
A321 Operational Data Manual (ODM)

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A321

Operational Data

Manual

Revision Number: 4
Revision Date: September 23, 2016

Issued by
Performance Engineering – Dept 088 ATG
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FUNCTION

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

AUTHORITY

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

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

RESPONSIBILITY

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

Distribution of this manual is the responsibility of the Dept. 188, ATG, LibSvc.ATL188@delta.com.

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: A321 OPERATIONAL DATA MANUAL

Date: 23 Sep 16

Revision Number: 4

Page: 1 of 1

REMOVE	INSERT	REMARKS
COVER PAGE	COVER PAGE	Cover page updated to reflect revision.
LIST OF EFFECTIVE PAGES Page <i>i</i>	LIST OF EFFECTIVE PAGES Page <i>i</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
APPROACH/LANDING Pages: 3-5, 3-7	APPROACH/LANDING Pages: 3-5, 3-7	Eliminated fair nomenclature to make it consistent with new FAA policy.
ABNORMAL Pages: 4-45, 4-47	ABNORMAL Pages: 4-45, 4-47	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: 4

ODM REVISION LOG

Page	Date
	NO DATE

TOC / COVER PAGE

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TOC	22 Apr 16
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LIST OF EFFECTIVE PAGES

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QUICK REFERENCE

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LAND DIST	23 Sep 16

FLIGHT PLANNING

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END

A321 QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES

RUNWAY CONDITION ASSESSMENT MATRIX

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

Reported Braking Action		Reported Runway Surface Conditions			
PIREP	Definition	Runway Contaminant	ICAO/Runway Condition Code	Mu ⁽²⁾	RCR
--	--	• Dry	6		--
Good	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal	- Frost - Wet or Damp 1/8" or less depth of: - Water - Slush - Dry Snow - Wet Snow	5	40 or higher	19 & above
Good to Medium	Braking deceleration OR directional control is between Good and Medium.	-15°C and colder OAT: Compacted Snow	4	39	
Medium	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	- Wet ("slippery when wet" runway) - Dry Snow or Wet Snow (any depth) over Compacted Snow Greater than 1/8" depth of: - Dry Snow - Wet Snow Warmer than -15°C OAT: - Compacted Snow	3	30 to 39	13 – 18
Medium to Poor	Braking deceleration OR directional control is between Medium and Poor.	Greater than 1/8" depth of: - Water - Slush	2	21 to 29	
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. The following crosswind guidelines are applicable to all Delta aircraft for takeoff and landing.

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

*Or as permitted by Delta 10-0 special pages.

A321 QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS FULL

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	DRY (6)			GOOD (5)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	10,400	7,500	7,200	10,400	8,200	8,200
190,000	10,200	7,300	7,000	10,200	8,000	8,000
185,000	10,000	7,200	6,800	10,000	7,800	7,800
180,000	9,800	7,000	6,700	9,800	7,600	7,600
175,000	9,600	6,900	6,600	9,600	7,500	7,500
171,518	8,600	6,100	4,800	8,600	6,200	6,000
170,000	8,600	6,100	4,800	8,600	6,200	6,000
165,000	8,400	5,900	4,700	8,400	6,000	5,800
160,000	8,200	5,800	4,600	8,200	5,900	5,700
155,000	8,000	5,700	4,500	8,000	5,700	5,500
150,000	7,800	5,500	4,400	7,800	5,600	5,300
145,000	7,500	5,400	4,300	7,500	5,400	5,200
140,000	7,300	5,300	4,200	7,300	5,300	5,000
135,000	7,100	5,100	4,100	7,100	5,100	4,900
130,000	6,900	5,000	4,000	6,900	5,000	4,700
125,000	6,700	4,800	3,900	6,700	4,900	4,600
120,000	6,500	4,700	3,800	6,500	4,700	4,400
115,000	6,300	4,600	3,700	6,300	4,600	4,200

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-400	-400	-600	-600	-600
2,000	0	0	0	0	0	0
4,000	600	400	400	600	600	600
6,000	1,200	800	800	1,200	1,200	1,200
8,000	1,800	1,200	1,200	1,800	1,800	1,700

CORRECTIONS	DRY (6)			GOOD (5)		
PER 5 ADD'L APP SPD	550	350	350	550	450	450
PER 1 KT TAILWIND	150	100	100	150	150	150
PER 10°C ABOVE ISA	300	200	200	300	250	250
PER 1% DOWN SLOPE	100	50	100	100	250	200
1 REV INOP	0	0	100	0	100	200
2 REV INOP or NO REV USED	100	0	200	100	200	300
Autoland	1,000			1,100		

Note: Do not operate when Braking Action is Nil.

A321 QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS FULL

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	MEDIUM (3)			POOR (1)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	10,500	9,500	9,500	12,600	12,200	12,500
190,000	10,300	9,300	9,300	12,300	11,900	12,200
185,000	10,100	9,100	9,100	12,000	11,700	11,900
180,000	9,900	8,900	8,900	11,700	11,400	11,700
175,000	9,700	8,700	8,700	11,500	11,100	11,400
171,518	8,700	7,400	7,300	10,500	10,200	10,200
170,000	8,700	7,300	7,200	10,400	10,100	10,100
165,000	8,500	7,200	7,100	10,200	9,900	9,800
160,000	8,300	7,000	6,900	9,900	9,600	9,600
155,000	8,100	6,800	6,700	9,700	9,300	9,300
150,000	7,800	6,600	6,500	9,400	9,100	9,000
145,000	7,600	6,500	6,400	9,100	8,800	8,800
140,000	7,400	6,300	6,200	8,800	8,600	8,500
135,000	7,200	6,100	6,000	8,600	8,300	8,300
130,000	7,000	5,900	5,800	8,300	8,000	8,000
125,000	6,800	5,800	5,700	8,000	7,800	7,700
120,000	6,600	5,600	5,500	7,800	7,500	7,500
115,000	6,400	5,400	5,300	7,500	7,200	7,200

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-600	-600	-1,100	-1,100	-1,100
2,000	0	0	0	0	0	0
4,000	600	600	600	1,100	1,100	1,100
6,000	1,200	1,200	1,100	2,300	2,300	2,300
8,000	1,900	1,700	1,700	3,400	3,400	3,400

CORRECTIONS	MEDIUM (3)			POOR (1)		
PER 5 ADD'L APP SPD	500	400	400	600	600	600
PER 1 KT TAILWIND	200	150	150	450	450	450
PER 10°C ABOVE ISA	300	250	300	550	550	550
PER 1% DOWN SLOPE	350	450	400	3,450	3,450	3,450
1 REV INOP	200	400	300	1,300	1,300	1,200
2 REV INOP or NO REV USED	400	900	700	2,600	2,600	2,300
Autoland	1,200			1,300		

Note: Do not operate when Braking Action is Nil.

A321 QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 3

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	DRY (6)			GOOD (5)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	11,200	8,000	7,600	11,200	8,800	8,800
190,000	11,000	7,800	7,400	11,000	8,600	8,600
185,000	10,700	7,700	7,200	10,700	8,400	8,400
180,000	10,500	7,500	7,100	10,500	8,200	8,200
175,000	10,300	7,400	6,900	10,300	8,000	8,000
171,518	9,300	6,500	5,200	9,300	6,800	6,600
170,000	9,300	6,500	5,100	9,300	6,700	6,500
165,000	9,000	6,400	5,000	9,000	6,500	6,300
160,000	8,800	6,200	4,900	8,800	6,300	6,200
155,000	8,600	6,100	4,800	8,600	6,200	6,000
150,000	8,300	5,900	4,700	8,400	6,000	5,800
145,000	8,100	5,800	4,600	8,100	5,800	5,600
140,000	7,900	5,600	4,500	7,900	5,700	5,500
135,000	7,700	5,500	4,400	7,700	5,500	5,300
130,000	7,500	5,300	4,300	7,500	5,400	5,100
125,000	7,200	5,200	4,100	7,200	5,200	4,900
120,000	7,000	5,000	4,000	7,000	5,000	4,800
115,000	6,800	4,900	3,900	6,800	4,900	4,600

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-400	-500	-600	-700	-700
2,000	0	0	0	0	0	0
4,000	600	400	500	600	700	700
6,000	1,300	900	900	1,300	1,300	1,300
8,000	1,900	1,300	1,400	1,900	2,000	2,000

CORRECTIONS	DRY (6)			GOOD (5)		
PER 5 ADD'L APP SPD	550	400	350	550	450	450
PER 1 KT TAILWIND	150	100	150	150	200	150
PER 10°C ABOVE ISA	300	200	200	300	300	300
PER 1% DOWN SLOPE	100	50	100	100	250	250
1 REV INOP	0	0	100	0	200	200
2 REV INOP or NO REV USED	100	0	200	100	400	400
Autoland	1,000			1,200		

Note: Do not operate when Braking Action is Nil.

A321 QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 3

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	MEDIUM (3)			POOR (1)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	11,300	10,200	10,200	13,600	13,500	13,500
190,000	11,100	10,000	10,000	13,300	13,200	13,200
185,000	10,900	9,700	9,700	13,000	12,900	12,900
180,000	10,600	9,500	9,500	12,700	12,600	12,600
175,000	10,400	9,300	9,300	12,400	12,300	12,300
171,518	9,400	8,000	7,900	11,400	11,100	11,000
170,000	9,400	7,900	7,800	11,300	11,000	10,900
165,000	9,100	7,800	7,600	11,000	10,700	10,700
160,000	8,900	7,600	7,400	10,700	10,400	10,400
155,000	8,700	7,400	7,300	10,400	10,100	10,100
150,000	8,500	7,200	7,100	10,100	9,800	9,800
145,000	8,200	7,000	6,900	9,900	9,500	9,500
140,000	8,000	6,800	6,700	9,600	9,300	9,200
135,000	7,800	6,600	6,500	9,300	9,000	8,900
130,000	7,500	6,400	6,300	9,000	8,700	8,600
125,000	7,300	6,200	6,100	8,700	8,400	8,300
120,000	7,100	6,000	5,900	8,400	8,100	8,100
115,000	6,800	5,800	5,700	8,100	7,800	7,800

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-700	-600	-600	-1,200	-1,200	-1,200
2,000	0	0	0	0	0	0
4,000	700	600	600	1,200	1,200	1,200
6,000	1,300	1,200	1,200	2,500	2,500	2,500
8,000	2,000	1,900	1,900	3,700	3,700	3,700

CORRECTIONS	MEDIUM (3)			POOR (1)		
PER 5 ADD'L APP SPD	550	400	400	600	600	600
PER 1 KT TAILWIND	200	200	150	450	450	450
PER 10°C ABOVE ISA	300	300	300	600	600	600
PER 1% DOWN SLOPE	400	450	450	3,850	3,850	3,850
1 REV INOP	200	500	400	1,500	1,500	1,300
2 REV INOP or NO REV USED	400	900	800	3,000	3,000	2,700
Autoland	1,200			1,300		

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.

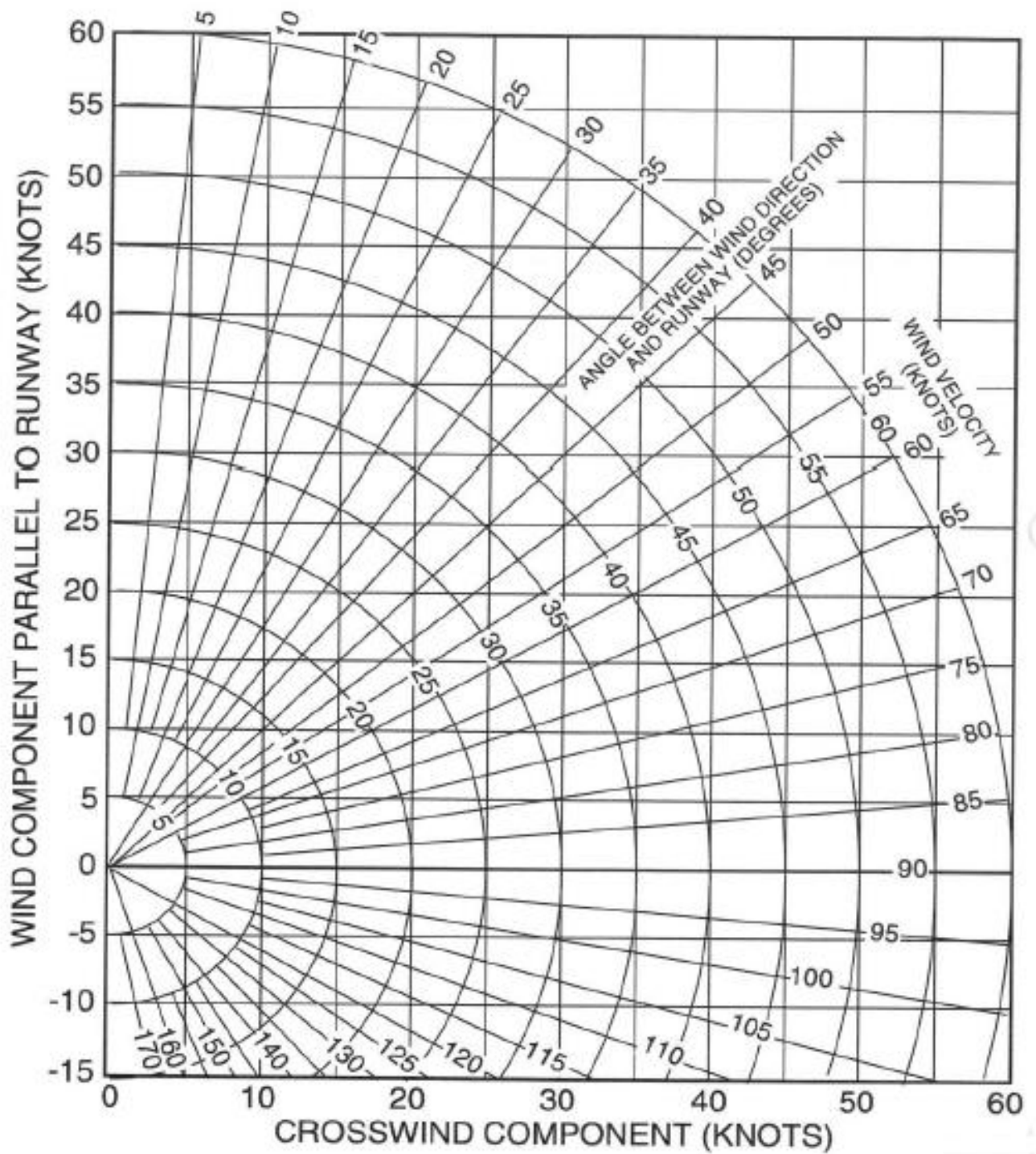
STATIC AIR TEMPERATURE (SAT) - The ambient still air temperature outside of the aircraft. Sometimes known as the Outside Air Temperature (OAT).

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

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

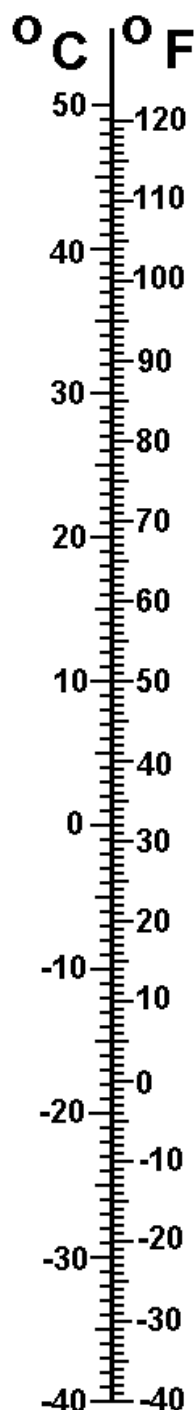
V_b - Buffet or severe turbulence target speed.

WIND COMPONENT CHART



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

TOTAL AIR TEMPERATURE vs STATIC AIR TEMPERATURE

°C

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

METRIC ALTIMETER CONVERSION CHART

MBS	Inch	MBS	Inch	MBS	Inch
940	27.76	977	28.85	1014	29.94
941	27.79	978	28.88	1015	29.97
942	27.82	979	28.91	1016	30.00
943	27.85	980	28.94	1017	30.03
944	27.88	981	28.97	1018	30.06
945	27.91	982	29.00	1019	30.09
946	27.94	983	29.03	1020	30.12
947	27.96	984	29.06	1021	30.15
948	27.99	985	29.09	1022	30.18
949	28.02	986	29.12	1023	30.21
950	28.05	987	29.15	1024	30.24
951	28.08	988	29.18	1025	30.27
952	28.11	989	29.21	1026	30.30
953	28.14	990	29.23	1027	30.33
954	28.17	991	29.26	1028	30.36
955	28.20	992	29.29	1029	30.39
956	28.23	993	29.32	1030	30.42
957	28.26	994	29.35	1031	30.45
958	28.29	995	29.38	1032	30.47
959	28.32	996	29.41	1033	30.50
960	28.35	997	29.44	1034	30.53
961	28.38	998	29.47	1035	30.56
962	28.41	999	29.50	1036	30.59
963	28.44	1000	29.53	1037	30.62
964	28.47	1001	29.56	1038	30.65
965	28.50	1002	29.59	1039	30.68
966	28.53	1003	29.62	1040	30.71
967	28.56	1004	29.65	1041	30.74
968	28.58	1005	29.68	1042	30.77
969	28.61	1006	29.71	1043	30.80
970	28.64	1007	29.74	1044	30.83
971	28.67	1008	29.77	1045	30.86
972	28.70	1009	29.80	1046	30.89
973	28.73	1010	29.83	1047	30.92
974	28.76	1011	29.85	1048	30.95
975	28.79	1012	29.88	1049	30.98
976	28.82	1013	29.91	1050	31.01

NORMAL OPERATING SPEED LIMITV_{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	0.688
17,000	350	0.713
19,000	350	0.740
21,000	350	0.767
23,000	350	0.796
25,000	347	0.820
27,000	333	0.820
29,000	319	0.820
31,000	306	0.820
33,000	293	0.820
35,000	280	0.820
37,000	267	0.820
39,000	244	0.820

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.			-37°C		-43°C	-44°C	-47°C	-57°C
MACH	FLT LEVEL		MAXIMUM ISA DEVIATION - °C					
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.

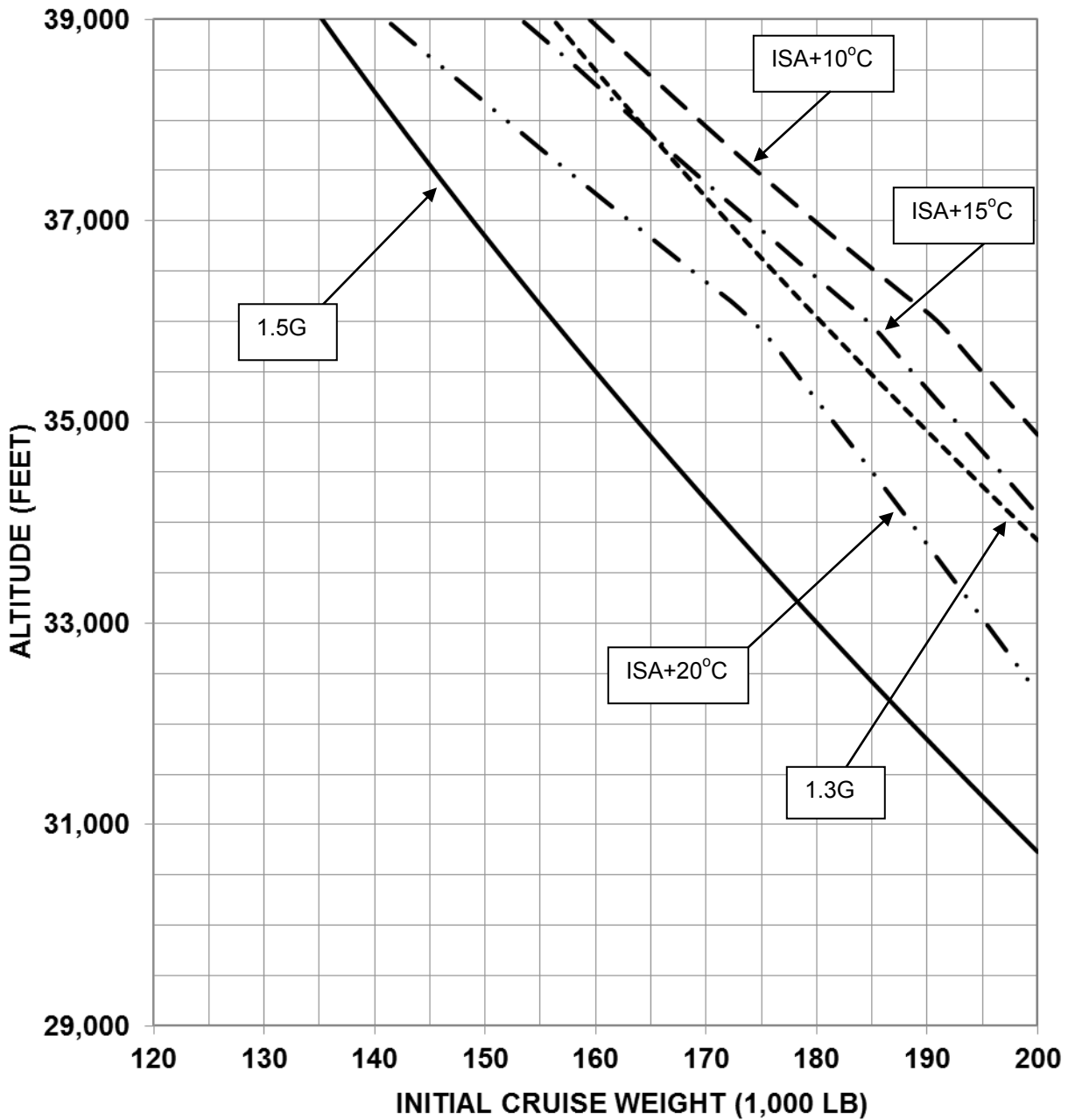
FUEL CONVERSION TABLE

Fuel Conversion Table — Kero @ 6.7 lbs/Gal							
Gallons	Pounds	Imperial Gallons	Liters	Gallons	Pounds	Imperial Gallons	Liters
100	670	83	379	3,300	22,110	2,748	12,501
200	1,340	167	758	3,400	22,780	2,831	12,879
300	2,010	250	1,136	3,500	23,450	2,914	13,258
400	2,680	333	1,515	3,600	24,120	2,998	13,636
500	3,350	416	1,894	3,700	24,790	3,081	14,051
600	4,020	500	2,273	3,800	25,460	3,164	14,394
700	4,690	583	2,652	3,900	26,130	3,247	14,773
800	5,360	666	3,030	4,000	26,800	3,331	15,152
900	6,030	749	3,409	4,100	27,470	3,414	15,530
1,000	6,700	833	3,788	4,200	28,140	3,497	15,909
1,100	7,370	916	4,167	4,300	28,810	3,580	16,288
1,200	8,040	999	4,545	4,400	29,480	3,664	16,667
1,300	8,710	1,082	4,924	4,500	30,150	3,747	17,045
1,400	9,380	1,166	5,303	4,600	30,820	3,830	17,424
1,500	10,050	1,249	5,682	4,700	31,490	3,913	17,803
1,600	10,720	1,332	6,061	4,800	32,160	3,997	18,182
1,700	11,390	1,415	6,439	4,900	32,830	4,080	18,561
1,800	12,060	1,499	6,818	5,000	33,500	4,163	18,939
1,900	12,730	1,582	7,197	5,100	34,170	4,246	19,318
2,000	13,400	1,665	7,576	5,200	34,840	4,330	19,697
2,100	14,070	1,749	7,955	5,300	35,510	4,413	20,076
2,200	14,740	1,832	8,333	5,400	36,180	4,496	20,455
2,300	15,410	1,915	8,712	5,500	36,850	4,580	20,833
2,400	16,080	1,998	9,091	5,600	37,520	4,663	21,212
2,500	16,750	2,082	9,470	5,700	38,190	4,746	21,591
2,600	17,420	2,165	9,848	5,800	38,860	4,829	21,970
2,700	18,090	2,248	10,227	5,900	39,530	4,913	22,348
2,800	18,760	2,331	10,606	6,000	40,200	4,996	22,727
2,900	19,430	2,415	10,985	6,100	40,870	5,079	23,106
3,000	20,100	2,498	11,364	6,200	41,540	5,162	23,485
3,100	20,770	2,581	11,742	6,300	42,210	5,245	23,864
3,200	21,440	2,664	12,121				

Given	Multiply By	To Find
Kilograms	2.205	Pounds
Liters	0.264	U.S. Gallons
Imperial Gallons	1.201	U.S. Gallons

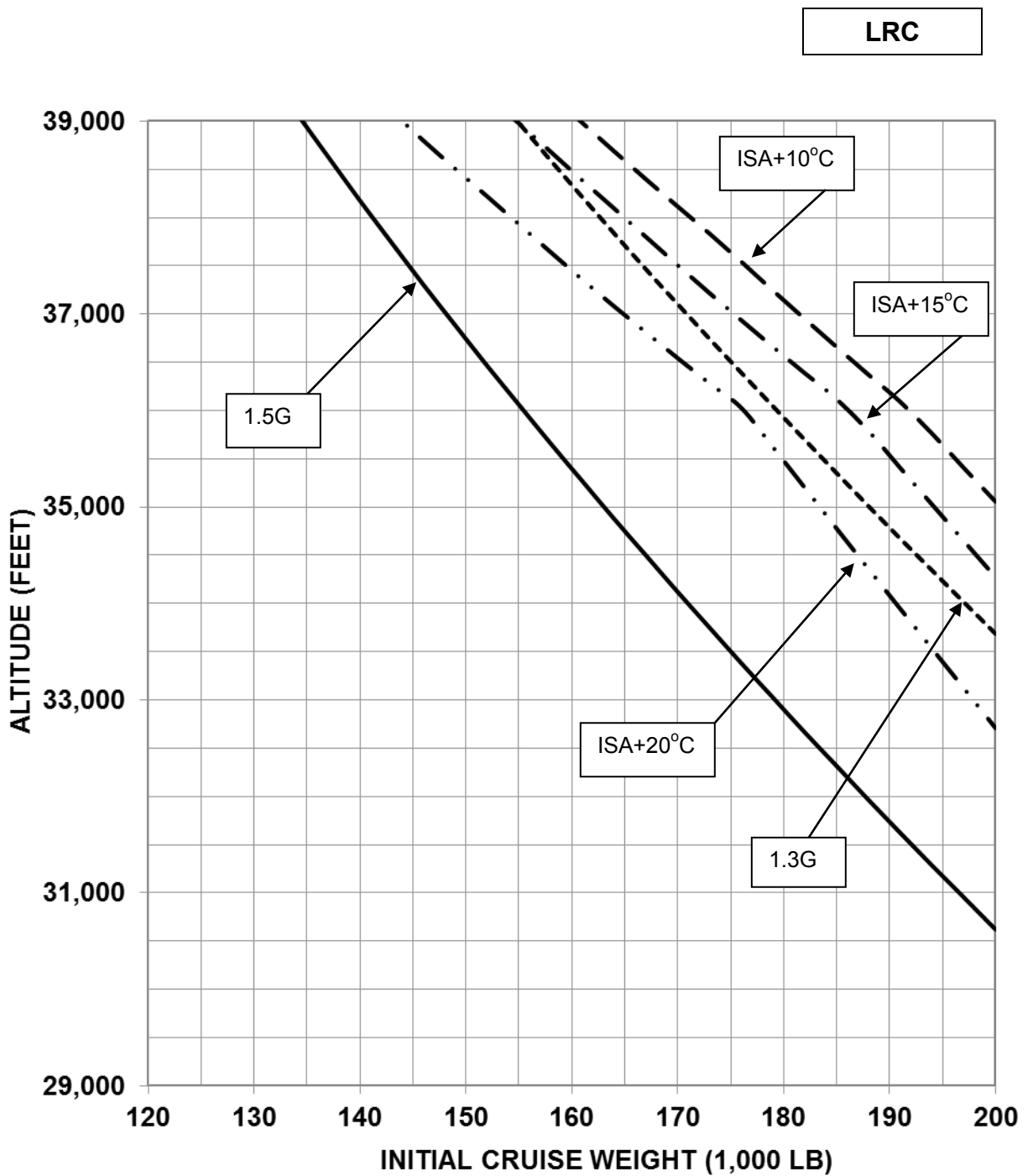
MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE

.79 MACH



Config	Corrections - Feet		
	≤ ISA+10	ISA+15	ISA+20
Engine Anti-Ice ON	-1,000	-1,800	-8,400
Engine and Wing Anti-Ice ON	-2,000	-5,400	-11,000

MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE



Config	Corrections - Feet		
	≤ ISA+10	ISA+15	ISA+20
Engine Anti-Ice ON	-1,000	-1,800	-8,400
Engine and Wing Anti-Ice ON	-2,000	-5,400	-11,000

BUFFET ONSET BOUNDARY SPEEDS

KCAS

FLIGHT LEVEL	CRUISE WEIGHT LBS	Vb M KIAS	G / BANK ANGLE - DEGREES		
			1.0/0°	1.15/30°	1.5/48°
			LOW SPEED		
390	200,000	0.79 244	240		
	180,000		220		
	160,000		205	223	
	140,000		189	206	
	120,000		172	188	220
370	200,000	0.79 256	232		
	180,000		217	238	
	160,000		203	220	
	140,000		187	204	241
	120,000		170	185	217
350	200,000	0.79 268	229	251	
	180,000		218	234	
	160,000		201	218	261
	140,000		185	202	236
	120,000		168	183	215
330	200,000	0.79 281	227	246	
	180,000		213	232	
	160,000		198	216	253
	140,000		182	199	234
	120,000		165	181	213
310	200,000	0.79 293	225	244	
	180,000		211	229	269
	160,000		196	214	250
	140,000		180	197	231
	120,000		162	178	211
290	200,000	0.79 306	222	242	284
	180,000		208	227	265
	160,000		193	211	248
	140,000		177	194	229
	120,000		159	175	208

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

End of Section

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INTENTIONALLY BLANK

DEFINITIONS AND ASSUMPTIONS

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

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

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 / 1+F

TAKEOFF WEIGHT 1,000 LBS	AIRPORT PRESS ALT FT	AMBIENT TEMPERATURE – °C					
		0 & below	10	20	30	40	50
200	8,000	142 / 169 / 171	139 / 166 / 168	137 / 163 / 165	135 / 161 / 162	128 / 153 / 154	121 / 144 / 145
	6,000	148 / 176 / 178	145 / 172 / 174	142 / 169 / 171	140 / 166 / 169	135 / 160 / 162	126 / 150 / 151
	4,000	142 / 169 / 172	142 / 169 / 172	142 / 169 / 172	145 / 173 / 175	141 / 168 / 170	132 / 156 / 158
	2,000	134 / 159 / 163	134 / 159 / 163	134 / 160 / 164	141 / 168 / 171	147 / 174 / 177	137 / 164 / 166
	0	133 / 158 / 163	133 / 158 / 163	133 / 159 / 163	133 / 159 / 163	142 / 169 / 172	143 / 170 / 173
190	8,000	142 / 169 / 171	139 / 166 / 168	137 / 163 / 165	135 / 161 / 162	128 / 153 / 154	121 / 144 / 145
	6,000	139 / 166 / 168	139 / 166 / 168	140 / 167 / 169	140 / 166 / 169	135 / 160 / 162	126 / 150 / 151
	4,000	131 / 156 / 160	132 / 157 / 160	132 / 157 / 161	139 / 165 / 168	141 / 168 / 170	132 / 156 / 158
	2,000	130 / 155 / 159	130 / 155 / 159	130 / 155 / 159	130 / 155 / 159	141 / 167 / 170	137 / 164 / 166
	0	129 / 154 / 159	129 / 154 / 159	130 / 154 / 159	130 / 154 / 159	131 / 156 / 159	143 / 170 / 173
180	8,000	137 / 163 / 166	138 / 164 / 166	137 / 163 / 165	135 / 161 / 162	128 / 153 / 154	121 / 144 / 145
	6,000	130 / 155 / 158	130 / 155 / 158	133 / 158 / 161	140 / 166 / 169	135 / 160 / 162	126 / 150 / 151
	4,000	127 / 151 / 155	127 / 151 / 155	127 / 151 / 155	128 / 153 / 156	141 / 168 / 170	132 / 156 / 158
	2,000	126 / 150 / 155	126 / 150 / 155	126 / 150 / 155	127 / 151 / 155	132 / 158 / 161	137 / 164 / 166
	0	125 / 149 / 155	126 / 149 / 155	126 / 150 / 155	126 / 150 / 155	127 / 151 / 155	135 / 161 / 164
170	8,000	129 / 154 / 157	130 / 154 / 157	132 / 157 / 159	135 / 161 / 162	128 / 153 / 154	121 / 144 / 145
	6,000	123 / 147 / 151	124 / 147 / 151	124 / 147 / 151	131 / 156 / 158	135 / 160 / 162	126 / 150 / 151
	4,000	123 / 146 / 151	123 / 146 / 151	123 / 146 / 151	123 / 147 / 151	131 / 156 / 159	132 / 156 / 158
	2,000	122 / 145 / 151	122 / 145 / 151	122 / 146 / 151	123 / 146 / 151	124 / 147 / 151	137 / 164 / 166
	0	122 / 145 / 151	122 / 145 / 151	122 / 145 / 151	122 / 145 / 151	123 / 146 / 151	125 / 149 / 152
160	8,000	120 / 143 / 147	120 / 143 / 147	121 / 144 / 147	130 / 155 / 157	128 / 153 / 154	121 / 144 / 145
	6,000	120 / 142 / 147	120 / 142 / 147	120 / 142 / 147	120 / 143 / 146	131 / 156 / 158	126 / 150 / 151
	4,000	119 / 141 / 147	119 / 141 / 147	119 / 142 / 147	120 / 142 / 146	120 / 143 / 146	132 / 156 / 158
	2,000	118 / 141 / 147	118 / 141 / 147	118 / 141 / 147	119 / 141 / 147	120 / 142 / 146	126 / 150 / 153
	0	118 / 140 / 147	118 / 140 / 147	118 / 140 / 147	118 / 140 / 147	119 / 141 / 146	120 / 142 / 146

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

TAKEOFF SPEEDS

DRY RUNWAY KIAS

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

**V₁ / V_R / V₂
TO / 1+F**

TAKEOFF WEIGHT 1,000 LBS	AIRPORT PRESS ALT FT	AMBIENT TEMPERATURE – °C					
		0 & below	10	20	30	40	50
150	8,000	116 / 138 / 142	116 / 138 / 142	116 / 138 / 142	120 / 143 / 145	128 / 153 / 154	121 / 144 / 145
	6,000	115 / 137 / 142	115 / 137 / 142	116 / 137 / 142	116 / 138 / 142	120 / 143 / 146	126 / 150 / 151
	4,000	115 / 136 / 142	115 / 136 / 142	115 / 136 / 142	115 / 137 / 142	116 / 138 / 142	124 / 147 / 149
	2,000	114 / 135 / 142	114 / 136 / 142	114 / 136 / 142	114 / 136 / 142	115 / 137 / 142	116 / 138 / 142
	0	113 / 135 / 142	113 / 135 / 142	113 / 135 / 142	114 / 135 / 142	114 / 136 / 142	116 / 137 / 142
140	8,000	111 / 133 / 137	112 / 133 / 137	112 / 133 / 137	112 / 134 / 137	119 / 142 / 144	121 / 144 / 145
	6,000	111 / 132 / 137	111 / 132 / 137	111 / 132 / 137	112 / 133 / 137	112 / 134 / 137	120 / 143 / 145
	4,000	110 / 131 / 137	110 / 131 / 137	110 / 131 / 137	111 / 132 / 137	112 / 133 / 137	113 / 134 / 137
	2,000	110 / 130 / 138	110 / 130 / 138	110 / 130 / 137	110 / 131 / 137	111 / 132 / 137	112 / 133 / 137
	0	113 / 129 / 138	113 / 129 / 138	113 / 129 / 138	113 / 130 / 138	113 / 131 / 137	112 / 132 / 137
130	8,000	107 / 127 / 132	107 / 127 / 132	107 / 127 / 132	108 / 128 / 132	108 / 129 / 132	116 / 138 / 140
	6,000	106 / 126 / 132	106 / 126 / 132	106 / 126 / 132	107 / 127 / 132	108 / 128 / 132	109 / 129 / 132
	4,000	107 / 125 / 132	107 / 125 / 132	107 / 125 / 132	107 / 126 / 132	107 / 127 / 132	108 / 128 / 132
	2,000	110 / 124 / 133	111 / 124 / 133	110 / 124 / 133	110 / 125 / 133	110 / 126 / 132	109 / 127 / 132
	0	114 / 123 / 133	114 / 123 / 133	114 / 123 / 133	114 / 124 / 133	113 / 125 / 132	113 / 126 / 132
120	8,000	102 / 121 / 127	102 / 121 / 127	102 / 122 / 127	103 / 122 / 127	104 / 123 / 126	104 / 124 / 126
	6,000	104 / 120 / 127	104 / 120 / 127	104 / 120 / 127	103 / 121 / 127	103 / 122 / 126	104 / 123 / 126
	4,000	107 / 119 / 127	107 / 119 / 127	107 / 119 / 127	107 / 120 / 127	106 / 121 / 127	106 / 122 / 126
	2,000	111 / 118 / 128	111 / 118 / 128	111 / 118 / 128	110 / 119 / 127	110 / 120 / 127	110 / 121 / 127
	0	114 / 120 / 131	114 / 120 / 131	114 / 120 / 130	114 / 120 / 130	113 / 120 / 128	113 / 120 / 127
110	8,000	100 / 115 / 122	100 / 115 / 122	100 / 115 / 121	100 / 116 / 121	100 / 117 / 121	100 / 118 / 121
	6,000	104 / 114 / 122	104 / 114 / 122	104 / 114 / 122	104 / 115 / 121	103 / 116 / 121	103 / 117 / 121
	4,000	108 / 113 / 123	108 / 113 / 123	107 / 113 / 122	107 / 114 / 122	107 / 115 / 121	106 / 116 / 121
	2,000	111 / 117 / 127	111 / 117 / 127	111 / 117 / 127	111 / 117 / 126	110 / 117 / 124	110 / 117 / 123
	0	115 / 120 / 132	114 / 120 / 131	114 / 120 / 131	114 / 120 / 131	114 / 120 / 129	113 / 120 / 127

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

TAKEOFF SPEEDS

DRY RUNWAY

KIAS

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

 $V_1 / V_R / V_2$

TO / 2

TAKEOFF WEIGHT 1,000 LBS	AIRPORT PRESS ALT FT	AMBIENT TEMPERATURE – °C					
		0 & below	10	20	30	40	50
200	8,000	143 / 170 / 169	140 / 167 / 166	138 / 164 / 163	135 / 161 / 160	129 / 153 / 152	120 / 143 / 142
	6,000	148 / 176 / 176	145 / 173 / 172	143 / 170 / 169	141 / 167 / 166	135 / 160 / 159	125 / 148 / 148
	4,000	138 / 164 / 164	138 / 165 / 165	139 / 166 / 166	146 / 173 / 173	141 / 167 / 167	130 / 155 / 154
	2,000	133 / 158 / 159	134 / 159 / 160	134 / 160 / 161	136 / 162 / 162	146 / 174 / 173	135 / 161 / 160
	0	127 / 151 / 154	127 / 152 / 154	128 / 152 / 154	128 / 152 / 154	137 / 163 / 163	143 / 170 / 170
190	8,000	143 / 170 / 169	140 / 167 / 166	138 / 164 / 163	135 / 161 / 160	129 / 153 / 152	120 / 143 / 142
	6,000	139 / 165 / 165	140 / 166 / 166	143 / 170 / 169	141 / 167 / 166	135 / 160 / 159	125 / 148 / 148
	4,000	131 / 156 / 157	132 / 157 / 157	132 / 157 / 158	137 / 163 / 163	141 / 167 / 167	130 / 155 / 154
	2,000	124 / 148 / 150	124 / 148 / 150	124 / 148 / 150	128 / 152 / 154	146 / 174 / 173	135 / 161 / 160
	0	124 / 147 / 150	124 / 147 / 150	124 / 148 / 150	124 / 148 / 150	131 / 156 / 157	143 / 170 / 170
180	8,000	143 / 170 / 169	140 / 167 / 166	138 / 164 / 163	135 / 161 / 160	129 / 153 / 152	120 / 143 / 142
	6,000	129 / 153 / 154	129 / 153 / 154	129 / 154 / 154	141 / 167 / 166	135 / 160 / 159	125 / 148 / 148
	4,000	121 / 144 / 146	121 / 144 / 146	121 / 144 / 146	128 / 153 / 153	141 / 167 / 167	130 / 155 / 154
	2,000	121 / 143 / 146	121 / 144 / 146	121 / 144 / 146	121 / 144 / 146	129 / 153 / 154	135 / 161 / 160
	0	120 / 143 / 146	120 / 143 / 146	120 / 143 / 146	120 / 143 / 146	121 / 144 / 146	135 / 160 / 160
170	8,000	126 / 150 / 150	126 / 150 / 150	130 / 155 / 155	135 / 161 / 160	129 / 153 / 152	120 / 143 / 142
	6,000	118 / 141 / 143	118 / 141 / 143	119 / 142 / 144	126 / 150 / 150	135 / 160 / 159	125 / 148 / 148
	4,000	118 / 140 / 143	118 / 140 / 143	118 / 140 / 143	118 / 140 / 142	126 / 150 / 151	130 / 155 / 154
	2,000	117 / 139 / 143	117 / 139 / 143	117 / 139 / 143	117 / 140 / 143	119 / 141 / 143	135 / 161 / 160
	0	116 / 138 / 143	116 / 139 / 143	117 / 139 / 143	117 / 139 / 143	117 / 140 / 142	125 / 148 / 149
160	8,000	116 / 137 / 139	116 / 138 / 139	121 / 144 / 145	135 / 161 / 160	129 / 153 / 152	120 / 143 / 142
	6,000	114 / 136 / 139	114 / 136 / 139	115 / 136 / 139	117 / 139 / 140	135 / 160 / 159	125 / 148 / 148
	4,000	114 / 135 / 139	114 / 135 / 139	114 / 136 / 139	114 / 136 / 139	119 / 142 / 143	130 / 155 / 154
	2,000	113 / 135 / 139	113 / 135 / 139	113 / 135 / 139	114 / 135 / 139	114 / 136 / 138	122 / 145 / 146
	0	113 / 134 / 139	113 / 134 / 139	113 / 134 / 139	113 / 134 / 139	114 / 135 / 139	115 / 136 / 138

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

TAKEOFF SPEEDS

DRY RUNWAY KIAS

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

**V₁ / V_R / V₂
TO / 2**

TAKEOFF WEIGHT 1,000 LBS	AIRPORT PRESS ALT FT	AMBIENT TEMPERATURE – °C					
		0 & below	10	20	30	40	50
150	8,000	111 / 132 / 134	111 / 132 / 134	111 / 132 / 134	118 / 141 / 141	129 / 153 / 152	120 / 143 / 142
	6,000	110 / 131 / 134	110 / 131 / 134	111 / 132 / 134	111 / 132 / 134	118 / 141 / 141	125 / 148 / 148
	4,000	110 / 130 / 134	110 / 131 / 134	110 / 131 / 134	110 / 131 / 134	111 / 132 / 134	119 / 142 / 142
	2,000	110 / 130 / 135	110 / 130 / 135	110 / 130 / 135	110 / 130 / 134	110 / 131 / 134	111 / 133 / 134
	0	113 / 129 / 135	113 / 129 / 135	113 / 129 / 135	113 / 129 / 135	113 / 130 / 134	112 / 131 / 134
140	8,000	107 / 127 / 130	107 / 127 / 130	107 / 127 / 130	108 / 128 / 130	115 / 137 / 137	120 / 143 / 142
	6,000	106 / 126 / 130	106 / 126 / 130	106 / 126 / 130	107 / 127 / 130	108 / 128 / 130	125 / 148 / 148
	4,000	107 / 125 / 130	107 / 125 / 130	107 / 125 / 130	106 / 126 / 130	107 / 127 / 130	110 / 131 / 132
	2,000	110 / 124 / 130	110 / 125 / 130	110 / 125 / 130	110 / 125 / 130	109 / 126 / 130	109 / 127 / 130
	0	113 / 124 / 131	113 / 124 / 131	113 / 124 / 130	113 / 124 / 130	113 / 125 / 130	112 / 126 / 130
130	8,000	102 / 121 / 125	102 / 122 / 125	103 / 122 / 125	103 / 123 / 125	105 / 124 / 126	121 / 144 / 143
	6,000	103 / 121 / 125	103 / 121 / 125	103 / 121 / 125	103 / 122 / 125	103 / 123 / 125	109 / 129 / 130
	4,000	107 / 120 / 125	107 / 120 / 125	107 / 120 / 125	106 / 121 / 125	106 / 122 / 125	106 / 123 / 125
	2,000	110 / 119 / 126	110 / 119 / 126	110 / 119 / 126	110 / 120 / 126	110 / 121 / 125	109 / 122 / 125
	0	114 / 120 / 128	114 / 120 / 128	114 / 120 / 128	113 / 120 / 127	113 / 120 / 126	113 / 121 / 125
120	8,000	100 / 116 / 120	100 / 116 / 120	100 / 116 / 120	100 / 117 / 120	100 / 118 / 120	104 / 124 / 125
	6,000	104 / 115 / 120	104 / 115 / 120	104 / 115 / 120	103 / 116 / 120	103 / 117 / 120	103 / 118 / 120
	4,000	107 / 114 / 121	107 / 114 / 121	107 / 114 / 121	107 / 115 / 120	106 / 116 / 120	106 / 117 / 120
	2,000	111 / 117 / 124	111 / 117 / 124	111 / 117 / 124	110 / 117 / 123	110 / 117 / 122	109 / 117 / 121
	0	114 / 120 / 128	114 / 120 / 128	114 / 120 / 128	114 / 120 / 128	113 / 120 / 126	113 / 120 / 125
110	8,000	100 / 110 / 115	100 / 110 / 115	100 / 110 / 115	100 / 111 / 115	100 / 112 / 115	100 / 113 / 114
	6,000	104 / 110 / 116	104 / 110 / 116	104 / 110 / 116	104 / 110 / 115	103 / 111 / 115	103 / 112 / 115
	4,000	108 / 113 / 121	107 / 113 / 120	107 / 113 / 120	107 / 113 / 119	107 / 113 / 118	106 / 113 / 117
	2,000	111 / 117 / 125	111 / 117 / 125	111 / 117 / 125	111 / 117 / 124	110 / 117 / 122	110 / 117 / 121
	0	114 / 120 / 129	114 / 120 / 129	114 / 120 / 129	114 / 120 / 129	114 / 120 / 127	113 / 120 / 125

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

TAKEOFF SPEEDS

DRY RUNWAY

KIAS

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

V₁ / V_R / V₂

TO / 3

TAKEOFF WEIGHT 1,000 LBS	AIRPORT PRESS ALT FT	AMBIENT TEMPERATURE – °C					
		0 & below	10	20	30	40	50
200	8,000	134 / 159 / 161	134 / 159 / 161	132 / 156 / 159	126 / 150 / 152	121 / 143 / 145	114 / 136 / 138
	6,000	138 / 164 / 167	138 / 164 / 167	137 / 163 / 165	133 / 158 / 160	126 / 150 / 152	119 / 141 / 143
	4,000	143 / 170 / 172	143 / 169 / 172	142 / 169 / 172	139 / 165 / 167	132 / 157 / 159	124 / 148 / 150
	2,000	136 / 161 / 164	139 / 165 / 168	142 / 169 / 171	144 / 171 / 173	137 / 163 / 165	129 / 154 / 156
	0	126 / 149 / 154	126 / 150 / 154	126 / 150 / 154	126 / 150 / 154	142 / 169 / 172	135 / 160 / 162
190	8,000	134 / 159 / 161	134 / 159 / 161	132 / 156 / 159	126 / 150 / 152	121 / 143 / 145	114 / 136 / 138
	6,000	138 / 164 / 167	138 / 164 / 167	137 / 163 / 165	133 / 158 / 160	126 / 150 / 152	119 / 141 / 143
	4,000	139 / 165 / 168	140 / 167 / 169	142 / 169 / 172	139 / 165 / 167	132 / 157 / 159	124 / 148 / 150
	2,000	123 / 146 / 150	123 / 146 / 150	123 / 146 / 150	127 / 151 / 154	137 / 163 / 165	129 / 154 / 156
	0	117 / 139 / 144	117 / 139 / 144	118 / 140 / 144	118 / 140 / 145	139 / 165 / 168	135 / 160 / 162
180	8,000	134 / 159 / 161	134 / 159 / 161	132 / 156 / 159	126 / 150 / 152	121 / 143 / 145	114 / 136 / 138
	6,000	138 / 164 / 167	138 / 164 / 167	137 / 163 / 165	133 / 158 / 160	126 / 150 / 152	119 / 141 / 143
	4,000	120 / 142 / 146	120 / 142 / 146	120 / 143 / 146	139 / 165 / 167	132 / 157 / 159	124 / 148 / 150
	2,000	114 / 135 / 140	114 / 135 / 140	114 / 135 / 140	119 / 141 / 145	137 / 163 / 165	129 / 154 / 156
	0	113 / 135 / 140	113 / 135 / 140	114 / 135 / 140	114 / 135 / 140	120 / 142 / 146	135 / 160 / 162
170	8,000	134 / 159 / 161	134 / 159 / 161	132 / 156 / 159	126 / 150 / 152	121 / 143 / 145	114 / 136 / 138
	6,000	117 / 139 / 143	117 / 139 / 143	118 / 140 / 143	133 / 158 / 160	126 / 150 / 152	119 / 141 / 143
	4,000	111 / 132 / 137	111 / 132 / 137	111 / 132 / 137	117 / 139 / 142	132 / 157 / 159	124 / 148 / 150
	2,000	110 / 131 / 137	111 / 131 / 137	111 / 131 / 137	111 / 132 / 136	117 / 139 / 143	129 / 154 / 156
	0	111 / 130 / 137	111 / 131 / 137	111 / 131 / 137	111 / 131 / 137	111 / 132 / 136	135 / 160 / 162
160	8,000	114 / 136 / 139	114 / 136 / 139	129 / 154 / 156	126 / 150 / 152	121 / 143 / 145	114 / 136 / 138
	6,000	108 / 128 / 133	108 / 129 / 133	110 / 130 / 134	115 / 137 / 140	126 / 150 / 152	119 / 141 / 143
	4,000	108 / 128 / 133	108 / 128 / 133	108 / 128 / 133	108 / 128 / 133	120 / 143 / 146	124 / 148 / 150
	2,000	108 / 127 / 133	108 / 127 / 133	108 / 127 / 133	108 / 128 / 133	109 / 129 / 134	129 / 154 / 156
	0	111 / 126 / 133	111 / 126 / 133	111 / 126 / 133	111 / 126 / 133	111 / 127 / 133	113 / 135 / 138

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

TAKEOFF SPEEDS

DRY RUNWAY KIAS

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

**V₁ / V_R / V₂
TO / 3**

TAKEOFF WEIGHT 1,000 LBS	AIRPORT PRESS ALT FT	AMBIENT TEMPERATURE – °C					
		0 & below	10	20	30	40	50
150	8,000	106 / 125 / 129	106 / 126 / 130	110 / 130 / 134	126 / 150 / 152	121 / 143 / 145	114 / 136 / 138
	6,000	104 / 124 / 129	104 / 124 / 129	104 / 124 / 129	106 / 126 / 130	126 / 150 / 152	119 / 141 / 143
	4,000	105 / 123 / 129	105 / 123 / 129	105 / 123 / 129	105 / 124 / 129	108 / 129 / 132	124 / 148 / 150
	2,000	108 / 122 / 129	108 / 122 / 129	108 / 122 / 129	108 / 123 / 129	108 / 124 / 129	111 / 131 / 135
	0	111 / 121 / 129	111 / 121 / 129	111 / 122 / 129	111 / 122 / 129	111 / 123 / 129	110 / 124 / 129
140	8,000	101 / 120 / 124	101 / 120 / 124	101 / 120 / 124	107 / 126 / 130	121 / 143 / 145	114 / 136 / 138
	6,000	102 / 119 / 124	102 / 119 / 124	102 / 119 / 124	101 / 120 / 124	107 / 126 / 130	119 / 141 / 143
	4,000	105 / 118 / 124	105 / 118 / 124	105 / 118 / 124	105 / 119 / 124	104 / 120 / 124	110 / 130 / 133
	2,000	109 / 117 / 124	109 / 117 / 124	108 / 117 / 124	108 / 118 / 124	108 / 119 / 124	108 / 120 / 124
	0	112 / 118 / 126	112 / 118 / 126	112 / 118 / 126	111 / 118 / 126	111 / 118 / 125	111 / 119 / 124
130	8,000	100 / 115 / 120	100 / 115 / 120	100 / 115 / 120	100 / 116 / 119	103 / 123 / 125	114 / 136 / 138
	6,000	102 / 114 / 120	102 / 114 / 120	102 / 114 / 120	102 / 115 / 120	101 / 116 / 119	115 / 137 / 139
	4,000	105 / 113 / 120	105 / 113 / 120	105 / 113 / 120	105 / 114 / 120	105 / 115 / 120	104 / 117 / 120
	2,000	109 / 115 / 123	109 / 115 / 123	109 / 115 / 123	108 / 115 / 122	108 / 115 / 121	108 / 116 / 121
	0	112 / 118 / 127	112 / 118 / 127	112 / 118 / 126	112 / 118 / 126	111 / 118 / 125	111 / 119 / 124
120	8,000	100 / 109 / 115	100 / 109 / 115	100 / 110 / 115	100 / 111 / 115	100 / 111 / 115	110 / 131 / 133
	6,000	102 / 108 / 115	102 / 109 / 115	102 / 109 / 115	102 / 109 / 115	101 / 110 / 115	101 / 113 / 116
	4,000	106 / 112 / 119	106 / 112 / 119	105 / 112 / 119	105 / 112 / 118	105 / 112 / 117	104 / 113 / 117
	2,000	109 / 115 / 123	109 / 115 / 123	109 / 115 / 123	109 / 115 / 122	108 / 115 / 121	108 / 116 / 121
	0	112 / 118 / 127	112 / 118 / 127	112 / 118 / 127	112 / 118 / 127	112 / 118 / 125	111 / 119 / 124
110	8,000	100 / 105 / 111	100 / 105 / 111	100 / 105 / 110	100 / 105 / 110	100 / 106 / 110	100 / 108 / 111
	6,000	103 / 108 / 115	102 / 108 / 115	102 / 108 / 115	102 / 108 / 114	102 / 108 / 113	101 / 110 / 113
	4,000	106 / 112 / 119	106 / 112 / 119	106 / 112 / 119	105 / 112 / 118	105 / 112 / 117	105 / 113 / 117
	2,000	109 / 115 / 124	109 / 115 / 124	109 / 115 / 123	109 / 115 / 123	109 / 115 / 121	108 / 116 / 121
	0	113 / 118 / 128	113 / 118 / 128	112 / 118 / 127	112 / 118 / 127	112 / 118 / 126	111 / 118 / 124

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

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.

Valid for all weights and configurations

%MAC	Trim	%MAC	Trim
10	-4.5	29	0.2
11	-4.5	30	0.5
12	-4.5	31	0.7
13	-4.2	32	1.0
14	-3.9	33	1.3
15	-3.7	34	1.6
16	-3.4	35	1.8
17	-3.1	36	2.1
18	-2.8	37	2.4
19	-2.6	38	2.7
20	-2.3	39	2.9
21	-2.0	40	3.2
22	-1.7	41	3.5
23	-1.5	42	3.5
24	-1.2	43	3.5
25	-0.9	44	3.5
26	-0.6	45	3.5
27	-0.4	46	3.5
28	-0.1		

Negative units are Airplane Nose Up
Positive Units are Airplane Nose Down

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 1.23 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. Actual demonstrated landing distance is 60% of the F.A.R landing distance. Dispatch is based on F.A.R. Landing Field Length at the destination airport.
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. 1.23 V_S is 1.23 times the stall speed, or an increase of 30% above stall speed.

OPERATIONAL LANDING DISTANCES FEET

FLAPS FULL

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	DRY (6)			GOOD (5)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	10,400	7,500	7,200	10,400	8,200	8,200
190,000	10,200	7,300	7,000	10,200	8,000	8,000
185,000	10,000	7,200	6,800	10,000	7,800	7,800
180,000	9,800	7,000	6,700	9,800	7,600	7,600
175,000	9,600	6,900	6,600	9,600	7,500	7,500
171,518	8,600	6,100	4,800	8,600	6,200	6,000
170,000	8,600	6,100	4,800	8,600	6,200	6,000
165,000	8,400	5,900	4,700	8,400	6,000	5,800
160,000	8,200	5,800	4,600	8,200	5,900	5,700
155,000	8,000	5,700	4,500	8,000	5,700	5,500
150,000	7,800	5,500	4,400	7,800	5,600	5,300
145,000	7,500	5,400	4,300	7,500	5,400	5,200
140,000	7,300	5,300	4,200	7,300	5,300	5,000
135,000	7,100	5,100	4,100	7,100	5,100	4,900
130,000	6,900	5,000	4,000	6,900	5,000	4,700
125,000	6,700	4,800	3,900	6,700	4,900	4,600
120,000	6,500	4,700	3,800	6,500	4,700	4,400
115,000	6,300	4,600	3,700	6,300	4,600	4,200

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-400	-400	-600	-600	-600
2,000	0	0	0	0	0	0
4,000	600	400	400	600	600	600
6,000	1,200	800	800	1,200	1,200	1,200
8,000	1,800	1,200	1,200	1,800	1,800	1,700

CORRECTIONS	DRY (6)			GOOD (5)		
PER 5 ADD'L APP SPD	550	350	350	550	450	450
PER 1 KT TAILWIND	150	100	100	150	150	150
PER 10°C ABOVE ISA	300	200	200	300	250	250
PER 1% DOWN SLOPE	100	50	100	100	250	200
1 REV INOP	0	0	100	0	100	200
2 REV INOP or NO REV USED	100	0	200	100	200	300
Autoland	1,000			1,100		

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS FULL

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	MEDIUM (3)			POOR (1)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	10,500	9,500	9,500	12,600	12,200	12,500
190,000	10,300	9,300	9,300	12,300	11,900	12,200
185,000	10,100	9,100	9,100	12,000	11,700	11,900
180,000	9,900	8,900	8,900	11,700	11,400	11,700
175,000	9,700	8,700	8,700	11,500	11,100	11,400
171,518	8,700	7,400	7,300	10,500	10,200	10,200
170,000	8,700	7,300	7,200	10,400	10,100	10,100
165,000	8,500	7,200	7,100	10,200	9,900	9,800
160,000	8,300	7,000	6,900	9,900	9,600	9,600
155,000	8,100	6,800	6,700	9,700	9,300	9,300
150,000	7,800	6,600	6,500	9,400	9,100	9,000
145,000	7,600	6,500	6,400	9,100	8,800	8,800
140,000	7,400	6,300	6,200	8,800	8,600	8,500
135,000	7,200	6,100	6,000	8,600	8,300	8,300
130,000	7,000	5,900	5,800	8,300	8,000	8,000
125,000	6,800	5,800	5,700	8,000	7,800	7,700
120,000	6,600	5,600	5,500	7,800	7,500	7,500
115,000	6,400	5,400	5,300	7,500	7,200	7,200

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-600	-600	-1,100	-1,100	-1,100
2,000	0	0	0	0	0	0
4,000	600	600	600	1,100	1,100	1,100
6,000	1,200	1,200	1,100	2,300	2,300	2,300
8,000	1,900	1,700	1,700	3,400	3,400	3,400

CORRECTIONS	MEDIUM (3)			POOR (1)		
PER 5 ADD'L APP SPD	500	400	400	600	600	600
PER 1 KT TAILWIND	200	150	150	450	450	450
PER 10°C ABOVE ISA	300	250	300	550	550	550
PER 1% DOWN SLOPE	350	450	400	3,450	3,450	3,450
1 REV INOP	200	400	300	1,300	1,300	1,200
2 REV INOP or NO REV USED	400	900	700	2,600	2,600	2,300
Autoland	1,200			1,300		

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 3

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	DRY (6)			GOOD (5)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	11,200	8,000	7,600	11,200	8,800	8,800
190,000	11,000	7,800	7,400	11,000	8,600	8,600
185,000	10,700	7,700	7,200	10,700	8,400	8,400
180,000	10,500	7,500	7,100	10,500	8,200	8,200
175,000	10,300	7,400	6,900	10,300	8,000	8,000
171,518	9,300	6,500	5,200	9,300	6,800	6,600
170,000	9,300	6,500	5,100	9,300	6,700	6,500
165,000	9,000	6,400	5,000	9,000	6,500	6,300
160,000	8,800	6,200	4,900	8,800	6,300	6,200
155,000	8,600	6,100	4,800	8,600	6,200	6,000
150,000	8,300	5,900	4,700	8,400	6,000	5,800
145,000	8,100	5,800	4,600	8,100	5,800	5,600
140,000	7,900	5,600	4,500	7,900	5,700	5,500
135,000	7,700	5,500	4,400	7,700	5,500	5,300
130,000	7,500	5,300	4,300	7,500	5,400	5,100
125,000	7,200	5,200	4,100	7,200	5,200	4,900
120,000	7,000	5,000	4,000	7,000	5,000	4,800
115,000	6,800	4,900	3,900	6,800	4,900	4,600

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-400	-500	-600	-700	-700
2,000	0	0	0	0	0	0
4,000	600	400	500	600	700	700
6,000	1,300	900	900	1,300	1,300	1,300
8,000	1,900	1,300	1,400	1,900	2,000	2,000

CORRECTIONS	DRY (6)			GOOD (5)		
PER 5 ADD'L APP SPD	550	400	350	550	450	450
PER 1 KT TAILWIND	150	100	150	150	200	150
PER 10°C ABOVE ISA	300	200	200	300	300	300
PER 1% DOWN SLOPE	100	50	100	100	250	250
1 REV INOP	0	0	100	0	200	200
2 REV INOP or NO REV USED	100	0	200	100	400	400
Autoland	1,000			1,200		

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 3

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	MEDIUM (3)			POOR (1)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	11,300	10,200	10,200	13,600	13,500	13,500
190,000	11,100	10,000	10,000	13,300	13,200	13,200
185,000	10,900	9,700	9,700	13,000	12,900	12,900
180,000	10,600	9,500	9,500	12,700	12,600	12,600
175,000	10,400	9,300	9,300	12,400	12,300	12,300
171,518	9,400	8,000	7,900	11,400	11,100	11,000
170,000	9,400	7,900	7,800	11,300	11,000	10,900
165,000	9,100	7,800	7,600	11,000	10,700	10,700
160,000	8,900	7,600	7,400	10,700	10,400	10,400
155,000	8,700	7,400	7,300	10,400	10,100	10,100
150,000	8,500	7,200	7,100	10,100	9,800	9,800
145,000	8,200	7,000	6,900	9,900	9,500	9,500
140,000	8,000	6,800	6,700	9,600	9,300	9,200
135,000	7,800	6,600	6,500	9,300	9,000	8,900
130,000	7,500	6,400	6,300	9,000	8,700	8,600
125,000	7,300	6,200	6,100	8,700	8,400	8,300
120,000	7,100	6,000	5,900	8,400	8,100	8,100
115,000	6,800	5,800	5,700	8,100	7,800	7,800

BASIS: Zero wind • Standard approach procedure • Two Engines at Full Reverse Thrust • Approach speed V_{APP} ($V_{LS}+5$)
Data is advisory and includes 15% safety margin and standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-700	-600	-600	-1,200	-1,200	-1,200
2,000	0	0	0	0	0	0
4,000	700	600	600	1,200	1,200	1,200
6,000	1,300	1,200	1,200	2,500	2,500	2,500
8,000	2,000	1,900	1,900	3,700	3,700	3,700

CORRECTIONS	MEDIUM (3)			POOR (1)		
PER 5 ADD'L APP SPD	550	400	400	600	600	600
PER 1 KT TAILWIND	200	200	150	450	450	450
PER 10°C ABOVE ISA	300	300	300	600	600	600
PER 1% DOWN SLOPE	400	450	450	3,850	3,850	3,850
1 REV INOP	200	500	400	1,500	1,500	1,300
2 REV INOP or NO REV USED	400	900	800	3,000	3,000	2,700
Autoland	1,200			1,300		

Note: Do not operate when Braking Action is Nil.

STALL SPEEDS**KCAS****Landing Gear UP**

Aircraft Weight (lb)	Configuration					
	CONF 0	CONF 1	CONF 1+F	CONF 2	CONF 3	CONF FULL
200,000	180	154	141	133	128	123
190,000	176	151	138	130	125	120
180,000	171	147	134	126	122	117
170,000	167	143	130	123	119	114
160,000	162	139	127	120	116	111
150,000	157	135	123	116	112	108
140,000	152	130	119	112	108	104
130,000	146	125	114	108	104	100
120,000	141	120	110	104	100	96
110,000	135	115	105	99	96	92

Landing Gear DOWN

Aircraft Weight (lb)	Configuration					
	CONF 0	CONF 1	CONF 1+F	CONF 2	CONF 3	CONF FULL
200,000	182	157	144	134	130	124
190,000	178	153	140	131	127	121
180,000	173	149	136	128	123	118
170,000	169	145	133	124	120	115
160,000	164	141	129	121	117	112
150,000	159	137	125	117	113	108
140,000	154	132	121	113	109	105
130,000	148	127	117	109	105	101
120,000	142	122	112	105	101	97
110,000	136	117	107	100	97	93

APPROACH AND LANDING SPEEDS

KIAS

Aircraft Weight	F	S	O*	V _{LS} CONF 3	V _{REF} CONF FULL
200,000	171	221	246	160	153
190,000	167	215	239	156	149
180,000	163	210	232	152	145
170,000	158	204	225	147	141
160,000	153	198	218	143	137
150,000	148	191	212	138	132
140,000	143	185	205	134	128
130,000	138	178	198	129	123
120,000	133	171	191	124	118

*Green dot speed valid up to FL200. Above FL200 add 1 kt per additional 1,000 feet.

F.A.R. DRY LANDING FIELD LENGTH

FEET

CFM56-5B3

FLAPS FULL

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE – FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
195,000	7,260	7,450	7,650	7,860	8,070	8,310	8,570	8,820	9,090
190,000	6,980	7,160	7,350	7,540	7,760	7,980	8,220	8,470	8,730
185,000	6,440	6,600	6,770	6,950	7,140	7,330	7,550	7,780	8,010
180,000	5,820	5,960	6,110	6,270	6,430	6,610	6,790	6,990	7,200
175,000	5,610	5,740	5,880	6,030	6,190	6,350	6,520	6,700	6,910
170,000	5,400	5,530	5,660	5,800	5,940	6,100	6,270	6,440	6,620
165,000	5,260	5,380	5,510	5,650	5,780	5,920	6,080	6,250	6,420
160,000	5,150	5,270	5,390	5,510	5,650	5,790	5,930	6,090	6,250
155,000	5,040	5,150	5,260	5,380	5,510	5,650	5,790	5,930	6,090
150,000	4,930	5,030	5,140	5,250	5,370	5,500	5,640	5,780	5,930
145,000	4,820	4,920	5,020	5,130	5,240	5,360	5,490	5,630	5,770
140,000	4,700	4,800	4,910	5,010	5,110	5,230	5,350	5,480	5,620
135,000	4,590	4,690	4,790	4,890	4,990	5,100	5,220	5,340	5,470
130,000	4,490	4,580	4,670	4,770	4,870	4,980	5,090	5,200	5,320
125,000	4,390	4,470	4,560	4,650	4,750	4,850	4,960	5,070	5,180
120,000	4,290	4,370	4,450	4,540	4,630	4,730	4,840	4,940	5,050
115,000	4,190	4,270	4,350	4,430	4,520	4,610	4,710	4,820	4,920

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 VLS.
- Based on Maximum Manual Braking, Ground Spoilers, anti-skid and No Reverse Thrust.

CONDITION	CORRECTION
Headwind	- 20 ft. per knot
Tailwind	+ 140 ft. per knot
Wet runway and/or Low Minima	increase distance by 15%

F.A.R. DRY LANDING FIELD LENGTH

FEET

CFM56-5B3

FLAPS 3

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE – FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
195,000	7,920	8,130	8,350	8,570	8,800	9,050	9,320	9,600	9,890
190,000	7,610	7,810	8,010	8,230	8,460	8,690	8,950	9,210	9,500
185,000	6,990	7,180	7,370	7,570	7,770	7,990	8,220	8,460	8,710
180,000	6,300	6,470	6,640	6,810	6,990	7,180	7,390	7,600	7,830
175,000	6,070	6,210	6,370	6,540	6,720	6,900	7,090	7,290	7,520
170,000	5,830	5,970	6,130	6,280	6,440	6,620	6,810	7,000	7,200
165,000	5,670	5,810	5,950	6,100	6,260	6,420	6,590	6,780	6,980
160,000	5,550	5,670	5,810	5,950	6,100	6,260	6,430	6,600	6,780
155,000	5,420	5,550	5,670	5,800	5,940	6,090	6,260	6,430	6,600
150,000	5,280	5,400	5,530	5,660	5,790	5,930	6,080	6,250	6,410
145,000	5,160	5,270	5,390	5,510	5,640	5,780	5,920	6,070	6,230
140,000	5,030	5,140	5,250	5,400	5,500	5,630	5,760	5,900	6,050
135,000	4,910	5,010	5,120	5,230	5,350	5,480	5,610	5,740	5,880
130,000	4,800	4,890	4,990	5,100	5,210	5,330	5,460	5,590	5,720
125,000	4,690	4,780	4,870	4,970	5,080	5,190	5,310	5,430	5,570
120,000	4,580	4,670	4,760	4,850	4,950	5,050	5,170	5,290	5,410
115,000	4,460	4,550	4,640	4,730	4,820	4,920	5,030	5,140	5,260

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 VLS.
- Based on Maximum Manual Braking, Ground Spoilers, anti-skid and No Reverse Thrust.

CONDITION	CORRECTION
Headwind	- 20 ft. per knot
Tailwind	+ 140 ft. per knot
Wet runway and/or Low Minima	increase distance by 15%

APPROACH AND LANDING CLIMB LIMITS**POUNDS****CFM56-5B3****APPROACH FLAPS 3
LANDING FLAPS FULL**

OAT °C	AIRPORT PRESSURE ALTITUDE – FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
50	169,400	162,500	155,700								
45	179,900	172,800	165,700	158,800	152,100	145,600					
40	190,600	183,400	176,200	169,200	162,200	155,300	147,600	140,400			
35	200,000	192,600	185,400	178,700	171,800	164,500	156,000	148,300	141,300	135,400	134,300
32	206,500	198,500	190,600	183,800	177,100	170,100	161,300	152,800	145,400	139,000	137,800
30	209,900	202,100	194,000	186,600	179,800	173,200	165,000	156,200	147,900	141,300	140,000
28	210,100	205,500	197,500	189,400	182,300	175,500	167,900	159,800	151,000	143,500	142,200
26	210,200	205,600	200,700	192,300	184,700	177,700	170,100	162,600	154,100	146,300	144,700
24	210,400	205,700	200,800	195,000	187,100	179,800	172,200	164,700	156,500	148,900	147,400
22	210,500	205,900	201,000	195,200	189,500	181,900	174,200	166,800	158,700	151,100	149,600
20	210,700	206,000	201,100	195,300	189,600	183,900	176,100	168,700	160,700	153,000	151,500
18	210,800	206,100	201,200	195,400	189,700	184,100	177,900	170,300	162,600	154,900	153,400
16	211,000	206,300	201,400	195,600	189,800	184,200	178,000	171,900	164,300	156,700	155,200
14	211,200	206,400	201,500	195,700	189,900	184,300	178,100	172,000	165,900	158,300	156,800
12	211,400	206,600	201,600	195,800	190,100	184,400	178,200	172,100	166,000	159,900	158,500
10	211,500	206,700	201,800	195,900	190,200	184,500	178,200	172,100	166,100	160,000	158,700
8	211,600	206,800	201,900	196,000	190,200	184,500	178,300	172,200	166,200	160,000	158,800
6	211,700	206,900	202,000	196,100	190,300	184,600	178,400	172,200	166,200	160,000	158,800
4	211,800	207,000	202,100	196,200	190,400	184,700	178,400	172,300	166,300	160,100	158,900
2	211,900	207,100	202,100	196,300	190,500	184,800	178,500	172,400	166,300	160,100	158,900
0 & below	211,900	207,200	202,200	196,300	190,500	184,800	178,600	172,400	166,300	160,200	159,000

NOTES:

- AFM Maximum Structural Landing Weight should not be exceeded (unless overweight landing is deemed necessary in flight).
- Limit weights are for packs on.
- Reduce Limit Weight by 18,300 pounds when operating in icing conditions during any part of the flight and the forecast landing temperature is below 10°C.

Bleed Adjustments (lb)	Altitude ≤ 7,500 feet	Altitude > 7,500 feet
Packs OFF	+4,200	+4,200
Eng A/I ON	-900	-4,800
Eng & Wing A/I ON	-6,000	-10,400

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.

APPROACH AND LANDING CLIMB LIMITS**POUNDS****CFM56-5B3****APPROACH FLAPS 2
LANDING FLAPS 3**

OAT °C	AIRPORT PRESSURE ALTITUDE – FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
50	181,300	174,000	166,800								
45	192,400	184,900	177,400	170,200	163,100	156,000					
40	203,900	196,300	188,600	181,200	173,900	166,700	158,200	150,500			
35	213,700	206,000	198,300	191,200	183,800	176,300	167,400	159,000	151,500	145,100	143,900
32	220,700	212,100	203,700	196,500	189,300	181,900	172,800	163,900	155,700	148,900	147,600
30	224,400	216,100	207,500	199,600	192,400	185,200	176,600	167,400	158,500	151,400	150,000
28	224,500	219,600	211,200	202,700	195,000	187,800	179,700	171,300	161,700	153,700	152,300
26	224,700	219,700	214,600	205,800	197,600	190,100	182,100	174,200	165,200	156,600	155,000
24	224,800	219,900	214,700	208,700	200,400	192,500	184,400	176,500	167,800	159,600	158,000
22	225,000	220,000	214,800	208,900	203,000	195,000	186,600	178,700	170,200	162,000	160,400
20	225,100	220,200	215,000	209,000	203,100	197,400	188,700	180,800	172,400	164,200	162,600
18	225,300	220,300	215,100	209,100	203,200	197,400	190,800	182,600	174,400	166,300	164,600
16	225,400	220,500	215,300	209,300	203,400	197,600	190,900	184,400	176,300	168,200	166,600
14	225,600	220,600	215,400	209,400	203,500	197,700	191,000	184,500	178,100	170,100	168,500
12	225,800	220,800	215,500	209,500	203,600	197,800	191,100	184,600	178,200	171,800	170,300
10	226,000	221,000	215,700	209,700	203,700	197,900	191,200	184,700	178,300	171,800	170,600
8	226,100	221,100	215,800	209,700	203,800	198,000	191,300	184,700	178,300	171,900	170,600
6	226,200	221,200	215,900	209,800	203,900	198,100	191,300	184,800	178,400	171,900	170,700
4	226,300	221,300	216,000	210,000	204,000	198,100	191,400	184,900	178,500	172,000	170,700
2	226,400	221,300	216,100	210,000	204,100	198,200	191,500	184,900	178,500	172,000	170,800
0 & below	226,400	221,400	216,100	210,100	204,200	198,300	191,600	185,000	178,600	172,100	170,800

NOTES:

- AFM Maximum Structural Landing Weight should not be exceeded (unless overweight landing is deemed necessary in flight).
- Limit weights are for packs on.
- Reduce Limit Weight by 19,500 pounds when operating in icing conditions during any part of the flight and the forecast landing temperature is below 10 degrees C.

Bleed Adjustments (lb)	Altitude ≤ 5,000 feet	Altitude > 5,000 feet
Packs OFF	+4,600	+4,600
Eng A/I ON	-900	-5,600
Eng & Wing A/I ON	-2,900	-11,900

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.

End of Section

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F/CTL FLAPS LOCKED ($1 \leq \text{FLAPS} < 2$)	4-27
F/CTL FLAPS FAULT ($2 \leq \text{FLAPS} < 3$)	4-28
F/CTL FLAPS LOCKED ($2 \leq \text{FLAPS} < 3$)	4-28
F/CTL FLAPS FAULT (FLAPS = 3)	4-28
F/CTL FLAPS LOCKED (FLAPS = 3)	4-28
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F/CTL FLAPS LOCKED (FLAPS > 3)	4-29
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F/CTL SPD BRK 2 FAULT	4-30
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F/CTL ONE SPLR FAULT (WITH SPOILER RUNAWAY SUSPECTED)	4-30
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F/CTL SEC 1+3 FAULT	4-34
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F/CTL SLATS LOCKED ($0 \leq \text{SLATS} < 1$)	4-35
F/CTL SLATS FAULT ($1 \leq \text{SLATS} < 2$)	4-36
F/CTL SLATS LOCKED ($1 \leq \text{SLATS} < 2$)	4-36
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HYD G RSVR LO LEVEL	4-37
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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

2SP	AWABS has automatically corrected the allowable weights and V1 speeds due to two pairs of ground spoilers (four spoilers) being inoperative.
ASP	AWABS has automatically corrected the allowable weights and V1 speeds due to the Ground Spoiler Control System being inoperative (all spoilers inoperative).
BKI	AWABS has automatically corrected the allowable weights and V1 speeds due to one inoperative brake.
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.
TRI	AWABS has automatically corrected the allowable weights and V1 speeds due to one thrust reverser inoperative.

THRUST SETTINGS – ALL ENGINE

TAKEOFF %N1

NORMAL BLEED - PACKS ON / ANTI-ICE OFF

CFM56-5B3

OAT °C	PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
54	94.8	95.3								
50	95.7	96.2	96.2	96.2						
46	96.6	97.1	97.1	97.1						
42	97.4	98.1	98.0	97.9	97.9	97.8	97.7	97.4		
38	98.0	98.8	98.8	98.7	98.7	98.6	98.5	98.2	97.9	97.7
34	98.9	99.6	99.8	99.8	99.8	99.8	99.5	99.0	98.7	98.4
30	99.1	100.9	101.0	101.1	101.0	101.0	101.1	100.4	99.7	99.1
26	98.5	100.3	101.4	102.4	102.0	102.0	102.1	101.5	101.0	100.3
22	97.8	99.7	100.7	101.7	102.1	102.4	102.4	102.2	101.8	101.3
18	97.2	99.1	100.1	101.1	101.4	101.7	102.0	102.3	102.2	101.9
14	96.6	98.5	99.5	100.5	100.8	101.1	101.4	101.7	102.0	102.3
10	96.0	97.8	98.8	99.8	100.1	100.4	100.7	101.0	101.4	101.6
6	95.3	97.2	98.2	99.2	99.5	99.8	100.1	100.4	100.7	101.0
2	94.7	96.5	97.5	98.5	98.8	99.1	99.4	99.7	100.0	100.3
-2	94.0	95.8	96.9	97.8	98.1	98.5	98.7	99.1	99.4	99.7
-6	93.4	95.2	96.2	97.2	97.5	97.8	98.1	98.4	98.7	99.0
-10	92.7	94.5	95.5	96.5	96.8	97.1	97.4	97.7	98.0	98.3
-14	92.1	93.9	94.9	95.9	96.2	96.5	96.8	97.1	97.4	97.7
-18	91.4	93.2	94.2	95.2	95.5	95.8	96.1	96.4	96.7	97.0
-22	90.7	92.5	93.5	94.5	94.8	95.1	95.3	95.7	96.0	96.3
-26	90.0	91.8	92.8	93.8	94.1	94.4	94.6	95.0	95.3	95.5
-30	89.3	91.1	92.1	93.1	93.4	93.7	93.9	94.2	94.5	94.8
-34	88.6	90.4	91.4	92.4	92.7	93.0	93.2	93.5	93.8	94.1
-38	88.0	89.7	90.7	91.6	92.0	92.2	92.5	92.8	93.1	93.4
-42	87.3	89.0	90.0	90.9	91.3	91.5	91.8	92.1	92.4	92.7
-46	86.5	88.3	89.3	90.2	90.5	90.8	91.1	91.4	91.7	92.0
-50	85.8	87.6	88.5	89.5	89.8	90.0	90.3	90.6	90.9	91.2
-54	85.1	86.8	87.8	88.7	89.0	89.3	89.6	89.9	90.2	90.5

Engine Bleed Adjustment	OAT < ISA + 15 (C)	OAT ≥ ISA + 15 (C)
Packs Off	+0.9	+0.9
Eng A/I ON	-0.0	-1.1
Eng & Wing A/I ON	-0.0	-2.0

 OAT ≥ to ISA + 15

THRUST SETTINGS – ALL ENGINE

CLIMB %N1

CFM56-5B3

BASED ON 250 / 300 / 0.78 SPEED SCHEDULE

NORMAL BLEED - PACKS ON / ANTI-ICE OFF

TAT °C	PRESSURE ALTITUDE - FEET											
	-1,000	3,000	7,000	11,000	15,000	19,000	23,000	27,000	31,000	35,000	39,000	41,000
54	86.3	86.3										
50	87.0	87.0	86.4	87.1								
46	87.7	87.7	87.1	87.8	88.2							
42	88.3	88.3	87.8	88.5	88.8							
38	88.9	89.0	88.5	89.1	89.4	89.3						
34	89.2	89.6	89.2	89.7	90.1	89.8	89.6					
30	88.6	90.2	89.8	90.3	90.6	90.3	90.0	89.4				
26	88.0	90.1	90.4	90.8	91.0	90.8	90.5	89.9	89.1			
22	87.5	89.6	91.0	91.3	91.4	91.3	91.0	90.4	89.6			
18	86.9	89.0	90.5	91.3	91.9	91.7	91.7	90.8	90.1			
14	86.3	88.4	90.0	90.7	92.3	92.2	92.7	91.7	90.6	90.1	89.2	88.9
10	85.7	87.8	89.3	90.1	91.6	92.6	93.0	93.3	91.0	90.5	89.7	89.4
6	85.1	87.2	88.7	89.5	91.0	92.3	93.3	93.6	92.8	91.0	90.2	89.9
2	84.6	86.6	88.1	88.8	90.4	91.7	93.2	93.9	94.2	91.4	90.7	90.4
-2	84.0	86.0	87.5	88.2	89.8	91.0	92.6	94.0	94.7	92.8	91.2	90.9
-6	83.4	85.4	86.9	87.6	89.1	90.4	91.9	93.4	95.1	94.5	92.7	92.3
-10	82.8	84.8	86.3	87.0	88.5	89.8	91.3	92.7	94.9	95.3	93.7	93.2
-14	82.2	84.2	85.7	86.4	87.9	89.1	90.7	92.1	94.2	96.2	94.3	93.8
-18	81.5	83.5	85.0	85.7	87.2	88.5	90.0	91.4	93.5	96.4	94.9	94.3
-22	80.9	82.9	84.4	85.1	86.6	87.8	89.3	90.7	92.8	95.7	94.5	93.8
-26	80.3	82.2	83.7	84.4	85.9	87.1	88.6	90.0	92.1	95.0	93.8	93.1
-30	79.6	81.6	83.1	83.8	85.2	86.5	87.9	89.4	91.4	94.3	93.1	92.4
-34	79.0	81.0	82.4	83.1	84.6	85.8	87.3	88.7	90.7	93.6	92.4	91.7
-38	78.4	80.3	81.8	82.4	83.9	85.1	86.6	88.0	90.1	92.9	91.7	91.1
-42	77.8	79.7	81.1	81.8	83.3	84.5	85.9	87.3	89.4	92.2	91.0	90.4
-46	77.1	79.0	80.4	81.1	82.6	83.8	85.2	86.6	88.6	91.5	90.3	89.6
-50	76.4	78.3	79.7	80.4	81.9	83.0	84.5	85.9	87.9	90.7	89.5	88.9
-54	75.7	77.6	79.0	79.7	81.2	82.3	83.8	85.1	87.2	90.0	88.8	88.1

Engine Bleed Adjustment	OAT < ISA + 10 (C)	OAT ≥ ISA + 10 (C)
Packs Off	+1.2	+1.2
Eng A/I ON	-0.0	-1.4
Eng & Wing A/I ON	-0.0	-2.2

OAT ≥ to ISA + 10

THRUST SETTINGS – ALL ENGINE

CRUISE %N1

BASED ON 250 / 300 / 0.78 SPEED SCHEDULE
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

CFM56-5B3

TAT °C	PRESSURE ALTITUDE - FEET											
	-1,000	3,000	7,000	11,000	15,000	19,000	23,000	27,000	31,000	35,000	39,000	41,000
54	84.8	84.8										
50	85.5	85.5	84.9	85.6								
46	86.2	86.2	85.6	86.3	86.7							
42	86.8	86.8	86.3	87.0	87.3							
38	87.4	87.5	87.0	87.6	87.9	87.8						
34	87.7	88.1	87.7	88.2	88.6	88.3	88.1					
30	87.1	88.7	88.3	88.8	89.1	88.8	88.5	97.9				
26	86.5	88.6	88.9	89.3	89.5	89.3	89.0	88.4	87.1			
22	86.0	88.1	89.5	89.8	89.9	89.8	89.5	88.9	87.6			
18	85.4	87.5	89.0	89.8	90.4	90.2	90.2	89.3	88.0			
14	84.8	86.9	88.5	89.2	90.8	90.7	91.2	90.2	88.5	87.6	86.3	85.9
10	84.2	86.3	87.8	88.6	90.1	91.1	91.5	91.8	88.9	88.0	86.8	86.4
6	83.6	85.7	87.2	88.0	89.5	90.8	91.8	92.1	90.8	88.5	87.3	86.9
2	83.1	85.1	86.6	87.3	88.9	90.2	91.7	92.4	92.2	88.9	87.8	87.4
-2	852.5	84.5	86.0	86.7	88.3	89.5	91.1	92.5	92.6	90.2	88.2	87.9
-6	81.9	83.9	85.4	86.1	87.6	88.9	90.4	91.9	93.0	92.0	89.8	89.3
-10	81.3	83.3	84.8	85.5	87.0	88.3	89.8	91.2	92.8	92.8	90.8	90.2
-14	80.7	82.7	84.2	84.9	86.4	87.6	89.2	90.6	92.2	93.7	91.4	90.8
-18	80.0	82.0	83.5	84.2	85.7	87.0	88.5	89.9	91.5	93.9	92.0	91.3
-22	79.4	81.4	82.9	83.6	85.1	86.3	87.8	89.2	90.8	93.2	91.6	90.8
-26	78.8	80.7	82.2	82.9	84.4	85.6	87.1	88.5	90.1	92.5	90.9	90.1
-30	78.1	80.1	81.6	82.3	83.7	85.0	86.4	87.9	89.4	91.8	90.2	89.4
-34	77.5	79.5	80.9	81.6	83.1	84.3	85.8	87.2	88.7	91.1	89.5	88.7
-38	76.9	78.8	80.3	80.9	82.4	83.6	85.1	86.5	88.0	90.4	88.8	88.1
-42	76.3	78.2	79.6	80.3	81.8	83.0	84.4	85.8	87.3	89.7	88.1	87.4
-46	75.6	77.5	78.9	79.6	81.1	82.3	83.7	85.1	86.6	89.0	87.4	86.6
-50	74.9	76.8	78.2	78.9	80.4	81.5	83.0	84.4	85.8	88.2	86.6	85.9
-54	74.2	76.1	77.5	78.2	79.7	80.8	82.3	83.6	85.1	87.4	85.9	85.1

Engine Bleed Adjustment	OAT < ISA + 10 (C)	OAT ≥ ISA + 10 (C)
Packs Off	+1.2	+1.2
Eng A/I ON	-0.0	-1.4
Eng & Wing A/I ON	-0.0	-2.2

OAT ≥ to ISA + 10

THRUST SETTINGS – ALL ENGINE

GO AROUND %N1

CFM56-5B3

BASED ON MACH 0.225
NORMAL BLEED - PACKS ON / ANTI-ICE OFF

TAT °C	PRESSURE ALTITUDE - FEET									
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
54	95.5	95.8	95.6	95.5						
50	96.5	96.7	96.6	96.5	96.3	96.2				
46	97.3	97.7	97.6	97.4	97.3	97.2	97.0	96.6		
42	98.1	98.6	98.5	98.4	98.3	98.2	98.0	97.5	97.1	96.9
38	99.0	99.4	99.4	99.3	99.3	99.2	98.9	98.4	98.0	97.6
34	99.5	100.5	100.4	100.2	100.1	100.1	100.1	99.5	98.8	98.3
30	98.9	100.3	101.2	101.5	101.2	101.0	100.9	100.6	100.0	99.2
26	98.3	99.7	100.5	101.4	101.9	102.0	101.8	101.4	101.0	100.3
22	97.6	99.1	99.9	100.8	101.3	101.7	102.2	102.1	101.8	101.2
18	97.0	98.5	99.3	100.1	100.6	101.1	101.6	101.8	102.1	101.9
14	96.4	97.8	98.7	99.5	100.0	100.5	100.9	101.2	101.4	101.6
10	95.8	97.2	98.0	98.9	99.3	99.8	100.3	100.5	100.8	100.9
6	95.1	96.5	97.4	98.2	98.7	99.2	99.6	99.9	100.1	100.3
2	94.5	95.9	96.7	97.5	98.0	98.5	99.0	99.2	99.5	99.6
-2	93.9	95.2	96.1	96.9	97.4	97.9	98.3	98.6	98.8	99.0
-6	93.2	94.6	95.4	96.2	96.7	97.2	97.7	97.9	98.1	98.3
-10	92.6	93.9	94.8	95.6	96.1	96.5	97.0	97.2	97.5	97.6
-14	91.9	93.3	94.1	94.9	95.4	95.9	96.3	96.6	96.8	97.0
-18	91.3	92.6	93.4	94.2	94.7	95.2	95.6	95.9	96.1	96.3
-22	90.6	91.9	92.7	93.5	94.0	94.5	94.9	95.2	95.4	95.6
-26	89.9	91.2	92.1	92.8	93.3	93.8	94.2	94.5	94.7	94.9
-30	89.2	90.5	91.4	92.2	92.6	93.1	93.5	93.8	94.0	94.2
-34	88.5	89.9	90.7	91.5	91.9	92.4	92.8	93.1	93.3	93.5
-38	87.8	89.2	90.0	90.8	91.2	91.7	92.1	92.4	92.6	92.8
-42	87.2	88.5	89.3	90.1	90.5	91.0	91.4	91.7	91.9	92.1
-46	86.4	87.7	88.6	89.3	89.8	90.3	90.7	90.9	91.2	91.3
-50	85.7	87.0	87.8	88.6	89.1	89.5	89.9	90.2	90.4	90.6
-54	85.0	86.3	87.1	87.9	88.3	88.8	89.2	89.4	89.7	89.8

Engine Bleed Adjustment	OAT < ISA + 15 (C)	OAT ≥ ISA + 15 (C)
Packs Off	+0.9	+0.9
Eng A/I ON	-0.0	-1.9
Eng & Wing A/I ON	-0.0	-2.7

OAT ≥ to ISA + 15

ONE ENGINE INOPERATIVE

MAXIMUM CONTINUOUS %N1

BASED ON 230 KIAS

NORMAL BLEED – ONE PACK ON / ANTI-ICE OFF

CFM56-5B3

TAT °C	PRESSURE ALTITUDE - FEET										
	-1,000	3,000	7,000	11,000	15,000	19,000	23,000	27,000	31,000	35,000	39,000
54	91.3	91.5									
50	91.8	92.0	91.9								
46	92.4	92.5	92.5								
42	93.1	93.1	93.0	92.8							
38	93.7	93.8	93.5	93.4							
34	94.3	94.4	94.1	94.0	93.9						
30	93.7	94.9	94.9	94.5	94.4	92.7					
26	93.1	95.2	95.3	95.1	95.0	93.2					
22	92.5	94.6	95.7	95.7	95.5	93.6	91.1				
18	91.9	94.0	95.7	96.2	95.9	94.0	91.6	89.8			
14	91.3	93.4	95.1	96.6	96.6	94.4	92.0	90.2	89.2		
10	90.7	92.8	94.4	96.1	97.2	94.8	92.5	90.7	89.7	88.9	88.8
6	90.1	92.2	93.8	95.5	97.7	95.5	92.9	91.2	90.2	89.4	89.3
2	89.5	91.5	93.1	94.9	97.1	96.1	93.5	91.7	90.7	89.9	89.8
-2	88.8	90.9	92.5	94.2	96.4	96.1	94.2	92.3	91.2	90.3	90.3
-6	88.2	90.3	91.9	93.6	95.8	95.5	94.9	93.0	91.9	90.8	90.9
-10	87.6	89.7	91.2	92.9	95.1	94.8	94.3	93.8	92.7	91.7	91.6
-14	87.0	89.0	90.6	92.3	94.5	94.2	93.6	93.8	93.5	92.7	92.6
-18	86.3	88.4	89.9	91.6	93.8	93.5	92.9	93.1	94.1	93.6	93.5
-22	85.7	87.7	89.2	90.9	93.1	92.8	92.2	92.4	93.4	94.5	94.1
-26	85.0	87.0	88.6	90.2	92.4	92.1	91.5	91.7	92.7	94.1	93.4
-30	84.4	86.4	87.9	89.5	91.7	91.4	90.8	91.0	92.0	93.4	92.7
-34	83.7	85.7	87.2	88.9	91.0	90.7	90.2	90.3	91.3	92.7	92.0
-38	83.0	85.0	86.5	88.2	90.3	90.0	89.5	89.6	90.6	92.0	91.3
-42	82.4	84.4	85.9	87.5	89.6	89.3	88.8	89.0	89.9	91.3	90.6
-46	81.7	83.7	85.2	86.8	88.9	88.6	88.0	88.2	89.2	90.6	89.9
-50	81.0	82.9	84.4	86.0	88.1	87.8	87.3	87.5	88.5	89.8	89.1
-54	80.3	82.2	83.7	85.3	87.4	87.1	86.6	86.8	87.7	89.1	88.4

Engine Bleed Adjustment	OAT < ISA + 10 (C)	OAT ≥ ISA + 10 (C)
Packs Off	+1.2	+1.2
Eng A/I ON	-0.0	-1.6
Eng & Wing A/I ON	-0.0	-2.9

OAT ≥ to ISA + 10

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE ALTITUDE CAPABILITY

GROSS WEIGHT - POUNDS	PRESSURE ALTITUDE - FEET		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
200,000	16,500	15,400	13,400
195,000	17,000	16,200	14,400
190,000	17,500	16,700	15,500
185,000	18,100	17,300	16,300
180,000	18,800	17,800	16,800
175,000	19,600	18,500	17,400
170,000	20,300	19,300	18,000
165,000	21,100	20,100	18,800
160,000	21,800	20,800	19,600
155,000	22,600	21,600	20,500
150,000	23,400	22,400	21,200
145,000	24,200	23,200	22,000
140,000	25,000	24,000	22,800
135,000	26,000	24,800	23,600
130,000	27,100	25,800	24,500
125,000	28,100	26,800	25,400
120,000	29,100	27,800	26,400
115,000	30,100	28,900	27,500

BASIS:

- Max continuous thrust
- One engine inoperative

Engine Bleed Adjustment (feet)

Engine A/I ON	-2,500
Engine & Wing A/I ON	-5,300

ONE ENGINE INOPERATIVE

DRIFTDOWN GROSS LEVEL OFF ALTITUDE

ENGINE ANTI-ICE OFF

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
195,000	188,400	18,900	17,900	16,900
185,000	178,900	20,200	19,300	18,000
175,000	169,300	21,500	20,600	19,500
165,000	159,700	22,900	21,900	20,900
155,000	150,000	24,300	23,300	22,200
145,000	140,300	25,900	24,800	23,600
135,000	130,800	27,700	26,500	25,200
125,000	121,300	29,500	28,400	27,000
115,000	112,000	31,400	30,300	28,900

ENGINE ANTI-ICE ON

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
195,000	188,400	17,900	16,800	15,900
185,000	178,800	19,200	18,000	17,000
175,000	169,300	20,600	19,500	18,200
165,000	159,700	21,900	22,000	19,800
155,000	150,000	23,200	22,100	21,100
145,000	140,300	24,700	23,500	22,500
135,000	130,700	26,400	25,000	23,900
125,000	121,300	28,100	26,700	25,500
115,000	111,700	30,000	28,600	27,300

ENGINE & WING ANTI-ICE ON

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
195,000	189,700	16,700	15,800	14,400
185,000	178,900	17,800	16,900	16,000
175,000	169,200	19,200	18,000	17,200
165,000	159,900	20,600	19,600	18,400
155,000	150,200	21,800	20,900	20,000
145,000	140,600	23,200	22,200	21,300
135,000	130,900	24,600	23,600	22,700
125,000	121,180	26,200	25,100	24,100
115,000	111,600	27,900	26,800	25,700

Based upon:

	Initial altitude = 35,000 feet
	Initial altitude = 25,000 feet

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES FEET

BASIS:

- Sea level, standard day, no wind, no slope.
- MAX PEDAL braking.
- Approach Speed V_{APP} ($V_{LS} + 5$)
- No reverse thrust.
- Includes 7 second air run (approx. 850 to 1,800 ft.)

FLAPS FULL

RWY COND.	LANDING WEIGHT – (1,000) POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,160	3,330	3,500	3,670	3,830	3,990	4,190	4,450	4,730
GOOD	3,630	3,890	4,140	4,400	4,660	4,910	5,180	5,440	5,710
MEDIUM	4,530	4,830	5,120	5,410	5,700	5,980	6,260	6,550	6,830
POOR	6,150	6,590	7,020	7,450	7,880	8,310	8,730	9,160	9,590

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 ft	+4%	+4%	+4%	+4%
Wind	Per 5 kts. headwind	0%	0%	0%	0%
	Per 5 kts. tailwind	+10%	+12%	+13%	+18%
Two Reversers Operative		-3%	-7%	-9%	-21%

Procedure:

1. Determine Flaps Full stopping distance.
2. Determine total correction factor by summing all applicable correction percentages.
3. Apply total correction factor to the Flaps Full stopping distance to get the Corrected Landing Distance.
4. Determine Landing Distance Multiplier below.
5. Multiply the Corrected Landing Dist by the Landing Dist Multiplier to determine the landing distance required for the abnormal condition.

Abnormal Description	Multiply Full Flap Dist By:	Abnormal Description	Multiply Full Flap Dist By:
Elec Emer Config	2.00	Reverser Unlock, buffet persists	1.15
Elec AC Bus 1 Fault	1.20	Ground Spoiler, one or two pair	1.25
Elec DC Bus 1+2 Fault	1.80	Ground Spoiler, three or more pair	1.60
Elec DC Bus 2 Fault	1.30	Speed Brakes/Spoilers, one or two pair	1.25
Elec DC Emer Config	1.85	Speed Brakes/Spoilers, three or more pair	1.60
Elec DC ESS Bus Fault w/ Ice Accretion	1.30	One Brake Released	1.20
Elec DC ESS Bus Fault w/o Ice Accretion	1.20	Two Brakes Released	1.50
Engine 1(2) Fail	1.15	Blue Hyd Pump	1.10
F/Ctl Direct Law	1.20	Yellow Hyd Pump	1.20
F/Ctl ELAC Fault	1.20	Blue + Yellow Hyd Pump	1.50
Flaps < 1	1.70	Green Hyd Pump	1.15
Flaps >= 1 but < 3	1.45	Green + Blue Hyd Pump	1.80
Flaps 3 Landing	1.20	Green + Yellow Hyd Pump	2.45
Flaps > 3	1.15	Wing Anti-Ice Fault with Ice Accretion	1.15
Slats < 1	1.40	Anti-Skid Inop	1.70
Slats >= 1 but <= 3	1.20	Norm Brake Fault	1.10
Slats > 3	1.15	Norm + Altn Brake Fault	1.65
Zero Flap/Zero Slat	2.00	IR 1+2+3 Fault	1.95
SEC single failure	1.20	Dual IR Fault	1.15
SEC double failure	1.45	Dual ADR Fault	1.15
SEC triple failure	1.65	All ADR Off	1.15

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

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:

- One Brake Inoperative
- All Spoilers Inoperative
- Two Pairs of 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
- No slope
- MAX PEDAL braking
- CONF FULL (unless otherwise specified)
- Includes 7 second air run from threshold to touchdown (850 to 1,800 feet of air distance depending on weight)
- Based on demonstrated landing performance produced by the manufacturer during certification process
- Does not include any other safety factors or margins

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

- Sea level altitude
- No wind
- No thrust reverser credit
- Manual landing

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

AIRSPEED UNRELIABLE

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,620	3,820	4,020	4,220	4,420	4,620	4,820	5,520	6,220
GOOD	4,480	4,780	5,080	5,380	5,680	5,980	6,280	7,080	7,880
MEDIUM	5,920	6,220	6,520	6,820	7,120	7,420	7,720	8,320	8,920
POOR	11,190	11,690	12,190	12,690	13,190	13,690	14,190	15,290	16,390

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+310	+290	+570
Approach Speed	Per Add'l 5 knots	+320	+420	+360	+530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,120	+1,580	+1,540	+3,920
Reverse Thrust	One Reverser Operative	-80	-180	-390	-1,610
	Two Reversers Operative	-160	-360	-780	-3,220
Autoland	Automatic Landing	+450	+450	+450	+430

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

AVIONICS SMOKE

FLAPS FULL

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,920	7,020	7,120	7,220	7,320	7,420	7,520	8,520	9,520
GOOD	7,180	7,280	7,380	7,480	7,580	7,680	7,780	8,780	9,780
MEDIUM	8,240	8,340	8,440	8,540	8,640	8,740	8,840	9,540	10,240
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+260	+350	+320	N/A
Approach Speed	Per Add'l 5 knots	+400	+550	+520	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,480	+1,940	+1,820	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	7,700	7,800	7,900	8,000	8,100	8,200	8,300	9,400	10,500
GOOD	8,160	8,260	8,360	8,460	8,560	8,660	8,760	9,860	10,960
MEDIUM	9,140	9,240	9,340	9,440	9,540	9,640	9,740	10,440	11,140
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+290	+410	+360	N/A
Approach Speed	Per Add'l 5 knots	+400	+590	+530	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,500	+2,040	+1,820	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

BLEED DUAL BLEED FAULT (WITH ICE ACCRETION)
BLEED ENG BLEED LO TEMP (WITH ICE ACCRETION)
BLEED WING OR ENG BLEED LEAK (WITH ICE ACCRETION)
BLEED X BLEED FAULT (WITH ICE ACCRETION)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,550	3,750	3,950	4,150	4,350	4,550	4,750	5,450	6,150
GOOD	4,300	4,600	4,900	5,200	5,500	5,800	6,100	6,900	7,700
MEDIUM	5,680	5,980	6,280	6,580	6,880	7,180	7,480	8,080	8,680
POOR	10,470	10,970	11,470	11,970	12,470	12,970	13,470	14,470	15,470

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+300	+280	+540
Approach Speed	Per Add'l 5 knots	+310	+390	+350	+490
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,520	+1,500	+3,800
Reverse Thrust	One Reverser Operative	-80	-170	-360	-1,450
	Two Reversers Operative	-160	-340	-720	-2,900
Autoland	Automatic Landing	+340	+380	+380	+420

BRAKES ALTN L(R) RELEASED (IF G SYS LO PR)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,140	6,240	6,340	6,440	6,540	6,640	6,740	7,840	8,940
GOOD	6,970	7,270	7,570	7,870	8,170	8,470	8,770	9,870	10,970
MEDIUM	8,870	9,170	9,470	9,770	10,070	10,370	10,670	11,570	12,470
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+310	+450	+420	N/A
Approach Speed	Per Add'l 5 knots	+410	+590	+520	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,740	+2,580	+2,620	N/A
Reverse Thrust	One Reverser Operative	-310	-540	-810	N/A
	Two Reversers Operative	-620	-1,080	-1,620	N/A
Autoland	Automatic Landing	+490	+530	+530	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

BRAKES ALTN L(R) RELEASED (IF NORM BRK FAULT)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	5,790	5,890	5,990	6,090	6,190	6,290	6,390	7,390	8,390
GOOD	6,180	6,480	6,780	7,080	7,380	7,680	7,980	8,980	9,980
MEDIUM	7,920	8,220	8,520	8,820	9,120	9,420	9,720	10,520	11,320
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+300	+400	+380	N/A
Approach Speed	Per Add'l 5 knots	+400	+500	+440	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,720	+2,340	+2,460	N/A
Reverse Thrust	One Reverser Operative	-270	-430	-770	N/A
	Two Reversers Operative	-540	-860	-1,540	N/A
Autoland	Automatic Landing	+490	+530	+530	N/A

BRAKES ANTISKID NWS FAULT (INCL. 1,000PSI BRAKING LIMIT)

BRAKES ANTISKID NWS/OFF (INCL. 1,000PSI BRAKING LIMIT)

BRAKES ANTISKID FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,310	6,410	6,510	6,610	6,710	6,810	6,910	7,810	8,710
GOOD	6,310	6,410	6,510	6,610	6,710	6,810	6,910	7,810	8,710
MEDIUM	6,310	6,410	6,510	6,610	6,840	7,140	7,440	8,040	8,640
POOR	9,850	10,350	10,850	11,350	11,850	12,350	12,850	13,850	14,850

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+240	+270	+260	+510
Approach Speed	Per Add'l 5 knots	+330	+370	+360	+520
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,360	+1,520	+1,520	+3,760
Reverse Thrust	One Reverser Operative	-220	-230	-370	-1,420
	Two Reversers Operative	-440	-460	-740	-2,840
Autoland	Automatic Landing	+490	+530	+530	+560

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

BRAKES NORM BRK FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,900	4,000	4,100	4,200	4,300	4,400	4,500	5,200	5,900
GOOD	4,050	4,350	4,650	4,950	5,250	5,550	5,850	6,550	7,250
MEDIUM	5,110	5,410	5,710	6,010	6,310	6,610	6,910	7,410	7,910
POOR	9,660	10,160	10,660	11,160	11,660	12,160	12,660	13,660	14,660

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+190	+290	+250	+500
Approach Speed	Per Add'l 5 knots	+280	+410	+340	+510
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,040	+1,580	+1,480	+3,740
Reverse Thrust	One Reverser Operative	-90	-170	-340	-1,400
	Two Reversers Operative	-180	-340	-680	-2,800
Autoland	Automatic Landing	+490	+530	+530	+560

BRAKES NORM + ALTN FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,310	6,410	6,510	6,610	6,710	6,810	6,910	7,810	8,710
GOOD	5,110	5,410	5,710	6,010	6,310	6,610	6,910	7,810	8,710
MEDIUM	5,640	5,940	6,240	6,540	6,840	7,140	7,440	8,040	8,640
POOR	9,850	10,350	10,850	11,350	11,850	12,350	12,850	13,850	14,850

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+240	+270	+260	+510
Approach Speed	Per Add'l 5 knots	+330	+370	+360	+520
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,360	+1,520	+1,520	+3,760
Reverse Thrust	One Reverser Operative	-220	-230	-370	-1,420
	Two Reversers Operative	-440	-460	-740	-2,840
Autoland	Automatic Landing	+490	+530	+530	+560

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

BRAKES ONE BRK RELEASED

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,370	4,470	4,570	4,670	4,770	4,870	4,970	5,770	6,570
GOOD	4,440	4,740	5,040	5,340	5,640	5,940	6,240	7,040	7,840
MEDIUM	6,160	6,460	6,760	7,060	7,360	7,660	7,960	8,560	9,160
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+310	+300	N/A
Approach Speed	Per Add'l 5 knots	+360	+440	+390	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,300	+1,740	+1,820	N/A
Reverse Thrust	One Reverser Operative	-120	-210	-480	N/A
	Two Reversers Operative	-240	-420	-960	N/A
Autoland	Automatic Landing	+490	+530	+530	N/A

BRAKES TWO BRK RELEASED

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	5,680	5,780	5,880	5,980	6,080	6,180	6,280	7,380	8,480
GOOD	5,690	5,990	6,290	6,590	6,890	7,190	7,490	8,490	9,490
MEDIUM	7,920	8,220	8,520	8,820	9,120	9,420	9,720	10,520	11,320
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+290	+380	+380	N/A
Approach Speed	Per Add'l 5 knots	+420	+480	+440	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,700	+2,240	+2,460	N/A
Reverse Thrust	One Reverser Operative	-220	-360	-770	N/A
	Two Reversers Operative	-440	-720	-1,540	N/A
Autoland	Automatic Landing	+490	+530	+530	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ELEC AC BUS 1 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,800	3,900	4,000	4,100	4,200	4,300	4,400	5,100	5,800
GOOD	5,210	5,310	5,410	5,510	5,610	5,710	5,810	6,610	7,410
MEDIUM	6,720	6,820	6,920	7,020	7,120	7,220	7,320	7,920	8,520
POOR	13,110	13,210	13,310	13,410	13,510	13,610	13,710	14,810	15,910

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+290	+270	+550
Approach Speed	Per Add'l 5 knots	+300	+440	+390	+580
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,560	+1,540	+3,940
Reverse Thrust	One Reverser Operative	-90	-180	-370	-1,250
	Two Reversers Operative	-180	-360	-740	-2,500
Autoland	Automatic Landing	+500	+530	+530	+600

ELEC DC BUS 2 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,100	4,200	4,300	4,400	4,500	4,600	4,700	5,500	6,300
GOOD	5,830	5,930	6,030	6,130	6,230	6,330	6,430	7,330	8,230
MEDIUM	7,580	7,680	7,780	7,880	7,980	8,080	8,180	8,780	9,380
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+340	+310	N/A
Approach Speed	Per Add'l 5 knots	+340	+550	+490	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,060	+1,800	+1,720	N/A
Reverse Thrust	One Reverser Operative	-120	-260	-620	N/A
	Two Reversers Operative	-240	-520	-1,240	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ELEC DC BUS 1+2 FAULT (INCL. 1,000PSI BRAKING LIMIT)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,900	7,000	7,100	7,200	7,300	7,400	7,500	8,500	9,500
GOOD	7,150	7,250	7,350	7,450	7,550	7,650	7,750	8,750	9,750
MEDIUM	8,210	8,310	8,410	8,510	8,610	8,710	8,810	9,510	10,210
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+260	+350	+320	N/A
Approach Speed	Per Add'l 5 knots	+400	+550	+520	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,480	+1,940	+1,820	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ELEC DC ESS BUS FAULT (WITH NO ICE ACCRETION)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,800	3,900	4,000	4,100	4,200	4,300	4,400	5,200	6,000
GOOD	5,250	5,350	5,450	5,550	5,650	5,750	5,850	6,650	7,450
MEDIUM	6,910	7,010	7,110	7,210	7,310	7,410	7,510	8,110	8,710
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+300	+280	N/A
Approach Speed	Per Add'l 5 knots	+320	+450	+410	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,100	+1,620	+1,640	N/A
Reverse Thrust	One Reverser Operative	-90	-200	-580	N/A
	Two Reversers Operative	-180	-400	-1,160	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ELEC DC ESS BUS FAULT (WITH ICE ACCRETION)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,260	4,360	4,460	4,560	4,660	4,760	4,860	5,660	6,460
GOOD	5,940	6,040	6,140	6,240	6,340	6,440	6,540	7,340	8,140
MEDIUM	7,590	7,690	7,790	7,890	7,990	8,090	8,190	8,790	9,390
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+330	+300	N/A
Approach Speed	Per Add'l 5 knots	+320	+470	+410	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,140	+1,700	+1,680	N/A
Reverse Thrust	One Reverser Operative	-100	-250	-650	N/A
	Two Reversers Operative	-200	-500	-1,300	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ELEC DC ESS SHED BUS (WITH ICE ACCRETION)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,150	4,250	4,350	4,450	4,550	4,650	4,750	5,450	6,150
GOOD	5,500	5,600	5,700	5,800	5,900	6,000	6,100	6,900	7,700
MEDIUM	6,880	6,980	7,080	7,180	7,280	7,380	7,480	8,080	8,680
POOR	12,870	12,970	13,070	13,170	13,270	13,370	13,470	14,470	15,470

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+300	+280	+540
Approach Speed	Per Add'l 5 knots	+310	+390	+350	+490
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,520	+1,500	+3,800
Reverse Thrust	One Reverser Operative	-80	-170	-360	-1,450
	Two Reversers Operative	-160	-340	-720	-2,900
Autoland	Automatic Landing	+500	+530	+530	+600

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ELEC DC EMER CONFIG (WITH 140 KT MIN)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,920	7,020	7,120	7,220	7,320	7,420	7,520	8,520	9,520
GOOD	7,180	7,280	7,380	7,480	7,580	7,680	7,780	8,780	9,780
MEDIUM	8,240	8,340	8,440	8,540	8,640	8,740	8,840	9,540	10,240
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+260	+350	+320	N/A
Approach Speed	Per Add'l 5 knots	+400	+550	+520	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,480	+1,940	+1,820	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ELEC EMER CONFIG (WITH 140 KT MIN) (INCL. 1,000PSI BRAKING LIMIT)

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	7,700	7,800	7,900	8,000	8,100	8,200	8,300	9,400	10,500
GOOD	8,160	8,260	8,360	8,460	8,560	8,660	8,760	9,860	10,960
MEDIUM	9,140	9,240	9,340	9,440	9,540	9,640	9,740	10,440	11,140
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+290	+410	+360	N/A
Approach Speed	Per Add'l 5 knots	+400	+590	+530	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,500	+2,040	+1,820	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+500	+530	+530	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ENG 1 (2) EGT OVERLIMIT

ENG 1 (2) FADEC FAULT

ENG 1 (2) FAIL

ENG 1 (2) FIRE

ENG 1 (2) N1 OVERLIMIT

ENG 1 (2) N2 OVERLIMIT

ENG 1 (2) OIL HI TEMP

ENG 1 (2) OIL LO PR

ENGINE RELIGHT

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,860	4,060	4,260	4,460	4,660	4,860	5,060	5,860	6,660
GOOD	4,760	5,060	5,360	5,660	5,960	6,260	6,560	7,360	8,160
MEDIUM	6,110	6,410	6,710	7,010	7,310	7,610	7,910	8,510	9,110
POOR	10,960	11,460	11,960	12,460	12,960	13,460	13,960	15,160	16,360

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+330	+300	+570
Approach Speed	Per Add'l 5 knots	+320	+410	+360	+530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,540	+1,500	+3,560
Reverse Thrust	One Reverser Operative	-90	-210	-420	-1,650
	Two Reversers Operative	-180	-420	-840	-3,300
Autoland	Automatic Landing	+340	+390	+390	+440

FLAPS FULL

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,490	3,690	3,890	4,090	4,290	4,490	4,690	5,390	6,090
GOOD	4,200	4,500	4,800	5,100	5,400	5,700	6,000	6,800	7,600
MEDIUM	5,520	5,820	6,120	6,420	6,720	7,020	7,320	7,920	8,520
POOR	9,770	10,270	10,770	11,270	11,770	12,270	12,770	13,870	14,970

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+290	+270	+520
Approach Speed	Per Add'l 5 knots	+320	+390	+350	+500
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,060	+1,480	+1,460	+3,460
Reverse Thrust	One Reverser Operative	-80	-170	-370	-1,440
	Two Reversers Operative	-160	-340	-740	-2,880
Autoland	Automatic Landing	+340	+390	+390	+440

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ENG 1 (2) REV UNLOCK (WITH BUFFET)

ENG 1 (2) SHUTDOWN

ENG 1 (2) STALL

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,560	3,760	3,960	4,160	4,360	4,560	4,760	5,460	6,160
GOOD	4,380	4,680	4,980	5,280	5,580	5,880	6,180	6,980	7,780
MEDIUM	5,750	6,050	6,350	6,650	6,950	7,250	7,550	8,150	8,750
POOR	10,440	10,940	11,440	11,940	12,440	12,940	13,440	14,640	15,840

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	210	310	280	550
Approach Speed	Per Add'l 5 knots	320	410	360	540
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	1,080	1,560	1,520	3,580
Reverse Thrust	One Reverser Operative	-80	-190	-400	-1,610
	Two Reversers Operative	-160	-380	-800	-3,220
Autoland	Automatic Landing	+340	+390	+390	+440

F/CTL ALTN LAW

F/CTL DIRECT LAW

F/CTL ELAC 1+2 FAULT

F/CTL L(R) ELEV FAULT

F/CTL L+R ELEV FAULT

F/CTL STABILIZER JAM

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,220	4,320	4,420	4,520	4,620	4,720	4,820	5,520	6,220
GOOD	5,080	5,280	5,480	5,680	5,880	6,080	6,280	7,080	7,880
MEDIUM	5,920	6,220	6,520	6,820	7,120	7,420	7,720	8,320	8,920
POOR	11,190	11,690	12,190	12,690	13,190	13,690	14,190	15,290	16,390

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+310	+290	+570
Approach Speed	Per Add'l 5 knots	+320	+420	+360	+530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,120	+1,580	+1,540	+3,920
Reverse Thrust	One Reverser Operative	-80	-180	-390	-1,610
	Two Reversers Operative	-160	-360	-780	-3,220
Autoland	Automatic Landing	+520	+610	+610	+710

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL FLAPS FAULT (0 ≤ FLAPS <1)

F/CTL FLAPS LOCKED (0 ≤ FLAPS <1)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	5,660	5,760	5,860	5,960	6,060	6,160	6,260	7,160	8,060
GOOD	7,260	7,360	7,460	7,560	7,660	7,760	7,860	8,760	9,660
MEDIUM	8,820	8,920	9,020	9,120	9,220	9,320	9,420	10,020	10,620
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+270	+410	+340	N/A
Approach Speed	Per Add'l 5 knots	N/A	N/A	N/A	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,220	+1,860	+1,680	N/A
Reverse Thrust	One Reverser Operative	-100	-280	-630	N/A
	Two Reversers Operative	-200	-560	-1,260	N/A
Autoland	Automatic Landing	+400	+440	+450	N/A

F/CTL FLAPS FAULT (1 ≤ FLAPS <2)

F/CTL FLAPS LOCKED (1 ≤ FLAPS <2)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,650	4,750	4,850	4,950	5,050	5,150	5,250	6,050	6,850
GOOD	6,310	6,410	6,510	6,610	6,710	6,810	6,910	7,710	8,510
MEDIUM	7,970	8,070	8,170	8,270	8,370	8,470	8,570	9,170	9,770
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+240	+370	+320	N/A
Approach Speed	Per Add'l 5 knots	+350	+460	+390	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,180	+1,760	+1,680	N/A
Reverse Thrust	One Reverser Operative	-90	-230	-580	N/A
	Two Reversers Operative	-180	-460	-1,160	N/A
Autoland	Automatic Landing	+400	+440	+450	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL FLAPS FAULT (2 ≤ FLAPS <3)

F/CTL FLAPS LOCKED (2 ≤ FLAPS <3)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,340	4,440	4,540	4,640	4,740	4,840	4,940	5,740	6,540
GOOD	5,910	6,010	6,110	6,210	6,310	6,410	6,510	7,310	8,110
MEDIUM	7,560	7,660	7,760	7,860	7,960	8,060	8,160	8,760	9,360
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+340	+300	N/A
Approach Speed	Per Add'l 5 knots	+340	+450	+390	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,160	+1,740	+1,680	N/A
Reverse Thrust	One Reverser Operative	-90	-210	-540	N/A
	Two Reversers Operative	-180	-420	-1,080	N/A
Autoland	Automatic Landing	+400	+440	+450	N/A

F/CTL FLAPS FAULT (FLAPS = 3)

F/CTL FLAPS LOCKED (FLAPS = 3)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,230	4,330	4,430	4,530	4,630	4,730	4,830	5,630	6,430
GOOD	5,720	5,820	5,920	6,020	6,120	6,220	6,320	7,120	7,920
MEDIUM	7,320	7,420	7,520	7,620	7,720	7,820	7,920	8,520	9,120
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+320	+290	N/A
Approach Speed	Per Add'l 5 knots	+330	+430	+380	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,140	+1,640	+1,640	N/A
Reverse Thrust	One Reverser Operative	-90	-200	-510	N/A
	Two Reversers Operative	-180	-400	-1,020	N/A
Autoland	Automatic Landing	+400	+440	+450	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL FLAPS FAULT (FLAPS > 3)

F/CTL FLAPS LOCKED (FLAPS > 3)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,930	4,030	4,130	4,230	4,330	4,430	4,530	5,230	5,930
GOOD	5,230	5,330	5,430	5,530	5,630	5,730	5,830	6,630	7,430
MEDIUM	6,770	6,870	6,970	7,070	7,170	7,270	7,370	7,870	8,370
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+290	+270	N/A
Approach Speed	Per Add'l 5 knots	+320	+400	+360	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,100	+1,540	+1,580	N/A
Reverse Thrust	One Reverser Operative	-80	-160	-450	N/A
	Two Reversers Operative	-160	-320	-900	N/A
Autoland	Automatic Landing	+400	+440	+450	N/A

F/CTL GND SPLR FAULT

F/CTL SPLR FAULT (ALL)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,690	4,790	4,890	4,990	5,090	5,190	5,290	5,990	6,690
GOOD	6,490	6,690	6,890	7,090	7,290	7,490	7,690	8,790	9,890
MEDIUM	7,860	8,160	8,460	8,760	9,060	9,360	9,660	10,460	11,260
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+440	+380	N/A
Approach Speed	Per Add'l 5 knots	+460	+850	+750	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,040	+2,200	+1,940	N/A
Reverse Thrust	One Reverser Operative	-160	-410	-810	N/A
	Two Reversers Operative	-320	-820	-1,620	N/A
Autoland	Automatic Landing	+520	+610	+610	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL GND SPLR 5 FAULT

F/CTL SPD BRK 2 FAULT

F/CTL ONE SPLR FAULT (WITH NO SPOILER RUNAWAY SUSPECTED)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,790	3,890	3,990	4,090	4,190	4,290	4,390	5,090	5,790
GOOD	4,580	4,780	4,980	5,180	5,380	5,580	5,780	6,580	7,380
MEDIUM	5,460	5,760	6,060	6,360	6,660	6,960	7,260	7,860	8,460
POOR	10,450	10,950	11,450	11,950	12,450	12,950	13,450	14,550	15,650

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+290	+270	+540
Approach Speed	Per Add'l 5 knots	+300	+430	+390	+560
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,080	+1,540	+1,540	+3,880
Reverse Thrust	One Reverser Operative	-80	-170	-380	-1,580
	Two Reversers Operative	-160	-340	-760	-3,160
Autoland	Automatic Landing	+520	+610	+610	+710

F/CTL ONE SPLR FAULT (WITH SPOILER RUNAWAY SUSPECTED)

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,330	4,430	4,530	4,630	4,730	4,830	4,930	5,730	6,530
GOOD	5,520	5,720	5,920	6,120	6,320	6,520	6,720	7,520	8,320
MEDIUM	6,460	6,760	7,060	7,360	7,660	7,960	8,260	8,860	9,460
POOR	12,640	13,140	13,640	14,140	14,640	15,140	15,640	16,840	18,040

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+350	+310	+630
Approach Speed	Per Add'l 5 knots	+330	+480	+420	+610
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,140	+1,720	+1,640	+4,160
Reverse Thrust	One Reverser Operative	-100	-230	-470	-1,950
	Two Reversers Operative	-200	-460	-940	-3,900
Autoland	Automatic Landing	+520	+610	+610	+710

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL TWO SPLR FAULT

F/CTL SPD BRK 3+4 FAULT

F/CTL GND SPLR 1+2(3+4) FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,070	4,170	4,270	4,370	4,470	4,570	4,670	5,470	6,270
GOOD	5,120	5,320	5,520	5,720	5,920	6,120	6,320	7,120	7,920
MEDIUM	6,150	6,450	6,750	7,050	7,350	7,650	7,950	8,550	9,150
POOR	12,070	12,570	13,070	13,570	14,070	14,570	15,070	16,270	17,470

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+190	+330	+300	+610
Approach Speed	Per Add'l 5 knots	+330	+530	+470	+680
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,040	+1,720	+1,660	+4,160
Reverse Thrust	One Reverser Operative	-100	-220	-490	-1,970
	Two Reversers Operative	-200	-440	-980	-3,940
Autoland	Automatic Landing	+520	+610	+610	+710

F/CTL SPEED BRK FAULT

F/CTL THREE SPLR FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,220	4,320	4,420	4,520	4,620	4,720	4,820	5,620	6,420
GOOD	5,480	5,680	5,880	6,080	6,280	6,480	6,680	7,580	8,480
MEDIUM	6,610	6,910	7,210	7,510	7,810	8,110	8,410	9,110	9,810
POOR	13,380	13,880	14,380	14,880	15,380	15,880	16,380	17,680	18,980

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+350	+320	+660
Approach Speed	Per Add'l 5 knots	+360	+600	+530	+770
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,040	+1,860	+1,740	+4,380
Reverse Thrust	One Reverser Operative	-120	-270	-560	-2,320
	Two Reversers Operative	-240	-540	-1,120	-4,640
Autoland	Automatic Landing	+520	+610	+610	+710

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL RUDDER JAM

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,480	4,580	4,680	4,780	4,880	4,980	5,080	5,980	6,880
GOOD	5,210	5,410	5,610	5,810	6,010	6,210	6,410	7,310	8,210
MEDIUM	6,130	6,430	6,730	7,030	7,330	7,630	7,930	8,730	9,530
POOR	10,560	11,060	11,560	12,060	12,560	13,060	13,560	14,860	16,160

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+280	+370	+370	+640
Approach Speed	Per Add'l 5 knots	+420	+490	+450	+580
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,320	+1,840	+1,880	+4,280
Reverse Thrust	One Reverser Operative	-100	-230	-450	-1,530
	Two Reversers Operative	-200	-460	-900	-3,060
Autoland	Automatic Landing	+520	+610	+610	+710

F/CTL SEC 1 OR SEC 3 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,900	4,000	4,100	4,200	4,300	4,400	4,500	5,300	6,100
GOOD	4,830	5,030	5,230	5,430	5,630	5,830	6,030	6,830	7,630
MEDIUM	5,800	6,100	6,400	6,700	7,000	7,300	7,600	8,200	8,800
POOR	11,370	11,870	12,370	12,870	13,370	13,870	14,370	15,470	16,570

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+310	+290	+580
Approach Speed	Per Add'l 5 knots	+310	+480	+420	+620
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,080	+1,620	+1,600	+4,060
Reverse Thrust	One Reverser Operative	-90	-190	-430	-1,800
	Two Reversers Operative	-180	-380	-860	-3,600
Autoland	Automatic Landing	+520	+610	+610	+710

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL SEC 2 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,740	3,840	3,940	4,040	4,140	4,240	4,340	5,040	5,740
GOOD	4,440	4,640	4,840	5,040	5,240	5,440	5,640	6,440	7,240
MEDIUM	5,290	5,590	5,890	6,190	6,490	6,790	7,090	7,690	8,290
POOR	10,140	10,640	11,140	11,640	12,140	12,640	13,140	14,140	15,140

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+280	+260	+520
Approach Speed	Per Add'l 5 knots	+310	+410	+370	+540
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,080	+1,500	+1,500	+3,840
Reverse Thrust	One Reverser Operative	-80	-150	-360	-1,510
	Two Reversers Operative	-160	-300	-720	-3,020
Autoland	Automatic Landing	+520	+610	+610	+710

F/CTL SEC 1+2 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,060	4,160	4,260	4,360	4,460	4,560	4,660	5,460	6,260
GOOD	5,170	5,370	5,570	5,770	5,970	6,170	6,370	7,270	8,170
MEDIUM	6,230	6,530	6,830	7,130	7,430	7,730	8,030	8,630	9,230
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+330	+310	N/A
Approach Speed	Per Add'l 5 knots	+340	+540	+480	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,060	+1,760	+1,660	N/A
Reverse Thrust	One Reverser Operative	-110	-250	-480	N/A
	Two Reversers Operative	-220	-500	-960	N/A
Autoland	Automatic Landing	+520	+610	+610	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL SEC 1+3 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,410	4,510	4,610	4,710	4,810	4,910	5,010	5,710	6,410
GOOD	5,850	6,050	6,250	6,450	6,650	6,850	7,050	8,050	9,050
MEDIUM	7,070	7,370	7,670	7,970	8,270	8,570	8,870	9,570	10,270
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+380	+340	N/A
Approach Speed	Per Add'l 5 knots	+400	+680	+600	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,020	+1,960	+1,820	N/A
Reverse Thrust	One Reverser Operative	-140	-340	-640	N/A
	Two Reversers Operative	-280	-680	-1,280	N/A
Autoland	Automatic Landing	+520	+610	+610	N/A

F/CTL SEC 2+3 FAULT

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,090	4,190	4,290	4,390	4,490	4,590	4,690	5,490	6,290
GOOD	5,200	5,400	5,600	5,800	6,000	6,200	6,400	7,300	8,200
MEDIUM	6,260	6,560	6,860	7,160	7,460	7,760	8,060	8,660	9,260
POOR	12,460	12,960	13,460	13,960	14,460	14,960	15,460	16,660	17,860

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+190	+330	+310	+620
Approach Speed	Per Add'l 5 knots	+340	+540	+480	+710
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,040	+1,760	+1,680	+4,240
Reverse Thrust	One Reverser Operative	-110	-230	-500	-2,070
	Two Reversers Operative	-220	-460	-1,000	-4,140
Autoland	Automatic Landing	+520	+610	+610	+710

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL SEC 1+2+3 FAULT FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	5,290	5,390	5,490	5,590	5,690	5,790	5,890	6,690	7,490
GOOD	7,840	8,040	8,240	8,440	8,640	8,840	9,040	10,140	11,240
MEDIUM	9,200	9,500	9,800	10,100	10,400	10,700	11,000	11,800	12,600
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+240	+520	+440	N/A
Approach Speed	Per Add'l 5 knots	+480	+950	+810	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,160	+2,460	+2,080	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+520	+610	+610	N/A

F/CTL SLATS FAULT (0 ≤ SLATS <1) F/CTL SLATS LOCKED (0 ≤ SLATS <1)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	5,010	5,110	5,210	5,310	5,410	5,510	5,610	6,410	7,210
GOOD	6,690	6,790	6,890	6,990	7,090	7,190	7,290	8,090	8,890
MEDIUM	8,060	8,160	8,260	8,360	8,460	8,560	8,660	9,260	9,860
POOR	14,870	14,970	15,070	15,170	15,270	15,370	15,470	16,570	17,670

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+240	+350	+310	+610
Approach Speed	Per Add'l 5 knots	N/A	N/A	N/A	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,120	+1,620	+1,560	+3,940
Reverse Thrust	One Reverser Operative	-100	-230	-440	-1,690
	Two Reversers Operative	-200	-460	-880	-3,380
Autoland	Automatic Landing	+400	+440	+450	+510

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

F/CTL SLATS FAULT ($1 \leq \text{SLATS} < 2$)

F/CTL SLATS LOCKED ($1 \leq \text{SLATS} < 2$)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,220	4,320	4,420	4,520	4,620	4,720	4,820	5,520	6,220
GOOD	5,680	5,780	5,880	5,980	6,080	6,180	6,280	7,080	7,880
MEDIUM	7,120	7,220	7,320	7,420	7,520	7,620	7,720	8,320	8,920
POOR	13,590	13,690	13,790	13,890	13,990	14,090	14,190	15,290	16,390

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+310	+290	+570
Approach Speed	Per Add'l 5 knots	+320	+420	+360	+530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,120	+1,580	+1,540	+3,920
Reverse Thrust	One Reverser Operative	-80	-180	-390	-1,610
	Two Reversers Operative	-160	-360	-780	-3,220
Autoland	Automatic Landing	+400	+440	+450	+510

F/CTL SLATS FAULT ($\text{SLATS} \geq 2$)

F/CTL SLATS LOCKED ($\text{SLATS} \geq 2$)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,010	4,110	4,210	4,310	4,410	4,510	4,610	5,310	6,010
GOOD	5,390	5,490	5,590	5,690	5,790	5,890	5,990	6,790	7,590
MEDIUM	6,840	6,940	7,040	7,140	7,240	7,340	7,440	8,040	8,640
POOR	13,180	13,280	13,380	13,480	13,580	13,680	13,780	14,780	15,780

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+300	+280	+550
Approach Speed	Per Add'l 5 knots	+320	+410	+370	+550
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,560	+1,520	+3,900
Reverse Thrust	One Reverser Operative	-80	-170	-380	-1,580
	Two Reversers Operative	-160	-340	-760	-3,160
Autoland	Automatic Landing	+400	+440	+450	+510

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

HYD B RSVR LO LEVEL

HYD B RSVR OVHT

HYD B SYS LO PR

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,800	3,900	4,000	4,100	4,200	4,300	4,400	5,100	5,800
GOOD	5,210	5,310	5,410	5,510	5,610	5,710	5,810	6,610	7,410
MEDIUM	6,720	6,820	6,920	7,020	7,120	7,220	7,320	7,920	8,520
POOR	12,510	12,710	12,910	13,110	13,310	13,510	13,710	14,810	15,910

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+290	+270	+550
Approach Speed	Per Add'l 5 knots	+300	+440	+390	+580
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,560	+1,540	+3,940
Reverse Thrust	One Reverser Operative	-80	-170	-390	-1,640
	Two Reversers Operative	-160	-340	-780	-3,280
Autoland	Automatic Landing	+470	+510	+510	+550

HYD G RSVR LO AIR PR

HYD G RSVR LO LEVEL

HYD G RSVR OVHT

HYD G SYS LO PR

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,170	4,270	4,370	4,470	4,570	4,670	4,770	5,470	6,170
GOOD	5,760	5,860	5,960	6,060	6,160	6,260	6,360	7,160	7,960
MEDIUM	6,890	6,990	7,090	7,190	7,290	7,390	7,490	8,090	8,690
POOR	12,820	13,020	13,220	13,420	13,620	13,820	14,020	15,120	16,220

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+180	+320	+280	+560
Approach Speed	Per Add'l 5 knots	+310	+480	+410	+600
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+980	+1,740	+1,580	+3,980
Reverse Thrust	One Reverser Operative	-120	-240	-390	-1,320
	Two Reversers Operative	-240	-480	-780	-2,640
Autoland	Automatic Landing	+470	+510	+510	+550

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

HYD G SYS LO PR WITH B SYS SUPPLIED BY THE RAT (WITH 140 KT MIN)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,480	4,580	4,680	4,780	4,880	4,980	5,080	5,780	6,480
GOOD	6,370	6,470	6,570	6,670	6,770	6,870	6,970	7,870	8,770
MEDIUM	7,580	7,680	7,780	7,880	7,980	8,080	8,180	8,880	9,580
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+190	+370	+310	N/A
Approach Speed	Per Add'l 5 knots	+340	+590	+500	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+980	+1,940	+1,700	N/A
Reverse Thrust	One Reverser Operative	-170	-450	-570	N/A
	Two Reversers Operative	-340	-900	-1,140	N/A
Autoland	Automatic Landing	+470	+510	+510	N/A

HYD Y ELEC PUMP LO PR

HYD Y ELEC PUMP OVHT

HYD Y SYS LO PR

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,920	4,020	4,120	4,220	4,320	4,420	4,520	5,320	6,120
GOOD	5,460	5,560	5,660	5,760	5,860	5,960	6,060	6,860	7,660
MEDIUM	7,030	7,130	7,230	7,330	7,430	7,530	7,630	8,230	8,830
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+310	+290	N/A
Approach Speed	Per Add'l 5 knots	+310	+480	+430	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,060	+1,640	+1,600	N/A
Reverse Thrust	One Reverser Operative	-90	-200	-370	N/A
	Two Reversers Operative	-180	-400	-740	N/A
Autoland	Automatic Landing	+470	+510	+510	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

HYD Y SYS LO PR WITH B SYS SUPPLIED BY THE RAT (WITH 140 KT MIN)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,150	4,250	4,350	4,450	4,550	4,650	4,750	5,550	6,350
GOOD	5,920	6,020	6,120	6,220	6,320	6,420	6,520	7,420	8,320
MEDIUM	7,610	7,710	7,810	7,910	8,010	8,110	8,210	8,910	9,610
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+340	+310	N/A
Approach Speed	Per Add'l 5 knots	+350	+560	+500	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,040	+1,800	+1,700	N/A
Reverse Thrust	One Reverser Operative	-140	-390	-570	N/A
	Two Reversers Operative	-280	-780	-1,140	N/A
Autoland	Automatic Landing	+470	+510	+510	N/A

HYD B+Y FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	4,620	4,720	4,820	4,920	5,020	5,120	5,220	6,020	6,820
GOOD	6,810	6,910	7,010	7,110	7,210	7,310	7,410	8,310	9,210
MEDIUM	8,480	8,580	8,680	8,780	8,880	8,980	9,080	9,780	10,480
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+400	+350	N/A
Approach Speed	Per Add'l 5 knots	+340	+590	+520	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,140	+1,920	+1,760	N/A
Reverse Thrust	One Reverser Operative	-120	-330	-530	N/A
	Two Reversers Operative	-240	-660	-1,060	N/A
Autoland	Automatic Landing	+470	+510	+510	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

HYD G+B

HYD G+B SYS LO PR

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	5,880	5,980	6,080	6,180	6,280	6,380	6,480	7,280	8,080
GOOD	9,070	9,170	9,270	9,370	9,470	9,570	9,670	10,770	11,870
MEDIUM	10,050	10,150	10,250	10,350	10,450	10,550	10,650	11,350	12,050
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+250	+510	+400	N/A
Approach Speed	Per Add'l 5 knots	N/A	N/A	N/A	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,100	+2,200	+1,820	N/A
Reverse Thrust	One Reverser Operative	-190	-550	-670	N/A
	Two Reversers Operative	-380	-1,100	-1,340	N/A
Autoland	Automatic Landing	+470	+510	+510	N/A

HYD G+Y

HYD G+Y SYS LO PR (INCL. 1,000PSI BRAKING LIMIT)

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	9,520	9,620	9,720	9,820	9,920	10,020	10,120	11,220	12,320
GOOD	10,940	11,040	11,140	11,240	11,340	11,440	11,540	12,840	14,140
MEDIUM	11,960	12,060	12,160	12,260	12,360	12,460	12,560	13,360	14,160
POOR	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000	>18,000

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+360	+560	+470	N/A
Approach Speed	Per Add'l 5 knots	N/A	N/A	N/A	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,460	+2,340	+2,000	N/A
Reverse Thrust	One Reverser Operative	INOP	INOP	INOP	N/A
	Two Reversers Operative	INOP	INOP	INOP	N/A
Autoland	Automatic Landing	+470	+510	+510	N/A

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

NAV ALL ADR OFF

NAV DUAL ADR FAULT

NAV ADR 1+2 FAULT

NAV ADR 1+3 FAULT

NAV ADR 2+3 FAULT

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,620	3,820	4,020	4,220	4,420	4,620	4,820	5,520	6,220
GOOD	4,480	4,780	5,080	5,380	5,680	5,980	6,280	7,080	7,880
MEDIUM	5,920	6,220	6,520	6,820	7,120	7,420	7,720	8,320	8,920
POOR	11,190	11,690	12,190	12,690	13,190	13,690	14,190	15,290	16,390

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+310	+290	+570
Approach Speed	Per Add'l 5 knots	+320	+420	+360	+530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,120	+1,580	+1,540	+3,920
Reverse Thrust	One Reverser Operative	-80	-180	-390	-1,610
	Two Reversers Operative	-160	-360	-780	-3,220
Autoland	Automatic Landing	+450	+450	+450	+430

NAV DUAL IR FAULT

NAV IR 1+3 FAULT

NAV IR 2+3 FAULT

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,620	3,820	4,020	4,220	4,420	4,620	4,820	5,520	6,220
GOOD	4,480	4,780	5,080	5,380	5,680	5,980	6,280	7,080	7,880
MEDIUM	5,920	6,220	6,520	6,820	7,120	7,420	7,720	8,320	8,920
POOR	11,190	11,690	12,190	12,690	13,190	13,690	14,190	15,290	16,390

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+220	+310	+290	+570
Approach Speed	Per Add'l 5 knots	+320	+420	+360	+530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,120	+1,580	+1,540	+3,920
Reverse Thrust	One Reverser Operative	-80	-180	-390	-1,610
	Two Reversers Operative	-160	-360	-780	-3,220
Autoland	Automatic Landing	+450	+450	+450	+430

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

NAV IR 1+2+3 FAULT

FLAPS 3

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	6,880	7,080	7,280	7,480	7,680	7,880	8,080	8,780	9,480
GOOD	6,290	6,590	6,890	7,190	7,490	7,790	8,090	8,790	9,490
MEDIUM	6,570	6,870	7,170	7,470	7,770	8,070	8,370	9,070	9,770
POOR	11,190	11,690	12,190	12,690	13,190	13,690	14,190	15,290	16,390

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	300	300	320	570
Approach Speed	Per Add'l 5 knots	540	540	550	530
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	1,440	1,460	1,620	3,920
Reverse Thrust	One Reverser Operative	-10	-10	-110	-1,560
	Two Reversers Operative	-20	-20	-220	-3,120
Autoland	Automatic Landing	+450	+450	+450	+430

WING A. ICE SYS FAULT (WITH ICE ACCRETION)

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	3,550	3,750	3,950	4,150	4,350	4,550	4,750	5,450	6,150
GOOD	4,300	4,600	4,900	5,200	5,500	5,800	6,100	6,900	7,700
MEDIUM	5,680	5,980	6,280	6,580	6,880	7,180	7,480	8,080	8,680
POOR	10,470	10,970	11,470	11,970	12,470	12,970	13,470	14,470	15,470

CORRECTIONS		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+300	+280	+540
Approach Speed	Per Add'l 5 knots	+310	+390	+350	+490
Wind	Per 10 kt. headwind	-0	-0	-0	-0
	Per 10 kt. tailwind	+1,100	+1,520	+1,500	+3,800
Reverse Thrust	One Reverser Operative	-80	-170	-360	-1,450
	Two Reversers Operative	-160	-340	-720	-2,900
Autoland	Automatic Landing	+340	+380	+370	+420

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES

FEET

NOTE: Data below assumes MAX PEDAL Braking and does NOT include 15% safety margin. Refer to Page 4-9 for all assumed conditions.

ZERO FLAP / ZERO SLAT APPROACH AND LANDING

BRAKING ACTION	LANDING WEIGHT – 1,000 POUNDS								
	120	130	140	150	160	170	180	190	200
DRY	7,170	7,270	7,370	7,470	7,570	7,670	7,770	8,870	9,970
GOOD	9,060	9,160	9,260	9,360	9,460	9,560	9,660	10,760	11,860
MEDIUM	10,470	10,570	10,670	10,770	10,870	10,970	11,070	11,770	12,470
POOR	> 18,000	> 18,000	> 18,000	> 18,000	> 18,000	> 18,000	> 18,000	> 18,000	> 18,000

CORRECTIONS		DRY	Good	MEDIUM	POOR
Altitude	Per 1,000 feet	+290	+520	+400	N/A
Approach Speed	Per Add'l 5 knots	N/A	N/A	N/A	N/A
Wind	Per 10 kt. headwind	-0	-0	-0	N/A
	Per 10 kt. tailwind	+1,180	+2,080	+1,800	N/A
Reverse Thrust	One Reverser Operative	-180	-470	-760	N/A
	Two Reversers Operative	-360	-940	-1,520	N/A
Autoland	Automatic Landing	+400	+440	+450	N/A

EMERGENCY LANDING DISTANCES

FEET

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

FLAPS FULL

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

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	DRY (6)			GOOD (5)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	9,000	6,500	6,300	9,000	7,100	7,100
190,000	8,900	6,300	6,100	8,900	7,000	7,000
185,000	8,700	6,300	5,900	8,700	6,800	6,800
180,000	8,500	6,100	5,800	8,500	6,600	6,600
175,000	8,300	6,000	5,700	8,300	6,500	6,500
171,518	7,500	5,300	4,200	7,500	5,400	5,200
170,000	7,500	5,300	4,200	7,500	5,400	5,200
165,000	7,300	5,100	4,100	7,300	5,200	5,000
160,000	7,100	5,000	4,000	7,100	5,100	5,000
155,000	7,000	5,000	3,900	7,000	5,000	4,800
150,000	6,800	4,800	3,800	6,800	4,900	4,600
145,000	6,500	4,700	3,700	6,500	4,700	4,500
140,000	6,300	4,600	3,700	6,300	4,600	4,300
135,000	6,200	4,400	3,600	6,200	4,400	4,300
130,000	6,000	4,300	3,500	6,000	4,300	4,100
125,000	5,800	4,200	3,400	5,800	4,300	4,000
120,000	5,700	4,100	3,300	5,700	4,100	3,800
115,000	5,500	4,000	3,200	5,500	4,000	3,700

BASIS: Zero wind • Standard approach procedure • Both Reversers Operating • Approach speed V_{APP} ($V_{LS}+5$)

Data is advisory and includes a standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-300	-400	-500	-500	-500
2,000	0	0	0	0	0	0
4,000	500	300	400	500	500	500
6,000	1,000	700	700	1,000	1,000	1,000
8,000	1,600	1,000	1,100	1,600	1,600	1,500

CORRECTIONS	DRY (6)			GOOD (5)		
PER 5 ADD'L APP SPD	450	300	300	450	400	400
PER 1 KT TAILWIND	150	100	100	150	150	150
PER 10°C ABOVE ISA	250	150	150	250	250	250
PER 1% DOWN SLOPE	100	50	100	100	200	200
1 REV INOPERATIVE	0	0	100	0	100	100
2 REV INOPERATIVE	100	0	100	100	200	300
Autoland	900			1,000		

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 FULL

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	MEDIUM (3)			POOR (1)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	9,100	8,300	8,300	11,000	10,900	10,900
190,000	9,000	8,100	8,100	10,700	10,600	10,600
185,000	8,800	7,900	7,900	10,400	10,300	10,300
180,000	8,600	7,700	7,700	10,200	10,200	10,200
175,000	8,400	7,600	7,600	10,000	9,900	9,900
171,518	7,600	6,400	6,300	9,100	8,900	8,900
170,000	7,600	6,300	6,300	9,000	8,800	8,800
165,000	7,400	6,300	6,200	8,900	8,600	8,500
160,000	7,200	6,100	6,000	8,600	8,300	8,300
155,000	7,000	5,900	5,800	8,400	8,100	8,100
150,000	6,800	5,700	5,700	8,200	7,900	7,800
145,000	6,600	5,700	5,600	7,900	7,700	7,700
140,000	6,400	5,500	5,400	7,700	7,500	7,400
135,000	6,300	5,300	5,200	7,500	7,200	7,200
130,000	6,100	5,100	5,000	7,200	7,000	7,000
125,000	5,900	5,000	5,000	7,000	6,800	6,700
120,000	5,700	4,900	4,800	6,800	6,500	6,500
115,000	5,600	4,700	4,600	6,500	6,300	6,300

BASIS: Zero wind • Standard approach procedure • Both Reversers Operating • Approach speed V_{APP} ($V_{LS}+5$)

Data is advisory and includes a standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-500	-500	-500	-1,000	-1,000	-1,000
2,000	0	0	0	0	0	0
4,000	500	500	500	1,000	1,000	1,000
6,000	1,100	1,000	1,000	2,000	2,000	2,000
8,000	1,600	1,500	1,400	2,900	2,900	2,900

CORRECTIONS	MEDIUM (3)			POOR (1)		
PER 5 ADD'L APP SPD	450	350	350	500	500	500
PER 1 KT TAILWIND	150	150	150	400	350	350
PER 10°C ABOVE ISA	250	250	250	500	500	500
PER 1% DOWN SLOPE	300	350	350	3,000	3,000	3,000
1 REV INOPERATIVE	200	400	300	1,200	1,200	1,000
2 REV INOPERATIVE	400	700	600	2,300	2,300	2,000
Autoland	1,000			1,100		

EMERGENCY LANDING DISTANCES

FEET

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

FLAPS 3

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

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	DRY (6)			GOOD (5)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	9,700	7,000	6,600	9,700	7,700	7,700
190,000	9,600	6,800	6,400	9,600	7,500	7,500
185,000	9,300	6,700	6,300	9,300	7,300	7,300
180,000	9,100	6,500	6,200	9,100	7,100	7,100
175,000	9,000	6,400	6,000	9,000	7,000	7,000
171,518	8,100	5,700	4,500	8,100	5,900	5,700
170,000	8,100	5,700	4,400	8,100	5,800	5,700
165,000	7,800	5,600	4,300	7,800	5,700	5,500
160,000	7,700	5,400	4,300	7,700	5,500	5,400
155,000	7,500	5,300	4,200	7,500	5,400	5,200
150,000	7,200	5,100	4,100	7,300	5,200	5,000
145,000	7,000	5,000	4,000	7,000	5,000	4,900
140,000	6,900	4,900	3,900	6,900	5,000	4,800
135,000	6,700	4,800	3,800	6,700	4,800	4,600
130,000	6,500	4,600	3,700	6,500	4,700	4,400
125,000	6,300	4,500	3,600	6,300	4,500	4,300
120,000	6,100	4,300	3,500	6,100	4,300	4,200
115,000	5,900	4,300	3,400	5,900	4,300	4,000

BASIS: Zero wind • Standard approach procedure • Both Reversers Operating • Approach speed V_{APP} ($V_{LS}+5$)

Data is advisory and includes a standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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	-600	-400	-400	-600	-600	-600
2,000	0	0	0	0	0	0
4,000	600	400	400	600	600	600
6,000	1,100	800	800	1,100	1,200	1,200
8,000	1,700	1,100	1,200	1,700	1,700	1,700

CORRECTIONS	DRY (6)			GOOD (5)		
PER 5 ADD'L APP SPD	500	350	300	500	400	400
PER 1 KT TAILWIND	150	100	100	150	150	150
PER 10°C ABOVE ISA	250	200	200	250	250	250
PER 1% DOWN SLOPE	100	50	100	100	250	200
1 REV INOPERATIVE	0	0	100	0	200	200
2 REV INOPERATIVE	100	0	200	100	300	300
Autoland	900			1,000		

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 3

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).					
	MEDIUM (3)			POOR (1)		
	Low AB	Med AB	Max Pedal	Low AB	Med AB	Max Pedal
195,000	9,800	8,900	8,900	11,800	11,700	11,700
190,000	9,700	8,700	8,700	11,600	11,500	11,500
185,000	9,500	8,400	8,400	11,300	11,200	11,200
180,000	9,200	8,300	8,300	11,000	11,000	11,000
175,000	9,000	8,100	8,100	10,800	10,700	10,700
171,518	8,200	7,000	6,900	9,900	9,700	9,600
170,000	8,200	6,900	6,800	9,800	9,600	9,500
165,000	7,900	6,800	6,600	9,600	9,300	9,300
160,000	7,700	6,600	6,400	9,300	9,000	9,000
155,000	7,600	6,400	6,300	9,000	8,800	8,800
150,000	7,400	6,300	6,200	8,800	8,500	8,500
145,000	7,100	6,100	6,000	8,600	8,300	8,300
140,000	7,000	5,900	5,800	8,300	8,100	8,000
135,000	6,800	5,700	5,700	8,100	7,800	7,700
130,000	6,500	5,600	5,500	7,800	7,600	7,500
125,000	6,300	5,400	5,300	7,600	7,300	7,200
120,000	6,200	5,200	5,100	7,300	7,000	7,000
115,000	5,900	5,000	5,000	7,000	6,800	6,800

BASIS: Zero wind • Standard approach procedure • Both Reversers Operating • Approach speed V_{APP} ($V_{LS}+5$)

Data is advisory and includes a standard air run from threshold to touchdown (approx. 1,200 ft to 2,000 ft depending on weight)

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)

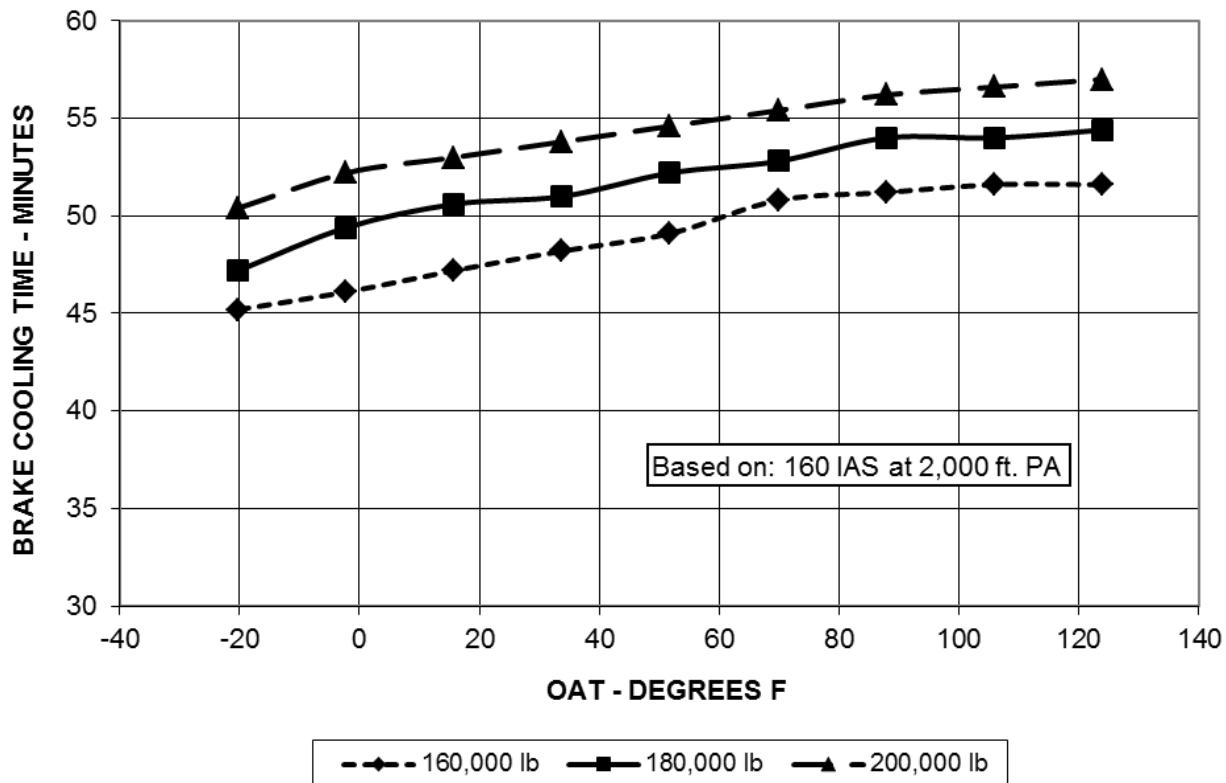
ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)			POOR (1)		
PER 5 ADD'L APP SPD	450	350	350	550	550	550
PER 1 KT TAILWIND	150	150	150	400	400	400
PER 10°C ABOVE ISA	300	250	250	550	550	550
PER 1% DOWN SLOPE	350	400	400	3,350	3,350	3,350
1 REV INOPERATIVE	200	400	300	1,300	1,300	1,200
2 REV INOPERATIVE	400	800	700	2,600	2,600	2,300
Autoland	1,000			1,100		

REQUIRED BRAKE COOLING TIME

REJECTED TAKEOFF



NOTE: The maximum brake temperature for takeoff is 300°C but a maximum of 275°C is suggested to prevent BRAKES HOT condition after takeoff.

NOTE: Do NOT taxi if the temperature difference between two brakes on the same gear is greater than 150°C and the temperature of one brake is above 600°C. This may be indicative of a brake binding.

Use this chart for planning purposes to determine the brake cooling time required following a high speed, rejected takeoff. Cooling times above based upon maximum reverse thrust usage during the braking phase. Timing begins when the brakes are released after the chocks have been installed. The MDM contains the procedures/guidance for inoperative Brake Temperature indications.

Instructions: Enter chart from bottom using OAT – DEGREES F. Move vertically until crossing the weight closest to your weight at the time of the rejected takeoff. Move horizontally to the left scale to determine the anticipated cooling time.

REQUIRED BRAKE COOLING TIME

NORMAL QUICK TURNAROUND

(minutes)

Gross Weight	Airport Altitude FT	OAT (°C)					
		0	10	20	30	40	50
172,000	0	41	42	43	44	45	45
	2,000	42	43	44	45	46	46
	4,000	44	45	46	47	47	
	6,000	46	46	47	48	48	
	8,000	47	47	48	49		
160,000	0	38	38	40	41	41	42
	2,000	39	39	41	42	42	42
	4,000	40	41	42	43	43	
	6,000	42	43	43	44	45	
	8,000	43	44	45	45		
150,000	0	34	35	36	38	38	39
	2,000	36	37	38	39	39	40
	4,000	37	38	39	40	40	
	6,000	38	39	40	41	41	
	8,000	40	40	41	42		
140,000	0	31	32	34	34	35	36
	2,000	32	33	35	36	36	37
	4,000	34	35	36	37	37	
	6,000	35	36	37	38	38	
	8,000	37	37	38	39		
130,000	0	27	29	30	31	31	32
	2,000	28	30	31	32	33	33
	4,000	30	31	33	33	34	
	6,000	31	32	34	34	35	
	8,000	33	34	35	35		
120,000	0	23	24	26	27	27	28
	2,000	24	26	27	28	28	29
	4,000	25	27	28	29	29	
	6,000	27	29	29	30	30	
	8,000	28	30	30	31		
110,000	0	20	21	23	25	25	25
	2,000	22	23	24	26	26	26
	4,000	23	24	25	26	26	
	6,000	24	26	26	27	27	
	8,000	25	27	27	28		

Use this chart to determine the brake cooling time required following a norm landing when MEL 32-60-03H ECAM Brake Temp Indication is inoperative.

Enter chart with landing weight and destination airport elevation and OAT. Read the required cooling time in minutes prior to subsequent takeoff.

This table assumes the use of thrust reversers during landing, zero wind, zero runway slope, Max Pedal braking, and CONF FULL landing at VLS + 5 touchdown speed.

OPERATION WITHOUT AIRSPEED INDICATION

Use the following pitch 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.***

PITCH / THRUST FOR INITIAL LEVEL OFF					
SLATS / FLAPS EXTENDED					
CONF	PITCH	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Thrust (% N1) / Speed (knots)			
3	5°	72% / 165	68% / 155	64% / 145	60% / 135
2	4.5°	70% / 185	66% / 175	62% / 165	58% / 155
1+F	4.5°	68% / 200	64% / 190	62% / 175	58% / 165
1	7.5°	68% / 215	64% / 205	60% / 190	56% / 175
CONF: CLEAN					
PITCH	FL	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Thrust (% N1) / Speed (knots)			
4° at or below FL250	100	70% / 260	66% / 250	62% / 230	60% / 215
	200	78% / 260	74% / 245	70% / 230	66% / 215
3° Above FL250	300	86% / 275	82% / 260	78% / 245	76% / 230
	350		88% / 255	84% / 240	80% / 225
	400				86% / 220

CLIMB					
THRUST	FL	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Pitch (°) / Speed (knots)			
CLB	50	9° / 255	11° / 240	12° / 220	14° / 205
	100	8° / 255	9° / 240	12° / 225	12° / 205
	200	6° / 250	7° / 240	8° / 225	9° / 205
	300		5° / 235	6° / 225	6° / 205
	400				4° / 200

OPERATION WITHOUT AIRSPEED INDICATION

Use the following pitch 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.***

CRUISE					
THRUST: Adjust N1 to maintain level flight				CONF: CLEAN	
PITCH	FL	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Thrust (% N1) / Speed (knots)			
4° at or below FL250	100	70% / 260	66% / 250	62% / 230	60% / 215
	200	78% / 260	74% / 245	70% / 230	66% / 215
3° Above FL250	300	86% / 275	82% / 260	78% / 245	76% / 230
	350		88% / 255	84% / 240	80% / 225
	400				86% / 220

DESCENT				
THRUST: IDLE			CONF: CLEAN	
PITCH	GROSS WEIGHT – LBS			
	200,000	175,000	155,000	130,000
	Speed (knots)			
1°	260	250	230	215

INITIAL / INTERMEDIATE APPROACH					
LANDING GEAR UP					
CONF	PITCH	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Thrust (% N1) / Speed (knots)			
0	5°	66% / 245	62% / 230	58% / 215	54% / 200
1	7.5°	68% / 215	64% / 205	60% / 190	56% / 175
1+F	4.5°	68% / 200	64% / 190	62% / 175	58% / 165
2	4.3°	70% / 185	66% / 175	62% / 165	58% / 155
LANDING GEAR DOWN					
CONF	PITCH	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Thrust (% N1) / Speed (knots)			
3	5°	76% / 165	72% / 155	68% / 145	64% / 135

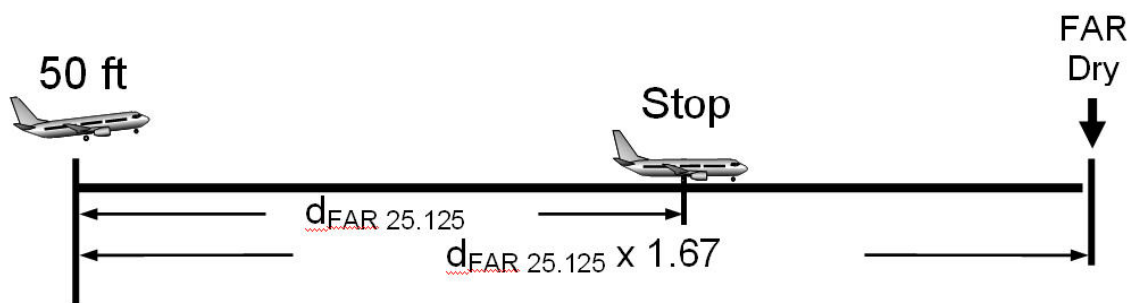
FINAL APPROACH					
GLIDESLOPE: 3°			GEAR: DOWN		
CONF	PITCH	GROSS WEIGHT – LBS			
		200,000	175,000	155,000	130,000
		Thrust (% N1)			
3	1°	60%	56%	52%	48%

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

DEFINITION

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



FAR Landing Distance Diagram

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

APPLICABILITY

The tables on the following pages provide landing distances and approach speeds to be used for dispatch with the given conditions and the associated MEL applied. For landing distances in the event of an in-flight system failure or abnormality not detected at or prior to dispatch, please refer to the "Abnormal Configuration Actual Landing Distances" page in this section of the ODM on Page 4-8 (distance multiplier table) or Pages 4-9 – 4-24 (lookup tables).

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
- MAX PEDAL braking
- Includes distance from 50 feet above threshold to stop

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

FLAPS FULL

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

ONE BRAKE INOP - DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
200,000	9,150	9,390	9,640	9,880	10,150	10,450	10,750	11,060	11,390	11,730	11,800
190,000	8,480	8,700	8,930	9,170	9,410	9,670	9,960	10,250	10,550	10,860	10,930
180,000	7,020	7,200	7,380	7,580	7,770	7,980	8,200	8,440	8,690	8,940	9,000
170,000	6,470	6,630	6,800	6,980	7,170	7,360	7,570	7,780	8,000	8,230	8,280
160,000	6,120	6,270	6,430	6,590	6,770	6,950	7,150	7,350	7,560	7,770	7,820
150,000	5,820	5,950	6,090	6,240	6,400	6,570	6,740	6,930	7,130	7,330	7,370
140,000	5,510	5,640	5,770	5,900	6,040	6,190	6,360	6,530	6,700	6,880	6,920
130,000	5,240	5,350	5,460	5,580	5,710	5,850	6,000	6,140	6,300	6,470	6,500
120,000	4,980	5,080	5,180	5,290	5,400	5,530	5,660	5,800	5,940	6,080	6,110
110,000	4,820	4,910	5,010	5,110	5,210	5,330	5,450	5,570	5,700	5,840	5,870

CORRECTIONS:

Headwind per kt	- 30 ft
Tailwind per kt	+ 180 ft

ONE BRAKE INOP - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
200,000	10,520	10,800	11,080	11,360	11,680	12,020	12,360	12,720	13,100	13,490	13,570
190,000	9,760	10,010	10,270	10,540	10,830	11,120	11,450	11,790	12,130	12,490	12,570
180,000	8,070	8,270	8,490	8,710	8,940	9,180	9,430	9,710	9,990	10,280	10,340
170,000	7,440	7,630	7,820	8,030	8,250	8,470	8,700	8,940	9,200	9,470	9,520
160,000	7,040	7,210	7,400	7,580	7,780	8,000	8,220	8,450	8,690	8,940	8,990
150,000	6,690	6,840	7,000	7,170	7,360	7,550	7,760	7,970	8,200	8,430	8,480
140,000	6,340	6,480	6,630	6,790	6,950	7,120	7,310	7,510	7,700	7,910	7,960
130,000	6,020	6,150	6,280	6,420	6,570	6,730	6,900	7,070	7,250	7,440	7,480
120,000	5,720	5,840	5,960	6,080	6,220	6,360	6,510	6,670	6,830	6,990	7,030
110,000	5,540	5,650	5,760	5,880	6,000	6,120	6,260	6,410	6,560	6,710	6,750

CORRECTIONS:

Headwind per kt	- 30 ft
Tailwind per kt	+ 200 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

FLAPS FULL

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

ALL SPOILERS INOP - DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
200,000	8,720	8,980	9,230	9,510	9,820	10,150	10,500	10,870	11,240	11,620	11,700
190,000	8,070	8,310	8,560	8,820	9,080	9,380	9,710	10,050	10,400	10,760	10,830
180,000	6,920	7,120	7,340	7,560	7,790	8,040	8,310	8,600	8,900	9,230	9,290
170,000	6,440	6,620	6,820	7,010	7,220	7,450	7,700	7,960	8,230	8,530	8,590
160,000	6,100	6,270	6,430	6,610	6,810	7,020	7,230	7,460	7,710	7,970	8,030
150,000	5,760	5,910	6,070	6,240	6,410	6,590	6,800	7,010	7,220	7,450	7,500
140,000	5,440	5,580	5,710	5,860	6,020	6,190	6,370	6,560	6,760	6,960	7,010
130,000	5,130	5,250	5,390	5,520	5,660	5,800	5,970	6,140	6,320	6,500	6,540
120,000	4,850	4,950	5,070	5,190	5,310	5,460	5,600	5,740	5,900	6,070	6,100
110,000	4,700	4,800	4,900	5,010	5,130	5,260	5,390	5,530	5,670	5,820	5,850

CORRECTIONS:

Headwind per kt	- 30 ft
Tailwind per kt	+ 180 ft

ALL SPOILERS INOP - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
200,000	10,030	10,330	10,620	10,940	11,290	11,670	12,080	12,500	12,920	13,370	13,460
190,000	9,280	9,560	9,840	10,140	10,450	10,790	11,160	11,550	11,960	12,370	12,460
180,000	7,960	8,190	8,440	8,690	8,960	9,250	9,550	9,890	10,240	10,610	10,680
170,000	7,410	7,620	7,840	8,070	8,310	8,560	8,860	9,150	9,470	9,810	9,880
160,000	7,010	7,210	7,400	7,610	7,830	8,070	8,320	8,580	8,870	9,170	9,240
150,000	6,620	6,790	6,980	7,180	7,370	7,580	7,820	8,060	8,310	8,570	8,630
140,000	6,260	6,410	6,570	6,740	6,920	7,120	7,330	7,540	7,770	8,010	8,060
130,000	5,900	6,040	6,190	6,350	6,500	6,670	6,860	7,060	7,270	7,480	7,520
120,000	5,570	5,700	5,830	5,960	6,110	6,270	6,440	6,600	6,790	6,980	7,020
110,000	5,400	5,510	5,640	5,760	5,900	6,050	6,200	6,350	6,510	6,690	6,730

CORRECTIONS:

Headwind per kt	- 30 ft
Tailwind per kt	+ 210 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

FLAPS FULL

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

TWO PAIRS OF SPOILERS INOP - DRY RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
200,000	7,940	8,160	8,380	8,610	8,870	9,140	9,420	9,710	10,020	10,340	10,400
190,000	7,340	7,540	7,750	7,960	8,190	8,430	8,690	8,960	9,250	9,550	9,610
180,000	6,170	6,330	6,500	6,680	6,880	7,080	7,310	7,550	7,800	8,050	8,110
170,000	5,740	5,880	6,030	6,200	6,380	6,560	6,760	6,970	7,190	7,430	7,480
160,000	5,450	5,590	5,720	5,860	6,020	6,190	6,380	6,560	6,760	6,970	7,010
150,000	5,180	5,300	5,430	5,570	5,710	5,850	6,010	6,180	6,370	6,550	6,590
140,000	4,920	5,030	5,140	5,260	5,390	5,530	5,680	5,820	5,980	6,140	6,180
130,000	4,680	4,790	4,890	4,990	5,100	5,220	5,350	5,490	5,640	5,780	5,810
120,000	4,460	4,550	4,640	4,740	4,840	4,950	5,060	5,180	5,300	5,440	5,470
110,000	4,320	4,400	4,490	4,580	4,670	4,770	4,880	4,990	5,100	5,230	5,250

CORRECTIONS:

Headwind per kt	- 20 ft
Tailwind per kt	+ 160 ft

TWO PAIRS OF SPOILERS INOP - WET RUNWAY

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	9,200
200,000	9,130	9,390	9,640	9,900	10,200	10,510	10,830	11,170	11,520	11,890	11,960
190,000	8,440	8,670	8,910	9,150	9,410	9,690	10,000	10,310	10,640	10,990	11,060
180,000	7,100	7,280	7,470	7,690	7,910	8,150	8,410	8,690	8,970	9,260	9,320
170,000	6,600	6,760	6,940	7,130	7,340	7,550	7,780	8,010	8,270	8,540	8,600
160,000	6,270	6,430	6,580	6,740	6,920	7,120	7,340	7,550	7,770	8,010	8,070
150,000	5,950	6,090	6,240	6,400	6,560	6,730	6,910	7,110	7,320	7,530	7,580
140,000	5,660	5,790	5,920	6,050	6,200	6,360	6,530	6,700	6,870	7,070	7,110
130,000	5,390	5,500	5,620	5,740	5,870	6,010	6,160	6,320	6,490	6,650	6,680
120,000	5,120	5,230	5,340	5,450	5,570	5,690	5,820	5,960	6,100	6,260	6,290
110,000	4,970	5,060	5,160	5,270	5,370	5,490	5,610	5,730	5,870	6,010	6,040

CORRECTIONS:

Headwind per kt	- 30 ft
Tailwind per kt	+ 180 ft

MEL SUPPORT

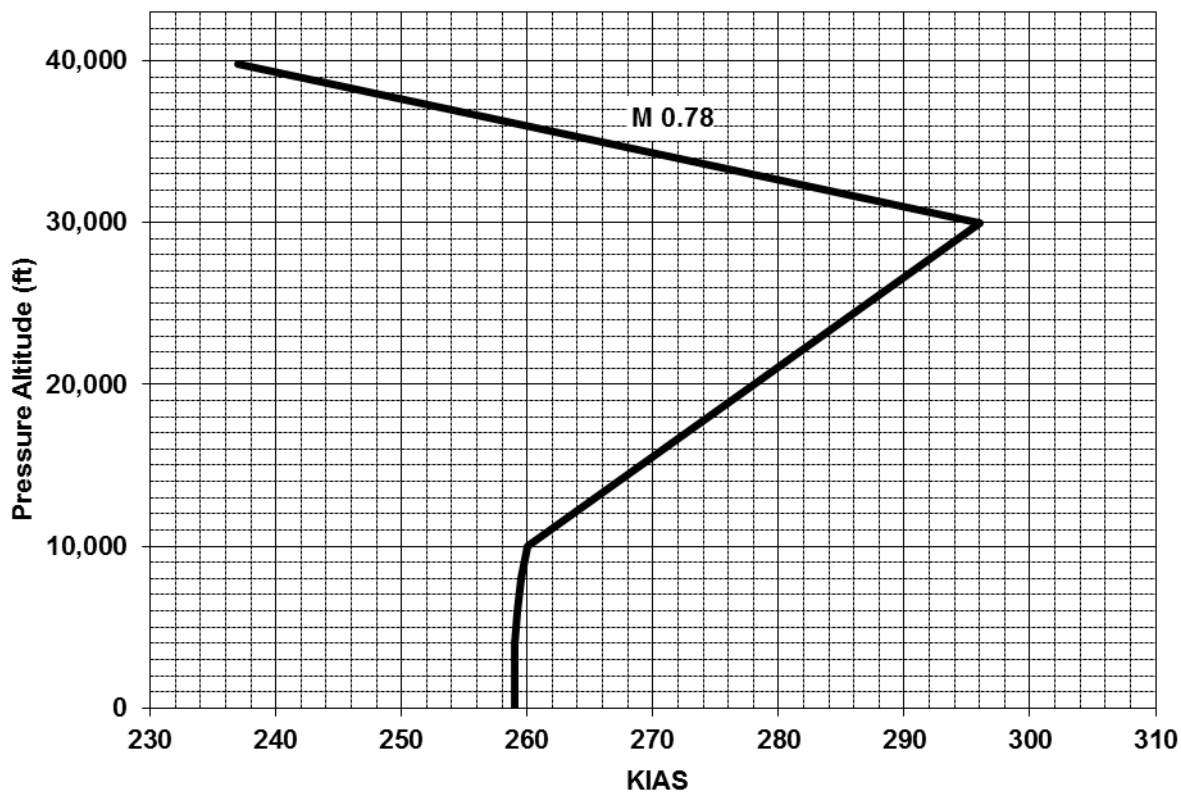
V_{MCG} – MINIMUM CONTROL SPEED, GROUND

Configuration	V_{MCG} – KIAS
1+F or 2	110
3	109

NOTES:

- V_{MCG} is defined as the minimum control speed on the *ground*. It is the speed where the airplane can maintain directional control after a critical engine failure using the primary aerodynamic controls only.
- V_{MCG} values based on sea level. Subtract 3 knots for every 2,000 feet above sea level.

V_A – MAXIMUM DESIGN MANEUVERING SPEED



NOTES:

- This limitation only applies in alternate or direct flight control laws. If alternate or direct law is active:
 - Full ailerons and rudder application should be confined to speeds below V_A .
 - Maneuvers involving angle of attack near stall should be confined to speeds below V_A .

End of Section

FERRY FLIGHT PLANNING AND OPERATION

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AUTHORIZATION AND FLIGHT PLANNING

(DISPATCHER INSTRUCTIONS)

Ferry operational data is available for the following configuration:

- Flight with Landing Gear Down

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) unfilled flight plan using Long Range Cruise (LRC) at the proposed cruise altitude.
2. Calculate the trip time and fuel load based on the values displayed 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 and climb out will be made using Maximum Climb thrust 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.

FLIGHT WITH LANDING GEAR DOWN

GENERAL

This section applies to dispatch with landing gear down. However, the limitations and inflight performance also apply in case of an inflight landing gear retraction failure. Revenue flight is permitted with the landing gear down and the gear doors closed in the conditions stated below.

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. VMO / MMO = 235 kt. IAS / M 0.60
2. Ditching with landing gear down has not been demonstrated.
3. Flight in forecasted icing conditions is not permitted.
4. Managed vertical modes CLB and DES must not be used.
5. Managed speed (except in approach) must not be used.
6. The FMS fuel predictions must be disregarded. Other predictions should also be disregarded (altitude, speed, and time), except time predictions at waypoints when in cruise.
7. Extended Operations (ETOPS) is not allowed to be used during Flight with Gear Down.
8. ALTITUDE ALERT is not available.
9. The APU must run during the whole flight. APU GEN must be available.
10. Failures that would normally lead to ALTN law will, with the landing gear extended, degrade flight control laws down to DIRECT law.

PROCEDURE (PREFLIGHT)

The L/G DOWN VMO/MMO switch located in the avionic bay on 188VU must be set to L/G DOWN position.

FLIGHT PLANNING (TAKEOFF)

RATOW & Takeoff climb limit weight:	Use GRD TPI in AWABS (Dispatchers)
Takeoff V Speeds:	Use GRD TPI in AWABS (Dispatchers)
Takeoff Thrust Settings:	Use TO only, use of AT (FLEX) settings NOT approved.
Takeoff Flap Settings:	Use GRD TPI in AWABS (Dispatchers)
Operation from Contaminated Runway:	Permitted, use GRD TPI (Dispatchers)

Note: Takeoff with tailwind is not recommended.

LANDING GEAR EXTENDED

FLIGHT PLANNING (ENROUTE)

-Use flight planning data in FPS if available. If no data is available, the following tables may be used as necessary.

MAXIMUM CRUISE ALTITUDE (FEET)

WEIGHT (LB)	MAX ALTITUDE (1.0 G)	MAX ALTITUDE (1.3 G)
200,000	16,700	
190,000	17,700	
180,000	18,800	
170,000	19,700	2,700
160,000	21,100	7,800
150,000	22,100	13,900
140,000	22,900	21,300
130,000	23,500	23,500
120,000	24,100	24,100
110,000	24,500	24,500

BASIS:

- Landing Gear Extended, Doors Closed
- CG Position = 27.0%
- Anti-Ice OFF, Packs NORM
- Max Cruise thrust limits

LANDING GEAR EXTENDED (cont'd)

FLIGHT PLANNING (ENROUTE) (cont.)

CLIMB

-Climb at 230 kt / M 0.50 with all engines at maximum climb thrust. The tables below give the time, distance, and fuel consumption according to takeoff weight.

CLIMB - 230KT / 0.50M - ALL ENGINES - GEAR DOWN														
MAX CLIMB THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG = 27.0%				FROM BRAKE RELEASE TIME (MIN) FUEL (LB) DISTANCE (NM)							
FL	WEIGHT AT BRAKE RELEASE (1,000 LB)													
	110		120		130		140		150		160		170	
250	14 62	2,866												
240	13 58	2,739												
220	11 50	2,486	13 57	2,802										
200	10 43	2,221	11 48	2,493	12 55	2,800								
180	8 35	1,927	9 39	2,153	10 44	2,403	12 49	2,683						
160	7 28	1,670	8 31	1,859	9 35	2,067	10 39	2,295						
140	6 23	1,445	6 25	1,604	7 28	1,777	8 31	1,966						
120	5 18	1,241	5 20	1,374	6 23	1,518	7 25	1,675	7 28	1,845				
100	4 14	1,052	4 16	1,162	5 18	1,281	5 20	1,409	6 22	1,547				
50	2 7	626	2 7	687	3 8	752	3 9	821	3 10	895	3 11	976		
10	1 2	316	1 2	342	1 2	371	1 2	401	1 3	433	1 3	467	2 3	502

LANDING GEAR EXTENDED (cont'd)

FLIGHT PLANNING (ENROUTE) (cont.)

CRUISE

-The recommended cruise speed is 230 kt / M 0.50.

-The ceiling with an engine inoperative may be a limiting factor, and the choice of the route should reflect this concern.

CRUISE - 230KT / 0.50M - ALL ENGINES - GEAR DOWN													
MAX CRUISE THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 27.0%				%N1 LB/H/ENG NM/1,000 LB				MACH IAS (KT) TAS (KT)	
WEIGHT (1,000 LB)	FL100		FL150		FL200		FL210		FL220		FL230		FL240
110	76.6	0.417	81.6	0.458	85.3	0.500	85.2	0.500	85.1	0.500	85.0	0.500	85.0
	4,168	230	4,182	230	4,154	228	4,009	223	3,871	219	3,741	214	3,618
	31.9	266	34.3	287	37	307	38.2	306	39.4	305	40.6	303	41.8
115	76.9	0.417	81.8	0.458	85.5	0.500	85.4	0.500	85.4	0.500	85.3	0.500	
	4,198	230	4,213	230	4,191	228	4,048	223	3,913	219	3,786	214	
	31.7	266	34	287	36.6	307	37.8	306	38.9	305	40.1	303	
120	77.1	0.417	82.0	0.458	85.7	0.500	85.7	0.500	85.6	0.500			
	4,231	230	4,247	230	4,231	228	4,091	223	3,958	219			
	31.4	266	33.8	287	36.3	307	37.4	306	38.5	305			
125	77.4	0.417	82.3	0.458	86.0	0.500	85.9	0.500					
	4,267	230	4,284	230	4,274	228	4,136	223					
	31.2	266	33.5	287	35.9	307	37.0	306					
130	77.7	0.417	82.5	0.458	86.2	0.500							
	4,304	230	4,326	230	4,319	228							
	30.9	266	33.1	287	35.6	307							
135	78.0	0.417	82.8	0.458									
	4,344	230	4,370	230									
	30.6	266	32.8	287									
140	78.4	0.417	83.0	0.458									
	4,386	230	4,416	230									
	30.3	266	32.5	287									
145	78.7	0.417											
	4,428	230											
	30.0	266											
150	79.0	0.417											
	4,475	230											
	29.7	266											

LANDING GEAR EXTENDED (cont'd)

FLIGHT PLANNING (ENROUTE) (cont.)

DESCENT

-The recommended descent speed is 230 kt / M 0.55.

DESCENT - 230KT / 0.55M - ALL ENGINES - GEAR DOWN					
IDLE THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG = 27.0%		
MAXIMUM CABIN RATE OF DESCENT 350 FT/MIN					
FL	TIME (MIN)	FUEL (LB)	DIST. (NM)	%N1	IAS (KT)
300	15.8	810	68	85.8	203
290	14.7	694	62	85.9	208
280	13.6	569	56	86.0	213
270	12.4	435	49	86.1	217
260	12.1	429	48	IDLE	222
250	11.9	425	46	IDLE	227
240	11.6	421	45	IDLE	230
220	11.1	411	42	IDLE	230
200	10.5	399	39	IDLE	230
180	9.8	385	36	IDLE	230
160	9.2	368	32	IDLE	230
140	8.5	349	29	IDLE	230
120	7.8	330	26	IDLE	230
100	7.1	313	23	IDLE	230
50	5.4	280	16	IDLE	230
10	4.0	250	10	IDLE	230

LANDING GEAR EXTENDED (cont'd)

FLIGHT PLANNING (ENROUTE) (cont.)

HOLDING

-The chart below represents holding parameters with slats out, this configuration being the least penalizing for holding.

RACE TRACK HOLDING PATTERN - S SPEED - ALL ENGINES - GEAR DOWN									
MAX CRUISE THRUST LIMITS CONFIGURATION 1 NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG = 27.0%				%N1 FF (LB/H/ENG)		
WEIGHT (1,000 LB)	FL 15	FL 50	FL100	FL120	FL140	FL150	FL160	FL180	FL200
110	59.0 2,986	61.5 2,933	65.5 2,894	67.4 2,870	69.0 2,856	69.9 2,850	70.8 2,845	72.9 2,835	75.1 2,826
115	60.3 3,110	62.6 3,063	66.8 3,018	68.6 2,997	70.3 2,986	71.3 2,980	72.2 2,975	74.4 2,966	76.5 2,962
120	61.3 3,237	63.8 3,194	68.2 3,143	69.8 3,129	71.6 3,118	72.6 3,113	73.7 3,108	75.9 3,100	77.8 3,101
125	62.3 3,364	64.9 3,324	69.3 3,272	71.0 3,260	72.9 3,249	74.0 3,245	75.1 3,240	77.1 3,237	79.1 3,239
130	63.3 3,492	66.0 3,453	70.4 3,403	72.2 3,392	74.2 3,382	75.3 3,378	76.4 3,375	78.4 3,376	80.4 3,381
135	64.3 3,620	67.2 3,582	71.5 3,535	73.4 3,525	75.5 3,516	76.6 3,513	77.6 3,513	79.6 3,515	81.4 3,527
140	65.3 3,749	68.3 3,708	72.7 3,669	74.6 3,659	76.8 3,651	77.8 3,651	78.7 3,653	80.8 3,658	82.4 3,672
145	66.3 3,879	69.5 3,835	73.8 3,803	75.9 3,794	78.0 3,791	78.9 3,793	79.9 3,795	81.8 3,807	83.4 3,819
150	67.4 4,009	70.4 3,967	74.9 3,939	77.1 3,930	79.0 3,932	80.0 3,935	81.0 3,937	82.7 3,953	84.4 3,969
155	68.4 4,139	71.4 4,101	76.1 4,075	78.2 4,070	80.1 4,075	81.1 4,078	82.0 4,086	83.6 4,100	85.3 4,126
160	69.4 4,266	72.3 4,235	77.2 4,212	79.2 4,212	81.1 4,218	82.1 4,225	82.9 4,234	84.5 4,249	86.1 4,283
165	70.4 4,395	73.3 4,371	78.3 4,351	80.2 4,356	82.1 4,365	82.9 4,375	83.7 4,382	85.4 4,403	87.0 4,443
170	71.2 4,528	74.2 4,506	79.2 4,492	81.1 4,499	83.0 4,515	83.8 4,522	84.6 4,529	86.2 4,560	87.9 4,612

LANDING GEAR EXTENDED (cont'd)

FLIGHT PLANNING (ENROUTE) (cont.)

ENGINE FAILURE

GROSS DRIFTDOWN FLIGHT PROFILE - GEAR DOWN					
MAX CONTINUOUS THRUST LIMITS HIGH AIR CONDITIONING ANTI-ICING OFF			20,000 FT INITIAL ALTITUDE CG = 27.0%		
INITIAL WEIGHT (1,000 LB)	LEVEL OFF WEIGHT (1,000 LB)	OPTIMUM DRIFTDOWN SPEED (KIAS)	GROSS LEVEL OFF ALTITUDE (FEET)		
			ISA + 10°C AND BELOW	ISA + 15°C	ISA + 20°C
160	154.1	206	11,400	10,200	8,600
155	149.6	203	12,500	11,400	9,900
150	145.2	200	13,600	12,600	11,200
145	140.5	197	14,700	13,700	12,500
140	136.1	194	15,700	14,800	13,700
135	131.6	191	16,500	15,800	14,800
130	126.9	187	17,400	16,700	15,900
125	122.2	184	18,200	17,500	16,700
120	118.3	181	19,100	18,500	17,600
115	114.4	178	19,900	19,400	18,600
110	108.7	174	20,000	20,000	19,500

FLIGHT PLANNING (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 27,000 lbs. (Dispatchers)

End of Section