SUPPLEMENTS

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SUPPLEMENT 27 - NOT APPLICABLE

SUPPLEMENT 28 - NOT APPLICABLE

SUPPLEMENT 29 - NOT APPLICABLE

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CONFIGURATION TABLE

All configurations listed below are composed by the basic AFM plus the applicable Supplements and Appendices.

NOTE: The list below presents, for each configuration, all the Supplements and Appendices that may be applicable to that configuration. It does not imply that all those Supplements or Appendices must be used with that configuration. Application of Service Bulletins or options made by the operator may render some Supplements/Appendices not applicable. The Supplements - Table of Contents must be used to clarify if a specific Supplement is or not applicable to a specific configuration. In any case, if an operation requires an approved AFM Supplement/Appendix, it must be in the operator's AFM.

The basic AFM means all AFM sections except the Supplements and Appendices sections.

CONFIGURATION DESCRIPTION	APPLICABLE SUPPLEMENTS and APPENDICES
Master (all configurations).	ALL
EMB-145 equipped with AE3007A engines and FMS FMZ2000.	1, 2, 3, 15, 16, 17, 19, 20, 23, 25 and Appendix 1
EMB-145 equipped with AE3007A engines and FMS UNS-1K.	1, 3, 4, 15, 16, 17, 19, 20, 23, 25 and Appendix 1
EMB-145 equipped with AE3007A1/1 engines and FMS FMZ2000.	1, 2, 3, 15, 16, 17, 19, 20, 23, 25, 26 and Appendix 1
EMB-145 equipped with AE3007A1/1 engines and FMS UNS-1K.	1, 3, 4, 15, 16, 17, 19, 20, 23, 25, 26 and Appendix 1
EMB-145 equipped with AE3007A1 engines and FMS FMZ2000.	1, 2, 3, 9, 15, 16, 17, 19, 20, 23, 24, 25, 26 and Appendix 1
EMB-145 equipped with AE3007A1 engines and FMS UNS-1K.	1, 3, 4, 9, 15, 16, 17, 19, 20, 23, 24, 25, 26 and Appendix 1

CONFIGURATION DESCRIPTION	APPLICABLE SUPPLEMENTS and APPENDICES
EMB-145 equipped with AE3007A1P engines and FMS FMZ2000.	1, 2, 3, 12, 15, 16, 17, 19, 20, 23, 24, 25, 26 and Appendix 1
EMB-145 equipped with AE3007A1P engines and FMS UNS-1K.	1, 3, 4, 12, 15, 16, 17, 19, 20, 23, 24, 25, 26 and Appendix 1
EMB-145 XR equipped with AE3007A1E engines and FMS FMZ2000.	1, 2, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 27, 28 and Appendix 1
EMB-145 XR equipped with AE3007A1E engines and FMS FMZ2010.	1, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29 and Appendix 1
EMB-145 XR equipped with AE3007A1E engines and FMS UNS-1K.	1, 4, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 27 and Appendix 1
EMB-135 equipped with AE3007A1/3 engines, FMS FMZ2000, flaps 9° or 18°, standard or 21.1% CG envelope.	1, 2, 10, 11, 13, 14, 15, 16, 17, 19, 20, 23, 25 and Appendix 1
EMB-135 equipped with AE3007A1/3 engines, FMS UNS-1K, flaps 9° or 18°, standard or 21.1% CG envelope.	1, 4, 10, 11, 13, 14, 15, 16, 17, 19, 20, 23, 25 and Appendix 1
EMB-135 equipped with AE3007A3 engines and FMS FMZ2000.	1, 2, 10, 15, 16, 17, 18, 19, 20, 25 and Appendix 1
EMB-135 equipped with AE3007A3 engines and FMS UNS-1K.	1, 4, 10, 15, 16, 17, 18, 19, 20, 25 and Appendix 1

SUPPLEMENT 1

LIST OF EFFECTIVE PAGES

ORIGINAL	0	Not Applicable
REVISION	1 to 8	Not Applicable
REVISION	9	FEB 20, 1998
REVISION	10 to 40	Not Applicable
REVISION	41	NOV 07, 2000
REVISION	42 to 49	Not Applicable
REVISION	50	NOV 09, 2001
REVISION	51 to 52	Not Applicable
REVISION	53	OCT 22, 2002
REVISION	54 to 55	Not Applicable
REVISION	56	OCT 21, 2003
REVISION	57 to 60	Not Applicable
REVISION	61	NOV 17, 2006

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CAT II OPERATION

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GENERAL

CAT II CHECKLIST LOGIC

The Primus-1000 integrated Avionics has a CAT II Checklist Logic which is automatically activated whenever the decision height is selected between 80 and 200 ft through the RA knob on the Display Control Panels. The correct setting is indicated by a green CAT 2 annunciator and the incorrect setting is indicated by an amber CAT 2 annunciator. The CAT 2 annunciator is displayed on the top right side on each PFD.

NOTE: Although the radio altitude setting may be adjusted down to 80 ft, if requested by an ILS Cat II Approved Chart, the Decision Height (DH) is limited to 100 ft above ground level.

CAT II OPERATING CONDITIONS

To obtain a green CAT 2 annunciator the following conditions must be met:

- Radio Altimeter indication valid on both PFDs.
- Radio altitude above 80 ft.
- Flaps 22°.
- NAV 1 on pilot's side and NAV 2 on copilot's side, both NAV’s tuned to the same frequency.
- An active approach mode selected above 1000 ft.
- Both Flight Directors operational (command bars visible).
- Attitude and Heading valid on both PFD’s.
- Glide slope and Localizer deviation valid on both PFD’s.
- No reversions (AHRS, ADC, SG) modes selected on both PFD’s.
- Valid Airspeed and Baro Altitude on both PFD’s.
- No comparison monitors are tripped (Attitude, Heading, Airspeed, Baro Altitude, Localizer, Glide slope and Radio altitude) on both PFD’s.
- No back course selected.
- Autopilot engaged (not required for EMB-135 and EMB-145 XR models).
- CAT II Decision Height setting on both Display Control Panels (greater than 80 ft and less than 200 ft).

NOTE: For EMB-135 and EMB-145 XR models, the CAT II approaches are allowed using either the Autopilot or Flight Director for guidance.

If one of these conditions is not met, the CAT 2 annunciator will not appear.

If the green CAT 2 annunciation is displayed and one of the above conditions is lost, the annunciation will turn amber and will flash for 10 seconds.

CAT II WARNINGS

LOCALIZER, GLIDE SLOPE AND RADIO ALTITUDE COMPARATORS WARNINGS

A comparison between the localizer, glide slope and radio altitude deviation indications are performed when the following conditions are met:

- On-side radio altitude valid and between 1200 and 80 ft.
- APR mode selected on Flight Guidance Controller.
- Autopilot engaged (not required for EMB-135 and EMB-145 XR models).
- Flaps 22°.
- CAT II Decision Height setting on both Display Control Panels.
- On-side RMU with VOR/LOC active course valid.
- Cross-side data valid.
- Go-around not selected on either side.
- No back course selected.

For localizer, the following additional condition is required:

- Both LOC signals tuned and valid for at least 15 seconds.

If LOC indications differ by values above approximately 1/2 dot, an amber LOC annunciator will appear flashing (for 10 seconds) then steady on the left side of the PFD's between EADI and EHSI.

For glide slope, the following additional condition is required:

- Both glide slope signals valid and both LOC signals tuned and valid for at least 15 seconds.

If GS indications differ by values above approximately 2/3 dot, an amber GS annunciator will appear flashing (for 10 seconds) then steady on the left side of the PFD's between EADI and EHSI.

For radio altitude, the following additional condition is required:

- Both radio altimeters signals valid and on scale.

If radio altimeters indications differ more than 10 ft approximately, an amber RA annunciator will appear flashing (for 10 seconds) then steady on the left side of the PFD's between EADI and EHSI.

NOTE: - For airplanes equipped with single radio altimeter the radio altitude comparison is made between both displayed RA values.

- If the radio altimeter is off scale, its value is set to maximum for comparison purposes.

EXCESSIVE LOCALIZER AND GLIDE SLOPE DEVIATIONS WARNINGS

The on-side localizer and glide slope excessive deviations are compared to the Cat II limits and displayed when the following conditions are met:

- APR mode selected on both Flight Guidance Controller.
- Autopilot engaged (not required for EMB-135 and EMB-145 XR models).
- Flaps 22°.
- CAT II Decision Height setting on Display Control Panels.
- VOR/LOC is the active course from the on-side RMU.
- On-side radio altitude between 500 and 80 ft.
- On-side localizer tuned and valid.
- On-side glide slope valid.
- No back course selected.
- Go-around not selected on either side.

Localizer excessive deviation:

If a localizer deviation greater than approximately 1/3 dot is detected, the EHSI lateral deviation bar on the PFD's EHSI will change from green to amber, the lateral deviation scale will change from white to amber, and flash.

NOTE: The on-side excessive deviation warning is also displayed when the cross-side system has detected an excessive deviation.

Glide slope excessive deviation:

If a glide slope deviation greater than approximately one dot is detected, the GS pointer on the PFD's EADI will change from green to amber, the GS scale will change from white to amber, and flash.

NOTE: The on-side excessive deviation warning is also displayed when the cross-side system has detected an excessive deviation.

LIMITATIONS

MINIMUM EQUIPMENT REQUIRED

The performance of Category II approaches requires that the following equipment and instruments be in proper operating conditions:

- 2 Attitude and Heading Reference Systems or 2 Inertial Reference Systems.
- 1 Yaw Damper System.
- 1 Autopilot (not required for EMB-135 and EMB-145 XR models).
- 2 Flight Director Systems.
- 2 Primary Flight Displays (PFD).
- Windshield Wipers.
- 2 VHF/NAV Systems.
- 1 VHF/COMM System.
- Both Engines.
- Cat II Checklist Logic.
- 1 Electrical Trim System.
- 1 Radio Altimeter.
- 1 Ground Proximity Warning System (GPWS).
- 1 Aural Warning Unit (AWU) Channel.
- 2 Air Data Systems (ADS).
- 1 Standby Attitude Indicator.
- 1 Standby Airspeed Indicator.
- 1 Standby Altimeter.

NOTE: Cat II operation with Autopilot engaged shall be performed by the pilot who has the Flight Director coupled to the Autopilot.

AUTOPILOT SYSTEM

Minimum Decision Height (DH) ....100 ft

NOTE: Although the radio altitude setting may be adjusted down to 80 ft, if requested by an ILS Cat II Approved Chart, the Decision Height (DH) is limited to 100 ft above ground level.

Minimum Use Height (MUH) .... 50 ft
Runway Visual Range (RVR) ....1200 ft

Maximum Tailwind (except for EMB-145 XR models) ..10 kt
Maximum Crosswind (except for EMB-145 XR models) ...25 kt

Maximum Tailwind (EMB-145 XR models) .... 9 kt
Maximum Crosswind (EMB-145 XR models)................10 kt

NOTE:
- Flight Director monitored manual approaches are restricted to Category I minimums (not applicable to EMB-135 and EMB-145 XR models).
- Coupled go-around height loss may be 50 ft.

APPROACH AND LANDING FLAPS

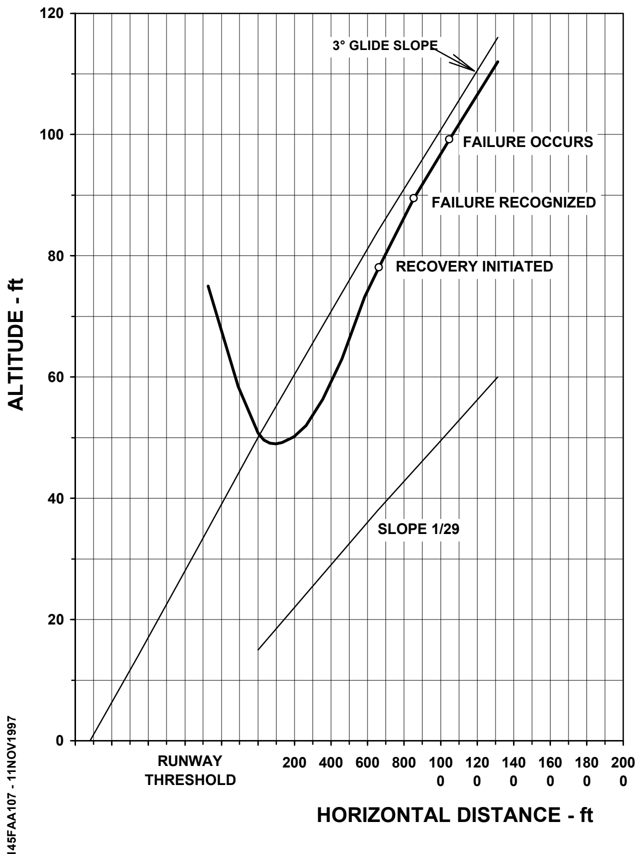
CAT II approach and landing must be performed with flaps 22°.

EMERGENCY AND ABNORMAL PROCEDURES

ALTITUDE LOSS

The demonstrated altitude loss due to a pitch down hardover during flight test is presented in the graph below.

– Recovery initiated 1 second after recognition:



NOTE: - The maximum demonstrated altitude loss due to autopilot malfunction is 30 ft (except for EMB-145 XR model).

- For EMB-145 XR model, the maximum demonstrated altitude loss due to autopilot malfunction is 35 ft.

ABNORMAL PROCEDURES

HARDOVER

If any unusual acceleration or motion is noticed on the airplane flight path the approach must be discontinued, and:

Autopilot .... DISENGAGE
MISSED APPROACH Procedure .... PERFORM AS REQUIRED

- Consider the possibility of continuing and performing the landing if adequate visual reference has been established to assure the airplane position and approach path.
- For EMB-135 and EMB-145 XR models, consider the possibility of continuing on the approach using the Flight Director for guidance.

SLOWOVER

The Slowover consists in a smooth and slow airplane attitude change due to an autopilot system malfunction. It may be recognized if one of the following symptoms occurs during approach:

- Unusual glide slope small deviation.
- Change in the rate of descent (small or large).
- Excessive glide slope deviation and the GS indications becoming amber.
- Flight Director command bar diverging from the airplane symbol.
- Autopilot self disconnection.

If a Slowover tendency is confirmed:

Autopilot .... DISENGAGE
MISSED APPROACH Procedure .... PERFORM AS REQUIRED

- Consider the possibility of continuing and performing the landing if adequate visual reference has been established to assure the airplane position and approach path.
- For EMB-135 and EMB-145 XR models, consider the possibility of continuing on the approach using the Flight Director for guidance.

ENGINE FAILURE ON FINAL APPROACH OR DURING GO-AROUND

ONE ENGINE INOPERATIVE
GO-AROUND Procedure .... APPLY

AUTOPILOT MALFUNCTION

BEFORE REACHING OUTER MARKER

If the autopilot disengages or has to be disengaged, transfer autopilot and reengage it. The pilot on side the engaged autopilot may continue the approach. Check no failure light illuminated on the PFD and no EICAS message related to the autopilot system.
If the autopilot disengages again:
MISSED APPROACH Procedure .... PERFORM AS REQUIRED
- For EMB-145 Models, consider the possibility of continuing and performing the landing if adequate visual reference has been established to assure the airplane position and approach path.
- For EMB-135 Models, consider the possibility of continuing on the approach using the Flight Director for guidance.

AFTER REACHING OUTER MARKER

If the autopilot disengages or has to be disengaged, do not reengage the autopilot.
MISSED APPROACH Procedure .... PERFORM AS REQUIRED
- For EMB-145 Models, consider the possibility of continuing and performing the landing if adequate visual reference has been established to assure the airplane position and approach path.
- For EMB-135 Models, consider the possibility of continuing on the approach using the Flight Director for guidance.

WARNINGS DURING FINAL APPROACH

Discontinue the approach if any of the following warnings occur:
- CAT 2 (not displayed or amber)
- RA (amber)
- RAD ALT FAIL (cyan) (for airplanes Post-Mod. SB 145-31-0020 or with an equivalent modification factory incorporated)
- GS (red or amber)
- LOC (red or amber)
- ILS (amber)
- ATT FAIL (red)
- ATT (amber)
- PIT (amber)
- ROL (amber)
- HDG FAIL (red)
- HDG (amber)
- FD (red)

Perform a normal MISSED APPROACH Procedure or consider the possibility of continuing and performing the landing if adequate visual reference has been established to assure the airplane position and approach path.

EXCESSIVE DEVIATION WARNING

If warning occurs above 200 ft Radio Altitude:
Monitor the ILS deviation to ensure that the airplane returns to the center beam. If not recovered up to 200 ft radio altitude:
Discontinue the approach.

If warning occurs below 200 ft Radio Altitude:
Discontinue the approach.

On both cases, perform a normal MISSED APPROACH Procedure, or consider the possibility of continuing and performing the landing if adequate visual reference has been established to assure the airplane position and approach path.

ABNORMALITIES

The following abnormalities are deviation from CAT II normal range and must be called out:

- Excessive LOC or GS deviations.
- Airspeed 10 kt higher or 5 kt lower than the Landing Reference Speed ($V_{REF\ 22}$).
- Roll angle in excess of 15°.
- Pitch angle below - 5° or above 5°.
- Rate of descent in excess of 1200 ft/min.

NORMAL PROCEDURES

AUTOPILOT COUPLED CAT II APPROACH

BEFORE INTERCEPTING LOCALIZER COURSE

- Perform the Descent/Approach/Before Landing checklists, as appropriate.
- Perform the Radio Altimeter test.
- Set the CAT II Decision Height on both Display Control Panels.
- Check radio altimeter information on both PFD.
- Select the same ILS frequency on both RMU.

NOTE: - After test, if Radio Altimeter is checked not functioning properly the CAT II approach must discontinued.
- A minimum distance of 4 NM to the Outer Marker is recommended for interception and stabilization along the approach course.

BEFORE INTERCEPTING THE GLIDE SLOPE

- Monitor radio altimeter information.
- Lower landing gear (one dot below GS interception) and set flaps to 22°.
- Set the Landing Reference Speed ($V_{REF\ 22}$) on AP bug (green bug).
- Stabilize and maintain the Landing Reference Speed ($V_{REF\ 22}$).
- Set approach climb speed on SPD reference speed bug (cyan bug).
- Be sure that Marker Beacon audio is on.

AFTER PASSING THE OUTER MARKER INBOUND

- The pilot flying should maintain the Landing Reference Speed ($V_{REF\ 22}$).
- Both pilots must monitor the progress of the approach on their displays down to approximately 200 ft above the decision height. At this point the pilot not flying looks out for external visual references while the pilot flying continues to monitor his displays down to the decision height.
- At 50 ft above the decision height setting the GPWS will call out "APPROACHING MINIMUM".
- At the decision height setting the GPWS will call out "MINIMUM", and the pilot not flying will call out "LANDING" or "GO AROUND", as appropriate.
- If visual contact is not made upon reaching the decision height or if any malfunction could not be promptly identified during approach, a missed approach must be immediately initiated.

NOTE: The Landing Reference Speed used for ILS CAT II approaches is the $V_{REF\ 22}$ speed presented in the Landing Climb and Reference Speeds (Flaps 22°) of the basic AFM.

FLIGHT DIRECTOR CAT II APPROACH (ONLY APPLICABLE TO EMB-135 AND EMB-145 XR MODELS)

The procedures for Flight Director CAT II Approach are the same as those for Autopilot Coupled CAT II Approach except that the approach is performed manually following the Flight Director indications.

MISSED APPROACH

GO-AROUND Procedure .... APPLY

LANDING

Reaching the Decision Height with runway in sight:

Autopilot .... DISENGAGE
Landing .... PERFORM

PERFORMANCE

GENERAL

The performance data used in Category II operations not presented in this Supplement are presented in the Section 5 (Performance) of the basic AFM or in the Supplements where landing performance data with flaps 22° is presented.

CAT II PERFORMANCE CONFIGURATION

	OPERATING ENGINES	POWER	FLAPS	GEAR	AIRSPEED
APPROACH CLIMB	1	MAX T/O	9°	UP	APPROACH CLIMB SPEED
LANDING CLIMB	2	MAX T/O	22°	DOWN	$V_{REF\ 22}$
LANDING	2	IDLE	22°	DOWN	$V_{REF\ 22}$

SUPPLEMENT 2

LIST OF EFFECTIVE PAGES

ORIGINAL	0	Not Applicable
REVISION	1 to 11	Not Applicable
REVISION	12	APR 24, 1998
REVISION	13 to 22	Not Applicable
REVISION	23	JAN 14, 1999
REVISION	24	Not Applicable
REVISION	25	FEB 12, 1999
REVISION	26	Not Applicable
REVISION	27	APR 23, 1999
REVISION	28 to 30	Not Applicable
REVISION	31	NOV 22, 1999
REVISION	32 to 36	Not Applicable
REVISION	37	JUL 03, 2000
REVISION	38 to 50	Not Applicable
REVISION	51	JAN 14, 2002
REVISION	52	Not Applicable
REVISION	53	OCT 22, 2002
REVISION	54 to 55	Not Applicable
REVISION	56	OCT 21, 2003
REVISION	57 to 64	Not Applicable
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REVISION	66	MAR 15, 2017

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FMZ2000 FLIGHT MANAGEMENT SYSTEM

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GENERAL

This Supplement is a part of, and must be placed in, the FAA Approved Airplane Flight Manual for airplanes incorporating single or dual FMZ2000 Flight Management System. The information contained herein supplements the information of the basic AFM. For limitations, procedures and performance information not contained in the Supplement, refer to the basic AFM.

NAVIGATION OPERATIONAL APPROVALS

The single Honeywell FMZ2000 Flight Management System, with the software version NZ4.8 Mod A or Mod C, and the single or dual Honeywell FMZ2000 Flight Management System software version NZ5.2 Mod B, Mod C, Mod D and Mod E have been demonstrated capable of and have been shown to meet the requirements for the following operations:

OCEANIC AND REMOTE

In accordance with AC 20-130A and FAA Notice 8110.60 the dual FMS is approved as a two independent Long Range Navigation (LRN) System on these routes, provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor. The dual FMZ2000 installation with dual GPS sensors as installed has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, when used in conjunction with Honeywell Off Line RAIM prediction program. For single FMS installation, in accordance with AC 20-130A, along routes requiring a single Long Range Navigation (LRN) System, provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor on these routes.

NORTH ATLANTIC (NAT) MINIMUM NAVIGATION PERFORMANCE SPECIFICATION (MNPS) AIRSPACE

- Provided two FMS installations are operating with each receiving information from two inertial reference systems (IRS) or from two global positioning systems (GPS) when used in conjunction with Honeywell Off Line RAIM prediction program, the FMS is capable of unrestricted flight into North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace and has been shown to meet the accuracy specification in accordance with AC 120-33 or AC 91-49.
- For single FMS installation as defined in AC 91-49 and AC 91-70, along the special routes requiring a single LRN (Long Range Navigation System), provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor on these routes.

RNP-10 - REQUIRED NAVIGATION PERFORMANCE

- The dual FMZ2000 installation with dual Global Positioning System (GPS) sensors as installed has been found to comply with the requirements of FAA Order 8400.12A, as amended, as a primary means of navigation with no time limitation, when used in conjunction with Honeywell Off Line RAIM prediction program.
- The dual FMZ2000 installation with dual Inertial Reference Systems (IRS) as installed has been found to comply with the requirements of FAA Order 8400.12A, as amended, as a primary means of navigation for flights up to 6.2 hours after the system is placed in the navigation mode.
- The dual FMZ2000 installation with dual Global Positioning System (GPS) sensors and dual Inertial Reference Systems (IRS) as installed has been found to comply with the requirements of FAA Order 8400.12A, as amended, as a primary means of navigation with no time limitation.

ENROUTE AND TERMINAL

In accordance with AC 20-130A and TSO C129a C1 provided it is receiving usable signals from:

- One VOR/DME or multiple DME's;
- GPS.

NON-PRECISION APPROACH

In accordance with AC 20-130A, TSO C129a C1 and AC 90-94 (Phase II and III overlay approaches and GPS only approaches), provided:

- The APP annunciation is set on the PFD at the Final Approach Fix.
- The DGR or DR is not annunciated on the PFD.
- The flight director is coupled to the LNAV mode (GPS only approaches).

NOTE: AC 90-94 deals with the use of GPS in the U.S. National Airspace System (NAS) and in oceanic areas. The general approval to use GPS to fly overlay instrument approaches as described in the AC, is initially limited to the U.S. NAS. Refer to Limitations Section of this Supplement, for use of GPS for non-precision approaches outside the U.S. NAS.

LIMITATIONS

The following limitations are applicable to the FMS:

- The Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number A28-1146-122-00, August 1997 edition (or later revision of the manual) for the software version NZ4.8, Honeywell Publication Number A28-1146-133-00, February 1999 edition (or later revision of the manual) for the software version NZ5.2 or FAA accepted Operating Manual, must be immediately available to the flight crew whenever navigation is predicated on the use of the FMS. The software status stated in the Pilot's Manual must match that displayed on the FMS Control Display Unit (CDU).
- Honeywell software version NZ4.8 or NZ5.2 must be installed.
- FMS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the FMS navigation data base. The FMS data base must incorporate the current update cycle.
- Use of FMS guidance for conducting instrument approach procedures is prohibited with the FMS operating in the degrade or dead reckoning mode (DGR or DR annunciation set on PFD).
- Operation above 72° 30.0' north latitude and below 59° 30.0' south latitude is prohibited due to unreliable magnetic heading.
- The pilot must review the complete transition-approach, comparing the waypoints and altitudes displayed on the FMS with those on the published procedure prior to activation to insure that the correct procedure and transition are selected.
- The Flight Director must be coupled to the LNAV mode (autopilot coupled or not coupled), to accomplish GPS only approaches.

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- When using FMS guidance for conducting instrument approach procedures that do not include a GPS reference in the title of the published procedure, the flight crew must verify that the procedure specified navaid and associated avionics are operational.
- For airplanes equipped with single FMS, when using FMS guidance for conducting instrument approach procedures, the procedure navaid must be tuned and valid, and the raw data must be displayed in the cockpit, under the following conditions:
  - For VOR approaches (where the procedure specified navaid is a VOR only navaid - no DME capability) and NDB approaches, without GPS (GPS failed or RAIM out of limits or unavailable).
  - For any instrument approach (other than a GPS stand alone approach), outside the Brazilian Airspace, with GPS as the navigation sensor.
- ILS, LOC, LOC-BC, LDA, SDF and MLS approaches, using the FMS for guidance, are prohibited.
- When flying to an airport where GPS (non-overlay) is the intended approach, prior to dispatch, the crew is required to verify that the predictive RAIM at the destination ETA is within the approach criteria. This information (RAIM AVAILABLE), is displayed on the PREDICTIVE RAIM page, accessed via the GPS STATUS page.
- When the approach at the destination is based on GPS and an alternate airport is required by the applicable operating rules, the alternate must be served by an approach based on a navigation aid other than GPS. The navigation aid must be operational and the airplane must have operational equipment capable of using that navigation aid.
- IFR non-precision approaches, including those based upon the use of GPS, may be performed with approved published instrument approach procedures.

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- The FMS is approved for those oceanic and North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) routes requiring only a single FMS and a single GPS in accordance with AC 20-130A.
- The pilot must check for leg gaps in the Flight Plan Display on EFIS and input waypoints to fill in any gaps as necessary.
- IFR enroute and terminal navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
- The fuel flow and fuel used presented on the FMS are supplementary information only. The flight crew must use fuel information primarily from the MFD and EICAS display.
- Coupled FMS vertical guidance is not available. Therefore, during FMS operation with Autopilot coupled, the pilot must use the Flight Guidance Controller for vertical control. Advisory vertical guidance is available only in descent.
- During oceanic, North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS), enroute and terminal area operation with DR or DGR annunciated on the PFD, the flight crew must verify the FMS position using VOR/DME raw data or other appropriate means.
- The airplane must have other navigation equipment installed and operating, appropriate to the route of flight.
- The FMS approaches and missed approaches are prohibited for airplanes with NZ4.8 Mod A software installed.
- FMS missed approaches using the CDU Mode Select Button is prohibited.

EMERGENCY AND ABNORMAL PROCEDURES

All FMZ Action/Malfunction Messages are described in the Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number A28-1146-122-00, August 1997 edition (or later revision of the manual) for the software version NZ4.8 and Honeywell Publication Number A28-1146-133-00, February 1999 edition (or later revision of the manual) for the software version NZ5.2.

The airplane abnormal operating procedures are the same as those in the basic FAA Approved Airplane Flight Manual except as follows:

FMS NAVIGATION PERFORMANCE DEGRADED

Verify airplane position by using VOR/DME information (enroute and terminal operations) or other sources as appropriate (oceanic).

If conducting an instrument approach, discontinue use of FMS for approach guidance and select an alternate source of navigation, if available.

In case of one FMS (single FMS) or both FMS (dual FMS) entering in Dead Reckoning Mode and EGPWS is installed:

EGPWS TERRAIN SYS OVRD Button.................... PRESS

The Terrain Awareness Alerting and Display functions on MFD will be inhibited. This will not affect the basic GPWS functions (modes 1 to 7).

If the FMS is restored after a period of inadequacy:

EGPWS TERRAIN SYS OVRD Button .... PRESS

The Terrain Awareness will be enabled.

NOTE: The DEGRADE annunciator indicates that the FMS cannot guarantee that the accuracy of the system meets the requirements for the current phase of flight.

FMS IN DEAD RECKONING MODE

During periods of dead reckoning, refer to FMS NAVIGATION PERFORMANCE DEGRADED Procedure.

NOTE: The FMS will continue to provide the best estimate of the airplane position based on airspeed and heading inputs, but it cannot guarantee the required accuracy for any of the flight phases. The pilot should cross check position with other navaids, station overfly or visually.

NORMAL PROCEDURES

The airplane normal operating procedures are the same as those in the basic AFM except as follows:

BEFORE START

FMS .... SET

HOLDING

If a Holding Pattern is depicted, but is not a mandatory part of the procedure, then the following is necessary:

FMS .... AS REQUIRED

The pilot must verify the type of entry and direction of turn prior to entering the hold. For anything other than a direct entry, the pilot must activate the holding procedure when it is retrieved from the navigation data base, prior to the FMS initiating any part of the procedure.

NOTE: The FMS normal operating procedures are contained in the Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number A28-1146-122-00, August 1997 edition (or later revision of the manual) for the software version NZ4.8 and in the Honeywell Publication Number A28-1146-133-00, February 1999 edition 9 (or later revision of the manual) for the software version NZ5.2.

FMS SOURCE SELECTION

Flight Plan .... SELECT OR CREATE

FMS Source .... SELECT

The FMS can be selected as the navigation source through the FMS Selector Button located on the Display Control Panel.

FMS Label... CHECK

The FMS label appears on the associated PFD and MFD.

On PFD:

For airplanes Pre-Mod. SB 145-22-0001 or Post-Mod. SB 145-31-0009 or equipped with an equivalent modification factory incorporated, if the FMS is the navigation source for only one side the color will be magenta, otherwise will be amber.

For airplanes Post-Mod. SB 145-22-0001 or Post-Mod. SB 145-31-0007, revision 02, or S/N 145.048, 145.052 and on or with an equivalent modification factory incorporated, the FMS label will be always magenta.

On MFD the FMS label will be always magenta.

For FMS coupling to the Autopilot/Flight Director:

NAV Mode (flight guidance controller)..................... SELECT

The FMS will be coupled to the Autopilot/Flight Director when is selected and valid at the on side EHSI and crew selects the NAV mode on the associated Flight Guidance Controller. Once coupled the autopilot will follow the preselected flight plan on the FMS.

APPROACH (ONLY PERMITTED FOR AIRPLANES WITH SOFTWARE NZ4.8 MOD C OR NZ5.2 MOD B, MOD C, MOD D OR MOD E INSTALLED)

The FMS LOC, B/C, GPS, NDB, RNAV, VOR, VOR/DME and VFR approaches may be linked into the flight plan and laterally coupled to the Autopilot/Flight Director.

ILS approaches can be retrieved from the navigation data base and linked to the flight plan, but cannot be armed or activated as FMS approaches. The FMS can be used to provide navigation up to the final approach course at the point that the PFD must be changed to display raw ILS data.

TRANSITION FROM FMS TO AUTOPILOT ILS APPROACH

ILS Frequency .... SELECT AS REQUIRED
Radio Altitude .... SELECT AS REQUIRED
HDG Mode (flight guidance controller) .... SELECT
Before selection, set the desired interception course on heading bug.

Navigation Source .... SELECT
Select the NAV source on the Display Control Panel (LOC course selected on the PFD).

Autopilot/Flight Director .... AS REQUIRED

When cleared for approach:

APR Mode (flight guidance controller)..................... SELECT

ARC DME APPROACH USING FMS

Pilot Not-Flying .... CHECK DME
During Arc DME approach using FMS the pilot not-flying must check DME raw data.

MISSED APPROACH (ONLY PERMITTED FOR AIRPLANES WITH SOFTWARE NZ4.8 MOD C OR NZ5.2 MOD B, MOD C, MOD D OR MOD E INSTALLED)

Go Around Button .... PRESS
Thrust Levers .... MAX

Verify that airplane rotates to 10° nose up wings level (Pitch Mode) and changes to Speed Hold Mode after 20 seconds.

Flaps .... 9°

With positive rate of climb:

Landing Gear .... UP
Airspeed .... APPROACH CLIMB SPEED OR ABOVE

NAV Mode (flight guidance controller) .... SELECT

Reselecting the NAV mode the airplane will regain the lateral guidance from the FMS to fly the missed approach legs to the missed holding point and to enter holding, as required.

LATERAL DEVIATION SCALE

When the FMS is selected as the navigation source the cross track deviation scale and pointer, if valid, will be displayed. The lateral deviation values are the following:

DEVIATION	ENROUTE (NM)	TERMINAL (NM)	APPROACH (NM)
0	0	0	0
1 dot	2.5	0.5	0.15
2 dots	5.0	1.0	0.30

PERFORMANCE

Performance Data presented in the basic AFM remain unchanged.

SUPPLEMENT 3

LIST OF EFFECTIVE PAGES

* Asterisk indicates pages revised, added or deleted by the current revision.

* Asterisk indicates pages revised, added or deleted by the current revision.

TAKEOFF WITH FLAPS 22°

TABLE OF CONTENTS

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GENERAL

This Supplement is provided to present the takeoff data required for takeoff operations with flaps 22°. The information herein presented must replace the equivalent data in the basic AFM.
For limitations, procedures and performance informations not contained in this Supplement, see the basic AFM.

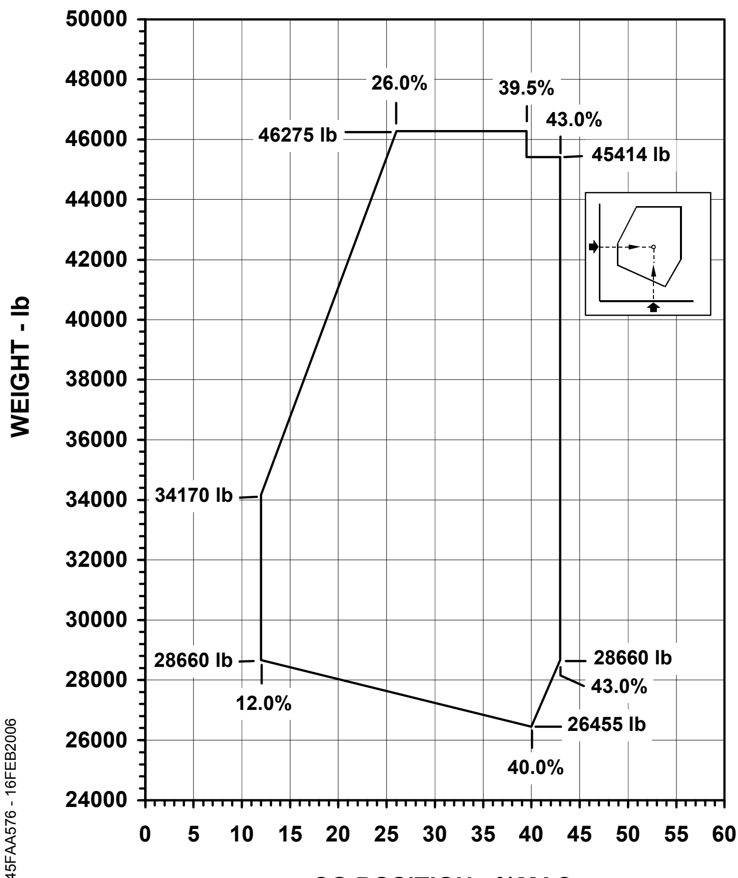
LIMITATIONS

CENTER OF GRAVITY LIMITS

For takeoff with Flaps 22°, the following Center of Gravity Envelope applies:

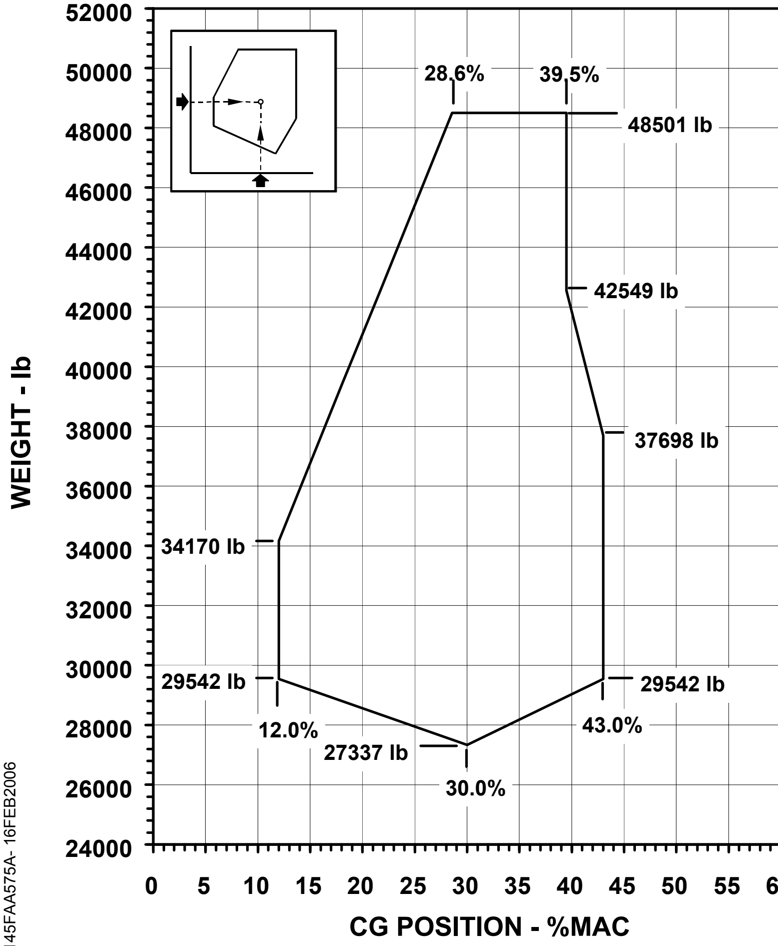
STANDARD, ER AND EP MODELS (TAKEOFF WITH FLAPS 22°)

NOTE: The data below must be used in conjunction with the maximum weight values (ramp, takeoff and zero fuel) associated to each model and found in the Operational Limitations Section, Weight table.



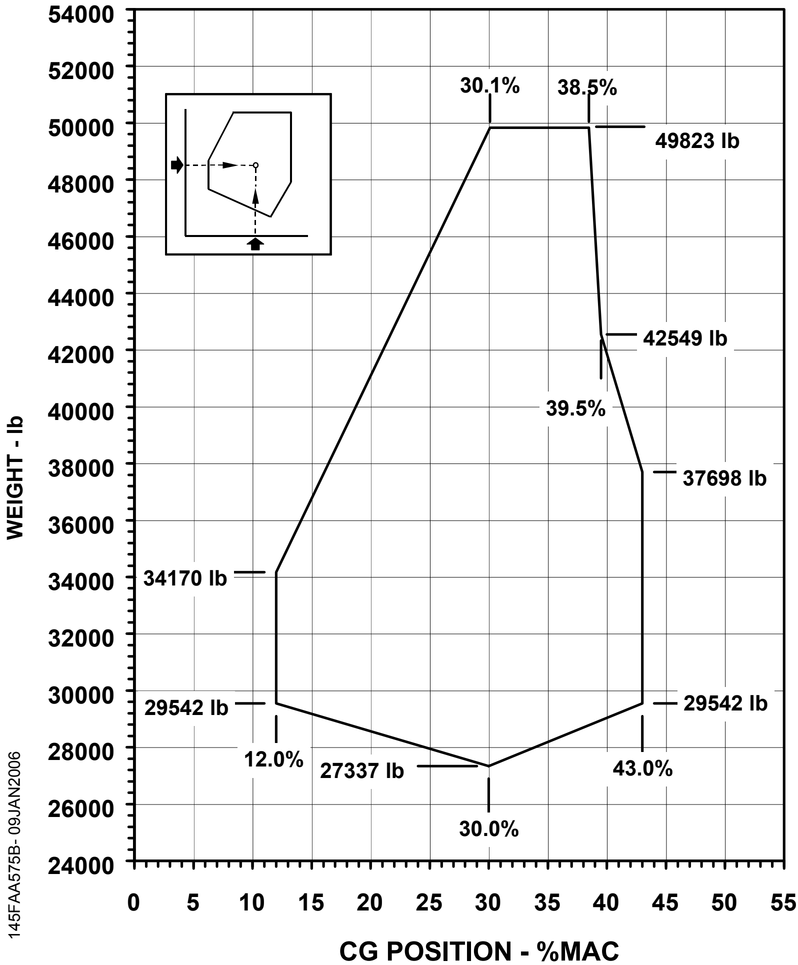
LR PRE-MOD. SB 145-00-0032 AND MP MODELS (TAKEOFF WITH FLAPS 22°)

NOTE: The data below must be used in conjunction with the maximum weight values (ramp, takeoff and zero fuel) associated to each model and found in the Operational Limitations Section, Weight table.



LR MODELS POST-MOD. SB 145-00-0032 OR WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED (TAKEOFF WITH FLAPS 22°)

NOTE: The data below must be used in conjunction with the maximum weight values (ramp, takeoff and zero fuel) associated to each model and found in the Operational Limitations Section, Weight table .



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POWER PLANT

ENGINES

Two Rolls-Royce AE3007A or AE3007A1/1 engines.

TAKEOFF THRUST MODE

Only T/O-1 Mode is allowed for takeoff.

AIRSPEEDS

Only NORMAL V_2 takeoff speed is allowed for takeoff.

EMERGENCY AND ABNORMAL PROCEDURES

TAKEOFF WITH ENGINE FAILURE ABOVE V_1

Maximum Takeoff Thrust	CHECK
At V_R rotate the airplane.	
With positive rate of climb:	
Landing Gear	UP
Airspeed	V_2

Maintain V_2 up to the level off altitude. If maneuvering is required, maintain a maximum bank 15°.

At V_2 + 5 KIAS:
Flaps .... 9°
At V_2 + 25 KIAS:
Flaps .... UP
Airspeed .... ACCELERATE TO FINAL SEGMENT SPEED
When appropriate:
PRECAUTIONARY ENGINE SHUTDOWN or ENGINE FIRE, SEVERE DAMAGE OR SEPARATION Procedure .... AS REQUIRED
After 5 minutes at T/O-1:
Thrust Rating .... COM

NORMAL PROCEDURES

BEFORE START

Takeoff Data .... SET
Select T/O-1 mode.

AFTER START

Flaps .... 22°

TAKEOFF

Thrust Levers .... THRUST SET

NOTE: - If the runway is considered to be limiting, a static takeoff must be accomplished. In this case, release brakes after engine has reached the target N1.
- During takeoff run, pedals should be used to steer the airplane.

Engine Parameters .... MONITOR
At V_R, rotate the airplane to 12°.
With positive rate of climb:
Landing Gear .... UP
Minimum Airspeed .... V_2
If maneuvering is required, maintain a minimum airspeed of V_2 + 10 KIAS with a maximum bank of 25°.
At V_2 + 5 KIAS:
Flaps .... 9°
At V_2 + 25 KIAS:
Flaps .... UP

PERFORMANCE

GENERAL

All performance data of this Supplement are the same of the basic AFM except the following configuration:

	WING FLAP POSITION
TAKEOFF	22°

The performance data presented in this section must replace the equivalent data in the basic AFM.

Unless otherwise specified, the performance charts presented in this Supplement must be used in the same way as in the basic AFM.

The data below are not presented in this Supplement and for takeoff calculations proceed as follows:

- BRAKE ENERGY - Use the Maximum Takeoff Weight - Brake Energy Limited (Normal V_2) chart of the basic AFM.

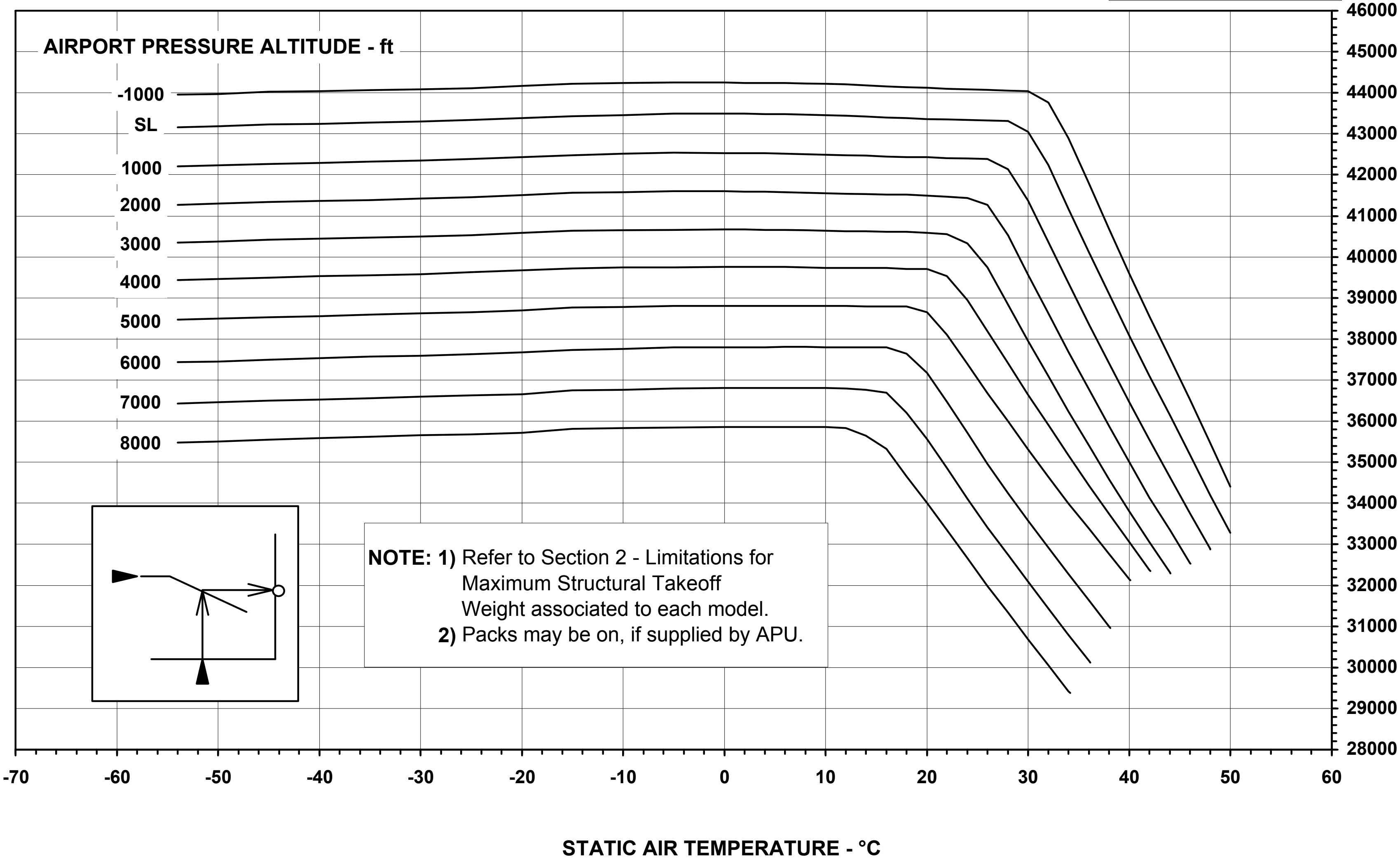
- NET TAKEOFF FLIGHT PATH - Use the Final Segment Net Gradient of Climb (Takeoff Flaps 9°) chart of the basic AFM.

- V_{MCA} AND V_{FS} - Use the Air Minimum Control Speed - V_{MCA} (Flaps 9°) and Final Segment Speed charts of the basic AFM.

NOTE: Although some performance charts are presented up to 52910 lb, the maximum takeoff weight associated to each model must be observed.

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED
FLAPS 22°
NORMAL V_2 - T/O-1 MODE - BLEED CLOSED (PACKS OFF - FADEC REF A/ICE OFF)

AE3007A ENGINES WITH T/R



NOTE: 1) Refer to Section 2 - Limitations for Maximum Structural Takeoff Weight associated to each model.
2) Packs may be on, if supplied by APU.

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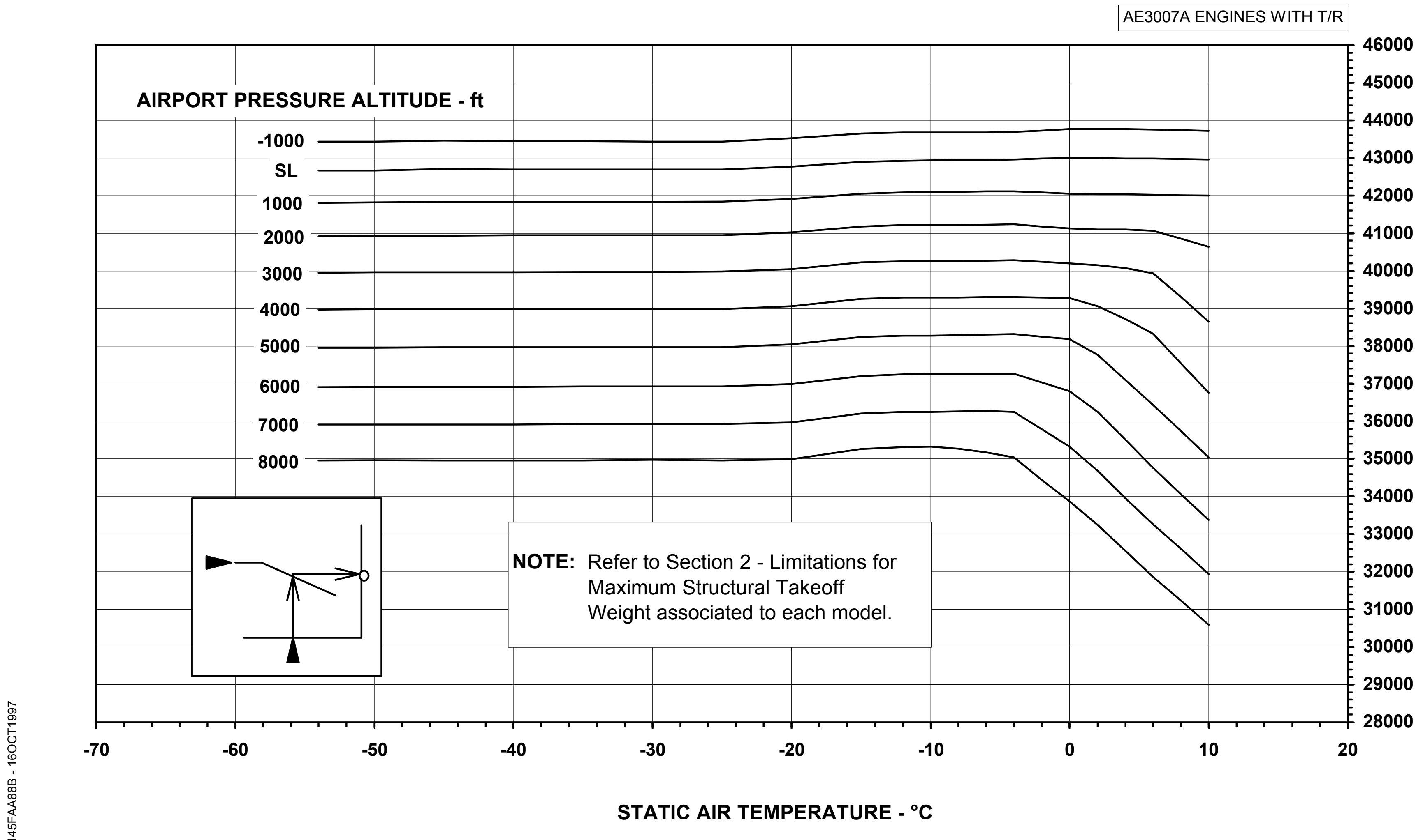
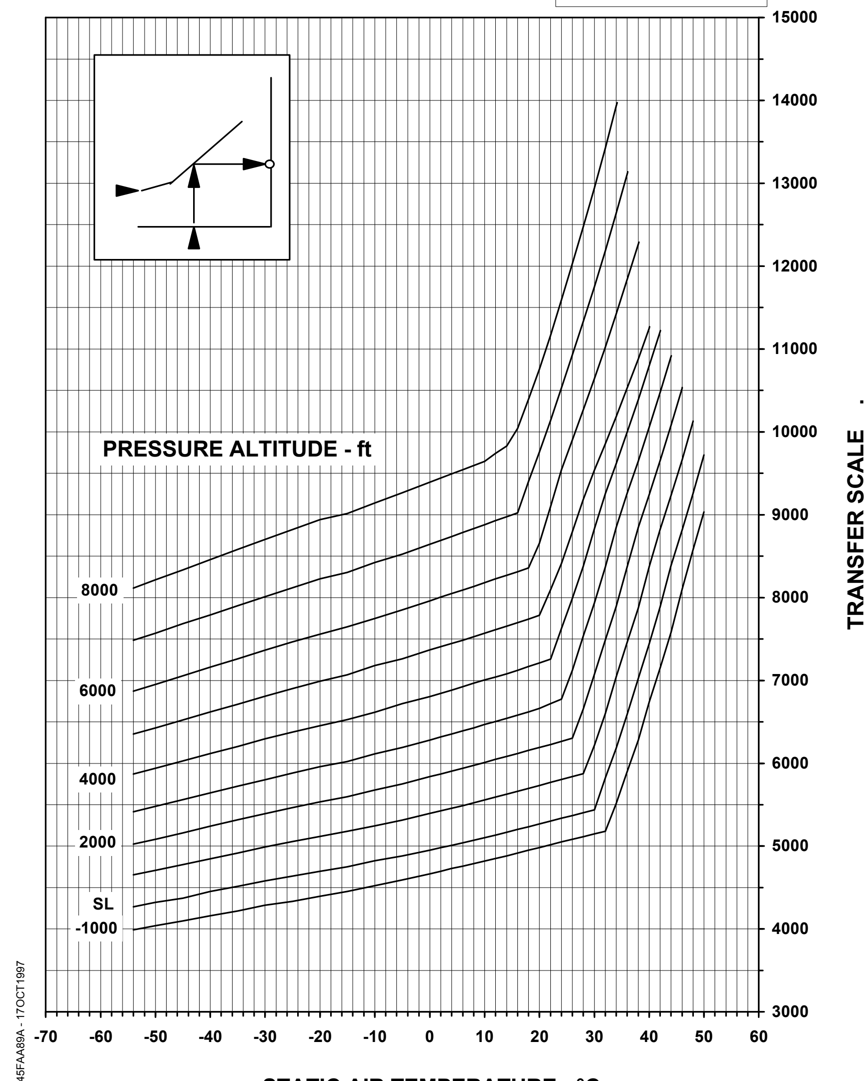
MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED
FLAPS 22°
NORMAL V_2 - T/O-1 MODE - BLEED OPEN (PACKS OFF - FADEC REF A/ICE ON)



MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

T/O-1 MODE - FLAPS 22° - BALANCED FIELD LENGTH -
NORMAL V_2 - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF
CHART 1 OF 2

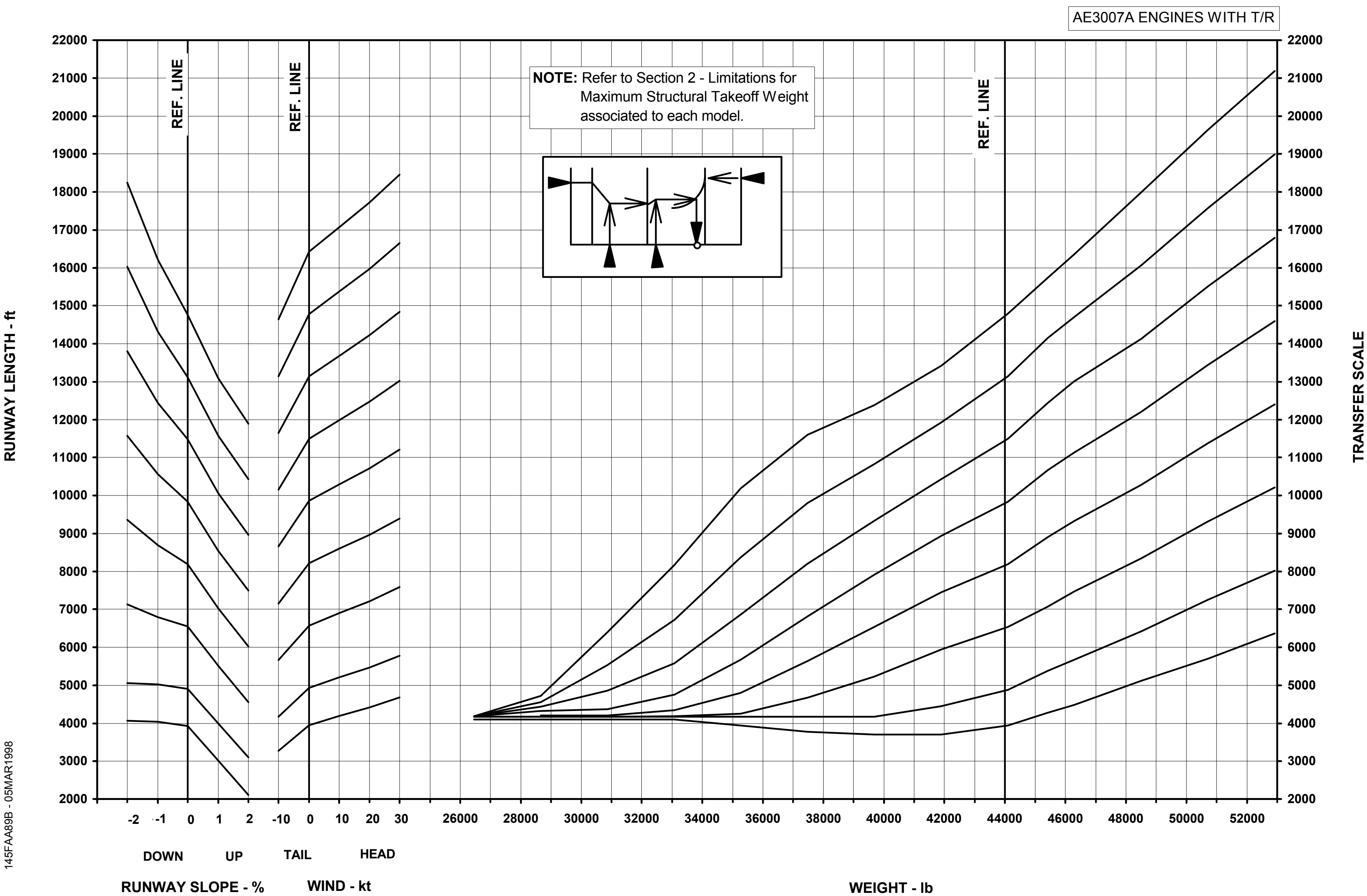
AE3007A ENGINES WITH T/R



MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

T/O-1 MODE - FLAPS 22° - BALANCED FIELD LENGTH - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF

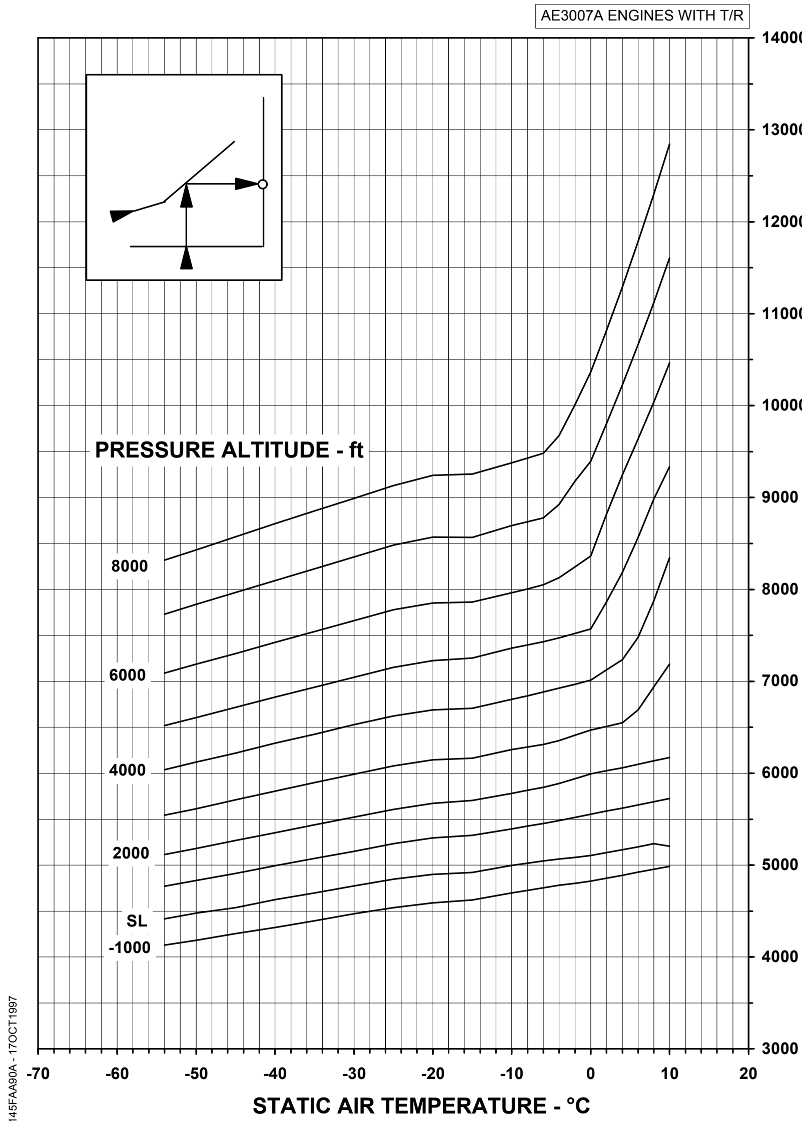
CHART 2 OF 2



MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

T/O-1 MODE - FLAPS 22° - BALANCED FIELD LENGTH - NORMAL V_2 - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON

CHART 1 OF 2

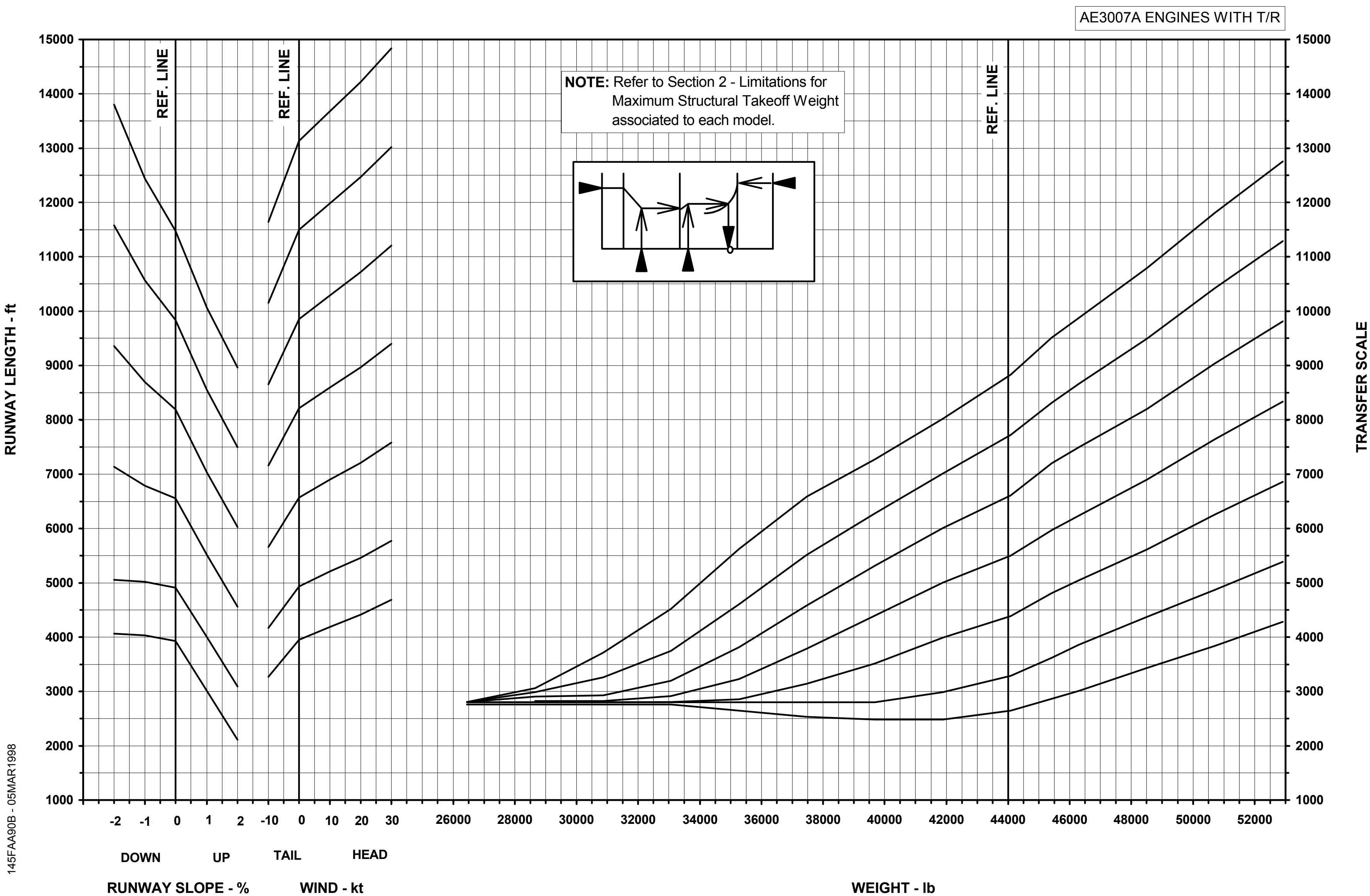


AFM-145/1153 - FAA

MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

T/O-1 MODE - FLAPS 22° - BALANCED FIELD LENGTH - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON

CHART 2 OF 2



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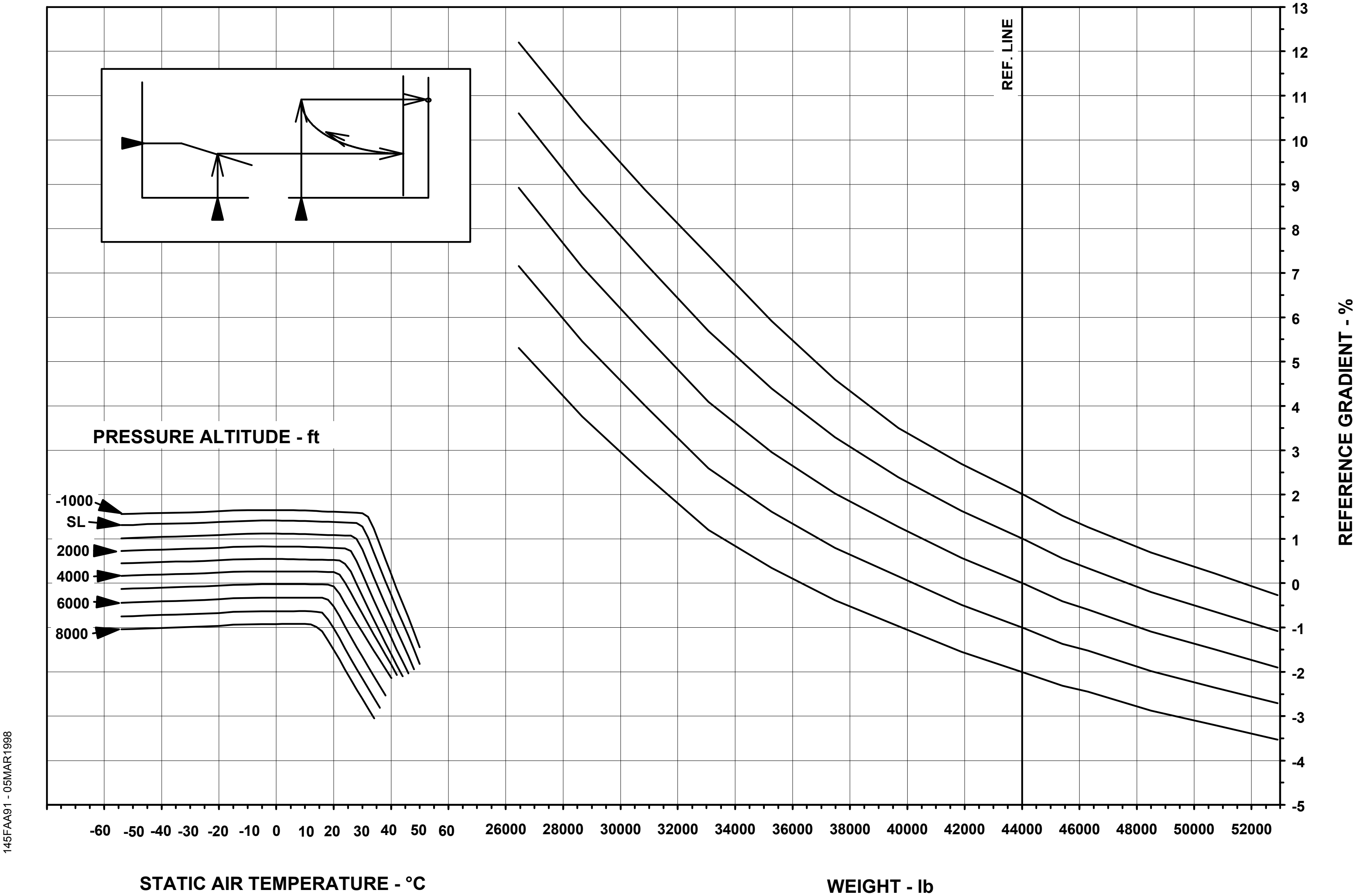
OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 22° - T/O-1 MODE - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF

AE3007A ENGINES WITH T/R



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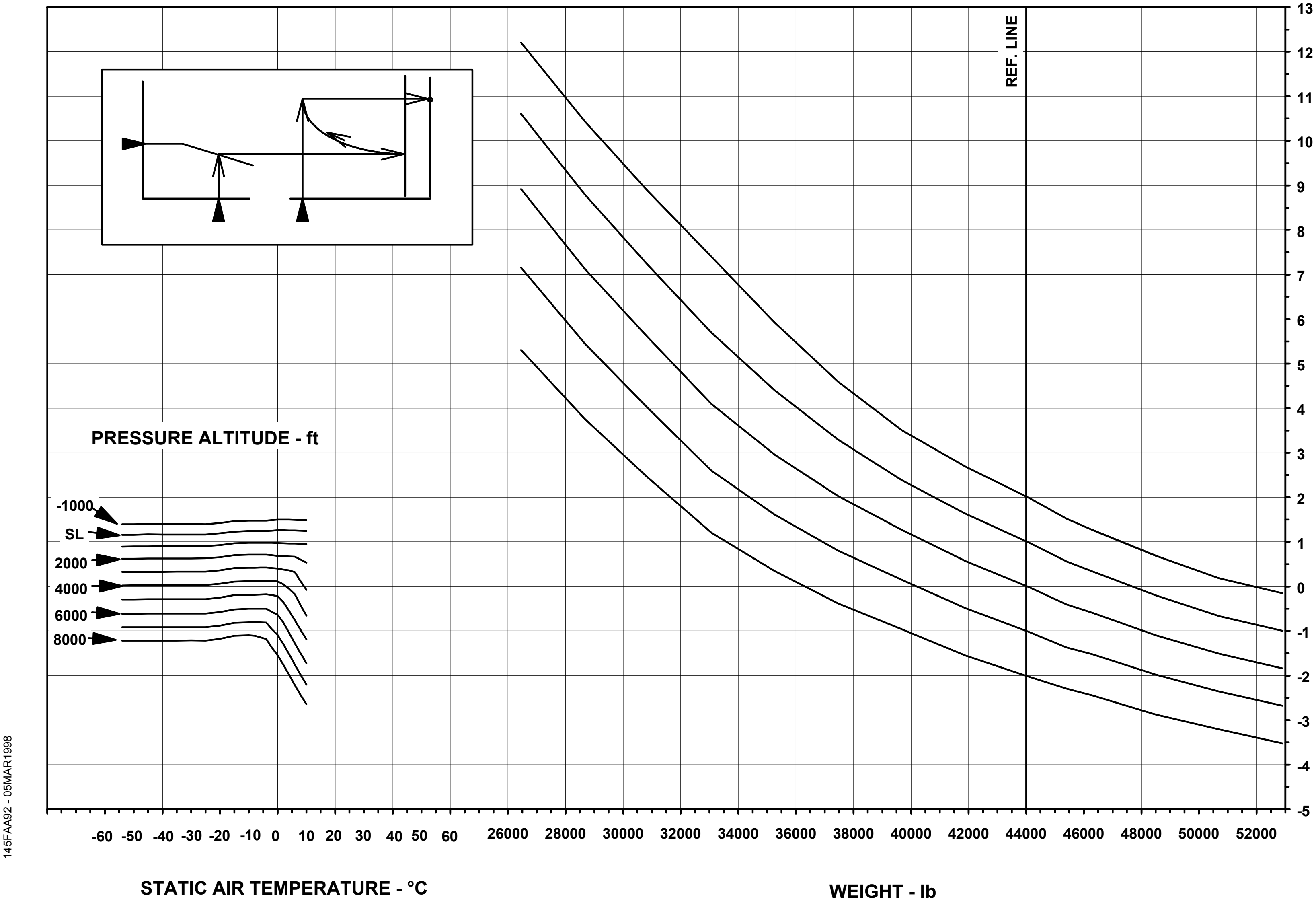
OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 22° - T/O-1 MODE - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON

AE3007A ENGINES WITH T/R



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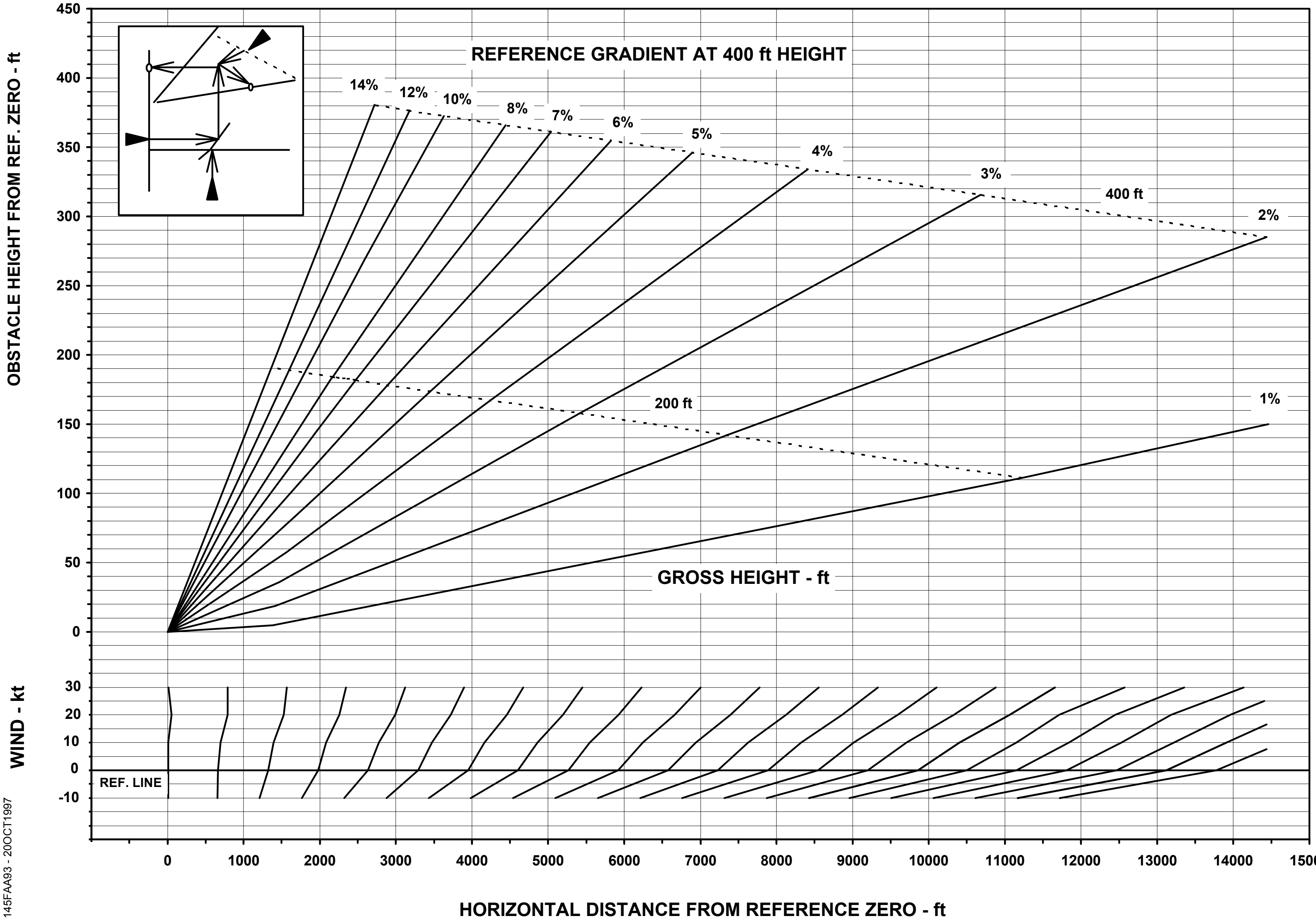
CLOSE-IN OBSTACLE CLEARANCE
FLAPS 22°

AE3007A ENGINES WITH T/R



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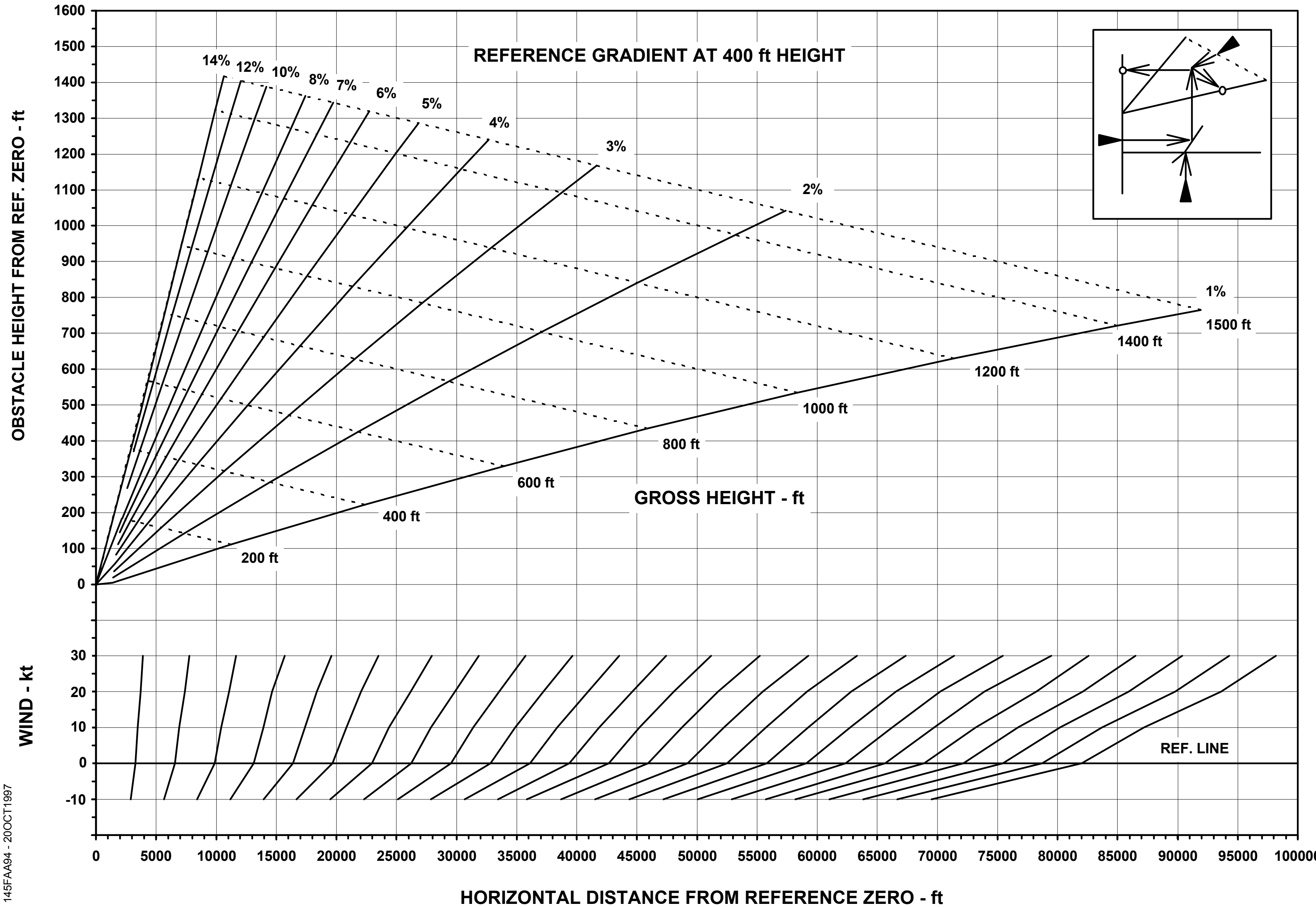
DISTANT OBSTACLE CLEARANCE
FLAPS 22°

AE3007A ENGINES WITH T/R



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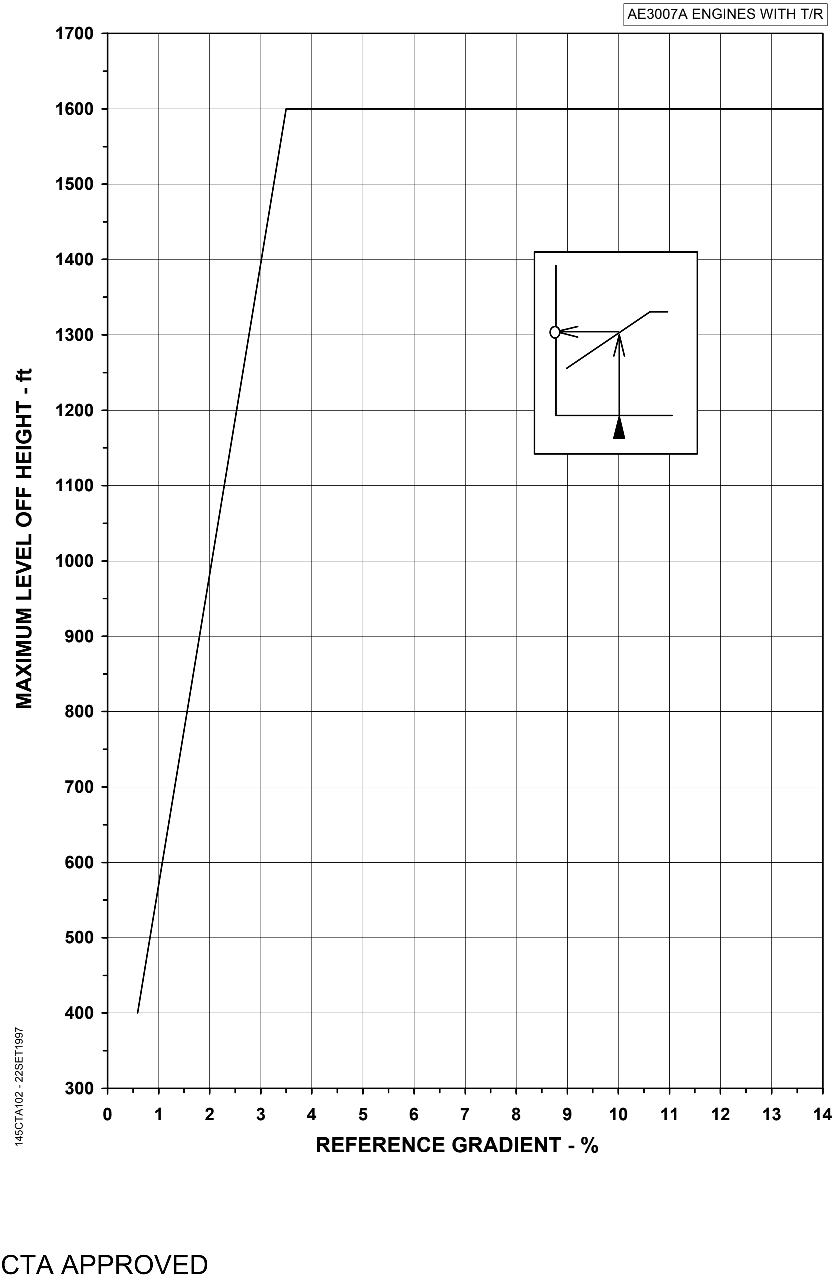
MAXIMUM LEVEL OFF HEIGHT
FLAPS 22°



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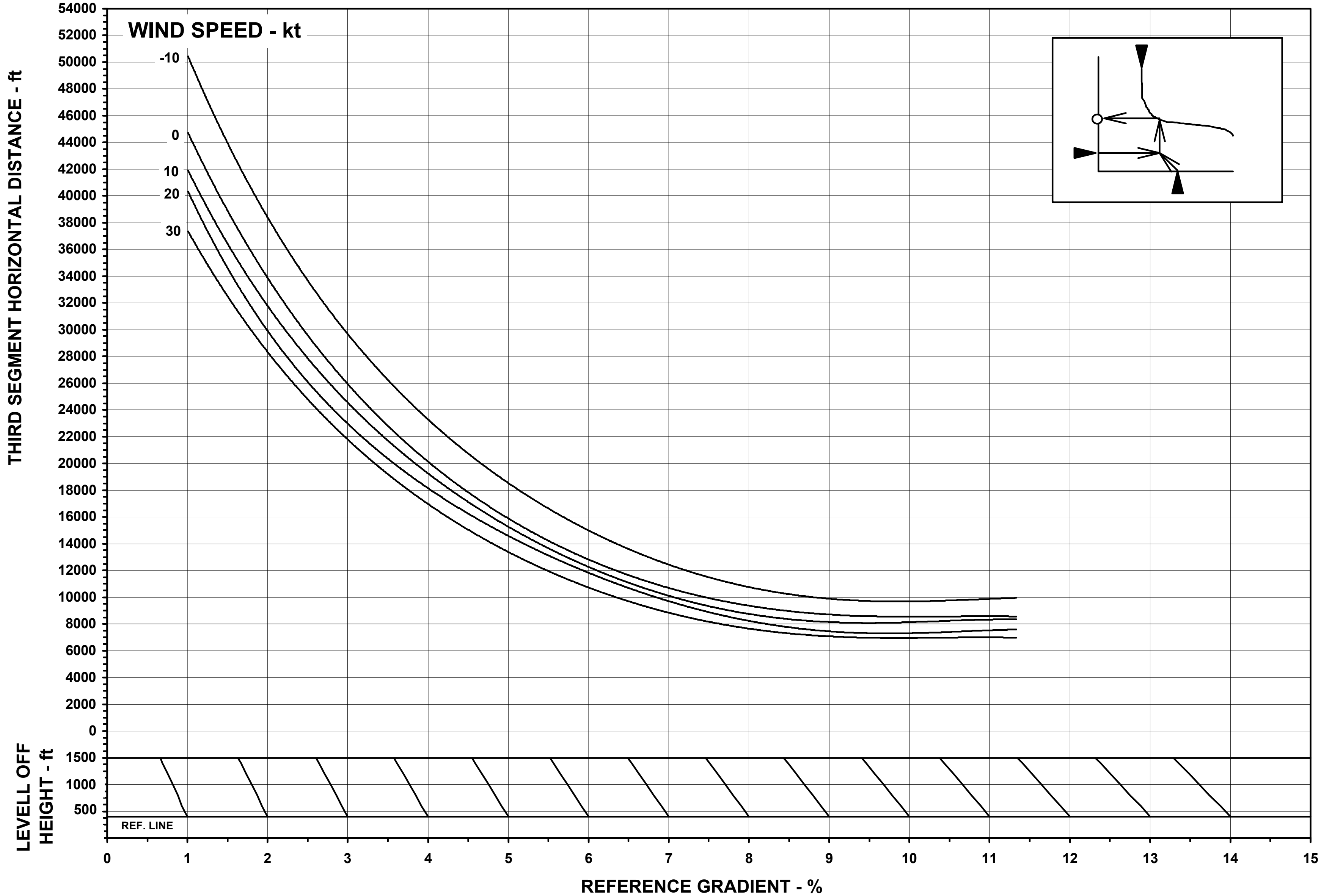
THIRD SEGMENT HORIZONTAL DISTANCE
TAKEOFF FLAPS 22°

AE3007A ENGINES WITH T/R



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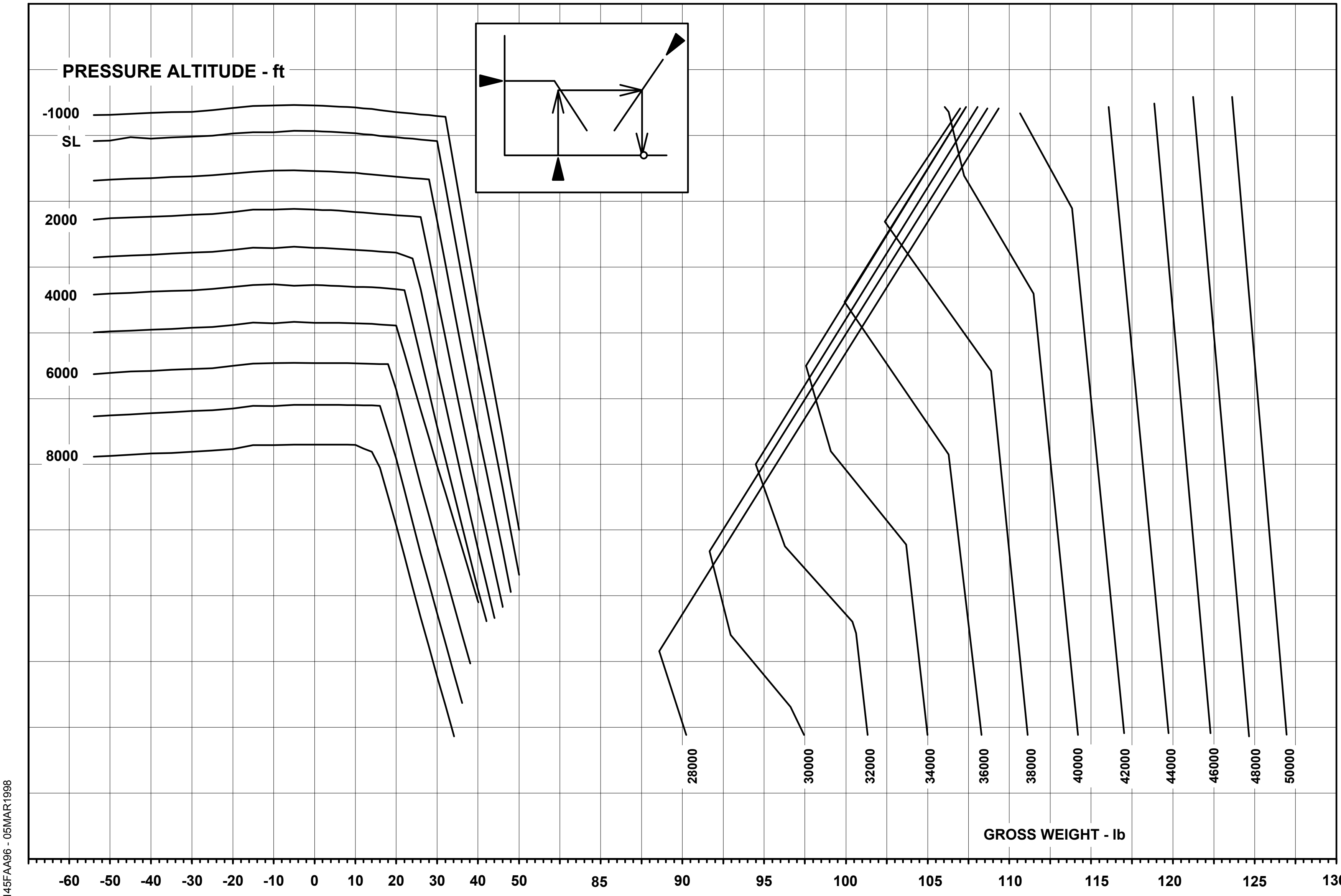
TAKEOFF SPEEDS - V_1 (FOR NORMAL V_2)

FLAPS 22° - T/O-1 MODE - BALANCED FIELD LENGTH

AE3007A ENGINES WITH T/R



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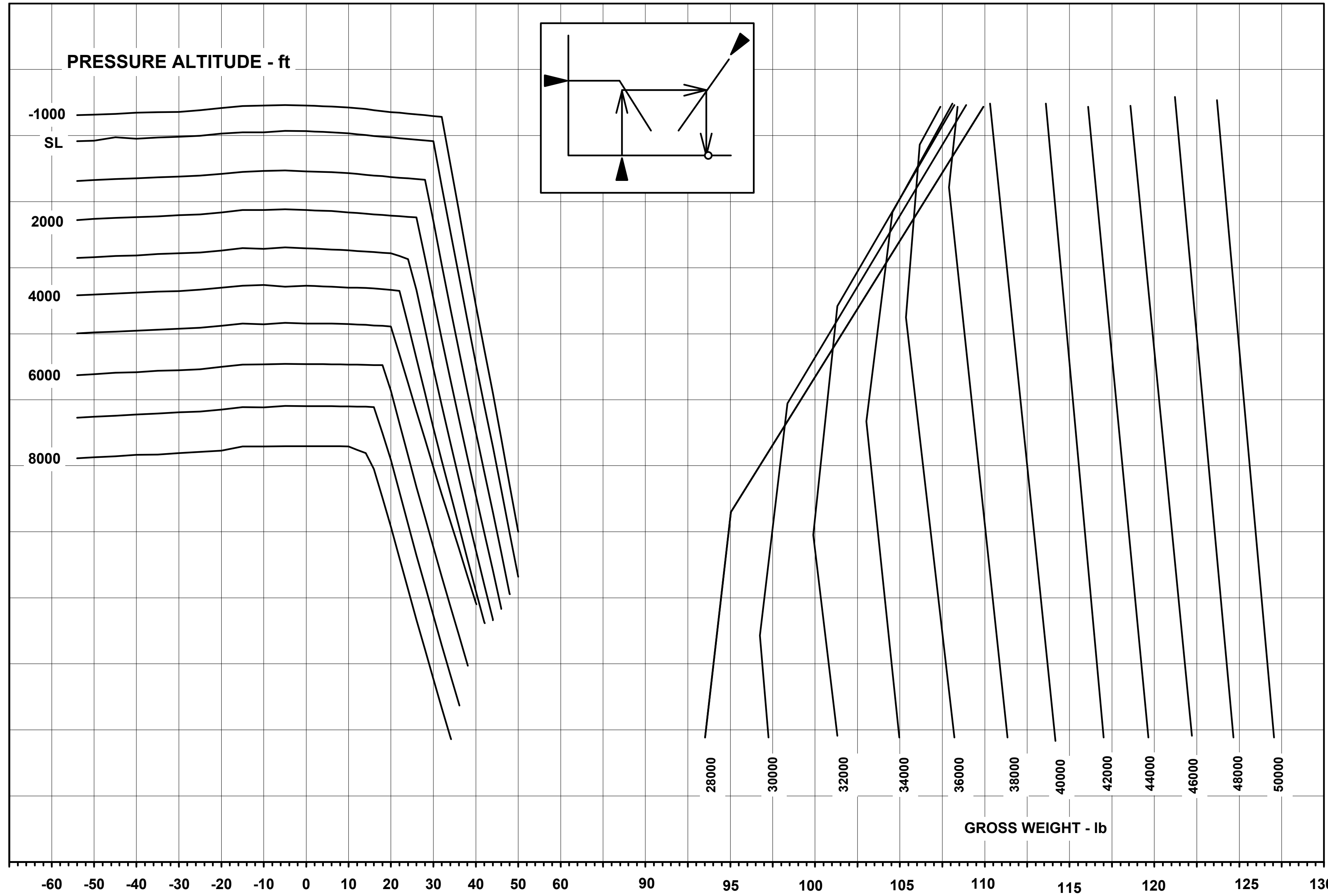
TAKEOFF SPEEDS - V_R (FOR NORMAL V_2)

FLAPS 22° - T/O-1 MODE - BALANCED FIELD LENGTH

AE3007A ENGINES WITH T/R



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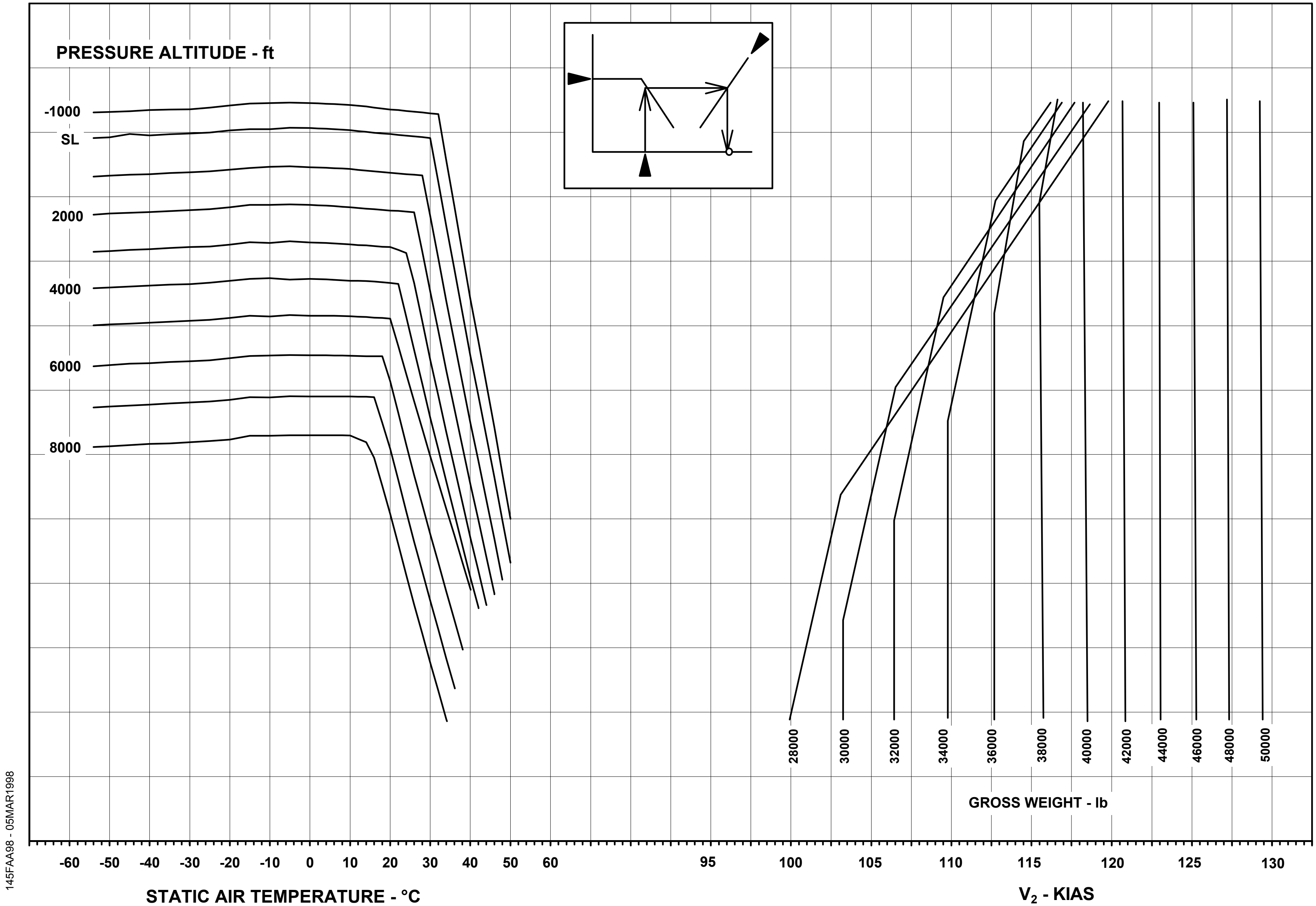
TAKEOFF SPEEDS - V_2 (NORMAL V_2)

FLAPS 22° - T/O-1 MODE - BALANCED FIELD LENGTH

AE3007A ENGINES WITH T/R



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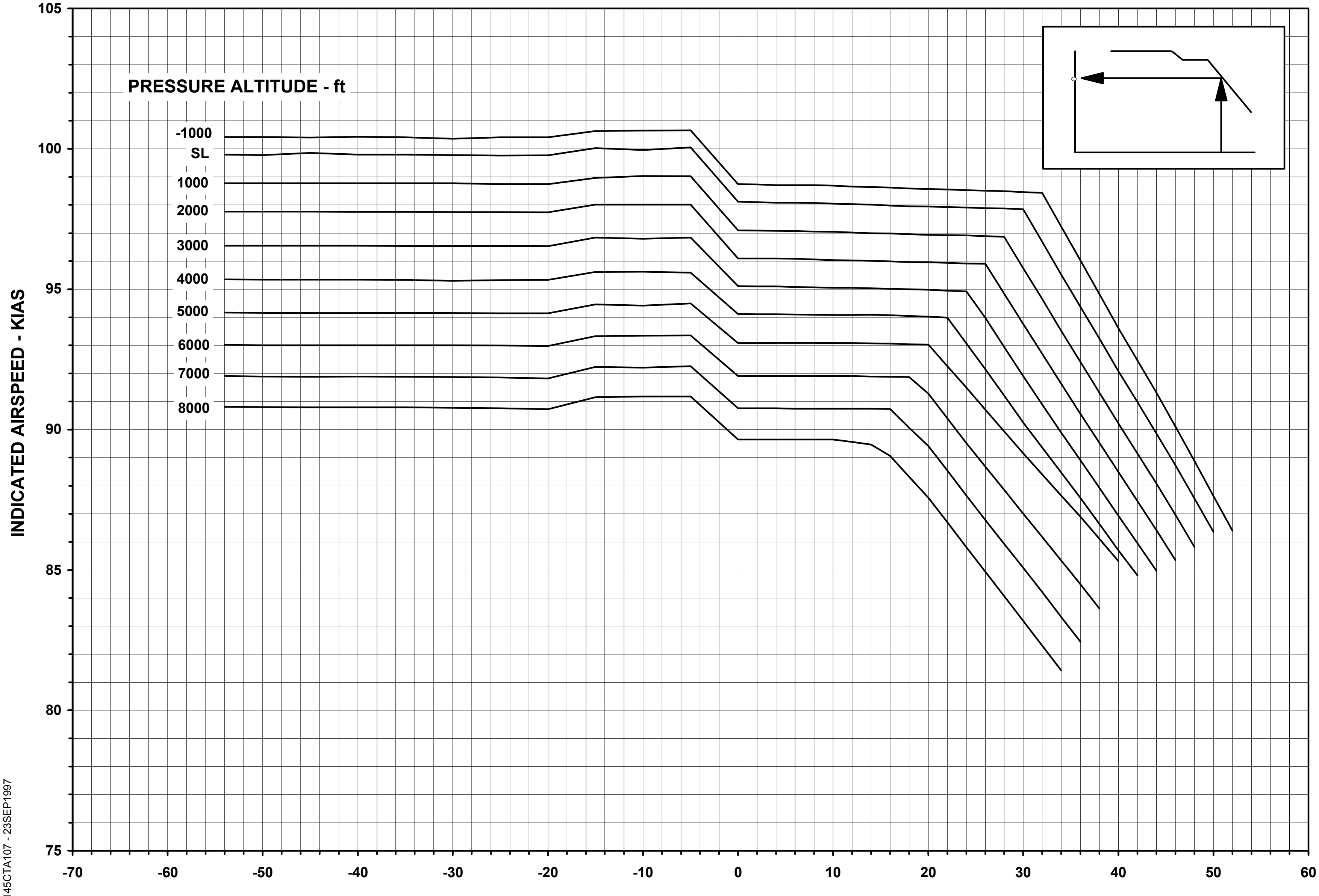
GROUND MINIMUM CONTROL SPEED
FLAPS 22°

AE3007A ENGINES WITH T/R



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SUPPLEMENT 4

LIST OF EFFECTIVE PAGES

ORIGINAL ....0 .... Not Applicable
REVISION .... 1 to 13 .... Not Applicable
REVISION ....14 ....MAY 07, 1998
REVISION .... 15 to 30 .... Not Applicable
REVISION ....31 ....NOV 22, 1999
REVISION .... 32 to 36 .... Not Applicable
REVISION ....37 .... JUL 03, 2000
REVISION .... 38 to 50 .... Not Applicable
REVISION ....51 ....JAN 14, 2002
REVISION ....52 .... Not Applicable
REVISION ....53 ....OCT 22, 2002
REVISION .... 54 to 55 .... Not Applicable
REVISION ....56 ....OCT 21, 2003
REVISION .... 57 to 63 .... Not Applicable
REVISION ....64 ....OCT 18, 2012
REVISION ....65 .... Not Applicable
REVISION ....66 ....MAR 15, 2017

* Asterisk indicates pages revised, added or deleted by the current revision.

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UNS-1K FLIGHT MANAGEMENT SYSTEM

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GENERAL

INTRODUCTION

This Supplement is a part of, and must be placed in the FAA Approved Airplane Flight Manual for airplanes incorporating single or dual UNS-1K Flight Management System. The information contained herein supplements the information of the basic AFM. For limitations, procedures and performance information not contained in the Supplement, refer to the basic AFM.

APPLICABILITY

This Supplement is applicable for airplanes not equipped with DU-875 (LCD Displays).

This Supplement must not be used in association with XM Weather system.

This Supplement must not be used in association with Runway Awareness and Advisory System (RAAS).

NAVIGATION OPERATIONAL APPROVALS

The Universal UNS-1K Flight Management System, with the version 603.X software, has been demonstrated capable of and has been shown to meet the requirements for the following operations:

- **Oceanic and Remote** - In accordance with AC 20-130A, along routes requiring a Long Range Navigation (LRN) System, provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor on these routes.
- **North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace.**
  - Provided two FMS installations are operating with each receiving information from global positioning systems (GPS) when used in conjunction with Universal Off Line RAIM prediction program, the FMS is capable of unrestricted flight into North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace and has been shown to meet the accuracy specification in accordance with AC 120-33 or AC 91-49.

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- For single FMS installation as defined in AC 91-49 and AC 91-70, along the special routes requiring a single LRN (Long Range Navigation System), provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor on these routes.

- **RNP-10 - Required Navigation Performance.**
  - The dual UNS-1K installation with dual Global Positioning Systems (GPS) sensors as installed has been found to comply with the requirements of FAA Order 8400.12A, as amended, as a primary means of navigation with no time limitation, when used in conjunction with Universal Off Line RAIM prediction program.

- **Enroute and Terminal** - In accordance with AC 20-130A and TSO C129a B1 provided it is receiving usable signals from:
  - One VOR/DME or multiple DME's.
  - GPS.

- **Non-Precision Approach** - LOC and BC approaches in accordance with AC 25-15 and RNAV, VOR, VOR/DME, NDB and GPS approaches in accordance with AC 20-130A, TSO C129a B1, TSO C115b and AC 90-94 (Phase II and III overlay approaches and GPS only approaches), provided:
  - The APP annunciation is set on the PFD at the Final Approach Fix.
  - The DR is not annunciated on the PFD.
  - The flight director is coupled to the LNAV mode (GPS only approaches).

NOTE: AC 90-94 deals with the use of GPS in the U.S. National Airspace System (NAS) and in oceanic areas. The general approval to use GPS to fly overlay instrument approaches as described in the AC, is initially limited to the U.S. NAS. Refer to limitations section of this supplement, for use of GPS for non-precision approaches outside the U.S. NAS.

LIMITATIONS

The following limitations are applicable to the FMS:

- The Universal UNS1 Operator´s Manual, Report 2423vs603, January 98 edition (or later revision of the manual) or FAA accepted Operating Manual, must be immediately available to the flight crew whenever navigation is predicated on the use of FMS. The software status stated in the Operator´s Manual must match that displayed on the FMS Control Display Unit (CDU).
- Universal FMS Software version 603.0 (or later approved version) must be installed.
- FMS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the FMS navigation data base. The FMS data base must incorporate the current update cycle.
- Instrument approaches must be conducted in the approach mode, and GPS integrity monitoring (when using GPS for approach guidance) must be available at the Final Approach Fix, as indicated to the pilot by the INTEG amber annunciator being off and APP annunciator displayed on PFD.
- Use of FMS guidance for conducting instrument approach procedures is prohibited with the FMS operating in the dead reckoning mode (DR annunciation set on PFD).
- The pilot must review the complete transition-approach, comparing the waypoints and altitudes displayed on the FMS with those on the published procedure prior to activation to insure that the correct procedure and transition are selected.
- VNAV is advisory only, and the aircraft altimeter should be the primary source of altitude information at all times.

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- When using FMS guidance for conducting instrument approach procedures that do not include a GPS reference in the title of the published procedure, the flight crew must verify that the procedure specified navaid and associated avionics are operational.
- For airplanes equipped with single FMS, when using FMS guidance for conducting instrument approach procedures, the procedure navaid must be tuned and valid, and the raw data must be displayed in the cockpit, under the following conditions:
    - For VOR approaches (where the procedure specified navaid is a VOR only navaid-no DME capability) and NDB approaches, without GPS (GPS failed or RAIM out of limits or unavailable).
    - For any instrument approach (other than GPS stand alone approach), outside the airspace of countries operating under FAA jurisdiction, with the GPS as the navigation sensor.
- ILS, LDA, SDF and MLS approaches, using the FMS for guidance, are prohibited.
- When conducting FMS guided missed approach procedures, autopilot coupled operation is prohibited until the flight crew has established a rate of climb that ensures all altitudes requirements of the procedure will be met.
- When flying to an airport where GPS (non-overlay) is the intended approach, prior to dispatch, the flight crew is required to verify that the predictive RAIM at the destination ETA is within the approach criteria.
- When the approach at the destination is based on GPS and an alternate airport is required by the applicable operating rules, the alternate airport must be served by an approach based on a navigation aid other than GPS. The navigation aid must be operational and the aircraft must have operational equipment capable of using that navigation aid.

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- IFR non-precision approaches, including those based upon the use of GPS, may be performed with approved published instrument approach procedures.
- IFR enroute and terminal navigation is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.
- The fuel flow and fuel used presented on the FMS are supplementary information only. The flight crew must use fuel information primarily from the MFD and EICAS display.
- Coupled FMS vertical guidance is not available. Therefore, during FMS operation with Autopilot coupled, the pilot must use the Flight Guidance Controller for vertical control. Advisory vertical guidance is available only in descent.
- During oceanic, North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS), enroute and terminal area operation with DR annunciated on the PFD, the flight crew must verify the FMS position using VOR/DME raw data or other appropriate means.
- The airplane must have other navigation equipment installed and operating, appropriate to the route of flight.
- Operation above 73° north latitude and below 60° south latitude is prohibited due to unreliable magnetic heading.
- FMS PVOR outbound function is prohibited.
- FMS missed approach using the CDU Mode Select Buttons is prohibited.
- During FMS Fuel Management initialization, the flight crew must enter manually the fuel on board data.

EMERGENCY AND ABNORMAL PROCEDURES

All UNS-1K FMS Action/Malfunction Messages are described in the Universal UNS1 Operator´s Manual, Report 2423vs603, January 98 edition (or later revision of the manual).

The UNS-1K FMS associated components are protected by the following circuit breakers:

COMPONENT	BUS	CB (LOCATION)
Navigation Computer 1	DC BUS 1	FMS 1 (D7)
Navigation Computer 2 (only for dual FMS)	DC BUS 2	FMS 2 (D25)

FMS IN DEAD RECKONING MODE

Verify airplane position by using VOR/DME information (enroute and terminal operations) or other sources as appropriate (oceanic).

If conducting an instrument approach, discontinue use of FMS for approach guidance and select an alternate source of navigation, if available.

In case of one FMS (single FMS) or both FMS (dual FMS) entering in Dead Reckoning Mode and EGPWS is installed:

EGPWS TERRAIN SYS OVRD Button.................... PRESS

The Terrain Awareness Alerting and Display functions on MFD will be inhibited. This will not affect the basic GPWS functions (modes 1 to 7).

If the FMS is restored after a period of inadequacy:

EGPWS TERRAIN SYS OVRD Button .... PRESS

The Terrain Awareness will be enabled.

NOTE: The FMS will continue to provide the best estimate of airplane position based on airspeed and heading inputs, but it cannot guarantee the required accuracy for any of the flight phases. The pilot should cross check position with other navaids, station overfly or visually.

INTEG ANNUNCIATOR ON

Discontinue the use of FMS whenever using the GPS source solely. If possible and feasible, select an alternate source of navigation for approach guidance.

NORMAL PROCEDURES

The FMS normal operating procedures are contained in the Universal UNS1 Operator´s Manual.

The airplane normal operating procedures are the same as those in the basic AFM except as follows:

BEFORE START

FMS .... SET

HOLDING

If a Holding Pattern is depicted, but is not a mandatory part of the procedure, then the following is necessary:

FMS .... AS REQUIRED

The pilot must verify the type of entry and direction of turn prior to entering the hold. For anything other than a direct entry, the pilot must activate the holding procedure when it is retrieved from the Navigation Data Base, prior to the FMS initiating any part of the procedure.

FMS SOURCE SELECTION

Flight Plan .... SELECT OR CREATE

FMS Source .... SELECT

The FMS can be selected as the navigation source through the FMS Selector Button located on the Display Control Panel.

FMS Label .... CHECK

The FMS label appears on the associated PFD and MFD.

On PFD:

For airplanes Pre-Mod. SB 145-22-0001 or airplanes equipped with dual FMS, if the FMS is the navigation source for only one side the color will be magenta, otherwise will be amber.
For airplanes Post-Mod. SB 145-22-0001 or with an equivalent modification factory incorporated, the FMS label will be always magenta (only for airplanes equipped with Single FMS).

On MFD the label will be always magenta.

For FMS coupling to the Autopilot/Flight Director:

NAV Mode (Flight Guidance Controller) .... SELECT

The FMS will be coupled to the Autopilot/Flight Director when is selected and valid at the on side EHSI and crew selects the NAV mode on the associated Flight Guidance Controller. Once coupled the autopilot will follow the preselected flight plan on the FMS.

APPROACH

NOTE: - ILS approaches can be retrieved from the navigation data base and linked to the flight plan, but cannot be armed or activated as FMS approaches. The FMS can be used to provide navigation up to the final approach course at the point that the PFD must be changed to display raw ILS data.
- GPS will remain selected for GPS and GPS-overlay approved approaches from navigation database, as well as pilot-defined VFR approaches. Refer to Universal Operator’s Manual approaches procedures.

The FMS LOC, B/C, GPS, NDB, RNAV, VOR, VOR/DME and VFR approaches may be linked into the flight plan and laterally coupled to the autopilot/Flight Director as follows:

APPROACH TRANSITION

When a entire approach transition (e.g., procedure turn, DME arc, etc.) is to be flown, the FMS will automatically enter in the ARM APPR mode at 30 nm from the runway with the lateral deviation scaling of 1 nm (full scale), then:

NAV Mode (Flight Guidance Controller) .... SELECT

The approach will be automatically activated prior to the FAF and the lateral deviation scaling will change to 0.3 nm full scale.

The VNAV scale will appear on the PFD.

VS or Pitch Hold Mode .... SELECT AS REQUIRED

Use VS or pitch hold mode mode as required to fly the VNAV flight path.

HEADING VECTORS

If the airplane is given heading vectors by ATC to the final approach course, proceed as follows to manually activate the FMS approach:

HDG Mode (Flight Controller Panel)............................. SELECT

If frequency is not already tuned:

TUNE APPR (FMS Control Panel).......................... PRESS
Navigation Frequency... SELECT

ACT APPR (FMS Control Panel)................................. PRESS

The MFD will display the final approach course data. The lateral deviation scaling of 0.3 nm (full scale) displayed on PFD.

When established on an intercept heading and cleared for the approach by the ATC:

NAV Mode (Flight Guidance Controller).................. SELECT

NOTE: Guidance is provided to the runway threshold or missed approach point. It is the pilot’s responsibility to level out at the Minimum Descent Altitude if the runway environment is not in sight.

TRANSITION FROM FMS TO AUTOPILOT ILS APPROACH

ILS Frequency.. SELECT AS REQUIRED
Radio Altitude.. SELECT AS REQUIRED
HDG Mode (Flight Guidance Controller)........................ SELECT

Before selection, set the desired interception course on heading bug.

Navigation Source.. SELECT

Select the NAV source on the Display Control Panel (LOC course selected on the PFD).

Autopilot/Flight Director... AS REQUIRED

When cleared for Approach:

APR Mode (Flight Guidance Controller) .... SELECT

ARC DME APPROACH USING FMS

Pilot Not-flying .... CHECK DME

During Arc DME approach using FMS the pilot not-flying must check DME Raw Data.

MISSED APPROACH

Go-Around Button .... PRESS
Thrust Levers .... MAX

Verify that airplane rotates to 10° nose up wings level (Pitch Mode) and changes to Speed Hold Mode after 20 seconds.

Flaps .... 9°

With positive rate of climb:

Landing Gear .... UP
Airspeed.. APPROACH CLIMB SPEED OR ABOVE

NAV Mode (Flight Guidance Controller) .... SELECT

Reselecting the NAV mode the airplane will regain the lateral guidance from the FMS to fly the missed approach legs to the missed holding point and to enter holding, as required.

LATERAL DEVIATION SCALE

When the FMS is selected as the navigation source the cross track deviation scale and pointer, if valid, will be displayed. The lateral deviation values are the following:

DEVIATION	ENROUTE (nm)	TERMINAL (nm)	APPROACH (nm)
0	0	0	0
1 dot	2.5	0.5	0.15
2 dots	5.0	1.0	0.30

PERFORMANCE

Performance Data presented in the basic AFM remain unchanged.

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SUPPLEMENT 5

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OPERATION WITH AE3007A1P ENGINES

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GENERAL

This Supplement is provided to present the data required for operations with AE3007A1P. The information herein presented must replace the equivalent data in the basic AFM.

For limitations, procedures and performance information not contained in this Supplement, see the basic AFM or Supplement 3.

LIMITATIONS

TAKEOFF FLAPS

Takeoffs with flaps 18° or 22° is only approved for T/O thrust rating mode.

V_2 SCHEDULE

Only Normal V_2 Takeoff charts are presented in this Supplement. Performance for Normal V_2 Schedule may also be computed through ETOASG.
Takeoff with increased V_2/V_S ratio can be computed only through ETOASG.

POWER PLANT

ENGINES

Two Rolls-Royce AE3007A1P.

OPERATIONAL LIMITS (AE3007A1P)

PARAMETER (5)	MIN	MAX
N1	-	100.0%
N2	-	102.4% (8)
ITT:	-	-
START	-	800°C
TAKEOFF	-	948°C (1)
CONTINUOUS	-	901°C
OIL PRESSURE:	-	-
BELOW 88% N2	34 psi	95 psi (2)(6) 110 psi (2)(7)
AT OR ABOVE 88% N2	50 psi (9)	95 psi (6) 110 psi (7)
OIL TEMPERATURE	21°C (3)	126°C
FUEL TEMPERATURE	-54°C	52°C
VIBRATION:	-	-
LP SPOOL	-	1.8 IPS (4)
HP SPOOL	-	1.1 IPS (4)

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NOTE: **1)** Time limited to 5 minutes.

2) May be exceeded during starts if oil temperature is below 21°C. The engine must remain at IDLE until the oil pressure is less than 95 psi (110 psi for airplanes Post-Mod. SB 145-73-0023 or equipped with an equivalent modification factory incorporated).

3) Minimum oil temperature for starting is -40°C for lubrication oil specified by MIL-L-23699D and -54°C for lubrication oil specified by MIL-L-7808K.

4) Vibration in the amber range below 2.5 IPS is time limited to 5 minutes during the takeoff or go-around phases or 10 seconds during the remainder flight phases.

5) Any engine exceedance or peak must be monitored and logged by the crew.

6) Operation in oil pressure amber range is permitted between 96 and 115 psi in all operational modes and time limited to 5 minutes, or between 116 and 155 psi in all operational modes time limited to 2 minutes. Total time above 95 psi may not exceed 5 minutes.

7) For airplanes Post-Mod. SB 145-73-0023 or equipped with an equivalent modification factory incorporated the upper limit of the oil pressure green band is 110 psi. Operation in oil pressure amber range is permitted between 111 and 115 psi in all operational modes time limited to 5 minutes, or between 116 and 155 psi in all operational modes time limited to 2 minutes. Total time above 110 psi may not exceed 5 minutes.

8) For airplanes Pre-Mod. SB 145-73-0027 the N2 limit is 102.5%.

9) While this is an abnormal condition, operation between 50 and 34 psi is permitted during takeoff and go-around phases.

TAKEOFF THRUST MODE

ALT T/O-1, T/O and T/O RSV modes are allowed for takeoff.

NOTE: Takeoff in T/O RSV mode is intended to be used only for Thrust Assurance Check purposes and does not improve certified performance.

PERFORMANCE

APPROACH CLIMB GRADIENT AND APPROACH CLIMB LIMITED WEIGHTS

Airplanes equipped with FADEC software version B5.1.1 must decrease the Approach Climb Gradient by 1.1% and decrease the Approach Climb Limited Weight by 1920 lb.

EMERGENCY AND ABNORMAL PROCEDURES

For takeoffs with flaps 9° refer to basic AFM.

For Takeoffs with Flaps 18° or 22° the following procedures are applicable:

TAKEOFF WITH ENGINE FAILURE ABOVE V_1

Maximum Takeoff Thrust	CHECK
With positive rate of climb:	
Landing Gear	UP
Airspeed	V_2

NOTE: The airplane must be rotated to 13° (for flaps 18°) or 12° (for flaps 22°).

Maintain V_2 up to the level off altitude. If maneuvering is required, maintain a maximum bank of 15°.

When reaching the level off height:

At V_2 + 10 KIAS:

Flaps .... 9°

At V_2 + 30 KIAS:

Flaps .... UP
Airspeed .... ACCELERATE TO FINAL SEGMENT SPEED

After flaps are retracted:
PRECAUTIONARY ENGINE SHUTDOWN or
ENGINE FIRE, SEVERE DAMAGE OR
SEPARATION Procedure................................... AS REQUIRED
After a maximum of 5 minutes at T/O:
Thrust Rating .... CON

NORMAL PROCEDURES

For takeoffs with flaps 9° refer to basic AFM.

For Takeoffs with Flaps 18° or 22° the following procedures are applicable:

BEFORE START

Takeoff Data.. SET
Select T/O mode.

AFTER START

Flaps .... 18° OR 22°

TAKEOFF

Thrust Levers .... THRUST SET
Check green ATTCS indication displayed on EICAS.

NOTE: - If the runway is considered to be limiting, a static takeoff must be accomplished. In this case, release brakes after engine has reached the target N1.
- For rolling takeoffs, performance data is valid from the point where takeoff thrust is achieved.
- During takeoff run, pedals should be used to steer the airplane.

Engine Parameters .... MONITOR
At V_R, rotate the airplane to 13° (flaps 18°) or 12° (flaps 22°).
With positive rate of climb:
Landing Gear .... UP
Minimum Airspeed .... V_2
If maneuvering is required, maintain a minimum airspeed of V_2 + 10 KIAS with a maximum bank of 25°.

At V_2 + 10 KIAS:

Flaps .... 9°

At V_2 + 30 KIAS:

Flaps .... UP

TAKEOFF IN T/O RSV MODE

NOTE: Takeoff in T/O RSV mode is intended to be used only for Thrust Assurance Check purposes and does not improve certified performance.

Thrust Levers .... THRUST SET
Check green ATTCS indication displayed on EICAS.
Thrust Levers .... MAX

NOTE:
- If the runway is considered to be limiting, a static takeoff must be accomplished. In this case, release brakes after engine has reached the target N1.
- For rolling takeoffs, performance data is valid from the point where takeoff thrust is achieved.
- During takeoff run, pedals should be used to steer the airplane.

Engine Parameters .... MONITOR
At V_R, rotate the airplane to 14° (flaps 9°), 13° (flaps 18°) or 12° (flaps 22°).

With positive rate of climb:
Landing Gear .... UP
Minimum Airspeed .... V_2
If maneuvering is required, maintain a minimum airspeed of V_2+10 KIAS with a maximum bank of 25°.

At level off height altitude:

For flaps 9°:
Airspeed .... V_2 + 15 KIAS
Flaps .... UP

For flaps 18° or flaps 22°:
At V_2 + 10 KIAS:
Flaps .... 9°

At V_2 + 30 KIAS:
Flaps .... UP

PERFORMANCE

The configurations referred in the charts are shown below.
Performance conditions not shown below are on the appropriate charts.

	OPERATING ENGINES	THRUST	FLAPS	GEAR	AIRSPEED
TAKEOFF	2 until V_{EF}, 1 after V_{EF}	THRUST SET or MAX	9° or 18° or 22°	DOWN	0 TO V_2
1ST SEGMENT	1	MAX	9° or 18° or 22°	DOWN TO UP	V_{LOF} TO V_2
2ND SEGMENT	1	MAX	9° or 18° or 22°	UP	V_2
3RD SEGMENT	1	MAX	9° TO UP or 18° TO UP or 22° TO UP	UP	V_2 TO FINAL SEGMENT SPEED

The performance data presented in this section must replace the equivalent data in the basic AFM or Supplement 3.

Unless otherwise specified, the performance charts presented in this Supplement must be used in the same way as in the basic AFM.

The Takeoff Performance Charts are presented in two different sets of charts, one set for ALT T/O-1 mode - Flaps 9° and another for T/O Mode - Flaps 9°, Flaps 18° and 22°.

The Takeoff Performance Charts for ALT T/O-1 mode - Flaps 9° are balanced field length charts; the Takeoff Performance Charts for T/O mode - Flaps 9°, Flaps 18° and 22° are unbalanced field length charts.

Takeoff performance data for T/O RSV mode is only available through the ETOASG version 15.00/4.01 or later approved version.

One Final Segment Net gradient of Climb Chart is present for each takeoff flap position.

NOTE: - Takeoff in T/O RSV mode is intended to be used only for Thrust Assurance Check purposes and does not improve certified performance.
- The performance charts from Final Segment up to Landing are the same for all takeoff flaps.

BRAKE ENERGY - Due to the associated conditions, the maximum takeoff weight will never be limited by brake energy with takeoff flaps 18° or 22°.

The Minimum Control Speed in Landing Configuration (V_{MCL}) is equal to 101.7 KIAS.

PROCEDURE TO USE THE TAKEOFF PERFORMANCE CHARTS

For takeoffs with ALT T/O-1 Mode - Flaps 9° refer to basic AFM.

For Takeoffs with T/O Mode - Flaps 9° or Flaps 18° or Flaps 22° the following procedure is applicable:

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

Enter the chart with static air temperature and airport pressure altitude to read the climb limited weight.

MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

It is possible to use these charts in two different ways. If the runway length is available, the maximum takeoff weight can be found. In the same way, if the maximum takeoff weight is available the runway length can be found.

MAXIMUM TAKEOFF WEIGHT TARGET

1. a) Enter the Takeoff Distance Chart 1 of 2 from the right with the Runway Length.

   b) If a clearway is available make the Clearway correction following directly the guidance line to the reference line. The difference between the runway length and the value found is the Maximum Allowable Clearway.
   If the Maximum Allowable Clearway is equal or shorter than the Clearway, proceed to the next step (1c).

   If the Maximum Allowable Clearway is bigger than the Clearway, enter again on the chart from the right with the runway length plus clearway, following directly to the reference line, and proceed to the next step (1c).

c) Proceed through Slope and Wind corrections (as necessary). Make the corrections, proceeding horizontally to the correction value and following the guide line until the reference line. The Takeoff Distance correction must be done following directly the guidance line to the reference line.

d) Proceed horizontally until intersecting three lines projected upwards from arbitrarily chosen V_1/V_R ratios. From the intersection, follow the guide line until the reference line, reading the transfer scale values.

e) Enter the Takeoff Distance Chart 2 of 2 with the Static Air Temperature and Airport Pressure Altitude. Proceed right horizontally to intersecting the reference line.

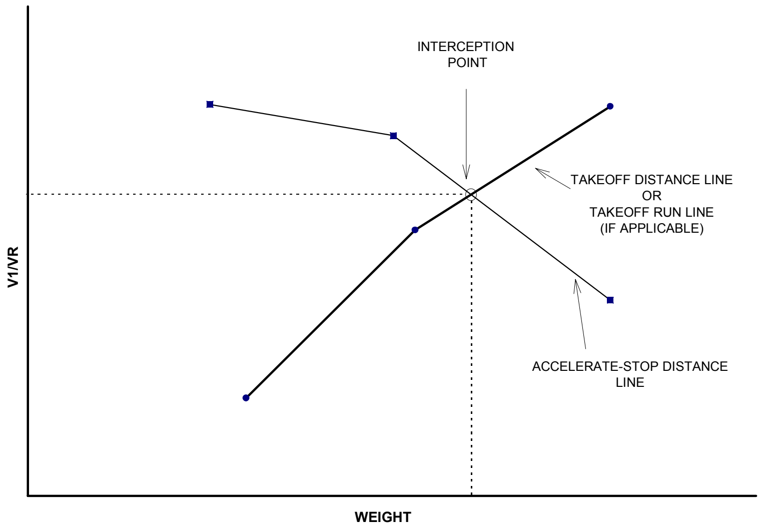
   Follow the guide lines to intersecting the three horizontal lines from transfer scale, and read three weights for the corresponding three values of V_1/V_R.

2. Enter the Accelerate Stop Distance Chart 1 of 2 from the right with the Accelerate-Stop distance. Proceed as step 1 (a through e) to read three weights for the corresponding three values of V_1/V_R.

3. a) Using V_1/V_R versus Weight Template, plot (see example 1) the three weights determined in the step 1, against the corresponding three values of V_1/V_R, creating the Takeoff Distance Line or the Takeoff Run Line (if applicable).

   b) Plot the three weights determined in the step 2, against the corresponding three values of V_1/V_R, creating the Accelerate-Stop Distance Line.

4. Read the maximum takeoff weight and V_1/V_R at the intersection point between Takeoff Distance line and Accelerate-Stop Distance line.



EXAMPLE 1

RUNWAY LENGTH TARGET

1. Enter the Takeoff Distance Chart 2 of 2 with the True Outside Air Temperature and Airport Pressure Altitude. Proceed right horizontally to intersecting the reference line.

Follow the guide line to intersect the vertical line from the weight, and read the transfer scale value.

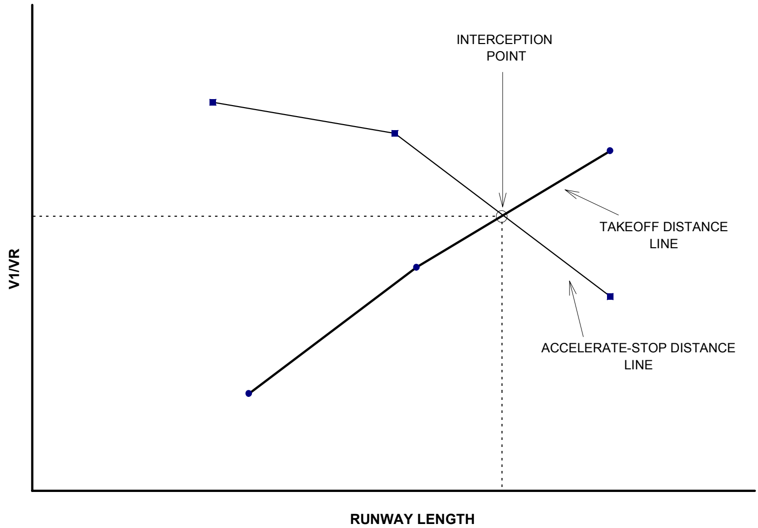
2. Enter in the Takeoff Distance Chart 1 of 2 from the left with the transfer scale value. Follow the guide lines to intersect three lines projected upwards from arbitrarily chosen V_1/V_R ratios.

3. Make the corrections (as necessary), proceeding horizontally to the reference line and following the guide line to the correction value. Read the three runway length values.

5. a) Using V_1/V_R versus Runway Length Template, plot (see example 2) the three runway lengths determined in step 3, against the corresponding three values of V_1/V_R, creating Takeoff Distance Line or Takeoff Run Line (if applicable).

   b) Plot the three runway lengths determined in step 4, against the corresponding three values of V_1/V_R, creating the Accelerate-Stop Distance Line.

6. Read the runway length and V_1/V_R at the intersection point between Takeoff Line and Accelerate-Stop Distance Line.



EXAMPLE 2

MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

Enter the chart in the same way as in the basic AFM to read the brake energy limited weight.

MAXIMUM TAKEOFF WEIGHT - OBSTACLE CLEARANCE LIMITED

Enter the charts (Obstacle Clearance - Reference Gradient and Obstacle Clearance) with the lowest among weight determined in the previous steps and the Maximum Takeoff Weight (structural) and check the obstacle clearance.

TAKEOFF SPEEDS V_1, V_R, V_2 AND V_{FS}

Enter the Takeoff Speeds charts with the maximum allowable takeoff weight and read V_R and V_2.

Enter the Takeoff Speeds - V_1 for Unbalanced Runway chart with the V_R and V_1/V_R and find the V_1.

If the V_1 found is greater than 110 KIAS (flaps 18°) or 117 KIAS (flaps 22°), the V_1 can be used.

If the V_1 found is lower than 110 KIAS (flaps 18°) or 117 KIAS (flaps 22°), enter the Minimum V_1 - chart. Check whether the V_1 is equal or greater than the minimum V_1, if V_1 found is lower than minimum V_1 it can not be used and it is necessary to procedure as follows:

- Enter the Takeoff Distance chart with a lower runway length and find three weights and the corresponding three values of V_1/V_R. Enter the V_1/V_R versus Weight Template with these values creating a new Takeoff Distance Line and maintaining the previous Accelerate-Stop Distance Line. Find the new Weight and the corresponding V_1/V_R.
  Find V_R and V_2.

NOTE: For Final Segment Net Gradient of Climb calculation, enter the appropriate chart based on the takeoff flap position with the reference gradient obtained from the associated Obstacle Clearance Reference Gradient Chart.

PROCEDURE FOR DETERMINATION OF TAKEOFF WEIGHT - ILLUSTRATIVE EXAMPLE

Takeoff data:

Takeoff flaps	18°
Runway Length	5000 ft
Clearway	Not Available
FADEC REF A/ICE	OFF
Static Air Temperature	20°C
Airport Pressure Altitude	3000 ft
Runway Slope	-1% (DOWN HILL)
Wind component	10 kt (HEAD WIND)

1 - Determine the Maximum Takeoff Weight - Climb limited:

- 46600 lb.

2 - Determine the Maximum Takeoff Weight - Field Length limited:

a) Transfer Scale value on the Takeoff distance chart:

Assuming that V_1/V_R = 0.90, 0.95 and 1.00:

- Transfer Scale = 5180 for V_1/V_R = 0.90
- Transfer Scale = 5400 for V_1/V_R = 0.95
- Transfer Scale = 5600 for V_1/V_R = 1.00

b) Determine the weight associated to each V_1/V_R on the Takeoff Distance chart:

Assuming that V_1/V_R = 0.90, 0.95 and 1.00:

- Weight = 40650 lb for V_1/V_R = 0.90
- Weight = 41900 lb for V_1/V_R = 0.95
- Weight = 42500 lb for V_1/V_R = 1.00

c) Determine the Transfer Scale Value on the Accelerate Stop Distance chart:

Assuming that V_1/V_R = 0.85, 0.90 and 1:

- Transfer Scale = 6680 for V_1/V_R = 0.85
- Transfer Scale = 5880 for V_1/V_R = 0.90
- Transfer Scale = 4800 for V_1/V_R = 1

d) Determine the weight associated to each V_1/V_R on the Accelerate Stop Distance chart:

Assuming that V_1/V_R 0.85, 0.90 and 1:

- Weight = 48500 lb for V_1/V_R = 0.85
- Weight = 45500 lb for V_1/V_R = 0.90
- Weight = 39500 lb for V_1/V_R = 1

e) Determine the Maximum Takeoff Weight and V_1/V_R:

- Maximum Takeoff Weight = 42000 lb.
- V_1/V_R = 0.958

3 - Determine the Maximum Weight - Obstacle Clearance limited:

- 48501 lb (not limiting)

4 - As the determined takeoff weight - field length limited is lower than the maximum takeoff - climb limited, the takeoff weight – field length limited will be used.

5 - Determine V_R and V_2 for the Takeoff Weight determined in 6:

- V_R = 118 KIAS
- V_2 = 125 KIAS

6 - Determine V_1 from the Takeoff Speeds - V_1 chart:

- V_1 = 118 KIAS

The V_1 found is higher than 110 KIAS, and no further correction is necessary.

7 - Determine the Minimum V_1 from the Takeoff Speeds Minimum V_1 chart:

- Minimum V_1 = 102 KIAS

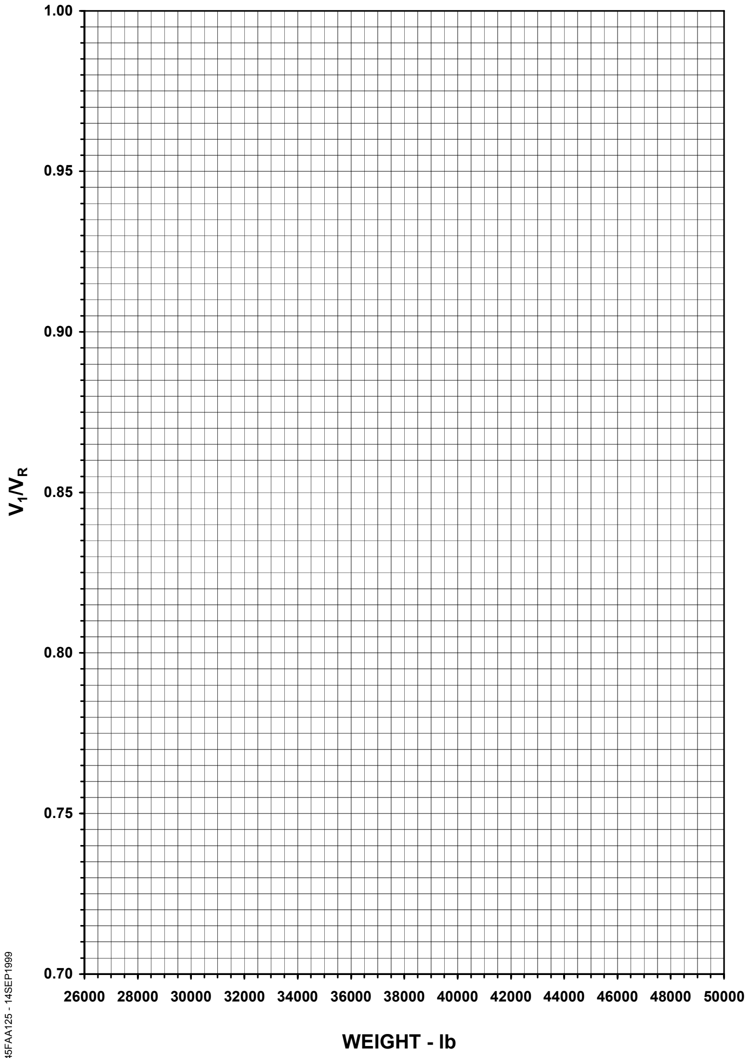
The V_1 found is greater than the minimum V_1, so this value can be used.

NOTE: If the V_1 found was lower than the minimum V_1, it would be necessary to find another Takeoff Distance Line in order to increase the V_1, by decreasing the maximum takeoff weight or runway length, as described at the step 5 of the illustrative example.

8 - Determine the V_{FS}:

- V_{FS} = 164 KIAS

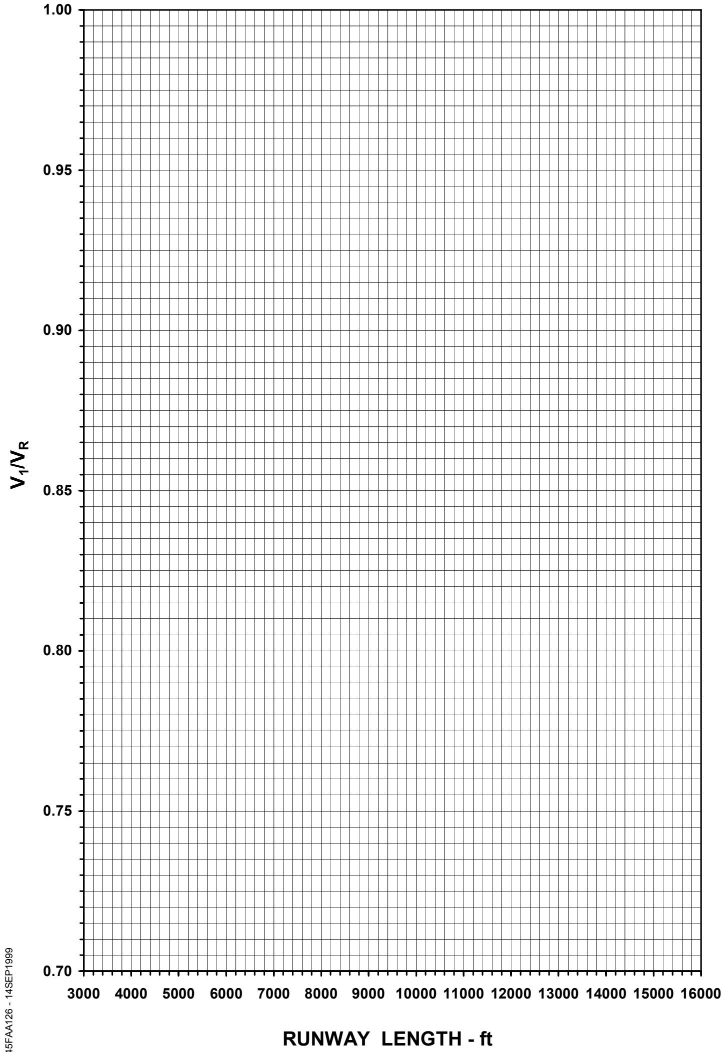
V_1/V_R X WEIGHT



TEMPLATE 1

NOTE: This chart is presented only to support the takeoff analysis calculation.

V_1/V_R x RUNWAY LENGTH



TEMPLATE 2

NOTE: This chart is presented only to support the takeoff analysis calculation.

N1 FOR T/O MODE

ANTI-ICE OFF

AIRSPEED: 0 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
-1000	74.8	75.5	76.4	77.2	78.0	78.8	79.6	80.4	81.2	82.0	82.8
0	75.5	76.1	77.0	77.8	78.7	79.5	80.3	81.1	81.9	82.7	83.5
1000	76.5	77.2	78.0	78.9	79.7	80.6	81.4	82.2	83.0	83.8	84.6
2000	77.5	78.2	79.1	80.0	80.8	81.7	82.5	83.3	84.1	84.9	85.7
3000	78.5	79.2	80.1	81.0	81.8	82.7	83.5	84.4	85.2	86.0	86.8
4000	79.5	80.2	81.1	82.0	82.8	83.7	84.6	85.4	86.2	87.1	87.9
5000	80.4	81.1	82.0	82.9	83.8	84.7	85.6	86.4	87.3	88.1	88.9
6000	80.9	81.7	82.6	83.5	84.4	85.2	86.1	87.0	87.8	88.7	89.5
7000	81.4	82.2	83.1	84.0	84.9	85.8	86.7	87.5	88.4	89.2	90.1
8000	82.0	82.7	83.6	84.6	85.5	86.3	87.2	88.1	89.0	89.8	90.7
9000	82.5	83.3	84.2	85.1	86.0	86.9	87.8	88.7	89.6	90.4	91.3
10000	83.1	83.9	84.8	85.7	86.6	87.5	88.4	89.3	90.2	91.1	91.9
11000	83.2	83.9	84.9	85.8	86.7	87.6	88.5	89.4	90.3	91.1	92.0
12000	83.3	84.0	84.9	85.9	86.8	87.7	88.6	89.5	90.4	91.2	92.1
13000	83.5	84.3	85.2	86.2	87.1	88.0	88.9	89.8	90.7	91.5	92.4
14000	84.0	84.8	85.8	86.7	87.6	88.5	89.4	90.3	91.2	92.1	93.0
15000	84.6	85.3	86.3	87.2	88.2	89.1	90.0	90.9	91.8	92.7	93.5
16000	84.6	85.3	86.3	87.2	88.2	89.1	90.0	90.9	91.8	92.7	93.5

N1 FOR T/O MODE

ANTI-ICE OFF

AIRSPEED: 0 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
-1000	83.6	84.3	85.1	85.8	86.6	87.3	88.0	88.8	89.5	90.2	90.3
0	84.2	85.0	85.8	86.5	87.3	88.0	88.8	89.5	90.2	90.9	90.8
1000	85.4	86.2	86.9	87.7	88.5	89.2	90.0	90.7	91.4	91.4	90.1
2000	86.5	87.3	88.1	88.9	89.7	90.4	91.2	91.9	92.0	91.0	90.2
3000	87.7	88.5	89.2	90.0	90.8	91.6	92.3	92.7	91.8	91.0	90.4
4000	88.7	89.5	90.3	91.1	91.9	92.7	93.2	93.1	91.8	91.0	90.7
5000	89.8	90.6	91.4	92.2	93.0	93.8	93.7	92.7	91.9	91.0	-
6000	90.3	91.2	92.0	92.8	93.6	94.0	93.3	92.6	91.7	91.2	-
7000	90.9	91.7	92.6	93.4	94.2	94.3	93.2	92.4	91.6	91.4	-
8000	91.5	92.4	93.2	94.0	94.5	94.4	93.1	92.3	91.6	-	-
9000	92.2	93.0	93.8	94.6	94.9	93.7	92.9	92.2	91.8	-	-
10000	92.8	93.6	94.5	94.5	93.2	92.2	91.5	90.9	-	-	-
11000	92.9	93.7	94.5	94.5	93.0	92.1	91.4	91.0	-	-	-
12000	92.9	93.8	94.6	94.6	92.8	92.0	91.3	91.2	-	-	-
13000	93.3	94.1	94.7	94.5	92.6	91.9	91.3	-	-	-	-
14000	93.8	94.7	94.9	93.4	92.5	91.7	91.4	-	-	-	-
15000	94.4	95.2	95.1	93.2	92.4	91.5	-	-	-	-	-
16000	94.1	94.1	92.7	91.7	90.9	90.3	-	-	-	-	-

N1 FOR T/O MODE

ANTI-ICE ON

AIRSPEED: 0 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
-1000	78.3	79.2	80.0	80.8	81.6	82.4	83.2	84.0	83.6	84.3	85.1
0	79.0	79.8	80.6	81.5	82.3	83.1	83.9	84.7	84.2	85.0	85.8
1000	80.0	80.9	81.7	82.6	83.4	84.2	85.0	85.8	85.4	86.2	86.9
2000	81.1	82.0	82.8	83.7	84.5	85.3	86.2	87.0	86.5	87.3	88.1
3000	82.1	83.0	83.9	84.7	85.6	86.4	87.2	88.1	87.6	88.4	89.2
4000	83.1	84.0	84.9	85.7	86.6	87.4	88.3	89.1	88.7	89.5	89.5
5000	84.1	85.0	85.9	86.7	87.6	88.5	89.3	90.2	89.8	90.5	89.5
6000	84.6	85.5	86.4	87.3	88.2	89.0	89.9	90.7	90.3	90.1	89.1
7000	85.1	86.0	86.9	87.8	88.7	89.6	90.4	91.3	90.6	89.8	88.8
8000	85.7	86.6	87.5	88.4	89.3	90.2	91.0	91.8	90.0	89.3	88.4
9000	86.3	87.2	88.1	89.0	89.9	90.8	91.6	91.1	89.3	88.7	88.0
10000	86.9	87.8	88.7	89.6	90.5	91.4	90.9	89.1	87.5	87.1	86.7
11000	86.9	87.9	88.8	89.7	90.6	90.9	90.4	88.8	87.3	87.0	86.6
12000	87.0	87.9	88.9	89.8	90.7	90.5	88.8	88.6	87.1	86.9	86.6
13000	87.3	88.2	89.2	90.1	90.5	90.1	88.6	88.4	87.0	86.8	86.5
14000	87.8	88.8	89.7	90.5	90.2	88.6	88.4	88.3	87.0	86.8	86.2
15000	88.4	89.3	90.2	90.2	89.9	88.4	88.3	88.3	87.0	86.9	85.9
16000	88.4	89.3	90.1	89.7	88.1	87.7	87.5	87.3	85.8	85.2	84.1

N1 FOR GO-AROUND

ANTI-ICE OFF

AIRSPEED: 100 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
-1000	77.4	78.1	79.0	79.8	80.7	81.5	82.3	83.2	84.0	84.8	85.6
0	78.0	78.7	79.6	80.4	81.3	82.1	83.0	83.8	84.6	85.5	86.3
1000	78.5	79.2	80.1	81.0	81.8	82.7	83.5	84.4	85.2	86.0	86.8
2000	79.0	79.7	80.6	81.5	82.4	83.2	84.1	84.9	85.8	86.6	87.4
3000	79.5	80.2	81.1	82.0	82.9	83.7	84.6	85.4	86.3	87.1	87.9
4000	79.9	80.7	81.6	82.4	83.3	84.2	85.1	85.9	86.7	87.6	88.4
5000	80.4	81.1	82.0	82.9	83.8	84.6	85.5	86.4	87.2	88.1	88.9
6000	80.8	81.6	82.5	83.4	84.3	85.1	86.0	86.9	87.7	88.6	89.4
7000	81.3	82.0	82.9	83.8	84.7	85.6	86.5	87.4	88.2	89.1	89.9
8000	81.8	82.5	83.5	84.4	85.3	86.2	87.0	87.9	88.8	89.6	90.5
9000	82.3	83.1	84.0	84.9	85.8	86.7	87.6	88.5	89.4	90.2	91.1
10000	82.9	83.6	84.6	85.5	86.4	87.3	88.2	89.1	90.0	90.8	91.7

N1 FOR GO-AROUND

ANTI-ICE OFF

AIRSPEED: 100 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
-1000	86.4	87.2	88.0	88.7	89.5	90.3	91.0	91.8	92.0	90.8	89.8
0	87.1	87.9	88.6	89.4	90.2	91.0	91.7	92.5	92.3	90.9	89.9
1000	87.6	88.4	89.2	90.0	90.8	91.6	92.3	92.6	91.7	90.9	89.9
2000	88.2	89.0	89.8	90.6	91.4	92.2	92.9	92.9	91.7	90.9	90.1
3000	88.8	89.6	90.4	91.2	92.0	92.7	93.2	92.5	91.7	90.9	90.3
4000	89.2	90.0	90.9	91.7	92.4	93.2	93.4	92.5	91.8	91.0	90.6
5000	89.7	90.5	91.3	92.1	92.9	93.7	93.6	92.6	91.8	91.0	-
6000	90.2	91.1	91.9	92.7	93.5	93.9	93.2	92.5	91.7	91.2	-
7000	90.7	91.6	92.4	93.2	94.0	94.1	93.2	92.4	91.6	91.4	-
8000	91.3	92.1	93.0	93.8	94.4	94.2	93.1	92.3	91.6	-	-
9000	91.9	92.8	93.6	94.4	94.7	93.6	92.9	92.1	91.8	-	-
10000	92.5	93.4	94.2	94.2	93.1	92.2	91.5	90.8	-	-	-

N1 FOR GO-AROUND

ANTI-ICE ON

AIRSPEED: 100 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
-1000	81.0	81.8	82.7	83.5	84.4	85.2	86.0	86.8	86.4	87.2	88.0
0	81.6	82.5	83.3	84.2	85.0	85.8	86.7	87.5	87.1	87.9	88.6
1000	82.1	83.0	83.9	84.7	85.6	86.4	87.2	88.1	87.6	88.4	89.2
2000	82.7	83.5	84.4	85.3	86.1	87.0	87.8	88.6	88.2	89.0	89.6
3000	83.1	84.0	84.9	85.8	86.6	87.5	88.3	89.2	88.8	89.6	89.8
4000	83.6	84.5	85.4	86.2	87.1	87.9	88.8	89.6	89.2	90.0	89.8
5000	84.0	84.9	85.8	86.7	87.6	88.4	89.3	90.1	89.7	90.5	89.8
6000	84.5	85.4	86.3	87.2	88.1	88.9	89.8	90.6	90.2	90.5	89.5
7000	85.0	85.9	86.8	87.7	88.6	89.4	90.3	91.1	90.8	90.2	89.2
8000	85.5	86.4	87.3	88.2	89.1	90.0	90.8	91.7	90.6	89.7	88.8
9000	86.1	87.0	87.9	88.8	89.7	90.6	91.4	91.6	89.8	89.1	88.4
10000	86.6	87.6	88.5	89.4	90.3	91.2	91.5	89.7	88.0	87.5	86.9

N1 FOR GO-AROUND

ANTI-ICE OFF

AIRSPEED: 150 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
-1000	77.3	78.0	78.8	79.7	80.5	81.4	82.2	83.0	83.9	84.7	85.5
0	77.9	78.6	79.4	80.3	81.2	82.0	82.8	83.7	84.5	85.3	86.1
1000	78.4	79.1	80.0	80.9	81.7	82.6	83.4	84.3	85.1	85.9	86.7
2000	78.9	79.6	80.5	81.4	82.3	83.1	84.0	84.8	85.7	86.5	87.3
3000	79.4	80.1	81.0	81.9	82.8	83.7	84.5	85.4	86.2	87.0	87.9
4000	79.9	80.6	81.5	82.4	83.3	84.1	85.0	85.8	86.7	87.5	88.4
5000	80.3	81.1	82.0	82.9	83.7	84.6	85.5	86.3	87.2	88.0	88.9
6000	80.8	81.5	82.4	83.3	84.2	85.1	85.9	86.8	87.6	88.5	89.3
7000	81.2	81.9	82.8	83.7	84.6	85.5	86.4	87.2	88.1	88.9	89.8
8000	81.6	82.4	83.3	84.2	85.1	86.0	86.9	87.7	88.6	89.4	90.3
9000	82.1	82.9	83.8	84.7	85.6	86.5	87.4	88.3	89.1	90.0	90.8
10000	82.6	83.4	84.3	85.2	86.1	87.0	87.9	88.8	89.7	90.5	91.4

N1 FOR GO-AROUND

ANTI-ICE OFF

AIRSPEED: 150 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
-1000	86.3	87.0	87.8	88.6	89.4	90.1	90.9	91.6	91.8	90.7	89.7
0	86.9	87.7	88.5	89.3	90.0	90.8	91.6	92.3	92.3	90.8	89.7
1000	87.5	88.3	89.1	89.9	90.7	91.4	92.2	92.6	91.6	90.7	89.7
2000	88.1	88.9	89.7	90.5	91.3	92.1	92.8	92.9	91.6	90.7	89.8
3000	88.7	89.5	90.3	91.1	91.9	92.6	93.1	93.0	91.6	90.8	90.1
4000	89.2	90.0	90.8	91.6	92.4	93.2	93.4	92.4	91.7	90.8	90.5
5000	89.7	90.5	91.3	92.1	92.9	93.7	93.6	92.5	91.7	90.9	-
6000	90.2	91.0	91.8	92.6	93.4	93.8	93.1	92.4	91.6	91.1	-
7000	90.6	91.4	92.3	93.1	93.9	94.0	93.1	92.3	91.5	91.3	-
8000	91.1	92.0	92.8	93.6	94.2	94.1	93.0	92.2	91.5	-	-
9000	91.7	92.5	93.3	94.2	94.4	93.5	92.8	92.0	91.7	-	-
10000	92.2	93.1	93.9	94.0	92.9	92.2	91.5	90.7	-	-	-

N1 FOR GO-AROUND

ANTI-ICE ON

AIRSPEED: 150 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C											
	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
-1000	80.0	80.8	81.7	82.5	83.4	84.2	85.1	85.9	86.7	86.3	87.0	87.8
0	80.6	81.4	82.3	83.2	84.0	84.9	85.7	86.5	87.3	86.9	87.7	88.5
1000	81.1	82.0	82.9	83.7	84.6	85.4	86.3	87.1	87.9	87.5	88.3	89.1
2000	81.7	82.6	83.4	84.3	85.2	86.0	86.9	87.7	88.5	88.1	88.9	89.5
3000	82.2	83.1	84.0	84.8	85.7	86.6	87.4	88.2	89.1	88.7	89.5	89.7
4000	82.6	83.5	84.4	85.3	86.2	87.0	87.9	88.7	89.6	89.2	90.0	89.8
5000	83.1	84.0	84.9	85.8	86.7	87.5	88.4	89.2	90.1	89.7	90.5	89.9
6000	83.5	84.4	85.3	86.2	87.1	88.0	88.8	89.7	90.6	90.2	90.6	89.6
7000	84.0	84.9	85.8	86.7	87.6	88.4	89.3	90.2	91.0	90.6	90.4	89.3
8000	84.4	85.3	86.2	87.1	88.0	88.9	89.8	90.7	91.5	90.8	89.9	88.9
9000	84.9	85.9	86.8	87.7	88.6	89.5	90.3	91.2	91.9	90.0	89.2	88.4
10000	85.4	86.4	87.3	88.2	89.1	90.0	90.9	91.8	90.0	88.2	87.6	86.9

N1 FOR GO-AROUND

ANTI-ICE OFF

AIRSPEED: 200 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
-1000	77.0	77.7	78.6	79.4	80.3	81.1	82.0	82.8	83.6	84.4	85.2
0	77.7	78.4	79.3	80.1	81.0	81.8	82.7	83.5	84.3	85.1	85.9
1000	78.2	79.0	79.8	80.7	81.6	82.4	83.3	84.1	84.9	85.7	86.6
2000	78.8	79.5	80.4	81.3	82.2	83.0	83.9	84.7	85.5	86.4	87.2
3000	79.4	80.1	81.0	81.9	82.7	83.6	84.4	85.3	86.1	87.0	87.8
4000	79.9	80.6	81.5	82.4	83.2	84.1	85.0	85.8	86.7	87.5	88.3
5000	80.4	81.1	82.0	82.9	83.8	84.6	85.5	86.4	87.2	88.1	88.9
6000	80.7	81.5	82.4	83.3	84.2	85.0	85.9	86.8	87.6	88.5	89.3
7000	81.1	81.8	82.8	83.7	84.6	85.4	86.3	87.2	88.0	88.9	89.7
8000	81.5	82.3	83.2	84.1	85.0	85.9	86.7	87.6	88.5	89.3	90.2
9000	82.0	82.7	83.6	84.5	85.4	86.3	87.2	88.1	89.0	89.8	90.7
10000	82.4	83.1	84.1	85.0	85.9	86.8	87.7	88.6	89.4	90.3	91.1

N1 FOR GO-AROUND

ANTI-ICE OFF

AIRSPEED: 200 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
-1000	86.0	86.8	87.6	88.3	89.1	89.8	90.6	91.3	91.6	90.5	89.3
0	86.7	87.5	88.3	89.1	89.8	90.6	91.4	92.1	92.1	90.6	89.3
1000	87.4	88.2	88.9	89.7	90.5	91.3	92.0	92.4	91.5	90.5	89.3
2000	88.0	88.8	89.6	90.4	91.2	91.9	92.7	92.8	91.5	90.5	89.4
3000	88.6	89.4	90.2	91.0	91.8	92.6	93.1	92.9	91.5	90.5	89.7
4000	89.1	90.0	90.8	91.6	92.4	93.1	93.3	92.4	91.5	90.6	90.2
5000	89.7	90.5	91.3	92.1	92.9	93.7	93.6	92.4	91.6	90.7	-
6000	90.1	91.0	91.8	92.6	93.4	93.8	93.0	92.3	91.5	91.0	-
7000	90.6	91.4	92.2	93.0	93.8	93.9	93.0	92.3	91.5	91.3	-
8000	91.0	91.8	92.7	93.5	94.1	94.0	92.9	92.2	91.5	-	-
9000	91.5	92.3	93.2	94.0	94.3	93.5	92.8	92.0	91.7	-	-
10000	92.0	92.8	93.7	93.8	92.8	92.2	91.5	90.7	-	-	-

N1 FOR GO-AROUND

ANTI-ICE ON

AIRSPEED: 200 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
-1000	80.6	81.5	82.3	83.1	84.0	84.8	85.6	86.4	86.0	86.8	87.6
0	81.3	82.1	83.0	83.8	84.7	85.5	86.3	87.2	86.7	87.5	88.3
1000	81.9	82.7	83.6	84.4	85.3	86.1	87.0	87.8	87.4	88.2	88.9
2000	82.4	83.3	84.2	85.1	85.9	86.8	87.6	88.4	88.0	88.8	89.4
3000	83.0	83.9	84.8	85.6	86.5	87.3	88.2	89.0	88.6	89.4	89.6
4000	83.5	84.4	85.3	86.2	87.0	87.9	88.7	89.6	89.1	90.0	89.8
5000	84.0	84.9	85.8	86.7	87.6	88.4	89.3	90.1	89.7	90.5	89.9
6000	84.4	85.3	86.2	87.1	88.0	88.8	89.7	90.5	90.1	90.7	89.7
7000	84.8	85.7	86.6	87.5	88.4	89.2	90.1	91.0	90.6	90.5	89.5
8000	85.2	86.1	87.0	87.9	88.8	89.7	90.6	91.4	91.0	90.1	89.1
9000	85.7	86.6	87.5	88.4	89.3	90.2	91.0	91.9	90.3	89.4	88.5
10000	86.1	87.1	88.0	88.9	89.8	90.6	91.5	90.4	88.5	87.7	87.0

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE OFF

AIRSPEED: 100 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C												
	-65	-60	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
0	71.2	72.1	73.1	73.7	74.6	75.4	76.2	77.0	77.8	78.5	79.3	80.1	80.8
2000	72.9	73.8	74.9	75.5	76.4	77.2	78.0	78.8	79.6	80.4	81.2	82.0	82.8
4000	74.8	75.7	76.8	77.5	78.4	79.2	80.1	80.9	81.7	82.5	83.4	84.2	85.0
6000	76.3	77.2	78.3	79.0	79.9	80.7	81.6	82.4	83.3	84.1	84.9	85.8	86.6
8000	77.1	78.0	79.1	79.9	80.8	81.6	82.5	83.4	84.2	85.1	85.9	86.7	87.6
10000	77.9	78.9	80.0	80.7	81.6	82.5	83.4	84.2	85.1	85.9	86.8	87.6	88.4
12000	78.7	79.7	80.8	81.5	82.4	83.3	84.2	85.1	86.0	86.8	87.7	88.5	89.4
14000	79.6	80.6	81.7	82.5	83.4	84.3	85.2	86.1	86.9	87.8	88.7	89.6	90.4
16000	80.6	81.5	82.7	83.4	84.4	85.3	86.2	87.1	88.0	88.9	89.7	90.6	91.5
18000	81.7	82.7	83.8	84.6	85.6	86.5	87.4	88.3	89.2	90.1	91.0	91.9	92.7
20000	83.5	84.5	85.7	86.4	87.4	88.4	89.3	90.2	91.2	92.1	93.0	93.9	94.3
22000	84.2	85.2	86.4	87.2	88.2	89.1	90.1	91.0	92.0	92.9	93.8	94.2	93.2
24000	85.0	86.0	87.2	88.0	89.0	89.9	90.9	91.9	92.8	93.7	94.3	93.4	92.6
26000	85.8	86.8	88.0	88.8	89.8	90.8	91.7	92.7	93.7	94.3	94.1	92.8	92.0
28000	86.6	87.6	88.8	89.7	90.7	91.6	92.6	93.6	94.3	94.2	93.0	92.2	91.5
30000	87.4	88.5	89.7	90.5	91.5	92.5	93.5	94.3	94.2	93.1	92.4	91.7	90.9
32000	88.3	89.3	90.6	91.4	92.4	93.4	94.2	94.1	93.2	92.6	91.9	91.0	90.7
34000	89.2	90.3	91.5	92.3	93.4	94.1	94.1	93.3	92.8	92.0	91.2	90.7	-
36000	90.1	91.2	92.5	93.3	94.0	93.8	93.4	92.9	92.2	91.3	90.6	-	-
37000	90.1	91.2	92.5	93.3	94.2	94.0	94.0	93.2	92.5	91.5	90.8	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE OFF

AIRSPEED: 100 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
0	81.6	82.3	83.1	83.8	84.5	85.2	85.9	86.6	87.3	88.0	87.8
2000	83.6	84.3	85.1	85.8	86.6	87.3	88.0	88.8	88.9	88.0	87.2
4000	85.7	86.5	87.3	88.1	88.8	89.6	90.1	89.4	88.8	88.1	87.9
6000	87.4	88.2	89.0	89.7	90.5	90.8	90.0	89.4	88.8	88.3	-
8000	88.4	89.2	90.0	90.8	91.3	90.6	90.0	89.3	88.7	-	-
10000	89.3	90.1	90.9	91.6	91.5	90.4	89.7	89.0	-	-	-
12000	90.2	91.0	91.8	91.9	90.9	90.2	89.5	89.3	-	-	-
14000	91.2	92.1	92.3	91.4	90.8	90.0	89.7	-	-	-	-
16000	92.3	92.7	91.9	91.2	90.5	90.0	-	-	-	-	-
18000	93.3	93.1	91.5	90.9	90.3	-	-	-	-	-	-
20000	93.0	92.0	91.4	90.8	-	-	-	-	-	-	-
22000	92.3	91.6	91.0	90.8	-	-	-	-	-	-	-
24000	91.8	91.1	90.8	-	-	-	-	-	-	-	-
26000	91.3	90.8	-	-	-	-	-	-	-	-	-
28000	90.8	-	-	-	-	-	-	-	-	-	-
30000	-	-	-	-	-	-	-	-	-	-	-
32000	-	-	-	-	-	-	-	-	-	-	-
34000	-	-	-	-	-	-	-	-	-	-	-
36000	-	-	-	-	-	-	-	-	-	-	-
37000	-	-	-	-	-	-	-	-	-	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE ON

AIRSPEED: 100 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
0	76.5	77.3	78.1	78.9	79.7	80.5	81.3	82.1	81.6	82.3	83.1
2000	78.3	79.2	80.0	80.8	81.6	82.4	83.2	84.0	83.6	84.3	85.1
4000	80.4	81.2	82.0	82.9	83.7	84.6	85.4	86.2	85.7	86.5	85.8
6000	81.9	82.7	83.6	84.5	85.3	86.1	87.0	87.8	87.1	86.4	85.6
8000	82.8	83.7	84.5	85.4	86.3	87.1	88.0	88.8	86.9	86.2	85.4
10000	83.6	84.5	85.4	86.3	87.1	88.0	88.8	89.0	86.9	86.0	85.0
12000	84.5	85.4	86.3	87.2	88.0	88.9	88.8	88.0	86.0	85.2	84.4
14000	85.4	86.3	87.3	88.1	89.0	88.8	88.1	87.5	85.5	84.8	83.9
16000	86.4	87.3	88.3	89.2	89.1	88.5	87.9	87.2	85.3	84.4	83.1
18000	87.6	88.6	89.5	89.9	89.3	88.5	87.7	86.9	84.7	83.4	82.1
20000	89.5	90.5	91.2	90.4	89.1	87.7	86.3	84.8	83.1	82.7	81.7
22000	90.3	90.8	90.1	89.1	87.8	86.5	85.2	84.5	82.8	82.1	81.3
24000	90.4	89.8	89.0	87.9	86.7	85.5	84.7	84.1	82.3	81.7	81.4
26000	89.5	88.8	87.9	87.0	86.0	85.0	84.3	83.7	82.0	81.6	-
28000	88.6	87.9	87.1	86.3	85.5	84.6	83.7	83.4	81.9	-	-
30000	87.7	87.1	86.4	85.8	84.9	84.1	83.5	82.9	-	-	-
32000	87.0	86.5	86.0	85.3	84.5	83.6	82.8	82.5	-	-	-
34000	86.4	86.0	85.4	84.7	83.9	82.9	82.4	-	-	-	-
36000	85.9	85.5	84.9	84.1	83.1	82.3	-	-	-	-	-
37000	85.7	85.2	84.5	83.6	82.6	81.9	-	-	-	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE OFF

AIRSPEED: 150 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C												
	-65	-60	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
0	71.2	72.1	73.1	73.8	74.6	75.4	76.2	77.0	77.8	78.6	79.3	80.1	80.9
2000	73.0	73.9	74.9	75.6	76.4	77.3	78.1	78.9	79.7	80.5	81.3	82.1	82.9
4000	74.9	75.8	76.9	77.6	78.5	79.3	80.2	81.0	81.8	82.6	83.5	84.3	85.1
6000	76.3	77.3	78.3	79.0	79.9	80.8	81.7	82.5	83.4	84.2	85.0	85.8	86.6
8000	77.2	78.1	79.2	79.9	80.8	81.7	82.6	83.4	84.3	85.1	86.0	86.8	87.6
10000	78.0	78.9	80.0	80.8	81.7	82.6	83.4	84.3	85.2	86.0	86.9	87.7	88.5
12000	78.8	79.7	80.8	81.6	82.5	83.4	84.3	85.1	86.0	86.9	87.7	88.6	89.4
14000	79.6	80.6	81.7	82.4	83.3	84.2	85.1	86.0	86.9	87.8	88.6	89.5	90.3
16000	80.4	81.3	82.5	83.2	84.2	85.1	86.0	86.9	87.8	88.6	89.5	90.4	91.2
18000	81.3	82.3	83.5	84.2	85.2	86.1	87.0	87.9	88.8	89.7	90.6	91.5	92.3
20000	83.1	84.1	85.2	86.0	87.0	87.9	88.9	89.8	90.7	91.6	92.5	93.4	93.9
22000	83.9	84.9	86.1	86.9	87.9	88.8	89.8	90.7	91.7	92.6	93.5	94.1	94.0
24000	84.8	85.8	87.0	87.8	88.8	89.8	90.7	91.7	92.6	93.5	94.2	94.1	92.6
26000	85.7	86.7	87.9	88.7	89.7	90.7	91.7	92.6	93.6	94.2	94.1	92.8	92.0
28000	86.6	87.7	88.9	89.7	90.7	91.7	92.7	93.6	94.2	93.7	93.0	92.3	91.4
30000	87.7	88.7	89.9	90.8	91.8	92.8	93.8	94.3	93.7	93.1	92.4	91.6	90.7
32000	88.7	89.8	91.1	91.9	92.9	93.9	94.3	93.8	93.2	92.6	91.7	90.7	90.4
34000	89.9	91.0	92.3	93.1	94.1	94.2	93.7	93.3	92.7	91.9	90.8	90.3	-
36000	91.2	92.3	93.6	94.0	93.9	93.8	93.4	92.9	92.1	91.0	90.1	-	-
37000	90.8	91.9	93.2	94.0	94.1	94.1	93.7	93.2	92.4	91.2	90.3	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE OFF

AIRSPEED: 150 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
-1000	81.0	81.7	82.4	83.1	83.9	84.6	85.3	86.0	86.7	87.3	87.6
0	81.6	82.4	83.1	83.8	84.5	85.3	86.0	86.7	87.4	88.0	87.8
1000	82.6	83.4	84.1	84.9	85.6	86.3	87.0	87.8	88.5	88.4	86.8
2000	83.6	84.4	85.2	85.9	86.7	87.4	88.1	88.8	89.0	87.9	87.0
3000	84.7	85.5	86.3	87.0	87.8	88.5	89.3	89.7	88.8	88.0	87.3
4000	85.8	86.6	87.4	88.2	88.9	89.7	90.2	89.5	88.8	88.1	87.7
5000	87.0	87.7	88.5	89.3	90.1	90.7	90.6	89.6	88.9	88.2	-
6000	87.4	88.2	89.0	89.8	90.6	90.9	90.1	89.5	88.9	88.4	-
8000	88.4	89.2	90.0	90.8	91.3	90.6	90.1	89.4	88.8	-	-
10000	89.4	90.2	91.0	91.7	91.6	90.6	89.9	89.1	-	-	-
12000	90.2	91.1	91.9	91.9	91.0	90.3	89.6	89.4	-	-	-
14000	91.2	92.0	92.2	91.4	90.8	90.1	89.8	-	-	-	-
16000	92.1	92.6	91.9	91.3	90.6	90.1	-	-	-	-	-
18000	93.2	93.1	91.6	91.0	90.4	-	-	-	-	-	-
20000	93.7	92.0	91.4	90.8	-	-	-	-	-	-	-
22000	92.3	91.6	91.0	90.8	-	-	-	-	-	-	-
24000	91.8	91.2	90.8	-	-	-	-	-	-	-	-
26000	91.3	90.8	-	-	-	-	-	-	-	-	-
28000	90.7	-	-	-	-	-	-	-	-	-	-
30000	-	-	-	-	-	-	-	-	-	-	-
32000	-	-	-	-	-	-	-	-	-	-	-
34000	-	-	-	-	-	-	-	-	-	-	-
36000	-	-	-	-	-	-	-	-	-	-	-
37000	-	-	-	-	-	-	-	-	-	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE ON

AIRSPEED: 150 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
0	76.5	77.4	78.2	79.0	79.8	80.5	81.3	82.1	81.6	82.4	83.1
2000	78.4	79.3	80.1	80.9	81.7	82.5	83.3	84.1	83.7	84.4	85.2
4000	80.4	81.3	82.1	83.0	83.8	84.7	85.5	86.3	85.8	86.6	86.1
6000	81.9	82.8	83.7	84.5	85.4	86.2	87.1	87.9	87.3	86.6	85.9
8000	82.8	83.7	84.6	85.5	86.3	87.2	88.0	88.8	87.2	86.4	85.6
10000	83.7	84.6	85.5	86.4	87.2	88.1	88.9	89.6	87.4	86.4	85.4
12000	84.5	85.4	86.3	87.2	88.1	88.9	89.4	88.6	86.5	85.6	84.6
14000	85.4	86.3	87.2	88.1	89.0	89.2	88.5	87.8	85.7	84.9	84.0
16000	86.2	87.1	88.1	89.0	89.3	88.7	88.0	87.4	85.4	84.5	83.2
18000	87.2	88.2	89.1	90.0	89.4	88.6	87.8	87.0	84.8	83.5	82.2
20000	89.1	90.0	91.0	90.5	89.2	87.9	86.5	85.1	83.3	82.8	81.7
22000	90.0	90.9	90.2	89.2	88.0	86.7	85.4	84.7	82.9	82.1	81.2
24000	90.5	89.9	89.1	88.0	86.8	85.5	84.7	84.3	82.5	81.7	81.4
26000	89.6	88.9	88.0	87.0	86.0	85.1	84.4	83.8	82.0	81.6	-
28000	88.7	87.9	87.2	86.3	85.5	84.6	83.8	83.5	82.0	-	-
30000	87.8	87.2	86.5	85.8	85.0	84.2	83.6	83.0	-	-	-
32000	87.1	86.6	86.1	85.3	84.5	83.7	82.9	82.6	-	-	-
34000	86.5	86.1	85.5	84.8	83.9	82.9	82.4	-	-	-	-
36000	86.1	85.7	85.0	84.2	83.0	82.1	-	-	-	-	-
37000	85.9	85.4	84.7	83.7	82.6	81.8	-	-	-	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE OFF

AIRSPEED: 200 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C -65	-60	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
0	71.1	72.0	73.0	73.6	74.5	75.3	76.1	76.9	77.7	78.4	79.2	80.0	80.7
2000	73.1	74.0	75.0	75.7	76.5	77.4	78.2	79.0	79.8	80.6	81.4	82.2	83.0
4000	75.0	75.9	77.0	77.7	78.6	79.4	80.3	81.1	81.9	82.8	83.6	84.4	85.2
6000	76.4	77.3	78.4	79.1	80.0	80.9	81.8	82.6	83.5	84.3	85.1	85.9	86.8
8000	77.3	78.2	79.3	80.0	80.9	81.8	82.7	83.5	84.4	85.2	86.1	86.9	87.7
10000	78.1	79.1	80.2	80.9	81.8	82.7	83.6	84.4	85.3	86.2	87.0	87.8	88.7
12000	78.8	79.8	80.9	81.6	82.5	83.4	84.3	85.2	86.1	86.9	87.8	88.6	89.5
14000	79.6	80.5	81.7	82.4	83.3	84.2	85.1	86.0	86.9	87.8	88.6	89.5	90.3
16000	80.2	81.2	82.3	83.1	84.0	84.9	85.8	86.7	87.6	88.5	89.3	90.2	91.1
18000	80.9	81.9	83.0	83.8	84.7	85.7	86.6	87.5	88.4	89.3	90.1	91.0	91.8
20000	82.3	83.3	84.4	85.2	86.2	87.1	88.0	89.0	89.9	90.8	91.7	92.5	93.4
22000	83.3	84.3	85.5	86.2	87.2	88.1	89.1	90.0	90.9	91.8	92.8	93.6	93.5
24000	84.3	85.3	86.5	87.3	88.3	89.3	90.2	91.2	92.1	93.0	93.8	93.7	92.5
26000	85.5	86.5	87.7	88.5	89.5	90.5	91.4	92.4	93.3	93.9	93.8	92.7	92.0
28000	86.5	87.5	88.7	89.5	90.5	91.5	92.5	93.5	94.0	93.4	92.8	92.2	91.3
30000	87.7	88.7	90.0	90.8	91.8	92.8	93.8	94.2	93.5	92.9	92.3	91.4	90.4
32000	89.1	90.2	91.4	92.3	93.3	94.3	94.3	93.5	92.9	92.3	91.4	90.4	90.1
34000	89.6	90.6	91.9	92.7	93.8	94.1	93.5	93.0	92.3	91.5	90.5	89.9	-
36000	90.0	91.1	92.3	93.2	93.8	93.4	92.9	92.3	91.5	90.5	89.7	-	-
37000	90.0	91.1	92.3	93.2	94.1	94.0	93.1	92.4	91.6	90.6	89.9	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE OFF

AIRSPEED: 200 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
0	81.5	82.2	83.0	83.7	84.4	85.1	85.8	86.5	87.2	87.8	87.6
2000	83.7	84.5	85.2	86.0	86.7	87.5	88.2	88.9	89.1	87.8	86.6
4000	86.0	86.7	87.5	88.3	89.0	89.8	90.2	89.6	88.9	88.0	87.6
6000	87.6	88.4	89.1	89.9	90.7	91.0	90.2	89.7	88.9	88.5	-
8000	88.5	89.4	90.1	90.9	91.4	90.7	90.2	89.6	89.1	-	-
10000	89.5	90.3	91.1	91.8	91.7	90.7	90.1	89.4	-	-	-
12000	90.3	91.1	91.9	92.0	91.1	90.5	89.8	89.6	-	-	-
14000	91.2	92.0	92.2	91.5	90.9	90.2	89.9	-	-	-	-
16000	91.9	92.5	91.9	91.3	90.6	90.2	-	-	-	-	-
18000	92.7	92.8	91.6	91.0	90.4	-	-	-	-	-	-
20000	93.4	92.0	91.4	90.8	-	-	-	-	-	-	-
22000	92.3	91.6	90.9	90.7	-	-	-	-	-	-	-
24000	91.8	91.1	90.7	-	-	-	-	-	-	-	-
26000	91.2	90.6	-	-	-	-	-	-	-	-	-
28000	90.4	-	-	-	-	-	-	-	-	-	-
30000	-	-	-	-	-	-	-	-	-	-	-
32000	-	-	-	-	-	-	-	-	-	-	-
34000	-	-	-	-	-	-	-	-	-	-	-
36000	-	-	-	-	-	-	-	-	-	-	-
37000	-	-	-	-	-	-	-	-	-	-	-

N1 FOR MAXIMUM CONTINUOUS MODE

ANTI-ICE ON

AIRSPEED: 200 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
0	76.4	77.2	78.0	78.8	79.6	80.4	81.2	82.0	81.5	82.2	82.9
2000	78.5	79.3	80.2	81.0	81.8	82.6	83.4	84.2	83.7	84.5	85.2
4000	80.6	81.4	82.3	83.1	83.9	84.8	85.6	86.4	86.0	86.7	86.4
6000	82.0	82.9	83.8	84.6	85.5	86.3	87.2	88.0	87.6	86.9	86.2
8000	83.0	83.8	84.7	85.6	86.4	87.3	88.1	89.0	87.4	86.7	85.9
10000	83.8	84.7	85.6	86.5	87.4	88.2	89.1	89.9	87.8	86.8	85.7
12000	84.6	85.5	86.4	87.3	88.1	89.0	89.9	89.1	86.9	85.9	84.9
14000	85.4	86.3	87.2	88.1	89.0	89.6	88.8	88.0	86.0	85.1	84.1
16000	86.1	87.0	87.9	88.8	89.4	88.8	88.1	87.4	85.5	84.5	83.3
18000	86.8	87.7	88.7	89.6	89.3	88.5	87.8	87.0	84.8	83.6	82.3
20000	88.3	89.2	90.1	90.3	89.1	87.9	86.7	85.4	83.4	82.5	81.5
22000	89.3	90.3	90.1	89.1	87.9	86.7	85.5	84.7	82.8	81.9	81.0
24000	90.4	89.9	89.0	87.9	86.7	85.5	84.7	84.2	82.3	81.5	81.1
26000	89.5	88.9	87.9	86.9	85.9	85.0	84.4	83.8	81.9	81.5	-
28000	88.7	87.9	87.1	86.2	85.3	84.6	83.9	83.5	81.9	-	-
30000	87.9	87.2	86.4	85.6	84.9	84.1	83.5	82.8	-	-	-
32000	87.2	86.6	85.9	85.2	84.4	83.6	82.7	82.4	-	-	-
34000	86.6	86.0	85.4	84.6	83.8	82.8	82.2	-	-	-	-
36000	86.1	85.5	84.7	83.9	82.8	82.0	-	-	-	-	-
37000	85.8	85.2	84.3	83.5	82.4	81.6	-	-	-	-	-

N1 FOR ALT T/O-1 MODE

ANTI-ICE OFF

AIRSPEED: 0 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-54	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5
-1000	72.3	72.9	73.7	74.6	75.3	76.1	76.9	77.7	78.4	79.2	79.9
0	72.9	73.5	74.3	75.1	75.9	76.7	77.5	78.3	79.1	79.8	80.6
1000	73.7	74.4	75.2	76.1	76.9	77.7	78.5	79.2	80.0	80.8	81.6
2000	74.6	75.3	76.1	77.0	77.8	78.6	79.4	80.2	81.0	81.8	82.5
3000	75.6	76.2	77.1	77.9	78.8	79.6	80.4	81.2	82.0	82.8	83.6
4000	76.6	77.2	78.1	79.0	79.8	80.6	81.5	82.3	83.1	83.9	84.7
5000	77.5	78.3	79.1	80.0	80.8	81.7	82.5	83.4	84.2	85.0	85.8
6000	78.0	78.7	79.6	80.5	81.3	82.2	83.0	83.9	84.7	85.5	86.3
7000	78.5	79.2	80.1	81.0	81.8	82.7	83.5	84.4	85.2	86.0	86.8
8000	78.9	79.6	80.5	81.4	82.2	83.1	84.0	84.8	85.6	86.5	87.3
9000	79.3	80.1	80.9	81.8	82.7	83.6	84.4	85.3	86.1	86.9	87.8
10000	79.7	80.5	81.4	82.2	83.1	84.0	84.8	85.7	86.5	87.4	88.2
11000	80.1	80.8	81.7	82.6	83.5	84.4	85.3	86.1	87.0	87.8	88.6
12000	80.5	81.2	82.1	83.0	83.9	84.8	85.7	86.5	87.4	88.2	89.0
13000	80.9	81.7	82.6	83.5	84.4	85.2	86.1	87.0	87.8	88.7	89.5
14000	81.4	82.1	83.1	84.0	84.9	85.7	86.6	87.5	88.3	89.2	90.0
15000	81.9	82.6	83.6	84.5	85.4	86.3	87.1	88.0	88.9	89.7	90.6
16000	82.6	83.3	84.3	85.2	86.1	87.0	87.9	88.8	89.6	90.5	91.4

N1 FOR ALT T/O-1 MODE

ANTI-ICE OFF

AIRSPEED: 0 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	0	5	10	15	20	25	30	35	40	45	50
-1000	80.7	81.4	82.2	82.9	83.6	84.3	85.0	85.7	86.4	87.1	87.3
0	81.3	82.1	82.8	83.5	84.3	85.0	85.7	86.4	87.1	87.7	87.5
1000	82.3	83.1	83.8	84.5	85.3	86.0	86.7	87.4	88.1	88.1	86.9
2000	83.3	84.1	84.8	85.6	86.3	87.0	87.8	88.5	88.6	87.7	87.1
3000	84.3	85.1	85.9	86.6	87.4	88.1	88.9	89.2	88.4	87.8	87.3
4000	85.5	86.2	87.0	87.8	88.5	89.3	89.8	89.1	88.5	87.8	87.6
5000	86.6	87.4	88.2	88.9	89.7	90.3	90.2	89.1	88.5	87.9	-
6000	87.1	87.9	88.7	89.5	90.2	90.6	89.7	89.1	88.5	88.0	-
7000	87.6	88.4	89.2	90.0	90.8	90.8	89.7	89.0	88.3	88.2	-
8000	88.1	88.9	89.7	90.5	91.0	90.3	89.6	88.9	88.3	-	-
9000	88.6	89.4	90.2	91.0	91.2	90.2	89.5	88.8	88.5	-	-
10000	89.0	89.8	90.6	91.4	91.3	90.1	89.4	88.6	-	-	-
11000	89.4	90.3	91.1	91.5	90.6	90.0	89.3	88.8	-	-	-
12000	89.9	90.7	91.5	91.5	90.5	89.9	89.2	89.0	-	-	-
13000	90.4	91.2	91.8	91.1	90.5	89.8	89.1	-	-	-	-
14000	90.9	91.7	92.0	91.1	90.4	89.7	89.3	-	-	-	-
15000	91.4	92.2	92.1	91.0	90.3	89.5	-	-	-	-	-
16000	92.2	92.5	91.5	90.8	90.1	89.6	-	-	-	-	-

N1 FOR ALT T/O-1 MODE

ANTI-ICE ON

AIRSPEED: 0 KCAS

ROLLS-ROYCE AE3007A1P ENGINES

Pressure Altitude (ft)	Static Air Temperature - °C										
	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10
-1000	75.7	76.5	77.3	78.1	78.9	79.6	80.4	81.2	80.7	81.4	82.2
0	76.3	77.1	77.9	78.7	79.5	80.3	81.0	81.8	81.3	82.1	82.8
1000	77.2	78.0	78.8	79.6	80.4	81.2	82.0	82.8	82.3	83.1	83.8
2000	78.1	78.9	79.7	80.6	81.4	82.2	83.0	83.8	83.3	84.1	84.8
3000	79.1	79.9	80.7	81.6	82.4	83.2	84.0	84.8	84.3	85.1	85.9
4000	80.1	80.9	81.8	82.6	83.5	84.3	85.1	85.9	85.5	86.2	87.0
5000	81.1	82.0	82.9	83.7	84.5	85.4	86.2	87.0	86.6	87.4	88.1
6000	81.6	82.5	83.3	84.2	85.0	85.9	86.7	87.5	87.1	87.9	88.7
7000	82.1	83.0	83.8	84.7	85.5	86.4	87.2	88.0	87.6	88.4	89.2
8000	82.5	83.4	84.3	85.2	86.0	86.9	87.7	88.5	88.1	88.9	89.4
9000	83.0	83.8	84.7	85.6	86.5	87.3	88.1	89.0	88.6	89.4	89.3
10000	83.4	84.3	85.2	86.0	86.9	87.7	88.6	89.4	89.0	89.8	89.2
11000	83.8	84.7	85.6	86.4	87.3	88.2	89.0	89.8	89.4	89.7	88.8
12000	84.2	85.1	86.0	86.8	87.7	88.6	89.4	90.3	89.9	89.3	88.5
13000	84.6	85.5	86.4	87.3	88.2	89.0	89.9	90.7	89.8	89.0	88.3
14000	85.1	86.0	86.9	87.8	88.7	89.6	90.4	91.3	89.6	88.9	88.2
15000	85.6	86.5	87.4	88.3	89.2	90.1	90.9	91.3	89.4	88.7	88.1
16000	86.3	87.3	88.2	89.1	90.0	90.8	91.7	91.3	89.4	88.7	88.0

TAKEOFF PERFORMANCE CHARTS - ALT T/O-1 MODE - FLAPS 9°

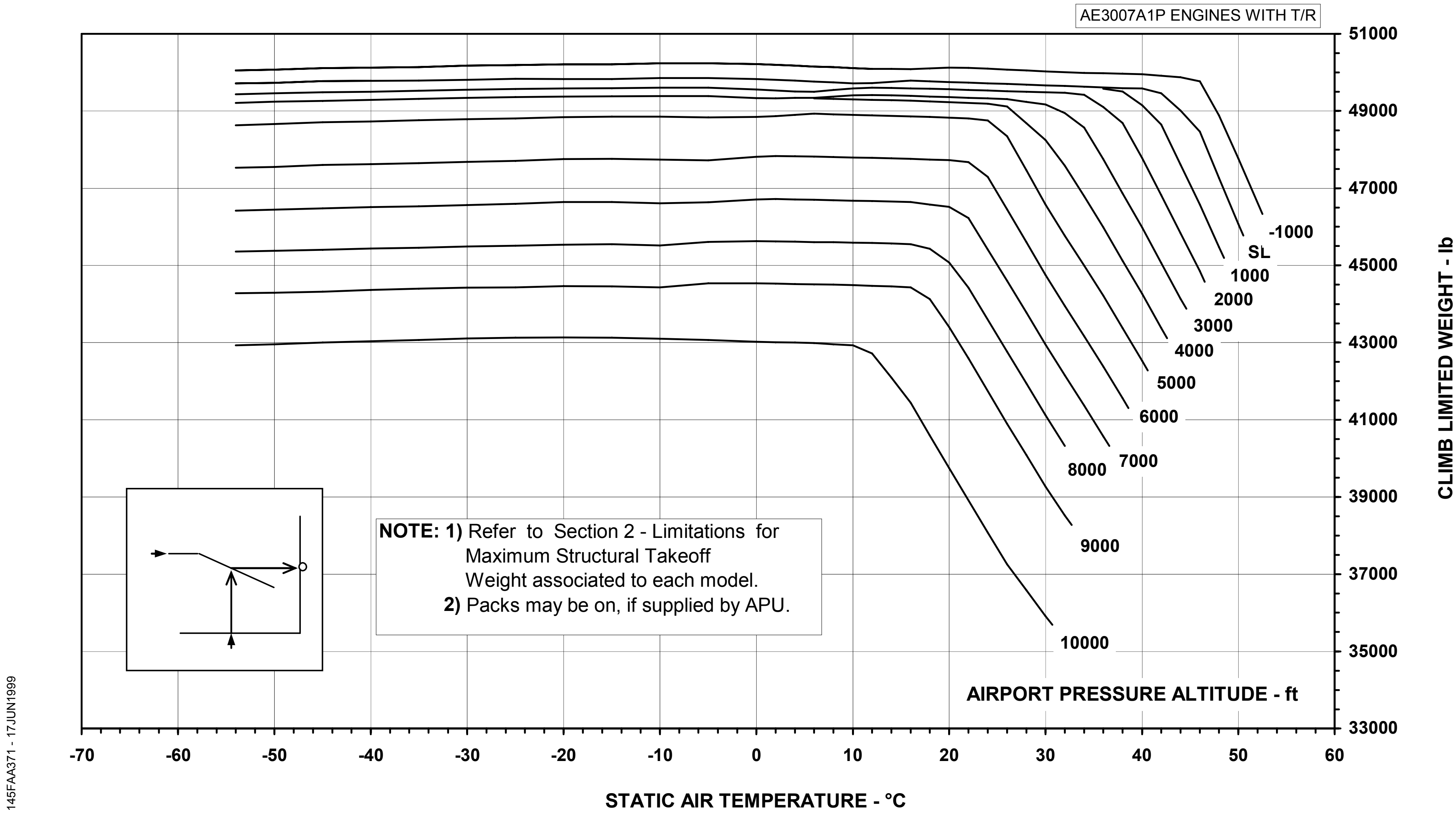
The performance charts presented herein refer to the takeoff performance with ALT T/O-1 Mode - Flaps 9°. These are balanced field length charts.

INTENTIONALLY BLANK

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

FLAPS 9°

NORMAL V_2 - ALT T/O-1 MODE - BLEED CLOSED (PACKS OFF - FADEC REF A/ICE OFF)



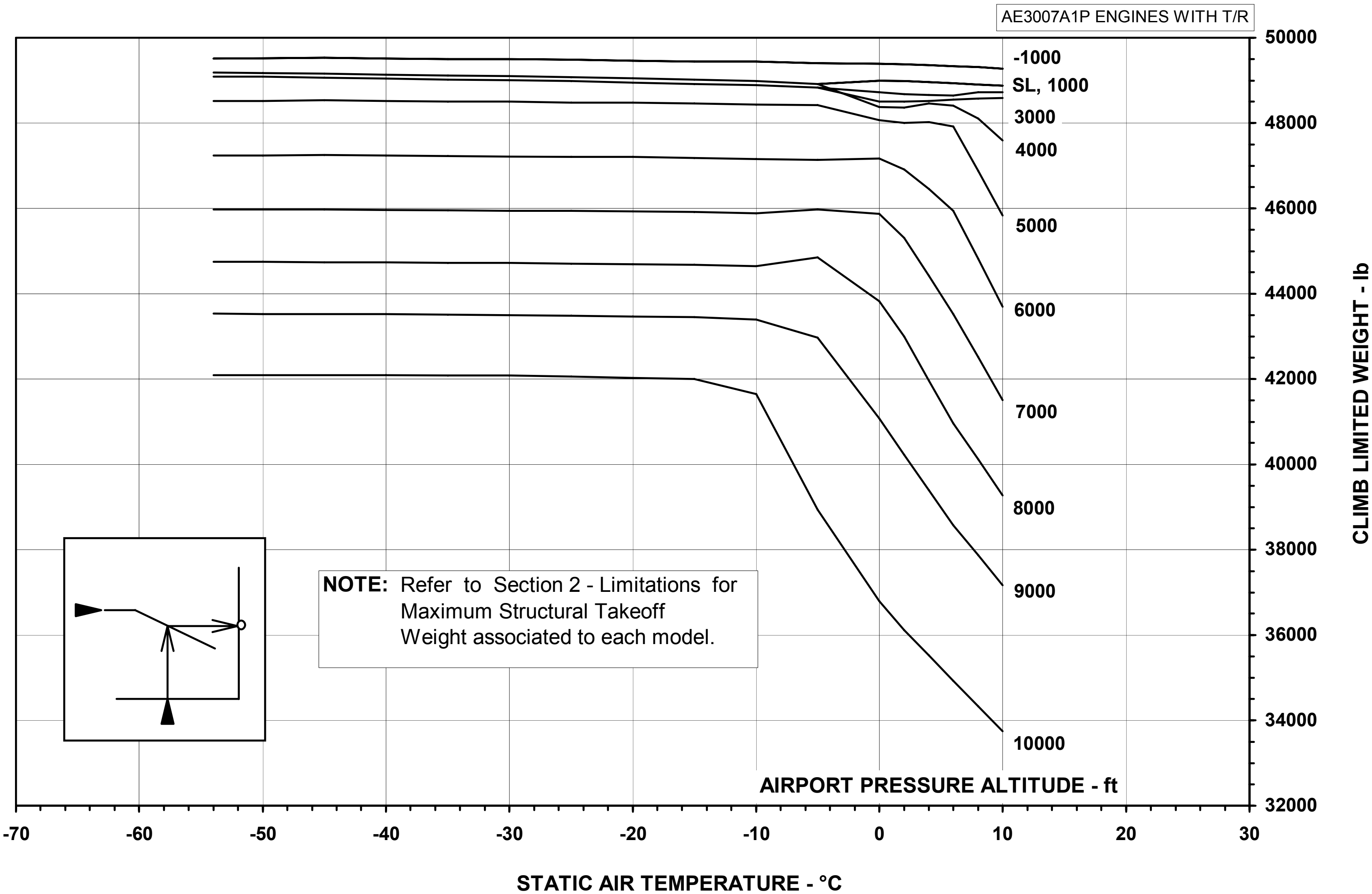
NOTE: 1) Refer to Section 2 - Limitations for Maximum Structural Takeoff Weight associated to each model.

2) Packs may be on, if supplied by APU.

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

FLAPS 9°

NORMAL V_2 - ALT T/O-1 MODE - BLEED OPEN (PACKS OFF - FADEC REF A/ICE ON)

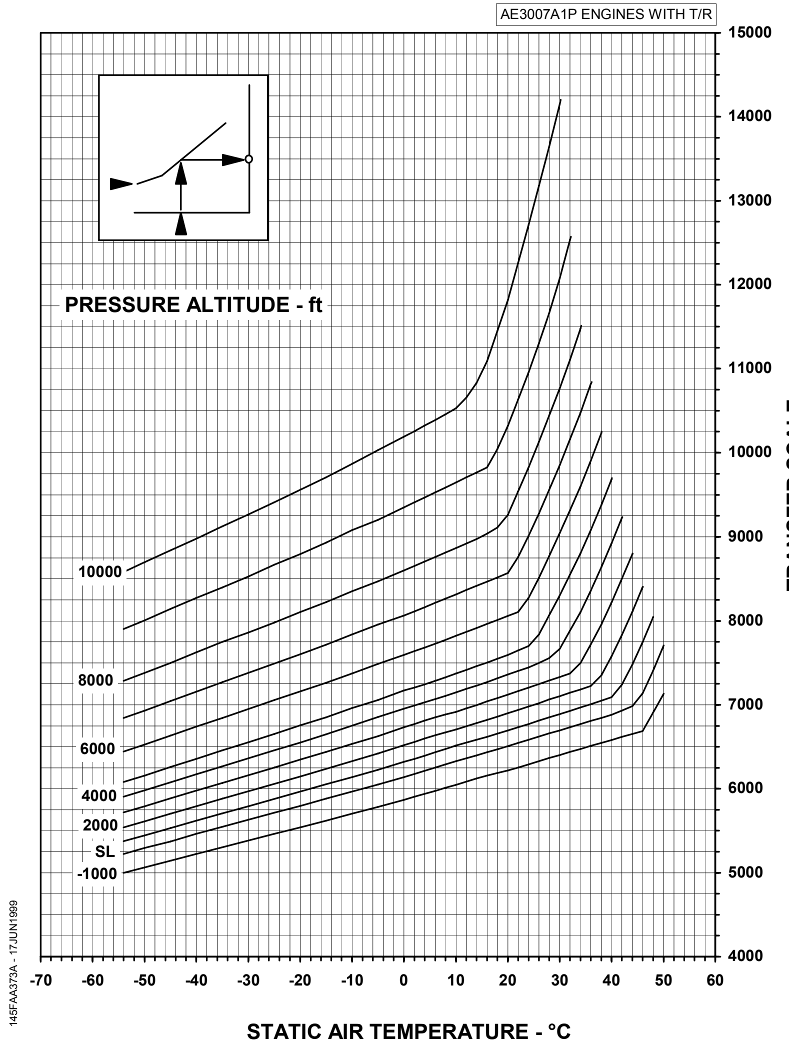


145FAA372 - 17JUN1999

MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

ALT T/O-1 MODE - FLAPS 9° - BALANCED FIELD LENGTH - NORMAL V_2 - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF

CHART 1 OF 2



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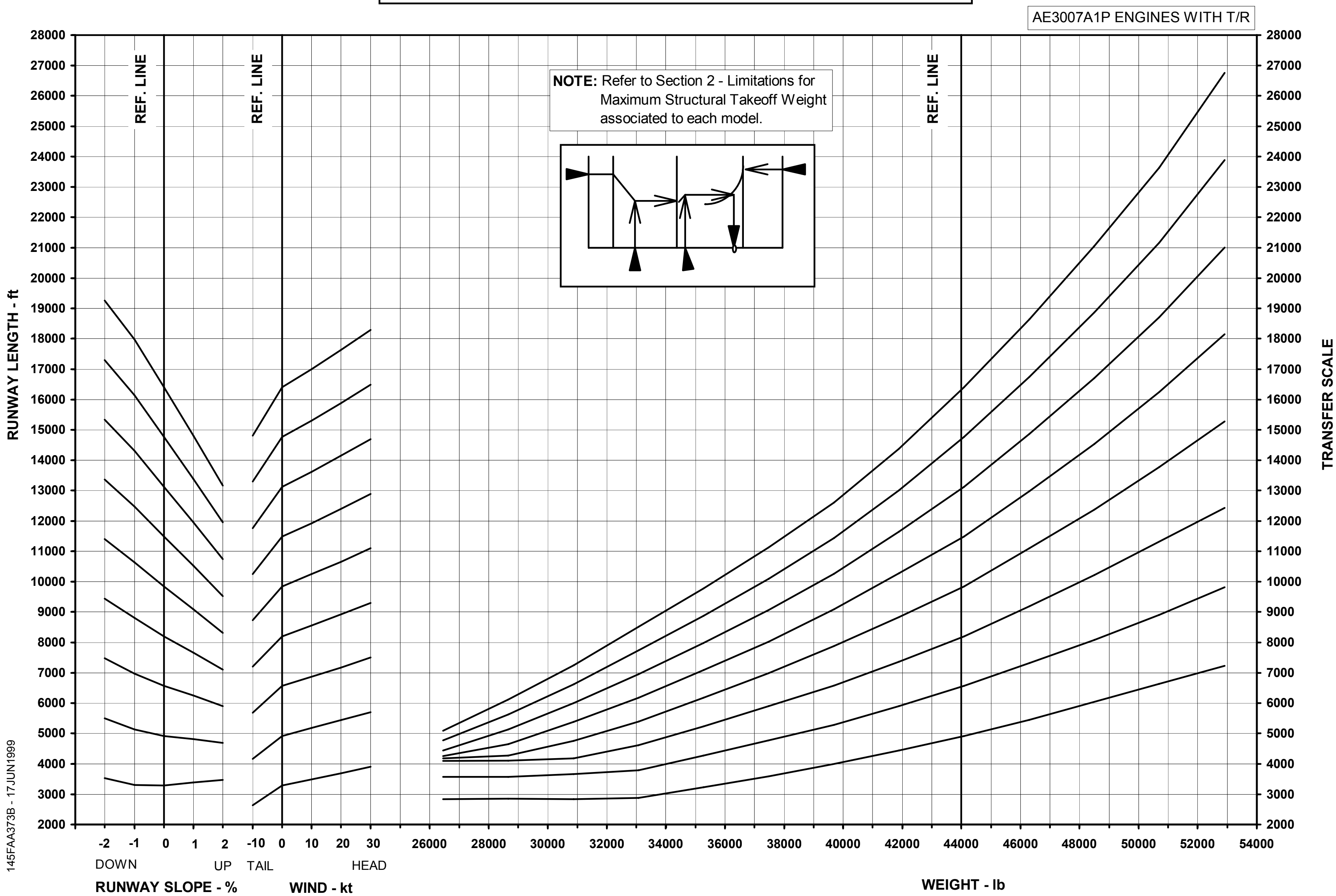
MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

ALT T/O-1 MODE - FLAPS 9° - BALANCED FIELD LENGTH - NORMAL V_2

BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF

CHART 2 OF 2

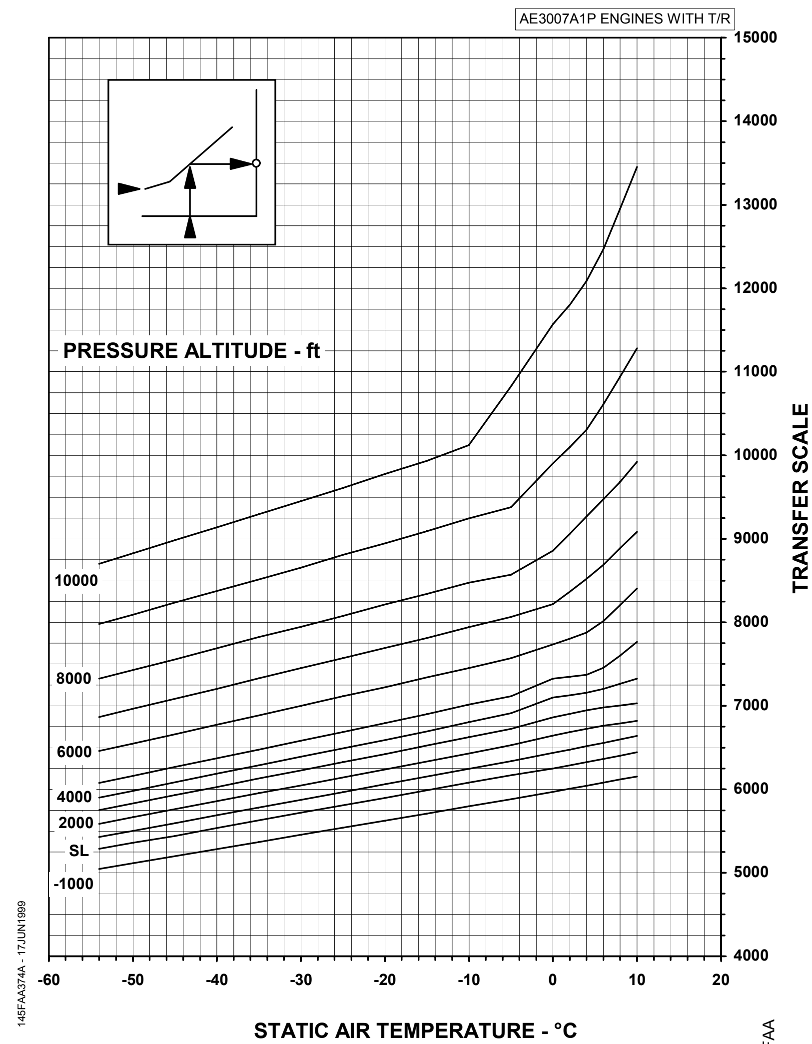


AFM-145/1153 - FAA

MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED

ALT T/O-1 MODE - FLAPS 9° - BALANCED FIELD LENGTH - NORMAL V_2 - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON

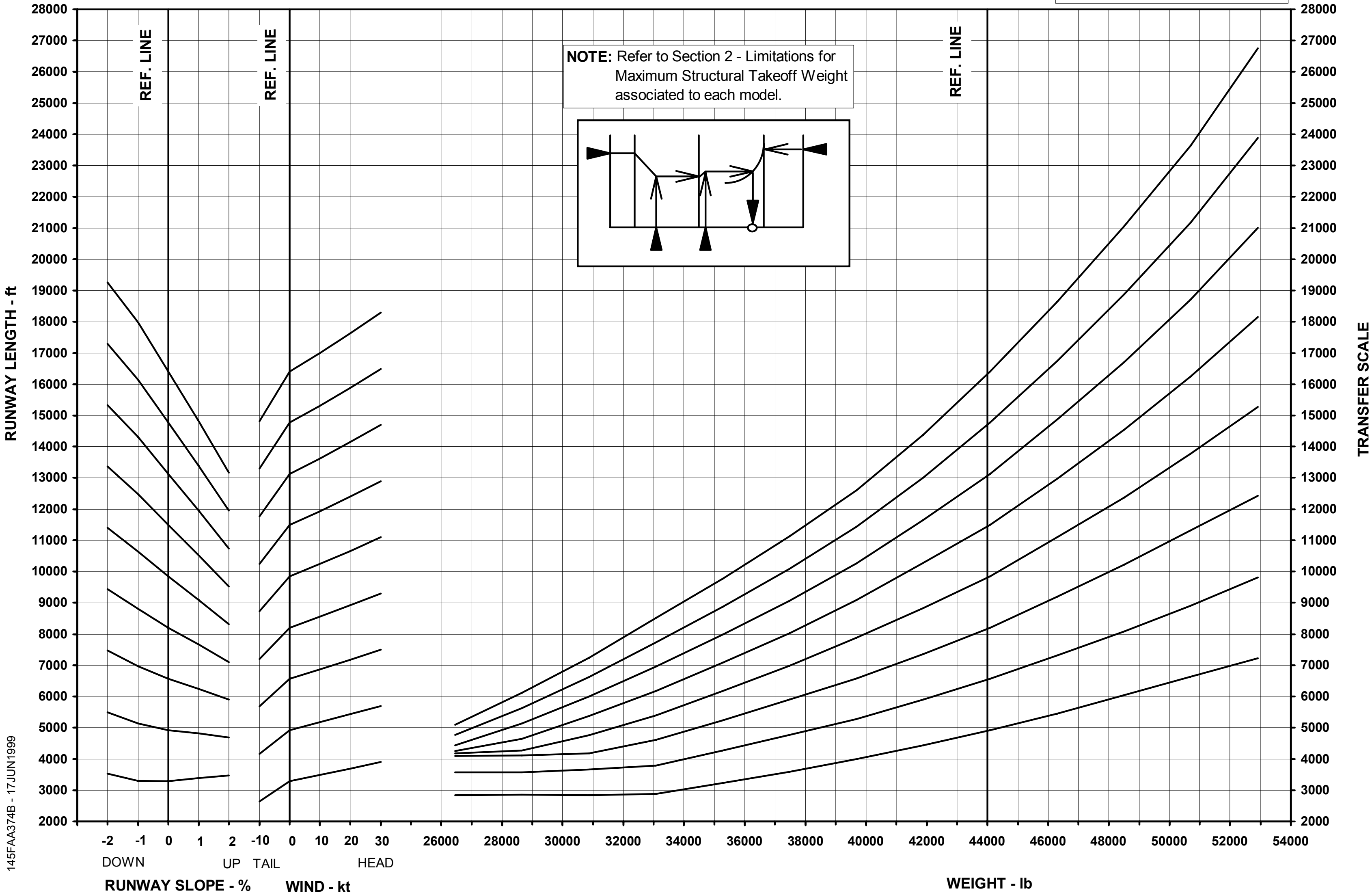
CHART 1 OF 2



MAXIMUM TAKEOFF WEIGHT - FIELD LENGTH LIMITED
ALT T/O-1 MODE - FLAPS 9° - BALANCED FIELD LENGTH - NORMAL V_2
BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON
CHART 2 OF 2

AE3007A1P ENGINES WITH T/R

NOTE: Refer to Section 2 - Limitations for Maximum Structural Takeoff Weight associated to each model.

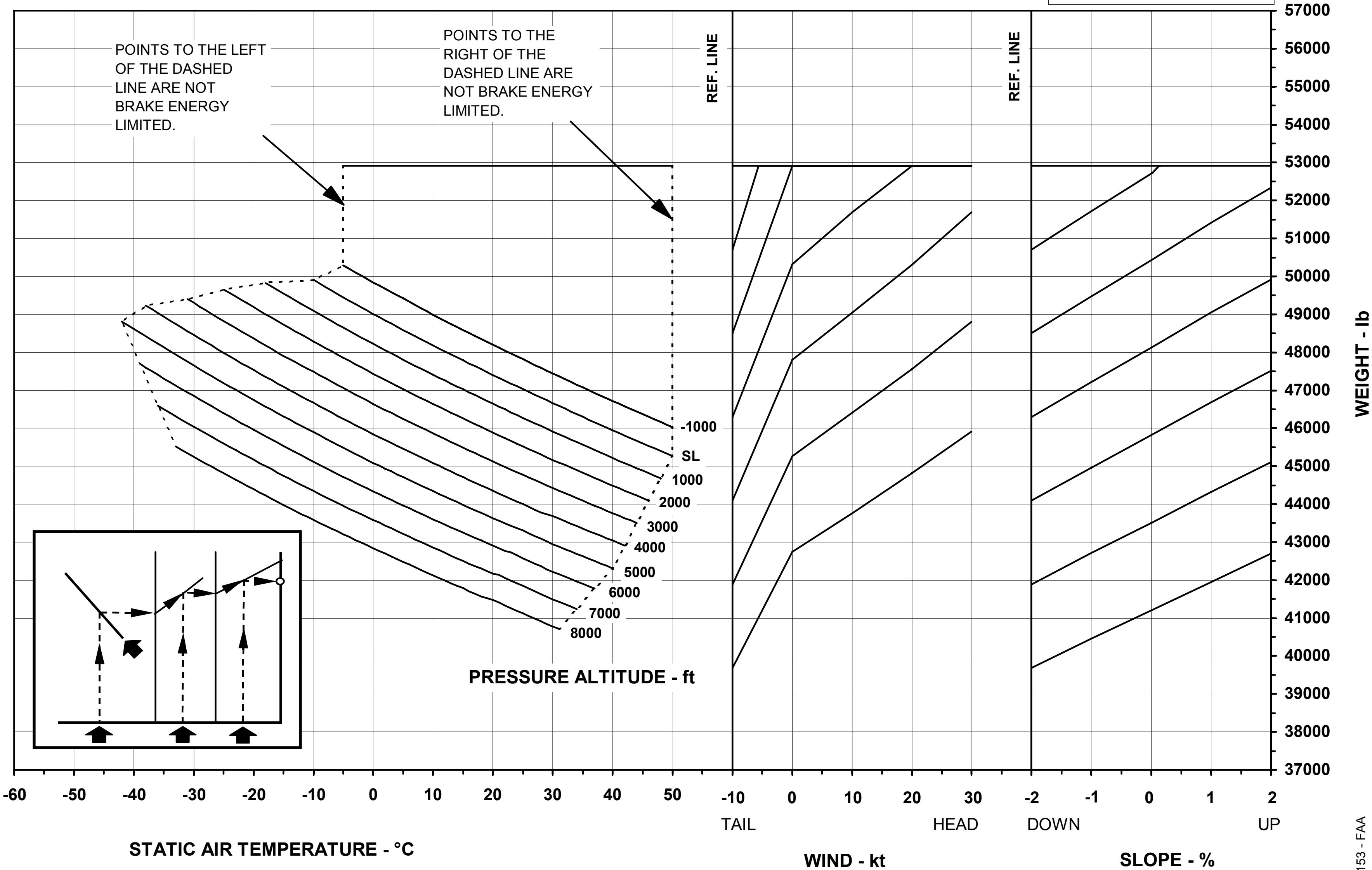


MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

ALT T/O-1 - FLAPS 9° - NORMAL V_2

AIRPLANES EQUIPPED WITH ER VERSION BRAKES

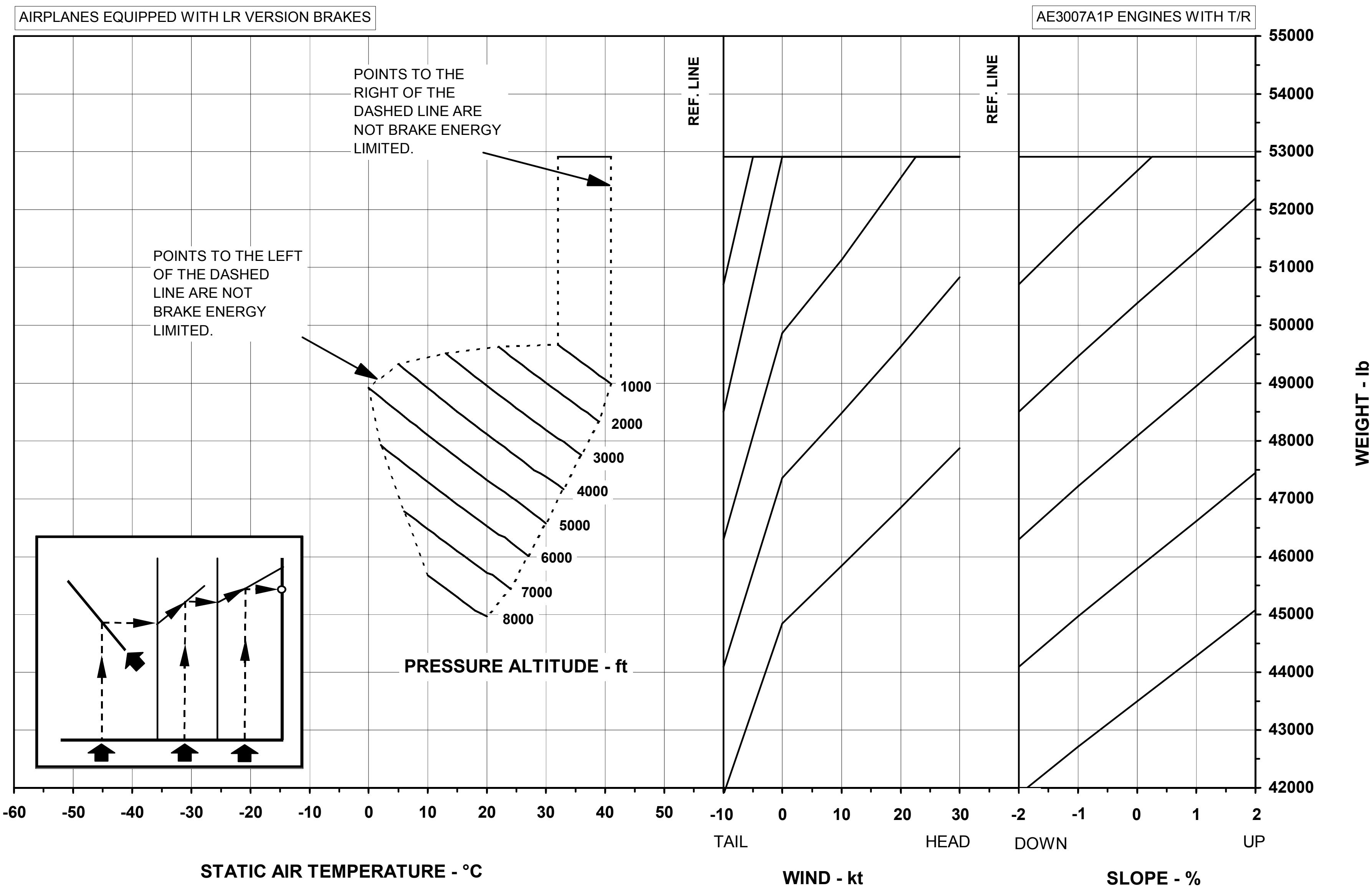
AE3007A1P ENGINES WITH T/R



145FAA399 - 10MAR2005

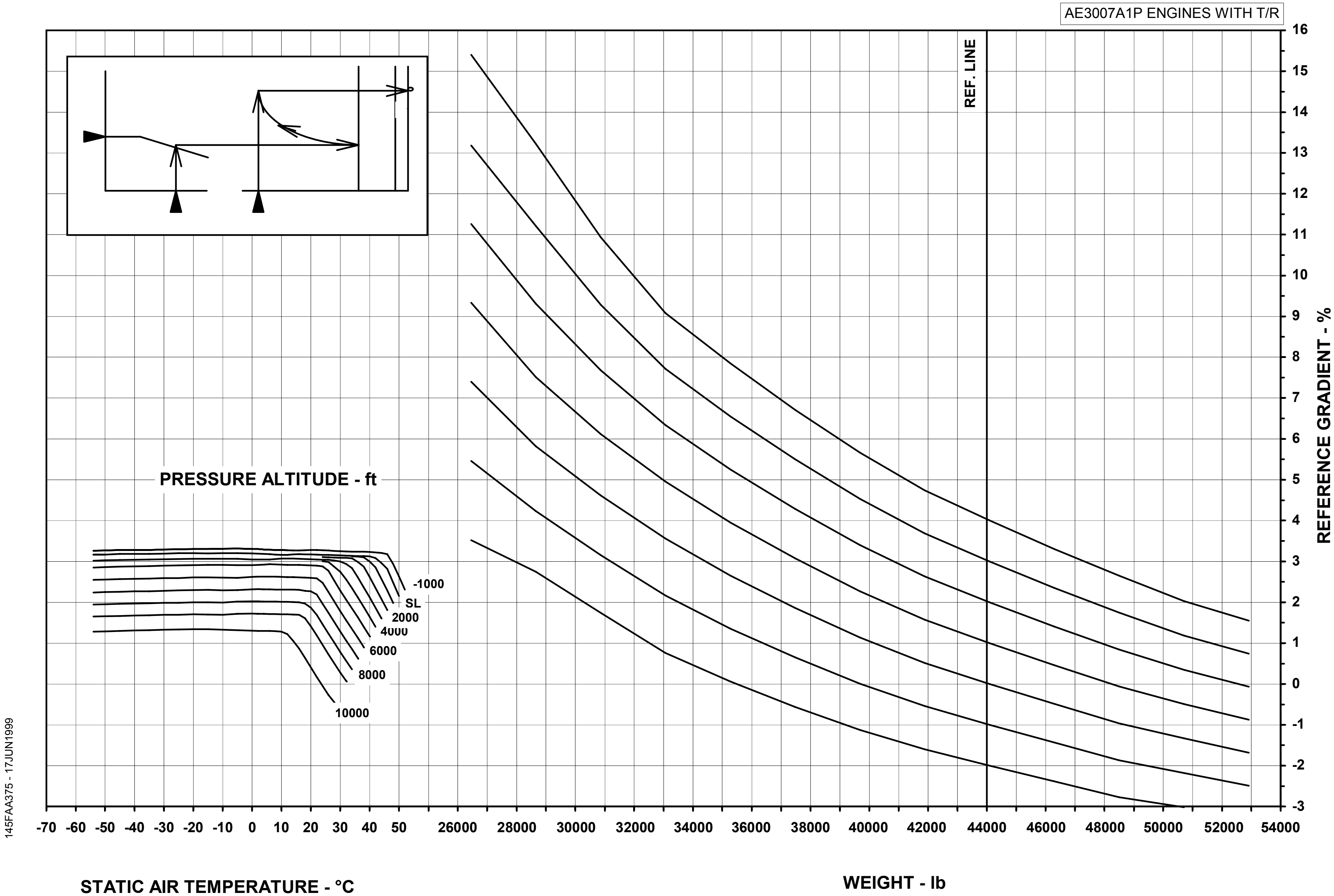
MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

ALT T/O-1 - FLAPS 9° - NORMAL V_2



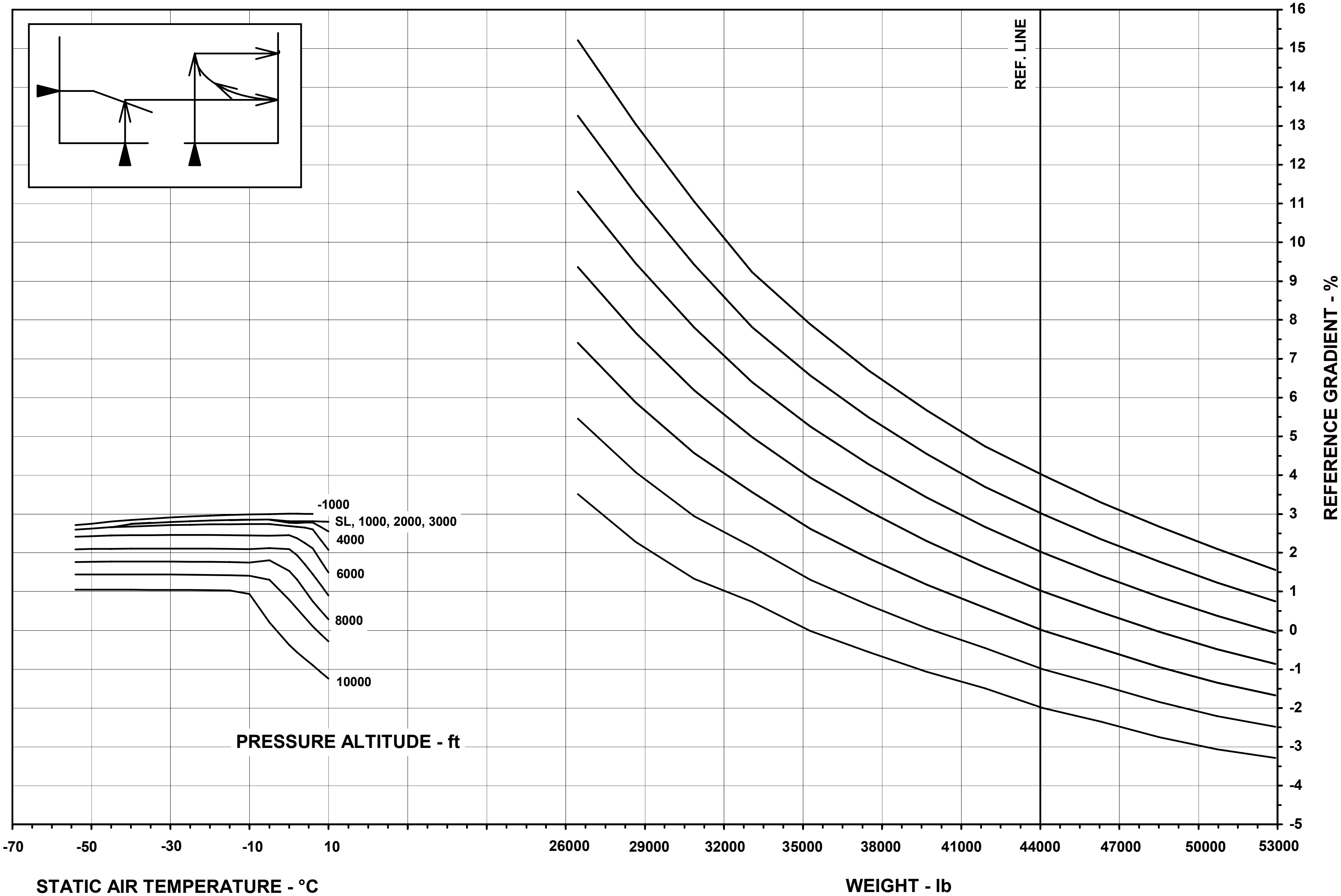
145FAA400 - 10MAR2005
AFM-145/1153 - FAA

OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 9° - ALT T/O-1 MODE - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF



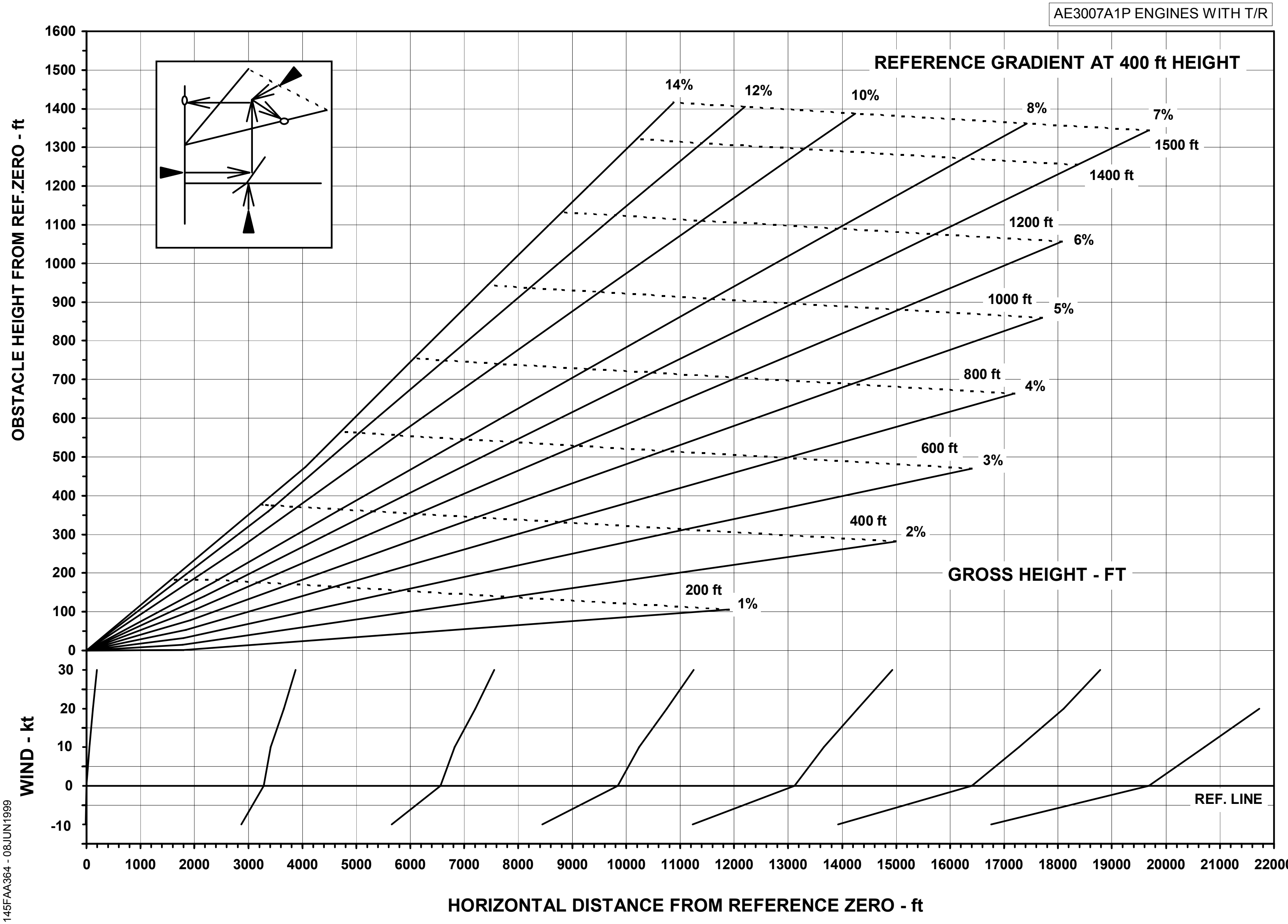
OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 9° - ALT T/O-1 MODE - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON

AE3007A1P ENGINES WITH T/R



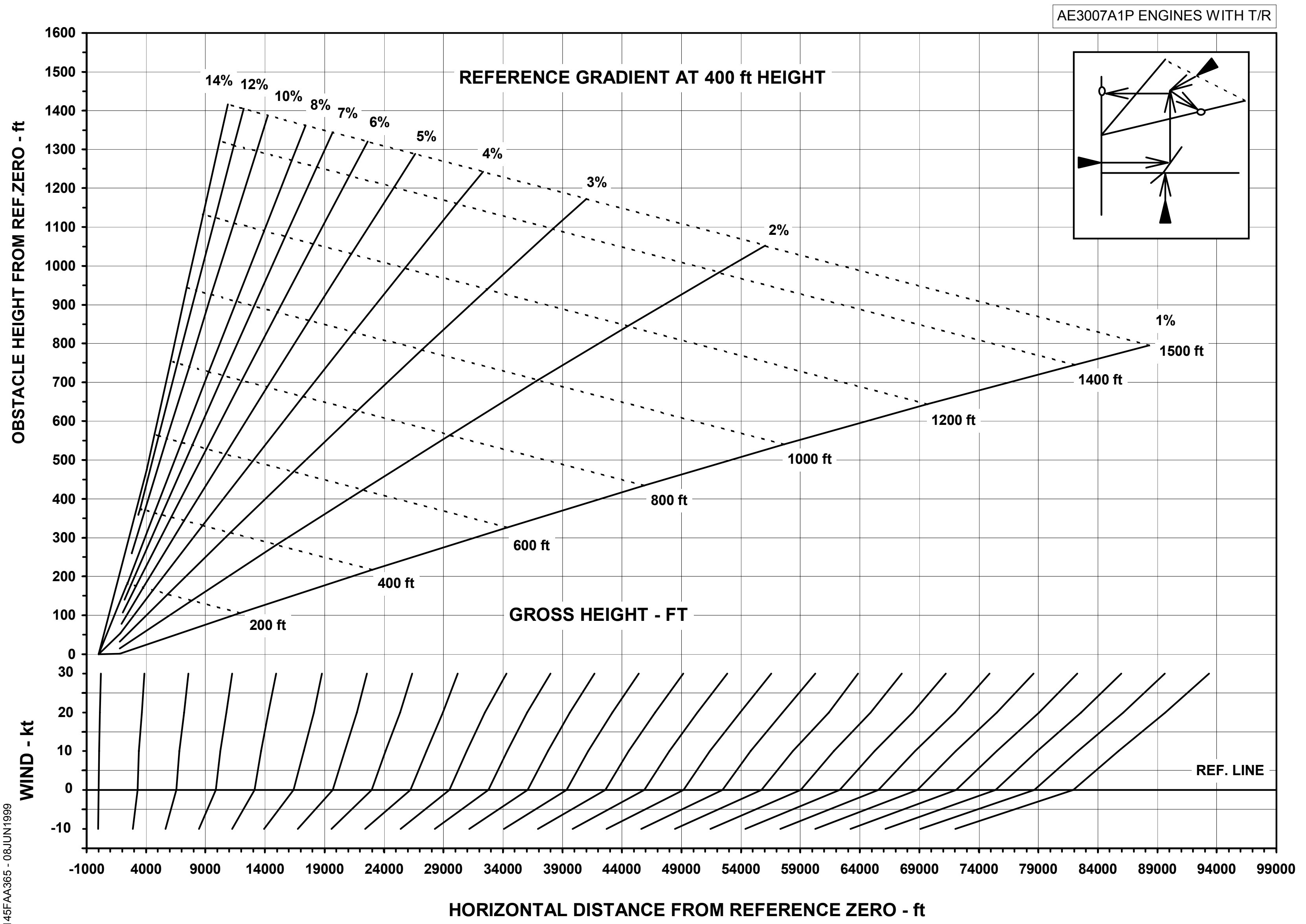
AFM-145/1153 - FAA

OBSTACLE CLEARANCE - CLOSE IN
FLAPS 9°

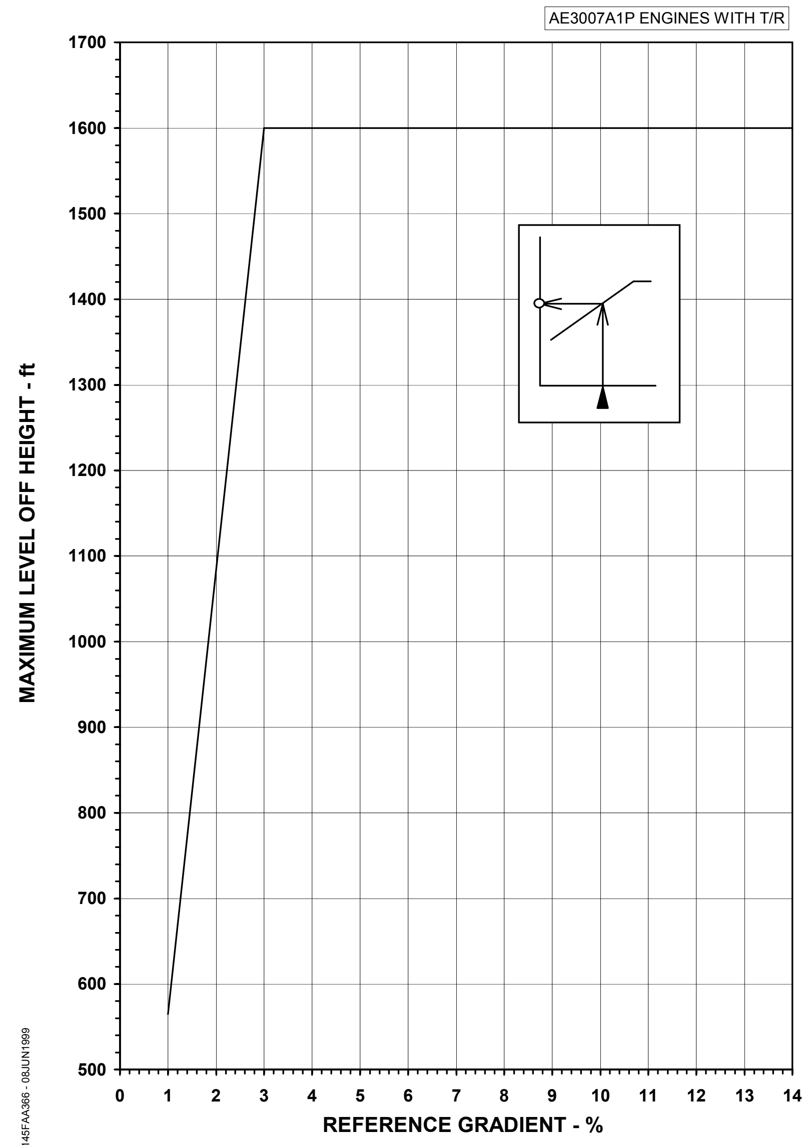


AFM-145/1153 - FAA

OBSTACLE CLEARANCE - DISTANT
FLAPS 9°



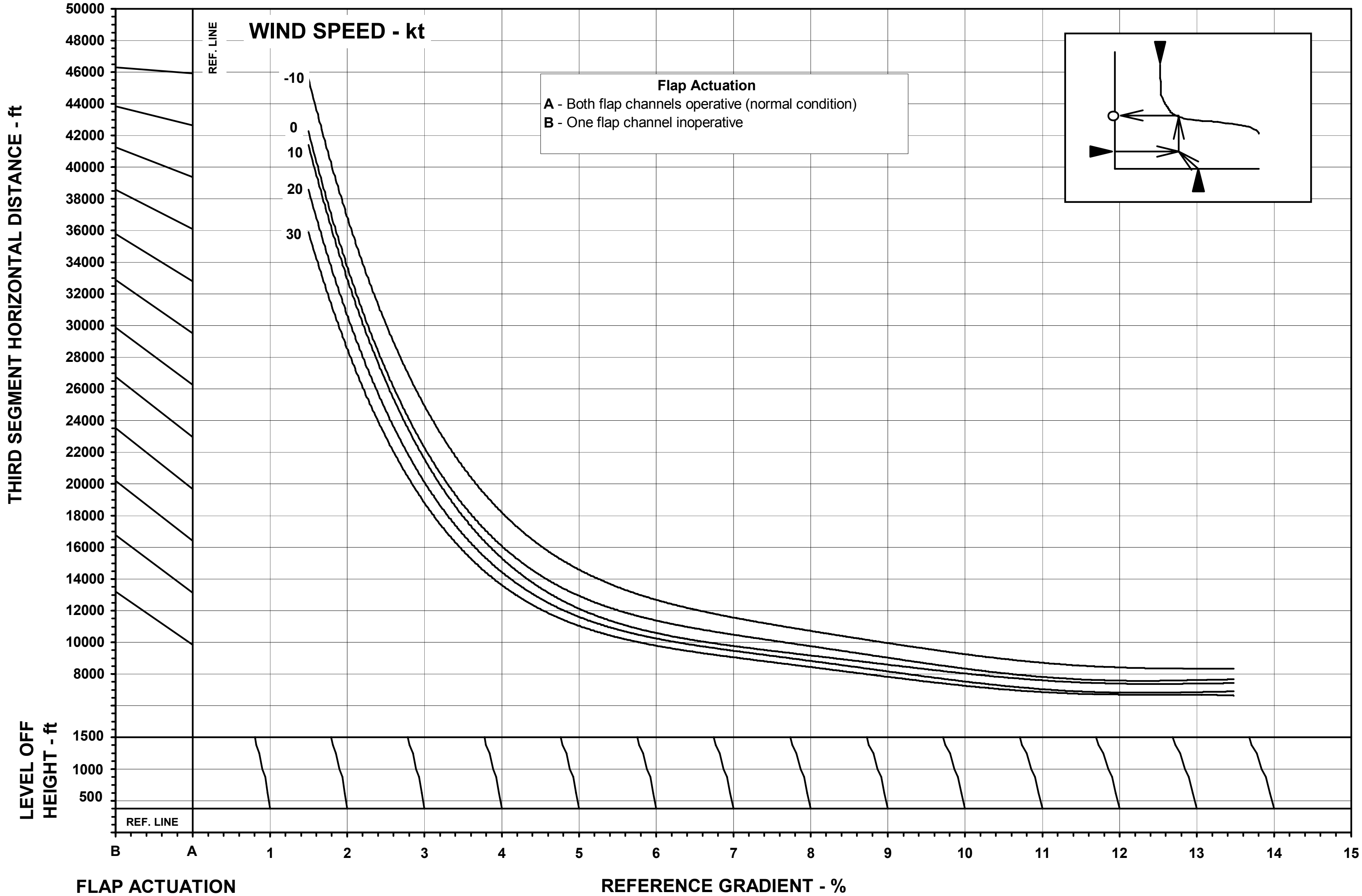
MAXIMUM LEVEL OFF HEIGHT FLAPS 9°



145FAA367 - 08JUN1999

THIRD SEGMENT HORIZONTAL DISTANCE
TAKEOFF FLAPS 9°

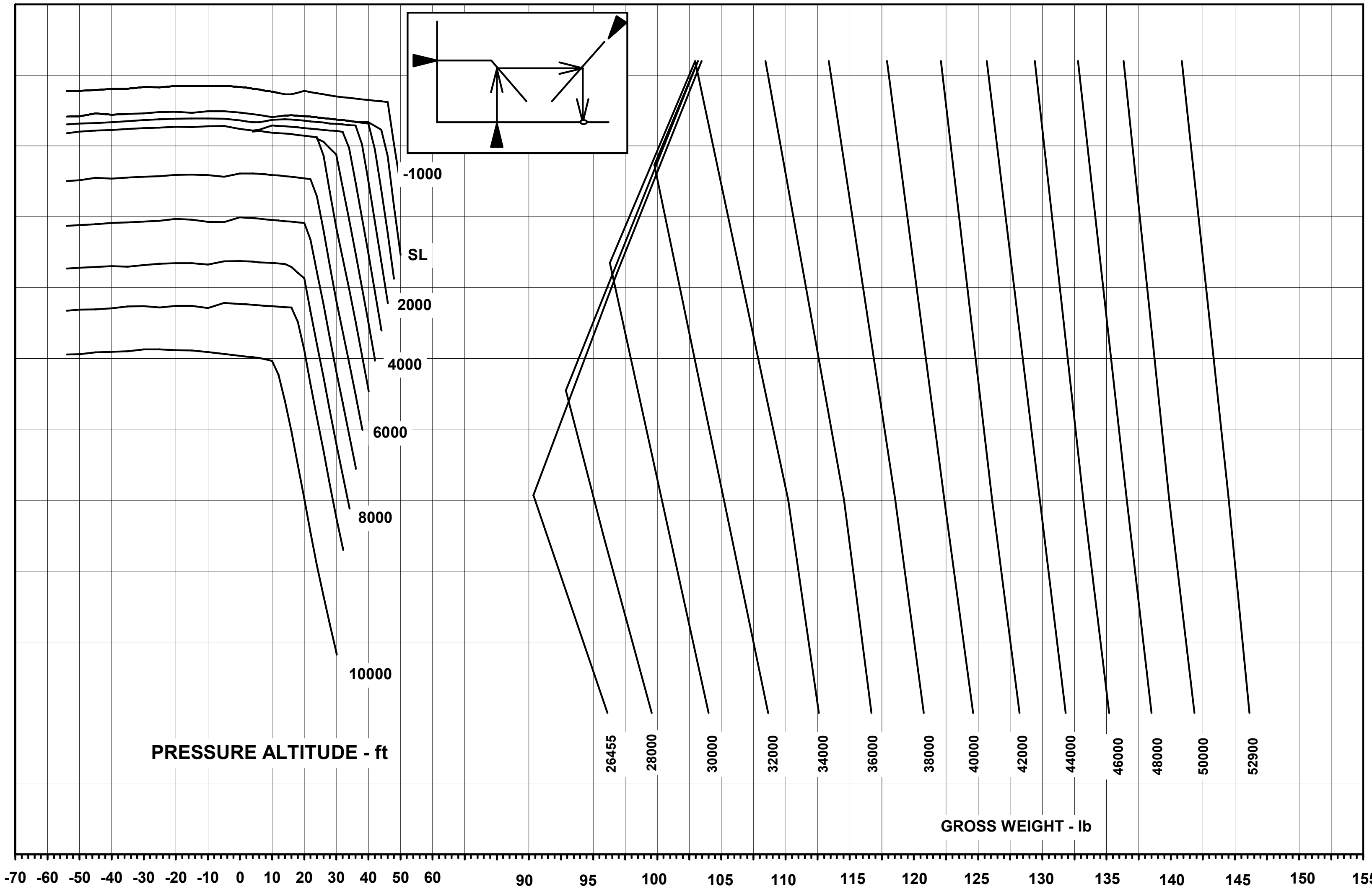
AE3007A1P ENGINES WITH T/R



TAKEOFF SPEEDS - V_1 (FOR NORMAL V_2)

FLAPS 9° - ALT T/O-1 MODE - BALANCED FIELD LENGTH

AE3007A1P ENGINES WITH T/R



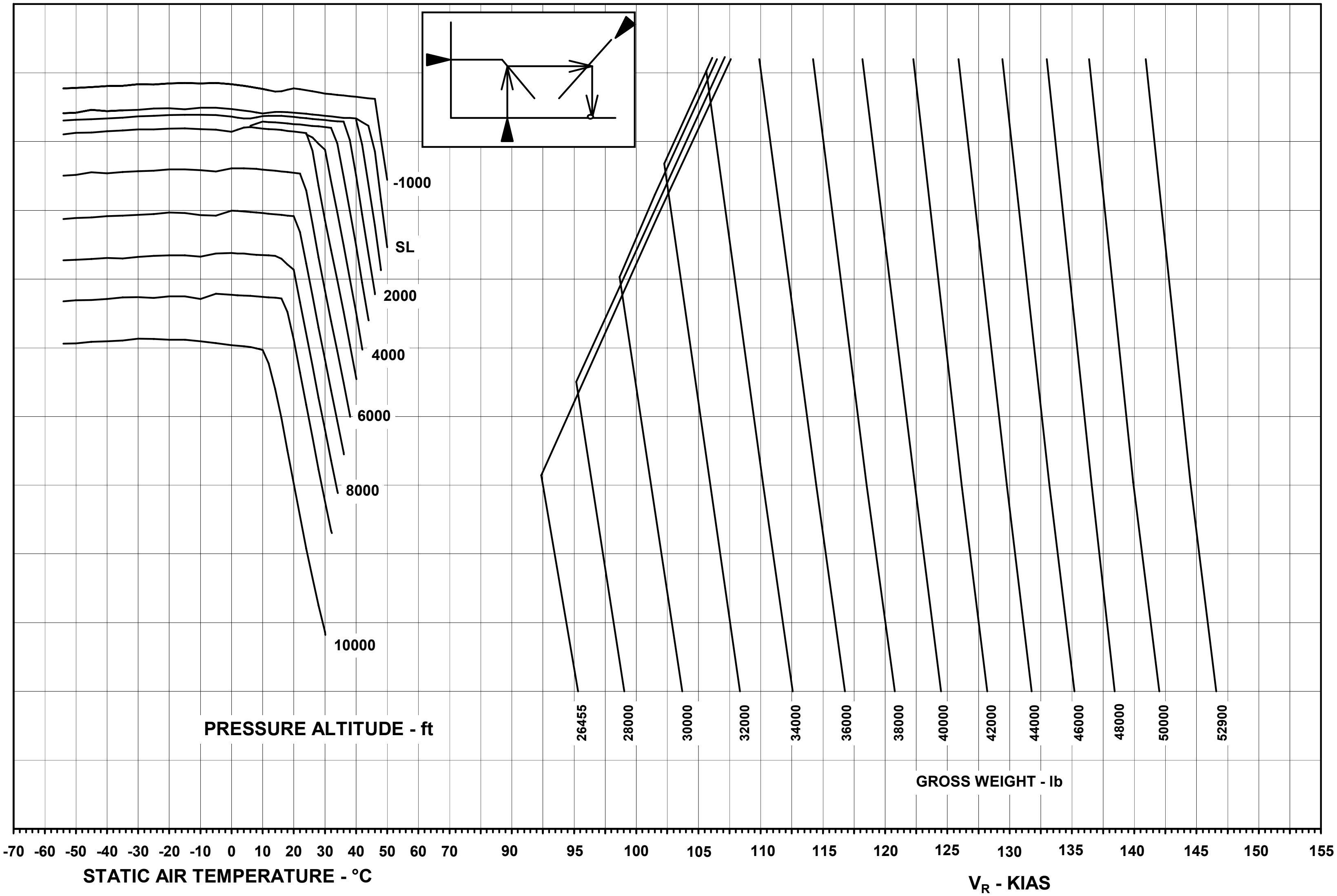
145FAA376 - 23MAR1999

AFM-145/1153 - FAA

TAKEOFF SPEEDS - V_R (FOR NORMAL V_2)

FLAPS 9° - ALT T/O-1 MODE - BALANCED FIELD LENGTH

AE3007A1P ENGINES WITH T/R

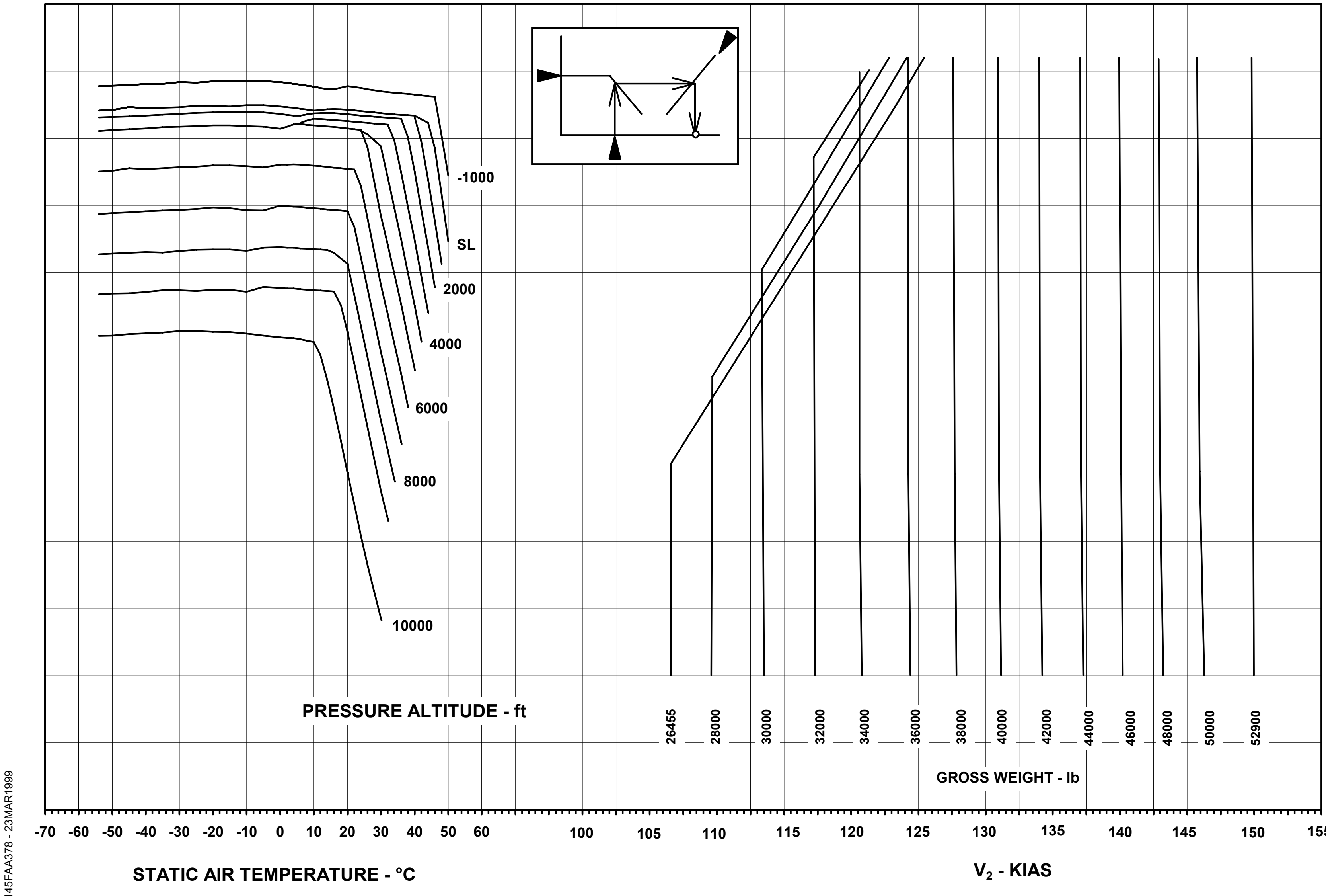


145FAA377 - 24MAR1999

TAKEOFF SPEEDS - V_2 (NORMAL)

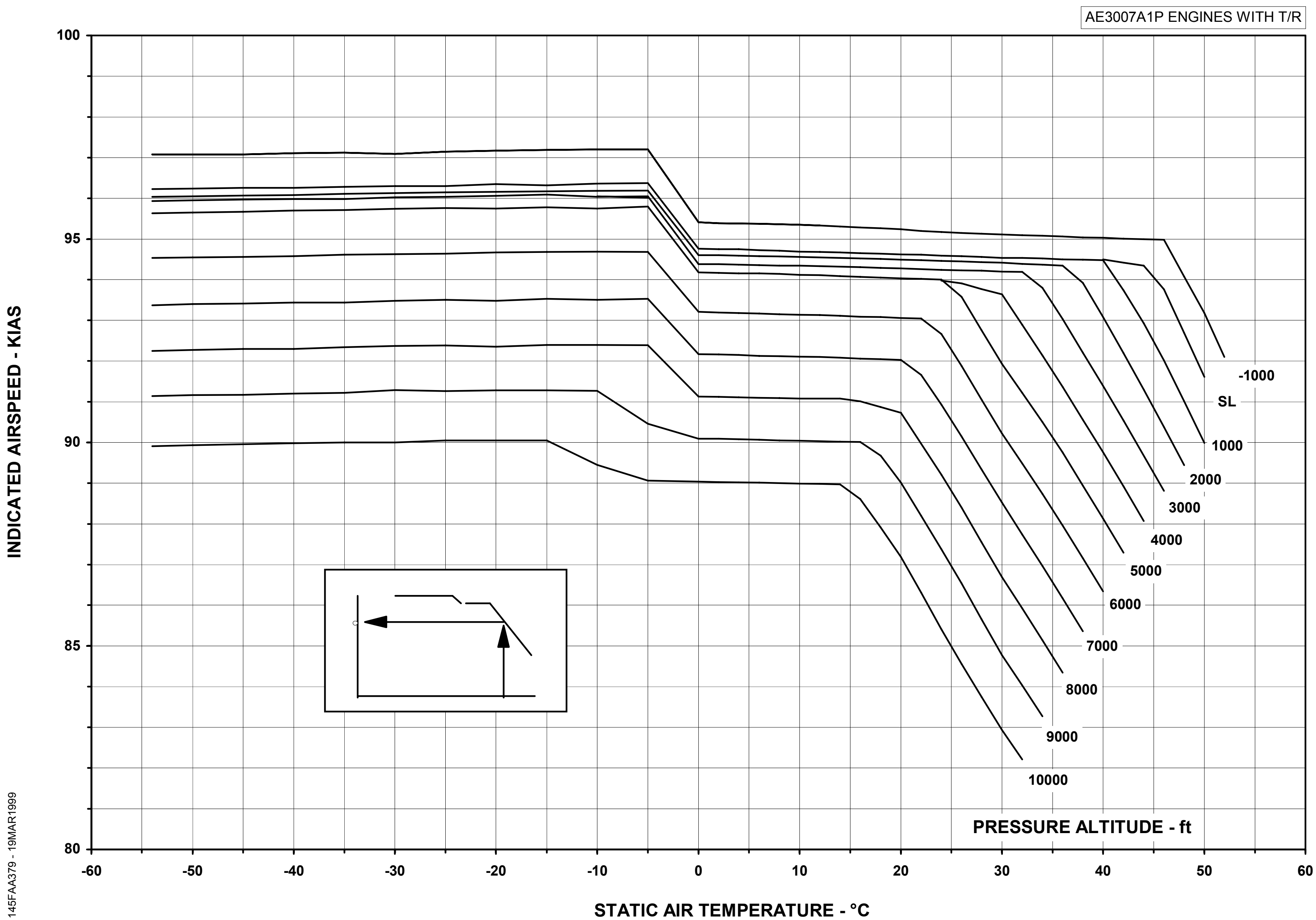
FLAPS 9° - ALT T/O-1 MODE - BALANCED FIELD LENGTH

AE3007A1P ENGINES WITH T/R

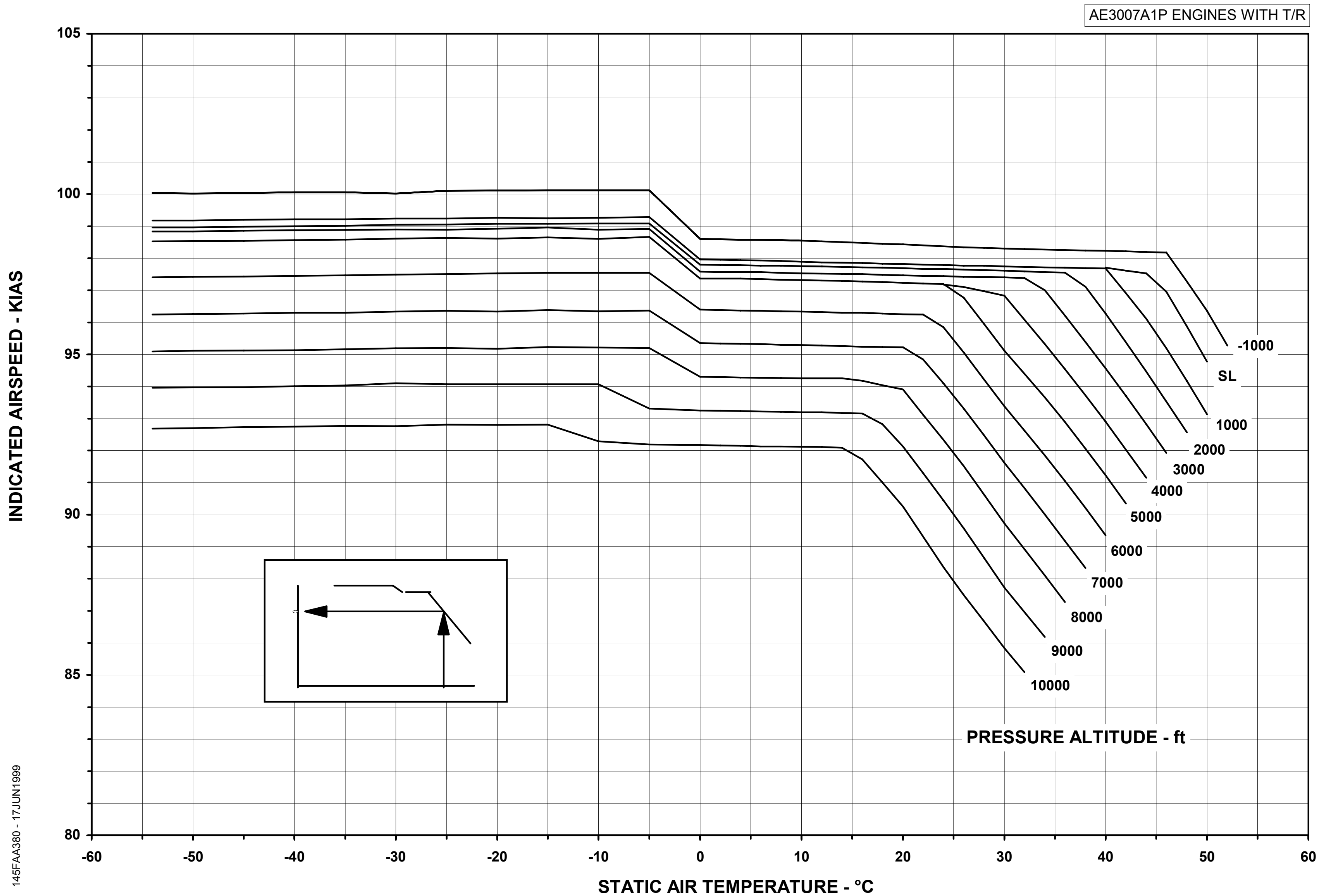


AFM-145/1153 - FAA

GROUND MINIMUM CONTROL SPEED
FLAPS 9°



AIR MINIMUM CONTROL SPEED
FLAPS 9°



AFM-145/1153 - FAA

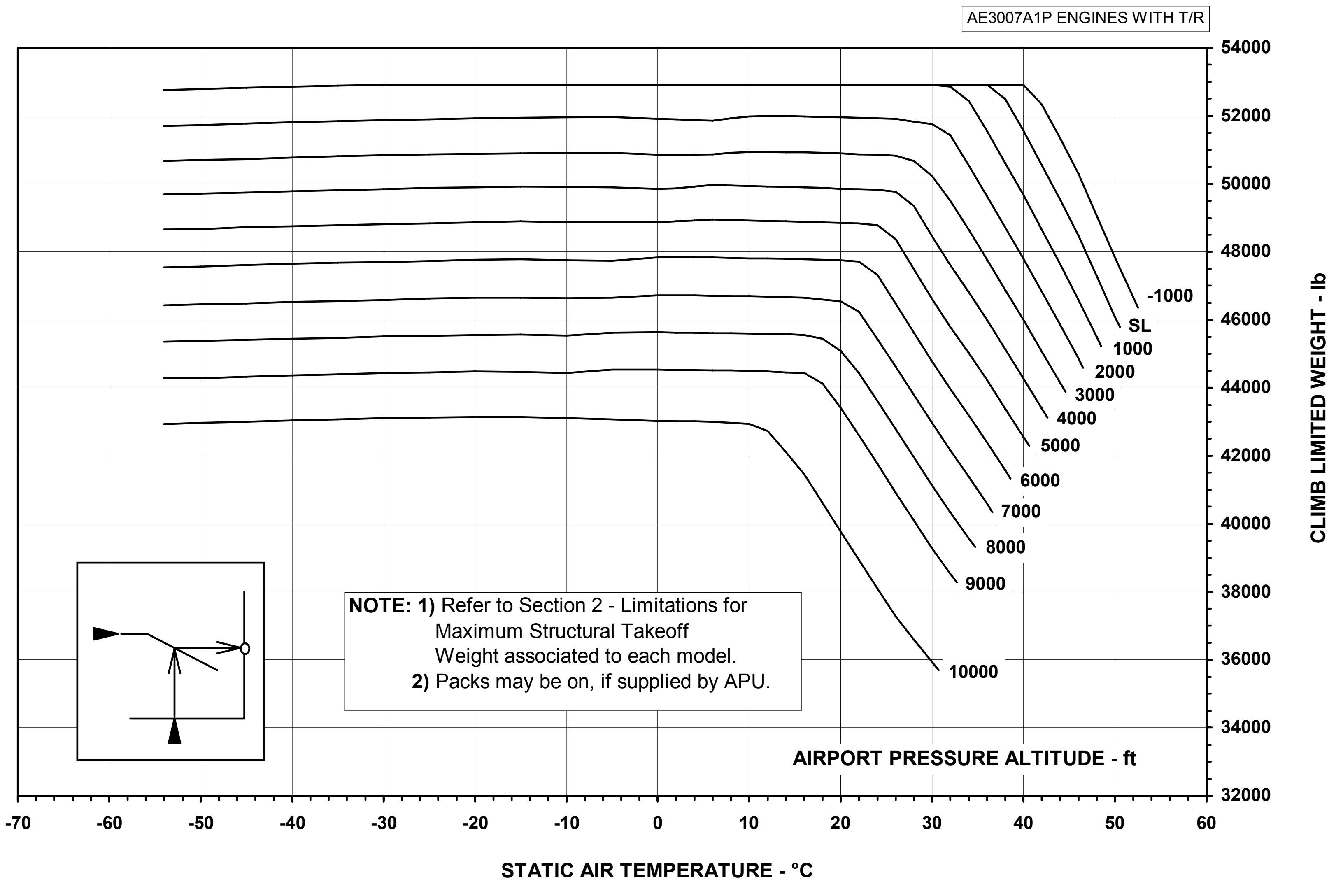
TAKEOFF PERFORMANCE CHARTS - T/O MODE - FLAPS 9°, FLAPS 18° AND FLAPS 22°

The performance charts presented herein refer to the takeoff performance with T/O Mode - Flaps 9°, Flaps 18° and 22°. These are unbalanced field length charts.

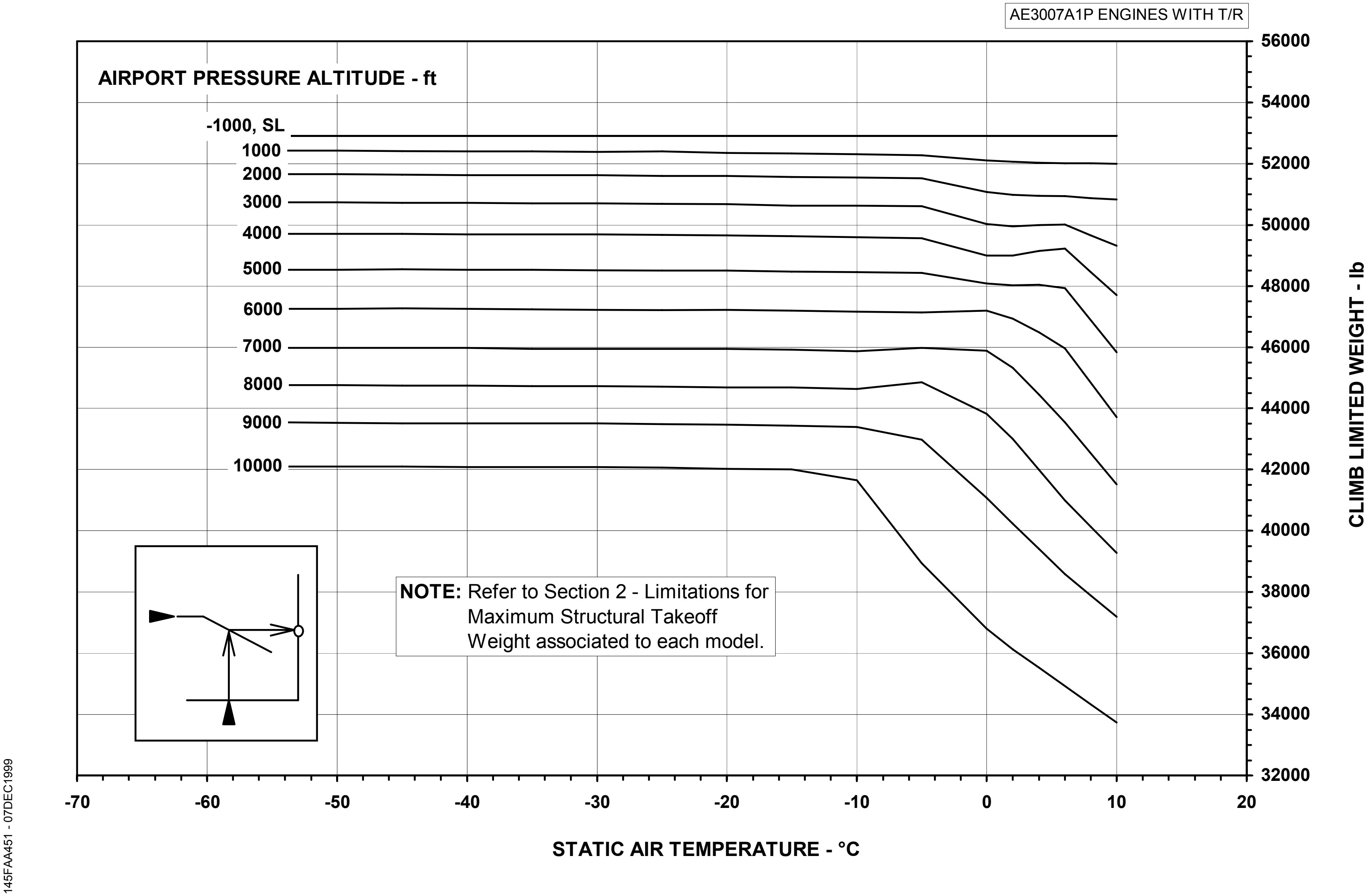
The performance charts presented herein from Final Segment up to Landing are also valid for takeoff with ALT T/O-1 - Flaps 9°.

INTENTIONALLY BLANK

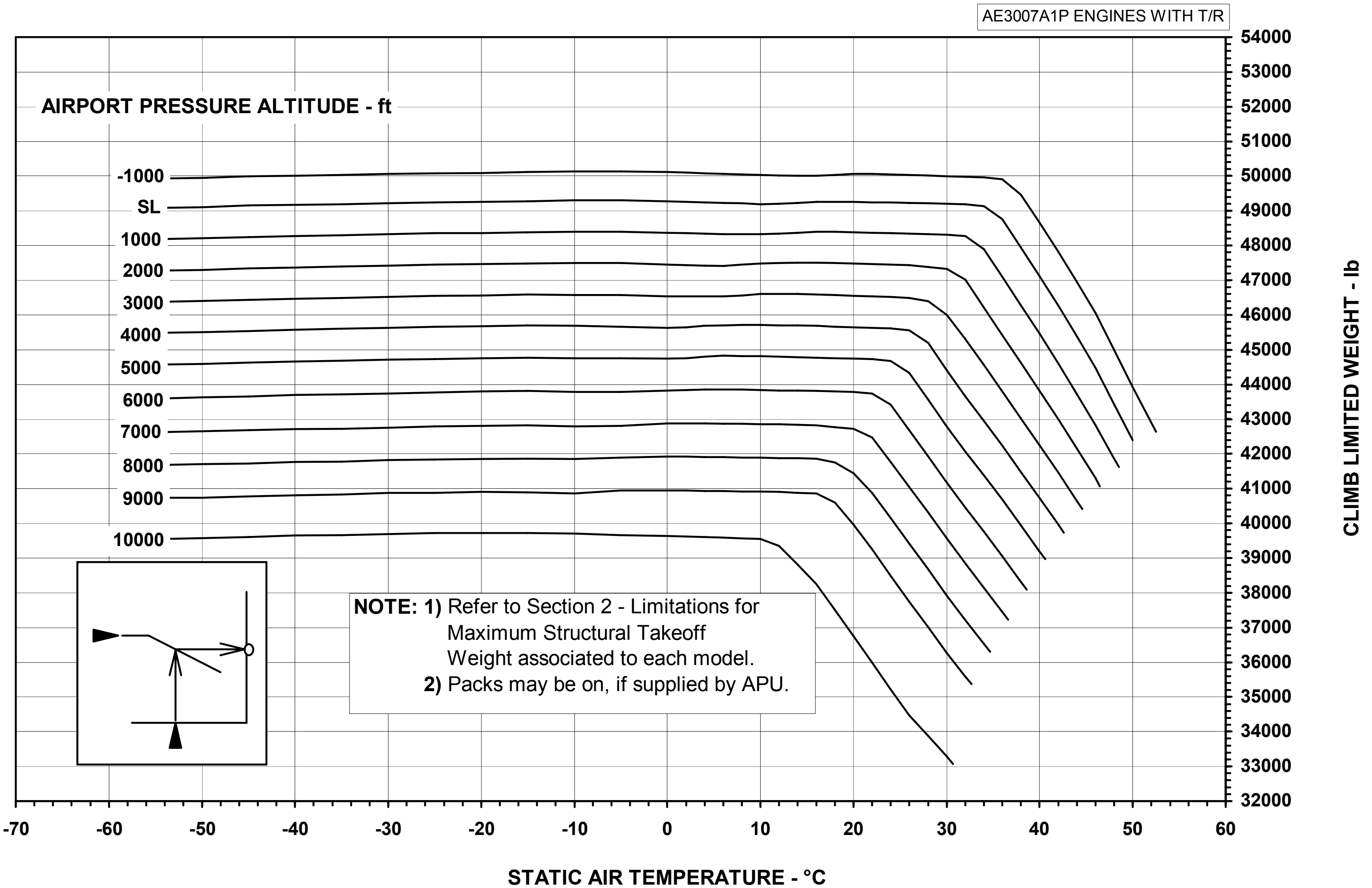
MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED
FLAPS 9°
NORMAL V_2 - T/O MODE - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF



MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED
FLAPS 9°
NORMAL V_2 - T/O MODE - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON



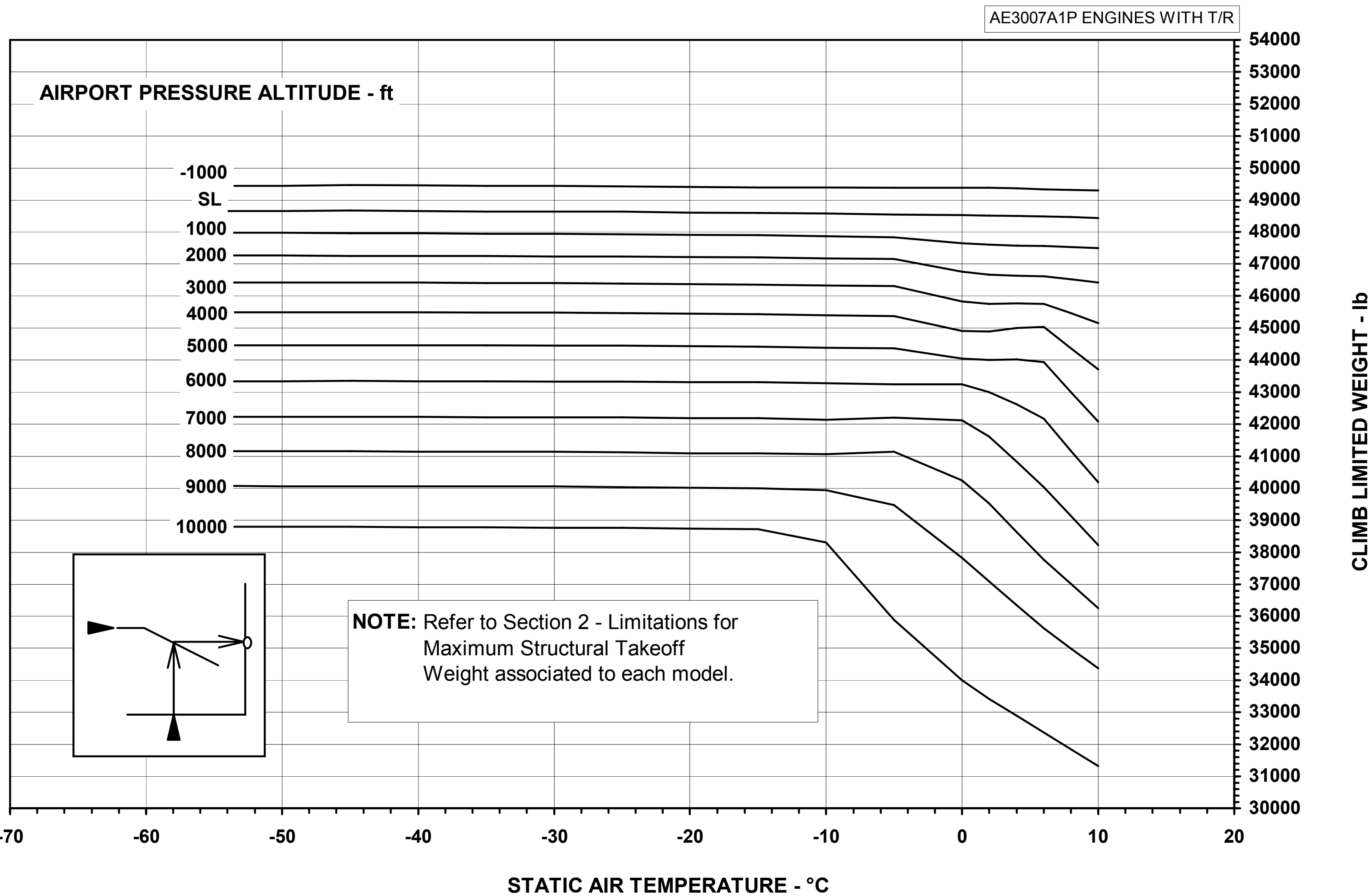
MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED
FLAPS 18°
NORMAL V_2 - T/O MODE - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF



MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

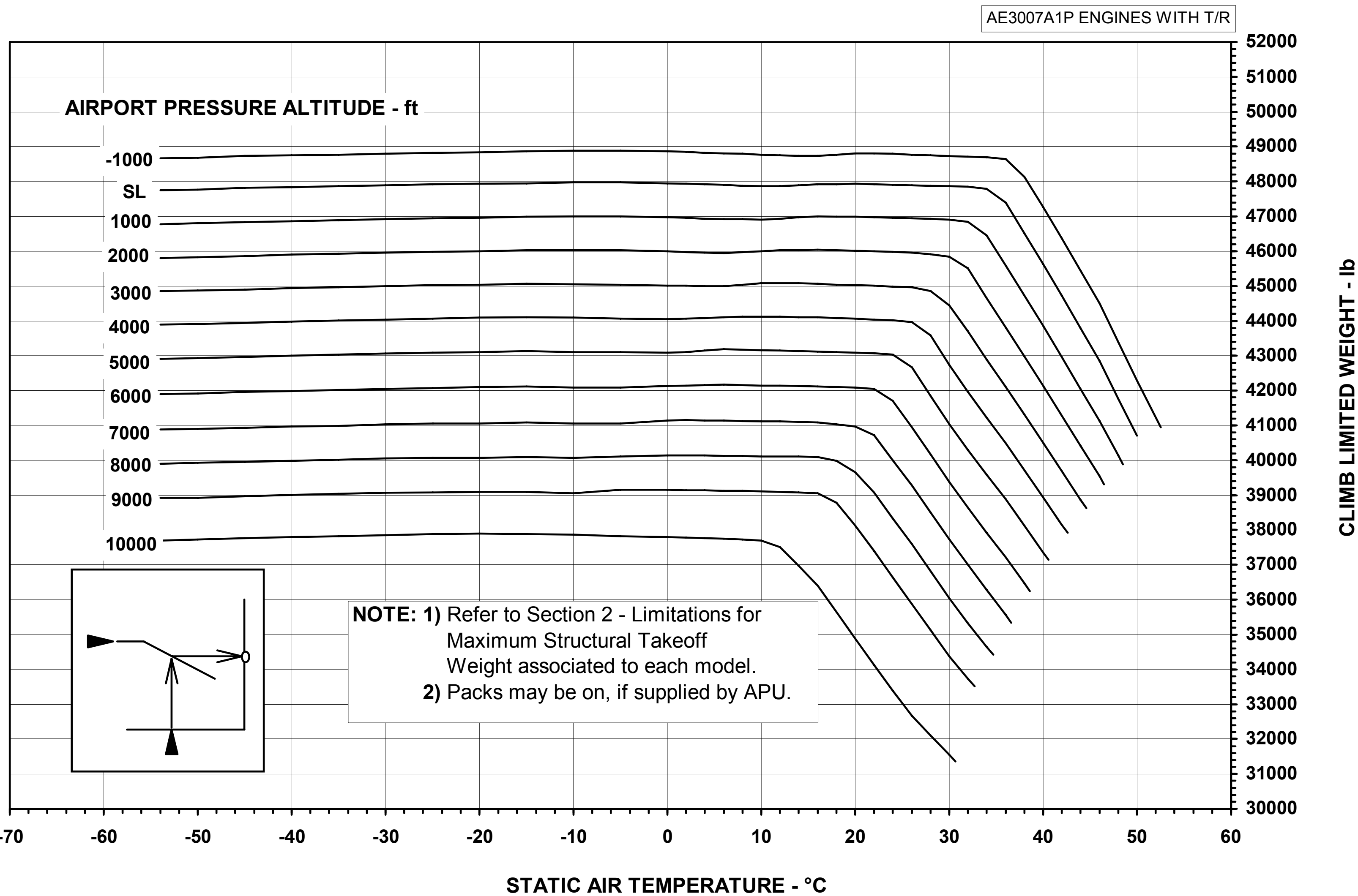
FLAPS 18°

NORMAL V_2 - T/O MODE - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON



145FAA398 - 07DEC1999

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED
FLAPS 22°
NORMAL V_2 - T/O MODE - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF

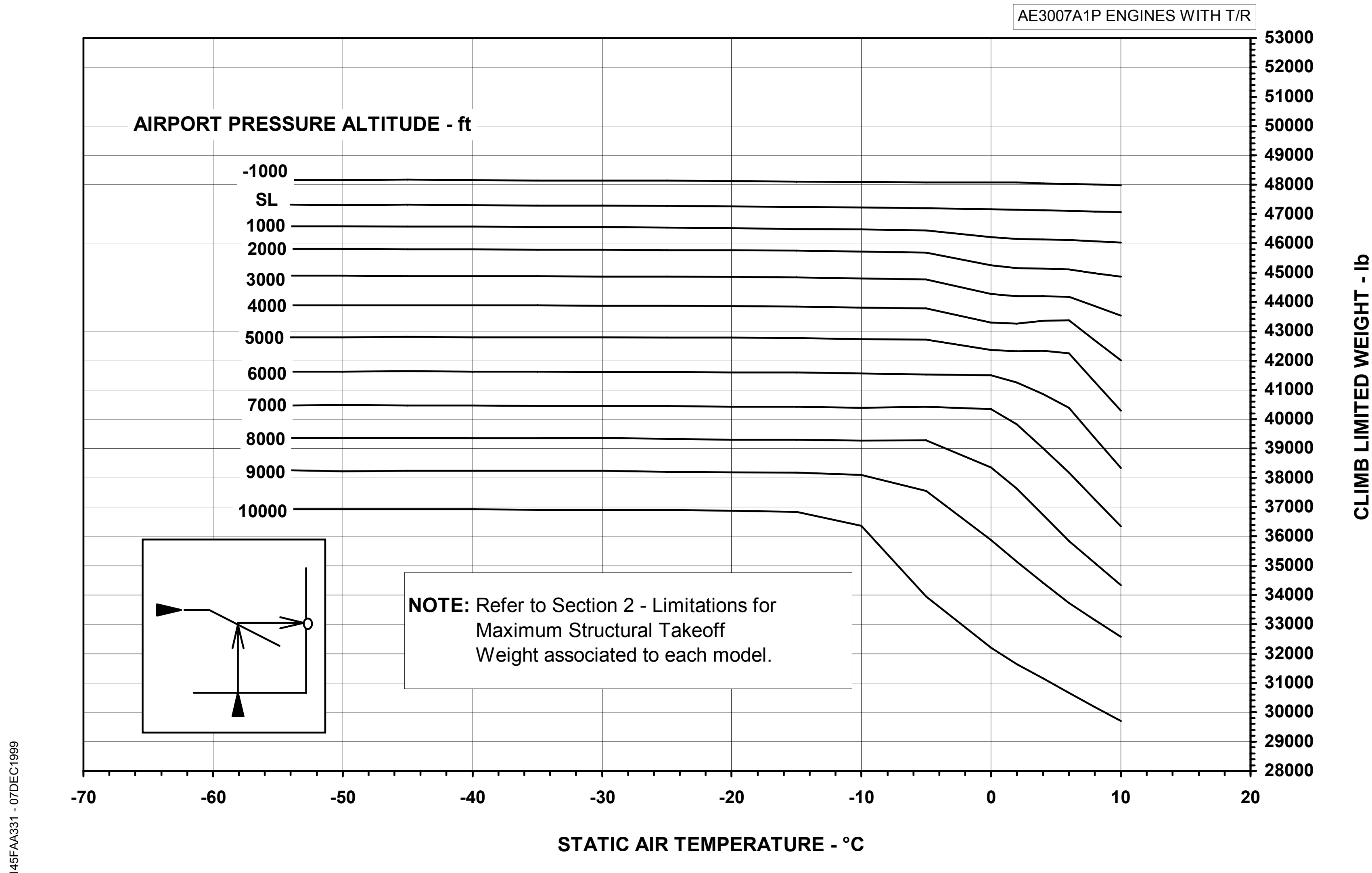


145FAA330 - 07DEC1999

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

FLAPS 22°

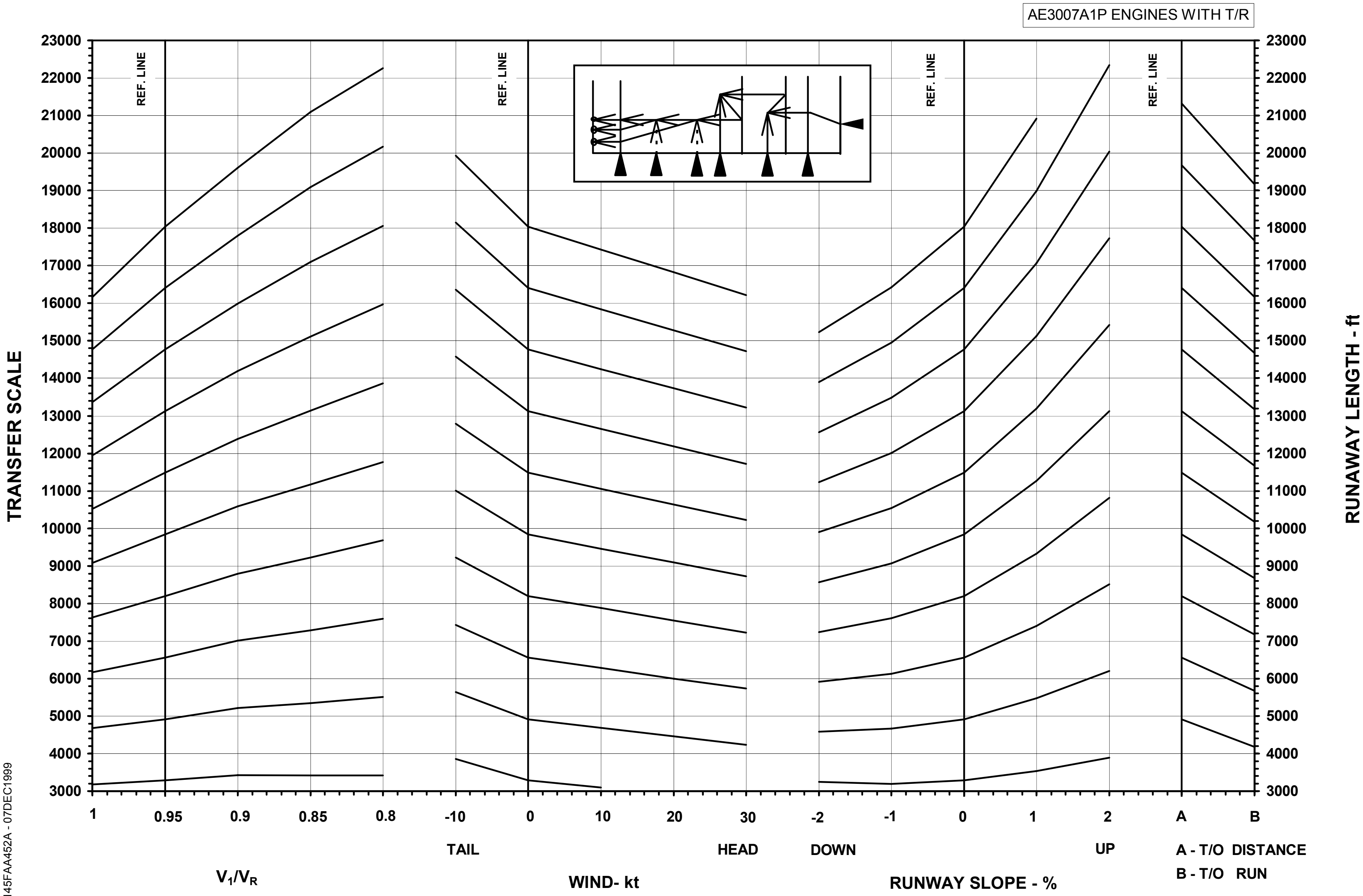
NORMAL V_2 - T/O MODE - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON



TAKEOFF DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

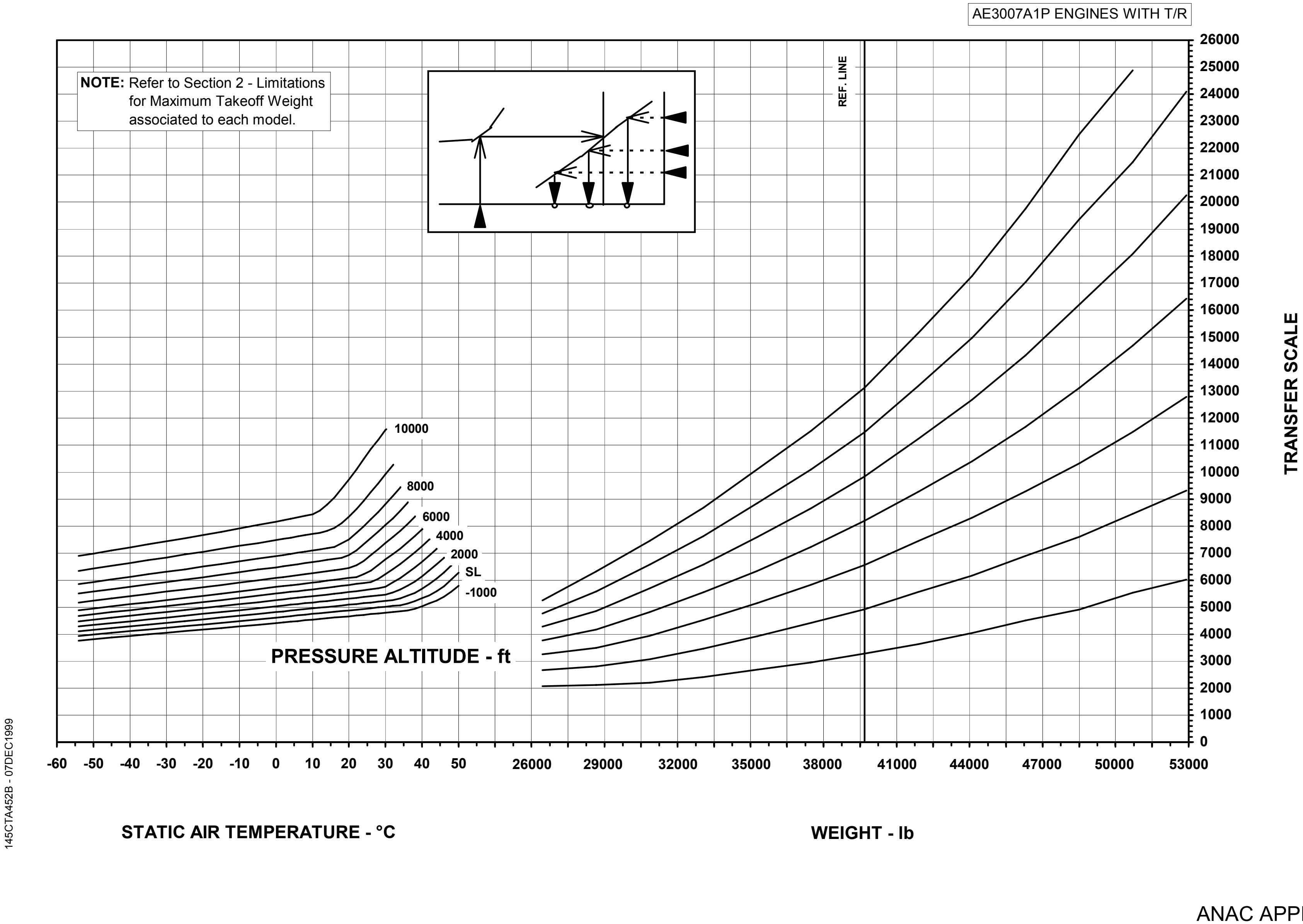
CHART 1 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

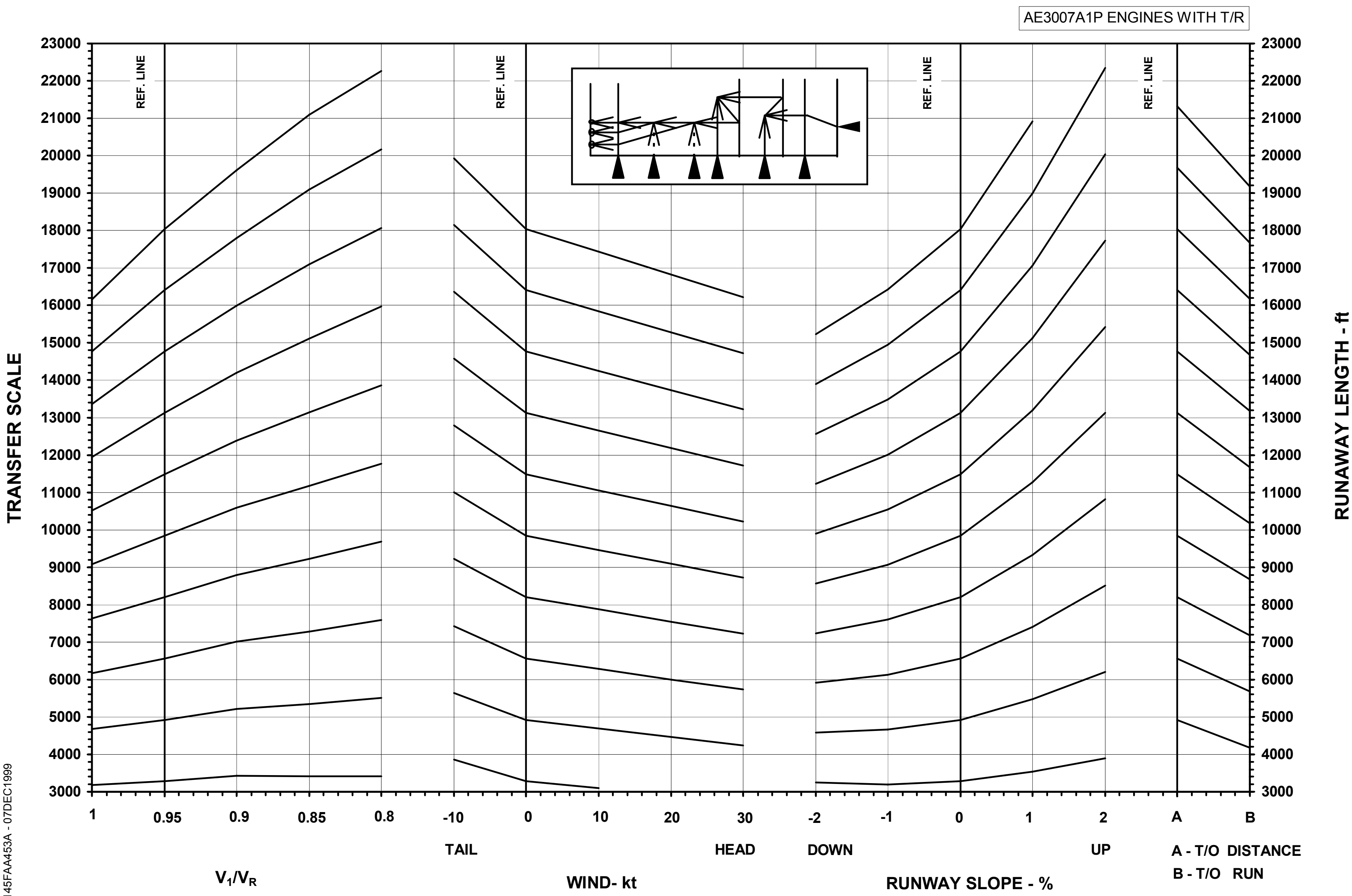
CHART 2 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

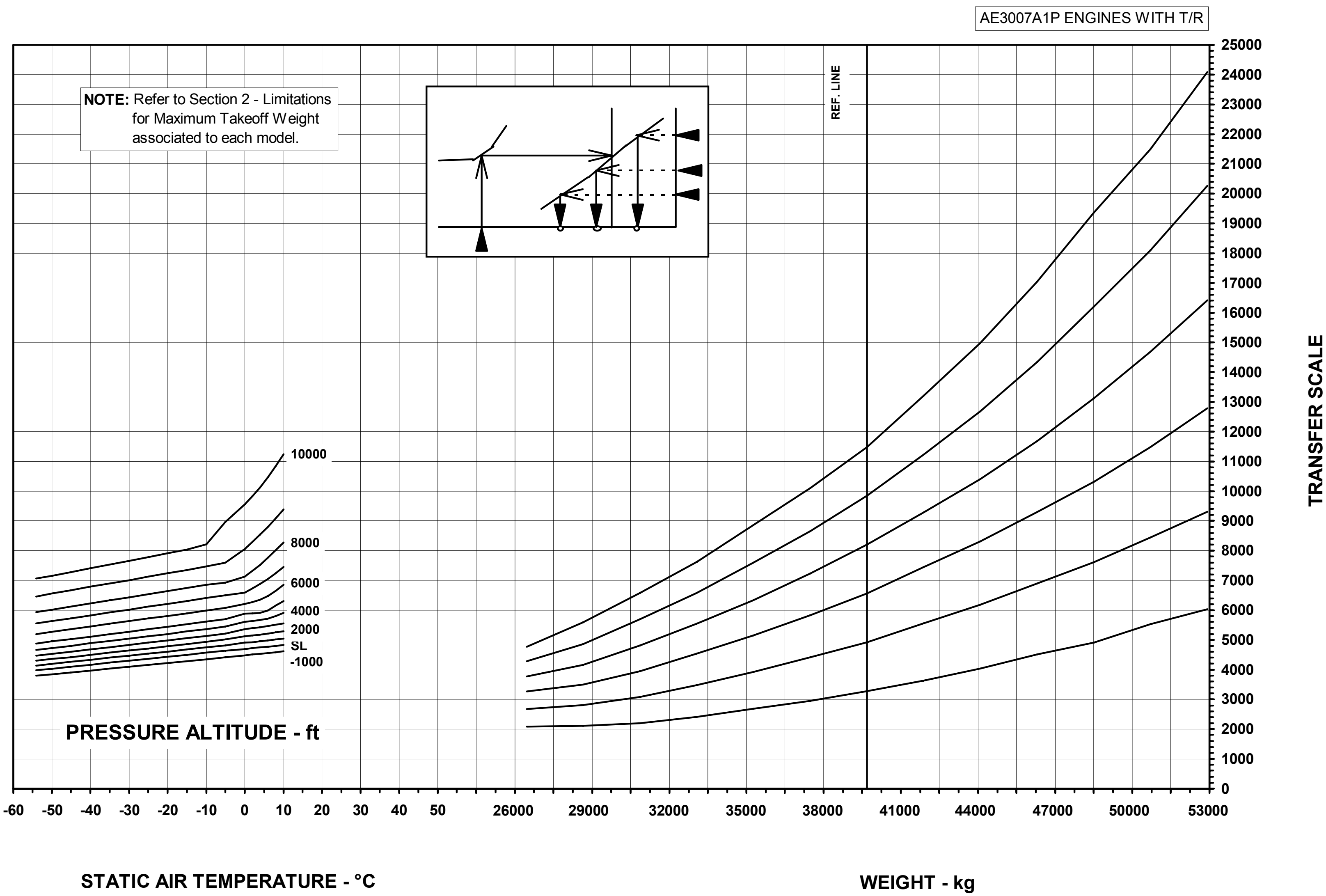
CHART 1 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

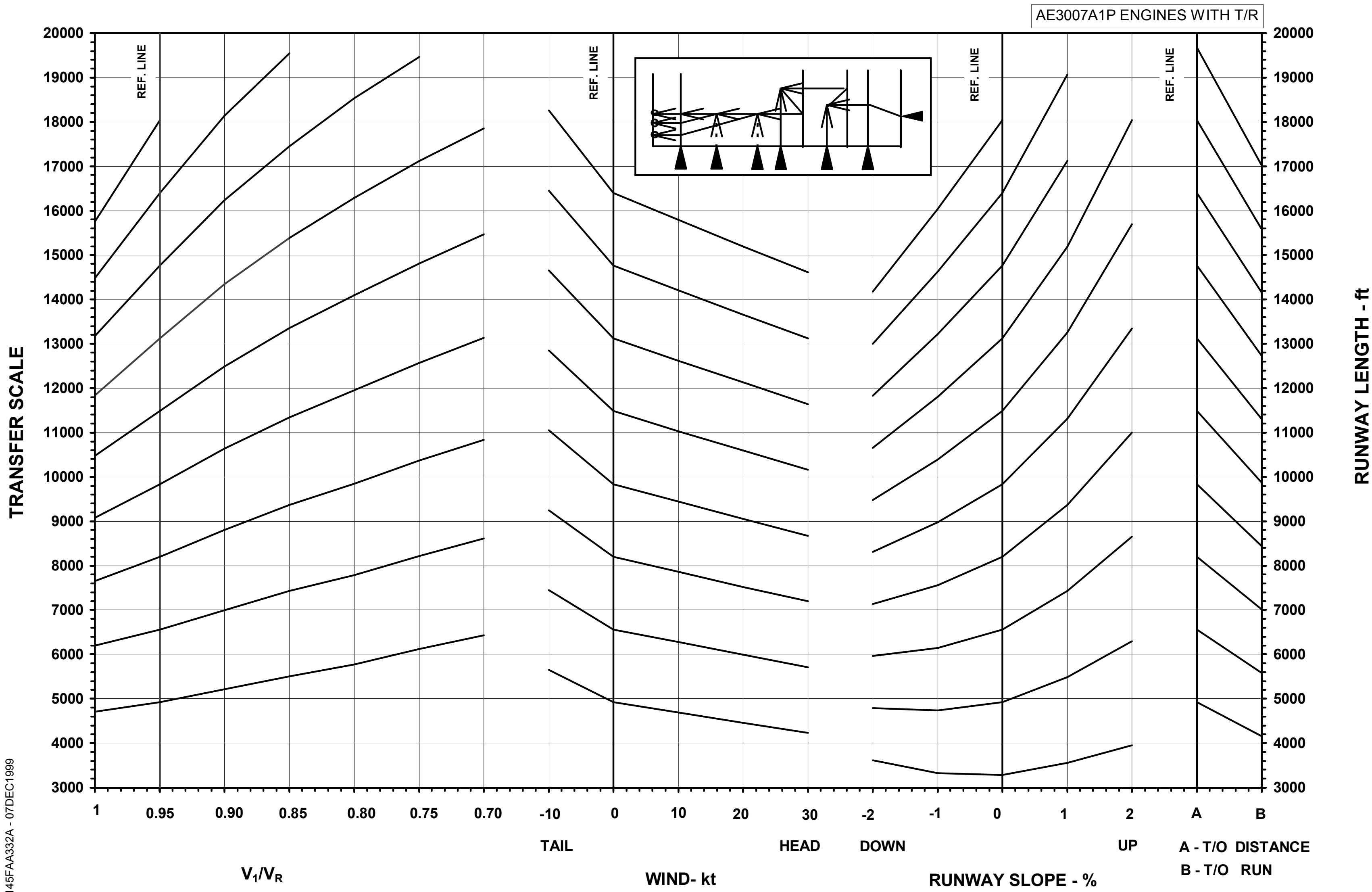
CHART 2 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

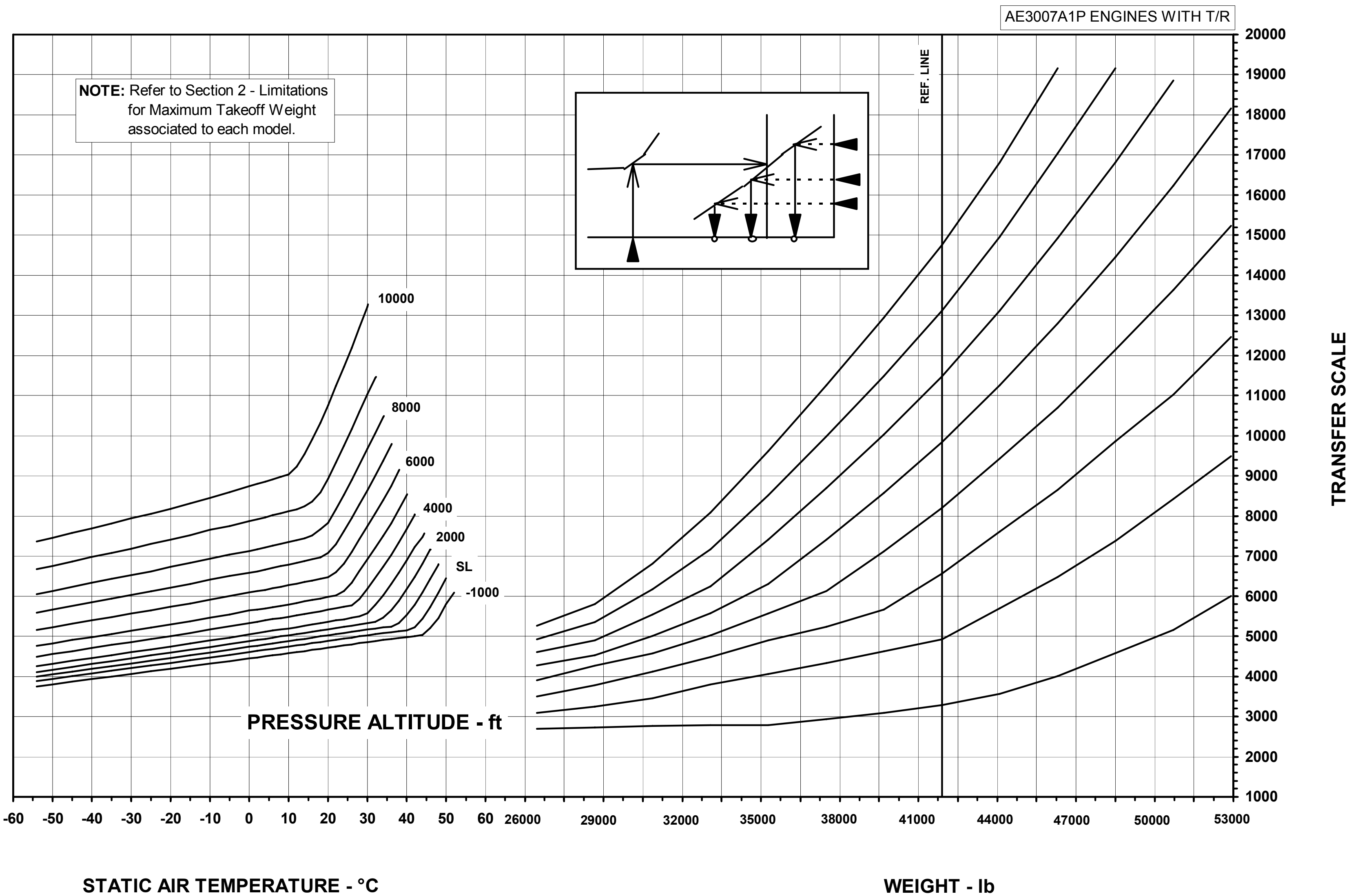
CHART 1 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

CHART 2 OF 2



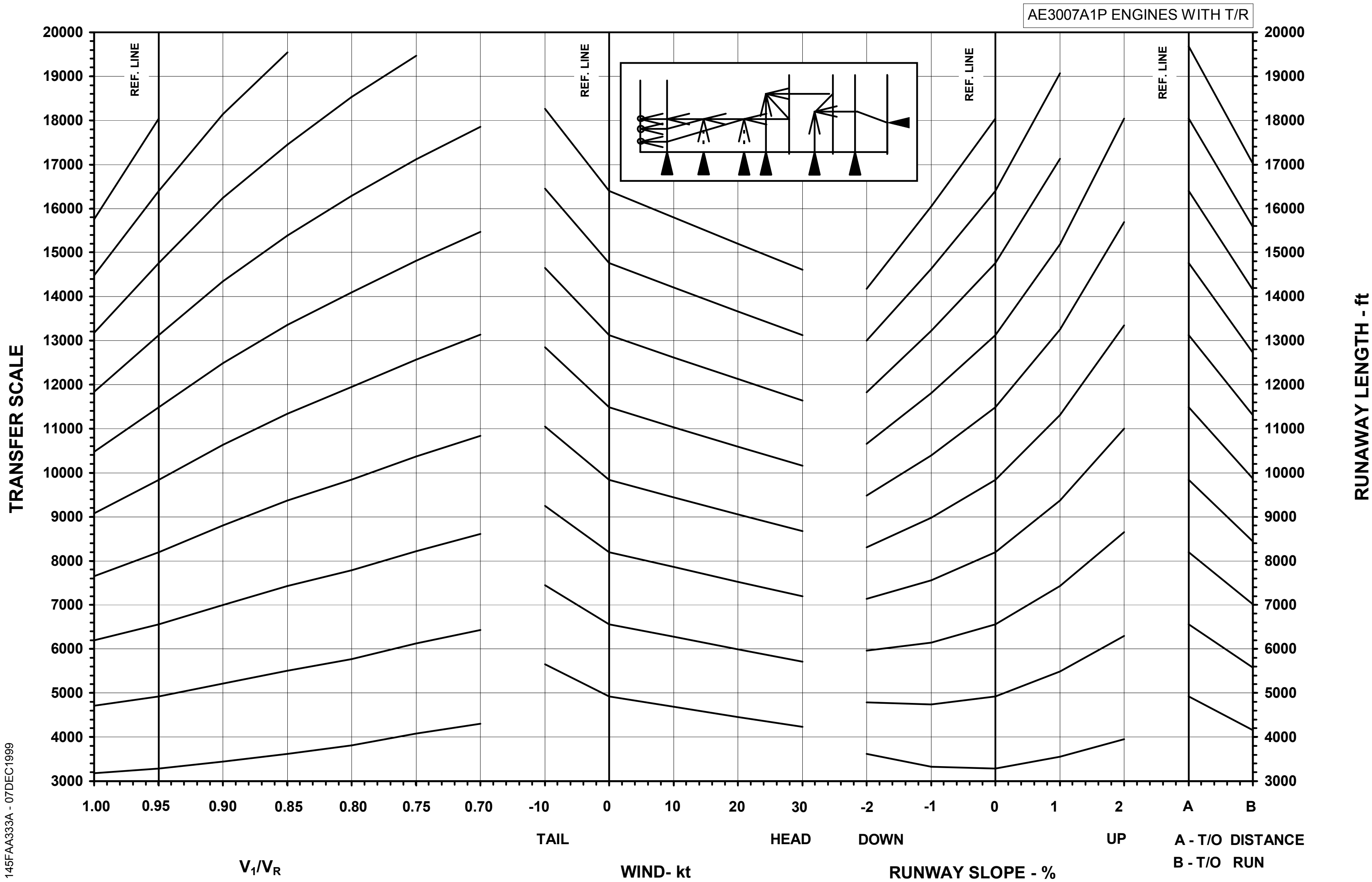
145FAA332B - 07DEC1999

AFM-145/1153 - FAA

TAKEOFF DISTANCE

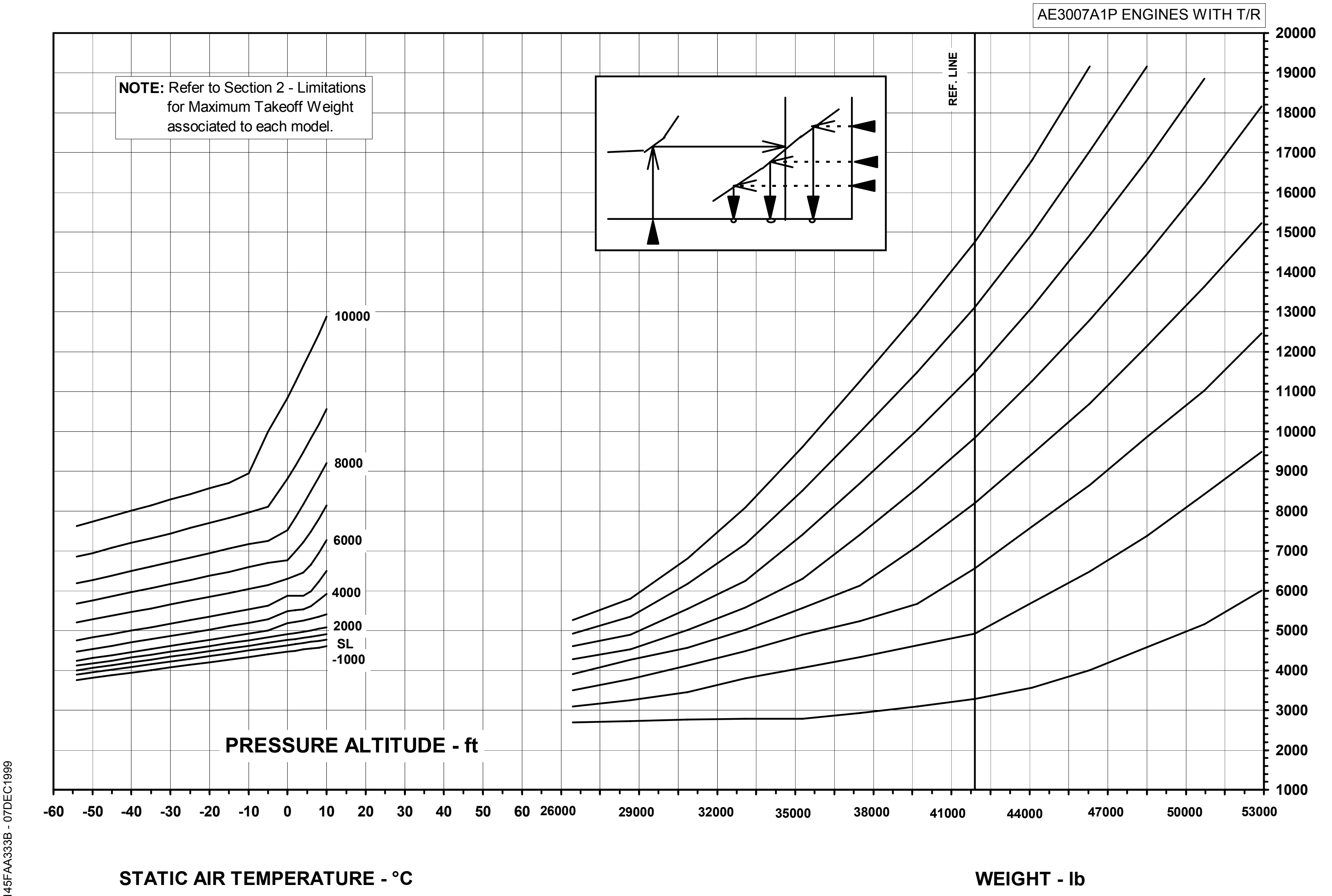
T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

CHART 1 OF 2



TAKEOFF DISTANCE

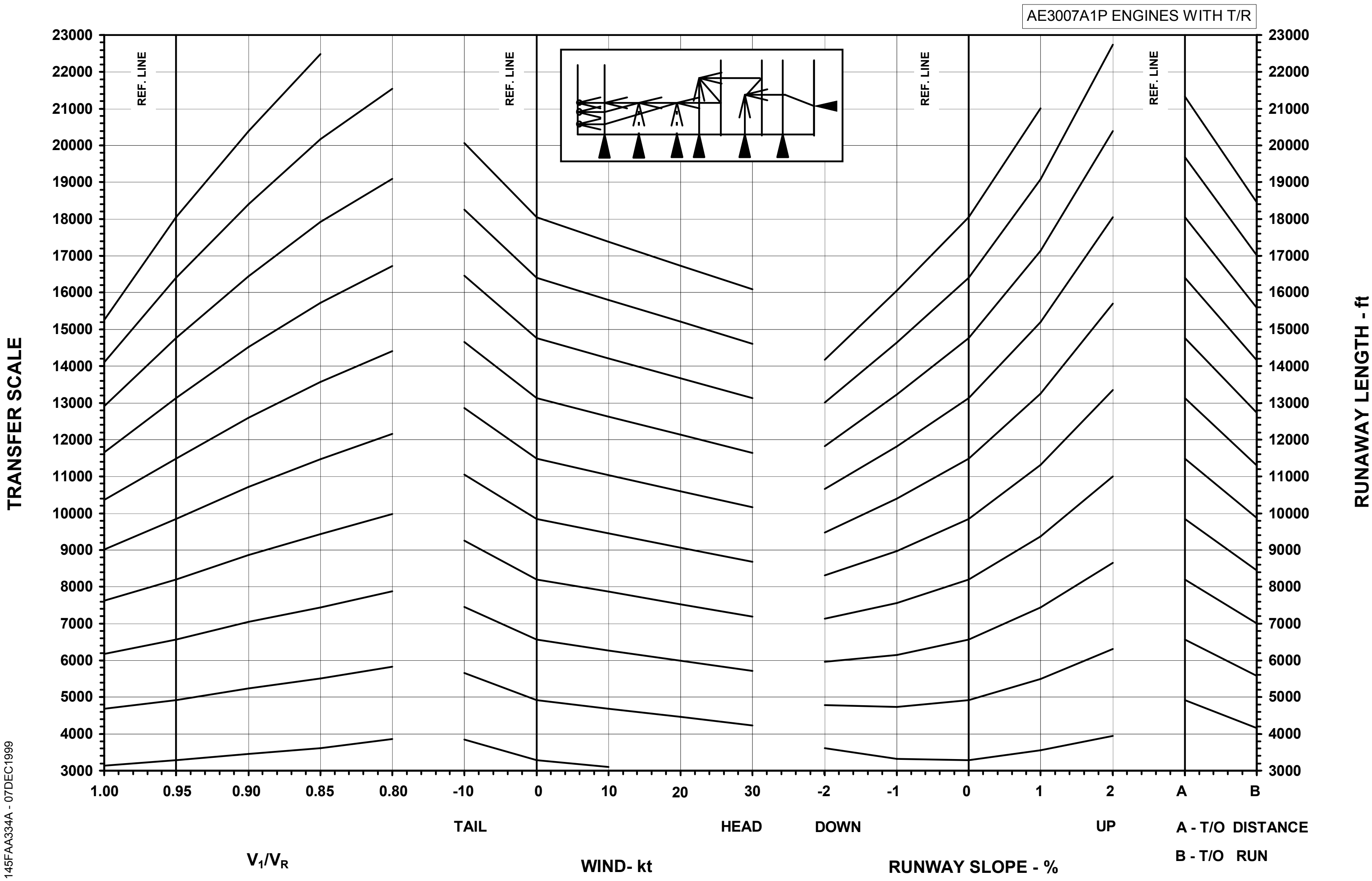
T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY
CHART 2 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

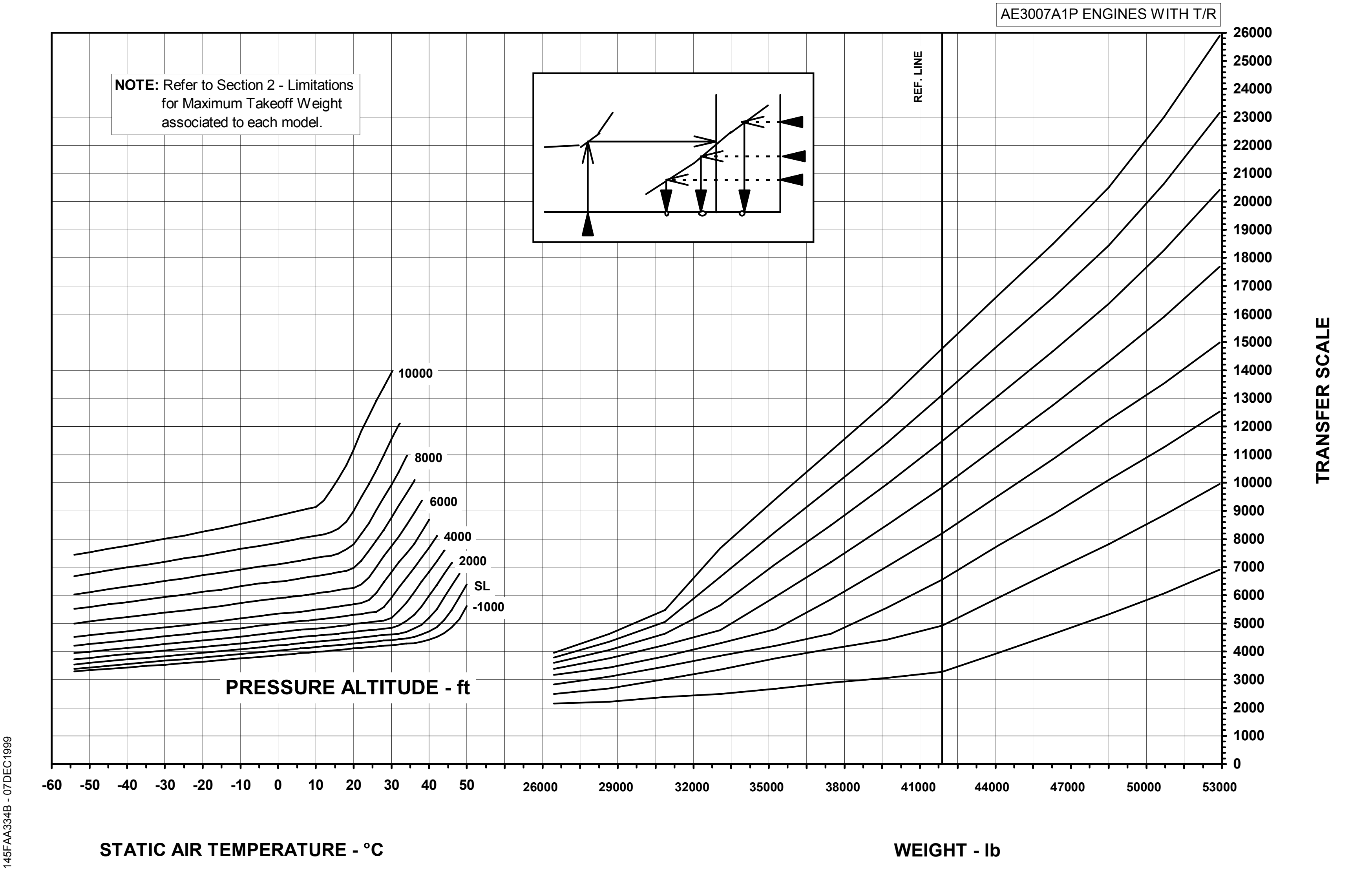
CHART 1 OF 2



TAKEOFF DISTANCE

T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

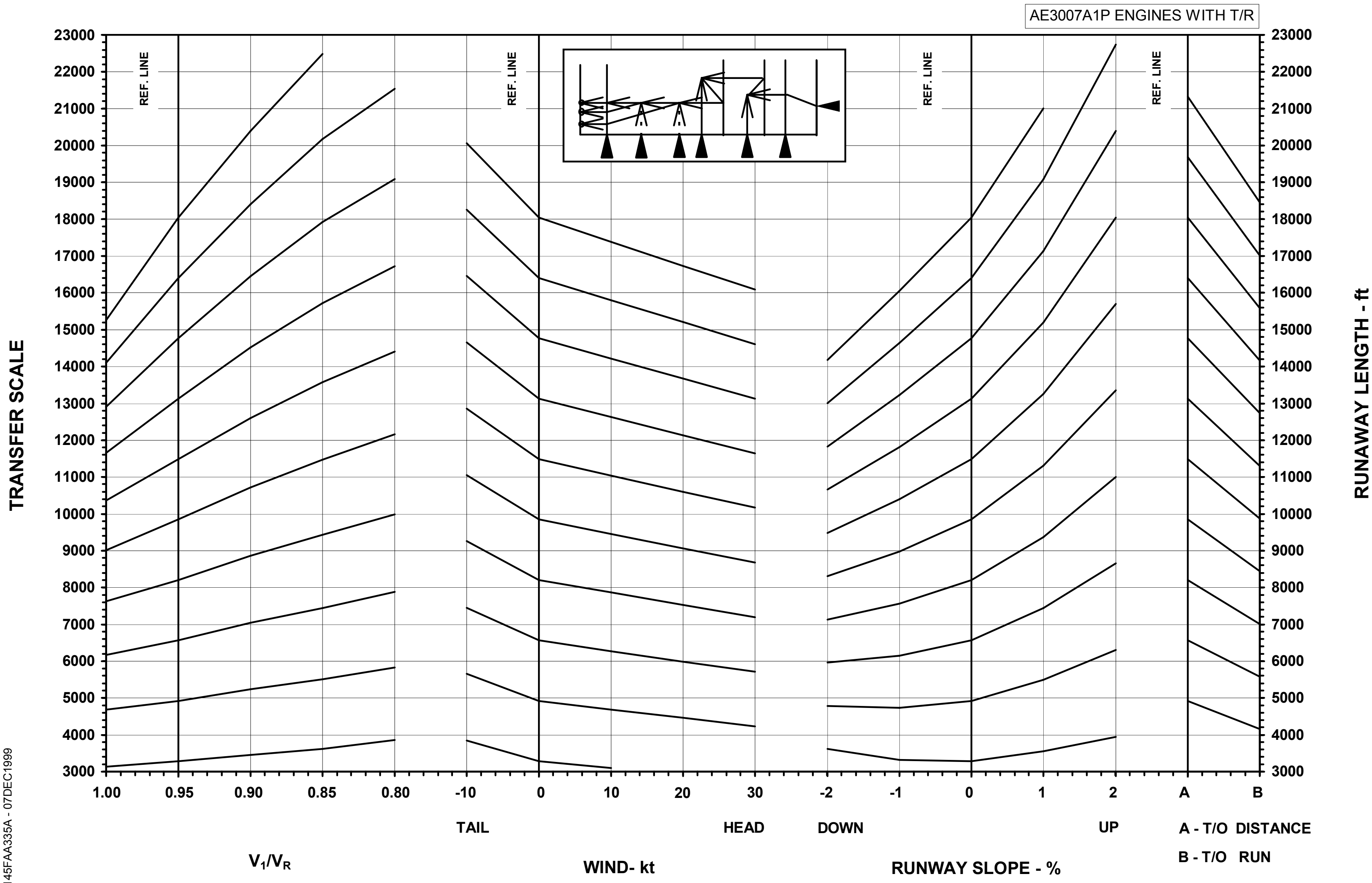
CHART 2 OF 2



TAKEOFF DISTANCE

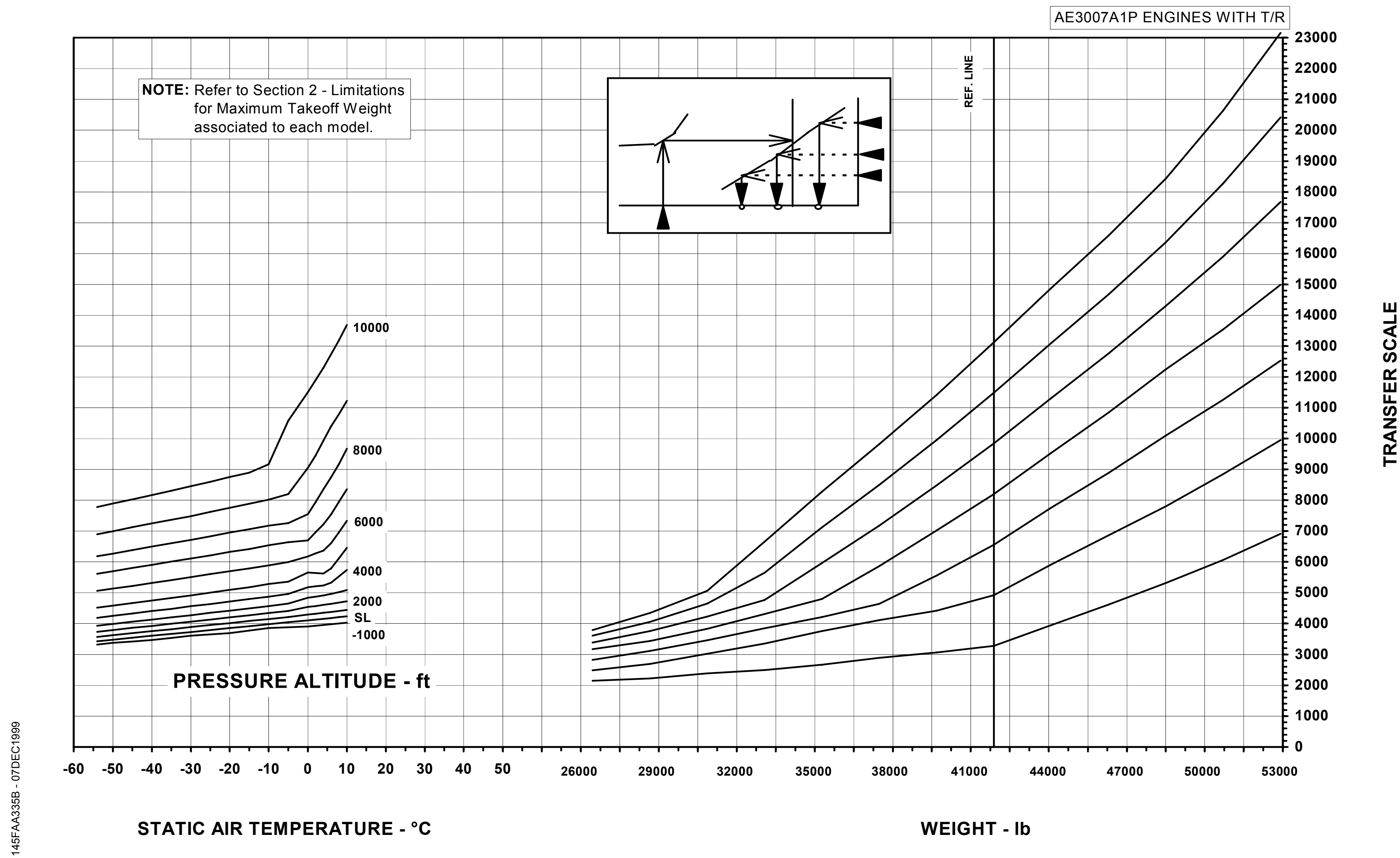
T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

CHART 1 OF 2



TAKEOFF DISTANCE

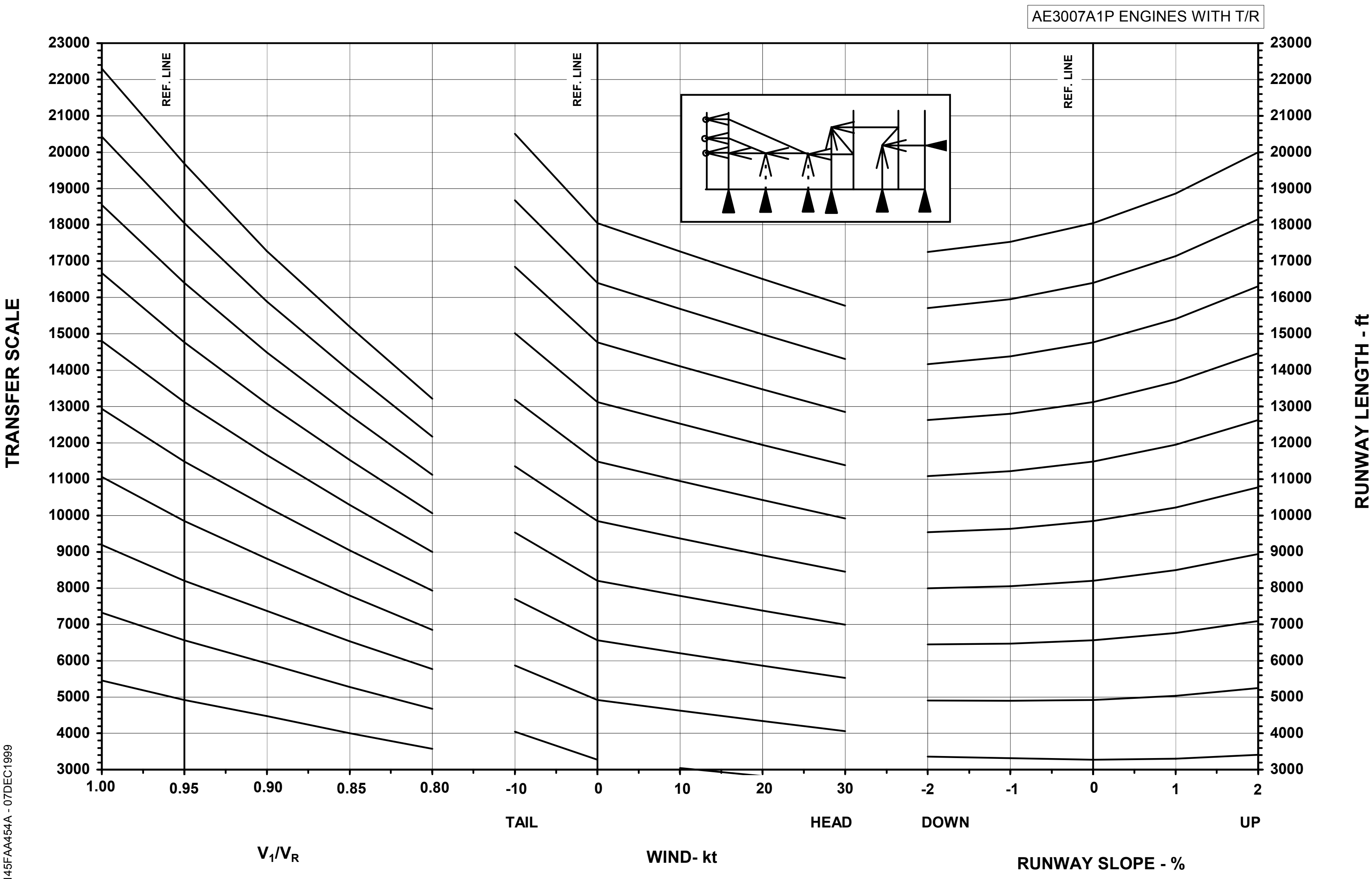
T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY
CHART 2 OF 2



ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

CHART 1 OF 2

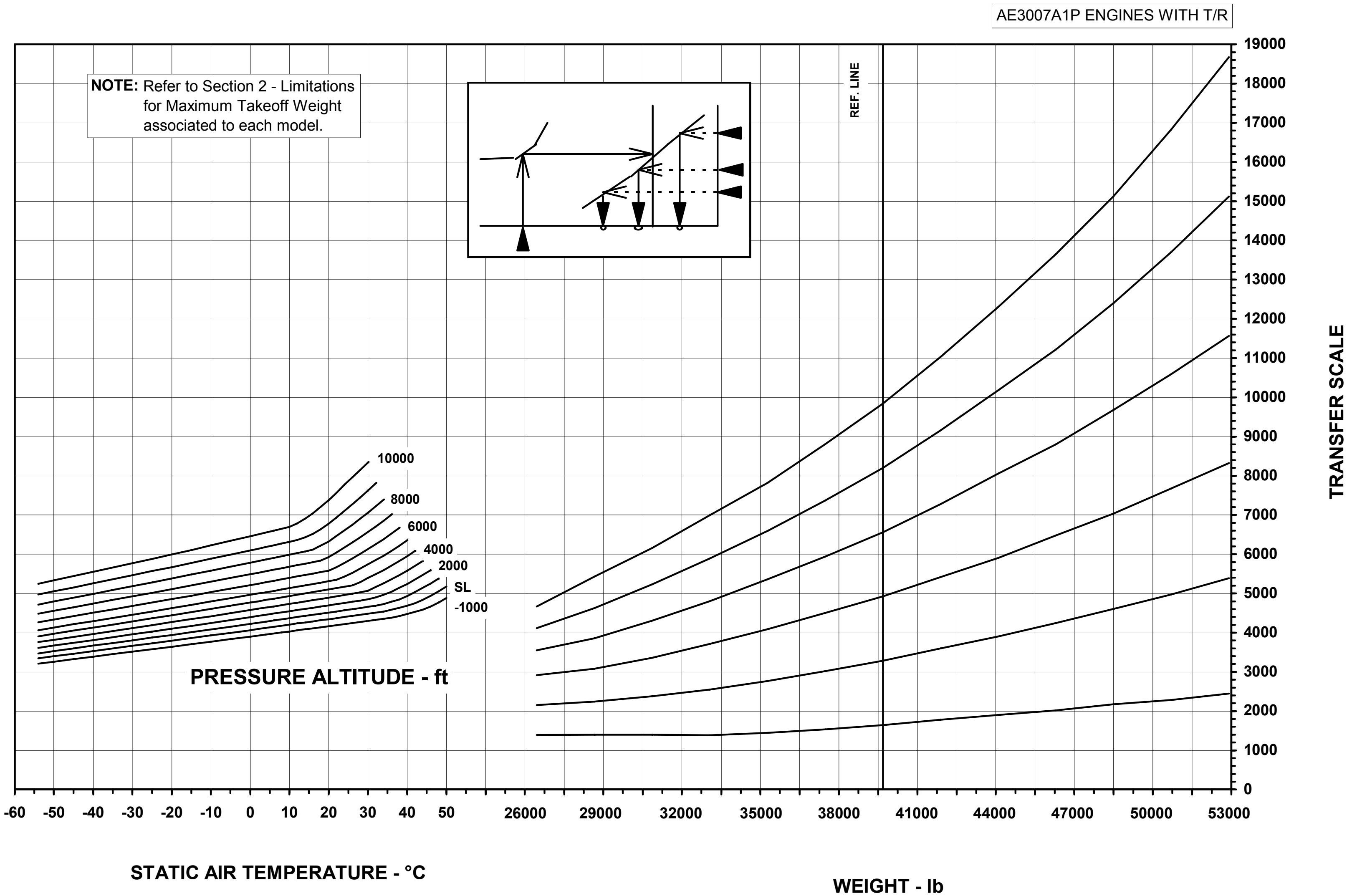


145FAA454A - 07DEC1999

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

CHART 2 OF 2

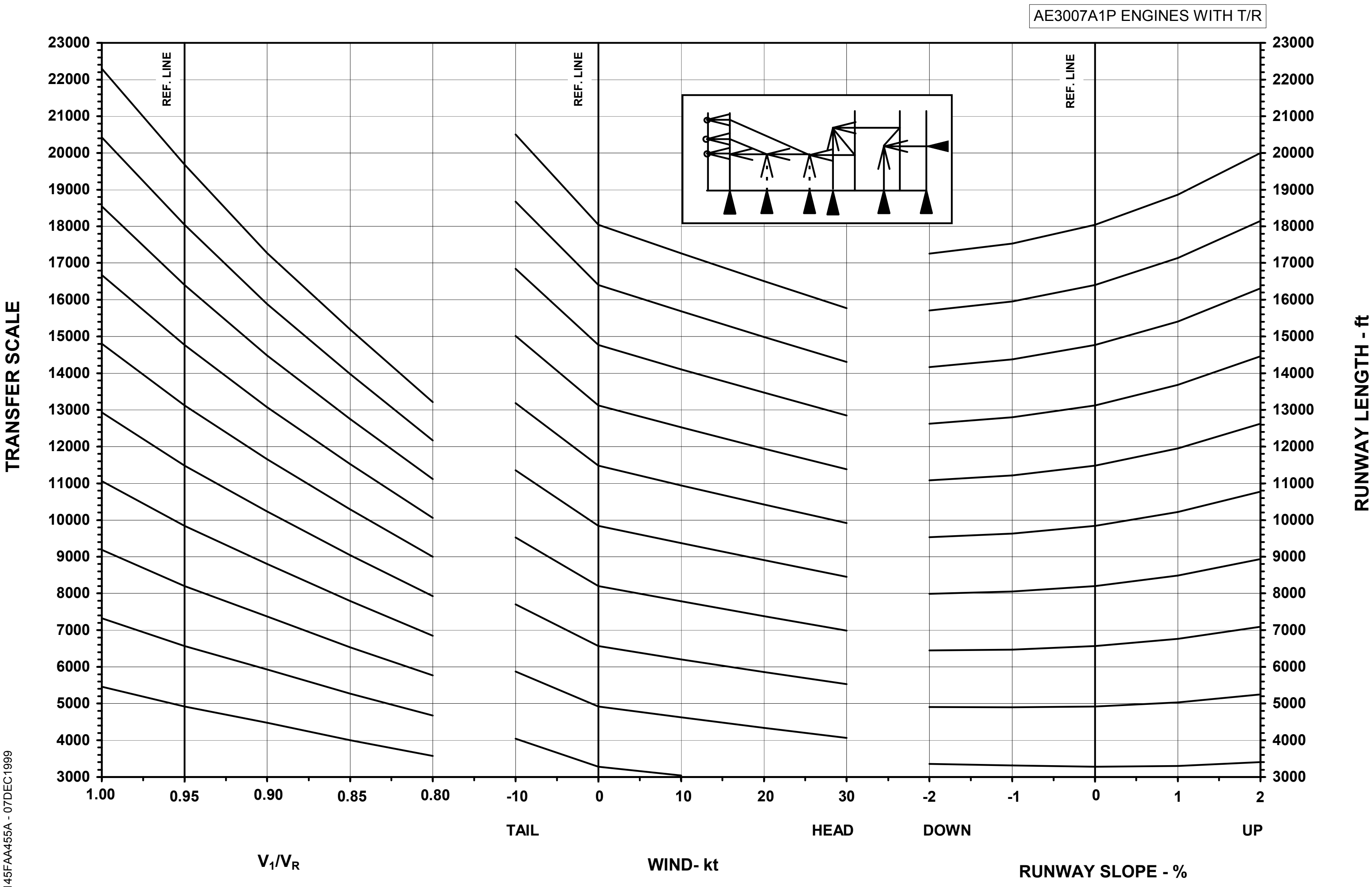


145FAA454B - 07DEC1999

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

CHART 1 OF 2

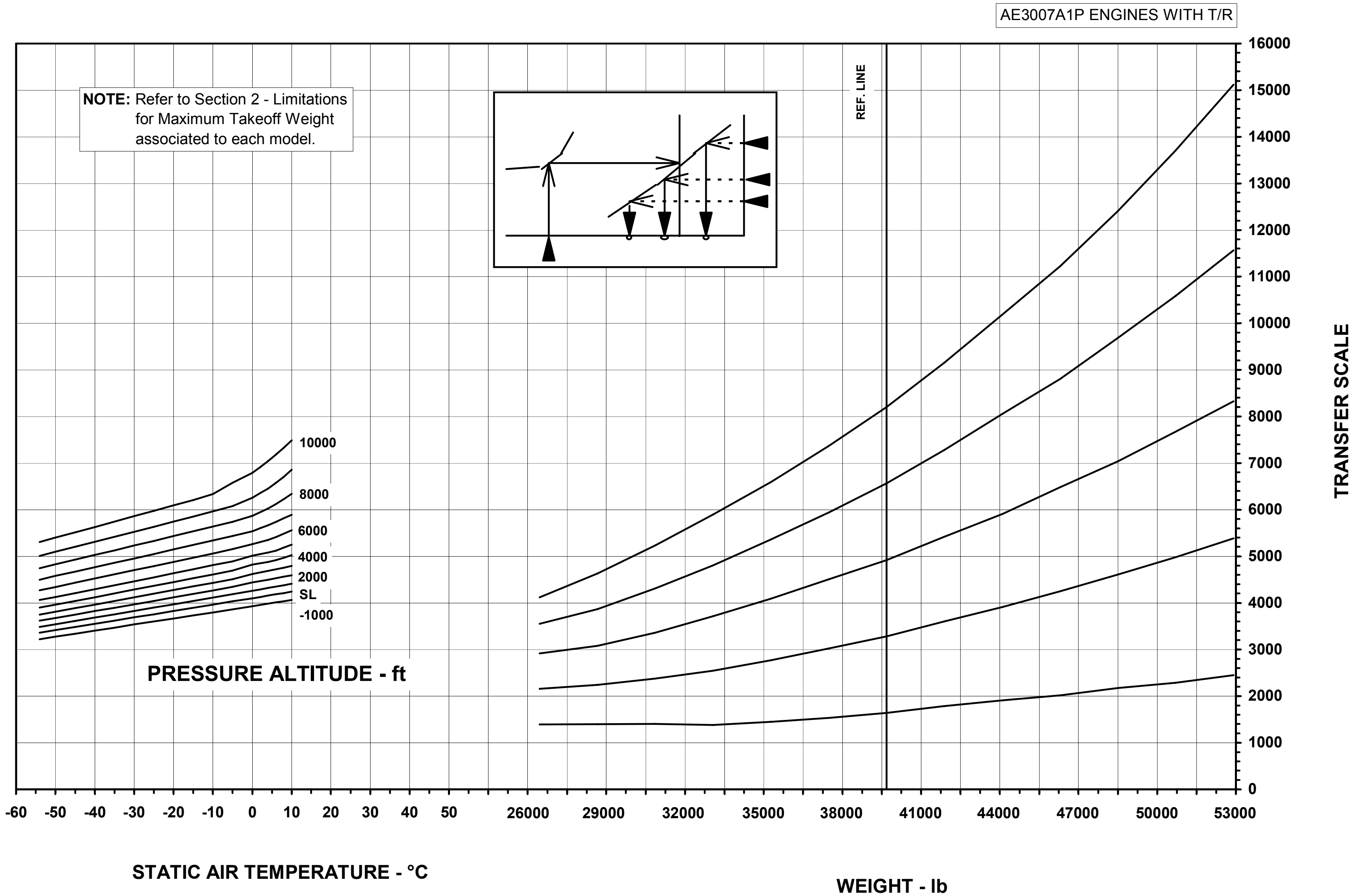


145FAA455A - 07DEC1999

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 9° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

CHART 2 OF 2



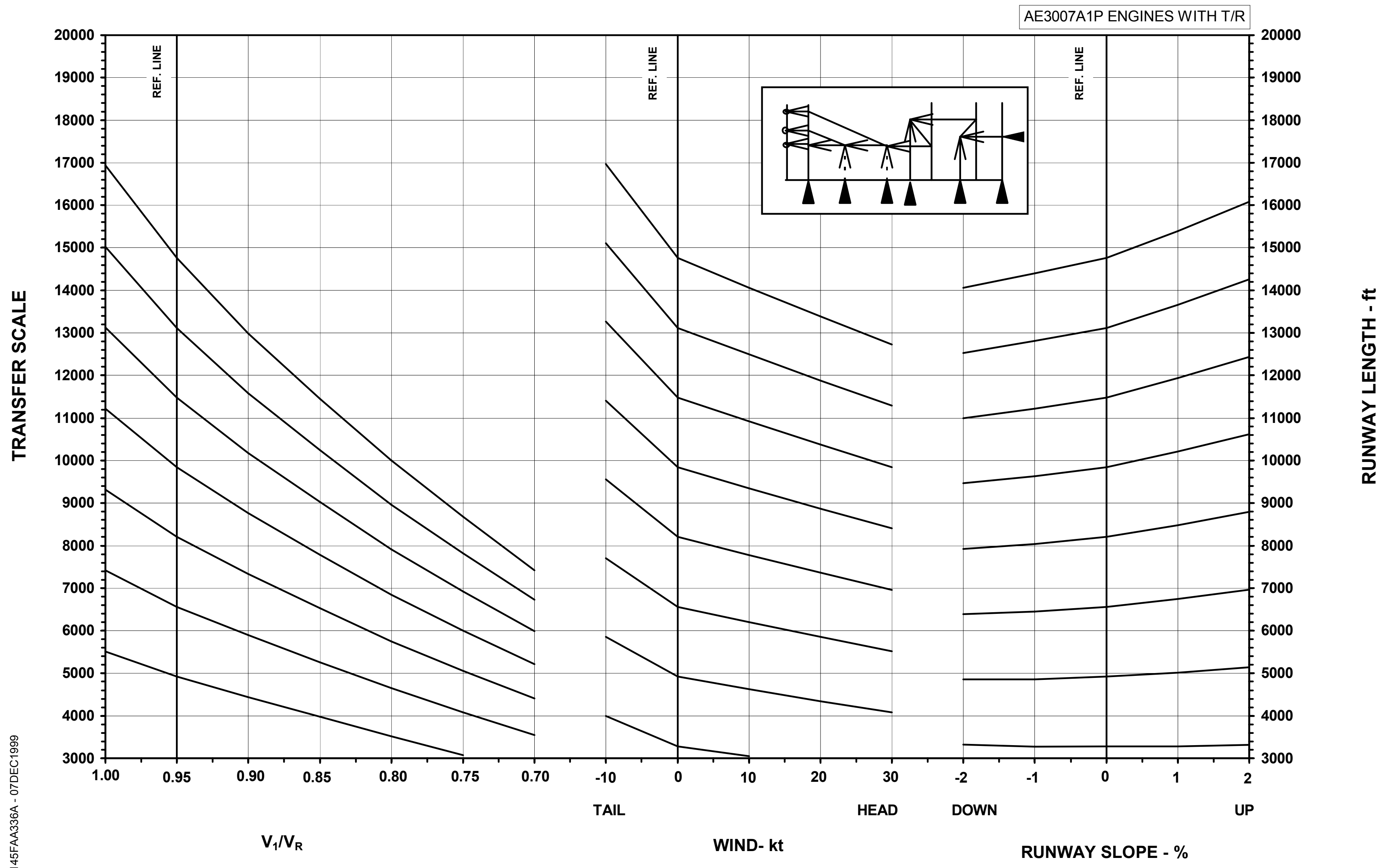
145FAA455B - 07DEC1999

AFM-145/1153 - FAA

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

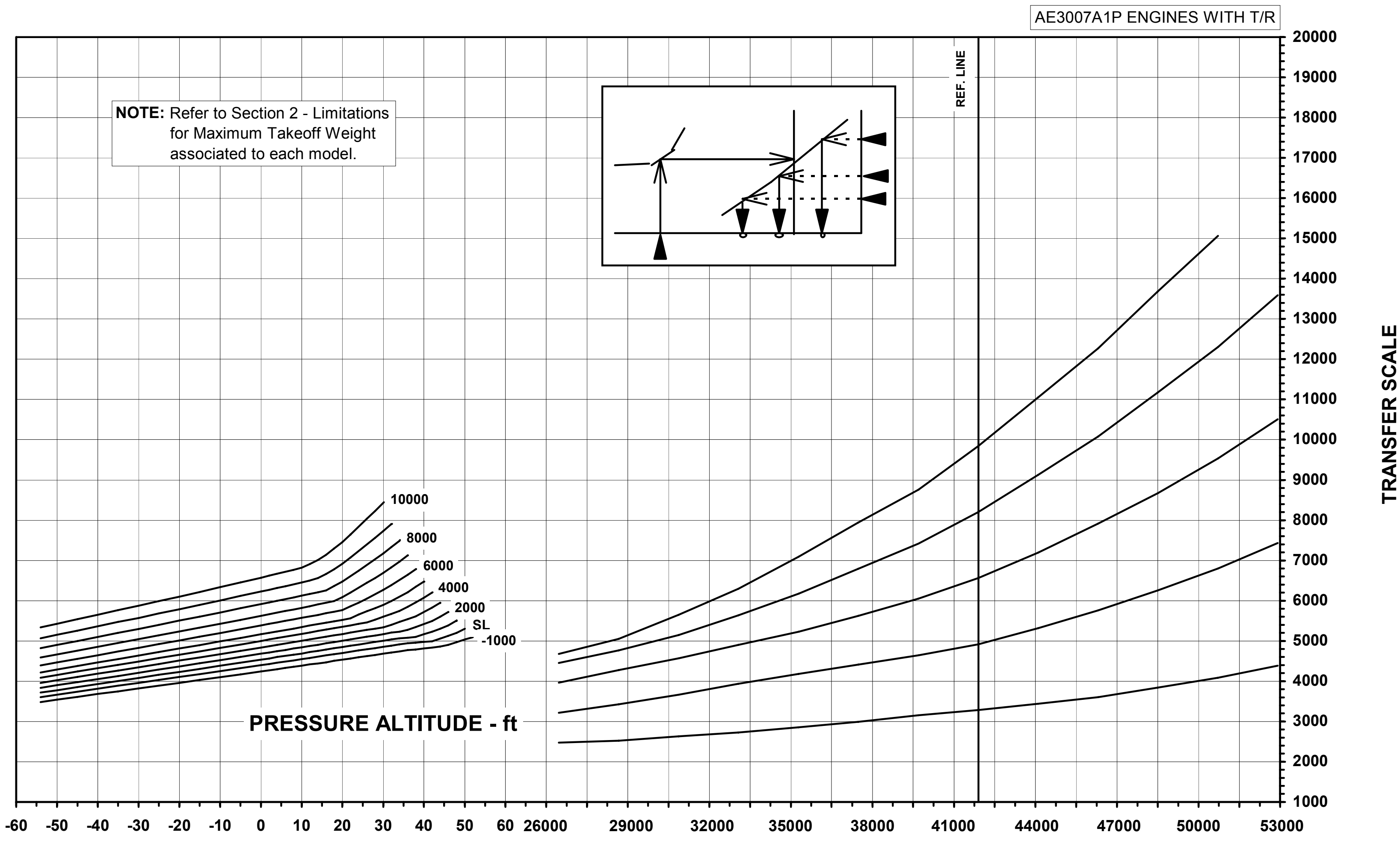
CHART 1 OF 2



ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

CHART 2 OF 2



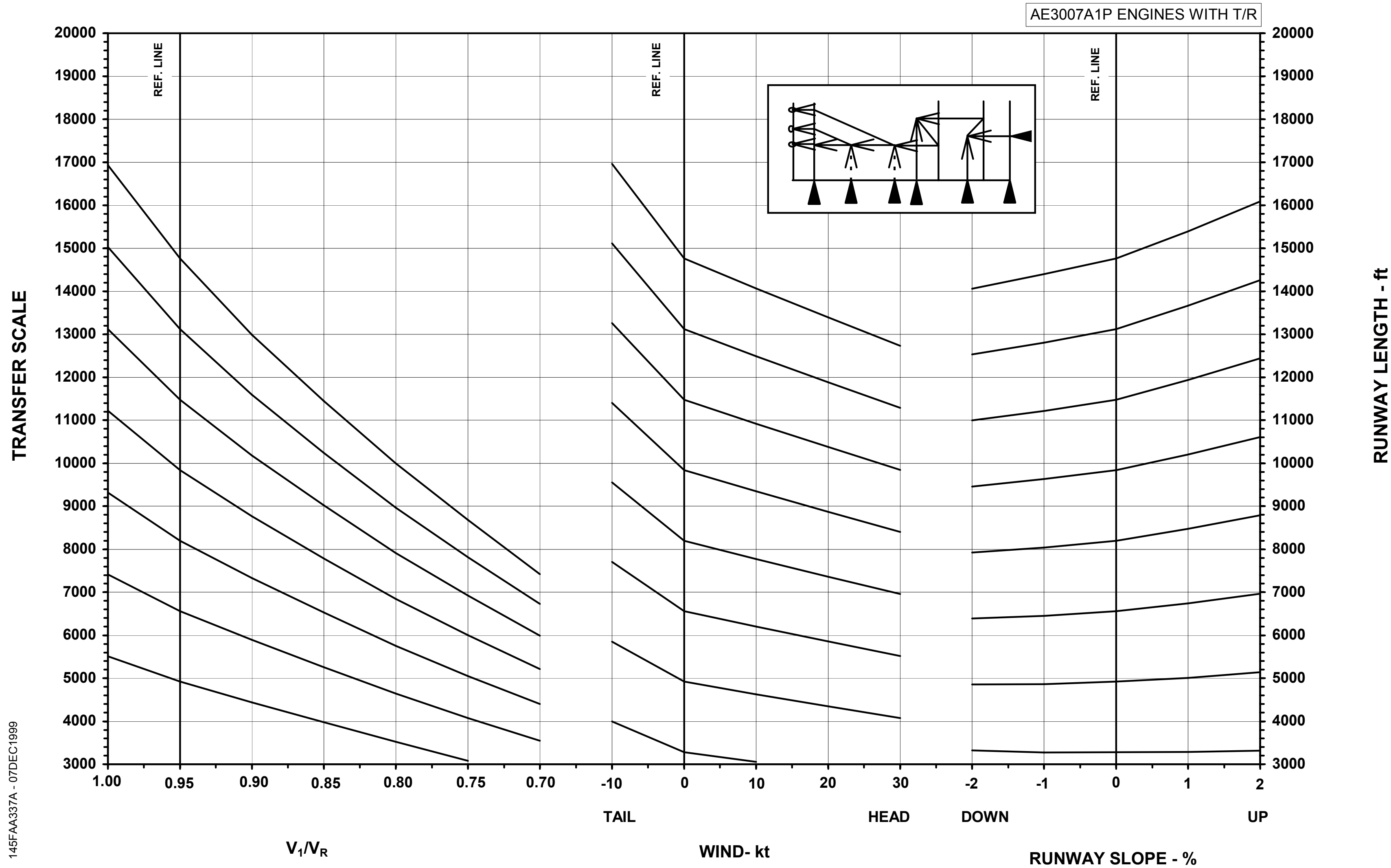
145FAA336B - 07DEC1999

AFM-145/1153 - FAA

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

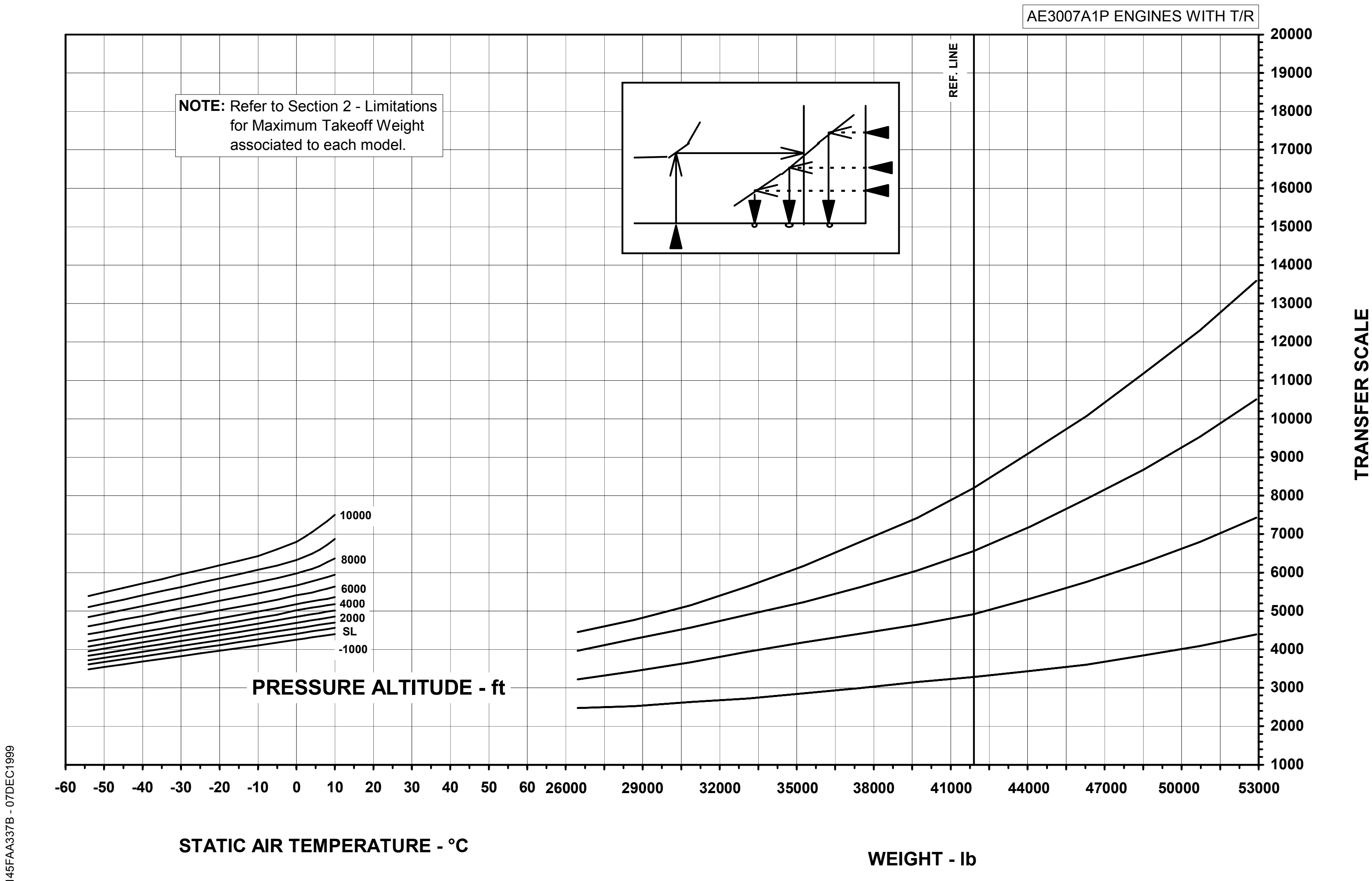
CHART 1 OF 2



ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 18° - NORMAL V_2 - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

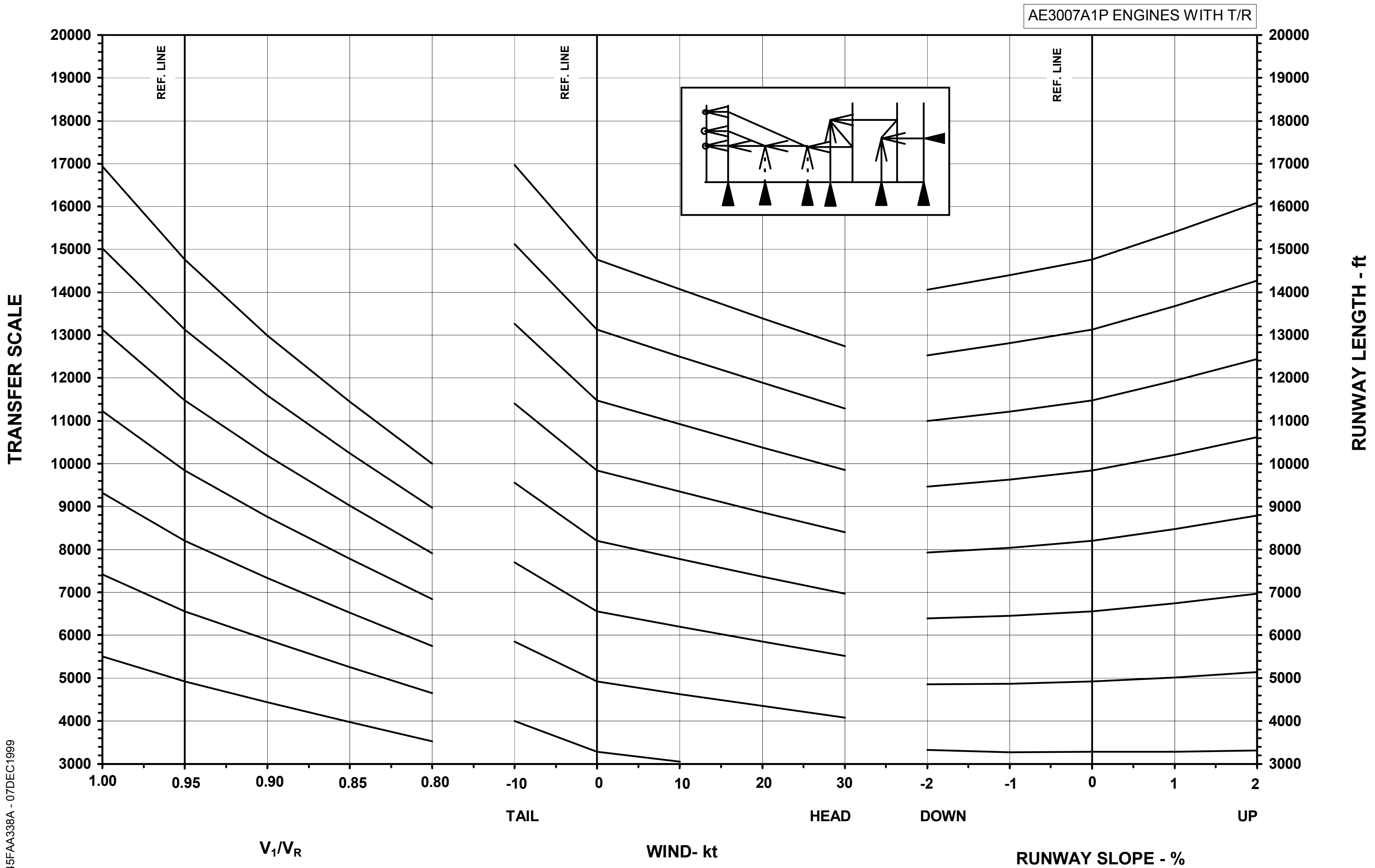
CHART 2 OF 2



ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

CHART 1 OF 2



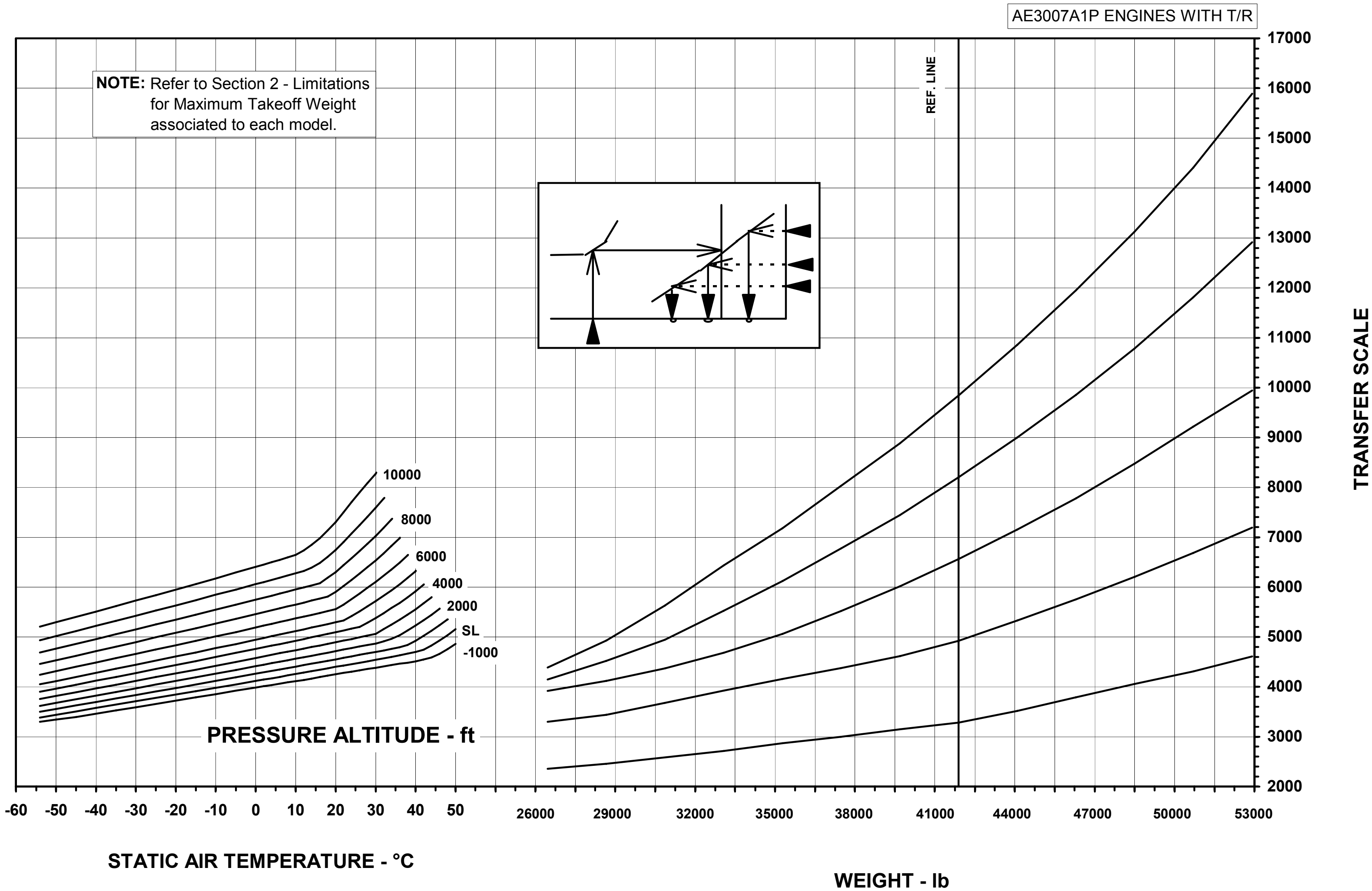
145FAA338A - 07DEC1999

AFM-145/1153 - FAA

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF - DRY RUNWAY

CHART 2 OF 2



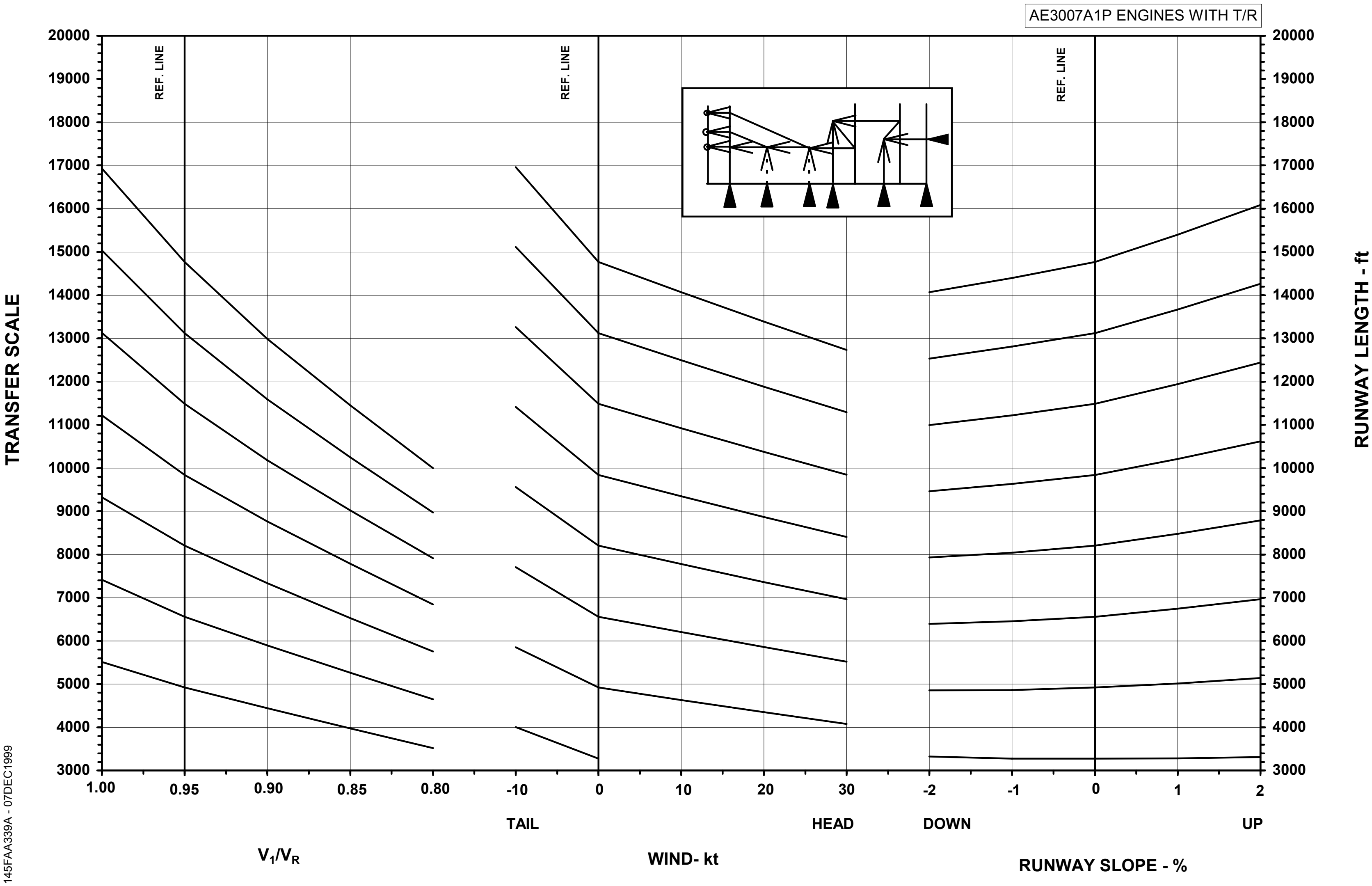
145FAA338B - 07DEC1999

AFM-145/1153 - FAA

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

CHART 1 OF 2

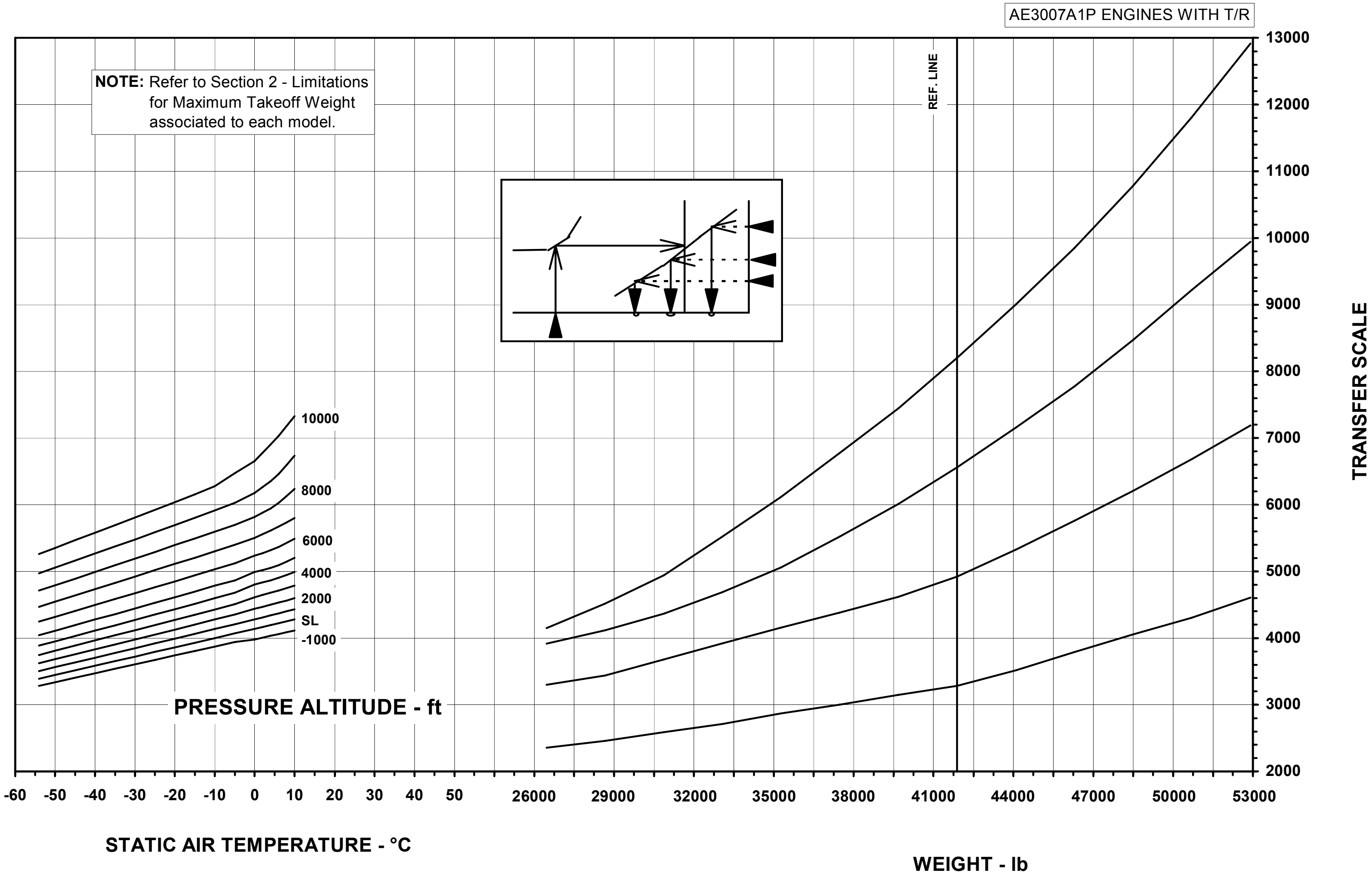


AFM-145/1153 - FAA

ACCELERATE STOP DISTANCE

T/O MODE - FLAPS 22° - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON - DRY RUNWAY

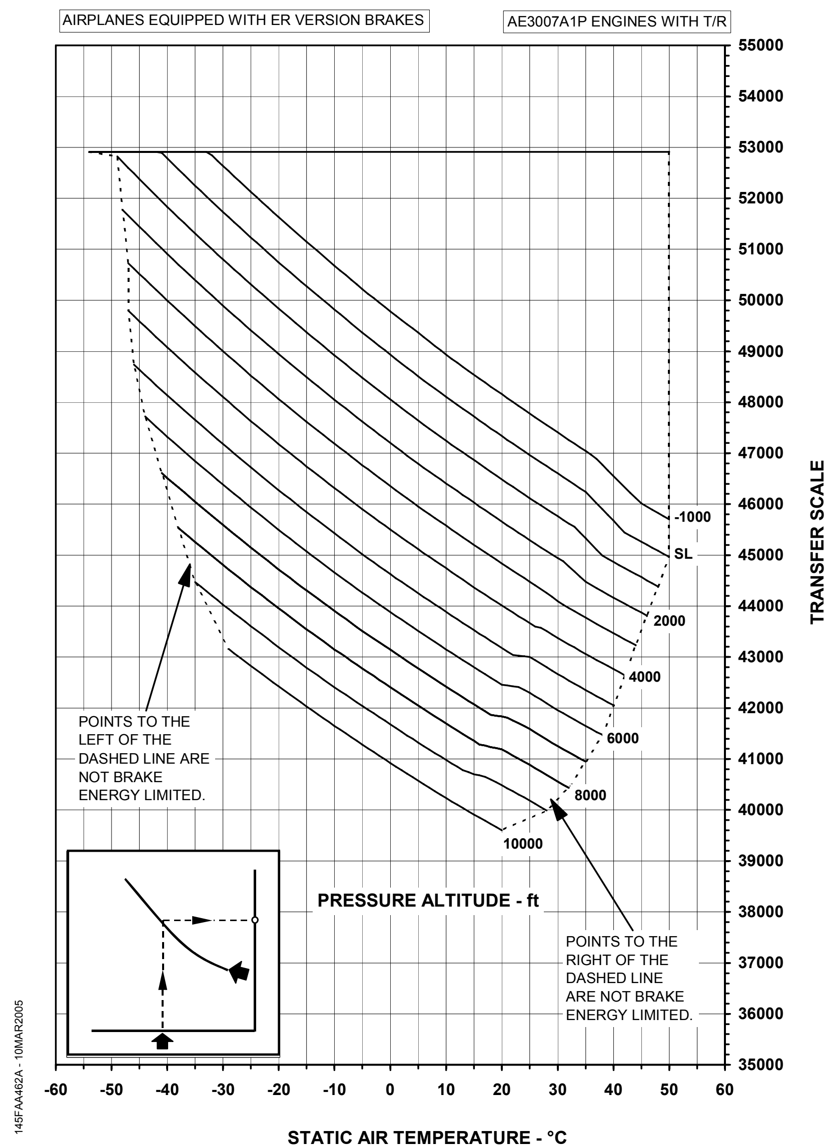
CHART 2 OF 2



MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

T/O MODE - FLAPS 9°

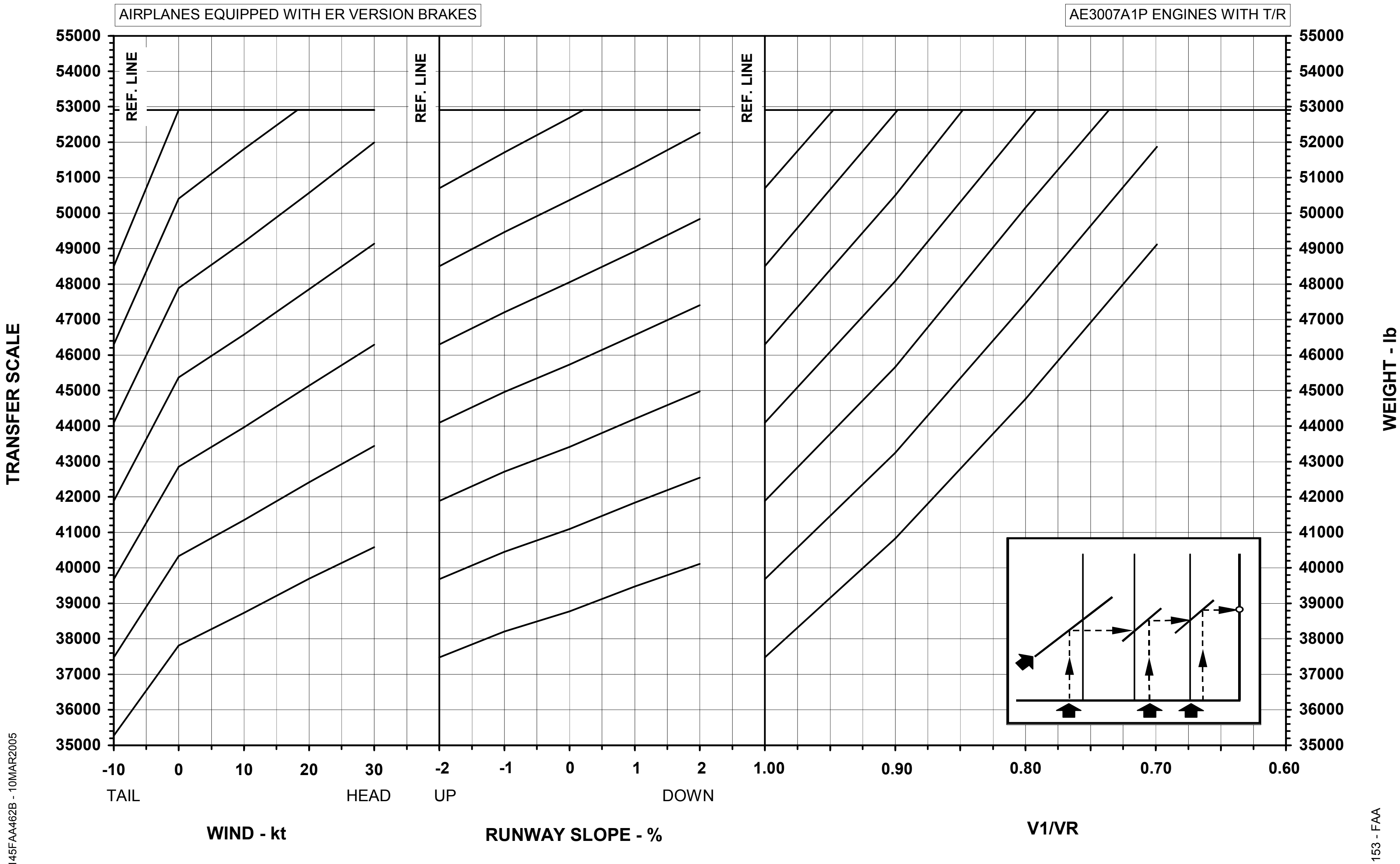
CHART 1 OF 2



MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

T/O MODE - FLAPS 9°

CHART 2 OF 2



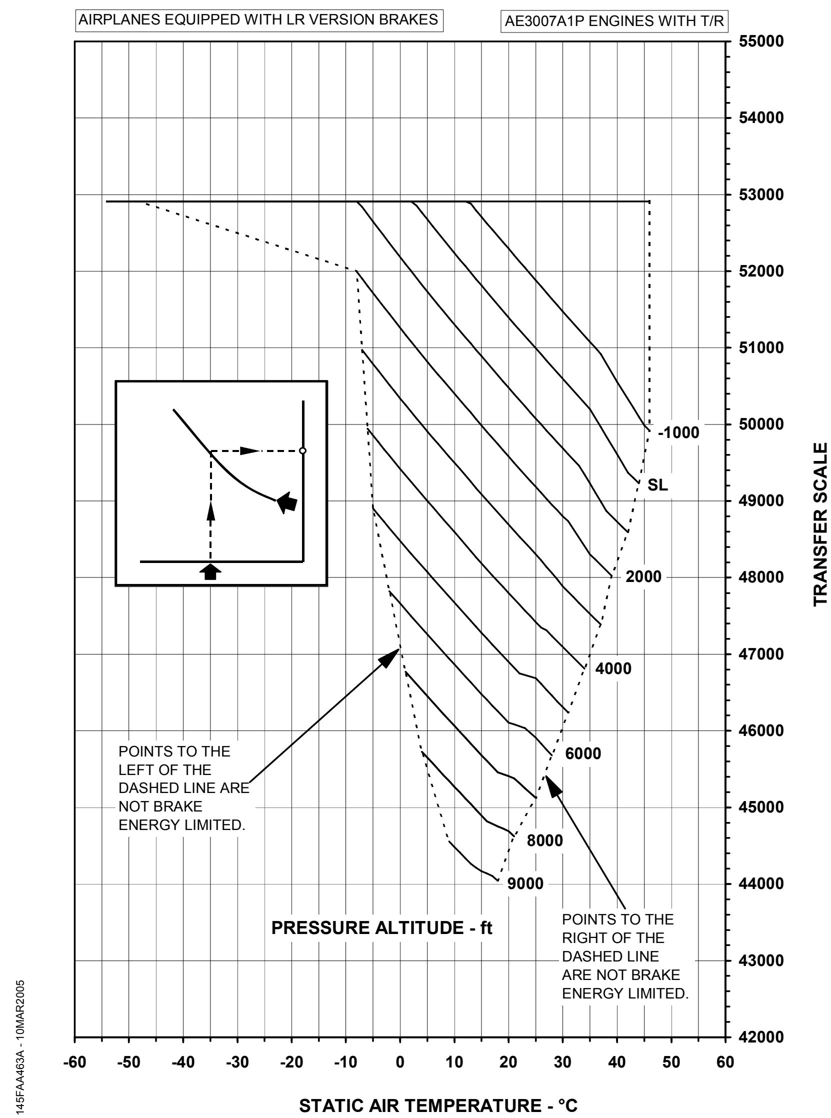
145FAA462B - 10MAR2005

AFM-145/1153 - FAA

MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

T/O MODE - FLAPS 9°

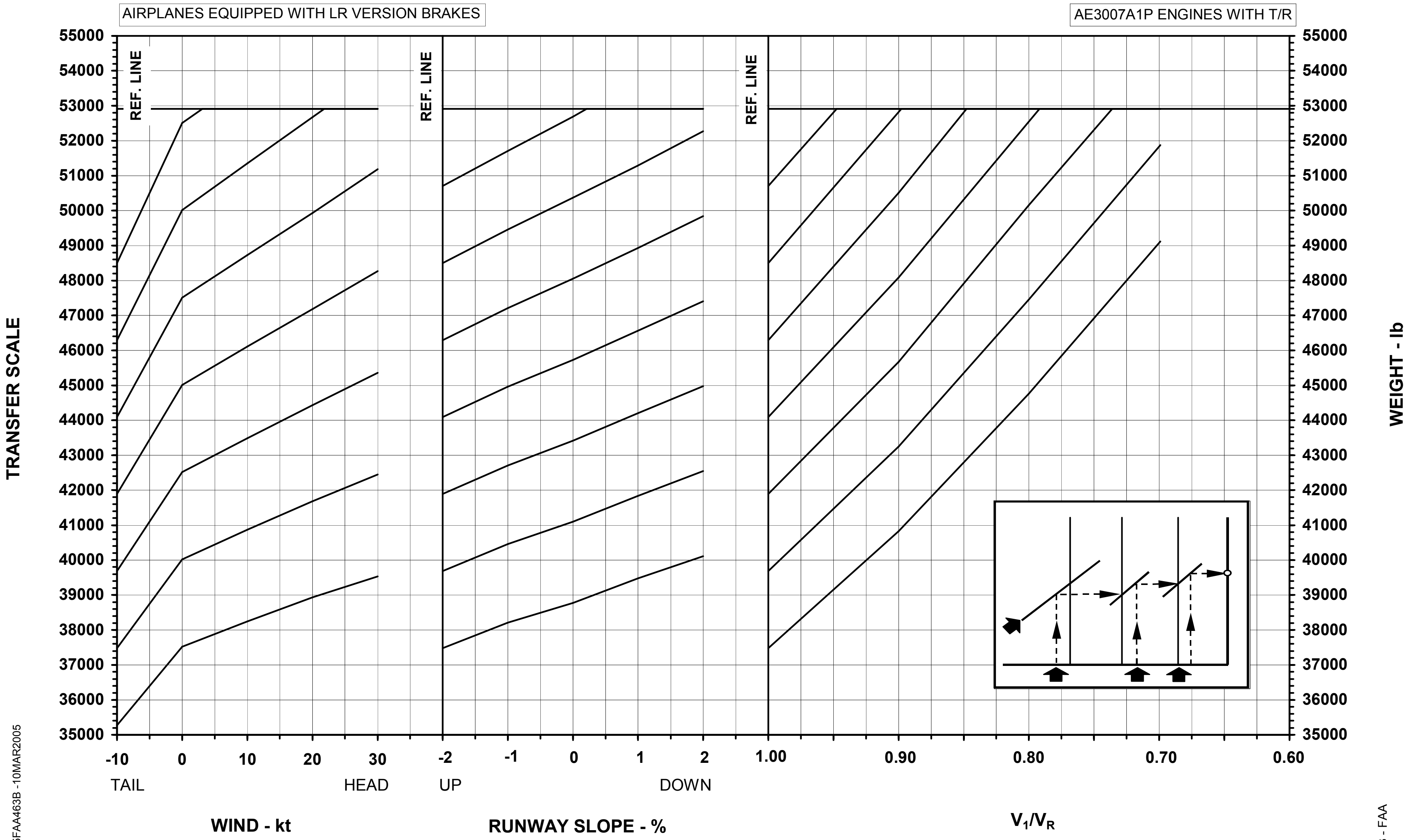
CHART 1 OF 2



MAXIMUM TAKEOFF WEIGHT - BRAKE ENERGY LIMITED

T/O MODE - FLAPS 9°

CHART 2 OF 2



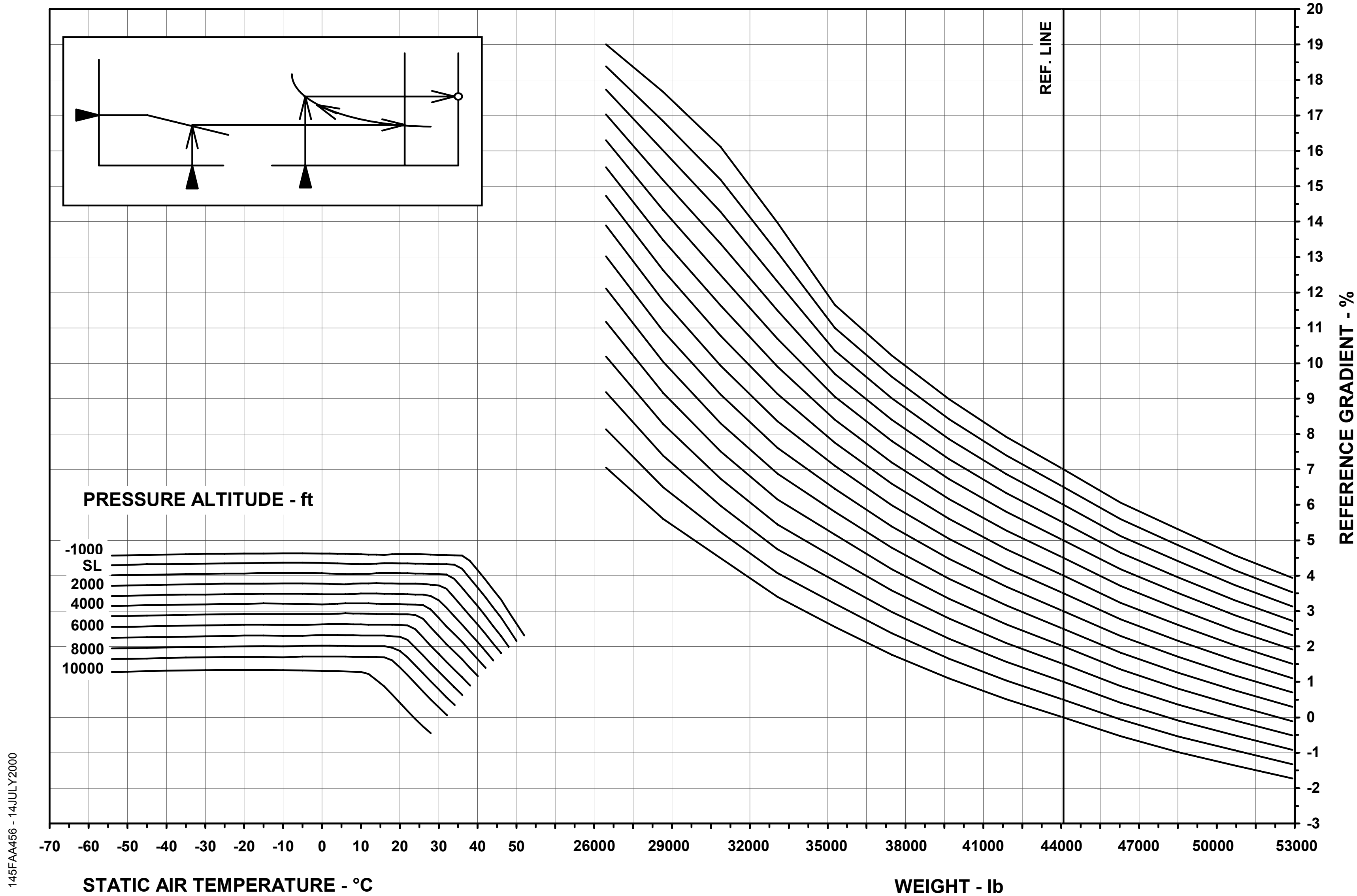
145FAA463B -10MAR2005

AFM-145/1153 - FAA

OBSTACLE CLEARANCE - REFERENCE GRADIENT

FLAPS 9° - T/O MODE - NORMAL V_2 - BLEED CLOSED - PACKS OFF - FADEC REF A/ICE OFF

AE3007A1P ENGINES WITH T/R

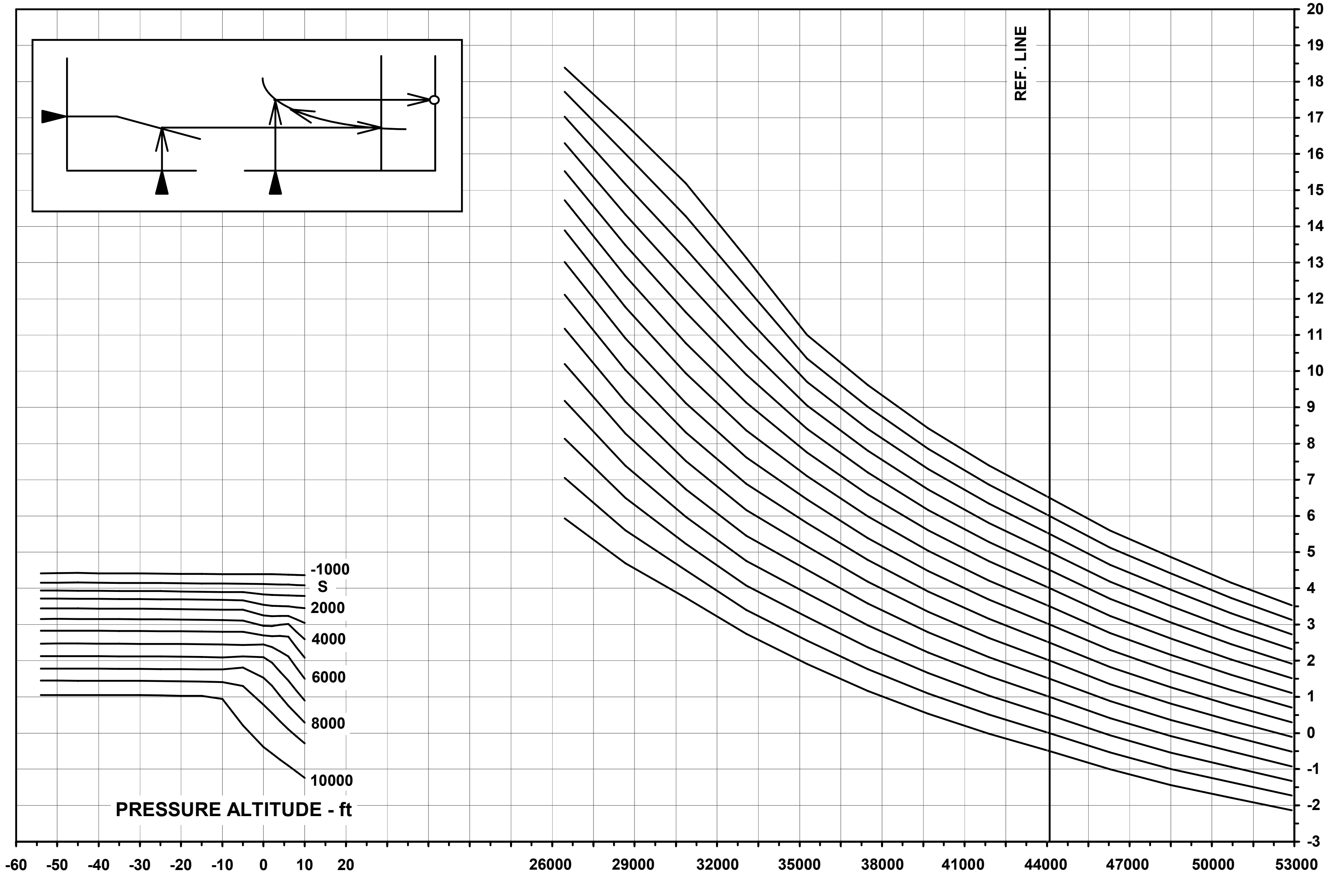


AFM-145/1153 - FAA

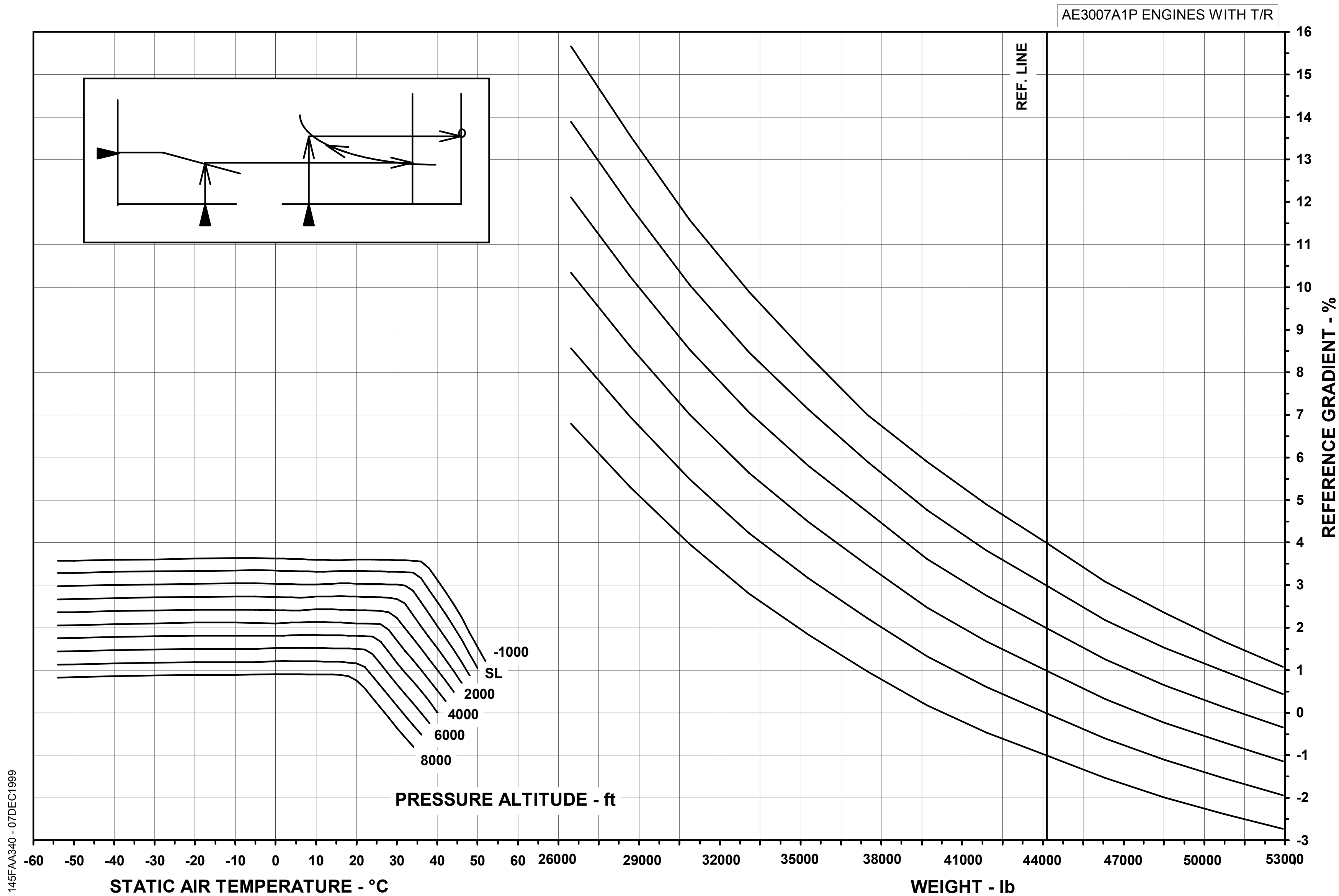
OBSTACLE CLEARANCE - REFERENCE GRADIENT

FLAPS 9° - T/O MODE - NORMAL V_2 - BLEED OPEN - PACKS OFF - FADEC REF A/ICE ON

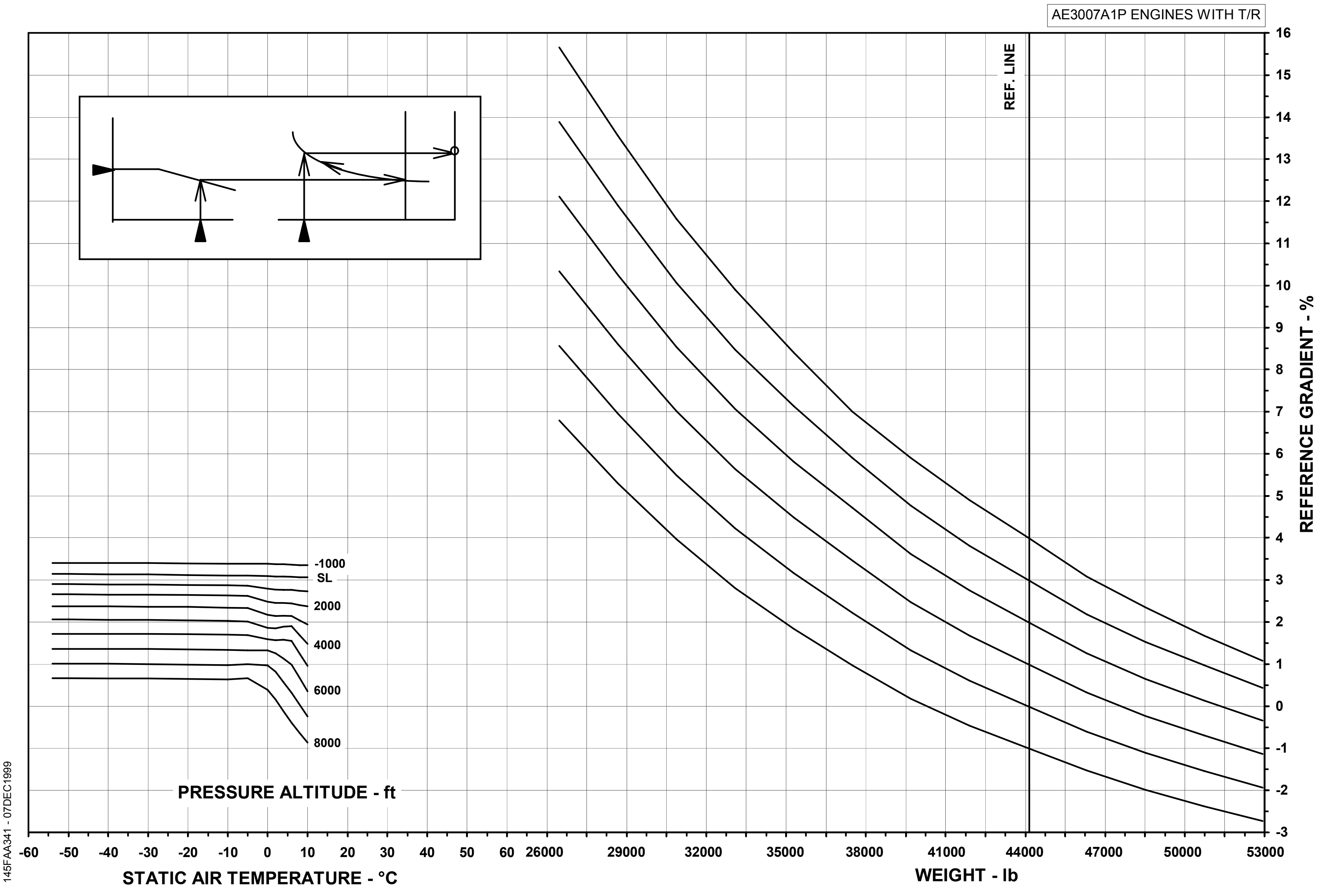
AE3007A1P ENGINES WITH T/R



OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 18° - T/O MODE - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF

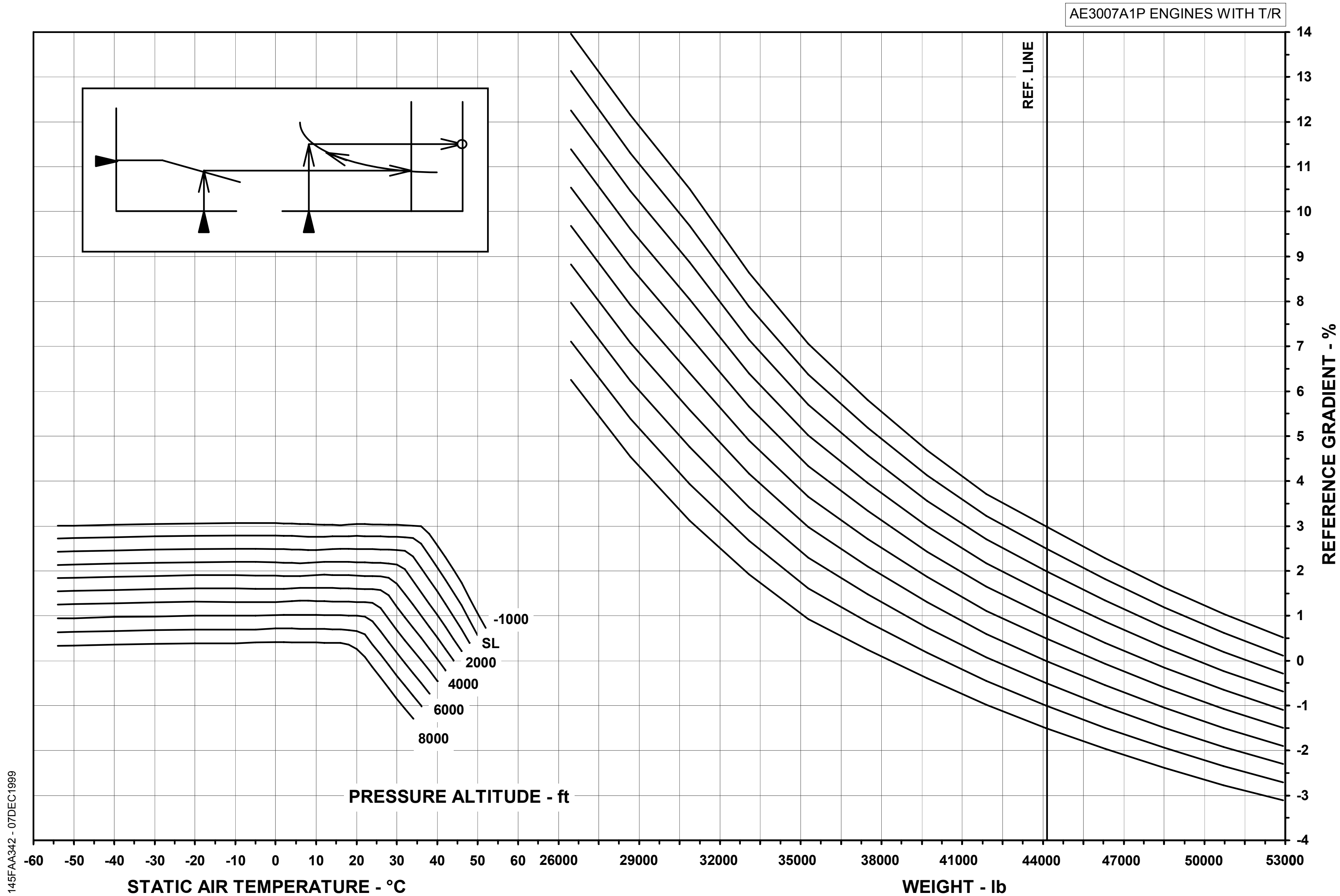


OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 18° - T/O MODE - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON

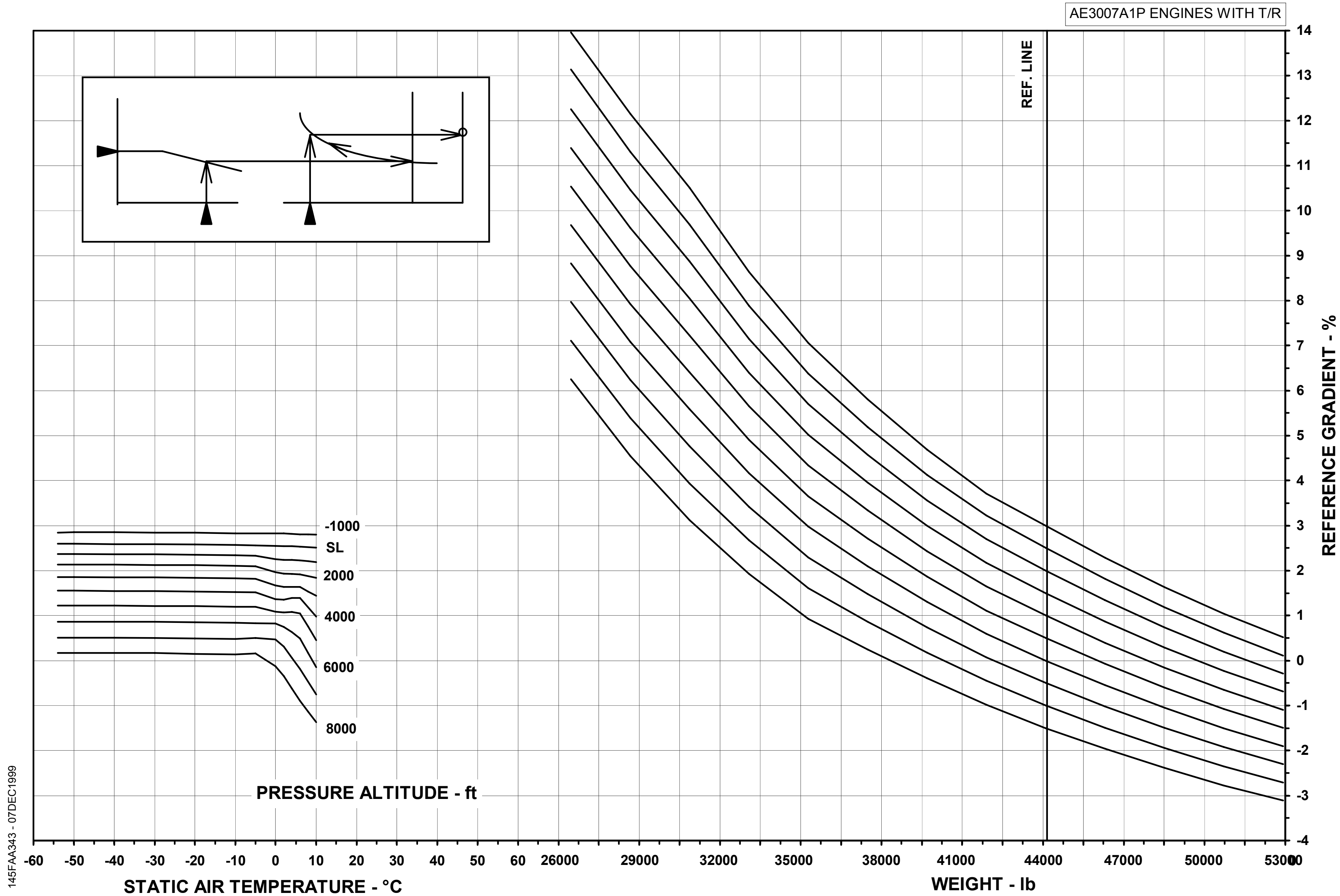


AFM-145/1153 - FAA

OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 22° - T/O MODE - BLEEDS CLOSED - PACKS OFF - FADEC REF A/ICE OFF

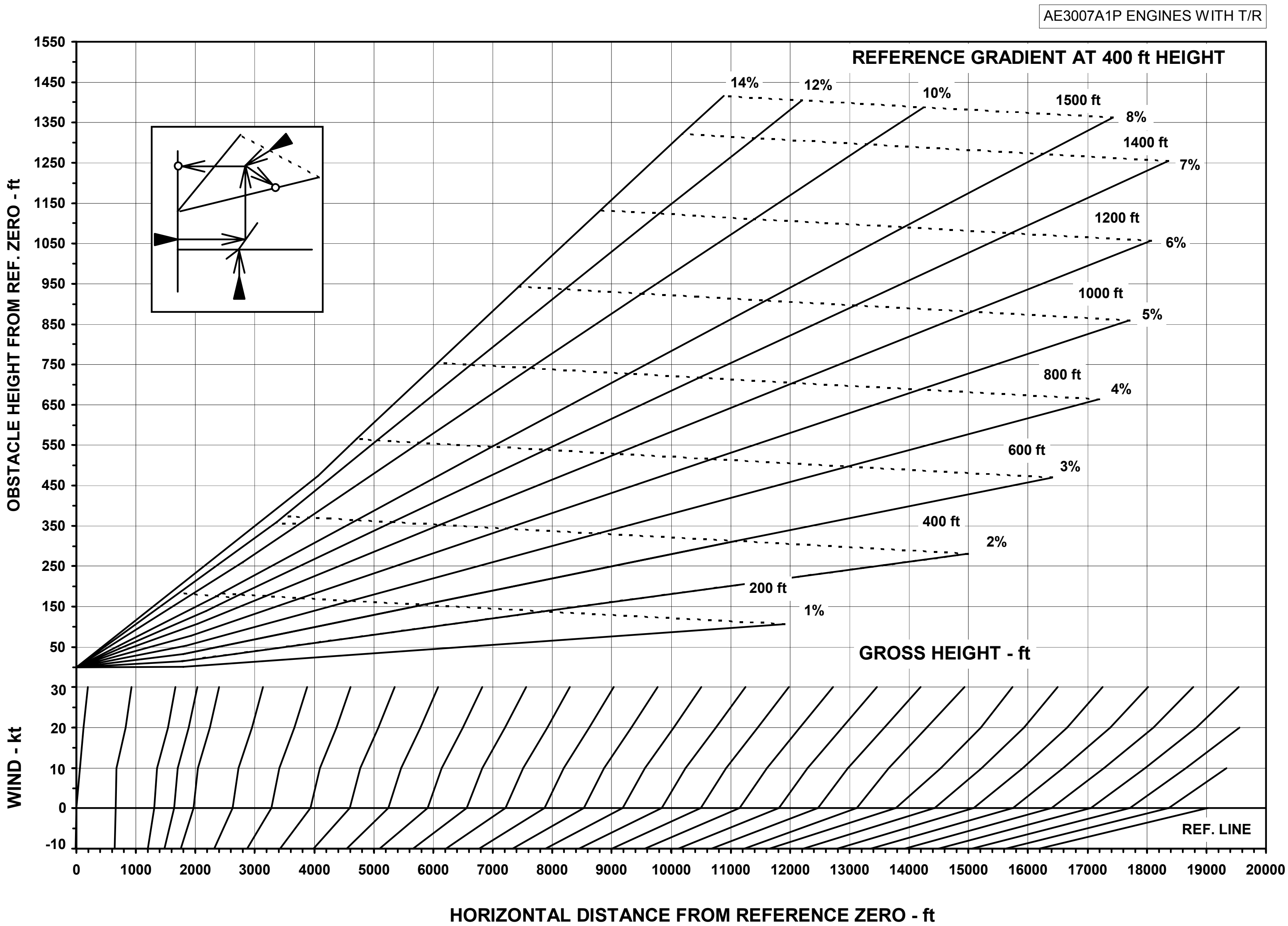


OBSTACLE CLEARANCE - REFERENCE GRADIENT
FLAPS 22° - T/O MODE - BLEEDS OPEN - PACKS OFF - FADEC REF A/ICE ON

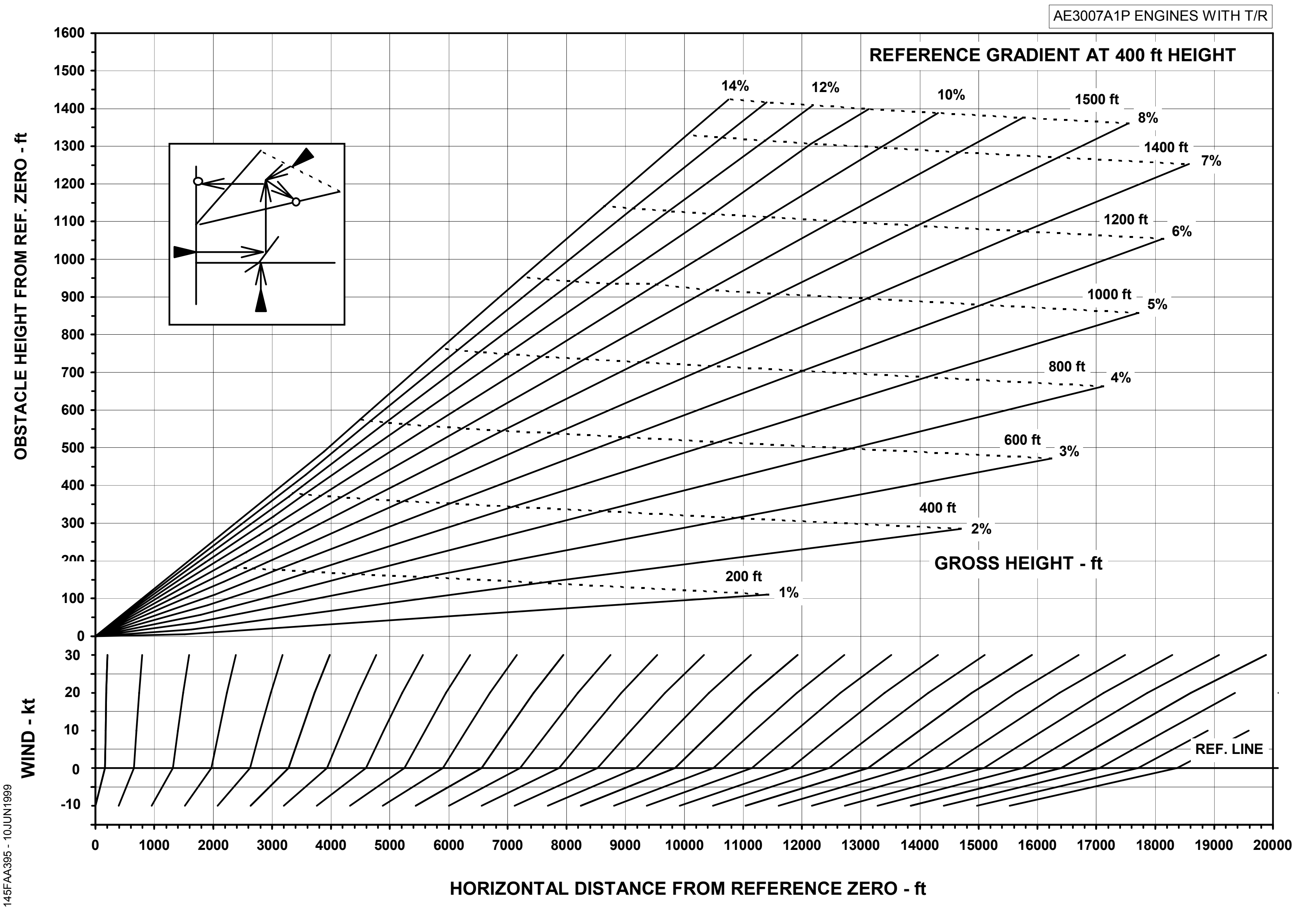


AFM-145/1153 - FAA

OBSTACLE CLEARANCE CLOSE IN
T/O MODE - FLAPS 9°

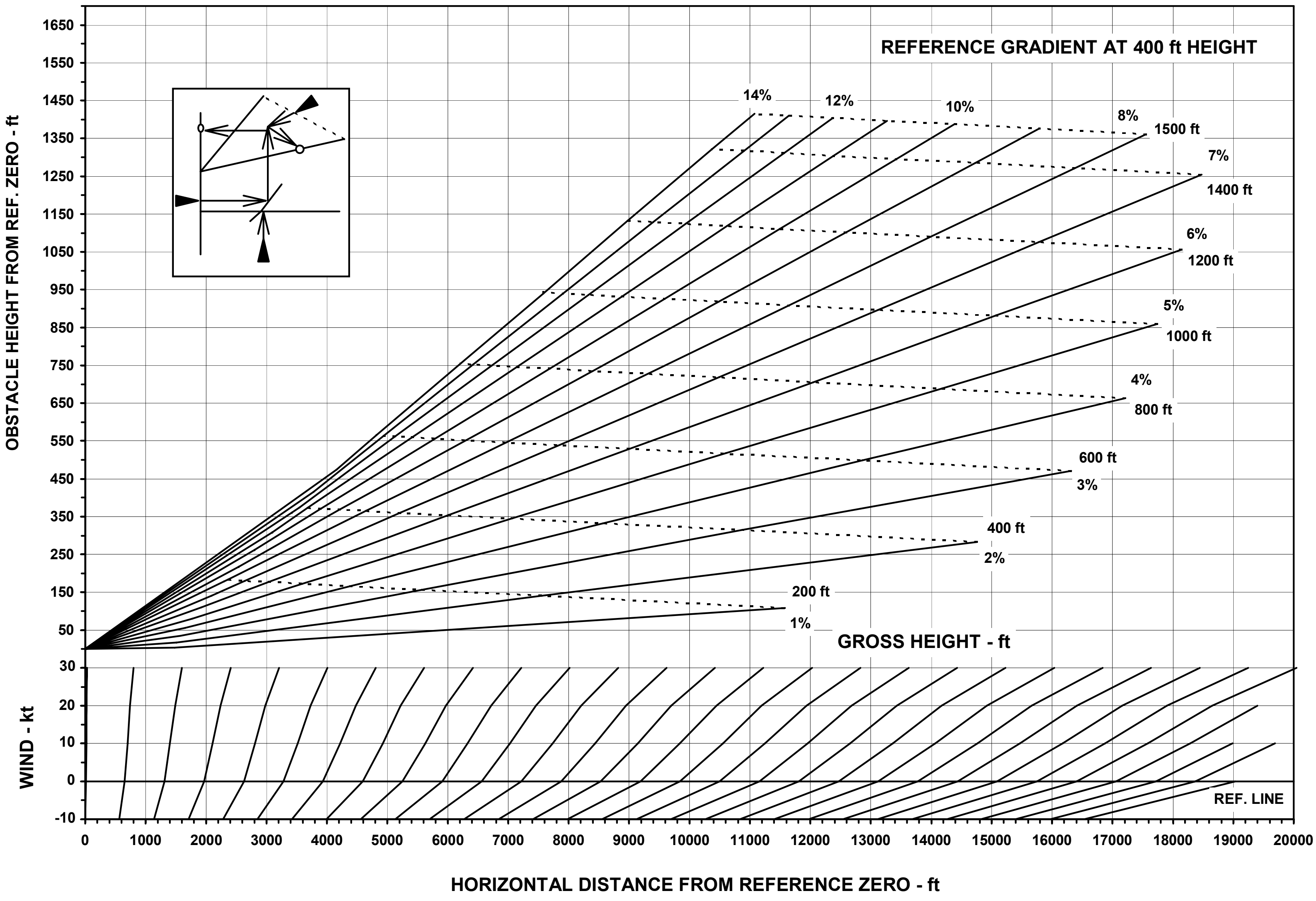


OBSTACLE CLEARANCE CLOSE-IN
FLAPS 18°

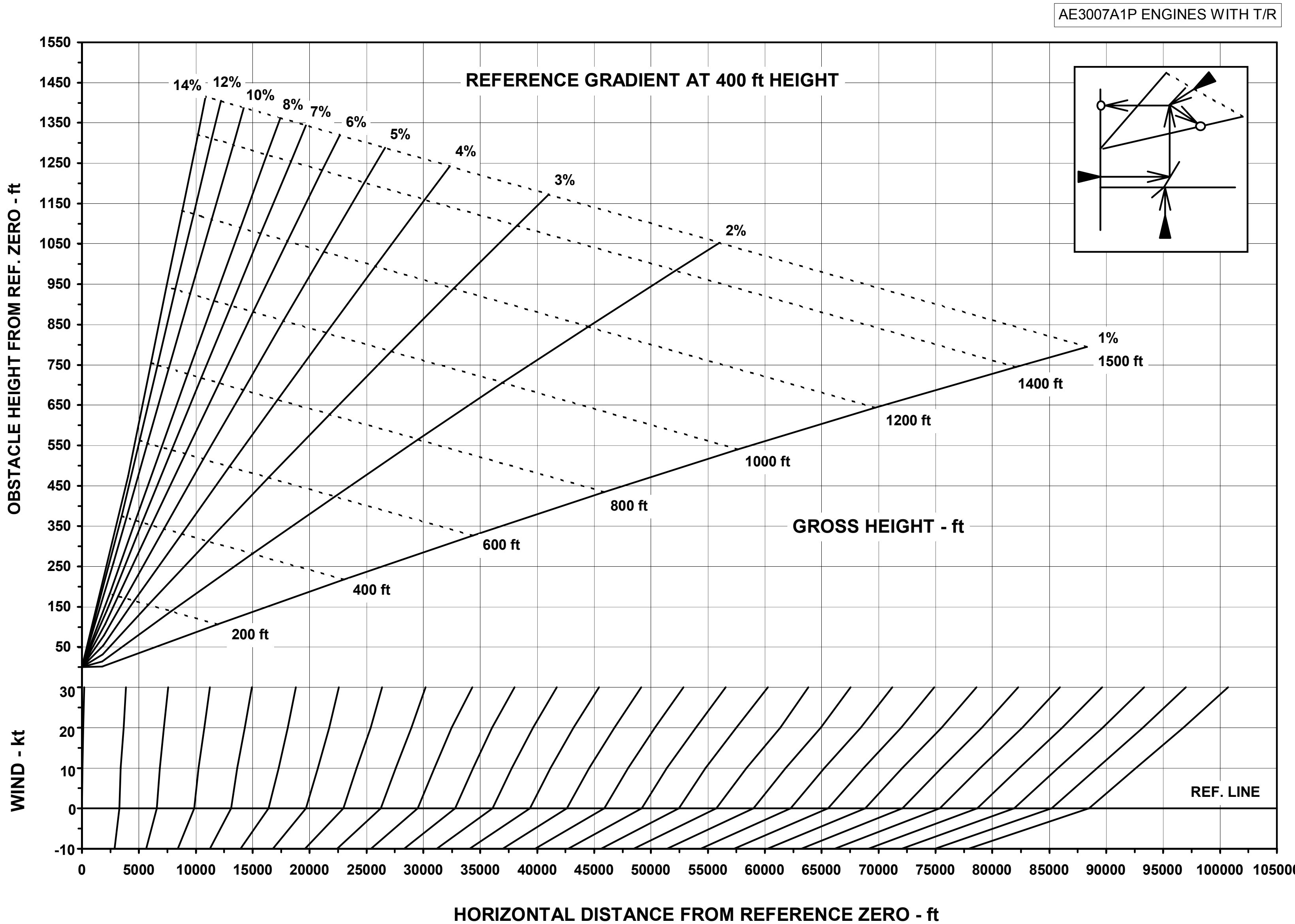


OBSTACLE CLEARANCE CLOSE-IN
FLAPS 22°

AE3007A1P ENGINES WITH T/R



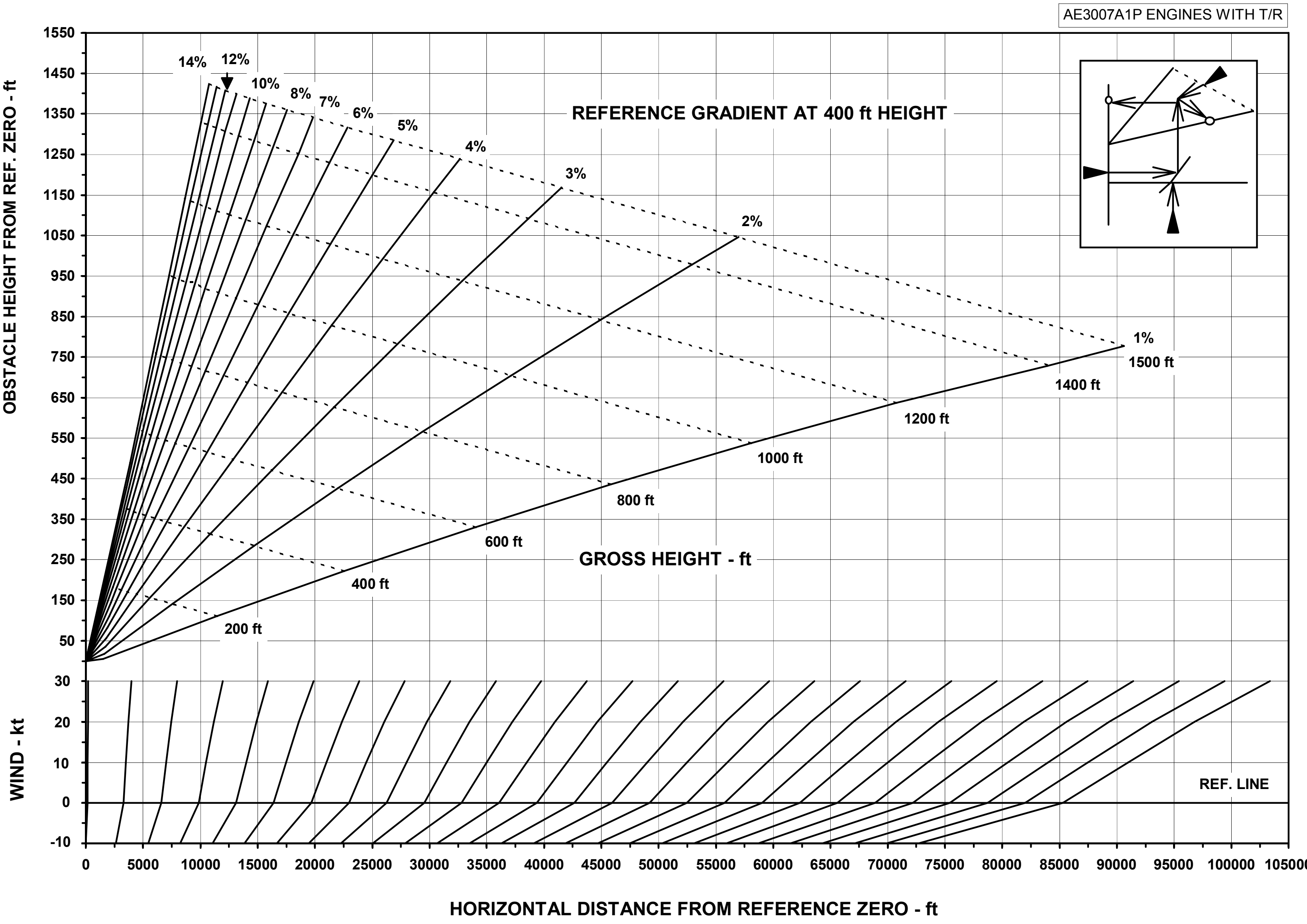
OBSTACLE CLEARANCE DISTANT
T/O MODE - FLAPS 9°



145FAA458 - 14JULY 2000

AFM-145/1153 - FAA

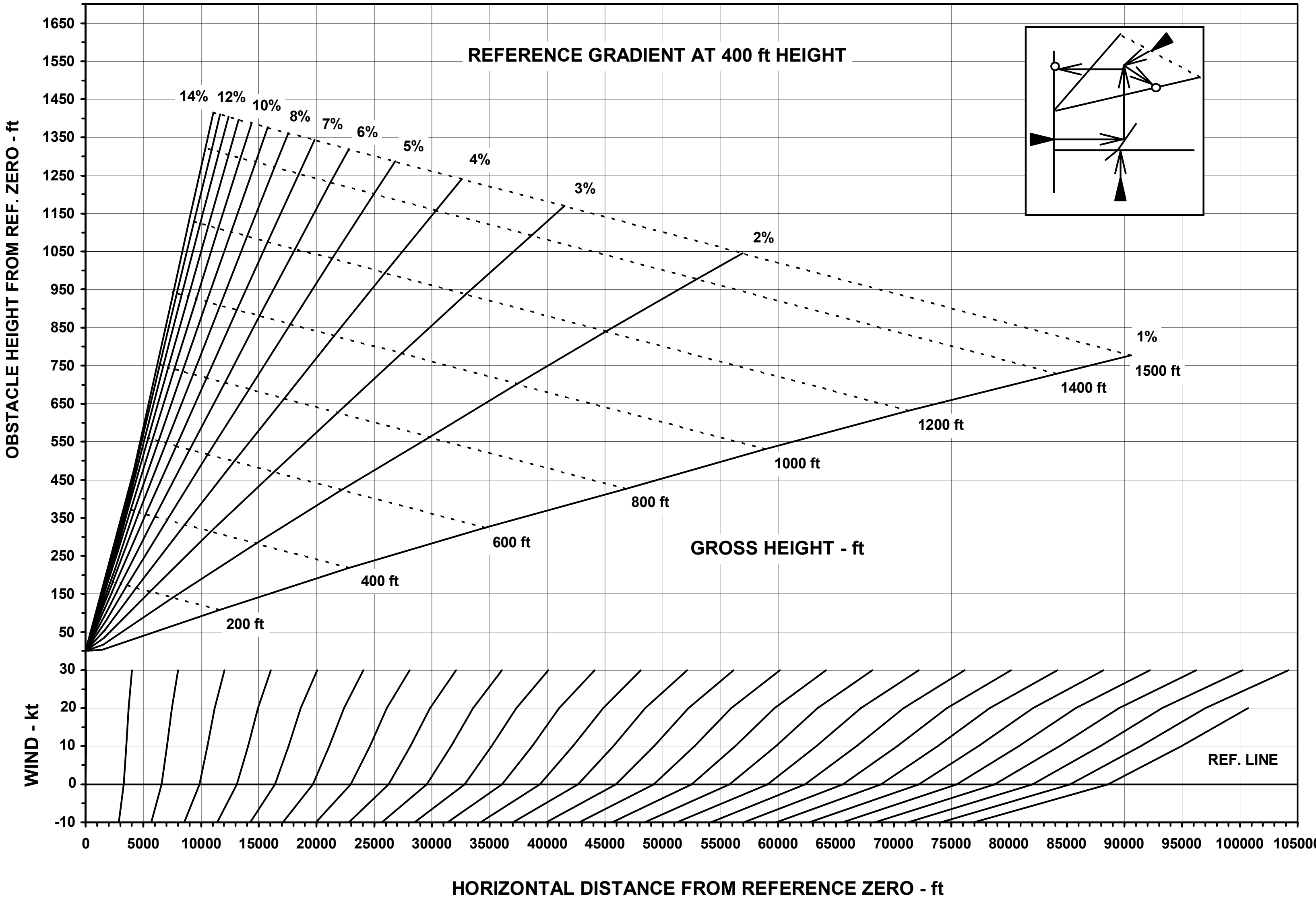
OBSTACLE CLEARANCE - DISTANT
FLAPS 18°



AFM-145/1153 - FAA

OBSTACLE CLEARANCE DISTANT
FLAPS 22°

AE3007A1P ENGINES WITH T/R

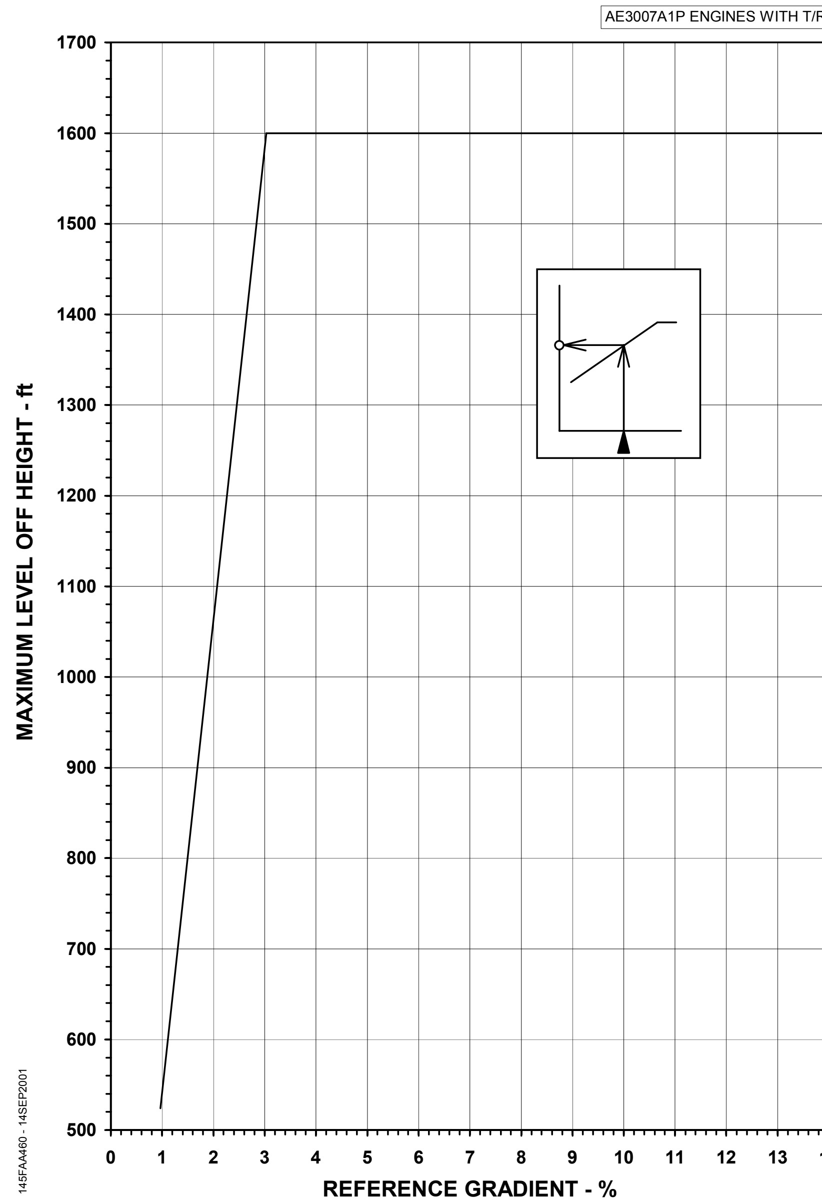


145FAA345 - 13SEP1999

AFM-145/1153 - FAA

MAXIMUM LEVEL OFF HEIGHT

ALT T/O MODE - FLAPS 9°



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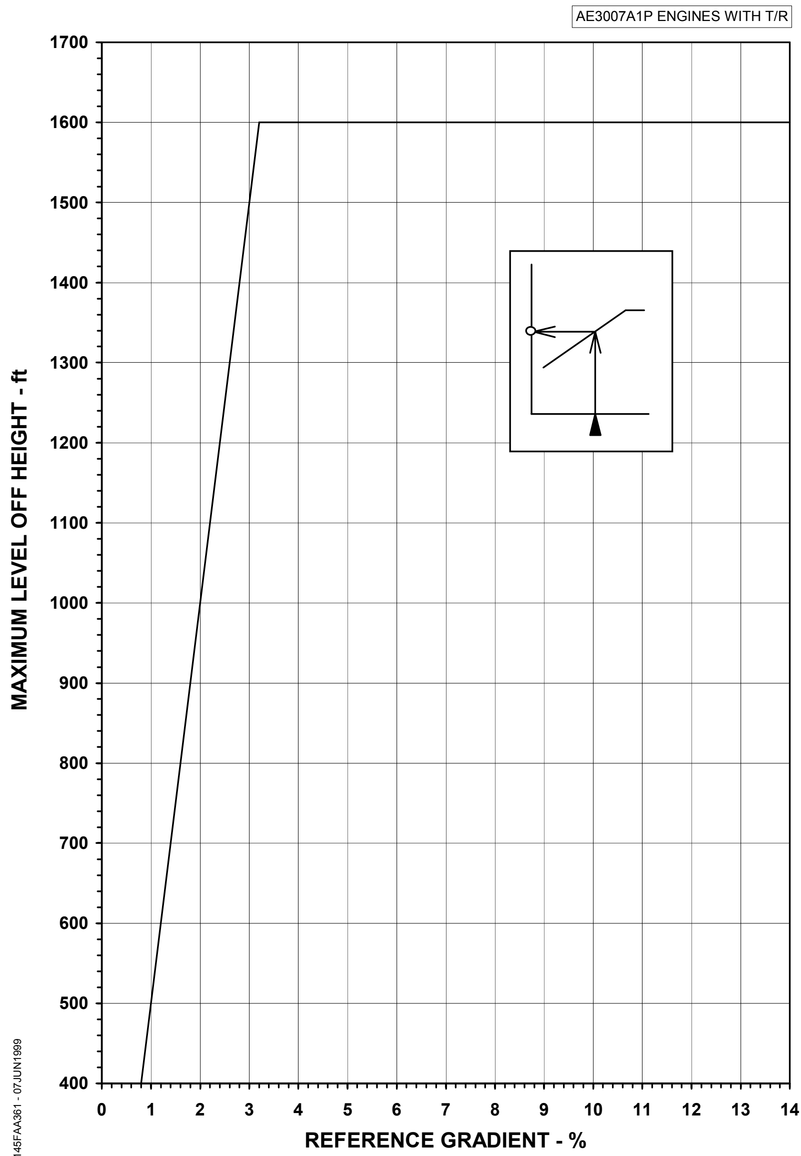
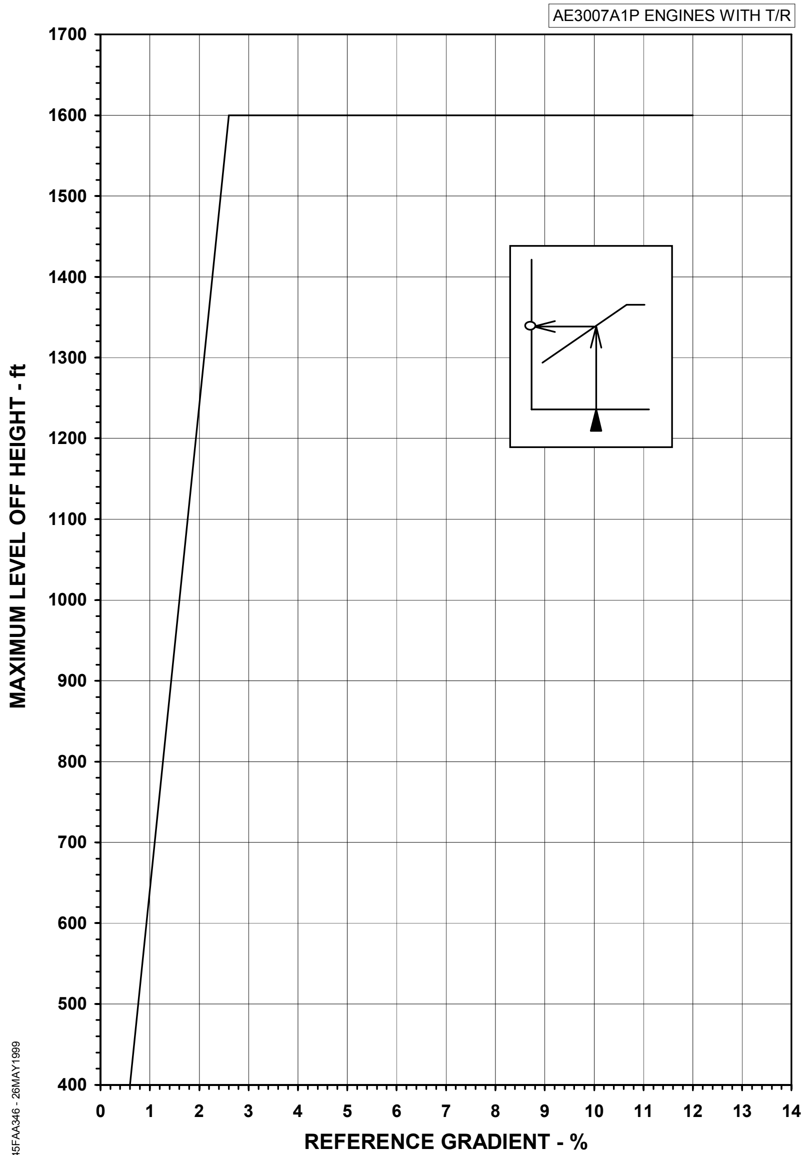
MAXIMUM LEVEL OFF HEIGHT
FLAPS 18°



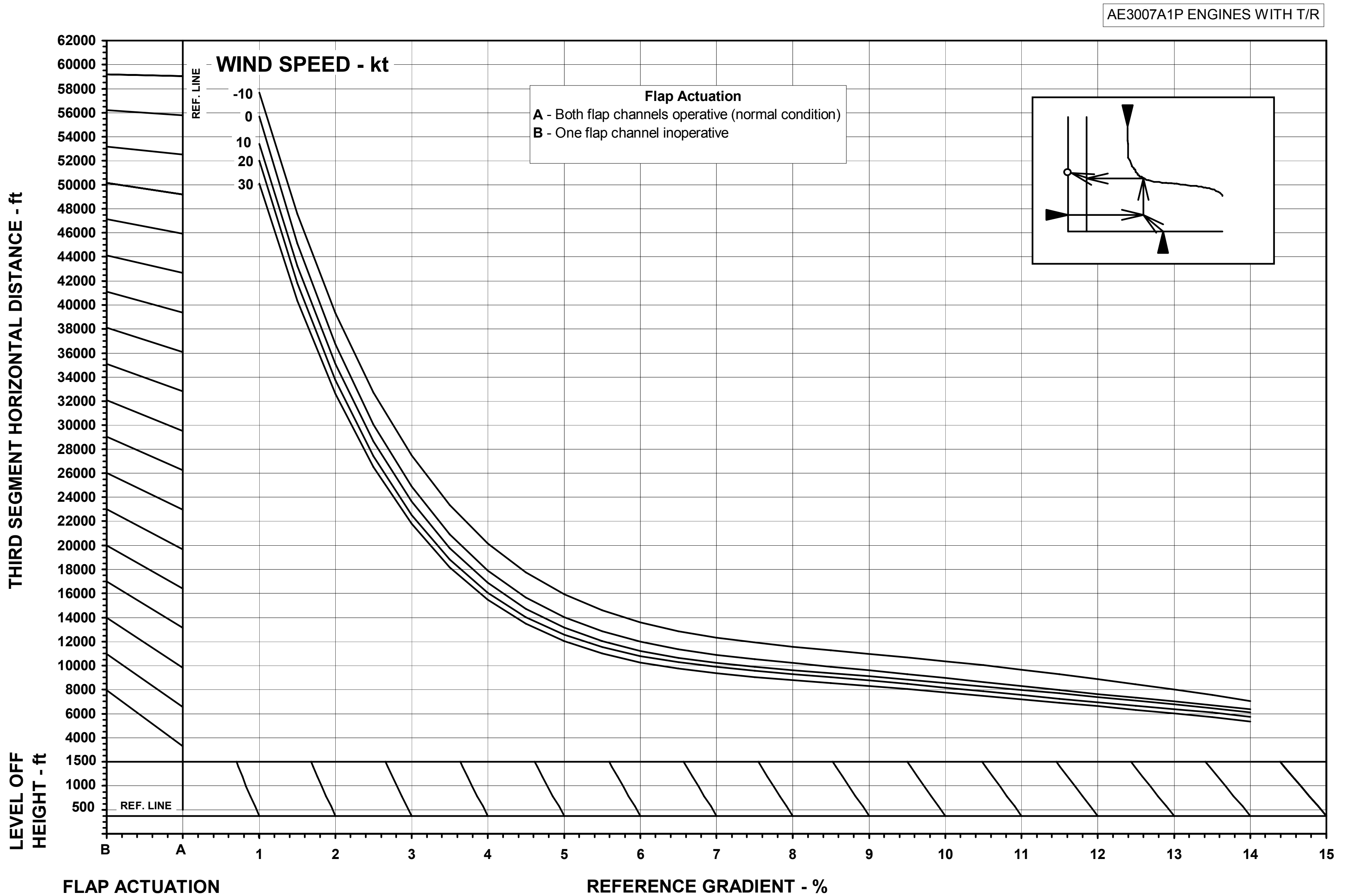
MAXIMUM LEVEL OFF HEIGHT

FLAPS 22°



145FAA461 - 14JULY2000

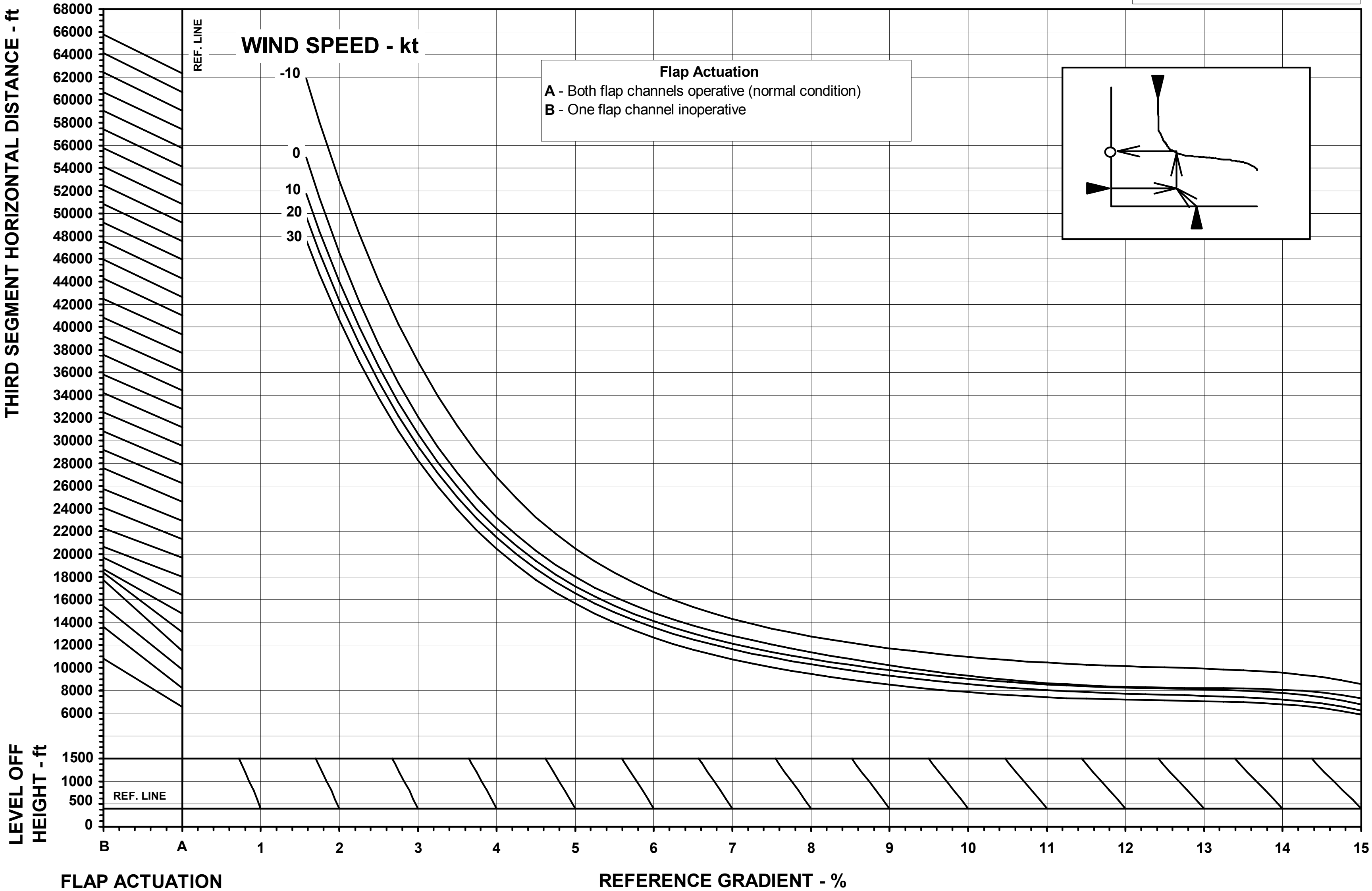
THIRD SEGMENT HORIZONTAL DISTANCE
T/O MODE - TAKEOFF FLAPS 9°



145FAA362 - 07JUN1999

THIRD SEGMENT HORIZONTAL DISTANCE
TAKEOFF FLAPS 18°

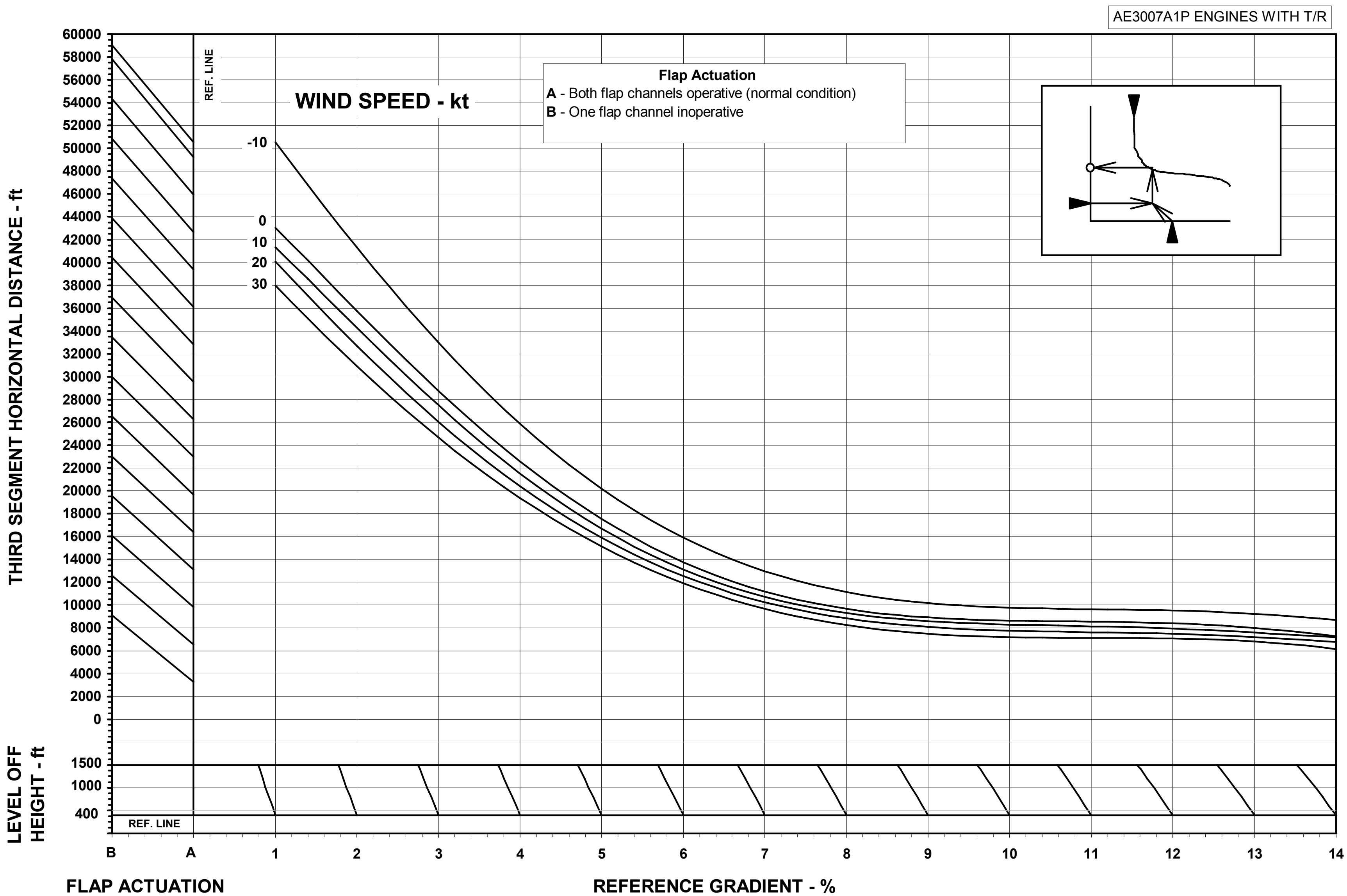
AE3007A1P ENGINES WITH T/R



AFM-145/1153 - FAA

145CTA347 - 14JULY2000

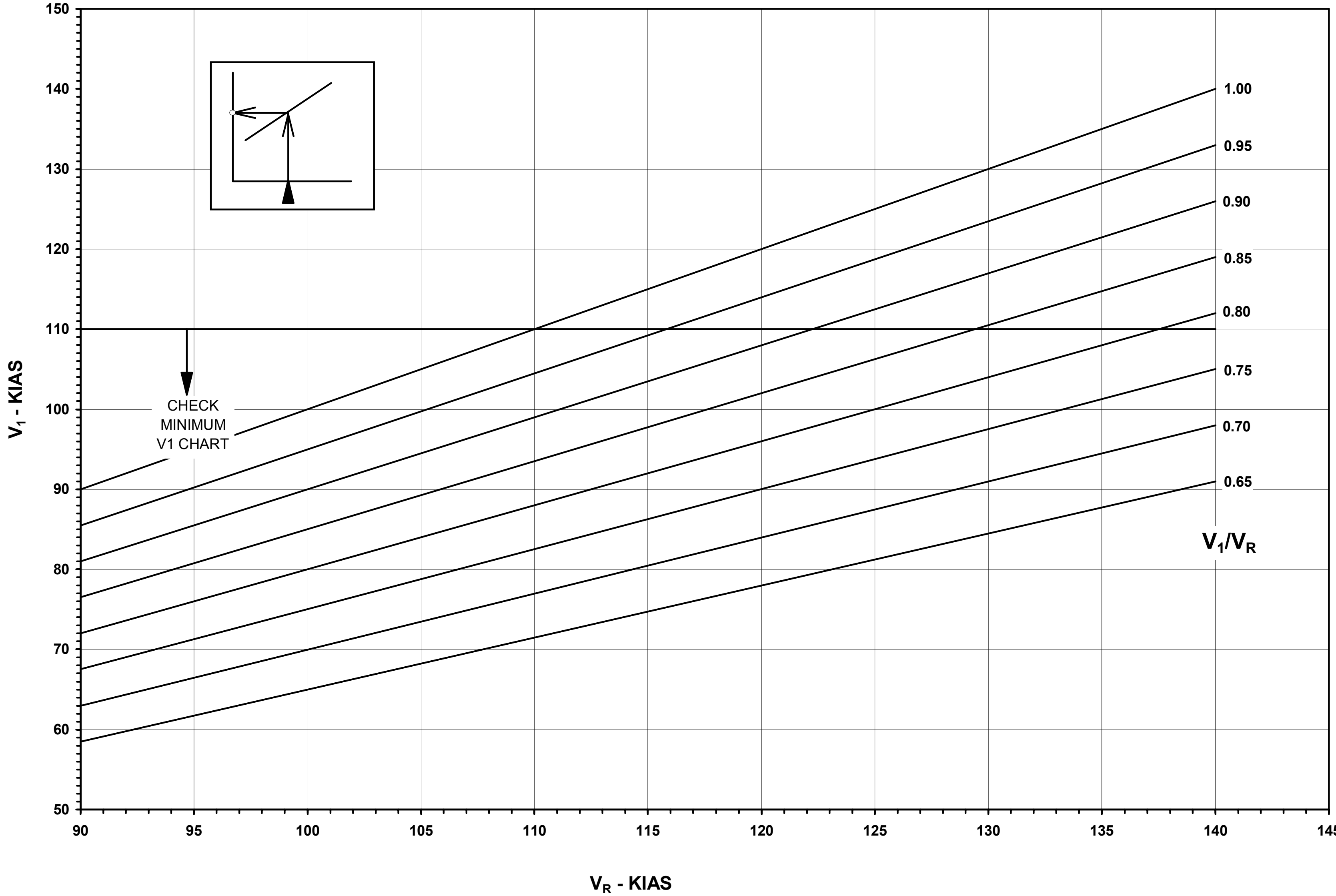
THIRD SEGMENT HORIZONTAL DISTANCE
TAKEOFF FLAPS 22°



TAKEOFF SPEEDS - V_1

FLAPS 9° - T/O MODE

AE3007A1P ENGINES WITH T/R

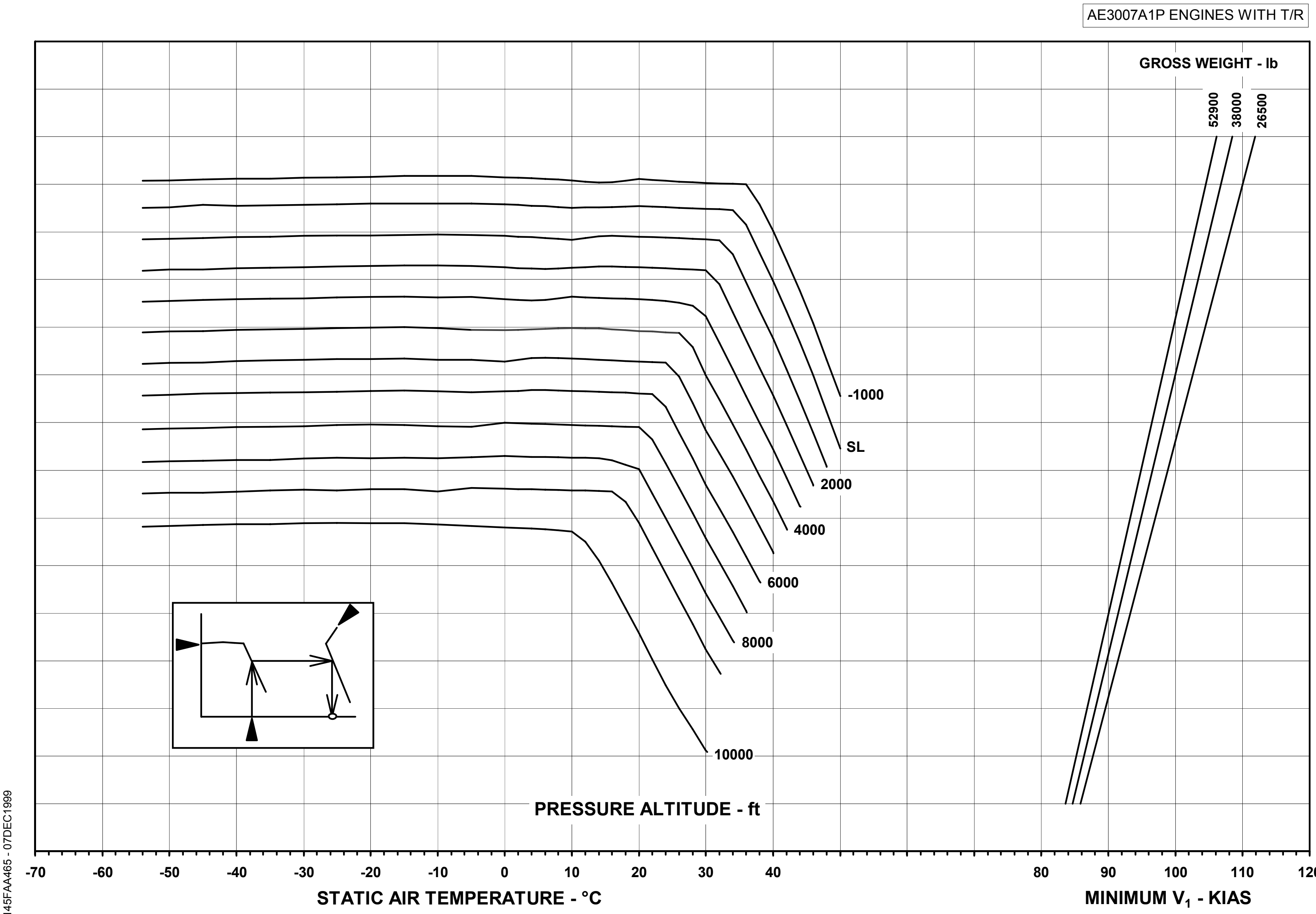


145FAA464 - 07DEC1999

AFM-145/1153 - FAA

TAKEOFF SPEEDS - MINIMUM V_1 (NORMAL V_2)

FLAPS 9° - T/O MODE

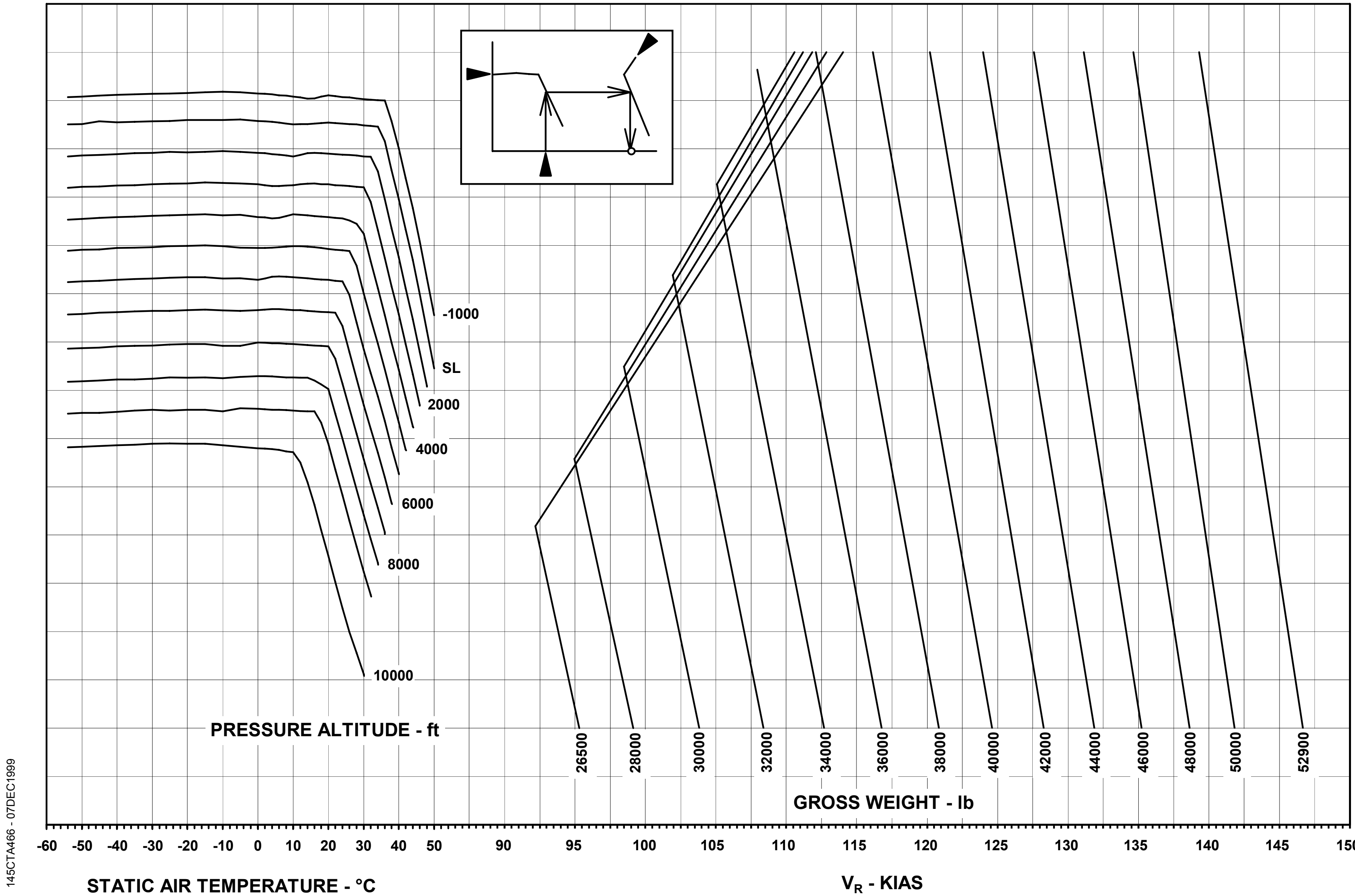


AFM-145/1153 - FAA

TAKEOFF SPEEDS - V_R (NORMAL V_2)

FLAPS 9° - T/O MODE

AE3007A1P ENGINES WITH T/R

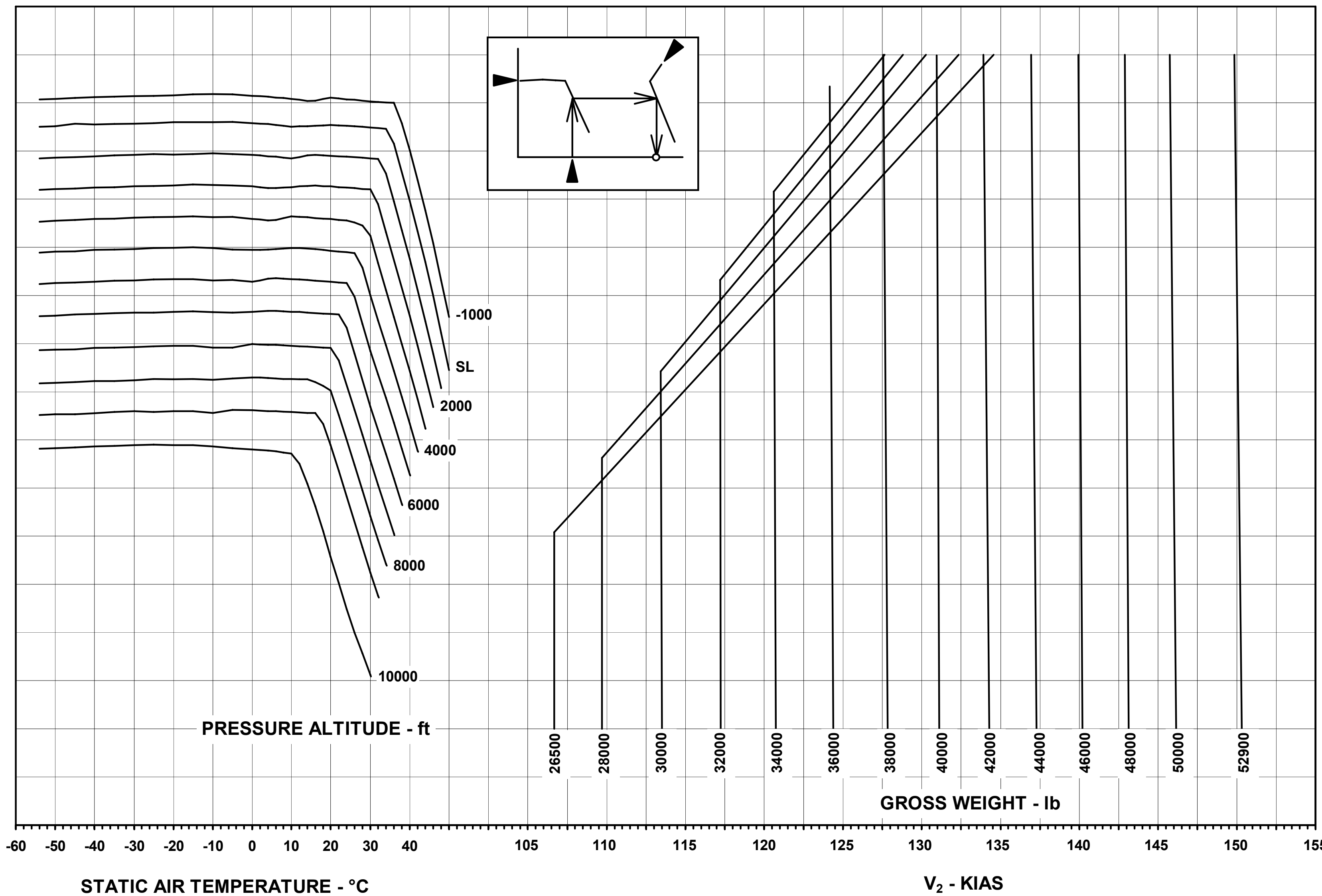


AFM-145/1153 - FAA

TAKEOFF SPEEDS - V_2 (NORMAL)

FLAPS 9° - T/O MODE

AE3007A1P ENGINES WITH T/R



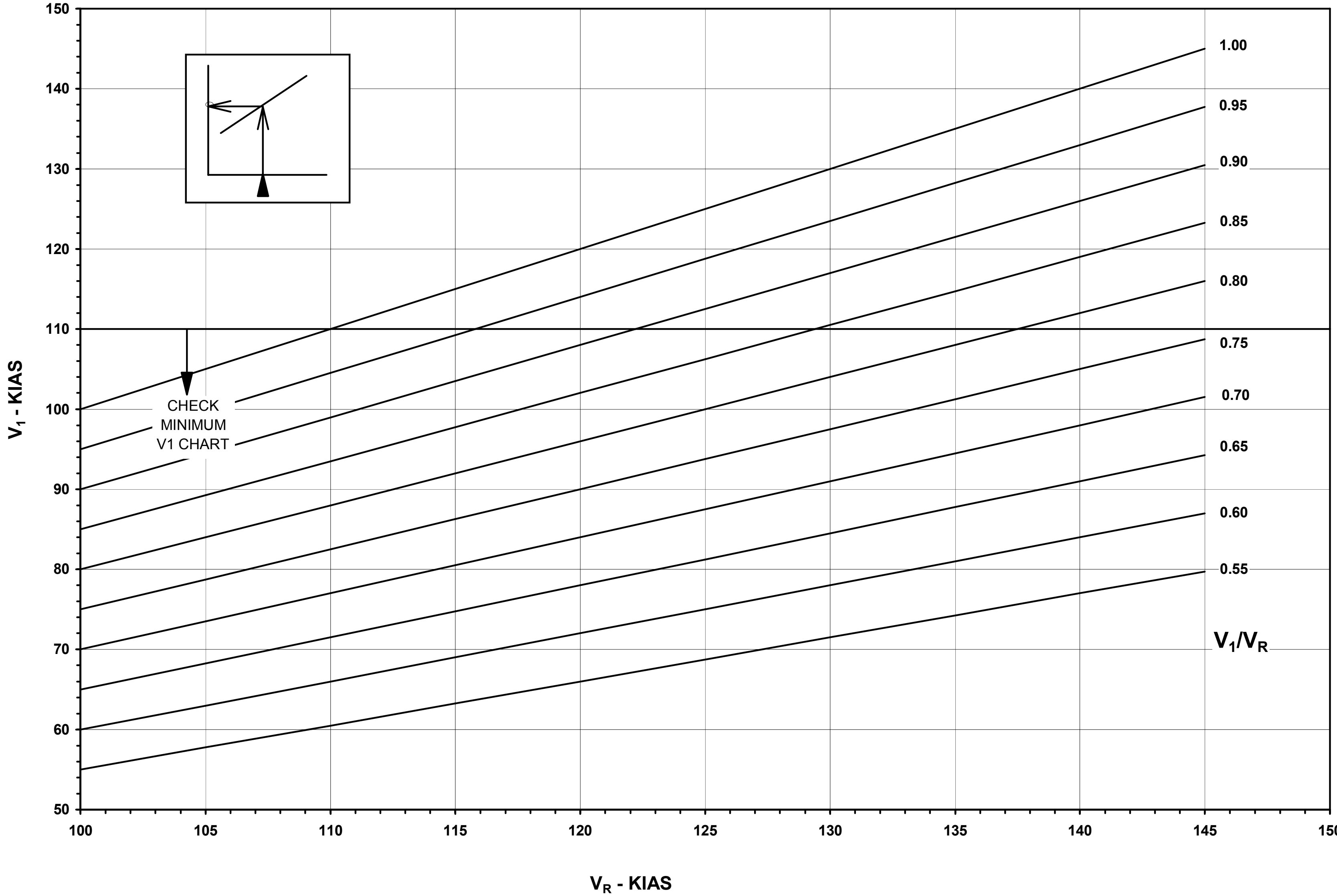
145FAA467 - 07DEC1999

AFM-145/1153 - FAA

TAKEOFF SPEEDS - V_1

FLAPS 18° - T/O MODE

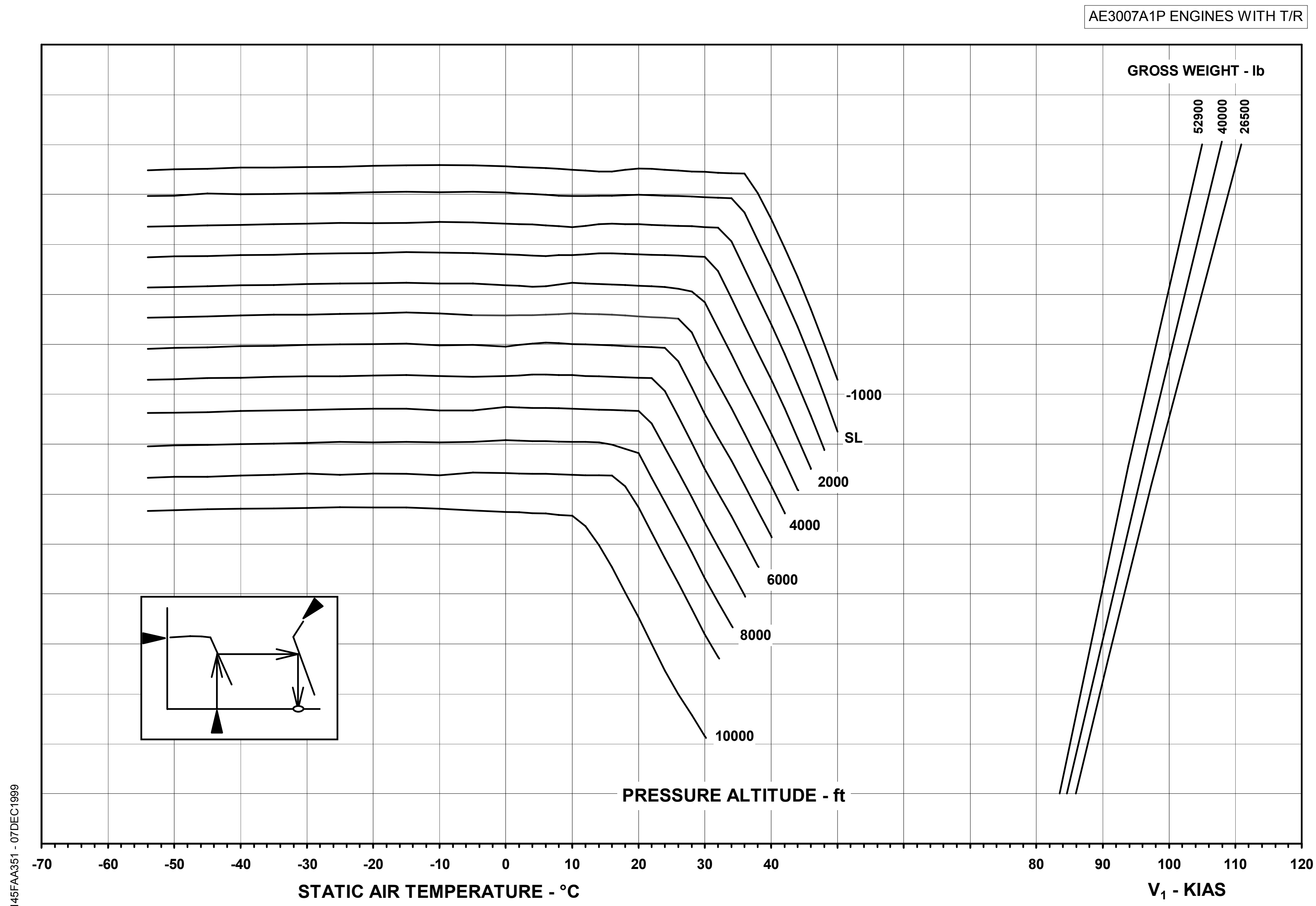
AE3007A1P ENGINES WITH T/R



145FAA349 -07DEC1999

TAKEOFF SPEEDS - MINIMUM V_1 (NORMAL V_2)

FLAPS 18° - T/O MODE

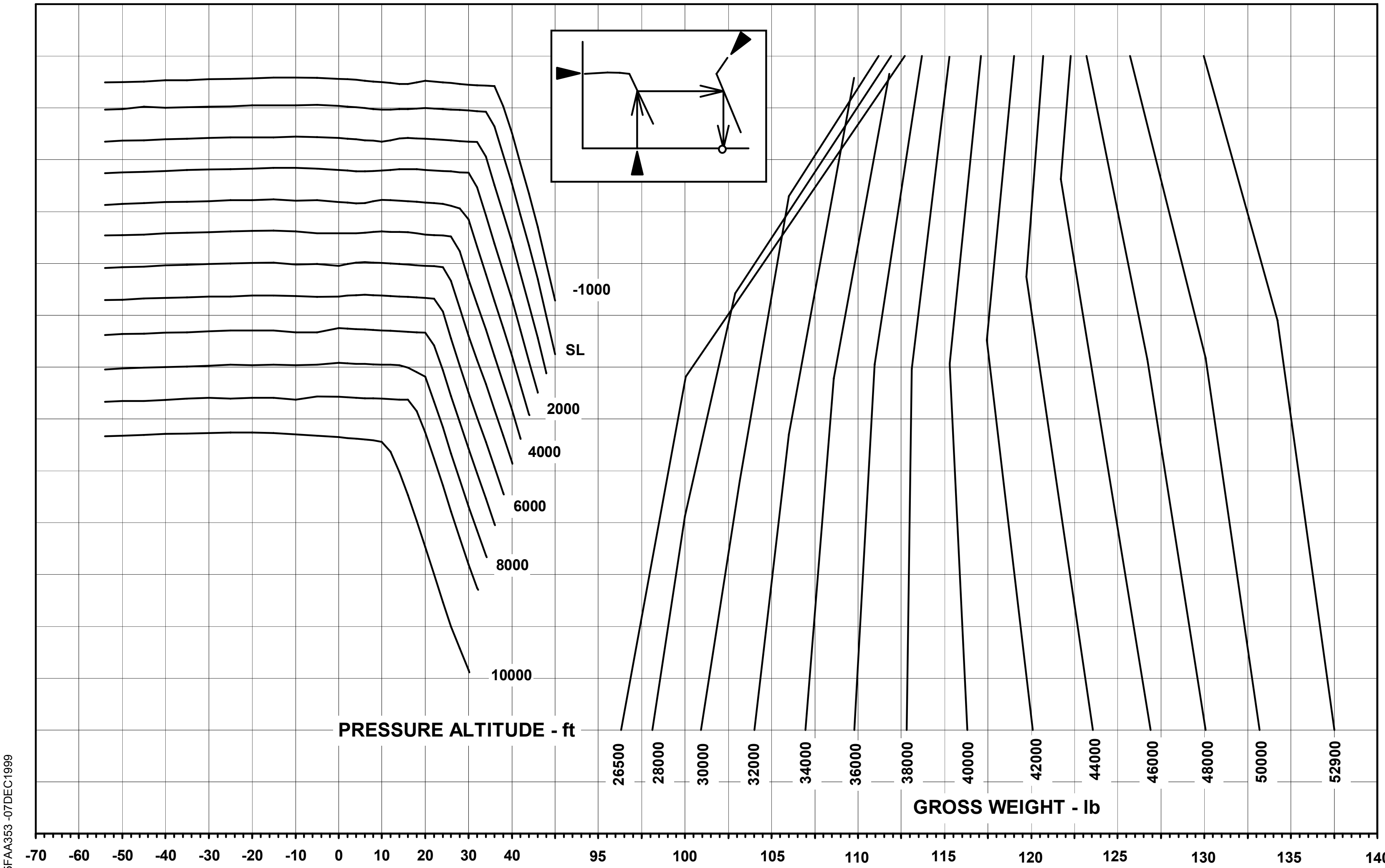


AFM-145/1153 - FAA

TAKEOFF SPEEDS - V_R (NORMAL V_2)

FLAPS 18° - T/O MODE

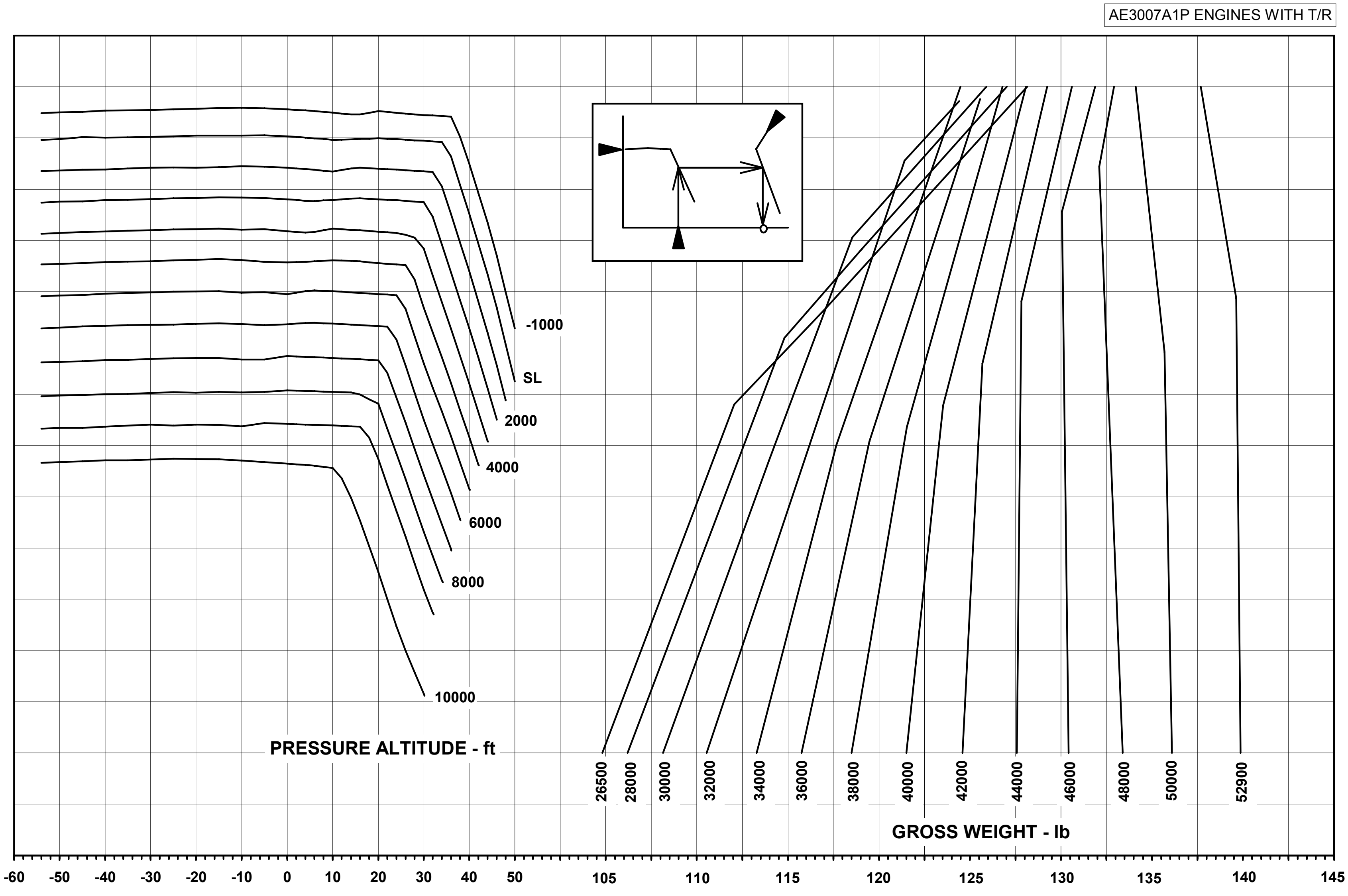
AE3007A1P ENGINES WITH T/R



AFM-145/1153 - FAA

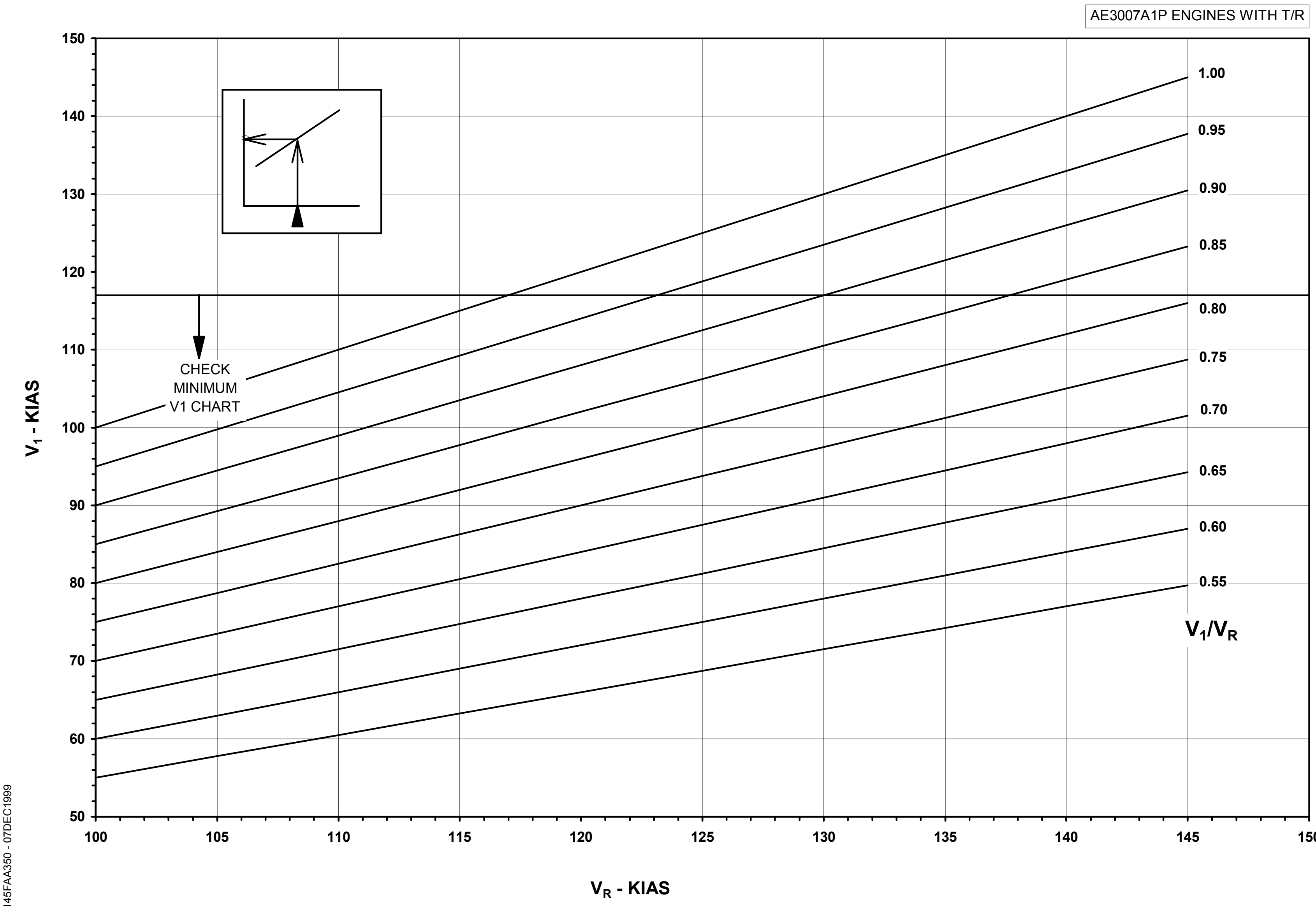
TAKEOFF SPEEDS - V_2 (NORMAL)

FLAPS 18° - T/O MODE



AFM-145/1153 - FAA

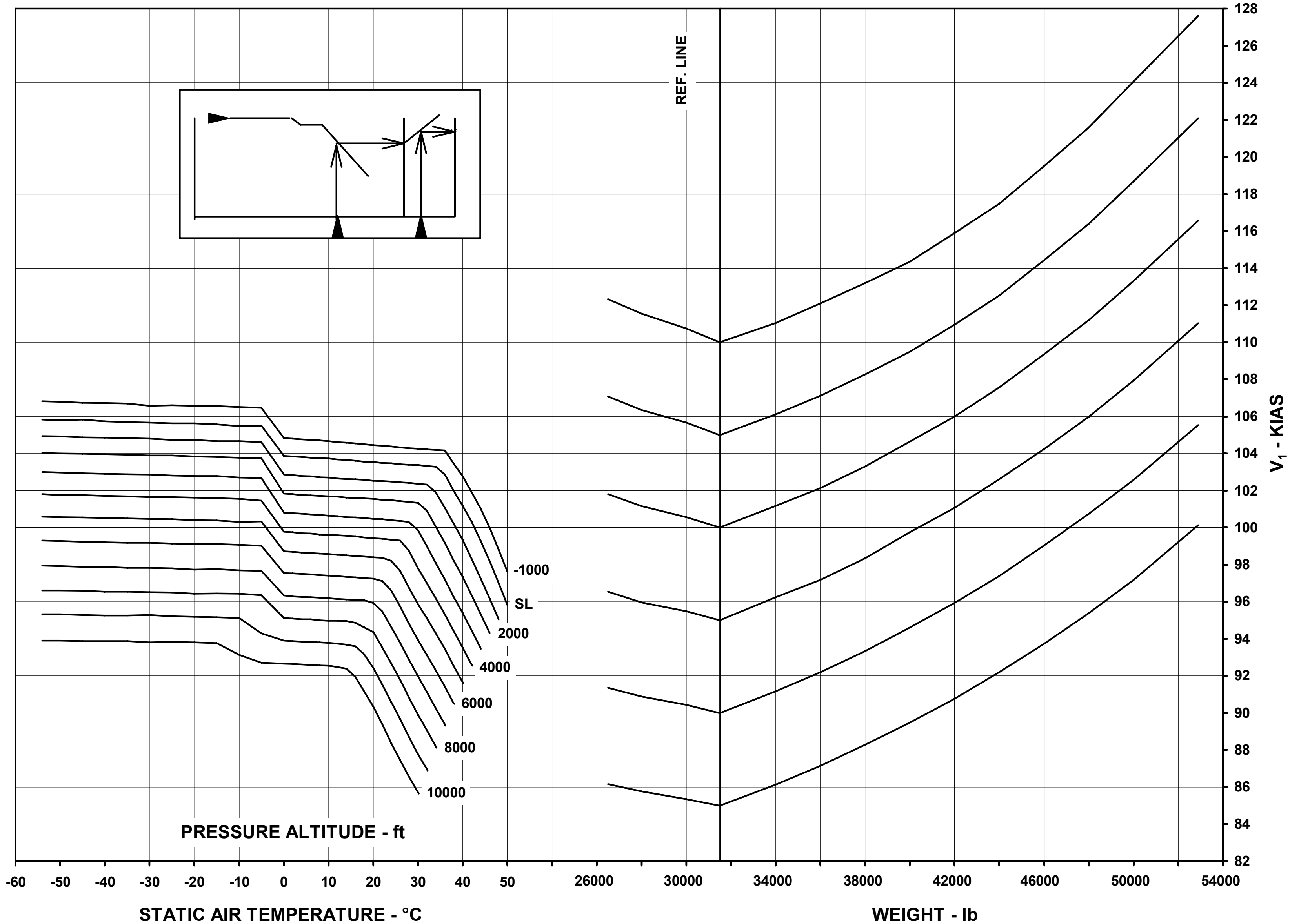
TAKEOFF SPEEDS - V_1
FLAPS 22° - T/O MODE



TAKEOFF SPEEDS - MINIMUM V_1 (NORMAL V_2)

FLAPS 22° - T/O MODE

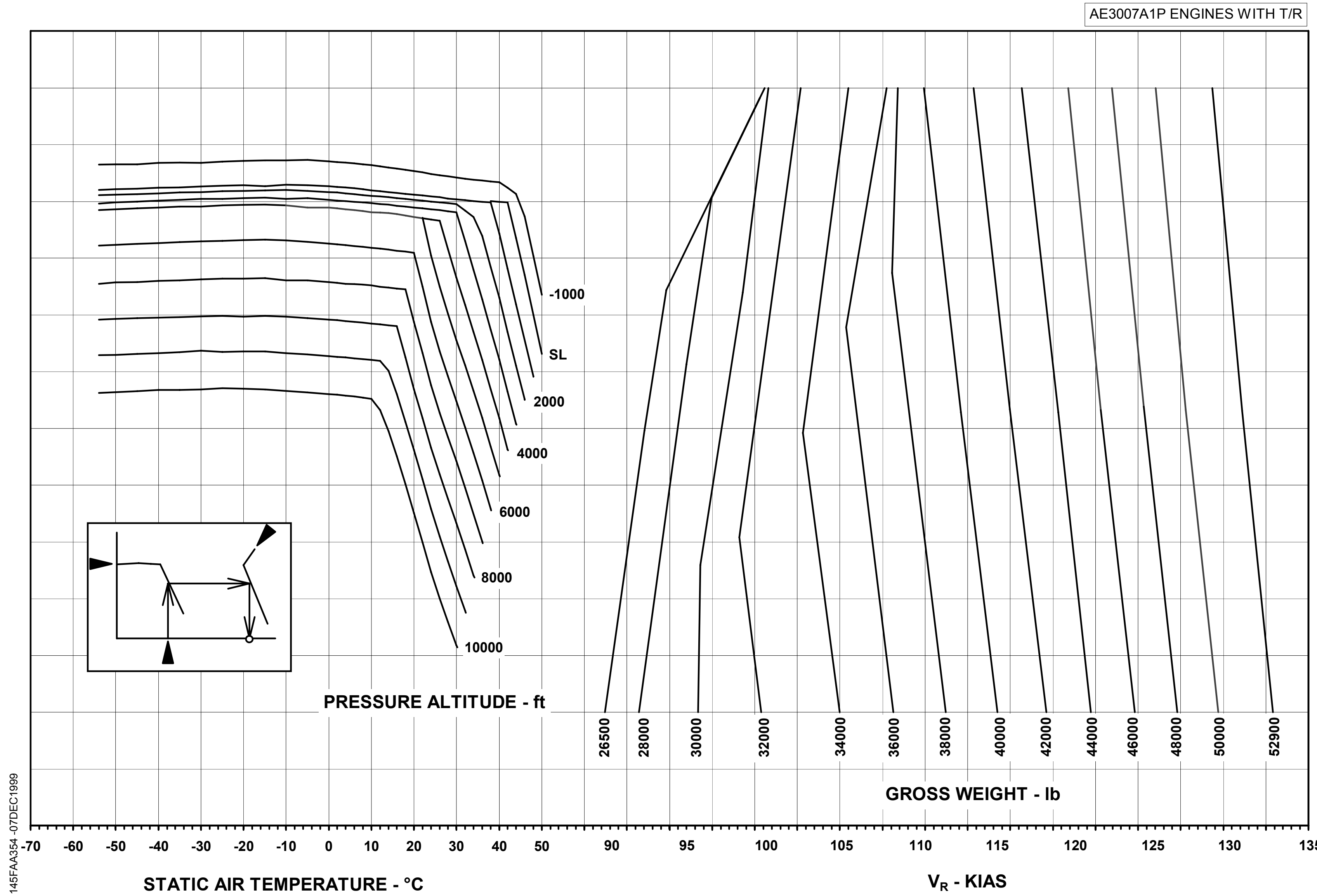
AE3007A1P ENGINES WITH T/R



145FAA352 - 07DEC1999

AFM-145/1153 - FAA

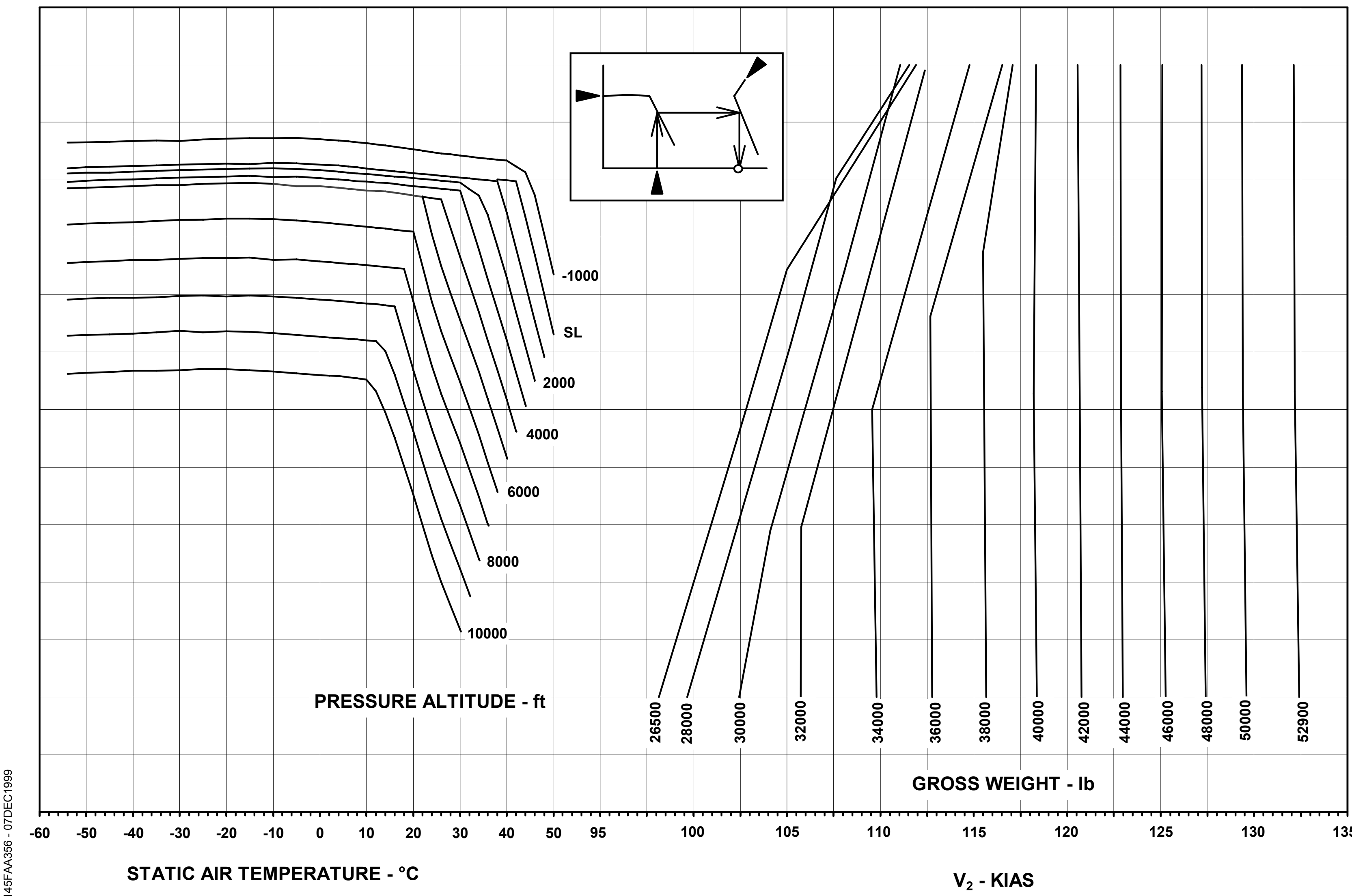
TAKEOFF SPEEDS - V_R (NORMAL V_2)
FLAPS 22° - T/O MODE



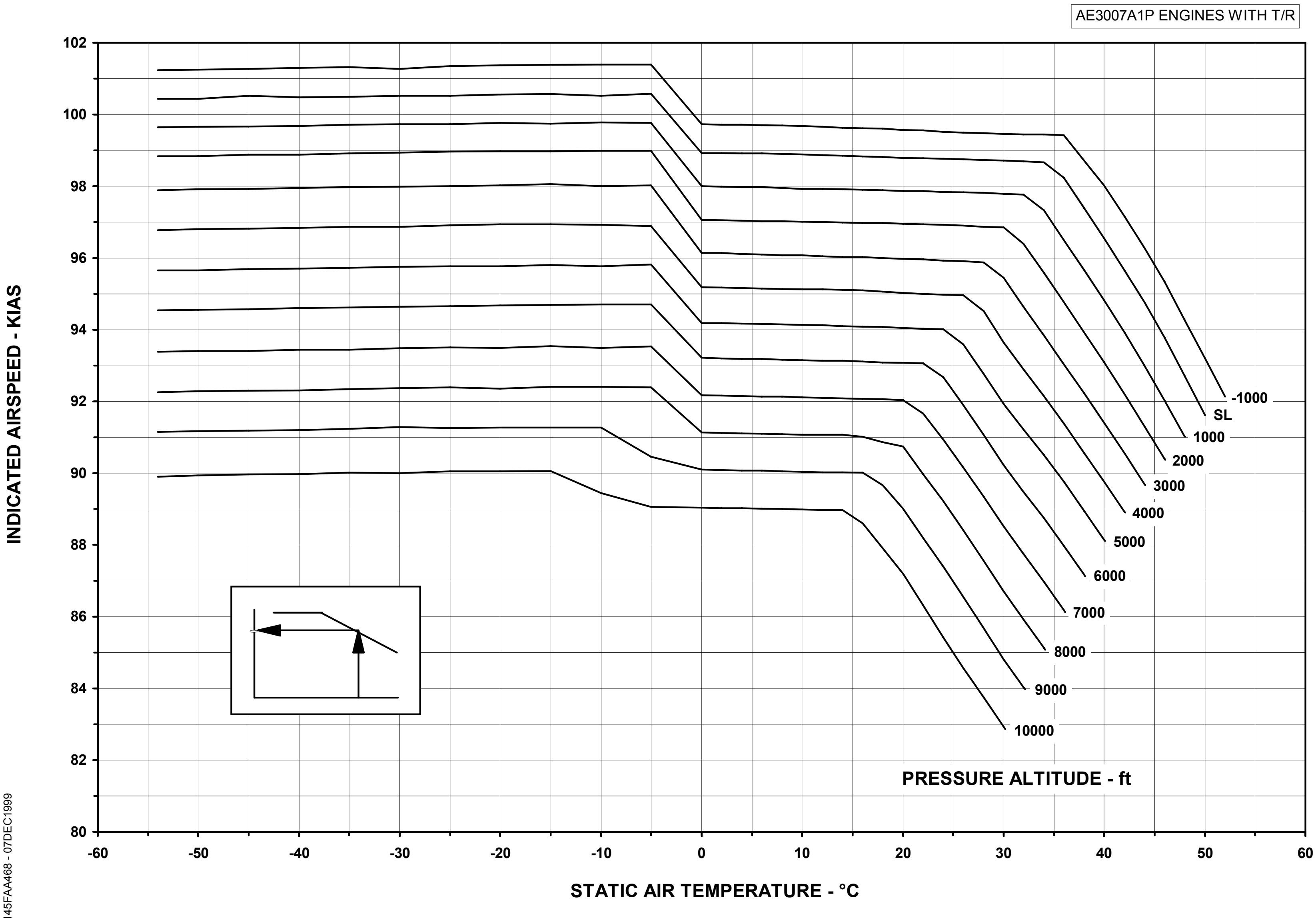
TAKEOFF SPEEDS - V_2 (NORMAL)

FLAPS 22° - T/O MODE

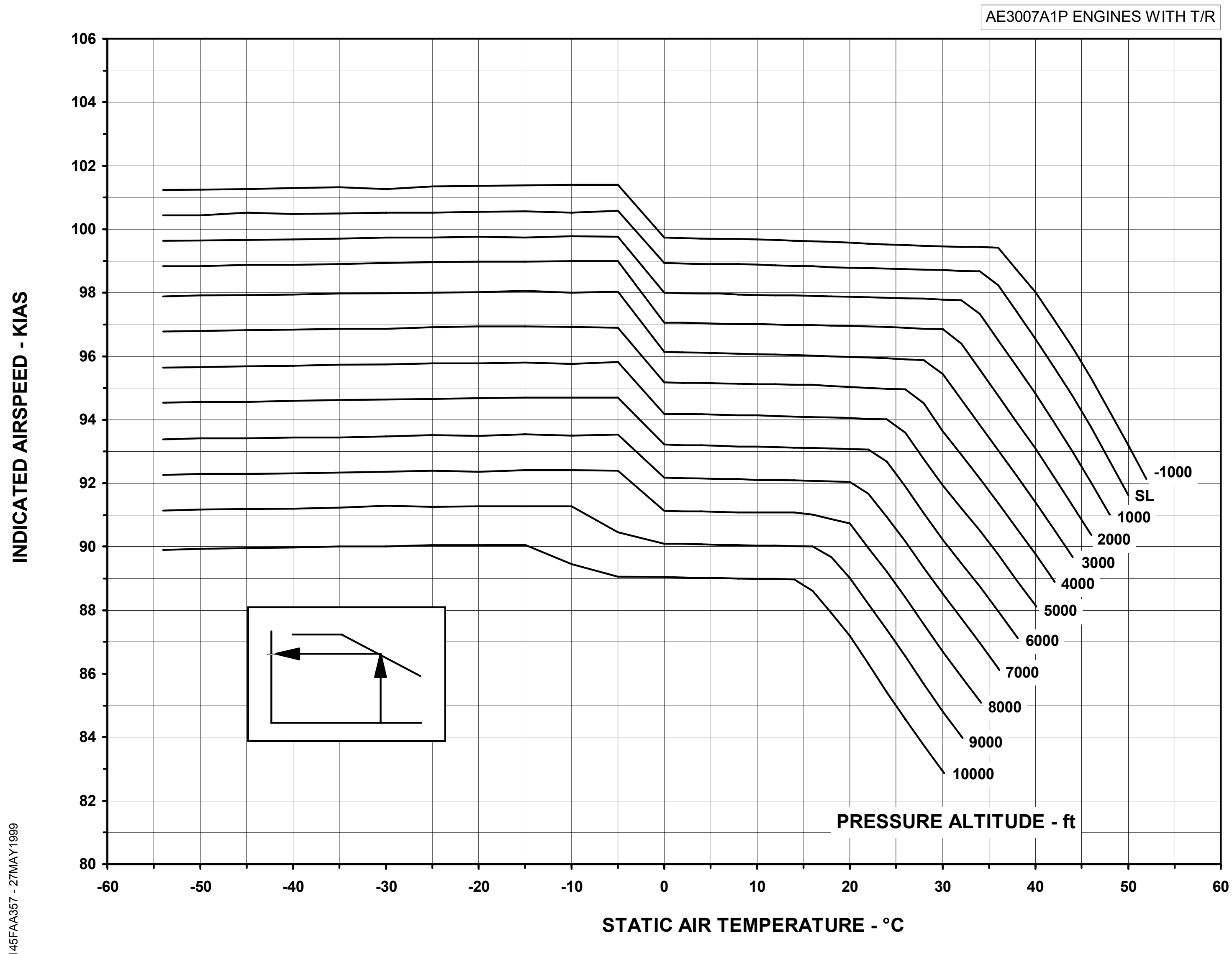
AE3007A1P ENGINES WITH T/R



GROUND MINIMUM CONTROL SPEED
T/O MODE - FLAPS 9°

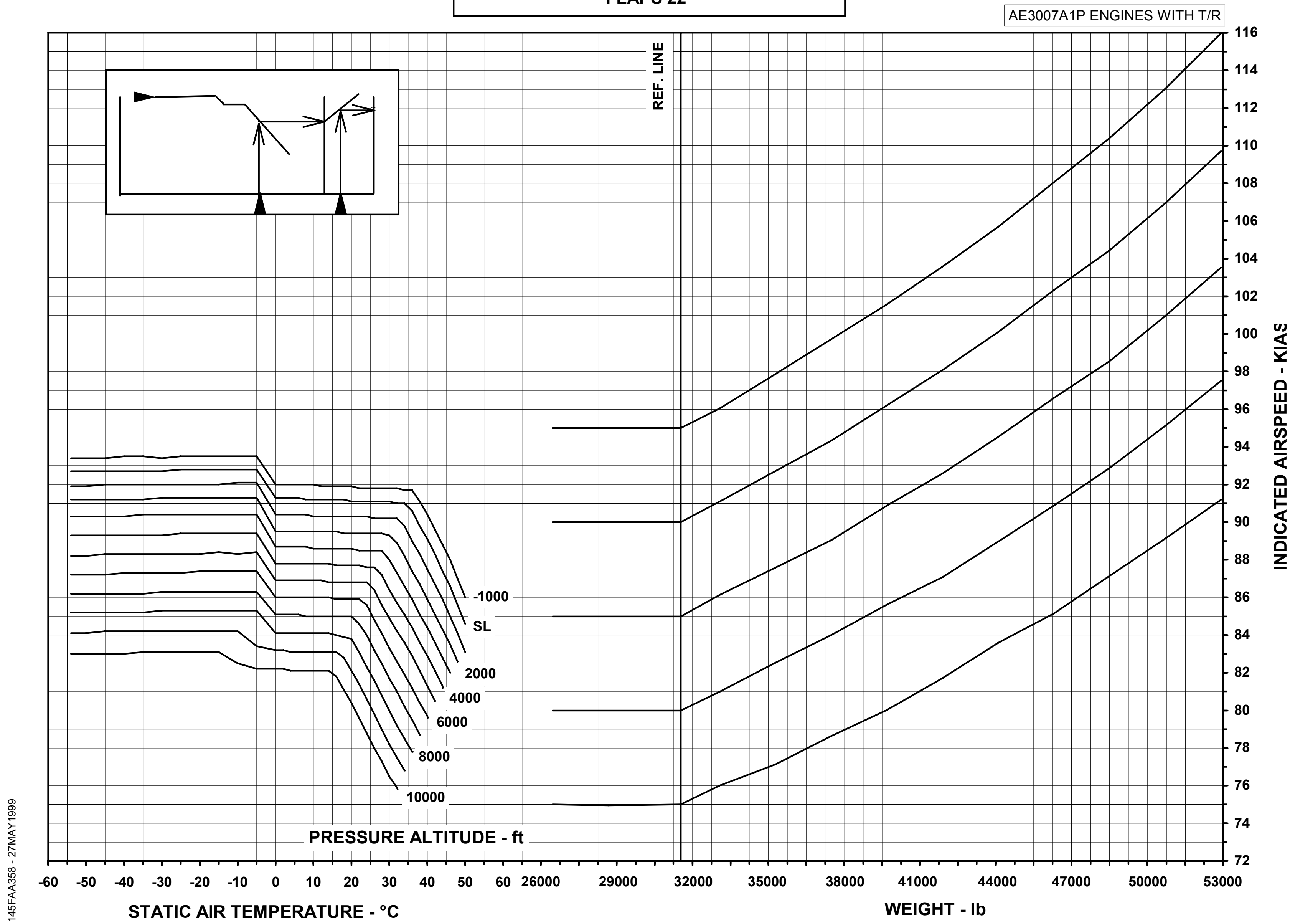


GROUND MINIMUM CONTROL SPEED
FLAPS 18°



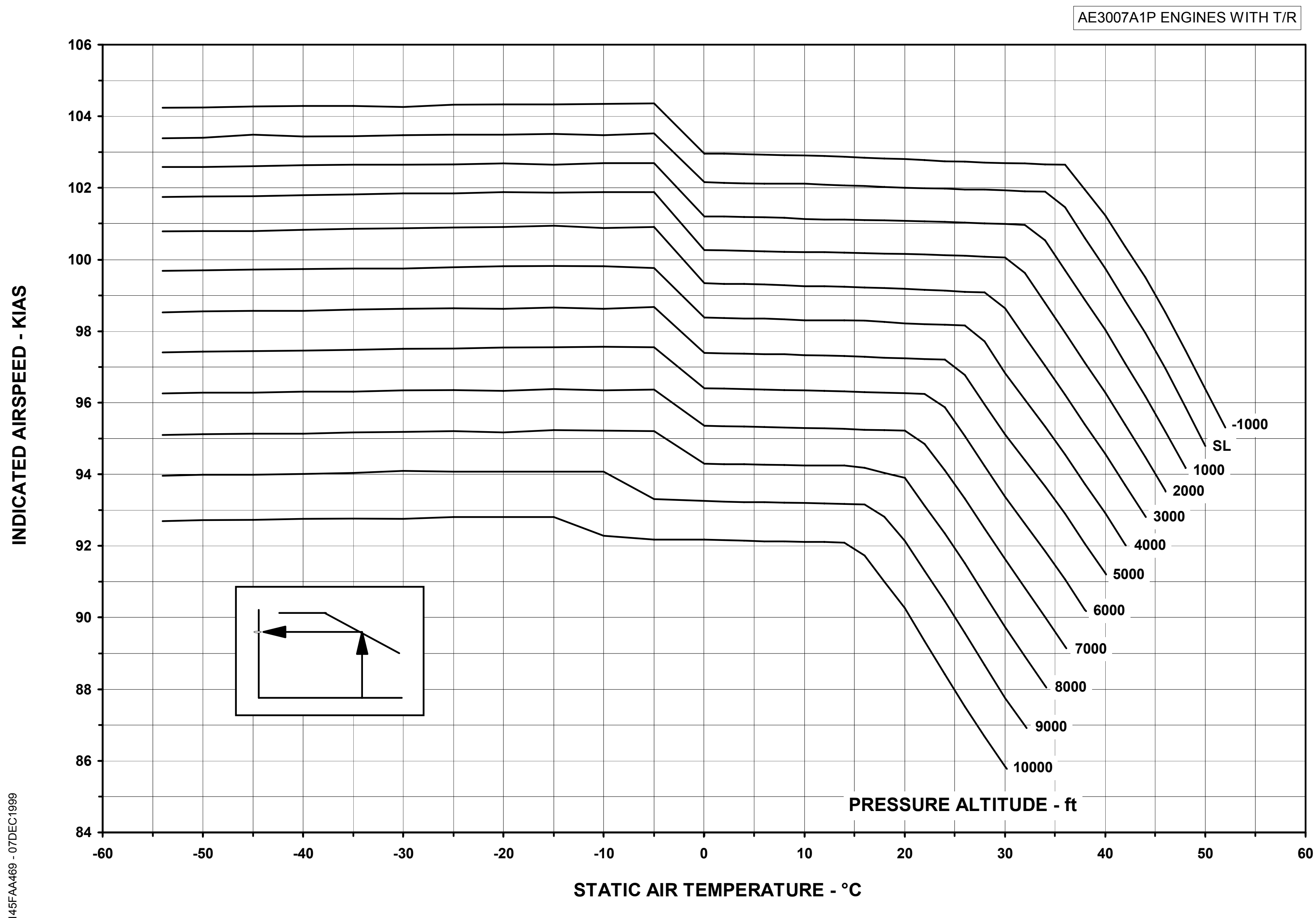
AFM-145/1153 - FAA

GROUND MINIMUM CONTROL SPEED
FLAPS 22°

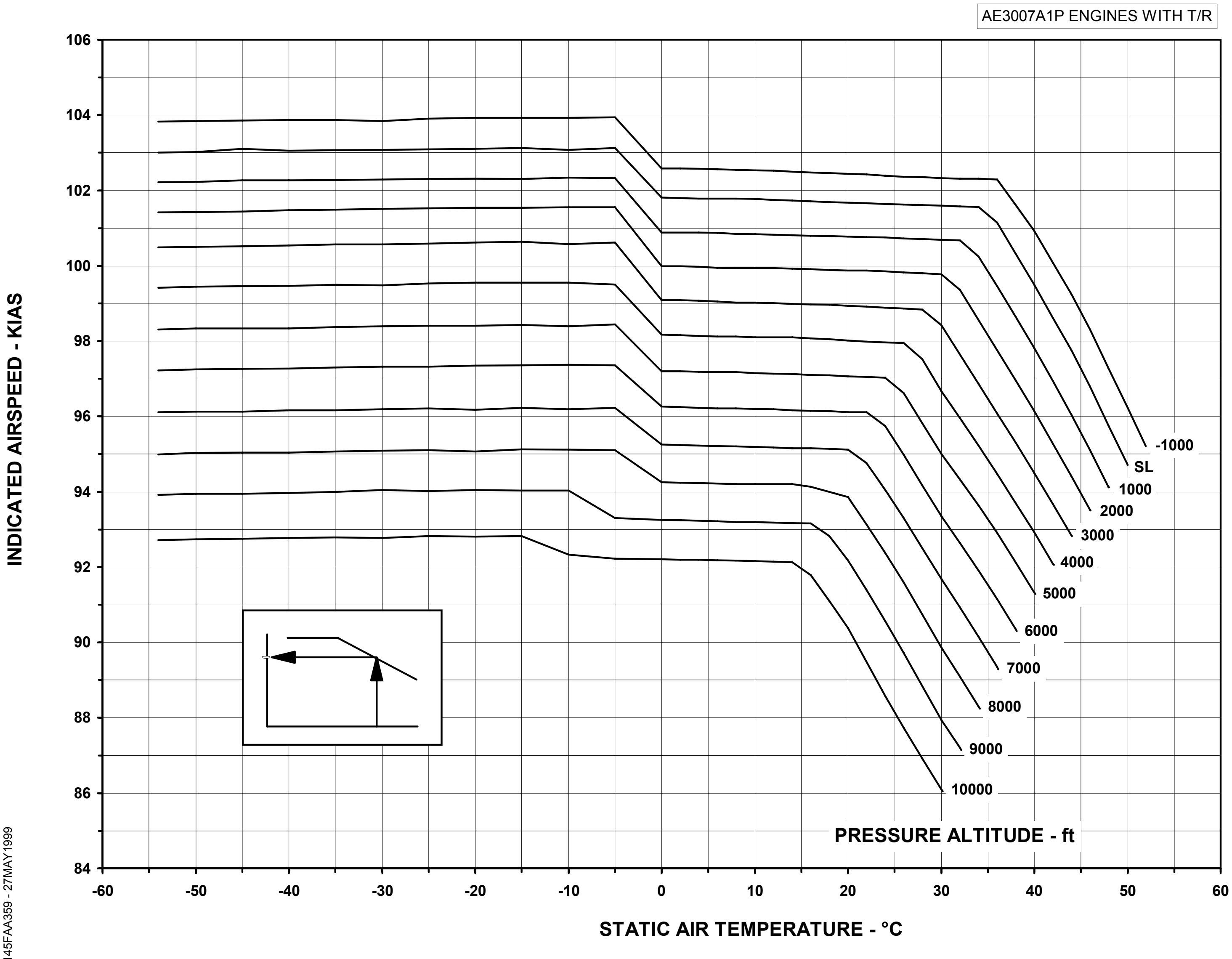


AFM-145/1153 - FAA

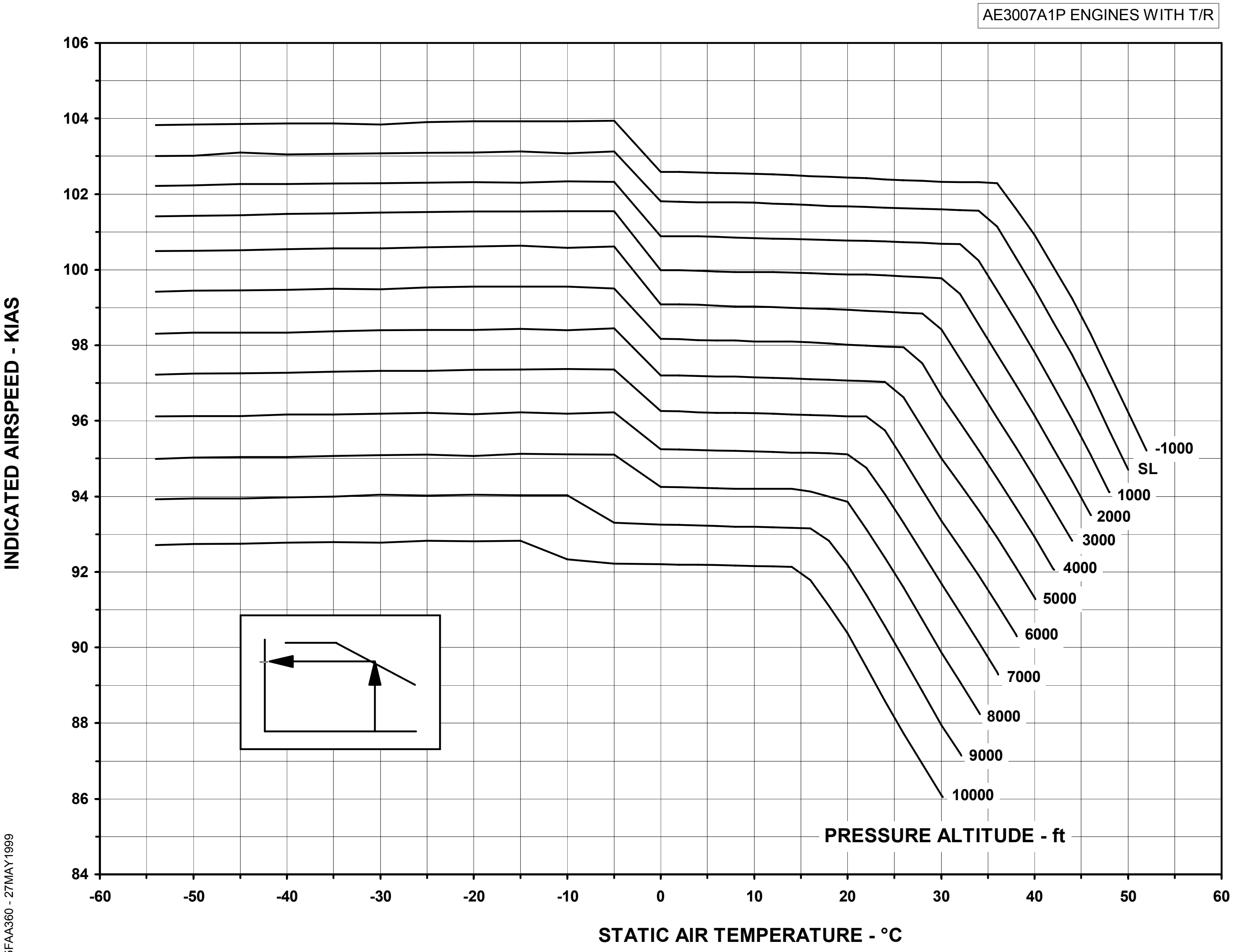
AIR MINIMUM CONTROL SPEED
T/O MODE - FLAPS 9°



AIR MINIMUM CONTROL SPEED
FLAPS 18°



AIR MINIMUM CONTROL SPEED
FLAPS 22°



145FAA360 - 27MAY1999

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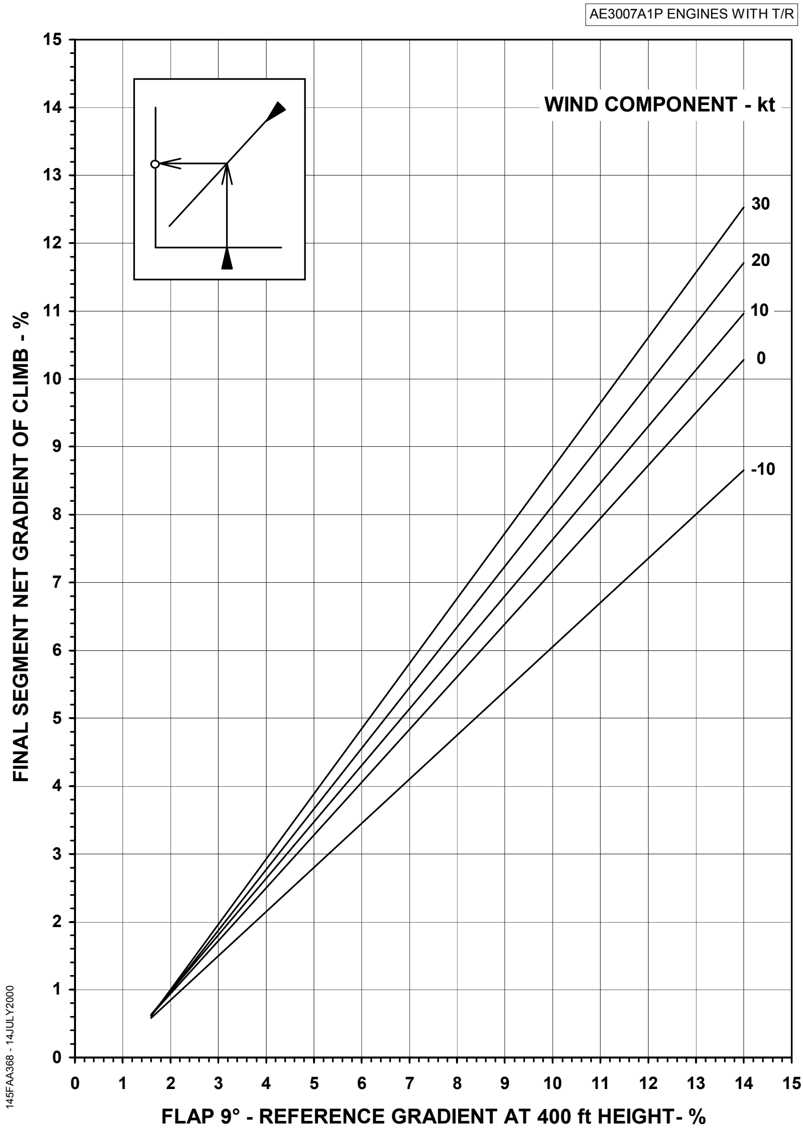
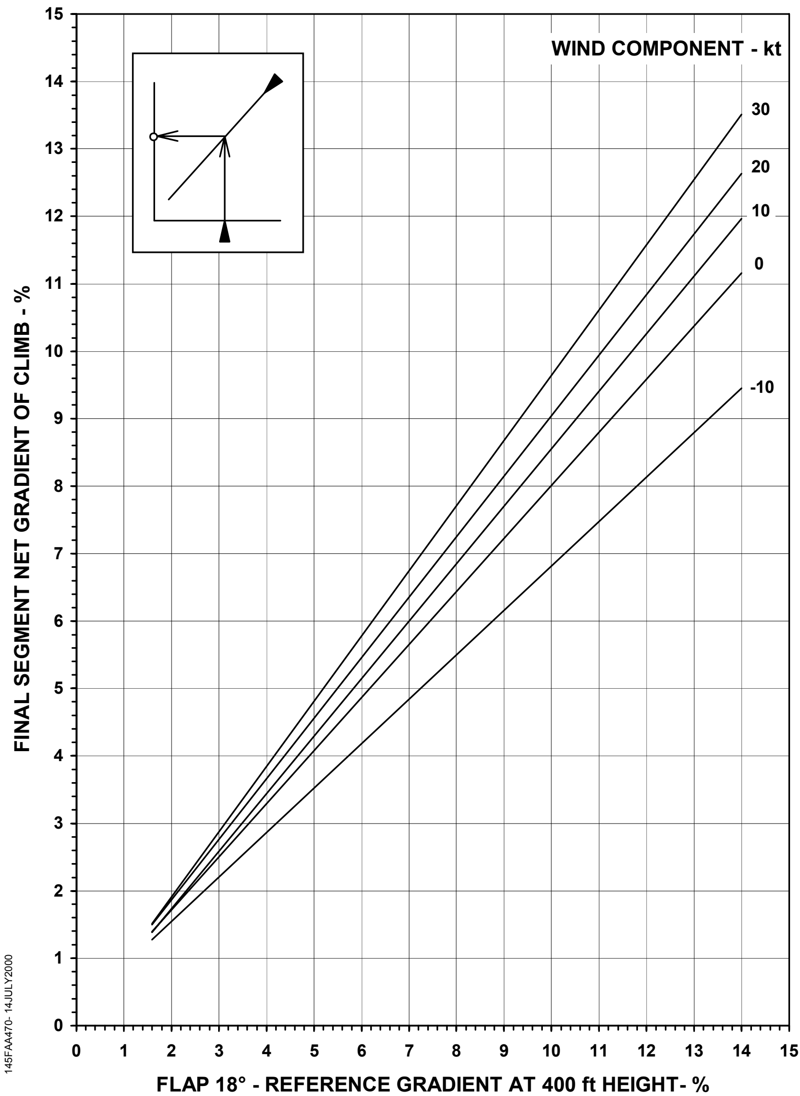
FINAL SEGMENT NET GRADIENT OF CLIMB
TAKEOFF FLAPS 9°



FINAL SEGMENT NET GRADIENT OF CLIMB

TAKEOFF FLAPS 18°

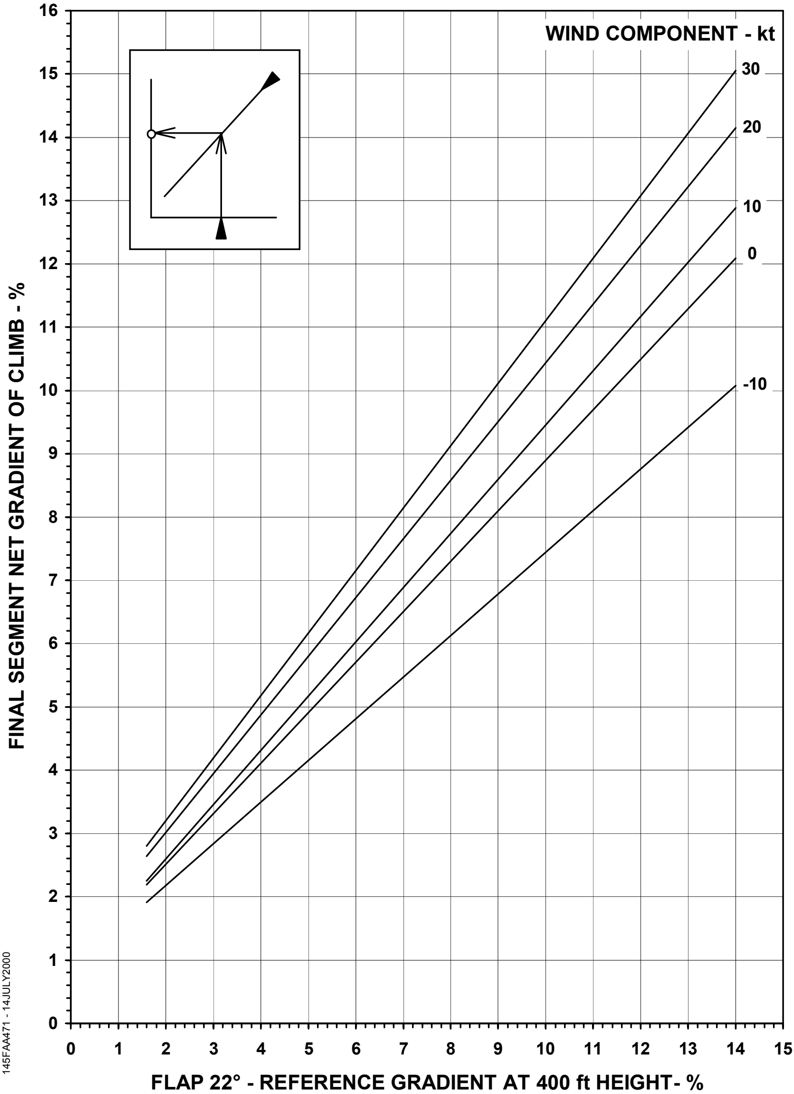
AE3007A1P ENGINES WITH T/R



FINAL SEGMENT NET GRADIENT OF CLIMB

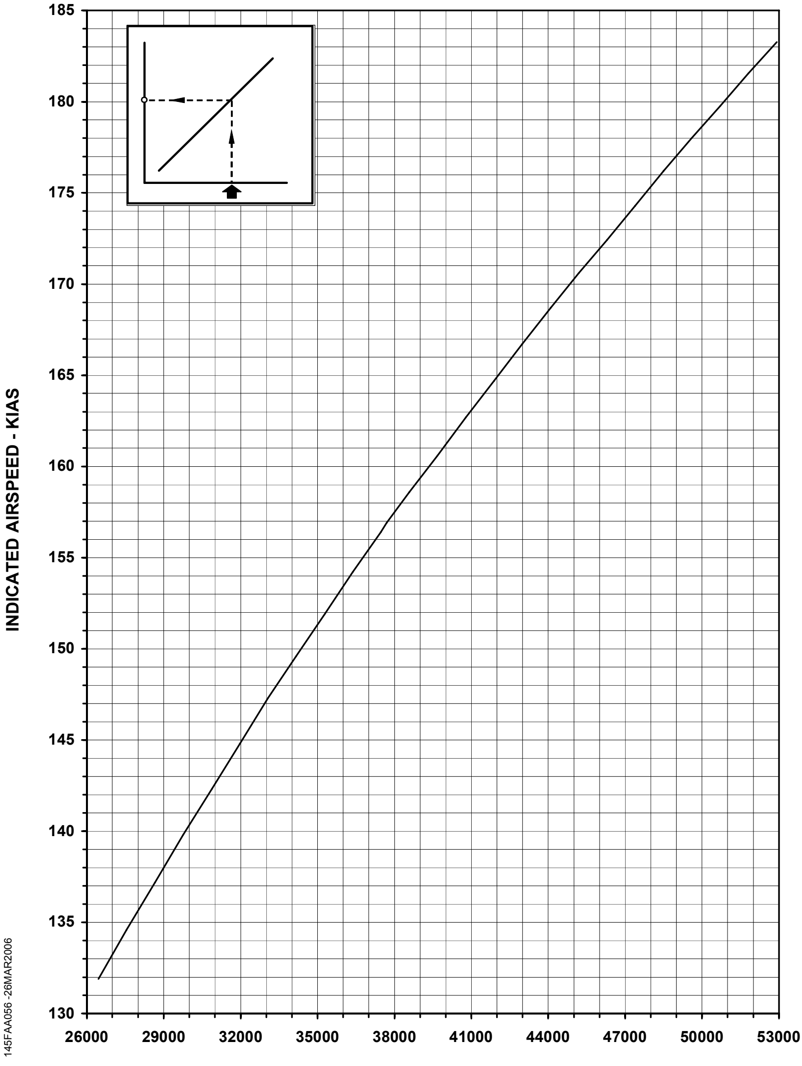
TAKEOFF FLAPS 22°

AE3007A1P ENGINES WITH T/R



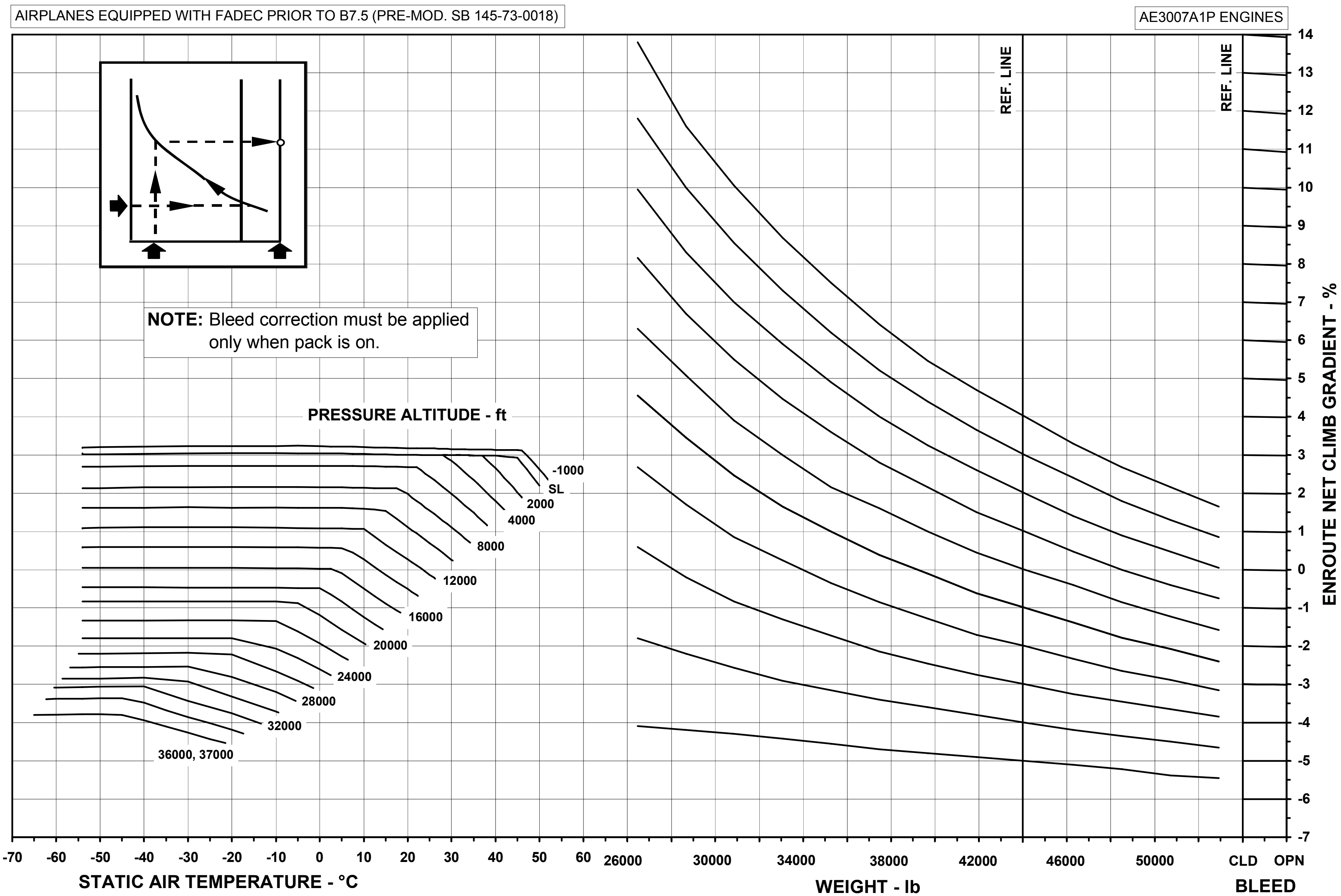
FINAL SEGMENT SPEED

GEAR UP - FLAPS UP



ENROUTE NET CLIMB GRADIENT

ONE ENGINE INOPERATIVE - FLAPS UP - ANTI-ICE OFF

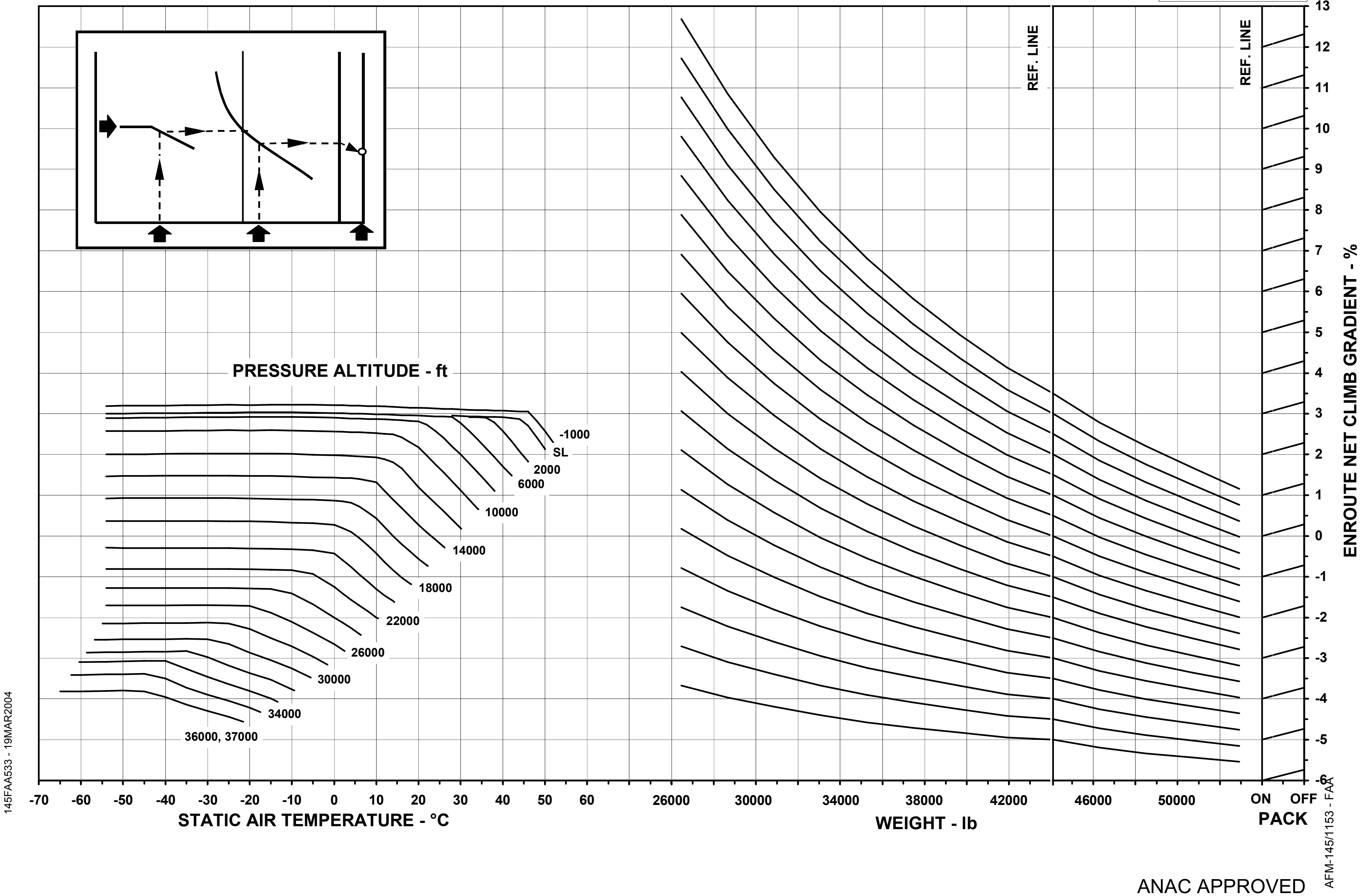


ENROUTE NET CLIMB GRADIENT

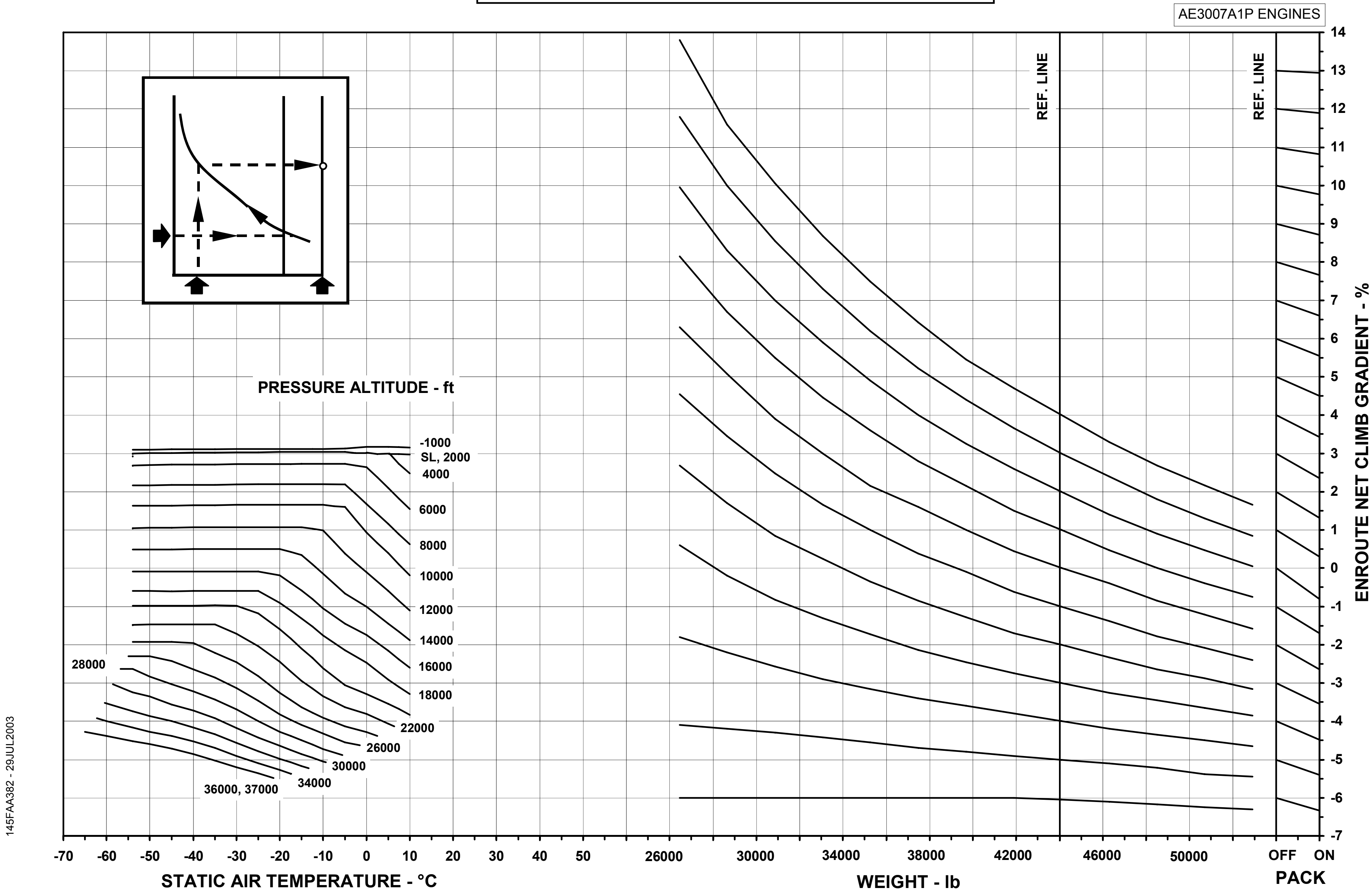
ONE ENGINE INOPERATIVE - FLAPS UP - ANTI-ICE OFF

AIRPLANES EQUIPPED WITH FADEC B7.5 AND ON (POST-MOD. SB 145-73-0018 OR WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED)

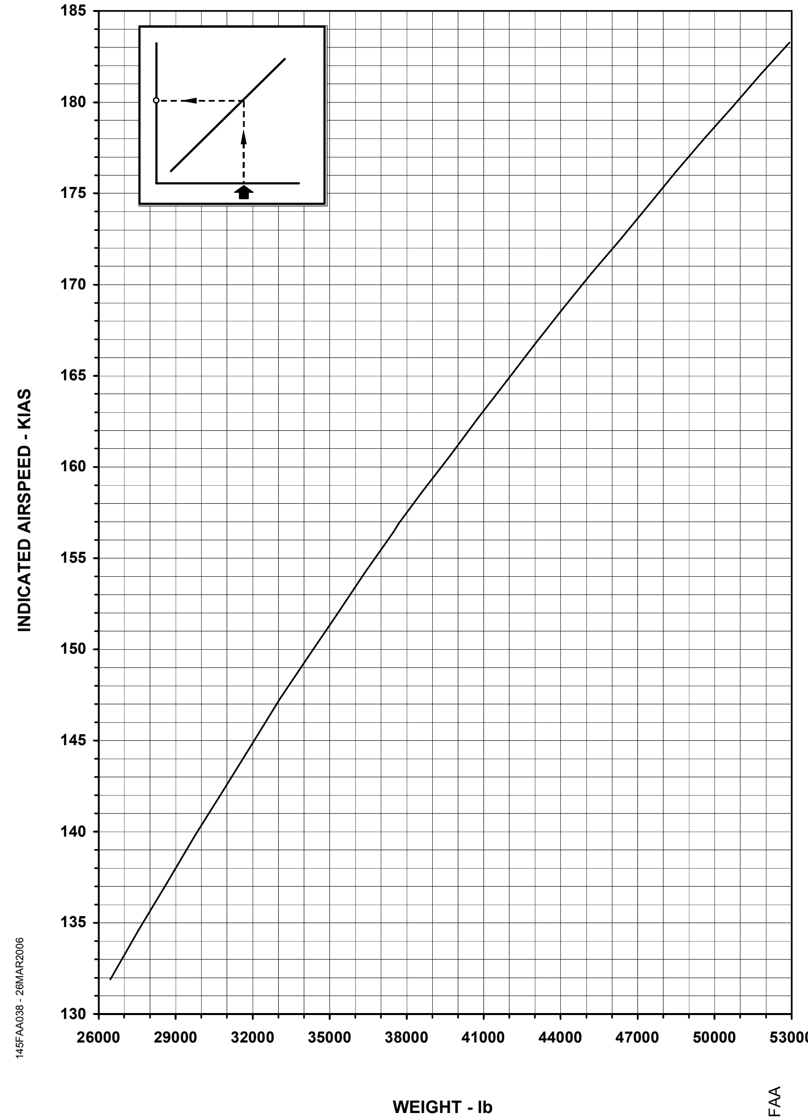
AE3007A1P ENGINES



ENROUTE NET CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS UP - ANTI-ICE ON

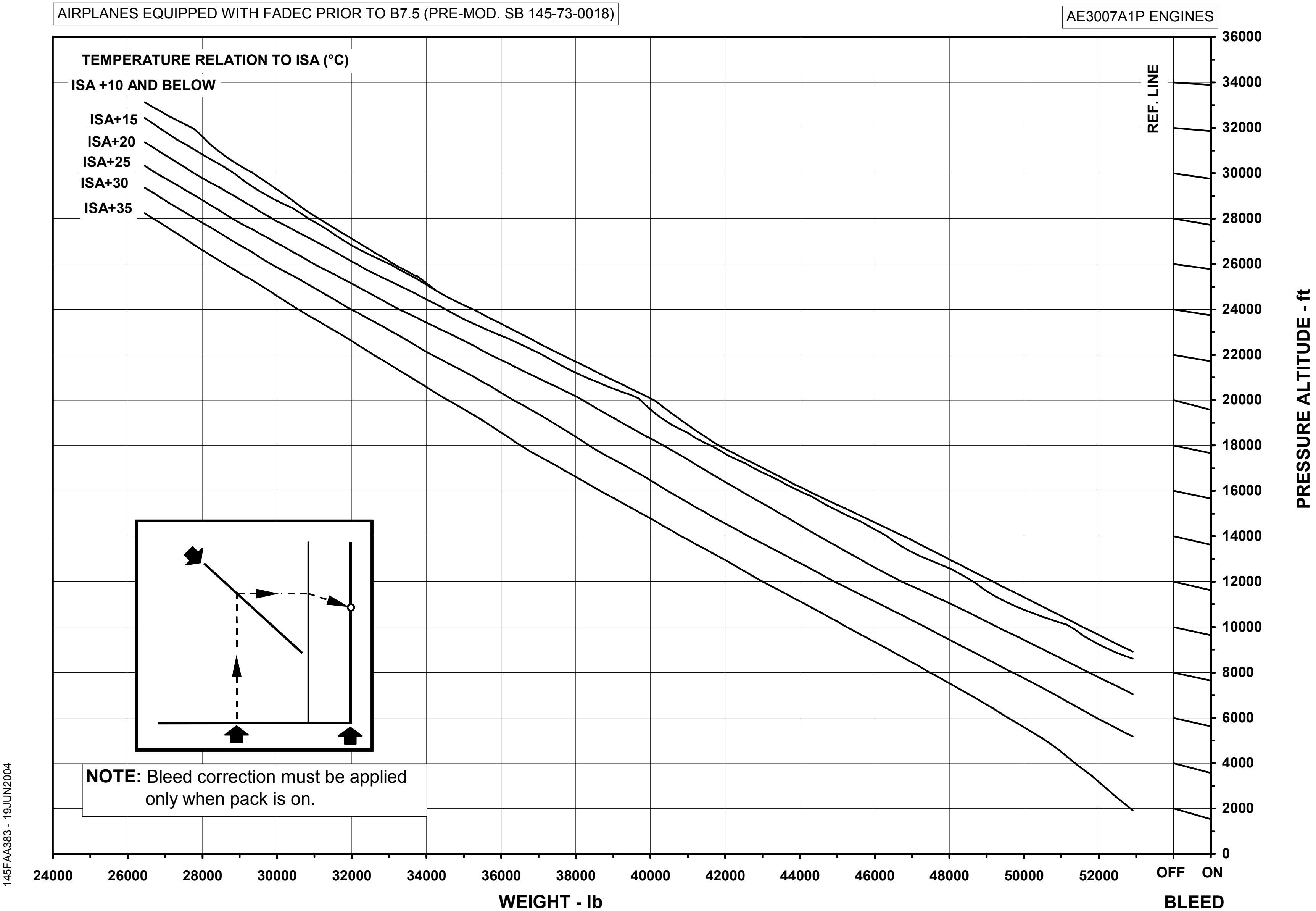


ENROUTE CLIMB SPEED
GEAR UP - FLAPS UP



ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF

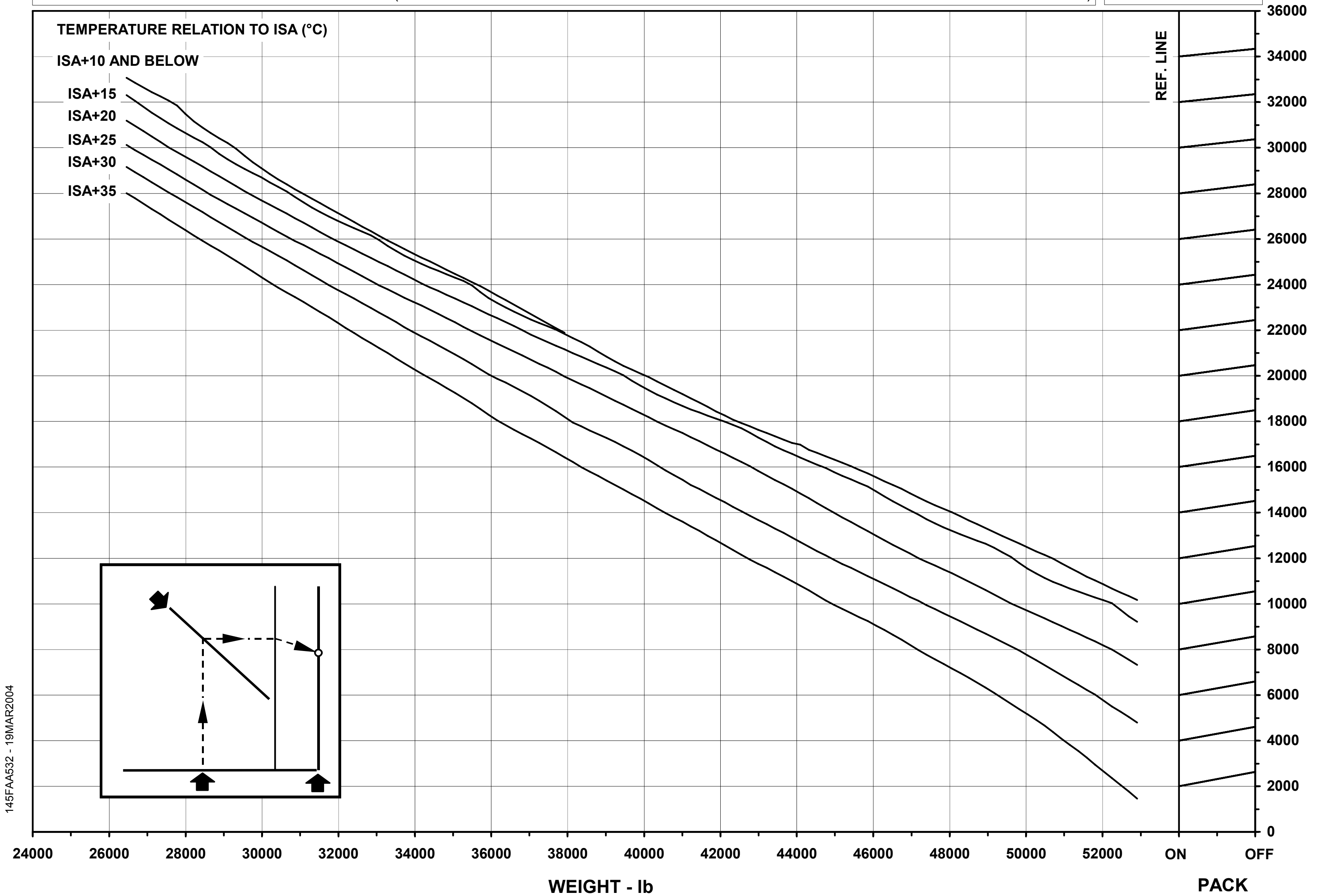


ENROUTE CLIMB WEIGHT FOR POSITIVE NET GRADIENT

FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF

AIRPLANES EQUIPPED WITH FADEC B7.5 AND ON (POST-MOD. SB 145-73-0018 OR WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED)

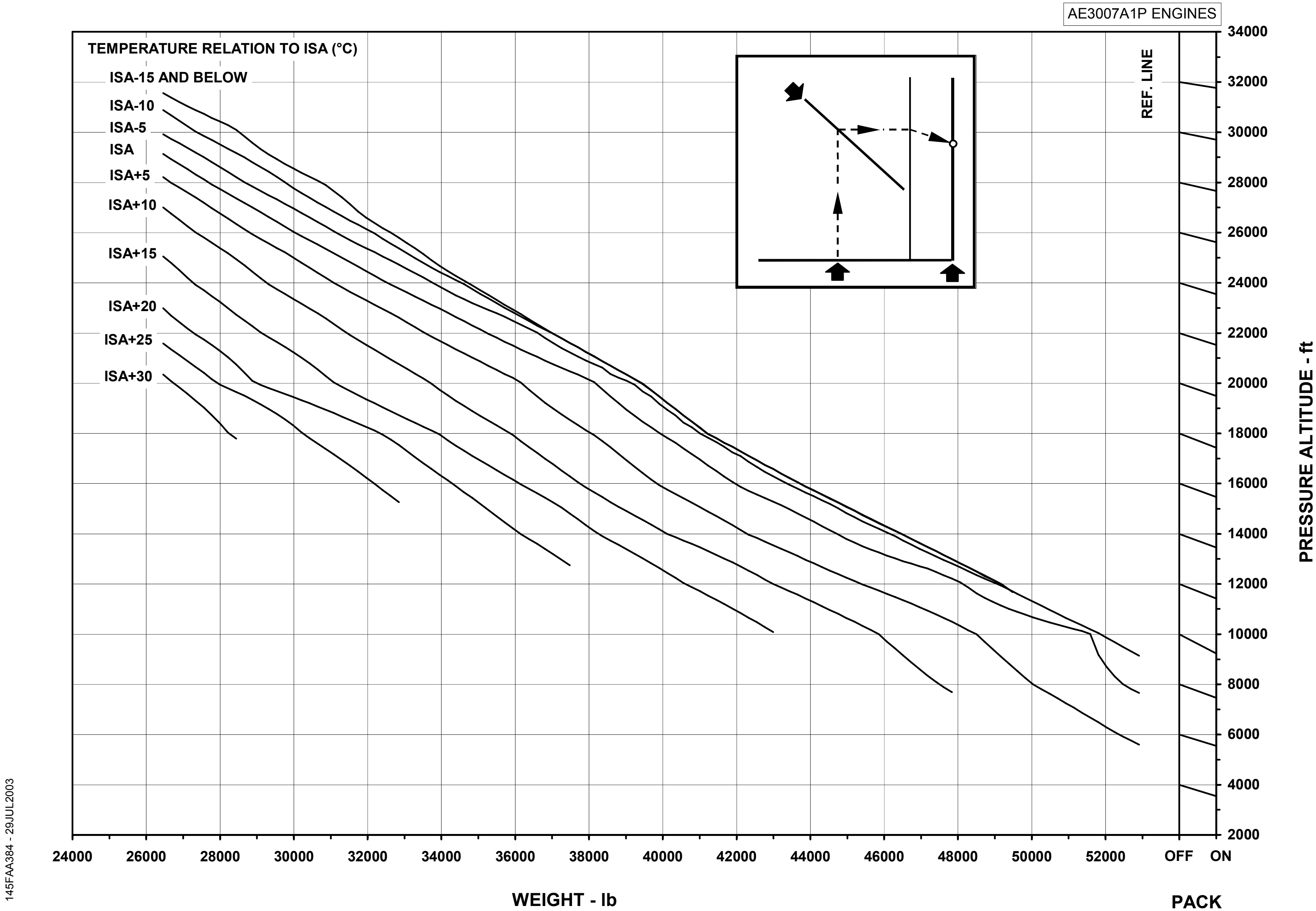
AE3007A1P ENGINES



AFM-145/1153 - FAA

ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE ON



AFM-145/1153 - FAA

APPROACH CLIMB GRADIENT CHARTS AND LANDING CLIMB GRADIENT CHARTS

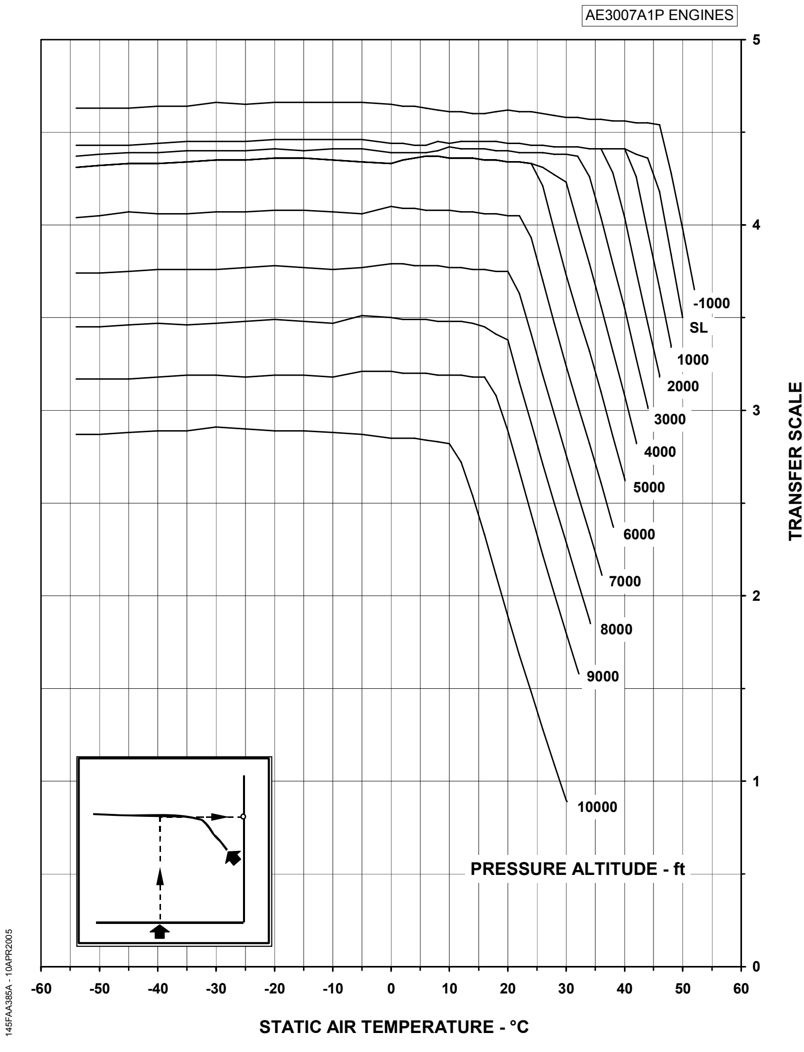
USE

Choose the appropriate chart considering the anti-ice and flaps options.

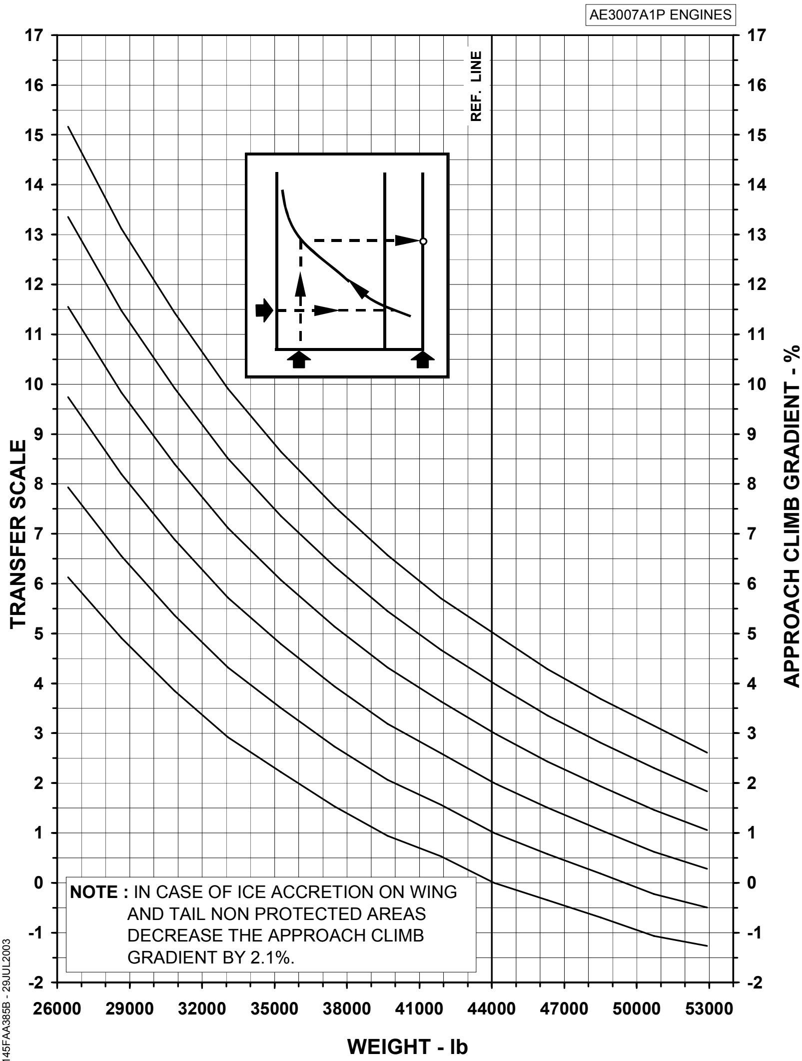
For each gradient, enter the first chart with the Static Air Temperature and Airport Pressure Altitude to read the transfer scale. Enter the second chart with the value obtained from the first one, go to the reference line and follow the guide lines to the airplane weight, to read the desired gradient.

NOTE: Airplanes equipped with FADEC software version B5.1.1 must decrease the Approach Climb Gradient by 1.1%.

APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 1 OF 2



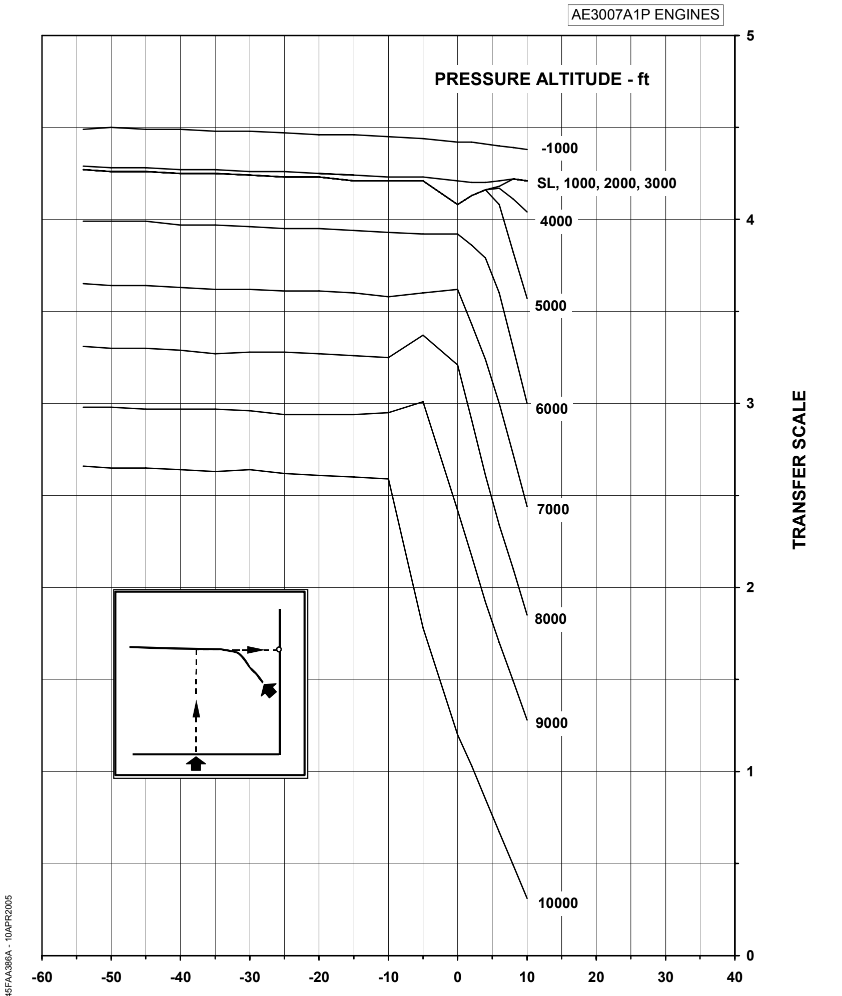
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 2 OF 2



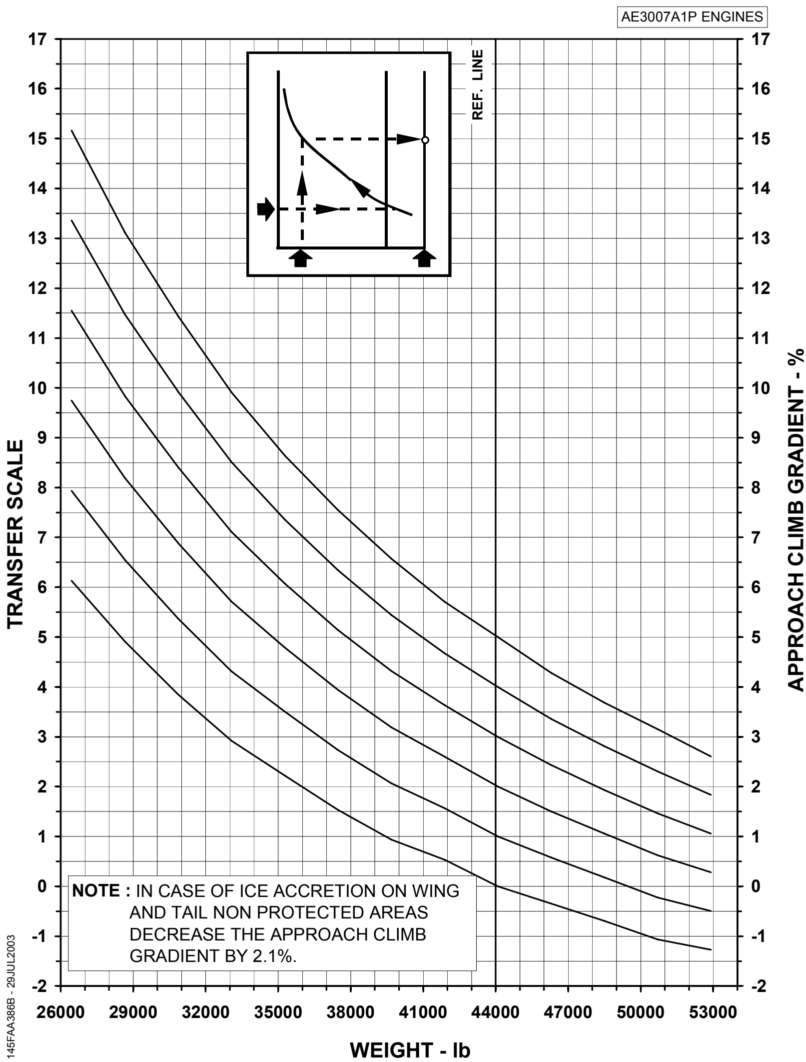
APPROACH CLIMB GRADIENT

ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON

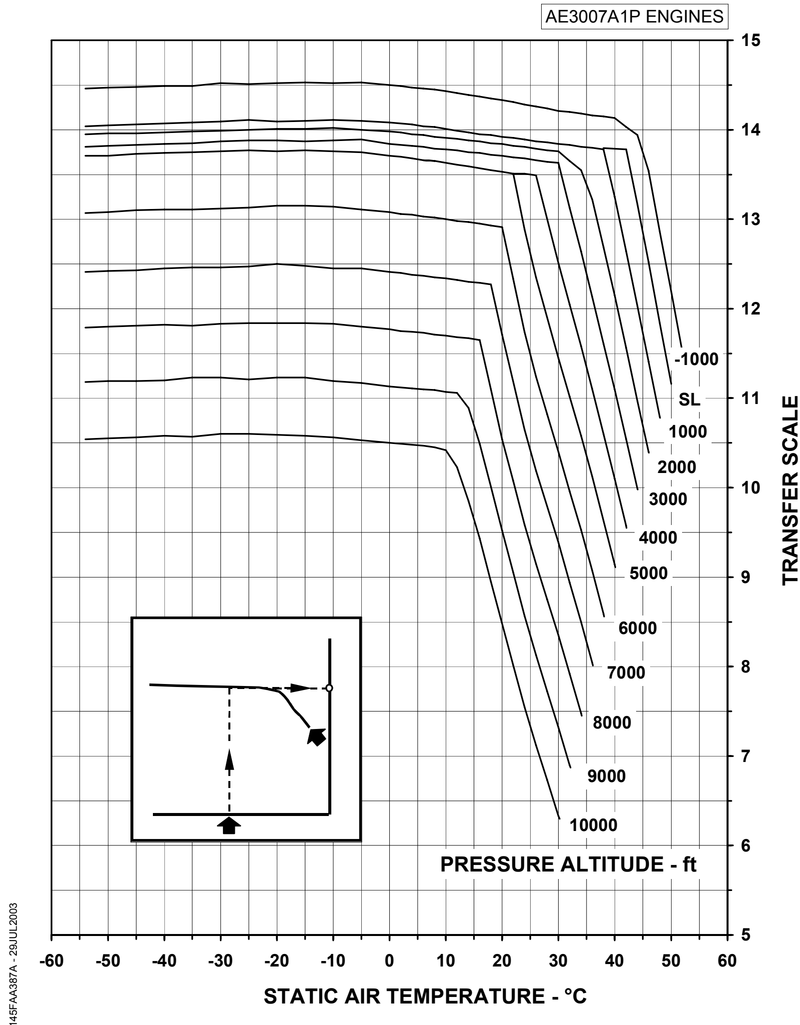
CHART 1 OF 2



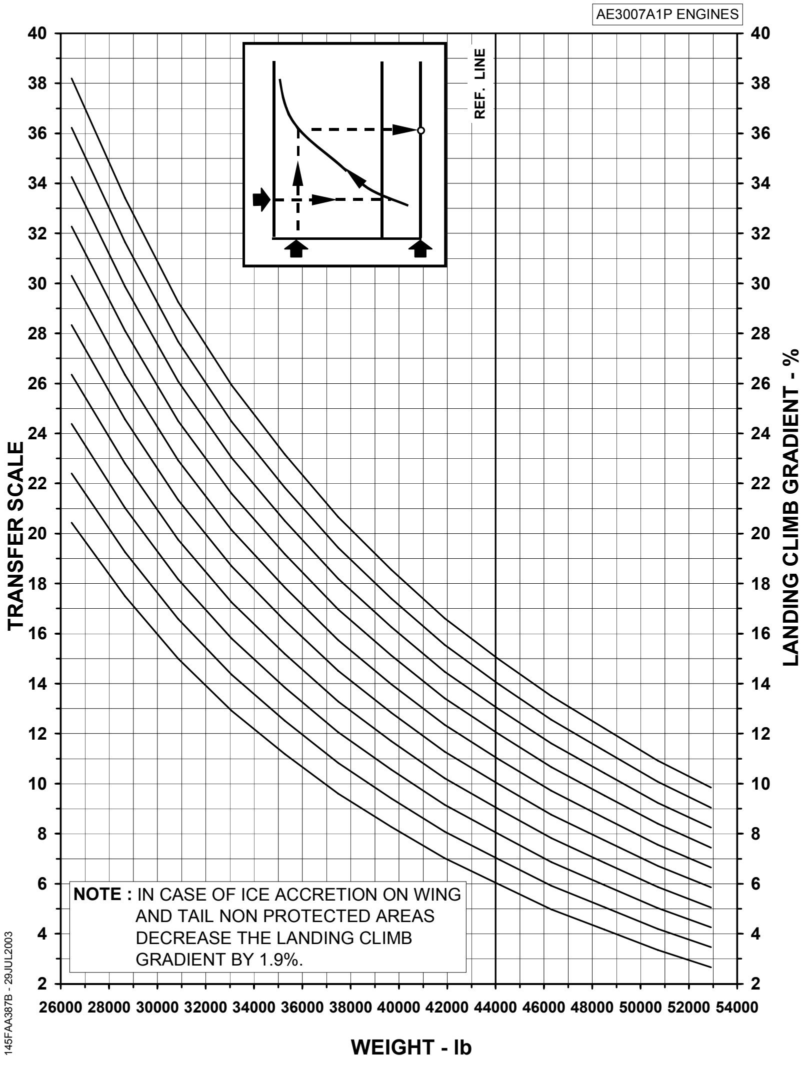
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 2 OF 2



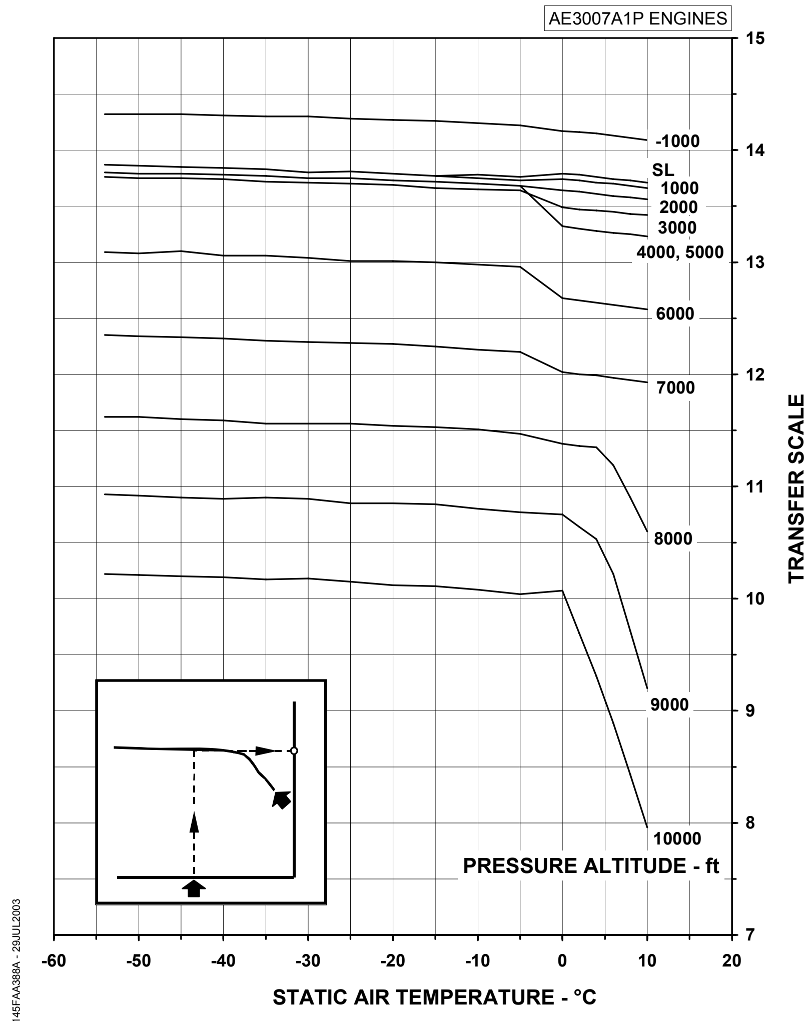
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 1 OF 2



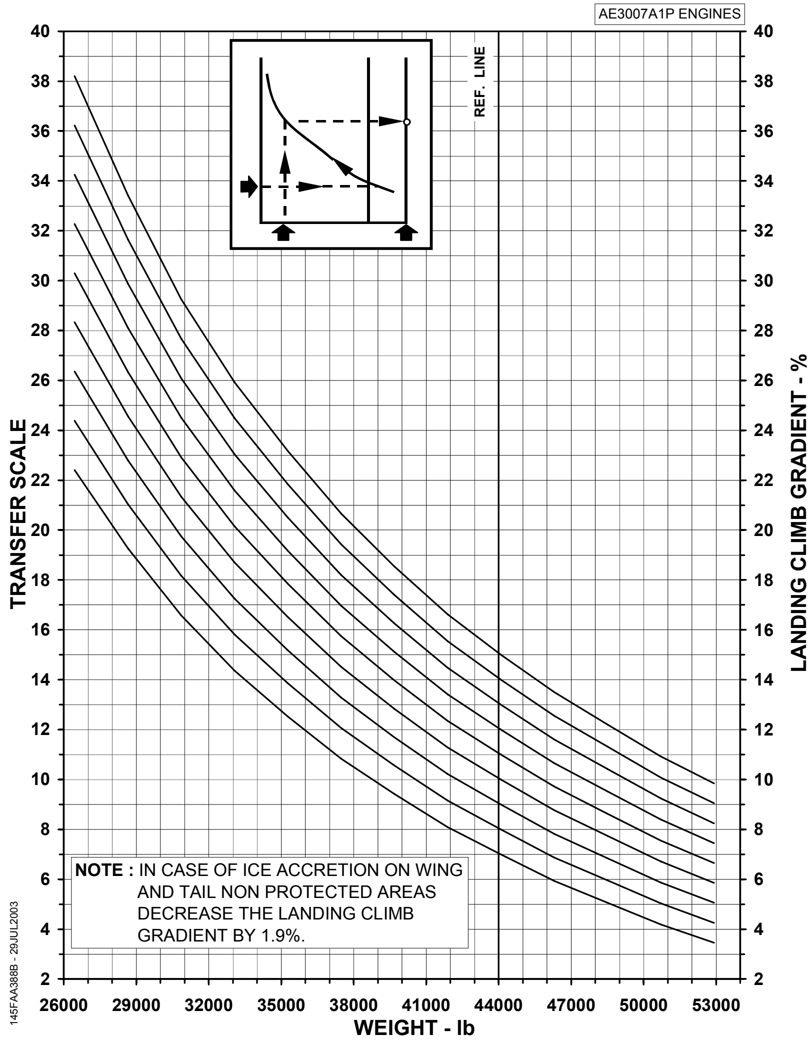
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 2 OF 2



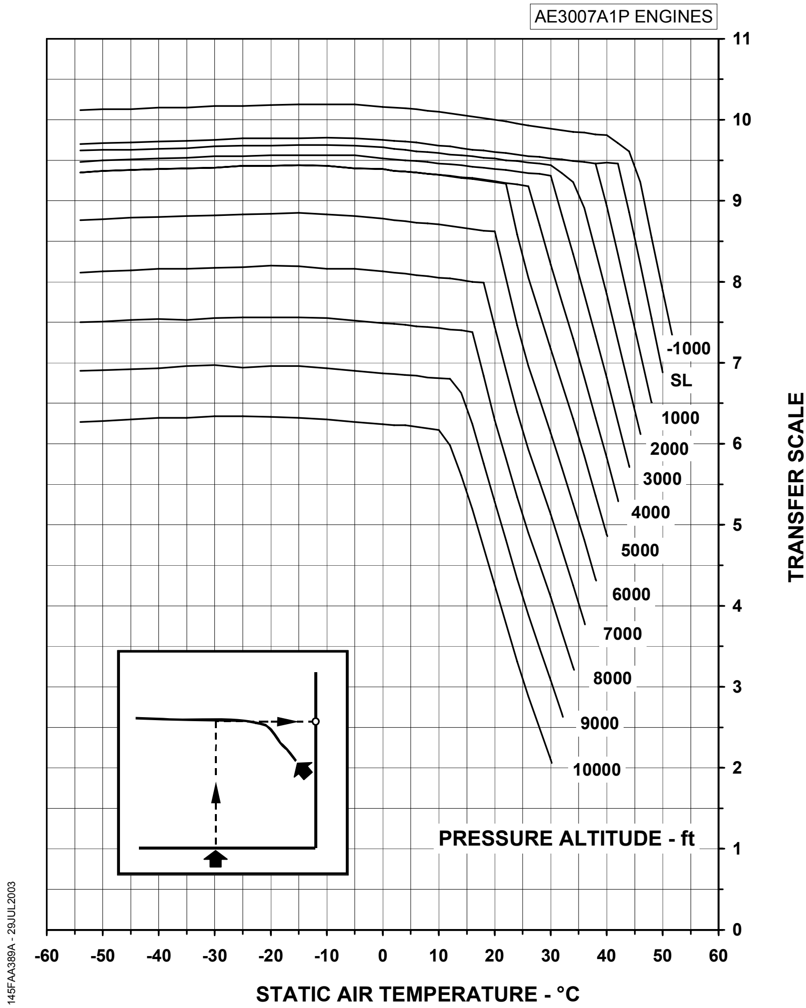
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 1 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 2 OF 2

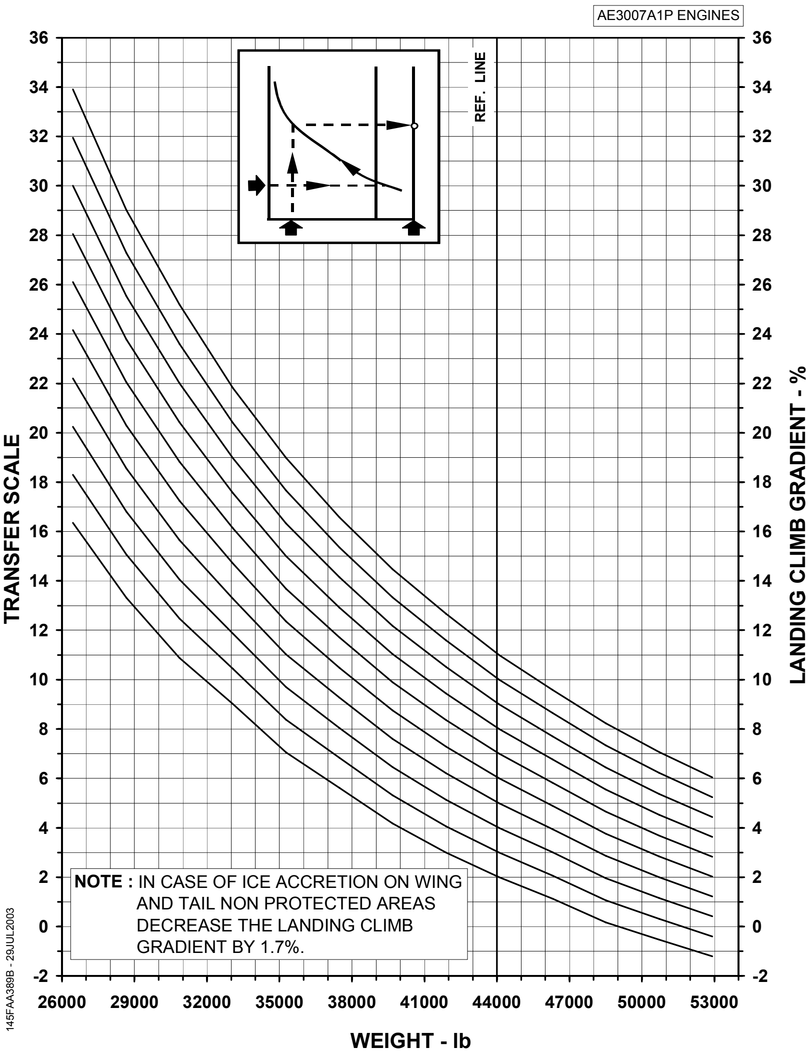


LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 1 OF 2



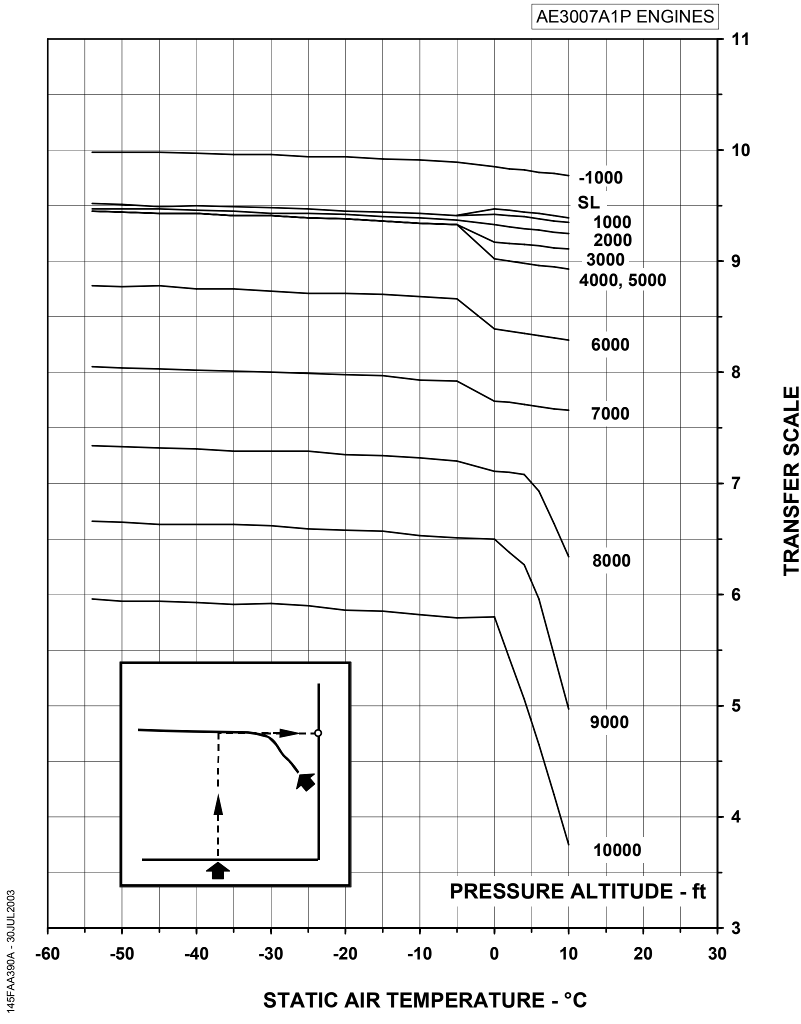
LANDING CLIMB GRADIENT

ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 2 OF 2

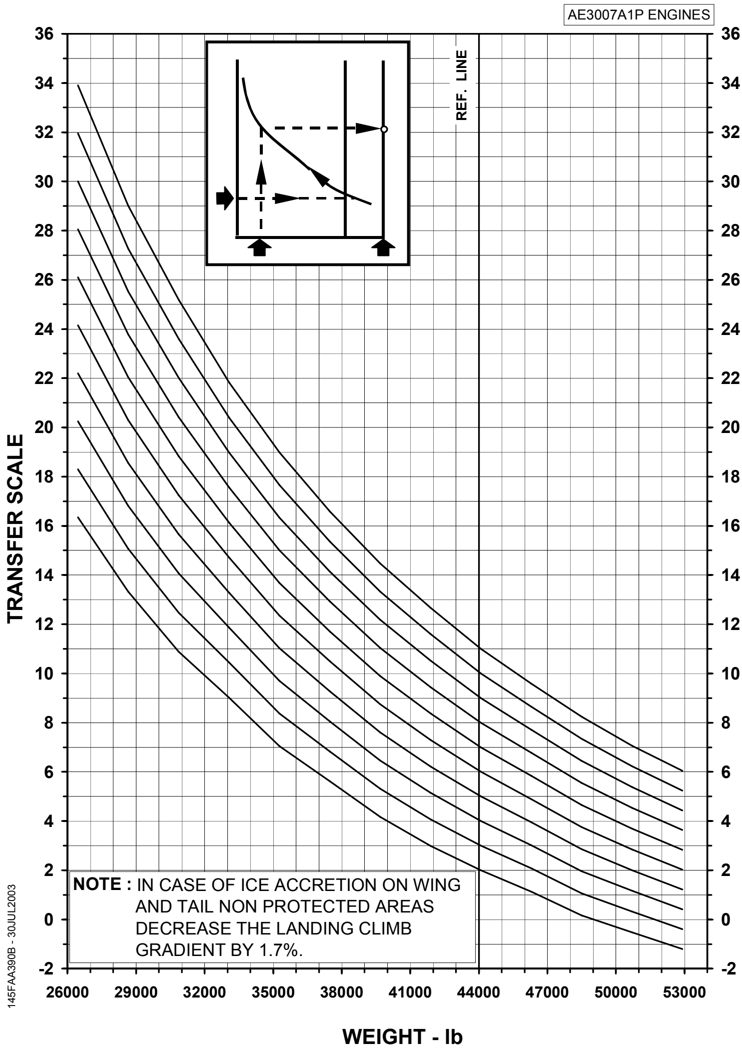


NOTE : IN CASE OF ICE ACCRETION ON WING AND TAIL NON PROTECTED AREAS DECREASE THE LANDING CLIMB GRADIENT BY 1.7%.

LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 1 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 2 OF 2



MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED CHARTS AND LANDING CLIMB LIMITED CHARTS

USE

Choose the appropriate chart considering the flaps and anti-ice options.

Enter the chart with the Static Air Temperature and go to the Airport Pressure Altitude. Read the desired climb limited weight.

NOTE: Airplanes equipped with FADEC software version B5.1.1 must decrease the Approach Climb Limited Weight by 1920 lb.

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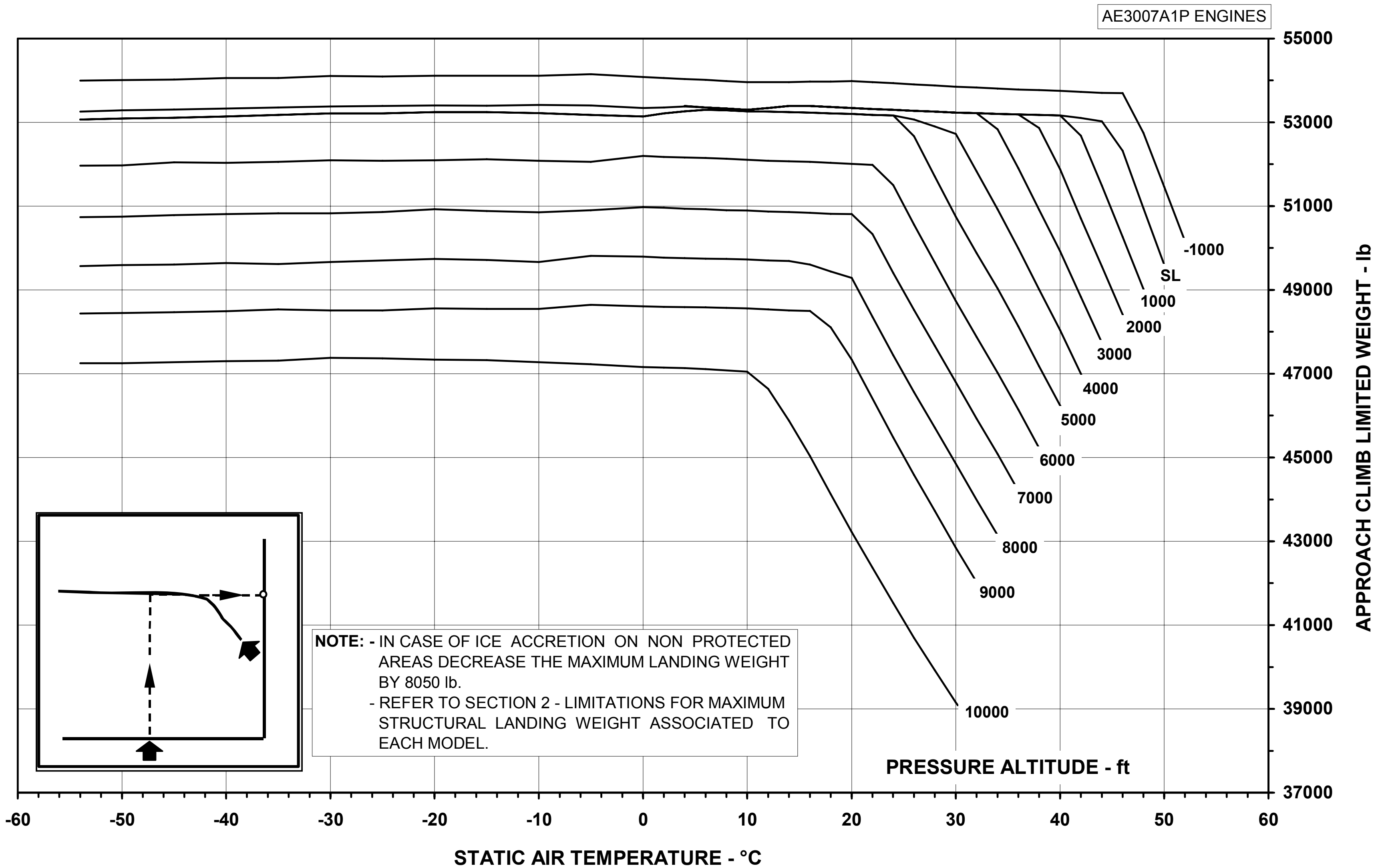
MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

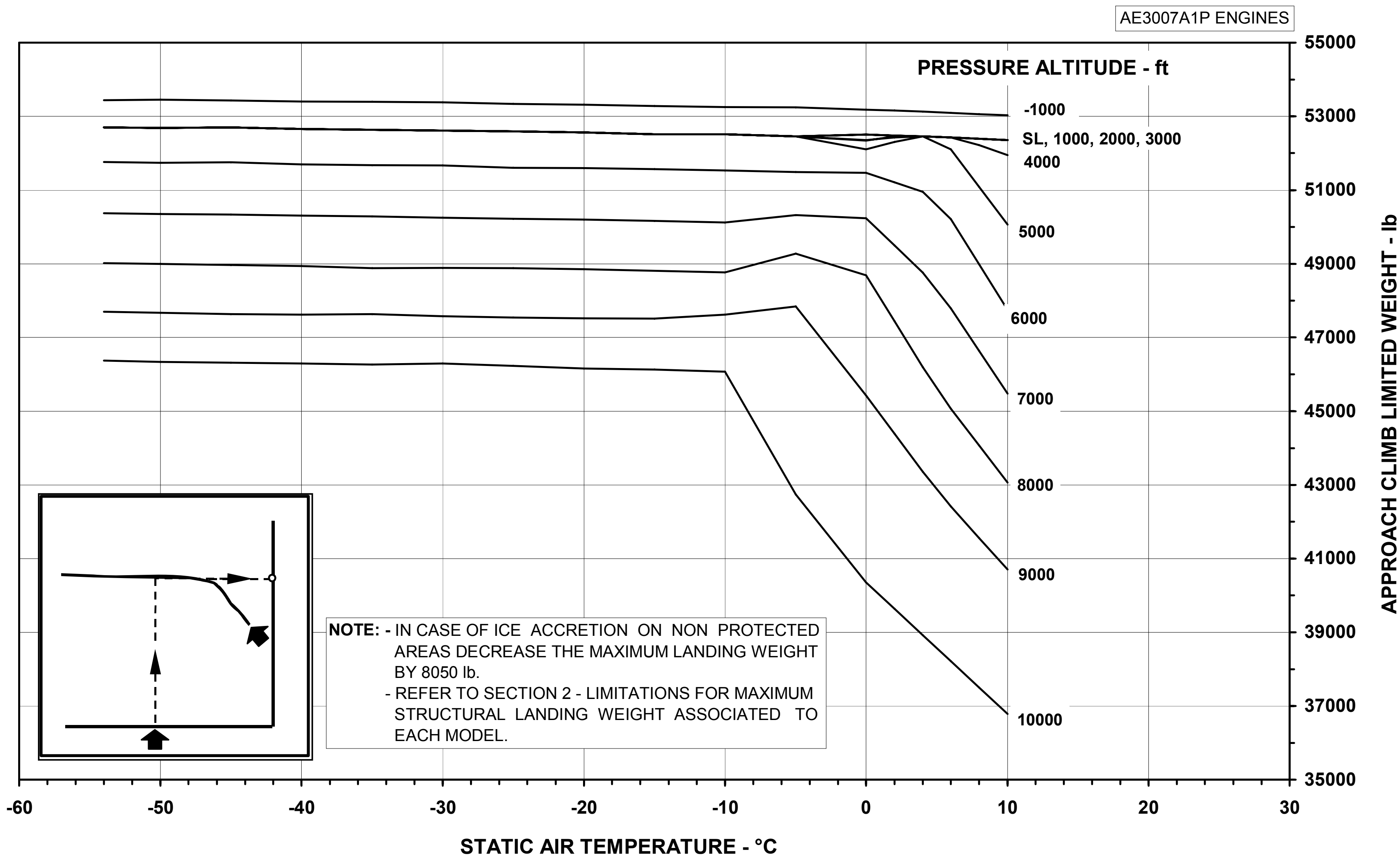
APPROACH FLAPS 9° - ANTI-ICE OFF



145FAA391 - 10APR2005

MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

APPROACH FLAPS 9° - ANTI-ICE ON

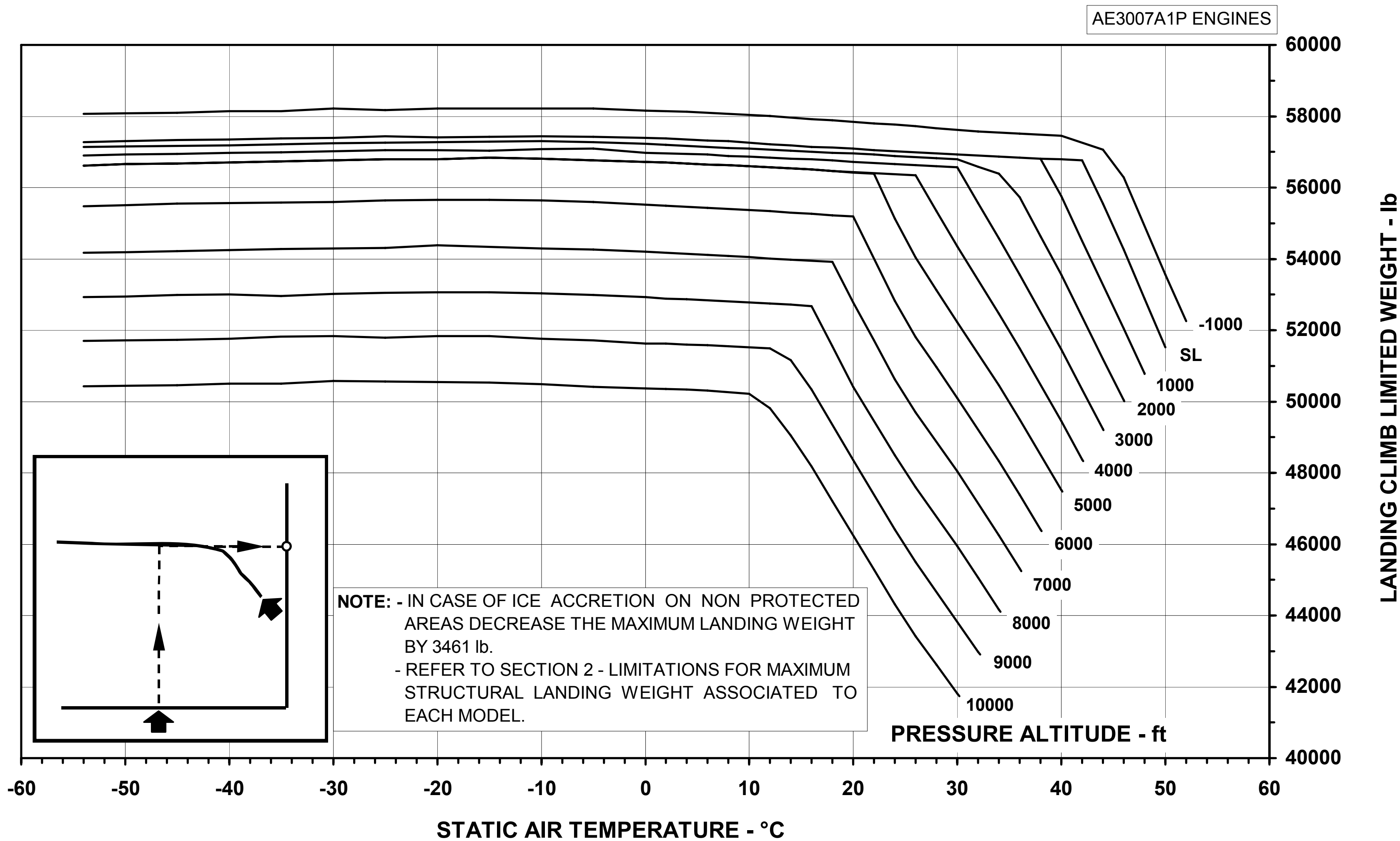


NOTE: - IN CASE OF ICE ACCRETION ON NON PROTECTED AREAS DECREASE THE MAXIMUM LANDING WEIGHT BY 8050 lb.
- REFER TO SECTION 2 - LIMITATIONS FOR MAXIMUM STRUCTURAL LANDING WEIGHT ASSOCIATED TO EACH MODEL.

145FAA392 - 10APR2005

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45°- ANTI-ICE OFF



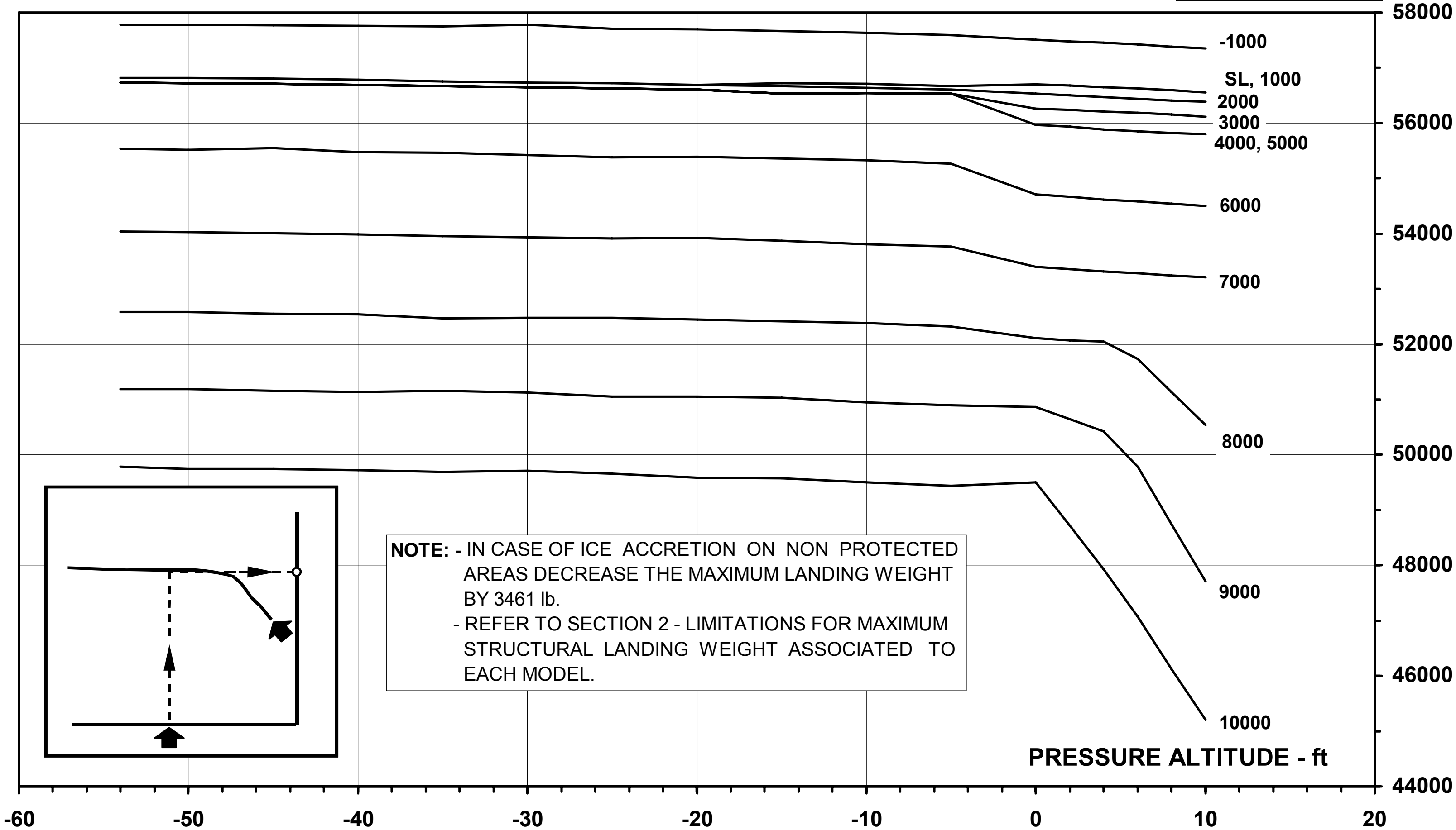
NOTE: - IN CASE OF ICE ACCRETION ON NON PROTECTED AREAS DECREASE THE MAXIMUM LANDING WEIGHT BY 3461 lb.
- REFER TO SECTION 2 - LIMITATIONS FOR MAXIMUM STRUCTURAL LANDING WEIGHT ASSOCIATED TO EACH MODEL.

145FAA393 - 30JUL2003

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE ON

AE3007A1P ENGINES



NOTE: - IN CASE OF ICE ACCRETION ON NON PROTECTED AREAS DECREASE THE MAXIMUM LANDING WEIGHT BY 3461 lb.
- REFER TO SECTION 2 - LIMITATIONS FOR MAXIMUM STRUCTURAL LANDING WEIGHT ASSOCIATED TO EACH MODEL.

145FAA394 - 30JUL2003

SUPPLEMENT 15

LIST OF EFFECTIVE PAGES

ORIGINAL	0	Not Applicable
REVISION	1 to 37	Not Applicable
REVISION	38	JUL 13, 2000
REVISION	39 to 50	Not Applicable
REVISION	51	JAN 14, 2002
REVISION	52	Not Applicable
REVISION	53	OCT 22, 2002
REVISION	54	Not Applicable
REVISION	55	NOV 27, 2002
REVISION	56	OCT 21, 2003
REVISION	57	JUN 17, 2004
REVISION	58	Not Applicable
REVISION	59	JUN 30, 2005
REVISION	60	Not Applicable
REVISION	61	NOV 17, 2006
REVISION	62 to 63	Not Applicable
REVISION	64	OCT 18, 2012

* Asterisk indicates pages revised, added or deleted by the current revision.

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EMBRAER TAKEOFF ANALYSIS SOFTWARE – ETOASG

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GENERAL

This Supplement presents the information relating to takeoff data calculation through the Embraer Takeoff Analysis Software – ETOASG. The valid version is:

VERSION	APPLICABILITY	STATUS	REASON FOR MODIFICATION
APFP-145/016 Version 20.02/7.10	All models	Valid	-

The software calculates the airplane takeoff performance and the takeoff flight path. All the information supplied by the software complies with the applicable airworthiness requirements. All the instructions to use the software can be obtained from the applicable User Guide.

The software specified in this Supplement is not included physically as part of the AFM.

The software authorized by this Supplement is supplied by Embraer to the operators of the airplane.

The computerized AFM is not intended for use on board the airplane.

The operator is responsible for the correct use of this software.

LIMITATIONS

The ETOASG software is a part of the basic AFM, presenting the takeoff performance in order to complement performance data presented in the AFM Section 5 and in the Supplement dedicated to the engine. Any modification to the ANAC-approved computerized AFM software application, or subsequent alteration to the generated output, will cancel the airworthiness approval of the information, unless this change was approved by the appropriate airworthiness authority. This statement applies regardless of any approval notation printed on a generated output.

The ETOAS software replaces or supplements portions of the paper AFM, and is an ANAC approved source for that AFM information.

The ETOAS software has been tested only on WINDOWS® 95/98/NT/2000/XP Operational Systems.

The operator is responsible for the compliance with remaining airplane limitations.

RUNWAY CONDITION

Airplanes not equipped with thrust reversers must take the runway condition into account (wet or dry runway option) and use the FAA 25 AMDT 92 option.

NOTE: Airplanes equipped with thrust reversers may use either amendment 84 or amendment 92.

POSSIBLE CONFIGURATIONS

ENGINE	T/O MODE	FLAP	ASSOCIATED CONDITIONS
All Engines	All Modes	All Flaps	– Standard Forward CG; – Anti-Ice ON or OFF; – Normal V_2/V_S ratio; – Equipped or not with Reversers; – Dry or Wet Runway (1); – ER or LR Brakes; – Normal or Extended Second Segment.

NOTE: 1) The Wet Runway performance must be compared with the Dry Runway performance and the most conservative result must be used.

The following tables present associated conditions that are only applicable to specific configurations (engines, takeoff modes and flaps).

<table>
<tr><th>ENGINE</th><th>T/O MODE</th><th>FLAP</th><th>ASSOCIATED CONDITIONS</th></tr>
<tr><td rowspan="3">A
or
A1/1</td><td rowspan="2">T/O-1</td><td>9°</td><td>– Engine Anti-Ice Valve Locked Open;
– Increased V_2/V_S ratio.</td></tr>
<tr><td>22°</td><td>– Engine Anti-Ice Valve Locked Open.</td></tr>
<tr><td>ALT T/O-1</td><td>9°</td><td>– Increased V_2/V_S ratio.</td></tr>
</table>

ENGINE	T/O MODE	FLAP	ASSOCIATED CONDITIONS
A1	T/O-1	9°	– High Altitude Operation; – Engine Anti-Ice Valve Locked Open; – Increased V_2/V_S ratio.
		22°	– High Altitude Operation; – Engine Anti-Ice Valve Locked Open.
	ALT T/O-1	9°	– High Altitude Operation; – Increased V_2/V_S ratio.
A1P	T/O	9°	– High Altitude Operation; – Engine Anti-Ice Valve Locked Open; – Increased V_2/V_S ratio.
		18°	– High Altitude Operation; – Engine Anti-Ice Valve Locked Open.
		22°	– High Altitude Operation; – Engine Anti-Ice Valve Locked Open.
	T/O RSV (1)	9°	– High Altitude Operation; – Increased V_2/V_S ratio.
		18°	– High Altitude Operation.
		22°	– High Altitude Operation.
	ALT T/O-1	9°	– High Altitude Operation; – Increased V_2/V_S ratio.
A1/3 (1)	T/O	9°	– Engine Anti-Ice Valve Locked Open.
		18°	– Engine Anti-Ice Valve Locked Open; – 21.1% Forward CG.

NOTE: 1) T/O RSV mode only for Thrust Assurance Check.

ENGINE	T/O MODE	FLAP	ASSOCIATED CONDITIONS
A1E	ALT T/O-1	9°	– Ferry Flight with Flaps 9°; – Ferry Flight with Landing Gear Down; – High Altitude Operation; – Increased V_2/V_S ratio.
		18°	– Ferry Flight with Landing Gear Down; – High Altitude Operation.
	T/O	9°	– Ferry Flight with Flaps 9°; – Ferry Flight with Landing Gear Down; – High Altitude Operation; – Engine Anti-Ice Valve Locked Open; – Increased V_2/V_S ratio.
		18°	– Ferry Flight with Landing Gear Down; – High Altitude Operation; – Engine Anti-Ice Valve Locked Open.
	E T/O	9°	– Ferry Flight with Flaps 9°; – Ferry Flight with Landing Gear Down; – High Altitude Operation; – Engine Anti-Ice Valve Locked Open; – Increased V_2/V_S ratio.
		18°	– Ferry Flight with Landing Gear Down; – High Altitude Operation; – Engine Anti-Ice Valve Locked Open.

EMERGENCY AND ABNORMAL PROCEDURES

Not applicable.

NORMAL PROCEDURES

Not applicable.

PERFORMANCE

The performance information obtained by the program may differ from that published in the AFM, since the calculation is performed exactly in a specific condition, instead of the interpolations used in the performance charts construction, where the entire airplane envelope should be represented in an unique graphical format. Therefore, the software may present improved takeoff performance information when compared with the information presented in the AFM.

Since the performance information supplied by the software complies with the applicable airworthiness requirements and is approved by the Certification Authorities, its results may be used as a valid alternative of the AFM performance charts.

SUPPLEMENT 16

LIST OF EFFECTIVE PAGES

ORIGINAL ....0 ....Not Applicable
REVISION .... 1 to 44 ....Not Applicable
REVISION ....45 ....MAR 12, 2001
REVISION ....46 ....Not Applicable
REVISION ....47 ....MAY 14, 2001
REVISION .... 48 to 51 ....Not Applicable
REVISION ....52 ....AUG 14, 2002
REVISION ....53 ....OCT 22, 2002
REVISION .... 54 to 64 ....Not Applicable
REVISION ....65 ....OCT 03, 2013

* Asterisk indicates pages revised, added or deleted by the current revision.

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IRS - INERTIAL REFERENCE SYSTEM

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GENERAL

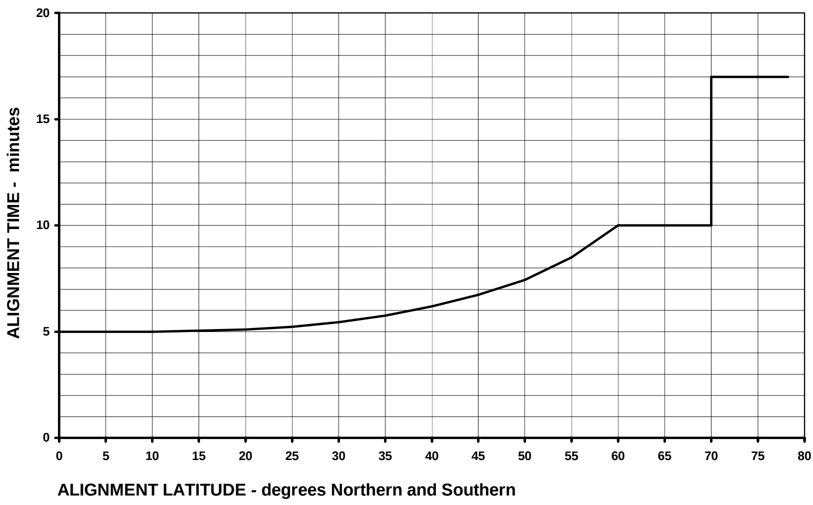
INTRODUCTION

This supplement is a part of, and must be placed in, the FAA Approved Airplane Flight Manual for airplanes incorporating single or dual IRS - Inertial Reference System. The information contained herein supplements the information of the basic FAA Approved Airplane Flight Manual. For limitations, procedures and performance information not contained in the supplement, consult the basic FAA Approved Airplane Flight Manual.

LIMITATIONS

INERTIAL REFERENCE SYSTEM

- Maximum latitude for alignment ..... 78.25° Northern and Southern
- IRS alignment will complete only after a valid aircraft present position (latitude and longitude) is received from the FMS.
- Time to Alignment:



- The airplanes may not be operated within the North and South magnetic polar cut-out regions below:

MAGNETIC CUT-OUT REGIONS	LATITUDE	LONGITUDE
North	Between 70°N and 82°N	Between 90°W and 120°W
	North of 82°N	Between 0° and 180°W/E
South	Between 60°S and 82°S	Between 120°E and 160°E
	South of 82°S	Between 0° and 180°W/E

NOTE: Within the magnetic polar cut-out regions IRS heading data is not available.

EMERGENCY AND ABNORMAL PROCEDURES

All IRS Fault Reaction for Abnormal Annunciation are described in the Honeywell Inertial Reference System (IRS) Pilot's Manual, Honeywell Publication Number M28-3343-003-00, August 1998 edition (or later revision of the manual).

The airplane's abnormal operating procedures are the same as those in the basic FAA Approved Airplane Flight Manual except as follows:

IRS OVERHEAT

EICAS CAUTION: IRS 1 (2) OVERHEAT

Operate affected IRU until completion of the flight.

If MSU FAULT annunciator is lighted, IRS 1 (2) FAIL message is presented or inertial data ceases to be transmitted by IRU:

Associated IRS Reversionary Button .... PRESS
Affected IRU Mode Select Switch .... OFF

NOTE: The Autopilot is not available.

If IRU is OFF, the airplane is near the end of the flight and additional attitude reference is necessary:

IRU Mode Select Switch..................................... ATT

CAUTION: FOR IRS IN ATTITUDE MODE, NAVIGATION AND ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NAV MODE. MAGNETIC HEADING MUST BE ENTERED AND UPDATED PERIODICALLY FROM THE BEST AVAILABLE ALTERNATIVE SOURCE, THROUGH THE FMS CDU.

IRS ATTITUDE MODE

EICAS ADVISORY: IRS 1 (2) ATT MODE

On ground:

IRU Mode Select Switch... OFF
Wait until POWER-OFF phase is finished (MSU annunciator lights extinguished).

IRU Mode Select Switch... NAV

IRS ALIGNMENT FAULT

EICAS CAUTION: IRS 1 (2) ALN FAULT

Check and reenter present position. If necessary, reenter present position once again.

IRS FAIL

EICAS CAUTION: IRS 1 (2) FAIL

During power on or alignment phases:

IRU Mode Select Switch .... OFF
Wait until POWER-OFF phase is finished (MSU annunciator lights extinguished).

IRU Mode Select Switch .... NAV

In flight:

Reversionary Panel IRS Button .... PRESS
If cross-side IRU is not available:

IRU Mode Select Switch .... ATT
Maintain wings level and constant airspeed until attitude display recovers (approximately 20 seconds).

Magnetic Heading .... ENTER

CAUTION: FOR IRS IN ATTITUDE MODE, NAVIGATION AND ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NAV MODE. MAGNETIC HEADING MUST BE ENTERED AND UPDATED PERIODICALLY FROM THE BEST AVAILABLE ALTERNATIVE SOURCE, THROUGH THE FMS CDU.

NOTE: Autopilot is available if the IRS 1(2) ATT MODE message is displayed and the IRS 1(2) ALN message is extinguished.

IRS ALIGNMENT

EICAS ADVISORY: IRS 1 (2) ALN

IRU Mode Select Switch.. CHECK NAV

This message is only presented during alignment phase or while the IRU mode select switch is set at ALIGN position.

IRS ON BATTERY

EICAS ADVISORY: IRS 1 (2) ON BATT

Associated IRU will operate for 40 minutes.

IRS EXCESSIVE MOTION

EICAS ADVISORY: IRS 1 (2) EXC MOTION

Make sure the airplane is completely stationary.

The IRU will restart a full alignment 30 seconds after the motion is stopped.

IRS/MSU FAILURE ANNUNCIATION

<table>
<tr><th rowspan="2">LIGHT</th><th colspan="3">OPERATION PHASE</th></tr>
<tr><th>POWER ON</th><th>ALIGNMENT</th><th>IN FLIGHT</th></tr>
<tr><td>ALIGN</td><td>– No light:
– Check IRS CB’s.
– Set mode select switch to ALIGN or NAV.
– Press MSU Test switch. Annunciator bulb must be replaced if the other MSU annunciators do light.</td><td>– Flashes immediately after entry:
– Check and reenter latitude or longitude.
– Reenter same latitude or longitude.
– Flashes at the end of alignment:
– Enter latitude.
– Check and reenter latitude.
– Allow additional time for alignment.</td><td>– Flashes:
– Select the remaining IRU by pressing the IRS Button on the associated reversionary panel.
– If necessary set mode select switch to ATT.</td></tr>
<tr><td>FAULT</td><td>– Set mode select switch to OFF for at least 3 sec. Then set mode select switch back to ALIGN or NAV.</td><td>– Associated with ALIGN annunciation:
– Recheck coordinates and reenter latitude.
– Allow additional time for alignment.
– Try new alignment. Set mode select switch to OFF for at least 3 sec, then to ALIGN, and enter present position.</td><td>– Select the remaining IRU by pressing the IRS Button on the associated reversionary panel.
– If necessary set mode select switch to ATT.</td></tr>
<tr><td>ON BATT</td><td>– Check IRS CB’s.
– If the annunciator remains lighted, do not takeoff.</td><td>*******</td><td>– The IRU operates on backup DC power and will operate for 30 minutes.</td></tr>
<tr><td>BATT FAIL</td><td>– Do not takeoff.</td><td>*******</td><td>*******</td></tr>
</table>

LIGHT	OPERATION PHASE		
	POWER ON	ALIGNMENT	IN FLIGHT
NO AIR	– Do not takeoff.	*******	– Operate IRU until completion of flight. – If fault annunciator is ON or inertial data ceases to be transmitted by IRU, select the remaining IRU and set mode select switch for affected IRU to OFF. If IRU is OFF, the airplane is near the end of the flight and additional attitude reference is needed, set mode select switch to ATT.

NORMAL PROCEDURES

The airplane normal operating procedures are the same as those in the basic FAA Approved Airplane Flight Manual except as follows:

BEFORE START

IRS .... CHECK

LEAVING THE AIRPLANE

IRS .... OFF

PERFORMANCE

Not applicable.

SUPPLEMENT 17

LIST OF EFFECTIVE PAGES

ORIGINAL	0	Not Applicable
REVISION	1 to 44	Not Applicable
REVISION	45	MAR 12, 2001
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REVISION	51	Not Applicable
REVISION	52	AUG 14, 2002
REVISION	53 to 55	Not Applicable
REVISION	56	OCT 21, 2003
REVISION	57	Not Applicable
REVISION	58	NOV 23, 2004
REVISION	59	JUN 30, 2005
REVISION	60	Not Applicable
REVISION	61	NOV 17, 2006

* Asterisk indicates pages revised, added or deleted by the current revision.

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HEAD-UP GUIDANCE SYSTEM (HGS) MODEL 3300 OPERATION

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GENERAL

The information presented in this Supplement, associated with the basic AFM, enables the establishment of the conditions required to accomplish the HGS operation.

The Flight Dynamics Model 3300 Head-Up Guidance System (HGS) is approved for use throughout the full flight regime as a supplemental display.

With the HGS installed and operated in the AIII mode and manually flown, the EMB-145 has been shown to meet the applicable airworthiness and performance criteria of FAA Advisory Circular AC 120-28D, with the exception of total loss of the HUD, which does not comply with the requirement for a warning to both pilots.

The CAT IIIa operation is predicated upon the use of an ILS facility with performance and integrity equivalent to, or between, an ICAO Annex 1 Facility Performance CAT III ILS, an US Type II or Type III ILS, or equivalent.

This AFM Supplement does not constitute approval to conduct takeoff operations or CAT II or CAT IIIa approach and landing operations below established operational minima. Approval must be obtained from the appropriate regulatory authority prior to conducting these operations.

For limitations, procedures and performance information not contained in this Supplement, refer to the basic AFM and Supplements related to the associated engines, as applicable.

LOW VISIBILITY TAKEOFF - CONDITIONS OF OPERATION

The low visibility takeoff display and Ground Roll Guidance Cue are automatically provided to the pilot once the following conditions have been established:

- Primary mode selected;
- IRS in NAV mode;
- All NAV receivers tuned to same ILS frequency;
- Runway length set between 6000 and 13500 ft;
- Selected heading bug set to runway heading;
- Selected course set to runway heading or approach course.

NOTE: Misleading/removal of the guidance is not annunciated. Safe operation in this condition was demonstrated and is predicated on the pilot's ability to see outside visual references.

AIII MODE - APPROACH AND LANDING - CONDITIONS OF OPERATION

To obtain the AIII Mode capability the following system conditions must be met :

- IRS in NAV mode;
- AHRS 2 in Full Performance mode;

  NOTE: AHRS is not applicable in case of dual IRS installation.

- All reversion selections in NORMAL position;
- All NAV receivers tuned to same ILS frequency;
- Basic attitude (pitch, roll, heading) data from dual sources within defined limits;
- All sensors/input data valid and no HGS BIT faults present;
- Radio altitude greater than 500 ft;
- Glideslope set between -2.50° and -3.00°.

AIII Mode becomes available for selection as the active mode when the above conditions are satisfied and the Approach on Course (AOC) logic is met. The Approach On Course logic depends on the following criteria:

- Flight Director Lateral Capture Mode indicates LOC and FD Vertical Capture mode indicates GS;
- No Localizer and Glideslope deviation for a period of 5 seconds;
- Difference between IRS Magnetic Track and the Selected Course 1 less than 15°;

USE OF HGS IN MODES OTHER THAN LOW VISIBILITY TAKEOFF AND AIII

The use of HGS in all modes other than for Low Visibility Takeoff and AIII must be in accordance with the limitations, emergency and abnormal procedures, normal procedures and performance data contained in the basic AFM and in the Supplements related to the associated engines, as applicable. When using PRI or IMC modes to monitor autopilot-coupled approaches, refer to the information contained in Supplement 1, in the basic AFM and in the Supplements related to the associated engines, as applicable.

CAT II OPERATIONS USING AIII MODE

For CAT II operations using AIII mode, the limitations, emergency and abnormal procedures, normal procedures and performance data contained in this Supplement must replace or complement the information contained in Supplement 1, in the basic AFM and in the Supplements related to the associated engines, as applicable.

LIMITATIONS

SYSTEM CAPABILITY LIMITATIONS

DEMONSTRATED MINIMUM VISIBILITY TAKEOFF LIMITS

Runway Visual Range (RVR) .... 300 ft

DEMONSTRATED MINIMUM CAT IIIA LIMITS

Decision Height (DH)... 50 ft
Runway Visual Range (RVR) .... 600 ft

WIND COMPONENTS

For Low Visibility Takeoff operations the following wind components must not be exceeded:

Headwind .... 25 kt
Tailwind .... 10 kt
Crosswind.. 15 kt

For AIII mode operations the following wind components must not be exceeded:

Headwind .... 25 kt
Tailwind .... 10 kt
Crosswind.. 15 kt

AIII mode operations initiated with one engine inoperative has been demonstrated and following wind components must not be exceeded:

Headwind .... 25 kt
Tailwind .... 10 kt
Crosswind.. 11 kt

NOTE: The maximum wind limits listed above include gusts.

AIRPORT ALTITUDE LIMITS

The HGS was demonstrated to meet the necessary requirements under the following conditions:

Demonstrated Maximum Airport Altitude .... 5500 ft

AIRPLANE EQUIPMENT LIMITATIONS

AIRPLANE SUN VISOR

With the HGS Combiner deployed, airplane sun visors must not be placed in a position, during takeoff, approach or landing, that will prevent the correct operation of the forward fly-away movement of the Combiner.

ATTITUDE AND HEADING REFERENCE SYSTEM

HGS operation on airplanes equipped with AH-900 AHRS version is prohibited.

MINIMUM EQUIPMENT REQUIRED

The performance for Low Visibility Takeoff requires that the following equipment and instruments be in proper operating conditions:

- Head-Up Guidance System (HGS);
- 1 Inertial Reference System (IRS);

  NOTE: IRS 1 must be operative in case of dual IRS installation.
- 2 Air Data Computers (ADC);
- 3 VHF/NAV Systems;
- 2 Integrated Computers (IC);
- Windshield Wipers;
- 2 Primary Flight Displays (PFD).

The performance of AIII mode approaches requires that the following equipment and instruments be in proper operating conditions:

- Head-Up Guidance System (HGS);
- 2 Inertial Reference Systems (IRS);

  NOTE: 1 IRS required in case of single IRS installation.
- 2 Air Data Computers (ADC);
- 3 VHF/NAV Systems;
- 2 Radio Altimeters;
- 2 Integrated Computers (IC);
- Attitude and Heading Reference System 2 (AHRS 2);

  NOTE: AHRS is not applicable in case of dual IRS installation.
- Windshield Wipers;
- Primpary Flight Display 2 (PFD 2);
- 1 Enhanced/Ground Proximity Warning System (EGPWS/GPWS);
- 1 Aural Warning Unit (AWU) Channel;
- 1 GPS (GPS 2 in case of dual GPS configuration);

  NOTE: GPS is not required in case of dual IRS installation.
- 2 Hydraulic Systems.

YAW DAMPER

For AIII mode approaches, the Yaw Damper must be disengaged below 500 ft.

APPROACH AND LANDING FLAPS

AIII mode approaches and landings must be performed with flaps 22°.

EMERGENCY AND ABNORMAL PROCEDURES

The procedures below must replace or complement the Emergency and Abnormal procedures contained in the basic AFM.
During the Low Visibility Takeoff, the Emergency and Abnormal Procedures are the same as those in the basic AFM.
For AIII mode operations, the approach must be discontinued in the event of engine failure above DH. A new approach may be attempted with one engine inoperative. In this case, the normal procedure AIII approach contained in this Supplement must be used.

APPROACH WARNING

COMBINER Message: APCH WARN

MISSED APPROACH Procedure..................................PERFORM

A Missed Approach procedure must be performed, unless the approach is continued under visual conditions and the airplane position and attitude assure a safe landing. In this case, the AIII guidance must not be followed.

HGS FAIL

EICAS CAUTION: HGS FAIL

Do not use HGS system.

AIII NOT AVAILABLE

EICAS ADVISORY: AIII NOT AVAIL

Do not perform AIII mode approaches.

NORMAL PROCEDURES

The procedures below must replace or complement the Normal Procedures contained in the basic AFM.

BEFORE START

IRS .... SET TO NAV
HGS Combiner .... SET
HGS Control Panel:
    HGS Mode .... PRI
    RUNWAY LENGTH .... SET
    RUNWAY ELEVATION .... SET
    GLIDESLOPE .... SET
Display Control Panel 1 .... SET TO NAV 1
Display Control Panel 2 .... SET TO NAV 2
All 3 NAV Receivers .... SET TO ILS
Course Selector 1 .... SET TO RUNWAY HEADING
Course Selector 2 .... SET TO RUNWAY HEADING

NOTE: - The Low Visibility Takeoff must only be performed in PRI mode.
- Although it is recommended to perform the Low Visibility Take Off, a normal takeoff can also be performed using the IMC or VMC modes.

BEFORE TAKEOFF

Low Visibility Takeoff Briefing..PERFORM
Aircraft Reference Symbol ....SET TO RUNWAY CENTERLINE
Course Selector 1...READJUST WITH RUNWAY CENTERLINE
Course Selector 2...READJUST WITH RUNWAY CENTERLINE
Heading Bug...SET TO RUNWAY CENTERLINE
Ground Roll Guidance Cue ....CHECK
Display Intensity...ADJUST

CAUTION: RUNWAY REMAINING IS A SUPPLEMENTAL SITUATION AWARENESS DISPLAY DECREASING IN 500 FT INCREMENTS AVAILABLE IN LOW VISIBILITY TAKEOFF. THE DATA DISPLAYED IS NOT INTENDED TO BE USED FOR PERFORMANCE MONITORING PURPOSES.

CLIMB/CRUISE

HGS Mode...AS REQUIRED
HGS Display ....MONITOR

NOTE: Although it is recommended to perform CLIMB/CRUISE in PRI mode, the IMC or VMC can also be used.

DESCENT

HGS Combiner ....SET
HGS Control Panel:
HGS..SET AND X CHECK
HGS Mode...AS REQUIRED
AIII Approach Briefing ....PERFORM AS REQUIRED

NOTE: Although it is recommended to perform DESCENT in PRI mode, the IMC or VMC can also be used.

APPROACH

AIII MODE APPROACH

NOTE: The approach must be initiated with the airplane in final configuration and stabilized.

Display Control Panel 1 .... SET TO NAV 1
Display Control Panel 2 .... SET TO NAV 2
All 3 NAV Receivers .... SET TO ILS
Course Selector 1 .... SET TO RUNWAY HEADING
Course Selector 2 .... SET TO RUNWAY HEADING
Decision Height (DH) 1 .... SET
Decision Height (DH) 2 .... SET
HGS Control Panel:
- HGS Mode .... AIII
- RUNWAY LENGTH .... CHECK
- RUNWAY ELEVATION .... CHECK
- GLIDESLOPE .... CHECK

Flaps .... 22°
Speed .... SET AIII V_{APP}

NOTE: The AIII V_{APP} is determined by adjusting the V_{APP} for head wind component and gust according to the following equation:
AIII V_{APP} = V_{APP} + wind correction, where
Wind Correction = ½ head wind component + full gust, limited to 20 kt.

Autopilot and Yaw Damper .... DISENGAGE ABOVE 500 ft

CAUTION:
- IF VISUAL CONTACT IS NOT MADE UPON REACHING THE DECISION HEIGHT OR IF ANY MALFUNCTION COULD NOT BE PROMPTLY IDENTIFIED DURING APPROACH, A MISSED APPROACH MUST BE IMMEDIATELY INITIATED;
- RUNWAY REMAINING IS A SUPPLEMENTAL SITUATION AWARENESS DISPLAY DECREASING IN 500 FT INCREMENTS AVAILABLE AFTER TOUCHDOWN IN AIII MODE. THE DATA DISPLAYED IS NOT INTENDED TO BE USED FOR PERFORMANCE MONITORING PURPOSES.

PRIMARY, IMC OR VMC MODE APPROACH

Course Selector 1 .... SET TO RUNWAY HEADING
Course Selector 2 .... SET TO RUNWAY HEADING
HGS Control Panel:
- HGS Mode .... AS REQUIRED
- RUNWAY LENGTH .... CHECK
- RUNWAY ELEVATION .... CHECK
- GLIDESLOPE .... CHECK

NOTE: In IMC or VMC modes, if the “ALIGN HUD” annunciation is displayed on the Combiner, it should be repositioned to eliminate the annunciation prior to use.

CAUTION: THE FLARE GUIDANCE IS ADVISORY INFORMATION ONLY. THE CREW MUST PERFORM A VISUAL LANDING.

WINDSHEAR PREVENTION/RECOVERY

The HGS will display a “WDSHEAR” message when the GPWS/EGPWS detects a windshear.

In the event of a windshear, the HGS will display a “WDSHEAR” on the combiner and on the PFD. A voice message will be presented in case of a red “WDSHEAR” indication on the PFD.

When the pilot selects the go around mode after a windshear warning, the primary mode is selected and a windshear guidance cue is provided.

TRAFFIC AND COLLISION AVOIDANCE

The HGS will display TCAS Resolution Advisories (RA) to alert the crew to traffic conflicts. Preventive and Corrective Resolution Advisories provided are similar to MFD indications.

Preventive Advisories do not require that action be taken by the crew to alter the flight path of the airplane, but indicate an unsafe zone.

Corrective Advisories displayed on the HGS require a vertical evasive maneuver.
Preventive and corrective resolution advisory use angled lines to guide the fly path to box or preventive bracket to indicate the unsafe or no-fly zone.

In this case, the lines out of the box bottom will flash until the flight path is positioned within the safe zone.

Preventive RA procedure:

– Ensure the airplane flight path remains clear of unsafe zones.

Corrective RA procedure:

– Fly the airplane to box and outside of the unsafe zone indicated by the lines off the fly-to box.
– Maintain action as required by TCAS RA.

PERFORMANCE

The minimum demonstrated weight for AIII mode operations is 33500 lb.
The performance data contained in this section must replace the equivalent data contained in the basic AFM and in the Supplements related to the associated engines, as applicable.

Unless otherwise specified, the performance charts presented in this Supplement must be used in the same way as in the basic AFM.

- LANDING CLIMB GRADIENT - Four charts are provided, according to the following options:
  - ANTI-ICE OFF or ON;
  - AE3007A or AE3007A1 engines.
- MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED - Two charts are provided, according to the following options:
  - ANTI-ICE OFF or ON, for AE3007A engines only;
  - For AE3007A1 engines, the Maximum Landing Weight will never be limited by Landing Climb.
- LANDING CLIMB AND REFERENCE SPEEDS - One chart is provided, applicable to all engines.
- MAXIMUM LANDING WEIGHT - FIELD LENGTH LIMITED - One chart is provided, applicable to all engines.

  NOTE: The wind correction in the MAXIMUM LANDING WEIGHT - FIELD LENGTH LIMITED chart is the increment applied to the V_{APP} considering the head wind component and gust (Wind Correction = ½ head wind component + full gust, limited to 20 kt).

- QUICK TURN AROUND WEIGHT - Two charts are provided, one for ER and one for LR version brakes.

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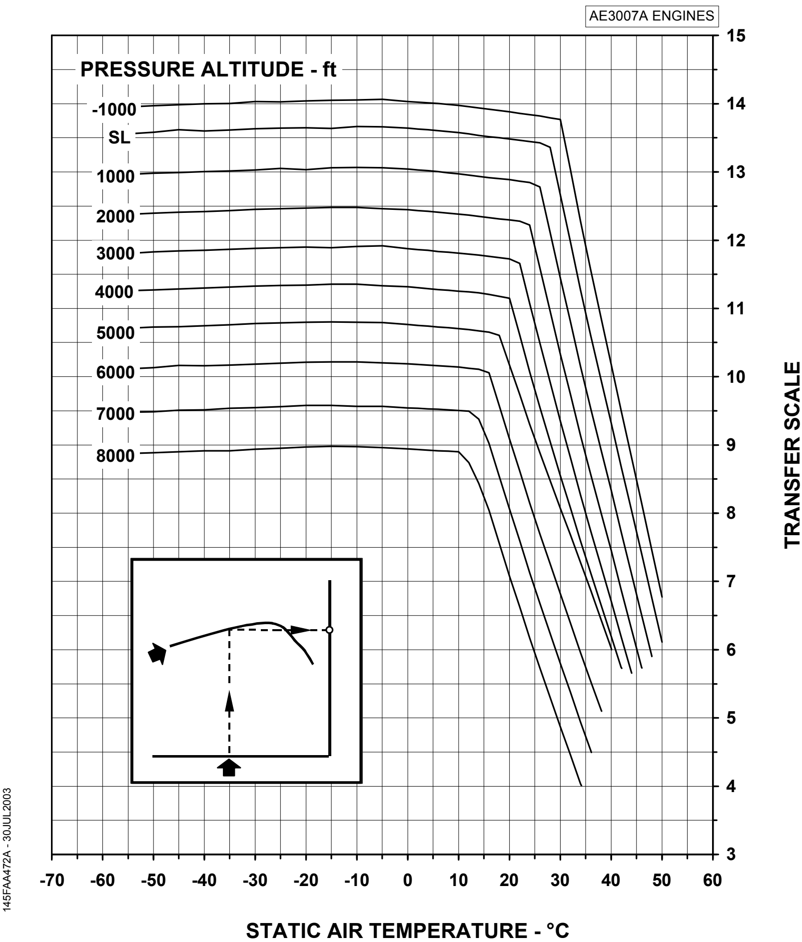
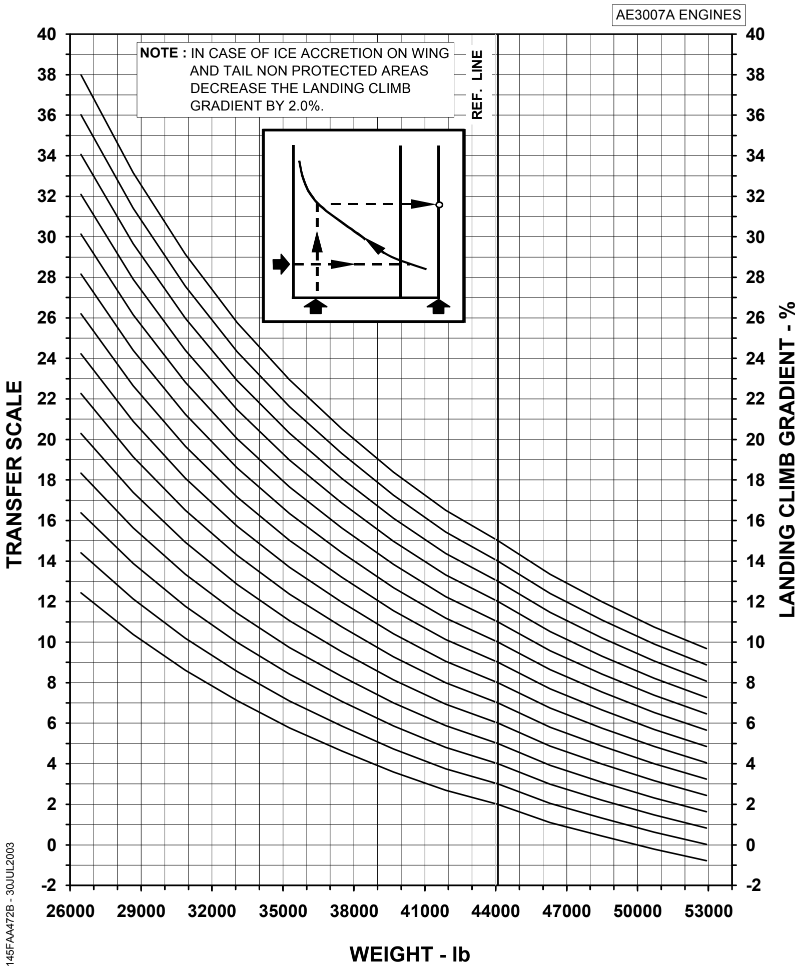
LANDING CLIMB GRADIENT

ALL ENGINES - FLAPS 22° - ANTI-ICE OFF

CHART 1 OF 2



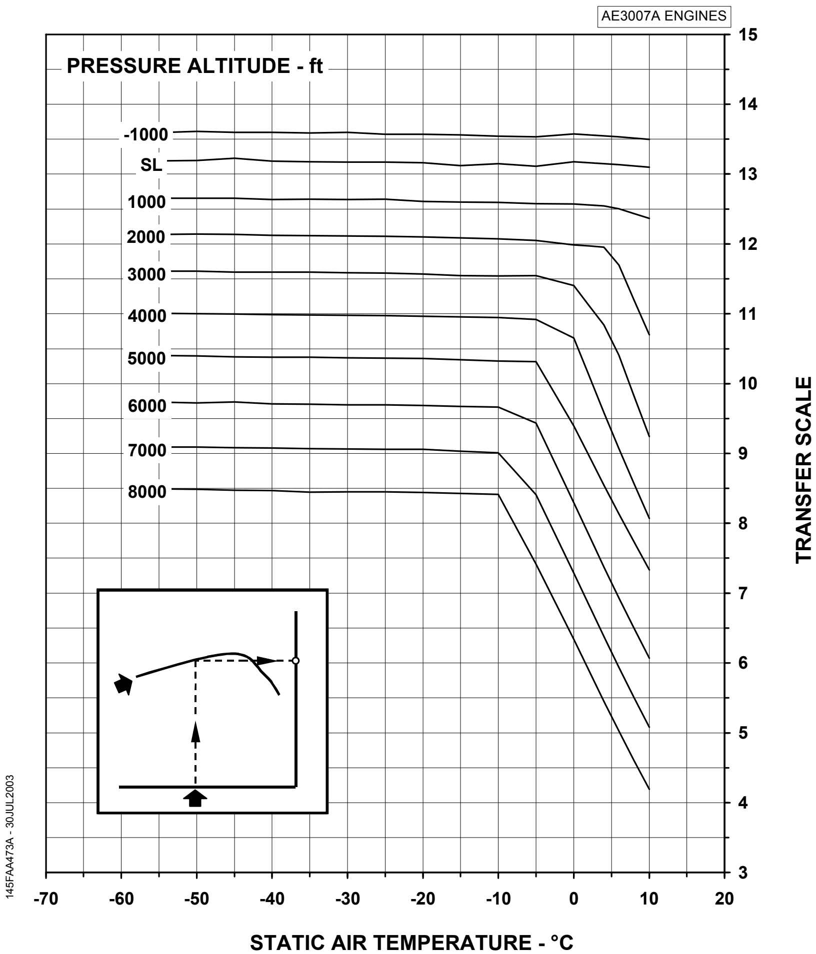
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 2 OF 2



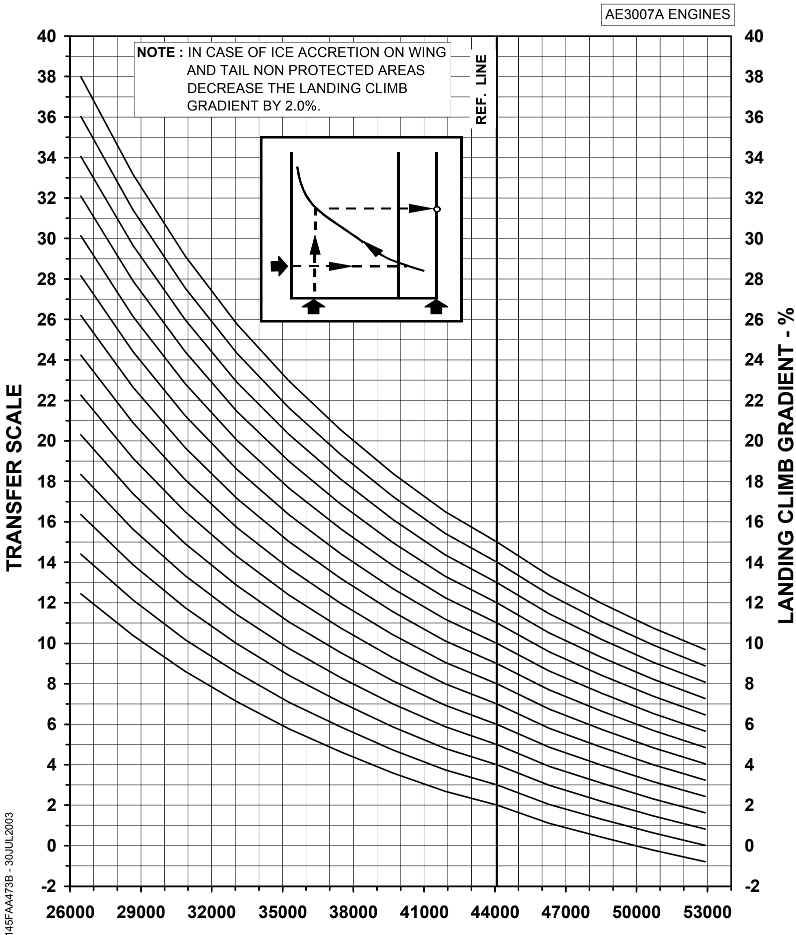
LANDING CLIMB GRADIENT

ALL ENGINES - FLAPS 22° - ANTI-ICE ON

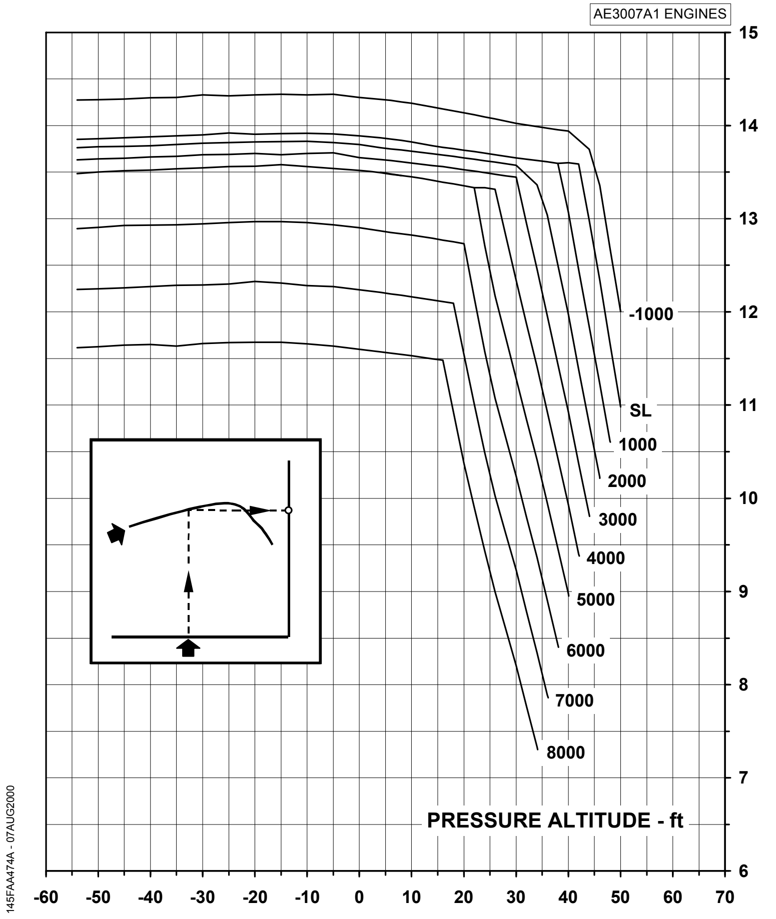
CHART 1 OF 2



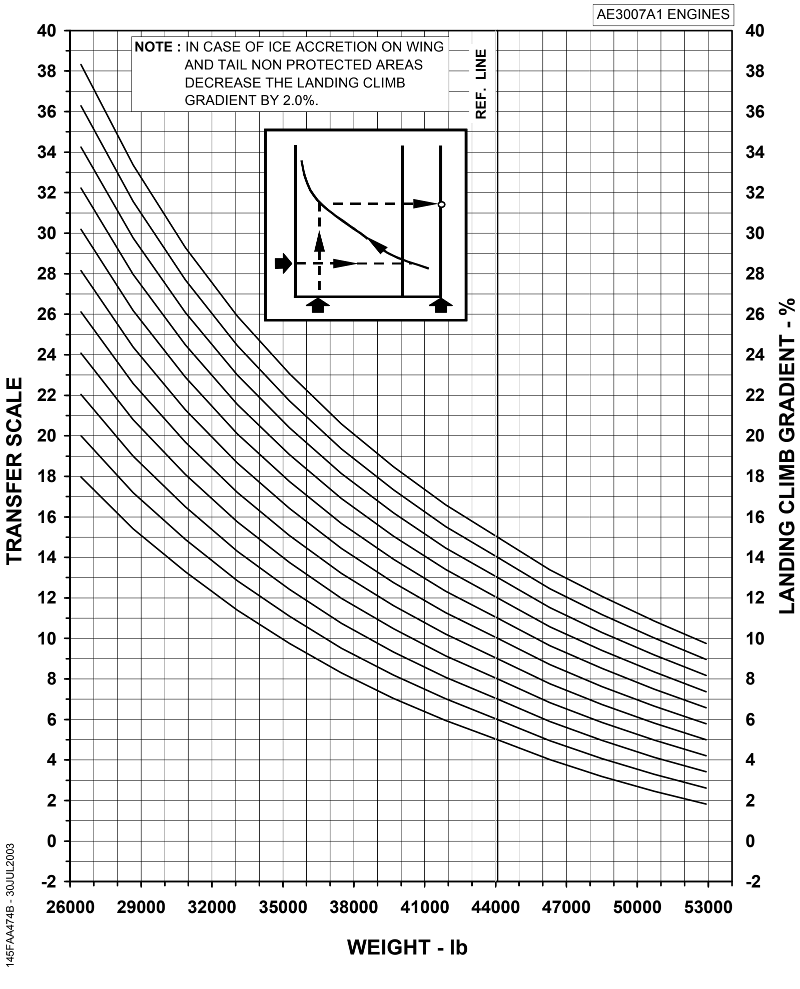
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 2 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 1 OF 2



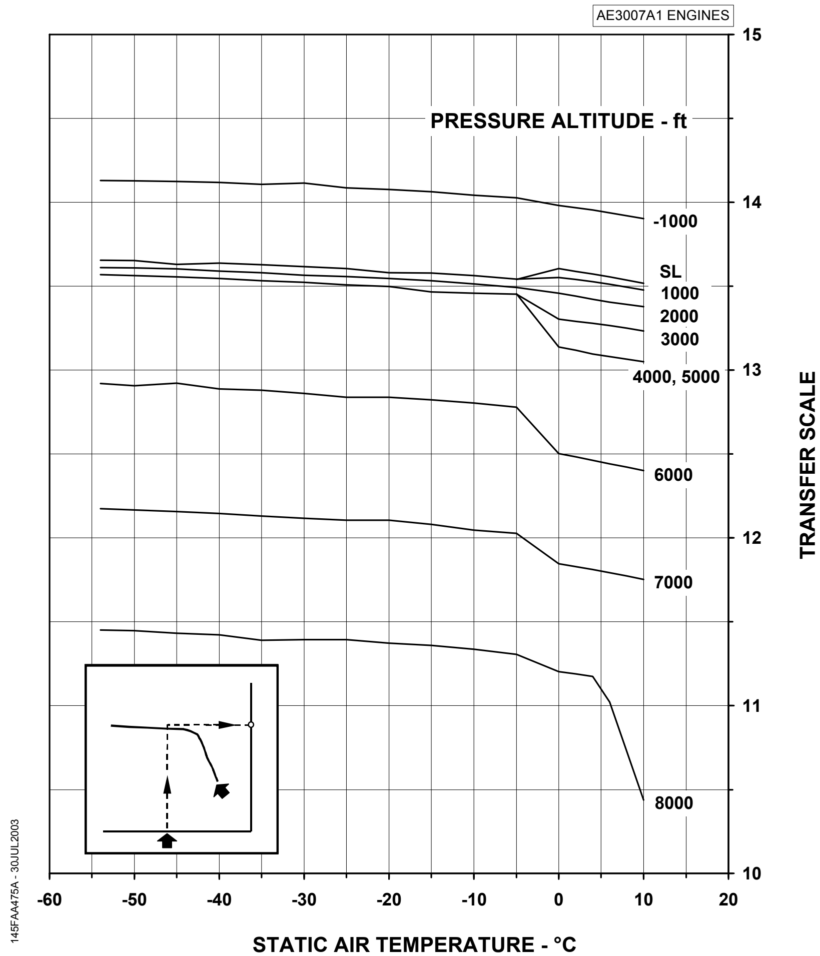
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 2 OF 2



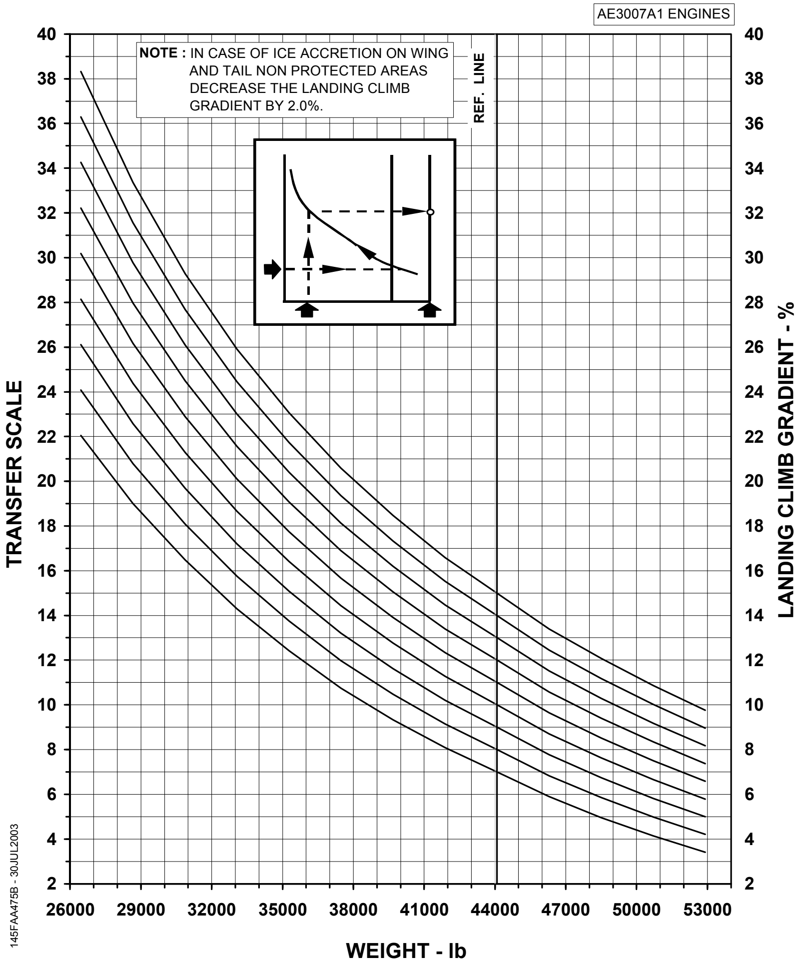
LANDING CLIMB GRADIENT

ALL ENGINES - FLAPS 22° - ANTI-ICE ON

CHART 1 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 2 OF 2



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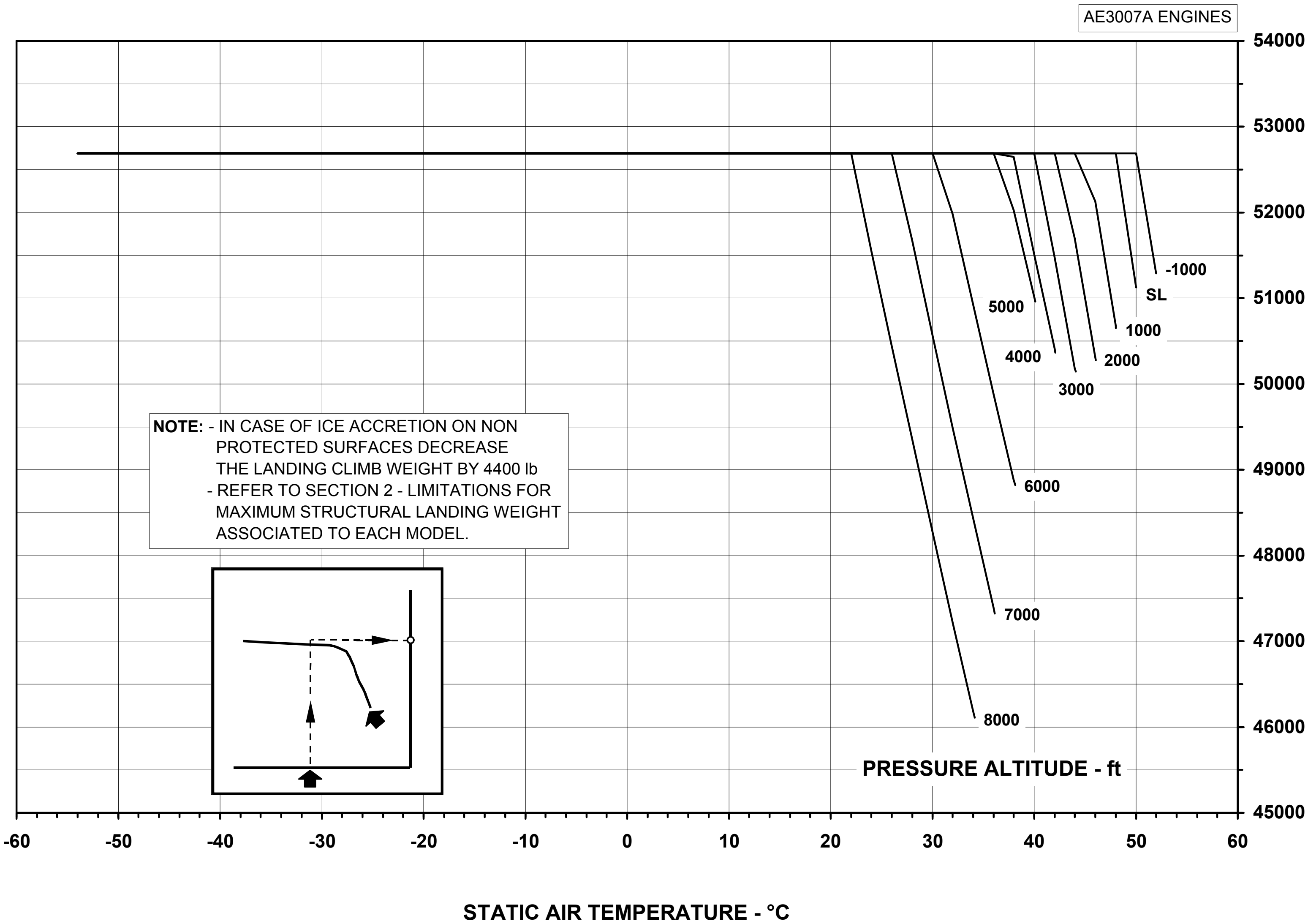
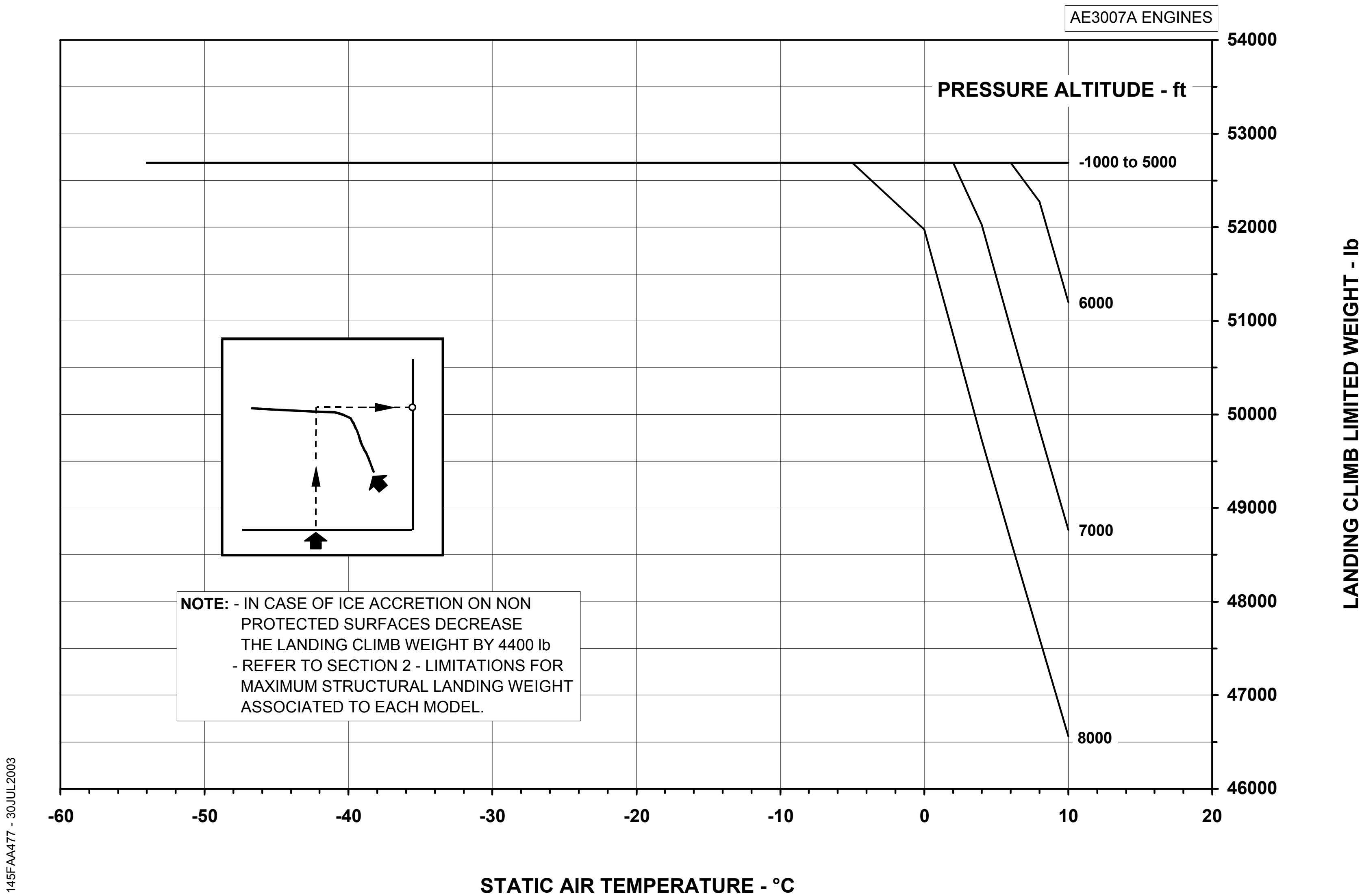
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

APPROACH FLAPS 9° - LANDING FLAPS 22° - ANTI-ICE OFF



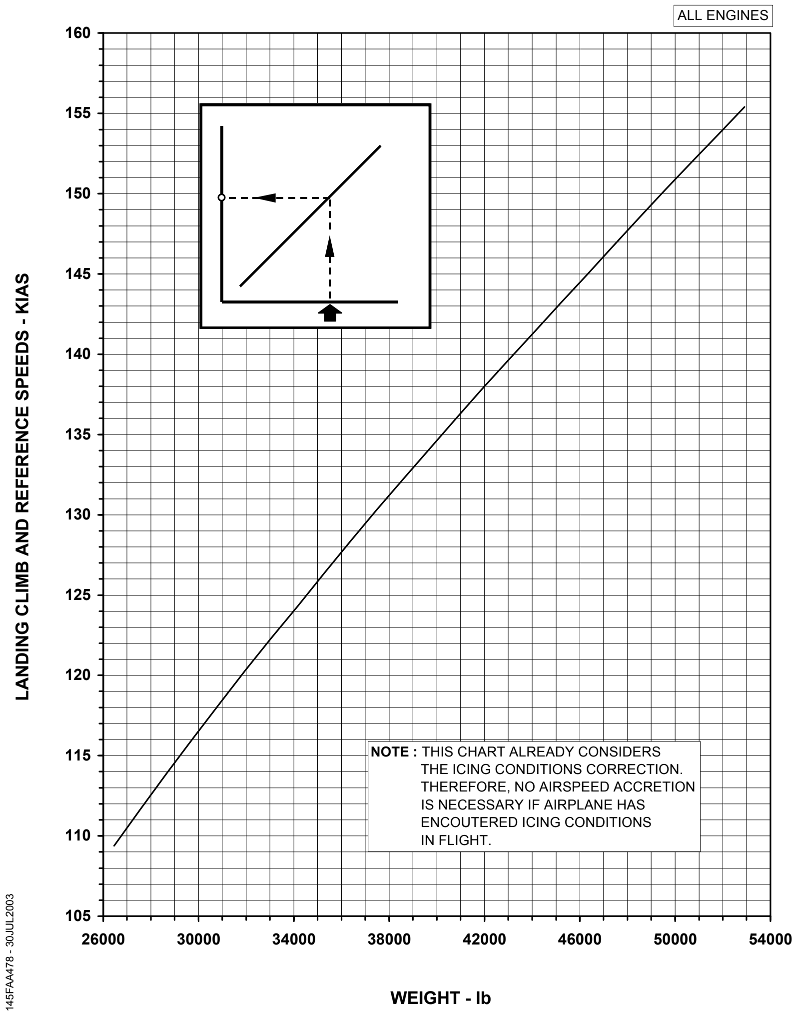
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

APPROACH FLAPS 9° - LANDING FLAPS 22° - ANTI-ICE ON



NOTE: - IN CASE OF ICE ACCRETION ON NON PROTECTED SURFACES DECREASE THE LANDING CLIMB WEIGHT BY 4400 lb
- REFER TO SECTION 2 - LIMITATIONS FOR MAXIMUM STRUCTURAL LANDING WEIGHT ASSOCIATED TO EACH MODEL.

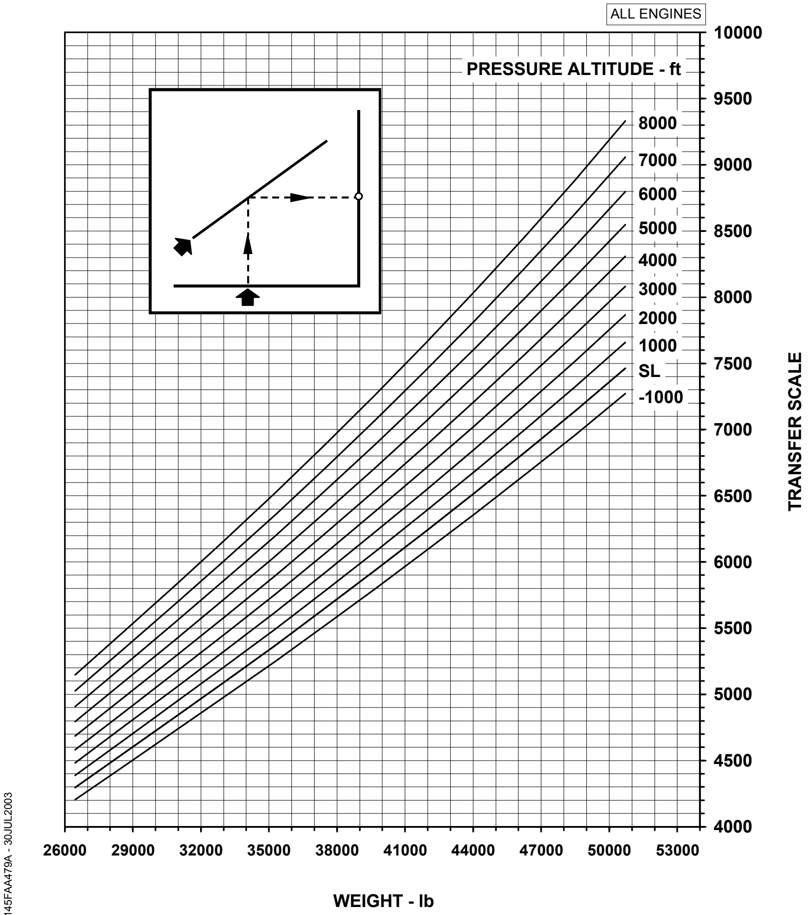
LANDING CLIMB AND REFERENCE SPEEDS
FLAPS 22°



MAXIMUM LANDING WEIGHT - FIELD LENGTH LIMITED

FLAPS 22°

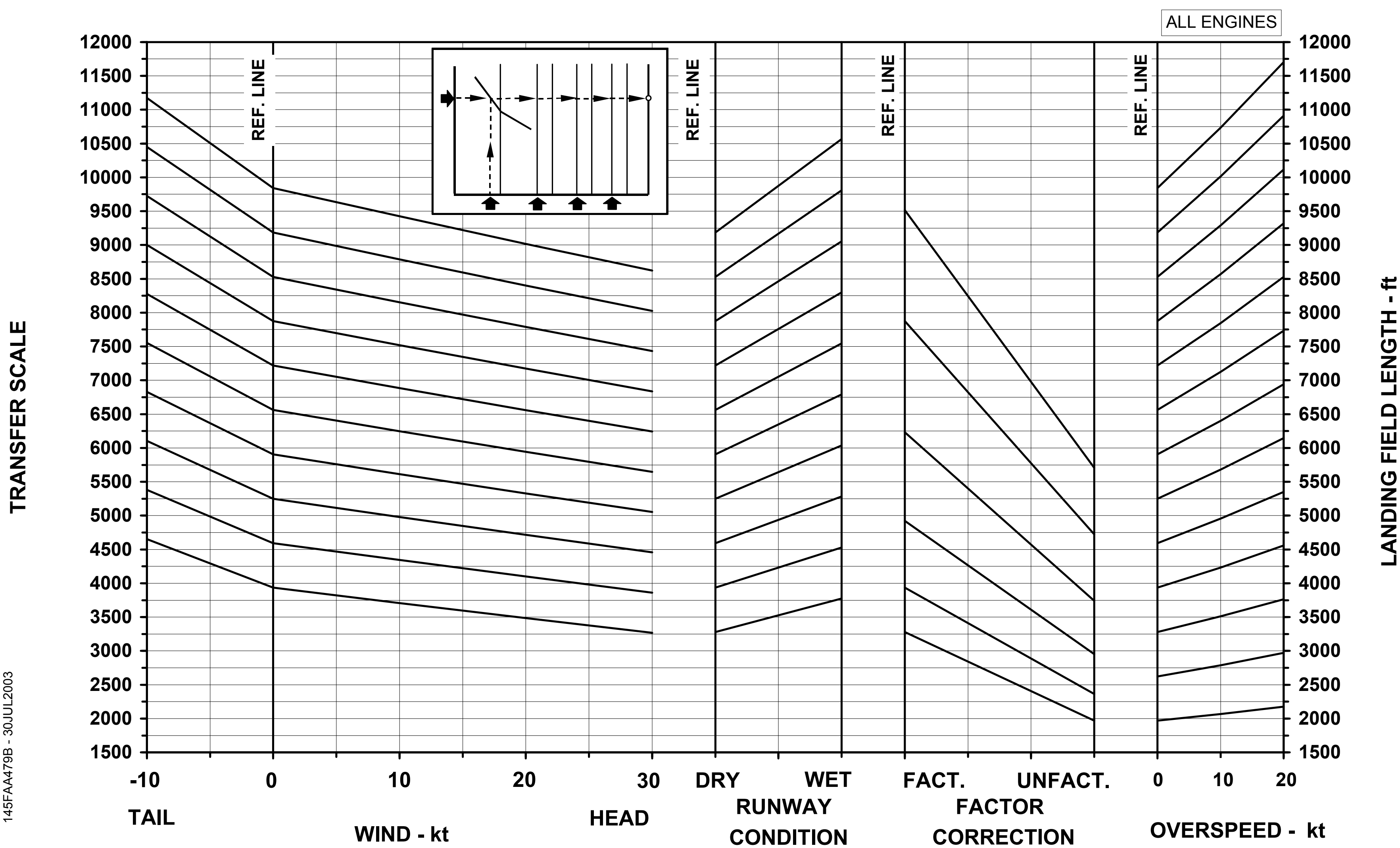
CHART 1 OF 2



MAXIMUM LANDING WEIGHT - FIELD LENGTH LIMITED

FLAPS 22°

CHART 2 OF 2



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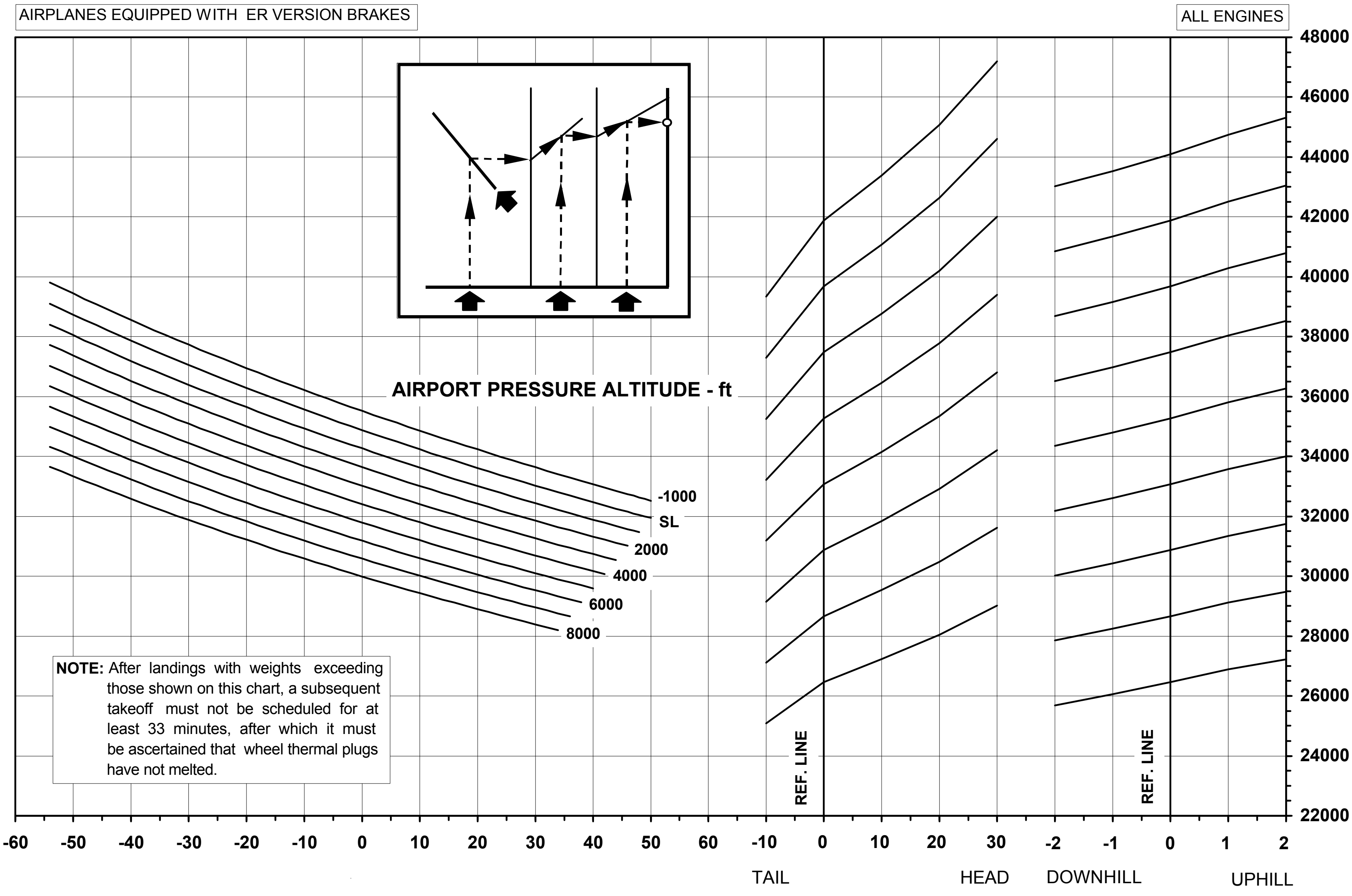
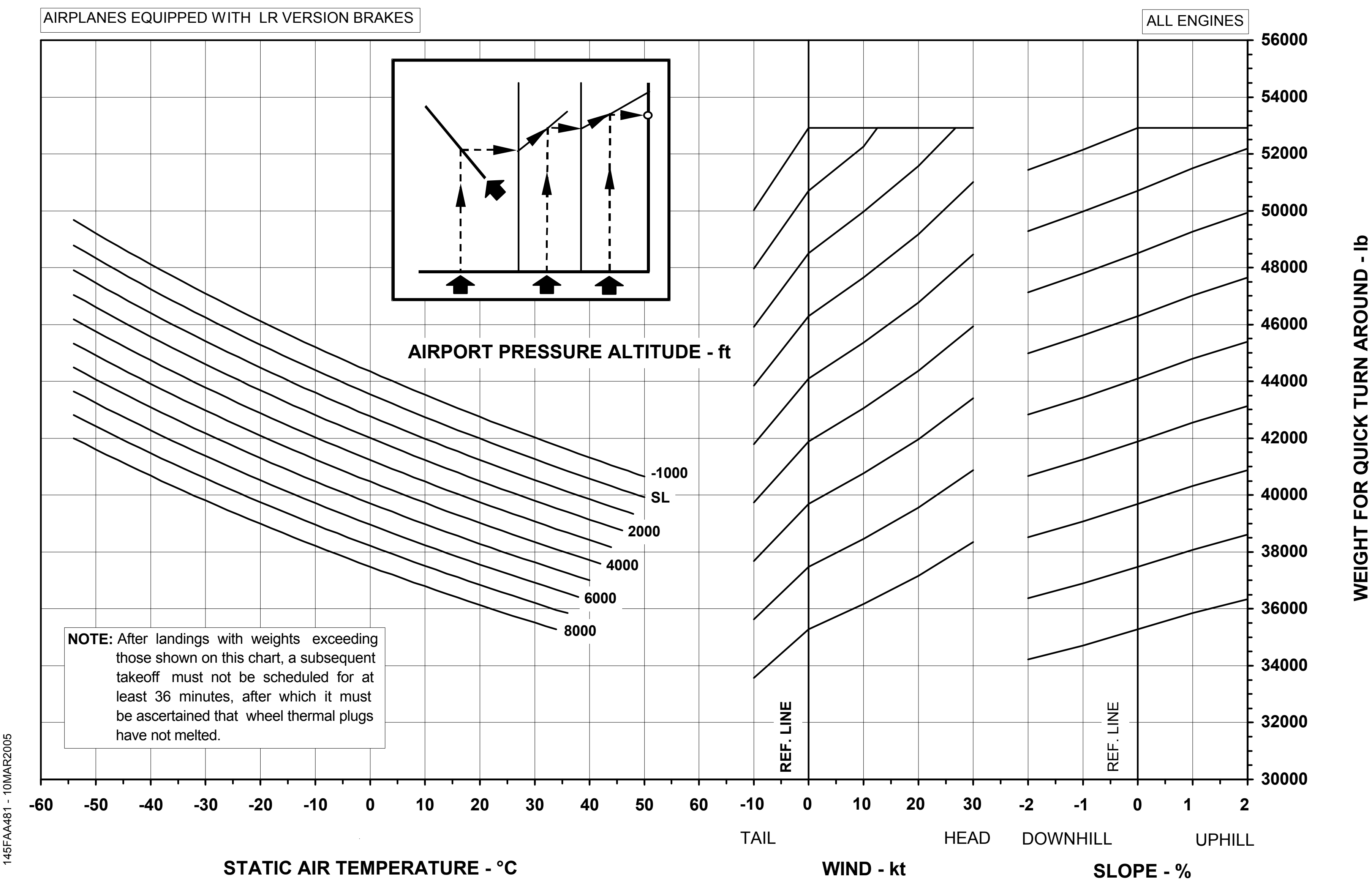
QUICK TURN AROUND WEIGHT
FLAPS 22°



NOTE: After landings with weights exceeding those shown on this chart, a subsequent takeoff must not be scheduled for at least 33 minutes, after which it must be ascertained that wheel thermal plugs have not melted.

QUICK TURN AROUND WEIGHT
FLAPS 22°



NOTE: After landings with weights exceeding those shown on this chart, a subsequent takeoff must not be scheduled for at least 36 minutes, after which it must be ascertained that wheel thermal plugs have not melted.

SUPPLEMENT 19

LIST OF EFFECTIVE PAGES

ORIGINAL...................... 0................ Not Applicable
REVISION..................1 to 49 .... Not Applicable
REVISION..................... 50................NOV 09, 2001
REVISION.................51 to 56 .... Not Applicable
REVISION..................... 57................ JUN 17, 2004
REVISION..................... 58................NOV 23, 2004

* Asterisk indicates pages revised, added or deleted by the current revision.

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FERRY FLIGHT WITH FLAPS 9°

TABLE OF CONTENTS

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GENERAL

The ferry flight is a flight for the purpose of returning an airplane to base or moving an airplane to and from a maintenance base where repairs or replacements can be made.

The information presented in this Supplement, associated with the basic AFM, enables the establishment of the conditions required to accomplish the ferry flight operation with flaps 9°.

The operator should ensure that any required approval from the Regulatory Authorities is granted prior to the ferry flight operation.

For limitations, procedures and performance information not contained in this Supplement, refer to the basic AFM.

LIMITATIONS

OPERATIONAL LIMITATIONS

AIRSPEED

Maximum Operating Limit Speed..................................250 KIAS

ALTITUDE

Maximum Altitude Operating Limit ....20000 ft

BRAKES

A fully operational brake system is required.

KINDS OF OPERATION

This Supplement permits the airplane operation, for ferry flight only, in the following conditions:

- No icing;
- Visual (VFR) or Instrument (IFR);
- In case of any failure associated with flight controls degradation, landing must be performed in VMC.

OCCUPANTS

No passenger is allowed on board.

POWER PLANT

ENGINES

Two Rolls-Royce AE3007A or AE3007A1/1 or AE3007A1 or AE3007A1P or AE3007A1E or AE3007A3 or AE3007A1/3 engines. The AE3007A and AE3007A1/1 engines intermix operation is also permitted.

EMERGENCY AND ABNORMAL PROCEDURES

The actions, warnings, cautions and notes listed in the procedures below must replace the equivalent procedures contained in the basic AFM.

TAKEOFF WITH ENGINE FAILURE (ABOVE V_1)

Maximum Takeoff Thrust ....CHECK
At V_R rotate the airplane.
With positive rate of climb:
  Landing Gear..UP
  Airspeed ....V_2

Maintain V_2 up to the level off altitude. If maneuvering is required, maintain a maximum bank of 15°.
When reaching the level off height:
  Airspeed ....ACCELERATE TO APPROACH CLIMB SPEED

After flaps are retracted:
  PRECAUTIONARY ENGINE SHUTDOWN or
    ENGINE FIRE, SEVERE DAMAGE OR
    SEPARATION Procedure ....AS REQUIRED
After a maximum of 5 minutes at takeoff mode:
  Thrust Rating..AS REQUIRED

PITCH TRIM INOPERATIVE

EICAS WARNING: PIT TRIM 1(2) INOP or
PTRIM MAIN INOP, PTRIM BACKUP INOP
(may be presented)
EICAS CAUTION: AUTO TRIM FAIL (may be presented)

If at least one message is presented without pressing any Pitch Trim Switch:

Affected Pitch Trim System .... OFF

Continue the flight with the remaining Pitch Trim System.

If both Pitch Trim Systems become inoperative:

Pitch Trim Main System .... OFF
Pitch Trim Back Up System .... OFF
Consider landing at the nearest suitable airport.

If no message is presented or is only presented when pressing any Pitch Trim Switch:

Airspeed .... REDUCE

Airspeed reduction alleviates control column forces and may permit Pitch Trim command to be recovered.

If Pitch Trim command is reestablished continue the flight with the remaining Pitch Trim System.

NOTE: - For the EMB-145 XR model, if the PTRIM BACKUP INOP message is displayed the maximum airspeed allowed is Mach 0.78.
- Do not engage the Autopilot if the Main Pitch Trim System is inoperative.
- If only one segment of the Pitch Trim Switch is pressed, the TRIM aural warning message will be generated.

WARNING: IF PITCH TRIM COMMAND IS NOT REESTABLISHED, DO NOT OPEN SPEEDBRAKE.

If pitch trim command is not reestablished and the airplane presents a NOSE UP tendency:

Airspeed .... REDUCE

NOTE: Turning the airplane and extending the landing gear helps to maintain minimum airspeed with unwanted pitch up tendency.

Pitch Trim Command.. CHECK ALL SWITCHES

CONTINUE ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

If pitch trim is recovered, re-trim the airplane and proceed with flight normally.

If pitch trim is not recovered:

Consider landing at the nearest suitable airport.

Approach and landing configuration:

Landing Gear .... DOWN

Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed .... $V_{REF\ 45}$ + 10 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.40.

If pitch trim command is not reestablished and the airplane presents a NOSE DOWN tendency:

Consider landing at the nearest suitable airport.

Airspeed .... REDUCE AS REQUIRED

Approach and landing configuration:

Landing Gear .... DOWN

NOTE: Gear extension should be delayed as long as possible.

Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed .... $V_{REF\ 45}$ + 25 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.70.

JAMMED ELEVATOR

EICAS WARNING: SPS 1-2 INOP (may be presented)
EICAS CAUTION: STICK PUSHER FAIL

Elevator Disconnect	PULL

Autopilot .... OFF
Airspeed .... MAXIMUM 200 KIAS
Pitch Trim .... AS REQUIRED
Avoid landing at airports with anticipated turbulence or crosswind.
Approach and landing configuration:
- Landing Gear .... DOWN
- Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

- Airspeed .... $V_{REF\ 45}$ + 20 KIAS

If both elevators are jammed, pitch trim may be used to land the airplane.
If left elevator is jammed, Stick Pusher will not be available.
Depending on the jammed elevator position, the remaining elevator power to flare the airplane will be reduced.
Do not reengage autopilot.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.60.

JAMMED AILERON

Aileron Disconnect	PULL

Autopilot..OFF
Airspeed ....MAXIMUM 200 KIAS

NOTE: Roll rate with aileron disconnected is lower than with full system.

After control is regained:

If the copilot's aileron is operative, roll trim and artificial feel are available.

If the pilot's aileron is operative, roll trim and artificial feel are not available. Do not make sudden and large aileron inputs. Do not increase bank angle above 20°.

In either case, autopilot must not be reengaged.

If both ailerons are jammed, use rudder to control the airplane.
Avoid landing at airports with anticipated turbulence or crosswind.
Approach and landing configuration:

Landing Gear...DOWN
Flaps Selector Lever ....22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed ....$V_{REF\ 45}$ + 15 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.50.

JAMMED RUDDER

Command rudder through yaw trim. If not possible:

Rudder System 2 .... OFF

If still jammed:

Rudder System 2 .... ON
Rudder System 1 .... OFF

If rudder control through pedals is not restored:

Airspeed .... MAXIMUM 200 KIAS

Avoid landing at airports with anticipated turbulence or crosswind.

Approach and landing configuration:

Landing Gear .... DOWN
Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed .... $V_{REF\ 45}$ + 30 KIAS OR 160 KIAS WHICHEVER IS HIGHER

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 2.70.

If required, use asymmetric thrust to trim the airplane directionally, and maintain the engine thrust until nose gear contact in order to avoid lateral and directional miscontrol.

During final approach, the pilot not flying must keep the Steering Disengage Button pressed to avoid inadvertent nose wheel deflection once on ground.

When the airplane is firmly on ground, use the Steering Handle to control the airplane still keeping the Steering Disengage Button pressed and then reduce the engine thrust to IDLE.

The pilot not flying must help the pilot flying to keep control column pressed forward after nose gear touch down, to assist the landing maneuver.

If necessary, use differential braking to steer the airplane.

NOTE: The Steering handle is effective even with the Steering Disengage Button pressed.

INADVERTENT SPOILER OPENING IN FLIGHT

EICAS CAUTION: SPOILER FAIL (may be presented)

Speed Brake	CLOSE

Speed Brake Circuit Breaker (F13) .... PULL
Ground Spoiler Outboard
Circuit Breaker (F14) .... PULL
Ground Spoiler Inboard
Circuit Breaker (F21) .... PULL

If any panel is jammed closed, open or is floating:
Approach and landing configuration:
Landing Gear .... DOWN
Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed .... $V_{REF\ 45}$ + 25 KIAS

Do not reduce engine thrust during flare to avoid abrupt lateral and directional corrections before touchdown.

CAUTION:
- IN CASE OF PANEL JAMMED CLOSED OR FLOATING, TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.72.
- IN CASE OF PANEL JAMMED OPEN, TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.70.

POWER PLANT

ONE ENGINE INOPERATIVE APPROACH AND LANDING

Approach and landing configuration:
- Landing Gear .... DOWN
- Thrust Rating .... TAKEOFF MODE
- Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

- Airspeed .... $V_{REF\ 45}$ + 15 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.48.

HYDRAULIC POWER

BOTH HYDRAULIC SYSTEMS FAILURE

EICAS CAUTION: HYD SYS 1-2 FAIL, RUDDER SYS 1-2 INOP or AIL SYS 1-2 INOP
EICAS ADVISORY: E1-2 HYD PUMP FAIL

Airspeed .... MAXIMUM 250 KIAS

Check hydraulic systems fluid quantity:
- If any hydraulic system fluid quantity is in green range:
  - Associated Electric Hydraulic Pump .... ON
- If any hydraulic system fluid quantity is in amber range:
  - Associated Electric Hydraulic Pump .... OFF

CAUTION: DO NOT OPEN THE SPEED BRAKE.

If one system can be recovered, complete the appropriate procedure for one hydraulic system failure.

(continue on next page)

(continued from previous page)

If both systems remain inoperative:

Quick Disconnect Button .... PRESS
Both Electric Hydraulic Pumps .... OFF

NOTE: The nose landing gear doors will open, therefore the pilot should expect noise increase.

ABNORMAL LANDING GEAR
EXTENSION Procedure .... ACCOMPLISH

Use rudder for directional control on the ground.

Rudder and aileron are operating under mechanical reversion mode. Expect greater rudder pedals and control wheels control forces. Both pilots should act together to control the airplane, if required. Consider the use of aileron and asymmetric thrust to help in yaw control.

Land at the nearest suitable airport. Avoid landings at airports with anticipated crosswind or turbulence. Perform a long final approach.

Landing must be performed only in VMC.

Approach and landing configuration:

Landing Gear .... DOWN
Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed .... $V_{REF\ 45}$ + 45 KIAS

EMERGENCY BRAKE
TECHNIQUE Procedure .... ACCOMPLISH

Do not attempt to taxi.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 3.60.

HYDRAULIC SYSTEM 1 FAILURE

EICAS CAUTION: HYD SYS 1 FAIL, RUDDER SYS 1 INOP or AIL SYS 1 INOP
EICAS ADVISORY: E1 HYD PUMP FAIL

Check hydraulic system fluid quantity:
- If hydraulic system fluid quantity is in green range:
  - Electric Hydraulic Pump 1 .... ON
- If hydraulic system fluid quantity is in amber range:
  - Electric Hydraulic Pump 1 .... OFF

If hydraulic power is not recovered:
- Airspeed .... MAXIMUM 250 KIAS
- Electric Hydraulic Pump 1 .... OFF

NOTE: As the nose landing gear doors will open, the pilot should expect a noise increasing during flight.

- For landing gear extension:
  - ABNORMAL LANDING GEAR EXTENSION Procedure .... ACCOMPLISH
- For approach and landing:
  - Landing Gear .... DOWN
  - Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

  - Airspeed .... $V_{REF\ 45}$ + 10 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 2.20.

Do not actuate left Thrust Reverser.
Use rudder and differential braking for directional control on ground.

HYDRAULIC SYSTEM 2 FAILURE

EICAS CAUTION: HYD SYS 2 FAIL, RUDDER SYS 2 INOP or AIL SYS 2 INOP
EICAS ADVISORY: E2 HYD PUMP FAIL

Check hydraulic system fluid quantity:
- If hydraulic system fluid quantity is in green range:
  - Electric Hydraulic Pump 2 .... ON
- If hydraulic system fluid quantity is in amber range:
  - Electric Hydraulic Pump 2 .... OFF

If hydraulic power is not recovered:
- Airspeed .... MAXIMUM 250 KIAS
- Electric Hydraulic Pump 2 .... OFF
- For approach and landing:
  - Landing Gear .... DOWN
  - Flaps Selector Lever .... 22°

    NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

  - Airspeed .... $V_{REF\ 45}$ + 10 KIAS
- Do not actuate right Thrust Reverser.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 2.10.

NOTE:
- Do not open the Speed Brake.
- The Emergency/Parking Brake will be available only with the accumulator charge.

FLIGHT CONTROLS

AILERON SYSTEM INOPERATIVE

EICAS CAUTION: AIL SYS 1 (2) INOP

Associated Aileron System .... OFF
Airspeed .... MAXIMUM 250 KIAS

If the remaining system fails:
- Remaining Aileron System....................................... OFF
- Quick Disconnect Button.. PRESS

Aileron is operating under mechanical reversion mode. Expect greater aileron control force. If required, both pilot should act together to control airplane. Avoid landing at airports with anticipated turbulence or crosswind. Perform a long final approach.

Approach and landing configuration:
- Landing Gear .... DOWN
- Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

Airspeed .... $V_{REF\ 45}$ + 45 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 2.00.

RUDDER/YAW TRIM RUNAWAY

Quick Disconnect Button	PRESS
Rudder Systems 1 and 2	OFF

Yaw Trim Circuit Breaker (F12).................................... PULL
Quick Disconnect Button .... RELEASE

If necessary, turn on one rudder system at a time to identify the failed system. Prepare to overcome the yaw generated by the failed system. Continue the flight with the failed system off.

If both systems remains inoperative:

Expect greater rudder pedals force. Both pilots should act together to control the airplane, if required. Consider the use of aileron to help in yaw control, and asymmetric thrust to trim the airplane.
Do not use yaw trim system for the remainder of the flight.
Avoid landing at airports with anticipated turbulence or crosswind.
Land at the nearest suitable airport.
Landing must be performed only in VMC.

CAUTION: DO NOT TRY TO RESET THE RUDDER SYSTEMS.

RUDDER SYSTEM INOPERATIVE

EICAS CAUTION: RUDDER SYS 1 (2) INOP or RUDDER SYS 1-2 INOP

If only one system fails:
- Confirm the failed side.
  - Affected Rudder System .... OFF
  - Check that only the affected RUDDER SYS INOP message is presented on EICAS.

If the message RUDDER SYS 1-2 INOP is displayed on EICAS and rudder is operating in Mechanical Reversion Mode:
- If Mechanical Reversion Mode was resultant of Hardover Protection activation:
  - Do not reset the systems.
  - Expect greater rudder pedal force. If required, both pilots should act together to control the airplane. Consider the use of aileron to help in yaw control, and asymmetric thrust to control the airplane.
  - Landing must be performed only in VMC.
  - Avoid landing at airports with anticipated turbulence, gusts or crosswind.
- If Mechanical Reversion Mode was not resultant of Hardover Protection activation:
  - Rudder System 2 .... OFF
  - If the message RUDDER SYS 1-2 INOP still remains on:
    - Rudder System 1 .... OFF
    - Both Rudder Systems.................................... ON
    - If the message RUDDER SYS 1-2 INOP still remains on:
      - Both Rudder Systems.............................. OFF
      - Expect greater rudder pedal force. Both pilots should act together to control the airplane, if required. Consider the use of aileron to help in yaw control, and asymmetric thrust to control the airplane.
      - Landing must be performed only in VMC.
      - Avoid landing at airports with anticipated turbulence, gusts or crosswind.

Approach and landing configuration:
- Landing Gear .... DOWN
- Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

- Airspeed .... $V_{REF\ 45}$ + 10 KIAS

<u>CAUTION:</u> TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.40.

NORMAL PROCEDURES

The actions, warnings, cautions and notes listed in the procedures below must complement or replace the equivalent procedures contained in the basic AFM.

WARNING: BE SURE THAT THE MAINTENANCE PERSONNEL HAS DISCONNECTED THE FPDU ELECTRICAL CONNECTORS P1101 AND P1102 (FOR ALL EMB-145 MODELS, EXCEPT EMB-145 XR) OR CONNECTORS P3683 AND P3682 (FOR EMB-145 XR MODELS).

BEFORE START

The EICAS caution message FLAP FAIL may be displayed and should be disregarded.

NOTE: The EICAS flaps indication will display dashes and the RMU will display 11°.

AFTER START

Flaps Selector Lever .... 9°

BEFORE LANDING

Flaps Selector Lever .... 22°

NOTE: The Flaps Selector Lever must be set to the landing setting to avoid GPWS/EGPWS nuisance messages.

LANDING

Airspeed .... $V_{REF\ 45}$ + 10 KIAS

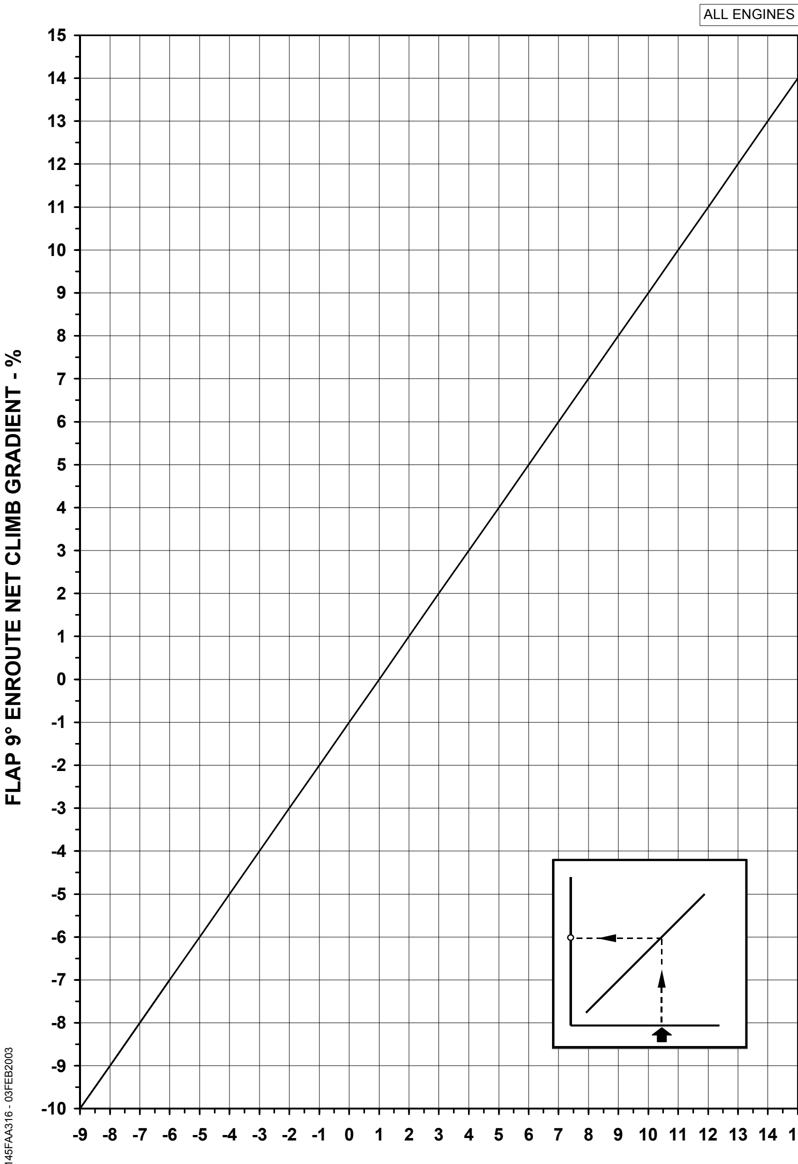
For Landing Field Length correction, refer to the chart contained in this Supplement.

PERFORMANCE

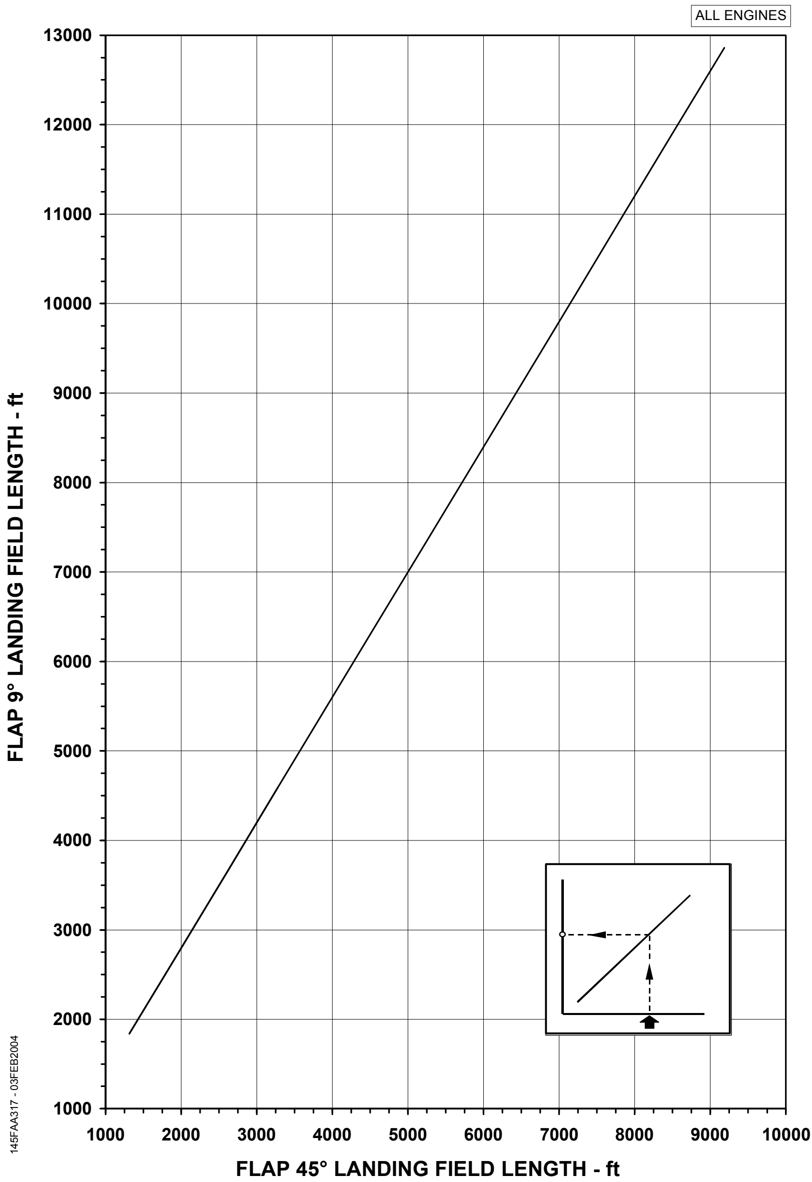
The performance data presented in this section must replace or complement the equivalent data contained in the basic AFM and Supplements related to the associated engines, as applicable.
Unless otherwise specified, the performance charts presented in this Supplement must be used in the same way as in the basic AFM.

- TAKEOFF - For the EMB-145 XR model, the takeoff data must be calculated through the ETOASG version 18.41/7.00 or later approved version.
- OBSTACLE CLEARANCE - The obstacle clearance must be made up to the second segment, and therefore the performance presented in AFM for flaps 9° is applicable.
- FINAL SEGMENT SPEED and ENROUTE CLIMB SPEED - The speed used in the final takeoff segment and in enroute climb with flaps 9° is the same used in the APPROACH CLIMB SPEED chart.
- ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE - A correction chart must be used to obtain the Enroute Net Climb Gradient. Use the ENROUTE NET CLIMB GRADIENT - ONE ENGINE OPERATIVE chart related to the associated engine and make the correction using the ENROUTE NET CLIMB GRADIENT CORRECTION chart contained in this Supplement.
- MAXIMUM LANDING WEIGHT - FIELD LENGTH LIMITED - A correction chart must be used to obtain the Landing Field Length. Use the MAXIMUM LANDING WEIGHT - FIELD LENGTH LIMITED - FLAPS 45° chart and make the correction using the LANDING FIELD LENGTH CORRECTION chart contained in this Supplement.

ENROUTE NET CLIMB GRADIENT CORRECTION



LANDING FIELD LENGTH CORRECTION



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SUPPLEMENT 20

LIST OF EFFECTIVE PAGES

ORIGINAL	0	Not Applicable
REVISION	1 to 49	Not Applicable
REVISION	50	NOV 09, 2001
REVISION	51 to 55	Not Applicable
REVISION	56	OCT 21, 2003
REVISION	57	JUN 17, 2004

* Asterisk indicates pages revised, added or deleted by the current revision.

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FERRY FLIGHT WITH LANDING GEAR DOWN

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GENERAL

The ferry flight is a flight for the purpose of returning an airplane to base or moving an airplane to and from a maintenance base where repairs or replacements can be made.

The information presented in this Supplement, associated with the basic AFM, enables the establishment of the conditions required to accomplish the ferry flight operation with the landing gear down.

The operator should ensure that any required approval from the Regulatory Authorities is granted prior to the ferry flight operation.

For limitations, procedures and performance information not contained in this Supplement, refer to the basic AFM.

LIMITATIONS

OPERATIONAL LIMITATIONS

AIRSPEED

Maximum Operating Limit Speed..................................250 KIAS

NOTE: The nose landing gear doors must be installed.

TEMPERATURE

Minimum Operating Temperature (SAT).......................-40°C

KINDS OF OPERATION

This Supplement permits the airplane operation, for ferry flight only, under the following conditions:

- No icing;
- Visual (VFR) or Instrument (IFR).

OCCUPANTS

No passengers are allowed on board.

POWER PLANT

ENGINES

Two Rolls-Royce AE3007A or AE3007A1/1 or AE3007A1 or AE3007A3 or AE3007A1/3 or AE3007A1P or AE3007A1E engines. The AE3007A and AE3007A1/1 engines intermix operation is also permitted.

FLIGHT CONTROLS

FLAPS

Takeoff Flaps .... 9°

EMERGENCY AND ABNORMAL PROCEDURES

The Emergency and Abnormal Procedures remain unchanged, except that all procedures will be performed with landing gear down.

NORMAL PROCEDURES

The actions listed in the procedure below must complement the equivalent procedure contained in the basic AFM. The remaining Normal Procedures section remains unchanged, except that all procedures will be performed with the landing gear down.

CRUISE

Monitor fuel quantity throughout the flight.

PERFORMANCE

The performance data presented in this section must replace or complement the equivalent data contained in the basic AFM and in the Supplements related to the associated engines, as applicable.

Unless otherwise specified, the performance charts presented in this Supplement must be used in the same way as in the basic AFM.

The following charts listed are presented in this Supplement:

- MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED - One chart for takeoff is provided, according to the following option:
  - T/O-1 or ALT T/O-1 thrust rating mode (for AE3007A, A1/1, A1 and A3 engines).
  - T/O thrust rating mode (for AE3007A1/3 and A1P engines).
  - ANTI-ICE OFF.
  - Normal V_2 and Increased V_2 (only for AE3007A engines).

- OBSTACLE CLEARANCE - REFERENCE GRADIENT - A correction chart is provided to obtain the Reference Gradient.

  Use the OBSTACLE CLEARANCE - REFERENCE GRADIENT - ANTI-ICE OFF chart related to the associated engine and make the correction using the OBSTACLE CLEARANCE - REFERENCE GRADIENT CORRECTION chart contained in this Supplement.

- ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE - A correction chart is provided to obtain the Enroute Net Climb Gradient.

  Use the ENROUTE NET CLIMB GRADIENT - ONE ENGINE OPERATIVE - ANTI-ICE OFF chart related to the associated engine and make the correction using the ENROUTE NET CLIMB GRADIENT CORRECTION chart contained in this Supplement.

- ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT - One chart is provided, according to the following option:
  - ANTI-ICE OFF.

- APPROACH CLIMB GRADIENT - A correction chart is provided to obtain the Approach Climb Gradient.

  Use the APPROACH CLIMB GRADIENT - ANTI-ICE OFF chart related to the associated engine and make the correction using the APPROACH CLIMB GRADIENT CORRECTION chart contained in this Supplement.

- MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED - A correction chart is provided to obtain the Approach Climb Limited Weight.

  Use the MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED - ANTI-ICE OFF chart related to the associated engine and make the correction using the MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED CORRECTION chart contained in this Supplement.

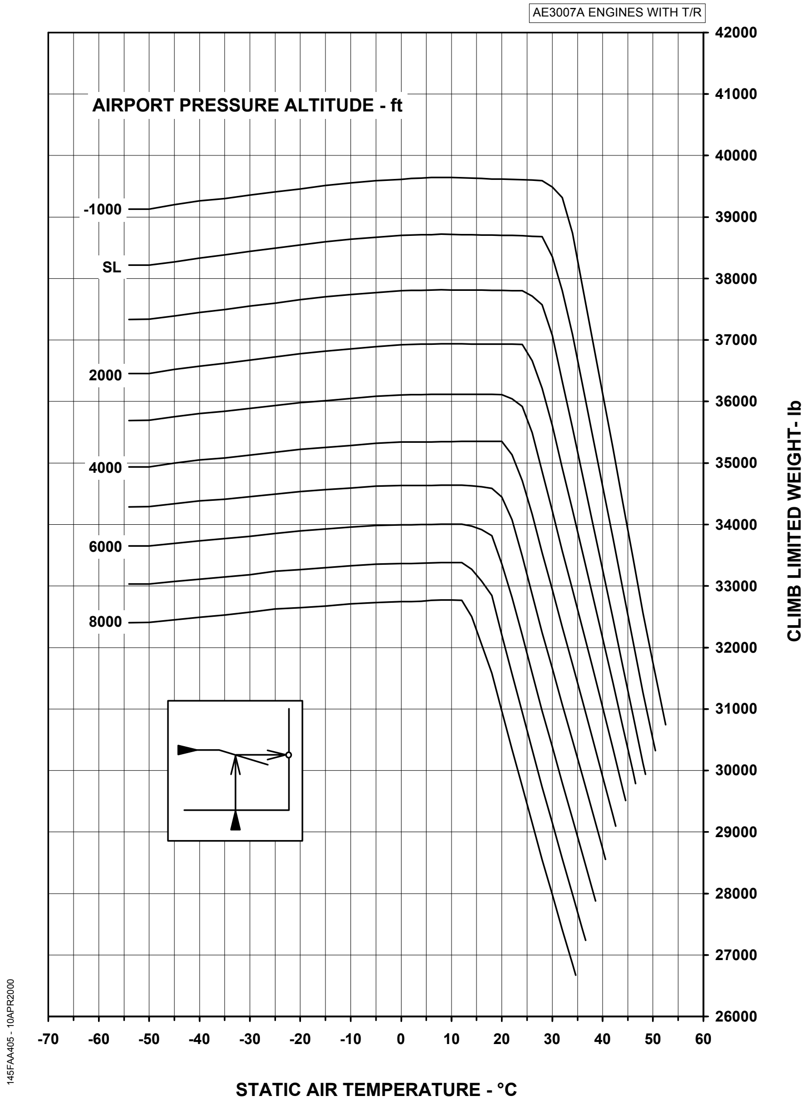
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A OR AE3007A1/1 ENGINES

The following performance charts are applicable for airplanes equipped with AE3007A or AE3007A1/1 engines.

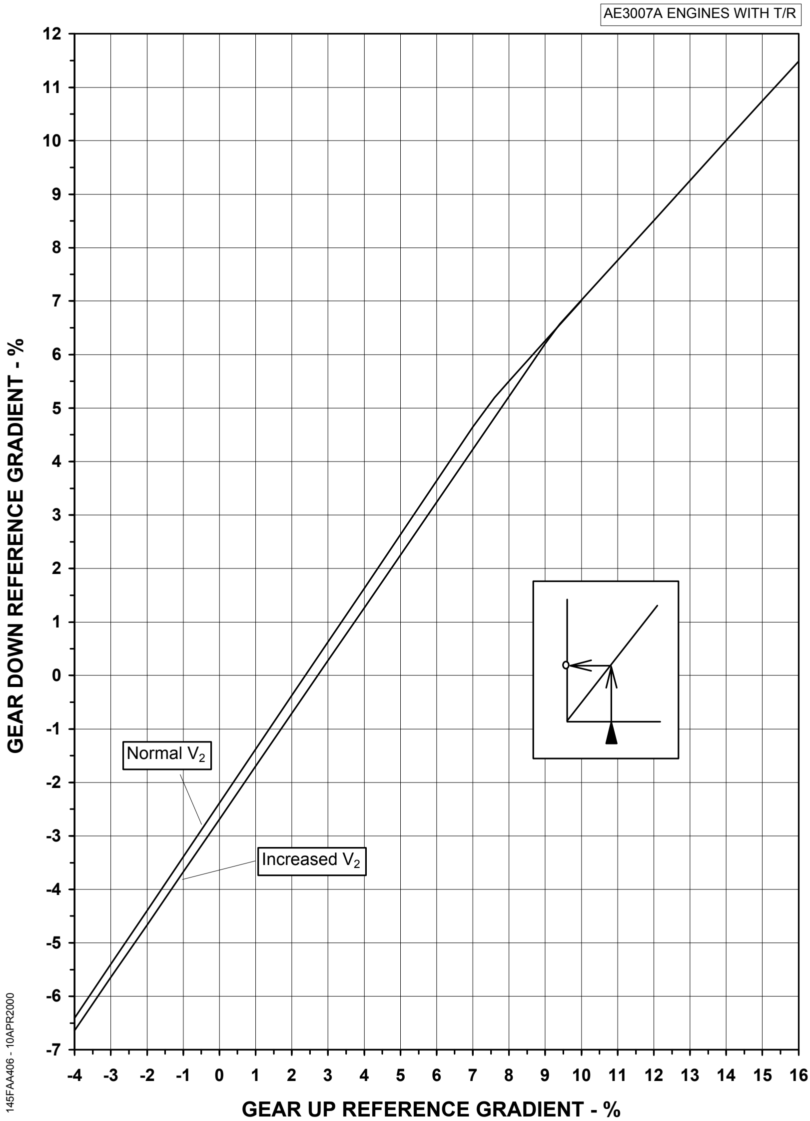
MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

FLAPS 9° - NORMAL V_2 AND INCREASED V_2

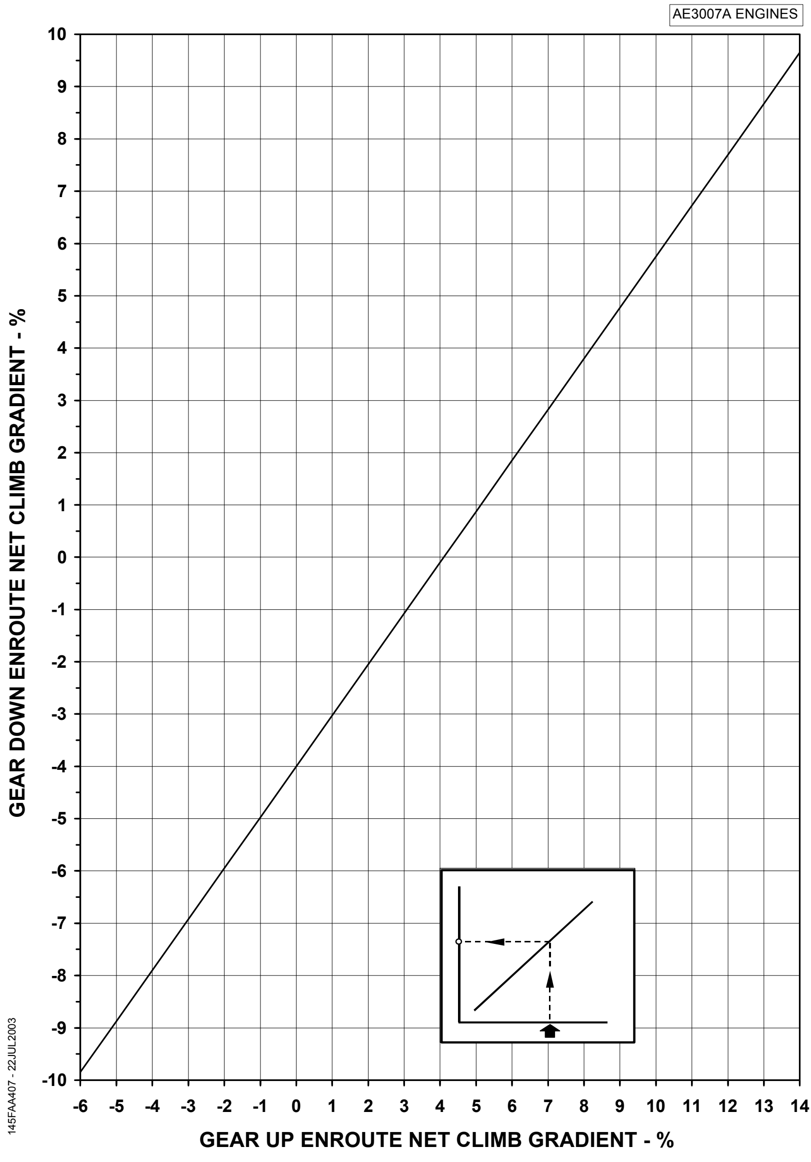
T/O-1 AND ALT T/O-1 MODE - GEAR DOWN - ANTI-ICE OFF



OBSTACLE CLEARANCE REFERENCE GRADIENT CORRECTION
FLAPS 9° - ANTI-ICE OFF

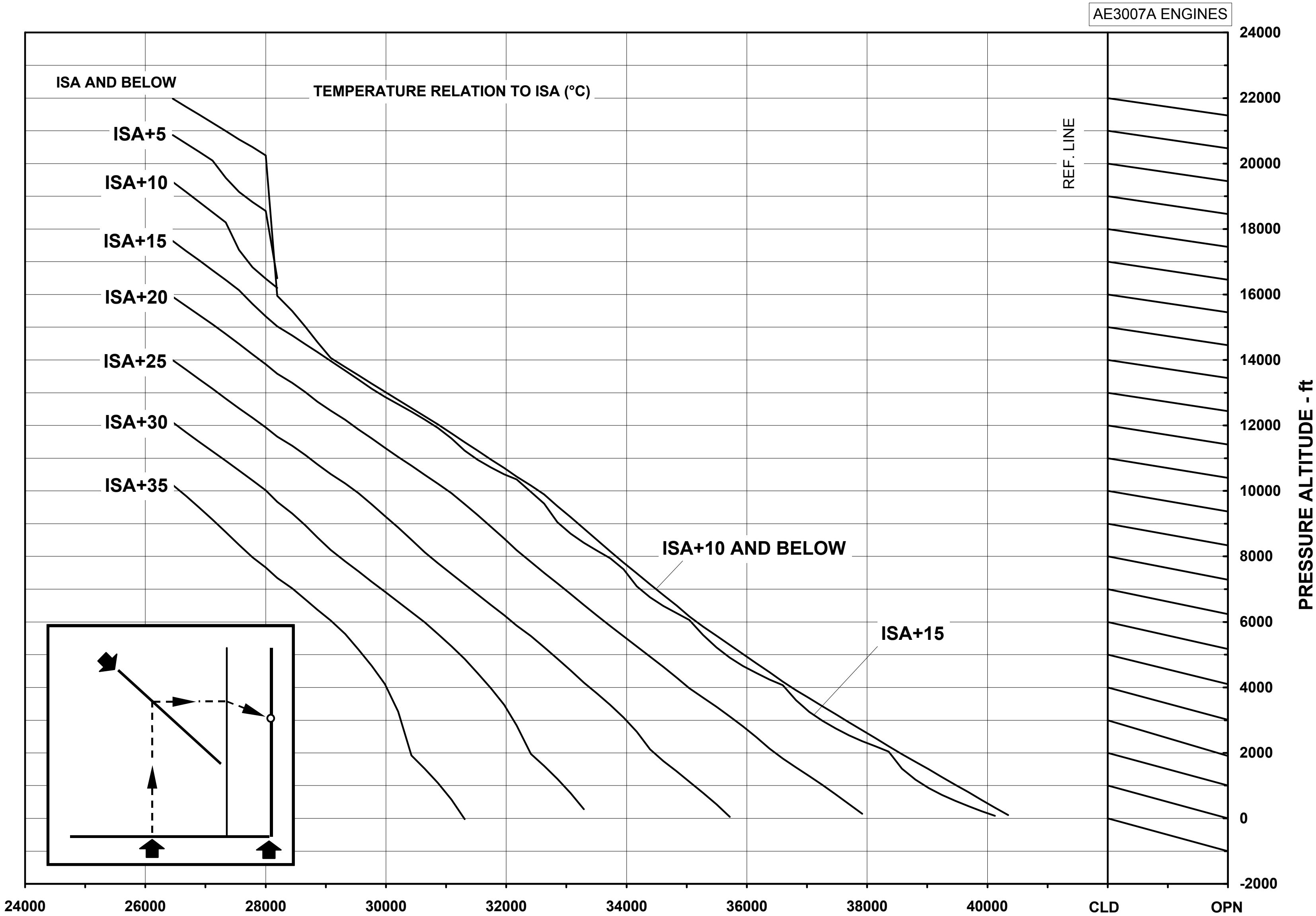


ENROUTE NET CLIMB GRADIENT CORRECTION
ANTI-ICE OFF



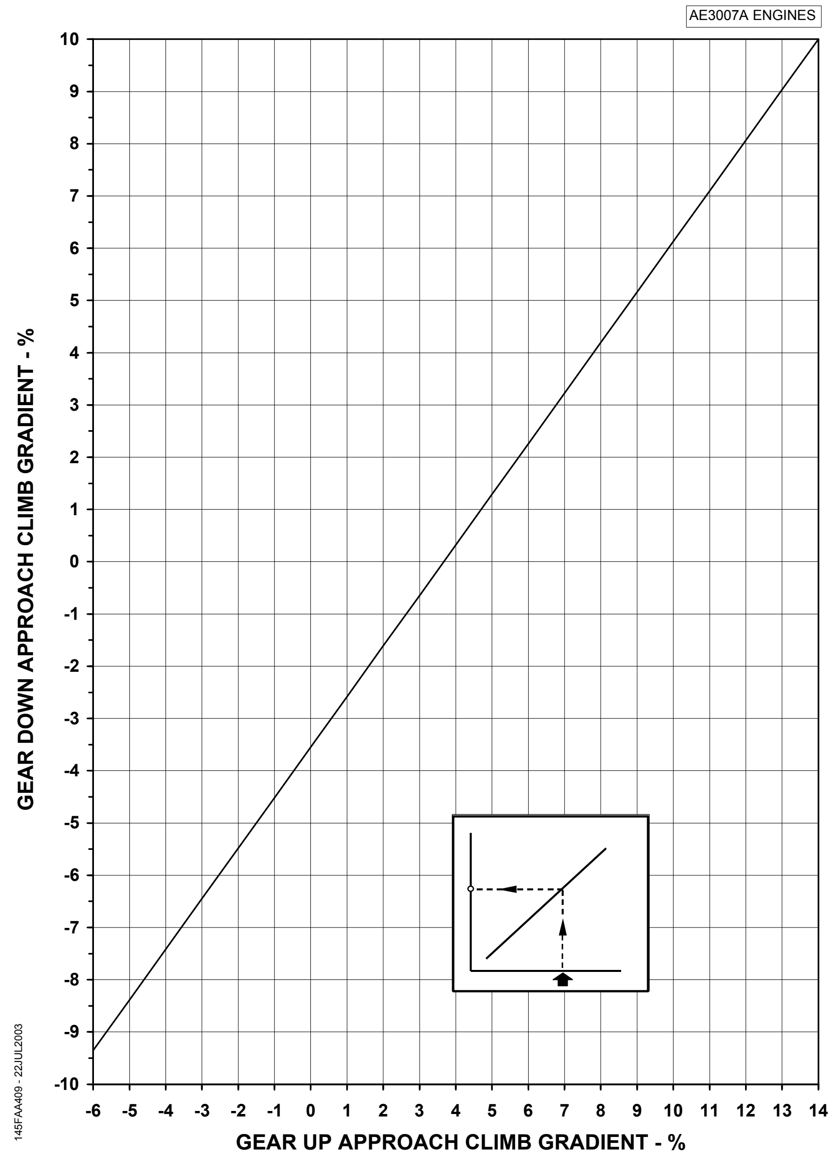
ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - GEAR DOWN - ONE ENGINE INOPERATIVE - ANTI-ICE OFF



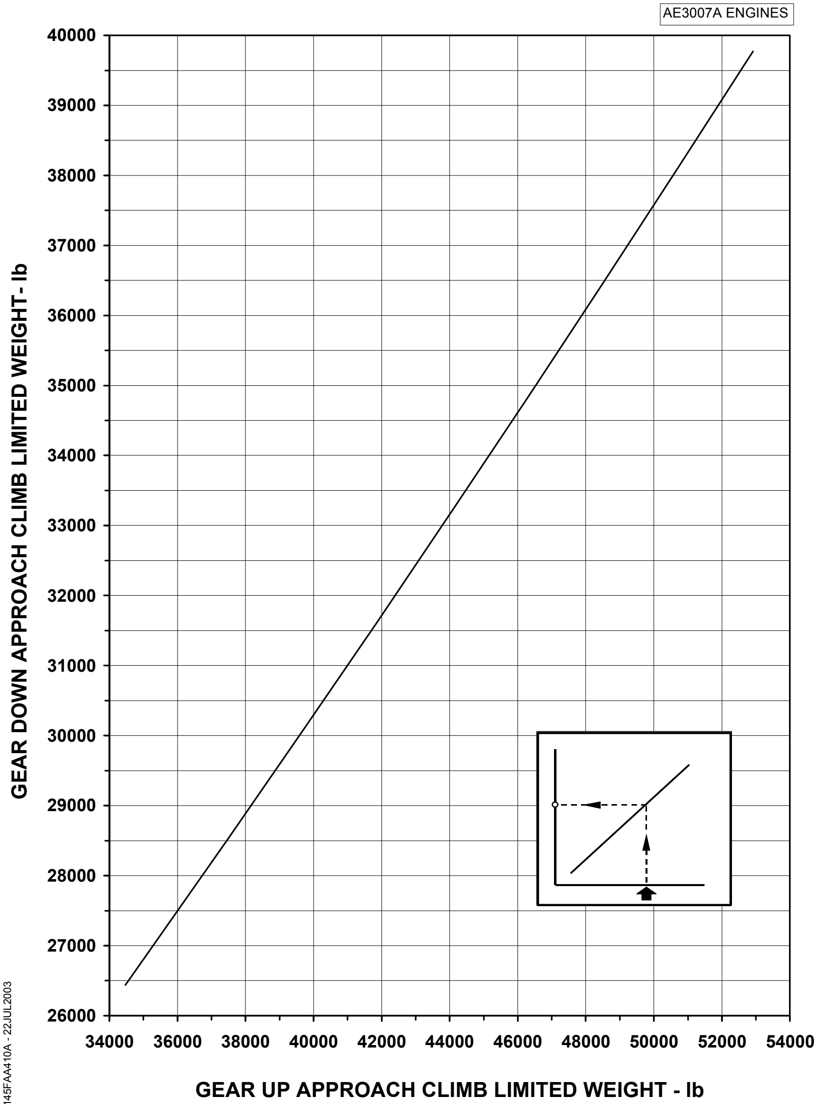
APPROACH CLIMB GRADIENT CORRECTION

ANTI-ICE OFF



MAXIMUM LANDING WEIGHT APPROACH CLIMB LIMITED CORRECTION

ANTI-ICE OFF



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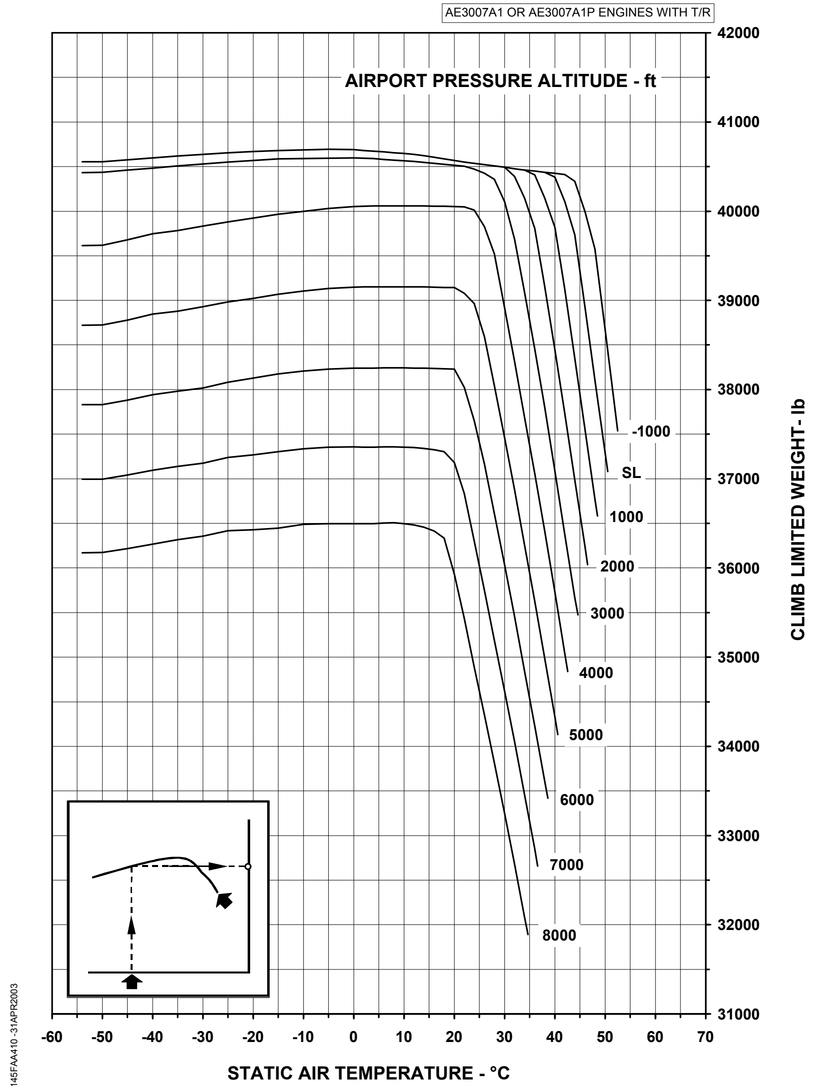
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A1 OR AE3007A1P ENGINES

The following performance charts are applicable for airplanes equipped with AE3007A1 or AE3007A1P engines.

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

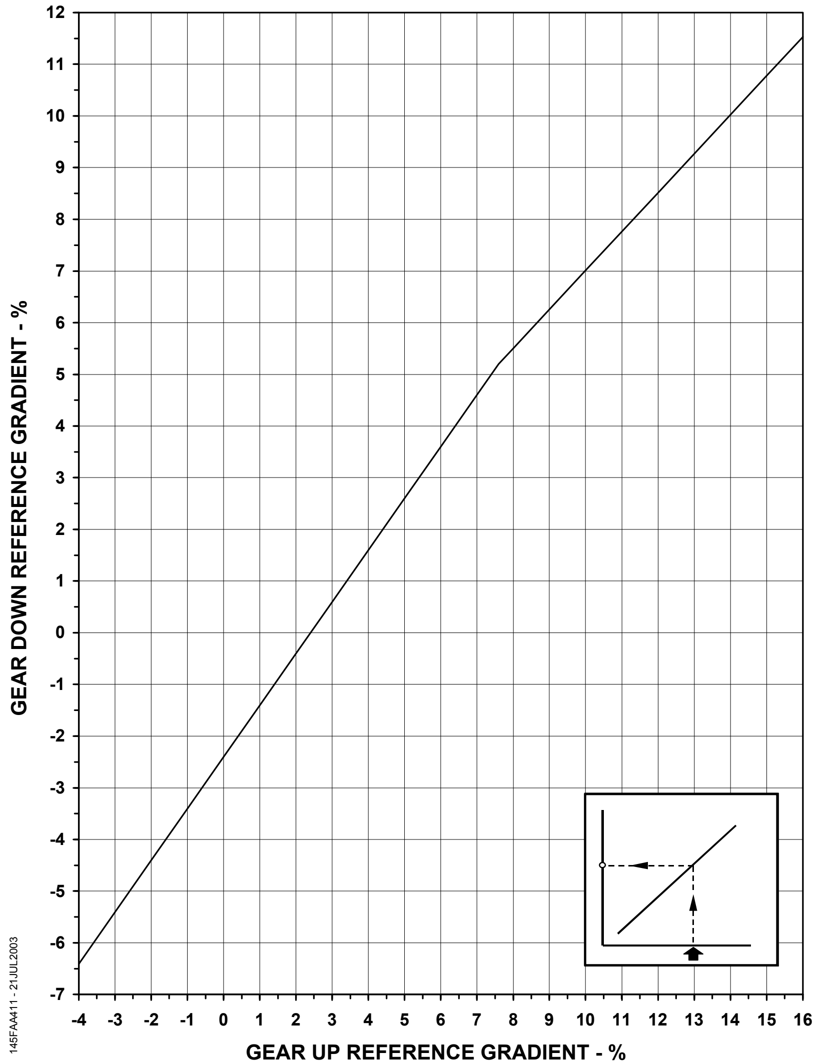
FLAPS 9° - NORMAL V_2 - GEAR DOWN - ANTI-ICE OFF



OBSTACLE CLEARANCE REFERENCE GRADIENT CORRECTION

FLAPS 9° - ANTI-ICE OFF

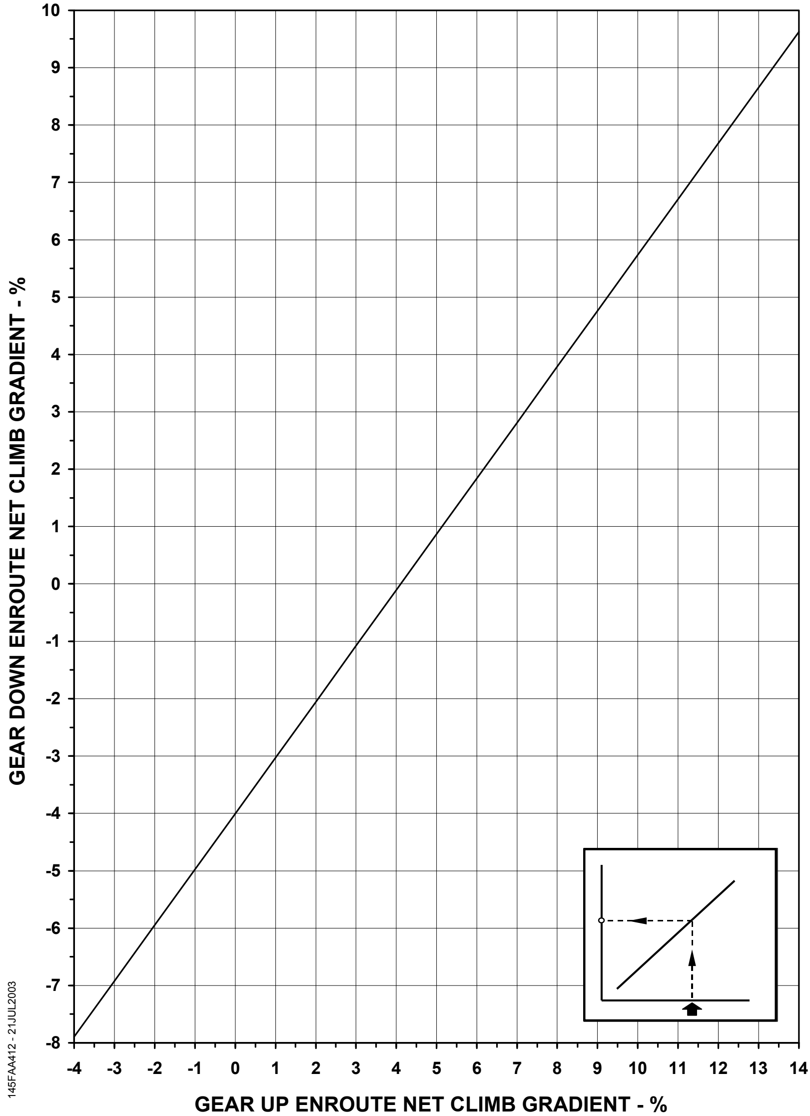
AE3007A1 OR AE3007A1P ENGINES



ENROUTE NET CLIMB GRADIENT CORRECTION

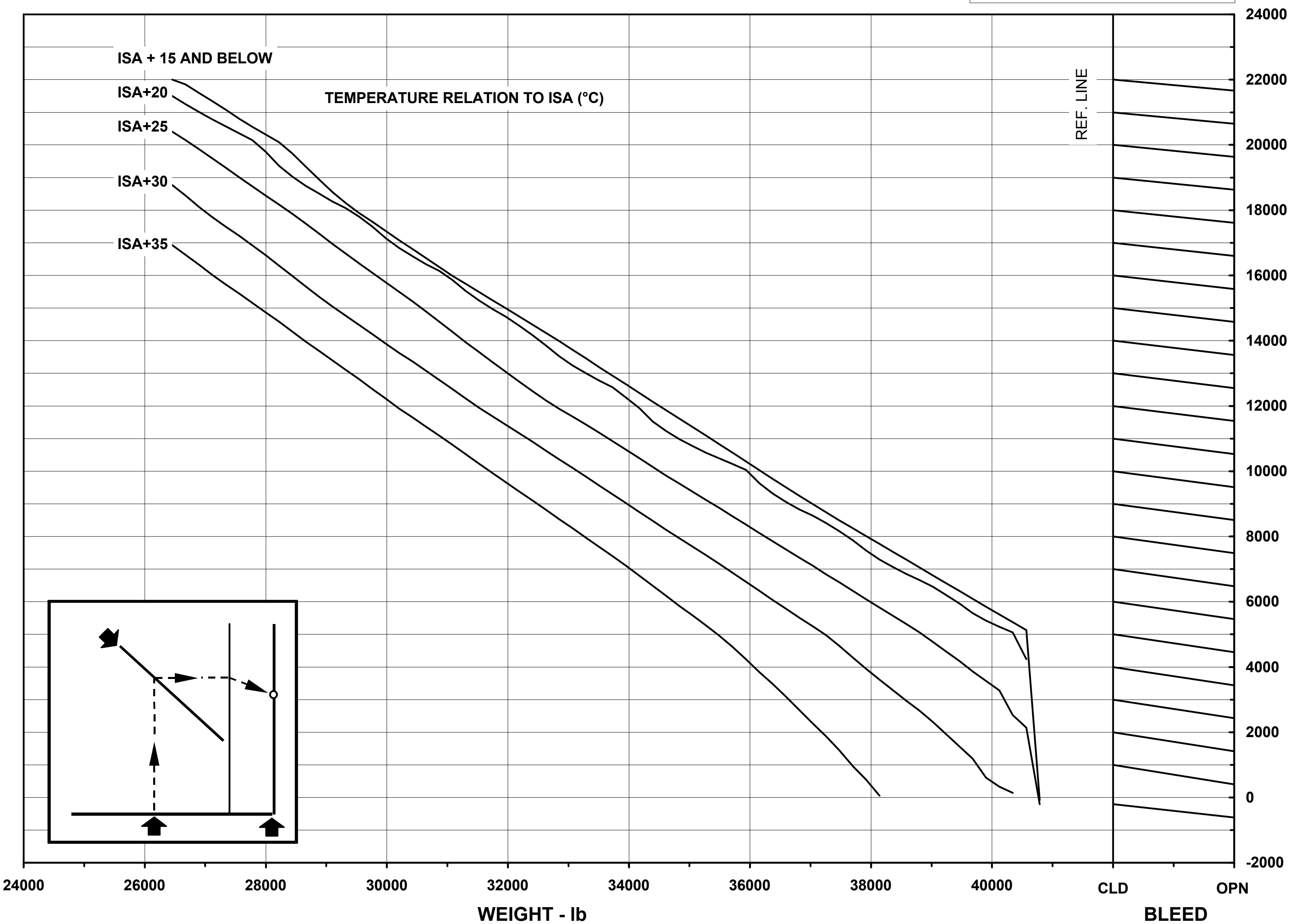
ANTI-ICE OFF

AE3007A1 OR AE3007A1P ENGINES

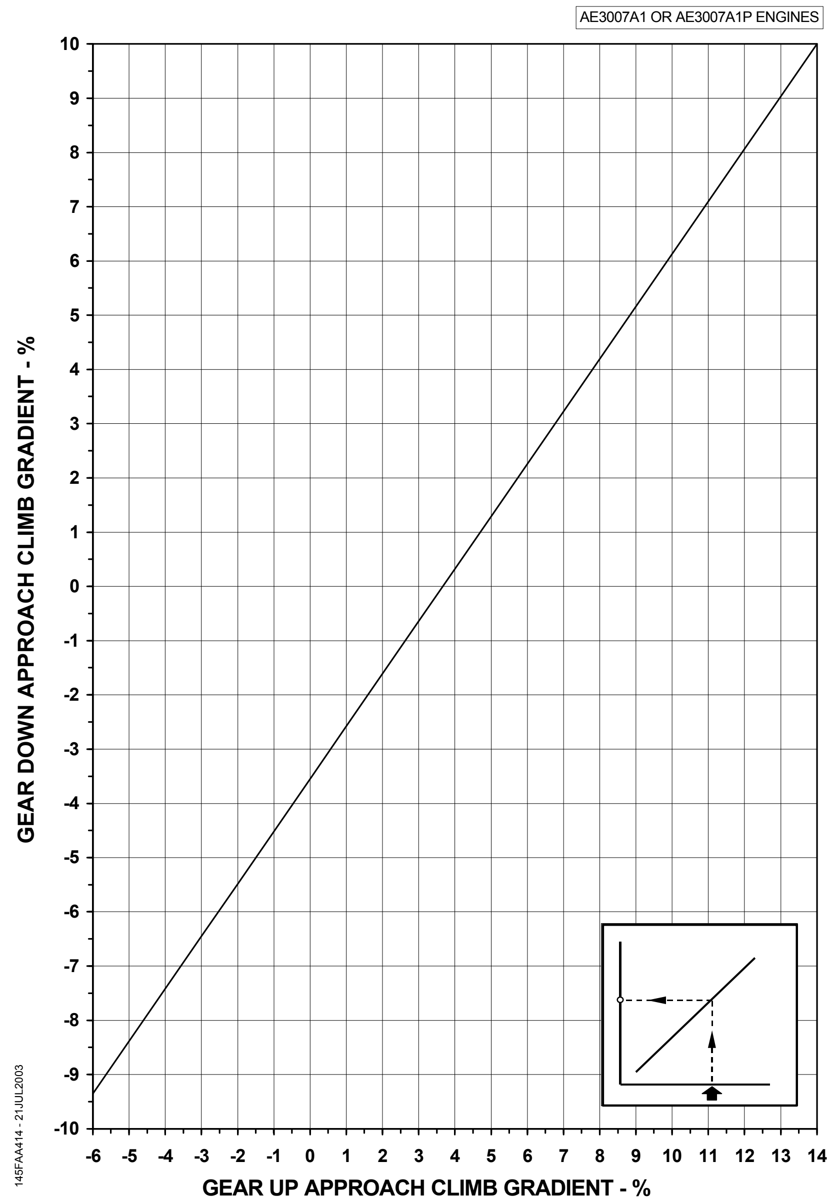


ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT
FLAPS UP - GEAR DOWN - ONE ENGINE INOPERATIVE - ANTI-ICE OFF

AE3007A1 OR AE3007A1P ENGINES



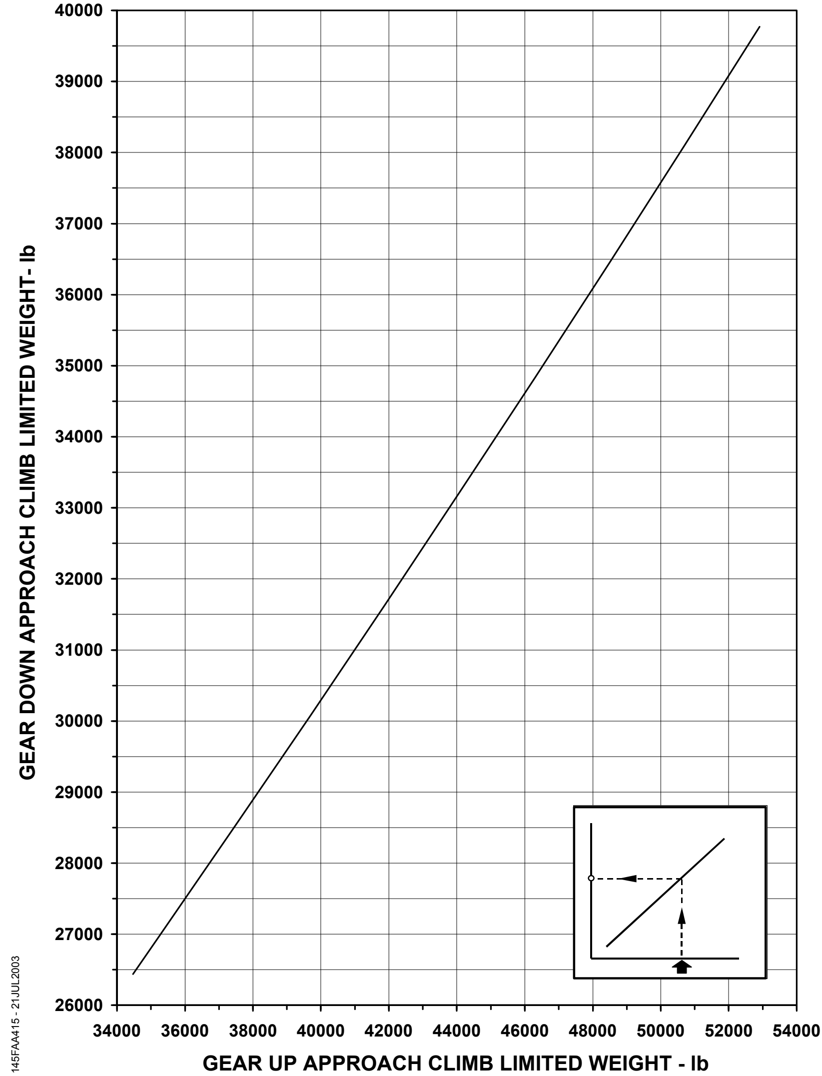
APPROACH CLIMB GRADIENT CORRECTION
ANTI-ICE OFF



MAXIMUM LANDING WEIGHT APPROACH CLIMB LIMITED CORRECTION

ANTI-ICE OFF

AE3007A1 OR AE3007A1P ENGINES



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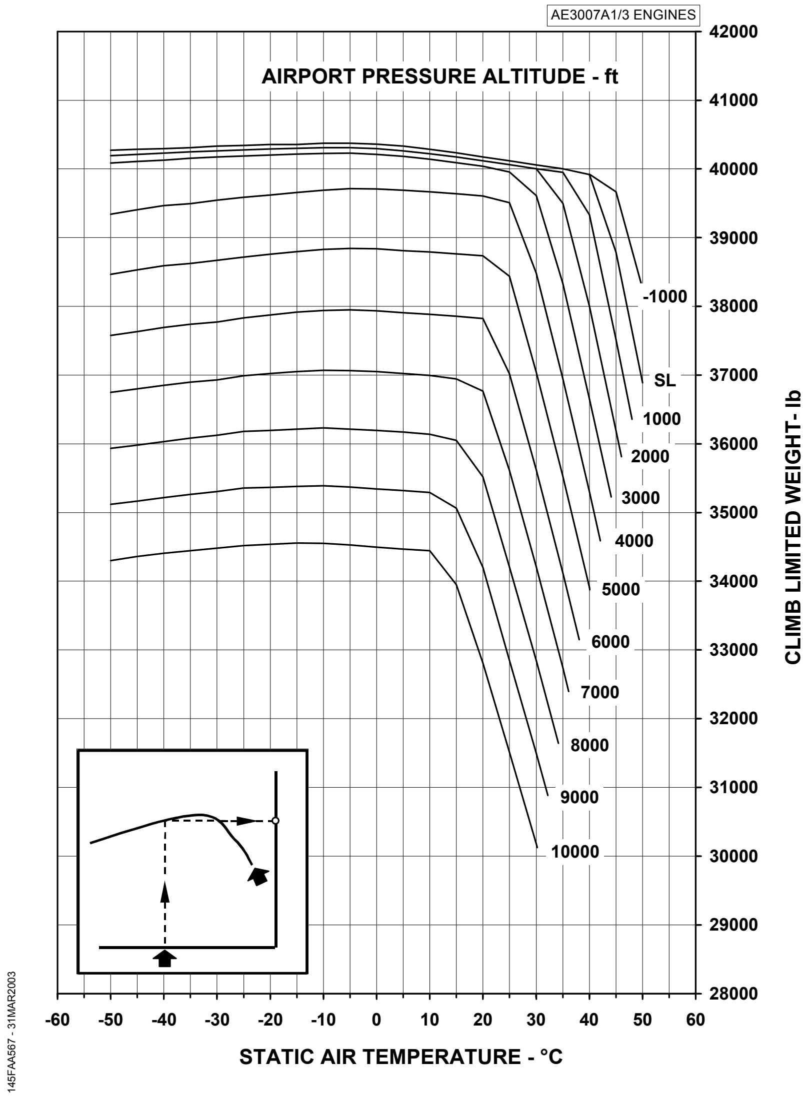
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A1/3 ENGINES

The following performance charts are applicable for airplanes equipped with AE3007A1/3 engines.

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

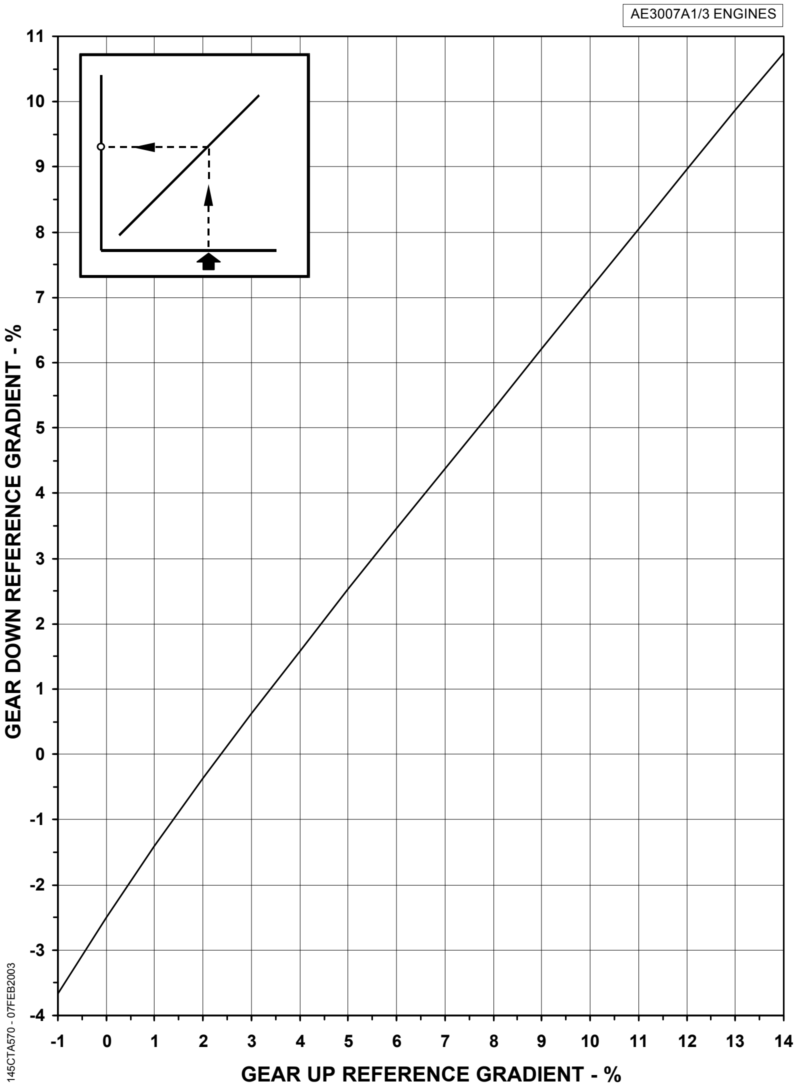
FLAPS 9° - NORMAL V_2

T/O MODE - GEAR DOWN - ANTI-ICE OFF

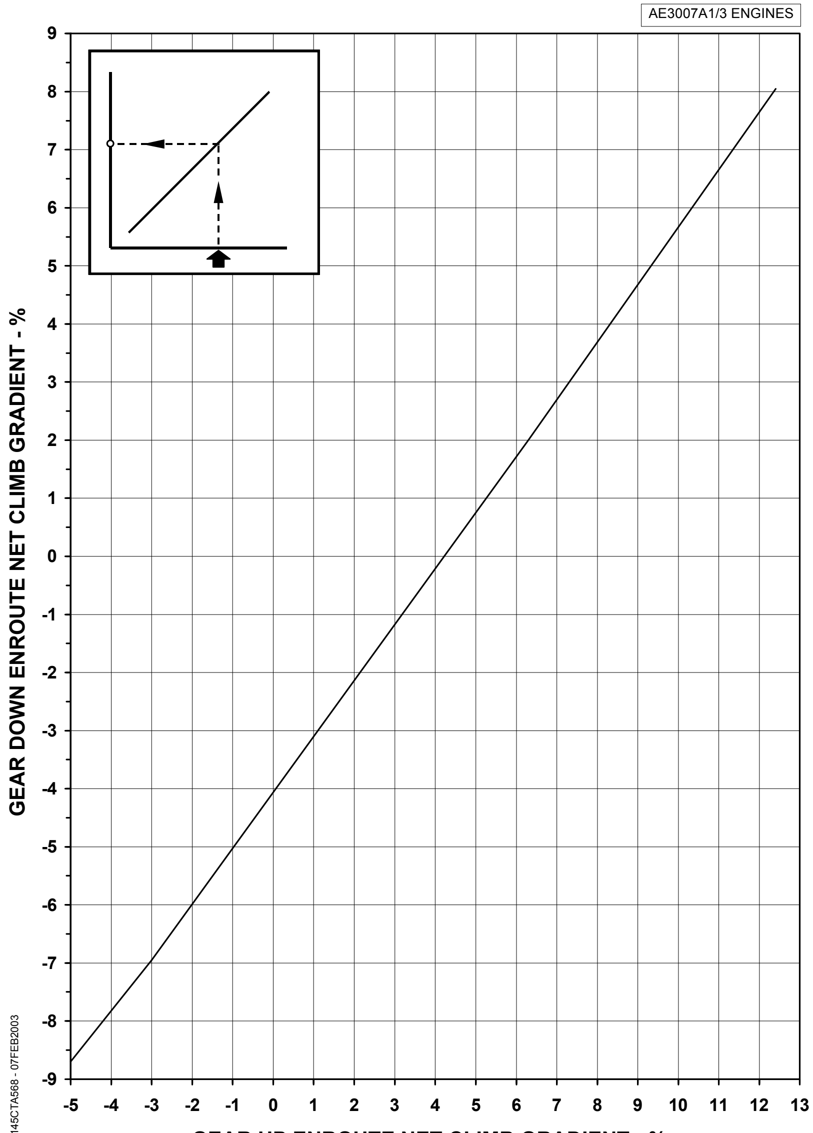


AFM-145/1153 - FAA

OBSTACLE CLEARANCE REFERENCE GRADIENT CORRECTION
FLAPS 9° - ANTI-ICE OFF



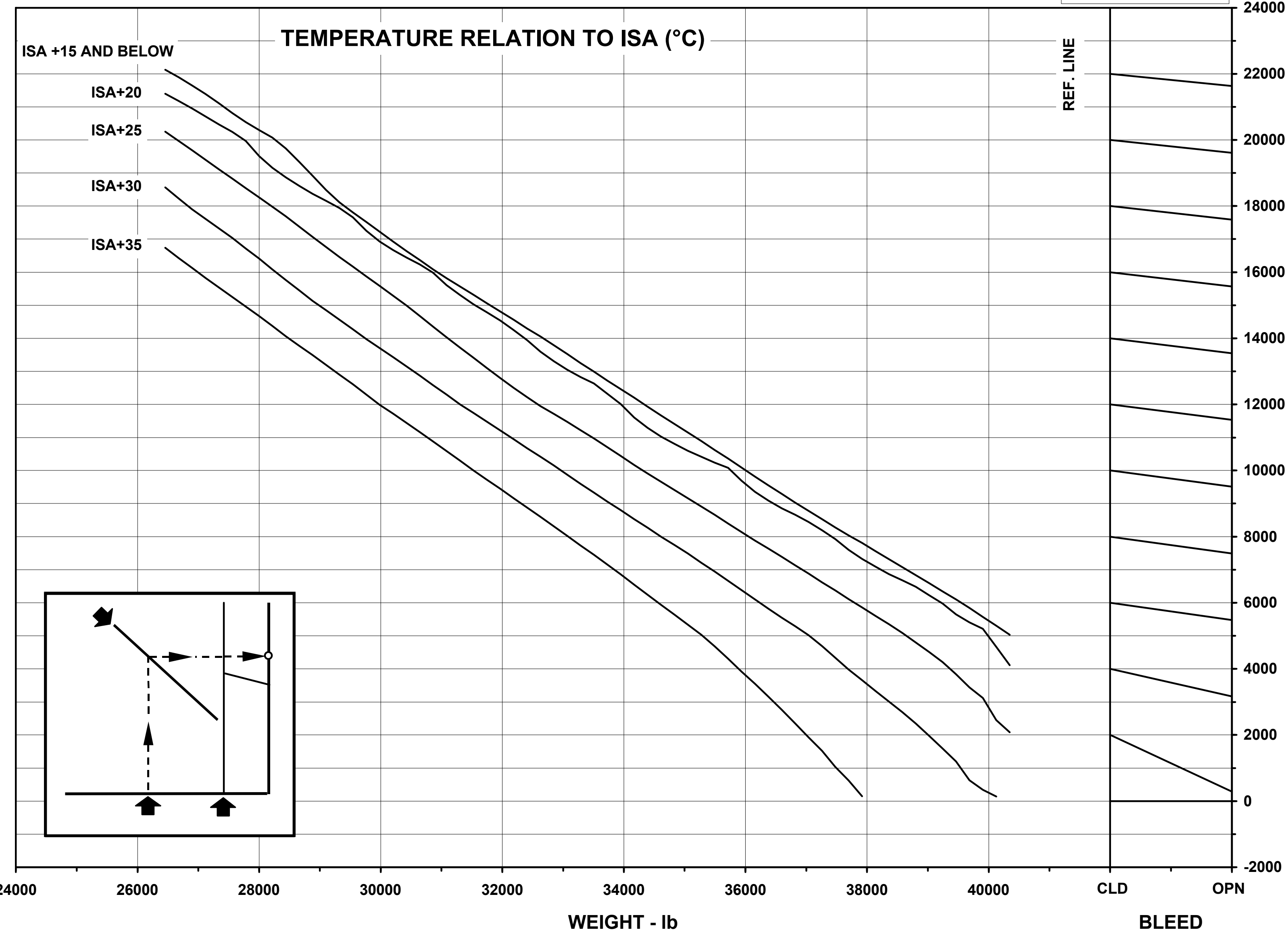
ENROUTE NET CLIMB GRADIENT CORRECTION
ANTI-ICE OFF



AFM-145/1153 - FAA

ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT
FLAPS UP - GEAR DOWN - ONE ENGINE INOPERATIVE - ANTI-ICE OFF

AE3007A1/3 ENGINES



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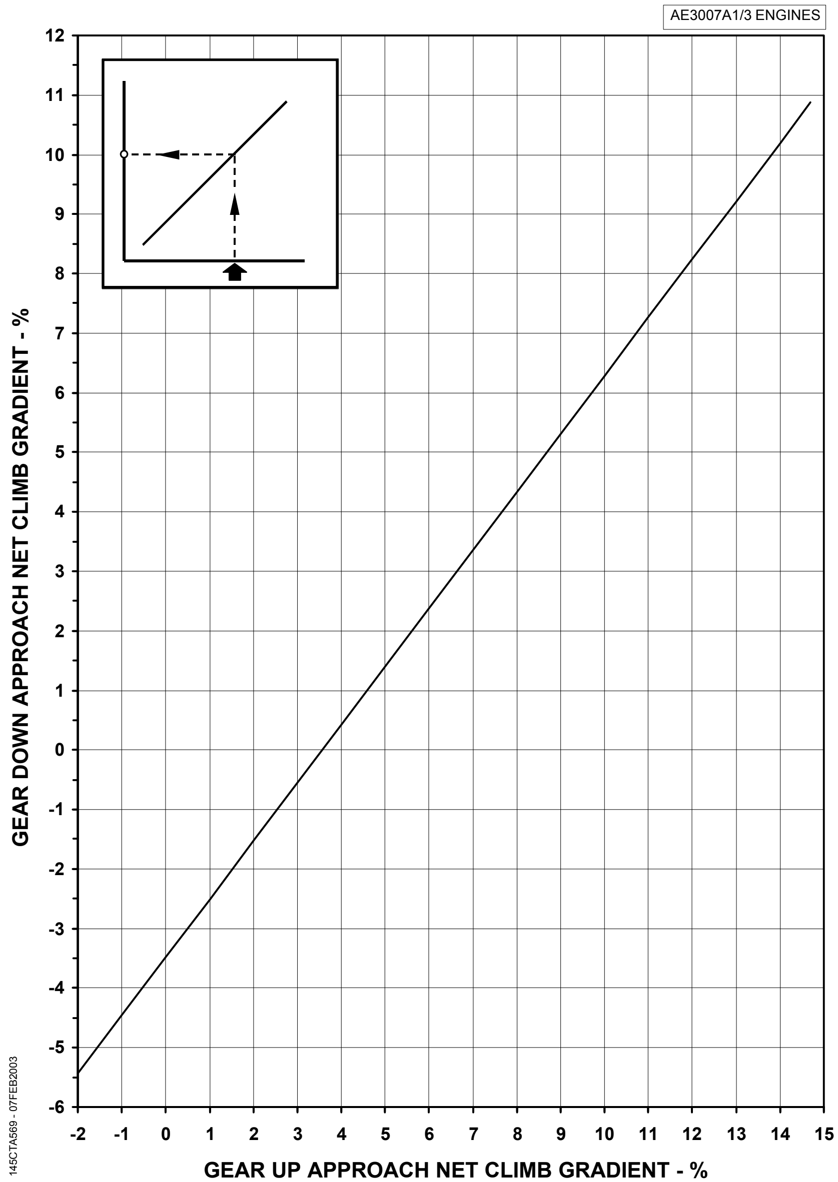
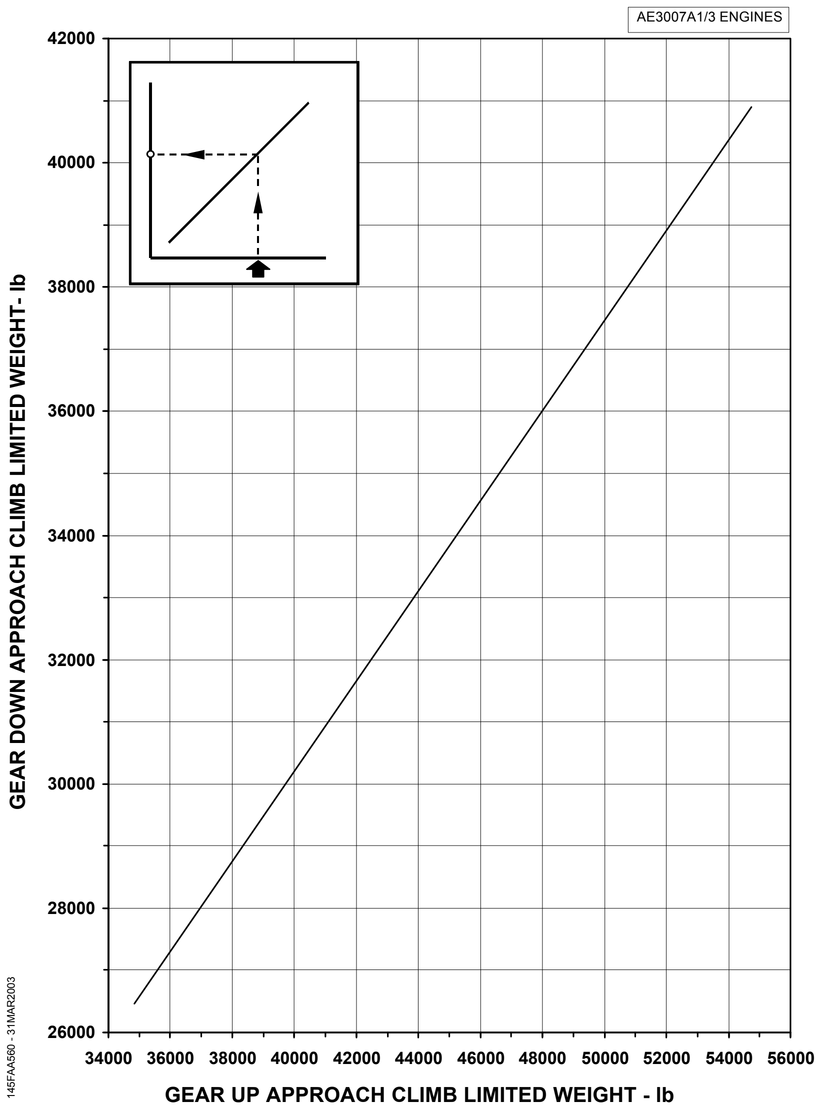
APPROACH CLIMB GRADIENT CORRECTION
ANTI-ICE OFF



MAXIMUM LANDING WEIGHT APPROACH CLIMB LIMITED CORRECTION

ANTI-ICE OFF



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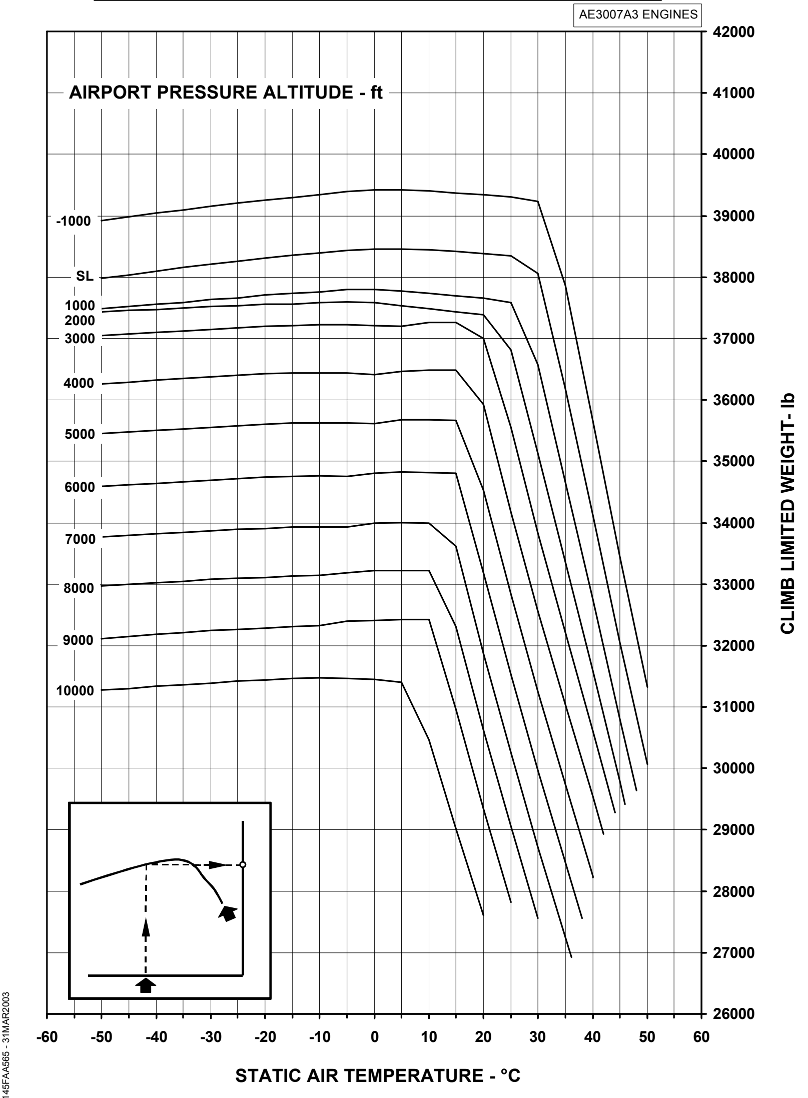
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A3 ENGINES

The following performance charts are applicable for airplanes equipped with AE3007A3 engines.

MAXIMUM TAKEOFF WEIGHT - CLIMB LIMITED

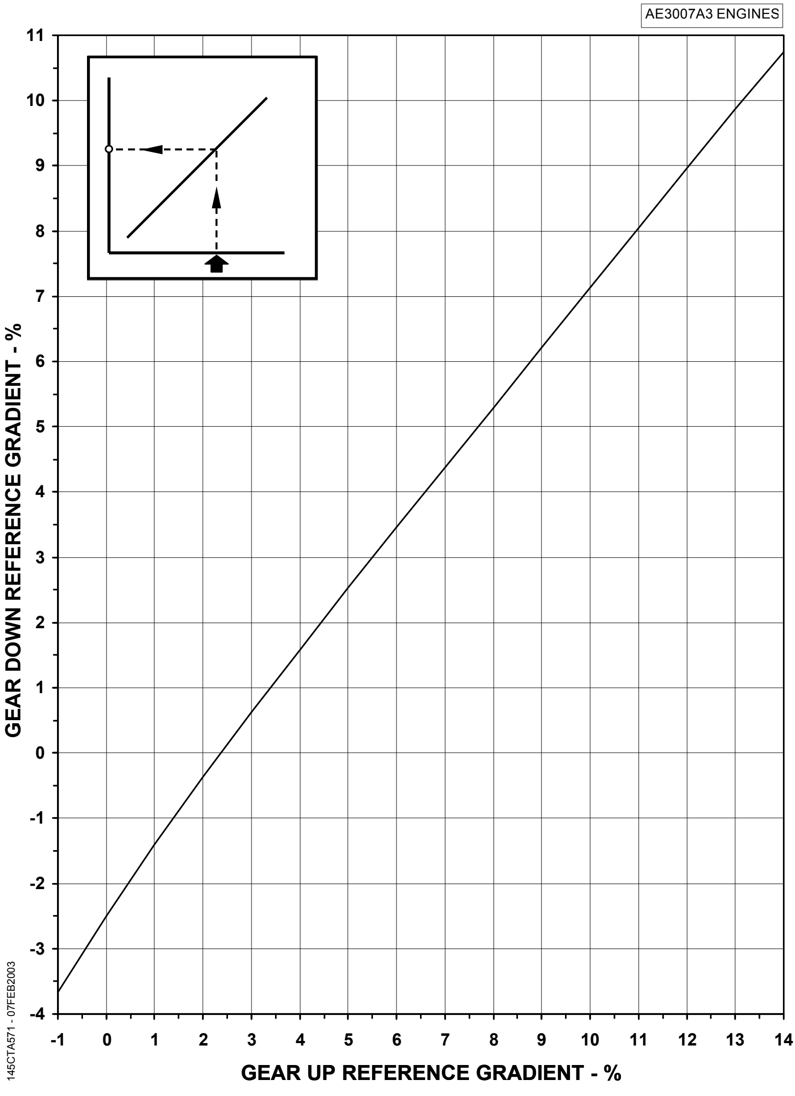
FLAPS 9° - NORMAL V_2

T/O-1 AND ALT T/O-1 MODE - GEAR DOWN - ANTI-ICE OFF



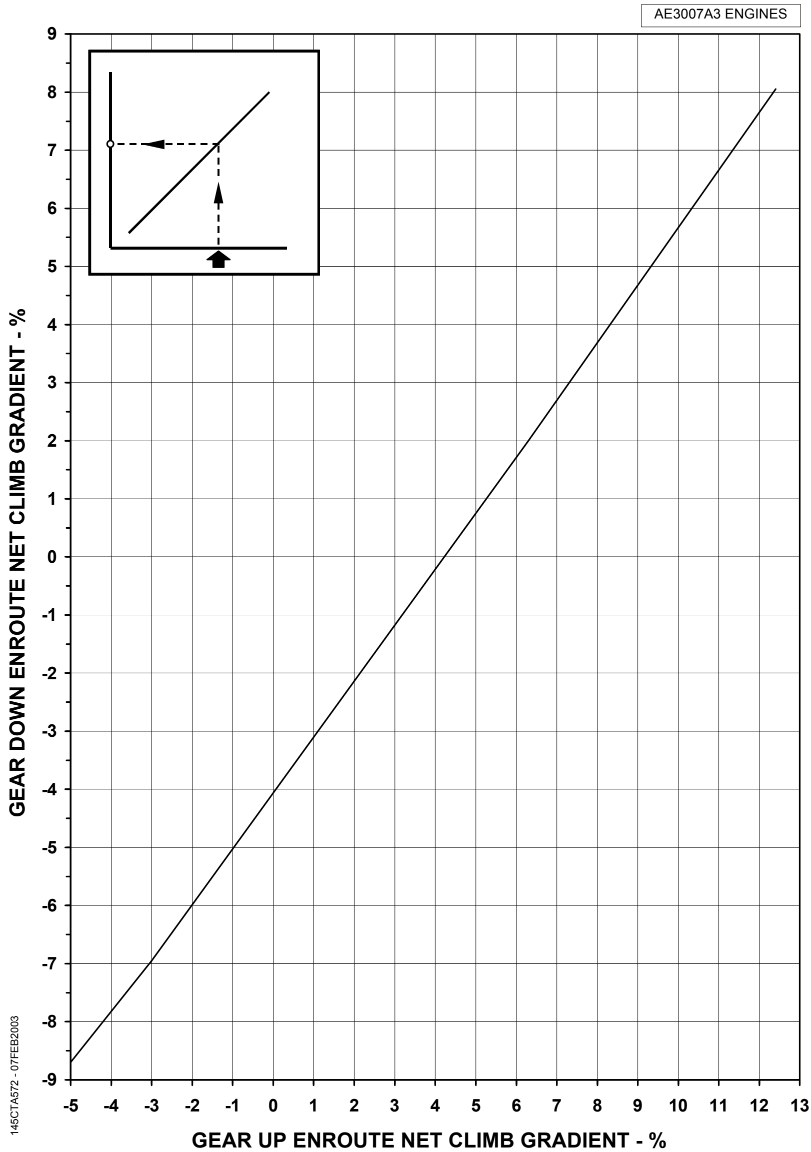
OBSTACLE CLEARANCE REFERENCE GRADIENT CORRECTION

FLAPS 9° - ANTI-ICE OFF



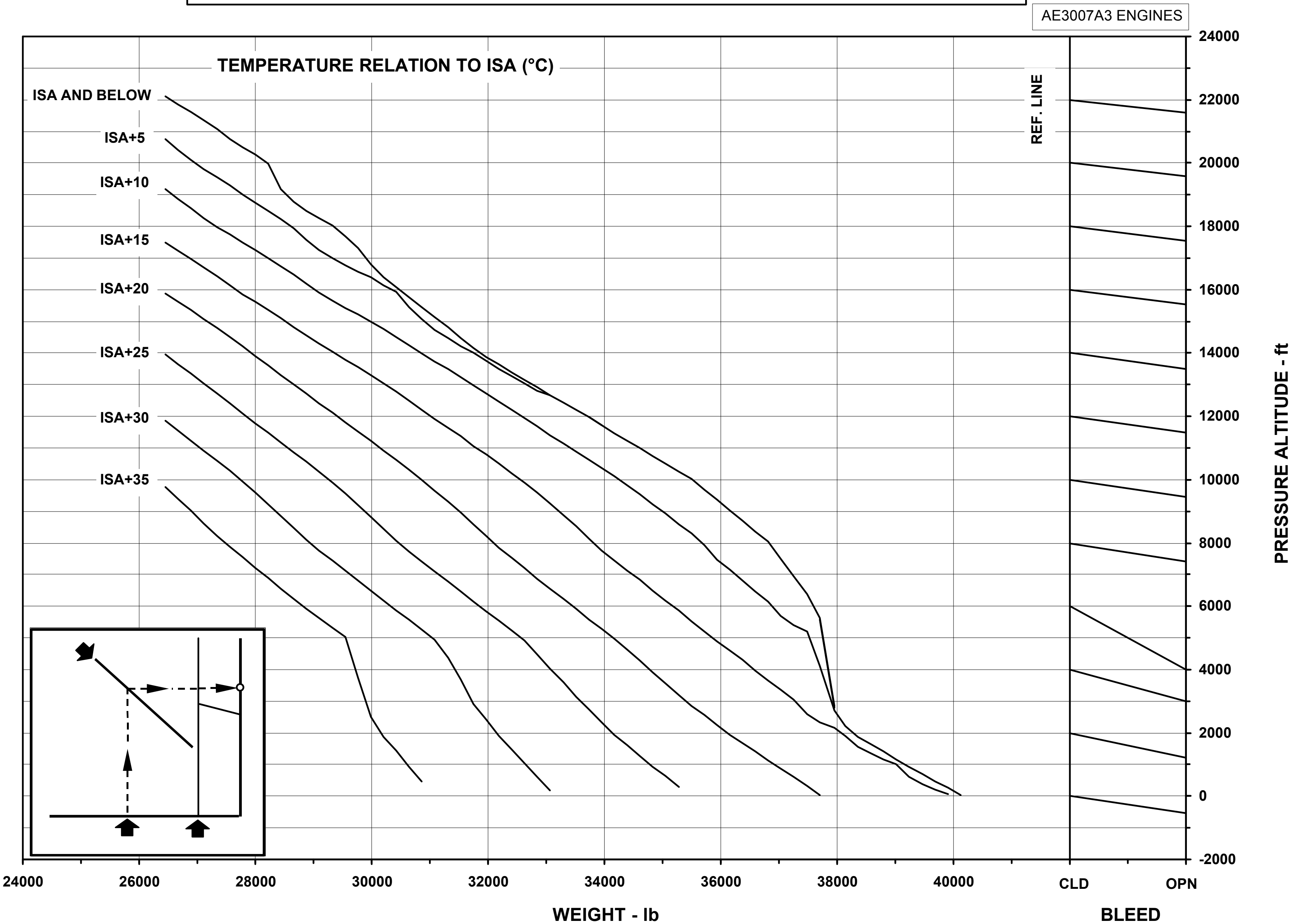
ENROUTE NET CLIMB GRADIENT CORRECTION

ANTI-ICE OFF



ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - GEAR DOWN - ONE ENGINE INOPERATIVE - ANTI-ICE OFF



APPROACH CLIMB GRADIENT CORRECTION

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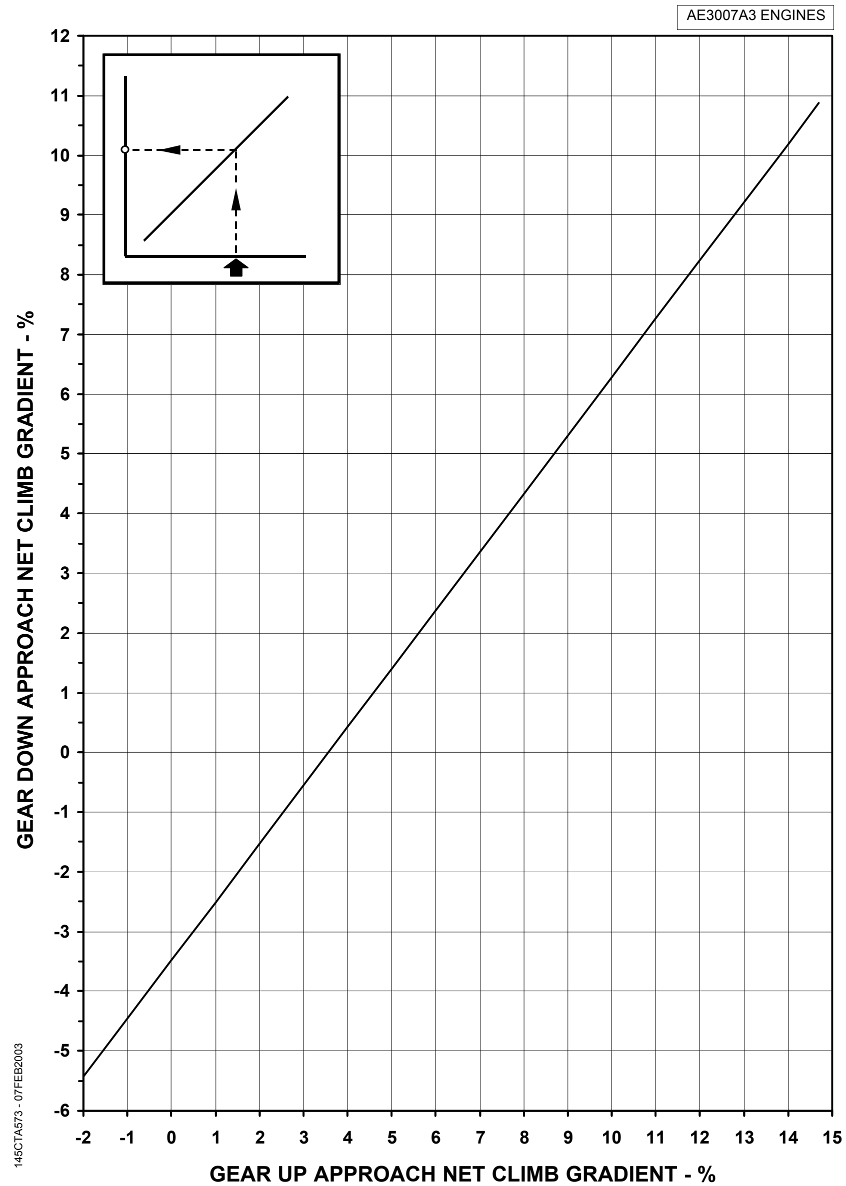
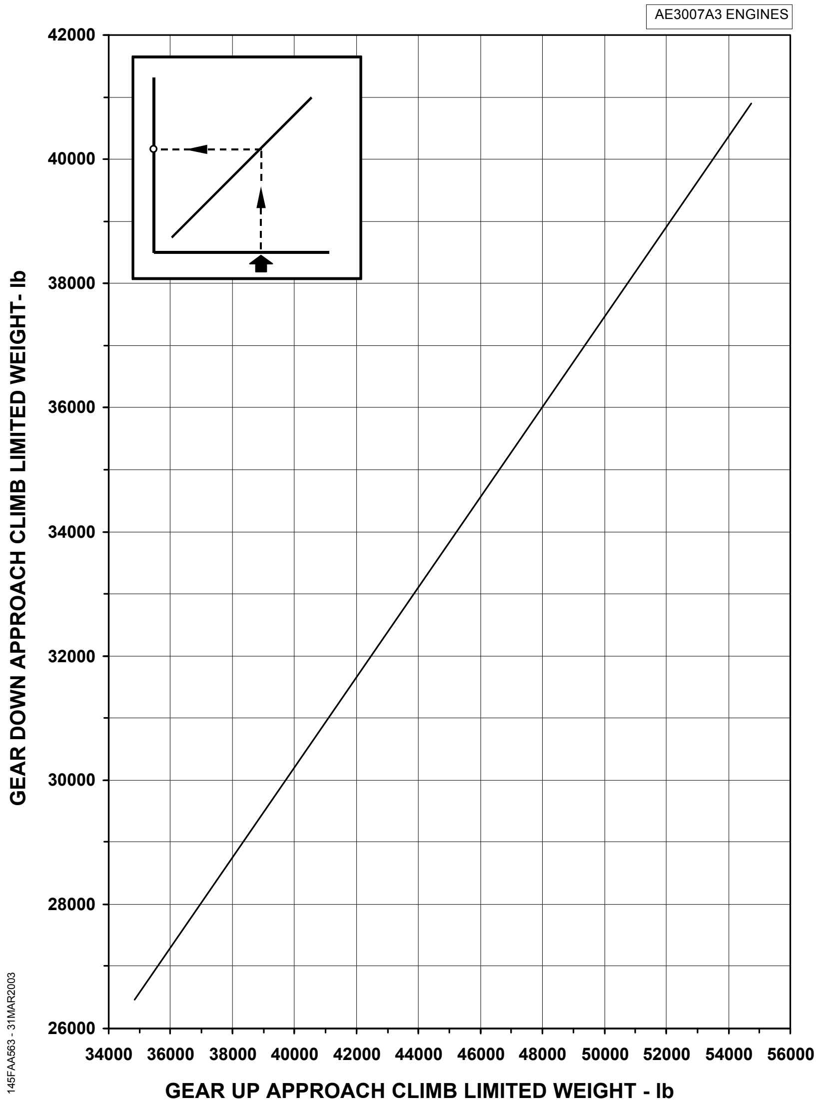


MAXIMUM LANDING WEIGHT APPROACH CLIMB LIMITED CORRECTION
ANTI-ICE OFF



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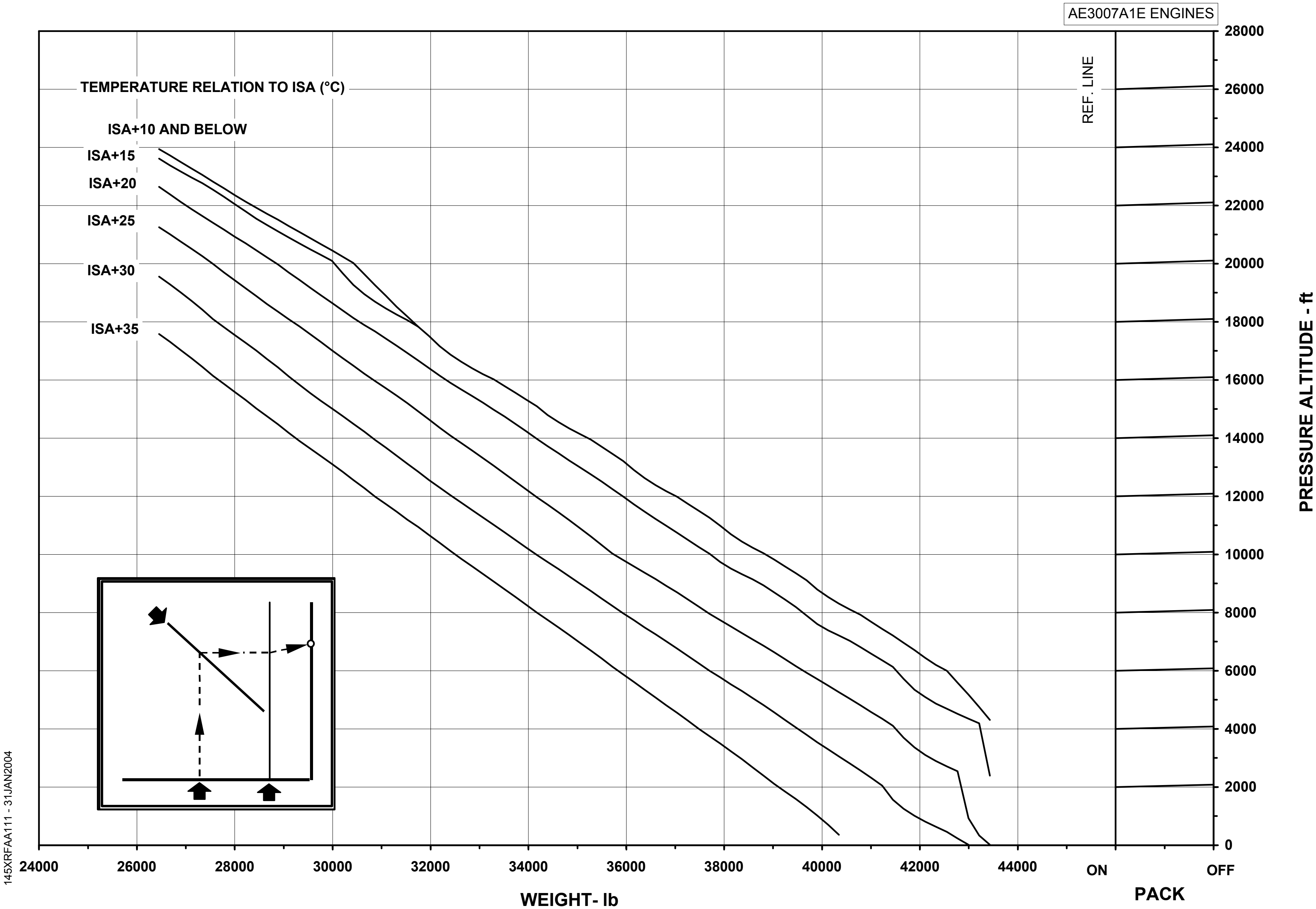
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A1E ENGINES

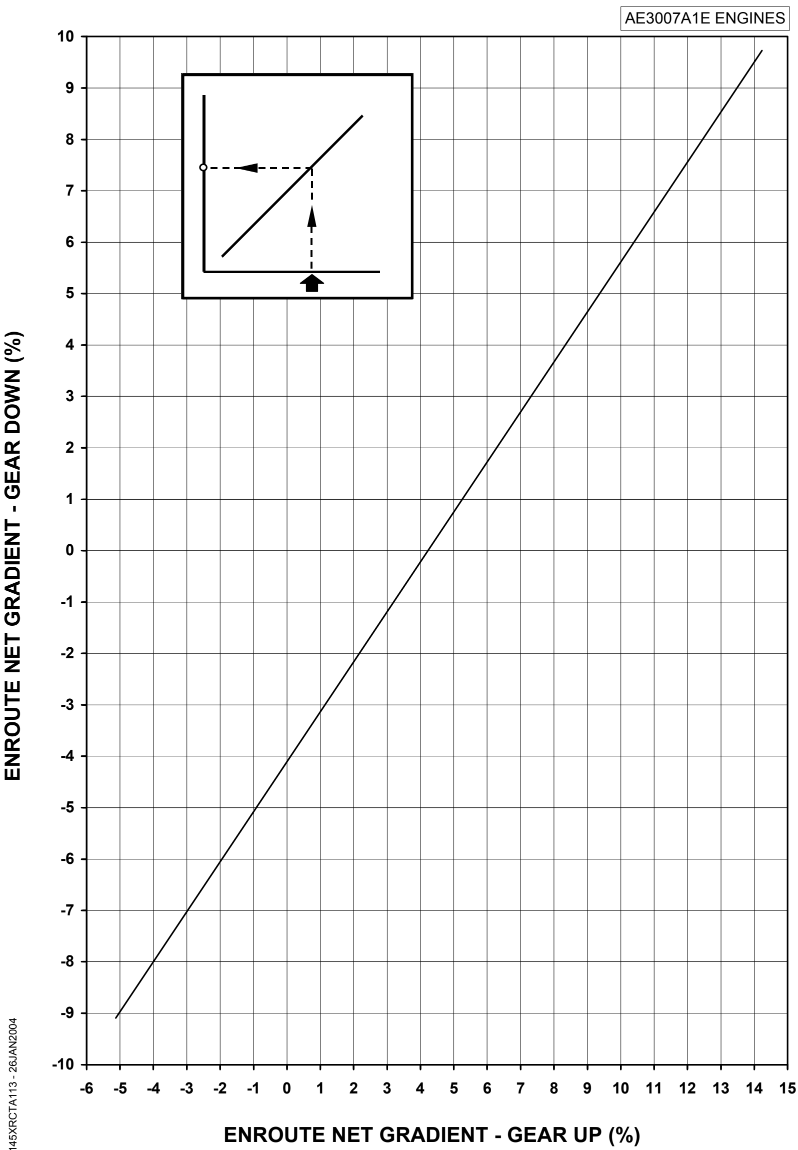
The following performance charts are applicable for airplanes equipped with AE3007A1E engines.

ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

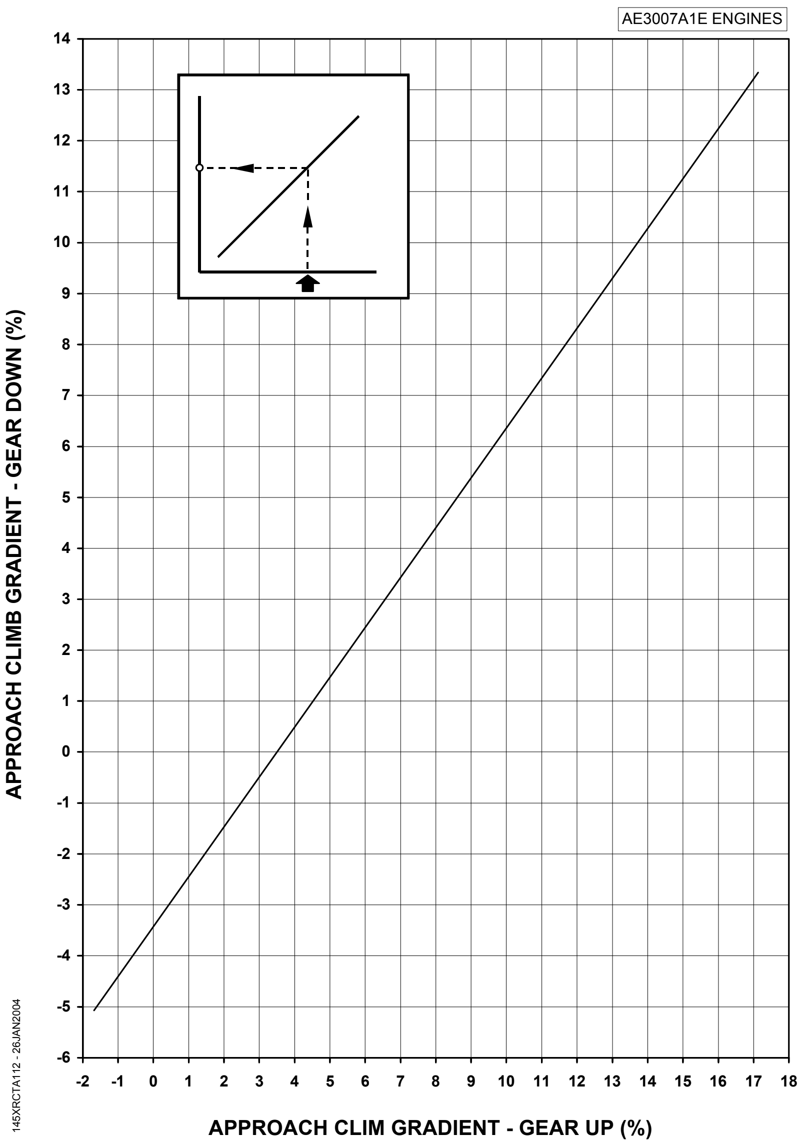
FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF



ENROUTE NET GRADIENT CORRECTION
ANTI-ICE OFF

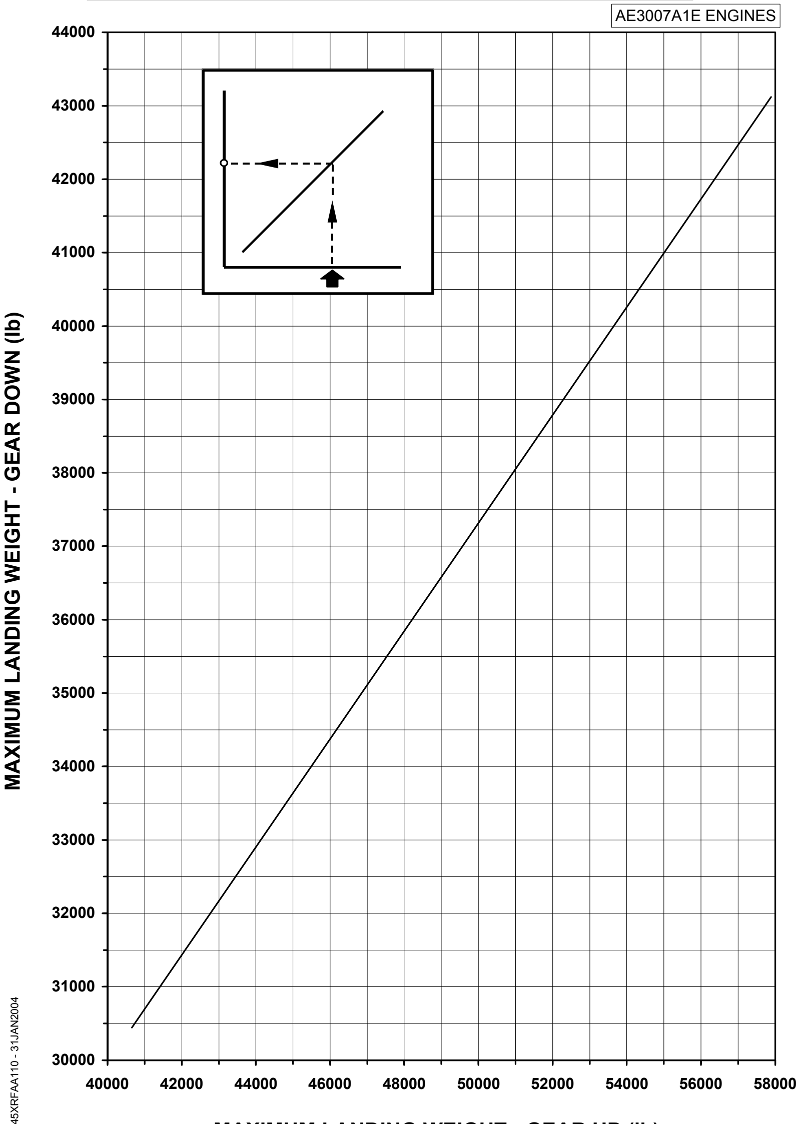


APPROACH CLIMB GRADIENT CORRECTION
APPROACH FLAPS 9° - ANTI-ICE OFF



MAXIMUM LANDING WEIGHT CORRECTION APPROACH CLIMB LIMITED

ANTI-ICE OFF



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SUPPLEMENT 23

LIST OF EFFECTIVE PAGES

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REVISION..................1 to 54 .... Not Applicable
REVISION..................... 55................NOV 27, 2002
REVISION..................... 56................OCT 21, 2003
REVISION..................... 57................ JUN 17, 2004

* Asterisk indicates pages revised, added or deleted by the current revision.

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OPERATION WITH ENGINE ANTI-ICE VALVE LOCKED OPEN

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GENERAL

This supplement is provided to present the performance data for airplane dispatch with the engine anti-ice valves locked open, as permitted by MMEL.
Takeoff performance is computed through the ETOASG software (Version 18.30/6.05 or later approved version) while Enroute and Landing performance data is presented in this supplement.
The information presented in this Supplement, associated with the basic AFM, enables the establishment of the conditions required to accomplish the flight with the engine anti-ice valve locked open.
For limitations, procedures and performance information not contained in this Supplement, refer to the basic AFM.

LIMITATIONS

POWER PLANT

ENGINES

Two Rolls-Royce AE3007A or AE3007A1/1 or AE3007A1 or AE3007A1P or AE3007A1E or AE3007A1/3 engines.
The AE3007A and AE3007A1/1 engines intermix operation is also permitted.

TAKEOFF THRUST MODE

Only T/O-1 Mode is allowed for takeoff with engine anti-ice valve locked open for AE3007A or AE3007A1/1 or AE3007A1 engines.
Only T/O Mode is allowed for takeoff with engine anti-ice valve locked open for AE3007A1P or AE3007A1/3 engines.
T/O and E T/O Modes are allowed for takeoff with engine anti-ice valve locked open for AE3007A1E engines.

EMERGENCY AND ABNORMAL PROCEDURES

The Emergency and Abnormal Procedures remain unchanged.

NORMAL PROCEDURES

The Normal Procedures remain unchanged.

PERFORMANCE

The performance data presented in this section must replace or complement the equivalent data contained in the basic AFM and in the Supplements related to the associated engines, as applicable.
Unless otherwise specified, the performance charts presented in this Supplement must be used in the same way as in the basic AFM.
Takeoff performance is not presented in this supplement and must be computed through ETOASG software.
For performance with all engines operative both engine anti-ice valves are considered to be locked open.
The following charts are presented in this Supplement:

- ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE - Two charts are provided, according to the following options for flaps up:
  - ANTI-ICE ON.
  - ANTI-ICE OFF.
- ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT - Two charts are provided, according to the following options for flaps up:
  - ANTI-ICE ON.
  - ANTI-ICE OFF.
- APPROACH CLIMB GRADIENT - Two charts are provided according to the following options for flaps 9°:
  - ANTI-ICE ON.
  - ANTI-ICE OFF.
- LANDING CLIMB GRADIENT - Charts are provided according to the following options for flaps 22° and 45°:
  - ANTI-ICE ON.
  - ANTI-ICE OFF.
- MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED - Two charts are provided according to the following options:
  - ANTI-ICE ON.
  - ANTI-ICE OFF.
- MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED - Charts are provided according to the following options for flaps 22° and 45°:
  - ANTI-ICE ON.
  - ANTI-ICE OFF.

NOTE: For the Rolls-Royce AE3007A1/3 engines the Maximum Landing Weight - Landing Climb Limited for landing flaps 22° (anti-ice on and off) is always above the maximum structural landing weight and is not presented herein.

PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A ENGINES

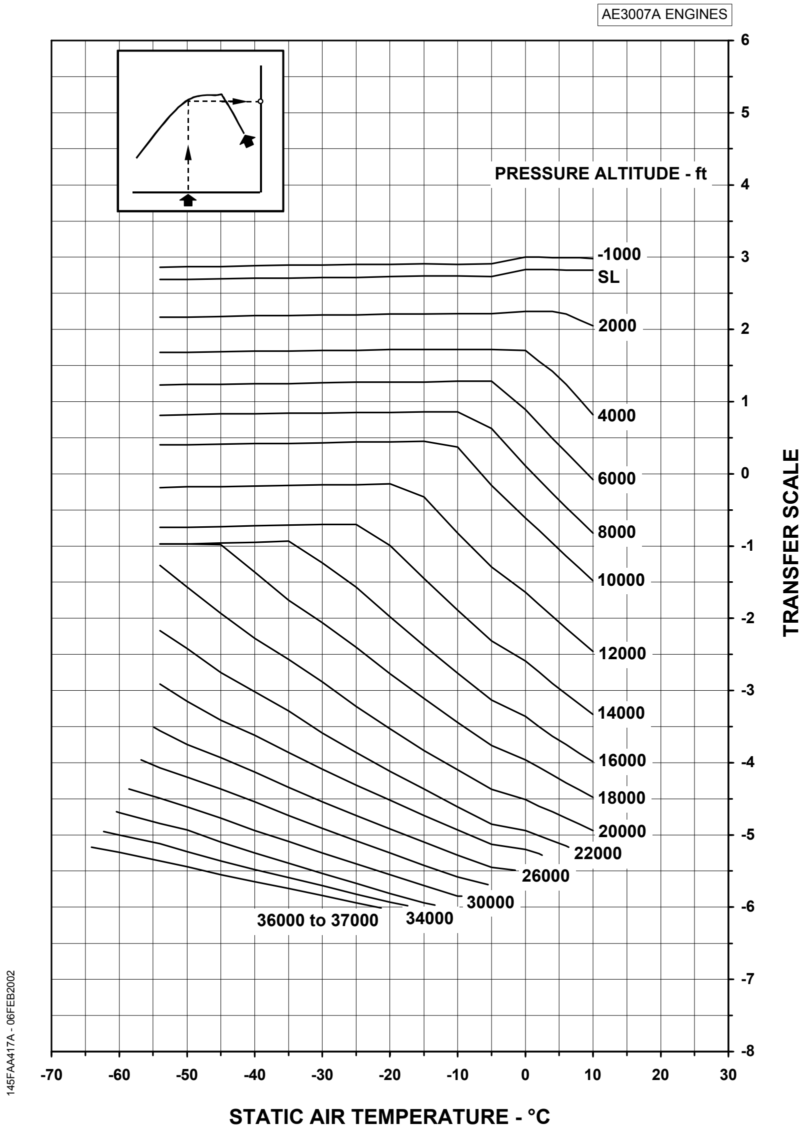
The following performance charts are applicable for airplanes equipped with AE3007A engines.

NOTE: These performance charts are also applicable to AE3007A1/1 engines.

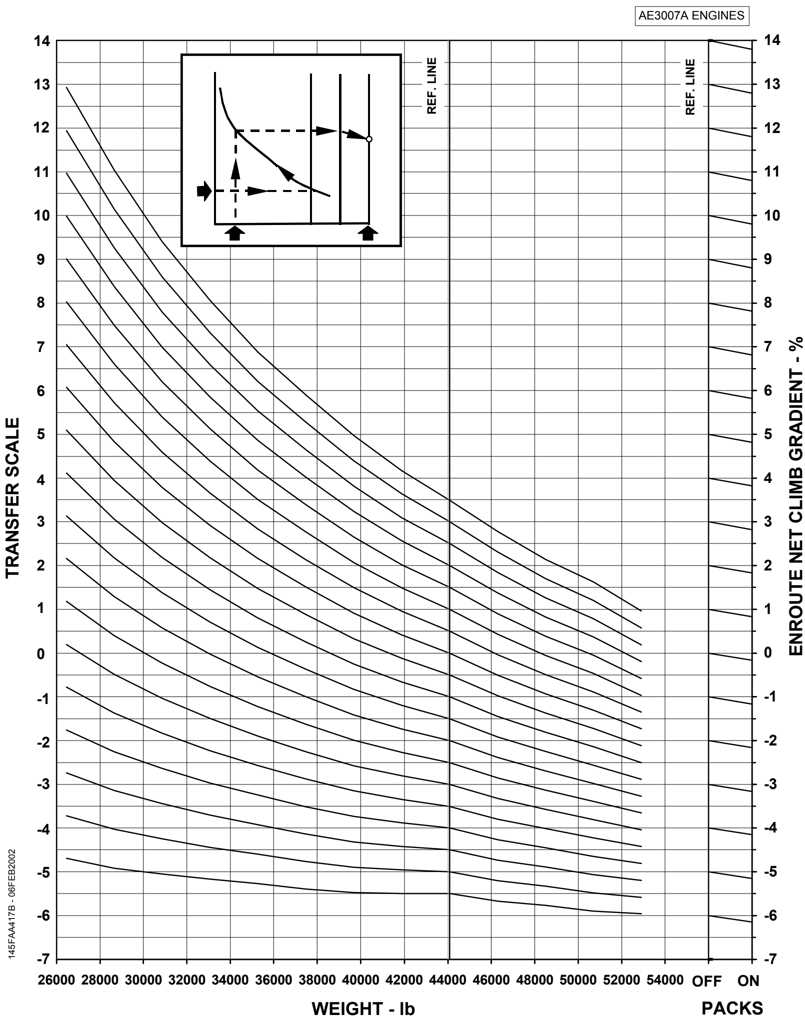
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE ON

CHART 1 OF 2



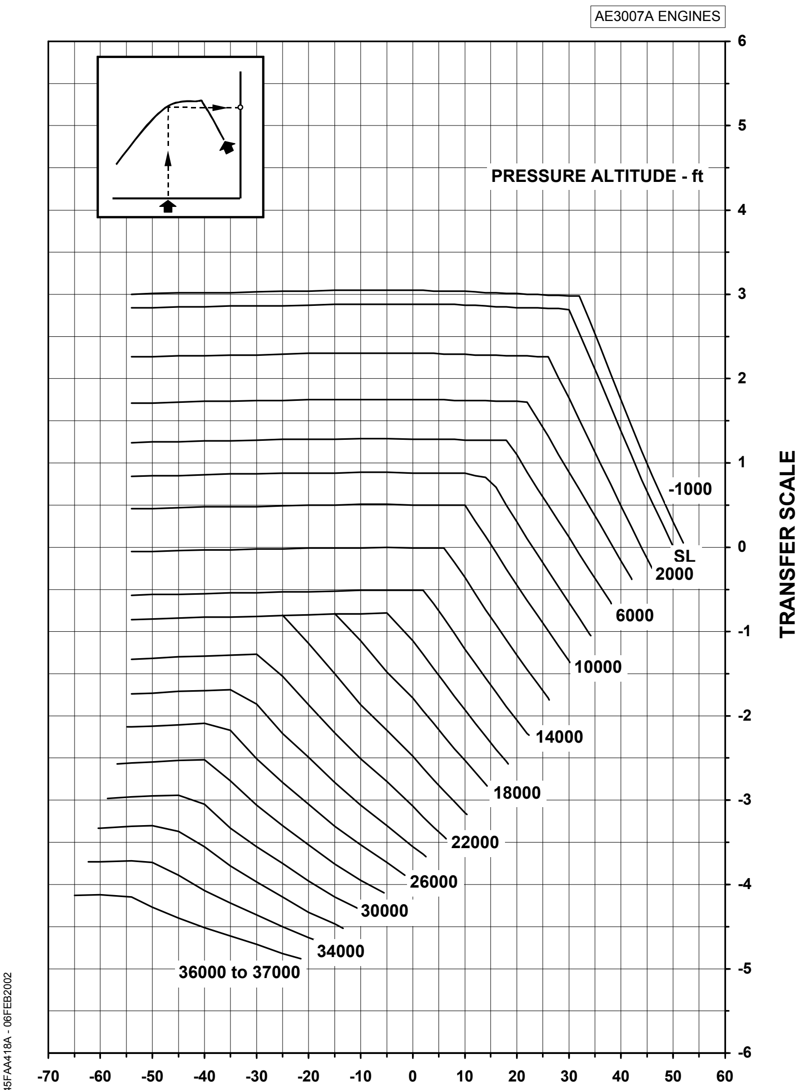
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE
FLAPS UP - ANTI-ICE ON
CHART 2 OF 2



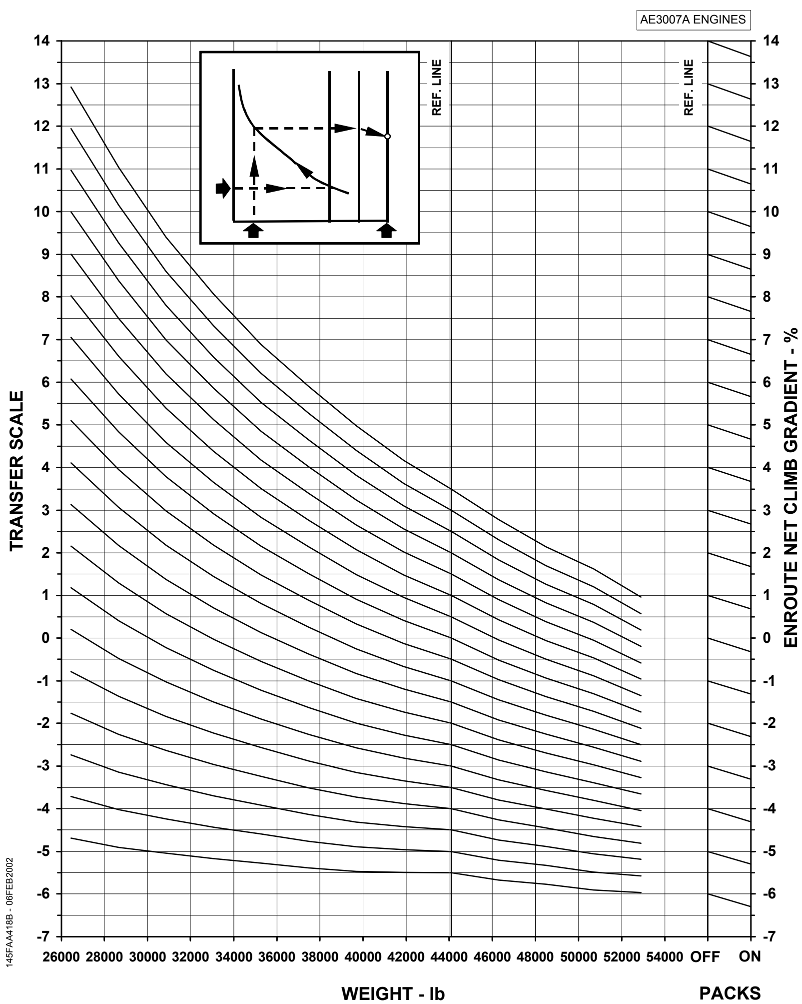
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE OFF

CHART 1 OF 2

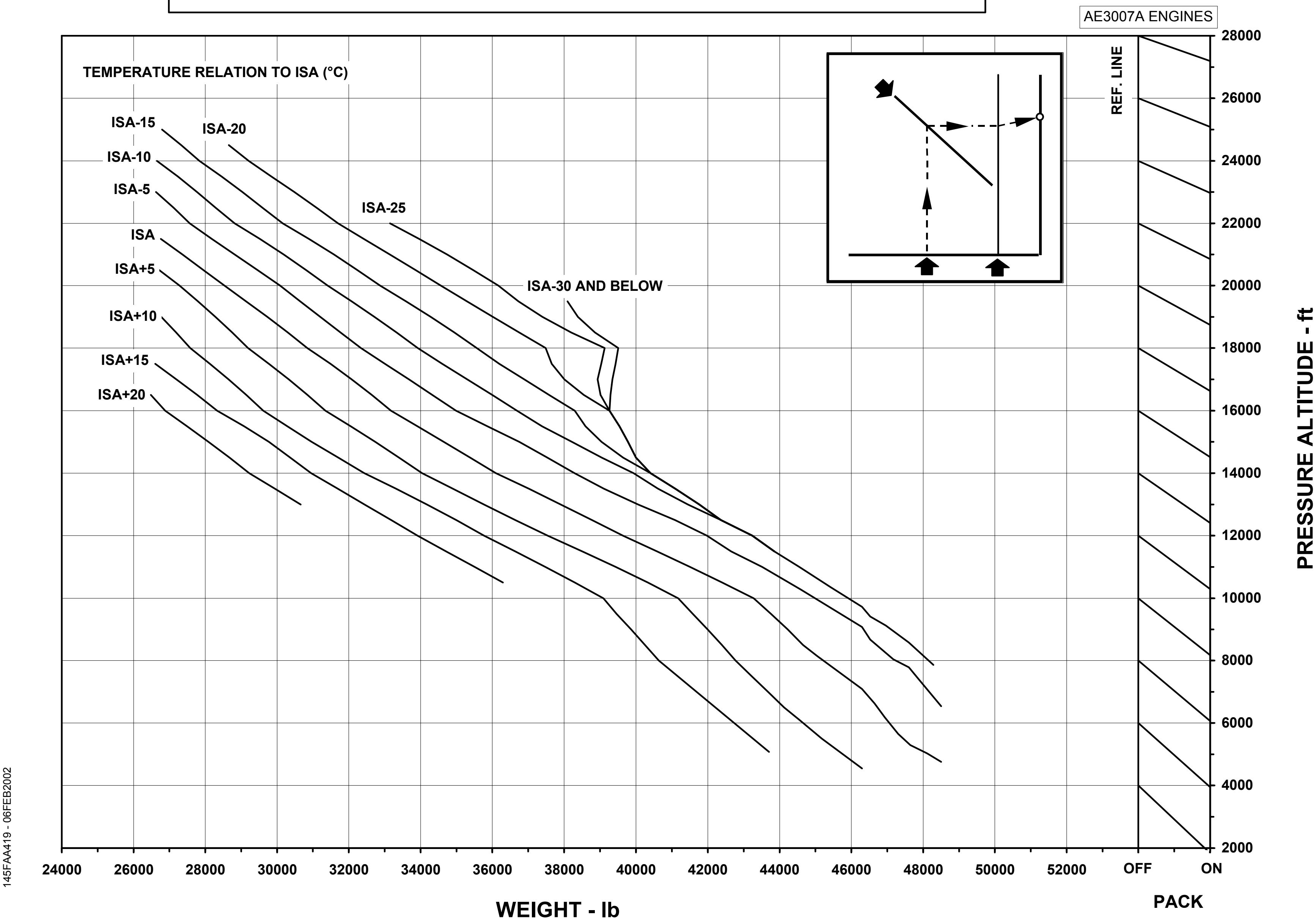


ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE
FLAPS UP - ANTI-ICE OFF
CHART 2 OF 2

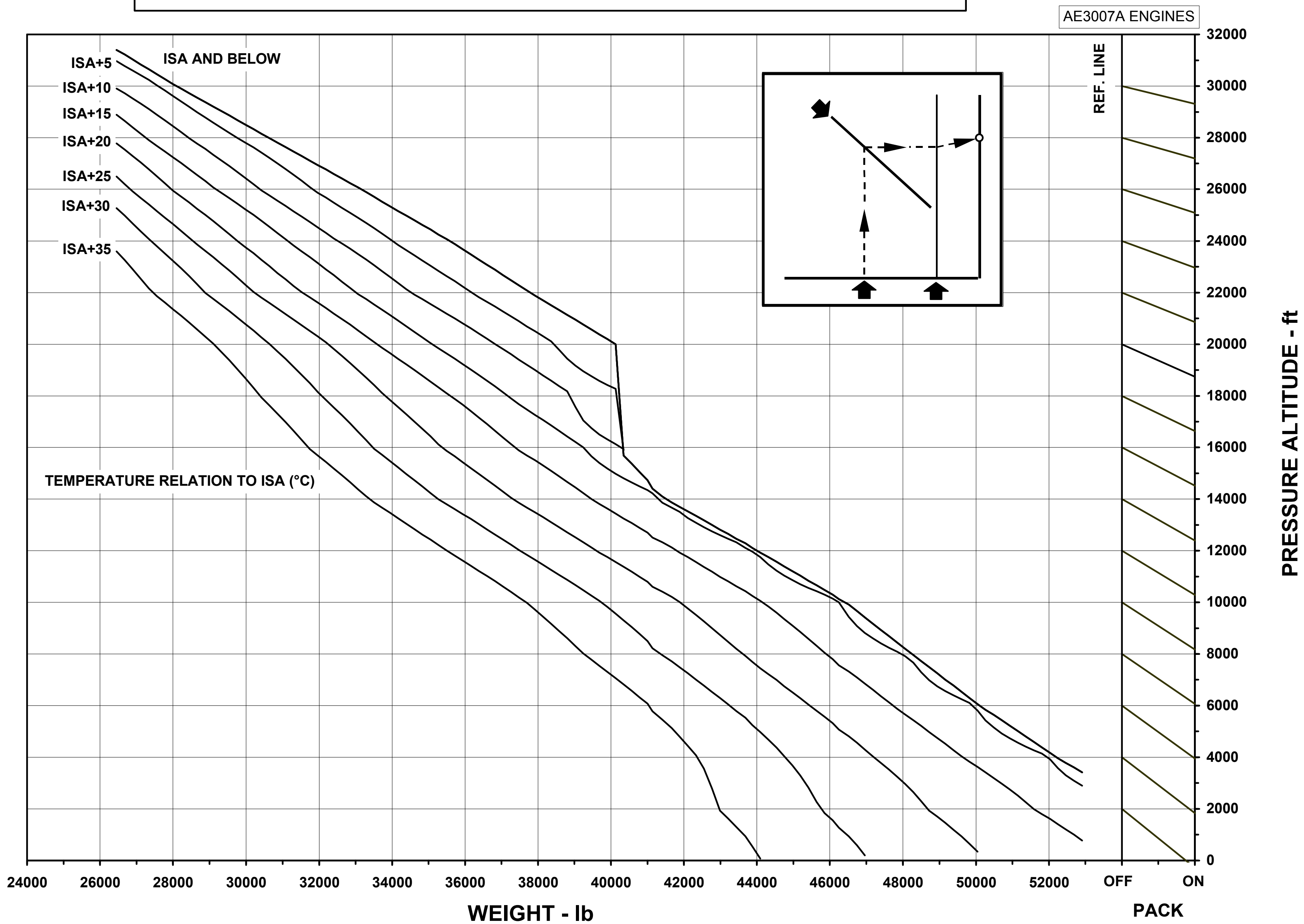


ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

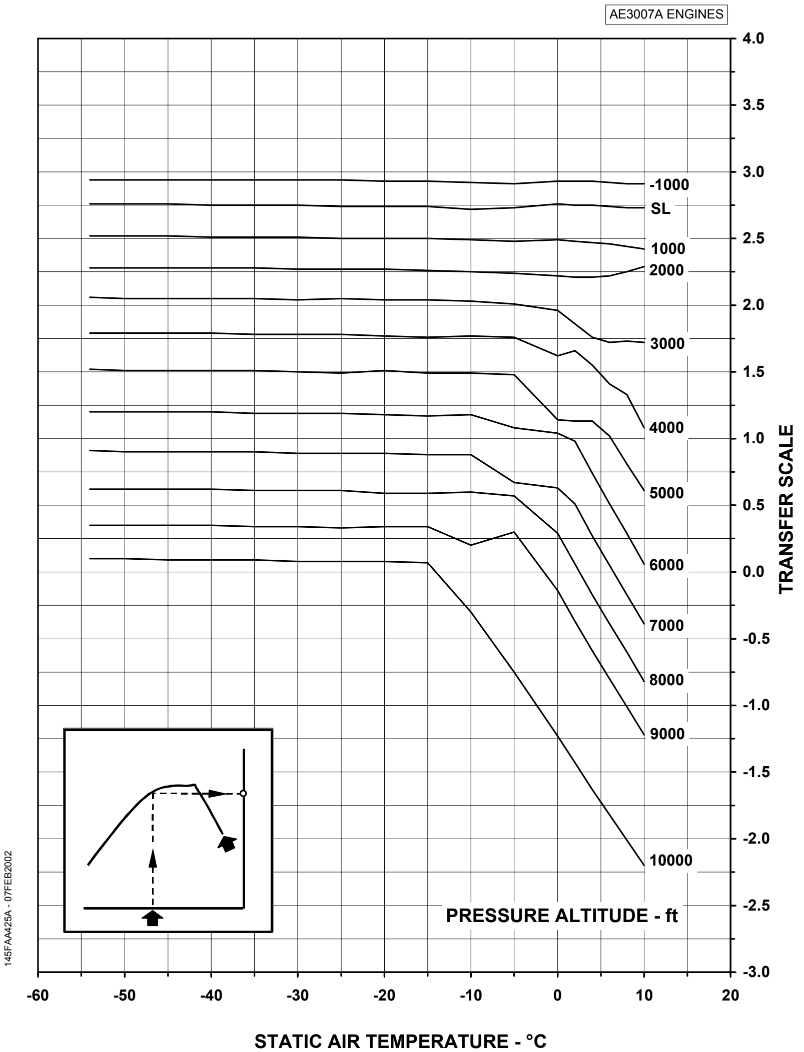
FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE ON



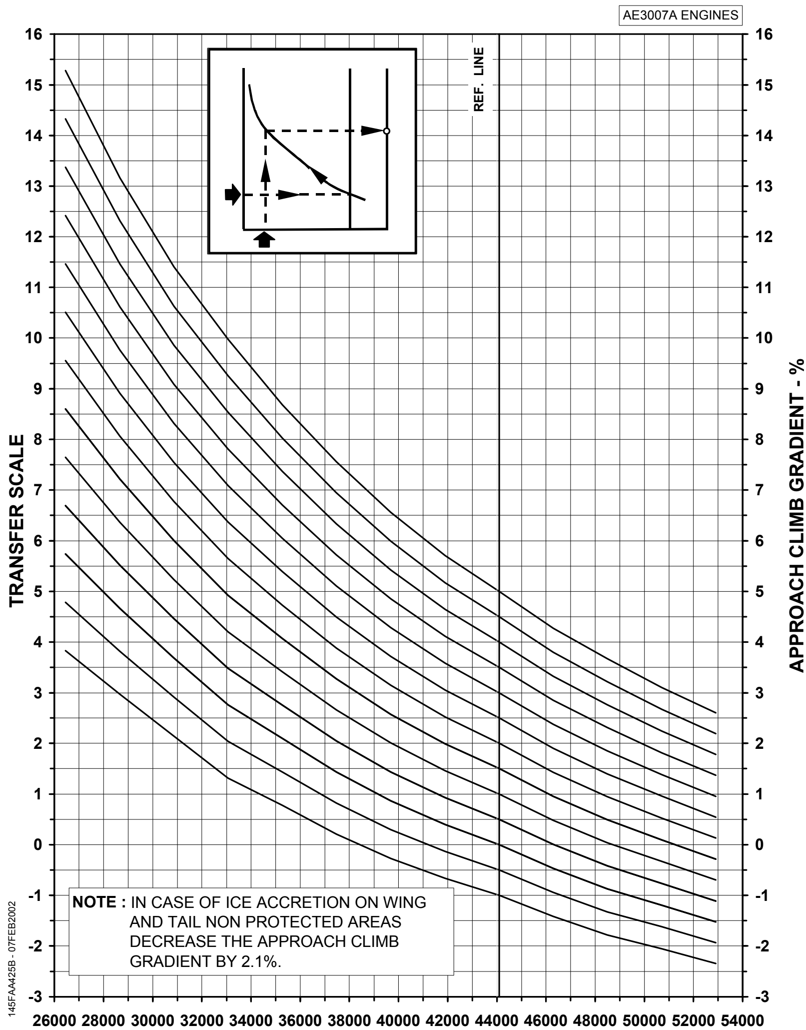
ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT
FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF



APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 1 OF 2



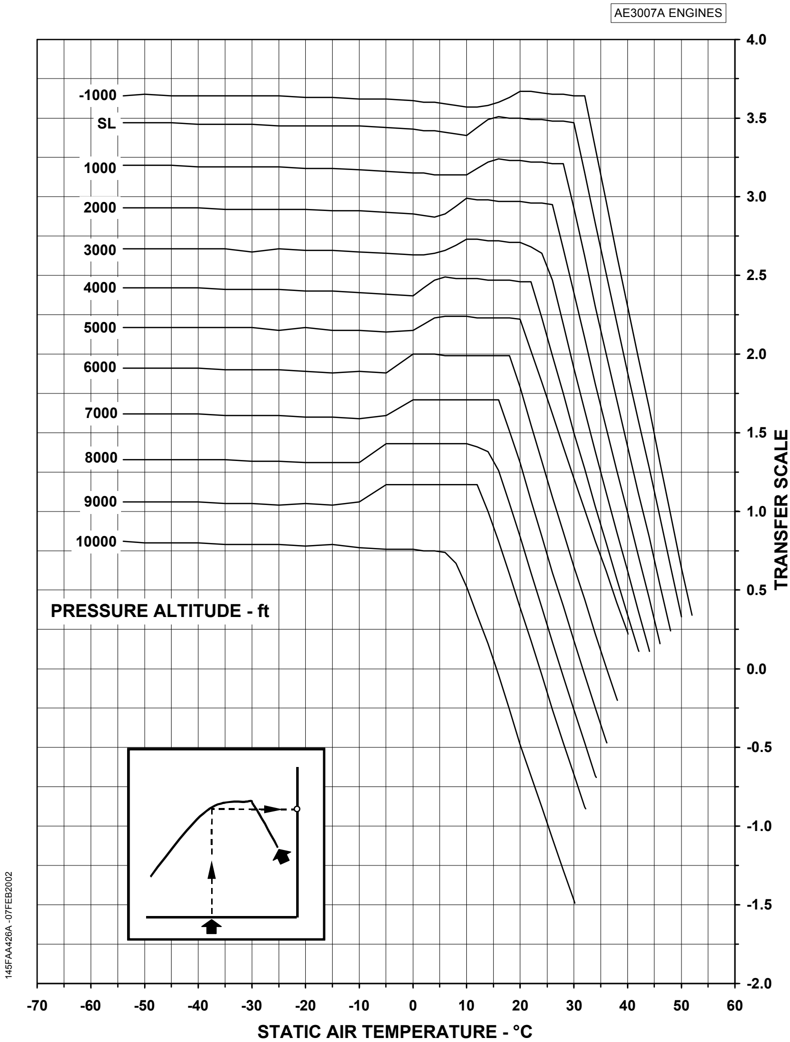
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 2 OF 2



APPROACH CLIMB GRADIENT

ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF

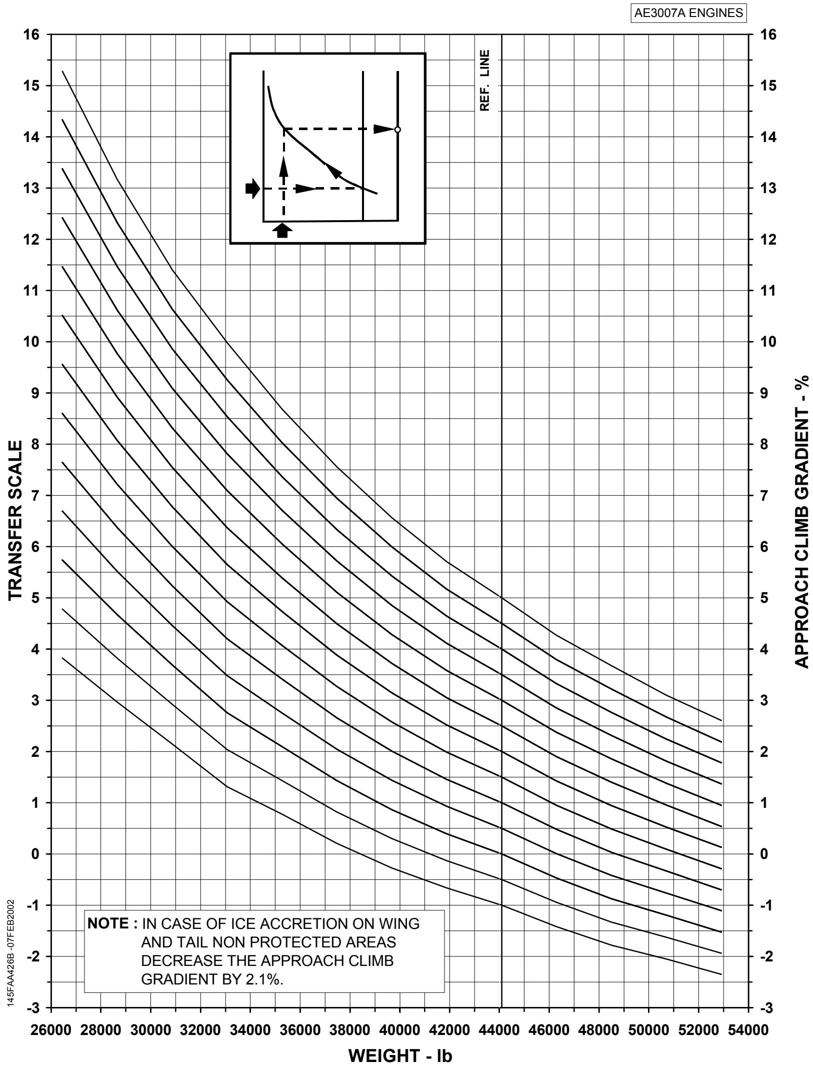
CHART 1 OF 2



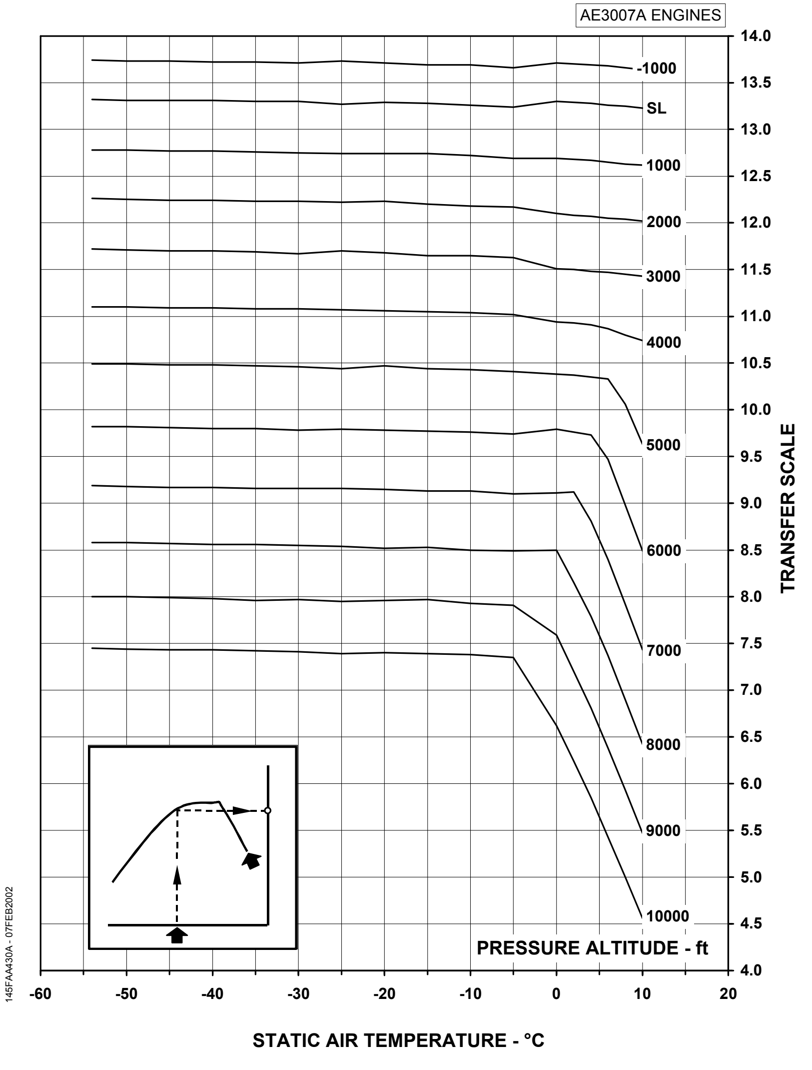
APPROACH CLIMB GRADIENT

ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF

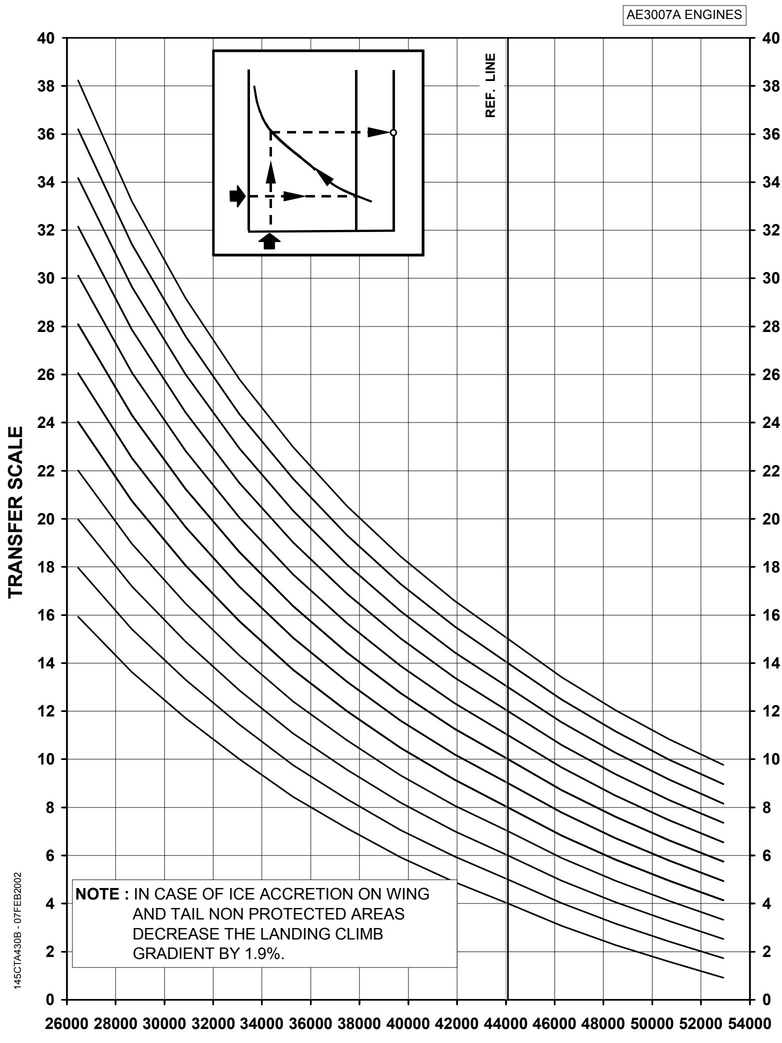
CHART 2 OF 2



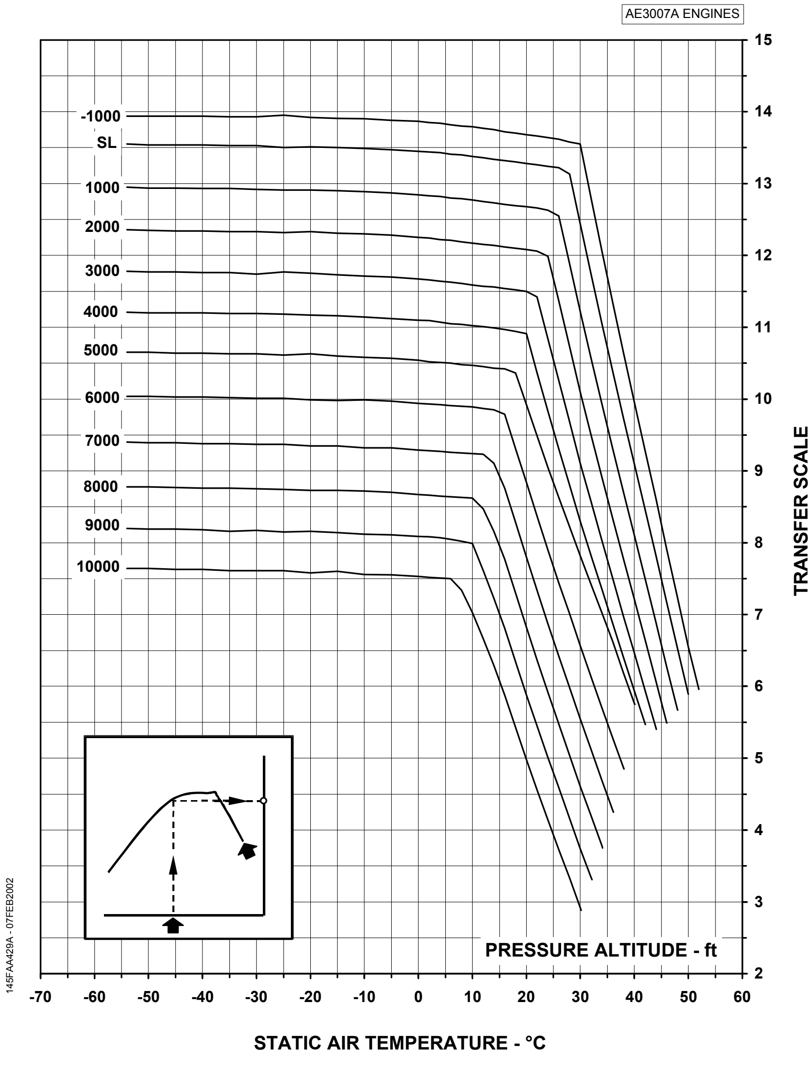
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 1 OF 2



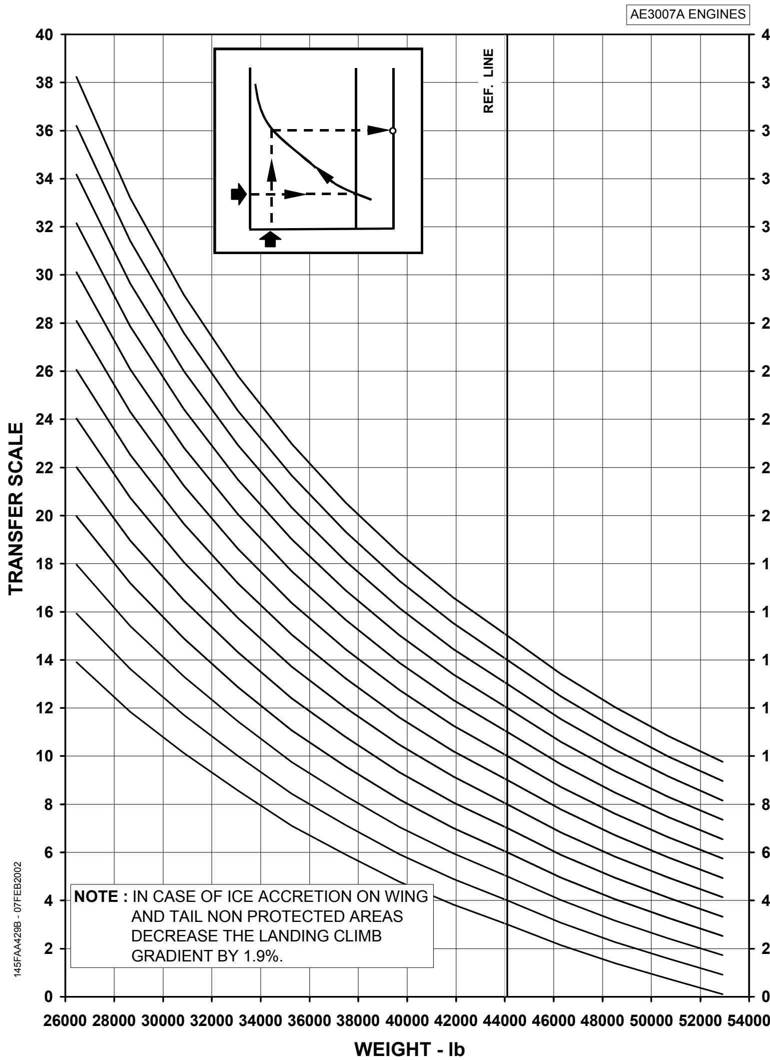
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 2 OF 2



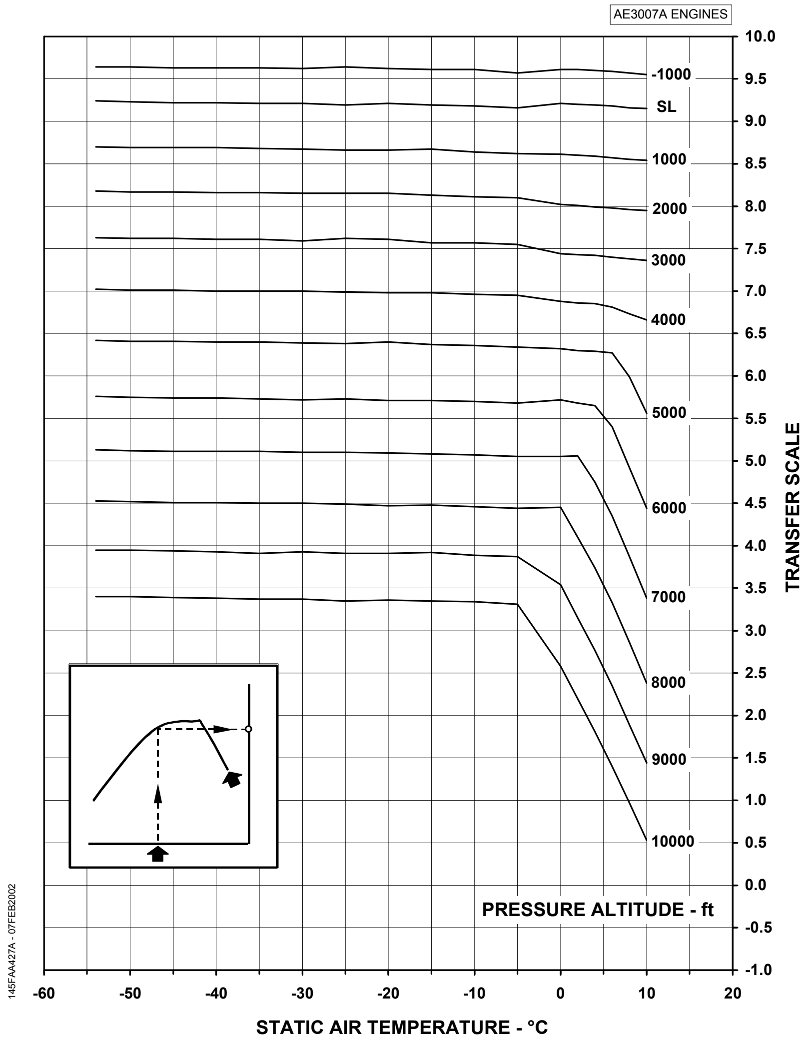
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 1 OF 2



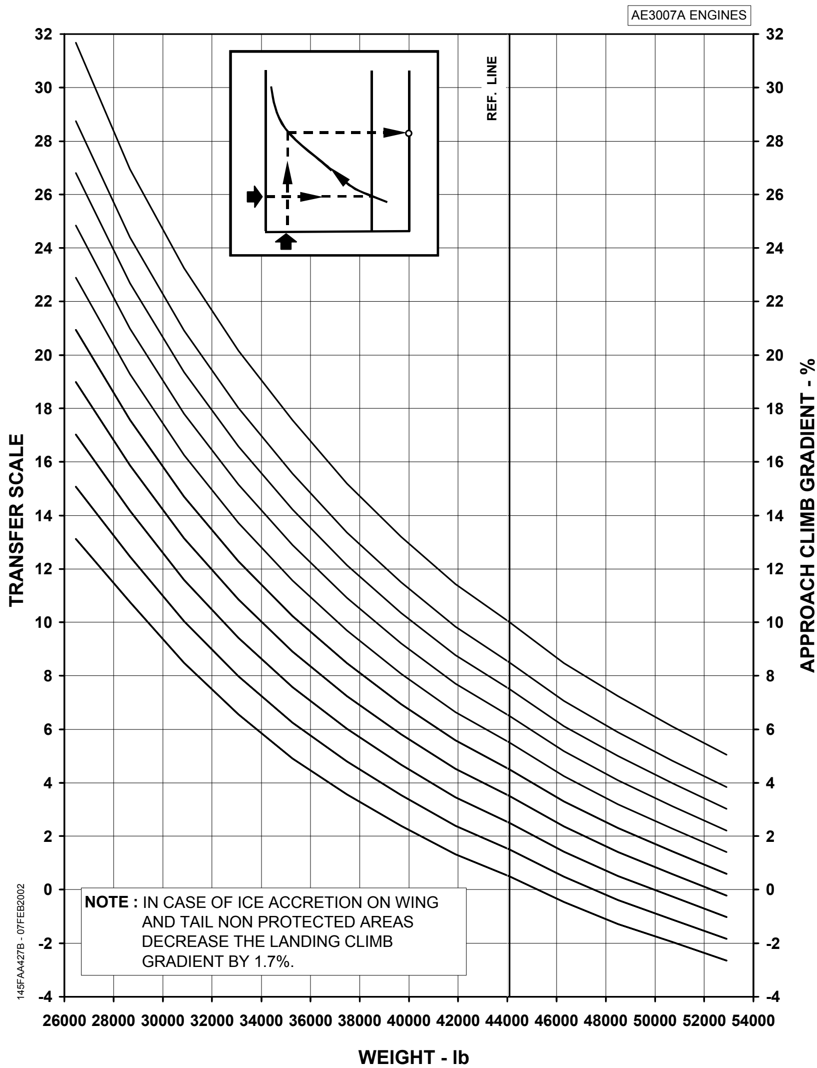
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 2 OF 2



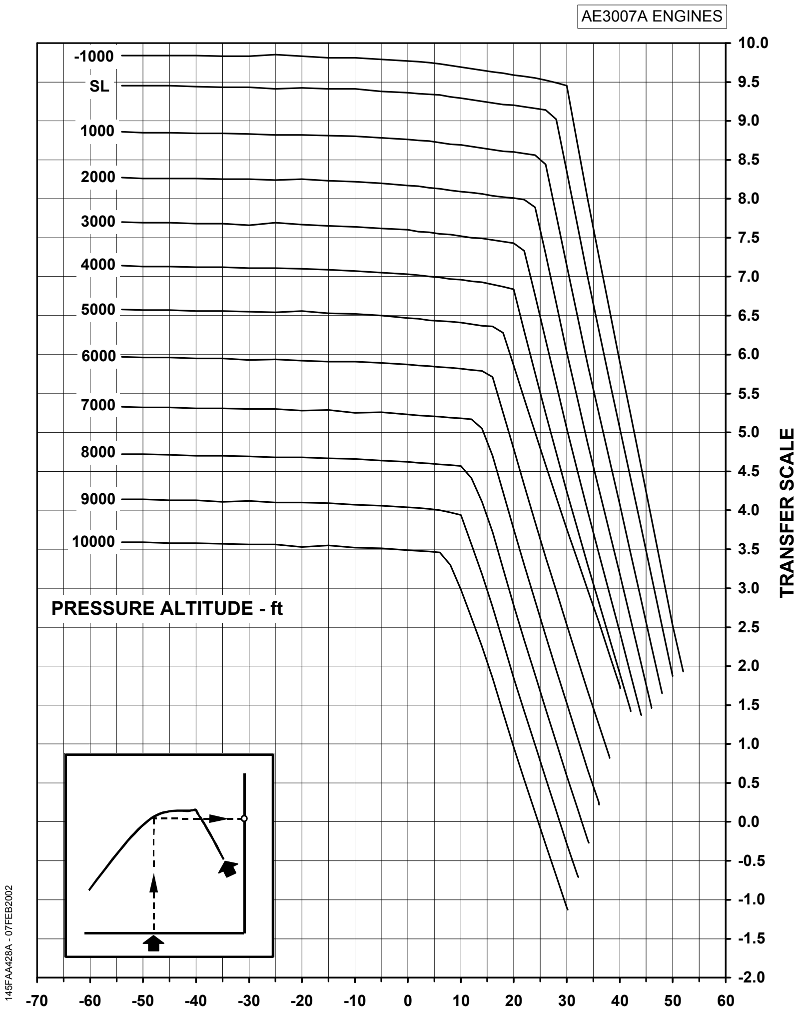
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 1 OF 2



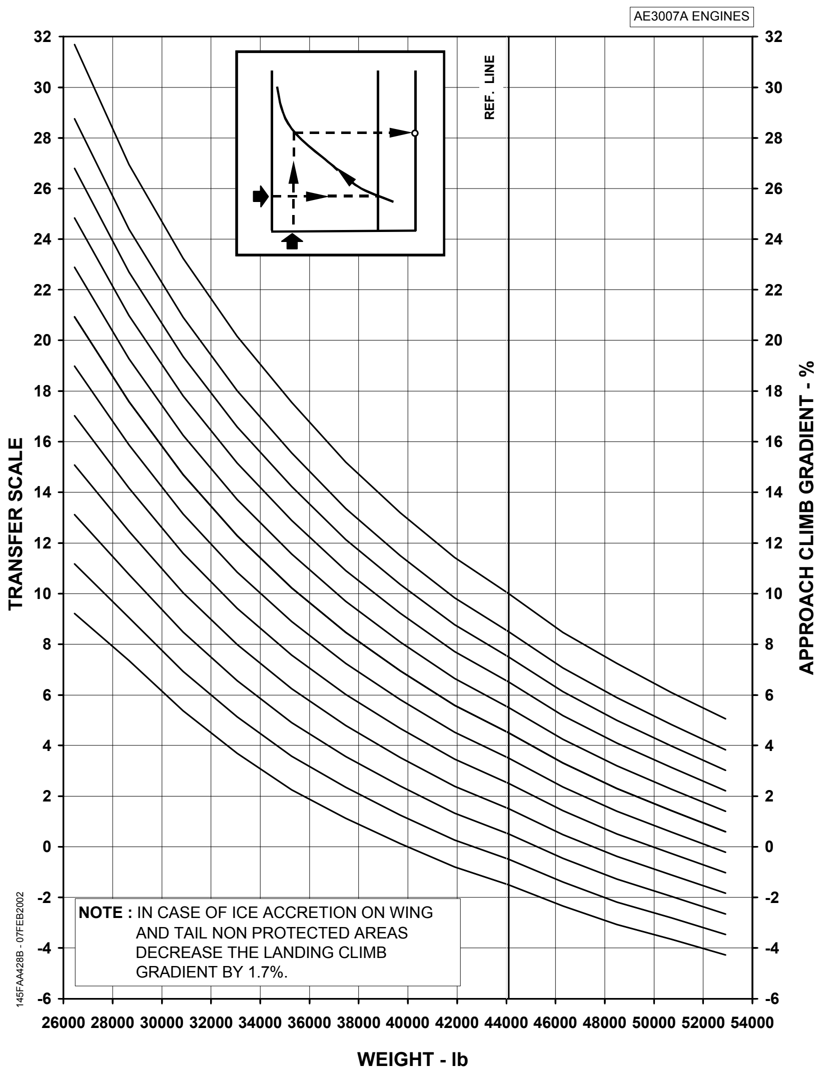
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 2 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 1 OF 2



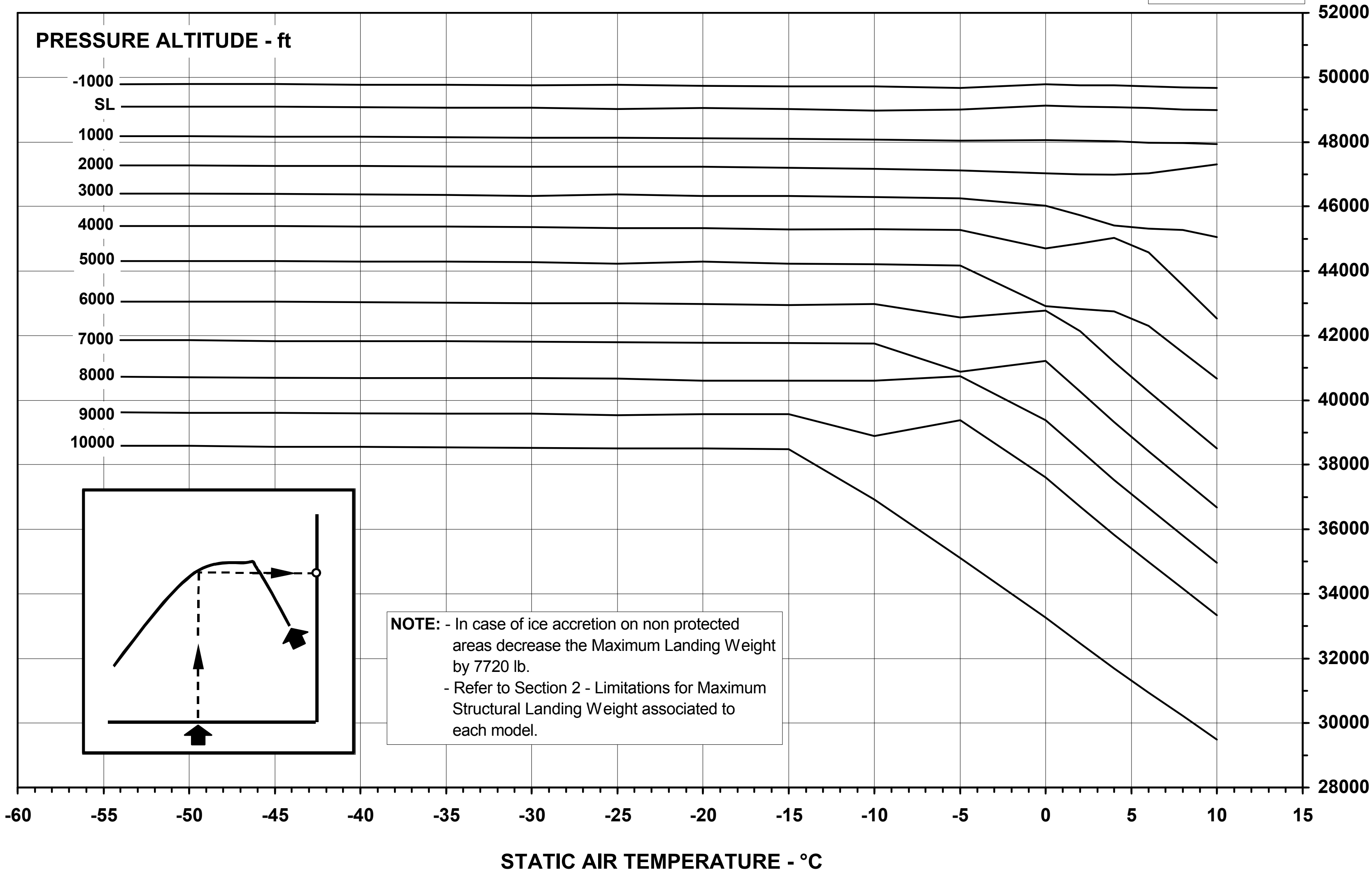
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 2 OF 2



MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

APPROACH FLAPS 9° - ANTI-ICE ON

AE3007A ENGINES



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 7720 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

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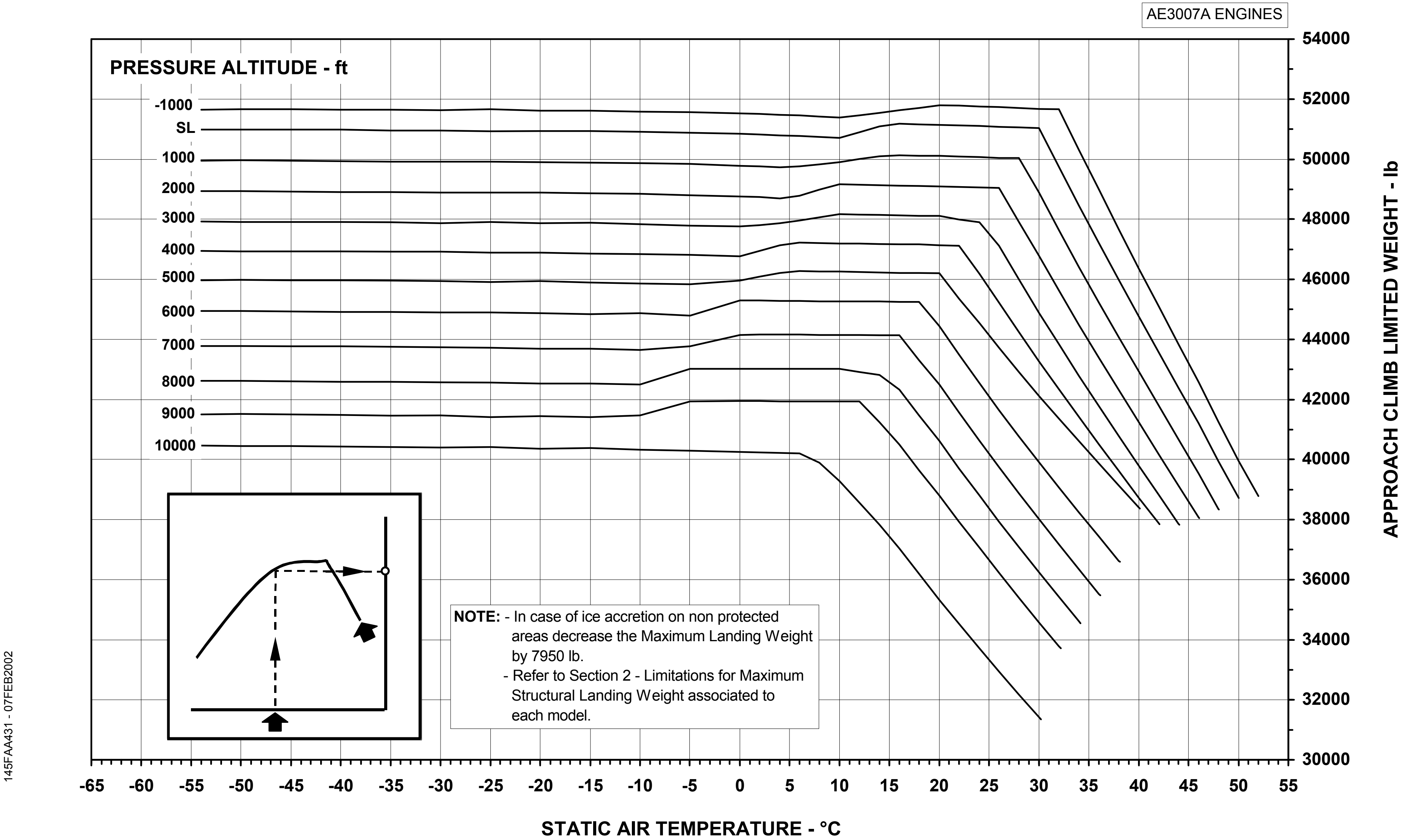
MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

APPROACH FLAPS 9° - ANTI-ICE OFF

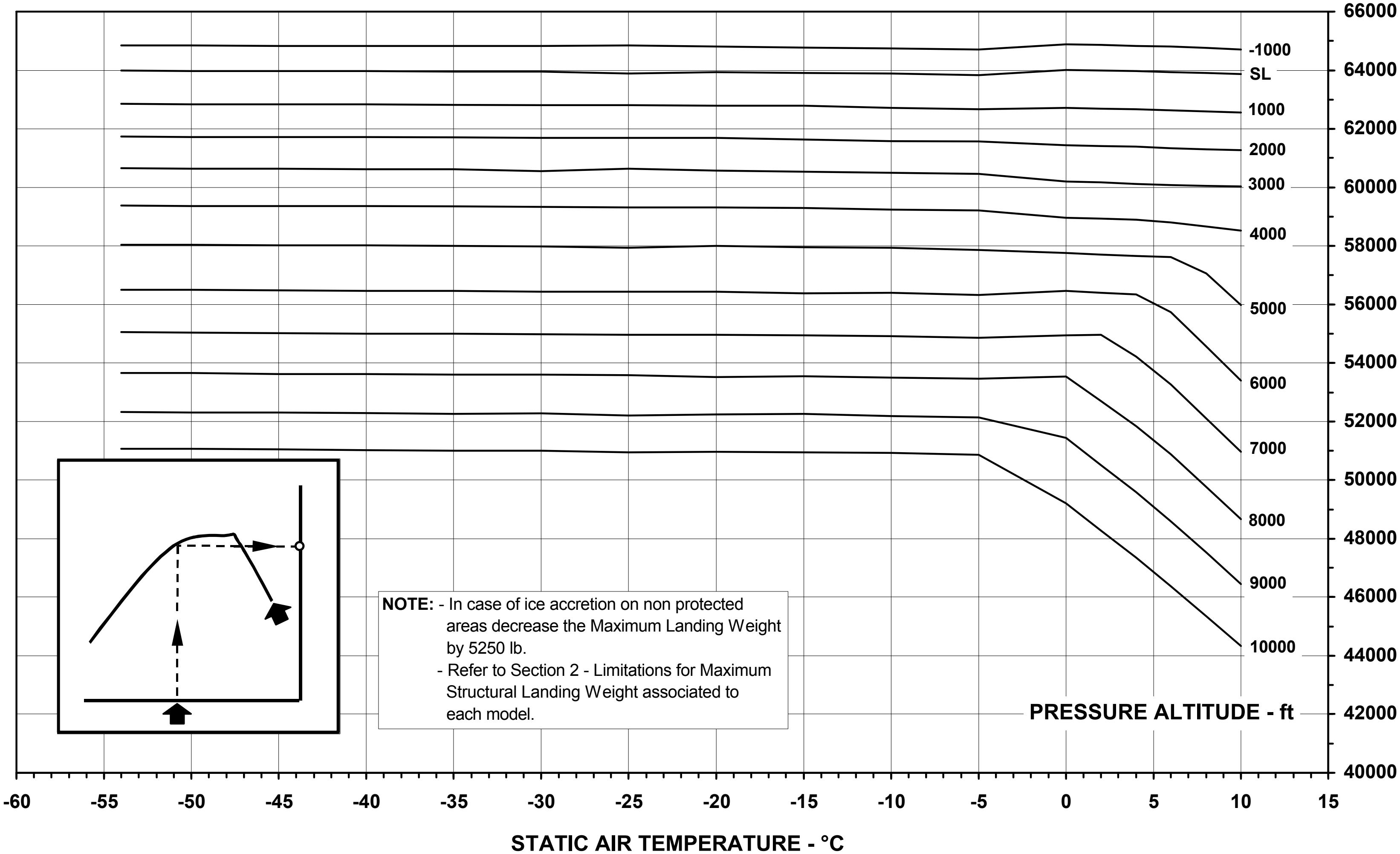


NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 7950 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 22° - ANTI-ICE ON

AE3007A ENGINES



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 5250 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

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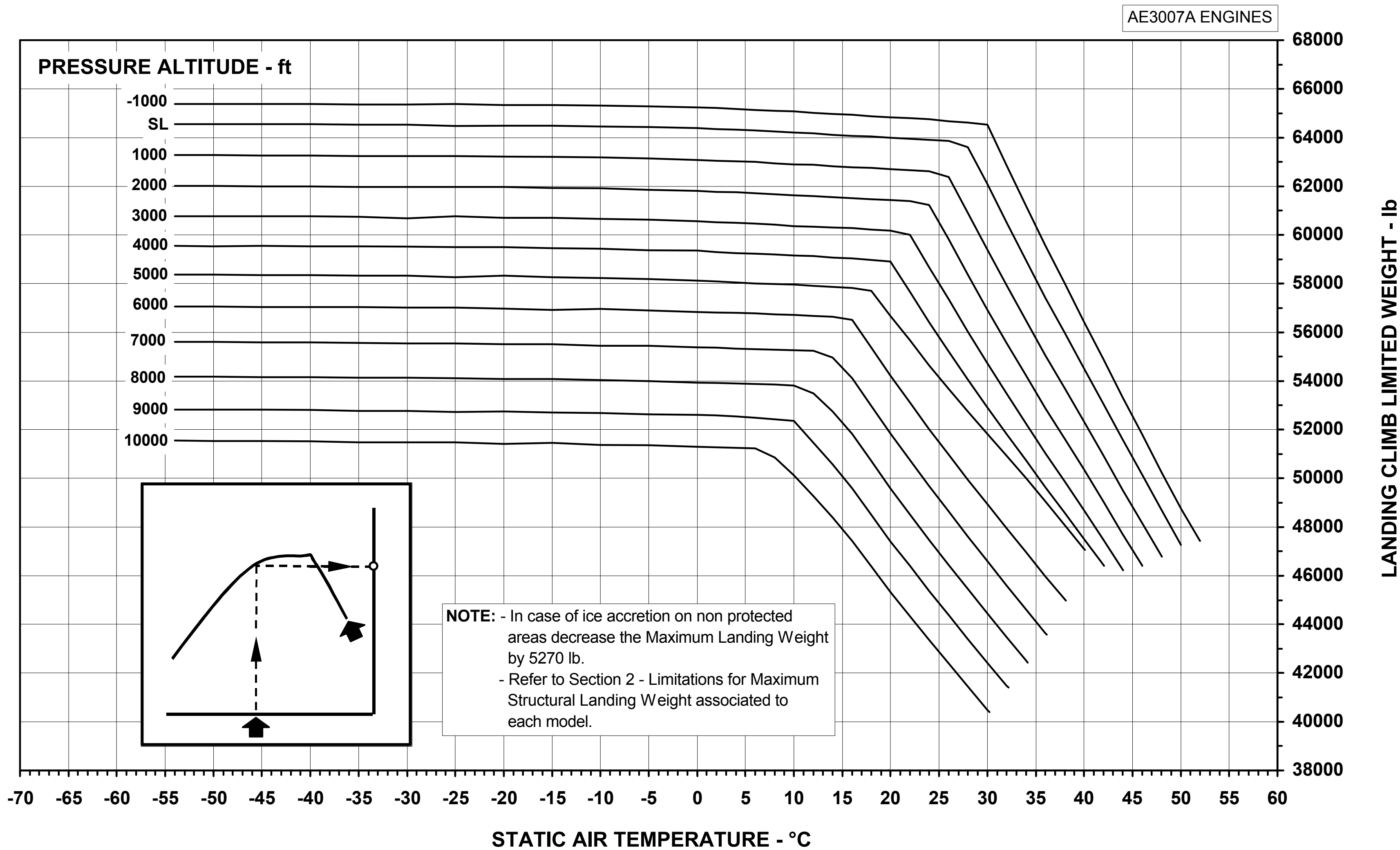
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED
LANDING FLAPS 22° - ANTI-ICE OFF



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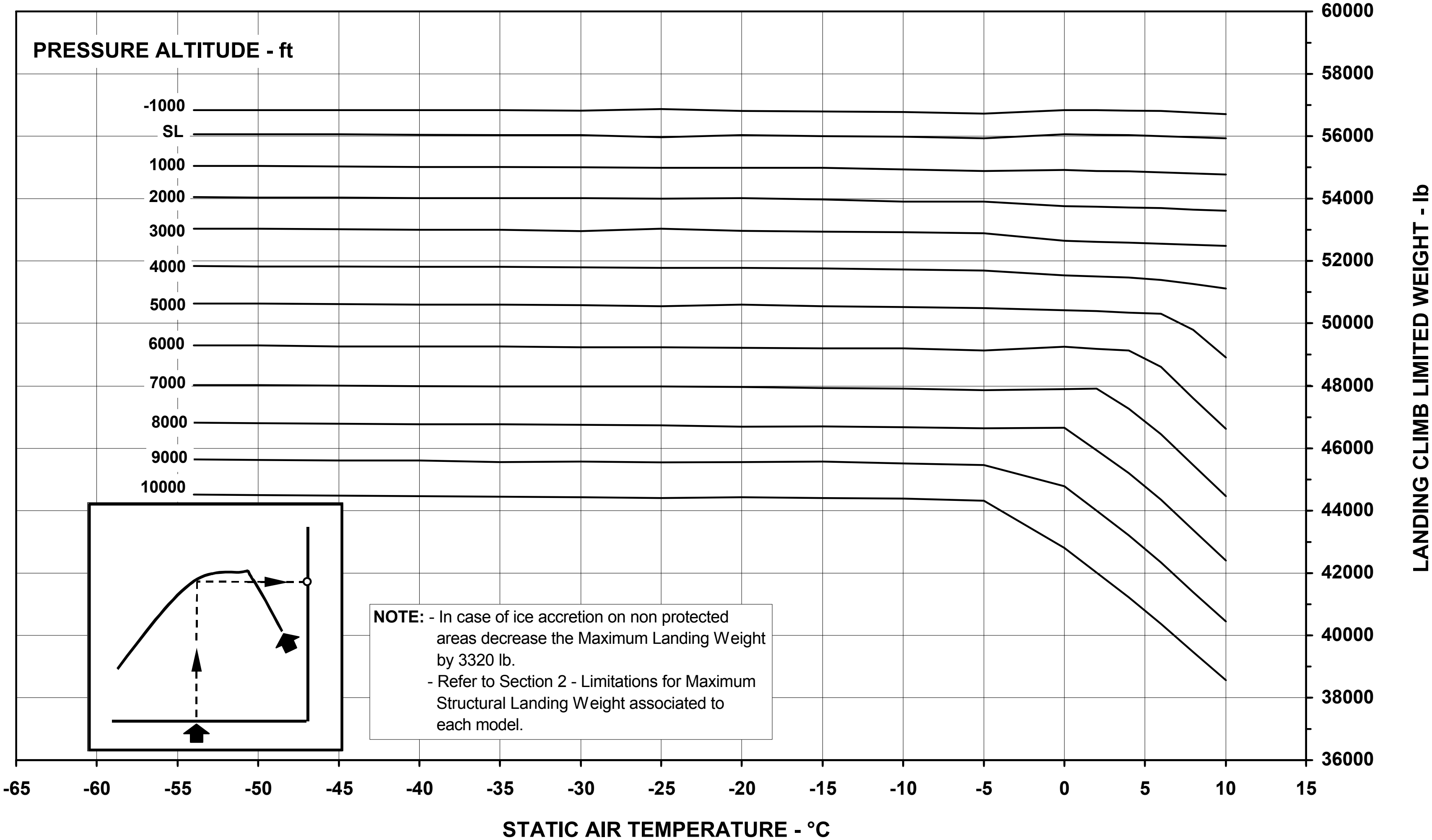
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE ON

AE3007A ENGINES



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 3320 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

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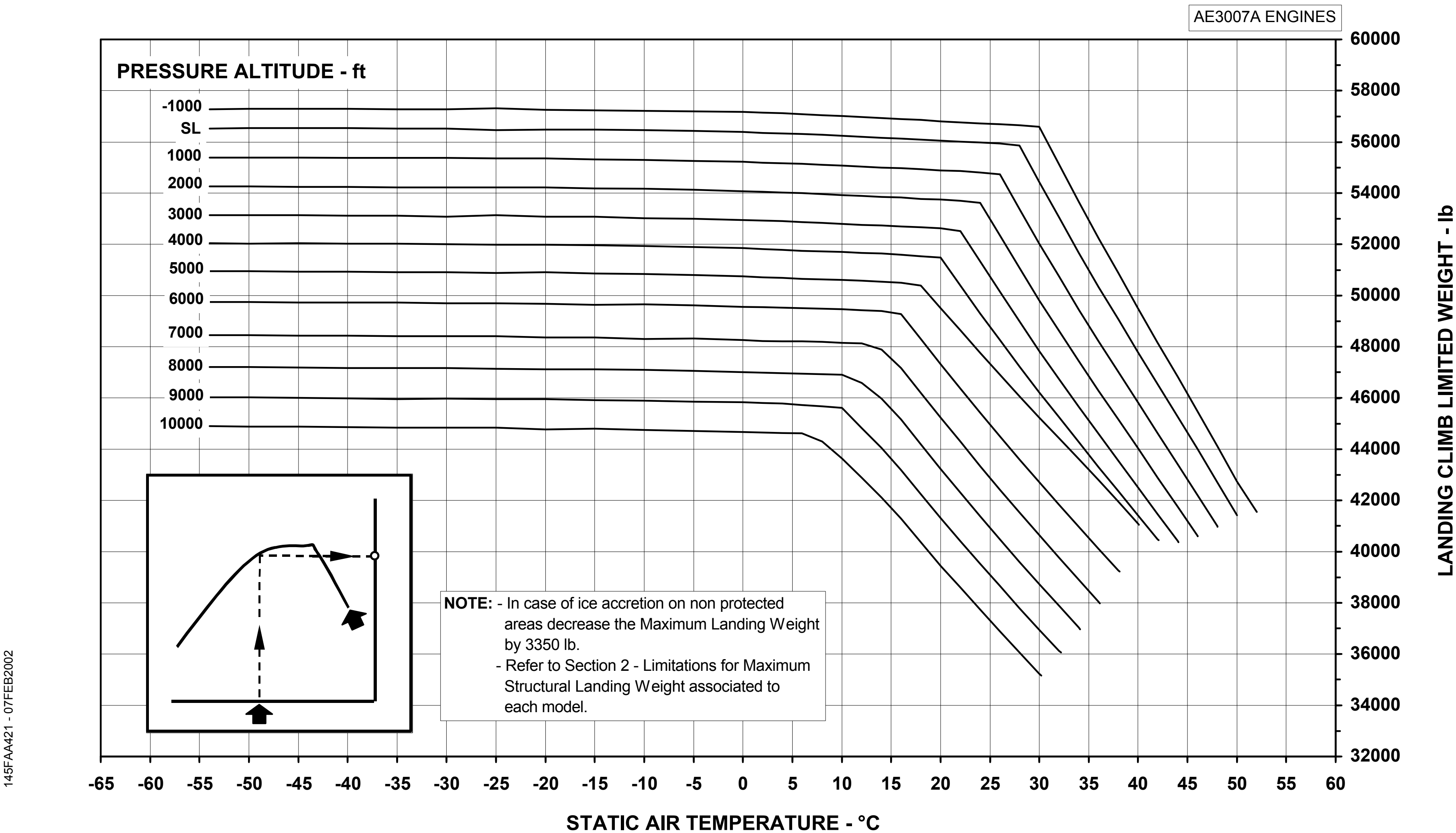
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE OFF



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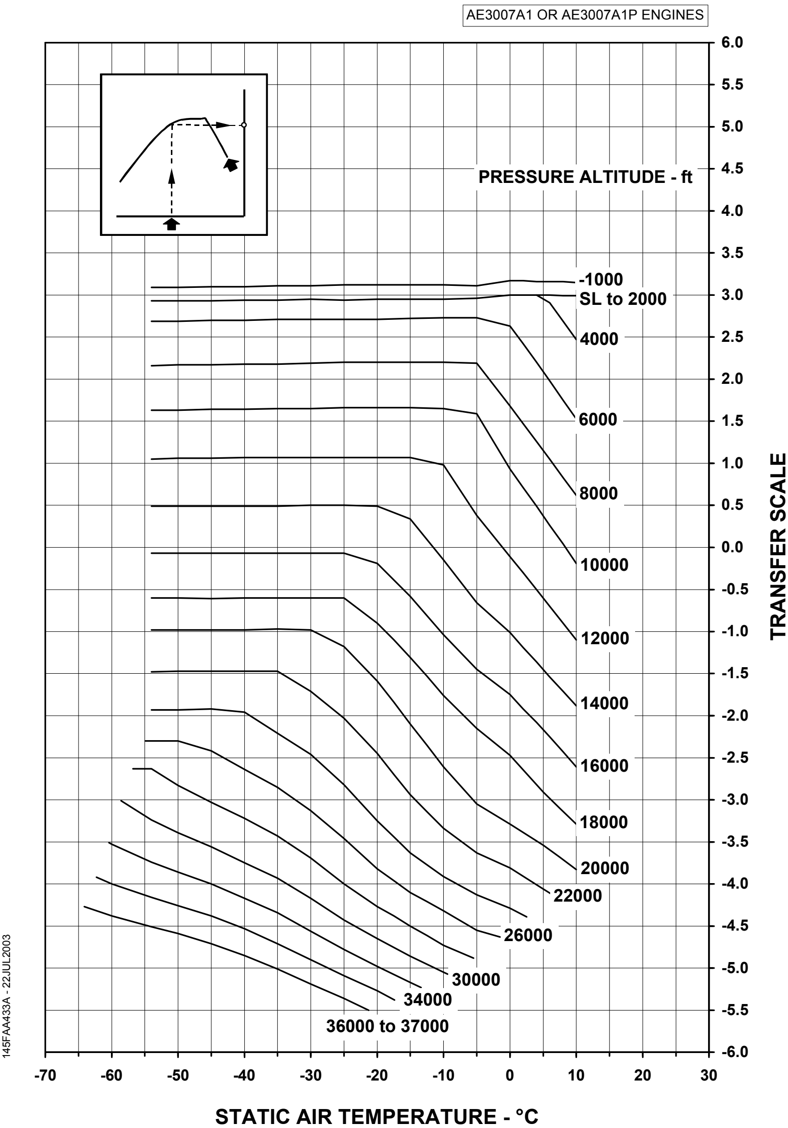
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A1 OR AE7003A1P ENGINES

The following performance charts are applicable for airplanes equipped with AE3007A1 or AE3007A1P engines.

ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE ON

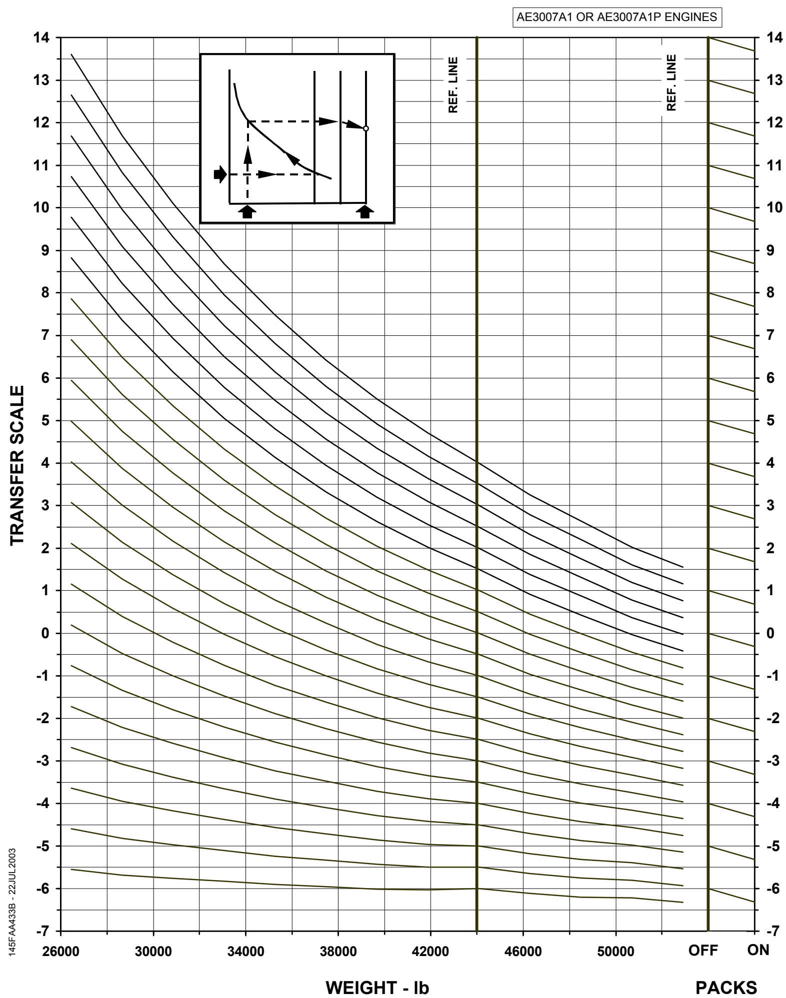
CHART 1 OF 2



ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

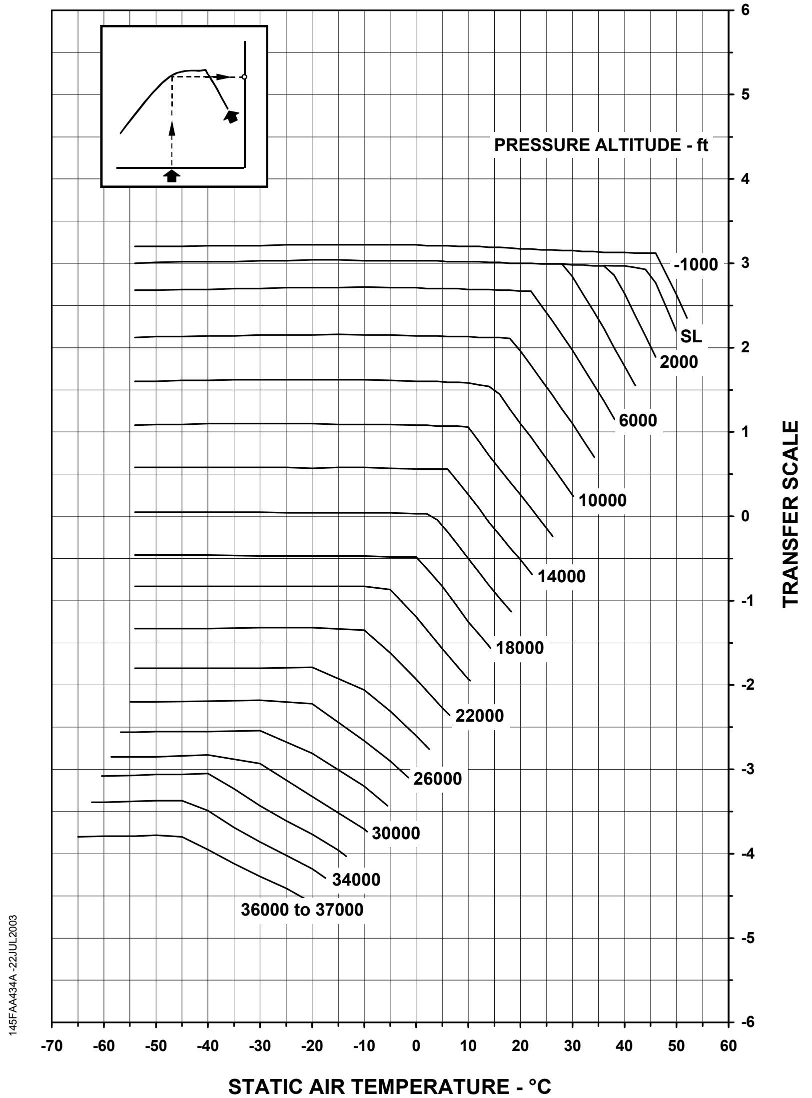
FLAPS UP - ANTI-ICE ON

CHART 2 OF 2



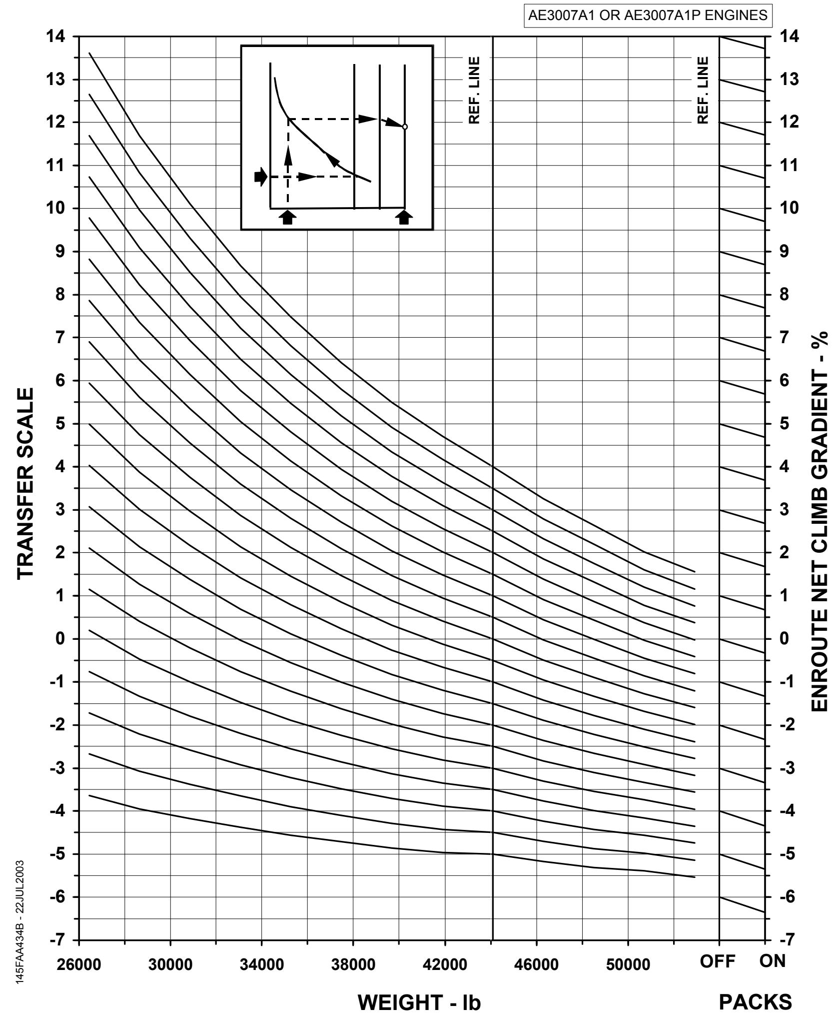
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE
FLAPS UP - ANTI-ICE OFF
CHART 1 OF 2

AE3007A1 OR AE3007A1P ENGINES



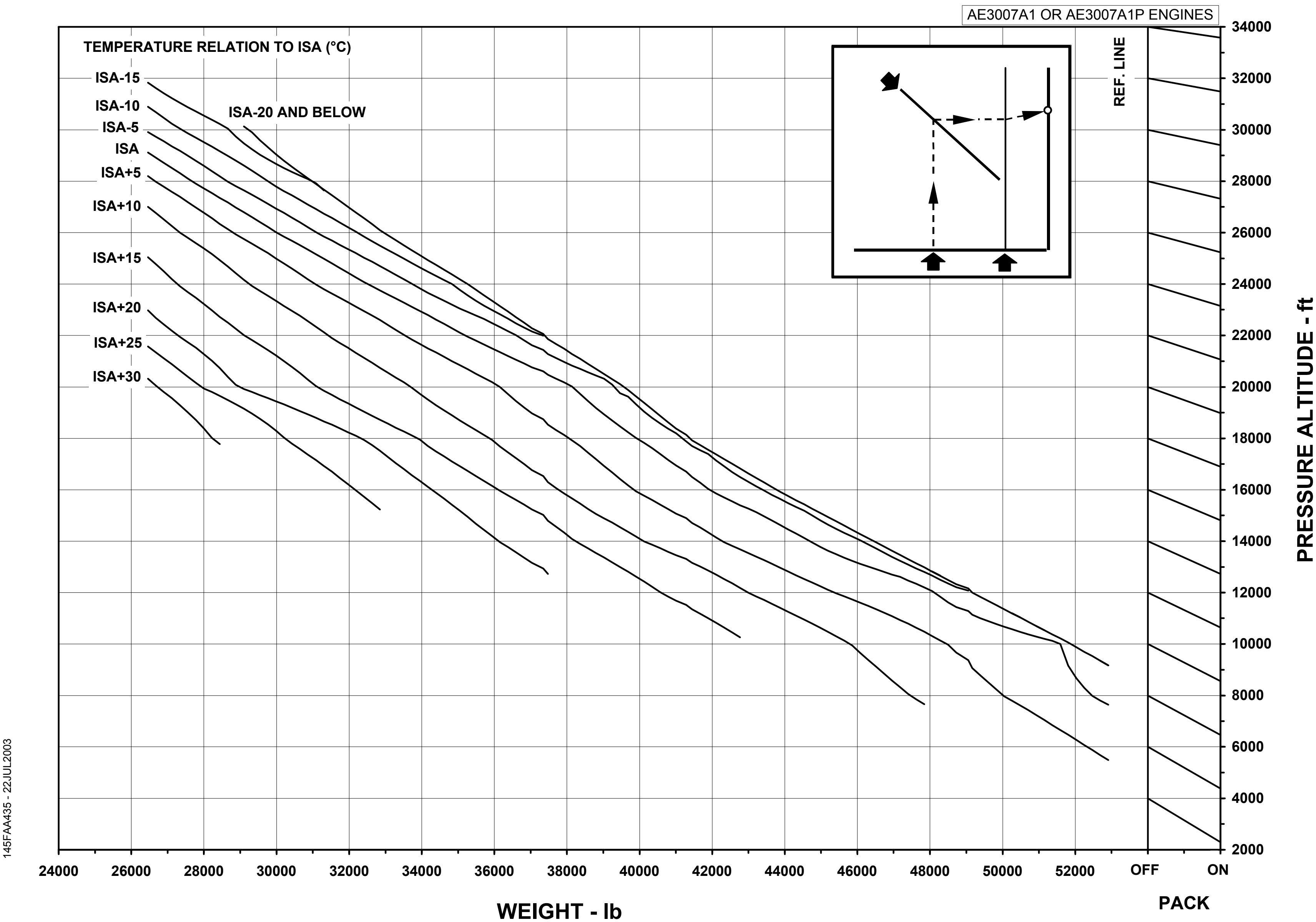
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE OFF
CHART 2 OF 2



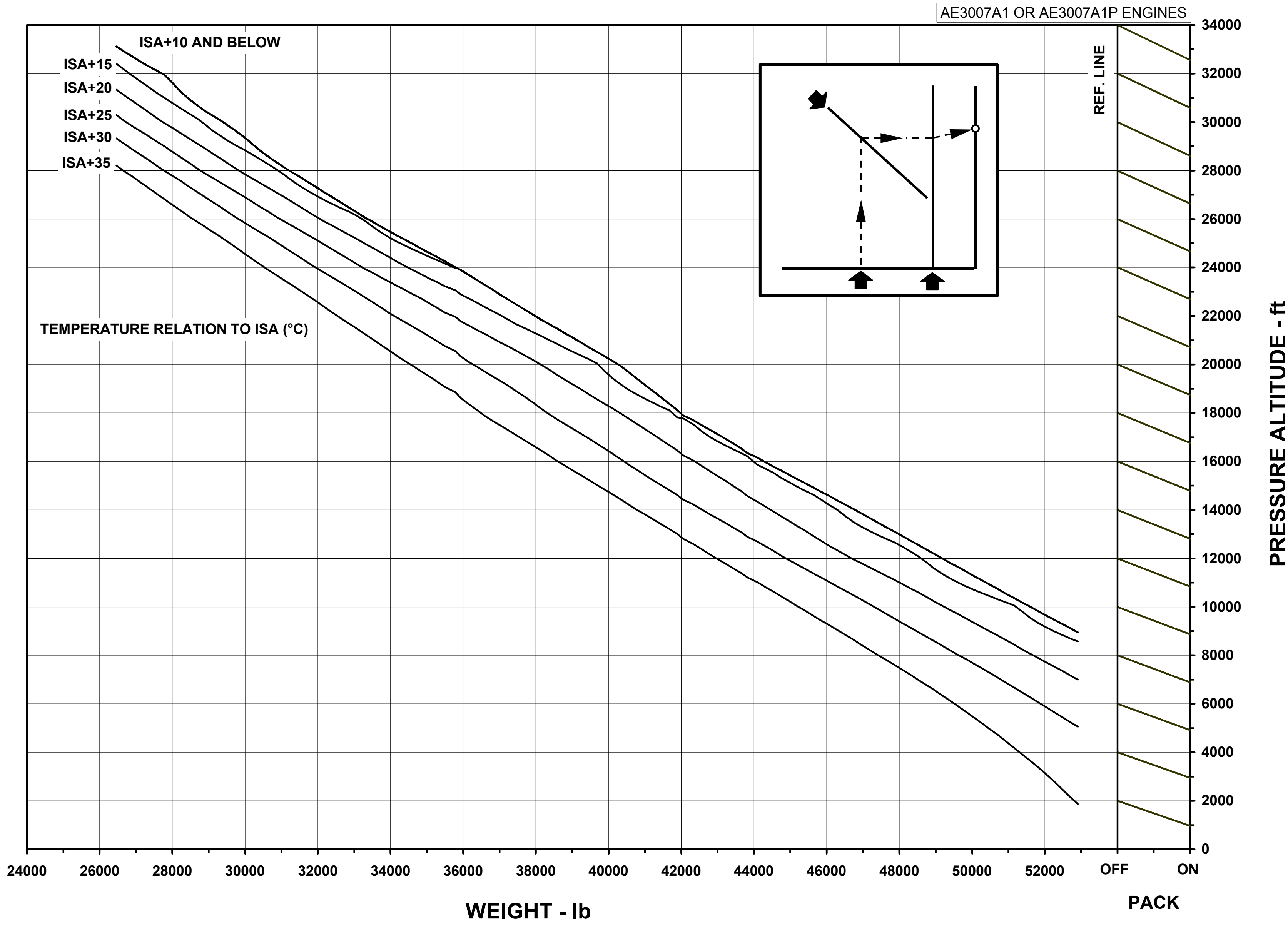
ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE ON

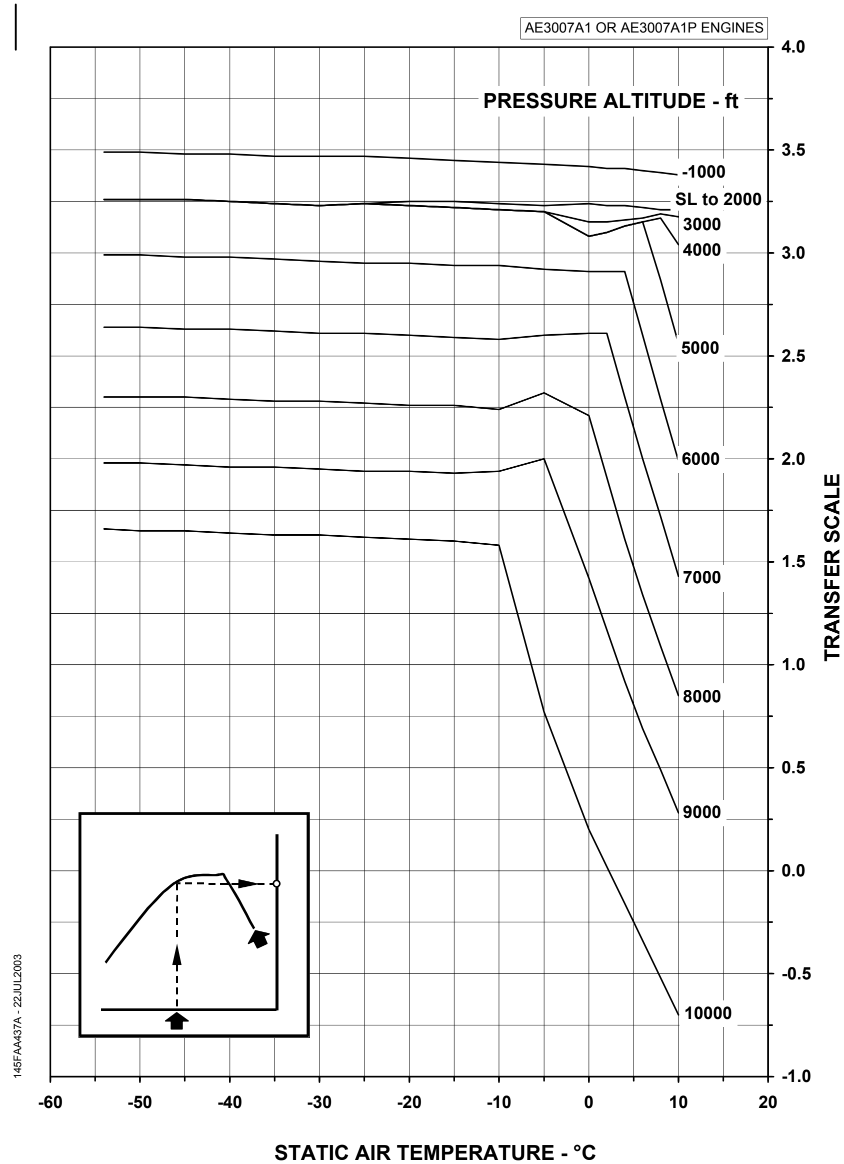


ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

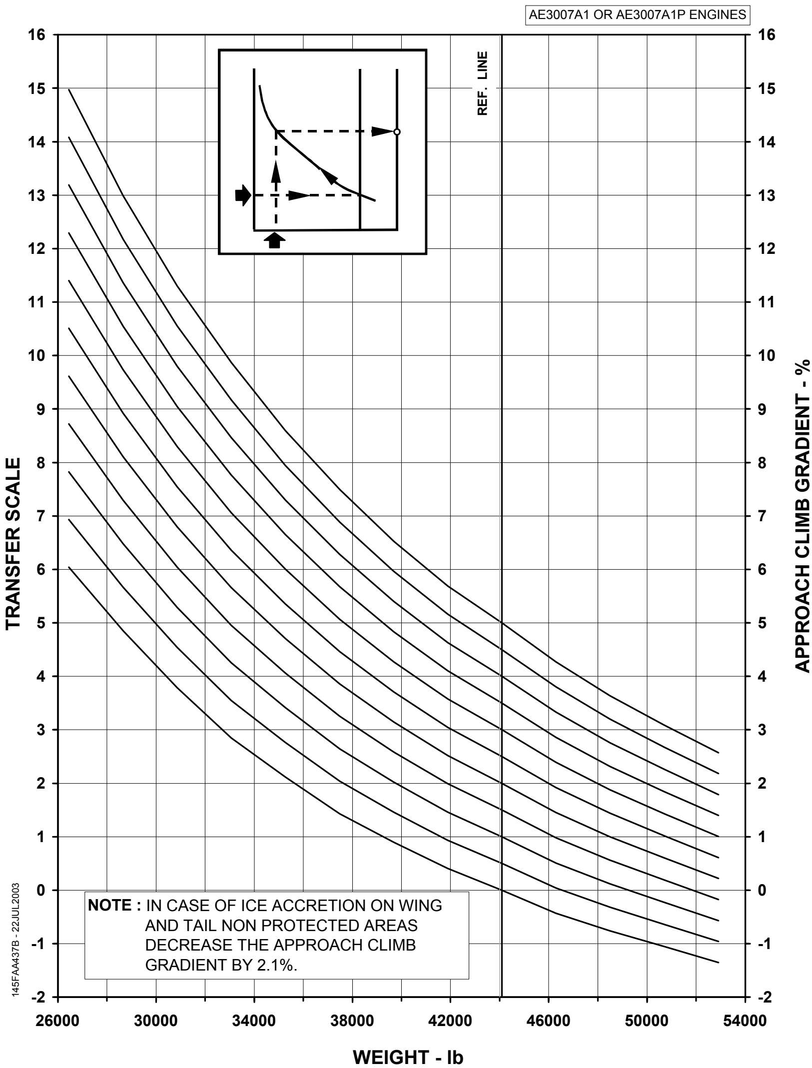
FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF



APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 1 OF 2



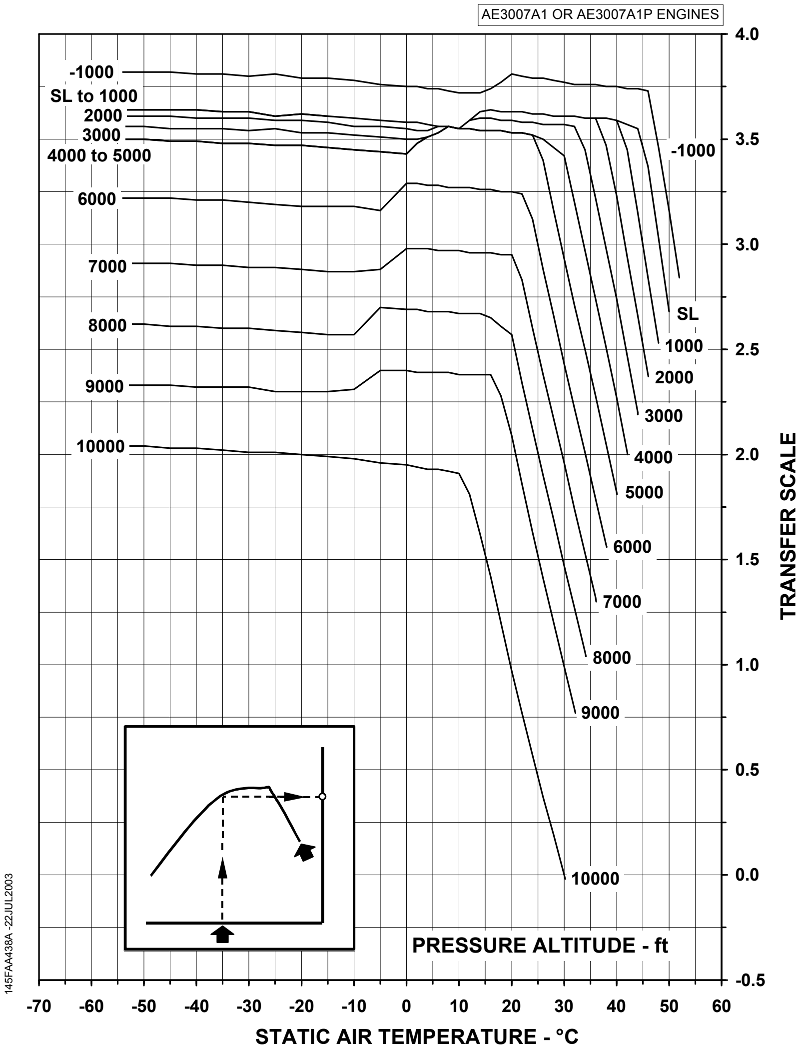
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 2 OF 2



NOTE : IN CASE OF ICE ACCRETION ON WING AND TAIL NON PROTECTED AREAS DECREASE THE APPROACH CLIMB GRADIENT BY 2.1%.

APPROACH CLIMB GRADIENT

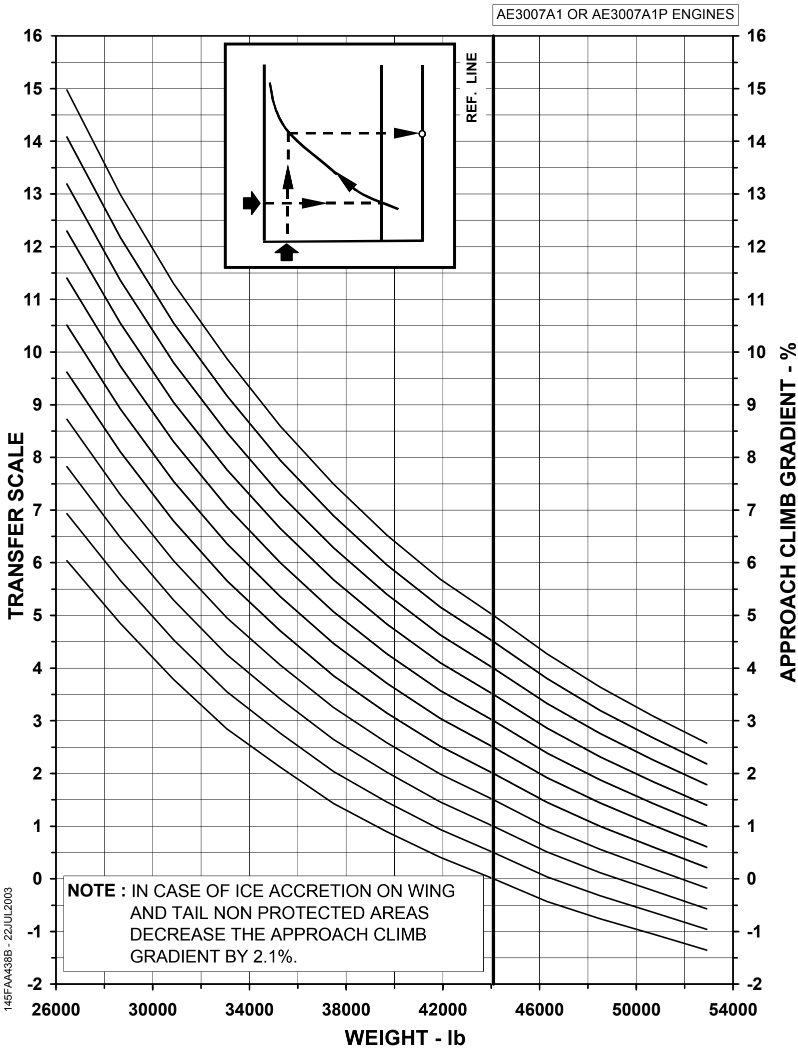
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 1 OF 2



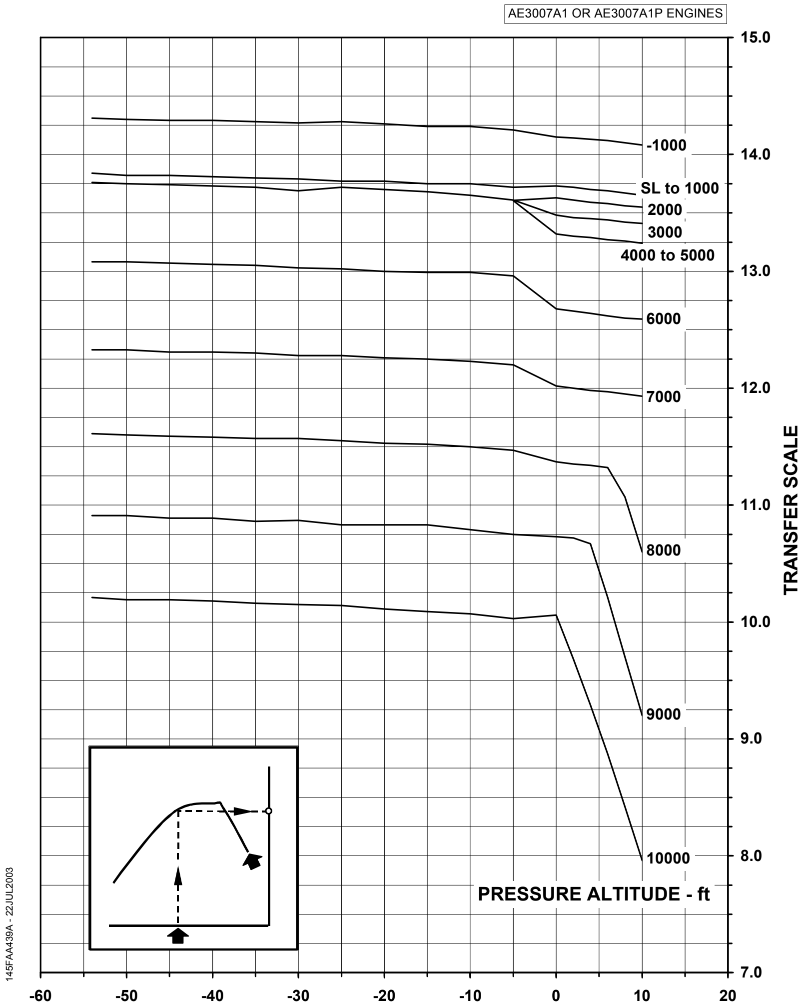
APPROACH CLIMB GRADIENT

ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF

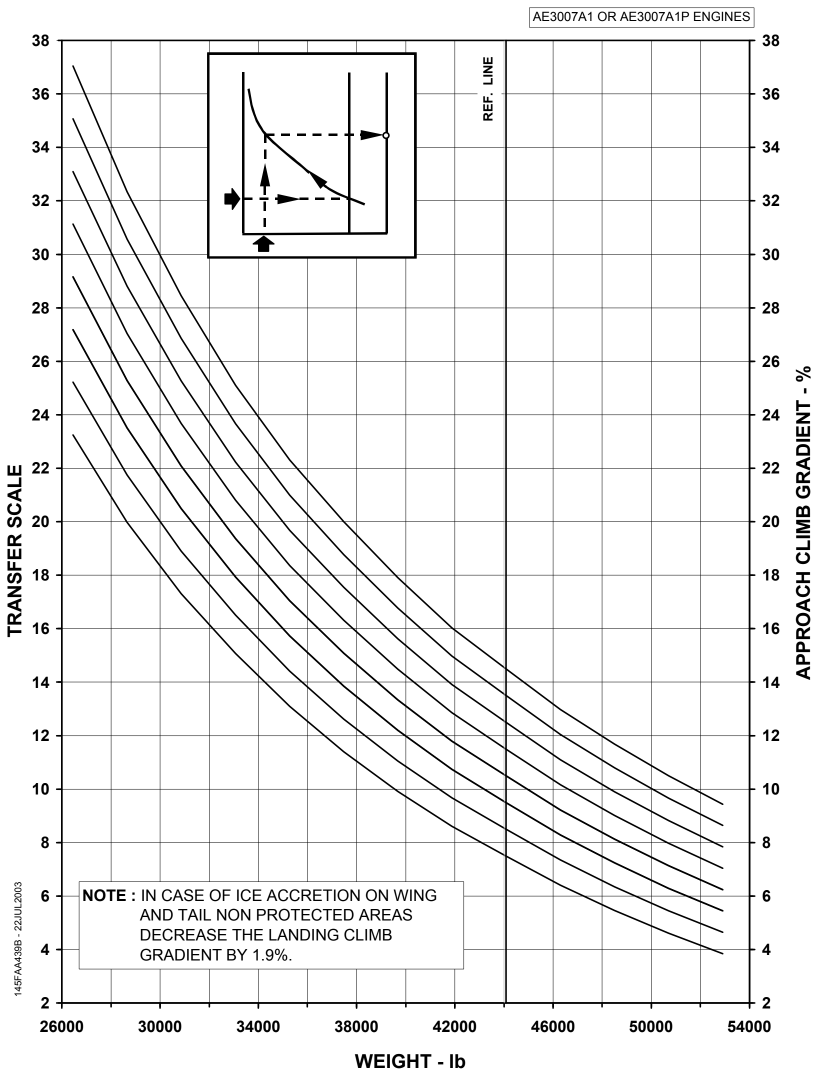
CHART 2 OF 2



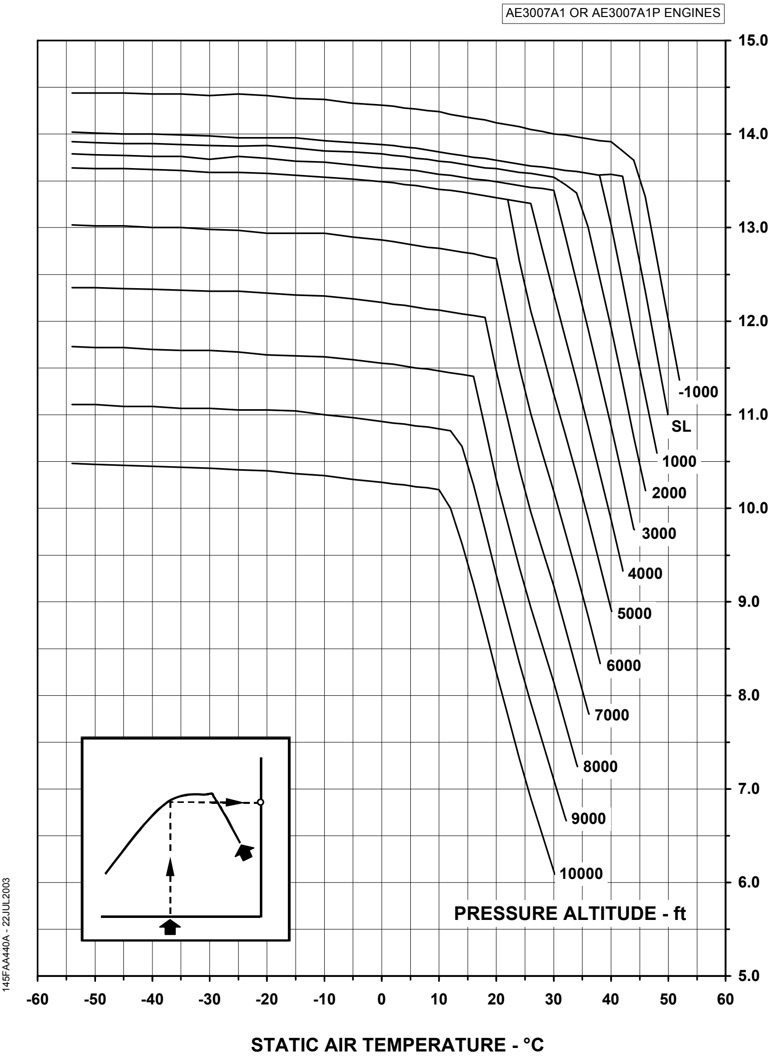
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 1 OF 2



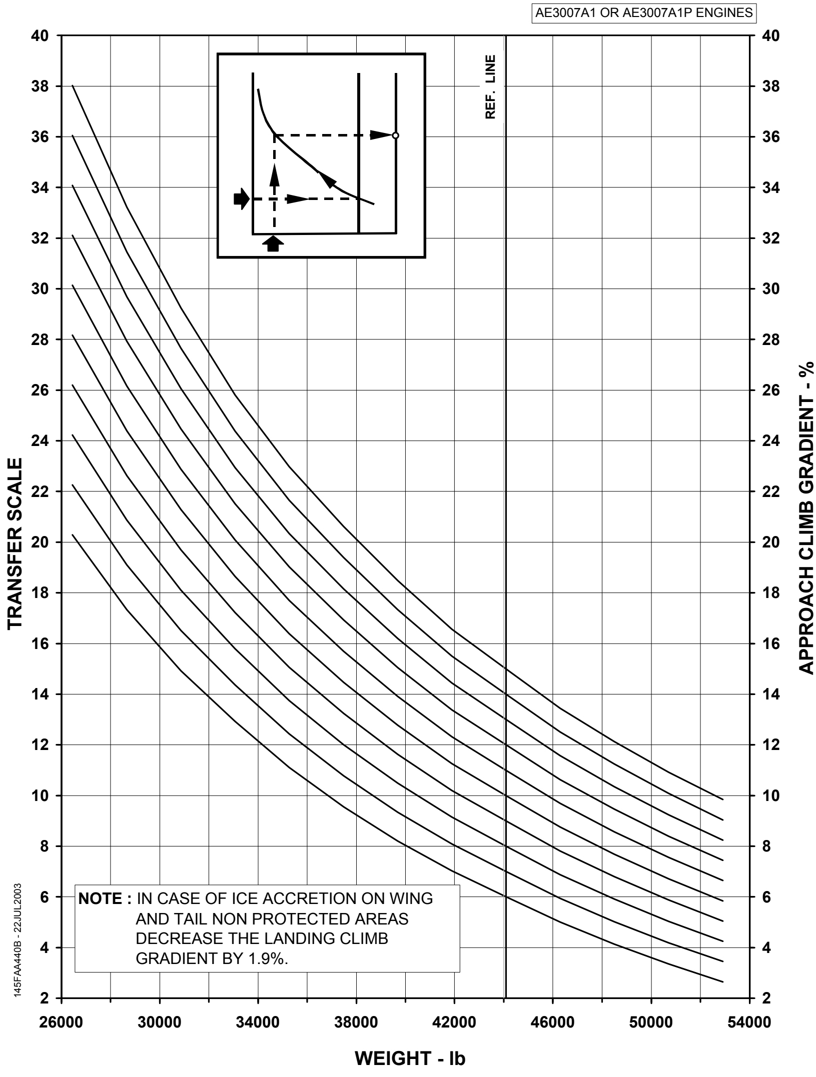
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 2 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 1 OF 2



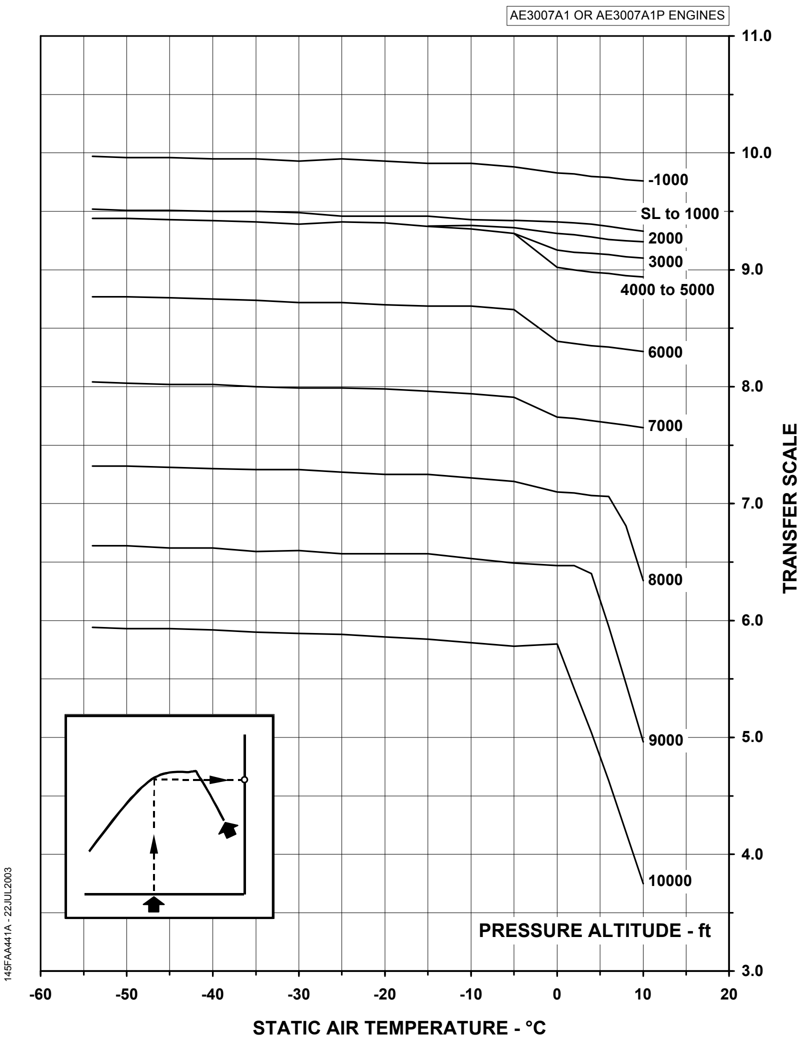
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 2 OF 2



LANDING CLIMB GRADIENT

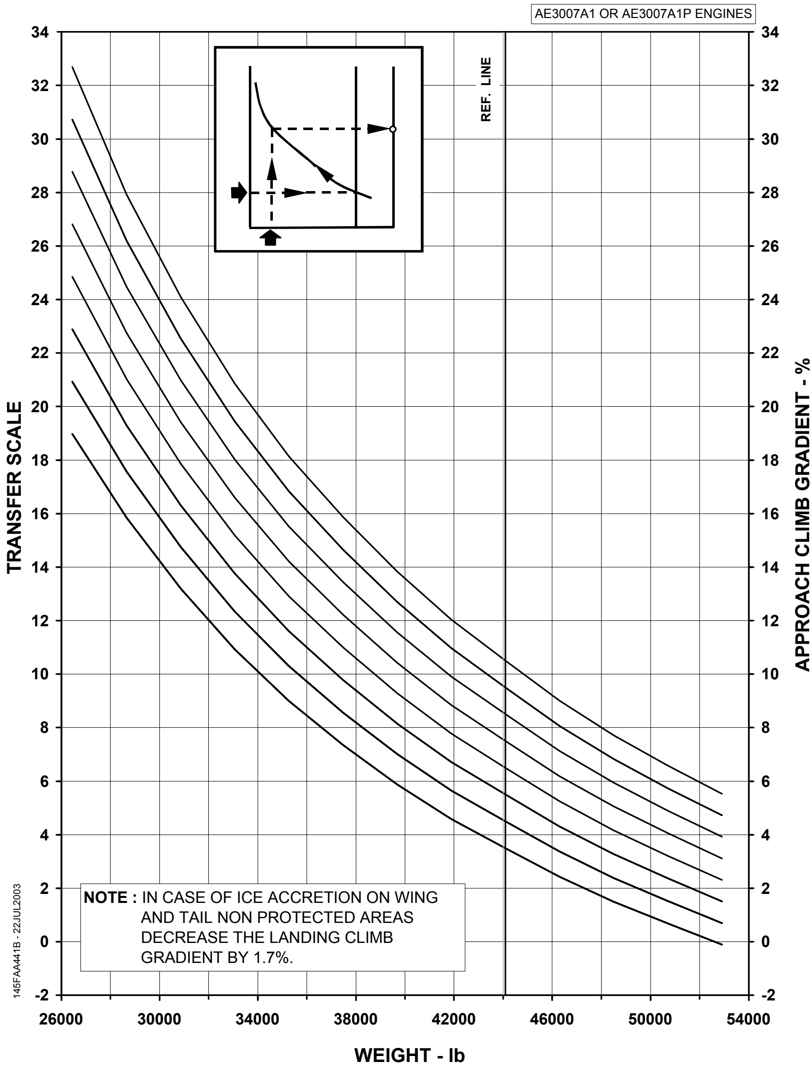
ALL ENGINES - FLAPS 45° - ANTI-ICE ON

CHART 1 OF 2

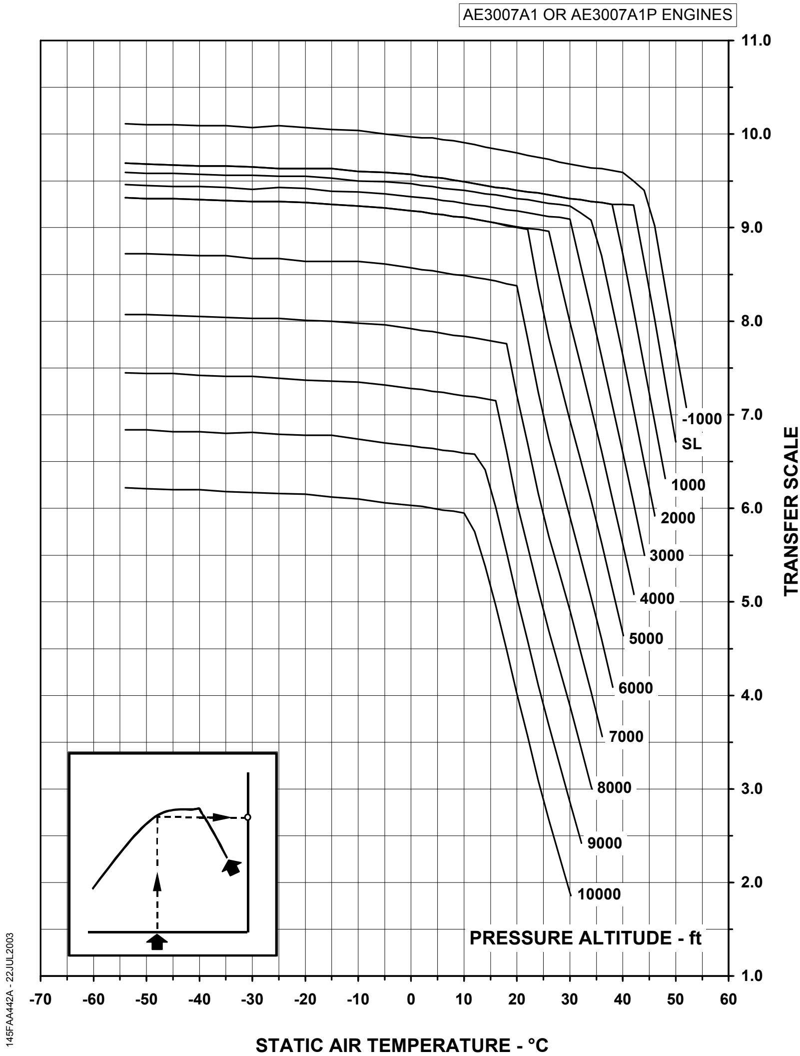


LANDING CLIMB GRADIENT

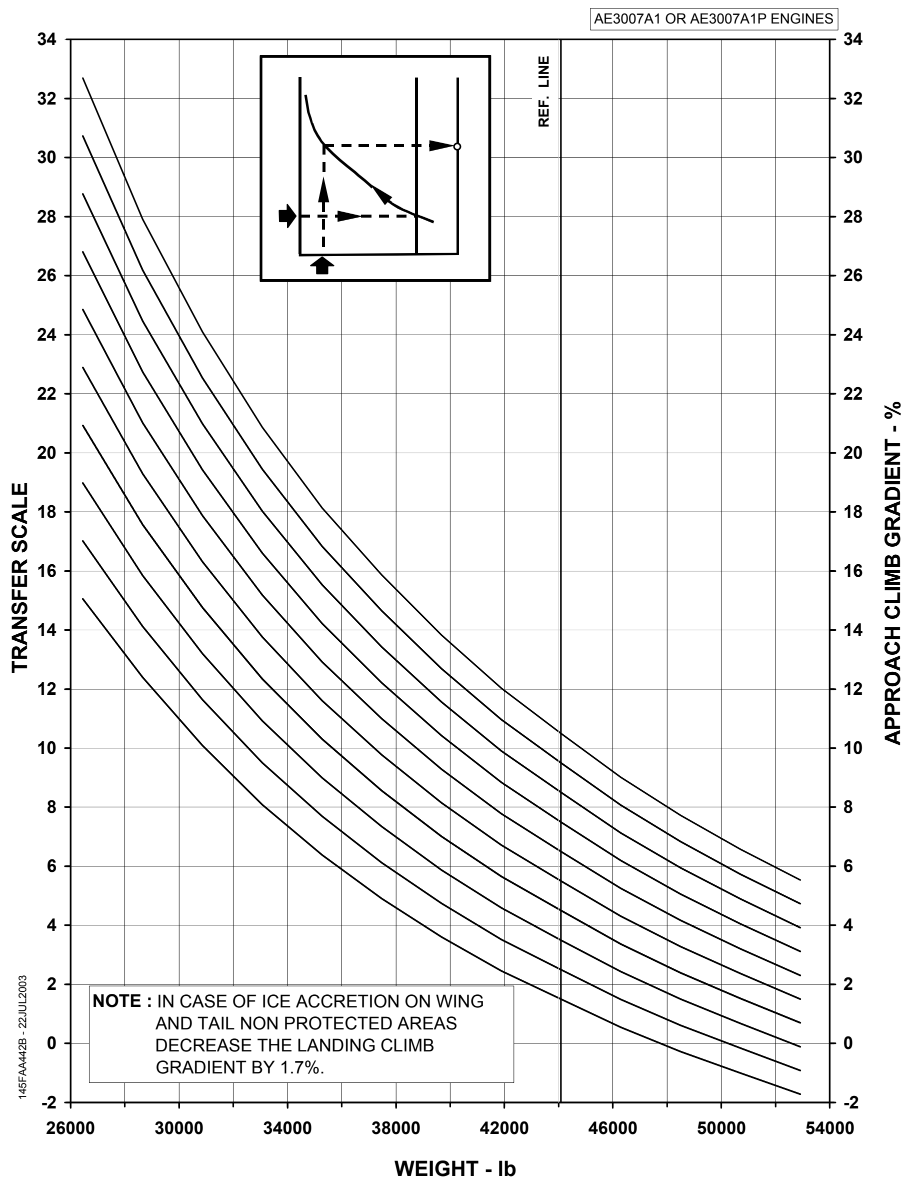
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 2 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 1 OF 2

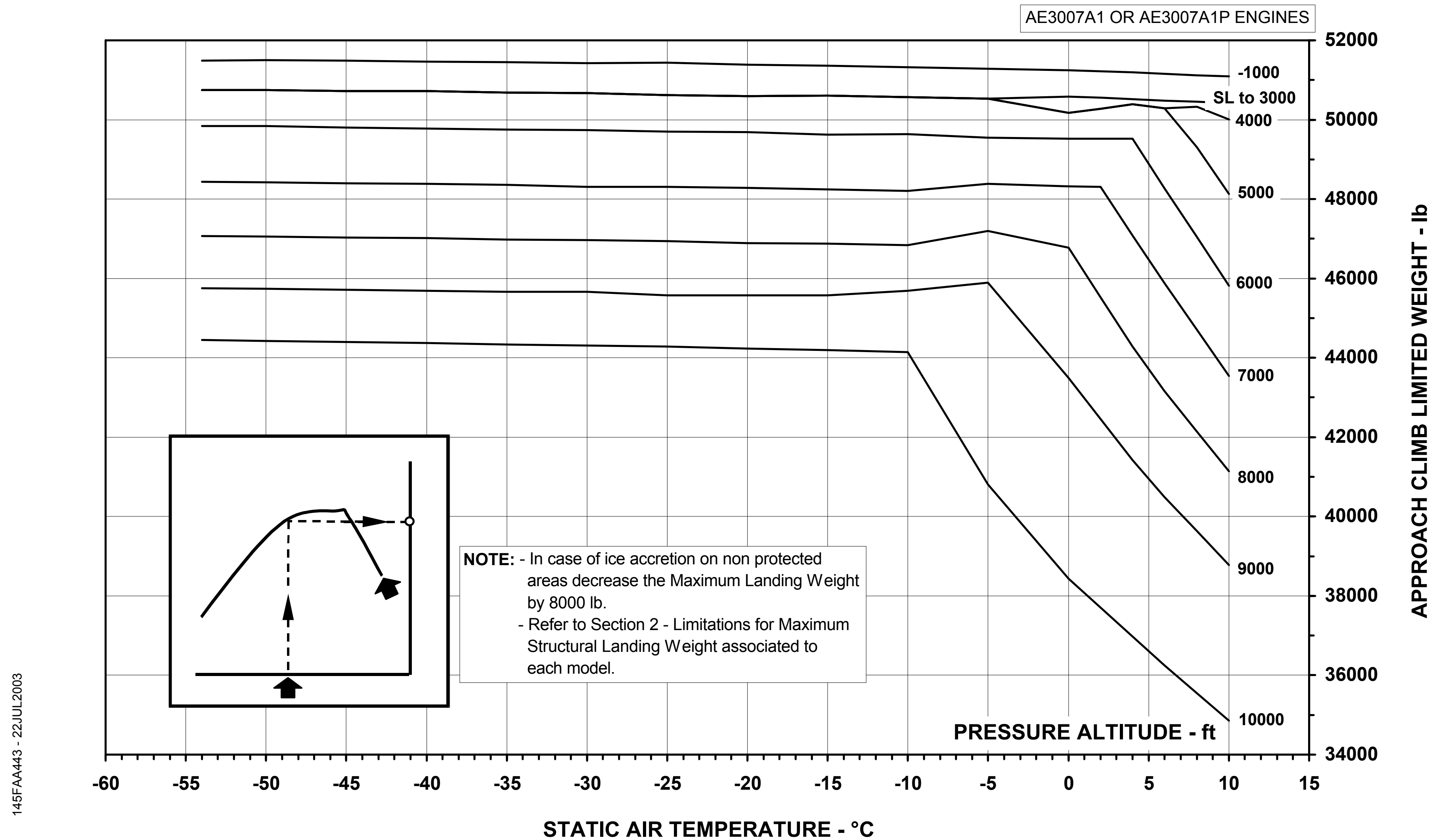


LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 2 OF 2



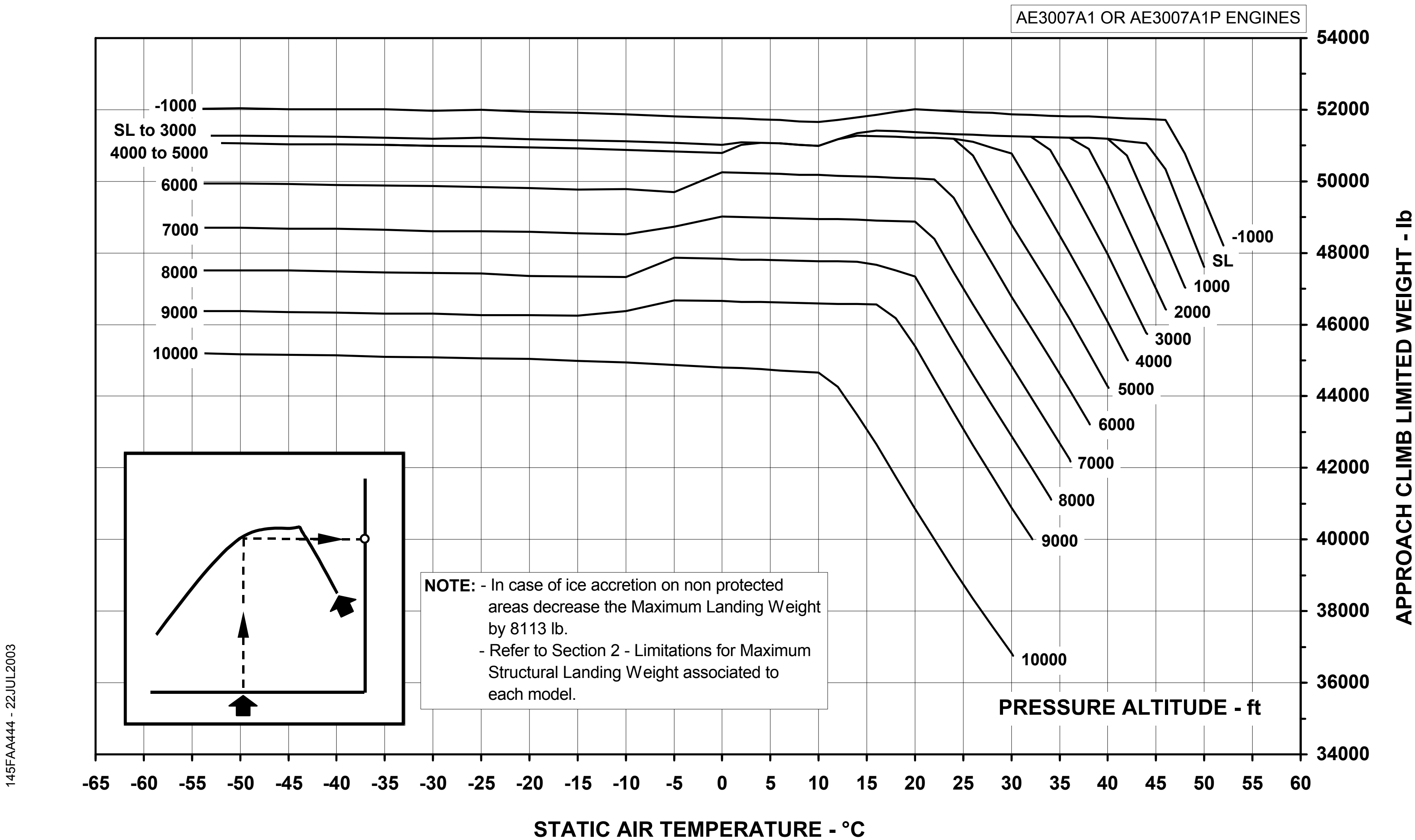
MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

APPROACH FLAPS 9° - ANTI-ICE ON



MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

APPROACH FLAPS 9° - ANTI-ICE OFF

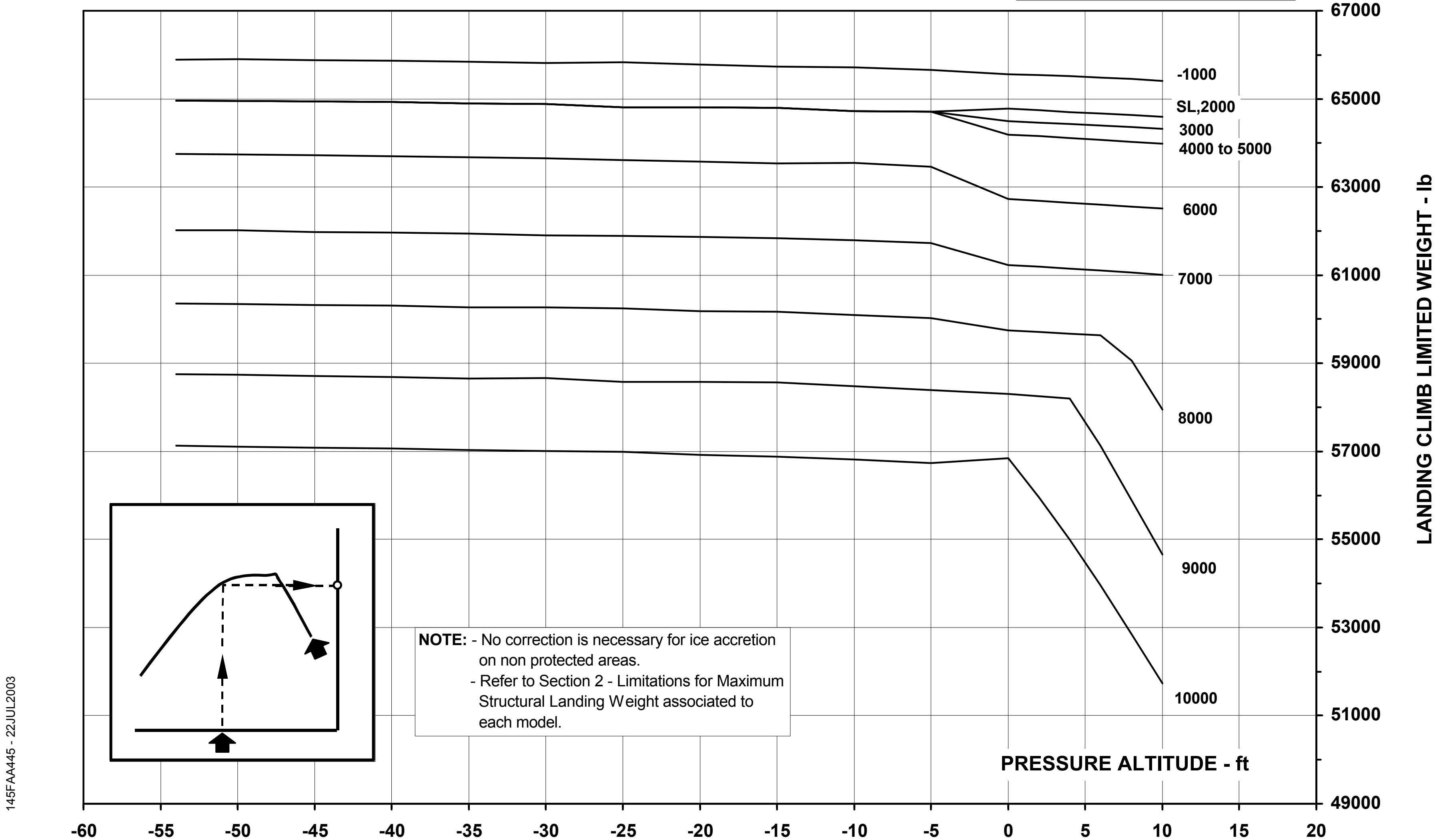


NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 8113 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 22° - ANTI-ICE ON

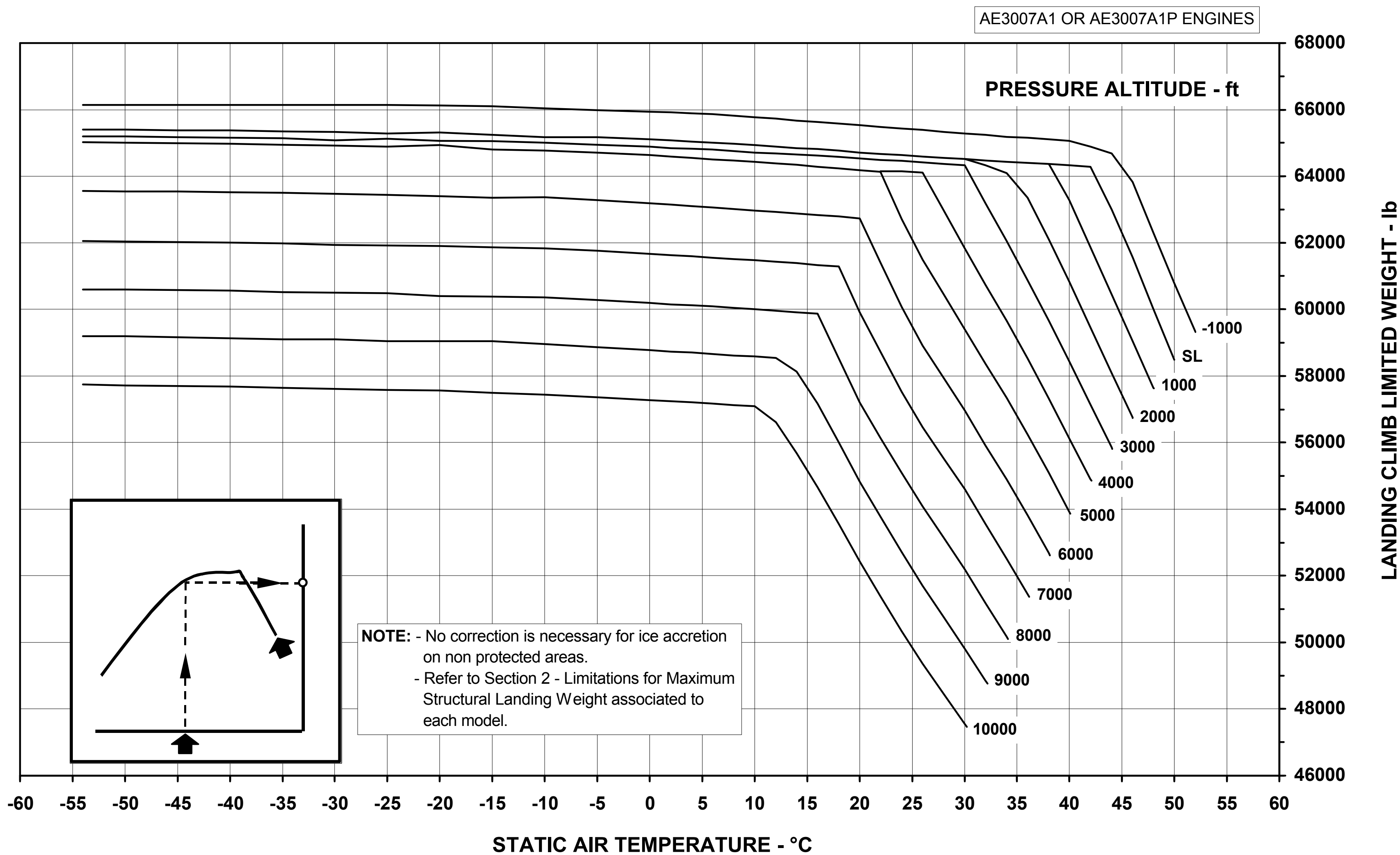
AE3007A1 OR AE3007A1P ENGINES



NOTE: - No correction is necessary for ice accretion on non protected areas.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 22° - ANTI-ICE OFF



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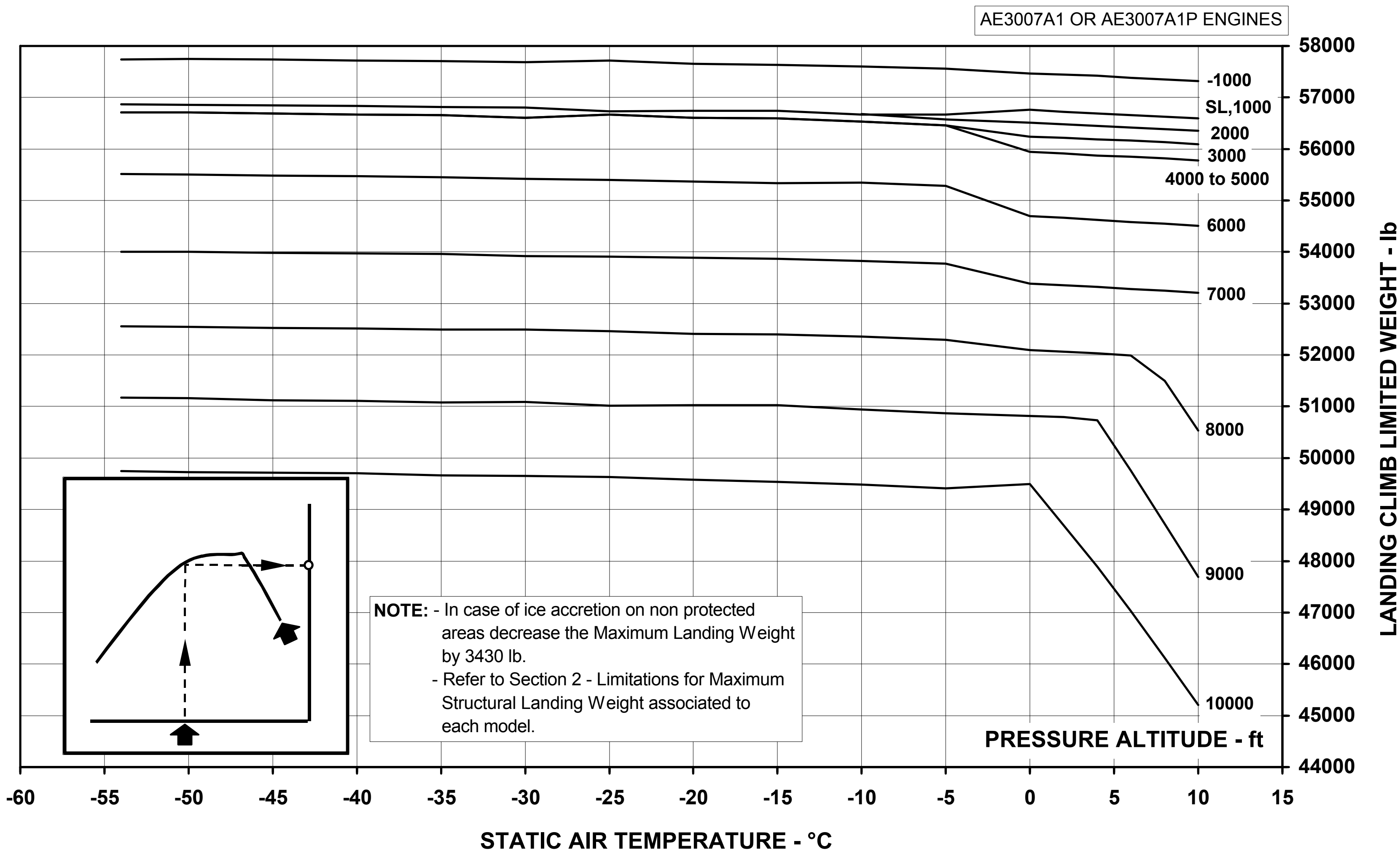
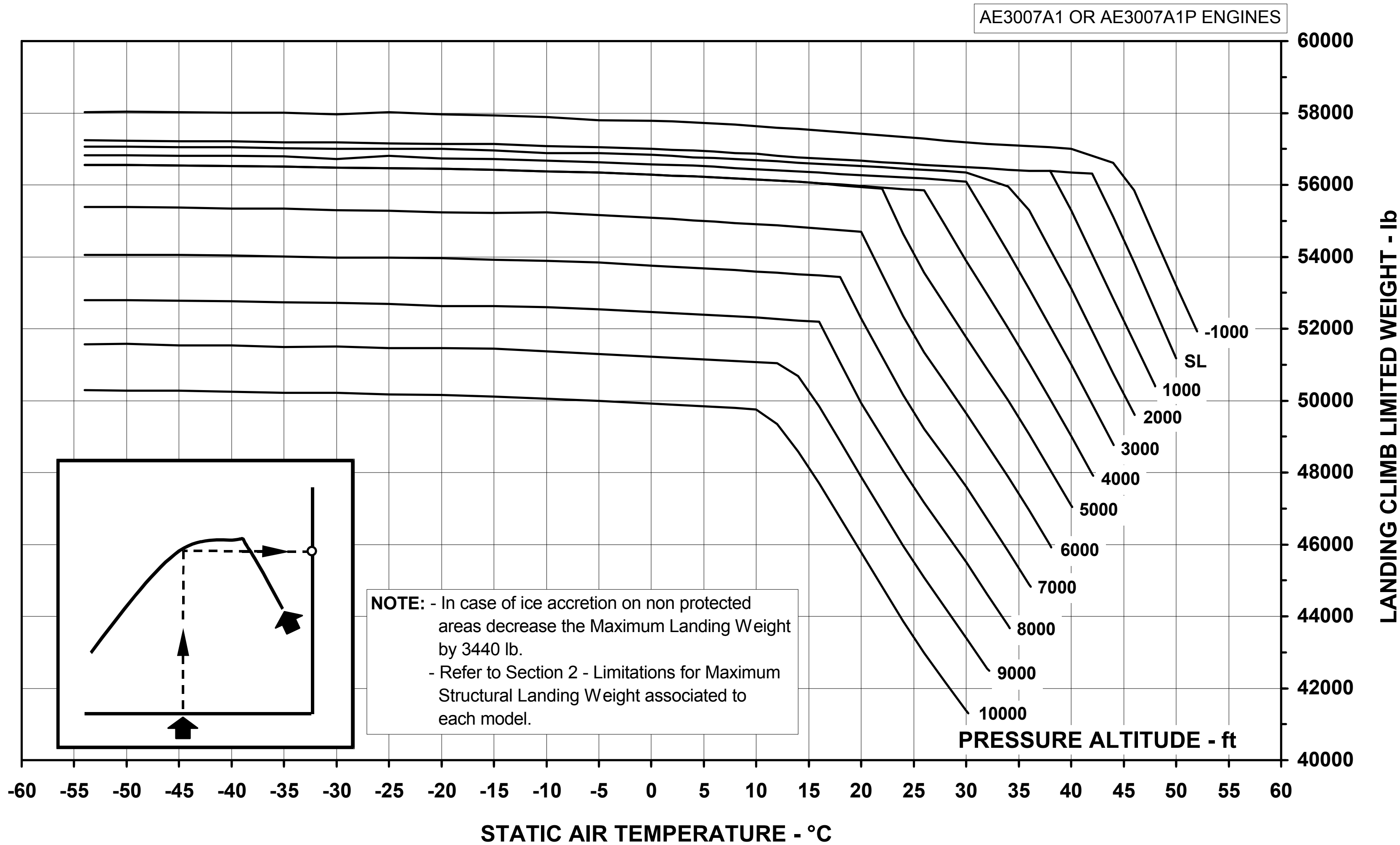
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE ON



MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE OFF



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 3440 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

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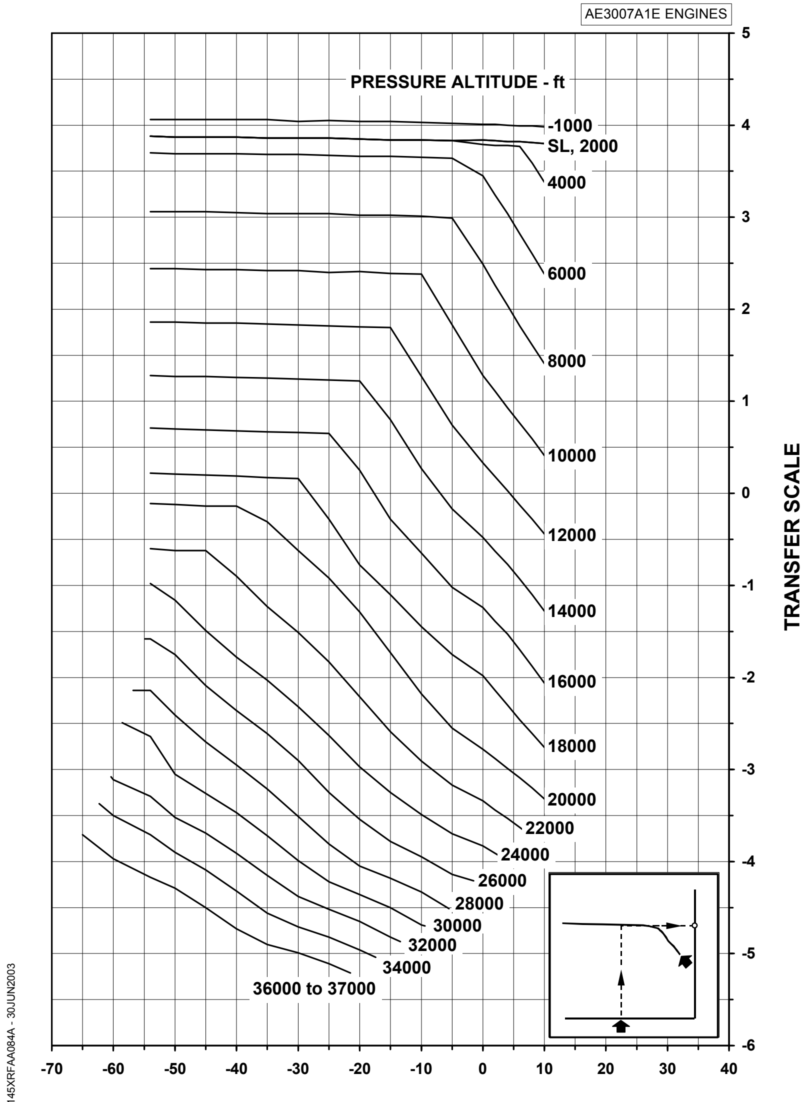
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A1E ENGINES

The following performance charts are applicable to airplanes equipped with AE3007A1E engines.

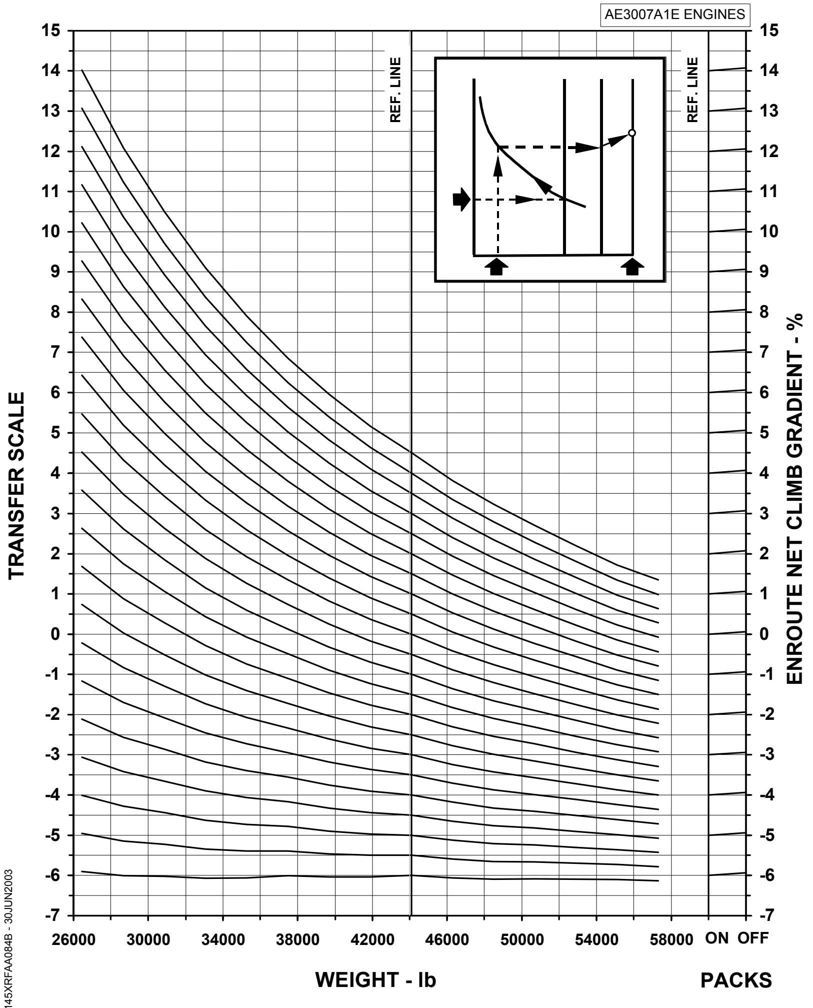
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE ON

CHART 1 OF 2



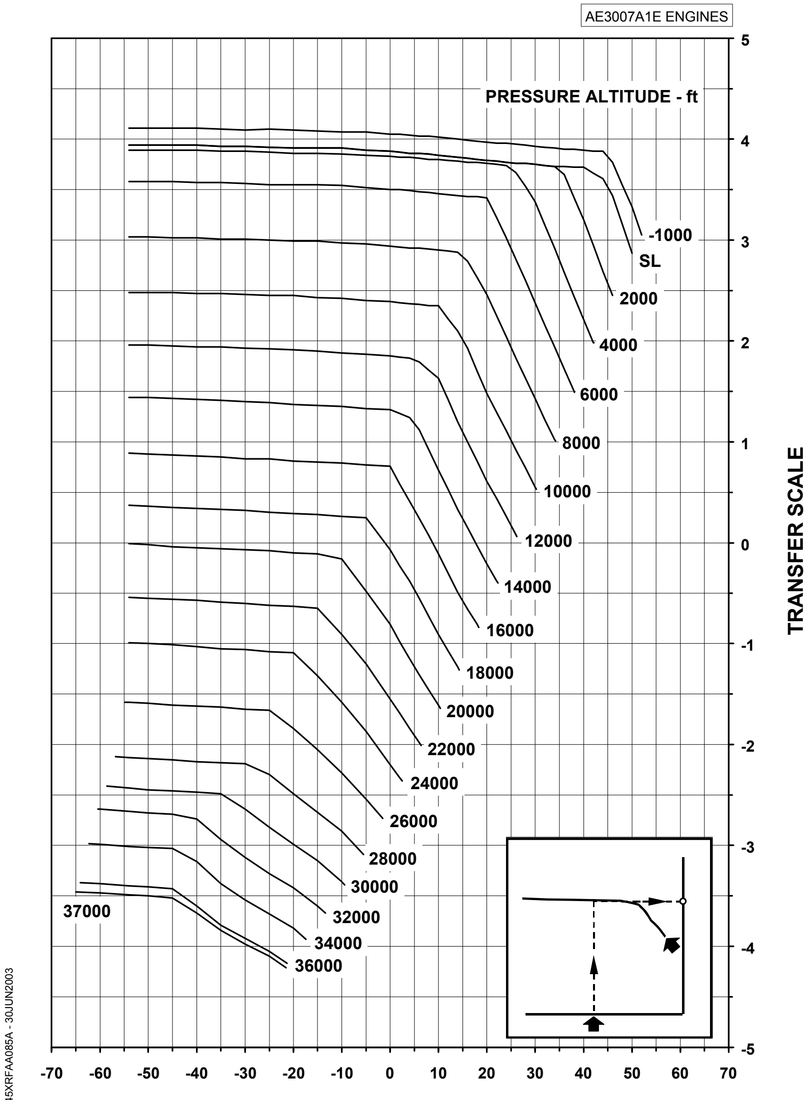
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE
FLAPS UP - ANTI-ICE ON
CHART 2 OF 2



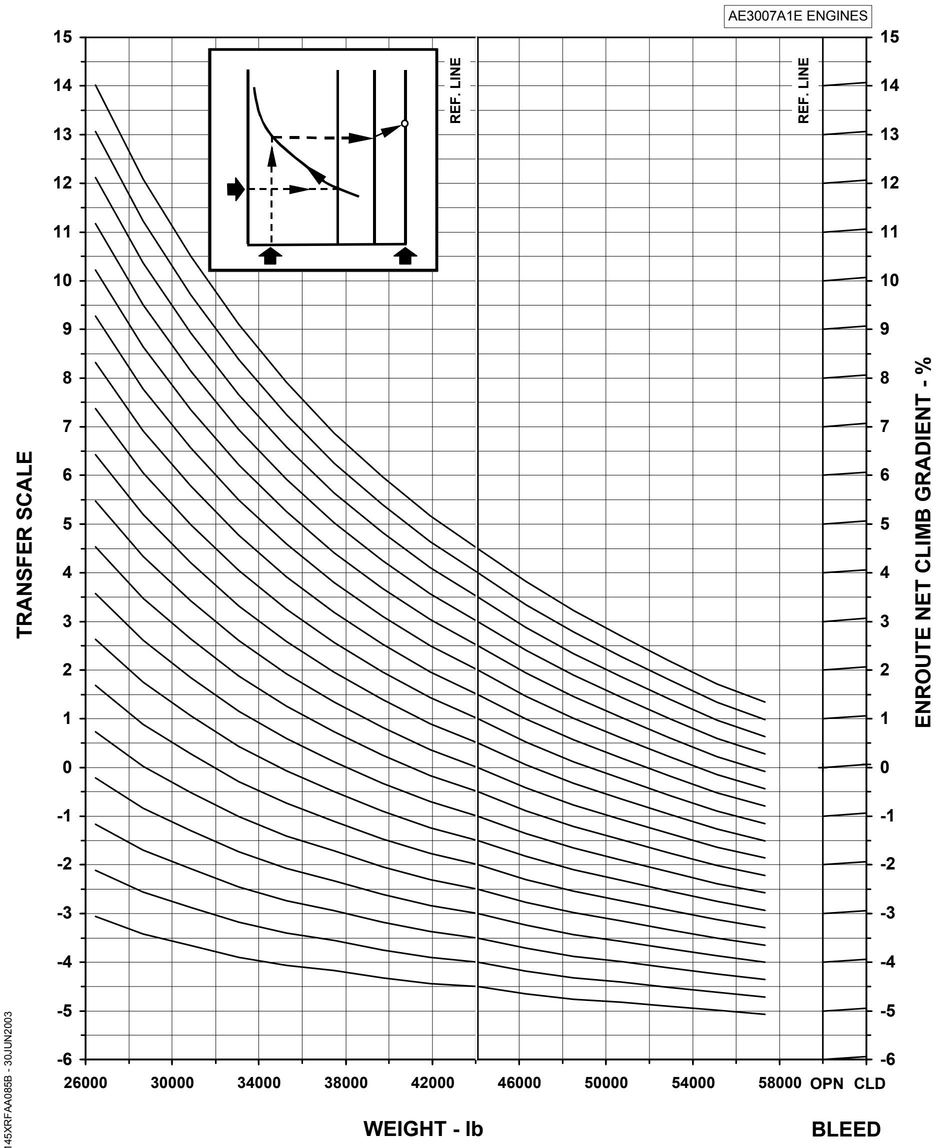
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE OFF

CHART 1 OF 2

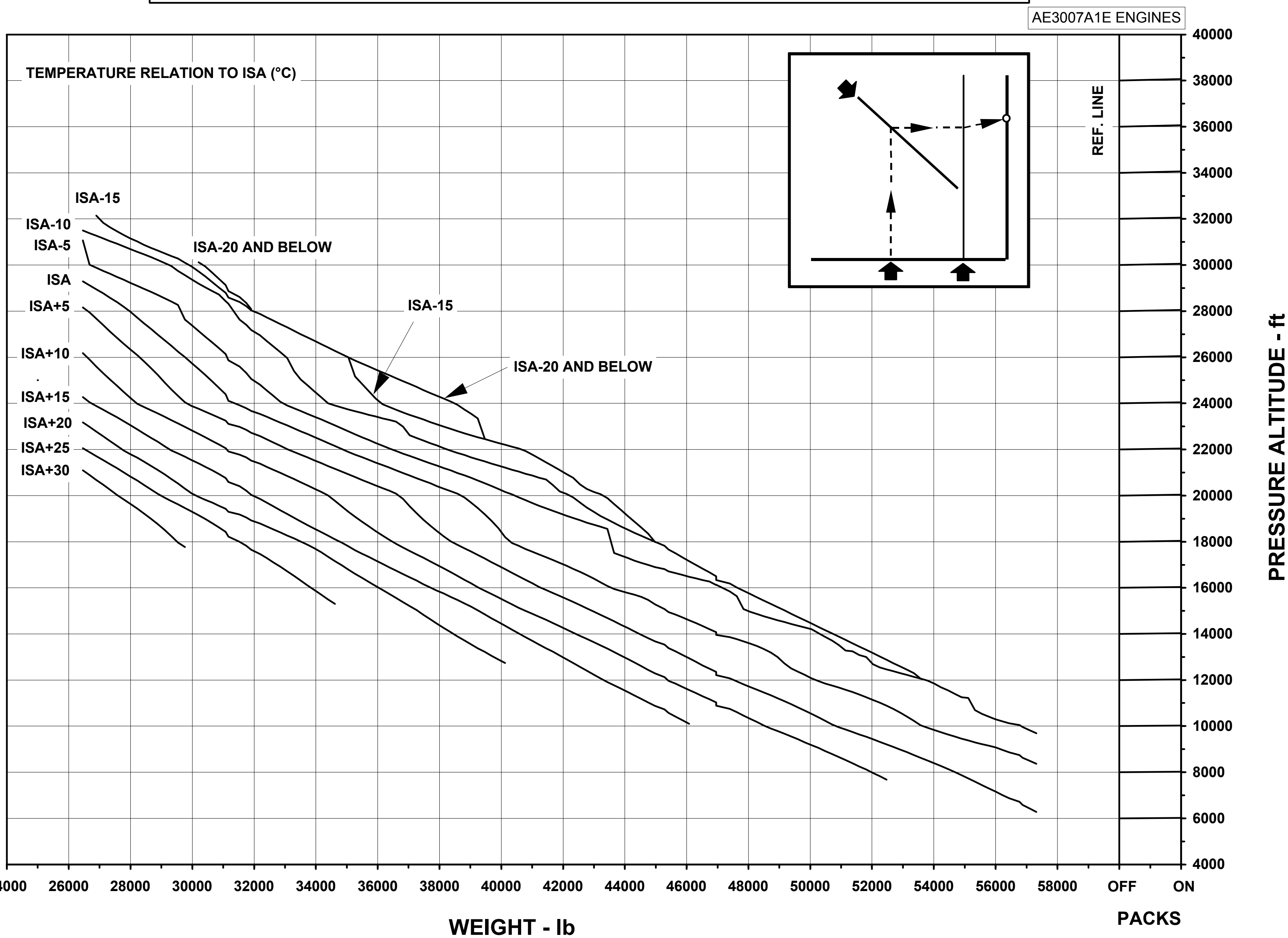


ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE
FLAPS UP - ANTI-ICE OFF
CHART 2 OF 2



ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE ON



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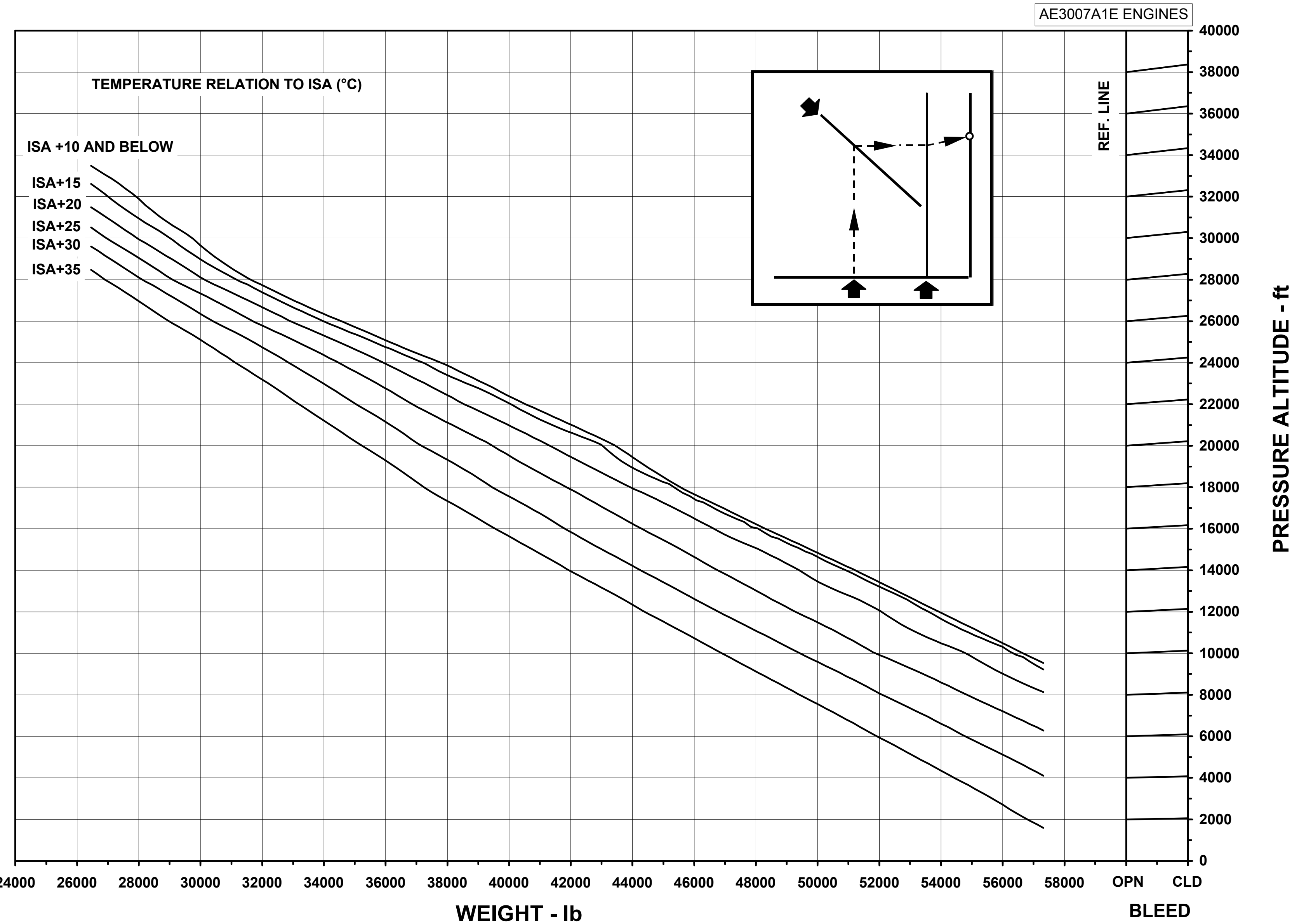
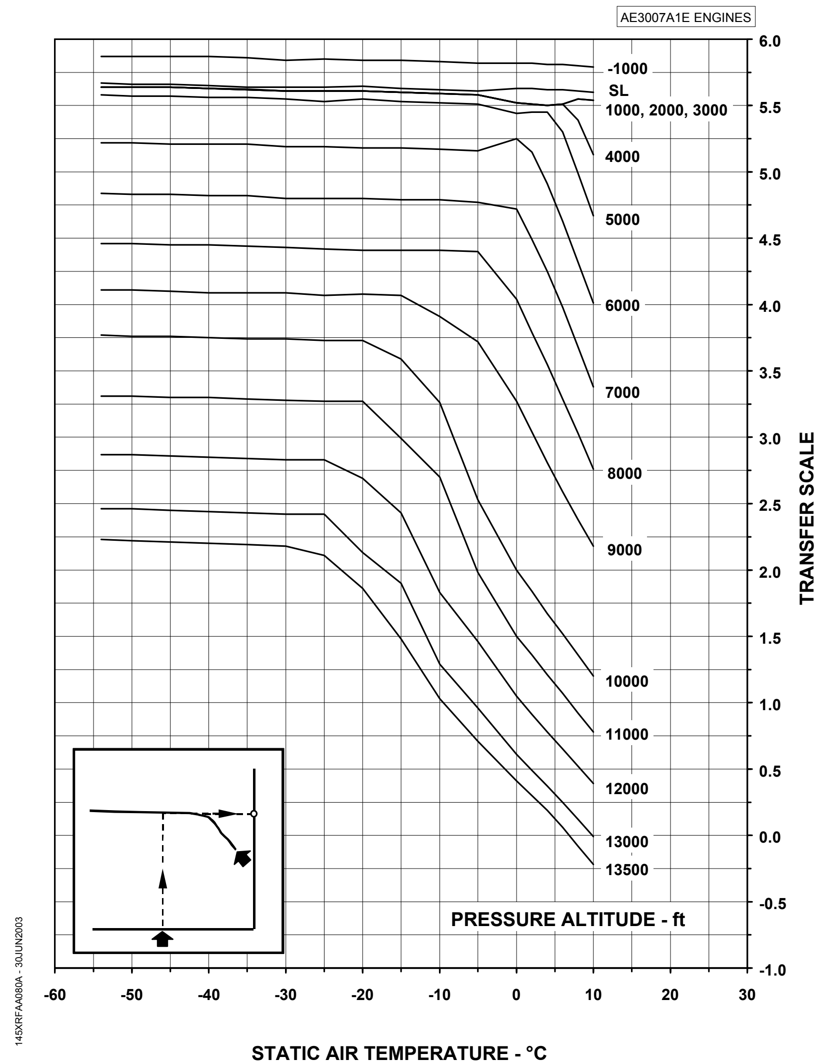
ENROUTE CLIMB WEIGHTS FOR POSITIVE GRADIENT

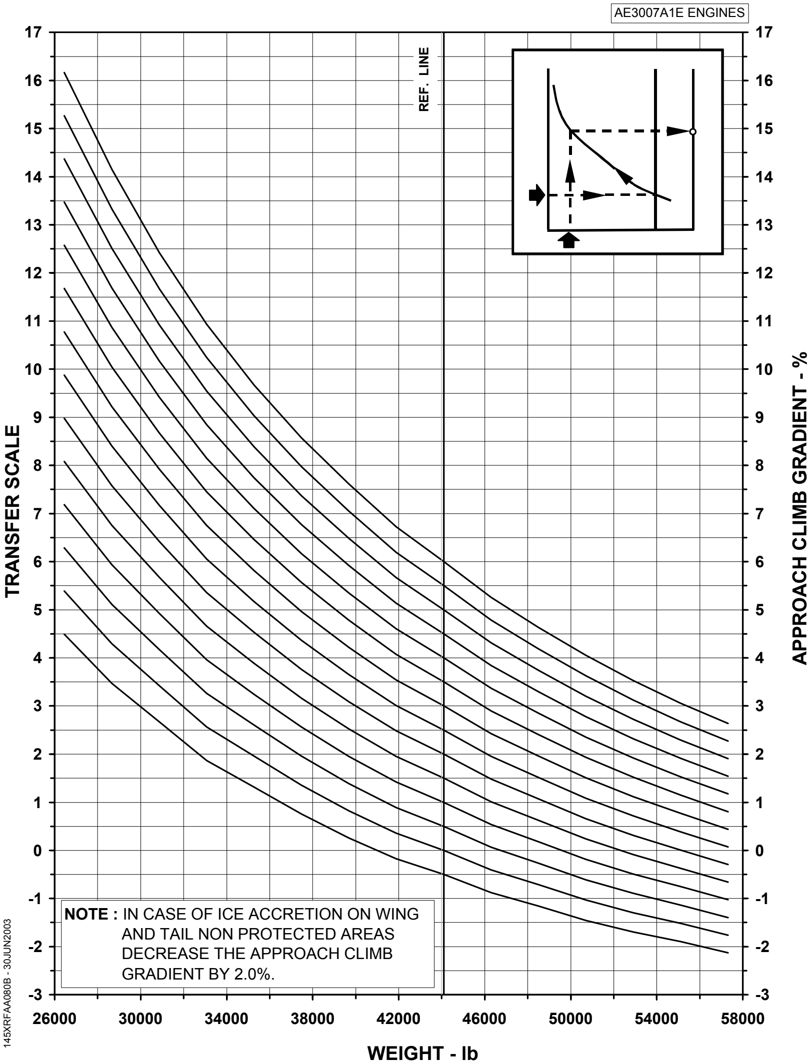
FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF



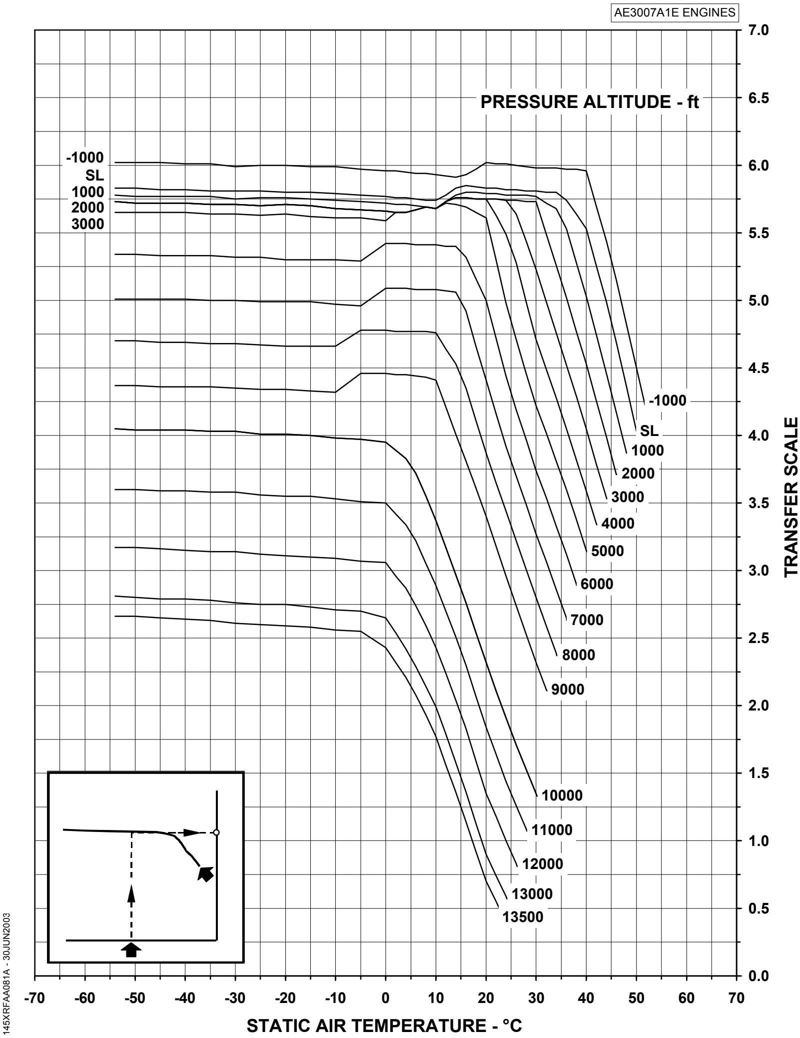
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 1 OF 2



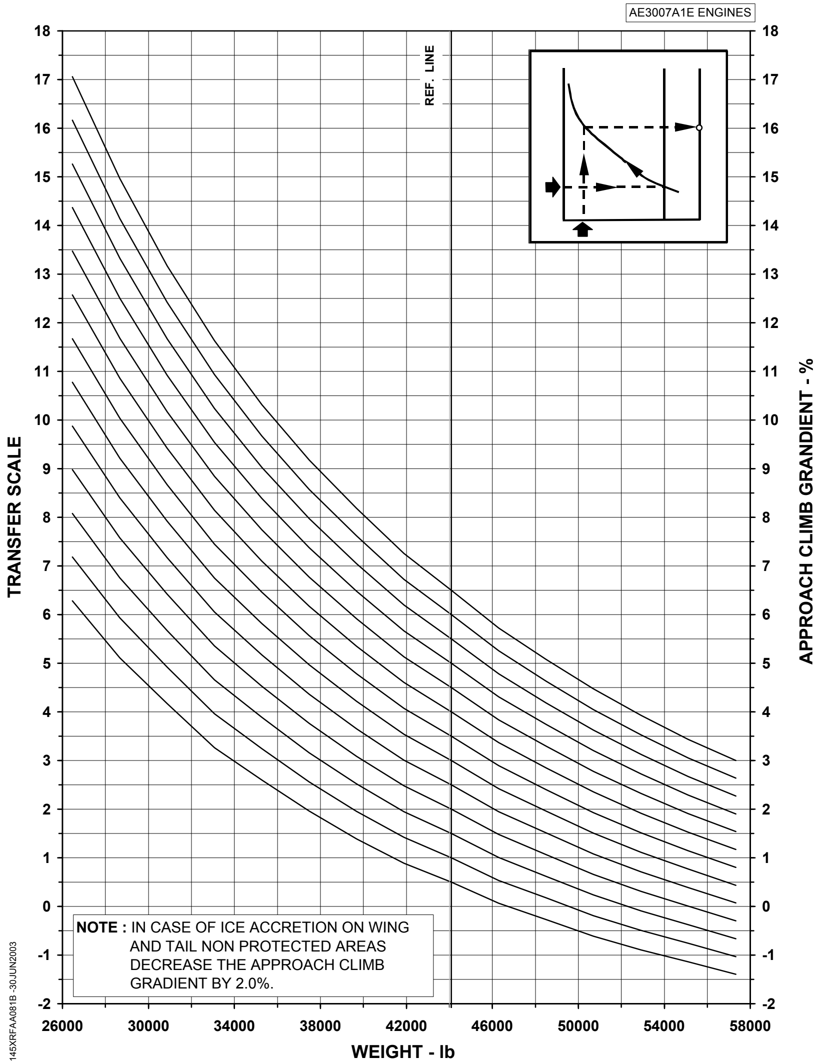
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 2 OF 2



APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 1 OF 2

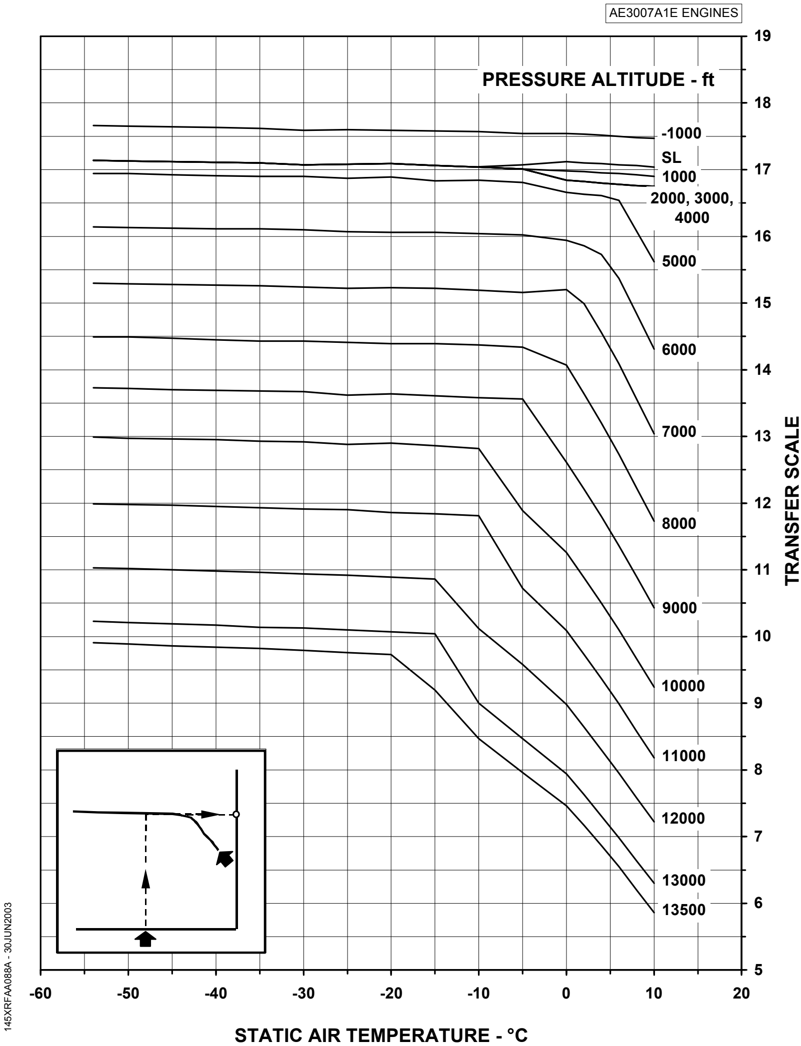


APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 2 OF 2

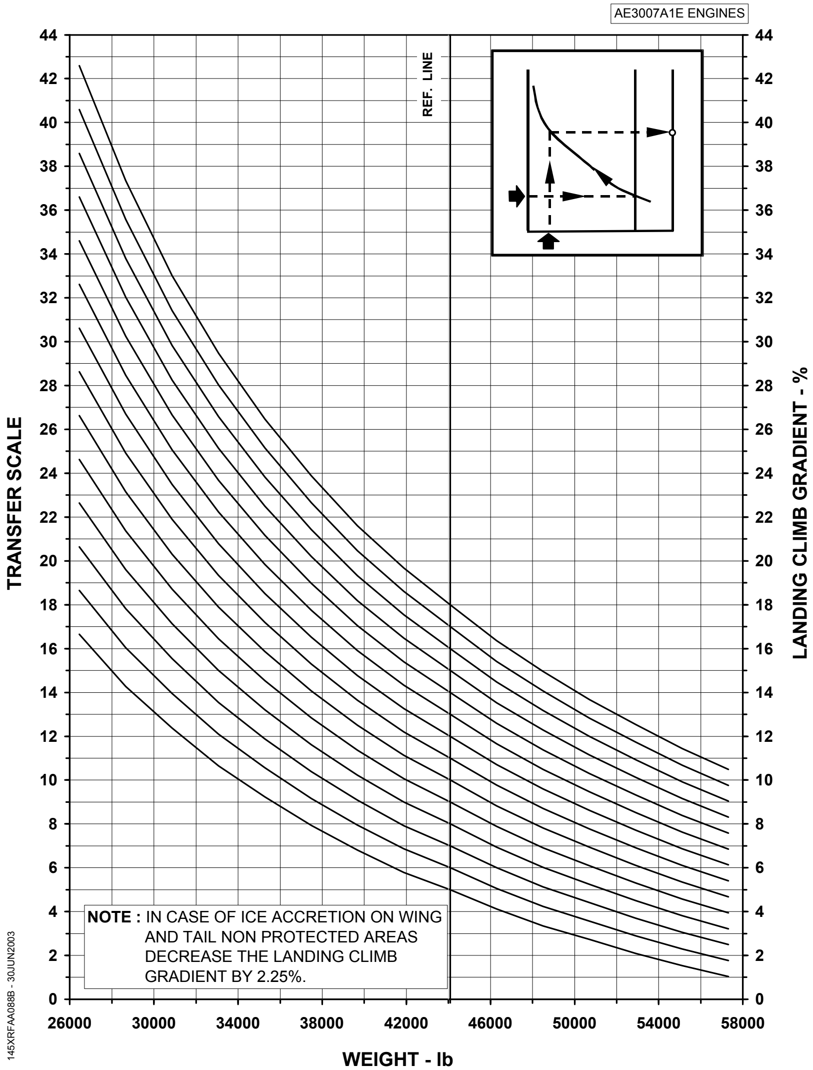


NOTE : IN CASE OF ICE ACCRETION ON WING AND TAIL NON PROTECTED AREAS DECREASE THE APPROACH CLIMB GRADIENT BY 2.0%.

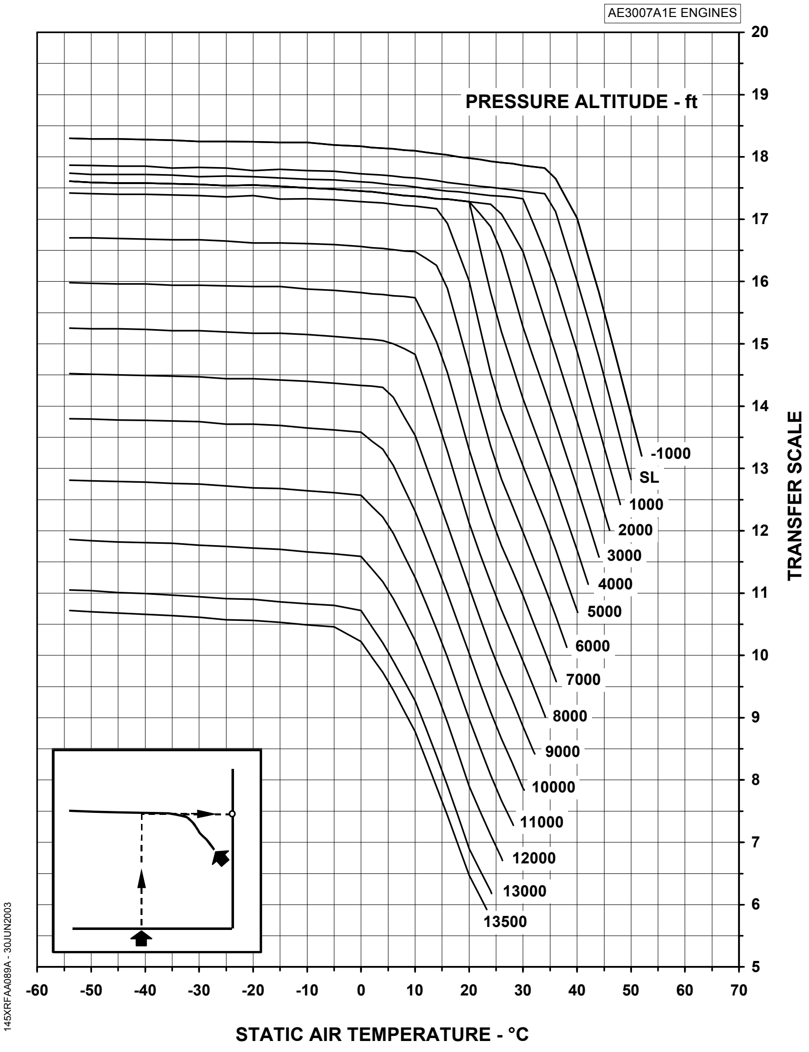
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22º - ANTI-ICE ON
CHART 1 OF 2



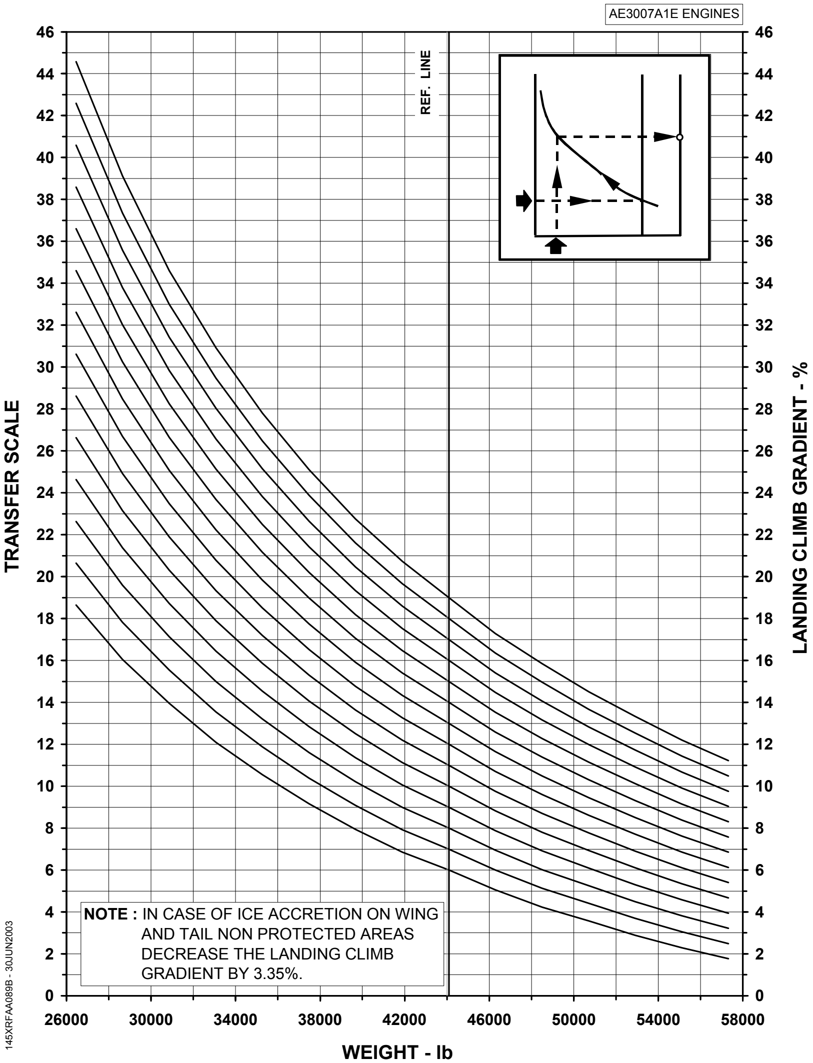
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22º - ANTI-ICE ON
CHART 2 OF 2



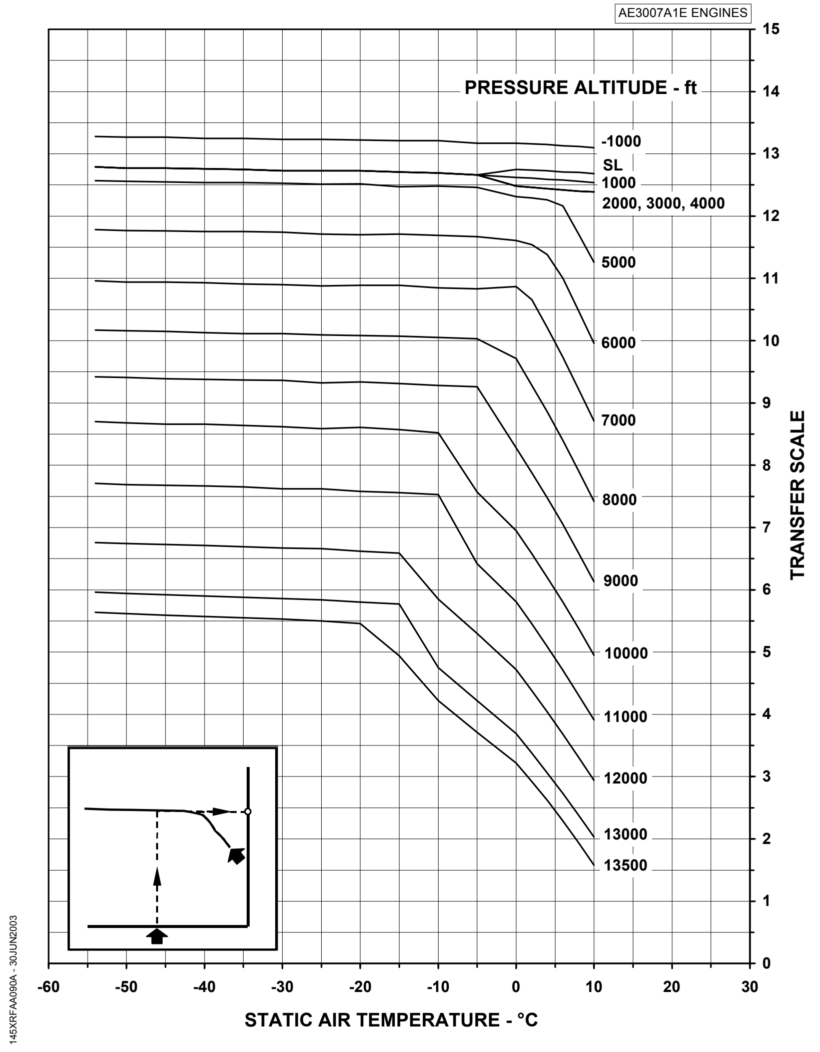
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22º - ANTI-ICE OFF
CHART 1 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22º - ANTI-ICE OFF
CHART 2 OF 2

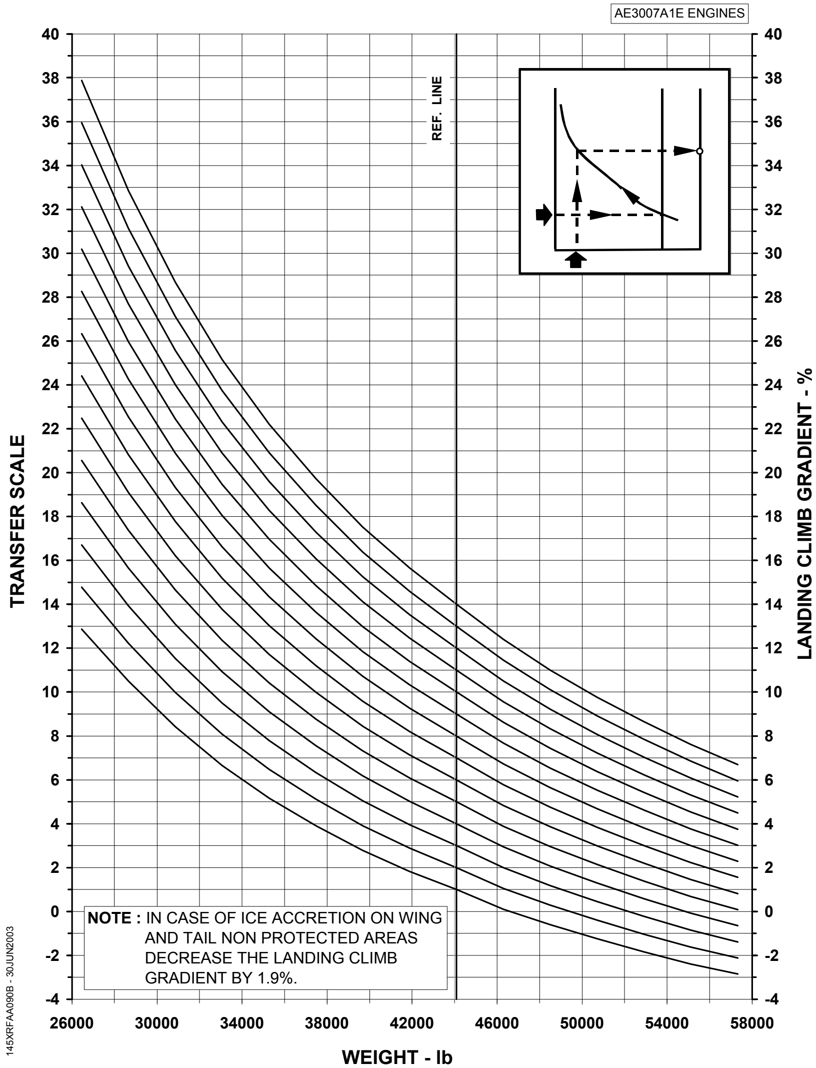


LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45º - ANTI-ICE ON
CHART 1 OF 2

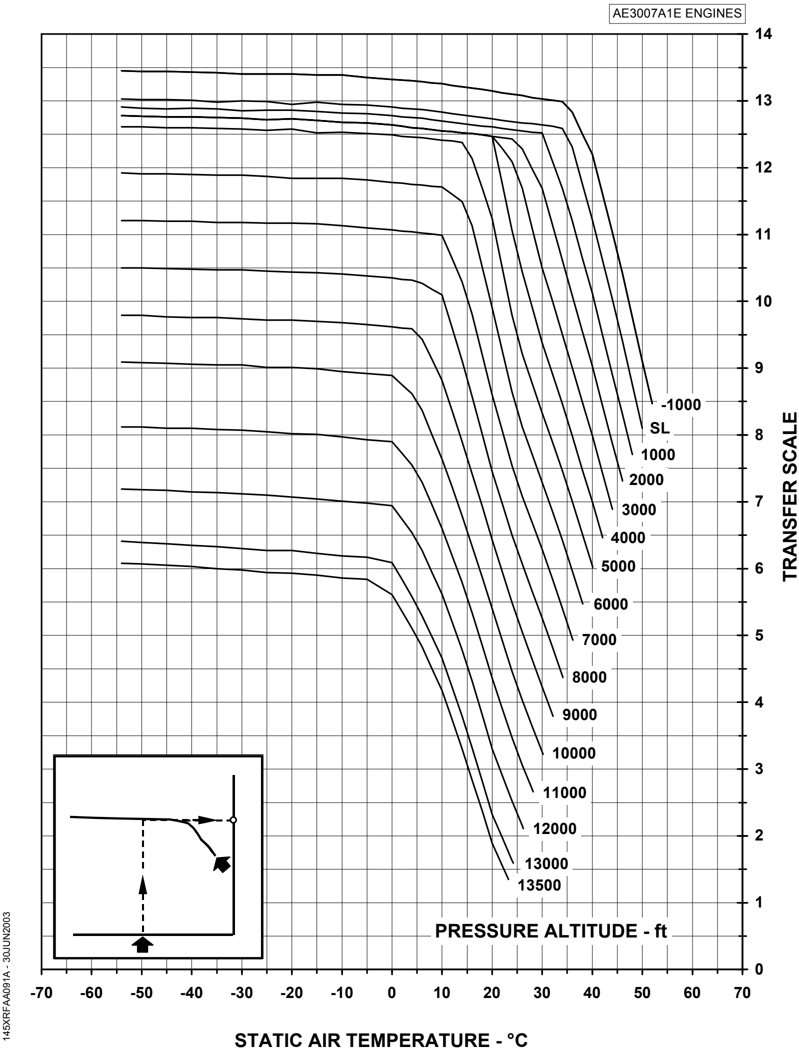


LANDING CLIMB GRADIENT

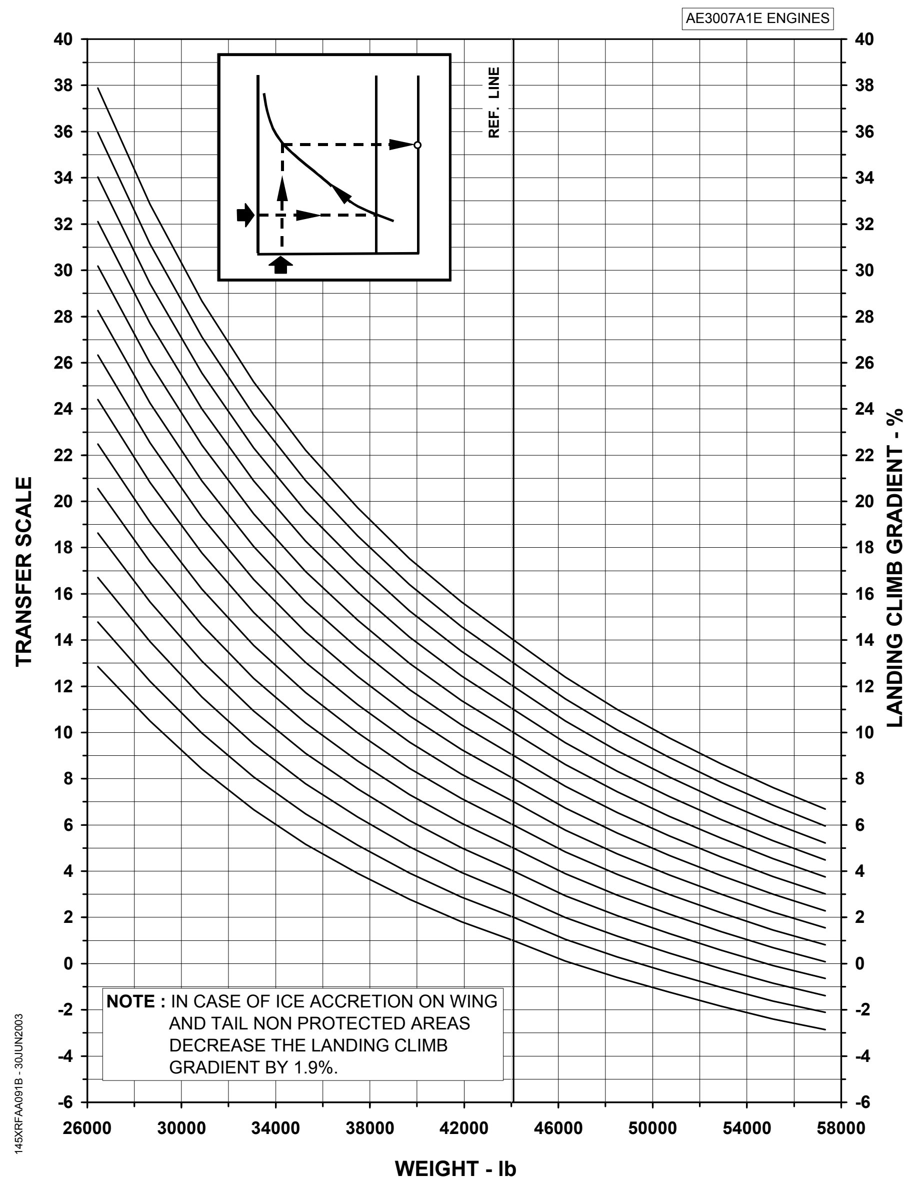
ALL ENGINES - FLAPS 45º - ANTI-ICE ON
CHART 2 OF 2



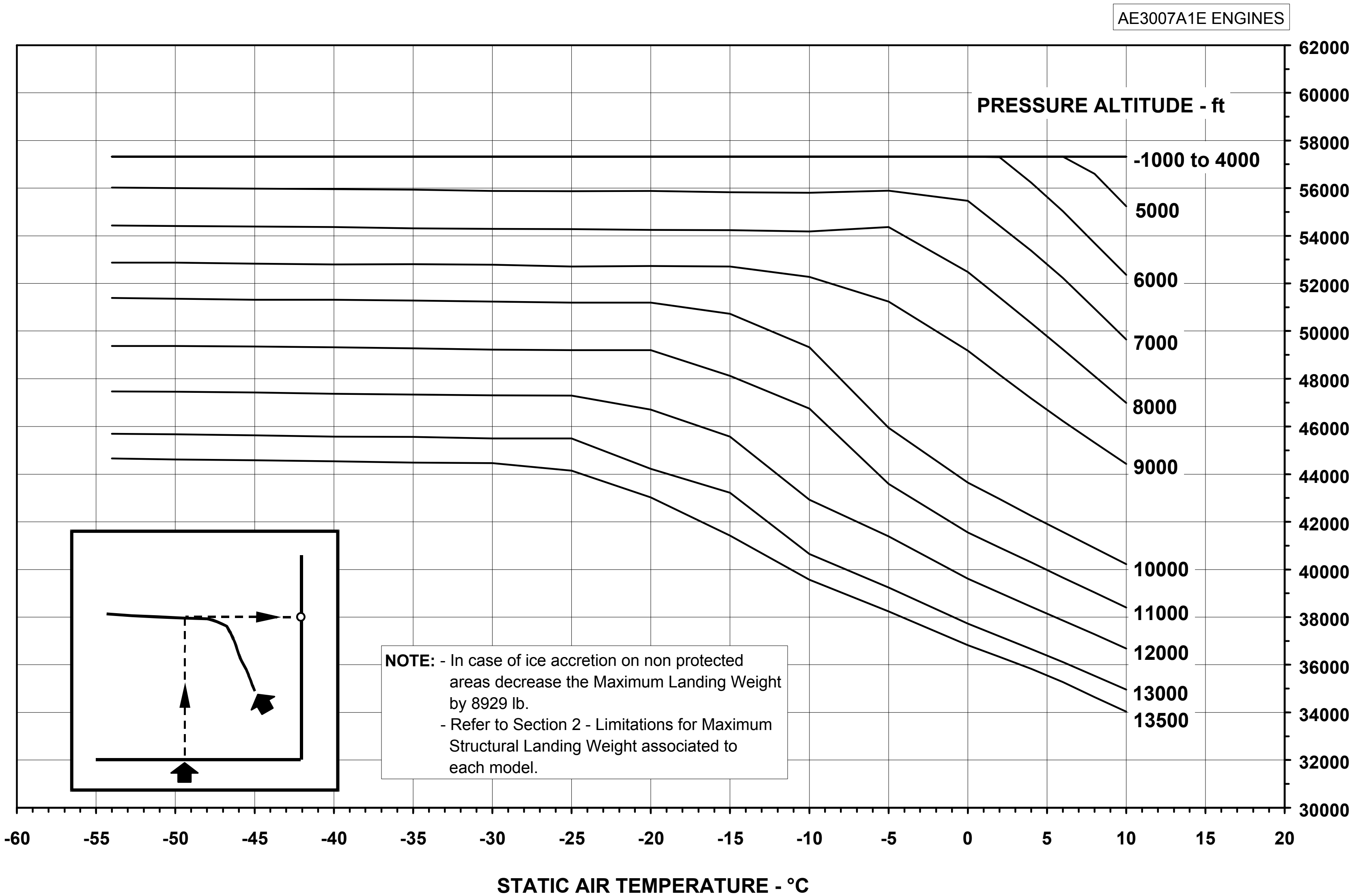
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45º - ANTI-ICE OFF
CHART 1 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 2 OF 2



MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED
APPROACH FLAPS 9º - ANTI-ICE ON

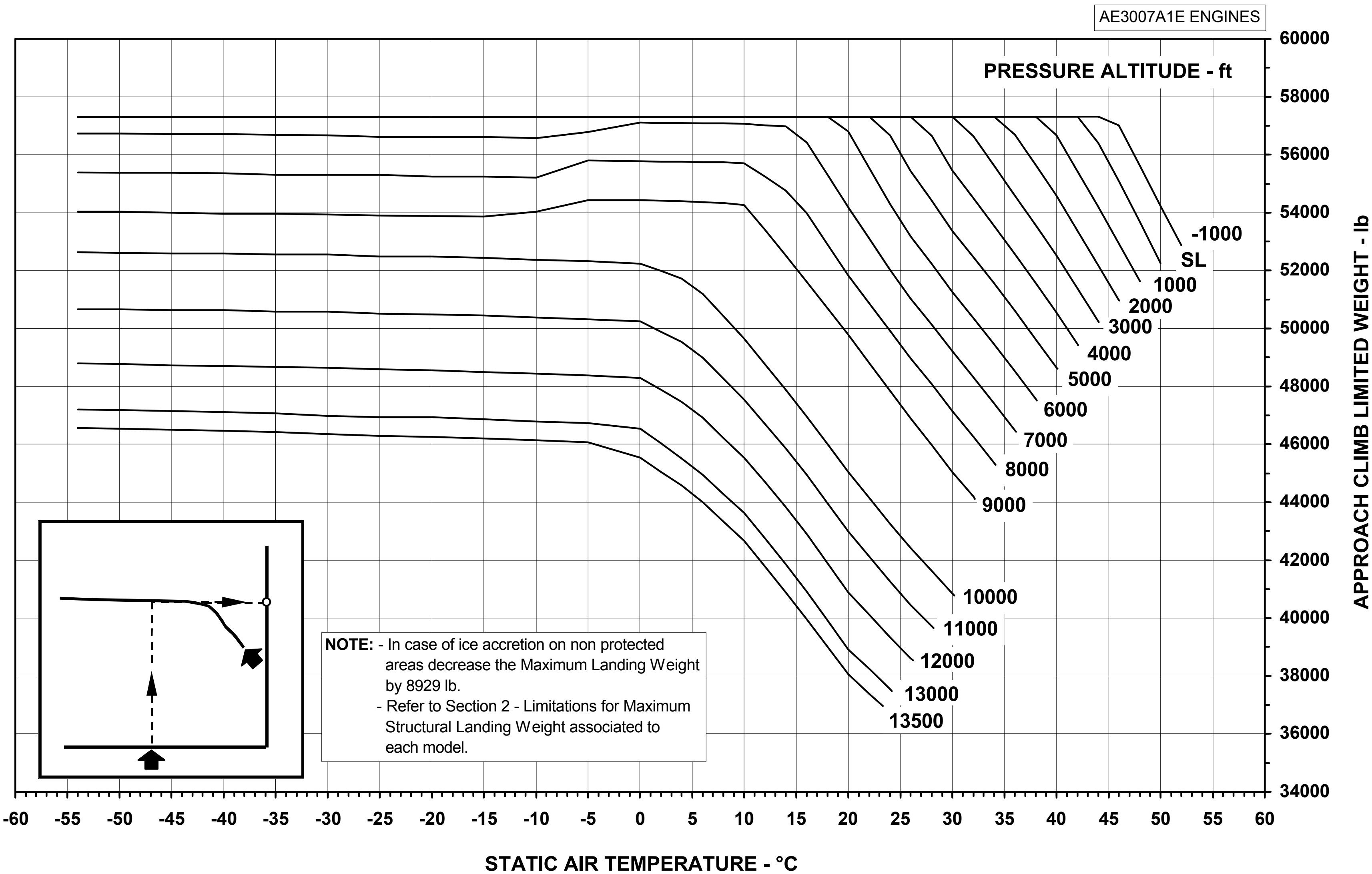


NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 8929 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

145XRFAA082 - 30JUN2003

MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

APPROACH FLAPS 9º - ANTI-ICE OFF

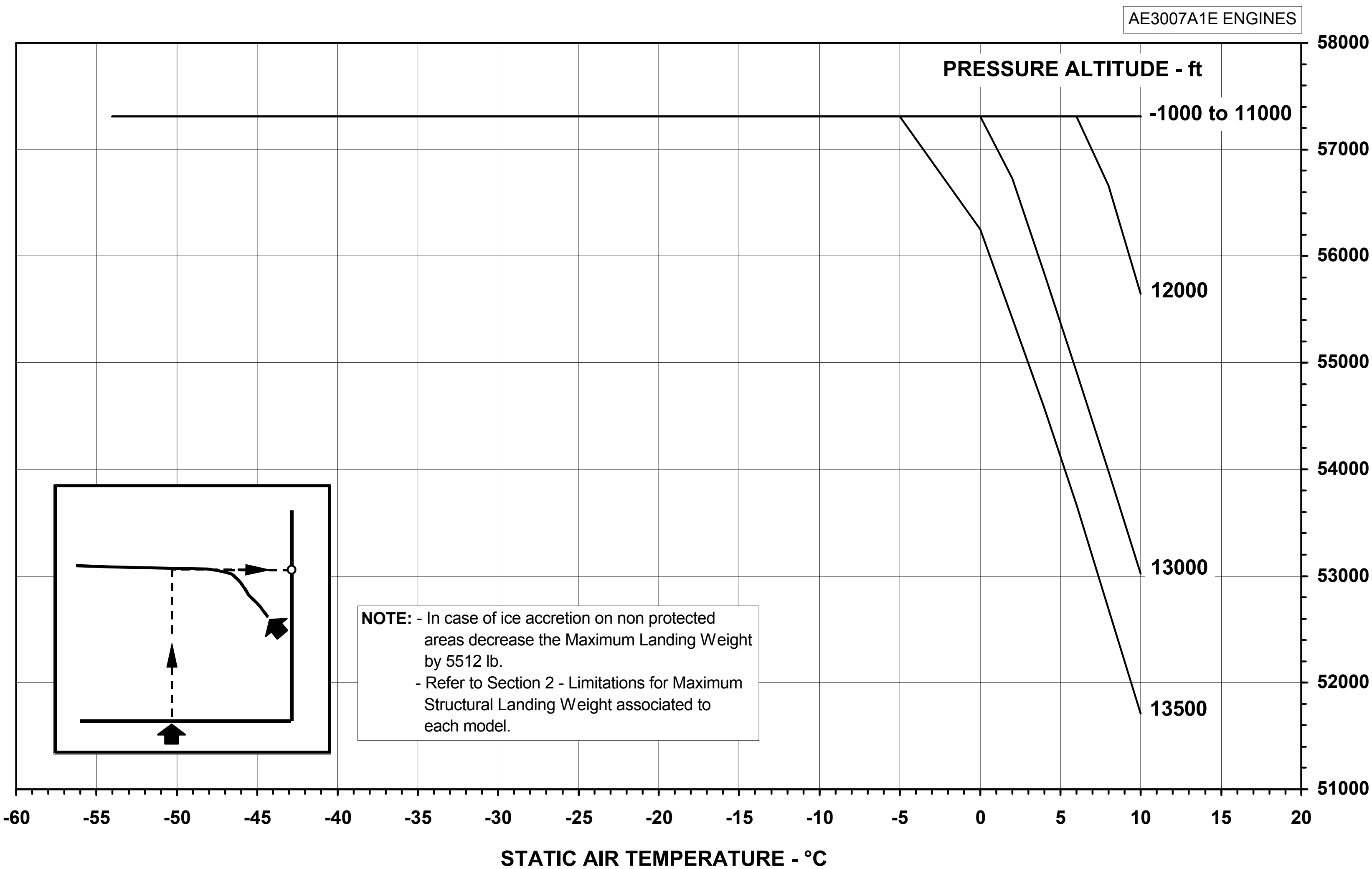


NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 8929 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

145XRFAA083 - 30JUN2003

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

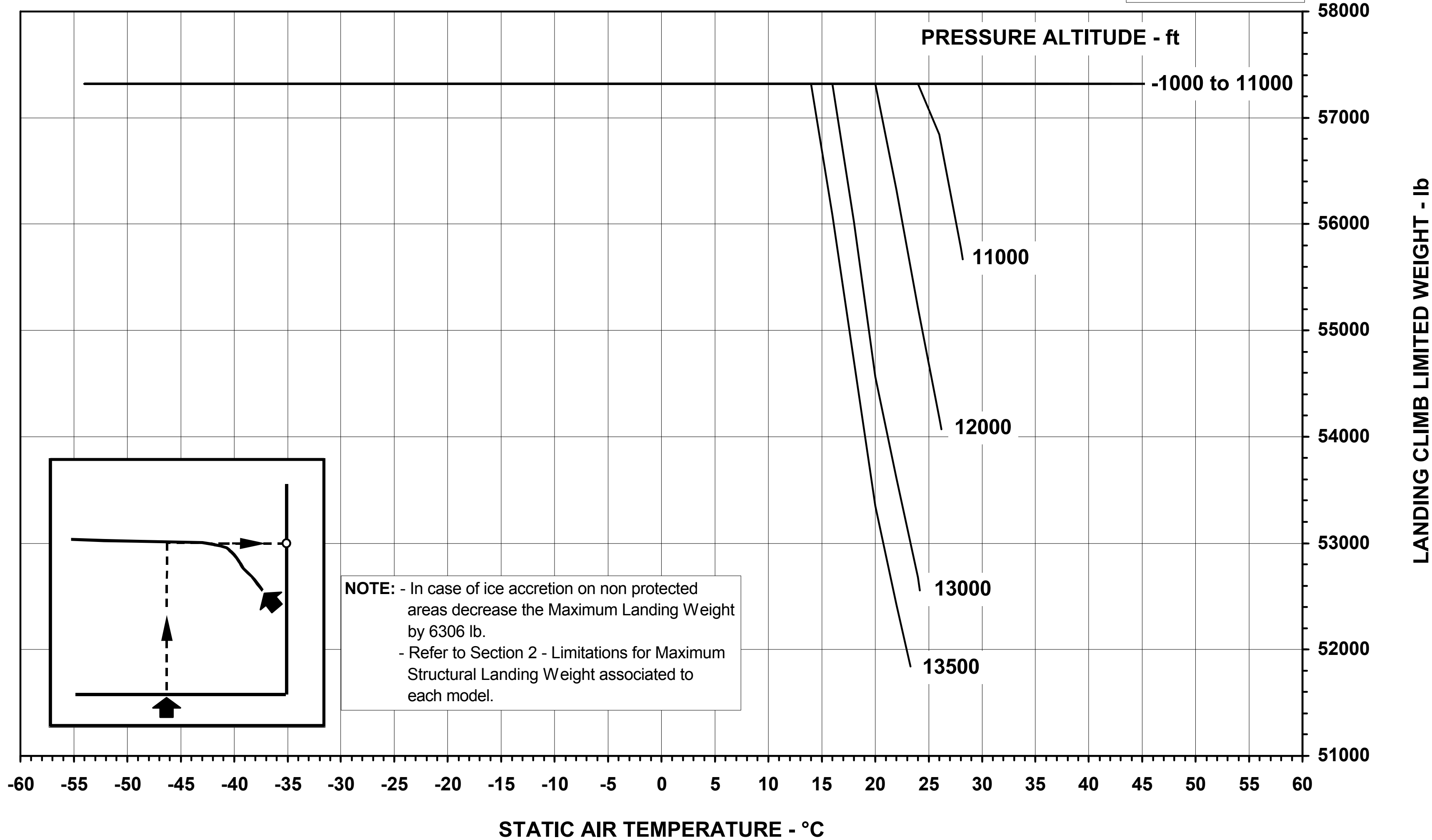
LANDING FLAPS 22º - ANTI-ICE ON



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 5512 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 22º - ANTI-ICE OFF

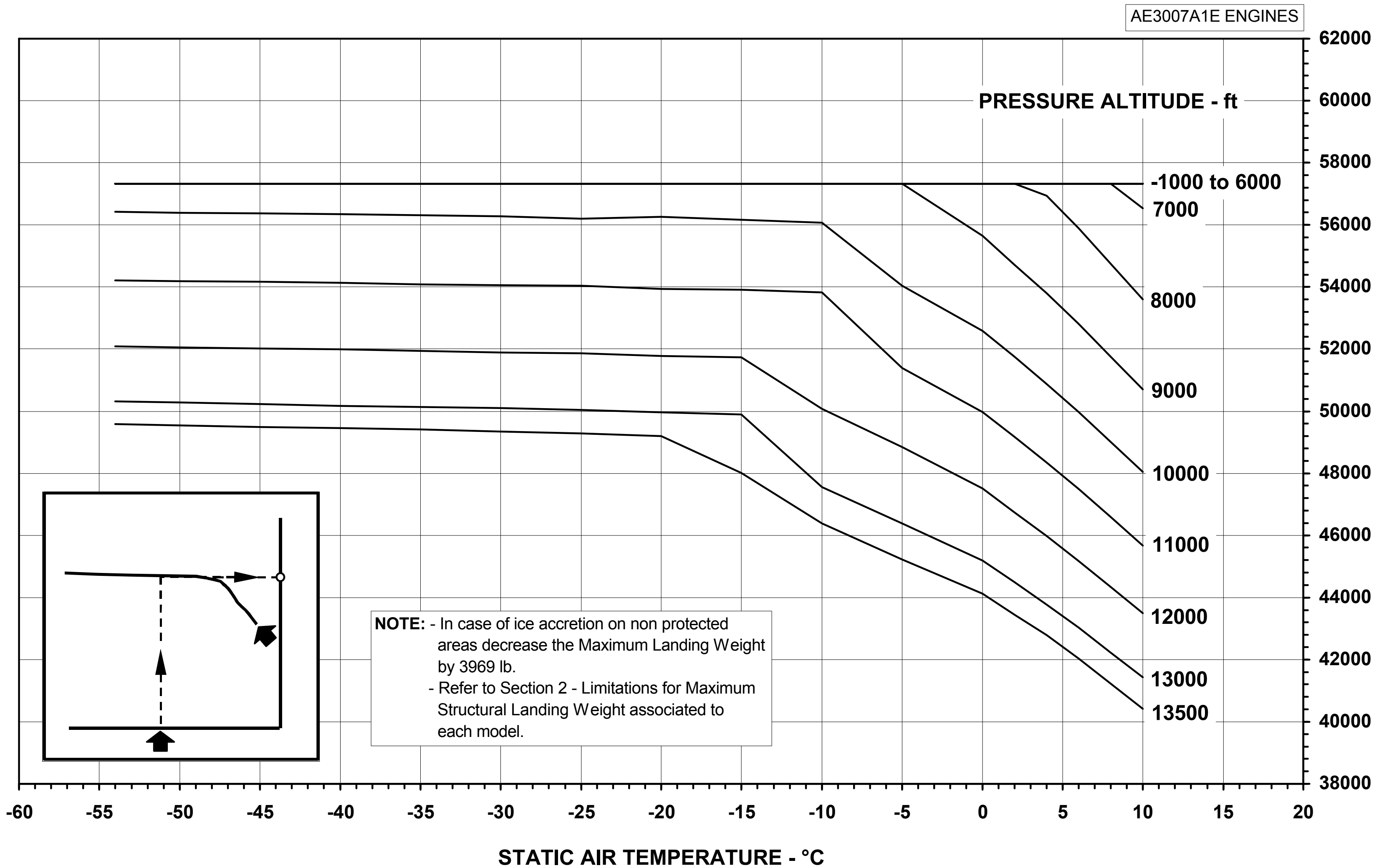


NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 6306 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

145XRFAA093 - 30JUN2003

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

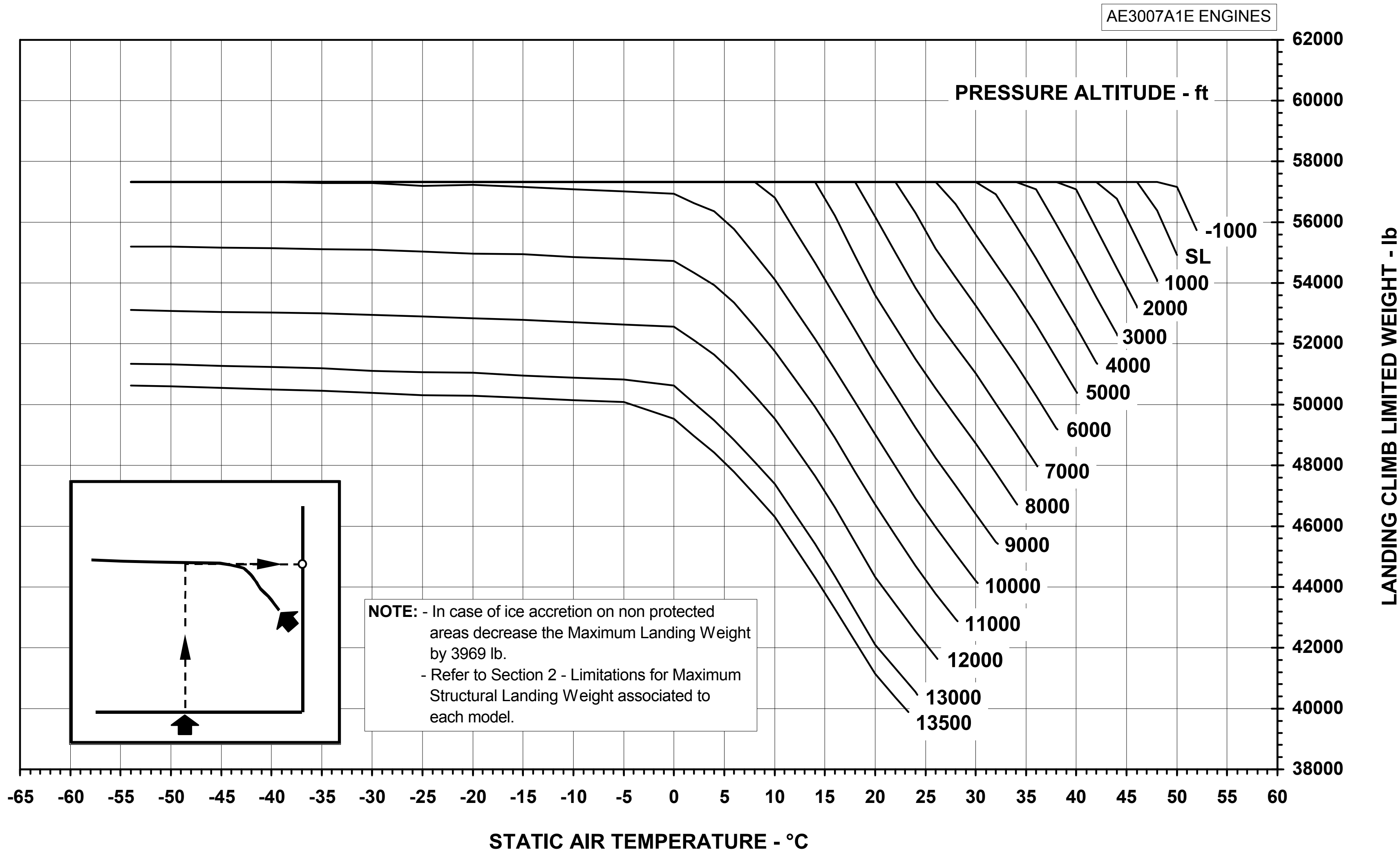
LANDING FLAPS 45º - ANTI-ICE ON



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 3969 lb.
- Refer to Section 2 - Limitations for Maximum Structural Landing Weight associated to each model.

145XRFAA094 - 30JUN2003

MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED
LANDING FLAPS 45º - ANTI-ICE OFF



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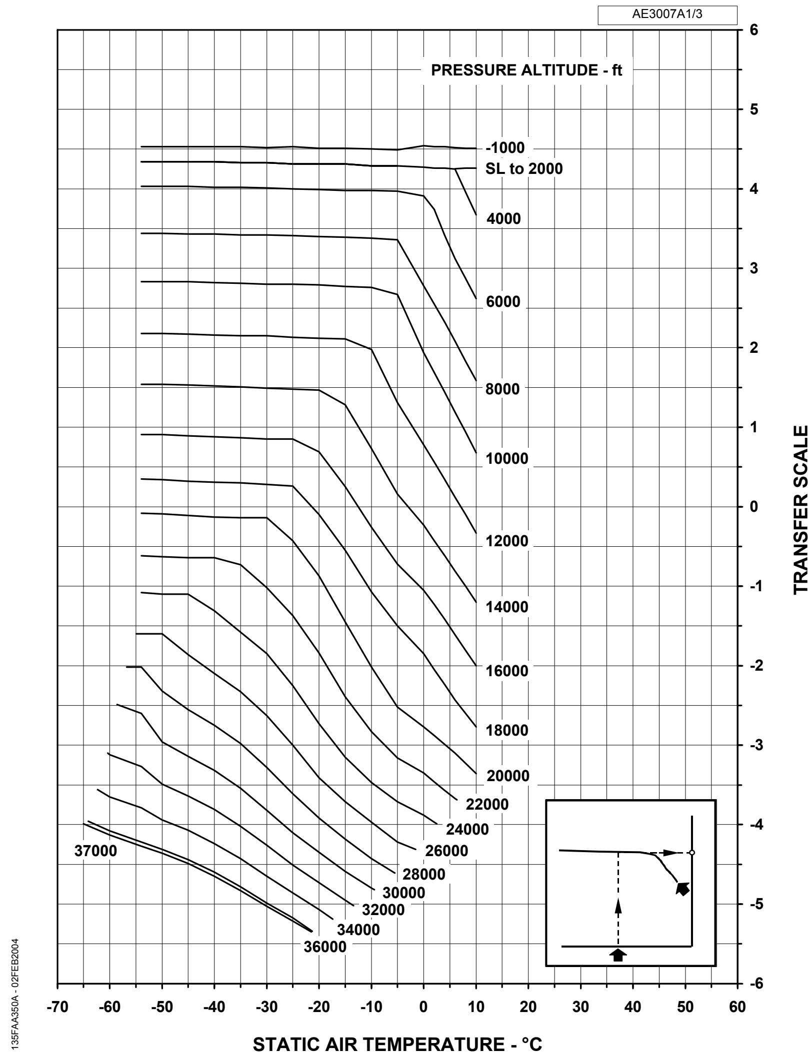
PERFORMANCE CHARTS FOR AIRPLANES EQUIPPED WITH AE3007A1/3 ENGINES

The following performance charts are applicable for airplanes equipped with AE3007A1/3 engines.

ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE ON

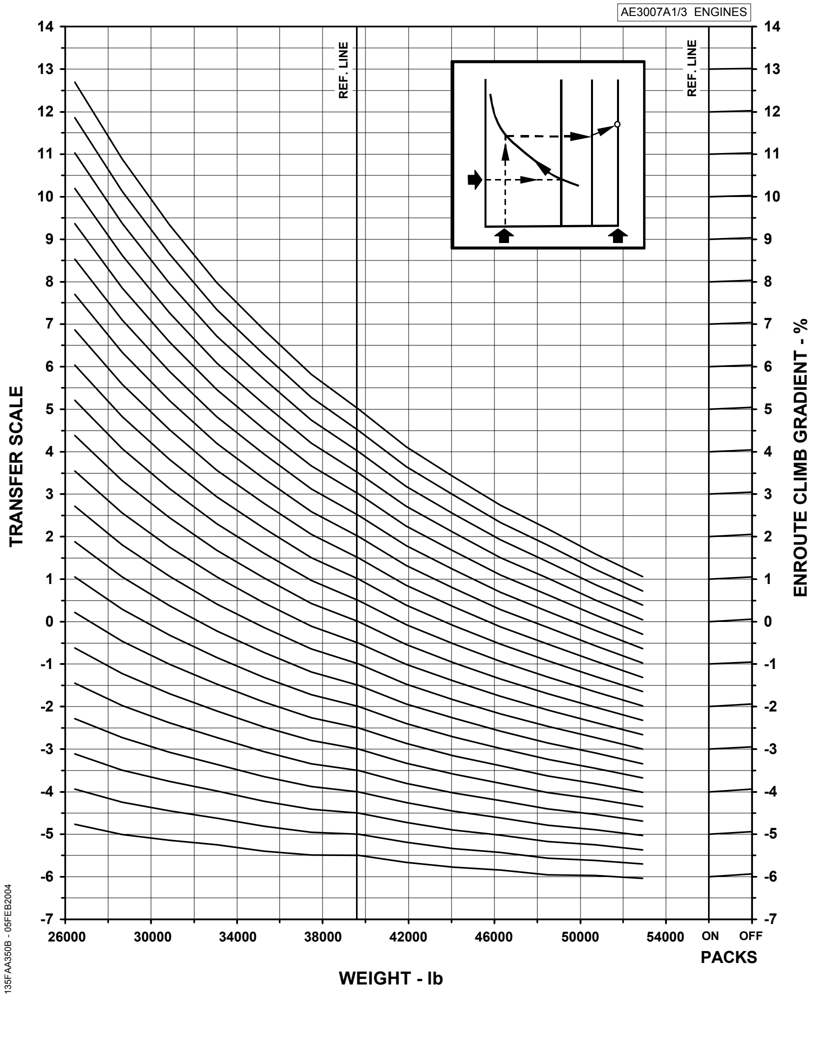
CHART 1 OF 2



ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE ON

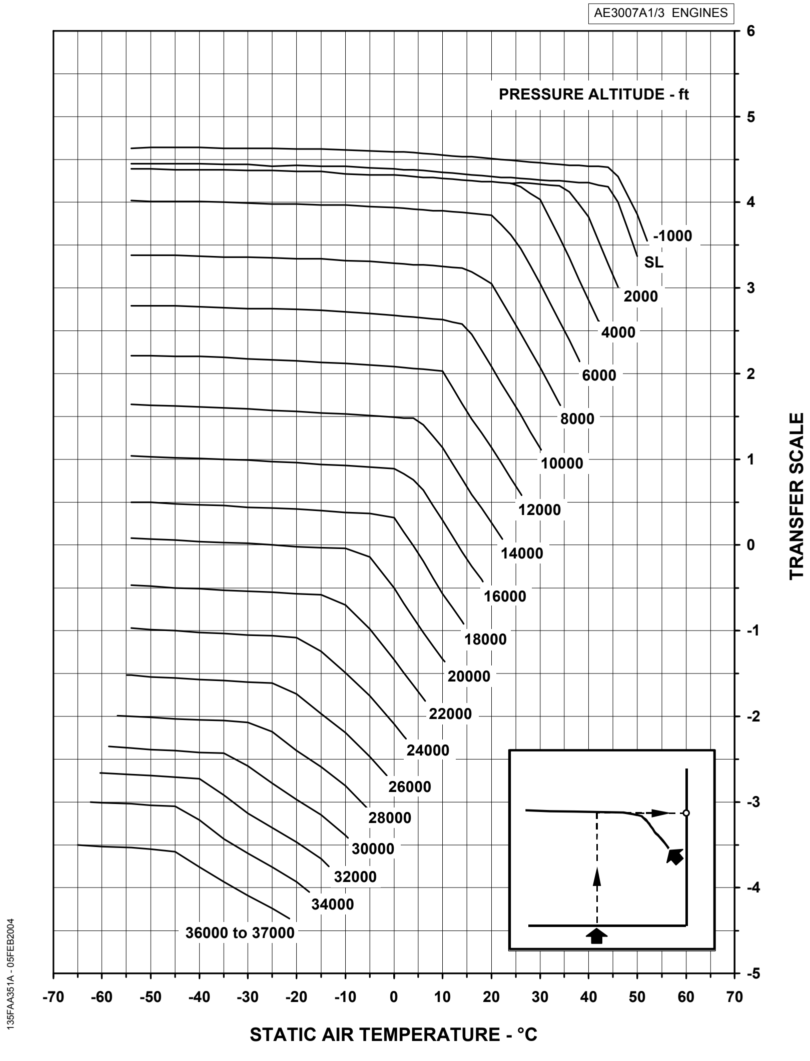
CHART 2 OF 2



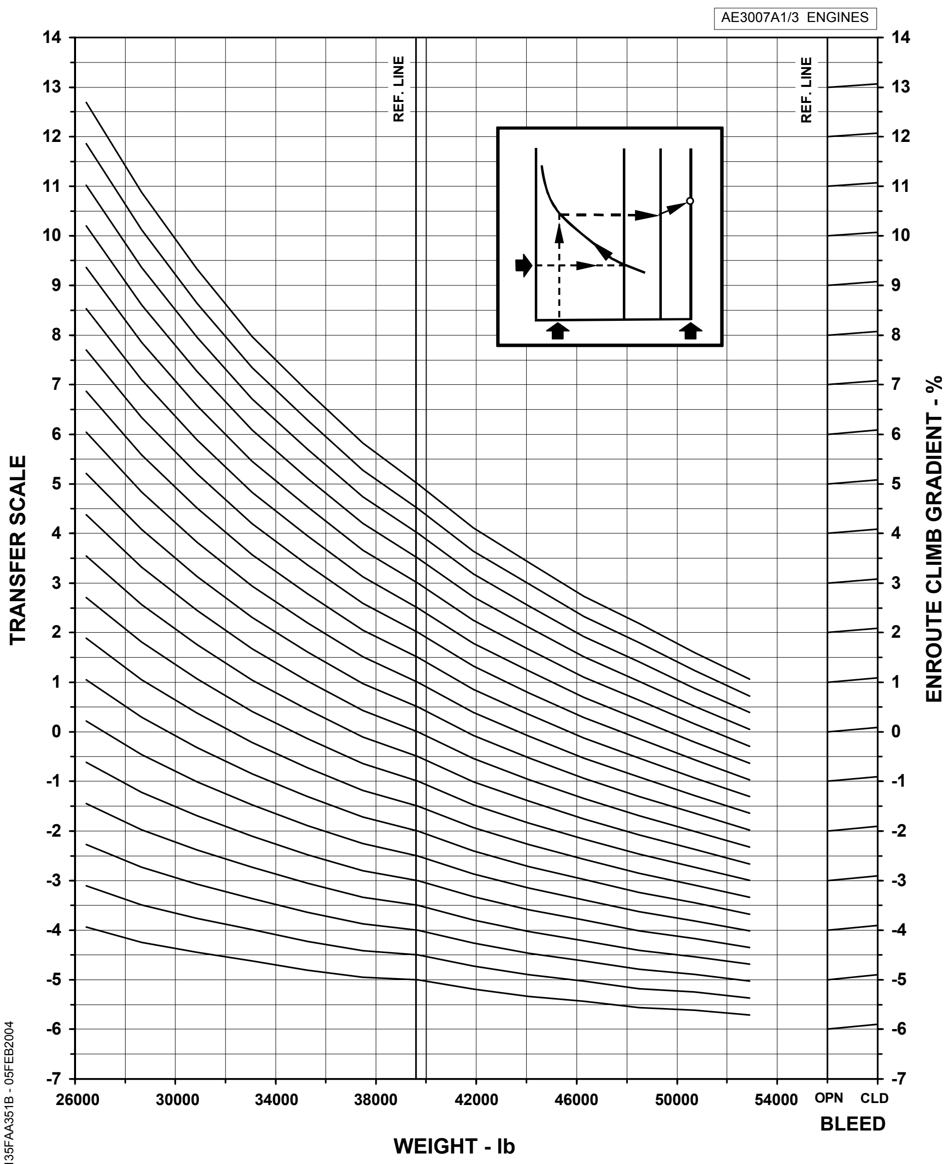
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE

FLAPS UP - ANTI-ICE OFF

CHART 1 OF 2



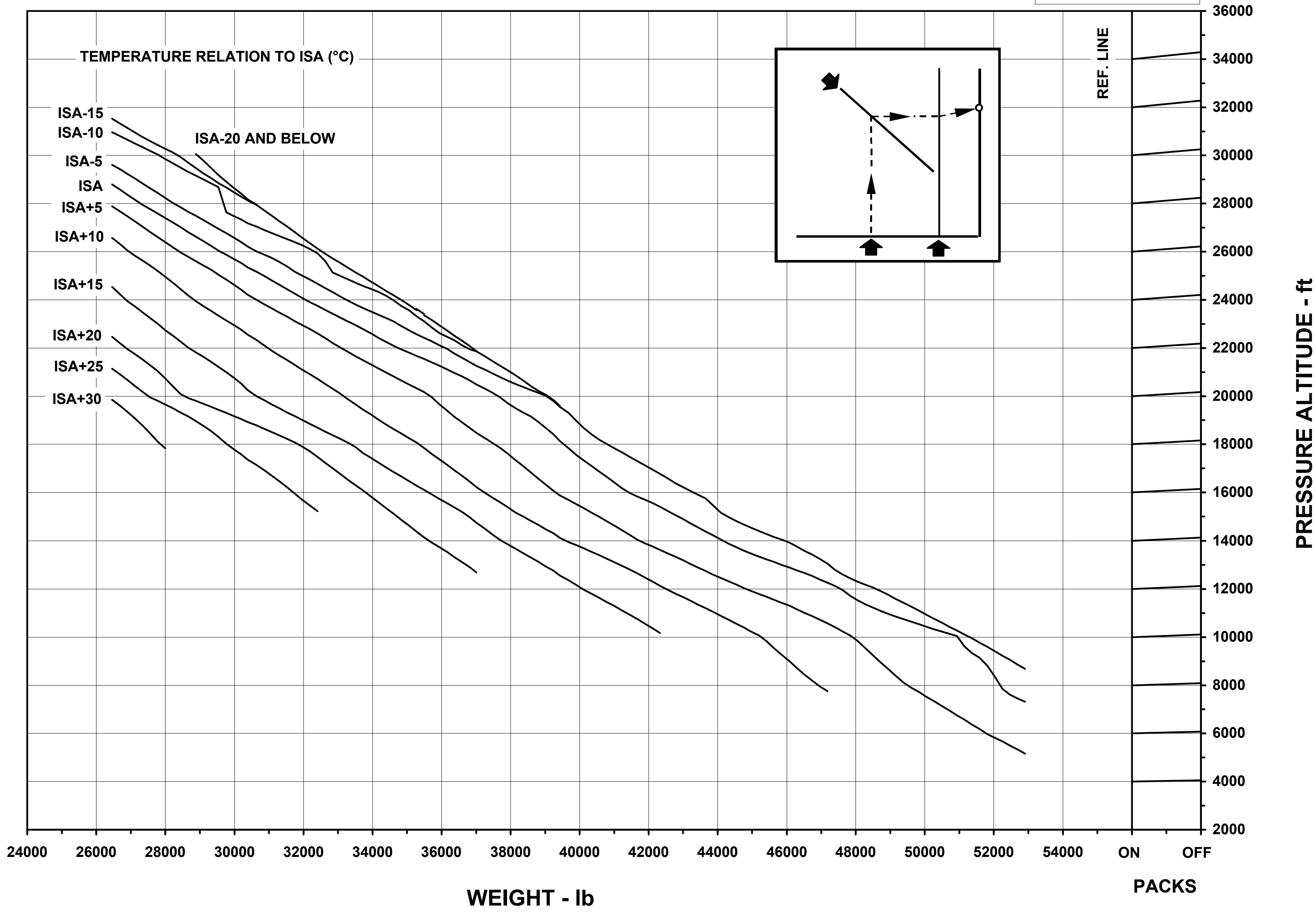
ENROUTE NET CLIMB GRADIENT - ONE ENGINE INOPERATIVE
FLAPS UP - ANTI-ICE OFF
CHART 2 OF 2



ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT

FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE ON

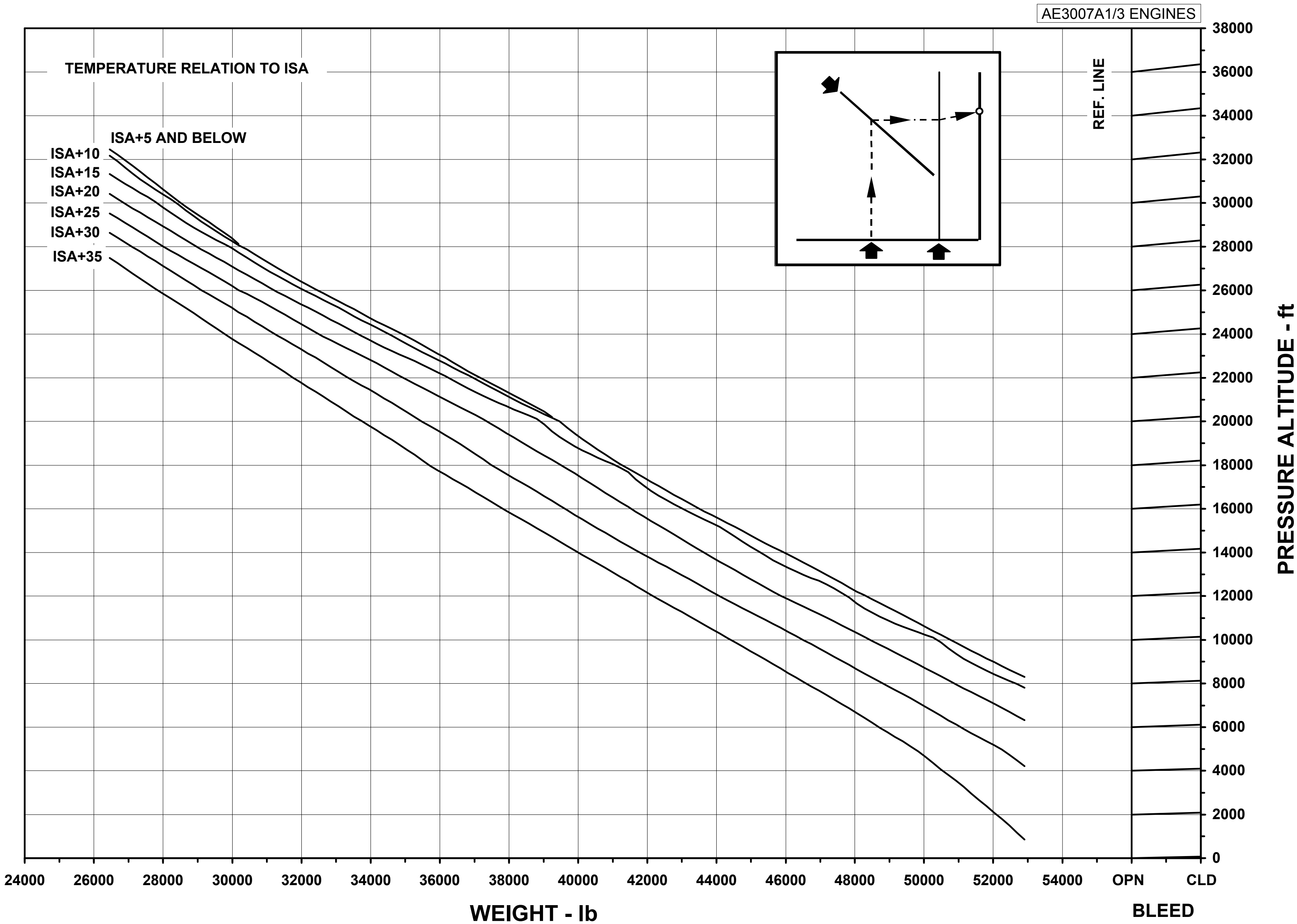
AE3007A1/3 ENGINES



135FAA352 - 09FEB2004

AFM-145/1153 - FAA

ENROUTE CLIMB WEIGHTS FOR POSITIVE NET GRADIENT
FLAPS UP - ONE ENGINE INOPERATIVE - ANTI-ICE OFF

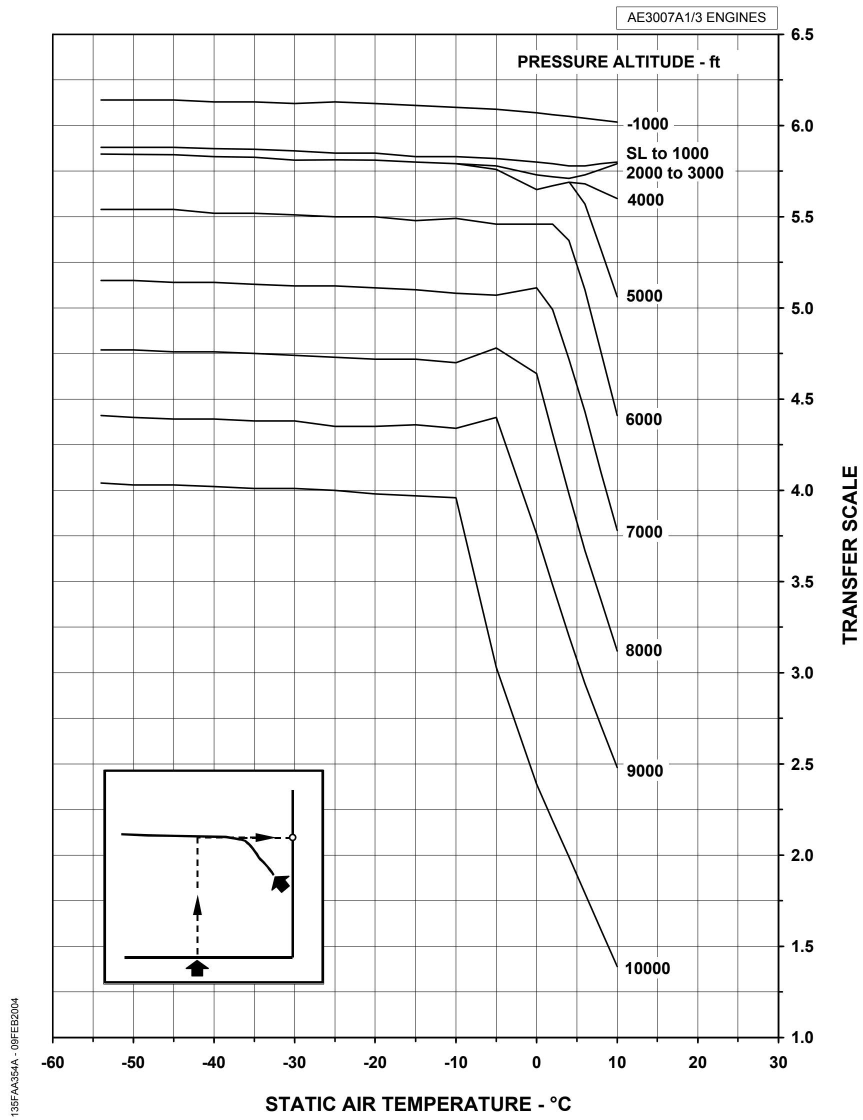


135FAA353 - 09FEB2004

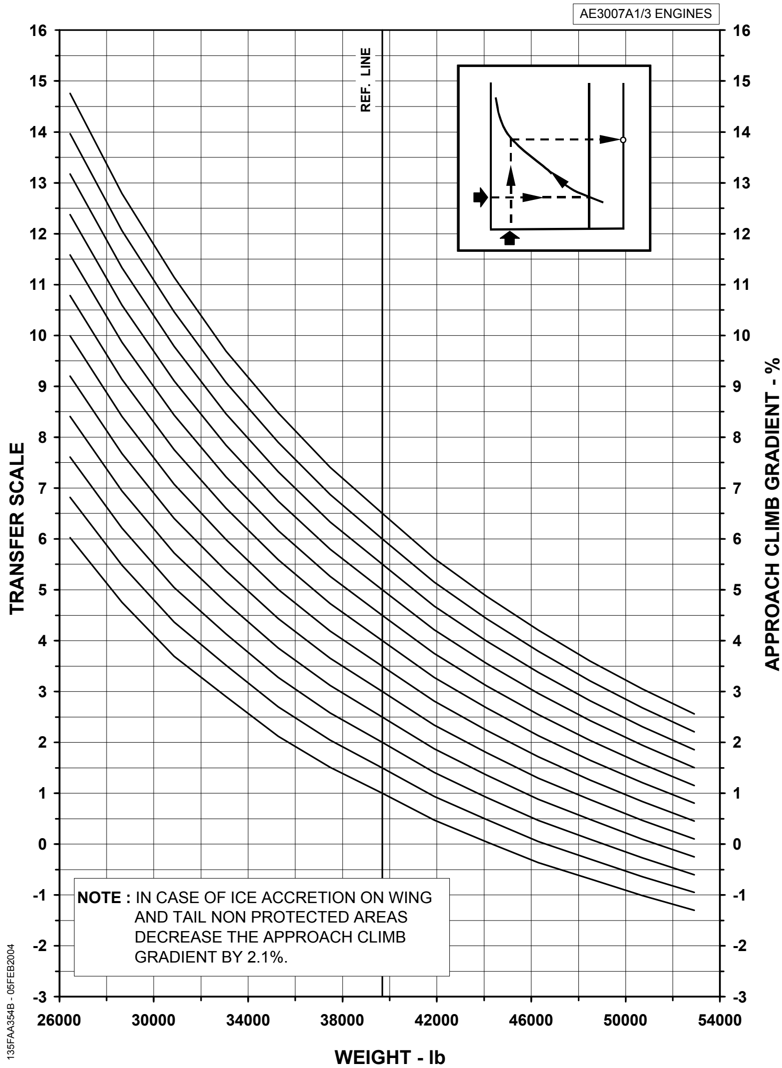
APPROACH CLIMB GRADIENT

ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON

CHART 1 OF 2

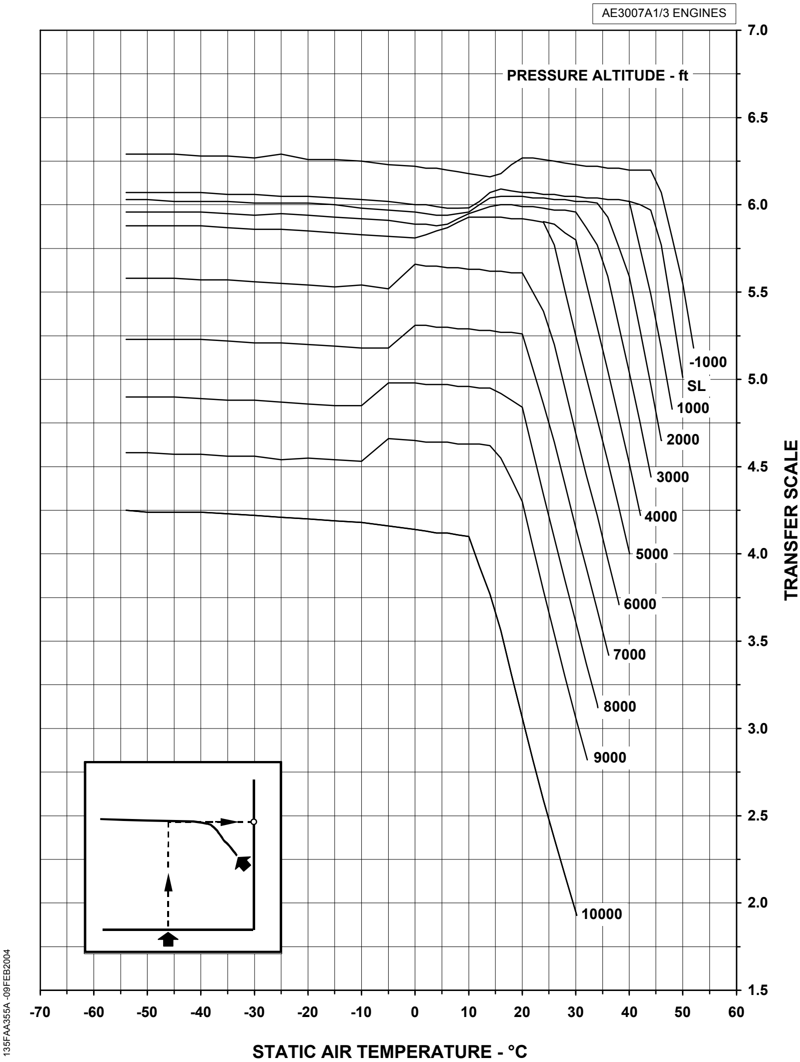


APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE ON
CHART 2 OF 2

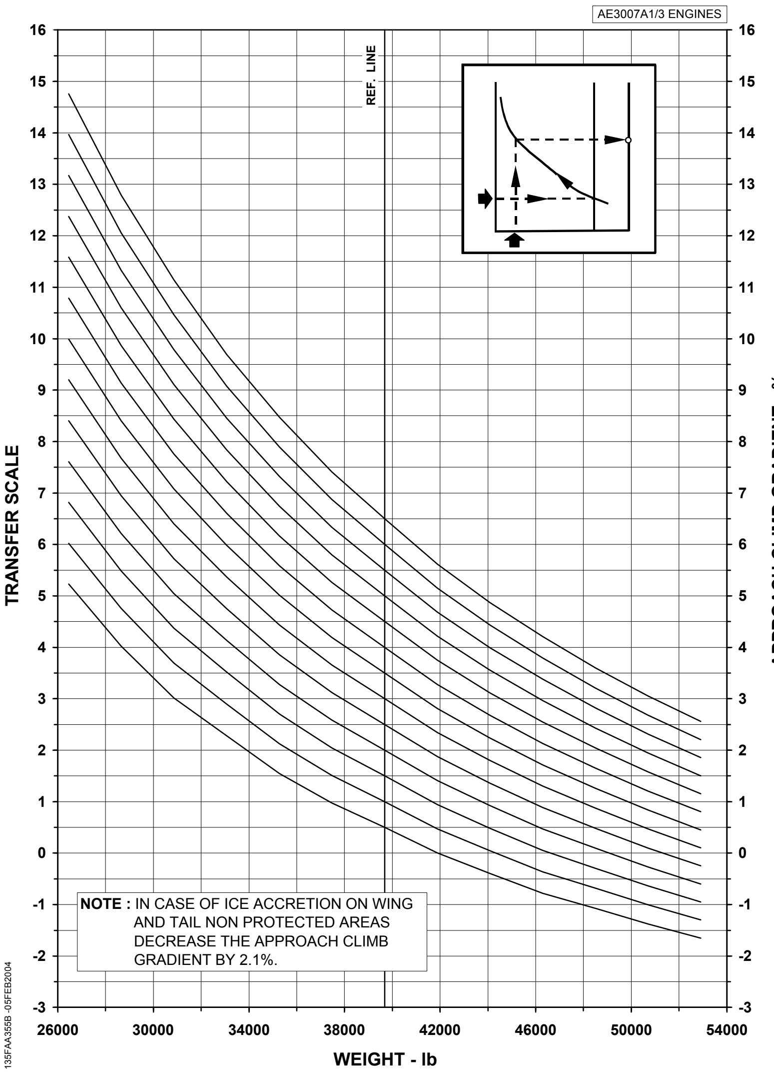


APPROACH CLIMB GRADIENT

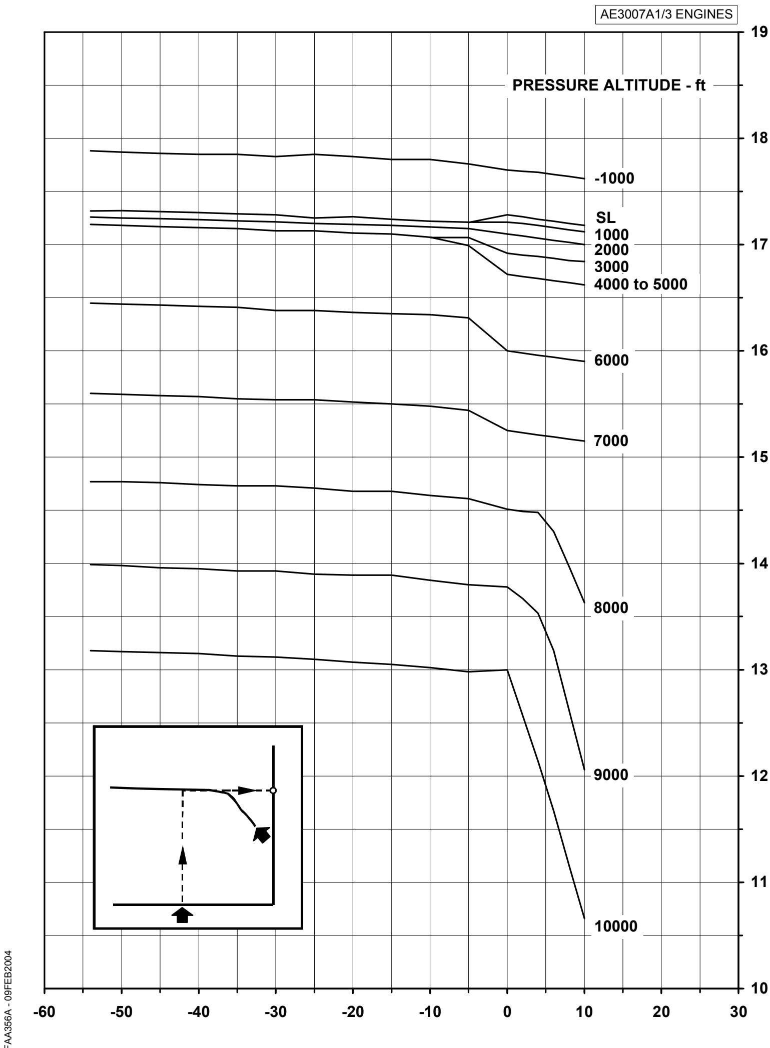
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 1 OF 2



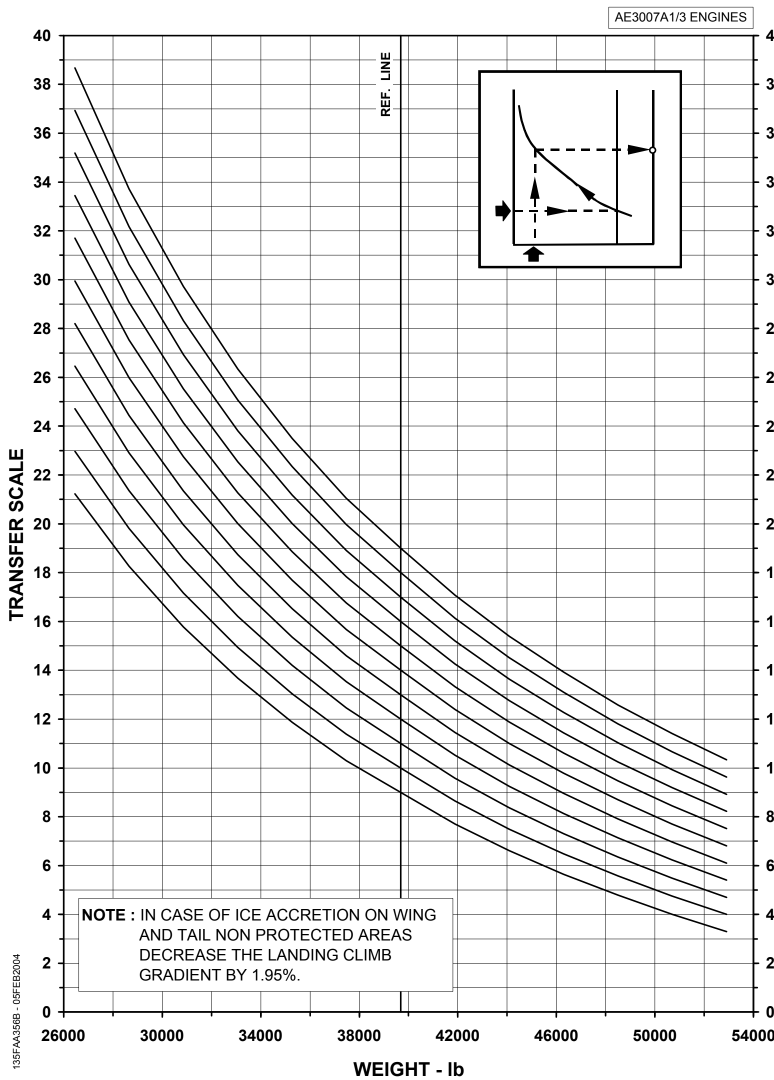
APPROACH CLIMB GRADIENT
ONE ENGINE INOPERATIVE - FLAPS 9° - ANTI-ICE OFF
CHART 2 OF 2



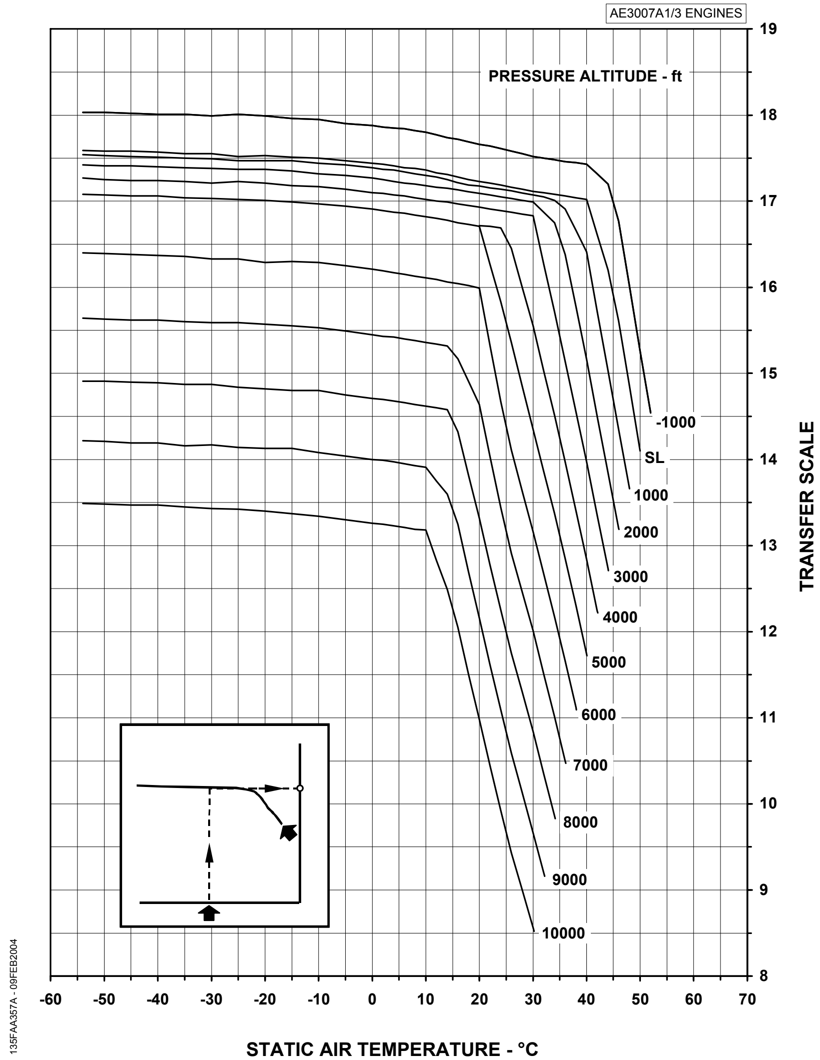
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 1 OF 2



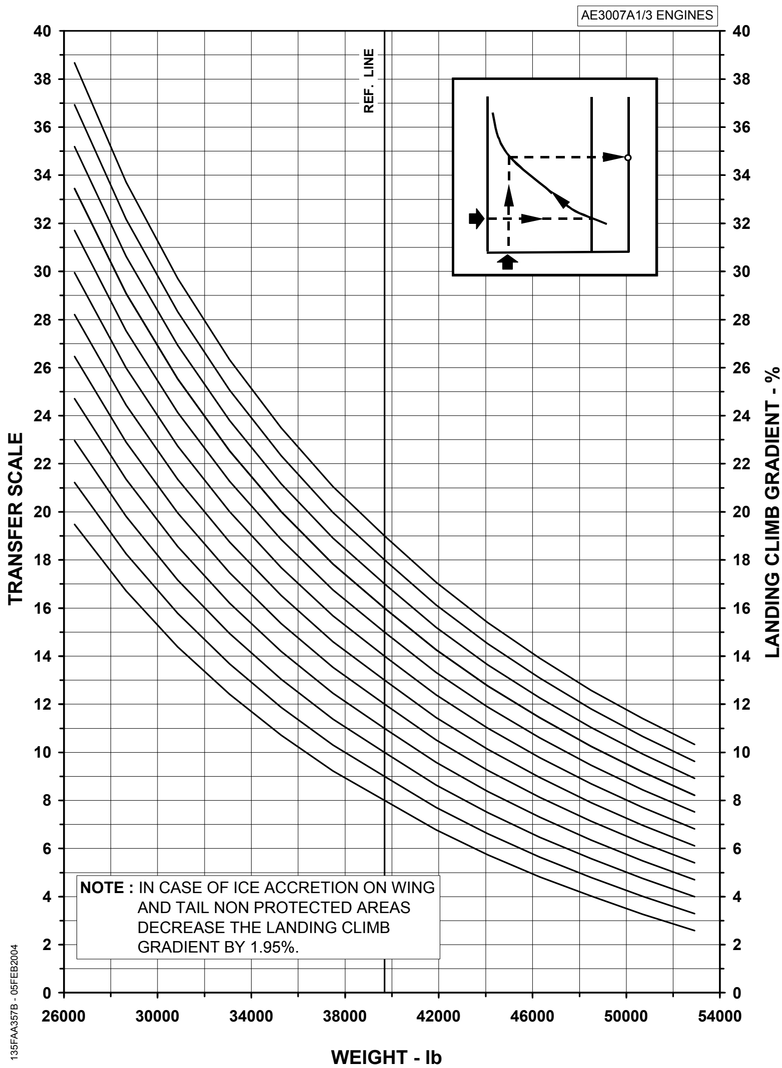
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE ON
CHART 2 OF 2



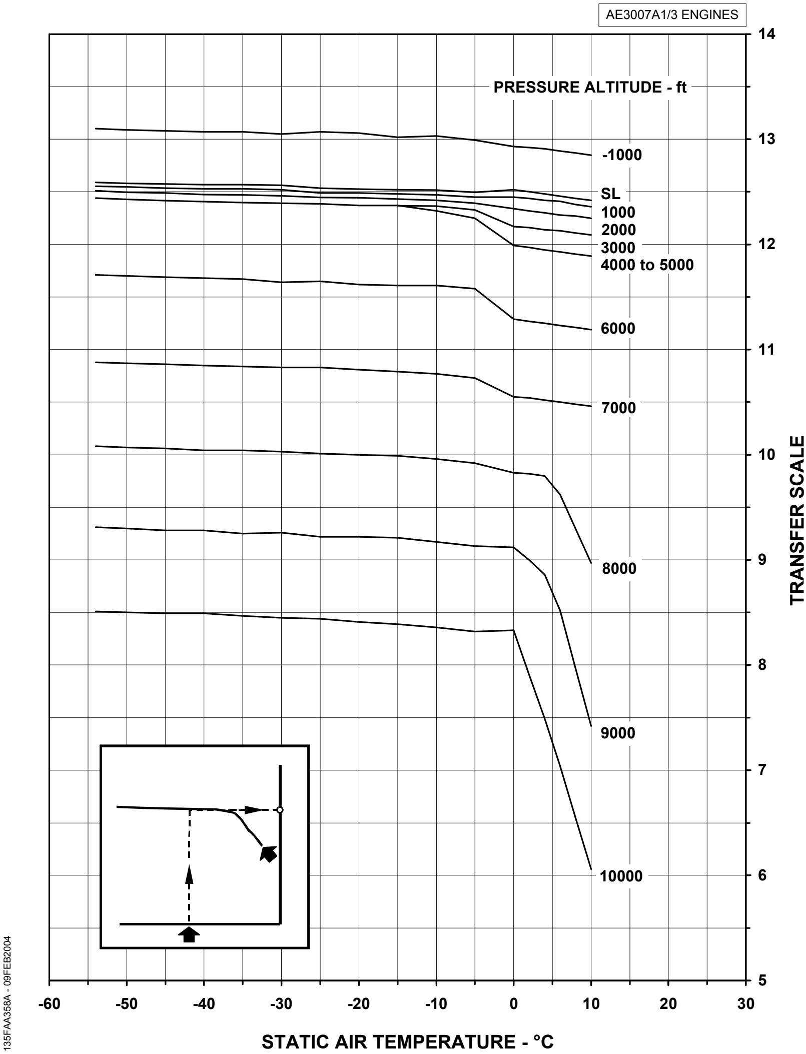
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 1 OF 2



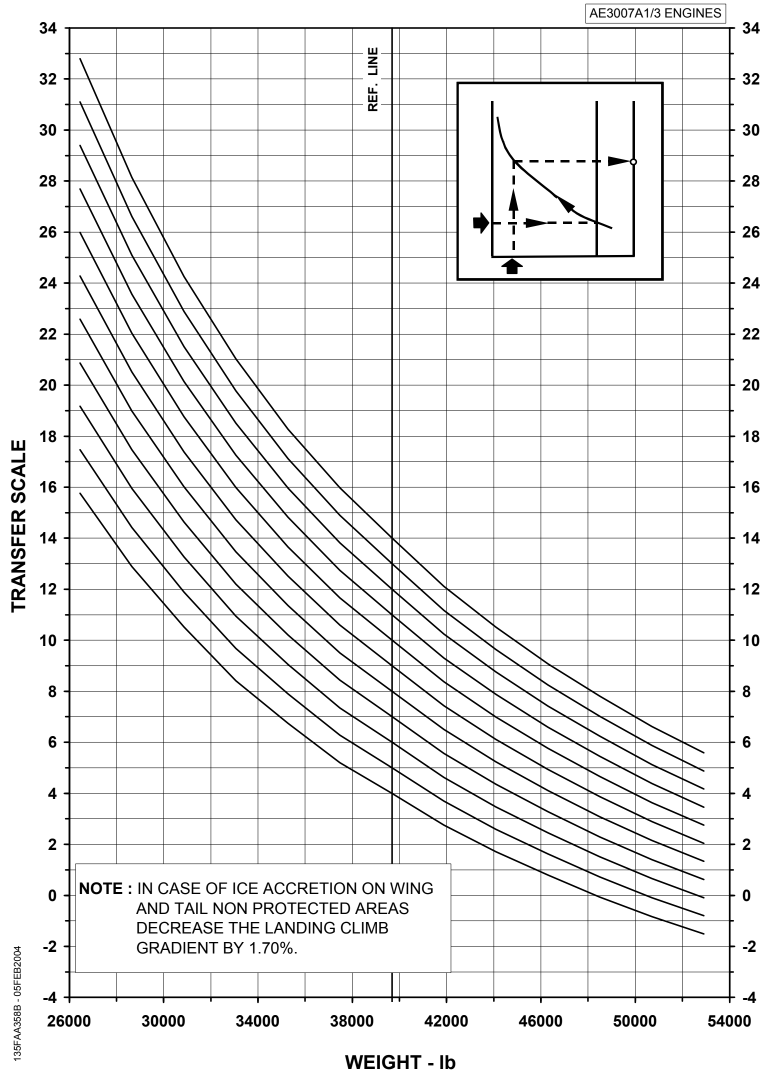
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 22° - ANTI-ICE OFF
CHART 2 OF 2



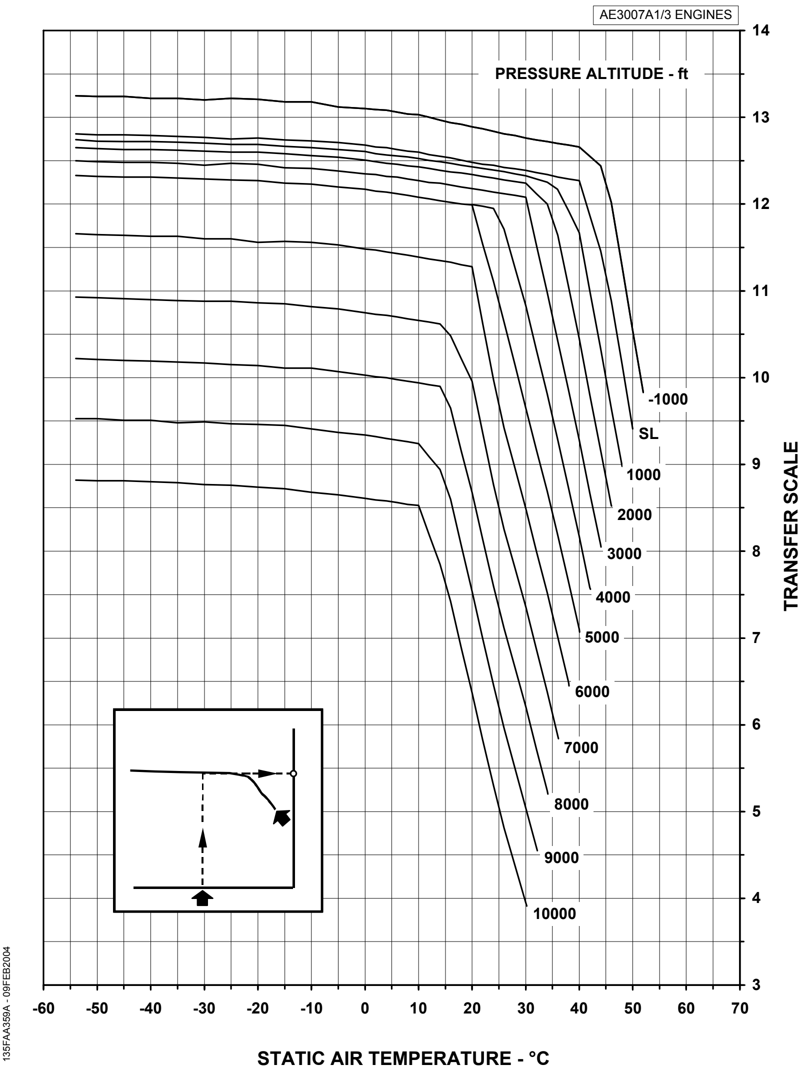
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 1 OF 2



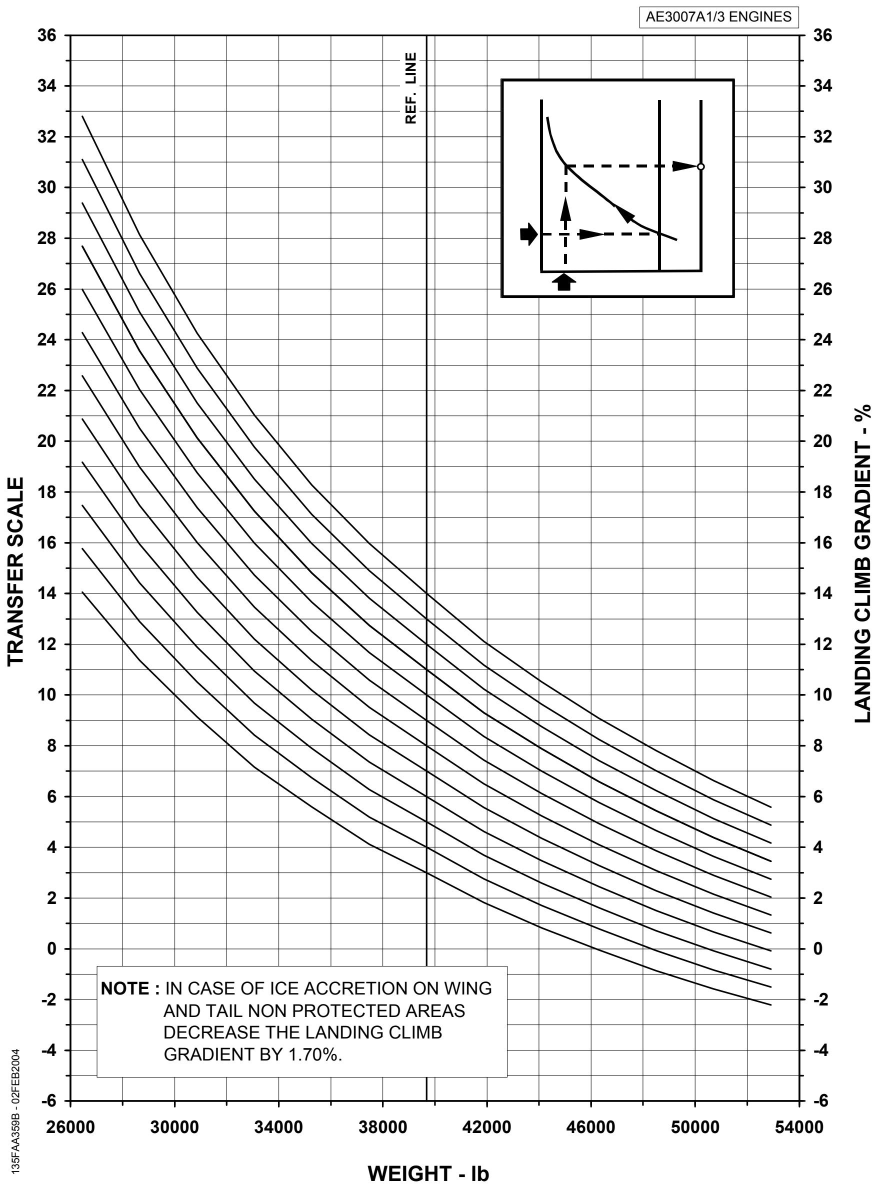
LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE ON
CHART 2 OF 2



LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 1 OF 2

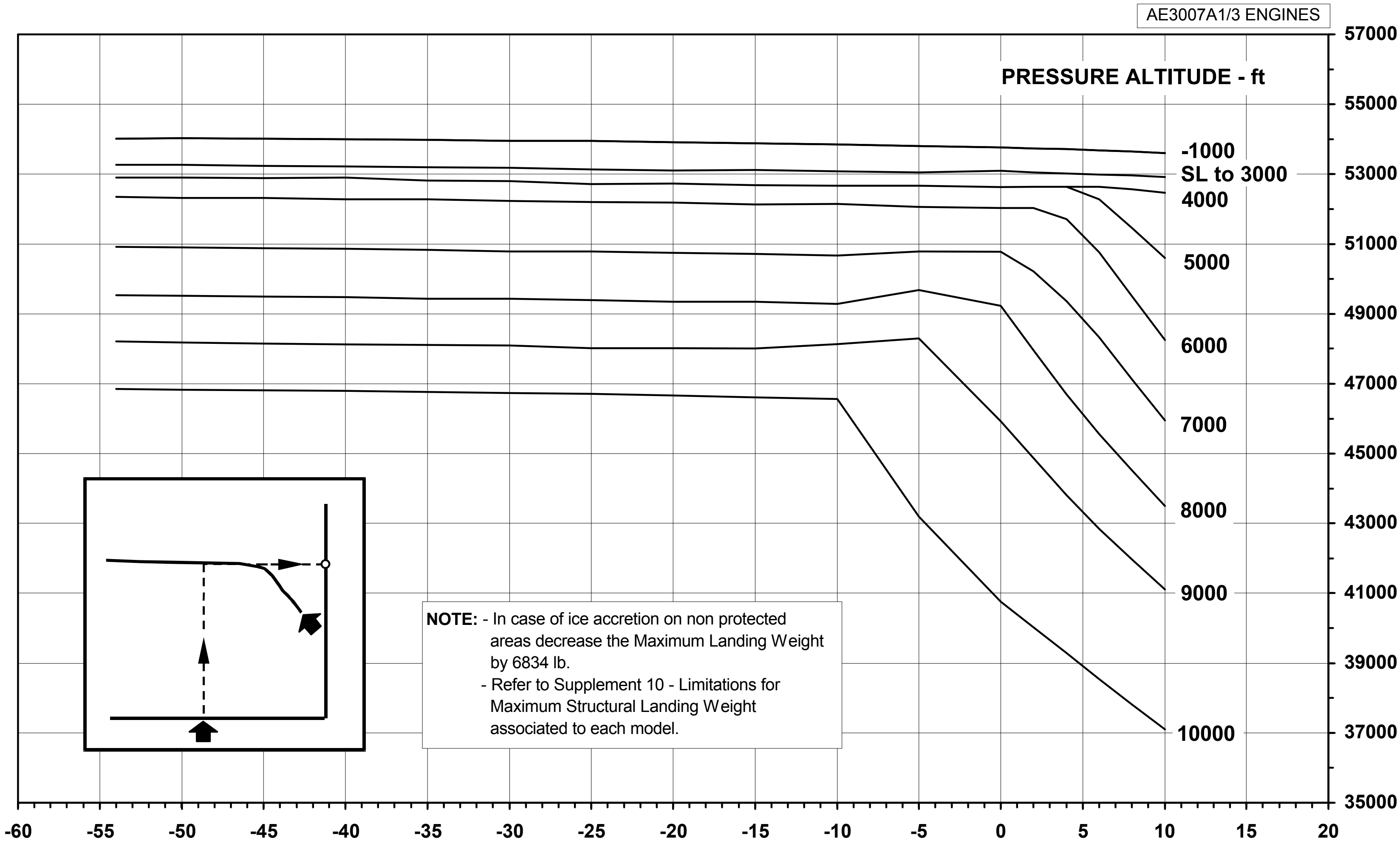


LANDING CLIMB GRADIENT
ALL ENGINES - FLAPS 45° - ANTI-ICE OFF
CHART 2 OF 2



MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

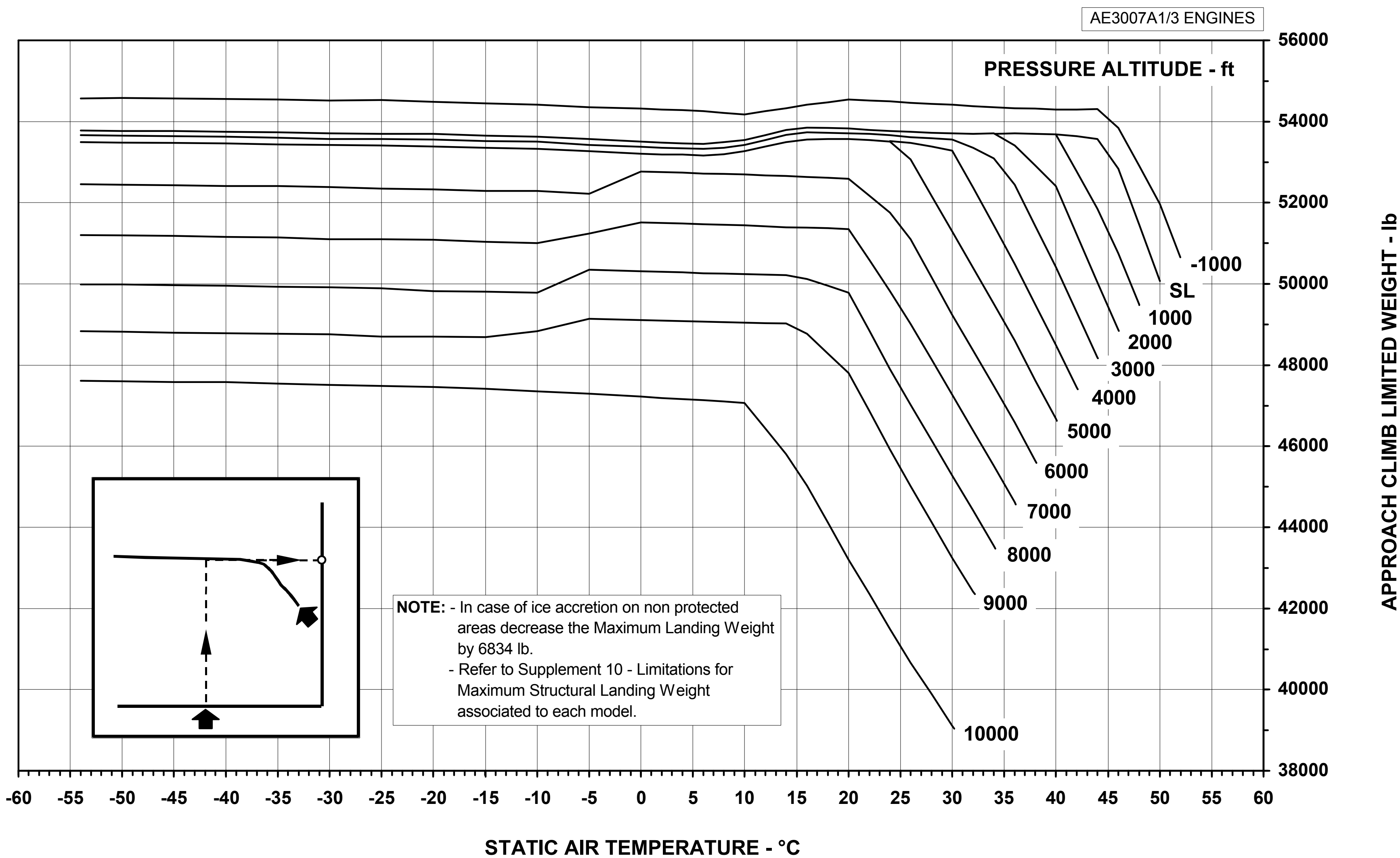
APPROACH FLAPS 9° - ANTI-ICE ON



135FAA360 - 03FEB2004

MAXIMUM LANDING WEIGHT - APPROACH CLIMB LIMITED

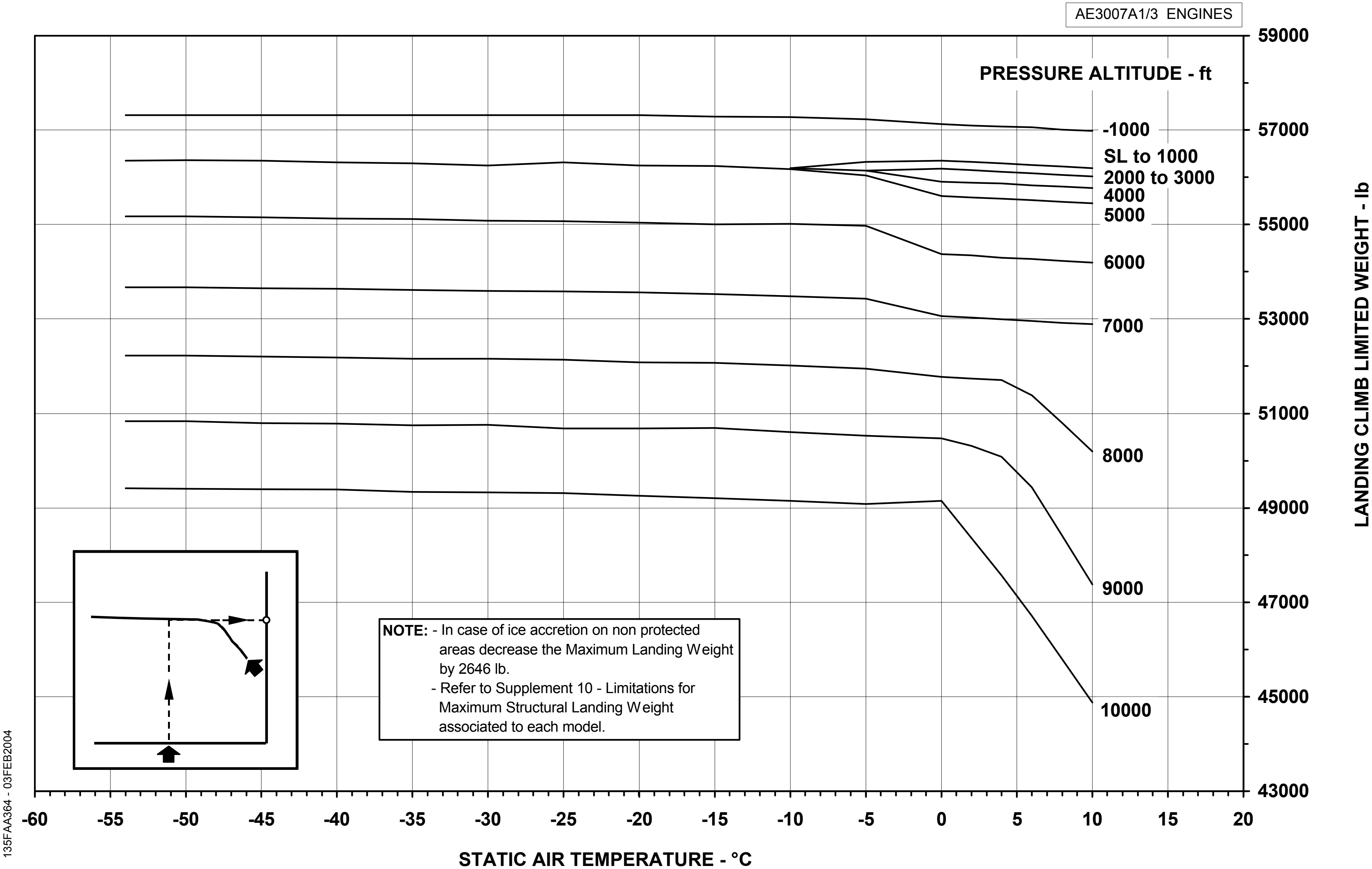
APPROACH FLAPS 9° - ANTI-ICE OFF



135FAA361 - 03FEB2004

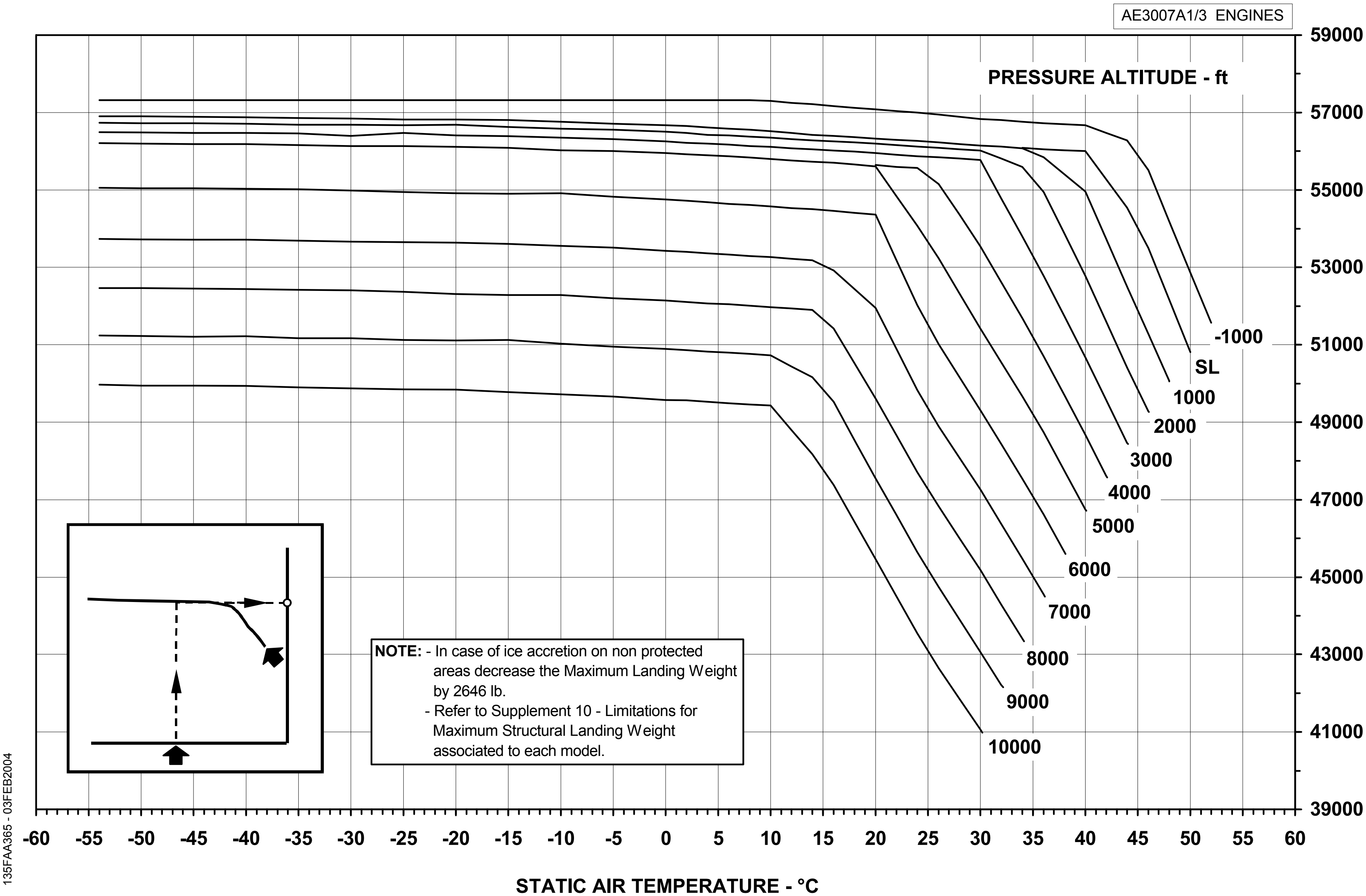
MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE ON



MAXIMUM LANDING WEIGHT - LANDING CLIMB LIMITED

LANDING FLAPS 45° - ANTI-ICE OFF



NOTE: - In case of ice accretion on non protected areas decrease the Maximum Landing Weight by 2646 lb.
- Refer to Supplement 10 - Limitations for Maximum Structural Landing Weight associated to each model.

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SUPPLEMENT 24

LIST OF EFFECTIVE PAGES

ORIGINAL...................... 0................ Not Applicable
REVISION..................1 to 55 .... Not Applicable
REVISION..................... 56................OCT 21, 2003
REVISION..................... 57................ JUN 17, 2004

* Asterisk indicates pages revised, added or deleted by the current revision.

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HIGH ALTITUDE LANDING AND TAKEOFF OPERATION

TABLE OF CONTENTS

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GENERAL

This Supplement presents the data required to perform takeoffs and landings operation at high altitude airports, from 8000 ft up to 10000 ft.

This AFM Supplement does not constitute approval to conduct High Altitude Operations. The airplane must be properly equipped and approval must be obtained from the appropriate regulatory authority prior to conducting these operations.

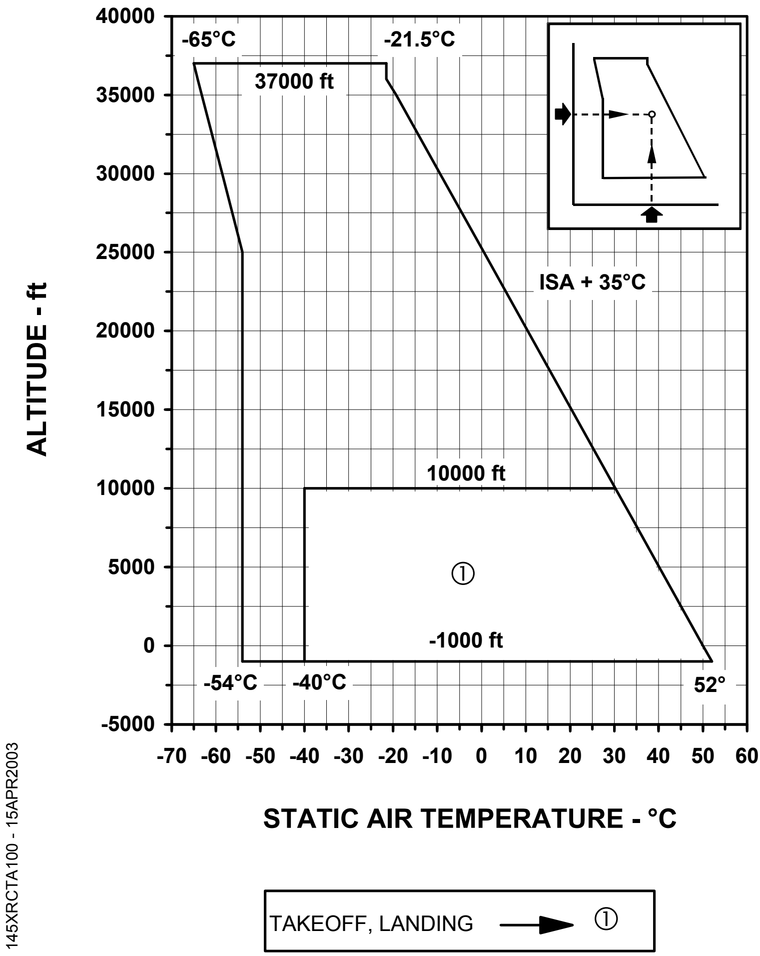
For limitations, procedures and performance information not contained in this Supplement, refer to the basic AFM and Supplements related to the associated engines, as applicable.

LIMITATIONS

AIRPLANES

This supplement is applicable only to the EMB-145LR and EMB-145 XR models.

OPERATIONAL ENVELOPE



AFM-145/1153 - FAA

EMERGENCY AND ABNORMAL PROCEDURES

The Emergency and Abnormal Procedures remain unchanged.

NORMAL PROCEDURES

The actions listed in the procedure below must complement the equivalent procedure contained in the basic AFM. The remaining Normal Procedures section remains unchanged.

NOTE: During high altitude operations, at least one pilot is required to use oxygen continuously, until the cabin altitude has reached 8000 ft.

BEFORE START

Pressurization .... 8000 ft
If flying from an airport above 8000 ft:
    High Altitude Mode.. ON
        Check that HI ALT LDG-T/O advisory message is displayed on the EICAS.
    Crew Oxygen Mask.. DON

CLIMB

When cabin altitude is below 9700 ft:
    High Altitude Mode.. OFF
        Check that HI ALT LDG-T/O advisory message is no longer displayed on the EICAS.

DESCENT

Pressurization .... SET
    Set the destination airport altitude.
If landing in an airport above 8000 ft:
    High Altitude Mode.. ON
        Check that HI ALT LDG-T/O advisory message is displayed on the EICAS.
    Crew Oxygen Mask.. DON

PERFORMANCE

For Takeoff and Landing performance refer to the ETOASG software and/or to the associated engine Supplement as applicable.

SUPPLEMENT 25

LIST OF EFFECTIVE PAGES

ORIGINAL...................... 0................ Not Applicable
REVISION..................1 to 56 .... Not Applicable
REVISION..................... 57................ JUN 17, 2004

* Asterisk indicates pages revised, added or deleted by the current revision.

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RVSM OPERATION

TABLE OF CONTENTS

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GENERAL

This Supplement is provided to present the data required for operation in the RVSM (Reduced Vertical Separation Minimum) airspace. The RVSM operation reduces the EMB-145/135 minimum vertical separation from 2000 ft to 1000 ft between FL 290 and FL 370.

Airworthiness approval alone does not authorize flight into airspace for which an RVSM operational approval is required by an ICAO Regional Navigation Agreement.

The information herein presented must replace or complement the equivalent data in the basic AFM.

For performance information not contained in this Supplement, refer to the basic AFM.

LIMITATIONS

MINIMUM EQUIPMENT REQUIRED

During RVSM operation it is necessary that the following equipment and instruments be in proper operating condition:

- 2 Primary Altitude Measurement Systems;
- 1 Autopilot with Altitude Hold Mode operative;
- 1 Altitude Alerter;
- 1 Transponder.

NOTE: - An operating transponder may not be required for entry into all designated RVSM airspace. The operator should determine the requirement for an operational transponder in each RVSM area where operations are intended. The operator should also determine the transponder requirements for transition areas next to RVSM airspace.

- Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot should request a new clearance to avoid entering this airspace.

OPERATIONAL LIMITATION

RVSM operation is allowed for airplanes Post-Mod. SB 145-34-0082 or with an equivalent modification factory incorporated.

EMERGENCY AND ABNORMAL PROCEDURES

The actions listed below must complement the procedures contained in the basic AFM. The remaining Emergency and Abnormal Procedures section remains unchanged.

- In case of emergency or abnormal situation or contingencies (equipment failures, weather, etc.) which affect the ability to maintain the cleared flight level, notify ATC and co-ordinate an action plan that is appropriate to the airspace concerned;
- Notify ATC when encountering greater than moderate turbulence;
- If unable to notify ATC and obtain an ATC clearance prior to deviating from the cleared flight level, follow any established contingency procedures and obtain ATC clearance as soon as possible.

NORMAL PROCEDURES

The actions listed below must complement the procedures contained in the basic AFM. The remaining Normal Procedures section remains unchanged.

EXTERNAL SAFETY INSPECTION

NOSE SECTION

Sensors, Pitot Tubes and Static Ports........................ CONDITION, NO OBSTRUCTION

Particular attention should be paid to the condition of static sources and to the marked area on the fuselage skin near each primary static source.

BEFORE TAKEOFF

Altimeters .... SET TO THE AIRFIELD QNH

Altitude Indications .... CHECK

NOTE: - An alternative procedure using QFE may also be used;

- The maximum difference between altimeters indication should not exceed 23 m (75 ft).

CRUISE

Be sure that all required equipment are in proper operating condition.

Ensure that the aircraft is flown at the cleared flight level and that ATC clearances are fully understood and followed. Do not depart from cleared flight level without a positive clearance from ATC except for a contingency or emergency situation.

While changing flight levels, do not overshoot or undershoot the cleared flight level by more than 45 m (150 ft).

The autopilot should be operative and engaged during level cruise, except for circumstances such as the need to re-trim the aircraft or when it must be disengaged due to turbulence.

AFTER LANDING

In case of failure or malfunction, the following information should be recorded when appropriate:

a) Primary and standby altimeter readings;

b) Altitude selector setting;

c) Barometric setting;

d) Flight Director used with the Autopilot to control the airplane and any differences when the other Flight Director was coupled;

e) Use of air data computer selector for fault diagnosis procedure;

f) The transponder selected to provide altitude information to ATC and any difference noted when an alternative transponder was selected.

PERFORMANCE

The performance data used for RVSM operations are presented in Section 5 (Performance) of the basic AFM, in the Supplements related to the associated engines or airplane models, as applicable.

SUPPLEMENT 26

LIST OF EFFECTIVE PAGES

ORIGINAL...................... 0................ Not Applicable
REVISION..................1 to 60 .... Not Applicable
REVISION..................... 61................NOV 17, 2006

* S26-i............ REVISION 61
* S26-ii........... REVISION 61
* S26-iii.......... REVISION 61
* S26-iv.......... REVISION 61
* S26-1 .... REVISION 61
* S26-2 .... REVISION 61
* S26-3 .... REVISION 61
* S26-4 .... REVISION 61

* Asterisk indicates pages revised, added or deleted by the current revision.

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OPERATION IN AIRPORTS UP TO 8500 FT

TABLE OF CONTENTS

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GENERAL

The information presented in this Supplement, associated with the basic AFM, enables the establishment of the conditions required to accomplish operations at high altitude airports, from 8000 ft to 8500 ft.

This AFM Supplement does not constitute approval to conduct High Altitude Operations. The airplane must be properly equipped and approval must be obtained from the appropriate regulatory authority prior to conducting these operations.

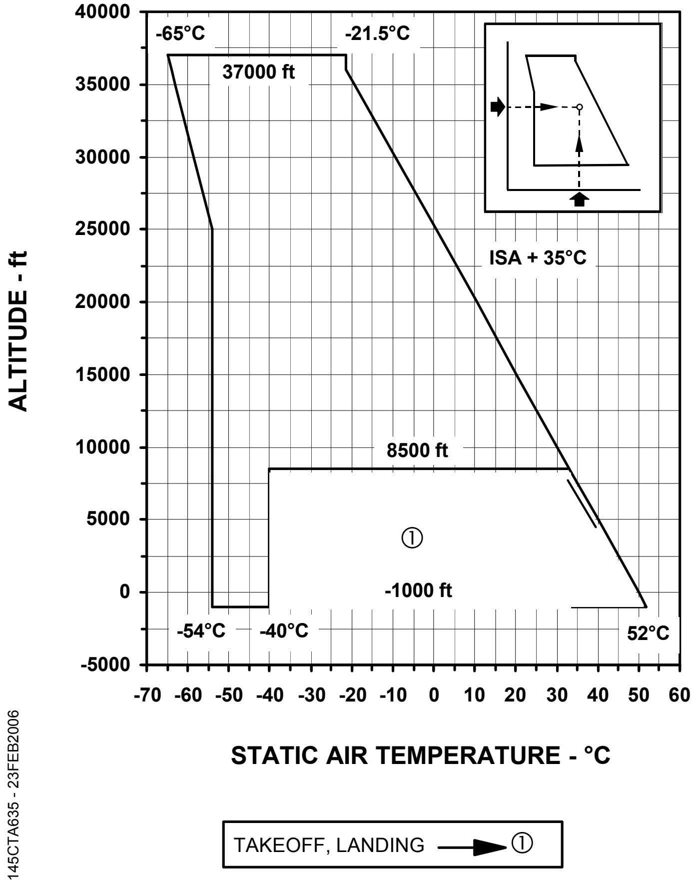
For limitations, procedures and performance information not contained in this Supplement, refer to the basic AFM and Supplements related to the associated engines and airplanes operation, as applicable.

LIMITATIONS

AIRPLANES

This supplement is applicable only to the EMB-145ER, EP and MP models that are Post-Mod. SB 145-00-0031 or have an equivalent modification factory incorporated.

OPERATIONAL ENVELOPE



NOTE: - In the event of a landing below -40°C, the airplane may not takeoff without further maintenance inspection.
- Total Air Temperature in cruise flight above 25000 ft is limited to -45°C.

POWER PLANT

ENGINES

Two Rolls-Royce AE3007A1, AE3007A1/1 or AE3007A1P.

EMERGENCY AND ABNORMAL PROCEDURES

The Emergency and Abnormal Procedures remain unchanged.

NORMAL PROCEDURES

The actions listed in the procedure below must complement the equivalent procedure contained in the basic AFM. The remaining Normal Procedures section remains unchanged.

BEFORE START

Pressurization .... 8000 ft

NOTE: In airports with pressure altitude between 8000 ft and 8500 ft, the cabin altitude displayed in EICAS may be amber.

DESCENT

Pressurization .... SET
Set the destination airport altitude.

NOTE: When flying to an airport with pressure altitude between 8000 ft and 8500 ft, the cabin altitude displayed in EICAS may become amber during approach.

PERFORMANCE

For Takeoff and Landing performance refer to the ETOASG software, AFM Section 5 and/or to the applicable Supplements.

APPENDICES

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APPENDIX 1

LIST OF EFFECTIVE PAGES

ORIGINAL ....0 .... DEC 10, 1996
REVISION .... 1 to 15............Not Applicable
REVISION ....16 ....JUN 17, 1998
REVISION .... 17 to 52...........Not Applicable
REVISION ....53 .... OCT 22, 2002
REVISION .... 54 to 55...........Not Applicable
REVISION ....56 .... OCT 21, 2003
REVISION ....57 ....JUN 17, 2004
REVISION .... 58 to 64...........Not Applicable
REVISION ....65 .... OCT 03, 2013

* Asterisk indicates pages revised, added or deleted by the current revision.

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CONFIGURATION DEVIATION LIST

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CONFIGURATION DEVIATION LIST

GENERAL LIMITATIONS

This Configuration Deviation List contains additional certificate limitations for operation of the EMB-145 airplane without certain secondary airframe and engine parts as listed herein. When the airplane is operated using the CDL, it must be operated in accordance with the limitations specified in the AFM, as amended in the CDL. All the items which are related to the airworthiness of the airplane and not included on the list are automatically required.

The associated limitations must be listed on a placard affixed in the cockpit in clear view of the pilots and other appropriate crewmember(s). The pilot in command should be notified of each operation with a missing part(s) by listing the missing part(s) in the flight or dispatch release. The operator should list in the airplane logbook an appropriate notation covering the missing part(s) on each flight.

If an additional part is lost, the airplane may not depart the airport at which it landed following this event, until it complies with the limitation of the CDL. This, of course, does not preclude the issuance of a ferry permit to allow the airplane to be flown to a point where the necessary repairs or replacement can be made.

No more than one part for any one system may be missing, unless specific combinations of parts are included in the CDL. Unless otherwise specified, parts from different systems may be missing. The performance penalties are cumulative, unless specifically designated penalties are indicated for the combination of missing parts.

No more than three parts that have each been determined to cause negligible performance degradation may be missing for takeoff without applying a performance penalty. When more than three such parts are missing, a performance penalty of either 0.05 percent of the maximum takeoff weight or 45 kilograms (100 pounds), whichever is less, must be applied for takeoff, en route, and landing for each missing part.
No more than ten parts that have each been determined to cause no performance penalty may be missing.

Takeoff performance penalties should be applied to the takeoff weights that are limited by performance considerations (i.e., takeoff field length, first, second, or final segment climb, or takeoff flight path). If the performance-limited takeoff weight is greater than the maximum certified takeoff weight, the takeoff performance penalties should be applied to the maximum certified takeoff weight to ensure compliance with the noise requirements.

Landing performance penalties should be applied to the landing weights that are limited by performance considerations (i.e., landing field length, landing climb, or approach climb). If the performance-limited landing weight is greater than the maximum certified landing weight, the landing performance penalties should be applied to the maximum certified landing weight to ensure compliance with the noise requirements.

En route performance penalties apply only to operations that are limited by the one-engine inoperative en route climb performance.

The numbering and designation of system in this Appendix is based on ATA Spec. 100. The parts within each system are identified by functional description and, when necessary, by panel identification. See Maintenance Manual, Chapter 6, for panel identification.

CONFIGURATION DEVIATION LIST			
Airplane: EMB-145	Revision n° 65		Page 6-1
System & Sequence Number — 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
6 DIMENSIONS AND AREAS			
41-1 Exterior Main Door Control Panel Access Door	1	0	May be missing with no penalty.
41-2 External Power Connection Access Door	1	0	May be missing with no penalty.
41-3 Ground Air Conditioning Connection Access Door	1	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-4 Air Conditioning Heat Exchanger Grills	1	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-5 Pack Valve/ Wing Anti-ice Valve Access Door (191LR/KL)	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-6 Bleed Flexible Joint Access Door (194AR/CR, 195AL/CL)	4	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-7 Red Beacon Fairing (192EL)	1	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.

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Airplane: EMB-145	Revision n° 65		Page 6-2
System & Sequence Number / 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
6 DIMENSIONS AND AREAS			
41-8 Hydraulic Servicing Access Door (193GR/HR/JR, 193DL/EL/FL)	6	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-9 Fuel Tank Drain Valve Access Door (192CL/DR)	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-10 Fuel Wing Stub Drain Valve Access Door (192HL/JR) (EMB-145 LR/XR)	2	1	One may be missing with no penalty.
41-11 Drip Stick Door (192FL/GR) (EMB-145 LR/XR)	2	1	One may be missing with no penalty.
41-12 Pneumatic Duct Joints Access Panel (193YR/TR/SL/XL) (EMB-145 XR)	4	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-13 Hydraulic System Service Access Door (193WL/ZR) (EMB-145 XR)	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
41-14 Hydraulic Oil Level Sight Glass Access Door (193UL/VR) (EMB-145 XR)	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.

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Airplane: EMB-145	Revision n° 65		Page 6-3
System & Sequence Number / 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
6 DIMENSIONS AND AREAS			
41-15 Pneumatic Duct Junction Access Panel (198ER/DL) (EMB-145 XR)	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
42-1 Pressure Fueling Panel Access Door	1	0	May be missing provided: a) Door microswitch is locked actuated (simulating door closed); b) Refueling, defueling and power switches are verified in the CLOSED/NORMAL position; c) Refueling cap is locked and latched; and d) Maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
42-2 Potable Water Service Door	1	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
42-3 Potable Water Service Access Panel (198BR) (EMB-145 XR)	1	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
42-4 Waste Service Door	1	0	May be missing with no penalty.

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Airplane **EMB-145**	Revision n° 65		Page 6-4
System & Sequence Number / ITEM (1.)	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
6 DIMENSIONS AND AREAS			
42-5 Engine Starting Pneumatic Connection Door	1	0	May be missing with no penalty.
42-6 Maintenance Interphone Connection Door	1	0	May be missing with no penalty.
42-7 APU Tail Cone Attaching Bolt Access Door (313ER/DR/AL/BR)	4	0	May be missing with no penalty.
42-8 APU Servicing Access Door (313CL)	1	0	May be missing provided APU operates on the ground only.

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Airplane EMB-145		**Revision n° 65**	**Page** 23-1
System & Sequence Number / **ITEM** / **1.**	**2. Number installed**	**3. Number required for dispatch**	**4. Remarks and/or exceptions**
23 COMMUNICATIONS			
60-1 Static Dischargers	22	13	A maximum of 9 (nine) static dischargers may be missing with no penalty. At least the following dischargers are required to be installed: a) 3 (three) are installed on each wing; b) 1 (one) is installed on the rudder; c) 3 (three) are installed on each elevator.
60-2 Static Dischargers (EMB-145 XR)	26	17	A maximum of 9 (nine) static dischargers may be missing with no penalty. At least the following dischargers are required to be installed: a) 4 (four) are installed on each wing; b) 1 (one) is installed on the rudder; c) 3 (three) are installed on each elevator.

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Airplane EMB-145		**Revision n° 65**	**Page** 28-1

System & Sequence Number — 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
28 FUEL			
11-1 Fuel Tank Drain Access Door	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
12-1 Vent Valves Screen Assembly	2	0	May be missing with no penalty.
42-1 Direct Quantity Measuring Sticks	4	0	May be missing with no penalty.

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Airplane EMB-145	Revision n° 65	Page 32-1	
System & Sequence Number — 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
32 LANDING GEAR			
10-1 Main Landing Gear Doors	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
10-2 Main Landing Gear Wheels Fairing	2	0	May be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.

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Airplane EMB-145	Revision n° 65		Page 33-1
System & Sequence Number — 1. ITEM	**2. Number installed**	**3. Number required for dispatch**	**4. Remarks and/or exceptions**
33 LIGHTS			
41-1 Nose Landing Light	1	0	May be missing with no penalty.
42-1 Taxi Light	2	0	May be missing with no penalty.
43-1 Navigation Light Protective Lens	3	0	May be missing with no penalty.
43-2 Navigation Light Protective Lens (EMB-145 XR)	6	0	May be missing with no penalty.
44-1 Inspection Light Protective Lens	2	0	May be missing with no penalty.
46-1 Logotype Light Protective Lens	2	0	May be missing with no penalty.
47-1 Red Beacon Light Protective Lens	2	0	May be missing with no penalty.
50-1 Exterior Emergency Light Protective Lens	4	0	May be missing with no penalty.

CONFIGURATION DEVIATION LIST

Airplane	Revision n° 65	Page
EMB-145		49-1

System & Sequence Number / 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
49 AUXILIARY POWER UNIT			
42-1 APU Starter/Generator Air Intake Scoop	1	0	May be missing provided APU operates on the ground only.
52-1 APU Compartment Cooling Air Intake Scoop	1	0	May be missing provided APU operates on the ground only.

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Airplane: **EMB-145**		Revision n° 65	Page 52-1
System & Sequence Number — 1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
52 DOORS			
10-1 Main Door Handgrip	1	0	May be missing with no penalty.
42-1 Service Door Handgrip	1	0	May be missing with no penalty.
43-1 Tail Cone Access Door (312AR)	1	0	May be missing with no penalty.

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Airplane: EMB-145	Revision n° 65	Page 54-1	
System & Sequence Number / 1. ITEM	**2. Number installed**	**3. Number required for dispatch**	**4. Remarks and/or exceptions**
54 NACELLE/PYLONS			
50-1 Systems Access Door (414AB/BB/EB, 424AB/BB/EB)	6	4	A maximum of 1 per pylon for a total of 2 may be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.
50-2 Bleed Valve Access Door (414CB, 424CB)	2	0	May be missing with no penalty.
50-3 Pre-cooler Access Door (414DB, 424DB)	2	0	May be missing with no penalty.
50-4 Engine Pylon Fairing (414HL, 424HR)	2	0	May be missing with no penalty.

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Airplane EMB-145			Revision n° 65	Page 55-1
System & Sequence Number	**1. ITEM**	**2. Number installed**	**3. Number required for dispatch**	**4. Remarks and/or exceptions**
55 STABILIZERS				
10-2	Horizontal Stabilizer Access Door (334AB/BB/CB, 333AB/BB/CB)	6	4	A maximum of 1 per side for a total of 2 may be missing with no penalty.
20-2	Elevator Control Rod Fairing	4	0	May be missing with no penalty.
20-3	Elevator Trim Control Rod Fairing	2	0	May be missing with no penalty.
20-4	Elevator Access Door (335AB/BB/CB/DB/EB/FB/GB/HB, 336AB/BB/CB/DB/EB/FB/GB/HB)	16	15	One may be missing with no penalty. 335AB/BB/CB/DB/EB and 336AB/BB/CB/DB/EB cannot be missing.
30-1	Vertical Stabilizer Access Door (322AL/BR, 324AL/BL/CL/DL/EL, 324FR, 325AL/BL/CL/DL/EL, 325FR/GR/HR/JR/KR/LR)	19	16	A maximum of 3 in any combination may be missing with no penalty. 324FR/EL and 325EL/LR cannot be missing.
40-1	Rudder Access Door (326AL/BL/CL/EL/FL/GL/HL, 327AL/BL/CL/GL, 327ER/FR/GR/HR)	15	13	A maximum of 2 in any combination may be missing with no penalty.

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Airplane: EMB-145			Revision n° 65	Page 57-1
System & Sequence Number	1. ITEM	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
57 WINGS				
20-1	Vortex Generator	24	22	A maximum of 1 per wing for a total of 2 may be missing with no penalty.
30-2	Wing Tip Glareshield	2	0	May be missing with no penalty.
42-1	Wing Grounding Point	2	0	One or both may be missing with no penalty provided: a) The hole is covered with Scotch Brand Tape (Silver Tape) or similar product and; b) The landing gear grounding point is available.
52-1	Flap Track Fairing	10	9	One may be missing with no penalty.
52-2	Wing-to-flap Seal	4	3	One may be missing provided maximum airspeed is limited to 250 KIAS/0.65 M, whichever is lower.

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Airplane EMB-145	Revision n° 65		Page 78-1
System & Sequence Number — ITEM — 1.	2. Number installed	3. Number required for dispatch	4. Remarks and/or exceptions
78 ENGINE EXHAUST			
31-1 Plug Inhibition of the Thrust Reversers	4	0	May be missing with no penalty.