B-757-200 Operational Data Manual (ODM)

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B-757-200
Operational Data Manual

Revision Number: 100
Revision Date: September 23, 2016

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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 – Perfomance 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

The General Manager – Performance Engineering has been designated the responsibility for the quality of this manual.

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Maintenance, safeguard, and revision of this manual are the responsibilities of the individual to whom it is issued.

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-757-200 OPERATIONAL DATA MANUAL** ***Date:*** **23 Sep 16**

Revision Number: **100** ***Page:*** **1 of 1**

REMOVE	*INSERT*	*REMARKS*
TABLE OF CONTENTS	**TABLE OF CONTENTS**	Date updated to reflect revision.
COVER PAGE	**COVER PAGE**	Cover page updated to reflect revision.
LIST OF EFFECTIVE PAGES Page *i*	**LIST OF EFFECTIVE PAGES** Page *i*	List of Effective Pages updated to reflect revision.
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 100

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END

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 to 30	
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	29 to 21	13 – 18
Medium to Poor	Braking deceleration OR directional control is between Medium and Poor.	Greater than 1/8" depth of: • Water • Slush	2		
Poor	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	• Ice	1	20 or lower	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.

	DRY	GOOD	MEDIUM	POOR
Crosswind Guidelines	40 kt	40 kt	35 kt	17 kt
Tailwind Limit	10 kt*	10 kt*	5 kt	0 kt

*Or as permitted by Delta 10-0 special pages. (10 kt for 6800 series aircraft.)

OPERATIONAL LANDING DISTANCES

FEET

FLAPS 25

NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).

Landing Weight (lb)	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
250,000	9,900	9,300	8,500	7,400	6,800	4,500	8,500	7,400	7,100	6,000
240,000	9,600	9,000	8,200	7,200	6,600	4,400	8,200	7,200	6,900	5,800
230,000	9,200	8,700	7,900	6,900	6,400	4,300	7,900	7,000	6,700	5,600
220,000	8,800	8,300	7,700	6,700	6,200	4,200	7,700	6,800	6,400	5,500
210,000	8,400	8,000	7,400	6,500	6,000	4,100	7,400	6,600	6,200	5,300
200,000	8,000	7,700	7,100	6,300	5,800	4,000	7,100	6,400	6,000	5,100
198,000	8,000	7,600	7,100	6,300	5,800	4,000	7,100	6,300	6,000	5,100
190,000	7,700	7,300	6,800	6,100	5,700	3,900	6,800	6,100	5,800	4,900
180,000	7,300	7,000	6,600	5,900	5,500	3,800	6,600	5,900	5,600	4,800
170,000	7,000	6,700	6,300	5,600	5,300	3,700	6,300	5,700	5,400	4,600
160,000	6,600	6,300	6,000	5,400	5,100	3,600	6,000	5,500	5,200	4,500
150,000	6,300	6,000	5,700	5,200	4,900	3,500	5,700	5,300	5,000	4,400

BASIS: Zero wind ● Two Engine Full 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	-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	600	500	500	300	600	500	500	400
8,000	1,400	1,200	1,000	800	700	400	1,000	800	700	600
10,000	2,000	1,800	1,400	1,100	1,000	600	1,400	1,100	1,000	900

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	250	250	250	200	200	100	250	200	200	150
PER 10°C ABOVE ISA	200	200	150	150	100	50	150	150	100	100
PER 10°C BELOW ISA	-150	-150	-150	-150	-100	-50	-150	-150	-100	-100
PER 1% UP SLOPE	-200	-200	-100	-50	-50	-50	-100	-100	-100	-100
PER 1% DOWN SLOPE	250	200	100	50	50	50	100	100	100	100
1 REVERSER INOP	1,200	700	300	200	200	100	300	300	400	300
2 REVERSERS INOP	1,800	1,000	600	500	500	200	600	800	1,100	700
MANUAL SPOILERS	0	0	0	0	0	300	0	0	0	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
250,000	8,900	8,300	8,300	7,800	9,900	9,800	9,800	9,700
240,000	8,600	8,000	8,000	7,600	9,600	9,400	9,400	9,300
230,000	8,300	7,700	7,700	7,300	9,200	9,100	9,100	9,000
220,000	8,000	7,500	7,500	7,100	8,900	8,700	8,700	8,700
210,000	7,700	7,200	7,200	6,800	8,500	8,400	8,400	8,300
200,000	7,400	6,900	6,900	6,500	8,200	8,000	8,000	8,000
198,000	7,400	6,900	6,900	6,500	8,100	8,000	8,000	7,900
190,000	7,100	6,700	6,600	6,300	7,800	7,700	7,700	7,700
180,000	6,800	6,400	6,400	6,100	7,500	7,400	7,400	7,400
170,000	6,600	6,200	6,100	5,900	7,200	7,000	7,000	7,100
160,000	6,300	5,900	5,900	5,600	6,900	6,700	6,700	6,800
150,000	6,000	5,700	5,600	5,400	6,600	6,400	6,400	6,500

BASIS: Zero wind ● Two Engine Full 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	-300	-300	-300	-300	-400	-400	-400	-400
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	400	400	400	400
6,000	700	600	600	600	800	800	800	800
8,000	1,000	1,000	1,000	900	1,200	1,200	1,200	1,200
10,000	1,500	1,500	1,500	1,300	1,800	1,800	1,800	1,800

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	150	150	150	150
PER 5 KTS ADD'L SPD	250	200	200	200	250	200	200	200
PER 10°C ABOVE ISA	150	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-150	-150	-150	-150	-150	-150	-150	-150
PER 1% UP SLOPE	-150	-150	-200	-150	-300	-350	-350	-300
PER 1% DOWN SLOPE	200	200	200	200	450	450	450	450
1 REVERSER INOP	600	900	900	700	1,500	1,600	1,700	1,500
2 REVERSERS INOP	2,100	2,600	2,600	2,100	5,300	5,400	5,400	5,000
MANUAL SPOILERS	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES

FEET

FLAPS 30

NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).

Landing Weight (lb)	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
250,000	9,700	9,100	8,300	7,200	6,600	4,600	8,300	7,300	6,900	5,900
240,000	9,300	8,800	8,000	7,000	6,400	4,400	8,000	7,100	6,700	5,700
230,000	9,000	8,400	7,700	6,800	6,200	4,300	7,700	6,800	6,500	5,600
220,000	8,600	8,100	7,500	6,600	6,000	4,200	7,500	6,600	6,300	5,400
210,000	8,200	7,800	7,200	6,400	5,900	4,100	7,200	6,400	6,100	5,200
200,000	7,800	7,400	6,900	6,100	5,700	4,000	6,900	6,200	5,900	5,100
198,000	7,700	7,400	6,900	6,100	5,600	4,000	6,900	6,100	5,900	5,000
190,000	7,400	7,100	6,600	5,900	5,500	3,900	6,600	6,000	5,700	4,900
180,000	7,100	6,800	6,400	5,700	5,300	3,800	6,400	5,800	5,500	4,700
170,000	6,800	6,500	6,100	5,500	5,100	3,700	6,100	5,500	5,300	4,600
160,000	6,400	6,100	5,800	5,300	4,900	3,600	5,800	5,300	5,100	4,400
150,000	6,100	5,800	5,500	5,100	4,800	3,500	5,500	5,100	4,900	4,300

BASIS: Zero wind ● Two Engine Full 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	-400	-400	-300	-300	-200	-100	-300	-300	-200	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	400	400	300	300	200	100	300	300	200	200
6,000	900	800	600	500	400	300	600	500	500	400
8,000	1,300	1,200	1,000	800	600	400	1,000	800	700	600
10,000	1,900	1,700	1,400	1,100	900	600	1,400	1,100	1,000	900

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	250	250	250	200	200	100	250	200	200	150
PER 10°C ABOVE ISA	200	200	150	150	100	50	150	150	100	100
PER 10°C BELOW ISA	-150	-150	-150	-100	-100	-50	-150	-150	-100	-100
PER 1% UP SLOPE	-200	-150	-100	-50	-50	-50	-100	-100	-100	-100
PER 1% DOWN SLOPE	200	150	100	50	50	50	100	100	100	100
1 REVERSER INOP	1,100	600	300	200	200	100	300	300	400	300
2 REVERSERS INOP	1,700	900	500	400	400	100	600	800	1,000	600
MANUAL SPOILERS	0	0	0	0	0	300	0	0	0	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
250,000	8,700	8,200	8,100	7,700	9,700	9,600	9,600	9,500
240,000	8,400	7,900	7,900	7,400	9,300	9,200	9,200	9,200
230,000	8,100	7,600	7,600	7,200	9,000	8,900	8,900	8,800
220,000	7,800	7,400	7,300	6,900	8,700	8,500	8,500	8,500
210,000	7,500	7,100	7,000	6,700	8,300	8,200	8,200	8,200
200,000	7,200	6,800	6,800	6,400	8,000	7,900	7,900	7,800
198,000	7,200	6,700	6,700	6,400	7,900	7,800	7,800	7,800
190,000	6,900	6,500	6,500	6,200	7,600	7,500	7,500	7,500
180,000	6,700	6,300	6,200	6,000	7,300	7,200	7,200	7,200
170,000	6,400	6,000	6,000	5,700	7,000	6,900	6,900	6,900
160,000	6,100	5,800	5,700	5,500	6,700	6,500	6,500	6,600
150,000	5,800	5,500	5,500	5,300	6,300	6,200	6,200	6,300

BASIS: Zero wind ● Two Engine Full 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	-300	-300	-300	-300	-400	-400	-400	-400
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	400	400	400	400
6,000	700	600	600	600	800	800	800	800
8,000	1,000	1,000	1,000	900	1,200	1,200	1,200	1,200
10,000	1,400	1,400	1,400	1,300	1,800	1,800	1,800	1,800

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	150	150	150	150
PER 5 KTS ADD'L SPD	250	200	200	200	250	200	200	200
PER 10°C ABOVE ISA	150	150	150	150	200	200	200	150
PER 10°C BELOW ISA	-150	-150	-150	-150	-150	-150	-150	-150
PER 1% UP SLOPE	-150	-150	-200	-150	-300	-300	-300	-300
PER 1% DOWN SLOPE	200	200	200	200	450	450	450	450
1 REVERSER INOP	500	800	900	700	1,400	1,500	1,500	1,400
2 REVERSERS INOP	1,900	2,300	2,400	1,900	4,700	4,800	4,800	4,400
MANUAL SPOILERS	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

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DEFINITIONS AND ASSUMPTIONS

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.

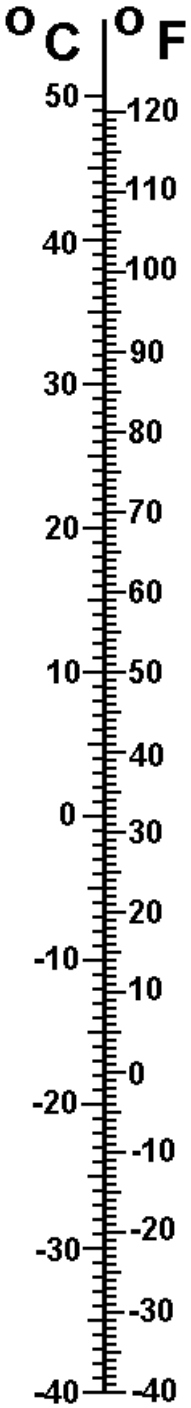
STATIC AIR TEMPERATURE (SAT) - The ambient still air temperature outside of the aircraft. Sometimes known as the Outside Air Temperature (OAT).

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

Vmo/Mmo - Maximum allowable operating indicated airspeed or Mach number.

TEMPERATURE CONVERSION AND

STATIC AIR TEMPERATURE



°C

ALTITUDE - FEET	ISA DEVIATION					
	ISA-20°C	ISA-10°C	ISA	ISA+10°C	ISA+20°C	ISA+30°C
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:	ALT	DOUBLE ALT	SUBTRACT 15	CHANGE SIGN
	0	0	-15	+15
	33	66	51	-51

TOTAL AIR TEMPERATURE vs STATIC AIR TEMPERATURE

°C

TAT	INDICATED MACH NUMBER													
°C	.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

V_{MO} / M_{MO}

PRESSURE ALTITUDE	INDICATED V_{MO} (KIAS)	MACH M_{MO}
0	350	0.529
5,000	350	0.576
10,000	350	0.629
15,000	350	0.687
17,000	350	0.713
19,000	350	0.739
21,000	350	0.767
23,000	350	0.796
25,000	350	0.826
27,000	350	0.858
29,000	336	0.860
31,000	322	0.860
33,000	308	0.860
35,000	294	0.860
37,000	281	0.860
39,000	268	0.860
41,000	256	0.860
42,000	250	0.860

EN ROUTE FUEL TEMPERATURE

FOR DETERMINING DISPATCH CAPABILITY BASED ON FUEL FREEZE POINT.

FUEL TYPE		ISA	JET A	JP-5	JET A1	Jet B	TS-1
ADJUSTED FUEL FREEZE TEMP.			-37ºC	-43ºC	-44ºC	-47°C	-57°C
MACH	FLT LEVEL		MAXIMUM ISA DEVIATION - ºC				
0.77	330	-50	-12	-17	-18	-21	-30
	350	-54	-8	-13	-14	-17	-26
	370 & HIGHER	-57	-6	-11	-12	-14	-23
0.78	330	-50	-12	-18	-18	-21	-30
	350	-54	-8	-14	-15	-17	-26
	370 & HIGHER	-57	-6	-11	-12	-15	-24
0.79	330	-50	-13	-18	-19	-22	-31
	350	-54	-9	-14	-15	-18	-27
	370 & HIGHER	-57	-7	-12	-13	-16	-24
0.80	330	-50	-13	-19	-20	-22	-31
	350	-54	-9	-15	-16	-18	-27
	370 & HIGHER	-57	-7	-13	-14	-16	-25
0.81	330	-50	-14	-19	-20	-23	-32
	350	-54	-10	-15	-16	-19	-28
	370 & HIGHER	-57	-8	-13	-14	-17	-26

INSTRUCTIONS:

1. Locate type of fuel being used.

   NOTE: THE ADJUSTED FUEL FREEZING TEMPERATURE IS THE BASIC FUEL FREEZING TEMPERATURE + 3°C (PER THE APPROVED AIRCRAFT FLIGHT MANUAL).
2. Move down to the Mach number and Altitude expected en route and read the Maximum ISA Deviation.

3. Do not dispatch aircraft into en route temperatures colder than the Maximum ISA Deviation obtained in Step 2 above.

EXAMPLE:

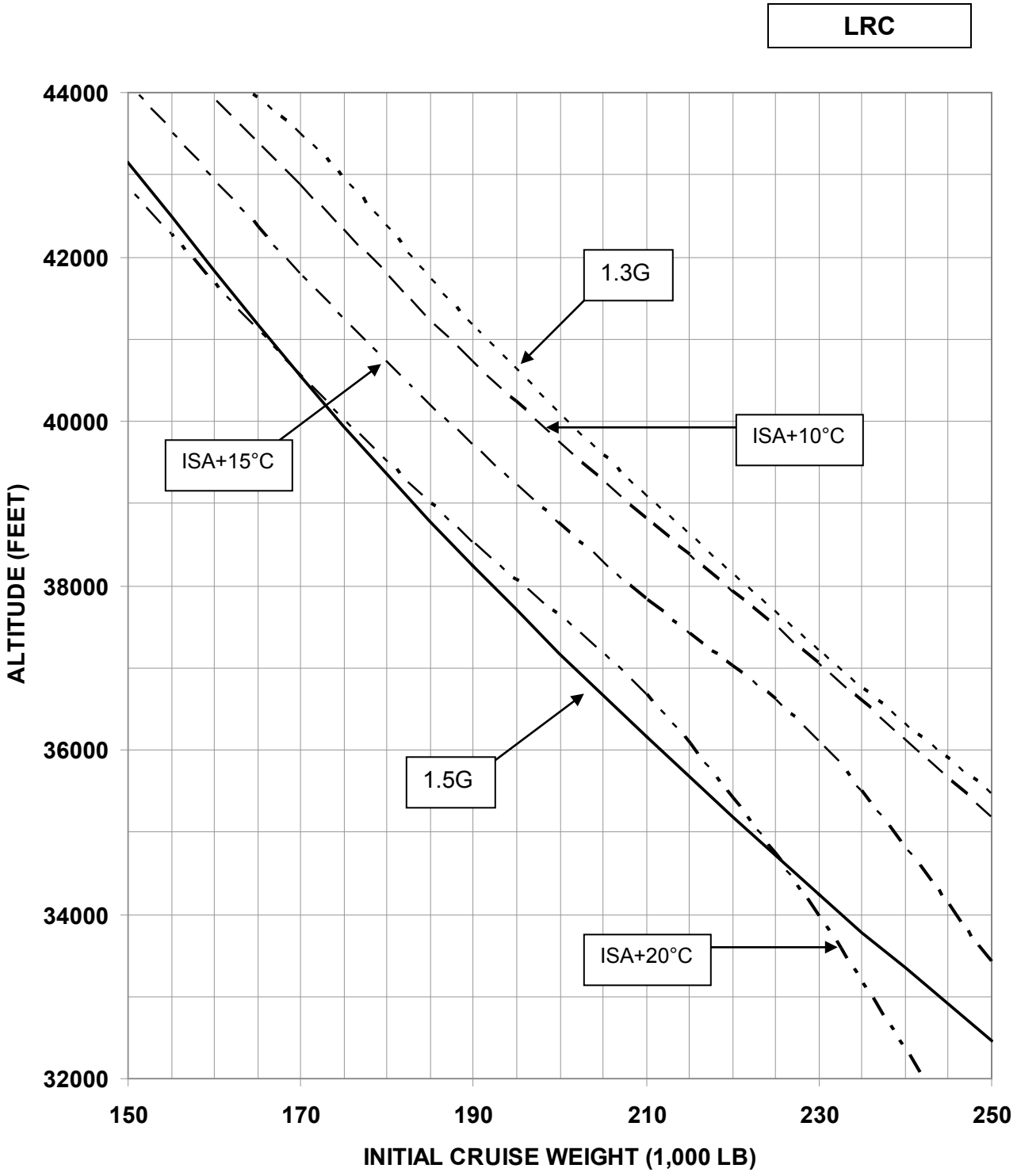
Fuel Type = Jet A (adjusted freeze point -37°C).
Expected Flight Level = 350.
Expected Mach Number = 0.81.

1. Enter the top of the Chart under JET A (Adjusted Fuel Freezing Temperature = -37°C).

2. Move down the chart to the flight conditions of Mach 0.81 and FL 350 and read the Maximum ISA Deviation (-10°C).

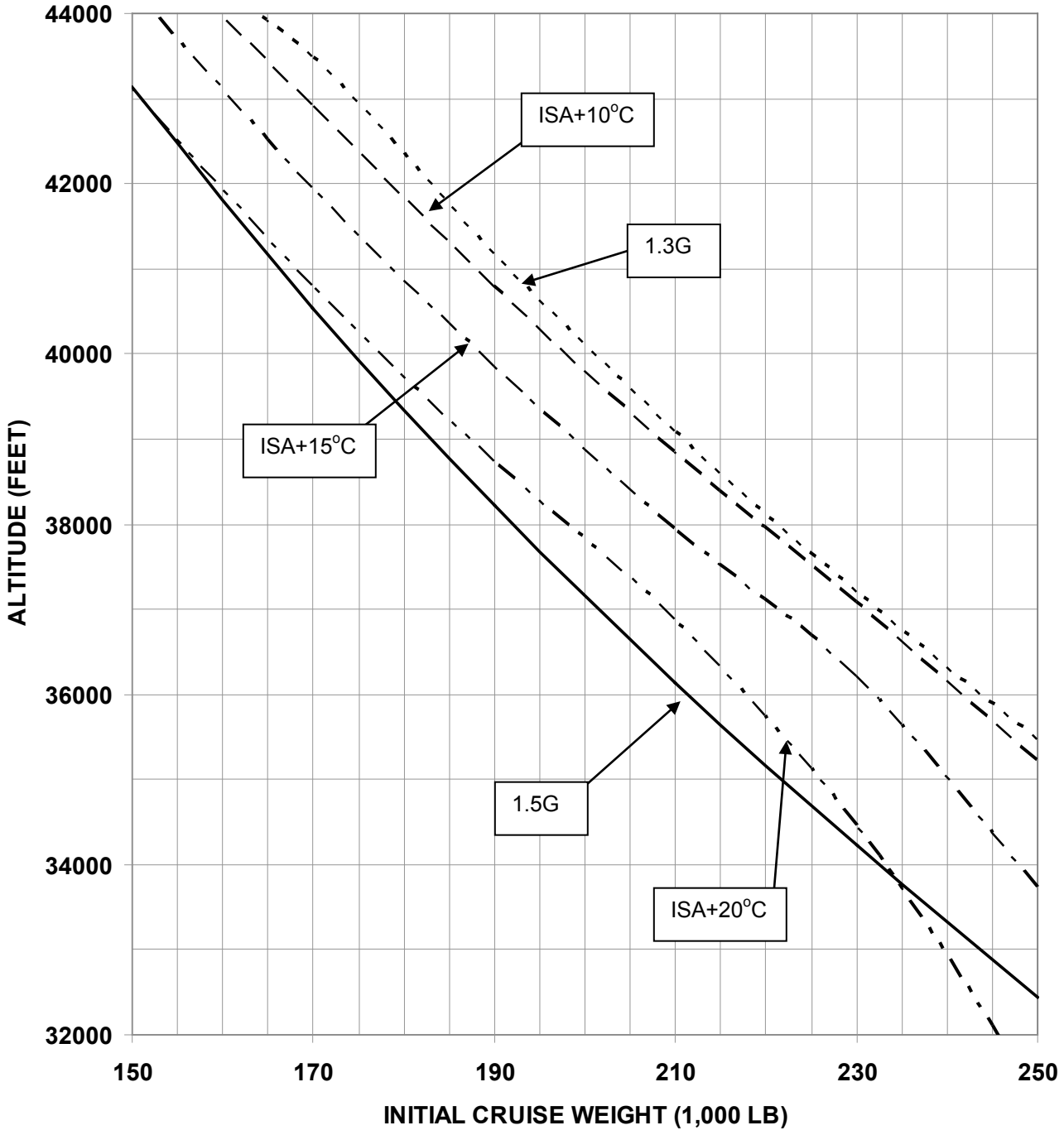
3. Do not dispatch aircraft into temperatures colder than ISA -10°C at FL 350.

MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE



MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE

.79 MACH



BUFFET ONSET BOUNDARY SPEEDS

FLIGHT LEVEL	CRUISE WEIGHT - POUNDS	V_b - M KIAS	BANK ANGLE - DEGREES					
			0		30		48	
			LOW	HIGH	LOW	HIGH	LOW	HIGH
410	250	229 (.78M)	231	236				
	230		211	251				
	210		198	256 +	221	245		
	190		187	256 +	204	255		
	170		171	256 +	191	256 +		
	150		157	256 +	176	256 +	207	253
390	250	241 (.78M)	218	263				
	230		208	269 +	231	258		
	210		196	269 +	214	265		
	190		182	269 +	202	269 +		
	170		168	269 +	188	269 +	222	262
	150		153	269 +	170	269 +	204	269 +
370	250	252 (.78M)	215	282 +	238	272		
	230		205	282 +	224	279		
	210		192	282 +	212	282 +		
	190		178	282 +	199	282 +	236	274
	170		164	282 +	182	282 +	218	280
	150		150	282 +	167	282 +	202	282 +
350	250	264 (.78M)	213	294 +	233	293		
	230		200	294 +	221	294 +		
	210		187	294 +	209	294 +	248	285
	190		173	294 +	193	294 +	230	294 +
	170		160	294 +	178	294 +	215	294 +
	150		148	294 +	163	294 +	197	294 +
330	250	277 (.78M)	208	308 +	230	308 +		
	230		195	308 +	218	308 +	258	300
	210		182	308 +	203	308 +	242	308 +
	190		169	308 +	188	308 +	228	308 +
	170		157	308 +	174	308 +	210	308 +
	150		145	308 +	160	308 +	192	308 +
310	250	289 (.78M)	203	322 +	227	322 +	268	313
	230		190	322 +	212	322 +	253	320
	210		178	322 +	198	322 +	239	322 +
	190		166	322 +	184	322 +	223	322 +
	170		153	322 +	171	322 +	205	322 +
	150		142	322 +	157	322 +	187	322 +
290	250	290 (.78M)	197	336 +	220	336 +	262	333
	230		186	336 +	208	336 +	250	336 +
	210		175	336 +	194	336 +	235	336 +
	190		163	336 +	181	336 +	218	336 +
	170		150	336 +	168	336 +	200	336 +
	150		138	336 +	154	336 +	184	336 +

+ NOTE: Buffet Speeds shown with a **following + sign** are higher than the aircraft Vmo/Mmo. The displayed speed is Vmo/Mmo.

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

End of Section

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DEFINITIONS AND ASSUMPTIONS

AWABS Automated Weight and Balance System - The computerized system for determining the weight, balance, and airport performance.

AIRPORT PRESSURE ALTITUDE The altitude read from the altimeter while sitting on the airport and adjusting the altimeter setting to 29.92 inches mercury.

GWT Gross Weight for Takeoff - Weight at the start of the takeoff roll.

V_1 Takeoff decision speed. Speed above which, with one engine failed at V1 and inoperative, it will take less distance to complete the takeoff than to stop on the runway.

V_R Rotation Speed.

V_2 Takeoff Safety Speed - Target speed to achieve at 35 feet above ground during takeoff with one engine failed at V1 and inoperative.

INTENTIONALLY BLANK

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.

V_1 / V_R / V_2
TO / 15

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE					
		5°C & BELOW	10°C	20°C	30°C	40°C	50°C
260,000	10,000						
	8,000						
	6,000	157/160/161	157/160/161	156/159/161			
	4,000	157/159/160	157/159/160	157/159/160			
	2,000	156/158/160	156/158/160	156/158/160	157/159/161	159/161/162	
	S.L.	156/158/160	156/158/160	155/158/160	155/158/160	158/160/161	
250,000	10,000	148/158/159	146/158/159				
	8,000	155/158/159	155/158/159	150/158/159			
	6,000	153/156/158	153/156/158	153/156/158	153/158/159		
	4,000	153/155/157	153/155/157	153/155/157	154/156/158	156/159/160	
	2,000	152/155/157	152/155/157	152/155/157	153/155/157	156/158/159	
	S.L.	152/155/157	152/155/157	152/155/157	152/155/157	154/156/158	157/158/159
240,000	10,000	152/154/155					
	8,000	151/153/154	151/153/154	151/154/155	151/156/157		
	6,000	150/152/154	150/152/154	151/154/156	152/154/155	153/155/156	
	4,000	149/151/154	149/151/154	149/151/154	151/153/155	154/155/157	156/158/159
	2,000	149/151/154	149/151/154	148/151/154	149/152/154	151/153/154	156/157/158
	S.L.	148/151/154	148/151/154	148/151/154	148/151/154	150/152/154	153/154/155
230,000	10,000	148/150/151	148/150/151	149/152/153	147/153/154		
	8,000	147/149/150	147/149/150	147/150/151	149/152/153	151/154/155	152/154/155
	6,000	146/148/151	146/148/151	146/148/151	147/150/151	151/153/154	151/153/154
	4,000	145/147/151	145/147/151	145/147/151	146/148/151	148/151/152	151/153/154
	2,000	144/147/151	144/147/151	144/147/151	145/147/151	147/150/151	151/153/154
	S.L.	144/147/151	144/147/151	144/147/151	144/147/151	146/148/151	149/150/151
220,000	10,000	144/146/147	144/146/147	145/147/148	147/149/150	148/152/153	147/149/150
	8,000	143/145/147	143/145/147	143/146/147	145/148/149	147/149/150	147/149/150
	6,000	141/144/147	142/144/147	142/144/147	143/146/147	146/149/150	147/149/150
	4,000	140/144/147	141/144/147	141/144/147	142/145/147	144/146/148	146/149/150
	2,000	140/143/147	140/143/147	140/143/147	141/144/147	143/145/147	147/148/149
	S.L.	140/143/147	140/143/147	139/143/147	139/143/147	142/144/147	145/146/147
210,000	10,000	140/142/144	140/142/144	141/143/144	143/144/145	146/148/149	143/145/146
	8,000	138/141/144	138/141/144	139/142/144	141/143/144	143/145/146	143/145/146
	6,000	137/140/144	137/140/144	137/140/144	139/142/144	142/144/145	143/145/146
	4,000	136/139/144	136/139/144	136/139/144	137/140/144	140/142/144	142/144/145
	2,000	135/139/143	135/139/143	135/139/143	136/139/144	139/141/144	143/144/145
	S.L.	135/139/144	135/139/143	135/139/143	135/139/143	137/140/144	141/142/144

Limited by Environmental Envelope.

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

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.

V_1 / V_R / V_2
TO / 15

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE					
		5°C & BELOW	10°C	20°C	30°C	40°C	50°C
200,000	10,000	135/138/140	136/138/140	137/139/140	138/140/141	142/143/144	139/141/142
	8,000	134/137/140	134/137/140	135/138/140	137/139/140	139/141/142	139/141/142
	6,000	133/136/140	133/136/140	133/136/140	135/138/140	138/140/141	138/140/141
	4,000	131/135/140	131/135/140	132/135/140	133/136/140	136/138/140	138/140/141
	2,000	131/135/140	131/135/140	131/135/140	132/135/140	135/137/140	138/140/141
	S.L.	131/135/140	131/135/140	130/135/140	130/135/140	133/136/140	137/138/140
190,000	10,000	131/133/137	131/134/137	132/135/137	134/136/137	137/138/139	135/136/137
	8,000	129/133/137	129/133/137	130/133/137	132/135/137	135/136/137	134/136/137
	6,000	128/132/136	128/132/136	128/132/136	130/133/137	133/135/137	134/136/137
	4,000	127/131/136	127/131/136	127/131/136	129/132/137	132/134/137	133/136/137
	2,000	126/131/136	126/131/136	126/131/136	127/131/136	130/133/137	134/135/137
	S.L.	126/131/136	126/131/136	125/131/136	126/131/136	128/132/136	132/134/137
180,000	10,000	126/129/133	127/129/133	128/130/133	130/132/133	133/134/135	130/132/133
	8,000	125/128/133	125/128/133	126/129/133	128/130/133	130/132/133	130/132/133
	6,000	123/127/133	123/127/133	124/128/133	126/129/133	129/131/133	129/131/133
	4,000	122/127/133	122/127/133	122/127/133	124/128/133	127/130/133	129/131/133
	2,000	121/127/133	121/127/133	121/127/133	122/127/133	125/129/133	129/131/133
	S.L.	121/126/133	121/126/133	121/126/133	121/126/133	124/128/133	127/130/133
160,000	10,000	116/120/125	117/121/125	118/121/125	121/123/125	124/125/126	121/123/126
	8,000	115/119/125	115/119/125	116/120/125	118/122/125	121/123/126	121/123/125
	6,000	113/119/125	113/119/125	114/119/125	116/120/125	119/122/125	120/123/125
	4,000	112/118/125	112/118/125	112/118/125	114/119/125	117/121/125	119/122/125
	2,000	111/118/125	111/118/125	111/118/125	112/118/125	115/120/125	120/122/125
	S.L.	111/118/125	111/118/125	111/118/125	111/118/125	114/119/125	118/121/125
140,000	10,000	106/111/117	106/111/117	107/112/117	110/113/117	113/115/117	111/114/117
	8,000	104/110/117	104/110/117	105/111/117	107/112/117	110/114/117	110/113/117
	6,000	103/109/117	103/109/117	103/109/117	105/111/117	108/113/117	109/113/117
	4,000	102/109/117	102/109/117	102/109/117	103/110/117	107/111/117	108/113/117
	2,000	101/109/117	101/109/117	101/109/117	102/109/117	105/110/117	109/112/117
	S.L.	*101/109/117	*101/109/117	101/109/117	101/109/117	103/109/117	107/111/117
120,000	10,000	95/101/108	95/101/108	96/102/108	99/103/108	102/105/108	100/104/108
	8,000	*95/100/108	*95/100/108	94/101/108	96/102/108	99/104/108	99/103/108
	6,000	*97/99/108	*97/99/108	*97/100/108	94/101/108	97/103/108	98/103/108
	4,000	*99/99/108	*99/99/108	*99/99/108	*96/100/108	95/101/108	97/103/108
	2,000	*100/100/110	*100/100/110	*100/100/109	*99/99/108	*95/100/108	98/102/108
	S.L.	*101/101/111	*101/101/111	*101/101/111	*101/101/111	*97/100/108	96/101/108

Speeds marked with an asterisk (*) are limited by Vmcg.

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

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.

V_1 / V_R / V_2
TO / 5

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE					
		5°C & BELOW	10°C	20°C	30°C	40°C	50°C
260,000	10,000						
	8,000						
	6,000						
	4,000	164/167/169	164/167/169				
	2,000	166/167/169	166/167/169	165/167/169			
	S.L.	165/167/169	165/167/169	165/167/169	165/167/169	167/168/169	
250,000	10,000						
	8,000	157/165/167	156/165/167				
	6,000	162/164/166	162/164/166	160/164/166	155/167/168		
	4,000	161/164/166	161/164/166	161/164/166	163/165/166		
	2,000	161/163/166	161/163/166	161/163/166	162/164/166	164/165/167	
	S.L.	161/163/166	161/163/166	160/163/166	161/163/166	163/164/166	167/168/169
240,000	10,000						
	8,000	159/161/163	159/161/163				
	6,000	158/160/163	158/160/163	158/160/163	160/162/163		
	4,000	157/160/163	157/160/163	157/160/163	158/161/163	162/163/164	
	2,000	157/159/162	157/159/162	157/159/162	158/160/163	160/161/163	164/164/165
	S.L.	157/159/162	157/159/162	157/159/162	156/159/162	159/160/163	163/163/164
230,000	10,000	156/158/159	157/159/160	153/159/160			
	8,000	155/157/159	155/157/159	156/158/159	157/160/161	153/163/164	154/163/164
	6,000	154/156/159	154/156/159	154/156/159	156/158/159	159/161/162	159/162/163
	4,000	153/155/159	153/155/159	153/155/159	155/157/159	157/159/160	159/161/162
	2,000	152/155/159	152/155/159	152/155/159	153/156/159	156/157/159	160/161/162
	S.L.	152/155/159	152/155/159	152/155/159	152/155/159	154/156/159	158/159/160
220,000	10,000	152/154/156	152/154/156	153/155/156	155/158/159	152/160/161	154/159/160
	8,000	151/153/155	151/153/155	152/154/156	153/155/156	157/158/159	156/158/159
	6,000	150/152/155	150/152/155	150/152/155	152/154/156	155/156/157	156/157/158
	4,000	149/151/155	149/151/155	149/151/155	150/153/155	153/155/156	155/156/157
	2,000	148/151/155	148/151/155	148/151/155	149/152/155	152/153/156	155/156/157
	S.L.	148/151/155	148/151/155	147/151/155	147/151/155	150/152/155	153/155/156
210,000	10,000	147/149/152	148/150/152	149/151/152	152/153/154	155/155/156	152/154/155
	8,000	146/149/152	146/149/152	147/149/152	149/151/152	152/154/155	152/153/154
	6,000	145/148/152	145/148/152	145/148/152	147/150/152	150/152/153	151/153/154
	4,000	144/147/152	144/147/152	144/147/152	146/148/152	149/150/152	150/152/153
	2,000	143/147/152	143/147/152	143/147/152	144/147/152	147/149/152	151/152/153
	S.L.	143/146/152	143/146/152	143/146/152	143/146/152	145/148/152	149/150/152

Limited by Environmental Envelope.

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

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.

V_1 / V_R / V_2
TO / 5

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE					
		5°C & BELOW	10°C	20°C	30°C	40°C	50°C
200,000	10,000	143/145/148	143/145/148	145/146/148	147/148/149	150/151/152	147/149/150
	8,000	142/144/148	142/144/148	143/145/148	145/147/148	147/149/150	147/149/150
	6,000	140/143/148	140/143/148	141/143/148	143/145/148	146/147/148	146/148/149
	4,000	139/143/148	139/143/148	139/143/148	141/144/148	144/146/148	146/147/148
	2,000	138/142/148	138/142/148	138/142/148	139/143/148	142/145/148	146/147/148
	S.L.	138/142/148	138/142/148	138/142/148	138/142/148	141/144/148	144/146/148
190,000	10,000	138/141/144	139/141/144	140/142/144	142/144/145	145/146/147	143/144/145
	8,000	137/140/144	137/140/144	138/140/144	140/142/144	143/144/145	142/144/145
	6,000	135/139/144	135/139/144	136/139/144	138/141/144	141/143/145	142/143/145
	4,000	134/138/144	134/138/144	134/138/144	136/139/144	139/142/144	141/143/145
	2,000	133/138/144	133/138/144	133/138/144	134/138/144	137/140/144	141/143/144
	S.L.	133/137/144	133/137/144	132/137/144	133/137/144	136/139/144	140/141/144
180,000	10,000	133/136/140	134/136/140	135/137/140	137/139/141	140/141/142	138/140/141
	8,000	132/135/140	132/135/140	133/136/140	135/138/140	138/140/141	137/139/141
	6,000	130/134/140	130/134/140	131/134/140	133/136/140	136/138/140	137/139/141
	4,000	129/134/140	129/134/140	129/133/140	131/135/140	134/137/140	136/138/140
	2,000	128/133/140	128/133/140	128/133/140	129/134/140	132/136/140	136/138/140
	S.L.	128/133/140	128/133/140	127/133/140	128/133/140	131/134/140	135/137/140
160,000	10,000	123/126/132	123/127/132	125/128/132	127/129/132	130/131/132	128/130/132
	8,000	121/126/132	121/126/132	122/126/132	125/128/132	128/130/132	127/129/132
	6,000	120/125/132	120/125/132	120/125/132	122/127/132	126/129/132	126/129/132
	4,000	118/124/132	118/124/132	119/124/132	120/125/132	124/127/132	126/129/132
	2,000	118/124/132	118/124/132	118/124/132	119/124/132	122/126/132	126/128/132
	S.L.	118/124/132	118/124/132	117/124/132	117/124/132	120/125/132	124/127/132
140,000	10,000	111/116/124	112/117/124	113/118/124	116/119/124	119/121/124	117/120/124
	8,000	110/116/124	110/116/124	111/116/124	113/118/124	117/120/124	116/119/124
	6,000	109/115/124	109/115/124	109/115/124	111/116/124	115/118/124	115/119/124
	4,000	107/114/124	108/114/124	108/114/124	109/115/124	113/117/124	115/118/124
	2,000	107/114/124	107/114/124	107/114/124	108/115/124	111/116/124	115/118/124
	S.L.	107/114/124	107/114/124	107/114/124	107/114/124	109/115/124	113/117/124
120,000	10,000	100/106/115	100/106/115	102/107/115	104/108/115	107/110/115	105/109/115
	8,000	98/105/115	98/105/115	99/106/115	102/107/115	105/109/115	104/108/115
	6,000	98/105/115	98/105/115	98/105/115	99/106/115	103/108/115	103/108/115
	4,000	*99/105/116	*99/105/115	*99/105/115	99/106/115	100/106/115	102/108/115
	2,000	*100/104/116	*100/104/116	*100/104/116	*99/105/116	99/106/115	103/107/115
	S.L.	*101/105/117	*101/105/116	*101/104/116	*101/104/116	98/106/115	101/106/115

Speeds marked with an asterisk (*) are limited by Vmcg.

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

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.

V_1 / V_R / V_2
TO / 20

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE					
		5°C & BELOW	10°C	20°C	30°C	40°C	50°C
260,000	10,000						
	8,000	150/152/153					
	6,000	149/151/152	149/151/152	149/151/152			
	4,000	148/151/152	148/151/153	148/150/153	149/151/153	153/155/156	156/158/159
	2,000	148/150/153	148/150/153	148/150/153	148/151/152	150/153/154	155/157/158
	S.L.	147/150/153	147/150/153	147/150/153	147/150/153	149/151/153	153/155/156
250,000	10,000	144/150/151					
	8,000	147/150/151	147/150/151	145/150/151	148/151/152	152/155/156	152/154/155
	6,000	145/148/150	145/148/150	145/148/150	147/150/151	150/152/153	149/152/153
	4,000	144/147/149	144/147/150	144/147/149	146/149/151	148/150/152	149/152/153
	2,000	143/147/149	143/147/149	143/147/149	144/147/150	147/150/151	150/152/153
	S.L.	143/146/149	143/146/149	143/146/149	143/146/149	145/148/150	148/150/151
240,000	10,000	144/147/148	144/147/148	145/147/148	146/148/149		
	8,000	142/145/146	142/145/146	143/146/147	145/147/148	147/149/150	149/151/152
	6,000	141/144/146	141/144/146	142/144/146	144/147/148	146/149/150	149/150/151
	4,000	141/143/146	141/143/146	141/143/146	142/145/146	145/147/148	147/150/151
	2,000	141/143/146	141/143/146	141/143/146	141/144/146	143/145/146	147/148/149
	S.L.	140/143/146	140/143/146	140/143/146	140/143/146	142/144/146	145/147/148
230,000	10,000	139/142/143	140/142/143	140/143/145	142/144/145	148/150/151	144/146/147
	8,000	139/141/144	139/141/144	139/142/143	140/143/145	144/147/148	143/146/147
	6,000	137/140/143	137/140/143	138/141/143	139/142/143	141/144/145	142/144/145
	4,000	136/140/143	136/140/143	137/140/143	138/141/144	140/142/144	141/144/145
	2,000	136/139/143	136/139/143	136/139/143	137/140/143	139/142/144	142/144/145
	S.L.	136/139/143	136/139/143	136/139/143	136/139/143	138/140/143	140/142/143
220,000	10,000	135/138/140	136/138/140	136/139/141	138/140/141	144/145/146	140/142/143
	8,000	135/137/140	135/137/140	135/138/140	136/139/141	140/142/143	139/142/143
	6,000	133/136/140	134/136/140	134/137/140	135/138/140	137/140/141	138/140/141
	4,000	133/136/140	133/136/140	133/136/140	134/137/140	136/138/141	137/140/141
	2,000	132/135/140	132/135/140	132/135/140	133/136/140	135/138/140	138/140/141
	S.L.	132/135/140	132/135/140	131/135/140	132/135/140	134/136/140	136/138/140
210,000	10,000	131/134/137	132/134/137	132/135/137	134/136/138	139/141/142	136/138/139
	8,000	131/133/137	131/133/137	131/134/137	132/135/137	135/138/139	135/137/138
	6,000	130/133/137	130/133/137	130/133/137	131/134/137	133/136/138	134/136/138
	4,000	128/132/137	129/132/137	129/132/137	130/133/137	132/135/137	133/136/138
	2,000	128/132/137	128/132/137	128/132/137	129/132/137	131/134/137	134/136/137
	S.L.	128/131/137	128/131/137	127/131/137	127/131/137	130/133/137	132/134/137

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

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.

V_1 / V_R / V_2
TO / 20

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE					
		5°C & BELOW	10°C	20°C	30°C	40°C	50°C
200,000	10,000	127/130/133	128/130/133	128/131/134	130/132/134	135/136/137	131/134/135
	8,000	126/129/133	127/129/133	127/130/133	128/131/134	131/134/135	131/133/135
	6,000	125/129/133	125/129/133	126/129/133	127/130/133	129/132/134	130/132/134
	4,000	124/128/133	124/128/133	124/128/133	126/129/133	128/131/134	129/132/134
	2,000	123/128/133	123/128/133	124/128/133	124/128/133	127/130/133	130/132/134
	S.L.	123/128/133	124/128/133	123/127/133	123/127/133	126/129/133	128/130/133
190,000	10,000	123/126/130	124/126/130	125/127/130	126/128/130	130/132/133	127/129/131
	8,000	122/125/130	122/125/130	123/126/130	124/127/130	127/129/131	127/129/131
	6,000	121/124/130	121/124/130	121/125/130	123/126/130	125/128/130	126/128/130
	4,000	120/124/130	120/124/130	120/124/130	121/125/130	124/127/130	125/128/130
	2,000	119/124/130	119/124/130	119/124/130	120/124/130	123/126/130	126/128/130
	S.L.	119/123/130	119/123/130	118/123/130	118/123/130	121/125/130	125/126/130
180,000	10,000	119/122/127	119/122/127	121/123/127	122/124/127	125/127/128	123/125/127
	8,000	118/121/127	118/121/127	119/122/127	120/123/127	123/125/127	122/125/127
	6,000	116/121/127	116/121/127	117/121/127	119/122/127	121/124/127	122/124/127
	4,000	115/120/127	115/120/127	115/120/127	117/121/127	120/123/127	121/124/127
	2,000	114/120/127	114/120/127	115/120/127	115/120/127	118/122/127	122/124/127
	S.L.	114/120/127	114/120/127	114/120/127	114/120/127	117/121/127	120/122/127
160,000	10,000	110/114/119	110/114/119	111/115/119	114/116/119	116/118/119	115/117/119
	8,000	108/113/119	108/113/119	109/114/119	111/115/119	114/117/119	114/116/119
	6,000	107/112/119	107/112/119	107/112/119	109/114/119	113/115/119	113/116/119
	4,000	106/112/119	106/112/119	106/112/119	108/113/119	111/114/119	112/116/119
	2,000	105/112/119	105/112/119	105/112/119	106/112/119	109/113/119	113/115/119
	S.L.	105/111/119	105/111/119	104/111/119	105/111/119	107/112/119	111/114/119
140,000	10,000	100/105/112	100/105/112	101/106/112	104/107/112	107/109/112	105/108/112
	8,000	98/104/112	98/104/112	99/105/112	101/106/112	104/108/112	104/107/112
	6,000	97/104/112	97/104/112	97/104/112	99/105/112	103/106/112	103/107/112
	4,000	*98/103/112	*98/103/112	*98/103/112	98/104/112	101/105/112	102/107/112
	2,000	*100/103/112	*100/103/112	*99/103/112	*98/103/112	99/104/112	103/106/112
	S.L.	*100/103/111	*100/103/111	*100/103/111	*100/103/112	98/104/112	101/105/112
120,000	10,000	*92/96/104	*91/96/104	91/97/104	93/98/104	97/99/104	94/98/104
	8,000	*95/95/104	*95/95/104	*93/96/104	91/97/104	94/98/104	93/98/104
	6,000	*97/97/106	*97/97/106	*97/97/106	*93/96/104	92/97/104	93/97/104
	4,000	*99/99/109	*99/99/109	*99/99/109	*96/96/105	*92/96/104	92/97/104
	2,000	*100/100/110	*100/100/110	*100/100/110	*99/99/109	*95/95/104	93/97/104
	S.L.	*101/101/110	*101/101/110	*101/101/110	*101/101/111	*97/97/106	*92/96/104

Speeds marked with an asterisk (*) are limited by Vmcg.

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

TAKEOFF STABILIZER SETTINGS

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.

FLAPS 1 AND 5

GROSS WEIGHT 1,000 LBS	CENTER OF GRAVITY Percent M.A.C.						
	9	14	19	24	29	34	39
260	7.0	7.0	6.1	5.1	4.2	3.5	2.8
240	7.0	6.7	5.7	4.8	4.1	3.4	2.8
220	7.0	6.3	5.4	4.5	3.9	3.4	2.8
200	7.0	6.0	5.1	4.3	3.7	3.2	2.6
180	6.6	5.6	4.7	4.1	3.5	3.0	2.4
160	6.3	5.3	4.4	3.9	3.3	2.8	2.2
140	5.9	5.0	4.2	3.7	3.1	2.6	2.0

FLAPS 15 AND 20

GROSS WEIGHT 1,000 LBS	CENTER OF GRAVITY Percent M.A.C.						
	9	14	19	24	29	34	39
260	7.0	7.0	6.3	5.2	4.1	3.2	2.3
240	7.0	6.9	5.8	4.7	3.9	3.1	2.3
220	7.0	6.5	5.4	4.4	3.7	3.0	2.3
200	7.0	6.0	4.9	4.1	3.4	2.7	2.0
180	6.7	5.6	4.5	3.8	3.1	2.4	2.0
160	6.2	5.1	4.2	3.5	2.8	2.1	2.0
140	5.8	4.7	3.9	3.2	2.5	2.0	2.0

End of Section

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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 1.3 V_S speed at 50 feet and assumes maximum braking and NO reverse thrust.

APPROACH CLIMB LIMIT WEIGHT Approach Climb Limit Weight is defined in FAR 25.121 as the maximum weight at which a missed approach climb meets the FAR prescribed climb gradient (2.1% for a two engine aircraft). This gradient is determined with the critical engine inoperative, remaining engine at takeoff thrust, landing gear retracted, and approach flap setting (as defined in the FAA Approved Flight Manual). This weight takes into account an air conditioning pack ON and operated from engine bleed air.

F.A.R. LANDING FIELD LENGTH This is the landing field length as defined in the Federal Air Regulations Part 121, and is the actual landing distance plus an additional safety margin of 67%. Dispatch is based on F.A.R. Landing Field Length at the destination airport.

GO-AROUND THRUST Maximum thrust setting available for use during a missed approach.

LANDING CLIMB LIMIT WEIGHT Landing Climb Limit Weight is defined in FAR 25.119 as the maximum weight at which the aircraft meets the FAR prescribed climb gradient (3.2%). This gradient is determined with all engines operating, landing gear extended, and landing flap setting.

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.

PATTERN AND APPROACH SPEEDS

KIAS
NORMAL CONFIGURATION

GROSS WEIGHT LBS	V_{ref}	APPROACH - GEAR UP					LANDING - GEAR DOWN	
		SLATS RET.	SLATS EXTENDED				SLATS EXTENDED	
		FLAPS 0	FLAPS 1	FLAPS 5	FLAPS 15	FLAPS 20	FLAPS 25	FLAPS 30
		V_{ref} + 80	V_{ref} + 60	V_{ref} + 40	V_{ref} + 20	V_{ref} + 20		
260,000	155	235	215	195	175	175	157	155
250,000	152	232	212	192	172	172	154	152
240,000	148	228	208	188	168	168	150	148
230,000	144	224	204	184	164	164	146	144
220,000	140	220	200	180	160	160	142	140
210,000	137	217	197	177	157	157	139	137
200,000	133	213	193	173	153	153	135	133
190,000	129	209	189	169	149	149	131	129
180,000	125	205	185	165	145	145	127	125
170,000	121	201	181	161	141	141	123	121
160,000	117	197	177	157	137	137	119	117
150,000	113	193	173	153	133	133	115	113
140,000	109	189	169	149	129	129	111	109

F.A.R. DRY LANDING FIELD LENGTH

FEET

PW 2037

FLAPS 25

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET											
	0	**1,000**	**2,000**	**3,000**	**4,000**	**5,000**	**6,000**	**7,000**	**8,000**	***8,400***	**9,000**	**10,000**
250,000	6,000	6,150	6,300	6,450	6,630	6,800	7,000	7,200	7,400	7,480	7,600	7,800
240,000	5,790	5,940	6,080	6,230	6,390	6,560	6,760	6,950	7,140	7,230	7,330	7,520
230,000	5,580	5,720	5,850	6,000	6,160	6,320	6,510	6,700	6,890	6,960	7,060	7,250
220,000	5,370	5,500	5,620	5,770	5,930	6,080	6,260	6,440	6,630	6,700	6,780	6,970
210,000	5,160	5,280	5,390	5,550	5,690	5,840	6,010	6,190	6,370	6,440	6,510	6,690
200,000	4,950	5,070	5,170	5,320	5,460	5,600	5,770	5,940	6,110	6,170	6,250	6,410
190,000	4,740	4,850	4,940	5,100	5,230	5,360	5,520	5,680	5,850	5,910	5,990	6,140
180,000	4,540	4,630	4,710	4,870	4,990	5,120	5,270	5,430	5,590	5,650	5,720	5,870
170,000	4,330	4,420	4,490	4,640	4,760	4,880	5,020	5,170	5,330	5,390	5,460	5,600
160,000	4,120	4,200	4,260	4,420	4,530	4,640	4,770	4,920	5,070	5,120	5,200	5,330
150,000	3,910	3,980	4,030	4,190	4,300	4,390	4,530	4,670	4,810	4,860	4,930	5,060
140,000	3,700	3,760	3,800	3,960	4,060	4,150	4,280	4,410	4,550	4,600	4,670	4,790

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 V_{Ref}.
- Based on maximum manual braking, speed brakes extended and NO reverse thrust.
- All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 30 ft. per knot
Tailwind	+ 100 ft. per knot
Manual Spoilers	+ 700 ft.
Wet runway and/or Low Minima	increase distance by 15%

F.A.R. DRY LANDING FIELD LENGTH

FEET

PW 2037

FLAPS 30

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET											
	0	**1,000**	**2,000**	**3,000**	**4,000**	**5,000**	**6,000**	**7,000**	**8,000**	***8,400***	**9,000**	**10,000**
250,000	5,950	6,100	6,260	6,420	6,600	6,750	6,950	7,150	7,350	7,430	7,550	7,770
240,000	5,750	5,890	6,040	6,190	6,370	6,510	6,700	6,890	7,090	7,170	7,270	7,470
230,000	5,530	5,670	5,810	5,960	6,130	6,260	6,440	6,630	6,820	6,900	6,980	7,190
220,000	5,310	5,440	5,580	5,720	5,890	6,020	6,190	6,370	6,550	6,620	6,700	6,900
210,000	5,090	5,220	5,350	5,480	5,640	5,770	5,940	6,110	6,280	6,350	6,420	6,610
200,000	4,870	5,000	5,120	5,240	5,400	5,530	5,680	5,850	6,010	6,080	6,150	6,330
190,000	4,650	4,770	4,890	5,010	5,160	5,280	5,430	5,590	5,740	5,810	5,870	6,040
180,000	4,440	4,550	4,670	4,770	4,910	5,040	5,170	5,330	5,480	5,540	5,600	5,760
170,000	4,220	4,320	4,440	4,530	4,670	4,790	4,920	5,070	5,210	5,270	5,320	5,470
160,000	4,000	4,100	4,210	4,300	4,430	4,540	4,660	4,810	4,940	5,000	5,060	5,200
150,000	3,780	3,880	3,980	4,060	4,190	4,300	4,410	4,540	4,670	4,730	4,790	4,920
140,000	3,560	3,650	3,750	3,820	3,940	4,050	4,150	4,280	4,400	4,450	4,530	4,650

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 V_{Ref}.
- Based on maximum manual braking, speed brakes extended and NO reverse thrust.
- All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 30 ft. per knot
Tailwind	+ 100 ft. per knot
Manual Spoilers	+ 700 ft.
Wet runway and/or Low Minima	increase distance by 15%

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APPROACH AND LANDING CLIMB LIMITS

POUNDS

PW 2037

APPROACH FLAPS 20
LANDING FLAPS 30

OAT °C	AIRPORT PRESSURE ALTITUDE - FEET											
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	*8,400*	9,000	10,000
50	208,200	199,500	190,400	OUTSIDE ENVIRONMENTAL ENVELOPE								
45	223,700	215,000	207,000	199,500	191,700							
40	243,300	228,500	222,100	213,500	205,700	197,700	191,300	184,000				
35	244,400	239,000	232,600	227,000	219,000	211,500	203,500	195,500	188,300	184,500	180,400	173,200
32	250,000	245,000	238,500	233,500	225,600	218,000	209,800	201,700	194,500	191,500	186,500	178,800
30	250,000	249,400	243,500	238,400	230,700	223,300	214,500	206,500	199,000	195,000	191,000	183,300
28	250,000	250,000	247,300	242,000	234,700	227,200	218,700	210,300	203,300	200,000	195,600	187,400
26	250,000	250,000	250,000	245,500	238,500	231,500	222,700	214,500	207,000	203,500	198,800	190,800
24	250,000	250,000	250,000	248,300	243,000	236,200	227,500	219,000	211,500	207,500	203,000	194,700
22	250,000	250,000	250,000	248,300	245,800	240,000	231,000	222,300	214,500	211,500	206,000	197,700
20	250,000	250,000	250,000	248,400	245,800	243,000	235,300	226,500	217,700	214,500	209,800	201,600
18	250,000	250,000	250,000	248,400	245,800	243,000	237,800	229,800	221,600	218,500	213,600	205,300
16	250,000	250,000	250,000	248,400	245,800	243,000	238,000	232,600	224,500	220,500	216,400	208,000
10	250,000	250,000	250,000	248,400	245,800	243,000	238,000	232,600	227,500	225,000	222,200	213,400
5 & below	250,000	250,000	250,000	248,400	245,800	243,000	238,000	232,600	227,500	225,000	222,200	216,300

NOTES:

1. All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.
2. AFM Maximum Structural Landing Weight should not be exceeded (unless overweight landing is deemed necessary in flight).
3. Reduce Gross Weight by 10,900 lbs. when operating in icing conditions during any part of the flight when the forecast landing temperature is below 8°C.
4. Apply the following Gross Weight Corrections (pounds) for applicable bleed configuration:

CONFIGURATION	CORRECTION – POUNDS	
	A/C PACKS OFF	A/C PACKS ON
Anti-Ice OFF	+ 2,200	0
Engine Anti-Ice ON at or below 7,000 feet altitude	+ 1,800	- 1,100
Engine Anti-Ice ON above 7,000 feet altitude	- 4,600	- 8,000
Engine & Wing Anti-Ice ON at or below 7,000 feet altitude	- 10,800	- 14,000
Engine & Wing Anti-Ice ON above 7,000 feet altitude	- 18,100	- 21,000

BASIS:

The limit weights shown are the more restrictive of:

Approach

- One engine inoperative.
- Flaps at approach setting.
- Landing gear retracted.

Landing

- All engines operating.
- Flaps at landing setting.
- Landing gear extended.

OPERATIONAL LANDING DISTANCES

FEET

FLAPS 25

NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).

Landing Weight (lb)	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
250,000	9,900	9,300	8,500	7,400	6,800	4,500	8,500	7,400	7,100	6,000
240,000	9,600	9,000	8,200	7,200	6,600	4,400	8,200	7,200	6,900	5,800
230,000	9,200	8,700	7,900	6,900	6,400	4,300	7,900	7,000	6,700	5,600
220,000	8,800	8,300	7,700	6,700	6,200	4,200	7,700	6,800	6,400	5,500
210,000	8,400	8,000	7,400	6,500	6,000	4,100	7,400	6,600	6,200	5,300
200,000	8,000	7,700	7,100	6,300	5,800	4,000	7,100	6,400	6,000	5,100
198,000	8,000	7,600	7,100	6,300	5,800	4,000	7,100	6,300	6,000	5,100
190,000	7,700	7,300	6,800	6,100	5,700	3,900	6,800	6,100	5,800	4,900
180,000	7,300	7,000	6,600	5,900	5,500	3,800	6,600	5,900	5,600	4,800
170,000	7,000	6,700	6,300	5,600	5,300	3,700	6,300	5,700	5,400	4,600
160,000	6,600	6,300	6,000	5,400	5,100	3,600	6,000	5,500	5,200	4,500
150,000	6,300	6,000	5,700	5,200	4,900	3,500	5,700	5,300	5,000	4,400

BASIS: Zero wind ● Two Engine Full 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	-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	600	500	500	300	600	500	500	400
8,000	1,400	1,200	1,000	800	700	400	1,000	800	700	600
10,000	2,000	1,800	1,400	1,100	1,000	600	1,400	1,100	1,000	900

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	250	250	250	200	200	100	250	200	200	150
PER 10°C ABOVE ISA	200	200	150	150	100	50	150	150	100	100
PER 10°C BELOW ISA	-150	-150	-150	-150	-100	-50	-150	-150	-100	-100
PER 1% UP SLOPE	-200	-200	-100	-50	-50	-50	-100	-100	-100	-100
PER 1% DOWN SLOPE	250	200	100	50	50	50	100	100	100	100
1 REVERSER INOP	1,200	700	300	200	200	100	300	300	400	300
2 REVERSERS INOP	1,800	1,000	600	500	500	200	600	800	1,100	700
MANUAL SPOILERS	0	0	0	0	0	300	0	0	0	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
250,000	8,900	8,300	8,300	7,800	9,900	9,800	9,800	9,700
240,000	8,600	8,000	8,000	7,600	9,600	9,400	9,400	9,300
230,000	8,300	7,700	7,700	7,300	9,200	9,100	9,100	9,000
220,000	8,000	7,500	7,500	7,100	8,900	8,700	8,700	8,700
210,000	7,700	7,200	7,200	6,800	8,500	8,400	8,400	8,300
200,000	7,400	6,900	6,900	6,500	8,200	8,000	8,000	8,000
198,000	7,400	6,900	6,900	6,500	8,100	8,000	8,000	7,900
190,000	7,100	6,700	6,600	6,300	7,800	7,700	7,700	7,700
180,000	6,800	6,400	6,400	6,100	7,500	7,400	7,400	7,400
170,000	6,600	6,200	6,100	5,900	7,200	7,000	7,000	7,100
160,000	6,300	5,900	5,900	5,600	6,900	6,700	6,700	6,800
150,000	6,000	5,700	5,600	5,400	6,600	6,400	6,400	6,500

BASIS: Zero wind ● Two Engine Full 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	-300	-300	-300	-300	-400	-400	-400	-400
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	400	400	400	400
6,000	700	600	600	600	800	800	800	800
8,000	1,000	1,000	1,000	900	1,200	1,200	1,200	1,200
10,000	1,500	1,500	1,500	1,300	1,800	1,800	1,800	1,800

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	150	150	150	150
PER 5 KTS ADD'L SPD	250	200	200	200	250	200	200	200
PER 10°C ABOVE ISA	150	150	150	150	200	200	200	200
PER 10°C BELOW ISA	-150	-150	-150	-150	-150	-150	-150	-150
PER 1% UP SLOPE	-150	-150	-200	-150	-300	-350	-350	-300
PER 1% DOWN SLOPE	200	200	200	200	450	450	450	450
1 REVERSER INOP	600	900	900	700	1,500	1,600	1,700	1,500
2 REVERSERS INOP	2,100	2,600	2,600	2,100	5,300	5,400	5,400	5,000
MANUAL SPOILERS	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES

FEET

FLAPS 30

NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).

Landing Weight (lb)	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
250,000	9,700	9,100	8,300	7,200	6,600	4,600	8,300	7,300	6,900	5,900
240,000	9,300	8,800	8,000	7,000	6,400	4,400	8,000	7,100	6,700	5,700
230,000	9,000	8,400	7,700	6,800	6,200	4,300	7,700	6,800	6,500	5,600
220,000	8,600	8,100	7,500	6,600	6,000	4,200	7,500	6,600	6,300	5,400
210,000	8,200	7,800	7,200	6,400	5,900	4,100	7,200	6,400	6,100	5,200
200,000	7,800	7,400	6,900	6,100	5,700	4,000	6,900	6,200	5,900	5,100
198,000	7,700	7,400	6,900	6,100	5,600	4,000	6,900	6,100	5,900	5,000
190,000	7,400	7,100	6,600	5,900	5,500	3,900	6,600	6,000	5,700	4,900
180,000	7,100	6,800	6,400	5,700	5,300	3,800	6,400	5,800	5,500	4,700
170,000	6,800	6,500	6,100	5,500	5,100	3,700	6,100	5,500	5,300	4,600
160,000	6,400	6,100	5,800	5,300	4,900	3,600	5,800	5,300	5,100	4,400
150,000	6,100	5,800	5,500	5,100	4,800	3,500	5,500	5,100	4,900	4,300

BASIS: Zero wind ● Two Engine Full 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	-400	-400	-300	-300	-200	-100	-300	-300	-200	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	400	400	300	300	200	100	300	300	200	200
6,000	900	800	600	500	400	300	600	500	500	400
8,000	1,300	1,200	1,000	800	600	400	1,000	800	700	600
10,000	1,900	1,700	1,400	1,100	900	600	1,400	1,100	1,000	900

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	250	250	250	200	200	100	250	200	200	150
PER 10°C ABOVE ISA	200	200	150	150	100	50	150	150	100	100
PER 10°C BELOW ISA	-150	-150	-150	-100	-100	-50	-150	-150	-100	-100
PER 1% UP SLOPE	-200	-150	-100	-50	-50	-50	-100	-100	-100	-100
PER 1% DOWN SLOPE	200	150	100	50	50	50	100	100	100	100
1 REVERSER INOP	1,100	600	300	200	200	100	300	300	400	300
2 REVERSERS INOP	1,700	900	500	400	400	100	600	800	1,000	600
MANUAL SPOILERS	0	0	0	0	0	300	0	0	0	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
250,000	8,700	8,200	8,100	7,700	9,700	9,600	9,600	9,500
240,000	8,400	7,900	7,900	7,400	9,300	9,200	9,200	9,200
230,000	8,100	7,600	7,600	7,200	9,000	8,900	8,900	8,800
220,000	7,800	7,400	7,300	6,900	8,700	8,500	8,500	8,500
210,000	7,500	7,100	7,000	6,700	8,300	8,200	8,200	8,200
200,000	7,200	6,800	6,800	6,400	8,000	7,900	7,900	7,800
198,000	7,200	6,700	6,700	6,400	7,900	7,800	7,800	7,800
190,000	6,900	6,500	6,500	6,200	7,600	7,500	7,500	7,500
180,000	6,700	6,300	6,200	6,000	7,300	7,200	7,200	7,200
170,000	6,400	6,000	6,000	5,700	7,000	6,900	6,900	6,900
160,000	6,100	5,800	5,700	5,500	6,700	6,500	6,500	6,600
150,000	5,800	5,500	5,500	5,300	6,300	6,200	6,200	6,300

BASIS: Zero wind ● Two Engine Full 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	-300	-300	-300	-300	-400	-400	-400	-400
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	400	400	400	400
6,000	700	600	600	600	800	800	800	800
8,000	1,000	1,000	1,000	900	1,200	1,200	1,200	1,200
10,000	1,400	1,400	1,400	1,300	1,800	1,800	1,800	1,800

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	150	150	150	150
PER 5 KTS ADD'L SPD	250	200	200	200	250	200	200	200
PER 10°C ABOVE ISA	150	150	150	150	200	200	200	150
PER 10°C BELOW ISA	-150	-150	-150	-150	-150	-150	-150	-150
PER 1% UP SLOPE	-150	-150	-200	-150	-300	-300	-300	-300
PER 1% DOWN SLOPE	200	200	200	200	450	450	450	450
1 REVERSER INOP	500	800	900	700	1,400	1,500	1,500	1,400
2 REVERSERS INOP	1,900	2,300	2,400	1,900	4,700	4,800	4,800	4,400
MANUAL SPOILERS	0	0	0	300	0	0	0	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.

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

ASI AWABS has automatically corrected the allowable weights and V1 speeds due to a completely inoperative anti-skid braking system.

BKI AWABS has automatically corrected the allowable weights and V1 speeds due to an inoperative brake or one anti-skid channel inoperative.

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 ENGINES

TAKEOFF
EPR

TO

PW 2037

40 TO 80 KNOTS
NORMAL BLEED - PACKS ON/ANTI-ICE OFF

OAT	AIRPORT PRESSURE ALTITUDE - FEET											
°C	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
55	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
54	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
52	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
50	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
48	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
46	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
44	1.35	1.35	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
42	1.36	1.36	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
40	1.37	1.37	1.38	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
38	1.38	1.38	1.38	1.38	1.39	1.40	1.40	1.40	1.40	1.40	1.40	1.40
36	1.39	1.39	1.40	1.40	1.40	1.41	1.42	1.42	1.42	1.42	1.42	1.42
34	1.40	1.40	1.40	1.41	1.42	1.43	1.43	1.43	1.43	1.43	1.43	1.43
32	1.40	1.40	1.41	1.42	1.43	1.44	1.44	1.44	1.44	1.44	1.44	1.44
30	1.40	1.41	1.43	1.43	1.44	1.45	1.45	1.45	1.45	1.45	1.45	1.45
28	1.40	1.41	1.43	1.45	1.45	1.46	1.47	1.47	1.47	1.47	1.47	1.47
26	1.40	1.41	1.43	1.45	1.46	1.47	1.48	1.48	1.48	1.48	1.48	1.48
24	1.40	1.41	1.43	1.45	1.47	1.48	1.49	1.49	1.49	1.49	1.49	1.49
22	1.40	1.41	1.43	1.45	1.47	1.48	1.49	1.49	1.49	1.49	1.49	1.49
20	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.52	1.52	1.52	1.52	1.52
18	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.53	1.53	1.53	1.53
16	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.54	1.54	1.54	1.54
14	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.54	1.55	1.55	1.55
12	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.54	1.56	1.56	1.56
10	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.54	1.56	1.57	1.57
5 & BELOW	1.40	1.41	1.43	1.45	1.47	1.49	1.51	1.53	1.54	1.56	1.57	1.58

BLEED ADJUSTMENTS:

Packs OFF	+ 0.01
Engine Anti-Ice ON	0.00
Engine Anti-Ice ON above 8,000 ft	- 0.03

THRUST SETTINGS – ALL ENGINES

TAKEOFF
% N_1

TO

PW2037

40 TO 80 KNOTS
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

OAT	ALTITUDE - FEET											
°C	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
55	86.1	86.1	86.1	86.1	86.1	86.1	86.1	86.1	86.1	86.1	86.1	86.1
54	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4
52	87.1	87.1	87.1	87.1	87.1	87.1	87.1	87.1	87.1	87.1	87.1	87.1
50	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8
48	88.5	88.5	88.5	88.5	88.5	88.5	88.5	88.5	88.5	88.5	88.5	88.5
46	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2	89.2
44	89.6	89.7	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9
42	89.8	89.9	90.2	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4
40	89.9	90.0	90.4	90.8	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0
38	90.1	90.2	90.6	91.0	91.3	91.5	91.5	91.5	91.5	91.5	91.5	91.5
36	90.3	90.3	90.7	91.2	91.5	91.8	92.1	92.1	92.1	92.1	92.1	92.1
34	90.4	90.5	90.9	91.3	91.7	92.1	92.4	92.4	92.4	92.4	92.4	92.4
32	90.5	90.7	91.1	91.5	91.9	92.3	92.6	92.6	92.6	92.6	92.6	92.6
30	90.2	90.8	91.3	91.7	92.1	92.5	92.8	92.8	92.8	92.8	92.8	92.8
28	89.9	90.4	91.4	92.0	92.4	92.8	93.1	93.1	93.1	93.1	93.1	93.1
26	89.4	89.4	90.9	92.1	92.6	93.1	93.4	93.4	93.4	93.4	93.4	93.4
24	89.1	89.7	90.6	91.6	92.8	93.3	93.7	93.7	93.7	93.7	93.7	93.7
22	88.8	89.4	90.3	91.3	92.3	93.5	94.1	94.1	94.1	94.1	94.1	94.1
20	88.5	89.1	90.0	91.0	92.0	93.1	94.2	94.4	94.2	95.1	95.1	95.1
18	88.2	88.8	89.7	90.7	91.7	92.7	94.1	94.5	94.8	94.8	94.8	94.8
16	87.9	88.5	89.4	90.4	91.4	92.4	93.8	94.2	95.0	95.1	95.1	95.1
14	87.6	88.1	89.1	90.1	91.1	92.1	93.5	93.9	94.6	95.1	95.1	95.1
12	87.3	87.8	88.8	89.8	90.7	91.8	93.1	93.5	94.3	95.1	95.1	95.1
10	87.0	87.5	88.5	89.5	90.4	91.5	92.8	93.2	93.9	94.7	95.1	95.1
8	86.7	87.2	88.2	89.1	90.1	91.1	92.5	92.9	93.6	94.3	95.1	95.1
6	86.4	86.9	87.8	88.8	89.8	90.8	92.2	92.6	93.3	94.0	94.7	95.1
4	86.1	86.6	87.5	88.5	89.5	90.5	91.8	92.2	92.9	93.6	94.4	95.1
2	85.7	86.3	87.2	88.2	89.1	90.2	91.5	91.9	92.6	93.3	94.1	94.8
0	85.4	86.0	86.9	87.9	88.8	89.8	90.8	91.5	92.2	92.9	93.7	94.5
-2	85.1	85.7	86.6	87.5	88.5	89.5	90.8	91.2	91.9	92.6	93.3	94.2
-4	84.8	85.3	86.3	87.2	88.2	89.2	90.5	90.9	91.6	92.3	93.0	93.8
-6	84.5	85.0	85.9	86.9	87.8	88.8	90.2	90.5	91.3	91.9	92.6	93.4
-8	84.1	84.6	85.5	86.5	87.4	88.4	89.4	90.1	90.8	91.5	92.3	93.1
-10	83.8	84.3	85.2	86.1	87.1	88.1	89.6	89.8	90.5	91.2	91.9	92.7
-15	82.1	82.7	83.6	84.5	85.4	86.4	87.4	88.0	88.7	89.4	90.1	90.9
-20	82.2	82.7	83.6	84.5	85.4	86.4	87.4	88.1	88.8	89.5	90.2	90.9
-25	81.4	81.9	82.7	83.6	84.6	85.6	86.5	87.2	87.9	88.6	89.3	90.0
-30	80.6	81.6	81.9	82.8	83.7	84.7	85.7	86.3	87.0	87.7	88.4	89.1
-35	79.7	80.2	81.1	81.9	82.9	83.8	84.8	85.4	86.1	86.8	87.5	88.2

BLEED ADJUSTMENTS:

Packs OFF	+ 0.6
Engine Anti-Ice ON below 8,000 ft	0.0
Engine Anti-Ice ON above 8,000 ft	- 1.4
Wing Anti-Ice ON	- 1.0

THRUST SETTINGS – ALL ENGINES

MAXIMUM CLIMB EPR

CLB

PW2037

250 / 300 KIAS/MACH 0.80 SPEED SCHEDULE
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	37,000	41,000
40	1.22	1.21	1.18	1.15	1.12	1.10	1.08	1.08	1.07	1.06
38	1.23	1.21	1.19	1.16	1.12	1.11	1.09	1.08	1.08	1.07
36	1.23	1.23	1.19	1.17	1.13	1.12	1.10	1.09	1.09	1.08
34	1.24	1.24	1.20	1.18	1.14	1.14	1.12	1.10	1.10	1.09
32	1.24	1.25	1.21	1.18	1.16	1.15	1.12	1.11	1.11	1.10
30	1.24	1.25	1.22	1.19	1.16	1.15	1.14	1.12	1.12	1.11
28	1.24	1.26	1.23	1.20	1.17	1.16	1.14	1.13	1.13	1.12
26	1.24	1.27	1.24	1.21	1.18	1.17	1.16	1.15	1.14	1.13
24	1.24	1.27	1.25	1.23	1.19	1.19	1.17	1.16	1.15	1.14
22	1.24	1.27	1.26	1.24	1.20	1.20	1.18	1.17	1.17	1.16
20	1.24	1.27	1.27	1.25	1.22	1.21	1.19	1.18	1.18	1.17
18	1.24	1.27	1.28	1.26	1.23	1.22	1.20	1.19	1.19	1.18
16	1.24	1.27	1.28	1.27	1.24	1.24	1.22	1.21	1.21	1.20
14	1.24	1.27	1.28	1.27	1.25	1.25	1.23	1.22	1.22	1.21
12	1.24	1.27	1.28	1.27	1.26	1.26	1.24	1.23	1.23	1.22
10	1.24	1.27	1.28	1.27	1.27	1.27	1.26	1.25	1.25	1.24
5	1.24	1.27	1.28	1.27	1.29	1.31	1.29	1.28	1.29	1.28
0	1.24	1.27	1.28	1.27	1.29	1.31	1.34	1.33	1.33	1.32
-5	1.24	1.27	1.28	1.27	1.29	1.31	1.36	1.37	1.37	1.36
-10	1.24	1.27	1.28	1.27	1.29	1.31	1.36	1.42	1.42	1.41
-15	1.24	1.27	1.28	1.27	1.29	1.31	1.36	1.46	1.47	1.46
-20 & below	1.24	1.27	1.28	1.27	1.29	1.31	1.36	1.46	1.49	1.48

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

Packs OFF	+0.01	+0.01	+0.01	+0.01	+0.02	+0.03	+0.03	+0.04	+0.04	+0.05
Eng. A/I ON	+0.00	+0.00	-0.03	-0.03	-0.04	-0.04	-0.05	-0.06	-0.06	-0.08
Wing A/I ON	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.05	-0.06	-0.07

THRUST SETTINGS – ALL ENGINE

MAX CRUISE EPR

CRZ

PW2037

CRUISE SPEED: LRC

TAT °C	PRESSURE ALTITUDE (1000 FT)										
	10	15	20	25	30	32	34	36	38	40	42
45	1.08	1.06	1.01	0.99	1.00	0.89	0.90	0.90	0.90	0.90	0.90
40	1.10	1.08	1.04	1.02	1.03	0.93	0.94	0.94	0.94	0.94	0.94
35	1.12	1.11	1.07	1.05	1.06	0.97	0.98	0.98	0.98	0.98	0.98
30	1.14	1.13	1.10	1.08	1.09	1.01	1.02	1.02	1.02	1.02	1.02
25	1.16	1.16	1.13	1.11	1.12	1.05	1.06	1.06	1.06	1.06	1.06
20	1.16	1.18	1.16	1.14	1.15	1.09	1.10	1.10	1.10	1.10	1.10
15	1.16	1.19	1.19	1.17	1.18	1.13	1.14	1.14	1.14	1.14	1.14
10	1.16	1.19	1.21	1.20	1.21	1.17	1.18	1.18	1.18	1.18	1.18
5	1.16	1.19	1.21	1.23	1.24	1.21	1.22	1.22	1.22	1.22	1.22
0	1.16	1.19	1.21	1.23	1.27	1.25	1.26	1.26	1.26	1.26	1.26
-5	1.16	1.19	1.21	1.23	1.29	1.29	1.30	1.30	1.30	1.30	1.30
-10	1.16	1.19	1.21	1.23	1.29	1.32	1.34	1.34	1.34	1.34	1.34
-15	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.38	1.38	1.38	1.38
-20	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-25	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-30	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-35	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-40	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-45	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-50	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-55	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40
-60	1.16	1.19	1.21	1.23	1.29	1.32	1.36	1.40	1.40	1.40	1.40

Bleed Adjustments

Bleed Configuration	PRESSURE ALTITUDE (1000 FT)										
	10	15	20	25	30	32	34	36	38	40	42
Engine Anti-Ice ON	-0.03	-0.03	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.09	-0.09	-0.09
Engine & Wing Anti-Ice ON	-0.06	-0.06	-0.07	-0.09	-0.09	-0.11	-0.11	-0.11	-0.17	-0.17	-0.17

THRUST SETTINGS – ALL ENGINES

GO-AROUND EPR

BASED ON FULL INFLIGHT TAKEOFF RATING
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

PW 2037

OAT °C	PRESSURE ALTITUDE - FEET												
	-1,000	**0**	**1,000**	**2,000**	**3,000**	**4,000**	**5,000**	**6,000**	**7,000**	**8,000**	***8,400***	**9,000**	**10,000**
50	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
48	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
46	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.32	1.32
44	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
42	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
40	1.35	1.35	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.35
38	1.36	1.36	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
36	1.37	1.37	1.37	1.38	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
34	1.38	1.38	1.38	1.39	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
32	1.38	1.38	1.39	1.40	1.41	1.41	1.42	1.42	1.42	1.42	1.42	1.42	1.42
30	1.39	1.39	1.40	1.41	1.41	1.42	1.43	1.43	1.43	1.43	1.43	1.43	1.43
28	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.45	1.45	1.45	1.45	1.44	1.44
26	1.39	1.40	1.42	1.43	1.44	1.45	1.46	1.46	1.46	1.46	1.46	1.46	1.46
24	1.39	1.40	1.42	1.43	1.44	1.45	1.46	1.46	1.46	1.46	1.46	1.47	1.47
22	1.39	1.40	1.42	1.43	1.45	1.47	1.48	1.48	1.48	1.48	1.48	1.48	1.48
20	1.39	1.40	1.42	1.43	1.45	1.47	1.49	1.49	1.49	1.49	1.49	1.49	1.49
18	1.39	1.40	1.42	1.43	1.45	1.47	1.49	1.50	1.50	1.50	1.50	1.50	1.50
≤16	1.39	1.40	1.42	1.43	1.45	1.47	1.49	1.51	1.51	1.51	1.52	1.52	1.52

CORRECTIONS:

CONFIGURATION	EPR CORRECTION
Packs OFF	+ 0.01
Engine Anti-Ice ON	0.00
Wing Anti-Ice ON (2 engines)	- 0.02
Speed over 160 KIAS	- 0.01

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

ONE ENGINE INOPERATIVE

MAXIMUM CONTINUOUS THRUST
EPR

PW2037

MCT

Based on 250/300/0.80
NORMAL BLEED - PACKS ON, ANTI-ICE OFF

TAT - ºC	PRESSURE ALTITUDE - FEET									
	0	5,000	10,000	15,000	20,000	25,000	30,000	35,000	37,000	41,000
50	1.22	1.23	1.21							
45	1.24	1.25	1.23	1.20						
40	1.26	1.27	1.25	1.22						
35	1.29	1.30	1.28	1.25	1.23	OUTSIDE ENVIRONMENTAL ENVELOPE				
30	1.29	1.32	1.30	1.28	1.26	1.19				
25	1.29	1.35	1.33	1.31	1.29	1.22				
20	1.29	1.36	1.36	1.34	1.33	1.25	1.19	1.18		
15	1.29	1.36	1.37	1.38	1.36	1.29	1.22	1.21		
10	1.29	1.36	1.37	1.38	1.40	1.32	1.26	1.25		
5	1.29	1.36	1.37	1.38	1.41	1.36	1.34	1.28	1.28	1.28
0	1.29	1.36	1.37	1.38	1.41	1.38	1.33	1.32	1.32	1.32
-2	1.29	1.36	1.37	1.38	1.41	1.38	1.35	1.34	1.34	1.33
-4	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.36	1.35	1.35
-6	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.37	1.37	1.37
-8	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.39	1.39	1.39
-10	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.41	1.41	1.40
-12	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.43	1.43	1.42
-14	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.45	1.44	1.44
-16	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.46	1.47	1.46
-18 & below	1.29	1.36	1.37	1.38	1.41	1.38	1.36	1.46	1.49	1.48

CORRECTIONS:

Packs OFF	+ 0.01	+ 0.01	+ 0.01	+ 0.01	+ 0.02	+ 0.03	+ 0.03	+ 0.04	+ 0.04	+ 0.05
Eng A/I ON	0.00	0.00	- 0.03	- 0.03	- 0.04	- 0.04	- 0.04	- 0.06	- 0.06	- 0.07
Wing A/I ON	- 0.02	- 0.02	- 0.02	- 0.03	- 0.03	- 0.03	- 0.04	- 0.05	- 0.06	- 0.07

ONE ENGINE INOPERATIVE

DRIFTDOWN PROCEDURES

IN THE EVENT OF AN ENGINE FAILURE OR SHUTDOWN DURING CRUISE:

1. Immediately set Maximum Continuous Thrust (MCT) from previous page.

2. Allow aircraft to decelerate in level flight to driftdown speed prior to initiating descent.
   - Aircraft will level off at or above altitudes shown in DRIFTDOWN GROSS LEVEL-OFF ALTITUDE chart.
   - Cross-check FMS engine-out level-off altitude if so equipped. Otherwise, cross-check with level-off altitude in ODM.

3. If driftdown terrain clearance is critical, consult Flight Plan Remarks to determine:
   - Recommended en route alternate airports, if required.
   - ISA temperature deviation at 18,000 feet.

4. If terrain clearance is a factor, select a suitable alternate airport as follows:
   - Terrain clearance is assured for flight to any flight plan alternate airport listed.
   - Comply with Unrestricted/Restricted Critical Terrain Procedures as described in Airway Manual – Section 6.
   - Use flight plan recommended en route alternate airport, or:
   - Determine aircraft position on appropriate Jeppesen Low Level or High/Low Level enroute chart and locations of other suitable alternates.
   - Check terrain clearance for flight via MEA / MOCA on airway or Grid MORA for a non-flight-plan suitable enroute alternate.
   - Maintain MCT / driftdown speed after level-off and allow aircraft to climb until at/above MEA / MOCA on airway or Grid MORA.
   - Maintain airway MEA / MOCA until established on the arrival to selected alternate airport.

5. Proceed to selected nearest suitable alternate.

6. Except as specified in Step 4, maintain Maximum Continuous Thrust (MCT) and allow aircraft to accelerate to engine-out Long Range Cruise speed at level-off altitude.

ONE ENGINE INOPERATIVE

DRIFTDOWN SPEED SCHEDULE
KIAS

GROSS WEIGHT - POUNDS	PRESSURE ALTITUDE - FEET				
	15,000	20,000	25,000	30,000	35,000
260,000	249	251	253	256	257
250,000	244	246	248	251	254
240,000	239	240	242	245	248
230,000	233	235	237	240	243
220,000	228	230	232	234	237
210,000	223	224	226	228	231
200,000	217	218	220	222	225
190,000	212	213	214	216	219
180,000	205	206	208	210	212
170,000	200	201	202	204	206
160,000	194	195	196	198	199
150,000	187	188	189	191	192
140,000	180	181	182	184	185

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	ISA + 15°C	ISA + 20°C
260,000	253,000	247	19,100	17,600	15,800
240,000	234,200	238	21,400	20,400	19,000
220,000	214,700	228	23,500	22,600	21,500
200,000	195,400	218	25,900	25,000	23,900
180,000	176,000	207	28,400	27,600	26,600
160,000	156,500	196	31,400	30,400	29,500
140,000	136,800	183	34,300	34,100	32,800

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	ISA + 15°C	ISA + 20°C
260,000	252,100	246	17,900	15,900	13,600
240,000	233,900	238	20,500	19,100	17,100
220,000	214,500	228	22,700	21,600	20,300
200,000	195,200	218	25,100	24,100	22,800
180,000	175,800	207	27,600	26,700	25,500
160,000	156,000	195	30,500	29,500	28,400
140,000	137,100	184	34,100	33,000	31,700

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	ISA + 15°C	ISA + 20°C
260,000	250,900	244	14,600	11,900	9,300
240,000	232,400	236	17,900	15,400	12,800
220,000	214,400	227	20,900	19,100	16,600
200,000	195,100	217	23,400	21,900	20,300
180,000	175,800	207	26,000	24,700	23,000
160,000	156,300	195	28,800	27,600	26,000
140,000	136,700	183	32,300	30,800	29,200

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

FEET

GROSS WEIGHT - POUNDS	PRESSURE ALTITUDE - FEET		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260,000	12,200	8,100	5,100
250,000	14,700	10,300	7,100
240,000	16,400	12,700	9,100
230,000	18,300	15,000	11,200
220,000	20,000	17,400	13,700
210,000	21,200	19,700	16,000
200,000	22,300	21,100	18,600
190,000	23,600	22,400	20,700
180,000	24,900	23,700	22,100
170,000	26,200	25,100	23,500
160,000	27,500	26,500	25,100
150,000	29,000	28,000	26,600
140,000	30,800	29,500	28,300
130,000	33,100	31,400	30,000
120,000	35,100	33,900	32,000

CORRECTIONS:

CONFIGURATION	ALT. CORRECTION (FEET)
Engine Anti-Ice ON	- 2,600
Engine and Wing Anti-Ice ON	- 6,600

BASIS:

- Max continuous thrust.
- Long range cruise speed.
- 100 ft/min residual rate of climb

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE SPEEDS

FL ISA		GROSS WEIGHT – 1,000 LB											
		260	250	240	230	220	210	200	190	180	170	160	150
300 -21	MN IAS TAS												.645 241 380
290 - 20	MN IAS TAS												.634 242 375
280 -18	MN IAS TAS											.639 249 380	.626 244 372
270 -17	MN IAS TAS										.642 256 383	.630 250 376	.620 247 370
260 -15	MN IAS TAS									.646 263 387	.632 257 379	.623 253 373	.616 250 369
250 -14	MN IAS TAS									.635 264 382	.625 259 376	.618 256 372	.610 253 367
240 -12	MN IAS TAS								.638 270 385	.627 266 379	.620 262 375	.613 259 370	.602 255 364
230 -11	MN IAS TAS							.639 277 388	.629 272 382	.621 269 377	.615 266 373	.606 262 368	.594 256 361
220 -9	MN IAS TAS						.641 283 391	.631 279 384	.623 275 380	.616 272 376	.609 269 371	.598 264 365	.586 258 357
210 -8	MN IAS TAS					.642 290 393	.632 285 386	.624 281 382	.618 278 378	.611 275 374	.602 271 368	.590 265 361	.576 259 353
200 -6	MN IAS TAS				.643 296 395	.633 291 389	.625 287 384	.619 284 380	.613 282 377	.605 277 371	.594 272 365	.581 266 357	.566 259 348
190 -5	MN IAS TAS				.633 297 390	.626 293 386	.620 290 382	.614 288 379	.607 284 374	.597 279 368	.585 274 361	.572 267 353	.555 259 342

Definitions:

FL: Flight level / altitude (feet).
ISA: Standard Day temperature in °C.
IAS: Indicated airspeed in knots.
MN: Mach number.
TAS: True airspeed in knots.

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE SPEEDS

FL ISA		GROSS WEIGHT – 1,000 LB											
		260	250	240	230	220	210	200	190	180	170	160	150
180 -3	MN IAS TAS			.633 303 392	.626 300 388	.620 297 384	.615 294 381	.608 291 377	.599 286 371	.589 281 365	.576 275 357	.561 267 348	.542 258 336
170 -2	MN IAS TAS		.633 309 394	.626 306 389	.621 303 386	.616 300 383	.609 297 379	.601 293 374	.591 288 368	.580 282 360	.566 275 352	.550 267 342	.529 257 329
160 0	MN IAS TAS		.626 312 391	.621 309 387	.616 306 384	.610 303 381	.603 299 376	.593 295 370	.583 289 364	.570 283 356	.555 275 347	.537 266 335	.516 255 322
150 2	MN IAS TAS	.626 317 392	.621 315 389	.616 312 386	.611 309 383	.604 306 378	.595 301 373	.585 296 367	.574 290 359	.560 283 351	.543 274 340	.524 264 328	.503 253 315
140 3	MN IAS TAS	.621 321 390	.616 318 388	.611 316 384	.604 312 380	.596 308 375	.587 303 369	.576 297 362	.564 290 355	.549 282 345	.531 273 334	.511 262 321	.491 252 309
130 5	MN IAS TAS	.616 324 389	.611 322 386	.605 318 382	.597 314 377	.588 309 371	.578 304 365	.567 297 358	.553 290 349	.536 281 338	.518 271 327	.498 261 314	.483 252 305
120 7	MN IAS TAS	.611 328 387	.605 324 383	.598 320 379	.589 316 373	.580 310 367	.569 304 360	.556 297 352	.541 289 343	.524 279 332	.505 269 320	.488 260 309	.475 253 301
110 8	MN IAS TAS	.605 330 385	.598 326 380	.590 322 375	.581 317 370	.571 311 363	.559 304 355	.544 296 346	.528 287 336	.511 278 325	.493 268 314	.480 261 305	.469 254 298
100 10	MN IAS TAS	.598 332 382	.590 328 377	.582 323 371	.572 318 365	.561 311 358	.547 304 349	.532 295 340	.516 286 329	.498 276 318	.484 268 309	.473 262 302	.463 256 296
90 12	MN IAS TAS	.591 334 378	.582 329 373	.573 324 367	.562 318 360	.550 311 352	.535 302 343	.520 293 333	.503 284 322	.488 275 313	.477 269 305	.467 263 299	.456 257 292
80 13	MN IAS TAS	.583 335 375	.574 330 369	.564 324 362	.552 317 355	.538 309 346	.523 301 336	.507 292 326	.492 282 316	.480 276 309	.470 270 302	.461 264 296	.449 258 289
70 15	MN IAS TAS	.574 336 370	.564 331 364	.553 324 357	.540 316 349	.526 308 339	.511 299 330	.495 290 320	.483 283 312	.473 277 306	.465 272 300	.454 265 293	.442 258 286

FL: Flight level / altitude (feet).
ISA: Standard Day temperature in °C.
IAS: Indicated airspeed in knots.
MN: Mach number.
TAS: True airspeed in knots.

LANDING GEAR EXTENDED REVENUE OPERATIONS

PROCEDURES

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. Takeoff is limited to Flaps 5 and 15.
8. V_{MO} and M_{MO} are reduced to 270 KIAS and .73 Mach.
9. The airspeed indicator and Mach-airspeed warning switch must be reprogrammed for V_{MO} and M_{MO}.
10. The EPR indication system must be operational.

PREPARATION OF AIRCRAFT

Maintenance will prepare the aircraft in accordance with the appropriate Maintenance Manual Procedures and make the appropriate log book entries.

EMERGENCY PROCEDURES

Procedures are unchanged for Emergency Procedures except as follows:

Emergency Descent: **Target speed is 270 KIAS**

NORMAL PROCEDURES

Operating Procedures are unchanged except as follows:

Severe Turbulent Air Penetration: The conditions for severe turbulence penetration are unchanged except the recommended airspeed for flight is V_{Ref} + 80 KIAS.

FLIGHT MANAGEMENT COMPUTER SYSTEMS (FMCS)

The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS will generate inaccurate enroute speed schedules, display non-conservative predictions of fuel burn, estimated time of arrival (ETA) and maximum altitude, and computer an overly shallow descent path. Use of VNAV during descent is not recommended.

LANDING GEAR EXTENDED REVENUE OPERATIONS

DRIFTDOWN PERFORMANCE

FEET

GROSS WEIGHT - POUNDS		OPTIMUM DRIFT DOWN SPEED - KIAS	GROSS LEVEL OFF ALTITUDE - FEET		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)		ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
220,000	208,000	218	6,000	2,700	
200,000	190,000	210	10,000	7,800	5,300
180,000	172,000	203	13,700	11,900	9,700
160,000	153,000	195	17,300	15,800	14,100
140,000	134,000	187	20,600	19,700	18,300

BASIS:
- One engine inoperative, APU operating
- Maximum Continuous Thrust Limits
- No Anti-Ice, one pack on
- 100 ft/min residual rate of climb

LONG RANGE CRUISE ALTITUDE CAPABILITY

FEET

GROSS WEIGHT - POUNDS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
200,000	6,200		
190,000	9,100	5,700	
180,000	11,800	9,000	5,800
170,000	14,100	12,000	8,800
160,000	16,000	14,400	12,200
150,000	17,900	16,400	14,600
140,000	19,800	18,500	16,800
130,000	21,400	20,500	19,200
120,000	22,900	22,000	21,000

CONFIGURATION	CORRECTION – FEET
Packs OFF	+ 100
Engine Anti-Ice ON	- 5,100
Engine and Wing Anti-Ice ON	- 8,900

BASIS:
- One engine inoperative, APU operating
- Maximum Continuous Thrust Limits
- 100 ft/min residual rate of climb

LANDING GEAR EXTENDED REVENUE OPERATIONS

LONG RANGE CRUISE

PRESSURE ALTITUDE - FEET	GROSS WEIGHT - POUNDS CRUISE SPEED - KIAS TARGET EPR FUEL FLOW – LB/HR					
	190,000	**180,000**	**170,000**	**160,000**	**150,000**	**140,000**
20,000						188 1.52 7644
19,000					193 1.54 8148	188 1.48 7527
18,000					193 1.50 8028	188 1.45 7448
17,000				197 1.51 8534	193 1.46 7929	188 1.42 7401
16,000				197 1.47 8418	193 1.43 7871	188 1.40 7375
15,000			201 1.48 8909	197 1.44 8344	193 1.41 7833	188 1.37 7360
14,000			201 1.45 8903	197 1.41 8379	193 1.38 7893	188 1.35 7423
13,000		205 1.46 9399	201 1.42 8857	197 1.39 8348	193 1.36 7871	188 1.33 7414
12,000		206 1.43 9407	202 1.40 8867	197 1.37 8352	193 1.34 7870	188 1.31 7423
11,000	211 1.44 9966	207 1.41 9423	203 1.38 8892	198 1.35 8410	193 1.32 7896	188 1.30 7433
10,000	212 1.42 9984	208 1.39 9443	204 1.36 8944	199 1.33 8450	193 1.30 7913	188 1.28 7432

BASIS:

- One engine inoperative, APU operating
- Maximum Continuous Thrust Limits
- Increase/decrease fuel flow 3% per 10°C above/below standard TAT.

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:

- Anti-skid Inoperative
- One Brake Deactivated
- Auto Spoilers 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:

- Standard day conditions
- Operating engines at maximum reverse thrust, except for hydraulic system failures
- 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

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
- No wind
- No slope
- 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

AIR-GROUND LOGIC IN AIR MODE

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,030	4,750	4,470	4,190	3,930	3,690	3,450
GOOD	7,220	6,780	6,340	5,900	5,500	5,140	4,780
MEDIUM	11,270	10,630	9,990	9,350	8,820	8,400	7,980
POOR	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000
VREF30	155	148	140	133	125	117	109

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+85	+150	+315	+N/A
	Per 1,000 feet (above 8,000 ft.)	+120	+240	+640	+N/A
Wind	Per 10 kt. headwind	-150	-270	-545	+N/A
	Per 10 kt. tailwind	+535	+965	+2090	+N/A
Slope	Per 1% downhill	+75	+255	+1210	+N/A
	Per 1% uphill	-65	-190	-650	+N/A
Approach Speed	Per 10 kt. Above VREF	+400	+590	+830	+N/A

AIRSPEED UNRELIABLE

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,470	4,170	3,870	3,570	3,320	3,120	2,920
GOOD	5,660	5,320	4,980	4,640	4,310	3,990	3,670
MEDIUM	7,800	7,280	6,760	6,240	5,740	5,260	4,780
POOR	10,330	9,570	8,810	8,050	7,320	6,620	5,920
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+65	+105	+160	+230
	Per 1,000 feet (above 8,000 ft.)	+85	+140	+230	+335
Wind	Per 10 kt. headwind	-115	-190	-305	-460
	Per 10 kt. tailwind	+450	+685	+1155	+1845
Slope	Per 1% downhill	+40	+110	+285	+720
	Per 1% uphill	-35	-90	-210	-420
Approach Speed	Per 10 kt. Above VREF	+235	+320	+420	+500

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

ANTI-SKID SYSTEM INOP - (For Inflight Failure ONLY, see MEL SUPPORT for dispatch with Anti-skid Inop)

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,760	5,420	5,080	4,740	4,420	4,120	3,820
GOOD	6,960	6,500	6,040	5,580	5,150	4,750	4,350
MEDIUM	8,460	7,860	7,260	6,660	6,100	5,580	5,060
POOR	10,830	10,010	9,190	8,370	7,610	6,910	6,210
VREF30	155	148	140	133	125	117	109

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+95	+130	+170	+235
	Per 1,000 feet (above 8,000 ft.)	+140	+185	+255	+335
Wind	Per 10 kt. headwind	-195	-265	-375	-600
	Per 10 kt. tailwind	+730	+1035	+1565	+2865
Slope	Per 1% downhill	+90	+170	+385	+2340
	Per 1% uphill	-75	-135	-255	-565
Approach Speed	Per 10 kt. Above VREF	+320	+365	+410	+445

FLAPS UP

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	6,390	5,750	5,110	4,470	4,030	3,790	3,550
GOOD	6,770	6,370	5,970	5,570	5,190	4,830	4,470
MEDIUM	8,990	8,390	7,790	7,190	6,620	6,080	5,540
POOR	11,180	10,380	9,580	8,780	8,020	7,300	6,580
VREF30+50	205	198	190	183	175	167	159

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+100	+140	+205	+275
	Per 1,000 feet (above 8,000 ft.)	+160	+190	+295	+400
Wind	Per 10 kt. headwind	-150	-200	-300	-425
	Per 10 kt. tailwind	+585	+720	+1140	+1720
Slope	Per 1% downhill	+55	+100	+230	+515
	Per 1% uphill	-50	-90	-185	-325
Approach Speed	Per 10 kt. Above VREF	+285	+285	+360	+415

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

HYDRAULIC SYSTEM CENTER INOP

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,010	3,790	3,570	3,350	3,150	2,970	2,790
GOOD	5,160	4,840	4,520	4,200	3,900	3,620	3,340
MEDIUM	6,660	6,200	5,740	5,280	4,850	4,450	4,050
POOR	8,260	7,640	7,020	6,400	5,830	5,310	4,790
VREF30	155	148	140	133	125	117	109

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+60	+90	+135	+175
	Per 1,000 feet (above 8,000 ft.)	+80	+125	+190	+265
Wind	Per 10 kt. headwind	-110	-170	-255	-370
	Per 10 kt. tailwind	+400	+630	+1005	+1545
Slope	Per 1% downhill	+40	+85	+195	+445
	Per 1% uphill	-35	-75	-150	-270
Approach Speed	Per 10 kt. Above VREF	+235	+300	+360	+400

HYDRAULIC SYSTEM LEFT INOP

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,660	4,400	4,140	3,880	3,640	3,420	3,200
GOOD	6,150	5,770	5,390	5,010	4,650	4,310	3,970
MEDIUM	8,390	7,830	7,270	6,710	6,190	5,710	5,230
POOR	11,220	10,460	9,700	8,940	8,260	7,660	7,060
VREF30	155	148	140	133	125	117	109

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+70	+115	+185	+300
	Per 1,000 feet (above 8,000 ft.)	+100	+170	+305	+555
Wind	Per 10 kt. headwind	-135	-215	-350	-590
	Per 10 kt. tailwind	+475	+775	+1360	+2555
Slope	Per 1% downhill	+50	+135	+380	+1645
	Per 1% uphill	-45	-110	-265	-615
Approach Speed	Per 10 kt. Above VREF	+310	+415	+515	+590

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

HYDRAULIC SYSTEM LEFT INOP W/ LE SLAT OR TE FLAPS DISAGREE FOR FLAPS≥20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,930	4,670	4,410	4,150	3,900	3,660	3,420
GOOD	6,580	6,200	5,820	5,440	5,070	4,710	4,350
MEDIUM	9,140	8,560	7,980	7,400	6,840	6,300	5,760
POOR	12,420	11,600	10,780	9,960	9,200	8,500	7,800
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.) Per 1,000 feet (above 8,000 ft.)	+80 +110	+130 +190	+210 +345	+340 +630
Wind	Per 10 kt. headwind Per 10 kt. tailwind	-140 +490	-225 +810	-375 +1425	-630 +2670
Slope	Per 1% downhill Per 1% uphill	+55 -50	+145 -120	+420 -290	+1790 -680
Approach Speed	Per 10 kt. Above VREF	+310	+420	+540	+635

HYDRAULIC SYSTEM RIGHT INOP

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,780	4,500	4,220	3,940	3,680	3,440	3,200
GOOD	6,110	5,710	5,310	4,910	4,540	4,200	3,860
MEDIUM	8,490	7,890	7,290	6,690	6,140	5,640	5,140
POOR	11,390	10,590	9,790	8,990	8,280	7,660	7,040
VREF30	155	148	140	133	125	117	109

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.) Per 1,000 feet (above 8,000 ft.)	+80 +120	+120 +175	+195 +325	+315 +585
Wind	Per 10 kt. headwind Per 10 kt. tailwind	-145 +515	-210 +770	-355 +1365	-600 +2580
Slope	Per 1% downhill Per 1% uphill	+75 -65	+150 -120	+415 -285	+1740 -650
Approach Speed	Per 10 kt. Above VREF	+355	+440	+540	+610

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

HYDRAULIC SYSTEM CENTER AND LEFT INOP, FLAPS 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,480	5,180	4,880	4,580	4,300	4,040	3,780
GOOD	7,360	6,920	6,480	6,040	5,620	5,220	4,820
MEDIUM	10,240	9,560	8,880	8,200	7,560	6,960	6,360
POOR	13,750	12,810	11,870	10,930	10,080	9,320	8,560
VREF30+20	175	168	160	153	145	137	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+95	+150	+245	+380
	Per 1,000 feet (above 8,000 ft.)	+130	+225	+395	+705
Wind	Per 10 kt. headwind	-155	-245	-400	-665
	Per 10 kt. tailwind	+530	+865	+1500	+2775
Slope	Per 1% downhill	+65	+175	+475	+1930
	Per 1% uphill	-60	-140	-335	-745
Approach Speed	Per 10 kt. Above VREF	+360	+480	+595	+675

HYDRAULIC SYSTEM CENTER AND RIGHT INOP, FLAPS 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,690	5,370	5,050	4,730	4,420	4,120	3,820
GOOD	7,360	6,900	6,440	5,980	5,540	5,120	4,700
MEDIUM	10,420	9,700	8,980	8,260	7,590	6,970	6,350
POOR	14,100	13,100	12,100	11,100	10,200	9,400	8,600
VREF30+20	175	168	160	153	145	137	129

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+110	+155	+260	+405
	Per 1,000 feet (above 8,000 ft.)	+155	+240	+420	+750
Wind	Per 10 kt. headwind	-170	-245	-405	-675
	Per 10 kt. tailwind	+585	+865	+1515	+2805
Slope	Per 1% downhill	+100	+195	+525	+2055
	Per 1% uphill	-85	-160	-365	-800
Approach Speed	Per 10 kt. Above VREF	+425	+520	+635	+715

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

HYDRAULIC SYSTEM LEFT AND RIGHT INOP**, FLAPS 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	7,560	7,140	6,720	6,300	5,910	5,550	5,190
GOOD	9,900	9,340	8,780	8,220	7,710	7,250	6,790
MEDIUM	16,500	15,660	14,820	13,980	13,350	12,930	12,510
POOR	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000
VREF30+20	175	168	160	153	145	137	129

****Reserve Brake System Only.**

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+155	+235	+510	+N/A
	Per 1,000 feet (above 8,000 ft.)	+245	+385	+1075	+N/A
Wind	Per 10 kt. headwind	-240	-350	-730	+N/A
	Per 10 kt. tailwind	+815	+1210	+2640	+N/A
Slope	Per 1% downhill	+220	+495	+2455	+N/A
	Per 1% uphill	-175	-355	-1215	+N/A
Approach Speed	Per 10 kt. Above VREF	+755	+980	+1420	+N/A

LE SLAT ASYMMETRY, GREATER THAN FLAPS 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,340	4,060	3,780	3,500	3,270	3,090	2,910
GOOD	5,290	4,990	4,690	4,390	4,100	3,820	3,540
MEDIUM	6,980	6,520	6,060	5,600	5,160	4,740	4,320
POOR	8,690	8,070	7,450	6,830	6,240	5,680	5,120
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+65	+95	+140	+190
	Per 1,000 feet (above 8,000 ft.)	+80	+135	+210	+285
Wind	Per 10 kt. headwind	-110	-175	-265	-380
	Per 10 kt. tailwind	+430	+640	+1025	+1580
Slope	Per 1% downhill	+35	+85	+195	+455
	Per 1% uphill	-35	-75	-150	-280
Approach Speed	Per 10 kt. Above VREF	+220	+280	+350	+395

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

LE SLAT ASYMMETRY, LESS THAN OR EQUAL TO FLAPS 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,090	4,710	4,330	3,950	3,660	3,460	3,260
GOOD	6,040	5,680	5,320	4,960	4,620	4,300	3,980
MEDIUM	7,850	7,330	6,810	6,290	5,800	5,340	4,880
POOR	9,720	9,020	8,320	7,620	6,960	6,340	5,720
VREF30+30	185	178	170	163	155	147	139

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+75	+115	+170	+220
	Per 1,000 feet (above 8,000 ft.)	+105	+160	+240	+330
Wind	Per 10 kt. headwind	-130	-185	-280	-400
	Per 10 kt. tailwind	+480	+685	+1080	+1635
Slope	Per 1% downhill	+45	+95	+215	+480
	Per 1% uphill	-40	-85	-165	-295
Approach Speed	Per 10 kt. Above VREF	+245	+285	+345	+390

LE SLAT DISAGREE

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,340	4,060	3,780	3,500	3,270	3,090	2,910
GOOD	5,290	4,990	4,690	4,390	4,100	3,820	3,540
MEDIUM	6,980	6,520	6,060	5,600	5,160	4,740	4,320
POOR	8,690	8,070	7,450	6,830	6,240	5,680	5,120
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+65	+95	+140	+190
	Per 1,000 feet (above 8,000 ft.)	+80	+135	+210	+285
Wind	Per 10 kt. headwind	-110	-175	-265	-380
	Per 10 kt. tailwind	+430	+640	+1025	+1580
Slope	Per 1% downhill	+35	+85	+195	+455
	Per 1% uphill	-35	-75	-150	-280
Approach Speed	Per 10 kt. Above VREF	+220	+280	+350	+395

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

ONE ENGINE INOPERATIVE

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,470	4,170	3,870	3,570	3,320	3,120	2,920
GOOD	5,660	5,320	4,980	4,640	4,310	3,990	3,670
MEDIUM	7,800	7,280	6,760	6,240	5,740	5,260	4,780
POOR	10,330	9,570	8,810	8,050	7,320	6,620	5,920
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+65	+105	+160	+230
	Per 1,000 feet (above 8,000 ft.)	+85	+140	+230	+335
Wind	Per 10 kt. headwind	-115	-190	-305	-460
	Per 10 kt. tailwind	+450	+685	+1155	+1845
Slope	Per 1% downhill	+40	+110	+285	+720
	Per 1% uphill	-35	-90	-210	-420
Approach Speed	Per 10 kt. Above VREF	+235	+320	+420	+500

REVERSER UNLOCK, FLAPS 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,330	4,910	4,490	4,070	3,750	3,530	3,310
GOOD	6,410	6,030	5,650	5,270	4,900	4,540	4,180
MEDIUM	8,880	8,280	7,680	7,080	6,510	5,970	5,430
POOR	11,560	10,720	9,880	9,040	8,240	7,480	6,720
VREF30+30	185	178	170	163	155	147	139

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+80	+125	+190	+270
	Per 1,000 feet (above 8,000 ft.)	+105	+170	+270	+380
Wind	Per 10 kt. headwind	-135	-205	-325	-485
	Per 10 kt. tailwind	+505	+740	+1220	+1925
Slope	Per 1% downhill	+50	+125	+310	+760
	Per 1% uphill	-45	-105	-235	-450
Approach Speed	Per 10 kt. Above VREF	+265	+325	+415	+485

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

TE FLAP ASYMMETRY, FLAPS 20 OR GREATER

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,340	4,060	3,780	3,500	3,270	3,090	2,910
GOOD	5,290	4,990	4,690	4,390	4,100	3,820	3,540
MEDIUM	6,980	6,520	6,060	5,600	5,160	4,740	4,320
POOR	8,690	8,070	7,450	6,830	6,240	5,680	5,120
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+65	+95	+140	+190
	Per 1,000 feet (above 8,000 ft.)	+80	+135	+210	+285
Wind	Per 10 kt. headwind	-110	-175	-265	-380
	Per 10 kt. tailwind	+430	+640	+1025	+1580
Slope	Per 1% downhill	+35	+85	+195	+455
	Per 1% uphill	-35	-75	-150	-280
Approach Speed	Per 10 kt. Above VREF	+220	+280	+350	+395

TE FLAP ASYMMETRY, 5 < FLAPS < 20

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,350	4,890	4,430	3,970	3,640	3,440	3,240
GOOD	6,040	5,680	5,320	4,960	4,620	4,300	3,980
MEDIUM	7,990	7,450	6,910	6,370	5,860	5,380	4,900
POOR	9,920	9,200	8,480	7,760	7,090	6,470	5,850
VREF30+30	185	178	170	163	155	147	139

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+75	+115	+175	+230
	Per 1,000 feet (above 8,000 ft.)	+100	+165	+250	+345
Wind	Per 10 kt. headwind	-135	-185	-280	-400
	Per 10 kt. tailwind	+495	+680	+1080	+1645
Slope	Per 1% downhill	+45	+90	+210	+480
	Per 1% uphill	-40	-80	-165	-300
Approach Speed	Per 10 kt. Above VREF	+245	+280	+350	+405

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

TE FLAP ASYMMETRY, FLAPS 5 OR LESS

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	5,840	5,300	4,760	4,220	3,840	3,620	3,400
GOOD	6,390	6,010	5,630	5,250	4,890	4,550	4,210
MEDIUM	8,410	7,850	7,290	6,730	6,200	5,700	5,200
POOR	10,470	9,710	8,950	8,190	7,480	6,820	6,160
VREF30+40	195	188	180	173	165	157	149

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+80	+125	+185	+250
	Per 1,000 feet (above 8,000 ft.)	+125	+180	+270	+365
Wind	Per 10 kt. headwind	-140	-190	-290	-410
	Per 10 kt. tailwind	+525	+700	+1105	+1675
Slope	Per 1% downhill	+50	+95	+220	+490
	Per 1% uphill	-45	-85	-170	-305
Approach Speed	Per 10 kt. Above VREF	+255	+280	+350	+400

TE FLAP DISAGREE

RWY COND & APPCH SPEED	LANDING WEIGHT - POUNDS						
	260,000	240,000	220,000	200,000	180,000	160,000	140,000
DRY	4,340	4,060	3,780	3,500	3,270	3,090	2,910
GOOD	5,290	4,990	4,690	4,390	4,100	3,820	3,540
MEDIUM	6,980	6,520	6,060	5,600	5,160	4,740	4,320
POOR	8,690	8,070	7,450	6,830	6,240	5,680	5,120
VREF20	165	158	151	144	136	128	119

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet (up to 8,000 ft.)	+65	+95	+140	+190
	Per 1,000 feet (above 8,000 ft.)	+80	+135	+210	+285
Wind	Per 10 kt. headwind	-110	-175	-265	-380
	Per 10 kt. tailwind	+430	+640	+1025	+1580
Slope	Per 1% downhill	+35	+85	+195	+455
	Per 1% uphill	-35	-75	-150	-280
Approach Speed	Per 10 kt. Above VREF	+220	+280	+350	+395

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.

NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).

Landing Weight (lb)	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
250,000	8,600	8,100	7,400	6,400	5,900	3,900	7,400	6,500	6,100	5,200
240,000	8,300	7,800	7,100	6,200	5,700	3,800	7,100	6,300	6,000	5,100
230,000	8,000	7,500	6,900	6,000	5,600	3,800	6,900	6,100	5,800	4,900
220,000	7,700	7,300	6,700	5,900	5,400	3,700	6,700	5,900	5,600	4,800
210,000	7,300	7,000	6,400	5,700	5,200	3,600	6,400	5,700	5,400	4,600
200,000	7,000	6,700	6,200	5,500	5,100	3,500	6,200	5,500	5,200	4,500
198,000	6,900	6,600	6,100	5,400	5,000	3,500	6,100	5,500	5,200	4,400
190,000	6,700	6,400	5,900	5,300	4,900	3,400	5,900	5,300	5,100	4,300
180,000	6,400	6,100	5,700	5,100	4,800	3,300	5,700	5,100	4,900	4,200
170,000	6,100	5,800	5,500	4,900	4,600	3,200	5,500	5,000	4,700	4,000
160,000	5,800	5,500	5,200	4,700	4,400	3,100	5,200	4,800	4,600	3,900
150,000	5,500	5,200	5,000	4,500	4,300	3,000	5,000	4,600	4,400	3,800

BASIS: Zero wind ● Two Engine Full Reverse Thrust ● Touchdown Speed = VREF25 - 5 ●
Data is advisory and includes 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	400	400	200	600	400	400	400
8,000	1,200	1,100	800	700	600	400	800	700	600	500
10,000	1,800	1,600	1,200	1,000	900	600	1,200	1,000	900	700

CORRECTIONS	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	0	0	0	-50	0	0	0
PER 1 KT TAILWIND	100	100	100	50	50	50	100	50	50	50
PER 5 KTS ADD'L SPD	200	200	200	200	150	100	200	200	150	150
PER 10°C ABOVE ISA	200	200	150	100	100	50	150	100	100	100
PER 10°C BELOW ISA	-150	-150	-150	-100	-100	-50	-150	-100	-100	-100
PER 1% UP SLOPE	-200	-150	-100	-50	-50	-50	-100	-100	-100	-50
PER 1% DOWN SLOPE	200	150	100	50	50	50	100	100	100	100
1 REVERSER INOP	1,100	600	300	200	200	100	300	300	400	200
2 REVERSERS INOP	1,600	900	500	400	400	100	500	700	1,000	600
MANUAL SPOILERS	0	0	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

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
250,000	7,700	7,200	7,200	6,800	8,600	8,500	8,500	8,400
240,000	7,500	7,000	7,000	6,600	8,300	8,200	8,200	8,100
230,000	7,200	6,700	6,700	6,400	8,000	7,900	7,900	7,800
220,000	7,000	6,500	6,500	6,100	7,700	7,600	7,600	7,500
210,000	6,700	6,300	6,300	5,900	7,400	7,300	7,300	7,200
200,000	6,500	6,000	6,000	5,700	7,100	7,000	7,000	7,000
198,000	6,400	6,000	6,000	5,700	7,100	6,900	6,900	6,900
190,000	6,200	5,800	5,800	5,500	6,800	6,700	6,700	6,700
180,000	6,000	5,600	5,600	5,300	6,500	6,400	6,400	6,400
170,000	5,700	5,400	5,300	5,100	6,300	6,100	6,100	6,100
160,000	5,500	5,200	5,100	4,900	6,000	5,800	5,800	5,900
150,000	5,200	4,900	4,900	4,700	5,700	5,600	5,600	5,600

BASIS: Zero wind ● Two Engine Full Reverse Thrust ● Touchdown Speed = VREF25 - 5 ●
Data is advisory and includes 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	-400	-400	-400	-300
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	400	400	400	300
6,000	600	600	600	500	700	700	700	700
8,000	900	800	800	800	1,100	1,100	1,100	1,000
10,000	1,300	1,200	1,200	1,200	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	100	100	100	100	150	150	150	150
PER 5 KTS ADD'L SPD	200	200	200	200	200	200	200	200
PER 10°C ABOVE ISA	150	150	150	100	150	150	150	150
PER 10°C BELOW ISA	-150	-100	-100	-100	-150	-150	-150	-150
PER 1% UP SLOPE	-150	-150	-150	-150	-250	-300	-300	-250
PER 1% DOWN SLOPE	150	200	200	200	400	400	400	400
1 REVERSER INOP	500	800	800	600	1,300	1,400	1,400	1,300
2 REVERSERS INOP	1,800	2,200	2,300	1,800	4,600	4,700	4,700	4,300
MANUAL SPOILERS	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

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.

NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).

Landing Weight (lb)	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
250,000	8,400	7,900	7,200	6,300	5,700	4,000	7,200	6,300	6,000	5,100
240,000	8,100	7,600	7,000	6,100	5,600	3,900	7,000	6,100	5,900	5,000
230,000	7,800	7,300	6,700	5,900	5,400	3,800	6,700	6,000	5,700	4,800
220,000	7,500	7,100	6,500	5,700	5,300	3,700	6,500	5,800	5,500	4,700
210,000	7,100	6,800	6,300	5,500	5,100	3,600	6,300	5,600	5,300	4,500
200,000	6,800	6,500	6,000	5,300	4,900	3,500	6,000	5,400	5,100	4,400
198,000	6,700	6,400	6,000	5,300	4,900	3,400	6,000	5,400	5,100	4,400
190,000	6,500	6,200	5,800	5,100	4,800	3,400	5,800	5,200	5,000	4,200
180,000	6,200	5,900	5,500	5,000	4,600	3,300	5,500	5,000	4,800	4,100
170,000	5,900	5,600	5,300	4,800	4,500	3,200	5,300	4,800	4,600	4,000
160,000	5,600	5,300	5,100	4,600	4,300	3,100	5,100	4,600	4,400	3,900
150,000	5,300	5,100	4,800	4,400	4,100	3,000	4,800	4,400	4,300	3,700

BASIS: Zero wind ● Two Engine Full Reverse Thrust ● Touchdown Speed = VREF30 - 5 ●
Data is advisory and includes 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	-300	-300	-200	-200	-100	-300	-200	-200	-200
2,000	0	0	0	0	0	0	0	0	0	0
4,000	400	300	300	200	200	100	300	200	200	200
6,000	800	700	600	400	400	200	600	400	400	400
8,000	1,100	1,000	800	700	500	400	800	700	600	500
10,000	1,600	1,400	1,200	1,000	700	500	1,200	1,000	900	700

CORRECTIONS	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	0	0	0	-50	0	0	0
PER 1 KT TAILWIND	100	100	100	50	50	50	100	50	50	50
PER 5 KTS ADD'L SPD	200	200	200	200	150	100	200	200	150	150
PER 10°C ABOVE ISA	150	150	150	100	100	50	150	100	100	100
PER 10°C BELOW ISA	-150	-150	-150	-100	-100	-50	-150	-100	-100	-100
PER 1% UP SLOPE	-150	-150	-100	-50	-50	-50	-100	-50	-100	-50
PER 1% DOWN SLOPE	200	150	100	50	50	50	100	100	100	100
1 REVERSER INOP	1,000	500	200	200	200	100	200	200	400	200
2 REVERSERS INOP	1,500	800	500	400	400	100	500	700	900	500
MANUAL SPOILERS	0	0	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

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
250,000	7,500	7,100	7,100	6,700	8,400	8,300	8,300	8,300
240,000	7,300	6,900	6,800	6,500	8,100	8,000	8,000	8,000
230,000	7,000	6,600	6,600	6,300	7,800	7,700	7,700	7,700
220,000	6,800	6,400	6,400	6,000	7,500	7,400	7,400	7,400
210,000	6,500	6,200	6,100	5,800	7,200	7,100	7,100	7,100
200,000	6,300	5,900	5,900	5,600	6,900	6,800	6,800	6,800
198,000	6,200	5,900	5,800	5,600	6,900	6,800	6,800	6,800
190,000	6,000	5,700	5,600	5,400	6,600	6,500	6,500	6,500
180,000	5,800	5,500	5,400	5,200	6,300	6,300	6,300	6,300
170,000	5,500	5,200	5,200	5,000	6,100	6,000	6,000	6,000
160,000	5,300	5,000	5,000	4,800	5,800	5,700	5,700	5,700
150,000	5,000	4,800	4,800	4,600	5,500	5,400	5,400	5,500

BASIS: Zero wind ● Two Engine Full Reverse Thrust ● Touchdown Speed = VREF30 - 5 ●
Data is advisory and includes 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	-300	-400	-400	-300
2,000	0	0	0	0	0	0	0	0
4,000	300	300	300	300	300	400	400	300
6,000	600	600	600	500	700	700	700	700
8,000	900	800	800	800	1,000	1,100	1,100	1,000
10,000	1,300	1,200	1,200	1,200	1,500	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	100	100	100	100	150	150	150	150
PER 5 KTS ADD'L SPD	200	200	150	150	200	200	200	200
PER 10°C ABOVE ISA	150	150	150	100	150	150	150	150
PER 10°C BELOW ISA	-150	-100	-100	-100	-150	-150	-150	-150
PER 1% UP SLOPE	-150	-150	-150	-150	-250	-300	-300	-250
PER 1% DOWN SLOPE	150	200	200	200	350	400	400	400
1 REVERSER INOP	500	700	700	600	1,200	1,300	1,300	1,200
2 REVERSERS INOP	1,700	2,000	2,100	1,600	4,100	4,200	4,200	3,900
MANUAL SPOILERS	0	0	0	300	0	0	0	300

Note: Do not operate when Braking Action is Nil.

OPERATION WITHOUT AIRSPEED INDICATION

Use the following body attitude and thrust setting data to estimate airspeed and rate of climb/descent, if the airspeed system becomes unreliable or unusable enroute. ***If the damage to the airspeed indication system is detected during early stages of the flight (takeoff or initial climb), return to departure airport***.

CLIMB

SPEED: 290/0.78 **THRUST: MAX CLIMB**
FLAPS: UP

PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		260,000	220,000	180,000	140,000
40,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)			+ 4.1 + 700	+ 4.3 + 1,600
30,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)		+ 3.8 + 1,100	+ 3.8 + 1,600	+ 4.0 + 2,200
20,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 3.8 + 700	+ 5.5 + 1,900	+ 5.8 + 2,600	+ 6.6 + 3,500
10,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 5.5 + 1400	+ 7.3 + 2,700	+ 8.0 + 3,500	+ 9.3 + 4,600
0	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 7.0 + 2100	+ 9.3 + 3,300	+ 10.3 + 4,200	+ 12.3 + 5,600

CRUISE

SPEED: 0.78/290 **THRUST: EPR FOR LEVEL FLIGHT**
FLAPS: UP

PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		260,000	220,000	180,000	140,000
40,000	PITCH ATTITUDE EPR REQUIRED			+ 3.1 1.27	+ 2.3 1.14
35,000	PITCH ATTITUDE EPR REQUIRED	+ 3.7 1.38	+ 3.0 1.23	+ 2.3 1.13	+ 1.6 1.08
30,000	PITCH ATTITUDE EPR REQUIRED	+ 3.0 1.18	+ 2.4 1.11	+ 1.8 1.07	+ 1.2 1.03
25,000	PITCH ATTITUDE EPR REQUIRED	+ 3.3 1.10	+ 2.7 1.05	+ 2.0 1.02	+ 1.3 0.99
20,000	PITCH ATTITUDE EPR REQUIRED	+ 3.4 1.05	+ 2.7 1.02	+ 2.1 1.00	+ 1.4 0.98
15,0000	PITCH ATTITUDE EPR REQUIRED	+ 3.5 1.03	+ 2.8 1.00	+ 2.2 0.98	+ 1.5 0.97

DESCENT

SPEED: 0.78/290 **THRUST: IDLE**
FLAPS: UP

PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		260,000	220,000	180,000	140,000
40,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)			+ 0.2 - 2,300	- 0.6 - 2,300
30,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 0.5 - 2,000	- 0.2 - 2,100	- 1.0 - 2,300	- 2.2 - 2,700
20,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 0.8 - 1,800	- 0.1 - 1,900	- 1.0 - 2,100	- 2.2 - 2,500
10,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 0.6 - 1,700	- 0.3 - 1,800	- 1.3 - 2,000	- 2.6 - 2,400
0	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	+ 0.6 - 1,500	- 0.3 - 1,600	-1.4 -1,800	- 2.9 - 2,200

OPERATION WITHOUT AIRSPEED INDICATION

Use the following body attitude and thrust setting data to estimate airspeed and rate of climb/descent, if the airspeed system becomes unreliable or unusable enroute. ***If the damage to the airspeed indication system is detected during early stages of the flight (takeoff or initial climb), return to departure airport***.

HOLDING

SPEED: see below **THRUST: EPR FOR LEVEL FLIGHT**
FLAPS: UP

PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		260,000	220,000	180,000	140,000
10,000	PITCH ATTITUDE EPR REQUIRED KIAS	+ 5.8 1.04 242	+ 5.9 1.03 223	+ 5.7 1.02 205	+ 5.2 1.01 188
5,000	PITCH ATTITUDE EPR REQUIRED KIAS	+ 2.9 1.03 241	+ 6.0 1.02 222	+ 5.8 1.01 205	+ 5.3 1.01 188

TERMINAL AREA

SPEED: see below **THRUST: EPR (OR %N1) FOR LEVEL FLIGHT**
FLAPS: AS REQ'D

PRESSURE ALTITUDE - FEET	FLAPS, SPEED		GROSS WEIGHT - POUNDS			
			260,000	220,000	180,000	140,000
5,000	FLAPS UP GEAR UP VREF30+80	PITCH ATT EPR ALT MODE %N1 KIAS	+ 6.5 1.04 60.9 236	+ 6.5 1.03 56.3 221	+ 6.0 1.02 51.6 205	+ 5.5 1.01 45.9 189
5,000	FLAPS 1 GEAR UP VREF30+60	PITCH ATT EPR ALT MODE %N1 KIAS	+ 8.0 1.07 63.2 216	+ 7.5 1.05 58.1 201	+ 7.5 1.04 52.8 185	+ 7.0 1.02 47.2 169
5,000	FLAPS 5 GEAR UP VREF30+40	PITCH ATT EPR ALT MODE %N1 KIAS	+ 7.5 1.09 64.1 196	+ 7.5 1.07 59.6 181	+ 7.0 1.05 53.6 165	+ 7.0 1.04 47.2 149
5,000	FLAPS 15 GEAR UP VREF30+20	PITCH ATT EPR ALT MODE %N1 KIAS	+ 8.0 1.12 66.2 176	+ 8.0 1.10 62.0 161	+ 8.0 1.07 56.1 145	+ 8.0 1.05 48.9 128
5,000	FLAPS 20 GEAR DOWN VREF30+20	PITCH ATT EPR ALT MODE %N1 KIAS	+ 5.0 1.18 72.3 176	+ 5.5 1.14 67.7 161	+ 5.5 1.12 62.2 145	+ 5.0 1.07 55.1 128

OPERATION WITHOUT AIRSPEED INDICATION

Use the following body attitude and thrust setting data to estimate airspeed and rate of climb/descent, if the airspeed system becomes unreliable or unusable enroute. ***If the damage to the airspeed indication system is detected during early stages of the flight (takeoff or initial climb), return to departure airport***.

FINAL APPROACH

SPEED: AS REQ'D

THRUST: EPR (OR %N1) FOR 3° GLIDESLOPE
FLAPS: AS REQ'D

PRESSURE ALTITUDE - FEET	FLAPS, SPEED		GROSS WEIGHT - POUNDS			
			260,000	220,000	180,000	140,000
1,500	FLAPS 20 GEAR DOWN VREF20+10	PITCH ATT EPR ALT MODE %N1 KIAS	+ 2.0 1.04 52.4 175	+ 2.0 1.04 48.4 161	+ 2.0 1.03 44.0 146	+ 2.0 1.02 39.3 129
1,500	FLAPS 25 GEAR DOWN VREF25+10	PITCH ATT EPR ALT MODE %N1 KIAS	+ 2.5 1.07 57.6 167	+ 2.5 1.06 52.7 152	+ 2.5 1.04 47.6 137	+ 2.5 1.03 42.0 121
1,500	FLAPS 30 GEAR DOWN VREF30+10	PITCH ATT EPR ALT MODE %N1 KIAS	+ 0.5 1.11 63.1 165	+ 0.5 1.08 58.2 151	+ 1.0 1.06 52.0 135	+ 1.0 1.04 45.4 118

Shaded cells exceed flap placard speed

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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 5,000 lbs of MLW using Flaps 30 at an altitude of 7,000 feet or above **or**
- Landing within 10,000 lbs of MLW using Flaps 25 at an altitude of 6,000 feet or above.
- Landing with non-standard aircraft configurations (flaps inoperative, brake deactivated, etc.)

PROCEDURES

A) Determine if the Maximum Quick Turn 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**

   Check the BTMS display on EICAS no sooner than 10 minutes and no later than 15 minutes after parking.

   If any brake temperature value is 5 or higher **or** BRAKE TEMP light is on then:

   A **45 minute** ground cooling period is required.

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

2. **BTMS INOPERATIVE or NON BTMS AIRCRAFT**

   Determine the Maximum Quick Turnaround Landing Weight from Page 4-39.

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

   A **45 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 4-40.
   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 or NON BTMS AIRCRAFT**

   Determine the Cooling Time and associated action if applicable from the Brake Cooling Time and AutoBrake Adjustment tables on Page 4-41. Comply with the specified procedures for the Caution Zone and Fuse Plug Melt Zone.

BRAKE COOLING FOLLOWING LANDING

MAXIMUM QUICK TURNAROUND LANDING WEIGHT

POUNDS

FLAPS 30

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE - °C					
	0	10	20	30	40	50
0	235,800	234,400	230,700	227,000	223,700	220,200
1,000	234,000	230,300	226,500	223,000	219,500	216,200
2,000	230,000	226,300	222,500	219,300	215,800	212,500
3,000	226,000	222,400	218,800	215,300	211,800	208,700
4,000	222,300	218,400	214,800	211,500	208,000	204,800
5,000	213,300	214,500	211,000	207,500	204,300	------
6,000	214,000	210,300	206,800	203,500	200,300	------
7,000	209,800	206,300	202,800	199,500	196,300	------
8,000	205,500	202,000	198,800	195,500	------	------
8,400	203,500	200,000	196,500	193,500	------	------
9,000	201,500	198,000	194,700	194,500	------	------
10,000	197,600	194,200	190,900	187.700	------	------

FLAPS 25

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE - °C					
	0	10	20	30	40	50
0	230,400	229,500	225,800	222,000	218,800	215,400
1,000	229,000	225,400	221,700	218,300	214,600	211,400
2,000	225,300	221,500	217,700	214,400	210,700	207,500
3,000	221,200	217,500	213,700	210,400	206,700	203,500
4,000	217,200	213,400	209,900	206,500	203,100	200,000
5,000	213,000	209,500	205,800	201,600	199,300	------
6,000	209,900	205,300	201,700	198,500	195,200	------
7,000	207,500	201,100	197,800	194,700	191,400	------
8,000	200,500	197,000	193,700	190,500	187,300	------
8,400	198,500	195,300	192,400	188,700	------	------
9,000	196,400	193,100	189,700	186,500	------	------
10,000	192,600	189,200	186,000	182,800	------	------

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

CORRECTIONS:

CONDITION		CORRECTION – POUNDS
Wind	per 1 kt. of headwind per 1 kt. of tailwind	+ 500 - 2,200
Runway slope	per 0.1% uphill slope per 0.1% downhill slope	+ 200 - 300
One brake deactivated		- 14,500

BRAKE COOLING FOLLOWING LANDING
BTMS OPERATIVE BRAKE COOLING

(minutes)

	BTMS Indication							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8 +**
Ground	0	0	30	52	67	82	96	**Fuse Plug**
In-Flight Gear Down *	0	0	2.5	4.5	7.0	9.5	12.5	**Melt Zone**

NOTE: 1) A BTMS indication of 5 or higher will cause the BRAKE TEMP light to illuminate. The light will extinguish when the temperature decreases to 4.

2) The shaded region indicates values in the Caution Zone.

- 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.
- The values above also apply to Rejected Takeoff.

BRAKE COOLING FOLLOWING LANDING

LANDING BRAKE COOLING

(BTMS INOPERATIVE or NON BTMS AIRCRAFT)

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
240	0:05	0:42	1:09	1:32C	1:54F	2:15F
230	0:02	0:39	1:06	1:29C	1:50F	2:11F
220	0:00	0:35	1:03	1:25C	1:46C	2:06F
210	0:00	0:31	1:00	1:21C	1:42C	2:01F
200	0:00	0:27	0:56	1:17C	1:37C	1:56F
190	0:00	0:23	0:53	1:13	1:32C	1:51F
180	0:00	0:20	0:49	1:09	1:28C	1:46C
170	0:00	0:15	0:44	1:05	1:23C	1:40C
160	0:00	0:10	0:39	1:01	1:18C	1:34C
150	0:00	0:05	0:33	0:56	1:12	1:28C
140	0:00	0:00	0:28	0:51	1:07	1:22C

C - CAUTION ZONE (1:14 – 1:49) – **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 (1:50 +) – **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 1:50 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
Reverse	**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	0:03 / 0:10	0:03 / 0:10	0:03 / 0:09	0:03 / 0:09	0:03 / 0:09	0:02 / 0:09
Auto 4	0:07 / 0:11	0:06 / 0:21	0:06 / 0:19	0:06 / 0:18	0:07 / 0:19	0:06 / 0:19
Auto 3	0:00 / 0:00	0:14 / **NW**	0:14 / 0:41	0:14 / 0:40	0:14 / 0:41	0:14 / 0:39
Auto 2	0:00 / 0:00	0:21 / **NW**	0:22 / 1:11	0:25 / 1:08	0:28 / 1:05	0:21 / 1:05
Auto 1	0:00 / 0:00	0:33 / **NW**	0:32 / **NW**	0:30 / **NW**	0:39 / 1:41	0:30 / 1:42

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 parking.
2) Use the highest value to enter the following BTMS Operative Brake Cooling table from Page 4-40.
3) Wait the specified time associated with the value from the BTMS indicator prior to subsequent takeoff.

BTMS INOPERATIVE or NON BTMS AIRCRAFT:

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
240	0:09	0:48	1:15C	1:41C	F	F
230	0:06	0:44	1:12	1:37C	F	F
220	0:03	0:41	1:08	1:33C	F	F
210	0:00	0:36	1:05	1:29C	F	F
200	0:00	0:32	1:02	1:25C	1:47C	F
190	0:00	0:28	0:58	1:20C	1:42C	F
180	0:00	0:24	0:54	1:16C	1:36C	F
170	0:00	0:19	0:50	1:11	1:31C	F
160	0:00	0:14	0:44	1:06	1:25C	1:44C
150	0:00	0:09	0:39	1:02	1:19C	1:37C
140	0:00	0:04	0:32	0:56	1:13	1:30C

C - CAUTION ZONE (1:14 – 1:49) – **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 (1:50 +) – **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.

MEL SUPPORT

73-21-01: ELECTRONIC ENGINE CONTROL (EEC) INOP
77-11-01: THRUST SETTING USING N_1

RESTRICTIONS

The following restrictions apply to all MEL items presented on this page:

Use of autothrottle is not permitted with one or both EPR systems inoperative.

73-21-01C or 73-21-01D
ELECTRONIC ENGINE CONTROL (EEC) SYSTEMS

MEL 73-21-01 allows dispatch with one control channel inoperative. When the primary EEC channel is inoperative, the engine will operate in the N1 control mode. The following N_1 power setting charts may be used in lieu of EPR thrust setting charts. Power setting charts provided for Takeoff, Go Around, and Maximum Continuous Thrust.

77-11-01
EPR SYSTEM INOPERATIVE

MEL 77-11-01 allows dispatch with one EPR system inoperative. The following N_1 power setting charts may be used in lieu of EPR thrust setting charts. Power setting charts provided for Takeoff, Go Around, and Maximum Continuous Thrust. Use of Assumed Temperature for takeoff is NOT permitted. At full throttle, takeoff thrust is assured if either target N_1 OR target EPR is achieved.

Procedures are unchanged except N_1 power setting is used in lieu of EPR, and the thrust levers are stabilized at 70% N_1 RPM prior to setting takeoff thrust.

NOTE:
The engine with the operative EPR indication may reach target EPR prior to target N_1.

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MEL SUPPORT

ALTERNATE THRUST SETTING - TAKEOFF THRUST

% N_1

PW2037

40 TO 80 KNOTS
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

OAT	ALTITUDE - FEET												
°C	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	*8,400*	9,000	10,000
55	84.6	84.6	84.6	84.6	84.6	84.6	84.6	84.6	84.6	84.6	84.6	84.6	84.6
50	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0
45	87.3	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
40	87.9	88.0	88.4	88.8	89.1	89.1	89.1	89.1	89.1	89.1	89.1	89.1	89.1
35	88.4	88.5	89.0	89.4	89.9	90.2	90.4	90.4	90.4	90.4	90.4	90.4	90.4
30	88.4	88.9	89.5	90.0	90.5	90.8	91.1	91.1	91.1	91.1	91.1	91.1	91.1
25	87.7	88.1	89.1	90.1	91.1	91.4	91.7	91.7	91.7	91.7	91.7	91.7	91.7
20	87.0	87.3	88.4	89.4	90.3	91.3	92.2	92.4	92.4	92.4	92.4	92.4	92.4
15	86.2	86.5	87.6	88.6	89.5	90.4	91.3	91.9	92.5	92.7	92.7	92.7	92.7
10	85.4	85.7	86.8	87.8	88.7	89.6	90.5	91.1	91.6	92.4	92.4	92.4	92.4
5	84.5	84.9	85.9	86.9	87.8	88.8	89.6	90.2	90.8	91.4	91.6	91.8	92.2
0	83.7	84.1	85.1	86.1	87.0	87.9	88.8	89.4	89.9	90.5	90.7	91.0	91.5
-5	82.9	83.2	84.3	85.3	86.1	87.1	87.9	88.5	89.1	89.6	89.8	90.1	90.7
-10	82.0	82.4	83.5	84.4	85.3	86.2	87.0	87.7	88.2	88.7	88.9	89.2	89.8
-15	81.2	81.6	82.6	83.6	84.4	85.4	86.2	86.8	87.3	87.8	88.0	88.3	88.9
-20	80.4	80.8	81.8	82.8	83.6	84.5	85.3	85.9	86.4	87.0	87.2	87.5	88.0
-25	79.5	80.0	81.0	81.9	82.7	83.7	84.5	85.1	85.6	86.1	86.3	86.6	87.1
-30	78.7	79.1	80.2	81.1	81.9	82.8	83.6	84.2	84.7	85.2	85.4	85.7	86.2
-35	77.9	78.3	79.4	80.3	81.0	82.0	82.7	83.3	83.8	84.3	84.5	84.8	85.3
-40	77.0	77.5	78.5	79.4	80.2	81.1	81.9	82.5	82.9	83.4	83.7	83.9	84.4
-45	76.2	76.6	77.7	78.6	79.4	80.3	81.0	81.6	82.1	82.6	82.8	83.0	83.5
-50	75.4	75.8	76.9	77.8	78.5	79.4	80.2	80.7	81.2	81.7	81.9	82.2	82.6

CORRECTIONS:

Packs OFF	+ 0.6
Engine Anti-Ice ON below 8,000 ft	0.0
Engine Anti-Ice ON above 8,000 ft	- 1.4
Wing Anti-Ice ON	- 1.0

NOTE:

- With EPR indication for either engine not available, use N_1 to set thrust for both engines.
- All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

MEL SUPPORT

ALTERNATE THRUST SETTING - GO AROUND THRUST

% N_1

PW 2037

NORMAL BLEED - PACKS ON / ANTI-ICE OFF

OAT	AIRPORT PRESSURE ALTITUDE - FEET												
°C	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	*8,400*	9,000	10,000
55	85.0	84.9	84.9	84.8	84.8	84.8	84.8	84.7	84.7	84.7	84.7	84.7	84.7
50	86.1	86.1	86.1	86.1	86.0	86.0	86.0	86.0	86.0	85.9	85.9	85.9	85.9
45	87.2	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.2	87.2	87.2	87.2
40	87.8	87.9	88.2	88.5	88.9	88.9	88.9	88.9	88.9	88.8	88.8	88.8	88.8
35	88.4	88.5	88.9	89.2	89.7	90.0	90.1	90.1	90.1	90.1	90.1	90.1	90.1
30	88.3	88.9	89.5	89.9	90.4	90.7	91.1	91.1	91.1	91.1	91.1	91.1	91.1
25	87.5	88.1	89.0	90.0	91.0	91.4	91.8	91.8	91.8	91.8	91.8	91.8	91.8
20	86.8	87.3	88.3	89.3	90.2	91.1	92.1	92.4	92.4	92.5	92.5	92.5	92.5
15	86.0	86.5	87.5	88.5	89.4	90.3	91.2	91.9	92.3	92.7	92.7	92.7	92.7
10	85.1	85.7	86.7	87.7	88.6	89.5	90.4	91.0	91.5	92.1	92.3	92.3	92.3
5	84.3	84.9	85.8	86.9	87.8	88.7	89.5	90.2	90.7	91.0	91.3	91.6	92.0
0	83.5	84.0	85.0	86.0	86.9	87.9	88.7	89.3	89.8	90.4	90.6	90.7	91.2
-5	82.7	83.2	84.2	85.2	86.1	87.0	87.8	88.4	89.0	89.5	89.7	89.8	90.3
-10	81.9	82.4	83.4	84.4	85.2	86.2	87.0	87.6	88.1	88.6	88.8	88.9	89.5
-15	81.0	81.6	82.6	83.5	84.4	85.3	86.1	86.7	87.2	87.8	88.0	88.1	88.6
-20	80.2	80.7	81.7	82.7	83.5	84.5	85.2	85.9	86.4	86.9	87.1	87.4	87.9
-25	79.4	79.9	80.9	81.9	82.7	83.6	84.4	85.0	85.5	86.0	86.2	86.3	86.8
-30	78.6	79.1	80.1	81.0	81.8	82.8	83.5	84.1	84.6	85.1	85.3	85.4	85.9
-35	77.8	78.3	79.3	80.2	81.0	81.9	82.7	83.3	83.7	84.2	84.4	84.5	85.0
-40	76.9	77.4	78.5	79.4	80.2	81.1	81.8	82.4	82.9	83.4	83.6	83.7	84.2
-45	76.1	76.6	77.6	78.5	79.3	80.2	81.0	81.5	82.0	82.5	82.7	82.8	83.3
-50	75.3	75.8	76.8	77.7	78.4	79.4	80.1	80.7	81.1	81.6	81.8	82.0	82.4

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

CORRECTIONS:

Packs OFF	+ 0.6
Engine Anti-Ice ON below 8,000 ft	0.0
Engine Anti-Ice ON above 8,000 ft	- 1.4
Wing Anti-Ice ON	- 1.0

MEL SUPPORT

MAXIMUM CONTINUOUS THRUST

% N1

PW2037

BASED ON 250/300/.80M
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

TAT - °C	PRESSURE ALTITUDE - FEET									
	0	5,000	8,700	15,000	20,000	25,000	30,000	35,000	37,000	41,000
50	84.5	86.6	86.6							
45	85.2	87.2	87.2	87.8						
40	85.9	87.9	87.9	88.5						
35	86.6	88.4	88.4	89.0	88.2					
30	86.3	89.0	89.0	89.5	88.7	86.8				
25	85.5	89.6	89.6	90.0	89.2	87.3				
20	84.8	88.9	90.2	90.5	89.8	87.8	85.2	85.0	84.9	84.6
15	84.1	88.1	89.6	91.1	90.3	88.4	85.8	85.6	85.5	85.2
10	83.4	87.3	88.8	90.5	90.9	89.1	86.5	86.3	86.2	85.9
5	82.6	86.6	88.0	89.7	90.9	89.9	87.5	87.3	87.2	87.0
0	81.9	85.8	87.2	88.9	90.1	90.2	88.2	88.0	87.9	87.6
-2	81.6	85.5	86.9	88.6	89.7	89.8	88.5	88.2	88.1	87.9
-4	81.3	85.1	86.6	88.2	89.4	89.5	88.8	88.6	88.5	88.2
-6	81.0	84.8	86.3	87.9	89.1	89.2	88.6	88.8	88.7	88.5
-8	80.7	84.5	85.9	87.6	88.7	88.8	88.3	89.2	89.1	88.8
-10	80.4	84.2	85.6	87.3	88.4	88.5	87.9	89.5	89.4	89.2
-12	80.1	83.9	85.3	86.9	88.1	88.2	87.6	89.8	89.7	89.5
-14	79.8	83.5	85.0	86.6	87.7	87.8	87.2	90.1	90.0	89.8
-16	79.4	83.2	84.6	86.2	87.3	87.4	86.9	90.0	90.3	90.0
-18	79.1	82.9	84.3	85.9	87.0	87.1	86.6	89.7	90.4	90.2
-20	78.8	82.6	84.0	85.6	86.7	86.8	86.2	89.3	90.1	89.9
-22				85.2	86.4	86.5	85.9	89.0	89.7	89.5
-24				84.9	86.0	86.1	85.5	88.6	89.4	89.2
-26				84.6	85.7	85.8	85.2	88.3	89.0	88.8
-28				84.2	85.0	85.4	84.9	87.9	88.6	88.5
-30				83.9	85.0	85.1	84.5	87.5	88.3	88.1
-32				83.5	84.6	84.7	84.2	87.2	87.9	87.7
-34				83.2	84.3	84.4	83.8	86.8	87.5	87.4
-36				82.8	83.9	84.0	83.5	86.5	87.2	87.0
-38				82.5	83.6	83.7	83.1	86.1	86.8	86.6
-40				82.1	83.2	83.3	82.8	85.7	86.4	86.3
-42				81.8	82.8	82.9	82.4	85.4	86.1	85.9

CORRECTIONS:

Packs OFF	+ 0.4	+ 0.4	+ 0.4	+ 0.5	+ 0.6	+ 0.8	+ 1.0	+ 1.3	+ 1.4	+ 1.5
Engine A/I ON	0.0	0.0	- 1.2	- 1.2	- 1.2	- 1.3	- 1.5	- 1.8	- 2.0	- 2.5
Wing A/I ON	- 0.9	- 1.0	- 1.0	- 1.0	- 1.1	- 1.2	- 1.3	- 1.6	- 1.8	- 2.3

MEL SUPPORT

V_{MCG} - MINIMUM CONTROL SPEED, GROUND

KIAS

PW2037

NO NOSEWHEEL STEERING

AIRPORT PRESSURE ALTITUDE - FEET	AMBIENT TEMPERATURE - °C						
	-10	**0**	**10**	**20**	**30**	**40**	**50**
0	102	102	102	101	101	97	92
1,000	102	102	102	101	100	96	90
2,000	101	101	101	100	98	94	88
3,000	100	100	100	100	97	93	
4,000	99	99	99	99	96	91	
5,000	98	98	98	98	94	90	
6,000	97	97	97	96	92	88	
7,000	96	96	96	94	91	96	
8,000	95	95	95	94	89		
8,400	94	94	94	92	88		
9,000	94	94	94	92	87		
10,000	92	92	92	89	85		

Note: All ships certified for takeoff up to 8,400 feet altitude. The following ships are certified for takeoff up to 9,500 feet altitude: 636, 638, 640-641, 6815-6817, 6901-6904.

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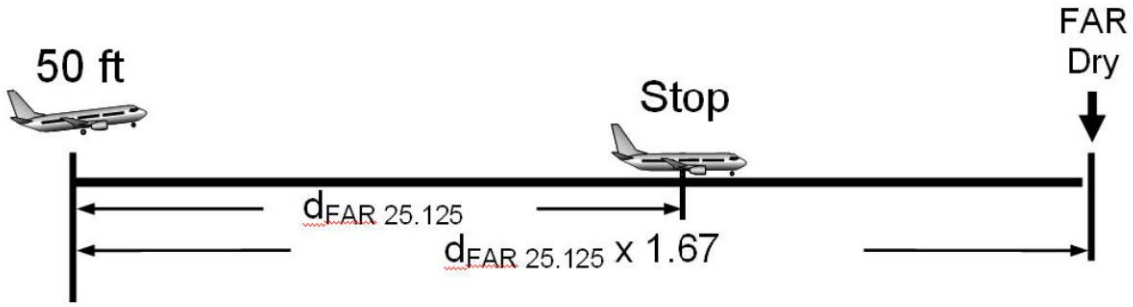
MEL SUPPORT

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 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)

ANTI-SKID INOP – DRY RUNWAY

FLAPS 30

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**	**9,000**	**10,000**
250,000	10,300	10,500	10,800	11,100	11,400	11,700	12,000	12,400	12,700	13,200	13,600	14,000
240,000	9,900	10,200	10,400	10,700	11,000	11,300	11,600	11,900	12,300	12,700	13,100	13,500
230,000	9,500	9,800	10,000	10,300	10,600	10,900	11,200	11,500	11,900	12,200	12,600	13,000
220,000	9,200	9,400	9,700	9,900	10,200	10,500	10,700	11,100	11,400	11,800	12,100	12,500
210,000	8,800	9,000	9,300	9,500	9,800	10,000	10,300	10,600	11,000	11,300	11,700	12,000
200,000	8,500	8,700	8,900	9,100	9,400	9,600	9,900	10,200	10,500	10,900	11,200	11,600
190,000	8,100	8,300	8,500	8,800	9,000	9,200	9,500	9,800	10,100	10,400	10,800	11,100
180,000	7,800	8,000	8,200	8,400	8,600	8,800	9,100	9,400	9,700	10,000	10,300	10,600
170,000	7,400	7,600	7,800	8,000	8,200	8,500	8,700	9,000	9,300	9,600	9,900	10,200
160,000	7,100	7,300	7,500	7,700	7,900	8,100	8,300	8,600	8,900	9,200	9,500	9,800
150,000	6,800	6,900	7,100	7,300	7,500	7,700	7,900	8,200	8,500	8,800	9,100	9,300
140,000	6,400	6,600	6,800	6,900	7,100	7,300	7,600	7,800	8,100	8,400	8,600	8,900
130,000	6,100	6,200	6,400	6,600	6,800	7,000	7,200	7,400	7,700	7,900	8,200	8,500
120,000	5,800	5,900	6,100	6,200	6,400	6,600	6,800	7,000	7,300	7,500	7,800	8,100

ANTI-SKID INOP - 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**	**9,000**	**10,000**
250,000	11,800	12,100	12,400	12,800	13,100	13,500	13,800	14,200	14,700	15,100	15,600	16,100
240,000	11,400	11,700	12,000	12,300	12,600	13,000	13,300	13,700	14,200	14,600	15,100	15,500
230,000	11,000	11,300	11,500	11,900	12,200	12,500	12,800	13,200	13,600	14,100	14,500	14,900
220,000	10,600	10,800	11,100	11,400	11,700	12,000	12,300	12,700	13,100	13,600	14,000	14,400
210,000	10,100	10,400	10,700	10,900	11,300	11,500	11,900	12,200	12,600	13,000	13,400	13,800
200,000	9,700	10,000	10,200	10,500	10,800	11,100	11,400	11,800	12,100	12,500	12,900	13,300
190,000	9,300	9,600	9,800	10,100	10,400	10,600	10,900	11,300	11,600	12,000	12,400	12,700
180,000	8,900	9,200	9,400	9,600	9,900	10,200	10,500	10,800	11,100	11,500	11,900	12,200
170,000	8,500	8,800	9,000	9,200	9,500	9,700	10,000	10,300	10,600	11,000	11,400	11,700
160,000	8,200	8,400	8,600	8,800	9,000	9,300	9,500	9,900	10,200	10,500	10,900	11,200
150,000	7,800	8,000	8,200	8,400	8,600	8,900	9,100	9,400	9,700	10,100	10,400	10,700
140,000	7,400	7,600	7,800	8,000	8,200	8,400	8,700	9,000	9,300	9,600	9,900	10,200
130,000	7,000	7,200	7,400	7,600	7,800	8,000	8,300	8,500	8,800	9,100	9,500	9,700
120,000	6,600	6,800	7,000	7,200	7,400	7,600	7,800	8,100	8,400	8,700	9,000	9,300

CORRECTIONS:

Headwind per kt	-40 ft
Tailwind per kt	+220 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

ONE BRAKE DEACTIVATED – DRY RUNWAY

FLAPS 30

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	9,000	10,000
250,000	6,400	6,600	6,700	6,900	7,100	7,300	7,400	7,600	7,800	8,000	8,200	8,500
240,000	6,200	6,300	6,500	6,700	6,800	7,000	7,200	7,300	7,600	7,800	8,000	8,200
230,000	5,900	6,100	6,200	6,400	6,500	6,700	6,900	7,100	7,300	7,500	7,700	7,900
220,000	5,700	5,800	6,000	6,100	6,300	6,400	6,600	6,800	7,000	7,200	7,400	7,600
210,000	5,400	5,600	5,700	5,900	6,000	6,200	6,300	6,500	6,700	6,900	7,100	7,200
200,000	5,200	5,300	5,500	5,600	5,800	5,900	6,100	6,200	6,400	6,600	6,800	6,900
190,000	5,000	5,100	5,200	5,400	5,500	5,600	5,800	5,900	6,100	6,300	6,500	6,600
180,000	4,700	4,900	5,000	5,100	5,200	5,400	5,500	5,700	5,800	6,000	6,200	6,300
170,000	4,500	4,600	4,700	4,900	5,000	5,100	5,200	5,400	5,600	5,700	5,900	6,000
160,000	4,300	4,400	4,500	4,600	4,700	4,900	5,000	5,100	5,300	5,400	5,600	5,700
150,000	4,000	4,200	4,300	4,400	4,500	4,600	4,700	4,900	5,000	5,100	5,300	5,400
140,000	3,800	3,900	4,000	4,100	4,200	4,400	4,500	4,600	4,700	4,900	5,000	5,100
130,000	3,600	3,700	3,800	3,900	4,000	4,100	4,200	4,300	4,400	4,600	4,700	4,800
120,000	3,400	3,400	3,500	3,600	3,700	3,900	4,000	4,100	4,200	4,300	4,400	4,500

ONE BRAKE DEACTIVATED - 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	9,000	10,000
250,000	7,400	7,600	7,800	8,000	8,100	8,300	8,600	8,800	9,000	9,300	9,500	9,700
240,000	7,100	7,300	7,500	7,600	7,800	8,000	8,200	8,500	8,700	8,900	9,100	9,400
230,000	6,800	7,000	7,200	7,300	7,500	7,700	7,900	8,100	8,400	8,600	8,800	9,000
220,000	6,500	6,700	6,900	7,000	7,200	7,400	7,600	7,800	8,000	8,200	8,500	8,700
210,000	6,300	6,400	6,600	6,700	6,900	7,100	7,300	7,500	7,700	7,900	8,100	8,300
200,000	6,000	6,100	6,300	6,500	6,600	6,800	7,000	7,200	7,400	7,600	7,800	8,000
190,000	5,700	5,900	6,000	6,200	6,300	6,500	6,600	6,800	7,000	7,200	7,400	7,600
180,000	5,500	5,600	5,700	5,900	6,000	6,200	6,300	6,500	6,700	6,900	7,100	7,300
170,000	5,200	5,300	5,500	5,600	5,700	5,900	6,000	6,200	6,400	6,600	6,800	6,900
160,000	4,900	5,000	5,200	5,300	5,400	5,600	5,700	5,900	6,100	6,200	6,400	6,600
150,000	4,700	4,800	4,900	5,000	5,100	5,300	5,400	5,600	5,800	5,900	6,100	6,300
140,000	4,400	4,500	4,600	4,700	4,900	5,000	5,100	5,300	5,400	5,600	5,700	5,900
130,000	4,100	4,200	4,400	4,500	4,600	4,700	4,800	5,000	5,100	5,300	5,400	5,600
120,000	3,900	4,000	4,100	4,200	4,300	4,400	4,500	4,700	4,800	4,900	5,100	5,200

CORRECTIONS:

Headwind per kt	-20 ft
Tailwind per kt	+120 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

AUTO SPOILERS INOP – DRY RUNWAY

FLAPS 30

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	9,000	10,000
250,000	6,500	6,700	6,800	7,000	7,100	7,300	7,400	7,600	7,800	8,000	8,200	8,400
240,000	6,300	6,400	6,600	6,700	6,900	7,000	7,200	7,400	7,600	7,700	7,900	8,100
230,000	6,100	6,200	6,300	6,500	6,600	6,800	6,900	7,100	7,300	7,500	7,600	7,800
220,000	5,800	6,000	6,100	6,300	6,400	6,500	6,700	6,900	7,000	7,200	7,400	7,600
210,000	5,600	5,700	5,900	6,000	6,100	6,300	6,400	6,600	6,800	6,900	7,100	7,300
200,000	5,400	5,500	5,600	5,800	5,900	6,000	6,200	6,300	6,500	6,700	6,800	7,000
190,000	5,200	5,300	5,400	5,600	5,700	5,800	5,900	6,100	6,200	6,400	6,600	6,700
180,000	5,000	5,100	5,200	5,300	5,400	5,600	5,700	5,800	6,000	6,100	6,300	6,400
170,000	4,800	4,900	5,000	5,100	5,200	5,300	5,400	5,600	5,700	5,900	6,000	6,200
160,000	4,600	4,700	4,800	4,900	5,000	5,100	5,200	5,300	5,500	5,600	5,700	5,900
150,000	4,400	4,500	4,600	4,700	4,700	4,900	5,000	5,100	5,200	5,400	5,500	5,600
140,000	4,100	4,200	4,300	4,400	4,500	4,600	4,700	4,900	5,000	5,100	5,200	5,300
130,000	3,900	4,000	4,100	4,200	4,300	4,400	4,500	4,600	4,700	4,800	5,000	5,100
120,000	3,700	3,800	3,900	4,000	4,100	4,200	4,300	4,400	4,500	4,600	4,700	4,800

AUTO SPOILERS INOP - 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	9,000	10,000
250,000	7,500	7,700	7,800	8,000	8,200	8,400	8,600	8,800	9,000	9,200	9,400	9,600
240,000	7,200	7,400	7,600	7,700	7,900	8,100	8,300	8,500	8,700	8,900	9,100	9,300
230,000	7,000	7,100	7,300	7,500	7,600	7,800	8,000	8,200	8,400	8,600	8,800	9,000
220,000	6,700	6,900	7,000	7,200	7,300	7,500	7,700	7,900	8,100	8,300	8,500	8,700
210,000	6,500	6,600	6,800	6,900	7,100	7,200	7,400	7,600	7,800	8,000	8,200	8,400
200,000	6,200	6,400	6,500	6,700	6,800	6,900	7,100	7,300	7,500	7,700	7,900	8,000
190,000	6,000	6,100	6,200	6,400	6,500	6,700	6,800	7,000	7,200	7,400	7,500	7,700
180,000	5,700	5,900	6,000	6,100	6,300	6,400	6,500	6,700	6,900	7,100	7,200	7,400
170,000	5,500	5,600	5,700	5,900	6,000	6,100	6,300	6,400	6,600	6,800	6,900	7,100
160,000	5,300	5,400	5,500	5,600	5,700	5,900	6,000	6,100	6,300	6,500	6,600	6,800
150,000	5,000	5,100	5,200	5,400	5,500	5,600	5,700	5,900	6,000	6,200	6,300	6,500
140,000	4,800	4,900	5,000	5,100	5,200	5,300	5,500	5,600	5,700	5,900	6,000	6,100
130,000	4,500	4,600	4,700	4,800	4,900	5,100	5,200	5,300	5,400	5,600	5,700	5,800
120,000	4,300	4,400	4,500	4,600	4,700	4,800	4,900	5,000	5,100	5,300	5,400	5,500

CORRECTIONS:

Headwind per kt	-35 ft
Tailwind per kt	+120 ft

End of Section

FERRY FLIGHT PLANNING AND OPERATION

AUTHORIZATION AND FLIGHT PLANNING **5-2**
2.5 BLEED VALVE INOPERATIVE **5-3**
FLAPS/SLATS RETRACTED **5-4**
FLAPS RETRACTED (SLATS EXTENDED FOR TAKEOFF & LANDING) **5-5**
WINGLET / WING EXTENSION REMOVAL **5-8**
LANDING GEAR EXTENDED **5-10**

AUTHORIZATION AND FLIGHT PLANNING

Authorization, procedures, and applicability of data for ferry operations is described in SP 4786 (Aircraft Restrictions Manual). Procedures outlined in SP 4786 must be strictly adhered to.

Ferry operational data is available for the following configurations:

- 2.5 Bleed Valve Inoperative
- Flaps/Slats Retracted
- Flaps Retracted/Slats Extended
- Winglet / Wing Extension Removed
- Landing Gear Extended

The following method should be used for ferry flight planning and certain revenue flight planning (as noted) and operations:

1. Obtain a normal aircraft configuration (computerized or manual) unfiled flight plan using Long Range Cruise (LRC) at the proposed cruise altitude. (The following FERRY pages contain recommended cruise altitude under the FLIGHT PLANNING heading.)

2. Calculate the trip time and fuel load based on the values in the flight plan by multiplying the time and fuel values obtained in Step 1 by the factors listed 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 (NS80172).

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, if available. (See FERRY, ENROUTE heading)

5. Adjust the Runway Allowable and Climb Limit Takeoff Weights, and the Landing Climb Limit Weight as follows:
   Go to the appropriate ferry configuration page and subtract the weight decrements indicated under headings for TAKEOFF and LANDING from the NORMAL Thrust takeoff weight and the Landing Climb weight, respectively, obtained from the ARM (Airport Sections).

The following limitations should be applied to all ferry flights:

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

2.5 BLEED VALVE INOPERATIVE

Use the following conditions and factors for the 2.5 bleed valve inoperative and secured in the fully open position:

LIMITATIONS:

Maximum Cruise Altitude:	35,000 feet.
Maximum Speed:	No additional restrictions.
C. G. Limitations:	No additional restrictions.
Enroute Weather Restrictions:	No additional restrictions.
Exhaust Gas Temperature Limits:	Maintenance Coordination must determine from Engine Trend Monitoring (ETM) if sufficient EGT margin is available to prevent exceeding EGT limits based on notes under TAKEOFF and ENROUTE.

FLIGHT PLANNING

Time and fuel factors (multiply by basic flight plan values - interpolate linearly):

RANGE - NM	RECOMMENDED ALTITUDE	TIME	FUEL
500	Normal	1.00	1.08
1000	Normal	1.00	1.08
1500	Normal	1.00	1.08

Target Gate Arrival Fuel: 8,600 lbs. plus fuel to alternate

TAKEOFF:

Adjustment to Runway Allowable and Climb Limit Weights:	None
Adjustment to V Speeds:	Use V Speeds for TO-2 or TO (NORMAL) THRUST
Thrust Setting Restrictions:	Use TO-2 if takeoff weight and conditions permit, otherwise use TO. Monitor EGT closely during takeoff and climb.
Flap Setting Restrictions:	No additional restrictions.
Operation From Contaminated Runway:	Permitted, use standard procedures.
Additional Information:	Expect N1and N2 to run 1.0% high and EGT to run 27 ºC high.

ENROUTE:

Climb:	Use CLB-2. Closely monitor EGT during Climb.
Cruise:	Cruise Limits per FMS (TMC CRZ)
Additional Information	Expect N1 to run 1.0% high, N2 to run 2.7% high and EGT to run 44ºC high. Monitor EGT at high altitudes, heavy weights, and when using anti-ice.

LANDING:

Landing Speed Restrictions:	No additional restrictions.
Flap Setting Restrictions:	No additional restrictions.
Adjustment to Landing Climb Limit Weights:	None.

HOLDING SPEED/THRUST - IAS/EPR:

Standard FMS/ODM speeds and thrusts.

FLAPS/SLATS RETRACTED

Use the following conditions and factors for ferry operations:

LIMITATIONS

Maximum Cruise Altitude: Normal.
Maximum Speed: Normal.
C. G. Limitations: No additional restrictions.
En Route Weather Restrictions: No additional restrictions.

FLIGHT PLANNING

Flight Plan as Normal.
Target Gate Arrival Fuel: 8,600 lbs. plus fuel to Alternate.

TAKEOFF

Adjustment to Runway Allowable Limit Takeoff Weights:
Packs ON or OFF, From Flaps 5 data, Subtract 46,000 lbs
Packs ON or OFF, From Flaps 15 data, Subtract 54,000 lbs.

Takeoff V Speeds:

WEIGHT	FIELD ELEVATION	V1		VR		V2	
		AMBIENT TEMPERATURE - °C					
		20 & Below	40	20 & Below	40	20 & Below	40
130,000	SL - 8000	124 127	126 133	133 135	134 140	146 146	146 146
160,000	SL - 8000	146 149	147 154	151 154	152 158	162 164	163 164
190,000	SL - 8000	165 169	167 173	168 172	170 176	176 177	177 177
220,000	SL - 8000	182 186	184 190	184 188	187 193	190 191	191 192

TAKEOFF

Thrust Setting Restrictions: NORMAL only, ALTERNATE Thrust NOT approved.
Flap/Slat Setting Restrictions: Flaps 0/Slats Retracted.
Safe pitch attitude with engine failure: Normal
Stabilizer Setting: Normal
Operation from Contaminated Runway: NOT permitted.

ENROUTE

Climb: Use MAXIMUM Climb Thrust (TMC CLB)/ODM.
Cruise: Cruise Limits per FMS (TMC CRZ)/ODM.
Additional Information: Use normal climb, cruise, and descent speeds and thrusts (TMC/ODM).

LANDING

Landing Speed Restrictions: Vref 30 + 50
Flap/Slat Setting Restrictions: Flaps 0/ Slats Retracted.
Minimum Runway Length: See ABNORMAL Section for ACTUAL landing distances.
Adjustment to Landing Climb Limit Weights: None.

HOLDING

Standard FMS/ODM speeds and thrusts.

FLAPS RETRACTED (SLATS EXTENDED FOR TAKEOFF & LANDING)

Use the following (•) procedures and considerations to modify Normal Procedures for Flaps Retracted (Slats Extended) ferry operations:

LIMITATIONS

Maximum Cruise Altitude:	Normal
Maximum Speed	Normal
C.G. Limitations	No Additional Restrictions
En Route Weather Restrictions	No Additional Restrictions

FLIGHT PLANNING

Flight Plan	Normal
Checklist	Use the Normal Procedures Checklist and the Modified Procedures listed here. Modified Procedures are identified by the "•" symbol.
Target Gate Arrival Fuel	8,600 pounds minimum fuel, plus fuel to alternate (reduces risk of uncovering fuel pumps for operation at higher than normal deck angles).
Runway	Plan on using the Longest Available Runway for takeoff and landing. Operation from Contaminated Runways is NOT permitted.
Thrust	Takeoff must be performed using NORMAL Power.
WDR Adjustment	The WDR will be issued for a normal FLAPS 5 and/or FLAPS 15 takeoff. Use the information below to adjust RATOW and to determine Takeoff V Speeds for a Flaps Retracted (Slats Extended) Takeoff.

Runway Allowable Takeoff Weight:

- Packs ON or OFF, **From FLAPS 5** data: Subtract **21,000** pounds
- Packs ON or OFF, **From FLAPS 15** data: Subtract **34,000** pounds

- **TAKEOFF V SPEEDS**

WEIGHT	FIELD ELEVATION	V1		VR		V2	
		AMBIENT TEMPERATURE - °C					
		20 & Below	40	20 & Below	40	20 & Below	40
130,000	SL	110	113	118	120	130	130
	8000	113	119	120	124	130	130
160,000	SL	130	131	135	136	145	146
	8000	131	137	136	141	146	147
190,000	SL	146	149	150	151	157	157
	8000	149	154	151	157	157	157
220,000	SL	161	164	164	166	169	169
	8000	164	169	166	171	169	170

Trim	• Set takeoff trim, refer to the **ODM Section 2, Takeoff Stabilizer Settings Flaps 1.** Use the MAC % provided by the WDR to determine trim.
Autothrottles	NORMAL Takeoff Thrust must be manually set. (Autothrottles will work normally in all other modes.)

FLAPS RETRACTED (SLATS EXTENDED FOR TAKEOFF & LANDING) (cont.)

AFTER START

- To configure for a **FLAPS RETRACTED, SLATS EXTENDED** Takeoff, follow the Alternate Slat extension procedures below.
  FLAP lever…… UP
  ALTN FLAPS selector……. 1
  LE ALTN FLAPS arm switch…… ALTN
  Note: The TE Flap Indicator will indicate a position between UP and 1 and the TRAILING EDGE Light will illuminate. DO NOT accomplish the TRAILING EDGE FLAP DISAGREE checklist.
  Note: DO NOT attempt takeoff with LEADING EDGE Light illuminated.
- Select FLAPS GPWS Override.
  GND PROX FLAP OVRD switch……. OVRD

TAKEOFF

Takeoff Warning

The TAKEOFF CONFIGURTION WARNING will sound with FLAPS UP and takeoff power applied. The Master Warning lights will illuminate and the EICAS will display a FLAPS Warning message. The Horn will sound and lights remain illuminated until the Main Gear is off the runway. Flight Crews may wish to disable the Horn for takeoff. This may be accomplished by pulling the Right and Left AURAL WARNING SPEAKER Circuit Breakers. The Master Warning/Caution lights, all other lights and EICAS messages will not be affected by this procedure. The procedure below should be accomplished just prior to taxiing onto the takeoff runway.

- To temporarily disable the AURAL WARNING SPEAKERs:
  AURAL WARNING SPEAKER CBs……. PULL
  CONFIGURATION TEST switch…….CHECK
  Verify that the Master Warning lights and EICAS Warning is for FLAPS only. Do not attempt a takeoff with any other messages displayed unless resolved.
  THRUST levers…….MANUALLY SET NORMAL T/O POWER

Rotation	Raise nose to normal takeoff attitude. Once airborne, the aircraft will accelerate very quickly.
Safe pitch attitude with Engine failure	Normal

AFTER TAKEOFF

Climb Power	Use Thrust Mode Select Panel to set Climb Power. Autothrottle will function normally.

- Slats — Retract
  The airplane will accelerate rapidly. Closely observe flap speed limit restrictions. Retract SLATS normally using hydraulic power.
  FLAP lever (confirm)……UP
  ALTN FLAPS selector…… NORM
  LE ALTN FLAPS arm switch…….. OFF
  AURAL WARNING SPEAKER CBs……. RESET

ENROUTE

Climb, Cruise, Descent	Use normal climb, cruise and descent speeds and thrust settings.

FLAPS RETRACTED (SLATS EXTENDED FOR TAKEOFF & LANDING) (cont.)

APPROACH PLANNING

Runway Length	See ABNORMAL Section of ODM for ACTUAL landing distances. (**ODM 4, TE FLAP ASSYMMETRY, FLAPS 5 OR LESS**)
Techniques	Refer to the **FCTM Chapter 8** for information on landing with an abnormal flap configuration.
Airspeed	Approach Airspeed will be **Vref 30 + 40**, plus wind additives.
ATC	Inform ATC higher than normal planned approach speed for aircraft spacing.
Adjustment to Climb	
Limit Weights	None

SLAT EXTENSION

- Approach configuration, use the following Alternate extension procedure to extend the Slats.
  FLAP lever…… UP
  ALTN FLAPS selector……. 1
  LE ALTN FLAPS arm switch…… ALTN
  Note: The TE Flap Indicator will indicate a position between UP and 1 and the TRAILING EDGE Light will illuminate. DO NOT accomplish the TRAILING EDGE FLAP DISAGREE checklist.

APPROACH

Autoflight	Operates normally. On glideslope, disconnect the A/T to maintain desired airspeed.
ADI	A green ALPHA speed box may display on the ADI (PLI will be well above the aircraft symbol). Limit bank angle to 15 degrees.
Attitude	Expect a pitch attitude above 5 degrees.

LANDING

Attitude	Caution: Pitch attitude is already high. To avoid tail strike limit flare during landing. Once on the runway, the nose must be lowered considerably more than normal before nose tire contact is made.

AFTER LANDING

- Configure Airplane for Normal Operation:
  FLAP lever…… UP
  ALTN FLAPS selector…… NORM
  LE ALTN FLAPS arm switch…….. OFF
  GND PROX FLAP OVRD switch……. OFF

WINGLET / WING EXTENSION REMOVAL

Use the following conditions and factors for one winglet or both winglets removed and with wing extensions either both installed or both removed.

LIMITATIONS:

Wing extension installation is symmetrical.

The wing extension has the ballast weight installation.

Both wing extensions shall remain in place if either winglet is installed.

Airplane must be flown during daytime hours since the position and anti-collision lights on the removed winglet(s) will be missing.

Avoid turbulence. Avoid abrupt control inputs.

Avoid flight in icing conditions.

Maximum Cruise Altitude:	Normal
Maximum Speed:	300KIAS or 0.82 MACH. Whichever is lower.
C. G. Limitations	No additional restrictions.
En Route Weather Restrictions:	No additional restrictions.

Configuration combinations of winglet and wing extension installation.

757 Winglet and Wing Extension Component Removal Matrix *				
LH Winglet	**RH Winglet**	**LH Wing Extension**	**RH Wing Extension**	**Configuration Status**
				STC Baseline: All Components Installed
Removed				Ferry Allowed
	Removed			Ferry Allowed
Removed	Removed			Ferry Allowed
Removed	Removed	Removed	Removed	Ferry Allowed
Removed		Removed		Not Allowed**
	Removed		Removed	Not Allowed**
Removed	Removed	Removed		Not Allowed**
Removed	Removed		Removed	Not Allowed**

* See attached page A1 for restrictions and procedures of Non Revenue Ferry Flight with Winglet(s) or Wing Extensions Removed, 757.

** Unsymmetrical wing extension installation ferry is not allowed.

Ferry flights are allowed for the following configurations:

- A winglet is removed from one wing and a winglet is installed on the other wing and both wing extensions are installed.
- The winglets are removed from both wings and the wing extensions are installed on both wings.
- Both winglets and both wing extensions are removed.

FLIGHT PLANNING

Increase trip fuel by 15%

Reduce all climb performance limited weights, i.e., takeoff climb and obstacle clearance, enroute climb, approach climb, and landing climb weight limits by 25,000 pounds

WINGLET / WING EXTENSION REMOVAL

TAKEOFF

Maximum crosswind:	15 knots.
RATOW & Climb limit weight:	Reduce by 25,000 lbs

ENROUTE

Trim with rudder if/as required during cruise flight so the autopilot can be used.

Climb:	Normal climb speeds and thrusts (TMC/ODM)
Cruise:	Normal cruise speeds and thrusts (TMC/ODM)
Climb limit weight:	Reduce by 25,000 lbs

LANDING

Cat. I landing approaches only.

Maximum crosswind:	15 knots.
Landing Speed restrictions:	No additional restrictions
Flap Setting Restrictions:	No additional restrictions
Approach & Landing Climb Limit Weights:	Reduce by 25,000 lbs

LANDING GEAR EXTENDED

LIMITATIONS:

Refer to "Landing Gear Extended Revenue Operations" in the Abnormal section of the ODM for a list of operational limitations.

FLIGHT PLANNING

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

PRESSURE ALTITUDE - FEET	RANGE – NAUTICAL GROUND MILES					
	300	600	900	1,200	1,500	1,800
8,000	13.6 / 1.4	26.8 / 2.6	40.5 / 3.8	54.6 / 4.9	69.4 / 6.0	
12,000	12.5 / 1.3	24.9 / 2.4	37.5 / 3.6	50.9 / 4.7	64.5 / 5.8	
16,000	12.0 / 1.3	23.3 / 2.3	35.0 / 3.4	47.3 / 4.5	59.9 / 5.5	
20,000	11.4 / 1.2	22.0 / 2.2	32.8 / 3.3	44.4 / 4.2	56.3 / 5.2	68.7 / 6.1
24,000	11.0 / 1.2	21.0 / 2.1	31.5 / 3.1	42.1 / 4.0	53.2 / 5.0	64.6 / 5.9
28,000	10.7 / 1.1	20.3 / 2.0	30.0 / 2.9	40.0 / 3.8	50.7 / 4.7	61.3 / 5.5

NOTE: Based on Long Range Cruise, VREF30 + 80 climb/descent, standard day conditions, zero winds.

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.

LANDING GEAR EXTENDED

ENROUTE

Long Range Cruise Table

GROSS WEIGHT - 1000 LB	PRESSURE ALTITUDE - 1,000 FEET CRUISE SPEED - KIAS TARGET EPR FUEL FLOW / ENGINE - LB/HR										
	10	**14**	**18**	**21**	**23**	**25**	**27**	**29**	**31**	**33**	**35**
260	251 1.20 7079	250 1.25 7051									
240	242 1.18 6515	241 1.22 6477	242 1.29 6483								
220	232 1.16 5955	232 1.20 5928	231 1.25 5832	233 1.31 5934							
200	222 1.14 5409	222 1.17 5371	221 1.22 5282	221 1.26 5290	223 1.30 5363	223 1.35 5394	221 1.40 5396				
180	213 1.12 4907	211 1.15 4821	210 1.19 4741	210 1.23 4714	209 1.26 4722	211 1.30 4787	212 1.35 4828	210 1.40 4831	208 1.47 4854		
160	203 1.10 4431	200 1.13 4304	199 1.16 4198	199 1.19 4183	198 1.22 4176	198 1.25 4162	199 1.29 4210	200 1.33 4258	199 1.38 4246	197 1.45 4279	197 1.55 4440
140	191 1.08 3928	190 1.11 3828	188 1.13 3705	188 1.16 3692	188 1.18 3694	188 1.21 3693	188 1.24 3696	188 1.27 3713	188 1.32 3704	188 1.37 3717	188 1.43 3780
120	179 1.07 3456	179 1.09 3380	179 1.11 3325	179 1.13 3294	179 1.15 3291	179 1.17 3288	179 1.20 3287	179 1.23 3287	179 1.26 3267	179 1.30 3258	179 1.35 3258

Refer to “Landing Gear Extended Revenue Operations” in the Abnormal section of the ODM for driftdown performance and Long Range Cruise speeds, EPR settings, and altitude capability.

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 50,000 lbs

HOLDING SPEED / THRUST (KIAS / EPR)

WEIGHT - POUNDS	ALTITUDE - FEET	
	10,000	**15,000**
260,000	235 / 1.19	235 / 1.25
240,000	228 / 1.17	228 / 1.22
220,000	220 / 1.15	220 / 1.20
200,000	213 / 1.13	213 / 1.17
180,000	205 / 1.11	205 / 1.15
160,000	197 / 1.10	197 / 1.13
140,000	188 / 1.08	188 / 1.11
120,000	179 / 1.07	179 / 1.09

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 0.78/290 KIAS driftdown speeds.
3. 290 KIAS engine-out cruise speed.

In the event of pressurization loss in addition to or independent of an engine shutdown, cruise at 290 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 ABNORMAL Section for one engine operating LRC data.

FLIGHT PLANNING CONSIDERATIONS

Flight Planning data provided in ETOPS CRITICAL FUEL RESERVES reflects the analysis used by Flight Control 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/290 KIAS (engine-out) or LRC (all engines)
- 250 KIAS descent to 1,500 feet
- Missed approach, approach and land
- 5000 lb. of hold fuel(approximately double AC120-42 requirement)
- 5% fuel added for wind errors
- APU operating
- 5% fuel added for weather avoidance (180 minute ETOPS)

For icing conditions, eighteen 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 - 808 NM
180 minutes - 1207 NM

CRITICAL FUEL RESERVES

WINGLET AIRCRAFT

FORECAST ICING CONDITIONS
ISA & BELOW

INITIAL GROSS WT (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
260,000	13.8	16.8	19.8	22.9	25.9	28.9	31.9	34.7	37.7	40.6
250,000	13.6	16.6	19.4	22.4	25.3	28.3	31.2	34.0	36.9	39.8
240,000	13.2	16.1	19.1	22.0	25.0	27.8	30.7	33.5	36.3	39.1
230,000	13.0	15.9	18.7	21.5	24.4	27.3	30.0	32.8	35.5	38.3
220,000	12.7	15.4	18.3	21.0	23.9	26.7	29.4	32.1	34.8	37.5
210,000	12.4	15.2	17.9	20.7	23.5	26.2	28.9	31.6	34.3	36.9
200,000	12.2	15.0	17.6	20.4	23.0	25.8	28.4	31.1	33.6	36.2
190,000	12.0	14.6	17.3	19.9	22.5	25.2	27.8	30.5	33.0	35.7
180,000	11.7	14.4	16.9	19.4	22.1	24.7	27.3	29.9	32.4	35.0
170,000	11.5	14.0	16.6	19.2	21.7	24.3	26.8	29.4	32.0	34.5
160,000	11.4	13.9	16.4	19.0	21.5	23.9	26.5	29.0	31.5	34.0
150,000	11.2	13.7	16.1	18.6	21.2	23.6	26.1	28.6	31.1	33.6
140,000	10.9	13.3	15.9	18.3	20.8	23.2	25.8	28.2	30.7	33.1

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 @ 290 KIAS.
   c. 250 KIAS descent to landing. ``
   d. 5000 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. **5% for weather avoidance (180 minute ETOPS).**
   c. 15% for Engine/Wing Anti-Ice ON and ice accumulation.

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 above ISA, increase fuel required by 0.8% for each 10°C above ISA.

CRITICAL FUEL RESERVES

WINGLET AIRCRAFT

ANTI-ICE NOT REQUIRED
ISA & BELOW

INITIAL GROSS WT (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
260,000	12.0	14.6	17.2	19.9	22.5	25.1	27.7	30.2	32.8	35.3
250,000	11.8	14.4	16.9	19.5	22.0	24.6	27.1	29.6	32.1	34.6
240,000	11.5	14.0	16.6	19.1	21.7	24.2	26.7	29.1	31.6	34.0
230,000	11.3	13.8	16.3	18.7	21.2	23.7	26.1	28.5	30.9	33.3
220,000	11.0	13.4	15.9	18.3	20.8	23.2	25.6	27.9	30.3	32.6
210,000	10.8	13.2	15.6	18.0	20.4	22.8	25.1	27.5	29.8	32.1
200,000	10.6	13.0	15.3	17.7	20.0	22.4	24.7	27.0	29.2	31.5
190,000	10.4	12.7	15.0	17.3	19.6	21.9	24.2	26.5	28.7	31.0
180,000	10.2	12.5	14.7	16.9	19.2	21.5	23.7	26.0	28.2	30.4
170,000	10.0	12.2	14.4	16.7	18.9	21.1	23.3	25.6	27.8	30.0
160,000	9.9	12.1	14.3	16.5	18.7	20.8	23.0	25.2	27.4	29.6
150,000	9.7	11.9	14.0	16.2	18.4	20.5	22.7	24.9	27.0	29.2
140,000	9.5	11.6	13.8	15.9	18.1	20.2	22.4	24.5	26.7	28.8

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 @ 290 KIAS @ 10,000 ft.
   c. 250 KIAS descent to landing.
   d. 5000 lb. hold fuel.
   e. Missed approach, approach and land.
   f. APU Operating .

2. Includes the following fuel allowances.
   a. 5% for wind forecast errors.

3. This data reflects data used by FLIGHT CONTROL for ETP Diversion Fuel analysis.

4. The flight planning system adjusts this critical fuel data to account for individual ship number performance deterioration.

5. For ambient temperatures above ISA, increase fuel required by 0.8% for each 10 °C above ISA.

CRITICAL FUEL RESERVES

NON-WINGLET AIRCRAFT

FORECAST ICING CONDITIONS
ISA & BELOW

INITIAL GROSS WT (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
240,000	14.1	17.1	20.0	23.0	25.8	28.7	31.6	34.4	37.2	40.1
230,000	13.8	16.7	19.5	22.3	25.2	28.0	31.0	33.7	36.4	39.2
220,000	13.4	16.3	19.1	21.9	24.7	27.5	30.2	32.9	35.6	38.5
210,000	13.1	15.9	18.7	21.4	24.2	26.9	29.6	32.3	34.9	37.6
200,000	12.8	15.7	18.4	21.1	23.8	26.5	29.0	31.6	34.3	36.9
190,000	12.7	15.4	18.0	20.6	23.2	25.9	28.6	31.1	33.6	36.1
180,000	12.4	15.0	17.6	20.3	22.9	25.4	28.0	30.5	33.0	35.6
170,000	12.2	14.8	17.3	19.8	22.4	24.9	27.5	30.0	32.4	34.9
160,000	11.9	14.5	17.0	19.5	22.0	24.6	27.1	29.5	32.0	34.4

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 @ 290 KIAS.
   c. 250 KIAS descent to landing. ``
   d. 5000 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. **5% for weather avoidance (180 minute ETOPS).**
   c. 15% for Engine/Wing Anti-Ice ON and ice accumulation.

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 above ISA, increase fuel required by 0.8% for each 10°C above ISA.

CRITICAL FUEL RESERVES

NON-WINGLET AIRCRAFT

ANTI-ICE NOT REQUIRED
ISA & BELOW

INITIAL GROSS WT (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
240,000	12.3	14.9	17.4	20.0	22.4	24.9	27.4	29.9	32.4	34.9
230,000	12.0	14.5	17.0	19.4	21.9	24.3	26.9	29.3	31.6	34.1
220,000	11.7	14.2	16.6	19.1	21.5	23.9	26.3	28.6	31.0	33.5
210,000	11.4	13.9	16.3	18.6	21.1	23.4	25.8	28.0	30.3	32.7
200,000	11.1	13.6	16.0	18.3	20.7	23.0	25.2	27.5	29.8	32.1
190,000	11.0	13.4	15.6	17.9	20.2	22.5	24.9	27.0	29.2	31.4
180,000	10.8	13.0	15.3	17.7	19.9	22.1	24.4	26.5	28.7	30.9
170,000	10.6	12.9	15.1	17.2	19.5	21.7	24.0	26.1	28.1	30.3
160,000	10.4	12.6	14.8	17.0	19.2	21.4	23.5	25.6	27.8	29.9

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 @ 290 KIAS @ 10,000 ft.
   c. 250 KIAS descent to landing.
   d. 5000 lb. hold fuel.
   e. Missed approach, approach and land.
   f. APU Operating .

2. Includes the following fuel allowances.
   a. 5% for wind forecast errors.

3. This data reflects data used by FLIGHT CONTROL for ETP Diversion Fuel analysis.

4. The flight planning system adjusts this critical fuel data to account for individual ship number performance deterioration.

5. For ambient temperatures above ISA, increase fuel required by 0.9% for each 10 °C above ISA.

End of Section