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B-777-200ER

Operational Data

Manual

Revision Number: 43
Revision Date: September 23, 2016

Issued by
Performance Engineering - Dept 088 ATG
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FUNCTION

The Aircraft Operational Data Manual (ODM) serves to provide trained Delta Flight Operations and Operations Control personnel with some of the information and instructions necessary for safe and economical operation of the aircraft.

AUTHORITY

This manual is published by the General Manager – Performance Engineering, Dept. 088, ATL under the authority of the Vice President – Operations Reliability and Control.

The procedures and data contained in this manual include those in the FAA Approved Airplane Flight Manual and aircraft manufacturer's data.

RESPONSIBILITY

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All manual holders and users are encouraged to contribute their suggestions and criticisms regarding the manual so that its function is well served. Inputs concerning data and technical content should be addressed to Performance Engineering, Dept. 088, ATL.

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Revision Notification

Publication: B-777-200ER OPERATIONAL DATA MANUAL

Date: 23 Sep 16

Revision Number: 43

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REMOVE	INSERT	REMARKS
TABLE OF CONTENTS COVER PAGE	TABLE OF CONTENTS COVER PAGE	Updated to reflect revision.
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QUICK REFERENCE Pages: All	QUICK REFERENCE Pages: All	Changed the table title and eliminated fair nomenclature to make it consistent with new FAA policy

**Pages not displaying a revision date of 23 Sep 16 were unchanged and included only for filing purposes.*

This list is effective with ODM Revision 43

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777-200ER QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES

RUNWAY CONDITION ASSESSMENT MATRIX

For additional guidance regarding the classification of the braking action based on existing contaminant types and the ICAO/Runway Condition Code values, please refer to Airway Manual, Supplemental, 4 – Weather, Braking Action.

Reported Braking Action		Reported Runway Surface Conditions			
PIREP	Definition	Runway Contaminant	ICAO/Runway Condition Code	Mu ⁽²⁾	RCR
--	--	• Dry	6		--
Good	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal	- Frost - Wet or Damp 1/8" or less depth of: - Water - Slush - Dry Snow - Wet Snow	5	40 or higher	19 & above
Good to Medium	Braking deceleration OR directional control is between Good and Medium.	-15°C and colder OAT: Compacted Snow	4	39	
Medium	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	- Wet ("slippery when wet" runway) - Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 1/8" depth of: - Dry Snow - Wet Snow Warmer than -15°C OAT: - Compacted Snow	3	30 to 29	13 – 18
Medium to Poor	Braking deceleration OR directional control is between Medium and Poor.	Greater than 1/8" depth of: - Water - Slush	2	21 to 20 or lower	
Poor	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	• Ice	1		6 – 12
Nil ⁽¹⁾	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	- Wet Ice - Water on top of Compacted Snow - Dry Snow or Wet Snow over Ice	0		5 & below
--	--	• Unreliable	9 (ICAO only)	N/A	N/A

⁽¹⁾ Operations on any runway with a PIREP or runway contaminant of nil are prohibited.

⁽²⁾ The overlapping Mu scales reflect the inherent inaccuracies of ground based Mu devices. Do not base the calculation of a landing distance solely on runway friction meter readings.

Braking actions "GOOD TO MEDIUM (4)" and "MEDIUM TO POOR (2)" are not displayed on the following pages. It is acceptable to interpolate between the provided data to calculate the desired landing performance when these conditions are present.

CROSSWIND

On slippery runways, crosswind guidelines are a function of runway surface condition, airplane loading and assume proper pilot technique. The following crosswind guidelines are applicable to all Delta aircraft for takeoff and landing.

	DRY	GOOD	MEDIUM	POOR
Crosswind Limit	Aircraft Limits	Aircraft Limits	20KTS	10KTS
Tailwind Limit	15KTS	15KTS	5KTS	0KTS

777-200ER QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	12,300	11,100	10,000	8,400	6,800	5,900	10,000	8,400	7,600	7,000
640,000	12,000	10,900	9,800	8,200	6,700	5,700	9,800	8,200	7,400	6,800
620,000	11,700	10,600	9,600	8,000	6,500	5,500	9,600	8,100	7,200	6,700
600,000	11,400	10,400	9,300	7,800	6,400	5,400	9,300	7,900	7,100	6,500
580,000	11,100	10,100	9,100	7,700	6,200	5,200	9,100	7,700	6,900	6,400
560,000	10,800	9,900	8,900	7,500	6,100	5,100	8,900	7,500	6,800	6,300
540,000	10,500	9,600	8,700	7,300	6,000	4,900	8,700	7,300	6,600	6,100
520,000	10,200	9,400	8,400	7,100	5,800	4,700	8,400	7,100	6,400	6,000
500,000	9,900	9,100	8,200	6,900	5,700	4,600	8,200	6,900	6,300	5,900
480,000	9,600	8,900	8,000	6,700	5,500	4,400	8,000	6,800	6,100	5,700
460,000	9,300	8,600	7,700	6,600	5,400	4,300	7,700	6,600	5,900	5,600
440,000	9,000	8,400	7,500	6,400	5,300	4,100	7,500	6,400	5,800	5,400
420,000	8,800	8,200	7,400	6,300	5,200	4,100	7,400	6,400	5,700	5,400
400,000	8,600	8,100	7,400	6,300	5,200	4,100	7,400	6,300	5,700	5,300
380,000	8,400	7,900	7,300	6,200	5,200	4,000	7,300	6,300	5,600	5,200
360,000	8,200	7,800	7,200	6,200	5,200	4,000	7,200	6,200	5,500	5,200

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF30 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-500	-400	-300	-300	-200	-100	-300	-300	-300	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	500	400	300	300	200	100	300	300	300	200
6,000	1,000	800	700	600	400	300	700	600	500	500
8,000	1,940	1,660	1,380	1,110	830	560	1,380	1,110	1,020	920

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	350	300	250	150	350	300	250	200
PER 10°C ABOVE ISA	200	200	200	150	100	50	200	150	100	100
PER 10°C BELOW ISA	-200	-200	-200	-150	-100	-50	-200	-150	-100	-100
PER 1% UP SLOPE	-200	-100	-50	0	0	-50	-50	0	-100	-100
PER 1% DOWN SLOPE	150	50	50	0	0	50	50	50	100	100
1 REVERSER INOP	400	100	0	0	0	100	0	100	300	300
2 REVERSERS INOP	400	100	0	0	0	100	0	100	500	500
MANUAL SPOILERS	200	200	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

777-200ER QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	10,700	9,800	9,700	9,700	12,700	12,700	12,600	12,600
640,000	10,400	9,600	9,500	9,500	12,400	12,400	12,300	12,300
620,000	10,200	9,400	9,300	9,200	12,100	12,000	12,000	11,900
600,000	9,900	9,100	9,000	9,000	11,800	11,700	11,700	11,600
580,000	9,700	8,900	8,800	8,800	11,500	11,400	11,300	11,300
560,000	9,400	8,700	8,600	8,500	11,100	11,100	11,000	11,000
540,000	9,100	8,400	8,400	8,300	10,800	10,800	10,700	10,700
520,000	8,900	8,200	8,100	8,100	10,500	10,400	10,400	10,300
500,000	8,600	8,000	7,900	7,900	10,200	10,100	10,100	10,000
480,000	8,400	7,700	7,700	7,600	9,800	9,800	9,700	9,700
460,000	8,100	7,500	7,400	7,400	9,500	9,500	9,400	9,400
440,000	7,900	7,300	7,200	7,200	9,200	9,100	9,100	9,000
420,000	7,800	7,200	7,100	7,100	9,000	8,900	8,900	8,800
400,000	7,700	7,100	7,000	6,900	8,900	8,700	8,700	8,600
380,000	7,600	6,900	6,900	6,800	8,700	8,500	8,500	8,400
360,000	7,500	6,800	6,700	6,700	8,600	8,300	8,300	8,200

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF30 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-500	-500	-500	-500
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	500	500	500	500
6,000	800	700	700	700	1,100	1,100	1,100	1,000
8,000	1,200	1,100	1,100	1,100	1,600	1,600	1,600	1,500

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	350	250	300	250	350	300	300	300
PER 10°C ABOVE ISA	200	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-200	-150	-150	-150	-200	-200	-200	-200
PER 1% UP SLOPE	-100	-200	-200	-200	-400	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	650	650	650	650
1 REVERSER INOP	300	700	600	600	1,300	1,400	1,400	1,300
2 REVERSERS INOP	1,100	1,600	1,500	1,500	3,600	3,600	3,600	3,600
MANUAL SPOILERS	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

777-200ER QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	13,300	12,200	10,900	8,900	7,100	6,300	10,900	9,100	7,800	7,500
640,000	12,900	11,900	10,600	8,700	7,000	6,100	10,600	8,900	7,700	7,300
620,000	12,600	11,600	10,400	8,500	6,800	5,900	10,400	8,700	7,500	7,200
600,000	12,300	11,300	10,100	8,300	6,700	5,700	10,100	8,500	7,400	7,000
580,000	11,900	11,000	9,800	8,100	6,600	5,500	9,800	8,300	7,200	6,800
560,000	11,600	10,700	9,600	8,000	6,400	5,400	9,600	8,100	7,000	6,700
540,000	11,200	10,400	9,300	7,800	6,300	5,200	9,300	7,900	6,900	6,500
520,000	10,900	10,100	9,100	7,600	6,100	5,000	9,100	7,700	6,700	6,400
500,000	10,500	9,800	8,800	7,400	6,000	4,800	8,800	7,500	6,500	6,200
480,000	10,200	9,500	8,600	7,200	5,900	4,600	8,600	7,300	6,400	6,000
460,000	9,800	9,200	8,300	7,000	5,700	4,400	8,300	7,100	6,200	5,900
440,000	9,500	8,900	8,100	6,800	5,600	4,200	8,100	6,900	6,100	5,700
420,000	9,200	8,700	7,900	6,700	5,500	4,200	7,900	6,700	5,900	5,600
400,000	8,900	8,500	7,700	6,600	5,400	4,100	7,700	6,600	5,800	5,500
380,000	8,700	8,200	7,500	6,400	5,300	4,000	7,500	6,400	5,700	5,400
360,000	8,400	8,000	7,300	6,300	5,200	4,000	7,300	6,300	5,600	5,200

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF25 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-500	-500	-400	-300	-200	-100	-400	-300	-300	-300
2,000	0	0	0	0	0	0	0	0	0	0
4,000	500	500	400	300	200	100	400	300	300	300
6,000	1,100	900	800	600	500	300	800	600	600	500
8,000	1,600	1,400	1,200	1,000	700	400	1,200	1,000	800	800

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	400	300	250	150	400	300	250	200
PER 10°C ABOVE ISA	250	200	200	150	100	50	200	150	150	100
PER 10°C BELOW ISA	-250	-200	-200	-150	-100	-50	-200	-150	-150	-100
PER 1% UP SLOPE	-250	-150	-50	0	0	-50	-50	0	-100	-100
PER 1% DOWN SLOPE	200	100	50	0	0	50	50	50	100	100
1 REVERSER INOP	600	200	0	0	0	100	0	100	300	300
2 REVERSERS INOP	600	200	0	0	0	200	0	100	600	600
MANUAL SPOILERS	200	200	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

777-200ER QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	11,200	10,400	10,300	10,300	13,500	13,300	13,300	13,300
640,000	11,000	10,200	10,100	10,000	13,100	13,000	12,900	12,900
620,000	10,700	9,900	9,800	9,800	12,800	12,600	12,600	12,600
600,000	10,500	9,700	9,600	9,500	12,400	12,300	12,200	12,200
580,000	10,200	9,400	9,300	9,300	12,100	12,000	11,900	11,900
560,000	10,000	9,200	9,100	9,000	11,700	11,600	11,500	11,500
540,000	9,700	8,900	8,800	8,800	11,400	11,300	11,200	11,200
520,000	9,400	8,700	8,600	8,500	11,100	10,900	10,900	10,800
500,000	9,200	8,400	8,300	8,300	10,700	10,600	10,500	10,500
480,000	8,900	8,200	8,100	8,000	10,400	10,200	10,200	10,100
460,000	8,700	7,900	7,800	7,800	10,000	9,900	9,800	9,800
440,000	8,400	7,700	7,600	7,500	9,700	9,500	9,500	9,500
420,000	8,200	7,500	7,400	7,300	9,400	9,300	9,200	9,200
400,000	8,100	7,300	7,200	7,100	9,200	9,000	8,900	8,900
380,000	7,900	7,100	7,000	6,900	8,900	8,700	8,700	8,600
360,000	7,700	6,900	6,800	6,800	8,700	8,400	8,400	8,400

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF25 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-600	-600	-600	-600
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	600	600	600	600
6,000	800	800	800	800	1,100	1,100	1,100	1,100
8,000	1,200	1,200	1,200	1,200	1,700	1,700	1,700	1,700

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	300	300	250	350	300	300	300
PER 10°C ABOVE ISA	200	150	150	150	250	200	200	200
PER 10°C BELOW ISA	-200	-150	-150	-150	-250	-200	-200	-200
PER 1% UP SLOPE	-150	-200	-200	-250	-350	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	650	650	700	650
1 REVERSER INOP	300	700	700	700	1,400	1,500	1,500	1,500
2 REVERSERS INOP	1,200	1,800	1,800	1,800	4,200	4,300	4,200	4,200
MANUAL SPOILERS	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

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DEFINITIONS AND ASSUMPTIONS

NET DRIFTDOWN PROFILE - Flight path altitude as a function of distance as an aircraft descends following the loss of one or two engines. Actual altitude is degraded for conservatism.

NET LEVEL-OFF ALTITUDE - Altitude for a given weight, temperature, and engine bleed at which the aircraft can achieve a 1.1% climb gradient with one engine inoperative. This data provides a degraded performance level and is used by Flight Control to assure terrain clearance. Nominal (GROSS) driftdown data is presented in the ABNORMAL Section for inflight use.

ISA International Standard Atmosphere temperature, in °C, for a given pressure altitude. ISA temperature for Sea Level is 15°C (59°F).

ISA DEVIATION The difference between the standard ISA temperature and the ambient temperature in °C.

STATIC AIR TEMPERATURE (SAT) The ambient still air temperature outside of the aircraft. Sometimes known as the Outside Air Temperature (OAT).

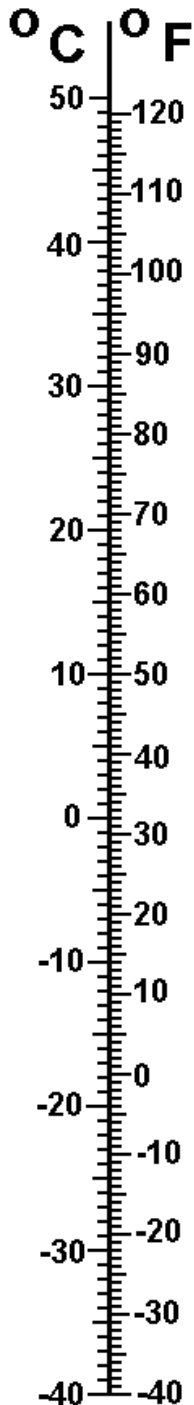
TOTAL AIR TEMPERATURE (TAT) The total of the ambient air temperature (SAT) plus the increase in temperature due to compression heating.

V_{MO}/M_{MO} Maximum allowable operating indicated airspeed or Mach number.

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TEMPERATURE CONVERSION AND STATIC AIR TEMPERATURE

(°C)



ALTITUDE - FEET	ISA DEVIATION - °C					
	ISA-20	ISA-10	ISA	ISA+10	ISA+20	ISA+30
36,000 & Higher	-76.5	-66.5	-56.5	-46.5	-36.5	-26.5
35,000	-74.2	-64.2	-54.2	-44.2	-34.2	-24.2
34,000	-72.3	-62.3	-52.3	-42.3	-32.3	-22.3
33,000	-70.3	-60.3	-50.3	-40.3	-30.3	-20.3
32,000	-68.3	-58.3	-48.3	-38.3	-28.3	-18.3
31,000	-66.3	-56.3	-46.3	-36.3	-26.3	-16.3
30,000	-64.3	-54.3	-44.3	-34.3	-24.3	-14.3
29,000	-62.4	-52.4	-42.4	-32.4	-22.4	-12.4
28,000	-60.4	-50.4	-40.4	-30.4	-20.4	-10.4
27,000	-58.4	-48.4	-38.4	-28.4	-18.4	-8.4
26,000	-56.5	-46.5	-36.5	-26.5	-16.5	-6.5
25,000	-54.5	-44.5	-34.5	-24.5	-14.5	-4.5
24,000	-52.5	-42.5	-32.5	-22.5	-12.5	-2.5
23,000	-50.5	-40.5	-30.5	-20.5	-10.5	-0.5
22,000	-48.5	-38.5	-28.5	-18.5	-8.5	+1.5
21,000	-46.6	-36.6	-26.6	-16.6	-6.6	+3.4
20,000	-44.6	-34.6	-24.6	-14.6	-4.6	+5.4
19,000	-42.6	-32.6	-22.6	-12.6	-2.6	+7.4
18,000	-40.6	-30.6	-20.6	-10.6	-0.6	+9.4
17,000	-38.7	-28.7	-18.7	-8.7	+1.3	+11.3
16,000	-36.7	-26.7	-16.7	-6.7	+3.3	+13.3
15,000	-34.7	-24.7	-14.7	-4.7	+5.3	+15.3
14,000	-32.7	-22.7	-12.7	-2.7	+7.3	+17.3
13,000	-30.7	-20.7	-10.7	-0.7	+9.3	+19.3
12,000	-28.8	-18.8	-8.8	+1.2	+11.2	+21.2
11,000	-26.8	-16.8	-6.8	+3.2	+13.2	+23.2
10,000	-24.8	-14.8	-4.8	+5.2	+15.2	+25.2
5000	-14.9	-4.9	+5.1	+15.1	+25.1	+35.1
0	-5.0	+5.0	+15.0	+25.0	+35.0	+45.0

RULE OF THUMB: For standard temperature (ISA) at or below 36,000 feet:

Double altitude (in thousands of feet), subtract 15, change sign.

EXAMPLES:	<u>ALT</u>	<u>DOUBLE ALT</u>	<u>SUBTRACT 15</u>	<u>CHANGE SIGN</u>
	0	0	-15	+15
	33	66	51	-51

TOTAL AIR TEMPERATURE vs STATIC AIR TEMPERATURE (°C)

TAT - °C	INDICATED MACH NUMBER													
	.40	.50	.60	.70	.74	.75	.76	.77	.78	.80	.82	.84	.86	.88
75	64	58	52	44	41	40	39	38	37	35	34	32	30	28
70	59	54	47	39	36	35	34	33	33	31	29	28	26	24
65	55	49	42	35	32	31	30	29	28	27	25	23	21	20
60	50	44	38	30	27	26	25	24	24	22	21	19	17	15
55	45	39	33	26	23	22	21	20	19	18	16	14	13	11
50	40	35	28	21	18	17	16	15	14	13	12	10	8	7
45	35	30	24	17	14	13	12	11	10	9	7	6	4	2
40	30	25	19	12	9	8	7	6	6	4	3	1	0	-2
35	25	20	14	7	5	4	3	2	1	0	-1	-3	-5	-6
30	21	16	10	3	0	-1	-2	-3	-3	-4	-6	-7	-9	-11
25	16	11	5	-2	-4	-5	-6	-7	-7	-9	-10	-12	-13	-15
20	11	6	0	-6	-9	-10	-11	-12	-12	-13	-15	-16	-18	-19
15	6	1	-4	-11	-13	-14	-15	-16	-16	-18	-19	-21	-22	-24
10	1	-3	-9	-15	-18	-19	-20	-21	-21	-22	-23	-25	-27	-28
5	-4	-8	-14	-20	-22	-23	-24	-25	-25	-27	-28	-29	-31	-32
0	-8	-13	-18	-24	-27	-28	-29	-30	-30	-31	-32	-34	-35	-37
-5	-13	-18	-23	-29	-31	-32	-33	-34	-34	-35	-37	-38	-40	-41
-10	-18	-23	-28	-33	-36	-37	-38	-39	-39	-40	-41	-43	-44	-45
-15	-23	-27	-32	-38	-40	-41	-42	-43	-43	-44	-46	-47	-48	-50
-20	-28	-32	-37	-43	-45	-46	-47	-48	-48	-49	-50	-51	-53	-54
-25	-33	-37	-42	-47	-49	-50	-51	-52	-52	-53	-54	-56	-57	-58
-30	-38	-42	-46	-52	-54	-54	-55	-55	-56	-58	-59	-60	-61	-63
-35	-42	-46	-51	-56	-58	-59	-60	-61	-61	-62	-63	-64	-66	-67
-40	-47	-51	-56	-61	-63	-63	-64	-64	-65	-66	-68	-69	-70	-71
-45	-52	-56	-60	-65	-67	-68	-69	-70	-70	-71	-72	-73	-74	-76
-50	-57	-61	-65	-70	-72	-72	-73	-73	-74	-75	-76	-78	-79	-80
-55	-62	-65	-70	-74	-76	-77	-78	-79	-79	-80	-81	-82	-83	-84

NORMAL OPERATING SPEED LIMIT

Vmo / Mmo

PRESSURE ALTITUDE	INDICATED Vmo (KIAS)	MACH Mmo
0	330	0.499
5,000	330	0.544
10,000	330	0.594
15,000	330	0.650
17,000	330	0.674
19,000	330	0.700
21,000	330	0.726
23,000	330	0.754
25,000	330	0.783
27,000	330	0.813
29,000	330	0.845
31,000	327	0.870
33,000	313	0.870
35,000	299	0.870
37,000	286	0.870
39,000	273	0.870
41,000	261	0.870
43,000	249	0.870

ENROUTE FUEL TEMPERATURE

Use the following Chart to determine Dispatch Capability based on Fuel Freeze Point.

ADJUSTED FUEL FREEZE TEMP. °C	JET A	JP-5	JET-A1	TS-1
	DEVIATION FROM STANDARD DAY TEMPERATURE*			
FLT CONDITION -				
@ MACH 0.82				
FL 280	-25	-30	-31	-42
FL 310	-19	-24	-25	-36
FL 330	-15	-20	-21	-32
FL 350	-11	-16	-17	-28
FL 370 & HIGHER	-8	-14	-15	-26
@ MACH 0.83				
FL 280	-25	-30	-31	-43
FL 310	-19	-24	-25	-37
FL 330	-15	-20	-21	-33
FL 350	-11	-17	-17	-29
FL 370 & HIGHER	-9	-14	-15	-27
@ MACH 0.84				
FL 280	-26	-31	-32	-43
FL 310	-20	-25	-26	-37
FL 330	-16	-21	-22	-33
FL 350	-12	-17	-18	-29
FL 370 & HIGHER	-10	-15	-16	-27
@ MACH 0.85				
FL 280	-26	-32	-32	-44
FL 310	-20	-26	-27	-38
FL 330	-16	-22	-23	-34
FL 350	-12	-18	-19	-30
FL 370 & HIGHER	-10	-16	-16	-28

*Includes 3°C margin above actual fuel freeze temperature for type of fuel.

INSTRUCTIONS:

1. Enter the top of the chart with the Fuel Type (e.g. Jet A, JP-5, etc.).
2. Move vertically down to the Flight Condition (Mach and Altitude) expected en-route and read the Limit Standard Day Deviation.
3. Do not dispatch Aircraft into en-route temperatures colder than the Limit Standard Day Deviation obtained in Step 2 above.

EXAMPLE: Fuel Type of Jet A dispatched at Mach 0.82 and FL 350/370.

1. Enter the top of the Chart at: Jet A
2. Move vertically down the Chart to the Flight Conditions of Mach 0.82 and FL 350 and FL 370 & HIGHER and read the Limit Standard Day Deviations:

FL 350 - -11°C
 FL 370 & HIGHER - -8°C
3. Do not dispatch aircraft into temperatures colder than Standard -11°C at FL 350 and Standard -8°C at FL 370 and above.

FUEL TYPE	Jet A	JP-5	Jet-A1	TS-1
FREEZE POINT	-40°C	-46°C	-47°C	-60°C

Reference: S.P. 3541

DRIFTDOWN NET LEVEL OFF ALTITUDE ONE ENGINE INOPERATIVE FEET

TRENT 892

ANTI-ICE OFF

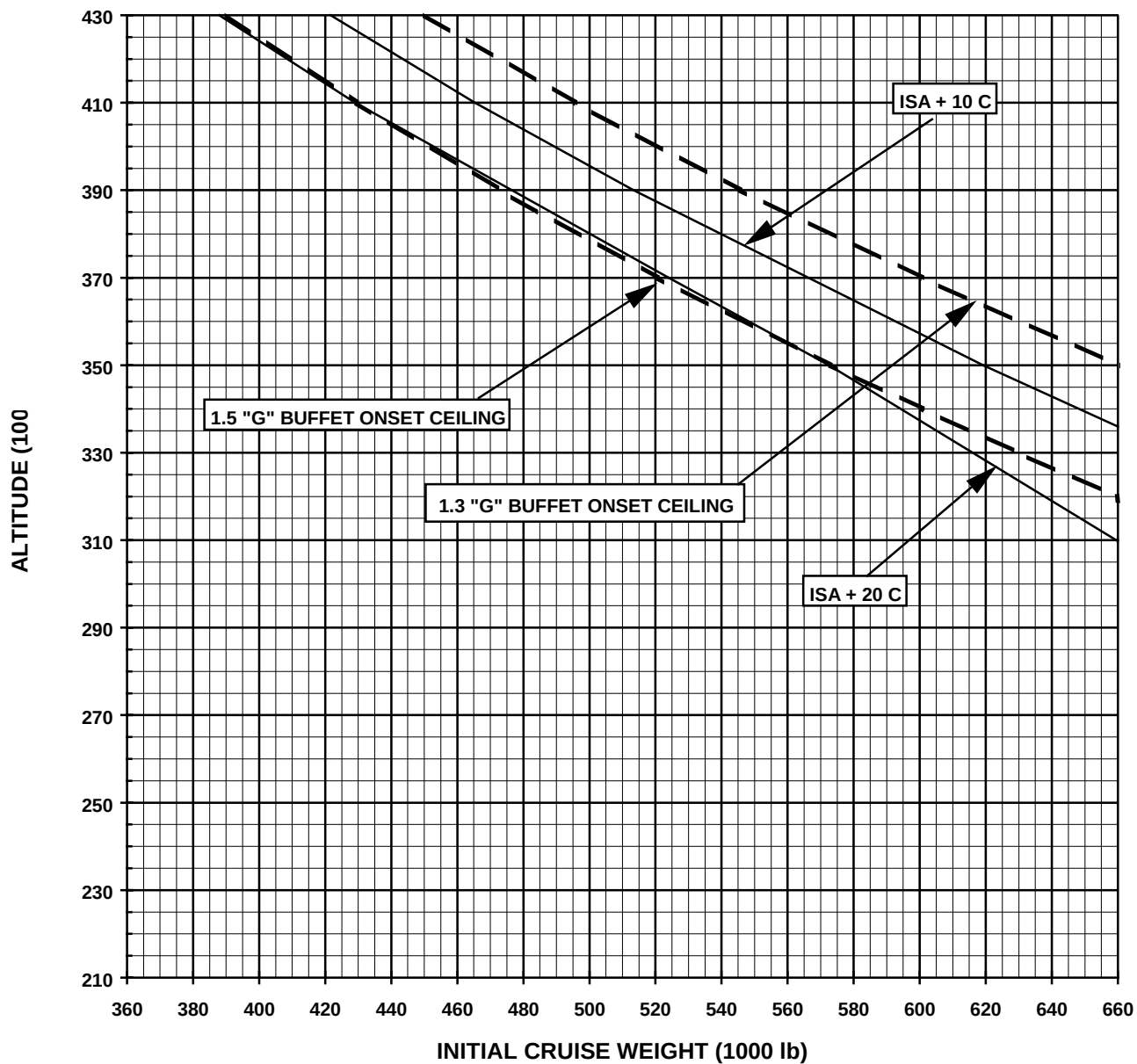
GROSS WEIGHT - POUNDS		ISA DEVIATION - °C		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	ISA + 10 & BELOW	ISA + 15	ISA + 20
640,000	619,500	14,000	12,600	10,600
600,000	581,000	16,100	14,700	13,100
560,000	542,500	17,900	16,800	15,300
520,000	504,000	19,800	18,700	17,400
480,000	465,500	21,800	20,700	19,400
440,000	426,500	23,900	22,800	21,500
400,000	387,000	26,000	25,100	23,900

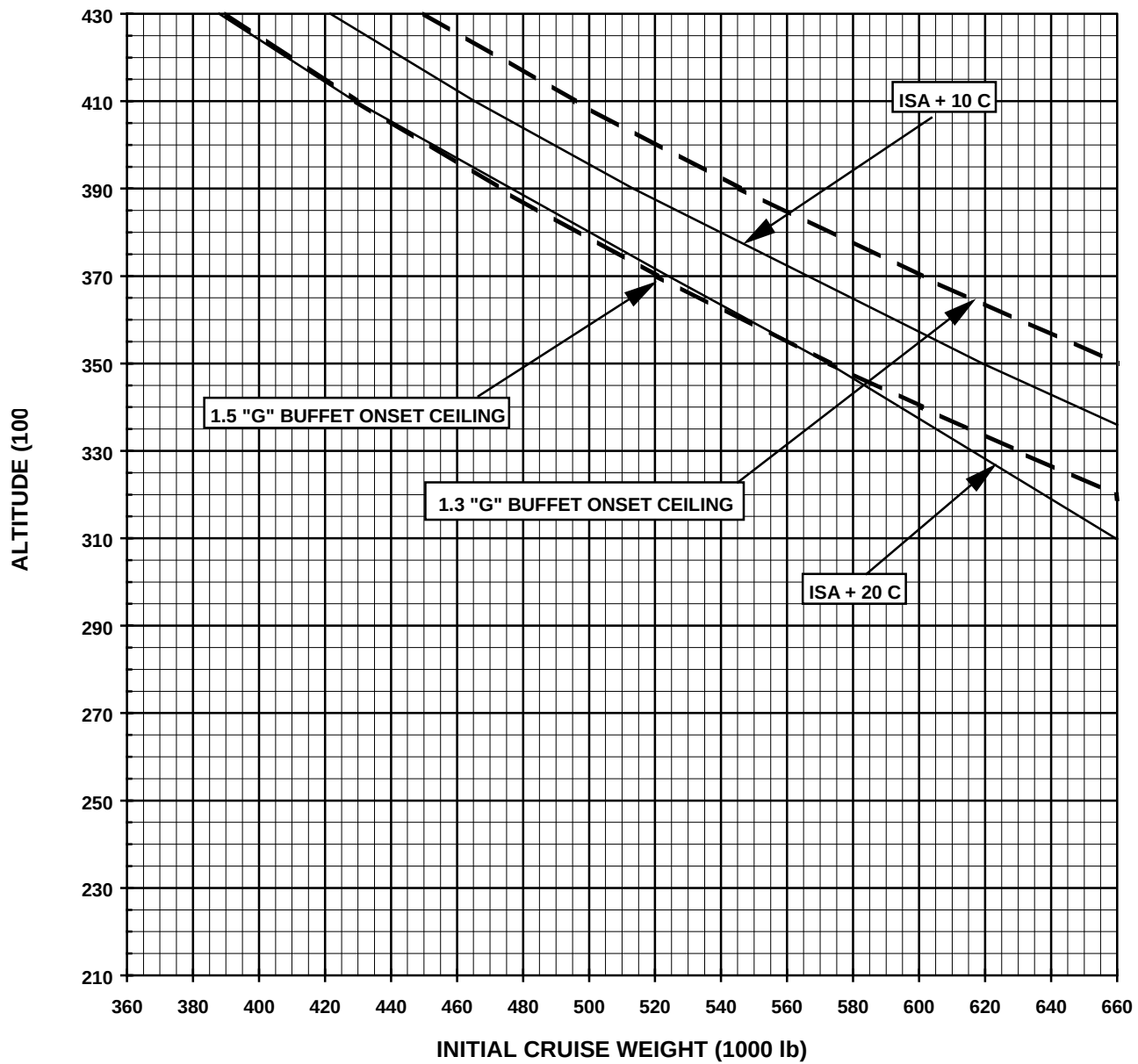
ENGINE ANTI-ICE ON

GROSS WEIGHT - POUNDS		ISA DEVIATION - °C		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	ISA + 10 & BELOW	ISA + 15	ISA + 20
640,000	619,500	13,500	11,900	9,600
600,000	581,000	15,700	14,200	12,500
560,000	542,500	17,600	16,500	14,900
520,000	504,000	19,700	18,500	17,100
480,000	465,500	21,600	20,500	19,200
440,000	426,500	23,700	22,600	21,400
400,000	387,000	25,900	24,900	23,700

ENGINE & WING ANTI-ICE ON

GROSS WEIGHT - POUNDS		ISA DEVIATION - °C		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	ISA + 10 & BELOW	ISA + 15	ISA + 20
640,000	619,500	13,200	11,700	9,300
600,000	581,000	15,400	14,000	12,200
560,000	542,500	17,400	16,300	14,600
520,000	504,000	19,500	18,300	16,900
480,000	465,500	21,400	20,300	19,000
440,000	426,500	23,500	22,400	21,200
400,000	387,000	25,700	24,700	23,500

MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE**LRC**

MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE**MACH 0.84**

BUFFET ONSET BOUNDARY SPEEDS

KIAS

FLIGHT LEVEL	CRUISE WEIGHT - POUNDS	V _b - M KIAS	G / BANK ANGLE - DEGREES					
			1.0 / 0°		1.15 / 30°		1.5 / 48°	
			LOW	HIGH	LOW	HIGH	LOW	HIGH
430	640	280 -0.84						
	560		227	248+				
	480		205	248+	223	248+		
	400		184	248+	199	248+		
	320		159	248+	174	248+	207	248+
410	640	280 -0.84	250	255+				
	560		223	260+	249	255+		
	480		202	260+	220	250+		
	400		180	260+	196	260+	230	260+
	320		155	260+	170	260+	205	260+
390	640	280 -0.84	238	272+				
	560		220	272+	237	272+		
	480		199	272+	217	272+		
	400		177	272+	193	272+	227	272+
	320		152	272+	167	272+	202	272+
370	640	280 -0.84	236	284+	258	284+		
	560		218	284+	235	284+		
	480		196	284+	215	284+	253	284+
	400		174	284+	190	284+	225	284+
	320		149	284+	164	284+	199	284+
350	640	280 -0.84	234	298+	254	298+		
	560		215	298+	233	298+	276	298+
	480		193	298+	212	298+	250	298+
	400		171	298+	187	298+	223	298+
	320		147	298+	160	298+	196	298+
330	640	280 -0.84	231	312+	251	312+		
	560		212	312+	231	312+	267	312+
	480		190	312+	209	312+	248	312+
	400		168	312+	183	312+	220	312+
	320		145	312+	157	312+	193	312+
310	640	280 -0.84	228	326+	249	326+	291	326+
	560		208	326+	229	326+	264	326+
	480		186	326+	205	326+	246	326+
	400		164	326+	180	326+	217	326+
	320		143	326+	153	326+	190	326+

+ NOTE: Buffet Speeds shown with a **following + sign** are higher than the aircraft V_{mo}/M_{mo}.
The displayed speed is V_{mo}/M_{mo}.

 Aircraft is above buffet onset ceiling at this weight and altitude.

End of Section

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DEFINITIONS AND ASSUMPTIONS

V₁ Takeoff Decision Speed	V ₁ is the speed that determines the go or no-go decision in the event of an engine failure. No time is allowed after V ₁ for reaction or decision. Action must be initiated at or before V ₁ . The Federal Aviation Regulations define V ₁ as “the speed at which an engine failure has been recognized and action initiated to either continue or stop the takeoff”.
V_R - Rotation Speed	V _R is the speed at which the pilot begins rotation of the aircraft to the takeoff pitch attitude. V _R is selected so that, with normal rate or rotation, the aircraft will lift off and attain a height of 35 feet at a speed of V ₂ .
V₂ - Takeoff Safety Speed	V ₂ is the speed used to achieve the required gradient during the second climb segment (landing gear retracted and flaps in the takeoff position).

NOTE: The following takeoff speeds may only be used with a manual weight data record based on ARM takeoff performance weight limits. They may not be used with takeoff performance weight limits from AWABS. Optimum V₁ speeds are calculated in AWABS versus Balanced or fixed V₁ speeds which are to be used for a manual WDR.

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TAKEOFF SPEEDS

DRY RUNWAY KIAS

CAUTION: Crews are not authorized to perform manual weight and balance computations without coordination and approval from Flight Control and the LCC. Refer to FOM Ch 5, Manual WDR.

TRENT 892
V₁ / V_R / V₂
TO / 15

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & BELOW	20	30	40	50
700,000	8,000	150/172/176	147/168/168	145/169/169	143/170/170	142/171/171
	6,000	155/171/177	152/167/167	150/167/167	148/168/168	147/170/170
	4,000	161/170/177	157/165/166	154/166/166	153/167/167	152/169/169
	2,000	163/169/167	158/164/167	159/165/166	158/166/166	157/167/167
	0	156/163/167	156/163/167	157/164/167	159/165/166	162/166/166
680,000	8,000	152/166/166	149/166/166	147/167/167	146/168/168	144/169/169
	6,000	157/165/165	154/165/165	152/165/165	151/166/166	149/168/168
	4,000	158/163/165	158/163/165	157/164/165	156/165/165	154/167/167
	2,000	156/162/166	156/162/166	157/163/165	160/164/165	160/165/165
	0	154/161/166	154/161/166	155/162/166	157/163/165	160/164/165
660,000	8,000	154/164/164	152/164/164	149/165/165	148/166/166	146/167/167
	6,000	158/163/164	157/163/164	155/163/164	153/164/164	151/166/166
	4,000	156/161/164	156/161/164	158/162/164	158/163/164	157/165/165
	2,000	154/160/165	154/160/165	155/161/164	158/162/164	160/163/164
	0	152/159/165	152/159/165	153/160/165	155/161/164	158/162/164
640,000	8,000	157/162/163	154/162/163	152/163/163	150/164/164	148/165/165
	6,000	156/161/163	156/161/163	157/161/163	155/162/163	154/164/164
	4,000	154/159/163	154/159/163	156/160/163	158/161/163	159/163/163
	2,000	152/158/164	152/158/164	153/159/163	156/160/163	158/161/163
	0	150/157/164	150/157/164	151/158/164	153/159/163	156/160/163
620,000	8,000	157/160/161	156/160/161	154/161/161	152/162/162	151/163/163
	6,000	154/159/161	154/159/161	156/159/161	158/160/161	156/162/162
	4,000	152/157/161	152/157/161	154/158/161	156/159/161	158/161/161
	2,000	150/156/162	150/156/162	151/157/161	154/158/161	156/159/161
	0	148/155/162	148/155/162	149/156/162	151/157/161	154/158/161
600,000	8,000	155/158/159	155/158/159	156/159/159	155/160/160	153/161/161
	6,000	152/157/159	152/157/159	154/157/159	156/158/159	159/160/160
	4,000	150/155/159	150/155/159	152/156/159	154/157/159	156/159/159
	2,000	150/156/162	150/156/162	151/157/161	154/158/161	156/159/161
	0	146/153/160	146/153/160	147/154/160	149/155/159	152/156/159
580,000	8,000	152/155/157	152/155/157	153/156/157	155/157/157	156/158/158
	6,000	149/154/157	149/154/157	151/154/157	153/155/157	156/157/157
	4,000	147/152/157	147/152/157	149/153/157	151/154/157	153/156/156
	2,000	148/154/160	148/154/160	149/155/159	152/156/159	154/157/159
	0	143/150/158	143/150/158	144/151/158	146/152/157	149/153/157

Limited by either Maximum Brake Energy, Tire Limit Speed, and/or Environmental Envelope.

TAKEOFF SPEEDS

DRY RUNWAY KIAS

CAUTION: Crews are not authorized to perform manual weight and balance computations without coordination and approval from Flight Control and the LCC. Refer to FOM Ch 5, Manual WDR.

TRENT 892
V₁ / V_R / V₂
TO / 15

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & BELOW	20	30	40	50
560,000	8,000	149/151/155	149/151/155	150/151/155	152/152/154	153/153/153
	6,000	147/150/156	147/150/156	148/150/155	150/151/154	152/152/153
	4,000	145/149/156	145/149/156	146/149/156	148/150/155	151/151/154
	2,000	143/148 /157	143/148/157	144/148/156	146/149/155	149/150/154
	0	142/147/157	142/147/157	142/147/157	144/148/156	147/149/155
520,000	8,000	142/145/149	142/145/149	143/145/149	145/146/148	147/147/147
	6,000	140/144/150	140/144/150	141/144/149	143/145/148	145/146/147
	4,000	138/143/150	138/143/150	139/143/150	141/144/149	144/145/148
	2,000	136/142/151	136/142/151	137/142/150	139/143/149	142/144/148
	0	135/141/151	135/141/151	135/141/151	137/142/150	140/143/149
480,000	8,000	136/139/143	136/139/143	137/139/143	139/140/142	141/141/141
	6,000	134/138/144	134/138/144	135/138/143	137/139/142	139/140/141
	4,000	132/137/144	132/137/144	133/137/144	135/138/143	138/139/142
	2,000	130/136/145	130/136/145	131/136/144	133/137/143	136/138/142
	0	129/135/145	129/135/145	129/135/145	131/136/144	134/137/143
440,000	8,000	128/132/137	128/132/137	129/132/137	131/133/136	133/134/135
	6,000	126/131/138	126/131/138	127/131/137	129/132/136	131/133/135
	4,000	124/130/138	124/130/138	125/130/138	127/131/137	130/132/136
	2,000	122/129/139	122/129/139	123/129/138	125/130/137	128/131/136
	0	*123/128/139	*123/128/139	121/128/139	123/129/138	126/130/137
400,000	8,000	120/125/132	120/125/132	121/125/132	123/126/131	125/127/130
	6,000	118/124/133	118/124/133	119/124/132	121/125/131	123/126/130
	4,000	116/123/133	116/123/133	117/123/132	119/124/132	122/125/131
	2,000	*119/122/134	*119/122/134	*118/122/133	117/123/132	120/124/131
	0	*123/123/134	*123/123/134	*121/122/134	*118/122/133	118/123/132
360,000	8,000	111/118/125	111/ 118/125	112/118/125	114/119/124	116/120/123
	6,000	*111/117/126	*111/117/126	110/117/125	112/118/124	114/119/123
	4,000	*115/117/126	*115/116/126	*113/116/126	110/117/125	113/118/124
	2,000	*119/120/127	*119/120/127	*118/119/126	*114/116/125	111/117/124
	0	*123/123/127	*123/123/127	*121/122/127	*118/119/126	*113/116/125
320,000	8,000	*108/110/119	*107/110/119	*104/110/119	105/111/118	107/112/117
	6,000	*111/113/120	*111/112/120	*109/110/119	*106/110/118	105/111/117
	4,000	*115/117/120	*115/116/120	*113/114/120	*109/110/119	106/110/118
	2,000	*119/120/121	*119/120/121	*118/119/120	*114/115/119	*109/110/118
	0	*123/123/123	*123/123/123	*121/122/122	*118/119/120	*113/114/119

* V₁ set by V_{mcg}

Limited by either Maximum Brake Energy, Tire Limit Speed, and/or Environmental Envelope.

TAKEOFF SPEEDS

**DRY RUNWAY
KIAS**

CAUTION: Crews are not authorized to perform manual weight and balance computations without coordination and approval from Flight Control and the LCC. Refer to FOM Ch 5, Manual WDR.

TRENT 892
V₁ / V_R / V₂
TO / 5

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & BELOW	20	30	40	50
700,000	8,000	150 / 180 / 180	147 / 180 / 180	145 / 180 / 180	144 / 181 / 181	142 / 182 / 182
	6,000	155 / 179 / 179	153 / 179 / 179	150 / 179 / 179	149 / 180 / 180	147 / 181 / 181
	4,000	161 / 178 / 178	158 / 178 / 178	156 / 178 / 178	154 / 179 / 179	152 / 180 / 180
	2,000	166 / 177 / 179	163 / 177 / 179	161 / 177 / 178	159 / 178 / 178	158 / 179 / 179
	0	169 / 176 / 179	169 / 176 / 179	166 / 176 / 179	164 / 177 / 178	163 / 178 / 178
680,000	8,000	152 / 177 / 177	150 / 177 / 177	148 / 177 / 177	146 / 178 / 178	144 / 179 / 179
	6,000	158 / 176 / 176	155 / 176 / 176	153 / 176 / 176	151 / 177 / 177	149 / 178 / 178
	4,000	164 / 175 / 176	161 / 175 / 176	158 / 175 / 176	156 / 176 / 176	155 / 177 / 177
	2,000	167 / 174 / 177	166 / 174 / 177	163 / 174 / 176	162 / 175 / 175	160 / 176 / 176
	0	166 / 173 / 177	166 / 173 / 177	166 / 173 / 177	167 / 174 / 176	166 / 175 / 175
660,000	8,000	155 / 174 / 174	152 / 174 / 174	150 / 174 / 174	148 / 175 / 175	147 / 176 / 176
	6,000	161 / 173 / 174	158 / 173 / 174	155 / 173 / 173	154 / 174 / 174	152 / 175 / 175
	4,000	166 / 172 / 174	163 / 172 / 174	161 / 172 / 174	159 / 173 / 173	157 / 174 / 174
	2,000	164 / 171 / 175	164 / 171 / 175	165 / 171 / 174	164 / 172 / 173	163 / 173 / 173
	0	163 / 170 / 175	163 / 170 / 175	163 / 170 / 175	165 / 171 / 174	168 / 172 / 173
640,000	8,000	157 / 171 / 171	155 / 171 / 171	152 / 171 / 171	151 / 172 / 172	149 / 173 / 173
	6,000	163 / 170 / 172	160 / 170 / 172	158 / 170 / 171	156 / 171 / 171	154 / 172 / 172
	4,000	163 / 169 / 172	163 / 169 / 172	163 / 169 / 172	162 / 170 / 171	160 / 171 / 171
	2,000	161 / 168 / 173	161 / 168 / 173	162 / 168 / 172	164 / 169 / 171	166 / 170 / 170
	0	160 / 167 / 173	160 / 167 / 173	160 / 167 / 173	162 / 168 / 172	165 / 169 / 171
620,000	8,000	160 / 168 / 168	157 / 168 / 168	155 / 168 / 168	153 / 169 / 169	151 / 170 / 170
	6,000	162 / 167 / 169	162 / 167 / 169	160 / 167 / 168	159 / 168 / 168	157 / 169 / 169
	4,000	160 / 166 / 169	160 / 166 / 169	161 / 166 / 169	163 / 167 / 168	163 / 168 / 168
	2,000	158 / 165 / 170	158 / 165 / 170	159 / 165 / 169	161 / 166 / 168	164 / 167 / 167
	0	157 / 164 / 170	157 / 164 / 170	157 / 164 / 170	159 / 165 / 169	162 / 166 / 168
600,000	8,000	161 / 165 / 166	160 / 165 / 166	157 / 165 / 166	156 / 166 / 166	154 / 167 / 167
	6,000	159 / 164 / 167	159 / 164 / 167	160 / 164 / 166	161 / 165 / 165	159 / 166 / 166
	4,000	157 / 163 / 167	157 / 163 / 167	158 / 163 / 167	160 / 164 / 166	163 / 165 / 165
	2,000	155 / 162 / 168	155 / 162 / 168	156 / 162 / 167	158 / 163 / 166	161 / 164 / 165
	0	154 / 161 / 168	154 / 161 / 168	154 / 161 / 168	156 / 162 / 167	159 / 163 / 166
580,000	8,000	158 / 162 / 163	158 / 162 / 163	159 / 162 / 163	158 / 163 / 163	157 / 164 / 164
	6,000	156 / 161 / 164	156 / 161 / 164	157 / 161 / 163	159 / 162 / 162	161 / 163 / 163
	4,000	154 / 160 / 164	154 / 160 / 164	155 / 160 / 164	157 / 161 / 163	160 / 162 / 162
	2,000	152 / 159 / 165	152 / 159 / 165	153 / 159 / 164	155 / 160 / 163	158 / 161 / 162
	0	151 / 158 / 165	151 / 158 / 165	151 / 158 / 165	153 / 159 / 164	156 / 160 / 163

Limited by either Maximum Brake Energy, Tire Limit Speed, and/or Environmental Envelope.

TAKEOFF SPEEDS

DRY RUNWAY KIAS

CAUTION: Crews are not authorized to perform manual weight and balance computations without coordination and approval from Flight Control and the LCC. Refer to FOM Ch 5, Manual WDR.

TRENT 892
V₁ / V_R / V₂
TO / 5

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & BELOW	20	30	40	50
560,000	8,000	155/159/160	155/159/160	156/159/160	158/160/160	160/161/161
	6,000	153/158/161	153/158/161	154/158/160	156/159/159	158/160/160
	4,000	151/157/161	151/157/161	152/157/161	154/158/160	157/159/159
	2,000	149/156/162	149/156/162	150/156/161	152/157/160	155/158/159
	0	148/155/162	148/155/162	148/155/162	150/156/161	153/157/160
520,000	8,000	149/152/155	149/152/155	150/152/155	152/153/154	154/154/154
	6,000	147/151/156	147/151/156	148/151/155	150/152/154	152/153/153
	4,000	145/150/156	145/150/156	146/150/156	148/151/155	151/152/154
	2,000	143/149/157	143/149/157	144/149/156	146/150/155	149/151/154
	0	142/148/157	142/148/157	142/148/157	144/149/156	147/150/155
480,000	8,000	142/145/149	142/145/149	143/145/149	145/146/148	147/147/147
	6,000	140/144/150	140/144/150	141/144/149	143/145/148	145/146/147
	4,000	138/143/150	138/143/150	139/143/150	141/144/149	144/145/148
	2,000	136/142/151	136/142/151	137/142/150	139/143/140	142/144/148
	0	135/141/151	135/141/151	135/141/151	137/142/150	140/143/149
440,000	8,000	134/138/143	134/138/143	135/138/143	137/139/142	139/140/141
	6,000	132/137/144	132/137/144	133/137/143	135/138/142	137/139/141
	4,000	130/136/144	130/136/144	131/136/144	133/137/143	136/138/142
	2,000	128/135/145	128/135/145	129/135/144	131/136/143	134/137/142
	0	127/134/145	127/134/145	127/134/145	129/135/144	132/136/143
400,000	8,000	125/131/137	125/131/137	126/131/137	128/132/136	130/133/135
	6,000	123/130/138	123/130/138	124/130/137	126/131/136	128/132/135
	4,000	121/129/138	121/129/138	122/129/138	124/130/137	127/131/136
	2,000	119/128/139	119/128/139	120/128/138	122/129/137	125/130/136
	0	*123/127/139	*123/127/139	*121/127/139	120/128/138	123/129/137
360,000	8,000	116/123/131	116/123/131	117/123/131	119/124/130	121/125/129
	6,000	114/122/132	114/122/132	115/122/131	117/123/130	119/124/129
	4,000	*115/121/132	*115/121/132	113/121/132	115/122/131	118/123/130
	2,000	*119/120/133	*119/120/133	*118/120/132	*114/121/131	116/122/130
	0	*123/123/133	*123/123/133	*121/122/133	*118/120/132	114/121/131
320,000	8,000	*108/115/124	107/115/124	108/115/ 124	110/116/123	112/117/122
	6,000	*111/114/125	*111/114/125	*109/114/124	108/115/123	110/116/122
	4,000	*115/117/125	*115/116/125	*113/114/125	*109/114/124	109/115/123
	2,000	*119/120/126	*119/120/126	*118/119/125	*114/115/124	*109/114/123
	0	*123/123/126	*123/123/126	*121/122/126	*118/119/125	*113/114/124

* V₁ set by V_{mcg}

 Limited by either Maximum Brake Energy, Tire Limit Speed, and/or Environmental Envelope.

TAKEOFF STABILIZER SETTINGS (UNITS AIRPLANE NOSE UP)

CAUTION: Crews are not authorized to perform manual weight and balance computations without coordination and approval from Flight Control and the LCC. Refer to FOM Ch 5, Manual WDR.

TRENT 892

**FLAPS 5
ALL THRUST SETTINGS**

GROSS WEIGHT LBS	CENTER OF GRAVITY – PERCENT M.A.C.								
	14.0	16.0	24.0	29.0	34.0	39.0	41.0	43.0	44.0
670,000	8.50	8.50	6.75	5.50	4.50	-	-	-	-
650,000	8.50	8.50	6.75	5.50	4.50	-	-	-	-
640,000	8.50	8.50	6.50	5.50	4.25	3.75	-	-	-
600,000	8.50	8.50	6.50	5.50	4.25	3.75	3.00	2.25	-
550,000	8.50	8.50	6.50	5.25	4.00	3.25	2.75	2.00	1.75
535,000	8.50	8.50	6.50	5.25	4.00	3.00	2.50	2.00	1.50
500,000	8.50	8.50	6.50	5.00	3.75	2.50	2.00	1.50	1.25
450,000	8.50	8.50	6.25	5.00	3.50	2.25	1.75	1.25	1.00
400,000	8.50	8.50	6.00	4.50	3.00	2.00	1.50	1.00	1.00
350,000	8.50	8.50	5.50	4.00	2.25	1.50	1.00	1.00	1.00
300,000	6.50	6.00	4.25	3.25	2.00	1.00	1.00	1.00	1.00

**FLAPS 15 & 20
ALL THRUST SETTINGS**

GROSS WEIGHT LBS	CENTER OF GRAVITY – PERCENT M.A.C.								
	14.0	17.0	24.0	29.0	34.0	39.0	41.0	43.0	44.0
670,000	9.75	9.00	7.00	5.75	4.50	-	-	-	-
650,000	9.75	9.00	7.00	5.75	4.50	-	-	-	-
640,000	9.75	9.00	7.25	5.75	4.50	3.75	3.50	-	-
600,000	10.00	9.00	7.25	5.75	4.25	3.75	3.00	2.25	-
550,000	10.00	9.00	7.00	5.50	4.00	3.25	2.75	2.00	1.75
535,000	10.00	9.00	7.00	5.50	4.00	3.00	2.50	2.00	1.50
500,000	10.00	9.00	7.00	5.50	3.75	2.50	2.00	1.50	1.25
450,000	10.00	9.00	6.75	5.25	3.50	2.25	1.75	1.25	1.00
400,000	10.25	9.00	6.50	5.00	3.00	2.00	1.50	1.00	1.00
350,000	9.50	8.50	6.00	4.25	2.50	1.50	1.00	1.00	1.00
300,000	7.50	6.75	4.75	3.50	2.00	1.00	1.00	1.00	1.00

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DEFINITIONS AND ASSUMPTIONS

ACTUAL LANDING DISTANCE	The actual distance required to land starting at 50 feet above the runway (usually at the threshold) to a complete stop on the runway. This distance is based on a V_{REF} speed at 50 feet and assumes maximum braking and NO reverse thrust.
AUTOBRAKES	Aircraft system that automatically applies wheel brakes to maintain a constant deceleration rate after touchdown.
F.A.R. - FEDERAL AVIATION REGULATIONS	When used in conjunction with landing, the distance is measured from an altitude of 50 feet at V_{ref} speed to touchdown followed by braking levels that do not cause excessive tire wear. The F.A.R. distance includes a safety margin of 67%.
F.A.R. LANDING DISTANCE	The actual landing distance increased by 67%. This is the minimum runway length at the destination permitted for dispatch.
LANDING CLIMB LIMIT	The Federal Aviation Regulations require that the aircraft must be weight limited such that the aircraft in landing configuration can achieve a 3.2% climb gradient with all engines operating at go-around power at 1.3 V_S .
N1	Fan Rotor Speed in %N1 is used for setting thrust with the Trent 892 series engines.
PRESSURE ALTITUDE	The altitude read directly from the altimeter when the altimeter setting window is set to 29.92 inches mercury.
V_S	Indicated stall speed for the aircraft weight and configuration. 1.3 V_S is 1.3 times the stall speed, or an increase of 30% above stall speed.

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PATTERN AND APPROACH SPEEDS (KIAS)

NORMAL CONFIGURATION

TRENT 892

GROSS WEIGHT - POUNDS	APPROACH GEAR UP					LANDING GEAR DOWN	
	Flaps 0°	Flaps 1°	Flaps 5°	Flaps 15°	Flaps 20°	Flaps 25° Slats Fully Extended	Flaps 30° Slats Fully Extended
	Slats Retracted $V_{REF30} + 80$	Slats Mid-Range $V_{REF30} + 60$	Slats Mid-Range $V_{REF30} + 40$	Slats Mid-Range $V_{REF30} + 20$	Slats Mid-Range $V_{REF30} + 20$	V_{REF25}	V_{REF30}
660,000	247	227	207	187	187	174	167
640,000	244	224	204	184	184	172	164
620,000	242	222	202	182	182	169	162
600,000	239	219	199	179	179	166	159
580,000	236	216	196	176	176	164	156
560,000	233	213	193	173	173	161	153
540,000	231	211	191	171	171	158	151
520,000	228	208	188	168	168	155	148
500,000	225	205	185	165	165	152	145
480,000	222	202	182	162	162	149	142
460,000	219	199	179	159	159	146	139
440,000	216	196	176	156	156	142	136
420,000	213	193	173	153	153	139	133
400,000	209	189	169	149	149	136	129
380,000	206	186	166	146	146	133	126
360,000	203	183	163	143	143	129	123
340,000	200	180	160	140	140	125	120
320,000	196	176	156	136	136	121	116

STALL SPEEDS-Vs (KIAS)

GROSS WEIGHT POUNDS	GEAR UP					GEAR DOWN	
	FLAPS - 0° SLATS- Retracted	1° Midrange	5° Midrange	15° Midrange	20° Midrange	25° Fully Extended	30° Fully Extended
660,000	198	162	153	148	144	138	135
640,000	194	160	150	146	142	135	132
620,000	190	157	148	143	139	133	130
600,000	186	154	145	141	137	131	128
580,000	183	151	142	138	134	128	126
560,000	179	148	139	135	132	126	123
540,000	175	146	137	132	129	124	121
520,000	172	143	134	130	127	121	118
500,000	168	139	131	127	124	118	116
480,000	164	136	128	124	122	116	114
460,000	160	134	125	122	119	114	111
440,000	156	130	122	118	116	111	108
420,000	152	127	119	116	113	108	106
400,000	148	124	116	112	110	105	103
380,000	144	120	112	110	107	103	100

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APPROACH AND LANDING CLIMB LIMIT WEIGHTS (POUNDS)

TRENT 892

APPROACH FLAPS 20

LANDING FLAPS 25 OR 30

OAT °C	PRESSURE ALTITUDE - FEET								
	0	1000	2000	3000	4000	5000	6000	7000	8000
50	563,000	542,000	521,000	OUTSIDE ENVIRONMENTAL ENVELOPE					
45	594,000	573,000	552,000						
40	630,000	605,000	581,000	555,000	531,000	511,000	493,000	473,000	
35	659,000	632,000	609,000	580,000	554,000	532,000	512,000	492,000	
32	673,000	648,000	623,000	594,000	566,000	545,000	523,000	503,000	483,000
30	683,000	658,000	632,000	603,000	575,000	553,000	531,000	510,000	491,000
28	683,000	666,000	640,000	611,000	583,000	561,000	539,000	518,000	498,000
26	683,000	667,000	649,000	619,000	591,000	569,000	547,000	526,000	506,000
24	683,000	667,000	650,000	626,000	598,000	574,000	554,000	531,000	513,000
22	683,000	667,000	650,000	628,000	605,000	579,000	559,000	537,000	516,000
20	683,000	667,000	650,000	628,000	606,000	583,000	561,000	541,000	519,000
18	683,000	667,000	650,000	628,000	606,000	585,000	564,000	544,000	523,000
16 & BELOW	683,000	667,000	651,000	628,000	606,000	585,000	565,000	547,000	527,000

NOTES:

1. AFM Maximum Structural Landing Weight should not be exceeded unless an overweight landing is necessary.
2. Reduce Limit Weight by 45,400 pounds when operating in icing conditions during any part of the flight when the forecast landing temperature is below 10 degrees C.

CORRECTIONS:

	ENGINE ANTI-ICE ON OR OFF (POUNDS)
PACKS OFF	+ 2,000
WING ANTI-ICE ON	- 3,400

BASIS:

The limit weights shown are the more restrictive of:

- | | |
|--|--|
| APPROACH <ul style="list-style-type: none"> One engine inoperative. Flaps at approach setting. Landing gear retracted. | LANDING <ul style="list-style-type: none"> All engines operating. Flaps at landing setting. Landing gear extended. |
|--|--|

F.A.R. DRY LANDING FIELD LENGTH (FEET)

FLAPS 25

AIRCRAFT WEIGHT - POUNDS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
660,000	8,860	9,080	9,310	9,610	9,930	10,260	10,620	10,990	11,380
640,000	8,500	8,710	8,930	9,160	9,400	9,710	10,040	10,380	10,750
620,000	8,150	8,350	8,560	8,780	9,000	9,230	9,490	9,810	10,140
600,000	7,800	7,990	8,190	8,400	8,610	8,840	9,060	9,300	9,570
580,000	7,490	7,670	7,860	8,060	8,270	8,480	8,700	8,920	9,160
560,000	7,140	7,310	7,490	7,680	7,870	8,070	8,280	8,490	8,710
540,000	6,790	6,950	7,120	7,300	7,480	7,670	7,870	8,070	8,280
520,000	6,450	6,600	6,760	6,930	7,100	7,280	7,470	7,660	7,850
500,000	6,120	6,260	6,420	6,570	6,730	6,900	7,080	7,260	7,440
480,000	5,800	5,930	6,070	6,220	6,370	6,530	6,700	6,860	7,040
460,000	5,560	5,690	5,830	5,970	6,120	6,270	6,420	6,580	6,750
440,000	5,370	5,500	5,630	5,770	5,910	6,050	6,200	6,360	6,510
420,000	5,180	5,310	5,430	5,560	5,700	5,840	5,980	6,130	6,280
400,000	4,990	5,110	5,230	5,350	5,480	5,620	5,760	5,900	6,040
380,000	4,800	4,910	5,030	5,150	5,270	5,400	5,530	5,670	5,810
360,000	4,680	4,720	4,820	4,940	5,060	5,180	5,310	5,440	5,570
340,000	4,660	4,700	4,740	4,780	4,840	4,960	5,080	5,200	5,330
320,000	4,650	4,690	4,730	4,770	4,810	4,850	4,900	4,970	5,090

NOTE:

Actual Landing Distance is:

- 60 percent of the F.A.R. Landing Field Lengths above.
- The distance to a complete stop from 50 feet above the runway threshold at VREF.
- Based on Maximum Braking, Speed Brakes Extended and No Thrust Reverse.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 25 ft. per knot
Tailwind	+ 240 ft. per knot
Manual Spoilers	Refer to ODM Abnormal section
Wet runway and/or Low Minima	increase distance by 15%

F.A.R. DRY LANDING FIELD LENGTH (FEET)

FLAPS 30

AIRCRAFT WEIGHT - POUNDS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
660,000	8,140	8,340	8,550	8,760	9,000	9,250	9,550	9,890	10,260
640,000	7,810	8,000	8,200	8,410	8,630	8,860	9,110	9,360	9,680
620,000	7,490	7,670	7,860	8,060	8,270	8,490	8,720	8,950	9,190
600,000	7,170	7,350	7,530	7,720	7,920	8,120	8,330	8,550	8,780
580,000	6,890	7,060	7,230	7,410	7,600	7,790	7,990	8,200	8,410
560,000	6,570	6,730	6,890	7,060	7,240	7,420	7,610	7,810	8,010
540,000	6,250	6,400	6,560	6,720	6,890	7,060	7,240	7,420	7,610
520,000	5,940	6,090	6,230	6,380	6,540	6,710	6,880	7,050	7,230
500,000	5,640	5,780	5,920	6,060	6,210	6,360	6,520	6,680	6,850
480,000	5,390	5,510	5,640	5,780	5,920	6,060	6,220	6,370	6,530
460,000	5,210	5,330	5,460	5,590	5,730	5,870	6,010	6,160	6,310
440,000	5,030	5,150	5,270	5,400	5,530	5,670	5,810	5,950	6,100
420,000	4,860	4,970	5,090	5,210	5,330	5,460	5,600	5,740	5,880
400,000	4,720	4,790	4,900	5,020	5,140	5,260	5,390	5,520	5,660
380,000	4,710	4,750	4,790	4,830	4,940	5,060	5,180	5,310	5,440
360,000	4,700	4,740	4,780	4,820	4,860	4,900	4,970	5,090	5,220
340,000	4,680	4,720	4,760	4,800	4,850	4,890	4,930	4,970	5,010
320,000	4,670	4,710	4,750	4,790	4,830	4,870	4,920	4,960	5,000

NOTE:

Actual Landing Distance is:

- 60 percent of the F.A.R. Landing Field Lengths above.
- The distance to a complete stop from 50 feet above the runway threshold at VREF.
- Based on Maximum Braking, Speed Brakes Extended and No Thrust Reverse.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 25 ft. per knot
Tailwind	+ 240 ft. per knot
Manual Spoilers	Refer to ODM Abnormal section
Wet runway and/or Low Minima	increase distance by 15%

OPERATIONAL LANDING DISTANCES

FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	12,300	11,100	10,000	8,400	6,800	5,900	10,000	8,400	7,600	7,000
640,000	12,000	10,900	9,800	8,200	6,700	5,700	9,800	8,200	7,400	6,800
620,000	11,700	10,600	9,600	8,000	6,500	5,500	9,600	8,100	7,200	6,700
600,000	11,400	10,400	9,300	7,800	6,400	5,400	9,300	7,900	7,100	6,500
580,000	11,100	10,100	9,100	7,700	6,200	5,200	9,100	7,700	6,900	6,400
560,000	10,800	9,900	8,900	7,500	6,100	5,100	8,900	7,500	6,800	6,300
540,000	10,500	9,600	8,700	7,300	6,000	4,900	8,700	7,300	6,600	6,100
520,000	10,200	9,400	8,400	7,100	5,800	4,700	8,400	7,100	6,400	6,000
500,000	9,900	9,100	8,200	6,900	5,700	4,600	8,200	6,900	6,300	5,900
480,000	9,600	8,900	8,000	6,700	5,500	4,400	8,000	6,800	6,100	5,700
460,000	9,300	8,600	7,700	6,600	5,400	4,300	7,700	6,600	5,900	5,600
440,000	9,000	8,400	7,500	6,400	5,300	4,100	7,500	6,400	5,800	5,400
420,000	8,800	8,200	7,400	6,300	5,200	4,100	7,400	6,400	5,700	5,400
400,000	8,600	8,100	7,400	6,300	5,200	4,100	7,400	6,300	5,700	5,300
380,000	8,400	7,900	7,300	6,200	5,200	4,000	7,300	6,300	5,600	5,200
360,000	8,200	7,800	7,200	6,200	5,200	4,000	7,200	6,200	5,500	5,200

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF30 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-500	-400	-300	-300	-200	-100	-300	-300	-300	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	500	400	300	300	200	100	300	300	300	200
6,000	1,000	800	700	600	400	300	700	600	500	500
8,000	1,940	1,660	1,380	1,110	830	560	1,380	1,110	1,020	920

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	350	300	250	150	350	300	250	200
PER 10°C ABOVE ISA	200	200	200	150	100	50	200	150	100	100
PER 10°C BELOW ISA	-200	-200	-200	-150	-100	-50	-200	-150	-100	-100
PER 1% UP SLOPE	-200	-100	-50	0	0	-50	-50	0	-100	-100
PER 1% DOWN SLOPE	150	50	50	0	0	50	50	50	100	100
1 REVERSER INOP	400	100	0	0	0	100	0	100	300	300
2 REVERSERS INOP	400	100	0	0	0	100	0	100	500	500
MANUAL SPOILERS	200	200	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	10,700	9,800	9,700	9,700	12,700	12,700	12,600	12,600
640,000	10,400	9,600	9,500	9,500	12,400	12,400	12,300	12,300
620,000	10,200	9,400	9,300	9,200	12,100	12,000	12,000	11,900
600,000	9,900	9,100	9,000	9,000	11,800	11,700	11,700	11,600
580,000	9,700	8,900	8,800	8,800	11,500	11,400	11,300	11,300
560,000	9,400	8,700	8,600	8,500	11,100	11,100	11,000	11,000
540,000	9,100	8,400	8,400	8,300	10,800	10,800	10,700	10,700
520,000	8,900	8,200	8,100	8,100	10,500	10,400	10,400	10,300
500,000	8,600	8,000	7,900	7,900	10,200	10,100	10,100	10,000
480,000	8,400	7,700	7,700	7,600	9,800	9,800	9,700	9,700
460,000	8,100	7,500	7,400	7,400	9,500	9,500	9,400	9,400
440,000	7,900	7,300	7,200	7,200	9,200	9,100	9,100	9,000
420,000	7,800	7,200	7,100	7,100	9,000	8,900	8,900	8,800
400,000	7,700	7,100	7,000	6,900	8,900	8,700	8,700	8,600
380,000	7,600	6,900	6,900	6,800	8,700	8,500	8,500	8,400
360,000	7,500	6,800	6,700	6,700	8,600	8,300	8,300	8,200

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF30 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-500	-500	-500	-500
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	500	500	500	500
6,000	800	700	700	700	1,100	1,100	1,100	1,000
8,000	1,200	1,100	1,100	1,100	1,600	1,600	1,600	1,500

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	350	250	300	250	350	300	300	300
PER 10°C ABOVE ISA	200	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-200	-150	-150	-150	-200	-200	-200	-200
PER 1% UP SLOPE	-100	-200	-200	-200	-400	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	650	650	650	650
1 REVERSER INOP	300	700	600	600	1,300	1,400	1,400	1,300
2 REVERSERS INOP	1,100	1,600	1,500	1,500	3,600	3,600	3,600	3,600
MANUAL SPOILERS	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES

FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	13,300	12,200	10,900	8,900	7,100	6,300	10,900	9,100	7,800	7,500
640,000	12,900	11,900	10,600	8,700	7,000	6,100	10,600	8,900	7,700	7,300
620,000	12,600	11,600	10,400	8,500	6,800	5,900	10,400	8,700	7,500	7,200
600,000	12,300	11,300	10,100	8,300	6,700	5,700	10,100	8,500	7,400	7,000
580,000	11,900	11,000	9,800	8,100	6,600	5,500	9,800	8,300	7,200	6,800
560,000	11,600	10,700	9,600	8,000	6,400	5,400	9,600	8,100	7,000	6,700
540,000	11,200	10,400	9,300	7,800	6,300	5,200	9,300	7,900	6,900	6,500
520,000	10,900	10,100	9,100	7,600	6,100	5,000	9,100	7,700	6,700	6,400
500,000	10,500	9,800	8,800	7,400	6,000	4,800	8,800	7,500	6,500	6,200
480,000	10,200	9,500	8,600	7,200	5,900	4,600	8,600	7,300	6,400	6,000
460,000	9,800	9,200	8,300	7,000	5,700	4,400	8,300	7,100	6,200	5,900
440,000	9,500	8,900	8,100	6,800	5,600	4,200	8,100	6,900	6,100	5,700
420,000	9,200	8,700	7,900	6,700	5,500	4,200	7,900	6,700	5,900	5,600
400,000	8,900	8,500	7,700	6,600	5,400	4,100	7,700	6,600	5,800	5,500
380,000	8,700	8,200	7,500	6,400	5,300	4,000	7,500	6,400	5,700	5,400
360,000	8,400	8,000	7,300	6,300	5,200	4,000	7,300	6,300	5,600	5,200

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF25 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-500	-500	-400	-300	-200	-100	-400	-300	-300	-300
2,000	0	0	0	0	0	0	0	0	0	0
4,000	500	500	400	300	200	100	400	300	300	300
6,000	1,100	900	800	600	500	300	800	600	600	500
8,000	1,600	1,400	1,200	1,000	700	400	1,200	1,000	800	800

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	400	300	250	150	400	300	250	200
PER 10°C ABOVE ISA	250	200	200	150	100	50	200	150	150	100
PER 10°C BELOW ISA	-250	-200	-200	-150	-100	-50	-200	-150	-150	-100
PER 1% UP SLOPE	-250	-150	-50	0	0	-50	-50	0	-100	-100
PER 1% DOWN SLOPE	200	100	50	0	0	50	50	50	100	100
1 REVERSER INOP	600	200	0	0	0	100	0	100	300	300
2 REVERSERS INOP	600	200	0	0	0	200	0	100	600	600
MANUAL SPOILERS	200	200	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	11,200	10,400	10,300	10,300	13,500	13,300	13,300	13,300
640,000	11,000	10,200	10,100	10,000	13,100	13,000	12,900	12,900
620,000	10,700	9,900	9,800	9,800	12,800	12,600	12,600	12,600
600,000	10,500	9,700	9,600	9,500	12,400	12,300	12,200	12,200
580,000	10,200	9,400	9,300	9,300	12,100	12,000	11,900	11,900
560,000	10,000	9,200	9,100	9,000	11,700	11,600	11,500	11,500
540,000	9,700	8,900	8,800	8,800	11,400	11,300	11,200	11,200
520,000	9,400	8,700	8,600	8,500	11,100	10,900	10,900	10,800
500,000	9,200	8,400	8,300	8,300	10,700	10,600	10,500	10,500
480,000	8,900	8,200	8,100	8,000	10,400	10,200	10,200	10,100
460,000	8,700	7,900	7,800	7,800	10,000	9,900	9,800	9,800
440,000	8,400	7,700	7,600	7,500	9,700	9,500	9,500	9,500
420,000	8,200	7,500	7,400	7,300	9,400	9,300	9,200	9,200
400,000	8,100	7,300	7,200	7,100	9,200	9,000	8,900	8,900
380,000	7,900	7,100	7,000	6,900	8,900	8,700	8,700	8,600
360,000	7,700	6,900	6,800	6,800	8,700	8,400	8,400	8,400

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF25 - 5 •

Data is advisory and includes 15% safety margin and 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-600	-600	-600	-600
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	600	600	600	600
6,000	800	800	800	800	1,100	1,100	1,100	1,100
8,000	1,200	1,200	1,200	1,200	1,700	1,700	1,700	1,700

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	300	300	250	350	300	300	300
PER 10°C ABOVE ISA	200	150	150	150	250	200	200	200
PER 10°C BELOW ISA	-200	-150	-150	-150	-250	-200	-200	-200
PER 1% UP SLOPE	-150	-200	-200	-250	-350	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	650	650	700	650
1 REVERSER INOP	300	700	700	700	1,400	1,500	1,500	1,500
2 REVERSERS INOP	1,200	1,800	1,800	1,800	4,200	4,300	4,200	4,200
MANUAL SPOILERS	200	200	200	300	200	200	200	300

Note: Do not operate when Braking Action is Nil.

End of Section

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DEFINITIONS AND ASSUMPTIONS

GROSS LEVEL OFF ALTITUDE	Altitude at which the aircraft is expected to level off after the loss of one engine. No conservatism is built into this value. For use during flight, not for flight planning.
GO AROUND THRUST	Maximum thrust setting available for use during a missed approach. Minimum climb gradient limit weights are based on an engine inoperative and the remaining engine set to this thrust level.
LONG RANGE CRUISE	The speed of the aircraft that will result in 99% of the maximum range of the aircraft in no wind conditions for a given weight and altitude.
MAXIMUM CONTINUOUS THRUST (MCT)	The maximum thrust level for which the engine is rated with no time constraint.
SPECIFIC AIR RANGE (SAR)	The gas mileage range an aircraft can fly per 1,000 lbs of fuel for a given weight, altitude, Mach number, and temperature. The SAR changes as the weight of the aircraft changes, all other parameters remaining constant. Fuel burn required for a given flight segment is the segment length divided by the average SAR for the leg.
STATIC AIR TEMPERATURE (SAT)	The static air temperature outside of the aircraft. Also referred to as the Outside Air Temperature or OAT.
TOTAL AIR TEMPERATURE (TAT)	The sum of both the ambient air temperature plus the total increase in temperature due to compression heating.

MEL RELATED PERFORMANCE ABBREVIATIONS DISPLAYED ON WDR

BK1	AWABS has automatically corrected the allowable weights and V1 speeds due to one inoperative brake.
BK2	AWABS has automatically corrected the allowable weights and V1 speeds due to two inoperative brakes.
GRD	AWABS has automatically corrected the allowable weights and V1 speeds due to gear down dispatch. Used when an MEL item requires delayed gear retraction or gear down flight.

THRUST SETTINGS – ALL ENGINE

TAKEOFF EPR

TO

TRENT 892

0 TO 60 KNOTS

NORMAL BLEED - PACKS ON / ENG. ANTI-ICE ON OR OFF/WING ANTI-ICE OFF

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET										
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	8,400
54	1.352	1.360									
52	1.357	1.376	1.377								
50	1.372	1.391	1.392	1.391							
48	1.387	1.406	1.406	1.405	1.401						
46	1.401	1.420	1.419	1.419	1.414	1.413					
44	1.414	1.433	1.432	1.432	1.426	1.423	1.423				
42	1.426	1.448	1.447	1.446	1.439	1.435	1.434	1.434			
40	1.439	1.463	1.462	1.461	1.454	1.448	1.447	1.447	1.446		
38	1.452	1.479	1.478	1.476	1.468	1.461	1.459	1.459	1.458	1.456	
36	1.466	1.490	1.489	1.487	1.479	1.472	1.470	1.469	1.469	1.467	1.467
34	1.474	1.500	1.499	1.498	1.491	1.483	1.482	1.480	1.479	1.478	1.478
32	1.483	1.511	1.510	1.509	1.502	1.494	1.493	1.490	1.490	1.489	1.489
30	1.491	1.518	1.520	1.520	1.513	1.507	1.506	1.503	1.503	1.502	1.501
28	1.494	1.525	1.530	1.531	1.524	1.520	1.519	1.516	1.516	1.515	1.514
26	1.498	1.528	1.535	1.538	1.533	1.530	1.528	1.527	1.526	1.526	1.524
24	1.500	1.528	1.535	1.540	1.538	1.537	1.534	1.535	1.535	1.533	1.532
22	1.500	1.528	1.535	1.541	1.543	1.544	1.540	1.542	1.543	1.540	1.539
20	1.500	1.528	1.535	1.542	1.545	1.548	1.545	1.548	1.550	1.547	1.547
18	1.500	1.528	1.535	1.542	1.545	1.548	1.548	1.551	1.555	1.556	1.554
16	1.500	1.528	1.535	1.542	1.545	1.548	1.551	1.555	1.561	1.564	1.562
14	1.500	1.528	1.535	1.542	1.545	1.548	1.551	1.555	1.561	1.566	1.565
12	1.500	1.528	1.535	1.542	1.545	1.548	1.551	1.555	1.562	1.568	1.569
10 & below	1.500	1.528	1.535	1.542	1.545	1.548	1.551	1.555	1.562	1.570	1.572

NOTE: For the following engine bleed conditions adjust EPR by the amount indicated.

Packs OFF	+0.003	+0.003	+0.003	+0.003	+0.003	+0.003	+0.004	+0.004	+0.004	+0.004	+0.004
Pack(1) ON	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	-0.004
Engine A/I	*** No Correction ***										

Pressure Altitude / Field Elevation Correction:

Subtract/Add 100ft to elevation for every 0.11 inch barometric setting above/below 29.92 inches.

NOTE: This table may also be used to set AT Thrust by using the temperatures above as the AT setting.

THRUST SETTINGS – ALL ENGINE

CLIMB EPR

320 KIAS/MACH 0.84 SPEED SCHEDULE
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

TRENT 892

TAT -	PRESSURE ALTITUDE - FEET									
°C	0	5,000	10,000	15,000	20,000	25,000	30,000	35,000	39,000	43,000
40	1.230	1.230	1.216	1.178	1.165	OUTSIDE ENVIRONMENTAL ENVELOPE				
35	1.258	1.255	1.241	1.203	1.192	1.173				
30	1.258	1.280	1.266	1.228	1.218	1.193	1.154			
25	1.258	1.301	1.295	1.261	1.253	1.221	1.191	1.192	1.181	1.170
20	1.258	1.301	1.324	1.294	1.288	1.249	1.227	1.192	1.181	1.170
15	1.258	1.301	1.342	1.322	1.319	1.289	1.269	1.232	1.220	1.212
10	1.258	1.301	1.342	1.322	1.349	1.328	1.311	1.273	1.262	1.257
5	1.258	1.301	1.342	1.322	1.367	1.386	1.356	1.319	1.304	1.300
0	1.258	1.301	1.342	1.322	1.367	1.386	1.400	1.368	1.354	1.349
-5	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.424	1.411	1.406
-10	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.482	1.469	1.465
-15	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.506	1.523	1.518
-20	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.506	1.523	1.518
-25	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.506	1.523	1.518
-30	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.506	1.523	1.518
-35	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.506	1.523	1.518
-40	1.258	1.301	1.342	1.322	1.367	1.386	1.425	1.506	1.523	1.518

NOTE: For the following engine bleed conditions adjust EPR by the amount indicated.

Eng. A/I ON	-0.010	-0.015	-0.014	-0.006	-0.005	-0.003	-0.003	-0.003	-0.004	-0.005
Eng. & Wing A/I ON Packs ON	-0.012	-0.018	-0.019	-0.012	-0.012	-0.012	-0.014	-0.015	-0.016	-0.019
Eng. & Wing A/I ON Packs OFF	-0.014	-0.022	-0.024	-0.018	-0.019	-0.021	-0.024	-0.026	-0.028	-0.033

THRUST SETTINGS – ALL ENGINE

CRUISE EPR

TRENT 892

CRUISE SPEED SCHEDULE: 250 KIAS/310KIAS / 0.84M
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

TAT -	PRESSURE ALTITUDE - FEET												
°C	0	5,000	10,000	15,000	20,000	25,000	30,000	35,000	39,000	41,000	43,000		
40	1.213	1.200	1.192	1.147	1.136	OUTSIDE ENVIRONMENTAL ENVELOPE							
35	1.221	1.223	1.212	1.169	1.158							1.139	
30	1.223	1.245	1.232	1.191	1.180							1.154	1.127
25	1.223	1.265	1.258	1.221	1.211							1.184	1.231
20	1.223	1.265	1.284	1.250	1.242	1.214	1.334	1.115	1.148	1.144	1.140		
15	1.223	1.265	1.300	1.268	1.270	1.245	1.295	1.171	1.182	1.179	1.176		
10	1.223	1.265	1.300	1.268	1.297	1.275	1.256	1.226	1.216	1.214	1.212		
5	1.223	1.265	1.300	1.268	1.312	1.316	1.296	1.264	1.253	1.251	1.249		
0	1.223	1.265	1.300	1.268	1.312	1.323	1.335	1.302	1.290	1.288	1.286		
-5	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.354	1.343	1.341	1.339		
-10	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.405	1.396	1.394	1.392		
-15	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.428	1.444	1.442	1.440		
-20	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.428	1.444	1.442	1.440		
-25	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.428	1.444	1.442	1.440		
-30	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.428	1.444	1.442	1.440		
-35	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.428	1.444	1.442	1.440		
-40	1.223	1.265	1.300	1.268	1.312	1.323	1.357	1.428	1.444	1.442	1.440		

NOTE: For the following engine bleed conditions adjust EPR by the amount indicated.

Eng. A/I ON	-0.010	-0.015	-0.014	-0.006	-0.005	-0.003	-0.003	-0.003	-0.004	-0.005	-0.005
Eng. & Wing A/I ON, 1 Pack ON	-0.012	-0.018	-0.019	-0.012	-0.012	-0.012	-0.014	-0.015	-0.016	-0.018	-0.019
Eng. & Wing A/I ON, Packs OFF	-0.014	-0.022	-0.024	-0.018	-0.019	-0.021	-0.024	-0.026	-0.028	-0.030	-0.033

THRUST SETTINGS – ALL ENGINE

GO AROUND EPR

TRENT 892

NORMAL BLEED - PACKS ON / ENGINE ANTI-ICE OFF OR ON

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
50	1.358	1.363	1.363	1.362	1.365	1.366	1.368	OUTSIDE ENVIRONMENTAL ENVELOPE		
45	1.392	1.398	1.399	1.399	1.395	1.393	1.394			
40	1.423	1.435	1.435	1.434	1.427	1.422	1.422			
35	1.450	1.467	1.467	1.466	1.457	1.452	1.451			
30	1.468	1.493	1.495	1.496	1.489	1.483	1.481	1.480	1.479	1.478
25	1.471	1.498	1.511	1.519	1.515	1.510	1.510	1.510	1.509	1.507
20	1.471	1.498	1.511	1.521	1.526	1.531	1.527	1.529	1.528	1.525
15	1.471	1.498	1.511	1.521	1.526	1.531	1.535	1.539	1.546	1.550
10	1.471	1.498	1.511	1.521	1.526	1.531	1.535	1.539	1.547	1.536
15	1.471	1.498	1.511	1.521	1.526	1.531	1.535	1.539	1.547	1.536
0 & Below	1.471	1.498	1.511	1.521	1.526	1.531	1.535	1.539	1.547	1.536

Packs OFF	+0.003	+0.003	+0.003	+0.003	+0.003	+0.003	+0.003	+0.004	+0.004	+0.004	+0.004
1 Pack ON	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004
Wing A/I OFF	-0.003	-0.004	-0.004	-0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.006	-0.006

THRUST SETTINGS – ONE ENGINE INOPERATIVE

MAXIMUM CONTINUOUS THRUST EPR

NORMAL BLEED – PACKS ON / ANTI-ICE OFF

TRENT 892

TAT -	PRESSURE ALTITUDE – FEET												
°C	5,000	10,000	15,000	20,000	25,000	30,000	35,000	37,000	39,000	41,000	43,000		
40	1.295	1.284	ABOVE ENVIRONMENTAL ENVELOPE										
35	1.329	1.314											
30	1.362	1.348										1.324	
25	1.391	1.387										1.357	1.292
20	1.396	1.424										1.396	1.327
15	1.396	1.449	1.439	1.367	1.313	1.240				1.216	1.212		
10	1.396	1.449	1.478	1.414	1.349	1.277	1.235	1.235	1.250	1.259	1.257		
5	1.396	1.449	1.493	1.462	1.388	1.309	1.277	1.277	1.290	1.302	1.300		
0	1.396	1.449	1.493	1.499	1.431	1.346	1.319	1.320	1.336	1.351	1.349		
-5	1.396	1.449	1.493	1.501	1.470	1.390	1.362	1.365	1.387	1.408	1.406		
-10	1.396	1.449	1.493	1.501	1.489	1.432	1.415	1.419	1.443	1.467	1.465		
-15	1.396	1.449	1.493	1.501	1.489	1.464	1.463	1.468	1.494	1.521	1.518		
-20	1.396	1.449	1.493	1.501	1.489	1.468	1.506	1.514	1.518	1.521	1.518		
-25	1.396	1.449	1.493	1.501	1.489	1.468	1.515	1.527	1.524	1.521	1.518		
-30	1.396	1.449	1.493	1.501	1.489	1.468	1.515	1.527	1.524	1.521	1.518		
-35	1.396	1.449	1.493	1.501	1.489	1.468	1.515	1.527	1.524	1.521	1.518		
-40	1.396	1.449	1.493	1.501	1.489	1.468	1.515	1.527	1.524	1.521	1.518		

NOTE: For the following engine bleed conditions adjust EPR by the amount indicated.

Eng. A/I ON	-0.010	-0.015	-0.014	-0.006	-0.005	-0.003	-0.003	-0.003	-0.004	-0.005	-0.005
Eng. & Wing A/I ON 1 Pack ON	-0.012	-0.018	-0.019	-0.012	-0.012	-0.012	-0.014	-0.015	-0.016	-0.018	-0.019
Eng. & Wing A/I ON Packs OFF	-0.014	-0.022	-0.024	-0.018	-0.019	-0.021	-0.024	-0.026	-0.028	-0.030	-0.033

Based on 0.84M/250 KI

ONE ENGINE INOPERATIVE**DRIFTDOWN SPEED AND GROSS LEVEL OFF ALTITUDE****(FEET)****ENGINE ANTI-ICE OFF**

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED – KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
640,000	621,000	284	20,000	18,600	17,200
600,000	582,000	275	21,700	20,400	18,900
560,000	544,000	265	23,400	22,200	20,800
520,000	506,000	255	25,200	24,100	22,700
480,000	467,000	245	26,900	25,900	24,800
440,000	428,000	234	28,800	27,600	26,600
420,000	407,000	229	29,700	28,600	27,500

ENGINE ANTI-ICE ON

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED – KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
640,000	621,000	284	19,900	18,500	17,000
600,000	582,000	275	21,600	20,200	18,700
560,000	544,000	265	23,300	22,000	20,600
520,000	506,000	255	25,100	24,000	22,600
480,000	467,000	245	26,900	25,800	24,600
440,000	428,000	234	28,700	27,500	26,400
420,000	407,000	229	29,700	28,500	27,400

ENGINE & WING ANTI-ICE ON

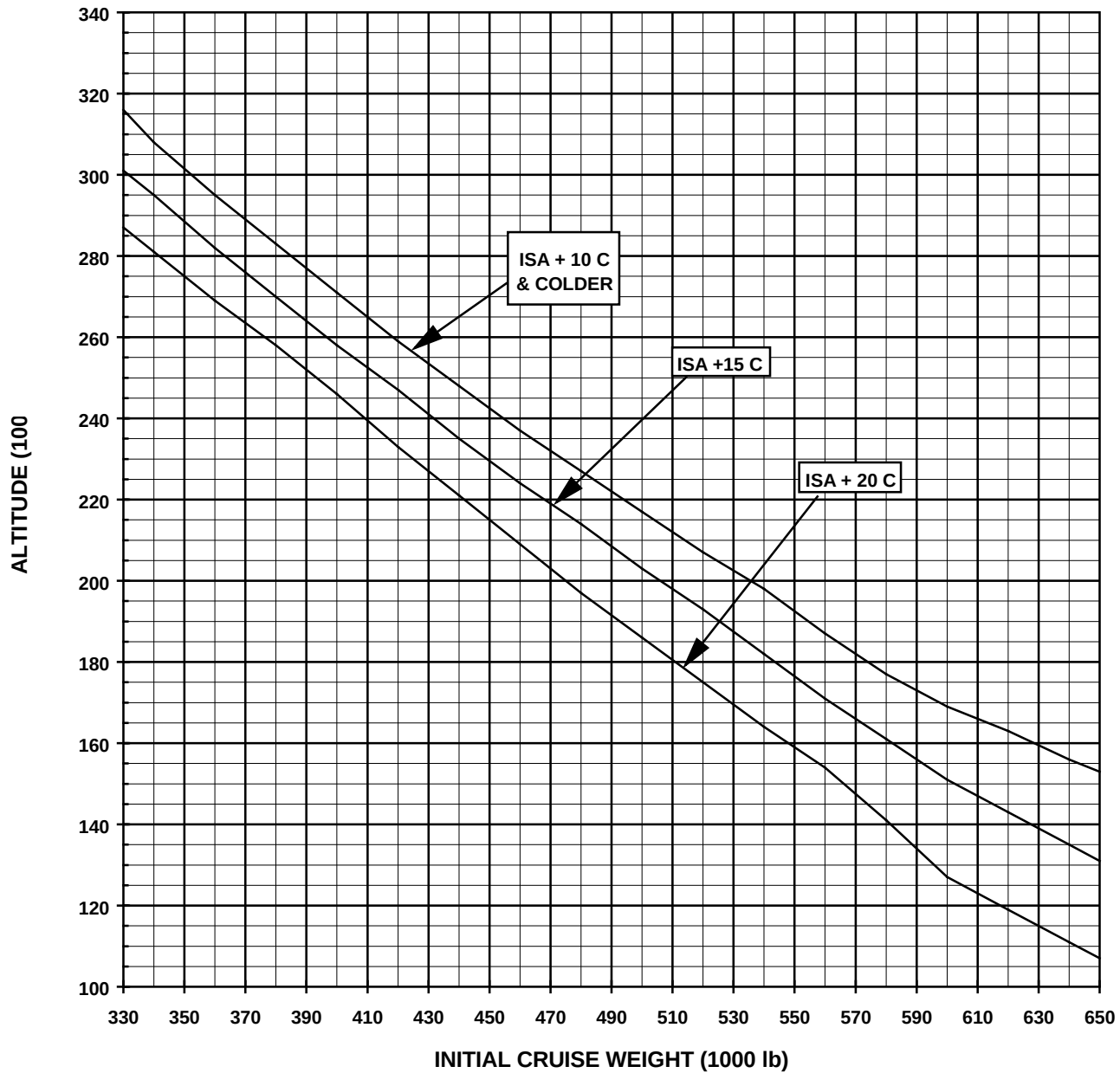
GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED – KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
640,000	620,000	284	19,700	18,300	16,800
600,000	582,000	275	21,400	20,100	18,600
560,000	544,000	265	23,200	21,900	20,400
520,000	506,000	255	25,000	23,800	22,400
480,000	467,000	245	26,700	25,600	24,400
440,000	428,000	234	28,500	27,400	26,300
420,000	407,000	229	29,500	28,300	27,200

BASIS:

- APU operating
- Maximum Continuous Thrust Limits
- 100 ft/min residual rate of climb
- 35,000 ft initial altitude

ONE ENGINE INOPERATIVE LONG RANGE CRUISE ALTITUDE CAPABILITY

LIMITED BY MAXIMUM CONTINUOUS THRUST



BLEED ADJUSTMENTS

ENGINE ANTI-ICE ON	-800FT
ENGINE & WING ANTI-ICE ON	-1000FT

ONE ENGINE INOPERATIVE

GEAR DOWN LANDING RATE OF CLIMB AVAILABLE

(FT/MIN)

FLAPS 20°

SEA LEVEL

TAT - °C	Weight (LBS)							
	300,000	350,000	400,000	450,000	500,000	550,000	600,000	650,000
52	1150	850	550	350	150	-50	-250	-450
50	1200	900	600	400	200	0	-200	-400
48	1250	950	650	450	250	50	-150	-350
46	1300	1000	700	500	300	100	-100	-300
44	1350	1050	750	550	350	150	-50	-250
42	1410	1110	810	610	410	210	10	-190
40	1460	1160	860	660	460	260	60	-140
38	1500	1200	900	700	500	300	100	-100
36	1540	1240	940	740	540	340	140	-60
34	1580	1280	980	780	580	380	180	-20
32	1620	1320	1020	820	620	420	220	20
30	1650	1350	1050	850	650	450	250	50
20	1670	1370	1070	870	670	470	270	70
10	1700	1400	1100	900	700	500	300	100
0	1720	1420	1120	920	720	520	320	120
-20	1770	1470	1170	970	770	570	370	170
-40	1820	1520	1220	1020	820	620	420	220

Decrease rate of climb 95 ft/min per 1000 ft. above sea level.

Above 30°C TAT – Increase rate of climb 55 ft/min per 1000 ft. below sea level.

FLAPS 30°

SEA LEVEL

TAT - °C	Weight (LBS)							
	300,000	350,000	400,000	450,000	500,000	550,000	600,000	650,000
52	670	370	70	-130	-330	-530	-730	-930
50	710	410	110	-90	-290	-490	-690	-890
48	760	460	160	-40	-240	-440	-640	-840
46	800	500	200	0	-200	-400	-600	-800
44	850	550	250	50	-150	-350	-550	-750
42	900	600	300	100	-100	-300	-500	-700
40	950	650	350	150	-50	-250	-450	-650
38	980	680	380	180	-20	-220	-420	-620
36	1010	710	410	210	10	-190	-390	-590
34	1050	750	450	250	50	-150	-350	-550
32	1080	780	480	280	80	-120	-320	-520
30	1120	820	520	320	120	-80	-280	-480
20	1130	830	530	330	130	-70	-270	-470
10	1140	840	540	340	140	-60	-260	-460
0	1150	850	550	350	150	-50	-250	-450
-20	1180	880	580	380	180	-20	-220	-420
-40	1210	910	610	410	210	10	-190	-390

Decrease rate of climb 95 ft/min per 1000 ft. above sea level.

Above 30°C TAT – Increase rate of climb 55 ft/min per 1000 ft. below sea level.

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

APPLICABILITY

The tables on the following pages provide landing distances and approach speeds to be used in the event of in-flight system failures. **The values in this section are not to be used for dispatch purposes.**

Refer to the “MEL Support” pages at the end of this section of the ODM for dispatch landing distances with the following MELs applied:

- Manual Spoilers
- One Brake Inoperative
- Two Brakes Inoperative

The landing distances provided in this section are classified by runway braking action. These classifications include “DRY,” “GOOD,” “MEDIUM,” or “POOR.” Refer to the Airway Manual – Section 4 (Weather) to find the relationship between these terms, the current environmental conditions, and runway friction values.

ASSUMPTIONS

The data within this section was generated based on a set of assumed conditions:

- Maximum manual braking (more aggressive than Max Autobrakes)
- Includes distance from 50 feet above threshold to stop (1,500 feet of air distance)
- Based on demonstrated landing performance produced by the manufacturer during certification process
- Does not include any other safety factors or margins

In addition, the data within this section were also calculated with certain baseline conditions. There are corrections provided for each abnormal configuration accounting for any variances from the following:

- Sea level altitude
- Standard Day Outside Air Temperature (OAT = ISA)
- No wind
- No slope
- Operating engines at maximum reverse thrust, except for hydraulic system failures
- Each abnormal configuration landing distance table is based on the approach speed stated within each table.

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

ANTISKID (FLAPS 25)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	8,790	8,350	7,910	7,470	7,030	6,590	6,150	5,710	5,310	4,910
GOOD	8,790	8,350	7,910	7,470	7,030	6,590	6,150	5,710	5,310	4,910
MEDIUM	11,310	10,710	10,110	9,510	8,910	8,310	7,710	7,110	6,550	5,990
POOR	15,920	15,000	14,080	13,160	12,240	11,320	10,400	9,480	8,640	7,800
VREF25	174	170	165	160	154	148	142	135	129	129

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+160	+160	+220	+320
Wind	Per 10 kt. headwind	-300	-300	-440	-760
	Per 10 kt. tailwind	+1160	+1160	+1830	+3680
Slope	Per 1% downhill	+240	+240	+580	+2300
	Per 1% uphill	-180	-180	-340	-830
Temperature	Per 10°C above ISA	+70	+70	+90	+130
	Per 10°C below ISA	-70	-70	-90	-130
Approach Speed	Per 10 kt. Above VREF	+390	+390	+440	+490
Reverse Thrust	One Reverser Operative	+560	+560	+1190	+3310
	No Reversers Operative	+1430	+1430	+3450	+15000

ANTISKID (FLAPS 30)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	8,270	7,870	7,470	7,070	6,670	6,270	5,870	5,470	5,070	4,670
GOOD	8,270	7,870	7,470	7,070	6,670	6,270	5,870	5,470	5,070	4,670
MEDIUM	11,020	10,420	9,820	9,220	8,620	8,020	7,420	6,820	6,300	5,780
POOR	15,290	14,410	13,530	12,650	11,770	10,890	10,010	9,130	8,330	7,530
VREF30	165	162	157	152	147	141	135	129	129	129

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+150	+150	+210	+310
Wind	Per 10 kt. headwind	-290	-290	-430	-750
	Per 10 kt. tailwind	+1140	+1140	+1800	+3640
Slope	Per 1% downhill	+230	+230	+570	+2190
	Per 1% uphill	-170	-170	-340	-820
Temperature	Per 10°C above ISA	+70	+70	+90	+120
	Per 10°C below ISA	-70	-70	-90	-120
Approach Speed	Per 10 kt. Above VREF	+390	+390	+440	+490
Reverse Thrust	One Reverser Operative	+480	+480	+1060	+3030
	No Reversers Operative	+1210	+1210	+2960	+15000

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

ENG SHUTDOWN L, R (FLAPS 20)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,750	5,430	5,110	4,790	4,470	4,150	3,830	3,510	3,310	3,110
GOOD	7,020	6,700	6,380	6,060	5,740	5,420	5,100	4,780	4,460	4,140
MEDIUM	10,140	9,620	9,100	8,580	8,060	7,540	7,020	6,500	5,980	5,460
POOR	13,860	13,100	12,340	11,580	10,820	10,060	9,300	8,540	7,780	7,020
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+110	+180	+270
Wind	Per 10 kt. headwind	-120	-210	-340	-520
	Per 10 kt. tailwind	+430	+740	+1260	+2040
Slope	Per 1% downhill	+40	+120	+320	+830
	Per 1% uphill	-40	-100	-240	-500
Temperature	Per 10°C above ISA	+40	+60	+90	+120
	Per 10°C below ISA	-40	-60	-90	-120
Approach Speed	Per 10 kt. Above VREF	+240	+350	+460	+560
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+60	+280	+950	+2400

ENG SHUTDOWN L, R (FLAPS 30)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,210	4,930	4,650	4,370	4,090	3,810	3,530	3,250	3,090	2,930
GOOD	6,300	6,020	5,740	5,460	5,180	4,900	4,620	4,340	4,060	3,780
MEDIUM	8,900	8,460	8,020	7,580	7,140	6,700	6,260	5,820	5,380	4,940
POOR	12,060	11,420	10,780	10,140	9,500	8,860	8,220	7,580	6,940	6,300
VREF30	165	162	157	152	147	141	135	129	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+60	+100	+150	+220
Wind	Per 10 kt. headwind	-120	-200	-320	-480
	Per 10 kt. tailwind	+410	+720	+1220	+1980
Slope	Per 1% downhill	+40	+100	+280	+730
	Per 1% uphill	-30	-90	-210	-440
Temperature	Per 10°C above ISA	+30	+50	+80	+110
	Per 10°C below ISA	-30	-50	-80	-110
Approach Speed	Per 10 kt. Above VREF	+230	+330	+430	+510
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+40	+200	+670	+1680

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

FLAPS DRIVE (FLAPS ≤ 5)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	7,350	6,870	6,390	5,910	5,430	4,950	4,470	3,990	3,790	3,590
GOOD	7,650	7,330	7,010	6,690	6,370	6,050	5,730	5,410	5,090	4,770
MEDIUM	10,790	10,270	9,750	9,230	8,710	8,190	7,670	7,150	6,630	6,110
POOR	14,300	13,540	12,780	12,020	11,260	10,500	9,740	8,980	8,260	7,540
VREF30+40	205	202	197	192	187	181	175	169	169	169

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+90	+140	+220	+310
Wind	Per 10 kt. headwind	-140	-220	-340	-490
	Per 10 kt. tailwind	+490	+780	+1280	+1990
Slope	Per 1% downhill	+50	+110	+270	+660
	Per 1% uphill	-40	-100	-210	-400
Temperature	Per 10°C above ISA	+50	+70	+100	+120
	Per 10°C below ISA	-50	-70	-100	-120
Approach Speed	Per 10 kt. Above VREF	+250	+310	+410	+490
Reverse Thrust	One Reverser Operative	+100	+350	+970	+2040
	No Reversers Operative	+220	+840	+2710	+6720

FLAPS DRIVE (5 < FLAPS < 20)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,900	5,580	5,260	4,940	4,620	4,300	3,980	3,660	3,500	3,340
GOOD	6,860	6,580	6,300	6,020	5,740	5,460	5,180	4,900	4,620	4,340
MEDIUM	9,750	9,270	8,790	8,310	7,830	7,350	6,870	6,390	5,910	5,430
POOR	12,460	11,820	11,180	10,540	9,900	9,260	8,620	7,980	7,340	6,700
VREF30+20	185	182	177	172	167	161	155	149	149	149

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+180	+250
Wind	Per 10 kt. headwind	-120	-200	-310	-460
	Per 10 kt. tailwind	+450	+740	+1200	+1910
Slope	Per 1% downhill	+40	+100	+240	+600
	Per 1% uphill	-40	-90	-190	-360
Temperature	Per 10°C above ISA	+40	+60	+80	+110
	Per 10°C below ISA	-40	-60	-80	-110
Approach Speed	Per 10 kt. Above VREF	+220	+320	+400	+470
Reverse Thrust	One Reverser Operative	+70	+280	+780	+1640
	No Reversers Operative	+150	+670	+2130	+5200

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

FLAPS DRIVE (FLAPS ≥ 20)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,720	5,400	5,080	4,760	4,440	4,120	3,800	3,480	3,320	3,160
GOOD	6,850	6,530	6,210	5,890	5,570	5,250	4,930	4,610	4,290	3,970
MEDIUM	9,360	8,880	8,400	7,920	7,440	6,960	6,480	6,000	5,520	5,040
POOR	11,980	11,340	10,700	10,060	9,420	8,780	8,140	7,500	6,860	6,220
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+110	+170	+230
Wind	Per 10 kt. headwind	-120	-200	-300	-450
	Per 10 kt. tailwind	+430	+720	+1180	+1840
Slope	Per 1% downhill	+40	+100	+240	+560
	Per 1% uphill	-30	-80	-190	-350
Temperature	Per 10°C above ISA	+30	+50	+80	+100
	Per 10°C below ISA	-40	-50	-80	-100
Approach Speed	Per 10 kt. Above VREF	+220	+310	+400	+460
Reverse Thrust	One Reverser Operative	+50	+220	+640	+1370
	No Reversers Operative	+120	+520	+1670	+4070

FLAPS PRIMARY FAIL

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,800	5,520	5,240	4,960	4,680	4,400	4,120	3,840	3,640	3,440
GOOD	7,280	6,960	6,640	6,320	6,000	5,680	5,360	5,040	4,720	4,400
MEDIUM	10,130	9,610	9,090	8,570	8,050	7,530	7,010	6,490	5,970	5,450
POOR	13,070	12,350	11,630	10,910	10,190	9,470	8,750	8,030	7,310	6,590
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+180	+250
Wind	Per 10 kt. headwind	-130	-210	-320	-470
	Per 10 kt. tailwind	+460	+770	+1240	+1910
Slope	Per 1% downhill	+40	+110	+270	+610
	Per 1% uphill	-40	-100	-210	-390
Temperature	Per 10°C above ISA	+40	+60	+80	+110
	Per 10°C below ISA	-40	-60	-80	-110
Approach Speed	Per 10 kt. Above VREF	+280	+380	+470	+530
Reverse Thrust	One Reverser Operative	+60	+270	+750	+1570
	No Reversers Operative	+140	+640	+2010	+4850

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

FLAP/SLAT CONTROL

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,700	5,380	5,060	4,740	4,420	4,100	3,780	3,460	3,300	3,140
GOOD	6,530	6,250	5,970	5,690	5,410	5,130	4,850	4,570	4,290	4,010
MEDIUM	9,010	8,570	8,130	7,690	7,250	6,810	6,370	5,930	5,490	5,050
POOR	11,880	11,240	10,600	9,960	9,320	8,680	8,040	7,400	6,760	6,120
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+60	+110	+160	+230
Wind	Per 10 kt. headwind	-120	-200	-300	-440
	Per 10 kt. tailwind	+430	+710	+1160	+1820
Slope	Per 1% downhill	+40	+100	+230	+550
	Per 1% uphill	-30	-80	-180	-350
Temperature	Per 10°C above ISA	+30	+50	+80	+100
	Per 10°C below ISA	-30	-50	-80	-100
Approach Speed	Per 10 kt. Above VREF	+220	+310	+390	+450
Reverse Thrust	One Reverser Operative	+50	+210	+610	+1310
	No Reversers Operative	+110	+500	+1590	+3860

FLIGHT CONTROL MODE

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,880	5,600	5,320	5,040	4,760	4,480	4,200	3,920	3,720	3,520
GOOD	7,690	7,330	6,970	6,610	6,250	5,890	5,530	5,170	4,810	4,450
MEDIUM	10,320	9,800	9,280	8,760	8,240	7,720	7,200	6,680	6,160	5,640
POOR	13,610	12,850	12,090	11,330	10,570	9,810	9,050	8,290	7,530	6,770
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+120	+190	+270
Wind	Per 10 kt. headwind	-140	-220	-330	-480
	Per 10 kt. tailwind	+470	+780	+1260	+1950
Slope	Per 1% downhill	+40	+120	+290	+650
	Per 1% uphill	-40	-100	-220	-410
Temperature	Per 10°C above ISA	+40	+60	+90	+110
	Per 10°C below ISA	-40	-60	-90	-110
Approach Speed	Per 10 kt. Above VREF	+300	+410	+510	+570
Reverse Thrust	One Reverser Operative	+70	+300	+830	+1740
	No Reversers Operative	+150	+720	+2280	+5570

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

HYD PRESS SYS C

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,800	5,520	5,240	4,960	4,680	4,400	4,120	3,840	3,640	3,440
GOOD	7,280	6,960	6,640	6,320	6,000	5,680	5,360	5,040	4,720	4,400
MEDIUM	10,130	9,610	9,090	8,570	8,050	7,530	7,010	6,490	5,970	5,450
POOR	13,070	12,350	11,630	10,910	10,190	9,470	8,750	8,030	7,310	6,590
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+180	+250
Wind	Per 10 kt. headwind	-130	-210	-320	-470
	Per 10 kt. tailwind	+460	+770	+1240	+1910
Slope	Per 1% downhill	+40	+110	+270	+610
	Per 1% uphill	-40	-100	-210	-390
Temperature	Per 10°C above ISA	+40	+60	+80	+110
	Per 10°C below ISA	-40	-60	-80	-110
Approach Speed	Per 10 kt. Above VREF	+280	+380	+470	+530
Reverse Thrust	One Reverser Operative	+60	+270	+750	+1570
	No Reversers Operative	+140	+640	+2010	+4850

HYD PRESS SYS L+C

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	6,300	6,020	5,740	5,460	5,180	4,900	4,620	4,340	4,100	3,860
GOOD	8,530	8,170	7,810	7,450	7,090	6,730	6,370	6,010	5,650	5,290
MEDIUM	12,440	11,840	11,240	10,640	10,040	9,440	8,840	8,240	7,640	7,040
POOR	17,090	16,210	15,330	14,450	13,570	12,690	11,810	10,930	10,050	9,170
VREF30+20	185	182	177	172	167	161	155	149	149	149

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+90	+160	+260	+360
Wind	Per 10 kt. headwind	-150	-260	-420	-650
	Per 10 kt. tailwind	+520	+910	+1540	+2560
Slope	Per 1% downhill	+60	+180	+480	+1300
	Per 1% uphill	-50	-150	-350	-730
Temperature	Per 10°C above ISA	+50	+80	+120	+160
	Per 10°C below ISA	-50	-80	-120	-160
Approach Speed	Per 10 kt. Above VREF	+360	+510	+660	+760
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+110	+540	+1730	+4400

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

HYD PRESS SYS L+R

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	6,600	6,320	6,040	5,760	5,480	5,200	4,920	4,640	4,400	4,160
GOOD	9,040	8,640	8,240	7,840	7,440	7,040	6,640	6,240	5,840	5,440
MEDIUM	13,990	13,350	12,710	12,070	11,430	10,790	10,150	9,510	8,870	8,230
POOR	21,490	20,490	19,490	18,490	17,490	16,490	15,490	14,490	13,530	12,570
VREF30+20	185	182	177	172	167	161	155	149	149	149

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+100	+160	+260	+400
Wind	Per 10 kt. headwind	-180	-280	-510	-910
	Per 10 kt. tailwind	+620	+980	+1840	+3520
Slope	Per 1% downhill	+100	+250	+870	+3680
	Per 1% uphill	-80	-200	-560	-1450
Temperature	Per 10°C above ISA	+60	+90	+150	+250
	Per 10°C below ISA	-60	-90	-150	-250
Approach Speed	Per 10 kt. Above VREF	+420	+580	+810	+1010
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	N/A	N/A	N/A	N/A

HYD PRESS SYS R+C

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	7,210	6,930	6,650	6,370	6,090	5,810	5,530	5,250	4,930	4,610
GOOD	8,950	8,550	8,150	7,750	7,350	6,950	6,550	6,150	5,750	5,350
MEDIUM	12,880	12,240	11,600	10,960	10,320	9,680	9,040	8,400	7,800	7,200
POOR	17,510	16,590	15,670	14,750	13,830	12,910	11,990	11,070	10,190	9,310
VREF30+20	185	182	177	172	167	161	155	149	149	149

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+120	+160	+250	+370
Wind	Per 10 kt. headwind	-210	-260	-430	-660
	Per 10 kt. tailwind	+720	+930	+1570	+2600
Slope	Per 1% downhill	+120	+200	+530	+1460
	Per 1% uphill	-100	-160	-370	-760
Temperature	Per 10°C above ISA	+60	+80	+120	+170
	Per 10°C below ISA	-70	-80	-120	-170
Approach Speed	Per 10 kt. Above VREF	+490	+560	+700	+800
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+300	+590	+1850	+4600

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

HYD PRESS SYS L (FLAPS 25)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,780	5,460	5,140	4,820	4,500	4,180	3,860	3,540	3,340	3,140
GOOD	7,090	6,770	6,450	6,130	5,810	5,490	5,170	4,850	4,530	4,210
MEDIUM	10,280	9,760	9,240	8,720	8,200	7,680	7,160	6,640	6,160	5,680
POOR	14,160	13,400	12,640	11,880	11,120	10,360	9,600	8,840	8,120	7,400
VREF25	174	170	165	160	154	148	142	135	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+110	+190	+270
Wind	Per 10 kt. headwind	-130	-220	-360	-570
	Per 10 kt. tailwind	+450	+790	+1370	+2320
Slope	Per 1% downhill	+40	+140	+380	+1120
	Per 1% uphill	-40	-110	-270	-580
Temperature	Per 10°C above ISA	+40	+60	+90	+130
	Per 10°C below ISA	-40	-60	-90	-130
Approach Speed	Per 10 kt. Above VREF	+270	+390	+510	+610
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+60	+320	+1060	+2750

HYD PRESS SYS L (FLAPS 30)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,360	5,080	4,800	4,520	4,240	3,960	3,680	3,400	3,240	3,080
GOOD	6,870	6,550	6,230	5,910	5,590	5,270	4,950	4,630	4,350	4,070
MEDIUM	9,710	9,230	8,750	8,270	7,790	7,310	6,830	6,350	5,870	5,390
POOR	13,510	12,790	12,070	11,350	10,630	9,910	9,190	8,470	7,790	7,110
VREF30	165	162	157	152	147	141	135	129	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+60	+110	+170	+260
Wind	Per 10 kt. headwind	-120	-210	-350	-560
	Per 10 kt. tailwind	+430	+780	+1350	+2290
Slope	Per 1% downhill	+40	+130	+370	+1110
	Per 1% uphill	-40	-110	-260	-570
Temperature	Per 10°C above ISA	+30	+60	+90	+120
	Per 10°C below ISA	-30	-60	-90	-120
Approach Speed	Per 10 kt. Above VREF	+270	+400	+520	+610
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+50	+270	+910	+2390

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

HYD PRESS SYS R (FLAPS 25)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,530	5,290	5,050	4,810	4,570	4,330	4,090	3,850	3,650	3,450
GOOD	7,090	6,770	6,450	6,130	5,810	5,490	5,170	4,850	4,530	4,210
MEDIUM	10,240	9,720	9,200	8,680	8,160	7,640	7,120	6,600	6,120	5,640
POOR	14,050	13,290	12,530	11,770	11,010	10,250	9,490	8,730	8,010	7,290
VREF25	174	170	165	160	154	148	142	135	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+110	+180	+270
Wind	Per 10 kt. headwind	-150	-220	-360	-570
	Per 10 kt. tailwind	+520	+790	+1370	+2310
Slope	Per 1% downhill	+60	+140	+380	+1090
	Per 1% uphill	-50	-110	-270	-570
Temperature	Per 10°C above ISA	+40	+60	+90	+130
	Per 10°C below ISA	-40	-60	-90	-130
Approach Speed	Per 10 kt. Above VREF	+310	+390	+510	+590
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+100	+320	+1040	+2640

HYD PRESS SYS R (FLAPS 30)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,070	4,870	4,670	4,470	4,270	4,070	3,870	3,670	3,470	3,270
GOOD	6,550	6,270	5,990	5,710	5,430	5,150	4,870	4,590	4,310	4,030
MEDIUM	9,570	9,090	8,610	8,130	7,650	7,170	6,690	6,210	5,770	5,330
POOR	12,950	12,270	11,590	10,910	10,230	9,550	8,870	8,190	7,550	6,910
VREF30	165	162	157	152	147	141	135	129	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+110	+170	+250
Wind	Per 10 kt. headwind	-140	-210	-350	-540
	Per 10 kt. tailwind	+510	+770	+1330	+2240
Slope	Per 1% downhill	+60	+130	+360	+1040
	Per 1% uphill	-50	-100	-250	-530
Temperature	Per 10°C above ISA	+40	+60	+80	+120
	Per 10°C below ISA	-40	-60	-80	-120
Approach Speed	Per 10 kt. Above VREF	+300	+390	+490	+570
Reverse Thrust	One Reverser Operative	N/A	N/A	N/A	N/A
	No Reversers Operative	+80	+260	+840	+2150

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

PITCH DOWN AUTHORITY (FLAPS 25)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,920	5,600	5,280	4,960	4,640	4,320	4,000	3,880	3,760	3,640
GOOD	6,860	6,580	6,300	6,020	5,740	5,460	5,180	4,980	4,780	4,580
MEDIUM	9,270	8,830	8,390	7,950	7,510	7,070	6,630	6,310	5,990	5,670
POOR	11,800	11,200	10,600	10,000	9,400	8,800	8,200	7,720	7,240	6,760
VREF25	174	170	165	160	154	148	142	135	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+170	+240
Wind	Per 10 kt. headwind	-140	-220	-340	-490
	Per 10 kt. tailwind	+470	+770	+1230	+1880
Slope	Per 1% downhill	+40	+110	+260	+590
	Per 1% uphill	-40	-100	-210	-390
Temperature	Per 10°C above ISA	+70	+110	+150	+200
	Per 10°C below ISA	-70	-110	-150	-200
Approach Speed	Per 10 kt. Above VREF	+150	+190	+230	+260
Reverse Thrust	One Reverser Operative	+40	+190	+560	+1240
	No Reversers Operative	+80	+430	+1420	+3490

PITCH DOWN AUTHORITY (FLAPS 30)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,520	5,240	4,960	4,680	4,400	4,120	3,840	3,800	3,760	3,720
GOOD	6,630	6,350	6,070	5,790	5,510	5,230	4,950	4,830	4,710	4,590
MEDIUM	8,730	8,330	7,930	7,530	7,130	6,730	6,330	6,130	5,930	5,730
POOR	11,200	10,640	10,080	9,520	8,960	8,400	7,840	7,480	7,120	6,760
VREF30	165	162	157	152	147	141	135	129	129	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+110	+160	+230
Wind	Per 10 kt. headwind	-130	-210	-330	-480
	Per 10 kt. tailwind	+460	+750	+1200	+1860
Slope	Per 1% downhill	+40	+110	+260	+580
	Per 1% uphill	-40	-90	-200	-390
Temperature	Per 10°C above ISA	+70	+100	+140	+190
	Per 10°C below ISA	-70	-100	-140	-190
Approach Speed	Per 10 kt. Above VREF	+150	+190	+230	+260
Reverse Thrust	One Reverser Operative	+30	+160	+490	+1090
	No Reversers Operative	+60	+360	+1200	+2980

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

PITCH UP AUTHORITY (FLAPS 5)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	6,780	6,380	5,980	5,580	5,180	4,780	4,380	3,980	3,820	3,660
GOOD	7,600	7,280	6,960	6,640	6,320	6,000	5,680	5,360	5,040	4,720
MEDIUM	10,350	9,870	9,390	8,910	8,430	7,950	7,470	6,990	6,510	6,030
POOR	13,440	12,760	12,080	11,400	10,720	10,040	9,360	8,680	8,000	7,320
VREF30+40	205	202	197	192	187	181	175	169	169	169

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+130	+200	+280
Wind	Per 10 kt. headwind	-140	-210	-320	-470
	Per 10 kt. tailwind	+480	+760	+1240	+1950
Slope	Per 1% downhill	+40	+100	+250	+570
	Per 1% uphill	-40	-90	-200	-370
Temperature	Per 10°C above ISA	+50	+70	+90	+120
	Per 10°C below ISA	-50	-70	-90	-120
Approach Speed	Per 10 kt. Above VREF	+210	+290	+370	+430
Reverse Thrust	One Reverser Operative	+90	+310	+840	+1720
	No Reversers Operative	+200	+740	+2250	+5260

PITCH UP AUTHORITY (FLAPS 20)

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,820	5,500	5,180	4,860	4,540	4,220	3,900	3,580	3,420	3,260
GOOD	6,720	6,440	6,160	5,880	5,600	5,320	5,040	4,760	4,480	4,200
MEDIUM	9,270	8,830	8,390	7,950	7,510	7,070	6,630	6,190	5,750	5,310
POOR	12,200	11,560	10,920	10,280	9,640	9,000	8,360	7,720	7,080	6,440
VREF30+20	185	182	177	172	167	161	155	149	149	149

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+110	+170	+240
Wind	Per 10 kt. headwind	-120	-200	-310	-450
	Per 10 kt. tailwind	+440	+720	+1180	+1880
Slope	Per 1% downhill	+40	+100	+230	+550
	Per 1% uphill	-40	-80	-180	-350
Temperature	Per 10°C above ISA	+40	+60	+80	+100
	Per 10°C below ISA	-40	-60	-80	-100
Approach Speed	Per 10 kt. Above VREF	+210	+290	+370	+430
Reverse Thrust	One Reverser Operative	+60	+230	+640	+1350
	No Reversers Operative	+130	+530	+1640	+3940

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

PRI FLIGHT COMPUTERS

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,880	5,600	5,320	5,040	4,760	4,480	4,200	3,920	3,720	3,520
GOOD	7,690	7,330	6,970	6,610	6,250	5,890	5,530	5,170	4,810	4,450
MEDIUM	10,320	9,800	9,280	8,760	8,240	7,720	7,200	6,680	6,160	5,640
POOR	13,610	12,850	12,090	11,330	10,570	9,810	9,050	8,290	7,530	6,770
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+120	+190	+270
Wind	Per 10 kt. headwind	-140	-220	-330	-480
	Per 10 kt. tailwind	+470	+780	+1260	+1950
Slope	Per 1% downhill	+40	+120	+290	+650
	Per 1% uphill	-40	-100	-220	-410
Temperature	Per 10°C above ISA	+40	+60	+90	+110
	Per 10°C below ISA	-40	-60	-90	-110
Approach Speed	Per 10 kt. Above VREF	+300	+410	+510	+570
Reverse Thrust	One Reverser Operative	+70	+300	+830	+1740
	No Reversers Operative	+150	+720	+2280	+5570

SLATS DRIVE

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	6,200	5,880	5,560	5,240	4,920	4,600	4,280	3,960	3,760	3,560
GOOD	7,520	7,200	6,880	6,560	6,240	5,920	5,600	5,280	4,960	4,640
MEDIUM	10,200	9,720	9,240	8,760	8,280	7,800	7,320	6,840	6,360	5,880
POOR	13,220	12,540	11,860	11,180	10,500	9,820	9,140	8,460	7,780	7,100
VREF30+30	195	192	187	182	177	171	165	159	159	159

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+130	+200	+270
Wind	Per 10 kt. headwind	-130	-220	-330	-480
	Per 10 kt. tailwind	+460	+780	+1240	+1920
Slope	Per 1% downhill	+40	+110	+260	+600
	Per 1% uphill	-40	-100	-210	-390
Temperature	Per 10°C above ISA	+40	+70	+90	+120
	Per 10°C below ISA	-40	-70	-90	-120
Approach Speed	Per 10 kt. Above VREF	+240	+330	+410	+460
Reverse Thrust	One Reverser Operative	+80	+300	+790	+1600
	No Reversers Operative	+170	+710	+2070	+4740

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

NOTE: Data below assumes Max Manual Braking and does NOT include 15% safety margin. Refer to Page 4-12 for all assumed conditions.

STABILIZER

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,950	5,630	5,310	4,990	4,670	4,350	4,030	3,710	3,510	3,310
GOOD	7,180	6,860	6,540	6,220	5,900	5,580	5,260	4,940	4,620	4,300
MEDIUM	9,770	9,290	8,810	8,330	7,850	7,370	6,890	6,410	5,930	5,450
POOR	12,430	11,790	11,150	10,510	9,870	9,230	8,590	7,950	7,310	6,670
VREF30+20	185	182	177	172	167	161	155	149	149	149

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+180	+250
Wind	Per 10 kt. headwind	-120	-200	-320	-460
	Per 10 kt. tailwind	+440	+750	+1210	+1880
Slope	Per 1% downhill	+40	+110	+250	+580
	Per 1% uphill	-40	-90	-200	-370
Temperature	Per 10°C above ISA	+40	+60	+80	+110
	Per 10°C below ISA	-40	-60	-80	-110
Approach Speed	Per 10 kt. Above VREF	+230	+320	+400	+460
Reverse Thrust	One Reverser Operative	+60	+260	+710	+1470
	No Reversers Operative	+140	+620	+1870	+4380

ALL OTHER FLAPS 20 ABNORMAL CONFIGURATIONS

RWY COND. & APPCH SPEED	LANDING WEIGHT – 1,000 POUNDS									
	680	640	600	560	520	480	440	400	360	320
DRY	5,880	5,600	5,320	5,040	4,760	4,480	4,200	3,920	3,720	3,520
GOOD	7,690	7,330	6,970	6,610	6,250	5,890	5,530	5,170	4,810	4,450
MEDIUM	10,320	9,800	9,280	8,760	8,240	7,720	7,200	6,680	6,160	5,640
POOR	13,610	12,850	12,090	11,330	10,570	9,810	9,050	8,290	7,530	6,770
VREF20	179	175	170	165	159	153	146	140	132	129

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+120	+190	+270
Wind	Per 10 kt. headwind	-140	-220	-330	-480
	Per 10 kt. tailwind	+470	+780	+1260	+1950
Slope	Per 1% downhill	+40	+120	+290	+650
	Per 1% uphill	-40	-100	-220	-410
Temperature	Per 10°C above ISA	+40	+60	+90	+110
	Per 10°C below ISA	-40	-60	-90	-110
Approach Speed	Per 10 kt. Above VREF	+300	+410	+510	+570
Reverse Thrust	One Reverser Operative	+70	+300	+830	+1740
	No Reversers Operative	+150	+720	+2280	+5570

EMERGENCY LANDING DISTANCES

FEET

NOTE: TO BE USED ONLY UNDER CAPTAIN'S EMERGENCY AUTHORITY. PROVIDES ACTUAL LANDING DISTANCES ON CONTAMINATED RUNWAYS.

FLAPS 20

DATA IS ADVISORY AND DOES NOT INCLUDE 15% SAFETY MARGIN.

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	12,300	11,300	9,800	8,200	6,600	5,800	9,800	8,300	7,200	6,700
640,000	12,000	11,000	9,600	8,000	6,500	5,600	9,600	8,100	7,100	6,600
620,000	11,700	10,800	9,400	7,900	6,300	5,500	9,400	7,900	6,900	6,500
600,000	11,300	10,500	9,200	7,700	6,200	5,300	9,200	7,700	6,800	6,300
580,000	11,000	10,200	9,000	7,500	6,000	5,100	9,000	7,500	6,600	6,200
560,000	10,700	9,900	8,700	7,300	5,900	4,900	8,700	7,400	6,400	6,000
540,000	10,400	9,600	8,500	7,100	5,800	4,700	8,500	7,200	6,300	5,900
520,000	10,100	9,400	8,300	7,000	5,600	4,600	8,300	7,000	6,100	5,800
500,000	9,700	9,100	8,100	6,800	5,500	4,400	8,100	6,800	6,000	5,600
480,000	9,400	8,800	7,900	6,600	5,300	4,200	7,900	6,600	5,800	5,500
460,000	9,100	8,500	7,600	6,400	5,200	4,000	7,600	6,500	5,600	5,300
440,000	8,800	8,200	7,400	6,200	5,100	3,800	7,400	6,300	5,500	5,200
420,000	8,500	8,000	7,200	6,100	4,900	3,800	7,200	6,100	5,300	5,100
400,000	8,200	7,700	7,000	5,900	4,800	3,700	7,000	6,000	5,200	4,900
380,000	7,900	7,500	6,800	5,800	4,700	3,600	6,800	5,800	5,100	4,800
360,000	7,600	7,200	6,500	5,600	4,600	3,500	6,500	5,600	4,900	4,600

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF20 - 5 •

Data is advisory and includes a 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-500	-400	-400	-300	-200	-100	-400	-300	-200	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	500	400	400	300	200	100	400	300	200	200
6,000	1,000	900	700	600	400	300	700	600	500	500
8,000	1,500	1,300	1,100	800	600	400	1,100	900	700	700

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	100	100	100	50	50	100	100	100	50
PER 5 KTS ADD'L SPD	300	350	350	300	200	100	350	300	200	150
PER 10°C ABOVE ISA	200	200	200	150	100	50	200	150	100	100
PER 10°C BELOW ISA	-200	-200	-200	-150	-100	-50	-200	-150	-100	-100
PER 1% UP SLOPE	-200	-100	-50	0	0	-50	-50	0	-100	-100
PER 1% DOWN SLOPE	150	50	0	0	0	50	0	0	100	100
1 REVERSER INOP	500	100	0	0	0	100	0	100	300	300
2 REVERSERS INOP	500	100	0	0	0	200	0	100	600	600
MANUAL SPOILERS	200	200	200	200	200	300	200	200	200	300

EMERGENCY LANDING DISTANCES

FEET

NOTE: TO BE USED ONLY UNDER CAPTAIN'S EMERGENCY AUTHORITY. PROVIDES ACTUAL LANDING DISTANCES ON CONTAMINATED RUNWAYS.

DATA IS ADVISORY AND DOES NOT INCLUDE 15% SAFETY MARGIN.

FLAPS 20

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	10,400	9,600	9,500	9,300	12,400	12,500	12,200	12,200
640,000	10,100	9,400	9,300	9,100	12,100	12,200	11,900	11,900
620,000	9,900	9,200	9,100	8,900	11,800	11,800	11,600	11,600
600,000	9,700	8,900	8,800	8,600	11,500	11,500	11,300	11,300
580,000	9,400	8,700	8,600	8,400	11,200	11,200	11,000	11,000
560,000	9,200	8,400	8,300	8,200	10,800	10,800	10,600	10,600
540,000	8,900	8,200	8,100	8,000	10,500	10,500	10,300	10,300
520,000	8,700	8,000	7,900	7,800	10,200	10,100	10,000	10,000
500,000	8,500	7,700	7,600	7,500	9,900	9,800	9,700	9,700
480,000	8,200	7,500	7,400	7,300	9,600	9,500	9,400	9,400
460,000	8,000	7,200	7,100	7,100	9,200	9,100	9,000	9,000
440,000	7,700	7,000	6,900	6,900	8,900	8,800	8,700	8,700
420,000	7,500	6,800	6,700	6,700	8,600	8,500	8,400	8,400
400,000	7,300	6,600	6,500	6,500	8,400	8,200	8,100	8,100
380,000	7,100	6,400	6,300	6,300	8,100	7,900	7,800	7,800
360,000	6,900	6,200	6,100	6,100	7,800	7,600	7,500	7,500

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF20 - 5 •

Data is advisory and includes a 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-500	-500	-500	-500
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	500	500	500	500
6,000	800	700	700	700	1,000	1,000	1,000	1,000
8,000	1,100	1,100	1,100	1,100	1,600	1,600	1,600	1,600

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	350	250	250	200	300	250	250	250
PER 10°C ABOVE ISA	200	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-200	-150	-150	-150	-200	-200	-200	-200
PER 1% UP SLOPE	-100	-150	-200	-200	-350	-400	-400	-400
PER 1% DOWN SLOPE	150	250	250	250	600	600	600	600
1 REVERSER INOP	300	700	700	700	1,400	1,500	1,500	1,500
2 REVERSERS INOP	1,300	1,800	1,800	1,800	4,300	4,400	4,300	4,300
MANUAL SPOILERS	200	200	200	300	200	200	200	300

EMERGENCY LANDING DISTANCES

FEET

NOTE: TO BE USED ONLY UNDER CAPTAIN'S EMERGENCY AUTHORITY. PROVIDES ACTUAL LANDING DISTANCES ON CONTAMINATED RUNWAYS.

FLAPS 25

DATA IS ADVISORY AND DOES NOT INCLUDE 15% SAFETY MARGIN.

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	11,600	10,600	9,400	7,700	6,200	5,500	9,400	7,900	6,800	6,500
640,000	11,300	10,400	9,200	7,600	6,100	5,300	9,200	7,800	6,700	6,400
620,000	11,000	10,100	9,000	7,400	5,900	5,100	9,000	7,600	6,500	6,200
600,000	10,700	9,800	8,800	7,200	5,800	5,000	8,800	7,400	6,400	6,100
580,000	10,400	9,600	8,600	7,100	5,700	4,800	8,600	7,200	6,300	5,900
560,000	10,100	9,300	8,300	6,900	5,600	4,700	8,300	7,000	6,100	5,800
540,000	9,800	9,100	8,100	6,800	5,500	4,500	8,100	6,900	6,000	5,700
520,000	9,500	8,800	7,900	6,600	5,300	4,300	7,900	6,700	5,800	5,500
500,000	9,200	8,500	7,700	6,400	5,200	4,200	7,700	6,500	5,700	5,400
480,000	8,900	8,300	7,500	6,300	5,100	4,000	7,500	6,300	5,600	5,200
460,000	8,600	8,000	7,200	6,100	5,000	3,900	7,200	6,100	5,400	5,100
440,000	8,300	7,800	7,000	6,000	4,900	3,700	7,000	6,000	5,300	5,000
420,000	8,000	7,600	6,900	5,800	4,800	3,600	6,900	5,800	5,200	4,900
400,000	7,800	7,400	6,700	5,700	4,700	3,600	6,700	5,700	5,100	4,800
380,000	7,500	7,200	6,500	5,600	4,600	3,500	6,500	5,600	5,000	4,700
360,000	7,300	7,000	6,400	5,500	4,500	3,500	6,400	5,500	4,900	4,600

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF25 - 5 •

Data is advisory and includes a 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-500	-400	-300	-300	-200	-100	-300	-300	-200	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	500	400	300	300	200	100	300	300	200	200
6,000	900	800	700	600	400	200	700	600	500	400
8,000	1,400	1,200	1,000	800	600	400	1,000	800	700	700

CORRECTIONS	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	0	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	100	100	100	50	50	100	100	100	50
PER 5 KTS ADD'L SPD	300	300	350	250	200	100	350	250	200	150
PER 10°C ABOVE ISA	200	200	150	150	100	50	150	150	100	100
PER 10°C BELOW ISA	-200	-200	-150	-150	-100	-50	-150	-150	-100	-100
PER 1% UP SLOPE	-200	-150	-50	0	0	-50	-50	0	-100	-100
PER 1% DOWN SLOPE	150	100	50	0	0	50	50	50	100	100
1 REVERSER INOP	500	100	0	0	0	100	0	100	300	300
2 REVERSERS INOP	500	100	0	0	0	100	0	100	600	500
MANUAL SPOILERS	200	200	200	200	200	200	200	200	200	200

EMERGENCY LANDING DISTANCES

FEET

NOTE: TO BE USED ONLY UNDER CAPTAIN'S EMERGENCY AUTHORITY. PROVIDES ACTUAL LANDING DISTANCES ON CONTAMINATED RUNWAYS.

DATA IS ADVISORY AND DOES NOT INCLUDE 15% SAFETY MARGIN.

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	9,800	9,100	9,000	8,900	11,700	11,600	11,500	11,500
640,000	9,500	8,900	8,800	8,700	11,400	11,300	11,200	11,200
620,000	9,300	8,600	8,600	8,500	11,100	11,000	10,900	10,900
600,000	9,100	8,400	8,300	8,300	10,800	10,700	10,600	10,600
580,000	8,900	8,200	8,100	8,100	10,500	10,400	10,300	10,300
560,000	8,700	8,000	7,900	7,800	10,200	10,100	10,000	10,000
540,000	8,400	7,800	7,700	7,600	9,900	9,800	9,700	9,700
520,000	8,200	7,500	7,500	7,400	9,600	9,500	9,400	9,400
500,000	8,000	7,300	7,200	7,200	9,300	9,200	9,100	9,100
480,000	7,800	7,100	7,000	7,000	9,000	8,900	8,800	8,800
460,000	7,600	6,900	6,800	6,700	8,700	8,600	8,500	8,500
440,000	7,300	6,700	6,600	6,500	8,400	8,300	8,200	8,200
420,000	7,200	6,500	6,400	6,400	8,200	8,100	8,000	8,000
400,000	7,000	6,300	6,300	6,200	8,000	7,800	7,800	7,700
380,000	6,900	6,200	6,100	6,000	7,800	7,600	7,500	7,500
360,000	6,700	6,000	5,900	5,900	7,500	7,300	7,300	7,300

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF25 - 5 •
Data is advisory and includes a 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-300	-300	-300	-500	-500	-500	-500
2,000	0	0	0	0	0	0	0	0
4,000	400	300	300	300	500	500	500	500
6,000	700	700	700	700	1,000	1,000	1,000	1,000
8,000	1,100	1,000	1,000	1,000	1,400	1,400	1,400	1,400

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	350	250	250	200	300	250	250	250
PER 10°C ABOVE ISA	200	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-200	-150	-150	-150	-200	-200	-200	-200
PER 1% UP SLOPE	-100	-150	-150	-200	-300	-400	-400	-400
PER 1% DOWN SLOPE	150	250	250	250	550	600	600	550
1 REVERSER INOP	300	600	600	600	1,300	1,300	1,300	1,300
2 REVERSERS INOP	1,000	1,600	1,500	1,600	3,600	3,700	3,700	3,700
MANUAL SPOILERS	200	200	200	200	200	200	200	200

EMERGENCY LANDING DISTANCES

FEET

NOTE: TO BE USED ONLY UNDER CAPTAIN'S EMERGENCY AUTHORITY. PROVIDES ACTUAL LANDING DISTANCES ON CONTAMINATED RUNWAYS.

FLAPS 30

DATA IS ADVISORY AND DOES NOT INCLUDE 15% SAFETY MARGIN.

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	10,700	9,700	8,700	7,300	5,900	5,100	8,700	7,300	6,600	6,100
640,000	10,400	9,500	8,500	7,100	5,800	5,000	8,500	7,200	6,400	5,900
620,000	10,100	9,200	8,300	7,000	5,700	4,800	8,300	7,000	6,300	5,800
600,000	9,900	9,000	8,100	6,800	5,500	4,700	8,100	6,800	6,200	5,700
580,000	9,600	8,800	7,900	6,700	5,400	4,500	7,900	6,700	6,000	5,600
560,000	9,400	8,600	7,700	6,500	5,300	4,400	7,700	6,500	5,900	5,500
540,000	9,100	8,400	7,500	6,300	5,200	4,300	7,500	6,400	5,700	5,300
520,000	8,800	8,100	7,300	6,200	5,100	4,100	7,300	6,200	5,600	5,200
500,000	8,600	7,900	7,100	6,000	4,900	4,000	7,100	6,000	5,500	5,100
480,000	8,300	7,700	6,900	5,900	4,800	3,800	6,900	5,900	5,300	5,000
460,000	8,100	7,500	6,700	5,700	4,700	3,700	6,700	5,700	5,200	4,900
440,000	7,800	7,300	6,500	5,500	4,600	3,600	6,500	5,600	5,000	4,700
420,000	7,600	7,100	6,500	5,500	4,600	3,500	6,500	5,500	5,000	4,700
400,000	7,500	7,000	6,400	5,500	4,500	3,500	6,400	5,500	4,900	4,600
380,000	7,300	6,900	6,300	5,400	4,500	3,500	6,300	5,400	4,900	4,600
360,000	7,200	6,800	6,300	5,400	4,500	3,500	6,300	5,400	4,800	4,500

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF30 - 5 •

Data is advisory and includes a 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	DRY (6)						GOOD (5)			
0	-400	-400	-300	-200	-200	-100	-300	-200	-200	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	400	400	300	200	200	100	300	200	200	200
6,000	800	700	600	500	400	200	600	500	400	400
8,000	1,680	1,440	1,200	960	720	480	1,200	960	880	800

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	0	0	0	-50	0	0	0
PER 1 KT TAILWIND	150	100	100	100	50	50	100	100	50	50
PER 5 KTS ADD'L SPD	300	300	300	250	200	100	300	250	200	150
PER 10°C ABOVE ISA	200	200	150	150	100	50	150	150	100	100
PER 10°C BELOW ISA	-200	-200	-150	-150	-100	-50	-150	-150	-100	-100
PER 1% UP SLOPE	-150	-100	-50	0	0	-50	-50	0	-50	-100
PER 1% DOWN SLOPE	150	50	50	0	0	50	50	50	100	100
1 REVERSER INOP	300	100	0	0	0	100	0	100	200	200
2 REVERSERS INOP	300	100	0	0	0	100	0	100	500	500
MANUAL SPOILERS	200	200	200	200	200	200	200	200	200	200

EMERGENCY LANDING DISTANCES

FEET

NOTE: TO BE USED ONLY UNDER CAPTAIN'S EMERGENCY AUTHORITY. PROVIDES ACTUAL LANDING DISTANCES ON CONTAMINATED RUNWAYS.

DATA IS ADVISORY AND DOES NOT INCLUDE 15% SAFETY MARGIN.

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR(1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
660,000	9,300	8,500	8,500	8,400	11,100	11,000	11,000	10,900
640,000	9,100	8,300	8,300	8,200	10,800	10,800	10,700	10,700
620,000	8,800	8,100	8,100	8,000	10,500	10,500	10,400	10,400
600,000	8,600	7,900	7,900	7,800	10,200	10,200	10,100	10,100
580,000	8,400	7,700	7,700	7,600	10,000	9,900	9,900	9,800
560,000	8,200	7,500	7,500	7,400	9,700	9,600	9,600	9,500
540,000	8,000	7,300	7,300	7,200	9,400	9,400	9,300	9,300
520,000	7,700	7,100	7,100	7,000	9,100	9,100	9,000	9,000
500,000	7,500	6,900	6,900	6,800	8,800	8,800	8,700	8,700
480,000	7,300	6,700	6,700	6,600	8,600	8,500	8,500	8,400
460,000	7,100	6,500	6,500	6,400	8,300	8,200	8,200	8,100
440,000	6,900	6,300	6,300	6,200	8,000	8,000	7,900	7,900
420,000	6,800	6,200	6,200	6,100	7,900	7,800	7,700	7,700
400,000	6,700	6,100	6,100	6,000	7,700	7,600	7,500	7,500
380,000	6,600	6,000	6,000	5,900	7,600	7,400	7,400	7,300
360,000	6,500	5,900	5,900	5,800	7,400	7,200	7,200	7,100

BASIS: Zero wind • Two Engine Reverse Thrust • Touchdown Speed = VREF30 - 5 •

Data is advisory and includes a 1,500 ft. air distance from threshold to touchdown.

REFERENCE DISTANCES BASED UPON PRESSURE ALTITUDE OF 2,000 FEET AND ARE CONSERVATIVE FOR ALL LOWER ALTITUDES.



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-300	-300	-300	-300	-500	-500	-500	-400
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	500	500	500	400
6,000	700	600	600	600	900	900	900	900
8,000	1,000	1,000	1,000	1,000	1,400	1,400	1,400	1,300

CORRECTIONS

	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	100	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	300	200	250	200	300	250	250	250
PER 10°C ABOVE ISA	150	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-150	-150	-150	-150	-200	-200	-200	-200
PER 1% UP SLOPE	-100	-200	-150	-200	-350	-400	-400	-350
PER 1% DOWN SLOPE	150	250	250	250	550	550	600	550
1 REVERSER INOP	300	600	500	600	1,200	1,200	1,200	1,200
2 REVERSERS INOP	1,000	1,400	1,300	1,300	3,200	3,200	3,200	3,100
MANUAL SPOILERS	200	200	200	200	200	200	200	200

BRAKE COOLING FOLLOWING LANDING

GOVERNING CONDITIONS

NOTE: Maximum Quick Turnaround Landing Weight (QTLW) is not limiting for most normal operations.

If any of the following conditions apply, accomplish the procedures below to determine QTLW and Brake Cooling requirements.

- “QTLW Warning Remark” appears on the WDR or
- Landing above MLW or
- Landing within 2,000 lbs of MLW using Flaps 30 at an altitude of 8,000 feet or above or
- Landing within 25,000 lbs of MLW using Flaps 25 at an altitude of 5,000 feet or above.
- Landing with non-standard aircraft configurations (flaps inoperative, brake deactivated, etc.)

PROCEDURES

- A) Determine if the Maximum Quick Turnaround Landing Weight has been exceeded.
- B) Obtain a Landing Brake Cooling time.
- C) **Wait the longer of the two times** once the aircraft is parked at the gate with the parking brake off.

QUICK TURNAROUND LANDING WEIGHT

1. BTMS OPERATIVE

No sooner than 10 and no later than 15 minutes after parking, check for the “BRAKE TEMP” advisory message on EICAS.

If the EICAS message is not displayed:

No waiting period is required.

If the EICAS message is displayed:

Do not dispatch until at least 65 minutes after Landing or until the Brake Temperature Monitoring System (BTMS) readings on the Landing Gear Synoptic Display are all 3.0 or lower. Check that wheel thermal plugs have not melted before making a subsequent takeoff.

NOTE: If any brake temperature display is blank or the “BRAKE TEMP SYS” status message is displayed, the BTMS INOPERATIVE Method must be used.

2. BTMS INOPERATIVE

Determine the Maximum Quick Turnaround Landing Weight from 4-33.

If the Actual Landing Weight is greater than the Maximum Quick Turnaround Landing Weight then:

A **65 minute** ground cooling period is required.

NOTE: Check that wheel thermal plugs have not melted before executing a takeoff.

LANDING BRAKE COOLING

1. BTMS OPERATIVE

- a) Check the BTMS display on EICAS no sooner than 10 minutes and no later than 15 minutes after parking.
- b) Use the highest value to enter the BTMS Operative Brake Cooling table for ground from Page 4-34.
- c) Wait the specified time associated with the value from the BTMS indicator.

NOTE: If any brake temperature display is blank or indicates 0, the BTMS INOPERATIVE Method must be used.

2. BTMS INOPERATIVE

Determine the Cooling Time and associated action if applicable from the Brake Cooling Time and Autobrake Adjustment tables on Page 4-35. Comply with the specified procedures for the Caution Zone and Fuse Plug Melt Zone.

BRAKE COOLING FOLLOWING LANDING

MAXIMUM QUICK TURNAROUND LANDING WEIGHT

1,000 POUNDS

FLAPS 30

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE - °C							
	-20	-10	0	10	20	30	40	50
-1,000	607.2	594.8	583.0	571.8	561.2	551.1	541.5	532.4
0	595.9	583.7	572.0	561.0	550.6	540.8	531.4	----
1,000	584.5	572.5	561.1	550.2	540.0	530.4	521.2	----
2,000	573.2	561.3	550.1	539.5	529.5	520.1	511.1	----
3,000	561.9	550.3	539.3	529.0	519.2	509.9	501.1	----
4,000	550.7	539.3	528.6	518.5	508.8	499.8	491.2	----
5,000	539.8	528.6	518.1	508.1	498.7	489.9	481.6	----
6,000	528.8	517.9	507.7	497.9	488.8	480.4	----	----
7,000	518.2	507.5	497.4	487.9	479.3	471.3	----	----
8,000	507.8	497.3	487.5	478.6	470.3	462.4	----	----
8,400	503.7	493.3	483.7	474.9	466.6	458.8	----	----

FLAPS 25

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE - °C							
	-20	-10	0	10	20	30	40	50
-1,000	575.2	563.3	552.1	541.4	531.4	521.9	512.8	504.3
0	564.3	552.7	541.7	531.3	521.4	512.1	503.3	----
1,000	553.5	542.1	531.3	521.1	511.5	502.3	493.6	----
2,000	542.7	531.5	520.9	511.0	501.5	492.6	484.2	----
3,000	532.1	521.1	510.1	501.0	491.8	483.0	474.7	----
4,000	521.5	510.8	500.7	491.1	482.0	473.5	465.7	----
5,000	511.2	500.7	490.7	481.3	472.6	464.6	457.0	----
6,000	500.9	490.6	480.8	471.8	463.6	455.8	----	----
7,000	490.8	480.7	474.3	462.8	454.8	447.1	----	----
8,000	481.0	471.3	462.4	454.1	446.1	438.7	----	----
8,400	477.1	467.6	458.9	450.6	442.8	435.3	----	----

NOTE: Weights in shaded area are above maximum landing weight.

CORRECTIONS:

Wind	per 1 kt. of headwind	+1,300
	per 1 kt. of tailwind	-6,390
Runway slope	per 0.1% uphill slope	+480
	per 0.1% downhill slope	-930
One brake deactivated		25,800
Two brakes deactivated		52,900

BRAKE COOLING FOLLOWING LANDING BTMS OPERATIVE BRAKE COOLING

LANDING AND REJECTED TAKEOFF

(minutes)

BTMS INDICATION																
	Up to 2.4	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0 – 6.3	6.3 +
GROUND	0	10	17	24	30	36	41	46	50	55	60	64	68	71	CAUTION ZONE	FUSE PLUG MELT ZONE
IN FLIGHT GEAR DOWN*	0	1	2	2	3	4	4	5	5	6	6	6	7	7		

NOTE: A BTMS indication of 5 or higher will cause an EICAS message “BRAKE TEMP” to appear. The message will extinguish when the temperature decreases to 4.

- The In-Flight Gear Down cooling times are for use **ONLY** after waiting the duration of the ground cooling time and BTMS indicates overheating on the subsequent takeoff
- Brake cooling time may be shorter if maintenance uses brake cooling fans.

BRAKE COOLING FOLLOWING LANDING

LANDING BRAKE COOLING

(BTMS INOPERATIVE)

LANDING USING MAX MANUAL BRAKING:

Obtain a brake cooling time from the following table. A quick assessment can be made by using the next highest weight and speed. If the resulting wait time has the potential of causing a delay or is in the Caution or Fuse Plug Melt Zones, interpolation may be used to determine a more precise wait time with the associated zone action. Zones are indicated in the table for quicker identification. Refer to the time ranges for Caution and Fuse Plug Melt Zones below.

BRAKE COOLING TIME (h:mm)

WEIGHT (1,000 lbs)	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
Reversers	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng
675	0:00 / 0:00	0:39 / 0:32	1:09 / 1:04	1:30C / 1:25C	1:49F / 1:43F	2:09F / 2:01F
650	0:00 / 0:00	0:36 / 0:29	1:06 / 1:01	1:28C / 1:23C	1:46F / 1:40F	2:05F / 1:57F
625	0:00 / 0:00	0:33 / 0:26	1:03 / 0:58	1:25C / 1:20C	1:43F / 1:38F	2:02F / 1:54F
600	0:00 / 0:00	0:30 / 0:23	1:00 / 0:55	1:23C / 1:18C	1:41F / 1:35F	1:58F / 1:51F
575	0:00 / 0:00	0:27 / 0:20	0:57 / 0:51	1:20C / 1:15	1:38F / 1:32F	1:55F / 1:48F
550	0:00 / 0:00	0:23 / 0:16	0:53 / 0:48	1:17C / 1:11	1:34F / 1:30C	1:51F / 1:45F
525	0:00 / 0:00	0:19 / 0:12	0:50 / 0:44	1:13 / 1:08	1:31F / 1:26C	1:47F / 1:41F
500	0:00 / 0:00	0:15 / 0:00	0:46 / 0:40	1:10 / 1:05	1:28C / 1:23C	1:43F / 1:37F
475	0:00 / 0:00	0:11 / 0:00	0:42 / 0:36	1:06 / 1:01	1:24C / 1:20C	1:39F / 1:34F
450	0:00 / 0:00	0:00 / 0:00	0:38 / 0:31	1:02 / 0:57	1:21C / 1:15C	1:35F / 1:30C
425	0:00 / 0:00	0:00 / 0:00	0:33 / 0:27	0:58 / 0:52	1:17C / 1:11	1:32F / 1:26C
400	0:00 / 0:00	0:00 / 0:00	0:28 / 0:22	0:53 / 0:47	1:12 / 1:07	1:27C / 1:22C
375	0:00 / 0:00	0:00 / 0:00	0:23 / 0:17	0:47 / 0:42	1:07 / 1:02	1:22C / 1:17C

NOTE: When using one thrust reverser during landing, the brake cooling time for zero reversers should be used to allow adequate cooling.

C - CAUTION ZONE (1:15-1:30) – Fuse plugs may melt. Wait the specified time. After the landing gear assembly has cooled, visually inspect for tire damage and seal leakage.

F - FUSE PLUG MELT ZONE (Shaded Region, 1:31 +) – Under these conditions, consider that fuse plugs will likely melt and deflate the tires. Unless required, do not set parking brake. The possibility of tire, grease or hydraulic fluid fires should also be considered. Maintenance inspection of tires, wheels and brakes is recommended.

LANDING USING AUTOBRAKES:

- 1) Determine the time from the table above. This is the reference time.
- 2) Subtract the times in the adjustment table below from the reference time in the table above to get proper cooling time for the respective brake setting. **Any resulting wait time of 1:31 or above is in the Fuse Plug Melt Zone.**

AUTOBRAKE ADJUSTMENT

NW INDICATES NO WAITING REQUIRED

	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
Reversers	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng
MaxAuto	NW / NW	0:08 / 0:18	0:08 / 0:18	0:06 / 0:15	0:05 / 0:12	0:05 / 0:10
Auto 4	NW / NW	0:14 / NW	0:13 / 0:37	0:13 / 0:35	0:10 / 0:30	0:11 / 0:25
Auto 3	NW / NW	0:23 / NW	0:20 / NW	0:19 / 0:55	0:18 / 0:47	0:16 / 0:42
Auto 2	NW / NW	NW / NW	0:27 / NW	0:26 / NW	0:23 / 1:14	0:23 / 1:05
Auto 1	NW / NW	NW / NW	0:34 / NW	0:34 / NW	0:30 / NW	0:29 / 1:33

BRAKE COOLING FOLLOWING REJECTED TAKEOFF

REJECTED TAKEOFF BRAKE COOLING

PROCEDURES

BTMS OPERATIVE:

- 1) Check the brake temperature indication on EICAS no sooner than 10 minutes and no later than 15 minutes after the aircraft comes to a complete stop.
- 2) Use the highest value to enter the following BTMS Operative Brake Cooling table from Page 4-34.
- 3) Wait the specified time associated with the value from the BTMS indicator prior to subsequent takeoff.

BTMS INOPERATIVE:

Use the table below. A quick assessment can be made by using the next highest weight and speed. If the resulting wait time has the potential of causing a delay or is in the Caution or Fuse Plug Melt Zones, interpolation may be used to determine a more precise wait time with the associated zone action. Zones are indicated in the table for quicker identification. Refer to the time ranges for Caution and Fuse Plug Melt Zones below.

NOTE: All wait times begin once the aircraft is parked at the gate or other designated area.

BRAKE COOLING TIME (h:mm)

WEIGHT (1,000 lbs)	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
675	0:19	0:54	1:21C	1:41F	2:01F	2:22F
650	0:16	0:51	1:19C	1:38F	1:58F	2:18F
625	0:14	0:48	1:16C	1:36F	1:55F	2:15F
600	0:11	0:46	1:13	1:33F	1:52F	2:11F
575	0:00	0:43	1:10	1:31C	1:49F	2:07F
550	0:00	0:40	1:07	1:28C	1:45F	2:03F
525	0:00	0:37	1:04	1:25C	1:42F	1:59F
500	0:00	0:33	1:01	1:22C	1:38F	1:55F
475	0:00	0:30	0:57	1:19C	1:35F	1:50F
450	0:00	0:26	0:53	1:15C	1:32F	1:46F
425	0:00	0:22	0:49	1:11	1:28C	1:42F
400	0:00	0:18	0:45	1:07	1:24C	1:38F
375	0:00	0:13	0:40	1:02	1:20C	1:33F
350	0:00	0:00	0:36	0:57	1:14C	1:28C
325	0:00	0:00	0:31	0:51	1:09	1:23C

C - CAUTION ZONE (1:15 -1:30) – Fuse plugs may melt. Wait the specified time. After the landing gear assembly has cooled, visually inspect for tire damage and seal leakage.

F - FUSE PLUG MELT ZONE (Shaded Region, 1:31 +) – Under these conditions, consider that fuse plugs will likely melt and deflate the tires. Unless required, do not set parking brake. The possibility of tire, grease or hydraulic fluid fires should also be considered. Maintenance inspection of tires, wheels and brakes is recommended.

OPERATION WITH UNRELIABLE AIRSPEED INDICATION

Use the following pitch attitude and thrust data to estimate airspeed and rate of climb/descent, if the airspeed system becomes unreliable or unusable. ***If the malfunction occurs during early stages of the flight (takeoff or climb), return to departure airport if possible.***

CLIMB

FLAPS UP, MAX CLIMB THRUST

PRESSURE ALTITUDE FT		GROSS WEIGHT- (1,000) POUNDS			
		350	450	550	650
40,000	AIRSPEED-MACH	0.82	0.82		
	PITCH ATTITUDE	3.5	3.5		
	RATE OF CLIMB	1,500	700		
30,000	AIRSPEED	280	280	280	280
	PITCH ATTITUDE	4.5	4.5	4.0	4.5
	RATE OF CLIMB	2,300	1,600	1,000	600
20,000	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	7.5	6.5	6.5	6.5
	RATE OF CLIMB	3,700	2,700	1,900	1,400
10,000	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	10.0	8.5	8.0	8.0
	RATE OF CLIMB	4,500	3,300	2,500	1,900
0	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	12.5	10.5	9.5	9.0
	RATE OF CLIMB	5,100	3,800	3,000	2,300

AIRSPEED = KIAS (Except where indicated)
 PITCH ATTITUDE = DEGREES
 RATE OF CLIMB = FEET/MINUTE

OPERATION WITH UNRELIABLE AIRSPEED INDICATION

CRUISE

PRESSURE ALTITUDE FT		GROSS WEIGHT- (1,000) POUNDS			
		350	450	550	650
40,000	AIRSPEED-MACH	0.82	0.82		
	PITCH ATTITUDE	2.0	2.5		
	EPR	1.134	1.266		
	ALT MODE %N1	79.2	84.0		
35,000	AIRSPEED	280	280	280	
	PITCH ATTITUDE	1.5	2.0	2.5	
	EPR	1.070	1.125	1.223	
	ALT MODE %N1	76.9	79.2	83.0	
30,000	AIRSPEED	280	280	280	280
	PITCH ATTITUDE	1.5	2.0	3.0	3.5
	EPR	1.024	1.065	1.132	1.229
	ALT MODE %N1	73.3	75.6	78.8	83.0
25,000	AIRSPEED	280	280	280	280
	PITCH ATTITUDE	1.5	2.5	3.0	4.0
	EPR	0.999	1.028	1.079	1.143
	ALT MODE %N1	69.9	72.0	75.1	78.6
20,000	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	1.5	2.5	3.5	4.5
	EPR	0.987	1.011	1.048	1.096
	ALT MODE %N1	65.4	68.0	71.2	74.6
15,000	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	1.5	2.5	3.5	4.5
	EPR	0.978	0.997	1.024	1.058
	ALT MODE %N1	61.9	64.3	67.5	70.9

NOTE: Adjust Power to Maintain Pitch Attitude, Level Flight.

AIRSPEED = KIAS (Except where indicated)
 PITCH ATTITUDE = DEGREES
 EPR = EPR (Engine Pressure Ratio – no units)
 ALT MODE %N1 = PERCENT

OPERATION WITH UNRELIABLE AIRSPEED INDICATION

DESCENT

FLAPS UP, IDLE THRUST

PRESSURE ALTITUDE FT		GROSS WEIGHT- POUNDS			
		350	450	550	650
40,000	AIRSPEED-MACH	0.82	0.82	0.82	0.82
	PITCH ATTITUDE	-1.0	-0.5	0.0	0.0
	DESCENT RATE	-2,500	-2,400	-2,800	-3,500
30,000	AIRSPEED	280	280	280	280
	PITCH ATTITUDE	-1.5	-0.5	0.5	1.0
	DESCENT RATE	-2,200	-1,900	-1,800	-1,900
20,000	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	-1.0	0.0	1.0	2.0
	DESCENT RATE	-1,800	-1,600	-1,600	-1,600
10,000	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	-1.5	-0.5	1.0	1.5
	DESCENT RATE	-1,700	-1,500	-1,400	-1,400
0	AIRSPEED	270	270	270	270
	PITCH ATTITUDE	-1.5	-0.5	0.5	1.5
	DESCENT RATE	-1,500	-1,300	-1,300	-1,200

NOTE: Fly to Pitch Attitude

Shaded AREA reflects the minimum speed limitation of 15 kts above minimum maneuvering speed.

AIRSPEED = KIAS
 PITCH ATTITUDE = DEGREES
 DESCENT RATE = FEET/MINUTE

OPERATION WITH UNRELIABLE AIRSPEED INDICATION

HOLDING

FLAPS UP, SET THRUST FOR LEVEL FLIGHT

CONFIGURATION		GROSS WEIGHT - (1,000) POUNDS			
		350	450	550	650
ALTITUDE 10,000 FEET FLAPS UP GEAR UP	PITCH ATTITUDE	4.0	5.0	5.0	5.0
	EPR	1.005	1.019	1.031	1.043
	ALT MODE %N1	51.2	57.3	62.7	67.1
	AIRSPEED	200	217	238	259
ALTITUDE 5,000 FEET FLAPS UP GEAR UP	PITCH ATTITUDE	4.0	4.5	5.0	5.0
	EPR	1.000	1.011	1.020	1.029
	ALT MODE %N1	47.3	53.1	58.4	63.1
	AIRSPEED	200	217	237	258

TERMINAL AREA (5,000 FEET)

SET THRUST FOR LEVEL FLIGHT

CONFIGURATION		GROSS WEIGHT - (1,000) POUNDS			
		350	450	550	650
FLAPS 0 GEAR UP (VREF30 + 80)	PITCH ATTITUDE	4.5	5.0	5.5	6.0
	EPR	1.000	1.010	1.030	1.040
	ALT MODE %N1	48.2	54.4	59.8	65.0
	AIRSPEED	201	217	232	245
FLAPS 1 GEAR UP (VREF30 + 60)	PITCH ATTITUDE	6.0	6.5	7.0	7.5
	EPR	1.020	1.030	1.050	1.070
	ALT MODE %N1	49.3	56.2	61.9	66.7
	AIRSPEED	181	197	212	225
FLAPS 5 GEAR UP (VREF30 + 40)	PITCH ATTITUDE	5.0	5.5	6.0	6.0
	EPR	1.030	1.050	1.070	1.090
	ALT MODE %N1	49.9	57.7	63.5	68.2
	AIRSPEED	161	177	192	205
FLAPS 15 GEAR UP (VREF30 + 20)	PITCH ATTITUDE	6.0	6.0	6.5	6.5
	EPR	1.040	1.070	1.090	1.120
	ALT MODE %N1	51.2	59.4	65.5	70.3
	AIRSPEED	141	157	172	185
FLAPS 20 GEAR DOWN (VREF30 + 20)	PITCH ATTITUDE	4.0	4.5	5.0	5.0
	EPR	1.070	1.100	1.140	1.180
	ALT MODE %N1	58.4	66.2	71.5	76.4
	AIRSPEED	141	157	172	185

PITCH ATTITUDE = DEGREES
 EPR = EPR (Engine Pressure Ratio – no units)
 ALT MODE %N1 = PERCENT
 AIRSPEED = KIAS (Except where indicated)

OPERATION WITH UNRELIABLE AIRSPEED INDICATION

FINAL APPROACH (1,500 FEET)

GEAR DOWN, SET THRUST FOR 3° GLIDESLOPE

CONFIGURATION		GROSS WEIGHT - (1,000) POUNDS			
		350	450	550	650
FLAPS 20 (VREF20 + 10)	PITCH ATTITUDE	1.0	1.5	1.5	1.5
	EPR	1.010	1.010	1.020	1.020
	ALT MODE %N1	35.2	41.2	46.4	50.9
	AIRSPEED	141	159	175	189
FLAPS 25 (VREF25 + 10)	PITCH ATTITUDE	0.0	0.5	0.5	0.5
	EPR	1.030	1.040	1.060	1.080
	ALT MODE %N1	43.9	51.7	57.7	62.2
	AIRSPEED	137	154	169	183
FLAPS 30 (VREF30 + 10)	PITCH ATTITUDE	-0.5	0.0	0.0	0.0
	EPR	1.050	1.070	1.090	1.120
	ALT MODE %N1	50.3	57.9	63.8	68.3
	AIRSPEED	131	147	162	175

NOTE: Based on 3° glide slope. Fly to glide slope or, if not available, to rate of descent Vref + 10.

PITCH ATTITUDE = DEGREES
 EPR = EPR (Engine Pressure Ratio – no units)
 ALT MODE %N1 = PERCENT
 AIRSPEED = KIAS (Except where indicated)

MEL SUPPORT

ALTERNATE MODE EEC

TAKEOFF % N1

TRENT 892

0 TO 60 KNOTS
NORMAL BLEED - PACKS ON / ENG. ANTI-ICE ON OR
OFF/WING ANTI-ICE OFF

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET										
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	8,400
55	93.1	93.3				NOT AUTHORIZED ABOVE ENVIRONMENTAL ENVELOPE					
50	94.3	94.6	94.6	94.6	94.4						
45											
40	96.2	96.7	96.7	96.6	96.3	96.0	96.0	96.0	95.9	95.8	
35											
30	96.6	97.4	97.4	97.4	97.2	97.1	97.0	96.9	96.9	96.8	96.8
25											
20	95.3	96.4	96.5	97.4	97.4	97.5	97.4	97.5	97.5	97.4	97.4
15											
10	93.7	94.7	94.9	95.7	95.7	95.8	96.3	96.3	96.9	97.3	97.3
5											
0	92.0	93.0	93.2	94.0	94.0	94.1	94.6	94.6	95.2	95.5	95.6
-10	90.3	91.3	91.5	92.2	92.3	92.4	92.8	92.9	93.4	93.8	93.8
-20	88.6	89.6	89.7	90.5	90.5	90.6	91.1	91.1	91.6	92.0	92.0
-30											
-40											
-50											

NOTE: For the following engine bleed conditions adjust N1 by the amount indicated.

Packs OFF	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Wing A-I On	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3

NOTE: For Alternate Mode EEC, add 3 KIAS to V1 and 1 KIAS to VR.

MEL SUPPORT

ALTERNATE MODE EEC

GO AROUND % N1

NORMAL BLEED - PACKS ON / ENG. ANTI-ICE ON OR OFF

TRENT 892

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET										
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	8,400
50	92.8	93.0	93.0	93.0	93.1	93.2	93.3	94.0	94.0		
45	93.9	94.2	94.3	94.3	94.0	93.9	94.0	94.6	94.6		
40	94.7	95.4	95.4	95.3	95.0	94.7	94.7	94.6	94.6	94.6	94.6
35	95.4	96.2	96.2	96.1	95.8	95.4	95.4	95.4	95.4	95.3	95.3
30	95.4	96.6	96.5	96.7	96.4	96.1	96.0	95.9	95.9	95.9	95.9
25	94.8	96.0	96.7	97.0	96.9	96.7	96.7	96.6	96.6	96.6	96.6
20	94.0	95.2	96.0	96.6	96.8	97.0	96.9	96.9	96.9	96.9	96.9
15	93.2	94.4	95.2	95.9	96.2	96.5	96.7	97.1	97.1	97.2	97.2
10	92.4	93.6	94.4	95.0	95.4	95.7	95.9	96.6	96.6	96.9	97.2
5	91.6	92.8	93.6	94.2	94.5	94.8	95.1	95.8	95.8	96.3	96.7
0	90.8	92.0	92.8	93.4	93.7	94.0	94.2	95.0	95.0	95.4	95.9
-5	90.0	91.2	91.9	92.5	92.8	93.1	93.4	94.1	94.1	94.6	95.0
-10	89.1	90.3	91.1	91.7	92.0	92.3	92.5	93.3	93.3	93.7	94.1
-15	88.3	89.5	90.2	90.8	91.1	91.4	91.7	92.4	92.4	92.8	93.2
-20	87.5	88.6	89.4	90.0	90.2	90.5	90.8	91.5	91.5	91.9	92.3
-25	86.6	87.7	88.5	89.1	89.4	89.7	89.9	90.6	90.6	91.0	91.4
-30	85.7	86.9	87.6	88.2	88.5	88.8	89.0	89.7	89.7	90.1	90.5

Bleed Adjustment

Packs OFF	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1 Pack ON	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Wing A/I ON	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3

MEL SUPPORT
ALTERNATE MODE EEC
MAX CONTINUOUS % N1

TRENT 892

NORMAL BLEED - PACKS ON OR OFF/WING ANTI-ICE OFF

TAT °C	AIRPORT PRESSURE ALTITUDE - FEET										
	5,000	10,000	10,000	15,000	20,000	25,000	30,000	35,000	39,000	41,000	43,000
30	92.4	92.3	93.9	93.2	91.6	90.6	90.6				
25	92.9	93.3	94.8	94.0	92.3	91.2	90.7				
20	92.3	94.2	95.0	95.0	93.0	91.8	91.2	90.9	90.5	90.2	90.0
15	91.6	94.5	94.3	95.8	94.1	92.3	91.8	91.5	91.1	91.0	90.9
10	90.8	93.7	93.5	95.7	95.3	92.9	92.3	92.1	91.7	91.6	91.5
5	89.9	92.8	92.7	94.8	95.5	93.7	92.9	92.5	92.2	92.1	92.1
0	89.1	92.0	91.8	93.9	94.8	93.9	93.8	93.3	92.9	92.8	92.8
-5	88.3	91.2	91.0	93.1	93.9	93.5	94.0	94.3	93.9	93.8	93.7
-10	87.5	90.3	90.1	92.2	93.0	92.6	93.7	95.4	95.0	94.9	94.8
-15	86.7	89.5	89.3	91.3	92.1	91.7	92.8	95.4	96.0	95.9	95.9
-20	85.8	88.6	88.4	90.4	91.2	90.8	91.9	94.5	95.1	95.0	95.0
-25	85.0	87.7	87.5	89.5	90.3	89.9	91.0	93.5	94.1	94.0	94.0
-30	84.1	86.8	86.6	88.6	89.4	89.0	90.1	92.6	93.2	93.1	93.1
-35	83.2	85.9	85.7	87.7	88.5	88.1	89.1	91.6	92.2	92.1	92.1
-40	82.4	85.0	84.8	86.8	87.5	87.2	88.2	90.7	91.2	91.1	91.1

Bleed Corrections

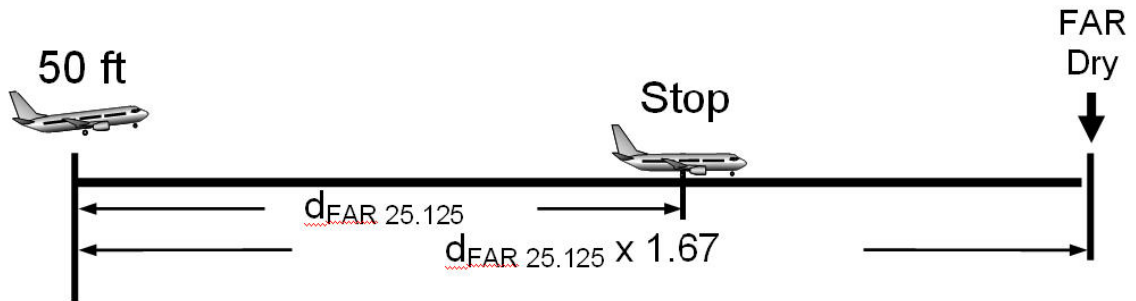
Eng. A/I ON	-0.4	-0.6	-0.6	-0.6	-0.3	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2
Eng. & Wing A/I ON Packs ON	-0.5	-0.8	-0.8	-0.8	-0.5	-0.4	-0.4	-0.5	-0.6	-0.6	-0.7
Eng. & Wing A/I ON Packs OFF	-0.6	-0.9	-0.9	-1.0	-0.8	-0.7	-0.7	-0.8	-1.0	-1.1	-1.2

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

Definition

All given distances in this section are FAR (Factored) Landing Distances. These distances represent the actual (or demonstrated) landing distances – designated as d_{FAR} in the diagram below – multiplied by a factor of 1.67.



FAR Landing Distance Diagram

This is in accordance with FAR 121.195, requiring the aircraft to be able to come to a complete stop within 60% of the effective length of the runway.

Applicability

The tables on the following pages provide landing distances and approach speeds to be used for dispatch with the given conditions and the associated MEL applied. For landing distances in the event of an in-flight system failure or abnormality not detected at or prior to dispatch, please refer to the "Abnormal Configuration Actual Landing Distances and Approach Speeds" pages in this section of the ODM.

Assumptions

The data within this section was generated based on a set of assumed conditions:

- Standard day conditions
- No wind
- No slope
- No reverse thrust credit factored in FAR Landing Distances
- Maximum manual braking
- Includes distance from 50 feet above threshold to stop (1,000 feet of air distance)

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

FLAPS 25

Actual (unfactored) landing distances are 60% of the distances indicated.

MANUAL SPOILERS – DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	8,830	9,040	9,260	9,490	9,730	9,990	10,320	10,660	11,010	11,390
630,000	8,480	8,680	8,900	9,110	9,340	9,570	9,820	10,100	10,430	10,780
610,000	8,140	8,330	8,530	8,740	8,960	9,180	9,410	9,650	9,900	10,200
590,000	7,810	7,990	8,180	8,380	8,580	8,800	9,020	9,240	9,480	9,720
570,000	7,490	7,670	7,850	8,040	8,230	8,440	8,650	8,870	9,090	9,320
550,000	7,150	7,310	7,490	7,670	7,850	8,040	8,240	8,450	8,660	8,880
530,000	6,810	6,970	7,130	7,300	7,480	7,660	7,850	8,040	8,240	8,450
510,000	6,480	6,630	6,780	6,940	7,110	7,280	7,460	7,640	7,830	8,030
490,000	6,160	6,300	6,440	6,600	6,750	6,910	7,080	7,250	7,430	7,610
470,000	5,870	6,000	6,130	6,280	6,420	6,580	6,730	6,900	7,060	7,240
450,000	5,680	5,800	5,930	6,070	6,210	6,360	6,510	6,670	6,830	7,000
430,000	5,490	5,610	5,730	5,870	6,000	6,140	6,290	6,440	6,600	6,760
410,000	5,290	5,410	5,530	5,660	5,790	5,930	6,070	6,210	6,360	6,510
390,000	5,100	5,210	5,330	5,450	5,580	5,710	5,840	5,980	6,130	6,270
370,000	4,950	5,010	5,120	5,240	5,360	5,490	5,610	5,750	5,890	6,030
350,000	4,940	4,980	5,020	5,060	5,140	5,260	5,390	5,510	5,650	5,780
330,000	4,920	4,960	5,000	5,040	5,090	5,130	5,170	5,280	5,400	5,530

MANUAL SPOILERS - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	10,150	10,400	10,650	10,910	11,180	11,490	11,860	12,250	12,670	13,100
630,000	9,760	9,990	10,230	10,480	10,740	11,010	11,290	11,620	12,000	12,400
610,000	9,360	9,580	9,810	10,050	10,300	10,560	10,820	11,100	11,380	11,730
590,000	8,970	9,180	9,410	9,630	9,870	10,110	10,370	10,630	10,900	11,180
570,000	8,620	8,820	9,030	9,240	9,470	9,700	9,940	10,190	10,450	10,720
550,000	8,220	8,410	8,610	8,810	9,030	9,250	9,480	9,710	9,960	10,210
530,000	7,830	8,010	8,200	8,400	8,600	8,810	9,020	9,250	9,480	9,710
510,000	7,450	7,620	7,800	7,980	8,170	8,370	8,580	8,790	9,010	9,230
490,000	7,080	7,240	7,410	7,580	7,760	7,950	8,140	8,340	8,550	8,750
470,000	6,740	6,890	7,050	7,220	7,390	7,560	7,740	7,930	8,120	8,320
450,000	6,530	6,670	6,820	6,980	7,140	7,310	7,490	7,670	7,860	8,050
430,000	6,310	6,450	6,590	6,740	6,900	7,060	7,230	7,410	7,590	7,770
410,000	6,090	6,220	6,360	6,510	6,660	6,810	6,980	7,140	7,320	7,490
390,000	5,860	5,990	6,130	6,270	6,410	6,560	6,720	6,880	7,040	7,210
370,000	5,690	5,760	5,890	6,020	6,160	6,310	6,460	6,610	6,770	6,930
350,000	5,680	5,720	5,770	5,820	5,910	6,050	6,190	6,340	6,490	6,640
330,000	5,660	5,700	5,750	5,800	5,850	5,900	5,950	6,070	6,210	6,360

CORRECTIONS:

Headwind per kt	-30 feet
Tailwind per kt	+250 feet

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

Actual (unfactored) landing distances are 60% of the distances indicated.

FLAPS 30

MANUAL SPOILERS – DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	8,130	8,320	8,520	8,730	8,950	9,180	9,420	9,680	9,960	10,300
630,000	7,810	7,990	8,190	8,390	8,590	8,810	9,040	9,280	9,530	9,780
610,000	7,500	7,680	7,860	8,050	8,250	8,450	8,670	8,890	9,130	9,360
590,000	7,190	7,360	7,540	7,720	7,910	8,100	8,300	8,510	8,730	8,950
570,000	6,910	7,070	7,240	7,410	7,590	7,780	7,970	8,170	8,370	8,580
550,000	6,600	6,750	6,910	7,070	7,240	7,420	7,600	7,790	7,980	8,180
530,000	6,290	6,430	6,580	6,740	6,900	7,070	7,240	7,420	7,600	7,790
510,000	5,990	6,130	6,270	6,420	6,570	6,720	6,890	7,050	7,230	7,410
490,000	5,700	5,830	5,960	6,100	6,240	6,390	6,540	6,700	6,860	7,030
470,000	5,500	5,620	5,750	5,880	6,020	6,160	6,310	6,460	6,620	6,780
450,000	5,320	5,440	5,560	5,690	5,820	5,960	6,100	6,250	6,400	6,550
430,000	5,140	5,260	5,380	5,500	5,630	5,760	5,900	6,040	6,180	6,330
410,000	4,990	5,070	5,190	5,310	5,430	5,560	5,690	5,820	5,960	6,110
390,000	4,980	5,020	5,060	5,110	5,230	5,350	5,480	5,610	5,740	5,880
370,000	4,970	5,010	5,050	5,090	5,130	5,170	5,270	5,390	5,520	5,650
350,000	4,960	4,990	5,030	5,080	5,120	5,160	5,200	5,250	5,300	5,420
330,000	4,940	4,980	5,020	5,060	5,100	5,150	5,190	5,230	5,280	5,320

MANUAL SPOILERS – WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	9,350	9,570	9,800	10,040	10,290	10,550	10,840	11,130	11,450	11,850
630,000	8,980	9,190	9,410	9,640	9,880	10,130	10,400	10,670	10,960	11,250
610,000	8,620	8,830	9,040	9,260	9,480	9,720	9,970	10,230	10,490	10,770
590,000	8,270	8,460	8,670	8,870	9,090	9,320	9,550	9,790	10,040	10,300
570,000	7,950	8,130	8,320	8,520	8,730	8,940	9,160	9,390	9,630	9,870
550,000	7,590	7,760	7,940	8,130	8,330	8,530	8,740	8,960	9,180	9,410
530,000	7,240	7,400	7,570	7,750	7,930	8,130	8,320	8,530	8,740	8,960
510,000	6,890	7,050	7,210	7,380	7,550	7,730	7,920	8,110	8,310	8,520
490,000	6,550	6,700	6,850	7,010	7,180	7,350	7,520	7,700	7,890	8,080
470,000	6,320	6,460	6,610	6,760	6,920	7,090	7,250	7,430	7,610	7,790
450,000	6,120	6,250	6,400	6,540	6,700	6,850	7,020	7,190	7,360	7,540
430,000	5,920	6,050	6,180	6,320	6,470	6,620	6,780	6,940	7,110	7,280
410,000	5,740	5,830	5,970	6,100	6,240	6,390	6,540	6,700	6,860	7,020
390,000	5,730	5,770	5,820	5,880	6,010	6,150	6,300	6,450	6,600	6,760
370,000	5,710	5,760	5,800	5,850	5,900	5,950	6,060	6,200	6,350	6,500
350,000	5,700	5,740	5,790	5,840	5,880	5,930	5,980	6,030	6,090	6,230
330,000	5,680	5,730	5,770	5,820	5,870	5,920	5,970	6,020	6,070	6,120

CORRECTIONS:

Headwind per kt	-30 feet
Tailwind per kt	+230 feet

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

FLAPS 25

Actual (unfactored) landing distances are 60% of the distances indicated.

ONE BRAKE INOPERATIVE – DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	8,950	9,170	9,440	9,740	10,070	10,410	10,770	11,150	11,550	11,970
630,000	8,580	8,790	9,010	9,240	9,520	9,840	10,170	10,520	10,890	11,280
610,000	8,220	8,420	8,630	8,840	9,070	9,300	9,600	9,930	10,270	10,630
590,000	7,860	8,050	8,250	8,450	8,670	8,890	9,120	9,360	9,670	10,000
570,000	7,530	7,710	7,900	8,100	8,300	8,510	8,730	8,960	9,190	9,440
550,000	7,160	7,330	7,510	7,700	7,890	8,090	8,300	8,520	8,740	8,970
530,000	6,810	6,970	7,140	7,310	7,500	7,680	7,880	8,080	8,290	8,510
510,000	6,460	6,610	6,770	6,940	7,110	7,290	7,470	7,660	7,860	8,060
490,000	6,120	6,260	6,410	6,570	6,730	6,900	7,070	7,250	7,430	7,620
470,000	5,810	5,940	6,090	6,230	6,380	6,540	6,710	6,870	7,050	7,230
450,000	5,610	5,740	5,880	6,020	6,170	6,320	6,480	6,640	6,810	6,980
430,000	5,420	5,540	5,670	5,810	5,950	6,100	6,250	6,400	6,570	6,730
410,000	5,220	5,340	5,470	5,600	5,730	5,870	6,020	6,170	6,320	6,480
390,000	5,020	5,140	5,260	5,380	5,510	5,650	5,790	5,930	6,080	6,230
370,000	4,870	4,930	5,050	5,170	5,290	5,420	5,550	5,690	5,830	5,980
350,000	4,860	4,900	4,940	4,980	5,070	5,190	5,320	5,450	5,590	5,720
330,000	4,840	4,880	4,920	4,960	5,010	5,060	5,100	5,210	5,340	5,470

ONE BRAKE INOPERATIVE – WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	10,290	10,540	10,850	11,200	11,580	11,970	12,380	12,820	13,280	13,770
630,000	9,870	10,110	10,360	10,620	10,950	11,310	11,700	12,100	12,530	12,970
610,000	9,450	9,680	9,920	10,170	10,430	10,700	11,040	11,410	11,810	12,220
590,000	9,040	9,250	9,480	9,720	9,970	10,230	10,490	10,760	11,120	11,500
570,000	8,660	8,860	9,080	9,310	9,540	9,790	10,040	10,300	10,570	10,850
550,000	8,240	8,430	8,640	8,850	9,080	9,310	9,540	9,790	10,050	10,310
530,000	7,830	8,010	8,210	8,410	8,620	8,840	9,060	9,290	9,540	9,780
510,000	7,430	7,600	7,790	7,980	8,170	8,380	8,590	8,810	9,040	9,270
490,000	7,040	7,200	7,370	7,550	7,740	7,930	8,130	8,340	8,550	8,770
470,000	6,680	6,830	7,000	7,170	7,340	7,520	7,710	7,900	8,100	8,310
450,000	6,460	6,600	6,760	6,920	7,090	7,270	7,450	7,630	7,830	8,020
430,000	6,230	6,370	6,520	6,680	6,840	7,010	7,180	7,360	7,550	7,740
410,000	6,000	6,140	6,290	6,440	6,590	6,750	6,920	7,090	7,270	7,450
390,000	5,780	5,910	6,050	6,190	6,340	6,490	6,650	6,820	6,990	7,160
370,000	5,600	5,670	5,810	5,940	6,080	6,230	6,390	6,550	6,710	6,870
350,000	5,580	5,630	5,680	5,730	5,830	5,970	6,120	6,270	6,430	6,580
330,000	5,560	5,610	5,660	5,710	5,760	5,810	5,870	5,990	6,140	6,290

CORRECTIONS:

Headwind per kt	-30 feet
Tailwind per kt	+290 feet

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

Actual (unfactored) landing distances are 60% of the distances indicated.

FLAPS 30

ONE BRAKE INOPERATIVE – DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	8,210	8,410	8,620	8,840	9,060	9,320	9,650	9,990	10,360	10,740
630,000	7,870	8,060	8,270	8,470	8,690	8,920	9,160	9,440	9,770	10,120
610,000	7,540	7,730	7,920	8,120	8,320	8,540	8,760	9,000	9,240	9,530
590,000	7,220	7,390	7,570	7,760	7,960	8,160	8,370	8,590	8,820	9,050
570,000	6,920	7,080	7,260	7,440	7,620	7,820	8,020	8,220	8,440	8,660
550,000	6,590	6,740	6,910	7,080	7,260	7,440	7,630	7,820	8,030	8,230
530,000	6,270	6,410	6,570	6,730	6,890	7,070	7,250	7,430	7,620	7,820
510,000	5,950	6,090	6,230	6,390	6,540	6,710	6,870	7,050	7,230	7,410
490,000	5,640	5,770	5,910	6,050	6,200	6,350	6,510	6,670	6,840	7,020
470,000	5,440	5,560	5,690	5,830	5,970	6,120	6,270	6,430	6,590	6,760
450,000	5,260	5,380	5,500	5,630	5,770	5,910	6,060	6,210	6,370	6,530
430,000	5,070	5,190	5,310	5,440	5,570	5,700	5,850	5,990	6,140	6,290
410,000	4,920	5,000	5,120	5,240	5,360	5,500	5,630	5,770	5,920	6,060
390,000	4,900	4,940	4,980	5,040	5,160	5,290	5,420	5,550	5,690	5,830
370,000	4,890	4,930	4,970	5,010	5,060	5,100	5,200	5,330	5,460	5,590
350,000	4,870	4,910	4,950	5,000	5,040	5,090	5,130	5,180	5,230	5,360
330,000	4,860	4,890	4,940	4,980	5,030	5,070	5,120	5,160	5,210	5,250

ONE BRAKE INOPERATIVE - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	9,440	9,670	9,910	10,160	10,420	10,720	11,090	11,490	11,910	12,350
630,000	9,050	9,270	9,500	9,740	9,990	10,260	10,530	10,850	11,240	11,640
610,000	8,670	8,880	9,100	9,330	9,570	9,820	10,080	10,350	10,630	10,960
590,000	8,300	8,500	8,710	8,930	9,150	9,390	9,630	9,880	10,140	10,410
570,000	7,960	8,150	8,350	8,550	8,770	8,990	9,220	9,460	9,700	9,960
550,000	7,580	7,760	7,940	8,140	8,340	8,550	8,770	9,000	9,230	9,470
530,000	7,200	7,370	7,550	7,740	7,930	8,130	8,330	8,550	8,770	8,990
510,000	6,840	7,000	7,170	7,340	7,520	7,710	7,900	8,100	8,310	8,520
490,000	6,490	6,640	6,790	6,960	7,130	7,300	7,490	7,670	7,870	8,070
470,000	6,250	6,390	6,550	6,700	6,870	7,040	7,210	7,390	7,580	7,770
450,000	6,040	6,180	6,330	6,480	6,630	6,800	6,970	7,140	7,320	7,500
430,000	5,830	5,970	6,110	6,250	6,400	6,560	6,720	6,890	7,060	7,240
410,000	5,650	5,750	5,880	6,020	6,170	6,320	6,480	6,640	6,800	6,970
390,000	5,640	5,680	5,730	5,800	5,930	6,080	6,230	6,380	6,540	6,700
370,000	5,620	5,670	5,710	5,760	5,810	5,870	5,980	6,130	6,280	6,430
350,000	5,600	5,650	5,700	5,750	5,800	5,850	5,900	5,960	6,020	6,160
330,000	5,580	5,630	5,680	5,730	5,780	5,830	5,880	5,940	5,990	6,040

CORRECTIONS:

Headwind per kt	-30 ft
Tailwind per kt	+250 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

FLAPS 25

Actual (unfactored) landing distances are 60% of the distances indicated.

TWO BRAKES INOPERATIVE – DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	9,610	9,910	10,240	10,590	10,950	11,330	11,740	12,170	12,620	13,110
630,000	9,110	9,380	9,680	10,000	10,340	10,690	11,070	11,460	11,880	12,320
610,000	8,720	8,940	9,160	9,440	9,750	10,080	10,430	10,790	11,170	11,580
590,000	8,340	8,540	8,760	8,980	9,210	9,500	9,820	10,150	10,500	10,880
570,000	7,980	8,180	8,380	8,590	8,810	9,040	9,270	9,570	9,900	10,240
550,000	7,590	7,770	7,970	8,170	8,370	8,590	8,810	9,040	9,280	9,570
530,000	7,210	7,380	7,560	7,750	7,950	8,150	8,360	8,580	8,800	9,030
510,000	6,840	7,000	7,170	7,350	7,530	7,720	7,920	8,120	8,330	8,550
490,000	6,470	6,620	6,780	6,950	7,120	7,300	7,490	7,680	7,880	8,080
470,000	6,140	6,280	6,430	6,590	6,750	6,920	7,100	7,280	7,470	7,660
450,000	5,930	6,070	6,220	6,370	6,520	6,690	6,850	7,030	7,210	7,390
430,000	5,720	5,860	6,000	6,140	6,290	6,450	6,610	6,780	6,950	7,130
410,000	5,510	5,640	5,770	5,910	6,060	6,210	6,360	6,520	6,690	6,860
390,000	5,300	5,420	5,550	5,690	5,820	5,970	6,120	6,270	6,430	6,590
370,000	5,140	5,210	5,330	5,460	5,590	5,730	5,870	6,020	6,170	6,320
350,000	5,120	5,160	5,210	5,260	5,350	5,480	5,620	5,760	5,900	6,050
330,000	5,100	5,140	5,190	5,240	5,280	5,340	5,390	5,500	5,640	5,780

TWO BRAKES INOPERATIVE - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	11,050	11,400	11,780	12,170	12,590	13,030	13,500	13,990	14,520	15,070
630,000	10,480	10,780	11,130	11,500	11,890	12,300	12,730	13,180	13,660	14,170
610,000	10,030	10,280	10,530	10,860	11,220	11,590	11,990	12,410	12,850	13,320
590,000	9,590	9,820	10,070	10,320	10,590	10,920	11,290	11,670	12,080	12,510
570,000	9,180	9,400	9,640	9,880	10,130	10,390	10,660	11,010	11,380	11,780
550,000	8,730	8,940	9,160	9,390	9,630	9,880	10,130	10,400	10,670	11,010
530,000	8,290	8,490	8,700	8,910	9,140	9,370	9,610	9,860	10,120	10,380
510,000	7,860	8,050	8,240	8,450	8,660	8,880	9,110	9,340	9,580	9,830
490,000	7,440	7,620	7,800	7,990	8,190	8,400	8,610	8,830	9,060	9,290
470,000	7,060	7,220	7,400	7,580	7,770	7,960	8,160	8,370	8,580	8,800
450,000	6,820	6,980	7,150	7,320	7,500	7,690	7,880	8,080	8,290	8,500
430,000	6,580	6,730	6,890	7,060	7,230	7,410	7,600	7,790	7,990	8,190
410,000	6,340	6,480	6,640	6,800	6,970	7,140	7,320	7,500	7,690	7,890
390,000	6,100	6,240	6,380	6,540	6,700	6,860	7,030	7,210	7,390	7,580
370,000	5,910	5,990	6,130	6,270	6,430	6,580	6,750	6,920	7,090	7,270
350,000	5,890	5,940	5,990	6,050	6,150	6,300	6,460	6,620	6,790	6,960
330,000	5,860	5,910	5,970	6,020	6,080	6,130	6,190	6,330	6,480	6,640

CORRECTIONS:

Headwind per kt	-30 ft
Tailwind per kt	+330 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

Actual (unfactored) landing distances are 60% of the distances indicated.

FLAPS 30

TWO BRAKES INOPERATIVE – DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	8,710	8,930	9,160	9,450	9,760	10,100	10,470	10,860	11,270	11,700
630,000	8,350	8,560	8,770	9,000	9,240	9,550	9,890	10,240	10,610	11,000
610,000	8,000	8,190	8,400	8,610	8,830	9,060	9,330	9,650	9,990	10,340
590,000	7,650	7,840	8,030	8,230	8,440	8,660	8,890	9,120	9,400	9,720
570,000	7,330	7,510	7,690	7,880	8,080	8,290	8,510	8,730	8,960	9,190
550,000	6,980	7,140	7,320	7,500	7,690	7,880	8,090	8,300	8,510	8,740
530,000	6,630	6,790	6,950	7,120	7,300	7,490	7,680	7,880	8,080	8,290
510,000	6,290	6,440	6,590	6,760	6,920	7,100	7,280	7,460	7,660	7,850
490,000	5,960	6,100	6,240	6,400	6,550	6,720	6,890	7,060	7,240	7,430
470,000	5,740	5,870	6,010	6,160	6,310	6,470	6,630	6,800	6,970	7,150
450,000	5,550	5,680	5,810	5,950	6,100	6,250	6,410	6,570	6,740	6,910
430,000	5,350	5,480	5,610	5,740	5,880	6,030	6,180	6,330	6,500	6,660
410,000	5,180	5,280	5,400	5,530	5,660	5,810	5,950	6,100	6,250	6,410
390,000	5,170	5,210	5,260	5,320	5,450	5,580	5,720	5,860	6,010	6,160
370,000	5,150	5,190	5,240	5,290	5,340	5,390	5,490	5,630	5,770	5,910
350,000	5,130	5,170	5,220	5,270	5,320	5,370	5,420	5,470	5,520	5,660
330,000	5,110	5,150	5,200	5,250	5,300	5,350	5,400	5,450	5,500	5,550

TWO BRAKES INOPERATIVE - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
650,000	10,020	10,270	10,530	10,870	11,230	11,620	12,040	12,490	12,960	13,460
630,000	9,610	9,840	10,090	10,340	10,620	10,980	11,370	11,770	12,200	12,650
610,000	9,200	9,420	9,660	9,900	10,160	10,420	10,730	11,100	11,490	11,890
590,000	8,800	9,010	9,240	9,470	9,710	9,960	10,220	10,490	10,800	11,170
570,000	8,430	8,630	8,840	9,070	9,290	9,530	9,780	10,030	10,300	10,570
550,000	8,020	8,210	8,410	8,620	8,840	9,070	9,300	9,540	9,790	10,050
530,000	7,620	7,800	7,990	8,190	8,400	8,610	8,830	9,060	9,290	9,530
510,000	7,230	7,400	7,580	7,770	7,960	8,160	8,370	8,580	8,810	9,030
490,000	6,850	7,010	7,180	7,360	7,540	7,730	7,920	8,120	8,330	8,540
470,000	6,600	6,750	6,920	7,080	7,260	7,440	7,630	7,820	8,020	8,220
450,000	6,380	6,530	6,680	6,840	7,010	7,190	7,370	7,550	7,740	7,940
430,000	6,150	6,300	6,450	6,600	6,760	6,930	7,100	7,280	7,470	7,660
410,000	5,960	6,070	6,210	6,360	6,510	6,670	6,840	7,010	7,190	7,370
390,000	5,940	5,990	6,050	6,110	6,260	6,420	6,580	6,740	6,910	7,080
370,000	5,920	5,970	6,030	6,080	6,130	6,190	6,310	6,470	6,630	6,800
350,000	5,900	5,950	6,000	6,060	6,110	6,170	6,230	6,290	6,350	6,510
330,000	5,880	5,930	5,980	6,030	6,090	6,150	6,210	6,260	6,320	6,380

CORRECTIONS:

Headwind per kt	-30 ft
Tailwind per kt	+290 ft

End of Section

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LANDING GEAR EXTENDED	5-3

AUTHORIZATION AND FLIGHT PLANNING

Authorization, procedures, and applicability of data for ferry operations is described in the Flight Operations Manual (Chapters 9 and 35) and the Technical Operations Policies and Procedures

Manual (TOPP chapter 40-60-05). Procedures outlined in those manuals must be strictly adhered to.

AVAILABLE FERRY CONFIGURATIONS

- Landing Gear Extended

NOTE: Data for landing gear extended configuration is also applicable to revenue flights

under certain conditions. See Note in Item 1 immediately below.

INSTRUCTIONS

1. Obtain a normal, unfiled flight plan using long range cruise (LRC) at the cruise altitude for the ferry configuration listed under the appropriate ferry configuration.

NOTE: If a computerized flight plan is available for the aircraft configuration (i.e. Landing Gear Extended), the computerized flight plan should be used in lieu of data contained in this section. Data contained in this section is conservative compared to the optimized data contained in the computerized flight plan.

2. Calculate the trip time and fuel load based on the values in the flight plan using the time and fuel values obtained under the appropriate ferry configuration. Enter this data either in the Dispatcher Remarks section of the Computerized Flight Plan or on the Standby Flight Plan form.

3. Add remarks containing the ferry speed, speed limit, altitude limit, total time, leg times if appropriate, and engine-out altitude capability. Note: Suggested cruise altitudes are for reference, and reasonable adjustments may be made to accommodate ATC and direction of flight.
4. Assure adequate terrain clearance by referring to the Engine Out Altitude Limit table. Interpolate between weights and temperatures for driftdown altitudes and speeds.
5. Adjust the Runway Allowable and Climb Limit Takeoff Weights, and the Landing Climb Limit Weight. Subtract the weight decrements indicated under the ferry configuration from the Normal Thrust takeoff weights and the Landing Climb weight obtained from the ARM.
6. Data presented in this section assumes no cargo is carried.

LIMITATIONS

1. Do not combine two or more ferry configurations.
2. All ferry flight takeoffs will be done at full (NORMAL) thrust (FMC TO) and climb out will be made at Maximum Climb thrust (FMC CLB)

unless otherwise specified on ferry configuration data page.

3. Observe additional limitations and restrictions as listed for each ferry configuration on the following data pages.

LANDING GEAR EXTENDED

OPERATIONAL LIMITATIONS:

The following are the FAA Airplane Flight Manual mandated limitations for gear down operations. Limitations are unchanged from normal except as listed below.

1. All components required for a landing gear extended operation must be functional in accordance with the appropriate maintenance manual.
2. The use of speed increase for improved climb performance in order to increase maximum takeoff weight is prohibited.
3. Dispatch into known icing conditions is prohibited.
4. The airplane is not eligible for extended over-water operations when landing gear down lock pins are installed. "Extended over-water operation" includes any operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline.
5. Use of reduced thrust takeoff is prohibited.
6. Limitations relating to engine-out drift down are contained in the ABNORMAL section of this Operational Data Manual (ODM).
7. Maximum takeoff weight for gear down dispatch is 600,000 pounds.
8. Takeoff is limited to Flaps 5 and 15.
9. V_{MO} and M_{MO} are reduced to 270 KIAS and .73 Mach.
10. The airspeed indicator and Mach-airspeed warning switch must be reprogrammed for V_{MO} and M_{MO} .
11. The EPR indication system must be operational.
12. Emergency procedures are unchanged, except **emergency descent target speed is 270 KIAS**.
13. The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS will generate inaccurate enroute speed schedules, display non-conservative predictions of fuel burn and thrust-limited maximum altitude, and compute an overly shallow descent path. Use of VNAV during descent is not recommended.
14. Do not use autothrottles when operating the airplane above 20,000 feet.
15. Reduced Vertical Separation Minimum (RVSM) operations are prohibited when conducting landing gear extended operations.
16. Traffic Alert and Collision Avoidance System (TCAS): Move transponder mode selector switch to traffic advisory (TA) only.
17. Flap retraction speed schedule is unchanged except Final Segment Climb Speed is $V_{REF} + 60$ KIAS.
18. The conditions for severe turbulent air penetration are unchanged except that the recommended airspeed for flight in severe turbulence is $V_{REF} + 80$ KIAS. The maximum altitude is restricted as follows:

Altitude Restriction	
Gross Weight - Pounds	Maximum Altitude - Feet
Above 550,000	16,000
Above 500,000 and less than or equal to 550,000	20,000
Less than or equal to 500,000	24,000

FLIGHT PLANNING

Fuel Required / Trip Time (1,000 lb / hours):

PRESSURE ALTITUDE - FEET	RANGE - NAUTICAL GROUND MILES			
	500	1,000	1,500	2,000
10,000	40.5 / 2.1	82.5 / 4.0	126.4 / 5.8	172.3 / 7.6
14,000	39.0 / 2.0	77.0 / 3.8	117.9 / 5.5	161.0 / 7.2
18,000	36.7 / 1.9	73.0 / 3.6	111.3 / 5.2	152.0 / 6.8
22,000	34.8 / 1.8	69.5 / 3.4	105.8 / 5.0	144.1 / 6.5
26,000	33.5 / 1.7	66.5 / 3.3		

NOTE: Based on Long Range Cruise, $V_{REF30} + 80$ climb/descent, standard day conditions, zero winds, reference landing weight of 400,000 lb.

LANDING GEAR EXTENDED (cont'd)

TAKEOFF

RATOW & Takeoff climb limit weight:	Use GRD TPI in AWABS
Takeoff V Speeds:	Use GRD TPI in AWABS
Takeoff Thrust Settings:	Use NORMAL only, ALTERNATE thrust NOT approved.
Takeoff Flap Settings:	Flaps 5 or 15 only.
Operation from Contaminated Runway:	Permitted, use GRD TPI.

ENROUTE

Long Range Cruise Table – All Engine

GROSS WEIGHT - POUNDS	PRESSURE ALTITUDE - 1,000 FEET									
	CRUISE SPEED - KIAS TARGET EPR FUEL FLOW / ENGINE - LB/HR									
	10	15	17	19	21	23	25	27	29	31
660,000	270 1.237 16107									
620,000	263 1.216 15070	261 1.292 15155	262 1.334 15302							
580,000	255 1.195 14025	254 1.264 14060	253 1.300 14119	253 1.345 14278						
540,000	246 1.175 12996	245 1.238 12992	245 1.269 13016	244 1.306 13080	245 1.353 13232					
500,000	237 1.154 11952	237 1.212 11930	236 1.239 11945	236 1.271 11971	236 1.309 12027	236 1.357 12172	235 1.416 12294			
460,000	227 1.135 10886	228 1.186 10881	228 1.211 10902	227 1.239 10915	227 1.272 10937	226 1.311 10984	227 1.360 11127	226 1.420 11244		
420,000	218 1.119 9923	218 1.161 9847	218 1.184 9872	218 1.209 9885	217 1.238 9917	217 1.270 9919	216 1.309 9963	217 1.359 10093		
380,000	210 1.104 9124	207 1.138 8806	207 1.157 8844	208 1.179 8867	207 1.206 8922	207 1.234 8940	207 1.266 8916	206 1.305 8947	206 1.355 9060	
340,000	202 1.090 8309	199 1.120 7989	199 1.135 7978	199 1.153 8105	199 1.178 8138	199 1.203 8085	199 1.231 8068	199 1.263 8075	199 1.303 8124	199 1.352 8208
300,000	192 1.077 7408	191 1.103 7385	191 1.117 7377	191 1.132 7368	191 1.152 7349	191 1.176 7408	191 1.200 7307	191 1.227 7299	191 1.260 7306	191 1.299 7351

LANDING GEAR EXTENDED (cont'd)

ENROUTE (cont'd.)

Long Range Cruise Table – One Engine Inoperative

GROSS WEIGHT - POUNDS	PRESSURE ALTITUDE - FEET CRUISE SPEED - KIAS TARGET EPR FUEL FLOW / ENGINE- LB/HR						
	5,000	7,000	9,000	11,000	13,000	15,000	17,000
500,000	224 1.362 22461	224 1.409 22694					
460,000	218 1.325 20715	218 1.365 20860	218 1.413 21086				
420,000	212 1.290 19092	212 1.326 19151	212 1.367 19293	212 1.416 19511	212 1.478 19881		
380,000	205 1.258 17513	205 1.289 17545	205 1.324 17600	205 1.366 17732	205 1.416 17937	205 1.478 18289	
340,000	199 1.227 15953	199 1.254 15972	199 1.285 15999	199 1.320 16048	199 1.362 16164	199 1.412 16344	199 1.474 16663
300,000	191 1.198 14447	191 1.221 14438	191 1.247 14448	191 1.278 14473	191 1.313 14512	191 1.354 14607	191 1.403 14764

LANDING GEAR EXTENDED (cont'd)

ENROUTE (cont'd.)

Driftdown Performance

GROSS WEIGHT - POUNDS		VREF30 + 80 DRIFTDOWN SPEED - KIAS	LEVEL OFF ALTITUDE - FEET		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)		ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
580,000	547,000	236	1,000		
540,000	516,000	231	4,900	2,400	
500,000	477,000	223	7,700	5,700	3,100
460,000	440,000	217	10,300	8,400	6,200
420,000	402,000	211	12,700	11,000	9,100
380,000	365,000	205	15,100	13,600	11,800
340,000	326,000	198	17,500	16,100	14,500

BASIS: One engine inoperative, Max Continuous Thrust, no anti-ice, one pack on, 100 ft/min residual rate of climb.

Altitude Capability – One Engine Inoperative

GROSS WEIGHT - POUNDS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
540,000	1,900		
520,000	4,500	1,000	
500,000	6,000	3,600	
480,000	7,400	5,400	2,500
460,000	8,900	6,800	4,400
440,000	10,300	8,300	6,000
420,000	11,500	9,800	7,600
400,000	12,800	11,100	9,100
380,000	14,100	12,500	10,600
360,000	15,400	13,800	12,000
340,000	16,600	15,200	13,400
320,000	17,800	16,400	14,900
300,000	19,100	17,700	16,100

BASIS: One engine inoperative, APU operating, Max Continuous Thrust limits, 100 ft/min residual rate of climb.

LANDING GEAR EXTENDED (cont'd)

LANDING

Landing Speed restrictions:

No additional restrictions

Flap Setting Restrictions:

No additional restrictions

Approach & Landing climb limit weights:

Use GRD LPI data if available, otherwise reduce standard landing climb limit by 102,000 lbs

HOLDING SPEED / THRUST (KIAS / EPR)

Weight - Pounds	Flaps Up Altitude - Feet		Flaps 1 Altitude - Feet	
	10,000	15,000	10,000	15,000
660,000	243 / 1.224	243 / 1.309	223 / 1.226	223 / 1.308
620,000	239 / 1.203	239 / 1.279	219 / 1.205	219 / 1.279
580,000	235 / 1.182	235 / 1.251	215 / 1.185	215 / 1.252
540,000	230 / 1.163	230 / 1.224	210 / 1.167	210 / 1.226
500,000	224 / 1.146	224 / 1.199	204 / 1.150	204 / 1.201
460,000	217 / 1.130	217 / 1.176	197 / 1.133	197 / 1.178
420,000	212 / 1.115	212 / 1.156	192 / 1.117	192 / 1.157
380,000	209 / 1.104	209 / 1.141	189 / 1.103	189 / 1.139
340,000	209 / 1.095	209 / 1.130	189 / 1.094	189 / 1.126
300,000	209 / 1.088	209 / 1.121	189 / 1.087	189 / 1.116

NOTE: Table includes 5% additional fuel for holding in a racetrack pattern.

End of Section

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ETOPS PERFORMANCE PROCEDURES

This section provides performance data for use in the event of an ETOPS enroute diversion and for flight planning to assure availability of engine-out terrain clearance and ETOPS fuel requirements. The performance levels in this section are based upon the following thrust setting and speed criteria:

1. Maximum Continuous Thrust.
2. Mach 0.84 / 300 KIAS driftdown speeds.
3. 300 KIAS engine-out cruise speed.

In the event of pressurization loss in addition to or independent of an engine shutdown, cruise at 300 KIAS (engine-out) or LRC (all-engines) following emergency descent to 10,000 feet or to 14,000 feet over terrain - critical areas of Greenland. Refer to the Airway Manual and QRH for driftdown and emergency descent procedures.

Refer to ETOPS Pages 6-3 and 6-4 for critical fuel reserve requirements for Forecast Icing Conditions and Anti-Ice Not Required, respectively.

FLIGHT PLANNING CONSIDERATIONS

Flight Planning data provided in ETOPS Pages 6-3 – 6-4 reflects the analysis used by Flight Control and the Flight Planning System to assure availability of required ETOPS fuel reserves. Critical Fuel Reserves are shown on the flight plan as “ETP Diversion Fuel” and are provided for both icing conditions and non-icing conditions. The ETOPS Critical Fuel Reserves are based upon the greater of engine-out or all-engines fuel consumption and reflect the following flight profile:

- Pressurization Inoperative
- Emergency descent to 10,000 feet
- Cruise at 10,000 feet / 300 KIAS (engine-out) or LRC (all engines)
- 250 KIAS descent to 1,500 feet
- 15 minute hold at 1500 feet
- Missed approach, approach, and land
- 7,500 lb. of hold fuel (approximately double AC120-42 requirement)
- 5% fuel added for wind errors
- APU operating

For icing conditions, eight percent additional fuel is added to account for both engine and wing anti-ice and ice accumulation on unheated surfaces. The normal mode of transatlantic operation assumes icing conditions. The flight planning system applies appropriate adjustment to these Reserves to account for performance deterioration of each specific ship number. These adjustments are updated weekly based upon Delta's aircraft/engine trend monitoring system.

Use of these procedures and Critical Fuel Reserves allows the following ETOPS Area of Operation (still air operating radius):

120 minutes - 835 NM
180 minutes - 1,245 NM

CRITICAL FUEL RESERVES
FORECAST ICING CONDITIONS
ISA + 10 °C & BELOW

INITIAL GROSS WT (1,000 LB)	CRITICAL FUEL RESERVES – 1,000 LB									
	DISTANCE TO ALTERNATE - NAM									
	400	500	600	700	800	900	1,000	1,100	1,200	1,300
660	24.9	30.4	36.0	41.3	47.2	52.5	58.1	63.4	68.7	74.0
620	23.5	29.1	34.4	39.8	45.1	50.4	55.7	60.8	66.1	71.1
580	22.7	27.8	32.9	38.2	43.2	48.3	53.3	58.4	63.2	68.2
540	21.7	26.7	31.5	36.6	41.4	46.4	51.2	56.0	60.8	65.6
500	20.9	25.7	30.2	35.0	39.8	44.6	49.4	53.9	58.4	63.0
460	20.1	24.6	29.4	33.7	38.5	43.0	47.5	52.1	56.6	60.8
420	19.3	23.9	28.4	32.6	37.2	41.7	46.2	50.5	54.7	59.3
380	18.5	23.1	27.3	31.6	36.1	40.4	44.9	48.9	53.2	57.4
340	18.0	22.3	26.5	30.8	35.1	39.3	43.3	47.6	51.8	56.1

NOTES

1. Based upon the greater of fuel burn for one-engine inoperative or for all-engines operating using the following flight profile:
 - a. Emergency descent to 10,000 ft.
 - b. Cruise @ 10,000 ft @ 300 KIAS
 - c. 250 KIAS descent to landing
 - d. 7500 lb. hold fuel
 - e. Missed approach, approach and land
 - f. APU Operating
2. Includes the following fuel allowances:
 - a. 5% for wind forecast errors
 - b. 8% for Engine/Wing Anti-Ice ON and ice accumulation
 - c. Does NOT include Extra Fuel at ETP allowance
3. This data reflects ETOPS data used by FLIGHT CONTROL for ETP Diversion Fuel analysis.
4. The flight planning system adjusts Critical Fuel Reserve data to account for individual ship number performance deterioration.
5. For ambient temperatures between ISA + 11 and ISA + 20 °C, increase fuel required by 0.8% for each 10 deg C hotter than ISA+10 °C.

CRITICAL FUEL RESERVES

ANTI-ICE NOT REQUIRED

ISA + 10 °C & BELOW

INITIAL GROSS WT (1,000 LB)	CRITICAL FUEL RESERVES – 1,000 LB									
	DISTANCE TO ALTERNATE - NAM									
	400	500	600	700	800	900	1,000	1,100	1,200	1,300
660	23.0	28.2	33.3	38.3	43.7	48.6	53.8	58.7	63.6	68.5
620	21.8	27.0	31.9	36.8	41.7	46.7	51.6	56.3	61.2	65.9
580	21.1	25.7	30.4	35.3	40.0	44.7	49.4	54.1	58.5	63.2
540	20.1	24.8	29.2	33.9	38.3	43.0	47.4	51.9	56.3	60.7
500	19.4	23.8	28.0	32.4	36.9	41.3	45.7	49.9	54.1	58.3
460	18.6	22.8	27.3	31.2	35.6	39.8	44.0	48.2	52.4	56.3
420	17.9	22.1	26.3	30.2	34.4	38.6	42.8	46.7	50.7	54.9
380	17.2	21.4	25.3	29.2	33.4	37.4	41.6	45.3	49.2	53.2
340	16.7	20.6	24.6	28.5	32.5	36.4	40.1	44.1	48.0	52.0

NOTES:

1. Based upon the greater of fuel burn for one-engine inoperative or. all-engines operating using the following flight profile:
 - a. Emergency descent to 10,000 ft
 - b. Cruise @ 300 KIAS @ 10,000 ft.
 - c. 250 KIAS descent to landing.
 - d. 7500 lb. hold fuel.
 - e. Missed approach, approach and land.
 - f. APU Operating .
2. Includes a 5% fuel allowance for wind forecast errors.
3. Does NOT include Extra Fuel at ETP allowance.
4. This data reflects data used by FLIGHT CONTROL for ETP Diversion Fuel analysis.
5. The flight planning system adjusts this critical fuel data to account for individual ship number performance deterioration.
6. For ambient temperatures above ISA + 10 °C, increase fuel required by 0.8% for each 10 °C above ISA+10 °C

End of Section