
B-767-300ER PW Operational Data Manual (ODM)**Table of Contents**

Cover Page

Revision Highlights

List of Effective Pages.....i

Quick Reference

Quick Reference (Ships 1401 – 1404)

Flight Planning.....1-1

Takeoff.....2-1

Approach / Landing.....3-1

Abnormal.....4-1

Ferry.....5-1

ETOPS.....6-1

THIS PAGE INTENTIONALLY BLANK



B-767-300ER PW Operational Data Manual

Revision Number: 70
Revision Date: September 23, 2016

Issued by
Performance Engineering - Dept 088 ATG
© 2016: Delta Air Lines, Inc.

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.

MANUAL RIGHTS

This Operational Data Manual has been prepared for use by properly trained Flight Operations and Operations Control personnel while operating or dispatching aircraft under the auspices of Delta Air Lines, Inc.

Neither this manual or any portion thereof may be reproduced, distributed, or used by any firm or person without the prior written consent of the Vice President – Operations Reliability and Control.



Revision Notification

Publication: B-767-300ER PW Operational Data Manual

Date 23 Sep 16

Revision Number: 70

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

**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 #70

ODM REVISION LOG		TAKEOFF		ABNORMAL	
Page	Date	Page	Date	Page	Date
Revision Log	No Date	2-1	19 Jul 12	4-19	19 Jul 12
TOC / COVER PAGE		2-2	19 Jul 12	4-20	19 Jul 12
Page	Date	2-3	BLANK	4-21	19 Jul 12
Table of Contents	22 Apr 16	2-4	15 Jul 14	4-22	19 Jul 12
Cover Page	23 Sep 16	2-5	15 Jul 14	4-23	19 Jul 12
INTRODUCTION		2-6	15 Jul 14	4-24	30 Dec 14
Page	Date	2-7	15 Jul 14	4-25	30 Dec 14
i	29 Mar 12	2-8	15 Jul 14	4-26	30 Dec 14
LIST OF EFFECTIVE PAGES		APPROACH/LANDING		4-27	30 Dec 14
Page	Date	Page	Date	4-28	30 Dec 14
i	23 Sep 16	3-1	25 Mar 14	4-29	30 Dec 14
ii	15 Jul 16	3-2	BLANK	4-30	30 Dec 14
QUICK REFERENCE		3-3	28 Jan 14	4-31	30 Dec 14
Page	Date	3-4	19 Jul 12	4-32	30 Dec 14
B-767-300ER(PW)		3-5	19 Jul 12	4-33	BLANK
Operational		3-6	03 Dec 13	4-34	16 Jun 15
Land Dist	23 Sep 16	3-7	03 Dec 13	4-35	16 Jun 15
B-767-300(PW)		3-8	BLANK	4-36	16 Jun 15
(Ships 1401-1404)		3-9	25 Mar 14	4-37	16 Jun 15
Operational		3-10	16 Jun 15	4-38	30 Dec 14
Land Dist	23 Sep 16	3-11	16 Jun 15	4-39	30 Dec 14
FLIGHT PLANNING		3-12	16 Jun 15	4-40	30 Dec 14
Page	Date	3-13	16 Jun 15	4-41	30 Dec 14
1-1	19 Jul 12	3-14	BLANK	4-42	30 Dec 14
1-2	19 Jul 12	3-15	(Green) 19 Jul 12	4-43	30 Dec 14
1-3	19 Jul 12	3-16	(Green) 03 Dec 13	4-44	30 Dec 14
1-4	19 Jul 12	3-17	(Green) 03 Dec 13	4-45	30 Dec 14
1-5	24 Feb 15	3-18	(Green) BLANK	4-46	30 Dec 14
1-6	19 Jul 12	3-19	(Green) 25 Mar 14	4-47	30 Dec 14
1-7	19 Jul 12	3-20	(Green) 16 Jun 15	4-48	30 Dec 14
1-8	19 Jul 12	3-21	(Green) 16 Jun 15	4-49	30 Dec 14
1-9	19 Jul 12	3-22	(Green) 16 Jun 15	4-50	30 Dec 14
1-10	19 Jul 12	3-23	(Green) 16 Jun 15	4-51	30 Dec 14
1-11	19 Jul 12	ABNORMAL		4-52	30 Dec 14
1-12	19 Jul 12	Page	Date	4-53	30 Dec 14
1-13	19 Jul 12	4-1	16 Jun 15	4-54	30 Dec 14
1-14	19 Jul 12	4-2	30 Dec 14	4-55	30 Dec 14
		4-3	30 Dec 14	4-56	30 Dec 14
		4-4	13 Aug 13	4-57	30 Dec 14
		4-5	19 Jul 12	4-58	30 Dec 14
		4-6	19 Jul 12	4-59	30 Dec 14
		4-7	19 Jul 12	4-60	30 Dec 14
		4-8	19 Jul 12	4-61	30 Dec 14
		4-9	BLANK	4-62	30 Dec 14
		4-10	19 Jul 12	4-63	01 Jul 16
		4-11	30 Dec 14	4-64	15 Jul 16
		4-12	19 Jul 12	4-65	BLANK
		4-13	19 Jul 12	4-66	15 Jul 16
		4-14	19 Jul 12	4-67	15 Jul 16
		4-15	19 Jul 12	4-68	15 Jul 16
		4-16	19 Jul 12	4-69	15 Jul 16
		4-17	19 Jul 12	4-70	15 Jul 16
		4-18	19 Jul 12	4-71	15 Jul 16

This list is effective with ODM Revision #70

ABNORMAL

(Cont'd)

Page	Date
4-72	15 Jul 16
4-73	15 Jul 16
4-74	15 Jul 16
4-75	15 Jul 16
4-76	15 Jul 16
4-77	15 Jul 16
4-76	15 Jul 16

FERRY

Page	Date
5-1	19 Jul 12
5-2	19 Jul 12
5-3	19 Jul 12
5-4	19 Jul 12
5-5	19 Jul 12
5-6	19 Jul 12
5-7	19 Jul 12
5-8	19 Jul 12
5-9	19 Jul 12

ETOPS

Page	Date
6-1	23 Apr 13
6-2	24 Feb 15
6-3	23 Apr 13
6-4	23 Apr 13

END

767-300ER PW 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.

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

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

767-300ER PW QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	12,200	11,100	9,800	8,600	8,300	5,500	9,800	8,600	8,300	7,000
400,000	12,000	10,900	9,700	8,500	8,200	5,300	9,700	8,500	8,200	6,900
390,000	11,700	10,700	9,500	8,300	8,000	5,200	9,500	8,300	8,000	6,800
380,000	11,500	10,400	9,300	8,200	7,900	5,100	9,300	8,200	7,900	6,700
370,000	11,200	10,200	9,100	8,000	7,700	5,000	9,100	8,000	7,700	6,500
360,000	11,000	10,000	8,900	7,800	7,600	4,800	8,900	7,800	7,600	6,400
350,000	10,700	9,800	8,700	7,700	7,400	4,700	8,700	7,700	7,400	6,300
340,000	10,500	9,600	8,600	7,500	7,300	4,600	8,600	7,500	7,300	6,200
330,000	10,200	9,300	8,400	7,400	7,100	4,500	8,400	7,400	7,100	6,000
320,000	10,000	9,100	8,200	7,200	7,000	4,400	8,200	7,200	7,000	5,900
310,000	9,700	8,900	8,000	7,000	6,800	4,300	8,000	7,000	6,800	5,800
300,000	9,500	8,700	7,800	6,900	6,700	4,300	7,800	6,900	6,700	5,700
290,000	9,200	8,500	7,600	6,700	6,500	4,200	7,600	6,700	6,500	5,600
280,000	9,000	8,200	7,500	6,500	6,400	4,100	7,500	6,500	6,400	5,500
270,000	8,700	8,000	7,300	6,400	6,200	4,000	7,300	6,400	6,200	5,400
260,000	8,400	7,800	7,100	6,200	6,100	3,900	7,100	6,200	6,100	5,200

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	0	-50	-50	-50	0
PER 1 KT TAILWIND	150	150	100	100	100	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	400	450	350	350	150	450	350	350	200
PER 10°C ABOVE ISA	300	250	200	200	200	100	200	200	200	150
PER 10°C BELOW ISA	-250	-250	-200	-200	-200	-100	-200	-200	-200	-150
PER 1% UP SLOPE	-250	-150	0	0	0	-50	0	0	0	-150
PER 1% DOWN SLOPE	200	50	0	0	0	50	0	0	0	150
1 REVERSER INOP	500	100	0	0	0	100	0	0	0	300
2 REVERSERS INOP	600	100	0	0	0	200	0	100	100	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300ER PW QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	10,500	9,700	9,700	9,700	12,700	12,700	12,700	12,700
400,000	10,300	9,500	9,500	9,500	12,400	12,400	12,400	12,400
390,000	10,100	9,400	9,300	9,300	12,100	12,100	12,100	12,100
380,000	9,800	9,200	9,100	9,100	11,800	11,800	11,800	11,800
370,000	9,600	9,000	8,900	8,900	11,600	11,500	11,500	11,500
360,000	9,400	8,800	8,700	8,700	11,300	11,300	11,300	11,300
350,000	9,200	8,600	8,500	8,500	11,000	11,000	11,000	11,000
340,000	9,000	8,400	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,800	8,200	8,100	8,100	10,500	10,500	10,500	10,500
320,000	8,600	8,000	8,000	8,000	10,200	10,200	10,200	10,200
310,000	8,400	7,800	7,800	7,800	9,900	9,900	9,900	9,900
300,000	8,200	7,600	7,600	7,600	9,700	9,700	9,700	9,700
290,000	8,000	7,500	7,400	7,400	9,400	9,400	9,400	9,400
280,000	7,800	7,300	7,200	7,200	9,100	9,100	9,100	9,100
270,000	7,600	7,100	7,000	7,000	8,900	8,900	8,900	8,900
260,000	7,400	6,900	6,900	6,900	8,600	8,600	8,600	8,600

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

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

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



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	450	350	350	250	400	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-100	-150	-200	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	300	350	350	800	850	850	850
1 REVERSER INOP	400	600	700	700	1,500	1,600	1,600	1,600
2 REVERSERS INOP	1,200	1,700	1,700	1,800	4,200	4,300	4,300	4,300
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300ER PW QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	12,700	11,600	10,500	9,100	8,800	5,700	10,500	9,200	8,900	7,400
400,000	12,400	11,300	10,200	8,900	8,600	5,500	10,200	8,900	8,600	7,200
390,000	12,000	11,000	9,900	8,600	8,400	5,400	9,900	8,700	8,400	7,000
380,000	11,700	10,700	9,600	8,400	8,100	5,200	9,600	8,400	8,100	6,800
370,000	11,300	10,400	9,300	8,100	7,900	5,000	9,300	8,100	7,900	6,700
360,000	11,000	10,000	9,000	7,900	7,600	4,900	9,000	7,900	7,700	6,500
350,000	10,700	9,700	8,700	7,600	7,400	4,700	8,700	7,600	7,400	6,300
340,000	10,300	9,400	8,400	7,400	7,200	4,500	8,400	7,400	7,200	6,100
330,000	10,100	9,200	8,200	7,200	7,000	4,500	8,200	7,200	7,000	6,000
320,000	9,800	8,900	8,000	7,000	6,800	4,400	8,000	7,100	6,800	5,800
310,000	9,500	8,700	7,800	6,900	6,700	4,300	7,800	6,900	6,700	5,700
300,000	9,300	8,500	7,600	6,700	6,500	4,200	7,600	6,700	6,500	5,600
290,000	9,000	8,200	7,400	6,500	6,400	4,100	7,400	6,600	6,400	5,500
280,000	8,800	8,000	7,200	6,400	6,200	4,100	7,200	6,400	6,200	5,300
270,000	8,500	7,800	7,000	6,200	6,000	4,000	7,000	6,300	6,000	5,200
260,000	8,300	7,500	6,800	6,100	5,900	3,900	6,800	6,100	5,900	5,100

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	0	-50	-50	-50	0
PER 1 KT TAILWIND	150	150	100	100	100	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	400	400	350	350	150	400	350	350	200
PER 10°C ABOVE ISA	300	250	200	200	150	100	200	200	150	150
PER 10°C BELOW ISA	-250	-250	-200	-200	-150	-100	-200	-200	-150	-150
PER 1% UP SLOPE	-250	-100	0	0	0	-50	0	0	0	-150
PER 1% DOWN SLOPE	200	0	0	0	0	50	0	0	0	150
1 REVERSER INOP	400	0	0	0	0	100	0	0	0	300
2 REVERSERS INOP	500	0	0	0	0	100	0	100	100	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300ER PW QUICK REFERENCE CHART

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	11,100	10,300	10,300	10,100	13,300	13,200	13,200	13,200
400,000	10,800	10,000	10,000	9,900	13,000	12,800	12,800	12,800
390,000	10,500	9,700	9,700	9,600	12,600	12,500	12,500	12,500
380,000	10,200	9,400	9,400	9,300	12,200	12,100	12,100	12,100
370,000	9,800	9,200	9,100	9,100	11,800	11,700	11,700	11,700
360,000	9,500	8,900	8,800	8,800	11,400	11,400	11,400	11,400
350,000	9,200	8,600	8,500	8,500	11,100	11,000	11,000	11,000
340,000	8,900	8,300	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,700	8,100	8,100	8,100	10,400	10,400	10,400	10,400
320,000	8,400	7,900	7,900	7,900	10,100	10,100	10,100	10,100
310,000	8,200	7,700	7,700	7,700	9,800	9,800	9,800	9,800
300,000	8,000	7,500	7,500	7,500	9,600	9,600	9,600	9,600
290,000	7,800	7,300	7,300	7,300	9,300	9,300	9,300	9,300
280,000	7,600	7,100	7,100	7,100	9,000	9,000	9,000	9,000
270,000	7,400	6,900	6,900	6,900	8,700	8,700	8,700	8,700
260,000	7,100	6,700	6,700	6,700	8,500	8,500	8,500	8,500

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	350	300	250	400	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-100	-200	-200	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	350	350	350	850	850	850	850
1 REVERSER INOP	400	600	700	700	1,500	1,500	1,500	1,500
2 REVERSERS INOP	1,200	1,600	1,600	1,600	3,900	3,900	3,900	3,900
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300 PW QUICK REFERENCE CHART

(SHIPS 1401 – 1404) OPERATIONAL LANDING DISTANCES

RUNWAY CONDITION ASSESSMENT MATRIX

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

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

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

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

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

CROSSWIND

On slippery runways, crosswind guidelines are a function of runway surface condition, airplane loading and assume proper pilot technique.

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

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

767-300 PW QUICK REFERENCE CHART

(SHIPS 1401 – 1404) OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	10,800	9,900	8,600	7,400	5,900	4,900	8,600	7,400	6,300	6,300
340,000	10,500	9,600	8,400	7,200	5,800	4,600	8,400	7,300	6,100	6,200
330,000	10,300	9,400	8,200	7,100	5,700	4,600	8,200	7,100	6,000	6,000
320,000	10,000	9,200	8,000	6,900	5,500	4,500	8,000	7,000	5,900	5,900
310,000	9,800	9,000	7,800	6,800	5,400	4,400	7,800	6,800	5,800	5,800
300,000	9,500	8,800	7,700	6,600	5,300	4,300	7,700	6,700	5,700	5,700
295,000	9,400	8,700	7,600	6,600	5,300	4,300	7,600	6,600	5,600	5,600
290,000	9,200	8,500	7,500	6,500	5,200	4,200	7,500	6,500	5,600	5,600
280,000	9,000	8,300	7,300	6,300	5,100	4,200	7,300	6,400	5,400	5,500
270,000	8,700	8,100	7,100	6,200	5,000	4,100	7,100	6,200	5,300	5,400
260,000	8,500	7,900	6,900	6,000	4,900	4,000	6,900	6,100	5,200	5,200
250,000	8,200	7,700	6,700	5,900	4,700	3,900	6,700	5,900	5,100	5,100
240,000	8,000	7,500	6,600	5,700	4,600	3,800	6,600	5,800	5,000	5,000
230,000	7,700	7,200	6,400	5,600	4,500	3,800	6,400	5,600	4,900	4,900
220,000	7,500	7,000	6,200	5,400	4,400	3,700	6,200	5,500	4,800	4,800

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	400	350	250	150	400	350	250	200
PER 10°C ABOVE ISA	300	250	200	150	150	100	200	200	150	150
PER 10°C BELOW ISA	-250	-250	-200	-150	-150	-100	-200	-200	-150	-150
PER 1% UP SLOPE	-250	-150	0	0	0	-50	0	0	-50	-150
PER 1% DOWN SLOPE	200	50	0	0	0	50	0	0	150	150
1 REVERSER INOP	500	100	0	0	0	100	0	0	300	300
2 REVERSERS INOP	600	100	0	0	0	200	0	100	600	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300 PW QUICK REFERENCE CHART

(SHIPS 1401 – 1404) OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	9,100	8,500	8,500	8,500	11,000	11,000	11,000	11,000
340,000	8,900	8,300	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,700	8,100	8,100	8,100	10,400	10,500	10,500	10,500
320,000	8,500	8,000	8,000	8,000	10,200	10,200	10,200	10,200
310,000	8,300	7,800	7,800	7,800	9,900	9,900	9,900	9,900
300,000	8,100	7,600	7,600	7,600	9,600	9,700	9,700	9,700
295,000	8,000	7,500	7,500	7,500	9,500	9,500	9,500	9,500
290,000	7,900	7,400	7,400	7,400	9,400	9,400	9,400	9,400
280,000	7,700	7,200	7,200	7,200	9,100	9,100	9,100	9,100
270,000	7,500	7,000	7,000	7,000	8,800	8,900	8,900	8,900
260,000	7,400	6,900	6,900	6,900	8,600	8,600	8,600	8,600
250,000	7,200	6,700	6,700	6,700	8,300	8,300	8,300	8,300
240,000	7,000	6,500	6,500	6,500	8,100	8,100	8,100	8,100
230,000	6,800	6,300	6,300	6,300	7,800	7,800	7,800	7,800
220,000	6,600	6,100	6,100	6,100	7,500	7,500	7,500	7,500

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

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

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



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	300	250	250	350	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-100	-200	-300	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	350	350	350	800	850	850	850
1 REVERSER INOP	400	700	700	700	1,600	1,600	1,600	1,600
2 REVERSERS INOP	1,300	1,700	1,800	1,800	4,200	4,300	4,300	4,300
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300 PW QUICK REFERENCE CHART

(SHIPS 1401 – 1404) OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	10,700	9,800	8,500	7,400	5,900	4,800	8,500	7,400	6,000	6,300
340,000	10,400	9,500	8,200	7,100	5,700	4,500	8,200	7,100	5,800	6,100
330,000	10,100	9,300	8,000	6,900	5,600	4,500	8,000	7,000	5,700	6,000
320,000	9,800	9,000	7,800	6,800	5,500	4,400	7,800	6,800	5,500	5,800
310,000	9,600	8,800	7,700	6,600	5,300	4,300	7,700	6,700	5,400	5,700
300,000	9,300	8,600	7,500	6,500	5,200	4,200	7,500	6,500	5,300	5,600
295,000	9,200	8,500	7,400	6,400	5,200	4,200	7,400	6,400	5,200	5,500
290,000	9,100	8,400	7,300	6,300	5,100	4,100	7,300	6,300	5,200	5,500
280,000	8,800	8,100	7,100	6,100	5,000	4,100	7,100	6,200	5,000	5,300
270,000	8,600	7,900	6,900	6,000	4,900	4,000	6,900	6,000	4,900	5,200
260,000	8,300	7,700	6,700	5,800	4,800	3,900	6,700	5,800	4,800	5,100
250,000	8,100	7,400	6,500	5,700	4,600	3,800	6,500	5,700	4,600	5,000
240,000	7,800	7,200	6,300	5,500	4,500	3,700	6,300	5,500	4,500	4,800
230,000	7,600	7,000	6,100	5,300	4,400	3,700	6,100	5,400	4,400	4,700
220,000	7,300	6,700	5,900	5,200	4,300	3,600	5,900	5,200	4,300	4,600

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	400	350	250	150	400	350	250	200
PER 10°C ABOVE ISA	300	250	200	150	150	100	200	150	150	150
PER 10°C BELOW ISA	-250	-250	-200	-150	-150	-100	-200	-150	-150	-150
PER 1% UP SLOPE	-250	-150	0	0	0	-50	0	0	-100	-150
PER 1% DOWN SLOPE	200	0	0	0	0	50	0	0	150	150
1 REVERSER INOP	400	100	0	0	0	100	0	0	300	300
2 REVERSERS INOP	500	100	0	0	0	100	0	100	600	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

767-300 PW QUICK REFERENCE CHART

(SHIPS 1401 – 1404) OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	9,100	8,500	8,500	8,500	11,100	11,000	11,000	11,000
340,000	8,800	8,300	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,600	8,100	8,100	8,100	10,400	10,400	10,400	10,400
320,000	8,400	7,900	7,900	7,900	10,100	10,100	10,100	10,100
310,000	8,100	7,700	7,700	7,700	9,800	9,800	9,800	9,800
300,000	7,900	7,500	7,500	7,500	9,600	9,600	9,600	9,600
295,000	7,800	7,400	7,400	7,400	9,400	9,400	9,400	9,400
290,000	7,700	7,300	7,300	7,300	9,300	9,300	9,300	9,300
280,000	7,500	7,100	7,100	7,100	9,000	9,000	9,000	9,000
270,000	7,300	6,900	6,900	6,900	8,700	8,700	8,700	8,700
260,000	7,100	6,700	6,700	6,700	8,500	8,500	8,500	8,500
250,000	6,900	6,500	6,500	6,500	8,200	8,200	8,200	8,200
240,000	6,700	6,300	6,300	6,300	7,900	7,900	7,900	7,900
230,000	6,500	6,100	6,100	6,100	7,600	7,600	7,600	7,600
220,000	6,300	5,900	5,900	5,900	7,400	7,400	7,400	7,400

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	300	250	250	350	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-150	-200	-300	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	350	350	350	850	850	850	850
1 REVERSER INOP	400	700	700	700	1,500	1,500	1,500	1,500
2 REVERSERS INOP	1,200	1,600	1,600	1,600	3,900	3,900	3,900	3,900
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

CONTENTS

	Page
DEFINITIONS AND ASSUMPTIONS	1-2
TEMPERATURE CONVERSION AND STATIC AIR TEMPERATURE	1-3
TOTAL AIR TEMPERATURE VS STATIC AIR TEMPERATURE	1-4
NORMAL OPERATING SPEED LIMIT	1-5
ENVIRONMENT ENVELOPE	1-6
TRIP FUEL ESTIMATE	1-7
0 – 2,000 NM TRIP	1-7
1,000 – 6,000 NM TRIP	1-8
SHORT RANGE FLIGHTS FUEL CONSUMPTION TABLE.....	1-9
ENROUTE FUEL TEMPERATURE.....	1-10
DRIFTDOWN NET LEVEL OFF ALTITUDE	1-11
MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE	1-12
LRC.....	1-12
MACH 0.81	1-13
BUFFET ONSET BOUNDARY SPEEDS	1-14

DEFINITIONS AND ASSUMPTIONS

AIR DISTANCE – The ground distance adjusted for wind. A headwind results in a longer air distance than the actual ground distance and a tailwind results in a shorter air distance than the actual ground distance.

BLOCK FUEL – Sum of Trip Fuel plus Taxi Fuel.

EQUAL TIME POINT (ETP) – Where it would take an equal amount of time, accounting for wind, to go on to the next suitable airport or destination as it would to go back to the last suitable airport or origin.

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.

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

NET LEVEL OFF ALTITUDE – Altitude for a given weight at which the aircraft can achieve a 1.1% climb gradient with one or two engines inoperative.

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

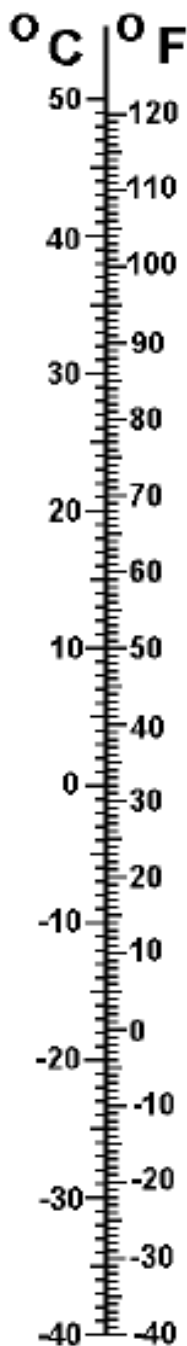
TOTAL AIR TEMPERATURE (TAT) - The total of the ambient air temperature (SAT) plus the increase in temperature due to compression heating.

TRIP FUEL – Fuel burn from brake release to landing.

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

TEMPERATURE CONVERSION AND STATIC AIR TEMPERATURE

°C



ALTITUDE - FEET	ISA DEVIATION					
	ISA-20°C	ISA-10°C	ISA	ISA+10°C	ISA+20°C	ISA+30°C
36,000 & Higher	-76.5	-66.5	-56.5	-46.5	-36.5	-26.5
35,000	-74.2	-64.2	-54.2	-44.2	-34.2	-24.2
34,000	-72.3	-62.3	-52.3	-42.3	-32.3	-22.3
33,000	-70.3	-60.3	-50.3	-40.3	-30.3	-20.3
32,000	-68.3	-58.3	-48.3	-38.3	-28.3	-18.3
31,000	-66.3	-56.3	-46.3	-36.3	-26.3	-16.3
30,000	-64.3	-54.3	-44.3	-34.3	-24.3	-14.3
29,000	-62.4	-52.4	-42.4	-32.4	-22.4	-12.4
28,000	-60.4	-50.4	-40.4	-30.4	-20.4	-10.4
27,000	-58.4	-48.4	-38.4	-28.4	-18.4	-8.4
26,000	-56.5	-46.5	-36.5	-26.5	-16.5	-6.5
25,000	-54.5	-44.5	-34.5	-24.5	-14.5	-4.5
24,000	-52.5	-42.5	-32.5	-22.5	-12.5	-2.5
23,000	-50.5	-40.5	-30.5	-20.5	-10.5	-0.5
22,000	-48.5	-38.5	-28.5	-18.5	-8.5	+1.5
21,000	-46.6	-36.6	-26.6	-16.6	-6.6	+3.4
20,000	-44.6	-34.6	-24.6	-14.6	-4.6	+5.4
19,000	-42.6	-32.6	-22.6	-12.6	-2.6	+7.4
18,000	-40.6	-30.6	-20.6	-10.6	-0.6	+9.4
17,000	-38.7	-28.7	-18.7	-8.7	+1.3	+11.3
16,000	-36.7	-26.7	-16.7	-6.7	+3.3	+13.3
15,000	-34.7	-24.7	-14.7	-4.7	+5.3	+15.3
14,000	-32.7	-22.7	-12.7	-2.7	+7.3	+17.3
13,000	-30.7	-20.7	-10.7	-0.7	+9.3	+19.3
12,000	-28.8	-18.8	-8.8	+1.2	+11.2	+21.2
11,000	-26.8	-16.8	-6.8	+3.2	+13.2	+23.2
10,000	-24.8	-14.8	-4.8	+5.2	+15.2	+25.2
5,000	-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

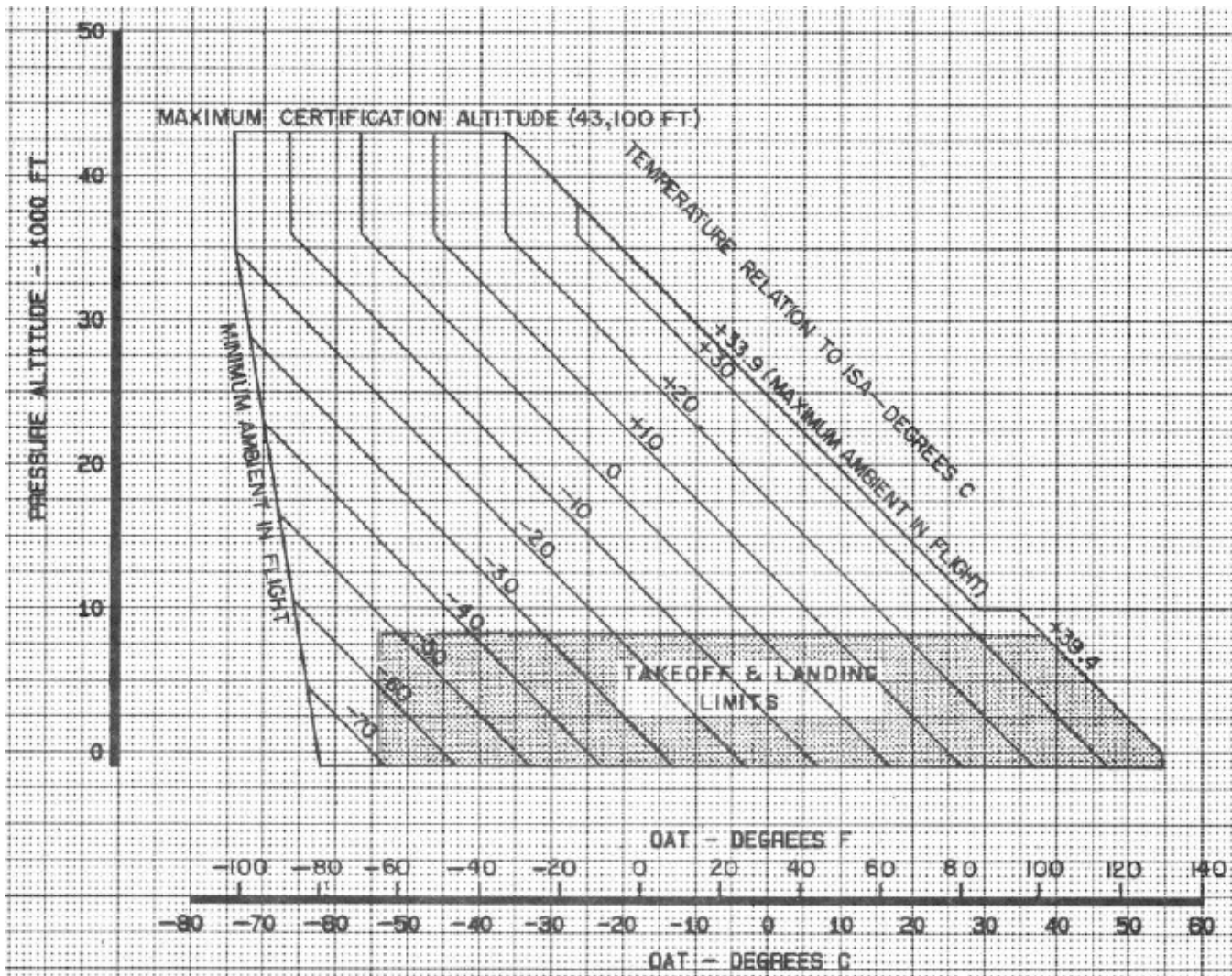
IND TAT °C	INDICATED MACH NUMBER													
	.40	.50	.60	.70	.74	.75	.76	.77	.78	.80	.82	.84	.86	.88
75	64	58	52	44	41	40	39	38	37	35	34	32	30	28
70	59	54	47	39	36	35	34	33	33	31	29	28	26	24
65	55	49	42	35	32	31	30	29	28	27	25	23	21	20
60	50	44	38	30	27	26	25	24	24	22	21	19	17	15
55	45	39	33	26	23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

NORMAL OPERATING SPEED LIMIT

V_{MO} / M_{MO}

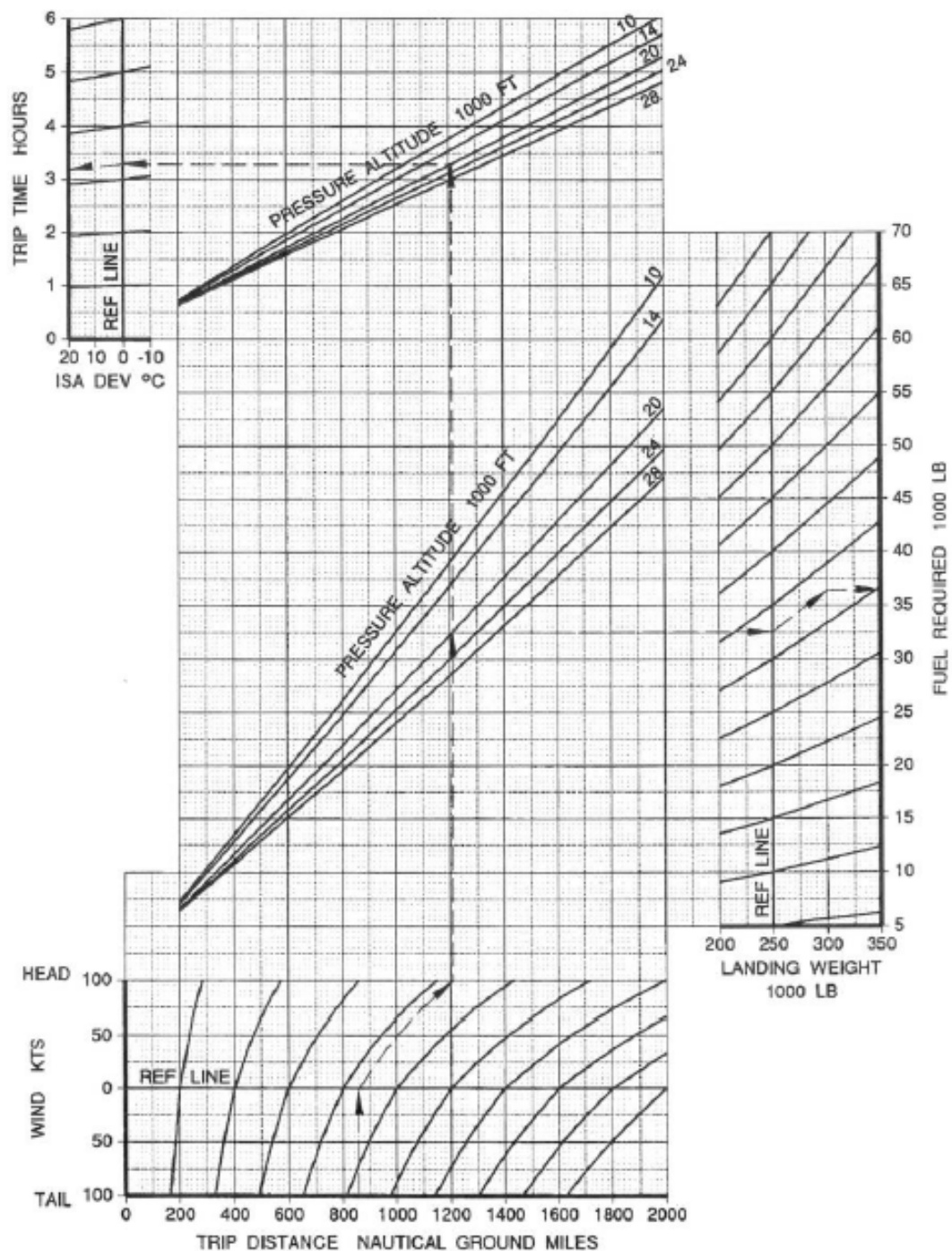
PRESSURE ALTITUDE	INDICATED V_{mo} (KIAS)	MACH M_{mo}
0	360 (Non-Winglet) 340 (Winglet)	0.544 (Non-Winglet) 0.514 (Winglet)
5,000	360 (Non-Winglet) 340 (Winglet)	0.593 (Non-Winglet) 0.560 (Winglet)
10,000	360 (Non-Winglet) 340 (Winglet)	0.647 (Non-Winglet) 0.612 (Winglet)
15,000	360 (Non-Winglet) 340 (Winglet)	0.707 (Non-Winglet) 0.669 (Winglet)
17,000	360 (Non-Winglet) 340 (Winglet)	0.733 (Non-Winglet) 0.694 (Winglet)
19,000	360 (Non-Winglet) 340 (Winglet)	0.760 (Non-Winglet) 0.720 (Winglet)
21,000	360 (Non-Winglet) 340 (Winglet)	0.788 (Non-Winglet) 0.747 (Winglet)
23,000	360 (Non-Winglet) 340 (Winglet)	0.818 (Non-Winglet) 0.775 (Winglet)
25,000	360 (Non-Winglet) 340 (Winglet)	0.848 (Non-Winglet) 0.805 (Winglet)
27,000	351 (Non-Winglet) 340 (Winglet)	0.860 (Non-Winglet) 0.836 (Winglet)
29,000	336	0.860
31,000	322	0.860
33,000	308	0.860
35,000	294	0.860
37,000	282	0.860
39,000	269	0.860
41,000	256	0.860
43,000	244	0.860

ENVIRONMENT ENVELOPE



TRIP FUEL ESTIMATE

0 – 2,000 NM TRIP

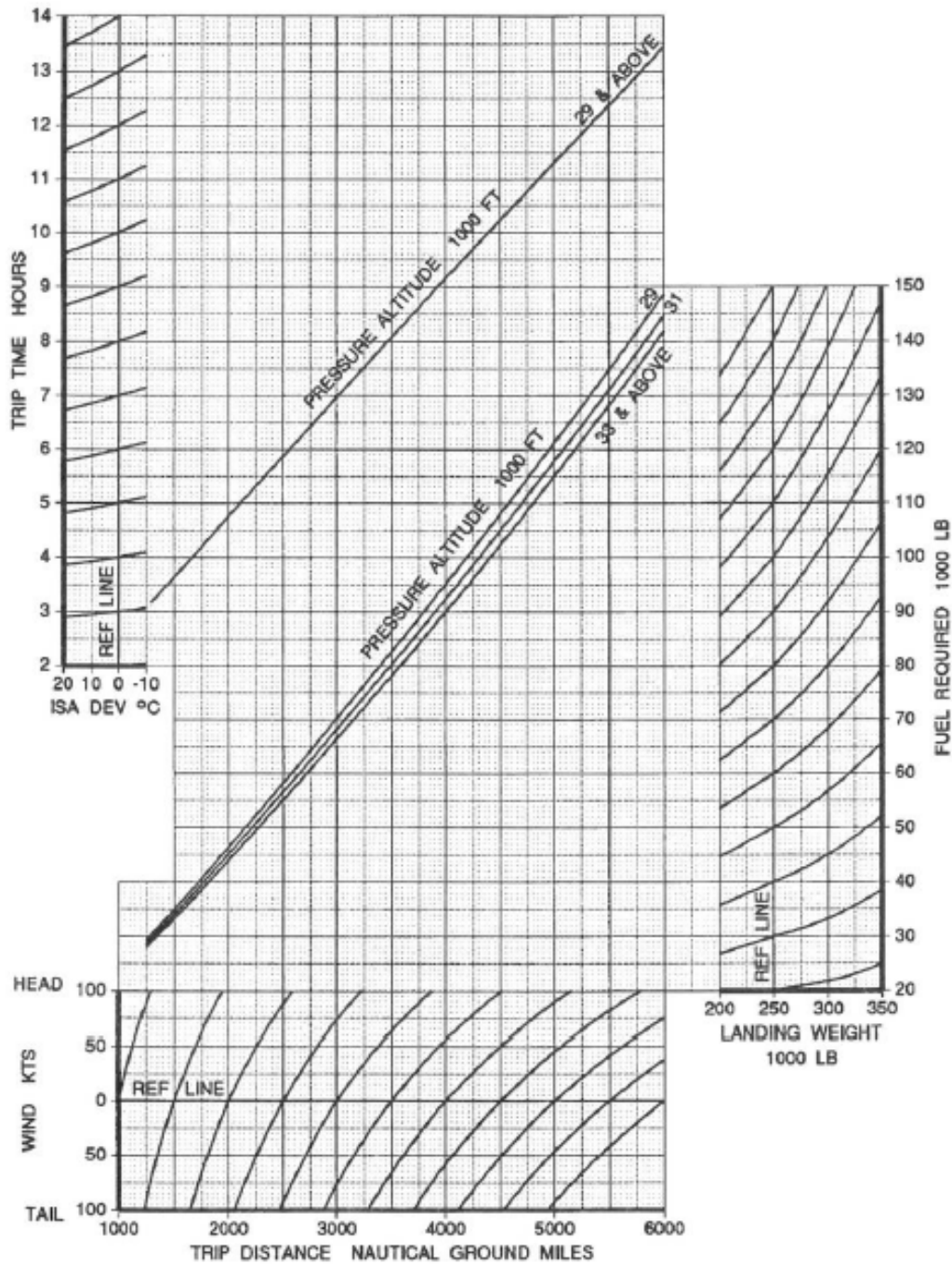


BASIS:

- 290 / 0.78M Climb
- Long Range Cruise
- 0.78M / 290 / 250 Descent

TRIP FUEL ESTIMATE

1,000 – 6,000 NM TRIP



BASIS:

- 290 / 0.78M Climb
- Long Range Cruise
- 0.78M / 290 / 250 Descent

SHORT RANGE FLIGHTS FUEL CONSUMPTION TABLE

Standard Day

Block Time (minutes)	Block Fuel (pounds)
30	3,340
35	4,300
40	5,260
45	6,220
50	7,050
55	7,880
60	8,710
65	9,510
70	10,310
75	11,110
80	11,910

BASIS:

- Standard day
- IFR reserves
- Climb @ 250 KIAS / 310 KIAS / Minimum Cost Cruise Mach
- Cruise @ Minimum Cost Cruise Mach
- Descent @ Cruise Mach / 300 KIAS / 250 KIAS
- Block Time = Trip Time + 15 minutes Ground Maneuver Time
- Block Fuel = Trip Fuel + 720 pounds Ground Maneuver Fuel
- Operational Landing Weight – 260,000 pounds

ENROUTE FUEL TEMPERATURE

FOR DETERMINING DISPATCH CAPABILITY BASED ON FUEL FREEZE POINT

FUEL TYPE		JET A	JP-5	JET A1	JET B	TS-1
ADJUSTED FUEL FREEZE TEMP. - °C		-37	-43	-44	-47	-57
MACH	FLIGHT LEVEL	MAXIMUM ISA DEVIATION - °C				NOT LIMITING
0.80	330	-13	-19	-20	-22	
	350	-9	-15	-16	-18	
	370 & HIGHER	-7	-13	-14	-16	
0.81	330	-14	-19	-20	-23	
	350	-10	-15	-16	-19	
	370 & HIGHER	-8	-13	-14	-17	
0.82	330	-15	-20	-21	-23	
	350	-11	-16	-17	-20	
	370 & HIGHER	-8	-14	-15	-17	
0.83	330	-15	-20	-21	-24	
	350	-11	-17	-17	-20	
	370 & HIGHER	-9	-14	-15	-18	

NOTE: For in flight reference, consult the POM, Transoceanic Operations section.

INSTRUCTIONS:

1. Locate the 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 = 0.82

1. Enter the top of the chart under JET A.
2. Move down the chart to the flight conditions of Mach 0.82 and FL350 and read the Maximum ISA Deviation (-11°C).
3. Do not dispatch aircraft into temperatures colder than ISA-11°C at FL350.

DRIFTDOWN NET LEVEL OFF ALTITUDE

(FOR FLIGHT PLANNING PURPOSES)

MAXIMUM CONTINUOUS THRUST

PW4060 Engines

ENGINE ANTI-ICE OFF

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED - KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
420,000	405,000	311	11,500	9,800	7,800
400,000	387,000	307	13,800	12,300	10,800
380,000	370,000	301	15,600	14,500	13,400
360,000	350,000	294	17,200	16,200	15,400
340,000	331,000	286	18,600	17,800	17,000
320,000	312,000	278	20,200	19,300	18,500
300,000	293,000	269	21,700	21,000	20,100
280,000	273,000	261	23,200	22,700	21,900
260,000	254,000	251	24,900	24,600	23,700

ENGINE ANTI-ICE ON

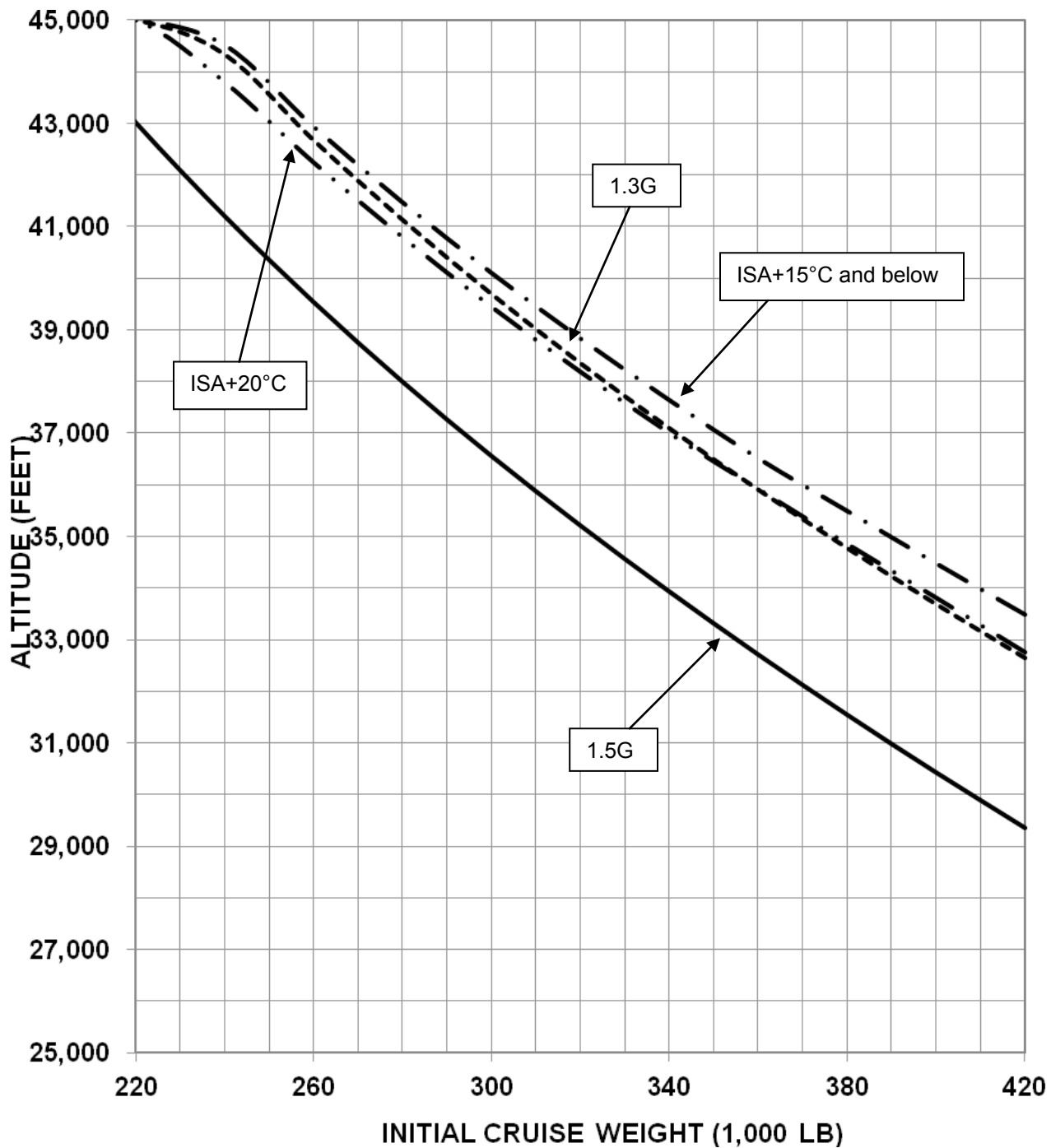
GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED - KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
420,000	404,000	309	10,500	8,600	5,600
400,000	386,000	304	12,800	11,300	9,500
380,000	369,000	299	15,000	13,800	12,300
360,000	350,000	292	16,600	15,700	14,700
340,000	331,000	284	18,100	17,200	16,300
320,000	312,000	276	19,600	18,700	17,900
300,000	293,000	268	21,100	20,300	19,400
280,000	273,000	259	22,700	21,900	21,100
260,000	254,000	250	24,300	23,600	22,900

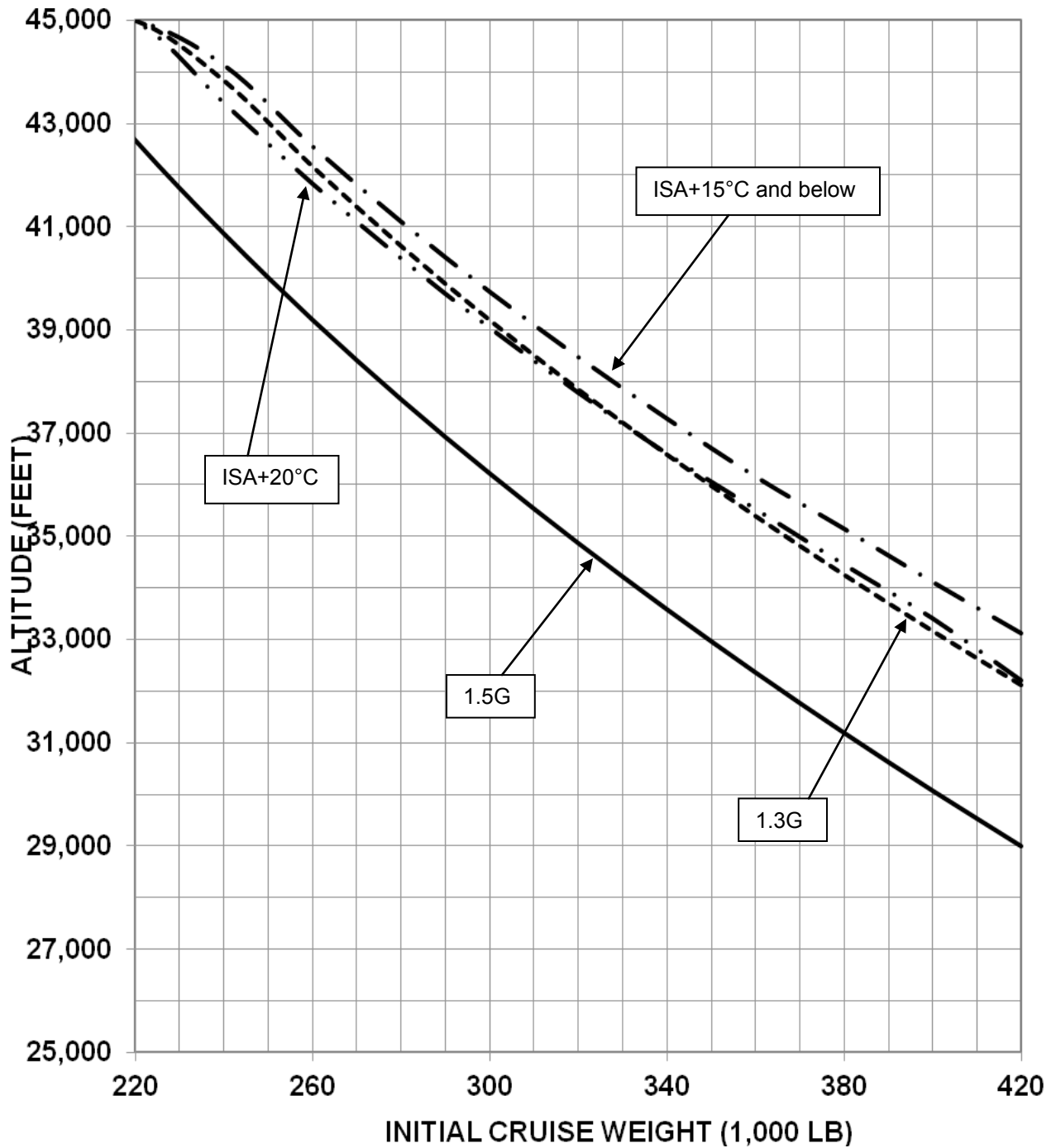
ENGINE & WING ANTI-ICE ON

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED - KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
420,000	403,000	308	9,000	6,300	
400,000	385,000	302	11,600	9,800	7,000
380,000	368,000	297	13,900	12,500	10,700
360,000	350,000	290	15,700	14,800	13,500
340,000	331,000	283	17,300	16,400	15,500
320,000	312,000	275	18,800	17,900	17,100
300,000	292,000	267	20,300	19,500	18,600
280,000	273,000	258	21,900	21,100	20,200
260,000	254,000	249	23,500	22,800	22,000

BASIS:

- A/C Packs ON
- Maximum Continuous Thrust Limits
- 1.1% gradient decrement (net driftdown)
- 100 ft./min. residual rate of climb
- 35,000 ft. initial altitude

MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE**LRC**

MAXIMUM RECOMMENDED INITIAL CRUISE ALTITUDE**MACH 0.81**

BUFFET ONSET BOUNDARY SPEEDS (KIAS)

FLIGHT LEVEL	CRUISE WEIGHT - POUNDS	V _b * - KIAS (Mach)	G / BANK ANGLE - DEGREES					
			1.0 / 0°		1.15 / 30°		1.5 / 48°	
			LOW	HIGH	LOW	HIGH	LOW	HIGH
430	400,000	218 (0.78)						
	360,000							
	320,000		200	233				
	280,000		184	240	203	234		
	240,000		166	240	182	240		
	200,000		150	240	165	240	193	238
410	400,000	229 (0.78)						
	360,000		200	240				
	320,000		196	250	225	236		
	280,000		182	251	197	249		
	240,000		165	256+	180	251	218	240
	200,000		150	256+	160	251	188	251
390	400,000	241 (0.78)	229	250				
	360,000		210	260				
	320,000		194	266	194	266		
	280,000		179	269+	178	266		
	240,000		164	269+	178	266	210	260
	200,000		148	269+	160	266	187	269+
370	400,000	252 (0.78)	222	269				
	360,000		207	278	228	266		
	320,000		194	281+	210	273		
	280,000		178	281+	191	281+	229	266
	240,000		164	281+	176	281+	206	278
	200,000		148	281+	158	281+	185	278
350	400,000	264 (0.78)	218	290	217	290		
	360,000		204	292+	222	289		
	320,000		191	292+	207	292+	249	275
	280,000		176	292+	190	292+	223	286
	240,000		162	292+	175	292+	203	292+
	200,000		147	292+	175	292+	203	292+
330	400,000	277 (0.78)	214	308+	215	306		
	360,000		202	308+	219	306	270	281
	320,000		189	308+	205	306	242	299
	280,000		176	308+	176	306	221	305
	240,000		161	308+	161	306	202	305
	200,000		156	308+	155	306	182	305
310	400,000	289 (0.78)	213	322+	231	320		
	360,000		200	322+	211	320	258	308
	320,000		188	322+	203	320	237	319
	280,000		175	322+	188	320	219	321
	240,000		161	322+	173	320	201	321
	200,000		156	322+	158	320	181	321

*V_b – Severe turbulence target speed.

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

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

End of Section

CONTENTS

	Page
DEFINITIONS AND ASSUMPTIONS	2-2
DRY RUNWAY TAKEOFF SPEEDS – V_1 / V_R / V_2	2-4
DRY TO / 15	2-4
DRY TO / 5	2-6
TAKEOFF STABILIZER SETTINGS	2-8

DEFINITIONS AND ASSUMPTIONS

AWABS	Automated Weight and Balance System. The computerized system for determining the weight & balance and airport performance.
AIRPORT PRESSURE ALTITUDE	The altitude read from the altimeter while sitting on the airport and adjusting the altimeter setting to 29.92 inches of mercury.
FMS	Flight Management System.
FMC	Flight Management Computer.
GWT	Gross Weight for Takeoff. The aircraft weight at the start of the takeoff roll.
N₁	Fan rotor speed in percent. Used as the primary thrust setting parameter for the CF6-80A engine.
V₁	Takeoff Decision Speed. V ₁ is the speed that determines a go or no-go decision in the event of an engine failure. No time is allowed after V ₁ for reaction or decision; action must be initiated at or before V ₁ . FAR, Part 25 defines V ₁ as "the speed at which an engine failure has been recognized and action initiated to either continue or stop the takeoff".
V_R	Rotation Speed. V _R is the speed at which the pilot begins to rotate the aircraft to the takeoff pitch attitude. V _R is selected so that, with a normal rate of rotation, the aircraft will lift off and attain a height of 35 feet at a speed of V ₂ .
V₂	Takeoff Safety Speed. V ₂ is the speed used to achieve the required gradient during second climb segment.

INTENTIONALLY BLANK

DRY RUNWAY TAKEOFF SPEEDS – V_1 / V_R / V_2

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.

DRY
TO / 15

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & below	20	30	40	50
412,000	8,000	141 / 166 / 169	137 / 167 / 169	131 / 168 / 169		
	6,000	155 / 164 / 168	152 / 164 / 168	142 / 165 / 168	135 / 167 / 169	
	4,000	158 / 163 / 167	157 / 163 / 167	155 / 164 / 167	144 / 165 / 168	
	2,000	159 / 162 / 167	159 / 162 / 167	160 / 162 / 167	159 / 164 / 168	145 / 167 / 169
	0	159 / 161 / 167	159 / 161 / 167	159 / 161 / 167	161 / 162 / 167	157 / 165 / 167
410,000	8,000	136 / 166 / 168	133 / 167 / 169	127 / 168 / 169	121 / 169 / 170	118 / 170 / 171
	6,000	147 / 165 / 168	143 / 165 / 168	139 / 166 / 168	132 / 167 / 169	127 / 168 / 170
	4,000	160 / 163 / 167	156 / 163 / 167	154 / 163 / 167	143 / 166 / 168	138 / 167 / 169
	2,000	159 / 162 / 167	159 / 162 / 167	159 / 162 / 167	155 / 164 / 167	141 / 167 / 168
	0	158 / 161 / 166	158 / 161 / 167	159 / 161 / 166	160 / 162 / 167	150 / 165 / 168
400,000	8,000	141 / 164 / 166	137 / 164 / 166	132 / 165 / 167	126 / 166 / 167	123 / 167 / 168
	6,000	150 / 162 / 165	147 / 162 / 166	143 / 163 / 166	137 / 164 / 166	131 / 165 / 167
	4,000	158 / 161 / 165	158 / 161 / 165	157 / 161 / 165	147 / 163 / 166	143 / 164 / 166
	2,000	157 / 159 / 165	157 / 159 / 165	157 / 159 / 164	158 / 161 / 165	146 / 164 / 166
	0	156 / 158 / 164	156 / 158 / 164	156 / 158 / 164	158 / 159 / 165	152 / 162 / 166
390,000	8,000	145 / 161 / 164	142 / 161 / 164	136 / 162 / 164	130 / 163 / 165	127 / 164 / 165
	6,000	154 / 159 / 163	150 / 160 / 163	147 / 160 / 164	141 / 162 / 164	136 / 163 / 164
	4,000	156 / 158 / 163	156 / 158 / 163	156 / 158 / 163	151 / 160 / 163	147 / 161 / 164
	2,000	154 / 157 / 162	154 / 157 / 162	155 / 157 / 162	157 / 158 / 163	149 / 161 / 164
	0	153 / 156 / 162	153 / 156 / 162	154 / 156 / 162	155 / 157 / 162	155 / 160 / 163
380,000	8,000	149 / 158 / 161	146 / 158 / 161	140 / 160 / 162	135 / 160 / 162	132 / 161 / 163
	6,000	154 / 157 / 161	154 / 157 / 161	151 / 158 / 161	146 / 159 / 162	141 / 160 / 162
	4,000	153 / 155 / 160	153 / 156 / 160	153 / 156 / 161	155 / 158 / 161	152 / 159 / 161
	2,000	152 / 154 / 160	152 / 154 / 160	152 / 154 / 160	154 / 156 / 160	151 / 158 / 161
	0	151 / 153 / 160	151 / 153 / 160	151 / 153 / 160	153 / 154 / 160	156 / 157 / 161
360,000	8,000	150 / 153 / 157	151 / 153 / 157	149 / 154 / 157	145 / 155 / 157	142 / 156 / 158
	6,000	149 / 152 / 156	149 / 152 / 156	151 / 152 / 156	152 / 153 / 157	150 / 154 / 157
	4,000	148 / 150 / 156	148 / 150 / 156	148 / 150 / 156	151 / 152 / 156	152 / 153 / 157
	2,000	147 / 149 / 156	147 / 149 / 156	147 / 149 / 156	149 / 151 / 156	151 / 153 / 157
	0	146 / 149 / 156	146 / 149 / 156	146 / 149 / 156	148 / 149 / 156	150 / 152 / 157
340,000	8,000	145 / 147 / 152	145 / 147 / 152	147 / 148 / 152	147 / 149 / 152	148 / 150 / 153
	6,000	144 / 146 / 152	144 / 146 / 152	145 / 147 / 152	146 / 148 / 152	147 / 149 / 152
	4,000	143 / 145 / 151	143 / 145 / 151	143 / 145 / 151	145 / 147 / 152	146 / 148 / 152
	2,000	141 / 144 / 152	142 / 144 / 152	142 / 144 / 152	144 / 146 / 151	145 / 147 / 152
	0	140 / 144 / 152	140 / 144 / 152	140 / 144 / 152	142 / 144 / 152	144 / 147 / 152

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

DRY RUNWAY TAKEOFF SPEEDS – V_1 / V_R / V_2

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.

DRY
TO / 15

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & below	20	30	40	50
320,000	8,000	140 / 142 / 147	140 / 142 / 147	141 / 143 / 147	142 / 143 / 147	143 / 144 / 147
	6,000	139 / 141 / 147	139 / 141 / 147	140 / 141 / 147	141 / 142 / 147	142 / 143 / 147
	4,000	137 / 140 / 147	137 / 140 / 147	138 / 140 / 147	140 / 141 / 147	141 / 142 / 147
	2,000	136 / 139 / 147	136 / 139 / 147	136 / 139 / 147	138 / 140 / 147	140 / 141 / 147
	0	135 / 138 / 147	135 / 138 / 147	135 / 138 / 147	137 / 139 / 147	139 / 141 / 147
300,000	8,000	134 / 136 / 142	134 / 137 / 142	136 / 137 / 142	136 / 138 / 142	137 / 138 / 142
	6,000	133 / 136 / 142	133 / 136 / 142	134 / 136 / 142	135 / 137 / 142	136 / 138 / 142
	4,000	132 / 135 / 142	132 / 135 / 142	132 / 135 / 142	134 / 136 / 142	135 / 137 / 142
	2,000	130 / 134 / 142	130 / 134 / 142	130 / 134 / 142	133 / 135 / 142	134 / 136 / 142
	0	129 / 133 / 133	129 / 133 / 133	129 / 133 / 133	131 / 134 / 133	134 / 136 / 132
280,000	8,000	128 / 131 / 137	128 / 131 / 137	130 / 132 / 137	131 / 132 / 137	132 / 133 / 137
	6,000	127 / 130 / 138	127 / 130 / 138	128 / 131 / 137	129 / 131 / 137	130 / 132 / 137
	4,000	126 / 129 / 138	126 / 129 / 138	126 / 129 / 138	128 / 131 / 137	129 / 132 / 137
	2,000	124 / 128 / 138	124 / 128 / 138	124 / 128 / 138	126 / 129 / 138	128 / 130 / 137
	0	123 / 127 / 138	123 / 127 / 138	123 / 127 / 138	125 / 128 / 138	128 / 130 / 137
260,000	8,000	122 / 125 / 132	122 / 125 / 132	124 / 126 / 132	124 / 126 / 132	125 / 127 / 132
	6,000	121 / 124 / 133	121 / 124 / 133	122 / 125 / 132	123 / 126 / 132	124 / 126 / 132
	4,000	120 / 123 / 133	120 / 123 / 133	120 / 123 / 133	122 / 125 / 132	123 / 126 / 132
	2,000	118 / 122 / 133	118 / 122 / 133	118 / 122 / 133	120 / 124 / 133	122 / 125 / 132
	0	117 / 121 / 133	117 / 121 / 133	117 / 121 / 133	119 / 122 / 133	122 / 124 / 132
230,000	8,000	113 / 116 / 125	113 / 116 / 125	114 / 117 / 125	114 / 117 / 125	115 / 118 / 125
	6,000	111 / 115 / 125	111 / 115 / 125	112 / 116 / 125	113 / 117 / 125	114 / 117 / 125
	4,000	110 / 114 / 125	110 / 114 / 125	110 / 114 / 125	112 / 116 / 125	113 / 117 / 125
	2,000	109 / 113 / 125	109 / 113 / 125	109 / 113 / 125	111 / 114 / 125	112 / 115 / 125
	0	110 / 114 / 127	110 / 114 / 127	110 / 114 / 127	110 / 113 / 125	112 / 115 / 125
200,000	8,000	103 / 106 / 116	103 / 106 / 116	104 / 107 / 116	104 / 107 / 116	105 / 108 / 116
	6,000	102 / 106 / 117	102 / 106 / 117	102 / 106 / 116	104 / 107 / 117	105 / 108 / 116
	4,000	104 / 108 / 120	104 / 108 / 120	104 / 108 / 119	102 / 106 / 116	103 / 107 / 116
	2,000	108 / 112 / 124	107 / 110 / 123	107 / 111 / 123	103* / 107 / 118	104 / 107 / 116
	0	110 / 114 / 127	110 / 114 / 127	110 / 114 / 127	107 / 110 / 123	104 / 107 / 118

NOTE:

Speeds denoted by an asterisk (*) are V_{MCG} limited.

DRY RUNWAY TAKEOFF SPEEDS – V_1 / V_R / V_2

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.

DRY
TO / 5

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & below	20	30	40	50
412,000	8,000	147 / 173 / 175	142 / 173 / 175	135 / 174 / 176		
	6,000	155 / 171 / 175	152 / 171 / 175	146 / 172 / 175	140 / 174 / 176	
	4,000	161 / 170 / 174	158 / 170 / 174	155 / 171 / 174	149 / 172 / 175	
	2,000	164 / 169 / 174	163 / 169 / 174	162 / 169 / 174	159 / 171 / 175	151 / 173 / 175
	0	164 / 168 / 174	164 / 168 / 174	164 / 168 / 174	166 / 169 / 174	161 / 172 / 174
410,000	8,000	145 / 172 / 175	141 / 172 / 175	137 / 174 / 175	133 / 174 / 176	127 / 177 / 178
	6,000	152 / 172 / 175	150 / 171 / 174	148 / 172 / 174	137 / 174 / 176	133 / 175 / 176
	4,000	161 / 170 / 174	159 / 170 / 174	157 / 170 / 174	146 / 172 / 175	143 / 173 / 175
	2,000	164 / 169 / 174	165 / 169 / 174	163 / 169 / 174	158 / 170 / 174	152 / 172 / 175
	0	163 / 168 / 174	164 / 168 / 174	164 / 168 / 174	166 / 169 / 174	156 / 172 / 175
400,000	8,000	148 / 170 / 172	145 / 170 / 172	141 / 171 / 173	136 / 172 / 173	131 / 173 / 174
	6,000	155 / 169 / 172	153 / 168 / 172	151 / 169 / 172	141 / 171 / 173	138 / 172 / 174
	4,000	163 / 167 / 172	161 / 167 / 172	160 / 167 / 172	150 / 170 / 172	147 / 171 / 173
	2,000	162 / 166 / 172	162 / 166 / 171	162 / 166 / 171	161 / 168 / 172	155 / 169 / 173
	0	161 / 165 / 171	161 / 165 / 171	161 / 165 / 171	163 / 166 / 171	158 / 169 / 172
390,000	8,000	151 / 167 / 170	148 / 167 / 170	144 / 168 / 170	140 / 169 / 171	136 / 170 / 172
	6,000	158 / 166 / 170	156 / 166 / 170	154 / 166 / 170	145 / 168 / 171	142 / 169 / 171
	4,000	161 / 165 / 169	161 / 165 / 169	161 / 165 / 169	153 / 167 / 170	150 / 168 / 171
	2,000	159 / 164 / 169	160 / 164 / 169	160 / 164 / 169	162 / 165 / 170	158 / 167 / 170
	0	158 / 163 / 169	159 / 163 / 169	159 / 163 / 169	161 / 164 / 169	160 / 167 / 170
380,000	8,000	154 / 164 / 168	151 / 164 / 168	148 / 165 / 168	144 / 166 / 168	140 / 167 / 169
	6,000	159 / 163 / 167	159 / 163 / 167	157 / 164 / 167	148 / 165 / 168	145 / 166 / 168
	4,000	158 / 162 / 167	158 / 162 / 167	158 / 162 / 167	157 / 164 / 168	154 / 165 / 168
	2,000	157 / 161 / 167	157 / 161 / 167	157 / 161 / 167	159 / 163 / 167	160 / 164 / 168
	0	156 / 160 / 167	156 / 160 / 167	156 / 160 / 167	158 / 161 / 167	161 / 164 / 168
360,000	8,000	155 / 159 / 163	155 / 159 / 163	154 / 160 / 163	151 / 160 / 163	148 / 161 / 164
	6,000	154 / 158 / 163	154 / 158 / 163	156 / 158 / 163	156 / 160 / 163	153 / 161 / 163
	4,000	153 / 157 / 163	153 / 157 / 163	153 / 157 / 163	155 / 159 / 163	157 / 160 / 163
	2,000	152 / 156 / 163	152 / 156 / 163	152 / 156 / 163	154 / 157 / 163	156 / 158 / 163
	0	150 / 155 / 163	151 / 155 / 163	151 / 155 / 163	153 / 156 / 163	155 / 158 / 163
340,000	8,000	150 / 153 / 158	150 / 153 / 158	151 / 154 / 158	152 / 155 / 158	153 / 156 / 159
	6,000	149 / 153 / 158	149 / 153 / 158	150 / 153 / 158	151 / 154 / 158	152 / 155 / 158
	4,000	148 / 152 / 158	148 / 152 / 158	148 / 152 / 158	150 / 153 / 158	151 / 154 / 158
	2,000	146 / 151 / 158	146 / 151 / 158	146 / 151 / 158	149 / 152 / 158	151 / 153 / 158
	0	145 / 150 / 158	145 / 150 / 158	145 / 150 / 158	147 / 151 / 158	150 / 153 / 158

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

DRY RUNWAY TAKEOFF SPEEDS – V_1 / V_R / V_2

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.

DRY TO / 5

TAKEOFF WEIGHT LBS	AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C				
		10 & below	20	30	40	50
320,000	8,000	145 / 148 / 153	145 / 148 / 153	146 / 149 / 153	146 / 149 / 153	147 / 150 / 154
	6,000	143 / 147 / 153	143 / 147 / 153	145 / 148 / 153	145 / 148 / 153	146 / 149 / 153
	4,000	142 / 146 / 153	142 / 146 / 153	142 / 146 / 153	145 / 148 / 153	146 / 149 / 153
	2,000	140 / 145 / 153	141 / 145 / 153	141 / 145 / 153	143 / 147 / 153	145 / 148 / 153
	0	139 / 144 / 153	139 / 145 / 153	139 / 145 / 153	141 / 145 / 153	144 / 147 / 153
300,000	8,000	139 / 143 / 148	139 / 143 / 148	140 / 143 / 148	141 / 144 / 148	142 / 144 / 148
	6,000	137 / 142 / 148	138 / 142 / 148	139 / 142 / 148	140 / 143 / 148	141 / 144 / 148
	4,000	136 / 141 / 148	136 / 141 / 148	136 / 141 / 148	139 / 142 / 148	140 / 143 / 148
	2,000	135 / 140 / 148	135 / 140 / 148	135 / 140 / 149	137 / 141 / 148	139 / 142 / 148
	0	133 / 139 / 138	133 / 139 / 138	133 / 139 / 138	135 / 140 / 138	138 / 142 / 138
280,000	8,000	133 / 137 / 143	133 / 137 / 143	134 / 137 / 143	135 / 138 / 143	136 / 138 / 143
	6,000	131 / 136 / 143	131 / 136 / 143	133 / 136 / 143	134 / 137 / 143	135 / 138 / 143
	4,000	130 / 135 / 143	130 / 135 / 143	130 / 135 / 143	133 / 136 / 143	134 / 137 / 143
	2,000	128 / 134 / 144	129 / 134 / 144	129 / 134 / 143	131 / 135 / 143	133 / 136 / 143
	0	127 / 133 / 144	127 / 133 / 144	127 / 133 / 144	129 / 134 / 144	132 / 136 / 143
260,000	8,000	126 / 131 / 138	126 / 131 / 138	128 / 131 / 138	128 / 132 / 138	129 / 132 / 138
	6,000	125 / 130 / 138	125 / 130 / 138	126 / 130 / 138	127 / 131 / 138	128 / 132 / 138
	4,000	124 / 129 / 138	124 / 129 / 138	124 / 129 / 138	126 / 130 / 138	127 / 131 / 138
	2,000	122 / 128 / 138	122 / 128 / 138	122 / 128 / 138	124 / 129 / 138	126 / 130 / 138
	0	121 / 127 / 138	121 / 127 / 138	121 / 127 / 138	122 / 128 / 138	125 / 130 / 138
230,000	8,000	116 / 121 / 130	116 / 121 / 130	118 / 122 / 130	118 / 122 / 130	119 / 123 / 130
	6,000	115 / 120 / 130	115 / 120 / 130	116 / 121 / 130	117 / 122 / 130	118 / 123 / 130
	4,000	113 / 119 / 130	113 / 119 / 130	114 / 119 / 130	116 / 121 / 130	117 / 122 / 130
	2,000	112 / 118 / 130	112 / 118 / 130	112 / 118 / 130	114 / 120 / 130	116 / 121 / 130
	0	111 / 118 / 131	110 / 117 / 130	111 / 117 / 130	112 / 118 / 130	115 / 120 / 130
200,000	8,000	106 / 111 / 121	106 / 111 / 122	107 / 112 / 121	107 / 112 / 121	108 / 113 / 121
	6,000	104 / 110 / 122	104 / 110 / 122	106 / 111 / 122	106 / 111 / 121	107 / 112 / 121
	4,000	104* / 110 / 123	104* / 110 / 123	105 / 111 / 123	106 / 111 / 122	107 / 112 / 121
	2,000	107* / 114 / 127	108 / 114 / 127	107* / 113 / 126	103* / 109 / 121	105 / 110 / 121
	0	111 / 118 / 131	110 / 117 / 130	110 / 116 / 130	107* / 113 / 126	106 / 112 / 121

NOTE:

Speeds denoted by an asterisk (*) are V_{MCG} limited.

TAKEOFF STABILIZER SETTINGS

UNITS AIRPLANE NOSE UP

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

GROSS WEIGHT LBS	CENTER OF GRAVITY – % MAC						
	12	16	20	24	28	32	36
420,000	7.0	6.5	5.5	4.5	4.0	3.0	2.0
400,000	7.0	6.0	5.5	4.5	3.5	3.0	1.5
380,000	7.0	6.0	5.0	4.5	3.5	2.5	1.5
360,000	6.5	6.0	5.0	4.0	3.5	2.5	1.5
340,000	6.0	5.5	4.5	3.5	3.0	2.0	1.0
320,000	5.5	5.0	4.0	3.5	2.5	1.5	0.5
300,000	5.0	4.5	3.5	3.0	2.0	1.5	0.5
280,000	4.5	4.0	3.0	2.5	1.5	1.0	0.5
260,000	4.0	3.5	2.5	2.0	1.0	0.5	0.5
240,000	3.5	3.0	2.0	1.5	1.0	0.5	0.5
220,000	3.5	2.5	2.0	1.0	0.5	0.5	0.5

End of Section

CONTENTS

	Page
DEFINITIONS AND ASSUMPTIONS	3-3
PATTERN AND APPROACH SPEEDS	3-4
STALL SPEEDS - V_s	3-5
F.A.R. DRY LANDING FIELD LENGTH	3-6
FLAPS 25	3-6
FLAPS 30	3-7
APPROACH AND LANDING CLIMB LIMITS.....	3-9
OPERATIONAL LANDING DISTANCES	3-10
FLAPS 25	3-10
FLAPS 30	3-12
***** APPENDIX: SHIPS 1401-1404 *****	
F.A.R. DRY LANDING FIELD LENGTH	3-16
FLAPS 25	3-16
FLAPS 30	3-17
APPROACH AND LANDING CLIMB LIMITS.....	3-19
OPERATIONAL LANDING DISTANCES	3-20
FLAPS 25	3-20
FLAPS 30	3-22

THIS PAGE INTENTIONALLY BLANK

DEFINITIONS AND ASSUMPTIONS

ACTUAL LANDING DISTANCE	The actual distance required to land starting at 50 feet above the runway (usually at the threshold) to a complete stop on the runway. This distance is based on a 1.3 V_S speed at 50 feet and assumes maximum braking and NO reverse thrust.
APPROACH CLIMB LIMIT WEIGHT	Approach Climb Limit Weight is defined in FAR 25.121 as the maximum weight at which a missed approach climb meets the FAR prescribed climb gradient (2.1% for a two engine aircraft). This gradient is determined with the critical engine inoperative, remaining engine at takeoff thrust, landing gear retracted, and approach flap setting (as defined in the FAA Approved Flight Manual). This weight takes into account an air conditioning pack ON and operated from engine bleed air.
F.A.R. LANDING FIELD LENGTH	This is the landing field length as defined in the Federal Air Regulations Part 121, and is the actual landing distance plus an additional safety margin of 67%. Dispatch is based on F.A.R. Landing Field Length at the destination airport.
GO-AROUND THRUST	Maximum thrust setting available for use during a missed approach.
LANDING CLIMB LIMIT WEIGHT	Landing Climb Limit Weight is defined in FAR 25.119 as the maximum weight at which the aircraft meets the FAR prescribed climb gradient (3.2%). This gradient is determined with all engines operating, landing gear extended, and landing flap setting.
V_S	Indicated stall speed for the aircraft weight and configuration. 1.3 V_S is 1.3 times the stall speed, or an increase of 30% above stall speed.

PATTERN AND APPROACH SPEEDS

KIAS

GROSS WEIGHT LBS	Vref	APPROACH – GEAR UP				LANDING	
		SLATS RET.	SLATS EXTENDED			SLATS EXTENDED	
		FLAPS 0 Vref + 80	FLAPS 1 Vref + 60	FLAPS 5 Vref + 40	FLAPS 20/15 Vref + 20	FLAPS 25	FLAPS 30
410,000	176	256	236	216	196	169	176
400,000	172	252	232	212	192	166	172
390,000	169	249	229	209	189	164	169
380,000	166	246	226	206	186	162	166
370,000	163	243	223	203	183	160	163
360,000	159	239	219	199	179	158	159
350,000	155	235	215	195	175	156	155
340,000	151	231	211	191	171	153	151
330,000	148	228	208	188	168	151	148
320,000	145	225	205	185	165	149	145
310,000	143	223	203	183	163	147	143
300,000	140	220	200	180	160	144	140
290,000	138	218	198	178	158	142	138
280,000	135	215	195	175	155	139	135
270,000	133	213	193	173	153	137	133
260,000	130	210	190	170	150	134	130
250,000	127	207	187	167	147	132	127
240,000	124	204	184	164	144	129	124
230,000	122	202	182	162	142	126	122
220,000	119	199	179	159	139	123	119
210,000	116	196	176	156	136	120	116
200,000	113	193	173	153	133	117	113

STALL SPEEDS - V_s**KIAS**

GROSS WEIGHT LBS	GEAR UP					GEAR DOWN	
	FLAPS 0 SLATS RET	FLAPS 1 SLATS EXT	FLAPS 5 SLATS EXT	FLAPS 15 SLATS EXT	FLAPS 20 SLATS EXT	FLAPS 25 SLATS EXT	FLAPS 30 SLATS EXT
410,000	198	164	150	146	144	137	135
400,000	195	162	148	144	142	135	133
390,000	192	159	146	142	140	133	132
380,000	189	157	144	140	138	131	130
370,000	187	154	142	138	136	129	128
360,000	184	152	139	136	134	128	126
350,000	181	150	137	134	132	126	124
340,000	178	147	135	132	129	124	122
330,000	175	144	133	130	127	122	120
320,000	172	141	130	127	125	120	119
310,000	169	138	128	125	123	118	116
300,000	165	136	127	123	120	116	114
290,000	162	134	123	121	118	114	112
280,000	159	131	121	118	115	111	110
270,000	156	128	117	116	113	109	108
260,000	152	125	115	113	110	107	106
250,000	149	122	112	110	108	104	104
240,000	145	119	110	107	105	102	101
230,000	142	116	107	104	102	99	99
220,000	137	112	104	102	99	97	97
210,000	133	109	101	99	96	94	94
200,000	128	106	98	96	93	91	91

F.A.R. DRY LANDING FIELD LENGTH**FEET****PW 4060****FLAPS 25**

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET					
	0	1,000	2,000	4,000	6,000	8,000
410,000	7,350	7,500	7,700	8,100	8,550	9,000
390,000	6,850	7,000	7,150	7,550	7,900	8,400
370,000	6,350	6,500	6,650	7,000	7,800	7,750
350,000	5,900	6,050	6,150	6,500	6,850	7,200
330,000	5,600	5,750	5,900	6,150	6,500	6,850
320,000	5,450	5,600	5,700	6,000	6,350	6,650
310,000	5,300	5,450	5,600	5,900	6,200	6,500
300,000	5,200	5,300	5,450	5,700	6,000	6,300
290,000	5,050	5,150	5,300	5,550	5,850	6,150
280,000	4,900	5,000	5,150	5,400	5,700	6,000
270,000	4,750	4,850	5,000	5,250	5,500	5,800
260,000	4,600	4,750	4,850	5,100	5,350	5,600
250,000	4,500	4,600	4,700	4,900	5,200	5,500
240,000	4,360	4,450	4,550	4,800	5,050	5,300
230,000	4,200	4,300	4,400	4,600	4,850	5,100
220,000	4,050	4,150	4,250	4,500	4,700	4,950

NOTE:

Actual Landing Distance is:

- 60 percent of the F.A.R. Landing Field Lengths above.
- The distance to a complete stop from 50 feet above the runway threshold at V_{Ref} .
- Based on maximum manual braking, speed brakes extended and NO reverse thrust.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 20 ft. per knot
Tailwind	+ 130 ft. per knot
Manual Spoilers	Refer to ODM Abnormal Section
Wet runway and/or Low Minima	increase distance by 15%

F.A.R. DRY LANDING FIELD LENGTH**FEET****PW 4060****FLAPS 30**

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET					
	0	1,000	2,000	4,000	6,000	8,000
410,000	7,700	7,800	8,050	8,500	8,950	9,500
390,000	7,000	7,200	7,400	7,800	8,200	8,650
370,000	6,400	6,550	6,750	7,100	7,450	7,850
350,000	5,800	5,900	6,100	6,400	6,700	7,100
330,000	5,300	5,400	5,550	5,850	6,150	6,500
320,000	5,150	5,300	5,400	5,700	6,000	6,300
310,000	5,000	5,150	5,250	5,550	5,850	6,150
300,000	4,900	5,000	5,150	5,400	5,650	6,000
290,000	4,750	4,850	5,000	5,250	5,500	5,800
280,000	4,600	4,750	4,850	5,100	5,350	5,650
270,000	4,500	4,600	4,700	4,950	5,200	5,500
260,000	4,350	4,450	4,550	4,800	5,050	5,300
250,000	4,200	4,300	4,400	4,650	4,900	5,150
240,000	4,150	4,150	4,250	4,500	4,700	5,000
230,000	3,950	4,000	4,150	4,350	4,550	4,800
220,000	3,800	3,800	4,000	4,150	4,400	4,650

NOTE:

Actual Landing Distance is:

- 60 percent of the F.A.R. Landing Field Lengths above.
- The distance to a complete stop from 50 feet above the runway threshold at V_{Ref} .
- Based on maximum manual braking, speed brakes extended and NO reverse thrust.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 20 ft. per knot
Tailwind	+ 130 ft. per knot
Manual Spoilers	Refer to ODM Abnormal Section
Wet runway and/or Low Minima	increase distance by 15%

THIS PAGE INTENTIONALLY BLANK

APPROACH AND LANDING CLIMB LIMITS

POUNDS

**APPROACH FLAPS 20
LANDING FLAPS 25 or 30**

OAT °F	PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
120	358,000	345,000	332,000	OUTSIDE ENVIRONMENTAL ENVELOPE					
115	371,000	357,500	345,000						
110	384,000	369,500	355,500	343,000	329,500	316,000			
105	395,500	380,500	366,000	353,000	339,000	325,500	313,500	302,000	
100	410,000	392,000	377,000	362,500	348,500	335,000	322,500	310,000	298,500
95	420,000	401,500	385,500	371,000	357,000	343,500	330,000	317,500	305,500
90	420,000	413,000	394,500	379,000	364,500	351,000	337,500	323,500	311,500
85	420,000	417,000	401,500	385,500	370,500	356,500	343,000	329,500	316,500
80	420,000	417,000	402,000	390,000	376,000	362,000	347,500	334,500	321,000
75	420,000	417,000	402,000	390,000	378,000	366,000	351,500	338,500	325,500
70	420,000	417,000	402,000	390,000	378,500	366,500	355,000	342,000	329,000
65	420,000	417,000	402,000	390,000	378,500	366,500	355,000	344,000	332,500
60	420,000	417,000	402,000	390,000	378,500	366,500	355,000	344,000	334,000
55	420,000	417,000	402,000	390,500	379,000	367,000	355,000	344,500	334,000
50 & below	420,000	417,000	402,000	390,500	379,000	367,000	355,000	344,500	334,000

NOTES:

1. AFM Maximum Structural Landing Weight should not be exceeded (unless overweight landing is deemed necessary in flight).
2. Reduce Gross Weight by 37,900 lbs. when operating in icing conditions during any part of the flight when the forecast landing temperature is below 50°F.
3. Apply the following Gross Weight Corrections for applicable bleed configuration:

CONFIGURATION	CORRECTION – POUNDS	
	A/C PACKS OFF	A/C PACKS ON
Engine Anti-Ice OFF	+ 2,800	0
Engine Anti-Ice ON	+ 2,800	0
Engine & Wing Anti-Ice ON	- 3,700	- 6,700

BASIS:

The limit weights shown are the more restrictive of:

- | | |
|---|---|
| <p style="text-align: center;"><u>Approach</u></p> <ul style="list-style-type: none"> • One engine inoperative. • Flaps at approach setting. • Landing gear retracted. | <p style="text-align: center;"><u>Landing</u></p> <ul style="list-style-type: none"> • All engines operating. • Flaps at landing setting. • Landing gear extended. |
|---|---|

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	12,200	11,100	9,800	8,600	8,300	5,500	9,800	8,600	8,300	7,000
400,000	12,000	10,900	9,700	8,500	8,200	5,300	9,700	8,500	8,200	6,900
390,000	11,700	10,700	9,500	8,300	8,000	5,200	9,500	8,300	8,000	6,800
380,000	11,500	10,400	9,300	8,200	7,900	5,100	9,300	8,200	7,900	6,700
370,000	11,200	10,200	9,100	8,000	7,700	5,000	9,100	8,000	7,700	6,500
360,000	11,000	10,000	8,900	7,800	7,600	4,800	8,900	7,800	7,600	6,400
350,000	10,700	9,800	8,700	7,700	7,400	4,700	8,700	7,700	7,400	6,300
340,000	10,500	9,600	8,600	7,500	7,300	4,600	8,600	7,500	7,300	6,200
330,000	10,200	9,300	8,400	7,400	7,100	4,500	8,400	7,400	7,100	6,000
320,000	10,000	9,100	8,200	7,200	7,000	4,400	8,200	7,200	7,000	5,900
310,000	9,700	8,900	8,000	7,000	6,800	4,300	8,000	7,000	6,800	5,800
300,000	9,500	8,700	7,800	6,900	6,700	4,300	7,800	6,900	6,700	5,700
290,000	9,200	8,500	7,600	6,700	6,500	4,200	7,600	6,700	6,500	5,600
280,000	9,000	8,200	7,500	6,500	6,400	4,100	7,500	6,500	6,400	5,500
270,000	8,700	8,000	7,300	6,400	6,200	4,000	7,300	6,400	6,200	5,400
260,000	8,400	7,800	7,100	6,200	6,100	3,900	7,100	6,200	6,100	5,200

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	0	-50	-50	-50	0
PER 1 KT TAILWIND	150	150	100	100	100	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	400	450	350	350	150	450	350	350	200
PER 10°C ABOVE ISA	300	250	200	200	200	100	200	200	200	150
PER 10°C BELOW ISA	-250	-250	-200	-200	-200	-100	-200	-200	-200	-150
PER 1% UP SLOPE	-250	-150	0	0	0	-50	0	0	0	-150
PER 1% DOWN SLOPE	200	50	0	0	0	50	0	0	0	150
1 REVERSER INOP	500	100	0	0	0	100	0	0	0	300
2 REVERSERS INOP	600	100	0	0	0	200	0	100	100	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	10,500	9,700	9,700	9,700	12,700	12,700	12,700	12,700
400,000	10,300	9,500	9,500	9,500	12,400	12,400	12,400	12,400
390,000	10,100	9,400	9,300	9,300	12,100	12,100	12,100	12,100
380,000	9,800	9,200	9,100	9,100	11,800	11,800	11,800	11,800
370,000	9,600	9,000	8,900	8,900	11,600	11,500	11,500	11,500
360,000	9,400	8,800	8,700	8,700	11,300	11,300	11,300	11,300
350,000	9,200	8,600	8,500	8,500	11,000	11,000	11,000	11,000
340,000	9,000	8,400	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,800	8,200	8,100	8,100	10,500	10,500	10,500	10,500
320,000	8,600	8,000	8,000	8,000	10,200	10,200	10,200	10,200
310,000	8,400	7,800	7,800	7,800	9,900	9,900	9,900	9,900
300,000	8,200	7,600	7,600	7,600	9,700	9,700	9,700	9,700
290,000	8,000	7,500	7,400	7,400	9,400	9,400	9,400	9,400
280,000	7,800	7,300	7,200	7,200	9,100	9,100	9,100	9,100
270,000	7,600	7,100	7,000	7,000	8,900	8,900	8,900	8,900
260,000	7,400	6,900	6,900	6,900	8,600	8,600	8,600	8,600

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

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

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



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	450	350	350	250	400	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-100	-150	-200	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	300	350	350	800	850	850	850
1 REVERSER INOP	400	600	700	700	1,500	1,600	1,600	1,600
2 REVERSERS INOP	1,200	1,700	1,700	1,800	4,200	4,300	4,300	4,300
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	12,700	11,600	10,500	9,100	8,800	5,700	10,500	9,200	8,900	7,400
400,000	12,400	11,300	10,200	8,900	8,600	5,500	10,200	8,900	8,600	7,200
390,000	12,000	11,000	9,900	8,600	8,400	5,400	9,900	8,700	8,400	7,000
380,000	11,700	10,700	9,600	8,400	8,100	5,200	9,600	8,400	8,100	6,800
370,000	11,300	10,400	9,300	8,100	7,900	5,000	9,300	8,100	7,900	6,700
360,000	11,000	10,000	9,000	7,900	7,600	4,900	9,000	7,900	7,700	6,500
350,000	10,700	9,700	8,700	7,600	7,400	4,700	8,700	7,600	7,400	6,300
340,000	10,300	9,400	8,400	7,400	7,200	4,500	8,400	7,400	7,200	6,100
330,000	10,100	9,200	8,200	7,200	7,000	4,500	8,200	7,200	7,000	6,000
320,000	9,800	8,900	8,000	7,000	6,800	4,400	8,000	7,100	6,800	5,800
310,000	9,500	8,700	7,800	6,900	6,700	4,300	7,800	6,900	6,700	5,700
300,000	9,300	8,500	7,600	6,700	6,500	4,200	7,600	6,700	6,500	5,600
290,000	9,000	8,200	7,400	6,500	6,400	4,100	7,400	6,600	6,400	5,500
280,000	8,800	8,000	7,200	6,400	6,200	4,100	7,200	6,400	6,200	5,300
270,000	8,500	7,800	7,000	6,200	6,000	4,000	7,000	6,300	6,000	5,200
260,000	8,300	7,500	6,800	6,100	5,900	3,900	6,800	6,100	5,900	5,100

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	0	-50	-50	-50	0
PER 1 KT TAILWIND	150	150	100	100	100	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	400	400	350	350	150	400	350	350	200
PER 10°C ABOVE ISA	300	250	200	200	150	100	200	200	150	150
PER 10°C BELOW ISA	-250	-250	-200	-200	-150	-100	-200	-200	-150	-150
PER 1% UP SLOPE	-250	-100	0	0	0	-50	0	0	0	-150
PER 1% DOWN SLOPE	200	0	0	0	0	50	0	0	0	150
1 REVERSER INOP	400	0	0	0	0	100	0	0	0	300
2 REVERSERS INOP	500	0	0	0	0	100	0	100	100	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	11,100	10,300	10,300	10,100	13,300	13,200	13,200	13,200
400,000	10,800	10,000	10,000	9,900	13,000	12,800	12,800	12,800
390,000	10,500	9,700	9,700	9,600	12,600	12,500	12,500	12,500
380,000	10,200	9,400	9,400	9,300	12,200	12,100	12,100	12,100
370,000	9,800	9,200	9,100	9,100	11,800	11,700	11,700	11,700
360,000	9,500	8,900	8,800	8,800	11,400	11,400	11,400	11,400
350,000	9,200	8,600	8,500	8,500	11,100	11,000	11,000	11,000
340,000	8,900	8,300	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,700	8,100	8,100	8,100	10,400	10,400	10,400	10,400
320,000	8,400	7,900	7,900	7,900	10,100	10,100	10,100	10,100
310,000	8,200	7,700	7,700	7,700	9,800	9,800	9,800	9,800
300,000	8,000	7,500	7,500	7,500	9,600	9,600	9,600	9,600
290,000	7,800	7,300	7,300	7,300	9,300	9,300	9,300	9,300
280,000	7,600	7,100	7,100	7,100	9,000	9,000	9,000	9,000
270,000	7,400	6,900	6,900	6,900	8,700	8,700	8,700	8,700
260,000	7,100	6,700	6,700	6,700	8,500	8,500	8,500	8,500

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	350	300	250	400	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-100	-200	-200	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	350	350	350	850	850	850	850
1 REVERSER INOP	400	600	700	700	1,500	1,500	1,500	1,500
2 REVERSERS INOP	1,200	1,600	1,600	1,600	3,900	3,900	3,900	3,900
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

THIS PAGE INTENTIONALLY BLANK

APPENDIX

—

SHIPS 1401-1404

APPENDIX: SHIPS 1401-1404

F.A.R. DRY LANDING FIELD LENGTH**FEET**

PW 4060

FLAPS 25

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET					
	0	1,000	2,000	4,000	6,000	8,000
350,000	5,960	6,360	6,520	6,700	6,850	7,100
340,000	5,980	6,110	6,270	6,430	6,600	6,750
330,000	5,800	5,950	6,100	6,250	6,350	6,570
320,000	5,660	5,800	5,950	6,100	6,200	6,410
310,000	5,510	5,650	5,800	5,940	6,040	6,240
300,000	5,370	5,500	5,640	5,780	5,880	6,070
290,000	5,220	5,350	5,490	5,620	5,720	5,910
280,000	5,080	5,200	5,330	5,460	5,570	5,740
270,000	4,930	5,050	5,180	5,300	5,410	5,570
260,000	4,780	4,900	5,030	5,150	5,250	5,410
250,000	4,640	4,750	4,870	4,990	5,090	5,240
240,000	4,490	4,600	4,720	4,830	4,940	5,070
230,000	4,350	4,450	4,560	4,670	4,780	4,910
220,000	4,200	4,300	4,410	4,510	4,620	4,740
210,000	4,050	4,150	4,250	4,350	4,460	4,570

NOTE:

Actual Landing Distance is:

- 60 percent of the F.A.R. Landing Field Lengths above.
- The distance to a complete stop from 50 feet above the runway threshold at V_{Ref} .
- Based on maximum manual braking, speed brakes extended and NO reverse thrust.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 20 ft. per knot
Tailwind	+ 130 ft. per knot
Manual Spoilers	Refer to ODM Abnormal Section
Wet runway and/or Low Minima	increase distance by 15%

APPENDIX: SHIPS 1401-1404

F.A.R. DRY LANDING FIELD LENGTH**FEET**

PW 4060

FLAPS 30

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET					
	0	1,000	2,000	4,000	6,000	8,000
350,000	6,150	6,300	6,460	6,620	6,780	7,000
340,000	5,780	5,940	6,090	6,250	6,400	6,570
330,000	5,610	5,700	5,850	5,980	6,140	6,300
320,000	5,460	5,550	5,700	5,830	5,980	6,140
310,000	5,310	5,400	5,550	5,670	5,820	5,970
300,000	5,160	5,250	5,390	5,510	5,660	5,810
290,000	5,010	5,100	5,240	5,360	5,500	5,640
280,000	4,860	4,950	5,080	5,200	5,340	5,480
270,000	4,710	4,800	4,930	5,040	5,170	5,310
260,000	4,560	4,650	4,780	4,890	5,010	5,140
250,000	4,410	4,500	4,620	4,730	4,850	4,980
240,000	4,260	4,350	4,470	4,570	4,690	4,810
230,000	4,110	4,200	4,310	4,420	4,530	4,650
220,000	3,960	4,050	4,160	4,260	4,370	4,480
210,000	3,810	3,900	4,000	4,100	4,200	4,310

NOTE:

Actual Landing Distance is:

- 60 percent of the F.A.R. Landing Field Lengths above.
- The distance to a complete stop from 50 feet above the runway threshold at V_{Ref} .
- Based on maximum manual braking, speed brakes extended and NO reverse thrust.

CORRECTIONS:

CONDITION	CORRECTION
Headwind	- 20 ft. per knot
Tailwind	+ 130 ft. per knot
Manual Spoilers	Refer to ODM Abnormal Section
Wet runway and/or Low Minima	increase distance by 15%

THIS PAGE INTENTIONALLY BLANK

APPENDIX: SHIPS 1401-1404

APPROACH AND LANDING CLIMB LIMITS**POUNDS**

PW 4060

APPROACH FLAPS 20 LANDING FLAPS 25 or 30

OAT - °F	AIRPORT PRESSURE ALTITUDE - FEET										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000		
120	358,000	345,000	332,000	OUTSIDE ENVIRONMENTAL ENVELOPE							
115	371,000	357,500	345,000							331,500	318,500
110	384,000	369,500	355,500							343,000	329,500
105	395,500	380,500	366,000	353,000	339,000	325,500	313,500	302,000			
100	410,000	392,000	377,000	362,500	348,500	335,000	322,500	310,000		298,500	
95	420,000	401,500	385,500	371,000	357,000	343,500	330,000	317,500		305,500	
90	420,000	413,000	394,500	379,000	364,500	351,000	337,500	323,500	311,500		
85	420,000	417,000	401,500	385,500	370,500	356,500	343,000	329,500	316,500		
80	420,000	417,000	402,000	390,000	376,000	362,000	347,500	334,500	321,000		
75	420,000	417,000	402,000	390,000	378,000	366,000	351,500	338,500	325,500		
70	420,000	417,000	402,000	390,000	378,500	366,500	355,000	342,000	329,000		
65	420,000	417,000	402,000	390,000	378,500	366,500	355,000	344,000	332,500		
60	420,000	417,000	402,000	390,000	378,500	366,500	355,000	344,000	334,000		
55	420,000	417,000	402,000	390,500	379,000	367,000	355,000	344,500	334,000		
50 & below	420,000	417,000	402,000	390,500	379,000	367,000	355,000	344,500	334,000		

NOTES:

1. AFM Maximum Structural Landing Weight should not be exceeded (unless overweight landing is deemed necessary in flight).
2. Reduce Gross Weight by 37,900 pounds when operating in icing conditions during any part of the flight when the forecast landing temperature is below 50°F.
3. Apply the following Gross Weight Corrections for applicable bleed configuration:

CONFIGURATION	CORRECTION – POUNDS	
	A/C PACKS OFF	A/C PACKS ON
Anti-Ice OFF	+ 2,800	0
Engine Anti-Ice ON	+ 2,800	0
Engine & Wing Anti-Ice ON	- 3,700	- 6,700

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.

APPENDIX: SHIPS 1401-1404

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	10,800	9,900	8,600	7,400	5,900	4,900	8,600	7,400	6,300	6,300
340,000	10,500	9,600	8,400	7,200	5,800	4,600	8,400	7,300	6,100	6,200
330,000	10,300	9,400	8,200	7,100	5,700	4,600	8,200	7,100	6,000	6,000
320,000	10,000	9,200	8,000	6,900	5,500	4,500	8,000	7,000	5,900	5,900
310,000	9,800	9,000	7,800	6,800	5,400	4,400	7,800	6,800	5,800	5,800
300,000	9,500	8,800	7,700	6,600	5,300	4,300	7,700	6,700	5,700	5,700
295,000	9,400	8,700	7,600	6,600	5,300	4,300	7,600	6,600	5,600	5,600
290,000	9,200	8,500	7,500	6,500	5,200	4,200	7,500	6,500	5,600	5,600
280,000	9,000	8,300	7,300	6,300	5,100	4,200	7,300	6,400	5,400	5,500
270,000	8,700	8,100	7,100	6,200	5,000	4,100	7,100	6,200	5,300	5,400
260,000	8,500	7,900	6,900	6,000	4,900	4,000	6,900	6,100	5,200	5,200
250,000	8,200	7,700	6,700	5,900	4,700	3,900	6,700	5,900	5,100	5,100
240,000	8,000	7,500	6,600	5,700	4,600	3,800	6,600	5,800	5,000	5,000
230,000	7,700	7,200	6,400	5,600	4,500	3,800	6,400	5,600	4,900	4,900
220,000	7,500	7,000	6,200	5,400	4,400	3,700	6,200	5,500	4,800	4,800

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	400	350	250	150	400	350	250	200
PER 10°C ABOVE ISA	300	250	200	150	150	100	200	200	150	150
PER 10°C BELOW ISA	-250	-250	-200	-150	-150	-100	-200	-200	-150	-150
PER 1% UP SLOPE	-250	-150	0	0	0	-50	0	0	-50	-150
PER 1% DOWN SLOPE	200	50	0	0	0	50	0	0	150	150
1 REVERSER INOP	500	100	0	0	0	100	0	0	300	300
2 REVERSERS INOP	600	100	0	0	0	200	0	100	600	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

APPENDIX: SHIPS 1401-1404

OPERATIONAL LANDING DISTANCES FEET

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	9,100	8,500	8,500	8,500	11,000	11,000	11,000	11,000
340,000	8,900	8,300	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,700	8,100	8,100	8,100	10,400	10,500	10,500	10,500
320,000	8,500	8,000	8,000	8,000	10,200	10,200	10,200	10,200
310,000	8,300	7,800	7,800	7,800	9,900	9,900	9,900	9,900
300,000	8,100	7,600	7,600	7,600	9,600	9,700	9,700	9,700
295,000	8,000	7,500	7,500	7,500	9,500	9,500	9,500	9,500
290,000	7,900	7,400	7,400	7,400	9,400	9,400	9,400	9,400
280,000	7,700	7,200	7,200	7,200	9,100	9,100	9,100	9,100
270,000	7,500	7,000	7,000	7,000	8,800	8,900	8,900	8,900
260,000	7,400	6,900	6,900	6,900	8,600	8,600	8,600	8,600
250,000	7,200	6,700	6,700	6,700	8,300	8,300	8,300	8,300
240,000	7,000	6,500	6,500	6,500	8,100	8,100	8,100	8,100
230,000	6,800	6,300	6,300	6,300	7,800	7,800	7,800	7,800
220,000	6,600	6,100	6,100	6,100	7,500	7,500	7,500	7,500

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

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

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



Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	300	250	250	350	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-100	-200	-300	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	350	350	350	800	850	850	850
1 REVERSER INOP	400	700	700	700	1,600	1,600	1,600	1,600
2 REVERSERS INOP	1,300	1,700	1,800	1,800	4,200	4,300	4,300	4,300
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

APPENDIX: SHIPS 1401-1404
**OPERATIONAL LANDING DISTANCES
FEET**
FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	10,700	9,800	8,500	7,400	5,900	4,800	8,500	7,400	6,000	6,300
340,000	10,400	9,500	8,200	7,100	5,700	4,500	8,200	7,100	5,800	6,100
330,000	10,100	9,300	8,000	6,900	5,600	4,500	8,000	7,000	5,700	6,000
320,000	9,800	9,000	7,800	6,800	5,500	4,400	7,800	6,800	5,500	5,800
310,000	9,600	8,800	7,700	6,600	5,300	4,300	7,700	6,700	5,400	5,700
300,000	9,300	8,600	7,500	6,500	5,200	4,200	7,500	6,500	5,300	5,600
295,000	9,200	8,500	7,400	6,400	5,200	4,200	7,400	6,400	5,200	5,500
290,000	9,100	8,400	7,300	6,300	5,100	4,100	7,300	6,300	5,200	5,500
280,000	8,800	8,100	7,100	6,100	5,000	4,100	7,100	6,200	5,000	5,300
270,000	8,600	7,900	6,900	6,000	4,900	4,000	6,900	6,000	4,900	5,200
260,000	8,300	7,700	6,700	5,800	4,800	3,900	6,700	5,800	4,800	5,100
250,000	8,100	7,400	6,500	5,700	4,600	3,800	6,500	5,700	4,600	5,000
240,000	7,800	7,200	6,300	5,500	4,500	3,700	6,300	5,500	4,500	4,800
230,000	7,600	7,000	6,100	5,300	4,400	3,700	6,100	5,400	4,400	4,700
220,000	7,300	6,700	5,900	5,200	4,300	3,600	5,900	5,200	4,300	4,600

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	150	100	100	50	50	100	100	100	100
PER 5 KTS ADD'L SPD	350	350	400	350	250	150	400	350	250	200
PER 10°C ABOVE ISA	300	250	200	150	150	100	200	150	150	150
PER 10°C BELOW ISA	-250	-250	-200	-150	-150	-100	-200	-150	-150	-150
PER 1% UP SLOPE	-250	-150	0	0	0	-50	0	0	-100	-150
PER 1% DOWN SLOPE	200	0	0	0	0	50	0	0	150	150
1 REVERSER INOP	400	100	0	0	0	100	0	0	300	300
2 REVERSERS INOP	500	100	0	0	0	100	0	100	600	600
MANUAL SPOILERS	0	0	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

APPENDIX: SHIPS 1401-1404

OPERATIONAL LANDING DISTANCES FEET

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	9,100	8,500	8,500	8,500	11,100	11,000	11,000	11,000
340,000	8,800	8,300	8,300	8,300	10,700	10,700	10,700	10,700
330,000	8,600	8,100	8,100	8,100	10,400	10,400	10,400	10,400
320,000	8,400	7,900	7,900	7,900	10,100	10,100	10,100	10,100
310,000	8,100	7,700	7,700	7,700	9,800	9,800	9,800	9,800
300,000	7,900	7,500	7,500	7,500	9,600	9,600	9,600	9,600
295,000	7,800	7,400	7,400	7,400	9,400	9,400	9,400	9,400
290,000	7,700	7,300	7,300	7,300	9,300	9,300	9,300	9,300
280,000	7,500	7,100	7,100	7,100	9,000	9,000	9,000	9,000
270,000	7,300	6,900	6,900	6,900	8,700	8,700	8,700	8,700
260,000	7,100	6,700	6,700	6,700	8,500	8,500	8,500	8,500
250,000	6,900	6,500	6,500	6,500	8,200	8,200	8,200	8,200
240,000	6,700	6,300	6,300	6,300	7,900	7,900	7,900	7,900
230,000	6,500	6,100	6,100	6,100	7,600	7,600	7,600	7,600
220,000	6,300	5,900	5,900	5,900	7,400	7,400	7,400	7,400

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	150	150	150	200	200	200	200
PER 5 KTS ADD'L SPD	400	300	250	250	350	300	300	300
PER 10°C ABOVE ISA	250	250	250	250	350	350	350	350
PER 10°C BELOW ISA	-250	-200	-200	-200	-300	-300	-300	-300
PER 1% UP SLOPE	-150	-200	-300	-300	-450	-550	-550	-550
PER 1% DOWN SLOPE	200	350	350	350	850	850	850	850
1 REVERSER INOP	400	700	700	700	1,500	1,500	1,500	1,500
2 REVERSERS INOP	1,200	1,600	1,600	1,600	3,900	3,900	3,900	3,900
MANUAL SPOILERS	0	0	0	500	0	0	0	500

Note: Do not operate when Braking Action is Nil.

END OF SECTION

CONTENTS

NOTE: For Ships 1401 – 1404, reference sections listed on Page 4-3 for data specific to those aircraft.

	Page
DEFINITIONS AND ASSUMPTIONS.....	4-4
THRUST SETTINGS – ALL ENGINES.....	4-5
TAKEOFF EPR.....	4-5
MAXIMUM CLIMB EPR	4-6
MAXIMUM CRUISE EPR	4-7
GO AROUND EPR	4-8
ONE ENGINE INOPERATIVE.....	4-10
MAXIMUM CONTINUOUS THRUST* EPR.....	4-10
DRIFTDOWN PROCEDURES	4-11
DRIFTDOWN SPEED SCHEDULE.....	4-11
DRIFTDOWN SPEED AND GROSS LEVEL OFF ALTITUDE.....	4-12
LONG RANGE CRUISE ALTITUDE CAPABILITY	4-13
LONG RANGE CRUISE	4-14
LANDING GEAR EXTENDED REVENUE OPERATIONS	4-20
PROCEDURES	4-20
DRIFTDOWN PERFORMANCE.....	4-21
LONG RANGE CRUISE ALTITUDE CAPABILITY	4-22
LONG RANGE CRUISE	4-23
ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS.....	4-24
APPLICABILITY	4-24
ASSUMPTIONS.....	4-24
AIR GROUND LOGIC IN AIR MODE, FLAPS 30.....	4-25
AIRSPEED UNRELIABLE	4-25
ANTI-SKID INOPERATIVE, FLAPS 30	4-26
FLAPS UP.....	4-26
HYDRAULIC SYSTEM C INOP	4-27
HYDRAULIC SYSTEM C+L OR C+R INOP	4-27
HYDRAULIC SYSTEM R & L INOP.....	4-28
LE SLAT ASYMMETRY, FLAPS LESS THAN OR EQUAL TO FLAPS 20	4-28
LE SLAT ASYMMETRY, FLAPS GREATER THAN 20	4-29
LE SLAT DISAGREE	4-29
ONE ENGINE INOPERATIVE	4-30
TE FLAP ASYMMETRY, FLAPS 20 OR GREATER	4-30
TE FLAP ASYMMETRY, 5 < FLAPS < 20	4-31
TE FLAP ASYMMETRY, FLAPS LESS THAN OR EQUAL TO 5	4-31
TE FLAP DISAGREE.....	4-32
THRUST REVERSER UNLOCKED	4-32
EMERGENCY LANDING DISTANCES	4-34
FLAPS 25.....	4-34
FLAPS 30.....	4-36

CONTENTS (CONT.)

	Page
OPERATION WITHOUT AIRSPEED INDICATION	4-38
CLIMB	4-38
CRUISE	4-38
DESCENT	4-38
HOLDING	4-39
TERMINAL AREA	4-39
FINAL APPROACH	4-39
BRAKE COOLING FOLLOWING LANDING	4-40
GOVERNING CONDITIONS	4-40
PROCEDURES	4-40
MAXIMUM QUICK TURNAROUND LANDING WEIGHT	4-41
BTMS OPERATIVE BRAKE COOLING	4-42
LANDING BRAKE COOLING	4-43
BRAKE COOLING FOLLOWING REJECTED TAKEOFF	4-44
REJECTED TAKEOFF BRAKE COOLING	4-44
MEL SUPPORT	4-45
V _{MCG} - MINIMUM CONTROL SPEED, GROUND	4-45
V ₁ ADJUSTMENT - EEC ALT MODE	4-46
TAKEOFF THRUST EPR - EEC ALT MODE	4-47
GO AROUND THRUST EPR - EEC ALT MODE	4-48
GO AROUND THRUST N ₁ - EEC ALT MODE	4-49
MAX CONTINUOUS THRUST - EEC ALT MODE	4-50
FAR LANDING DISTANCES (FACTORED)	4-51
DEFINITION	4-51
APPLICABILITY	4-51
ASSUMPTIONS	4-51
ANTI-SKID INOP	4-52
ONE BRAKE DEACTIVATED	4-53
AUTO SPOILERS INOP	4-54

(CONTINUED ON NEXT PAGE)

CONTENTS (CONT.)

APPENDIX: SHIPS 1401-1404

	Page
ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS.....	4-56
APPLICABILITY	4-56
ASSUMPTIONS.....	4-56
AIR GROUND LOGIC IN AIR MODE, FLAPS 30.....	4-57
AIRSPEED UNRELIABLE	4-57
ANTI-SKID INOPERATIVE, FLAPS 30	4-58
FLAPS UP.....	4-58
HYDRAULIC SYSTEM C INOP	4-59
HYDRAULIC SYSTEM C+L OR C+R INOP	4-59
HYDRAULIC SYSTEM R & L INOP.....	4-60
LE SLAT ASYMMETRY, FLAPS ≥ 20	4-60
LE SLAT ASYMMETRY, FLAPS < 20	4-61
ONE ENGINE INOPERATIVE	4-61
TE FLAP ASYMMETRY, FLAPS ≥ 20	4-62
TE FLAP ASYMMETRY, $5 < \text{FLAPS} < 20$	4-62
TE FLAP ASYMMETRY, FLAPS ≤ 5	4-63
TE FLAP DISAGREE.....	4-63
THRUST REVERSER UNLOCKED	4-64
EMERGENCY LANDING DISTANCES	4-66
FLAPS 25.....	4-66
FLAPS 30.....	4-68
BRAKE COOLING FOLLOWING LANDING	4-70
GOVERNING CONDITIONS	4-70
PROCEDURES	4-70
MAXIMUM QUICK TURNAROUND LANDING WEIGHT.....	4-71
BTMS OPERATIVE BRAKE COOLING	4-72
LANDING BRAKE COOLING	4-73
BRAKE COOLING FOLLOWING REJECTED TAKEOFF.....	4-74
MEL SUPPORT	4-75
FAR LANDING DISTANCES (FACTORED).....	4-75
DEFINITION.....	4-75
APPLICABILITY	4-75
ASSUMPTIONS	4-75
ANTI-SKID INOP.....	4-76
ONE BRAKE DEACTIVATED	4-77
AUTO SPOILERS INOP	4-78

DEFINITIONS AND ASSUMPTIONS

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

MEL RELATED PERFORMANCE ABBREVIATIONS DISPLAYED ON WDR

ASI	AWABS has automatically corrected the allowable weights and V1 speeds due to a completely inoperative anti-skid braking system.
BKI	AWABS has automatically corrected the allowable weights and V1 speeds due to an inoperative brake or one anti-skid channel inoperative.
GRD	AWABS has automatically corrected the allowable weights and V1 speeds due to gear down dispatch. Used when an MEL item requires delayed gear retraction or gear down flight.

THRUST SETTINGS – ALL ENGINES**TAKEOFF****EPR****TO**

BASED ON FULL RATING
 NORMAL BLEED – PACKS ON, EEC NORM, ANTI-ICE ON or OFF

PW4060

AIRPORT OAT		AIRPORT PRESSURE ALTITUDE (FT)					
°F	°C	-1,000	0	2,000	4,000	6,000	8,000
158	70	1.24	1.23	1.25	1.25	1.25	1.25
149	65	1.29	1.28	1.27	1.27	1.27	1.27
140	60	1.34	1.33	1.33	1.32	1.32	1.32
131	55	1.39	1.38	1.38	1.37	1.37	1.37
122	50	1.43	1.42	1.42	1.42	1.42	1.42
113	45	1.46	1.46	1.46	1.46	1.46	1.46
104	40	1.51	1.51	1.51	1.51	1.50	1.51
95	35	1.53	1.55	1.55	1.54	1.54	1.54
86	30	1.53	1.56	1.58	1.58	1.58	1.58
77	25	1.53	1.56	1.58	1.60	1.60	1.60
68	20	1.53	1.56	1.58	1.60	1.61	1.62
59	15	1.53	1.56	1.58	1.60	1.61	1.64
50 & BELOW	10 & BELOW	1.53	1.56	1.58	1.60	1.61	1.64

CORRECTIONS:

Bleed Configuration	PRESSURE ALTITUDE (1000 FT)							
	-1,000	0	2,000	4,000	4,500	4,501	6,000	8,000
Packs OFF	+0.01	+0.01	+0.01	+0.01	+0.01	+0.02	+0.02	+0.02

THRUST SETTINGS – ALL ENGINES

MAXIMUM CLIMB

EPR

CLB

PW4060

NORMAL BLEED – PACKS ON, ANTI-ICE OFF

TAT °C	PRESSURE ALTITUDE (1000 FT) / SPEED (KIAS OR MACH)								
	0	5	10	15	20	25	30	35	40
	250	250	250	290	290	290	290	0.78	0.78
60	1.24	1.25	1.25	1.21	1.20	1.18	1.14	1.08	1.05
50	1.28	1.29	1.29	1.26	1.24	1.23	1.21	1.15	1.11
40	1.32	1.34	1.34	1.31	1.30	1.29	1.27	1.21	1.18
30	1.33	1.40	1.40	1.38	1.37	1.36	1.35	1.29	1.25
20	1.33	1.40	1.46	1.46	1.45	1.44	1.43	1.37	1.34
10	1.33	1.40	1.46	1.47	1.53	1.53	1.53	1.47	1.44
0	1.33	1.40	1.46	1.47	1.53	1.57	1.63	1.57	1.54
-10	1.33	1.40	1.46	1.47	1.53	1.57	1.64	1.67	1.63
-20 & BELOW	1.33	1.40	1.46	1.47	1.53	1.57	1.64	1.68	1.66

CORRECTIONS:

Bleed Configuration	PRESSURE ALTITUDE (1000 FT)								
	0	5	10	15	20	25	30	35	40
Packs OFF	+0.01	+0.01	+0.01	+0.01	+0.01	+0.01	+0.02	+0.02	+0.03
Engine Anti-Ice ON	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05
Engine & Wing Anti-Ice ON	-0.02	-0.03	-0.04	-0.05	-0.05	-0.05	-0.07	-0.07	-0.08

THRUST SETTINGS – ALL ENGINES

MAXIMUM CRUISE

EPR

CRZ

PW4060

TAT °C	PRESSURE ALTITUDE (1000 FT)									
	10	15	20	25	30	35	37	39	41	43
45	1.20	1.17	1.13	1.12	1.07	1.05	1.01	1.01	1.01	1.00
40	1.23	1.21	1.17	1.17	1.12	1.10	1.06	1.06	1.06	1.05
35	1.27	1.25	1.22	1.21	1.18	1.15	1.11	1.11	1.11	1.10
30	1.29	1.29	1.26	1.26	1.23	1.20	1.16	1.16	1.16	1.15
25	1.29	1.32	1.31	1.30	1.29	1.25	1.21	1.21	1.21	1.20
20	1.29	1.32	1.35	1.35	1.34	1.30	1.26	1.26	1.26	1.25
15	1.29	1.32	1.36	1.39	1.40	1.35	1.31	1.31	1.31	1.30
10	1.29	1.32	1.36	1.43	1.45	1.40	1.36	1.36	1.36	1.35
5	1.29	1.32	1.36	1.43	1.51	1.45	1.41	1.41	1.41	1.40
0	1.29	1.32	1.36	1.43	1.53	1.50	1.46	1.46	1.46	1.45
-5	1.29	1.32	1.36	1.43	1.53	1.55	1.51	1.51	1.51	1.50
-10	1.29	1.32	1.36	1.43	1.53	1.58	1.56	1.56	1.56	1.55
-15	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-20	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-25	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-30	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-35	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-40	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-45	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-50	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-55	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56
-60	1.29	1.32	1.36	1.43	1.53	1.58	1.57	1.57	1.57	1.56

CORRECTIONS:

Bleed Configuration	PRESSURE ALTITUDE (1000 FT)									
	10	15	20	25	30	35	37	39	41	43
Engine Anti-Ice ON	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Engine & Wing Anti-Ice ON	-0.03	-0.05	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07

THRUST SETTINGS – ALL ENGINES**GO AROUND****EPR****PW4060**

BASED ON FULL INFLIGHT TAKEOFF RATING
 PACKS ON, EEC NORM, ENGINE ANTI-ICE ON or OFF and WING ANTI-ICE OFF

AIRPORT OAT		TAT °C	AIRPORT PRESSURE ALTITUDE (FT)					
°F	°C		-1,000	0	2,000	4,000	6,000	8,000
131	55	58	1.38	1.38	1.37	1.37	1.36	1.37
122	50	53	1.42	1.42	1.42	1.42	1.41	1.42
113	45	48	1.46	1.46	1.47	1.46	1.46	1.46
104	40	43	1.51	1.51	1.51	1.51	1.51	1.51
95	35	38	1.54	1.56	1.55	1.55	1.55	1.55
86	30	33	1.54	1.57	1.59	1.59	1.59	1.59
77	25	28	1.54	1.57	1.60	1.62	1.61	1.62
68	20	23	1.54	1.57	1.60	1.62	1.63	1.64
59	15	18	1.54	1.57	1.60	1.62	1.63	1.66
50 & BELOW	10 & BELOW	13 & BELOW	1.54	1.57	1.60	1.62	1.63	1.66

CORRECTIONS:

Bleed Configuration	PRESSURE ALTITUDE (1000 FT)							
	-1,000	0	2,000	4,000	4,500	4,501	6,000	8,000
Packs OFF	+0.01	+0.01	+0.01	+0.01	+0.01	+0.02	+0.02	+0.02
Engine & Wing Anti-Ice ON	-0.01	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02

INTENTIONALLY BLANK

ONE ENGINE INOPERATIVE

MAXIMUM CONTINUOUS THRUST*

EPR

PW4060

ONE ENGINE INOPERATIVE
 BASED ON 300 KIAS / 0.80 MACH SPEED SCHEDULE
 NORMAL BLEED - PACKS ON, ANTI-ICE OFF

MCT

TAT - °C	PRESSURE ALTITUDE - FEET									
	HOT DAY EPR									
	0	5,000	10,000	15,000	20,000	25,000	30,000	35,000	40,000	45,000
40	1.43	1.50	1.46	1.42	1.33	1.28	1.28	1.27	1.27	1.27
35	1.47	1.54	1.49	1.46	1.37	1.32	1.31	1.31	1.31	1.31
30	1.50	1.57	1.53	1.49	1.40	1.35	1.35	1.35	1.35	1.34
25	1.54	1.61	1.56	1.54	1.45	1.40	1.40	1.39	1.39	1.39
20	1.58	1.66	1.61	1.58	1.49	1.44	1.44	1.44	1.43	1.43
15	1.62	1.70	1.65	1.63	1.54	1.49	1.49	1.48	1.48	1.48
10	1.67	1.75	1.70	1.68	1.59	1.54	1.54	1.54	1.54	1.53
5	1.72	1.79	1.74	1.73	1.65	1.60	1.59	1.59	1.59	1.59
0	1.76	1.84	1.79	1.78	1.70	1.65	1.64	1.64	1.64	1.64
-2	1.78	1.86	1.81	1.80	1.72	1.67	1.67	1.66	1.66	1.66
-4	1.80	1.88	1.83	1.82	1.74	1.69	1.69	1.68	1.68	1.68
-6	1.82	1.90	1.85	1.84	1.76	1.71	1.71	1.70	1.70	1.70
-8	1.84	1.91	1.86	1.86	1.78	1.73	1.72	1.72	1.72	1.72
-10	1.85	1.93	1.88	1.87	1.80	1.75	1.74	1.74	1.74	1.74
-12	1.87	1.95	1.90	1.89	1.81	1.76	1.76	1.75	1.75	1.75
-14	1.88	1.96	1.91	1.91	1.83	1.78	1.77	1.77	1.77	1.77
-16	1.90	1.98	1.93	1.92	1.84	1.79	1.79	1.78	1.78	1.78
-18	1.91	1.99	1.94	1.93	1.85	1.80	1.80	1.80	1.79	1.79
-20	1.93	2.01	1.96	1.95	1.86	1.81	1.81	1.81	1.80	1.80

MACH	FLAT RATED EPR									
0.40	1.54	1.63	1.73	1.75	1.75	1.74	1.74	1.74	1.73	1.73
0.45	1.56	1.68	1.73	1.75	1.75	1.74	1.74	1.74	1.73	1.73
0.50	1.59	1.76	1.78	1.78	1.78	1.77	1.77	1.77	1.77	1.76
0.55	1.56	1.73	1.77	1.77	1.77	1.76	1.76	1.76	1.75	1.75
0.60	1.54	1.70	1.75	1.76	1.75	1.75	1.75	1.74	1.74	1.74
0.65	1.50	1.66	1.72	1.73	1.73	1.72	1.72	1.72	1.72	1.71
0.70	1.46	1.62	1.69	1.71	1.70	1.70	1.70	1.69	1.69	1.69
0.75	1.43	1.59	1.66	1.70	1.69	1.69	1.69	1.69	1.69	1.68
0.80	1.39	1.55	1.63	1.68	1.68	1.69	1.69	1.68	1.68	1.68
0.85	1.35	1.51	1.60	1.65	1.64	1.65	1.65	1.65	1.65	1.64
0.90	1.31	1.48	1.56	1.61	1.61	1.62	1.62	1.61	1.61	1.61

CORRECTIONS:

PACKS OFF	+ 0.02	+ 0.02	+ 0.02	+ 0.02	+ 0.02	+ 0.03	+ 0.03	+ 0.04	+ 0.04	+ 0.04
Eng A/I ON	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05
Wing A/I ON	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03	-0.03	-0.04

* USE LOWER OF HOT DAY EPR OR FLAT RATED EPR

ONE ENGINE INOPERATIVE DRIFTDOWN PROCEDURES

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

1. Immediately set Maximum Continuous Thrust (MCT) from previous page.
2. Allow aircraft to decelerate in level flight to driftdown speed prior to initiating descent.
 - Aircraft will level off at or above altitudes shown in DRIFTDOWN GROSS LEVEL-OFF ALTITUDE chart.
 - Cross-check FMS engine-out level-off altitude if so equipped. Otherwise, cross-check with level-off altitude in ODM.
3. If driftdown terrain clearance is critical, consult Flight Plan Remarks to determine:
 - Recommended en route alternate airports, if required.
 - ISA temperature deviation at 18,000 feet.
4. If terrain clearance is a factor, select a suitable alternate airport as follows:
 - Terrain clearance is assured for flight to any flight plan alternate airport listed.
 - Comply with Unrestricted/Restricted Critical Terrain Procedures as described in Airway Manual – Section 6.
 - Use flight plan recommended en route alternate airport, or:
 - Determine aircraft position on appropriate Jeppesen Low Level or High/Low Level enroute chart and locations of other suitable alternates.
 - Check terrain clearance for flight via MEA / MOCA on airway or Grid MORA for a non-flight-plan suitable enroute alternate.
 - Maintain MCT / driftdown speed after level-off and allow aircraft to climb until at/above MEA / MOCA on airway or Grid MORA.
 - Maintain airway MEA / MOCA until established on the arrival to selected alternate airport.
5. Proceed to selected nearest suitable alternate.
6. Except as specified in Step 4, maintain Maximum Continuous Thrust (MCT) and allow aircraft to accelerate to engine-out Long Range Cruise speed at level-off altitude.

DRIFTDOWN SPEED SCHEDULE KIAS

GROSS WEIGHT LBS	PRESSURE ALTITUDE - FEET						
	10,000	15,000	20,000	25,000	30,000	35,000	40,000
420,000	274	276	278	281	285		
410,000	271	273	275	278	281		
400,000	268	269	272	274	278		
390,000	264	266	268	270	274		
380,000	261	263	264	267	270		
370,000	257	259	261	263	266		
360,000	254	255	257	259	262		
350,000	250	252	253	256	259	263	
340,000	247	248	250	252	255	258	
330,000	243	244	246	248	251	254	
320,000	239	240	242	244	246	250	
310,000	235	236	238	240	242	245	
300,000	231	233	234	236	238	241	
290,000	227	229	230	232	234	237	
280,000	224	225	226	227	229	232	
270,000	219	220	221	223	225	228	232
260,000	215	216	217	219	221	223	227

ONE ENGINE INOPERATIVE

DRIFTDOWN SPEED AND GROSS LEVEL OFF ALTITUDE

FEET

ENGINE ANTI-ICE OFF

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED - KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
420,000	407,000	275	18,500	17,600	17,000
400,000	387,000	269	19,800	18,900	18,200
380,000	369,000	262	21,000	20,300	19,500
360,000	349,000	256	22,300	21,700	20,800
340,000	330,000	249	23,700	23,300	22,400
320,000	311,000	242	25,100	24,900	24,000
300,000	291,000	234	26,600	26,300	25,500
280,000	272,000	227	28,000	28,000	27,200
260,000	253,000	219	29,700	29,700	29,000

ENGINE ANTI-ICE ON

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED - KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
420,000	406,000	275	18,000	17,100	16,200
400,000	387,000	268	19,200	18,300	17,500
380,000	368,000	262	20,600	19,700	18,900
360,000	349,000	255	21,800	21,000	20,200
340,000	330,000	248	23,100	22,300	21,600
320,000	310,000	241	24,600	23,900	23,100
300,000	291,000	234	25,900	25,300	24,600
280,000	272,000	226	27,600	27,000	26,300
260,000	253,000	218	29,100	28,700	28,100

ENGINE & WING ANTI-ICE ON

GROSS WEIGHT – POUNDS		APPROX GROSS LEVEL OFF ALTITUDE – FEET			
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)	OPTIMUM DRIFTDOWN SPEED - KIAS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
420,000	406,000	274	17,100	16,300	15,400
400,000	387,000	268	18,300	17,600	16,800
380,000	368,000	262	19,700	18,900	18,000
360,000	349,000	255	20,900	20,100	19,300
340,000	330,000	248	22,200	21,600	20,800
320,000	310,000	241	23,700	23,000	22,200
300,000	291,000	234	25,100	24,600	23,900
280,000	272,000	226	26,700	26,100	25,400
260,000	253,000	218	28,400	27,800	27,200

BASIS:

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

**ONE ENGINE INOPERATIVE
LONG RANGE CRUISE ALTITUDE CAPABILITY
FEET**

GROSS WEIGHT - POUNDS	PRESSURE ALTITUDE - FEET		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
420,000	15,700	14,600	13,300
410,000	16,400	15,400	14,500
400,000	17,100	16,200	15,400
390,000	17,700	16,900	16,100
380,000	18,400	17,600	16,800
370,000	19,100	18,300	17,500
360,000	19,900	19,000	18,200
350,000	20,500	19,700	19,000
340,000	21,200	20,500	19,700
330,000	21,900	21,300	20,500
320,000	22,600	22,100	21,200
310,000	23,400	22,900	22,100
300,000	24,100	23,700	22,900
290,000	24,900	24,600	23,700
280,000	25,700	25,400	24,600
270,000	26,500	26,200	25,500
260,000	27,300	27,100	26,300
250,000	28,100	28,000	27,200
240,000	29,000	28,900	28,100
230,000	29,800	29,800	29,100
220,000	30,800	30,700	30,100

CORRECTIONS:

CONFIGURATION	ALT. CORRECTION – FEET
Engine Anti-Ice ON	- 1,400
Engine and Wing Anti-Ice ON	- 3,200

BASIS:

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

ONE ENGINE INOPERATIVE LONG RANGE CRUISE

FL ISA		GROSS WEIGHT - POUNDS							
		410,000	400,000	390,000	380,000	370,000	360,000	350,000	340,000
290 - 43	SAR EPR FF MN IAS TAS								
280 - 41	SAR EPR FF MN IAS TAS								
270 - 39	SAR EPR FF MN IAS TAS								
260 - 37	SAR EPR FF MN IAS TAS								
250 - 35	SAR EPR FF MN IAS TAS								
240 - 33	SAR EPR FF MN IAS TAS								

DEFINITIONS:

FL: Flight level / altitude (feet).	FF: Fuel Flow (lb per hr).
ISA: Standard Day temperature in °C.	MN: Mach number.
SAR: Specific Air Range (nm per 1,000 lbs of fuel).	IAS: Indicated airspeed in knots.
EPR: Target EPR setting.	TAS: True airspeed in knots.

TEMPERATURE TRADE FACTORS:

- SAR decreases 0.2% for every +10°C and increases 0.2% for every -10°C difference from ISA.
- FF increases 3% for every +10°C and decreases 3% for every -10°C difference from ISA.
- TAS increases 1 knot per 1°C above ISA and decreases 1 knot per 1°C below ISA.

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE

FL ISA		GROSS WEIGHT - POUNDS							
		330,000	320,000	310,000	300,000	290,000	280,000	270,000	260,000
290 - 43	SAR								39.7
	EPR								1.75
	FF								10,100
	MN								0.68
	IAS								260
	TAS								401
280 - 41	SAR							38.2	39.8
	EPR							1.72	1.67
	FF							10,500	9,800
	MN							0.675	0.657
	IAS							263	256
	TAS							401	390
270 - 39	SAR						37.0	38.2	40.0
	EPR						1.71	1.66	1.61
	FF						10,800	10,200	9,500
	MN						0.672	0.654	0.636
	IAS						269	26	253
	TAS						400	390	380
260 - 37	SAR					35.7	37.1	38.4	39.8
	EPR					1.7	1.65	1.6	1.55
	FF					11,200	10,500	9,900	9,300
	MN					0.667	0.65	0.633	0.617
	IAS					273	265	257	251
	TAS					400	390	380	370
250 - 35	SAR			33.4	34.6	36.0	37.2	38.5	39.7
	EPR			1.73	1.68	1.63	1.59	1.54	1.5
	FF			12,200	11,500	10,800	10,200	9,600	9,100
	MN			0.678	0.662	0.646	0.63	0.615	0.6
	IAS			284	276	268	262	255	248
	TAS			407	398	389	379	370	361
240 - 33	SAR		32.5	33.6	35.0	36.1	37.4	38.4	39.8
	EPR		1.7	1.66	1.62	1.57	1.53	1.49	1.45
	FF		12,500	11,800	11,100	10,500	9,900	9,400	8,900
	MN		0.673	0.657	0.641	0.626	0.612	0.598	0.585
	IAS		286	279	272	265	259	253	247
	TAS		406	397	388	379	370	361	354

DEFINITIONS:**FL:** Flight level / altitude (feet).**ISA:** Standard Day temperature in °C.**SAR:** Specific Air Range (nm per 1,000 lbs of fuel).**EPR:** Target EPR setting.**FF:** Fuel Flow (lb per hr).**MN:** Mach number.**IAS:** Indicated airspeed in knots.**TAS:** True airspeed in knots.**TEMPERATURE TRADE FACTORS:**

- SAR decreases 0.2% for every +10°C and increases 0.2% for every -10°C difference from ISA.
- FF increases 3% for every +10°C and decreases 3% for every -10°C difference from ISA.
- TAS increases 1 knot per 1°C above ISA and decreases 1 knot per 1°C below ISA.

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE

FL ISA		GROSS WEIGHT - POUNDS							
		410,000	400,000	390,000	380,000	370,000	360,000	350,000	340,000
230 - 31	SAR EPR FF MN IAS TAS								
220 - 29	SAR EPR FF MN IAS TAS							30.0 1.7 13,700 0.674 298 411	30.9 1.66 13,000 0.66 292 402
210 - 27	SAR EPR FF MN IAS TAS						29.1 1.68 14,000 0.668 301 408	30.1 1.64 13,300 0.654 295 400	30.9 1.6 12,700 0.64 289 392
200 - 25	SAR EPR FF MN IAS TAS				27.7 1.7 14,900 0.673 310 413	28.5 1.66 14,200 0.66 304 405	29.2 1.62 13,600 0.647 298 397	29.9 1.58 13,000 0.634 292 389	31.1 1.55 12,300 0.622 286 382
190 - 23	SAR EPR FF MN IAS TAS			27.2 1.68 15,100 0.666 313 411	27.8 1.64 14,500 0.653 307 403	28.4 1.6 13,900 0.64 301 395	29.3 1.56 13,200 0.628 295 387	30.2 1.53 12,600 0.616 289 380	31.1 1.5 12,000 0.605 283 373
180 - 21	SAR EPR FF MN IAS TAS		26.5 1.64 15,400 0.658 315 408	27.0 1.61 14,800 0.646 309 400	27.8 1.58 14,100 0.634 303 392	28.5 1.54 13,500 0.622 298 385	29.3 1.51 12,900 0.611 292 378	30.2 1.48 12,300 0.6 287 372	30.9 1.45 11,800 0.59 282 365

DEFINITIONS:**FL:** Flight level / altitude (feet).**ISA:** Standard Day temperature in °C.**SAR:** Specific Air Range (nm per 1,000 lbs of fuel).**EPR:** Target EPR setting.**FF:** Fuel Flow (lb per hr).**MN:** Mach number.**IAS:** Indicated airspeed in knots.**TAS:** True airspeed in knots.**TEMPERATURE TRADE FACTORS:**

- SAR decreases 0.2% for every +10°C and increases 0.2% for every -10°C difference from ISA.
- FF increases 3% for every +10°C and decreases 3% for every -10°C difference from ISA.
- TAS increases 1 knot per 1°C above ISA and decreases 1 knot per 1°C below ISA.

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE

FL ISA		GROSS WEIGHT - POUNDS							
		330,000	320,000	310,000	300,000	290,000	280,000	270,000	260,000
230 - 31	SAR	31.8	32.6	33.6	35.0	35.8	37.2	38.5	39.9
	EPR	1.68	1.64	1.6	1.56	1.52	1.48	1.44	1.41
	FF	12,700	12,100	11,500	10,800	10,300	9,700	9,200	8,700
	MN	0.665	0.651	0.637	0.622	0.609	0.596	0.584	0.572
	IAS	288	282	276	269	263	257	252	247
	TAS	404	395	386	378	369	361	354	347
220 - 29	SAR	31.7	32.6	34.0	34.8	36.1	37.3	38.7	39.8
	EPR	1.62	1.58	1.54	1.51	1.47	1.44	1.4	1.38
	FF	12,400	11,800	11,100	10,600	10,000	9,500	9,000	8,600
	MN	0.646	0.632	0.618	0.605	0.593	0.582	0.571	0.561
	IAS	286	279	273	267	261	256	251	247
	TAS	393	385	377	369	361	354	348	342
210 - 27	SAR	31.7	33.0	33.8	34.7	35.8	37.0	38.5	39.8
	EPR	1.57	1.53	1.49	1.46	1.43	1.4	1.37	1.35
	FF	12,100	11,400	10,900	10,400	9,900	9,400	8,900	8,500
	MN	0.627	0.614	0.602	0.59	0.579	0.569	0.56	0.552
	IAS	282	276	271	265	260	255	251	247
	TAS	383	376	368	361	354	348	343	338
200 - 25	SAR	32.0	32.8	33.7	34.7	36.0	36.9	38.5	39.3
	EPR	1.51	1.48	1.45	1.42	1.39	1.37	1.34	1.32
	FF	11,700	11,200	10,700	10,200	9,700	9,300	8,800	8,500
	MN	0.609	0.598	0.587	0.577	0.568	0.559	0.551	0.544
	IAS	280	274	269	264	260	256	252	249
	TAS	374	367	361	354	349	343	339	334
190 - 23	SAR	31.8	32.7	33.7	34.9	35.8	36.8	38.1	39.4
	EPR	1.47	1.44	1.41	1.38	1.36	1.34	1.32	1.3
	FF	11,500	11,000	10,500	10,000	9,600	9,200	8,800	8,400
	MN	0.594	0.584	0.574	0.566	0.558	0.55	0.543	0.537
	IAS	278	273	268	264	260	257	253	250
	TAS	366	360	354	349	344	339	335	331
180 - 21	SAR	31.8	32.8	33.9	34.7	35.8	36.9	37.7	39.0
	EPR	1.42	1.4	1.38	1.35	1.33	1.31	1.3	1.28
	FF	11,300	10,800	10,300	9,900	9,500	9,100	8,800	8,400
	MN	0.581	0.572	0.563	0.556	0.549	0.543	0.536	0.53
	IAS	277	272	268	265	261	258	255	252
	TAS	359	354	349	344	340	336	332	328

DEFINITIONS:**FL:** Flight level / altitude (feet).**ISA:** Standard Day temperature in °C.**SAR:** Specific Air Range (nm per 1,000 lbs of fuel).**EPR:** Target EPR setting.**FF:** Fuel Flow (lb per hr).**MN:** Mach number.**IAS:** Indicated airspeed in knots.**TAS:** True airspeed in knots.**TEMPERATURE TRADE FACTORS:**

- SAR decreases 0.2% for every +10°C and increases 0.2% for every -10°C difference from ISA.
- FF increases 3% for every +10°C and decreases 3% for every -10°C difference from ISA.
- TAS increases 1 knot per 1°C above ISA and decreases 1 knot per 1°C below ISA.

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE

FL ISA		GROSS WEIGHT - POUNDS							
		410,000	400,000	390,000	380,000	370,000	360,000	350,000	340,000
160 - 17	SAR	25.7	26.5	27.2	28.0	28.6	29.3	30.1	31.0
	EPR	1.57	1.54	1.51	1.48	1.45	1.43	1.4	1.38
	FF	15,600	14,600	14,000	13,400	12,900	12,400	11,900	11,400
	MN	0.631	0.62	0.61	0.6	0.591	0.582	0.574	0.566
	IAS	314	308	303	298	293	289	284	280
	TAS	394	387	381	375	369	363	358	353
140 - 13	SAR	25.9	26.7	27.1	27.8	28.5	29.3	30.0	30.8
	EPR	1.47	1.44	1.42	1.4	1.38	1.36	1.34	1.32
	FF	14,900	13,900	13,500	13,000	12,500	12,000	11,600	11,200
	MN	0.599	0.59	0.582	0.574	0.567	0.56	0.554	0.548
	IAS	309	304	300	296	292	288	285	282
	TAS	376.5	371	366	361	356	352	348	345
120 - 9	SAR	26.1	26.6	27.1	27.6	28.3	28.8	29.5	30.0
	EPR	1.40	1.38	1.36	1.34	1.32	1.31	1.3	1.28
	FF	14,300	13,500	13,100	12,700	12,300	12,000	11,600	11,300
	MN	0.573	0.565	0.56	0.555	0.549	0.544	0.539	0.535
	IAS	308	304	300	296	294	291	288	285
	TAS	364	359	355	351	348	345	342	339
100 - 7	SAR	25.6	26.2	26.8	27.4	27.8	28.3	29.0	29.5
	EPR	1.34	1.32	1.31	1.3	1.28	1.27	1.26	1.25
	FF	14,100	13,400	13,000	12,600	12,300	12,000	11,600	11,300
	MN	0.555	0.55	0.545	0.54	0.536	0.531	0.526	0.521
	IAS	308	305	302	299	297	294	292	289
	TAS	354	351	348	345	342	339	336	333

DEFINITIONS:**FL:** Flight level / altitude (feet).**ISA:** Standard Day temperature in °C.**SAR:** Specific Air Range (nm per 1,000 lbs of fuel).**EPR:** Target EPR setting.**FF:** Fuel Flow (lb per hr).**MN:** Mach number.**IAS:** Indicated airspeed in knots.**TAS:** True airspeed in knots.**TEMPERATURE TRADE FACTORS:**

- SAR decreases 0.2% for every +10°C and increases 0.2% for every -10°C difference from ISA.
- FF increases 3% for every +10°C and decreases 3% for every -10°C difference from ISA.
- TAS increases 1 knot per 1°C above ISA and decreases 1 knot per 1°C below ISA.

ONE ENGINE INOPERATIVE

LONG RANGE CRUISE

FL ISA		GROSS WEIGHT - POUNDS							
		330,000	320,000	310,000	300,000	290,000	280,000	270,000	260,000
160 - 17	SAR	31.7	32.5	33.4	34.4	35.2	36.3	37.0	38.3
	EPR	1.36	1.34	1.32	1.3	1.29	1.27	1.26	1.24
	FF	11,000	10,600	10,200	9,800	9,500	9,100	8,800	8,400
	MN	0.559	0.552	0.546	0.54	0.535	0.529	0.523	0.516
	IAS	277	273	270	267	264	262	258	255
	TAS	349	345	341	337	334	330	326	322
140 - 13	SAR	31.3	32.2	32.8	33.8	34.5	35.2	36.4	37.2
	EPR	1.31	1.29	1.28	1.26	1.25	1.24	1.22	1.21
	FF	10,900	10,500	10,200	9,800	9,500	9,200	8,800	8,500
	MN	0.543	0.538	0.532	0.527	0.521	0.515	0.509	0.502
	IAS	279	276	274	271	268	265	261	258
	TAS	341	338	335	331	328	324	320	316
120 - 9	SAR	30.7	31.3	31.9	32.8	33.4	34.2	35.3	36.0
	EPR	1.27	1.26	1.24	1.23	1.22	1.21	1.2	1.18
	FF	10,900	10,600	10,300	9,900	9,600	9,300	8,900	8,600
	MN	0.53	0.524	0.519	0.513	0.507	0.501	0.495	0.49
	IAS	283	280	277	274	271	267	264	261
	TAS	335	332	329	325	321	318	314	310
100 - 7	SAR	30.2	30.8	31.4	32.2	32.8	33.5	34.2	35.1
	EPR	1.24	1.22	1.21	1.2	1.19	1.18	1.17	1.16
	FF	10,900	10,600	10,300	9,900	9,600	9,300	9,000	8,700
	MN	0.516	0.511	0.505	0.5	0.494	0.489	0.483	0.478
	IAS	286	283	280	277	274	271	267	264
	TAS	329	326	323	319	315	312	308	305

DEFINITIONS:

FL: Flight level / altitude (feet).	FF: Fuel Flow (lb per hr).
ISA: Standard Day temperature in °C.	MN: Mach number.
SAR: Specific Air Range (nm per 1,000 lbs of fuel).	IAS: Indicated airspeed in knots.
EPR: Target EPR setting.	TAS: True airspeed in knots.

TEMPERATURE TRADE FACTORS:

- SAR decreases 0.2% for every +10°C and increases 0.2% for every -10°C difference from ISA.
- FF increases 3% for every +10°C and decreases 3% for every -10°C difference from ISA.
- TAS increases 1 knot per 1°C above ISA and decreases 1 knot per 1°C below ISA.

LANDING GEAR EXTENDED REVENUE OPERATIONS PROCEDURES

OPERATIONAL LIMITATIONS

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

1. All components required for a landing gear extended operation must be functional in accordance with the appropriate maintenance manual.
2. The use of speed increase for improved climb performance in order to increase maximum takeoff weight is prohibited.
3. Dispatch into known icing conditions is prohibited.
4. The airplane is not eligible for extended over-water operations when landing gear down lock pins are installed. "Extended over-water operation" includes any operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline.
5. Use of reduced thrust takeoff is prohibited.
6. Limitations relating to engine-out drift down are contained in the FLIGHT PLANNING and ABNORMAL sections of this Operational Data Manual (ODM).
7. Takeoff is limited to Flaps 5.
8. V_{MO} and M_{MO} are reduced to 270 KIAS and .73 Mach.
9. The airspeed indicator and Mach-airspeed warning switch must be reprogrammed for V_{MO} and M_{MO} .
10. Alternate EEC Mode prohibited.

PREPARATION OF AIRCRAFT

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

EMERGENCY PROCEDURES

Procedures are unchanged for Emergency Procedures except as follows:

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

NORMAL PROCEDURES

Operating Procedures are unchanged except as follows:

Severe Turbulent Air Penetration: The conditions for severe turbulence penetration are unchanged except the recommended airspeed for flight is $V_{Ref} + 70$ KIAS.

LANDING GEAR EXTENDED REVENUE OPERATIONS

DRIFTDOWN PERFORMANCE

FEET

GROSS WEIGHT - POUNDS		OPTIMUM DRIFT DOWN SPEED - KIAS	GROSS LEVEL OFF ALTITUDE - FEET		
AT ENGINE FAILURE	AT LEVEL OFF (APPROX)		ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
380,000	362,000	233	4,900	3,100	
360,000	344,000	226	7,400	5,700	3,700
340,000	326,000	218	9,700	8,200	6,400
320,000	306,000	213	11,700	10,500	8,900
300,000	288,000	208	13,600	12,800	11,200
280,000	270,000	203	15,500	15,100	13,800
260,000	250,000	198	17,100	17,000	16,100
240,000	231,000	193	19,100	19,000	18,400
220,000	212,000	187	21,000	20,900	20,400

BASIS:

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

LANDING GEAR EXTENDED REVENUE OPERATIONS

LONG RANGE CRUISE ALTITUDE CAPABILITY

FEET

GROSS WEIGHT - POUNDS	ISA + 10°C & COLDER	ISA + 15°C	ISA + 20°C
340,000	3,300		
330,000	4,800		
320,000	6,400	3,700	
310,000	7,900	5,500	2,700
300,000	9,400	7,100	4,500
290,000	10,900	8,800	6,300
280,000	12,300	10,500	8,100
270,000	13,700	12,100	9,800
260,000	15,100	13,600	11,600
250,000	16,500	15,000	13,400
240,000	17,800	16,300	14,900
230,000	19,000	17,800	16,300
220,000	20,200	19,100	17,700

BASIS:

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

LANDING GEAR EXTENDED REVENUE OPERATIONS

LONG RANGE CRUISE

ALTITUDE - FEET	GROSS WEIGHT - POUNDS CRUISE SPEED - KIAS TARGET EPR					
	320,000	300,000	280,000	260,000	240,000	220,000
20,000						189 1.64
18,000					194 1.62	189 1.53
16,000				200 1.61	194 1.52	189 1.45
14,000			207 1.60	200 1.51	195 1.45	189 1.39
12,000			208 1.51	203 1.44	197 1.40	191 1.35
10,000		215 1.50	210 1.44	205 1.40	200 1.35	193 1.32
8,000	222 1.48	218 1.43	213 1.39	208 1.36	201 1.32	194 1.28
6,000	225 1.42	220 1.39	215 1.35	209 1.32	202 1.29	195 1.25

NOTE:

- For estimated fuel burn, increase ABNORMAL One Engine Inoperative LRC fuel burn data by approximately 75%.

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

APPLICABILITY

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

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

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

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

ASSUMPTIONS

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

- Standard day conditions
- Operating engines at maximum reverse thrust, except for hydraulic system failures
- Maximum manual braking (more aggressive than Max Autobrakes)
- Includes distance from 50 feet above threshold to stop (1,500 feet of air distance)
- Based on demonstrated landing performance produced by the manufacturer during certification process

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

- Sea level altitude
- No wind
- No slope
- Each abnormal configuration landing distance table is based on the approach speed stated within each table.

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

AIR GROUND LOGIC IN AIR MODE, FLAPS 30

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,850	5,570	5,290	5,010	4,730	4,550	4,190	3,830
GOOD	8,450	8,010	7,570	7,130	6,690	6,410	5,850	5,290
MEDIUM	12,720	12,060	11,400	10,740	10,080	9,640	8,760	7,880
POOR	19,080	18,160	17,240	16,320	15,400	14,820	13,660	12,500
Vapp - V_{Ref30}	179	172	166	159	151	145	135	124

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+90	+150	+250	+450
Wind	Per 10 kt. headwind	-150	-260	-480	-920
	Per 10 kt. tailwind	+540	+940	+1770	+3690
Slope	Per 1% downhill	+70	+240	+860	+5360
	Per 1% uphill	-60	-180	-530	-1480
Approach Speed	Per 10 kt. Above VREF	+410	+590	+800	+960

AIRSPEED UNRELIABLE

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,170	4,890	4,610	4,330	4,050	3,910	3,630	3,350
GOOD	6,760	6,480	6,200	5,920	5,640	5,400	4,920	4,440
MEDIUM	9,780	9,340	8,900	8,460	8,020	7,640	6,880	6,120
POOR	13,550	12,890	12,230	11,570	10,910	10,330	9,170	8,010
Vapp - V_{Ref20}	179	174	169	164	159	154	144	134

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+200	+300
Wind	Per 10 kt. headwind	-120	-200	-340	-540
	Per 10 kt. tailwind	+440	+760	+1300	+2120
Slope	Per 1% downhill	+50	+140	+390	+1030
	Per 1% uphill	-40	-110	-280	-580
Approach Speed	Per 10 kt. Above VREF	+260	+380	+510	+610

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

ANTI-SKID INOPERATIVE, FLAPS 30

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	8,150	7,750	7,350	6,950	6,550	6,270	5,710	5,150
GOOD	9,260	8,780	8,300	7,820	7,340	7,000	6,320	5,640
MEDIUM	11,670	11,050	10,430	9,810	9,190	8,730	7,810	6,890
POOR	15,710	14,830	13,950	13,070	12,190	11,530	10,210	8,890
V_{app} - V_{Ref30}	179	172	166	159	151	145	135	124

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+140	+160	+230	+330
Wind	Per 10 kt. headwind	-260	-310	-460	-760
	Per 10 kt. tailwind	+970	+1200	+1840	+3510
Slope	Per 1% downhill	+170	+260	+630	+2060
	Per 1% uphill	-130	-180	-360	-840
Approach Speed	Per 10 kt. Above VREF	+410	+440	+500	+560

FLAPS UP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	7,120	6,660	6,200	5,740	5,280	5,080	4,680	4,280
GOOD	8,510	8,130	7,750	7,370	6,990	6,710	6,150	5,590
MEDIUM	12,180	11,580	10,980	10,380	9,780	9,320	8,400	7,480
POOR	16,250	15,390	14,530	13,670	12,810	12,150	10,830	9,510
V_{app} - V_{Ref30} + 50	229	222	216	209	201	195	185	174

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+110	+170	+270	+390
Wind	Per 10 kt. headwind	-140	-230	-360	-540
	Per 10 kt. tailwind	+510	+820	+1340	+2090
Slope	Per 1% downhill	+60	+140	+360	+840
	Per 1% uphill	-50	-120	-270	-520
Approach Speed	Per 10 kt. Above VREF	+260	+340	+460	+550

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

HYDRAULIC SYSTEM C INOP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,560	5,360	5,160	4,960	4,760	4,580	4,220	3,860
GOOD	7,590	7,270	6,950	6,630	6,310	6,030	5,470	4,910
MEDIUM	10,300	9,820	9,340	8,860	8,380	7,960	7,120	6,280
POOR	13,260	12,600	11,940	11,280	10,620	10,060	8,940	7,820
V_{app} - V_{Ref20}	179	174	169	164	159	154	144	134

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+90	+140	+220	+300
Wind	Per 10 kt. headwind	-140	-220	-340	-500
	Per 10 kt. tailwind	+510	+800	+1290	+1980
Slope	Per 1% downhill	+60	+150	+350	+800
	Per 1% uphill	-50	-150	-360	-470
Approach Speed	Per 10 kt. Above VREF	+360	+470	+560	+630

HYDRAULIC SYSTEM C+L OR C+R INOP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	7,250	6,890	6,530	6,170	5,810	5,590	5,150	4,710
GOOD	10,190	9,650	9,110	8,570	8,030	7,690	7,010	6,330
MEDIUM	14,330	13,550	12,770	11,990	11,210	10,670	9,590	8,510
POOR	19,340	18,260	17,180	16,100	15,020	14,240	12,680	11,120
V_{app} - V_{Ref30} + 20	199	192	186	179	171	165	155	144

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+120	+190	+300	+440
Wind	Per 10 kt. headwind	-170	-280	-450	-710
	Per 10 kt. tailwind	+600	+980	+1640	+2710
Slope	Per 1% downhill	+110	+370	+690	+1830
	Per 1% uphill	-80	-210	-470	-940
Approach Speed	Per 10 kt. Above VREF	+550	+700	+830	+910

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

HYDRAULIC SYSTEM R & L INOP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	6,370	6,070	5,770	5,470	5,170	4,990	4,630	4,270
GOOD	9,710	9,210	8,710	8,210	7,710	7,390	6,750	6,110
MEDIUM	15,140	14,360	13,580	12,800	12,020	11,500	10,460	9,420
POOR	22,850	21,750	20,650	19,550	18,450	17,670	16,110	14,550
Vapp - V_{Ref30} + 20	199	192	186	179	171	165	155	144

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+100	+180	+300	+480
Wind	Per 10 kt. headwind	-160	-290	-530	-960
	Per 10 kt. tailwind	+560	+1000	+1890	+3660
Slope	Per 1% downhill	+100	+300	+1040	+4600
	Per 1% uphill	-80	-230	-650	-1690
Approach Speed	Per 10 kt. Above VREF	+450	+650	+880	+1080

LE SLAT ASYMMETRY, FLAPS LESS THAN OR EQUAL TO FLAPS 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	6,080	5,760	5,440	5,120	4,800	4,640	4,320	4,000
GOOD	8,140	7,740	7,340	6,940	6,540	6,280	5,760	5,240
MEDIUM	11,140	10,560	9,980	9,400	8,820	8,400	7,560	6,720
POOR	14,340	13,560	12,780	12,000	11,220	10,640	9,480	8,320
Vapp - V_{Ref30} + 30	209	202	196	189	181	175	165	154

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+100	+150	+240	+330
Wind	Per 10 kt. headwind	-140	-220	-340	-500
	Per 10 kt. tailwind	+500	+800	+1290	+1990
Slope	Per 1% downhill	+60	+150	+350	+780
	Per 1% uphill	-50	-120	-260	-470
Approach Speed	Per 10 kt. Above VREF	+290	+380	+470	+530

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

LE SLAT ASYMMETRY, FLAPS GREATER THAN 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,590	5,270	4,950	4,630	4,310	4,170	3,890	3,610
GOOD	7,220	6,880	6,540	6,200	5,860	5,620	5,140	4,660
MEDIUM	10,030	9,510	8,990	8,470	7,950	7,570	6,810	6,050
POOR	13,080	12,360	11,640	10,920	10,200	9,680	8,640	7,600
V_{app} - V_{Ref30} + 20	199	192	186	179	171	165	155	144

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+130	+200	+290
Wind	Per 10 kt. headwind	-120	-200	-320	-480
	Per 10 kt. tailwind	+460	+750	+1230	+1910
Slope	Per 1% downhill	+50	+130	+310	+720
	Per 1% uphill	-40	-100	-230	-430
Approach Speed	Per 10 kt. Above VREF	+250	+340	+430	+500

LE SLAT DISAGREE

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,030	4,770	4,510	4,250	3,990	3,850	3,570	3,290
GOOD	6,440	6,180	5,920	5,660	5,400	5,180	4,740	4,300
MEDIUM	9,030	8,610	8,190	7,770	7,350	6,990	6,270	5,550
POOR	11,810	11,230	10,650	10,070	9,490	8,990	7,990	6,990
V_{app} - V_{Ref20}	179	174	169	164	159	154	144	134

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+190	+270
Wind	Per 10 kt. headwind	-120	-190	-310	-460
	Per 10 kt. tailwind	+440	+720	+1190	+1870
Slope	Per 1% downhill	+50	+120	+290	+690
	Per 1% uphill	-40	-90	-210	-410
Approach Speed	Per 10 kt. Above VREF	+250	+340	+440	+530

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

ONE ENGINE INOPERATIVE

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,170	4,890	4,610	4,330	4,050	3,910	3,630	3,350
GOOD	6,760	6,480	6,200	5,920	5,640	5,400	4,920	4,440
MEDIUM	9,780	9,340	8,900	8,460	8,020	7,640	6,880	6,120
POOR	13,550	12,890	12,230	11,570	10,910	10,330	9,170	8,010
Vapp - V_{Ref20}	179	174	169	164	159	154	144	134

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+200	+300
Wind	Per 10 kt. headwind	-120	-200	-340	-540
	Per 10 kt. tailwind	+440	+760	+1300	+2120
Slope	Per 1% downhill	+50	+140	+390	+1030
	Per 1% uphill	-40	-110	-280	-580
Approach Speed	Per 10 kt. Above VREF	+260	+380	+510	+610

TE FLAP ASYMMETRY, FLAPS 20 OR GREATER

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,030	4,770	4,510	4,250	3,990	3,850	3,570	3,290
GOOD	6,440	6,180	5,920	5,660	5,400	5,180	4,740	4,300
MEDIUM	9,030	8,610	8,190	7,770	7,350	6,990	6,270	5,550
POOR	11,810	11,230	10,650	10,070	9,490	8,990	7,990	6,990
Vapp - V_{Ref20}	179	174	169	164	159	154	144	134

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+190	+270
Wind	Per 10 kt. headwind	-120	-190	-310	-460
	Per 10 kt. tailwind	+440	+720	+1190	+1870
Slope	Per 1% downhill	+50	+120	+290	+690
	Per 1% uphill	-40	-90	-210	-410
Approach Speed	Per 10 kt. Above VREF	+250	+340	+440	+530

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

TE FLAP ASYMMETRY, 5 < FLAPS < 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,750	5,390	5,030	4,670	4,310	4,170	3,890	3,610
GOOD	7,320	6,960	6,600	6,240	5,880	5,640	5,160	4,680
MEDIUM	10,100	9,580	9,060	8,540	8,020	7,640	6,880	6,120
POOR	13,320	12,580	11,840	11,100	10,360	9,820	8,740	7,660
V_{app} - V_{Ref30} + 20	199	192	186	179	171	165	155	144

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+80	+130	+210	+300
Wind	Per 10 kt. headwind	-130	-200	-320	-480
	Per 10 kt. tailwind	+460	+750	+1230	+1920
Slope	Per 1% downhill	+50	+120	+310	+720
	Per 1% uphill	-40	-100	-230	-420
Approach Speed	Per 10 kt. Above VREF	+250	+340	+430	+510

TE FLAP ASYMMETRY, FLAPS LESS THAN OR EQUAL TO 5

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,980	5,620	5,260	4,900	4,540	4,380	4,060	3,740
GOOD	7,830	7,430	7,030	6,630	6,230	5,970	5,450	4,930
MEDIUM	10,670	10,130	9,590	9,050	8,510	8,110	7,310	6,510
POOR	13,990	13,230	12,470	11,710	10,950	10,390	9,270	8,150
V_{app} - V_{Ref30} + 30	209	202	196	189	181	175	165	154

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+90	+140	+220	+320
Wind	Per 10 kt. headwind	-130	-210	-340	-490
	Per 10 kt. tailwind	+470	+770	+1260	+1960
Slope	Per 1% downhill	+50	+130	+320	+740
	Per 1% uphill	-40	-110	-240	-450
Approach Speed	Per 10 kt. Above VREF	+250	+340	+430	+500

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

TE FLAP DISAGREE

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	5,030	4,770	4,510	4,250	3,990	3,850	3,570	3,290
GOOD	6,440	6,180	5,920	5,660	5,400	5,180	4,740	4,300
MEDIUM	9,030	8,610	8,190	7,770	7,350	6,990	6,270	5,550
POOR	11,810	11,230	10,650	10,070	9,490	8,990	7,990	6,990
Vapp - V_{Ref20}	179	174	169	164	159	154	144	134

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+70	+120	+190	+270
Wind	Per 10 kt. headwind	-120	-190	-310	-460
	Per 10 kt. tailwind	+440	+720	+1190	+1870
Slope	Per 1% downhill	+50	+120	+290	+690
	Per 1% uphill	-40	-90	-210	-410
Approach Speed	Per 10 kt. Above VREF	+250	+340	+440	+530

THRUST REVERSER UNLOCKED

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	420,000	400,000	380,000	360,000	340,000	320,000	280,000	240,000
DRY	6,180	5,860	5,540	5,220	4,900	4,720	4,360	4,000
GOOD	8,580	8,160	7,740	7,320	6,900	6,620	6,060	5,500
MEDIUM	12,320	11,680	11,040	10,400	9,760	9,300	8,380	7,460
POOR	16,670	15,770	14,870	13,970	13,070	12,390	11,030	9,670
Vapp - V_{Ref30} + 30	209	202	196	189	181	175	165	154

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+100	+160	+260	+370
Wind	Per 10 kt. headwind	-140	-240	-390	-590
	Per 10 kt. tailwind	+510	+850	+1430	+2290
Slope	Per 1% downhill	+70	+180	+470	+1180
	Per 1% uphill	-60	-150	-340	-670
Approach Speed	Per 10 kt. Above VREF	+310	+430	+550	+640

THIS PAGE INTENTIONALLY BLANK

EMERGENCY LANDING DISTANCES

FEET

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

FLAPS 25

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

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	10,600	9,600	8,600	7,500	7,200	4,800	8,600	7,500	7,300	6,100
400,000	10,400	9,500	8,400	7,400	7,100	4,600	8,400	7,400	7,100	6,000
390,000	10,200	9,300	8,200	7,200	7,000	4,500	8,200	7,200	7,000	5,900
380,000	10,000	9,100	8,100	7,100	6,900	4,400	8,100	7,100	6,900	5,800
370,000	9,800	8,900	7,900	7,000	6,700	4,300	7,900	7,000	6,700	5,700
360,000	9,500	8,700	7,800	6,800	6,600	4,200	7,800	6,800	6,600	5,600
350,000	9,300	8,500	7,600	6,700	6,500	4,100	7,600	6,700	6,500	5,500
340,000	9,100	8,300	7,400	6,500	6,300	4,000	7,400	6,500	6,300	5,400
330,000	8,900	8,100	7,300	6,400	6,200	3,900	7,300	6,400	6,200	5,300
320,000	8,700	7,900	7,100	6,300	6,100	3,800	7,100	6,300	6,100	5,200
310,000	8,400	7,700	7,000	6,100	5,900	3,800	7,000	6,100	6,000	5,100
300,000	8,200	7,600	6,800	6,000	5,800	3,700	6,800	6,000	5,800	5,000
290,000	8,000	7,400	6,600	5,800	5,700	3,600	6,600	5,800	5,700	4,900
280,000	7,800	7,200	6,500	5,700	5,600	3,600	6,500	5,700	5,600	4,800
270,000	7,600	7,000	6,300	5,600	5,400	3,500	6,300	5,600	5,400	4,700
260,000	7,300	6,800	6,200	5,400	5,300	3,400	6,200	5,400	5,300	4,600

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

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

EMERGENCY LANDING DISTANCES

FEET

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

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

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	9,100	8,500	8,400	8,400	11,000	11,000	11,000	11,000
400,000	8,900	8,300	8,300	8,300	10,800	10,800	10,800	10,800
390,000	8,700	8,100	8,100	8,100	10,500	10,500	10,500	10,500
380,000	8,600	8,000	7,900	7,900	10,300	10,300	10,300	10,300
370,000	8,400	7,800	7,800	7,800	10,100	10,000	10,000	10,000
360,000	8,200	7,600	7,600	7,600	9,800	9,800	9,800	9,800
350,000	8,000	7,500	7,400	7,400	9,600	9,600	9,600	9,600
340,000	7,800	7,300	7,200	7,200	9,300	9,300	9,300	9,300
330,000	7,700	7,100	7,100	7,100	9,100	9,100	9,100	9,100
320,000	7,500	7,000	6,900	6,900	8,900	8,900	8,900	8,900
310,000	7,300	6,800	6,800	6,800	8,600	8,600	8,600	8,600
300,000	7,100	6,600	6,600	6,600	8,400	8,400	8,400	8,400
290,000	6,900	6,500	6,400	6,400	8,200	8,200	8,200	8,200
280,000	6,800	6,300	6,300	6,300	8,000	7,900	7,900	7,900
270,000	6,600	6,200	6,100	6,100	7,700	7,700	7,700	7,700
260,000	6,400	6,000	6,000	6,000	7,500	7,500	7,500	7,500

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-600	-600	-600	-600
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	600	600	600	600
6,000	800	800	800	800	1,100	1,100	1,100	1,100
8,000	1,300	1,200	1,200	1,200	1,700	1,700	1,700	1,700

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	350	300	300	250	350	250	250	250
PER 10°C ABOVE ISA	200	200	200	200	300	300	300	300
PER 10°C BELOW ISA	-200	-200	-200	-200	-250	-250	-250	-250
PER 1% UP SLOPE	-100	-150	-150	-250	-350	-450	-450	-450
PER 1% DOWN SLOPE	150	250	300	300	700	700	700	700
1 REVERSER INOP	400	600	600	600	1,300	1,400	1,400	1,400
2 REVERSERS INOP	1,100	1,500	1,500	1,500	3,600	3,700	3,700	3,700
MANUAL SPOILERS	0	0	0	400	0	0	0	400

EMERGENCY LANDING DISTANCES

FEET

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

FLAPS 30

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

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	11,100	10,100	9,100	7,900	7,700	4,900	9,100	8,000	7,700	6,400
400,000	10,800	9,800	8,800	7,700	7,500	4,800	8,800	7,700	7,500	6,300
390,000	10,500	9,600	8,600	7,500	7,300	4,700	8,600	7,500	7,300	6,100
380,000	10,200	9,300	8,300	7,300	7,100	4,500	8,300	7,300	7,100	5,900
370,000	9,900	9,000	8,100	7,100	6,900	4,400	8,100	7,100	6,900	5,800
360,000	9,600	8,700	7,800	6,800	6,600	4,200	7,800	6,900	6,700	5,600
350,000	9,300	8,400	7,500	6,600	6,400	4,100	7,500	6,600	6,400	5,500
340,000	9,000	8,200	7,300	6,400	6,200	4,000	7,300	6,400	6,200	5,300
330,000	8,700	8,000	7,100	6,300	6,100	3,900	7,100	6,300	6,100	5,200
320,000	8,500	7,800	6,900	6,100	5,900	3,800	6,900	6,100	6,000	5,100
310,000	8,300	7,600	6,800	6,000	5,800	3,700	6,800	6,000	5,800	5,000
300,000	8,100	7,400	6,600	5,800	5,700	3,700	6,600	5,900	5,700	4,900
290,000	7,900	7,200	6,400	5,700	5,500	3,600	6,400	5,700	5,500	4,800
280,000	7,600	7,000	6,300	5,600	5,400	3,500	6,300	5,600	5,400	4,600
270,000	7,400	6,800	6,100	5,400	5,200	3,500	6,100	5,400	5,300	4,500
260,000	7,200	6,600	5,900	5,300	5,100	3,400	5,900	5,300	5,100	4,400

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

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

EMERGENCY LANDING DISTANCES

FEET

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

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

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
410,000	9,700	9,000	8,900	8,800	11,600	11,500	11,500	11,500
400,000	9,400	8,700	8,700	8,600	11,300	11,100	11,100	11,100
390,000	9,100	8,500	8,400	8,400	10,900	10,800	10,800	10,800
380,000	8,800	8,200	8,200	8,100	10,600	10,500	10,500	10,500
370,000	8,600	8,000	7,900	7,900	10,300	10,200	10,200	10,200
360,000	8,300	7,700	7,700	7,700	9,900	9,900	9,900	9,900
350,000	8,000	7,500	7,400	7,400	9,600	9,600	9,600	9,600
340,000	7,700	7,200	7,200	7,200	9,300	9,300	9,300	9,300
330,000	7,500	7,000	7,000	7,000	9,000	9,000	9,000	9,000
320,000	7,300	6,900	6,800	6,900	8,800	8,800	8,800	8,800
310,000	7,200	6,700	6,700	6,700	8,600	8,600	8,600	8,600
300,000	7,000	6,500	6,500	6,500	8,300	8,300	8,300	8,300
290,000	6,800	6,400	6,300	6,400	8,100	8,100	8,100	8,100
280,000	6,600	6,200	6,200	6,200	7,800	7,800	7,800	7,800
270,000	6,400	6,000	6,000	6,000	7,600	7,600	7,600	7,600
260,000	6,200	5,900	5,800	5,800	7,400	7,400	7,400	7,400

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-600	-600	-600	-600
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	600	600	600	600
6,000	800	800	800	800	1,100	1,100	1,100	1,100
8,000	1,300	1,200	1,100	1,200	1,700	1,700	1,700	1,700

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	350	300	300	250	350	250	250	250
PER 10°C ABOVE ISA	200	200	200	200	300	300	300	300
PER 10°C BELOW ISA	-200	-200	-200	-200	-250	-250	-250	-250
PER 1% UP SLOPE	-100	-150	-200	-250	-400	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	700	750	750	750
1 REVERSER INOP	400	600	600	600	1,300	1,300	1,300	1,300
2 REVERSERS INOP	1,000	1,400	1,400	1,400	3,400	3,400	3,400	3,400
MANUAL SPOILERS	0	0	0	400	0	0	0	400

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.***

CLIMB					
SPEED: 290/0.78			THRUST: MAX CLIMB FLAPS: UP		
PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		400,000	350,000	300,000	260,000
40,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)			3.5 300	4.0 1000
30,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	4.0 900	3.5 1200	3.5 1700	4.0 2100
20,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	5.5 1700	5.5 2100	6.0 2700	6.0 3100
10,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	7.5 2500	7.5 3000	8.0 3700	9.0 4400
0	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	9.0 3000	9.5 3500	10.0 4300	11.0 5000

CRUISE					
SPEED: 0.78/290			THRUST: EPR FOR LEVEL FLIGHT FLAPS: UP		
PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		400,000	350,000	300,000	260,000
40,000	PITCH ATTITUDE EPR		4.0 1.87	3.5 1.53	2.5 1.33
35,000	PITCH ATTITUDE EPR	3.5 1.59	3.0 1.37	2.5 1.24	1.5 1.17
30,000	PITCH ATTITUDE EPR	2.5 1.26	2.0 1.20	1.5 1.14	1.0 1.11

DESCENT					
SPEED: 0.78/290			THRUST: IDLE FLAPS: UP		
PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		400,000	350,000	300,000	260,000
40,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)		0.5 -2900	0.0 -2400	0.0 -2200
30,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	0.0 -2000	-0.5 -2000	-1.5 -2100	-1.5 -2300
20,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	0.5 -1800	0.0 -1800	-1.0 -1900	-1.5 -2100
10,000	PITCH ATTITUDE RATE OF CLIMB (FT/MIN)	0.5 -1600	0.0 -1600	-1.0 -1700	-2.0 -1900

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.***

HOLDING					
SPEED: $V_{Ref30} + 80$		THRUST: EPR FOR LEVEL FLIGHT FLAPS: UP			
PRESSURE ALTITUDE - FEET		GROSS WEIGHT - POUNDS			
		400,000	350,000	300,000	260,000
10,000	PITCH ATTITUDE	5.5	5.5	5.0	5.0
	EPR	1.07	1.06	1.05	1.03

TERMINAL AREA						
SPEED: AS REQ'D			THRUST: EPR FOR LEVEL FLIGHT FLAPS: AS REQ'D			
PRESSURE ALTITUDE - FEET	FLAPS, SPEED		GROSS WEIGHT - POUNDS			
			400,000	350,000	300,000	260,000
5,000	UP V _{Ref30} + 80	PITCH ATT EPR	5.5	5.5	5.0	5.0
			1.05	1.04	1.03	1.01
5,000	1 V _{Ref30} + 60	PITCH ATT EPR	7.0	7.0	7.0	6.5
			1.08	1.07	1.05	1.04
5,000	5 V _{Ref30} + 40	PITCH ATT EPR	5.0	5.0	5.0	5.0
			1.11	1.10	1.08	1.07
5,000	15 V _{Ref30} + 20	PITCH ATT EPR	5.5	6.0	6.5	6.0
			1.14	1.12	1.10	1.08
5,000	20 V _{Ref30} + 20	PITCH ATT EPR	4.0	4.5	4.5	4.5
			1.16	1.13	1.11	1.09

FINAL APPROACH						
SPEED: AS REQ'D			THRUST: EPR FOR 3° GLIDESLOPE FLAPS: AS REQ'D			
PRESSURE ALTITUDE - FEET	FLAPS, SPEED		GROSS WEIGHT - POUNDS			
			400,000	350,000	300,000	260,000
1,500	25	PITCH ATT	1.0	1.0	1.0	1.0
	V _{Ref25} + 10	EPR	1.10	1.08	1.07	1.06
1,500	30	PITCH ATT	-0.5	0.5	1.0	1.0
	V _{Ref30} + 10	EPR	1.13	1.11	1.09	1.08

BRAKE COOLING FOLLOWING LANDING

GOVERNING CONDITIONS

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

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

- “QTLW Warning Remark” appears on the WDR **or**
- Landing above MLW **or**
- Landing within 19,000 lbs of MLW using Flaps 30 up to altitudes of 3,000 feet **or**
- Landing within 42,000 lbs of MLW using Flaps 30 for altitudes over 3,000 feet **or**
- Landing within 27,000 lbs of MLW using Flaps 25 up to an altitudes of 3,000 feet or above **or**
- Landing within 49,000 lbs of MLW using Flaps 25 for altitudes over 3,000 feet or above **or**
- Landing with non-standard aircraft configurations (flaps inoperative, brake deactivated,...etc.)

PROCEDURES

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

QUICK TURNAROUND LANDING WEIGHT

1. BTMS OPERATIVE

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

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

A **75 minute** ground cooling period is required.

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

2. BTMS INOPERATIVE

Determine the Maximum Quick Turnaround Landing Weight from Page 4-41.

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

A **75 minute** ground cooling period is required.

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

LANDING BRAKE COOLING

1. BTMS OPERATIVE

- a) Check the BTMS display on EICAS no sooner than 10 minutes and no later than 15 minutes after parking.
- b) Use the highest value to enter the BTMS Operative Brake Cooling table for ground from Page 4-42.
- c) Wait the specified time associated with the value from the BTMS indicator.

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

2. BTMS INOPERATIVE

Determine the Cooling Time and associated action if applicable from the Brake Cooling Time and AutoBrake Adjustment tables on Page 4-43. Comply with the specified procedures for the Caution Zone and Fuse Plug Melt Zone.

BRAKE COOLING FOLLOWING LANDING
MAXIMUM QUICK TURNAROUND LANDING WEIGHT
POUNDS

FLAPS 30

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE- °C							
	-20	-10	0	10	20	30	40	50
-1000	352,500	347,500	342,500	337,500	333,000	328,000	323,000	318,000
0	347,000	342,000	337,000	332,500	327,500	322,500	318,000	313,000
1,000	342,000	337,000	332,000	327,500	322,500	317,500	312,500	307,500
2,000	337,000	332,000	327,000	322,000	317,000	312,000	306,500	---
3,000	332,000	326,500	321,500	316,500	311,500	306,000	301,000	---
4,000	326,500	321,500	316,000	311,000	305,500	300,500	295,000	---
5,000	321,500	316,000	310,500	305,000	300,000	294,500	---	---
6,000	316,000	310,500	305,000	299,500	294,500	289,000	---	---
7,000	310,000	304,500	299,000	294,000	288,500	283,000	---	---
8,000	304,500	299,000	294,000	288,500	283,000	278,000	---	---

FLAPS 25

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE- °C							
	-20	-10	0	10	20	30	40	50
-1000	350,500	345,000	339,000	333,000	327,500	321,500	315,500	310,000
0	345,000	339,000	333,500	327,500	321,500	316,000	310,000	304,500
1,000	338,500	333,000	327,500	321,500	316,000	310,500	304,500	299,000
2,000	332,500	327,000	321,000	315,500	310,000	304,000	298,500	---
3,000	326,500	321,000	315,500	310,000	304,500	299,000	293,000	---
4,000	320,500	315,000	309,000	303,500	298,000	292,500	287,000	---
5,000	314,500	309,000	303,500	297,500	292,000	286,500	---	---
6,000	308,500	303,000	297,500	292,000	286,500	281,000	---	---
7,000	302,500	297,500	292,000	286,500	281,000	275,500	---	---
8,000	297,000	292,000	286,500	281,500	276,000	271,000	---	---

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

CORRECTIONS:

CONDITION		CORRECTION – POUNDS
Wind	per 1 kt. of headwind	730
	per 1 kt. of tailwind	3,860
Runway slope	per 0.1% uphill slope	2,900
	per 0.1% downhill slope	5,100
One brake deactivated		24,600

BRAKE COOLING FOLLOWING LANDING**BTMS OPERATIVE BRAKE COOLING****(minutes)**

	BTMS Indication						
	Up to 1	1	2	3	4	5 - 6	7 +
Ground	0	16	31	44	56	Caution Zone	Fuse Plug
In-Flight Gear Down *	0	2	3	4	5		Melt Zone

NOTE: A BTMS indication of 5 or higher will cause the Brake Temp Light to illuminate. The light will extinguish when the temperature decreases to 4.

- The In-Flight Gear Down cooling times are for use **ONLY** after waiting the duration of the ground cooling time and BTMS indicates overheating on the subsequent takeoff.
- The values above also pertain to rejected takeoff.

BRAKE COOLING FOLLOWING LANDING

LANDING BRAKE COOLING

(BTMS INOPERATIVE)

LANDING USING MAX MANUAL BRAKING:

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

BRAKE COOLING TIME (h:mm)

WEIGHT (1,000 lbs)	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
Reverse	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng
420	0:00 / 0:00	0:27 / 0:23	0:49 / 0:44	1:15C / 1:10C	1:43F / 1:36F	2:19F / 2:09F
400	0:00 / 0:00	0:24 / 0:20	0:45 / 0:41	1:10C / 1:05C	1:37F / 1:30F	2:11F / 2:01F
375	0:00 / 0:00	0:21 / 0:17	0:41 / 0:37	1:04C / 0:59	1:29F / 1:22F	2:00F / 1:51F
350	0:00 / 0:00	0:17 / 0:14	0:36 / 0:32	0:58 / 0:53	1:21F / 1:15C	1:49F / 1:41F
325	0:00 / 0:00	0:14 / 0:11	0:32 / 0:28	0:52 / 0:47	1:13C / 1:08C	1:39F / 1:32F
300	0:00 / 0:00	0:11 / 0:00	0:28 / 0:24	0:45 / 0:41	1:05C / 1:00C	1:28F / 1:22F
275	0:00 / 0:00	0:00 / 0:00	0:23 / 0:19	0:39 / 0:35	0:57 / 0:52	1:18C / 1:12C
250	0:00 / 0:00	0:00 / 0:00	0:18 / 0:14	0:33 / 0:29	0:49 / 0:44	1:07C / 1:02C
225	0:00 / 0:00	0:00 / 0:00	0:13 / 0:10	0:27 / 0:23	0:41 / 0:37	0:56 / 0:52
200	0:00 / 0:00	0:00 / 0:00	0:00 / 0:00	0:21 / 0:17	0:33 / 0:29	0:46 / 0:41

C - CAUTION ZONE (1:00-1:19) – Fuse plugs may melt. Wait the specified time. After the landing gear assembly has cooled, visually inspect for tire damage and seal leakage.

F - FUSE PLUG MELT ZONE (Shaded Region, 1:20 +) – Under these conditions, consider that the fuse plugs will likely melt and deflate the tires. Unless required, do not set parking brake. The possibility of tire, grease or hydraulic fluid fires should also be considered. Maintenance inspection of tires, wheels and brakes is recommended.

LANDING USING AUTOBRAKES:

- 1) Determine the time from the table above. This is the reference time.
- 2) Subtract the times in the adjustment table below from the reference time in the table above to get proper cooling time for the respective brake setting. **Any resulting wait time of 1:20 or above is in the Fuse Plug Melt Zone.**

AUTOBRAKE ADJUSTMENT

NW INDICATES NO WAITING REQUIRED

	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
Reverse	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng	0 Eng / 2 Eng
MaxAuto	NW / NW	0:06 / NW	0:07 / 0:14	0:09 / 0:15	0:10 / 0:18	0:12 / 0:22
Auto 4	NW / NW	NW / NW	0:09 / 0:22	0:12 / 0:26	0:15 / 0:30	0:19 / 0:35
Auto 3	NW / NW	NW / NW	0:12 / NW	0:16 / 0:35	0:21 / 0:42	0:25 / 0:50
Auto 2	NW / NW	NW / NW	0:13 / NW	0:20 / NW	0:26 / 0:60	0:34 / 1:06
Auto 1	NW / NW	NW / NW	0:24 / NW	0:25 / NW	0:35 / NW	0:45 / 1:36

BRAKE COOLING FOLLOWING REJECTED TAKEOFF

REJECTED TAKEOFF BRAKE COOLING

PROCEDURES

BTMS OPERATIVE:

- 1) Check the brake temperature indication on EICAS no sooner than 10 minutes and no later than 15 minutes after parking.
- 2) Use the highest value to enter the following BTMS Operative Brake Cooling table from Page 4-42.
- 3) Wait the specified time associated with the value from the BTMS indicator prior to subsequent takeoff.

BTMS INOPERATIVE:

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

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

BRAKE COOLING TIME (h:mm)

WEIGHT (1,000 lbs)	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
420	0:14	0:36	1:00C	1:27F	1:57F	2:36F
400	0:13	0:33	0:56	1:22F	1:51F	2:27F
375	0:11	0:30	0:51	1:15C	1:42F	2:15F
350	0:00	0:26	0:46	1:09C	1:34F	2:04F
325	0:00	0:23	0:41	1:02C	1:25F	1:53F
300	0:00	0:19	0:36	0:56	1:17C	1:41F
275	0:00	0:16	0:32	0:49	1:08C	1:30F
250	0:00	0:13	0:27	0:43	0:59	1:19C
225	0:00	0:00	0:22	0:36	0:51	1:07C
200	0:00	0:00	0:17	0:30	0:42	0:56

C - CAUTION ZONE (1:00 – 1:19) – Fuse plugs may melt. Wait the specified time. After the landing gear assembly has cooled, visually inspect for tire damage and seal leakage.

F - FUSE PLUG MELT ZONE (Shaded Region, 1:20 +) – Under these conditions, consider that the fuse plugs will likely melt and deflate the tires. Unless required, do not set parking brake. The possibility of tire, grease or hydraulic fluid fires should also be considered. Maintenance inspection of tires, wheels and brakes is recommended.

MEL SUPPORT**V_{MCG} - MINIMUM CONTROL SPEED, GROUND****KIAS****PW4060**

NO NOSEWHEEL STEERING

AIRPORT PRESSURE ALTITUDE FT	AMBIENT TEMPERATURE - °C								
	14 & BELOW	15	20	25	30	35	40	45	50
0	111	110	110	110	110	109	106	103	100
1,000	109	108	108	108	108	106	104	101	98
2,000	107	106	106	106	106	104	102	99	96
3,000	106	105	105	105	104	102	100	97	
4,000	104	103	103	103	102	100	98	95	
5,000	102	102	102	101	100	98	96	94	
6,000	100	100	100	99	98	96	94	92	
7,000	99	98	98	97	96	94	92		
8,000	97	96	96	95	94	92	90		

MEL SUPPORT

V₁ ADJUSTMENT - EEC ALT MODE

KIAS

PROCEDURES

V₁ ADJUSTMENT FOR EEC ALT MODE:

- 1) Use the actual takeoff weight, airport elevation and ambient temperature to determine the basic V₁, V_R and V₂ (i.e V₁ Basic, V_R Basic and V₂ Basic) for T/O thrust and the appropriate flap setting from the TAKEOFF section.
- 2) Adjust the basic V speeds determined above as follows:
 - a. Adjusted V₁ = V₁ Basic + increment from table below
 - b. Adjusted V_R = V_R Basic + 2 knots
 - c. Adjusted V₂ = V₂ Basic + 1 knot

Flap	AIRPORT OAT (°C)											
	10 & below	12	14	16	18	20	22	24	26	28	30	32 & above
	V ₁ INCREMENT (KTS)											
15	+3	+4	+4	+4	+4	+4	+4	+4	+5	+5	+5	+5
5	+3	+4	+4	+4	+4	+4	+4	+4	+5	+5	+5	+5

MEL SUPPORT

TAKEOFF THRUST EPR - EEC ALT MODE

EPR

BASED ON FULL RATING

TO

40 TO 80 KNOTS

NORMAL BLEED - PACKS ON / ANTI-ICE OFF

PW4060

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET								
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
50	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
48	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
46	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
42	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
40	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46
38	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47
36	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
34	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
32	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
30	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
28	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
26	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
24	1.53	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
22	1.53	1.56	1.55	1.55	1.55	1.55	1.55	1.55	1.55
20	1.53	1.56	1.57	1.57	1.56	1.56	1.56	1.56	1.56
18	1.53	1.56	1.57	1.57	1.58	1.58	1.58	1.57	1.57
16	1.53	1.56	1.57	1.58	1.58	1.58	1.58	1.58	1.58
14	1.53	1.56	1.57	1.58	1.59	1.60	1.60	1.60	1.60
12	1.53	1.56	1.57	1.58	1.59	1.60	1.61	1.61	1.61
10	1.53	1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.62
8 & BELOW	1.53	1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.62

CORRECTIONS:

CONFIGURATION	EPR CORRECTION
Packs OFF	+ 0.01
Engine Anti-Ice ON	NONE

MEL SUPPORT

GO AROUND THRUST EPR - EEC ALT MODE

EPR

GO AROUND

BASED ON FULL RATING

PW 4060

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

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET								
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
50	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
48	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
46	1.44	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
44	1.45	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
42	1.46	1.46	1.45	1.45	1.45	1.45	1.45	1.45	1.45
40	1.47	1.47	1.47	1.47	1.46	1.46	1.46	1.46	1.46
38	1.48	1.48	1.48	1.48	1.47	1.47	1.47	1.47	1.47
36	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
34	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
32	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
30	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
28	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
26	1.54	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.54
24	1.54	1.56	1.56	1.56	1.55	1.55	1.55	1.55	1.55
22	1.54	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
20	1.54	1.57	1.58	1.59	1.58	1.58	1.58	1.58	1.58
18	1.54	1.57	1.59	1.59	1.59	1.59	1.59	1.59	1.59
16	1.54	1.57	1.59	1.60	1.60	1.60	1.60	1.60	1.60
14	1.54	1.57	1.59	1.60	1.61	1.62	1.62	1.62	1.62
12	1.54	1.57	1.59	1.60	1.61	1.62	1.62	1.63	1.63
10 & BELOW	1.54	1.57	1.59	1.60	1.61	1.62	1.62	1.63	1.64

CORRECTIONS:

CONFIGURATION	EPR CORRECTION
Packs OFF	+ 0.01
Engine Anti-Ice ON	NONE

MEL SUPPORT

GO AROUND THRUST N₁ - EEC ALT MODE

%N₁

BASED ON FULL RATING

GO AROUND

40 TO 80 KNOTS

NORMAL BLEED - PACKS ON / ANTI-ICE OFF

PW4060

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET								
	-1,000	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
50	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
48	96.4	96.4	96.5	96.5	96.5	96.5	96.6	96.6	96.6
46	96.7	96.7	96.8	96.8	96.8	96.8	96.8	96.9	96.9
44	97.0	97.0	97.0	97.1	97.1	97.1	97.1	97.1	97.1
42	97.3	97.3	97.3	97.3	97.4	97.4	97.4	97.4	97.4
40	97.5	97.5	97.6	97.6	97.6	97.7	97.7	97.7	97.7
38	97.8	97.8	97.8	97.8	97.9	97.9	97.9	97.9	97.9
36	98.0	98.0	98.0	98.1	98.1	98.1	98.1	98.2	98.2
34	98.2	98.2	98.2	98.3	98.3	98.3	98.3	98.4	98.4
32	98.4	98.4	98.4	98.5	98.5	98.5	98.5	98.6	98.6
30	98.6	98.6	98.7	98.7	98.7	98.8	98.8	98.8	98.8
28	98.9	98.9	98.9	98.9	99.0	99.0	99.0	99.0	99.0
26	98.7	99.1	99.1	99.2	99.2	99.3	99.3	99.3	99.3
24	98.4	99.4	99.4	99.4	99.5	99.5	99.5	99.5	99.5
22	98.1	99.6	99.6	99.6	99.7	99.7	99.7	99.7	99.7
20	97.8	99.7	99.8	99.9	99.9	99.9	100.0	100.0	100.0
18	97.5	99.4	99.8	100.1	100.0	100.2	100.2	100.2	100.2
16	97.2	99.0	99.7	100.3	100.4	100.4	100.5	100.5	100.5
14	96.8	98.7	99.3	100.0	100.0	100.8	100.8	100.8	100.8
12	96.5	98.4	99.0	99.7	100.2	100.7	101.0	101.0	101.1
10	96.1	98.0	98.6	99.3	99.8	100.3	100.9	101.3	101.3
8	95.8	97.7	98.3	98.9	99.5	100.0	100.5	100.9	101.5
6	95.5	97.3	97.9	98.6	99.1	99.6	100.2	100.6	101.3
4	95.1	97.0	97.6	98.2	98.7	99.3	99.8	100.2	100.9
2	94.8	96.6	97.2	97.8	98.4	99.0	99.4	99.8	100.5
0	94.4	96.2	96.9	97.5	98.0	98.6	99.1	99.5	100.1
-2	94.1	95.9	96.5	97.2	97.6	98.3	98.7	99.2	99.7
-4	93.7	95.5	96.2	96.8	97.3	97.9	98.3	98.8	99.4
-6	93.4	95.2	95.8	96.4	96.9	97.5	97.9	98.4	99.0
-8	93.0	94.9	95.5	96.1	96.5	97.1	97.5	98.0	98.6
-10	92.7	94.5	95.1	95.7	96.2	96.7	97.2	97.6	98.3
-12	92.3	94.1	94.7	95.3	95.8	96.4	96.8	97.3	97.9
-14	91.9	93.8	94.4	95.0	95.5	96.0	96.5	96.9	97.5
-16	91.6	93.4	94.0	94.6	95.1	95.7	96.1	96.5	97.2
-18	91.2	93.0	93.6	94.3	94.7	95.3	95.7	96.2	96.8
-20	90.8	92.7	93.3	93.9	94.4	94.9	95.4	95.8	96.4

CORRECTIONS									
Packs OFF	+ 0.8	+ 0.7	+ 0.7	+ 0.7	+ 0.6	+ 0.6	+ 0.5	+ 0.5	+ 0.5
Wing A/I ON	- 0.9	- 0.8	- 0.7	- 0.7	- 0.6	- 0.6	- 0.5	- 0.5	- 0.5

MEL SUPPORT

MAX CONTINUOUS THRUST - EEC ALT MODE

%N₁

MAX CON

BASED ON FULL RATING

PW 4060

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

OAT - °C	AIRPORT PRESSURE ALTITUDE - FEET									
	0	5,000	10,000	15,000	20,000	25,000	30,000	35,000	39,000	43,000
40	91.6	94.6	97.5	101.1	100.2	99.2	95.1	91.2	91.0	90.9
35	90.9	95.4	98.3	101.8	100.8	99.9	95.8	91.9	91.8	91.6
30	90.2	95.4	98.9	102.4	101.5	100.7	96.7	92.8	92.7	92.5
25	89.4	94.6	99.8	103.1	102.3	101.8	97.8	94.0	93.8	93.7
20	88.7	93.8	99.0	103.9	103.2	102.9	98.9	95.1	95.0	94.8
15	87.9	93.0	98.1	103.4	104.5	104.2	100.2	96.5	96.3	96.2
10	87.2	92.2	97.3	102.5	104.5	105.5	101.7	97.9	97.8	97.6
5	86.4	91.3	96.4	101.6	103.5	104.5	102.9	99.2	99.1	98.9
0	85.6	90.5	95.6	100.7	102.6	103.6	103.5	100.6	100.4	100.3
-5	84.8	89.7	94.7	99.8	101.7	102.6	102.6	101.4	101.2	101.1
-10	84.0	88.8	93.8	98.8	100.7	101.7	101.6	102.0	102.0	101.9
-12	83.7	88.5	93.4	98.4	100.3	101.3	101.2	101.6	101.6	101.5
-14	83.4	88.2	93.1	98.1	100.0	100.9	100.9	101.2	101.2	101.1
-16	83.1	87.8	92.7	97.7	99.6	100.5	100.5	100.8	100.8	100.7
-18	82.7	87.5	92.3	97.3	99.2	100.1	100.1	100.4	100.4	100.3
-20	82.4	87.1	92.0	96.9	98.8	99.7	99.7	100.0	100.0	99.9
-22	82.1	86.8	91.6	96.5	98.4	99.3	99.3	99.6	99.7	99.5
-24	81.8	86.4	91.3	96.2	98.0	98.9	98.9	99.2	99.3	99.1
-26	81.4	86.1	90.9	95.8	97.6	98.5	98.5	98.8	98.9	98.7
-28	81.1	85.8	90.5	95.4	97.2	98.1	98.1	98.4	98.5	98.3
-30	80.8	85.4	90.2	95.0	96.8	97.7	97.7	98.0	98.1	97.9
-32	80.4	85.0	89.8	94.6	96.4	97.3	97.3	97.6	97.6	97.5
-34	80.1	84.7	89.4	94.2	96.0	96.9	96.9	97.2	97.2	97.1
-36	79.8	84.3	89.0	93.8	95.6	96.5	96.5	96.8	96.8	96.7
-38	79.4	84.0	88.7	93.4	95.2	96.1	96.1	96.4	96.4	96.3
-40	79.1	83.6	88.3	93.0	94.8	95.7	95.7	96.0	96.0	95.9
-42	78.8	83.3	87.9	92.6	94.4	95.3	95.3	95.6	95.6	95.5
-44	78.4	82.9	87.5	92.2	94.0	94.9	94.8	95.2	95.2	95.1
-46	78.1	82.5	87.1	91.8	93.6	94.5	94.4	94.7	94.8	94.6
-48	77.7	82.2	86.8	91.4	93.2	94.1	94.0	94.3	94.4	94.2
-50	77.4	81.8	86.4	91.0	92.7	93.6	93.6	93.9	93.9	93.8

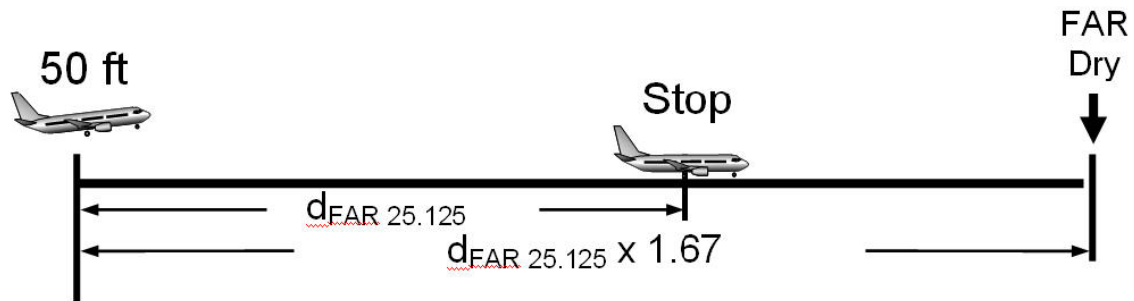
CORRECTIONS										
PACKS OFF	+ 0.4	+ 0.6	+ 0.5	+ 0.5	+ 0.6	+ 0.6	+ 0.7	+ 0.8	+ 1.0	+ 1.1
ENG A/I ON	- 0.6	- 0.8	- 0.9	- 1.1	- 1.3	- 1.3	- 1.3	- 1.4	- 1.5	- 1.6
WING A/I ON	- 0.9	- 1.1	- 1.3	- 1.5	- 1.7	- 1.8	- 1.8	- 1.9	- 2.1	- 2.3

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

DEFINITION

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



FAR Landing Distance Diagram

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

APPLICABILITY

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

ASSUMPTIONS

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

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

MEL SUPPORT**FAR LANDING DISTANCES (FACTORED)****ANTI-SKID INOP – DRY RUNWAY****FLAPS 30**

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
410,000	14,850	15,230							
400,000	14,330	14,690	15,080	15,480					
390,000	13,840	14,190	14,560	14,940	15,320	15,710			
380,000	13,380	13,720	14,070	14,420	14,790	15,160	15,550	15,940	
370,000	12,960	13,270	13,600	13,940	14,300	14,660	15,030	15,410	
360,000	12,570	12,870	13,180	13,500	13,840	14,200	14,570	14,960	15,350
350,000	12,240	12,520	12,820	13,130	13,450	13,790	14,160	14,600	15,010
340,000	11,940	12,220	12,510	12,800	13,120	13,440	13,800	14,250	14,680
330,000	11,680	11,950	12,230	12,520	12,820	13,130	13,480	13,910	14,330
320,000	11,420	11,690	11,970	12,250	12,550	12,850	13,180	13,580	13,980
310,000	11,170	11,440	11,720	12,000	12,280	12,580	12,900	13,260	13,630
300,000	10,910	11,180	11,450	11,720	12,000	12,290	12,600	12,940	13,280
290,000	10,630	10,890	11,160	11,430	11,700	11,990	12,290	12,600	12,930
280,000	10,340	10,590	10,860	11,120	11,380	11,660	11,950	12,260	12,570
270,000	10,060	10,300	10,550	10,800	11,060	11,330	11,620	11,910	12,220
260,000	9,770	10,000	10,250	10,490	10,740	11,010	11,280	11,570	11,860
250,000	9,480	9,700	9,940	10,180	10,420	10,680	10,940	11,220	11,500
240,000	9,190	9,400	9,630	9,860	10,100	10,350	10,600	10,870	11,140

ANTI-SKID 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
410,000	17,080	17,520							
400,000	16,480	16,900	17,350	17,810					
390,000	15,920	16,320	16,750	17,190	17,620	18,070			
380,000	15,390	15,780	16,190	16,590	17,010	17,440	17,890	18,340	
370,000	14,910	15,270	15,640	16,040	16,450	16,860	17,290	17,730	
360,000	14,460	14,810	15,160	15,530	15,920	16,330	16,760	17,210	17,660
350,000	14,080	14,400	14,750	15,100	15,470	15,860	16,290	16,790	17,270
340,000	13,740	14,060	14,390	14,720	15,090	15,460	15,870	16,390	16,890
330,000	13,440	13,750	14,070	14,400	14,750	15,100	15,510	16,000	16,480
320,000	13,140	13,450	13,770	14,090	14,440	14,780	15,160	15,620	16,080
310,000	12,850	13,160	13,480	13,800	14,130	14,470	14,840	15,250	15,680
300,000	12,550	12,860	13,170	13,480	13,800	14,140	14,490	14,890	15,280
290,000	12,230	12,530	12,840	13,150	13,460	13,790	14,140	14,490	14,870
280,000	11,900	12,180	12,490	12,790	13,090	13,410	13,750	14,100	14,460
270,000	11,570	11,850	12,140	12,420	12,720	13,030	13,370	13,700	14,060
260,000	11,240	11,500	11,790	12,070	12,360	12,670	12,980	13,310	13,640
250,000	10,910	11,160	11,440	11,710	11,990	12,290	12,590	12,910	13,230
240,000	10,570	10,810	11,080	11,340	11,620	11,910	12,190	12,510	12,820

CORRECTIONS:

Headwind per kt	- 60 ft
Tailwind per kt	+ 280 ft

MEL SUPPORT**FAR LANDING DISTANCES (FACTORED)****ONE BRAKE DEACTIVATED – DRY RUNWAY****FLAPS 30**

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
410,000	8,600	8,810	9,030	9,260	9,510	9,760	10,020	10,290	10,570
400,000	8,220	8,430	8,640	8,860	9,080	9,320	9,570	9,840	10,100
390,000	7,830	8,040	8,250	8,450	8,660	8,890	9,120	9,370	9,610
380,000	7,500	7,690	7,890	8,090	8,290	8,510	8,730	8,950	9,180
370,000	7,260	7,430	7,620	7,810	8,020	8,230	8,440	8,660	8,880
360,000	7,040	7,210	7,380	7,560	7,760	7,960	8,170	8,380	8,610
350,000	6,810	6,970	7,140	7,310	7,490	7,690	7,900	8,100	8,310
340,000	6,510	6,660	6,830	7,000	7,180	7,360	7,540	7,740	7,940
330,000	6,230	6,380	6,550	6,720	6,890	7,060	7,230	7,410	7,600
320,000	6,030	6,190	6,370	6,530	6,700	6,860	7,030	7,200	7,380
310,000	5,870	6,040	6,230	6,390	6,550	6,710	6,870	7,050	7,220
300,000	5,740	5,900	6,080	6,240	6,400	6,560	6,720	6,890	7,060
290,000	5,610	5,760	5,910	6,060	6,220	6,370	6,530	6,700	6,870
280,000	5,470	5,600	5,740	5,880	6,030	6,180	6,340	6,500	6,670
270,000	5,300	5,430	5,570	5,700	5,840	5,990	6,150	6,310	6,470
260,000	5,130	5,260	5,390	5,520	5,660	5,800	5,960	6,110	6,270
250,000	4,970	5,090	5,220	5,340	5,470	5,620	5,770	5,910	6,070
240,000	4,800	4,920	5,050	5,170	5,290	5,430	5,580	5,720	5,860

ONE BRAKE DEACTIVATED - 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
410,000	9,890	10,140	10,390	10,650	10,940	11,230	11,530	11,840	12,160
400,000	9,460	9,700	9,940	10,190	10,450	10,720	11,010	11,320	11,620
390,000	9,010	9,250	9,490	9,720	9,960	10,230	10,490	10,780	11,060
380,000	8,630	8,850	9,080	9,310	9,540	9,790	10,040	10,300	10,560
370,000	8,350	8,550	8,770	8,990	9,230	9,470	9,710	9,960	10,220
360,000	8,100	8,300	8,490	8,700	8,930	9,160	9,400	9,640	9,910
350,000	7,840	8,020	8,220	8,410	8,620	8,850	9,090	9,320	9,560
340,000	7,490	7,660	7,860	8,050	8,260	8,470	8,680	8,910	9,140
330,000	7,170	7,340	7,540	7,730	7,930	8,120	8,320	8,530	8,740
320,000	6,940	7,120	7,330	7,510	7,710	7,890	8,090	8,280	8,490
310,000	6,760	6,950	7,170	7,350	7,540	7,720	7,910	8,110	8,310
300,000	6,610	6,790	7,000	7,180	7,360	7,550	7,730	7,930	8,120
290,000	6,460	6,630	6,800	6,970	7,160	7,330	7,510	7,710	7,910
280,000	6,300	6,440	6,610	6,770	6,940	7,110	7,300	7,480	7,680
270,000	6,100	6,250	6,410	6,560	6,720	6,890	7,080	7,260	7,450
260,000	5,900	6,050	6,200	6,350	6,510	6,670	6,860	7,030	7,220
250,000	5,720	5,860	6,010	6,150	6,300	6,470	6,640	6,800	6,990
240,000	5,520	5,660	5,810	5,950	6,090	6,250	6,420	6,580	6,740

CORRECTIONS:

Headwind per kt	- 20 ft
Tailwind per kt	+ 140 ft

MEL SUPPORT

FAR LANDING DISTANCES (FACTORED)

AUTO SPOILERS INOP – DRY RUNWAY
FLAPS 30

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
410,000	9,820	10,080	10,300	10,580	10,870	11,170	11,460	11,740	12,020
400,000	9,420	9,670	9,890	10,160	10,430	10,710	11,000	11,270	11,550
390,000	9,030	9,270	9,490	9,740	10,010	10,270	10,540	10,820	11,100
380,000	8,650	8,880	9,100	9,340	9,590	9,840	10,100	10,370	10,650
370,000	8,290	8,500	8,720	8,950	9,180	9,430	9,680	9,940	10,200
360,000	7,930	8,130	8,340	8,560	8,790	9,020	9,260	9,510	9,770
350,000	7,580	7,780	7,980	8,190	8,400	8,620	8,850	9,090	9,340
340,000	7,240	7,420	7,620	7,820	8,020	8,230	8,450	8,680	8,910
330,000	6,900	7,080	7,260	7,450	7,640	7,840	8,060	8,270	8,480
320,000	6,640	6,800	6,970	7,150	7,340	7,530	7,730	7,930	8,150
310,000	6,430	6,580	6,750	6,920	7,100	7,290	7,480	7,680	7,890
300,000	6,220	6,370	6,530	6,700	6,880	7,050	7,240	7,430	7,630
290,000	5,990	6,130	6,290	6,450	6,620	6,790	6,970	7,150	7,340
280,000	5,710	5,840	5,990	6,150	6,310	6,470	6,640	6,810	6,990
270,000	5,490	5,630	5,780	5,930	6,090	6,240	6,400	6,560	6,740
260,000	5,330	5,480	5,640	5,790	5,930	6,080	6,230	6,390	6,560
250,000	5,200	5,360	5,520	5,670	5,810	5,950	6,100	6,250	6,410
240,000	5,090	5,230	5,380	5,520	5,660	5,800	5,940	6,100	6,260

AUTO 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
410,000	11,300	11,600	11,850	12,170	12,510	12,850	13,180	13,510	13,830
400,000	10,840	11,130	11,380	11,690	12,000	12,320	12,650	12,970	13,290
390,000	10,390	10,670	10,920	11,210	11,520	11,820	12,130	12,450	12,770
380,000	9,950	10,220	10,470	10,750	11,030	11,320	11,620	11,930	12,250
370,000	9,540	9,780	10,030	10,300	10,560	10,850	11,140	11,440	11,730
360,000	9,120	9,350	9,600	9,850	10,110	10,380	10,650	10,940	11,240
350,000	8,720	8,950	9,180	9,420	9,660	9,920	10,180	10,460	10,750
340,000	8,330	8,540	8,770	9,000	9,230	9,470	9,720	9,990	10,250
330,000	7,940	8,150	8,350	8,570	8,790	9,020	9,270	9,520	9,760
320,000	7,640	7,820	8,020	8,230	8,450	8,660	8,890	9,120	9,380
310,000	7,400	7,570	7,770	7,960	8,170	8,390	8,610	8,840	9,080
300,000	7,160	7,330	7,510	7,710	7,920	8,110	8,330	8,550	8,780
290,000	6,890	7,050	7,240	7,420	7,620	7,810	8,020	8,230	8,450
280,000	6,570	6,720	6,890	7,080	7,260	7,450	7,640	7,840	8,040
270,000	6,320	6,480	6,650	6,820	7,010	7,180	7,360	7,550	7,760
260,000	6,130	6,310	6,490	6,660	6,820	7,000	7,170	7,350	7,550
250,000	5,980	6,170	6,350	6,530	6,690	6,850	7,020	7,190	7,380
240,000	5,860	6,020	6,190	6,350	6,510	6,670	6,840	7,020	7,200

CORRECTIONS:

Headwind per kt	- 20 ft
Tailwind per kt	+ 140 ft

APPENDIX

SHIPS 1401-1404

APPENDIX: SHIPS 1401-1404**ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES
AND
APPROACH SPEEDS****APPLICABILITY**

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

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

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

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

ASSUMPTIONS

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

- Standard day conditions
- No wind
- No slope
- Each abnormal configuration landing distance table is based on the approach speed stated within each table.
- Operating engines at maximum reverse thrust, except for hydraulic system failures
- Maximum manual braking (more aggressive than Max Autobrakes)
- Includes distance from 50 feet above threshold to stop (1,500 feet of air distance)
- Based on demonstrated landing performance produced by the manufacturer during certification process

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

- Sea level altitude

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

AIR GROUND LOGIC IN AIR MODE, FLAPS 30

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	5,030	4,750	4,570	4,390	4,210	4,030	3,850	3,670
GOOD	7,190	6,750	6,470	6,190	5,910	5,630	5,350	5,070
MEDIUM	10,830	10,150	9,690	9,230	8,770	8,310	7,850	7,390
POOR	16,400	15,500	14,880	14,260	13,640	13,020	12,400	11,780
V_{app} - V_{Ref30}	159	151	145	140	135	130	124	119

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+180	+280	+440	+660

AIRSPEED UNRELIABLE

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	4,400	4,100	3,960	3,820	3,680	3,540	3,400	3,260
GOOD	5,880	5,600	5,380	5,160	4,940	4,720	4,500	4,280
MEDIUM	8,460	8,000	7,620	7,240	6,860	6,480	6,100	5,720
POOR	11,560	10,900	10,320	9,740	9,160	8,580	8,000	7,420
V_{app} - V_{Ref20}	164	159	154	149	144	139	134	128

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+160	+220	+330	+460

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

ANTI-SKID INOPERATIVE, FLAPS 30

RWY COND. & APPCH SPEED	LANDING WEIGHT – POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	8,550	8,050	7,690	7,330	6,970	6,610	6,250	5,890
GOOD	7,830	7,350	7,010	6,670	6,330	5,990	5,650	5,310
MEDIUM	9,890	9,250	8,770	8,290	7,810	7,330	6,850	6,370
POOR	13,130	12,250	11,570	10,890	10,210	9,530	8,850	8,170
V_{app} - V_{Ref30}	159	151	145	140	135	130	124	119

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+320	+310	+400	+540

FLAPS UP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	7,300	6,300	5,940	5,580	5,220	4,860	4,500	4,140
GOOD	7,380	7,000	6,700	6,400	6,100	5,800	5,500	5,200
MEDIUM	10,370	9,750	9,290	8,830	8,370	7,910	7,450	6,990
POOR	13,660	12,800	12,140	11,480	10,820	10,160	9,500	8,840
V_{app} - V_{Ref30} + 50	209	201	195	190	185	180	174	169

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+310	+280	+410	+550

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

HYDRAULIC SYSTEM C INOP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	4,950	4,750	4,590	4,430	4,270	4,110	3,950	3,790
GOOD	6,650	6,350	6,090	5,830	5,570	5,310	5,050	4,790
MEDIUM	8,880	8,400	8,000	7,600	7,200	6,800	6,400	6,000
POOR	11,310	10,650	10,090	9,530	8,970	8,410	7,850	7,290
V_{app} - V_{Ref20}	164	159	154	149	144	139	134	128

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+170	+250	+350	+450

HYDRAULIC SYSTEM C+L OR C+R INOP

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	6,200	5,800	5,600	5,400	5,200	5,000	4,800	4,600
GOOD	8,590	8,050	7,710	7,370	7,030	6,690	6,350	6,010
MEDIUM	12,000	11,200	10,660	10,120	9,580	9,040	8,500	7,960
POOR	16,340	15,100	14,300	13,500	12,700	11,900	11,100	10,300
V_{app} - V_{Ref30} + 20	179	171	165	160	155	150	144	139

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+340	+490	+690

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

HYDRAULIC SYSTEM R & L INOP

RWY COND. & APPCH SPEED	LANDING WEIGHT – POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	5,510	5,150	4,970	4,790	4,610	4,430	4,250	4,070
GOOD	8,200	7,700	7,380	7,060	6,740	6,420	6,100	5,780
MEDIUM	12,800	12,000	11,460	10,920	10,380	9,840	9,300	8,760
POOR	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000	>15,000
V_{app} - V_{Ref30} + 20	179	171	165	160	155	150	144	139

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+180	+280	+440	+N/A

LE SLAT ASYMMETRY, FLAPS ≥ 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	4,940	4,400	4,240	4,080	3,920	3,760	3,600	3,440
GOOD	6,160	5,800	5,560	5,320	5,080	4,840	4,600	4,360
MEDIUM	8,490	7,950	7,570	7,190	6,810	6,430	6,050	5,670
POOR	10,920	10,200	9,660	9,120	8,580	8,040	7,500	6,960
V_{app} - V_{Ref30} + 20	179	171	165	160	155	150	144	139

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+200	+240	+340	+440

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

LE SLAT ASYMMETRY, FLAPS < 20

RWY COND. & APPCH SPEED	LANDING WEIGHT – POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	5,580	4,900	4,720	4,540	4,360	4,180	4,000	3,820
GOOD	6,950	6,550	6,270	5,990	5,710	5,430	5,150	4,870
MEDIUM	9,380	8,800	8,380	7,960	7,540	7,120	6,700	6,280
POOR	12,030	11,250	10,650	10,050	9,450	8,850	8,250	7,650
V_{app} - V_{Ref30} + 30	189	181	175	170	165	160	154	149

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+270	+380	+490

ONE ENGINE INOPERATIVE

RWY COND. & APPCH SPEED	LANDING WEIGHT – POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	4,400	4,100	3,960	3,820	3,680	3,540	3,400	3,260
GOOD	5,880	5,600	5,380	5,160	4,940	4,720	4,500	4,280
MEDIUM	8,460	8,000	7,620	7,240	6,860	6,480	6,100	5,720
POOR	11,560	10,900	10,320	9,740	9,160	8,580	8,000	7,420
V_{app} - V_{Ref20}	164	159	154	149	144	139	134	128

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+160	+220	+330	+460

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

**FEET
KIAS**

TE FLAP ASYMMETRY, FLAPS ≥ 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	4,300	4,000	3,860	3,720	3,580	3,440	3,300	3,160
GOOD	5,660	5,400	5,180	4,960	4,740	4,520	4,300	4,080
MEDIUM	7,770	7,350	7,010	6,670	6,330	5,990	5,650	5,310
POOR	10,080	9,500	9,000	8,500	8,000	7,500	7,000	6,500
V_{app} - V_{Ref20}	164	159	154	149	144	139	134	128

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+160	+210	+300	+400

TE FLAP ASYMMETRY, 5 < FLAPS < 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	5,100	4,500	4,320	4,140	3,960	3,780	3,600	3,420
GOOD	6,260	5,900	5,660	5,420	5,180	4,940	4,700	4,460
MEDIUM	8,540	8,000	7,620	7,240	6,860	6,480	6,100	5,720
POOR	11,090	10,350	9,810	9,270	8,730	8,190	7,650	7,110
V_{app} - V_{Ref30} + 20	179	171	165	160	155	150	144	139

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+210	+240	+340	+450

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

TE FLAP ASYMMETRY, FLAPS ≤ 5

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	5,650	4,950	4,730	4,510	4,290	4,070	3,850	3,630
GOOD	6,580	6,200	5,960	5,720	5,480	5,240	5,000	4,760
MEDIUM	9,060	8,500	8,100	7,700	7,300	6,900	6,500	6,100
POOR	11,730	10,950	10,390	9,830	9,270	8,710	8,150	7,590
V_{app} - V_{Ref30} + 30	189	181	175	170	165	160	154	149

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+230	+260	+360	+480

TE FLAP DISAGREE, FLAPS ≥ 20

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	4,490	4,050	3,910	3,770	3,630	3,490	3,350	3,210
GOOD	5,670	5,410	5,190	4,970	4,750	4,530	4,310	4,090
MEDIUM	7,770	7,370	7,010	6,650	6,290	5,930	5,570	5,210
POOR	10,140	9,560	9,060	8,560	8,060	7,560	7,060	6,560
V_{app} - V_{Ref20}	164	159	154	149	144	139	134	128

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+110	+140	+220	+320

APPENDIX: SHIPS 1401-1404

ABNORMAL CONFIGURATION ACTUAL LANDING DISTANCES AND APPROACH SPEEDS

FEET
KIAS

THRUST REVERSER UNLOCKED

RWY COND. & APPCH SPEED	LANDING WEIGHT - POUNDS							
	360,000	340,000	320,000	300,000	280,000	260,000	240,000	220,000
DRY	5,770	5,050	4,850	4,650	4,450	4,250	4,050	3,850
GOOD	7,320	6,900	6,600	6,300	6,000	5,700	5,400	5,100
MEDIUM	10,390	9,750	9,290	8,830	8,370	7,910	7,450	6,990
POOR	13,970	13,050	12,370	11,690	11,010	10,330	9,650	8,970
V_{app} - V_{Ref30} + 30	189	181	175	170	165	160	154	149

CORRECTIONS (feet):

CONDITION		DRY	GOOD	MEDIUM	POOR
Altitude	Per 1,000 feet	+240	+290	+420	+570

INTENTIONALLY BLANK

APPENDIX: SHIPS 1401-1404

EMERGENCY LANDING DISTANCES

FEET

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

FLAPS 25

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

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	9,400	8,600	7,500	6,400	5,100	4,200	7,500	6,400	5,400	5,500
340,000	9,100	8,400	7,300	6,300	5,000	4,000	7,300	6,300	5,300	5,400
330,000	8,900	8,200	7,100	6,200	4,900	4,000	7,100	6,200	5,200	5,300
320,000	8,700	8,000	7,000	6,000	4,800	3,900	7,000	6,100	5,100	5,200
310,000	8,500	7,800	6,800	5,900	4,700	3,800	6,800	5,900	5,000	5,100
300,000	8,300	7,600	6,700	5,800	4,600	3,800	6,700	5,800	4,900	5,000
295,000	8,200	7,500	6,600	5,700	4,600	3,700	6,600	5,700	4,900	4,900
290,000	8,000	7,400	6,500	5,600	4,500	3,700	6,500	5,700	4,800	4,900
280,000	7,800	7,200	6,300	5,500	4,400	3,600	6,300	5,500	4,700	4,800
270,000	7,600	7,100	6,200	5,400	4,300	3,600	6,200	5,400	4,600	4,700
260,000	7,400	6,900	6,000	5,300	4,200	3,500	6,000	5,300	4,500	4,600
250,000	7,200	6,700	5,900	5,100	4,100	3,400	5,900	5,100	4,400	4,500
240,000	6,900	6,500	5,700	5,000	4,000	3,300	5,700	5,000	4,300	4,400
230,000	6,700	6,300	5,500	4,900	3,900	3,300	5,500	4,900	4,200	4,300
220,000	6,500	6,100	5,400	4,700	3,800	3,200	5,400	4,800	4,100	4,200

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

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

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

Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

	DRY (6)						GOOD (5)			
PER 1 KT HEADWIND	-50	-50	-50	-50	0	0	-50	-50	0	0
PER 1 KT TAILWIND	150	100	100	100	50	50	100	100	50	50
PER 5 KTS ADD'L SPD	300	350	350	300	200	150	350	300	200	200
PER 10°C ABOVE ISA	250	250	200	150	100	100	200	150	150	150
PER 10°C BELOW ISA	-250	-200	-200	-150	-100	-100	-200	-150	-100	-100
PER 1% UP SLOPE	-200	-100	0	0	0	-50	0	0	-50	-100
PER 1% DOWN SLOPE	150	50	0	0	0	50	0	0	100	150
1 REVERSER INOP	400	100	0	0	0	100	0	0	200	200
2 REVERSERS INOP	600	100	0	0	0	200	0	100	500	500
MANUAL SPOILERS	0	0	0	0	0	400	0	0	0	400

APPENDIX: SHIPS 1401-1404

EMERGENCY LANDING DISTANCES FEET

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

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

FLAPS 25

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	7,900	7,400	7,400	7,400	9,500	9,600	9,600	9,600
340,000	7,800	7,200	7,200	7,200	9,300	9,300	9,300	9,300
330,000	7,600	7,100	7,100	7,100	9,100	9,100	9,100	9,100
320,000	7,400	6,900	6,900	6,900	8,800	8,900	8,900	8,900
310,000	7,200	6,800	6,800	6,800	8,600	8,600	8,600	8,600
300,000	7,100	6,600	6,600	6,600	8,400	8,400	8,400	8,400
295,000	7,000	6,500	6,500	6,500	8,300	8,300	8,300	8,300
290,000	6,900	6,400	6,400	6,400	8,200	8,200	8,200	8,200
280,000	6,700	6,300	6,300	6,300	7,900	7,900	7,900	7,900
270,000	6,600	6,100	6,100	6,100	7,700	7,700	7,700	7,700
260,000	6,400	6,000	6,000	6,000	7,500	7,500	7,500	7,500
250,000	6,200	5,800	5,800	5,800	7,200	7,300	7,300	7,300
240,000	6,100	5,600	5,600	5,600	7,000	7,000	7,000	7,000
230,000	5,900	5,500	5,500	5,500	6,800	6,800	6,800	6,800
220,000	5,700	5,300	5,300	5,300	6,500	6,600	6,600	6,600

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

ALTITUDE (FEET)	MEDIUM (3)				POOR (1)			
0	-400	-400	-400	-400	-600	-600	-600	-600
2,000	0	0	0	0	0	0	0	0
4,000	400	400	400	400	600	600	600	600
6,000	800	800	800	800	1,100	1,100	1,100	1,100
8,000	1,300	1,200	1,200	1,200	1,700	1,700	1,700	1,700

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	350	300	200	250	350	250	250	250
PER 10°C ABOVE ISA	200	200	200	200	300	300	300	300
PER 10°C BELOW ISA	-200	-200	-200	-200	-250	-250	-250	-250
PER 1% UP SLOPE	-100	-200	-250	-250	-400	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	700	700	700	700
1 REVERSER INOP	400	600	700	600	1,400	1,400	1,400	1,400
2 REVERSERS INOP	1,100	1,500	1,600	1,500	3,700	3,700	3,700	3,700
MANUAL SPOILERS	0	0	0	400	0	0	0	400

APPENDIX: SHIPS 1401-1404

EMERGENCY LANDING DISTANCES

FEET

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

FLAPS 30

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

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).									
	DRY (6)						GOOD (5)			
	AB 1	AB 2	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	9,300	8,500	7,400	6,400	5,100	4,200	7,400	6,400	5,200	5,500
340,000	9,000	8,300	7,200	6,200	4,900	4,000	7,200	6,200	5,000	5,300
330,000	8,800	8,100	7,000	6,000	4,800	3,900	7,000	6,100	4,900	5,200
320,000	8,600	7,900	6,800	5,900	4,700	3,800	6,800	5,900	4,800	5,100
310,000	8,300	7,700	6,700	5,800	4,600	3,700	6,700	5,800	4,700	5,000
300,000	8,100	7,500	6,500	5,600	4,500	3,700	6,500	5,600	4,600	4,900
295,000	8,000	7,400	6,400	5,600	4,500	3,600	6,400	5,600	4,500	4,800
290,000	7,900	7,300	6,300	5,500	4,400	3,600	6,300	5,500	4,500	4,800
280,000	7,700	7,100	6,100	5,300	4,300	3,500	6,100	5,400	4,400	4,600
270,000	7,500	6,900	6,000	5,200	4,200	3,500	6,000	5,200	4,300	4,500
260,000	7,200	6,700	5,800	5,100	4,100	3,400	5,800	5,100	4,200	4,400
250,000	7,000	6,500	5,600	4,900	4,000	3,300	5,600	4,900	4,000	4,300
240,000	6,800	6,300	5,500	4,800	3,900	3,300	5,500	4,800	3,900	4,200
230,000	6,600	6,100	5,300	4,600	3,800	3,200	5,300	4,700	3,800	4,100
220,000	6,400	5,900	5,100	4,500	3,700	3,100	5,100	4,500	3,700	4,000

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

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

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS

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

APPENDIX: SHIPS 1401-1404

EMERGENCY LANDING DISTANCES FEET

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

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

FLAPS 30

Landing Weight (lb)	NOTE: Interpolate for GOOD-TO-MEDIUM (4) or MEDIUM-TO-POOR (2).							
	MEDIUM (3)				POOR (1)			
	AB 3	AB 4	Max AB	Max Manual	AB 3	AB 4	Max AB	Max Manual
350,000	7,900	7,400	7,400	7,400	9,600	9,600	9,600	9,600
340,000	7,600	7,200	7,200	7,200	9,300	9,300	9,300	9,300
330,000	7,400	7,000	7,000	7,000	9,000	9,000	9,000	9,000
320,000	7,300	6,800	6,900	6,900	8,800	8,800	8,800	8,800
310,000	7,100	6,700	6,700	6,700	8,600	8,600	8,600	8,600
300,000	6,900	6,500	6,500	6,500	8,300	8,300	8,300	8,300
295,000	6,800	6,400	6,400	6,400	8,200	8,200	8,200	8,200
290,000	6,700	6,300	6,400	6,400	8,100	8,100	8,100	8,100
280,000	6,500	6,200	6,200	6,200	7,800	7,800	7,800	7,800
270,000	6,400	6,000	6,000	6,000	7,600	7,600	7,600	7,600
260,000	6,200	5,800	5,800	5,800	7,400	7,400	7,400	7,400
250,000	6,000	5,700	5,700	5,700	7,100	7,100	7,100	7,100
240,000	5,800	5,500	5,500	5,500	6,900	6,900	6,900	6,900
230,000	5,600	5,300	5,300	5,300	6,600	6,600	6,600	6,600
220,000	5,500	5,100	5,200	5,200	6,400	6,400	6,400	6,400

BASIS: Zero wind • Two Engine Full Reverse Thrust • Touchdown Speed = VREF30 - 5 •
Data is advisory and includes 1,500 ft. air distance from threshold to touchdown.

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

 Shaded region corresponds to Max Landing Weight (MLW)

ALTITUDE ADJUSTMENT

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

CORRECTIONS	MEDIUM (3)				POOR (1)			
PER 1 KT HEADWIND	-50	-50	-50	-50	-50	-50	-50	-50
PER 1 KT TAILWIND	150	100	100	100	200	200	200	200
PER 5 KTS ADD'L SPD	350	250	250	250	300	250	250	250
PER 10°C ABOVE ISA	200	200	200	200	300	300	300	300
PER 10°C BELOW ISA	-200	-200	-200	-200	-250	-250	-250	-250
PER 1% UP SLOPE	-100	-200	-250	-250	-400	-450	-450	-450
PER 1% DOWN SLOPE	200	300	300	300	750	750	750	750
1 REVERSER INOP	400	600	600	600	1,300	1,300	1,300	1,300
2 REVERSERS INOP	1,100	1,400	1,400	1,400	3,400	3,400	3,400	3,400
MANUAL SPOILERS	0	0	0	400	0	0	0	400

APPENDIX: SHIPS 1401-1404**BRAKE COOLING FOLLOWING LANDING****GOVERNING CONDITIONS**

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

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

- “QTLW Warning Remark” appears on the WDR **or**
- Landing above MLW **or**
- Landing within 5,000 lbs of MLW using Flaps 30 at an altitude of 4,000 feet or above **or**
- Landing within 10,000 lbs of MLW using Flaps 25 at an altitude of 6,000 feet or above.
- Landing with non-standard aircraft configurations (flaps inoperative, brake deactivated,...etc.)

PROCEDURES

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

QUICK TURNAROUND LANDING WEIGHT**1. BTMS OPERATIVE**

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

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

A **58 minute** ground cooling period is required.

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

2. BTMS INOPERATIVE

Determine the Maximum Quick Turnaround Landing Weight from Page 4-69.

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

A **58 minute** ground cooling period is required.

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

LANDING BRAKE COOLING**1. BTMS OPERATIVE**

- a) Check the BTMS display on EICAS no sooner than 10 minutes and no later than 15 minutes after parking.
- b) Use the highest value to enter the BTMS Operative Brake Cooling table for ground from Page 4-70.
- c) Wait the specified time associated with the value from the BTMS indicator.

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

2. BTMS INOPERATIVE

Determine the Cooling Time and associated action if applicable from the Brake Cooling Time and AutoBrake Adjustment tables on Page 4-71. Comply with the specified procedures for the Caution Zone and Fuse Plug Melt Zone.

APPENDIX: SHIPS 1401-1404

**BRAKE COOLING FOLLOWING LANDING
MAXIMUM QUICK TURNAROUND LANDING WEIGHT
POUNDS**

FLAPS 25

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE- °C							
	-20	-10	0	10	20	30	40	50
-1,000	360,000	346,000	341,000	335,000	329,000	324,000	318,000	313,000
0	353,000	340,000	335,000	329,000	323,000	318,000	313,000	308,000
1,000	347,000	334,000	328,000	323,000	317,000	312,000	307,000	302,000
2,000	340,000	328,000	322,000	317,000	311,000	306,000	301,000	----
3,000	334,000	322,000	316,000	311,000	306,000	301,000	296,000	----
4,000	328,000	316,000	311,000	306,000	300,000	295,000	290,000	----
5,000	322,000	310,000	305,000	300,000	294,000	289,000	----	----
6,000	316,000	304,000	299,000	294,000	289,000	284,000	----	----
7,000	310,000	298,000	293,000	288,000	283,000	278,000	----	----
8,000	304,000	293,000	288,000	283,000	278,000	273,000	----	----

FLAPS 30

AIRPORT PRESSURE ALTITUDE - FT.	AMBIENT TEMPERATURE- °C							
	-20	-10	0	10	20	30	40	50
-1,000	355,000	350,500	345,500	340,800	335,300	330,700	326,000	321,300
0	350,000	345,500	340,600	335,500	330,200	325,500	321,000	316,000
1,000	345,000	340,500	335,500	330,200	325,000	320,200	315,000	310,500
2,000	340,200	335,300	330,000	325,000	320,000	314,500	309,800	305,000
3,000	335,000	330,000	324,500	319,000	314,000	309,000	304,000	299,000
4,000	329,800	324,600	319,000	313,900	308,500	303,000	298,200	----
5,000	324,500	314,000	313,500	308,000	302,800	297,500	293,000	----
6,000	319,000	313,000	307,800	302,000	297,000	292,000	287,000	----
7,000	313,000	307,500	301,800	296,000	291,200	286,500	282,000	----
8,000	307,500	301,700	296,000	291,800	286,000	281,000	276,500	----

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

APPENDIX: SHIPS 1401-1404

BRAKE COOLING FOLLOWING LANDING

BTMS OPERATIVE BRAKE COOLING

(minutes)

	BTMS Indication						
	Up to 1	1	2	3	4	5 - 6	7 +
Ground	0	13	30	43	55	Caution Zone	Fuse Plug
In-Flight Gear Down *	0	2	3	4	5		Melt Zone

NOTE: A BTMS indication of 5 or higher will cause the Brake Temp Light to illuminate. The light will extinguish when the temperature decreases to 4.

- The In-Flight Gear Down cooling times are for use **ONLY** after waiting the duration of the ground cooling time and BTMS indicates overheating on the subsequent takeoff.
- The values above also apply to rejected takeoff.

APPENDIX: SHIPS 1401-1404

BRAKE COOLING FOLLOWING LANDING

LANDING BRAKE COOLING

(BTMS INOPERATIVE)

LANDING USING MAX MANUAL BRAKING:

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

BRAKE COOLING TIME (h:mm)

WEIGHT (1,000 lbs)	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
350	0:10	0:16	0:35	0:54	1:16C	1:36F
340	0:10	0:15	0:33	0:51	1:13C	1:33F
330	0:10	0:14	0:31	0:49	1:10C	1:30F
320	0:10	0:13	0:29	0:47	1:07C	1:26F
310	0:10	0:11	0:27	0:45	1:04C	1:23F
300	0:10	0:10	0:25	0:43	1:01C	1:19F
290	0:10	0:10	0:23	0:40	0:58	1:16C
280	0:10	0:10	0:22	0:38	0:55	1:12C
270	0:10	0:10	0:20	0:35	0:52	1:09C
260	0:10	0:10	0:18	0:33	0:49	1:06C
250	0:10	0:10	0:16	0:30	0:46	1:02C
240	0:10	0:10	0:14	0:28	0:43	0:58
230	0:10	0:10	0:13	0:25	0:40	0:55
220	0:10	0:10	0:11	0:23	0:37	0:51

C - CAUTION ZONE (1:00-1:16) – Fuse plugs may melt. Wait the specified time. After the landing gear assembly has cooled, visually inspect for tire damage and seal leakage.

F - FUSE PLUG MELT ZONE (Shaded Region, 1:17 +) – Under these conditions, consider that the fuse plugs will likely melt and deflate the tires. Unless required, do not set parking brake. The possibility of tire, grease or hydraulic fluid fires should also be considered. Maintenance inspection of tires, wheels and brakes is recommended.

LANDING USING AUTOBRAKES:

- 3) Determine the time from the table above. This is the reference time.
- 4) Subtract the times in the adjustment table below from the reference time in the table above to get proper cooling time for the respective brake setting. **Any resulting wait time of 1:17 or above is in the Fuse Plug Melt Zone.**

AUTOBRAKE ADJUSTMENT

NW INDICATES NO WAITING REQUIRED

	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
	No Reverse Thrust Credit					
MaxAuto	NW	0:02	0:03	0:04	0:05	0:05
Auto 4	NW	0:05	0:07	0:10	0:10	0:09
Auto 3	NW	NW	0:10	0:13	0:15	0:16
Auto 2	NW	NW	0:15	0:21	0:21	0:21
Auto 1	NW	NW	0:22	0:23	0:25	0:27

APPENDIX: SHIPS 1401-1404

BRAKE COOLING FOLLOWING REJECTED TAKEOFF

REJECTED TAKEOFF BRAKE COOLING

PROCEDURES**BTMS OPERATIVE:**

- 1) Check the brake temperature indication on EICAS no sooner than 10 minutes and no later than 15 minutes after parking.
- 2) Use the highest value to enter the following BTMS Operative Brake Cooling table from Page 4-70.
- 3) Wait the specified time associated with the value from the BTMS indicator prior to subsequent takeoff.

BTMS INOPERATIVE:

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

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

BRAKE COOLING TIME (h:mm)

WEIGHT (1,000 lbs)	Brakes on Speed (Ground Speed KTS)					
	80	100	120	140	160	180
350	0:10	0:25	0:46	1:08C	1:34F	1:59F
340	0:10	0:23	0:44	1:05C	1:31F	1:55F
330	0:10	0:22	0:42	1:02C	1:27F	1:51F
320	0:10	0:20	0:40	1:00C	1:23F	1:47F
310	0:10	0:19	0:38	0:57	1:20F	1:43F
300	0:10	0:17	0:35	0:54	1:16C	1:38F
290	0:10	0:16	0:33	0:51	1:13C	1:34F
280	0:10	0:14	0:31	0:49	1:09C	1:30F
270	0:10	0:13	0:28	0:46	1:06C	1:26F
260	0:10	0:11	0:26	0:44	1:02C	1:22F
250	0:10	0:10	0:24	0:41	0:58	1:18F
240	0:10	0:10	0:22	0:39	0:55	1:14C
230	0:10	0:10	0:20	0:35	0:51	1:10C
220	0:10	0:10	0:18	0:32	0:48	1:06C

C - CAUTION ZONE (1:00 – 1:16) – Fuse plugs may melt. Wait the specified time. After the landing gear assembly has cooled, visually inspect for tire damage and seal leakage.

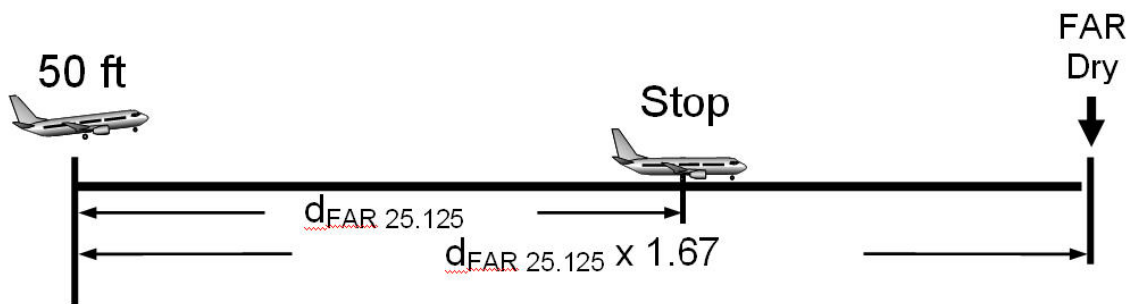
F - FUSE PLUG MELT ZONE (Shaded Region, 1:17 +) – Under these conditions, consider that the fuse plugs will likely melt and deflate the tires. Unless required, do not set parking brake. The possibility of tire, grease or hydraulic fluid fires should also be considered. Maintenance inspection of tires, wheels and brakes is recommended.

APPENDIX: SHIPS 1401-1404

MEL SUPPORT FAR LANDING DISTANCES (FACTORED)

DEFINITION

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



FAR Landing Distance Diagram

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

APPLICABILITY

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

ASSUMPTIONS

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

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

APPENDIX: SHIPS 1401-1404

MEL SUPPORT
FAR LANDING DISTANCES (FACTORED)

ANTI-SKID INOP – DRY RUNWAY

FLAPS 30

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
350,000	11,170	11,450	11,740	12,010	12,320	12,600			
340,000	10,730	11,000	11,270	11,550	11,850	12,120	12,460	12,940	13,540
330,000	10,430	10,680	10,950	11,220	11,510	11,810	12,130	12,450	12,780
320,000	10,170	10,420	10,690	10,960	11,240	11,530	11,830	12,140	12,460
310,000	9,930	10,170	10,420	10,680	10,960	11,240	11,520	11,830	12,140
300,000	9,680	9,920	10,160	10,420	10,680	10,950	11,240	11,530	11,830
290,000	9,430	9,660	9,890	10,140	10,400	10,660	10,940	11,220	11,510
280,000	9,170	9,390	9,630	9,870	10,120	10,370	10,630	10,910	11,200
270,000	8,920	9,130	9,360	9,590	9,840	10,080	10,340	10,610	10,880
260,000	8,660	8,870	9,090	9,310	9,550	9,790	10,040	10,300	10,570
250,000	8,410	8,610	8,820	9,040	9,270	9,500	9,740	9,990	10,240
240,000	8,150	8,340	8,550	8,760	8,990	9,210	9,440	9,680	9,930
230,000	7,890	8,080	8,290	8,490	8,690	8,900	9,120	9,360	9,610
220,000	7,620	7,810	8,000	8,190	8,400	8,610	8,830	9,050	9,280
210,000	7,360	7,540	7,720	7,920	8,110	8,310	8,510	8,730	8,960

ANTI-SKID 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
350,000	12,850	13,170	13,510	13,820	14,170	14,490			
340,000	12,340	12,650	12,970	13,290	13,630	13,940	14,330	14,890	15,580
330,000	12,000	12,290	12,600	12,910	13,240	13,590	13,950	14,320	14,700
320,000	11,700	11,990	12,300	12,610	12,930	13,260	13,610	13,970	14,330
310,000	11,420	11,700	11,990	12,290	12,610	12,930	13,250	13,610	13,970
300,000	11,140	11,410	11,690	11,990	12,290	12,600	12,930	13,260	13,610
290,000	10,850	11,110	11,380	11,670	11,960	12,260	12,590	12,910	13,240
280,000	10,550	10,800	11,080	11,360	11,640	11,930	12,230	12,550	12,880
270,000	10,260	10,500	10,770	11,030	11,320	11,600	11,900	12,210	12,520
260,000	9,960	10,210	10,460	10,710	10,990	11,260	11,550	11,850	12,160
250,000	9,680	9,910	10,150	10,400	10,670	10,930	11,210	11,490	11,780
240,000	9,380	9,600	9,840	10,080	10,340	10,600	10,860	11,140	11,420
230,000	9,080	9,300	9,540	9,770	10,000	10,240	10,490	10,770	11,060
220,000	8,770	8,990	9,200	9,420	9,660	9,910	10,160	10,410	10,680
210,000	8,470	8,680	8,880	9,110	9,330	9,560	9,790	10,040	10,310

CORRECTIONS:

Headwind per kt	- 40 ft
Tailwind per kt	+ 240 ft

APPENDIX: SHIPS 1401-1404**MEL SUPPORT****FAR LANDING DISTANCES (FACTORED)****ONE BRAKE DEACTIVATED – DRY RUNWAY****FLAPS 30**

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
350,000	6,820	7,010	7,200	7,400	7,610	7,850	8,150	8,490	8,800
340,000	6,400	6,580	6,750	6,920	7,110	7,310	7,540	7,770	8,040
330,000	6,120	6,280	6,430	6,610	6,800	7,000	7,210	7,430	7,640
320,000	5,950	6,120	6,280	6,450	6,640	6,810	7,000	7,210	7,430
310,000	5,760	5,930	6,100	6,260	6,430	6,620	6,810	7,010	7,210
300,000	5,590	5,750	5,910	6,080	6,240	6,420	6,610	6,800	6,990
290,000	5,420	5,570	5,730	5,890	6,060	6,240	6,410	6,590	6,780
280,000	5,260	5,390	5,540	5,700	5,870	6,040	6,220	6,390	6,570
270,000	5,100	5,230	5,360	5,510	5,670	5,840	6,010	6,180	6,350
260,000	4,940	5,060	5,190	5,320	5,470	5,630	5,800	5,970	6,140
250,000	4,770	4,890	5,020	5,150	5,280	5,420	5,570	5,740	5,910
240,000	4,610	4,720	4,850	4,970	5,100	5,230	5,370	5,520	5,680
230,000	4,450	4,560	4,680	4,790	4,920	5,050	5,180	5,320	5,470
220,000	4,300	4,400	4,510	4,630	4,740	4,870	5,000	5,140	5,280
210,000	4,140	4,240	4,350	4,460	4,580	4,690	4,820	4,950	5,090

ONE BRAKE DEACTIVATED - 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
350,000	7,940	8,170	8,430	8,660	8,900	9,200	9,530	9,900	10,310
340,000	7,460	7,660	7,860	8,070	8,310	8,570	8,820	9,100	9,410
330,000	7,110	7,300	7,490	7,700	7,910	8,160	8,440	8,690	8,940
320,000	6,920	7,110	7,300	7,520	7,720	7,920	8,160	8,430	8,700
310,000	6,710	6,890	7,090	7,290	7,490	7,700	7,920	8,170	8,440
300,000	6,520	6,700	6,870	7,060	7,260	7,480	7,700	7,910	8,160
290,000	6,330	6,500	6,670	6,850	7,040	7,250	7,470	7,680	7,890
280,000	6,140	6,300	6,470	6,640	6,820	7,020	7,230	7,440	7,640
270,000	5,940	6,100	6,260	6,430	6,610	6,790	6,980	7,190	7,390
260,000	5,730	5,890	6,050	6,220	6,390	6,560	6,750	6,940	7,130
250,000	5,510	5,670	5,830	6,000	6,160	6,330	6,500	6,690	6,870
240,000	5,320	5,460	5,610	5,770	5,940	6,100	6,270	6,440	6,630
230,000	5,140	5,270	5,400	5,540	5,700	5,870	6,050	6,210	6,390
220,000	4,960	5,080	5,210	5,340	5,480	5,640	5,810	5,990	6,160
210,000	4,780	4,900	5,020	5,150	5,280	5,420	5,570	5,740	5,930

CORRECTIONS:

Headwind per kt	- 20 ft
Tailwind per kt	+ 190 ft

APPENDIX: SHIPS 1401-1404**MEL SUPPORT
FAR LANDING DISTANCES (FACTORED)****AUTO SPOILERS INOP – DRY RUNWAY****FLAPS 30**

AIRCRAFT WEIGHT LBS	AIRPORT PRESSURE ALTITUDE - FEET								
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
350,000	6,680	6,840	6,990	7,150	7,320	7,530	7,760	8,000	8,250
340,000	6,330	6,480	6,620	6,770	6,920	7,080	7,260	7,460	7,680
330,000	6,090	6,220	6,350	6,510	6,670	6,830	7,000	7,170	7,350
320,000	5,950	6,090	6,220	6,370	6,520	6,670	6,830	7,000	7,170
310,000	5,800	5,940	6,070	6,210	6,360	6,510	6,670	6,840	7,000
300,000	5,660	5,790	5,920	6,060	6,200	6,350	6,510	6,660	6,820
290,000	5,530	5,650	5,770	5,900	6,040	6,190	6,340	6,490	6,650
280,000	5,380	5,500	5,620	5,750	5,890	6,030	6,170	6,320	6,470
270,000	5,240	5,350	5,470	5,600	5,730	5,860	6,000	6,140	6,290
260,000	5,090	5,210	5,320	5,440	5,560	5,690	5,830	5,970	6,100
250,000	4,940	5,050	5,170	5,280	5,400	5,520	5,650	5,780	5,920
240,000	4,800	4,900	5,010	5,120	5,240	5,360	5,480	5,610	5,740
230,000	4,660	4,760	4,860	4,970	5,080	5,190	5,310	5,440	5,560
220,000	4,520	4,610	4,710	4,810	4,920	5,030	5,150	5,270	5,400
210,000	4,380	4,470	4,570	4,670	4,770	4,880	4,990	5,110	5,230

AUTO 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
350,000	7,600	7,790	7,960	8,140	8,340	8,580	8,850	9,120	9,410
340,000	7,200	7,370	7,540	7,710	7,880	8,060	8,270	8,500	8,750
330,000	6,930	7,080	7,220	7,410	7,590	7,780	7,970	8,170	8,370
320,000	6,760	6,930	7,080	7,250	7,420	7,590	7,780	7,970	8,170
310,000	6,590	6,750	6,900	7,060	7,240	7,410	7,590	7,790	7,970
300,000	6,430	6,580	6,730	6,890	7,050	7,220	7,410	7,580	7,770
290,000	6,280	6,420	6,560	6,710	6,870	7,040	7,210	7,390	7,570
280,000	6,110	6,250	6,390	6,530	6,700	6,860	7,020	7,190	7,360
270,000	5,950	6,070	6,210	6,360	6,510	6,660	6,820	6,980	7,160
260,000	5,780	5,910	6,040	6,180	6,320	6,470	6,630	6,790	6,940
250,000	5,600	5,730	5,870	5,990	6,130	6,270	6,420	6,570	6,730
240,000	5,440	5,560	5,680	5,810	5,950	6,090	6,220	6,370	6,520
230,000	5,280	5,400	5,510	5,640	5,760	5,890	6,030	6,180	6,320
220,000	5,120	5,220	5,340	5,450	5,580	5,710	5,840	5,980	6,130
210,000	4,960	5,060	5,180	5,290	5,410	5,530	5,660	5,800	5,940

CORRECTIONS:

Headwind per kt	- 20 ft
Tailwind per kt	+ 190 ft

End of Section

CONTENTS

	Page
AUTHORIZATION AND FLIGHT PLANNING	5-2
2.5 BLEED VALVE INOPERATIVE	5-3
FLAPS RETRACTED (SLATS EXTENDED).....	5-4
WINGLET REMOVAL.....	5-5
LANDING GEAR EXTENDED	5-7

AUTHORIZATION AND FLIGHT PLANNING

Authorization, procedures, and applicability of data for ferry operations are described the Flight Operations Manual (Chapters 9 and 35) and the Technical Operations Policies and Procedures Manual (TOPP chapter 40-60-05). Procedures outlined in those manuals must be strictly adhered to.

Ferry operational data is available for the following configurations:

- 2.5 Bleed Valve Inoperative
- Flaps Retracted (Slats Extended for Takeoff and Landing)
- Winglet Removed
- Landing Gear Extended

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

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

NOTE: If a computerized flight plan is available for the aircraft configuration, the computerized flight plan should be used in lieu of FERRY data. Data contained in this section is conservative compared to the optimized data contained in the computerized flight plan.

2. Calculate the trip time and fuel load based on the values in the flight plan by multiplying the time and fuel values obtained in Step 1 by the factors listed under the appropriate ferry configuration. Enter this data either in the Dispatcher Remarks section of the Computerized Flight Plan.
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 One Engine Inoperative Altitude Capability table, if applicable (see ferry configuration page, Enroute heading).
5. Adjust the a) Runway Allowable Weight
b) Climb Limit Takeoff Weight
c) Landing Climb Limit Weight
as follows:

From the appropriate ferry configuration page, subtract the weight decrements indicated under the Takeoff and Landing headings, from the NORMAL Thrust takeoff weights and the Landing Climb weight, respectively, obtained from the ARM (Airport Section).

The following limitations should be applied to all ferry flights:

1. Do not combine both ferry configurations.
2. All ferry flight takeoffs will be done at full (TO) thrust (TMC TO) and climb out will be made at Maximum Climb thrust (TMC CLB) unless otherwise specified on ferry configuration data page.
3. Observe additional limitations and restrictions as listed for each ferry configuration on the following data pages.

2.5 BLEED VALVE INOPERATIVE

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

LIMITATIONS

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

FLIGHT PLANNING

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

RANGE - NM	RECOMMENDED ALTITUDE	TIME	FUEL
500	Normal	1.00	1.08
1,000	Normal	1.00	1.08
1,500	Normal	1.00	1.08

Target Gate Arrival Fuel: 12,500 lbs. plus fuel to alternate

TAKEOFF

Adjustment to Runway Allowable and Climb Limit Weights:	None
Adjustment to V Speeds:	Use V Speeds for AT Thrust or TO (NORMAL) THRUST
Thrust Setting Restrictions:	Use AT Thrust if takeoff weight and conditions permit, otherwise use TO. Monitor EGT closely during takeoff and climb.
Flap Setting Restrictions:	No additional restrictions.
Operation From Contaminated Runway:	Use standard procedures.
Additional Information:	Expect N1 and N2 to run 1.0% high and EGT to run 60 °C high.

ENROUTE

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

LANDING

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

HOLDING SPEED/THRUST - IAS/EPR

Standard FMS/ODM speeds and thrusts.

FLAPS RETRACTED (SLATS EXTENDED)

Use the following conditions and factors for flaps retracted ferry operations:

LIMITATIONS

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

FLIGHT PLANNING

Flight Plan as Normal.

Target Gate Arrival Fuel: 11,500 lbs. plus fuel to Alternate.

TAKEOFF

Select **FLAPS 1 for Takeoff** (Slats Extended/Flaps Retracted) and use the following adjustments to Runway Allowable Limit Takeoff Weights:

Packs ON or OFF, From Flaps 5 data, Subtract 52,000 lbs

Packs ON or OFF, From Flaps 15 data, Subtract 62,000 lbs.

Takeoff V Speeds:

Weight LBS	Field Elev. FT	V1		VR		V2	
		Ambient Temperature - Degree C					
		20 & Below	40	20 & Below	40	20 & Below	40
340,000	SL	169	170	174	175	181	181
	8,000	173	174	178	179	181	182
300,000	SL	155	156	161	162	170	170
	8,000	160	161	166	167	170	170
260,000	SL	140	142	147	149	154	154
	8,000	145	146	152	154	158	158
220,000	SL	123	125	132	134	146	146
	8,000	130	131	138	139	146	145

Thrust Setting Restrictions:	<u>NORMAL</u> only, ALTERNATE Thrust <u>NOT</u> approved.
Flap/Slat Setting Restrictions:	Select Flaps 1 (Slats Extended/Flaps Retracted).
Safe pitch attitude with engine failure:	Normal
*Stabilizer Setting:	Normal
Operation from Contaminated Runway:	<u>NOT</u> permitted.

***NOTE:** Since the electrical trim limit is reduced when the airplane is in the Flaps Up configuration, it may be necessary to use the alternate trim system to set the stabilizer to the value specified in the manuals.

ENROUTE

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

LANDING

Landing Speed Restrictions:	Flaps 0 / Slats Extended Speed per ODM ABNORMAL Section
Flap/Slat Setting Restrictions:	Flaps 0 / Slats Extended.
Minimum Runway Length:	See ABNORMAL Section for ACTUAL landing distances.
Adjustment to Landing Climb Limit Weights:	None.

HOLDING

Standard FMS/ODM speeds and thrusts.

WINGLET REMOVAL

Use the following conditions and factors for one winglet or both winglets removed.

Restrictions:

- Airplane must be flown during daytime hours since the positions and anti-collision lights on the removed winglet(s) will be missing.
- Approval to ferry must be obtained through local regulating authorities.
- Ballast weight(s), if part of the winglet installation, shall remain in place.
Note: Ballast weight(s) are installed in the wing leading edge(s). Disassembly of the wing leading edge(s) is not required for ferry flight without winglets(s).
- Maximum airspeed is 250 KIAS or 0.65 Mach whichever is lower.
- Avoid turbulence. Avoid abrupt control inputs.
- Additional requirements for Ferry Flight with One Winglet:
 - Avoid icing conditions.
 - Maximum crosswind at takeoff and landing.

Configuration combinations of winglet and wing extension installation.

767-300ER Winglet and Wing Extension Component Removal Matrix *		
LH Winglet	RH Winglet	Configuration Status
		STC Baseline: All Components Installed
Removed		Ferry Allowed
	Removed	Ferry Allowed
Removed	Removed	Ferry Allowed

Ferry flights are allowed for the indicated configurations:

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

WINGLET REMOVAL

FLIGHT PLANNING

Increase trip fuel by 20%

Reduce all climb performance limited weights, i.e., takeoff climb and obstacle clearance, enroute climb, approach climb, and landing climb weight limits by 35,000 pounds

TAKEOFF

Maximum crosswind (one winglet):	15 knots.
RATOW & Climb limit weight:	Reduce by 35,000 lbs

ENROUTE

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

Max Climb Speed:	Lower of 250 KIAS or 0.65 Mach
Maximum Cruise Altitude:	Normal
Max Cruise Speed:	Lower of 250 KIAS or 0.65 Mach
Climb limit weight:	Reduce by 35,000 lbs

LANDING

Cat. I landing approaches only.

Maximum crosswind (one winglet):	15 knots.
Landing Speed restrictions:	No additional restrictions
Flap Setting Restrictions:	No additional restrictions
Approach & Landing Climb Limit Weights:	Reduce by 35,000 lbs

LANDING GEAR EXTENDED

LIMITATIONS:

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

FLIGHT PLANNING

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

PRESSURE ALTITUDE - FEET	RANGE – NAUTICAL GROUND MILES			
	500	1,000	1,500	2,000
8,000	29.5 / 2.20	60.0 / 4.15	92.0 / 6.10	126.5 / 7.90
10,000	29.0 / 2.15	58.0 / 4.05	89.0 / 5.90	122.0 / 7.70
14,000	27.0 / 2.05	54.5 / 3.85	83.0 / 5.65	113.5 / 7.35
20,000	24.5 / 1.90	48.5 / 3.60	74.0 / 5.25	101.0 / 6.90
24,000 and Above	23.5 / 1.85	46.5 / 3.45	71.0 / 5.05	97.5 / 6.55

NOTE: Based on Long Range Cruise, VREF30 + 70 climb/descent, standard day conditions, zero winds.

TAKEOFF

RATOW & Takeoff climb limit weight:

Use GRD TPI in AWABS

Takeoff V Speeds:

Use GRD TPI in AWABS

Takeoff Thrust Settings:

Use NORMAL only, ALTERNATE thrust NOT approved.

Takeoff Flap Settings:

Flaps 5 only.

Operation from Contaminated Runway:

DRY and WET runways only. No cluttered or icy runways allowed. Use GRD TPI.

LANDING GEAR EXTENDED (cont.)ENROUTE

Long Range Cruise Table – All Engine

GROSS WEIGHT - 1000 LB	PRESSURE ALTITUDE - 1,000 FEET CRUISE SPEED - KIAS TARGET EPR FUEL FLOW / ENGINE - LB/HR											
	10	15	17	19	21	23	25	27	29	31	33	35
420,000	261 1.25 10970	260 1.35 11100	260 1.40 11252									
400,000	256 1.23 10409	254 1.32 10449	254 1.37 10537	254 1.43 10670								
380,000	251 1.21 9880	249 1.29 9819	248 1.34 9846	248 1.39 9969	247 1.46 10129							
360,000	245 1.20 9357	242 1.27 9204	242 1.31 9213	241 1.36 9259	241 1.42 9426	241 1.49 9649						
340,000	240 1.18 8839	236 1.25 8622	236 1.28 8589	235 1.32 8597	235 1.38 8731	235 1.44 8944	234 1.52 9178					
320,000	233 1.17 8299	230 1.22 8095	229 1.25 8011	229 1.29 7986	228 1.34 8034	228 1.39 8239	228 1.46 8461					
300,000	226 1.15 7763	224 1.20 7600	223 1.23 7487	222 1.26 7409	222 1.30 7414	221 1.35 7536	221 1.41 7749	220 1.49 7946				
280,000	220 1.14 7263	218 1.18 7111	217 1.21 6991	215 1.24 6883	215 1.27 6845	214 1.31 6900	213 1.36 7038	214 1.43 7238	213 1.51 7431			
260,000	212 1.12 6753	211 1.17 6594	210 1.19 6508	209 1.21 6395	208 1.24 6316	207 1.28 6324	206 1.32 6397	206 1.37 6527	206 1.44 6716	206 1.53 6908		
240,000	204 1.11 6217	203 1.15 6091	203 1.17 6009	202 1.19 5923	201 1.21 5837	200 1.24 5797	199 1.28 5815	198 1.32 5875	198 1.38 6011	198 1.45 6189	198 1.55 6365	
220,000	196 1.10 5722	196 1.13 5619	195 1.15 5519	194 1.17 5435	194 1.19 5377	193 1.21 5327	191 1.24 5294	191 1.28 5300	190 1.33 5354	190 1.39 5490	190 1.46 5653	189 1.56 5817

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

LANDING GEAR EXTENDED (cont.)

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 130,000 lbs

HOLDING SPEED / THRUST (KIAS / EPR)

WEIGHT - POUNDS	ALTITUDE - FEET	
	10,000	15,000
420,000	249 / 1.24	249 / 1.33
400,000	242 / 1.22	242 / 1.30
380,000	236 / 1.20	236 / 1.28
360,000	229 / 1.18	229 / 1.25
340,000	221 / 1.17	221 / 1.23
320,000	215 / 1.16	215 / 1.21
300,000	210 / 1.14	210 / 1.19
280,000	205 / 1.13	205 / 1.17
260,000	200 / 1.12	200 / 1.16
240,000	194 / 1.10	194 / 1.14
220,000	189 / 1.09	189 / 1.13

End of Section

CONTENTS

	Page
ETOPS PERFORMANCE PROCEDURES	6-2
FLIGHT PLANNING CONSIDERATIONS	6-2
CRITICAL FUEL RESERVES	6-3
ANTI-ICE OFF.....	6-3
ENG & WING ANTI-ICE ON	6-4

ETOPS PERFORMANCE PROCEDURES

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

1. Maximum Continuous Thrust.
2. Mach 0.78/290 KIAS driftdown speeds.
3. 290 KIAS engine-out cruise speed.

In the event of pressurization loss in addition to or independent of an engine shutdown, cruise at 290 KIAS (engine-out) or LRC (all-engines) following emergency descent to 10,000 feet or to 14,000 feet over terrain - critical areas of Greenland. Refer to the Airway Manual and QRH for driftdown and emergency descent procedures.

Refer to ABNORMAL Section for one engine operating LRC data.

FLIGHT PLANNING CONSIDERATIONS

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

- Pressurization Inoperative
- Emergency descent to 10,000 feet
- Cruise at 10,000 feet/290 KIAS (engine-out) or LRC (all engines)
- 250 KIAS descent to 1,500 feet
- Missed approach, approach and land
- 5000 lb. of hold fuel (approximately double AC120-42 requirement)
- 5% fuel added for wind errors

- APU operating
- 5% fuel added for weather avoidance (180 minute ETOPS)

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

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

120 minutes - 808 NM
180 minutes - 1207 NM

CRITICAL FUEL RESERVES

ANTI-ICE NOT REQUIRED
ISA + 10°C & BELOW

ANTI-ICE OFF

INITIAL GROSS WT (1,000 LB)	CRITICAL FUEL RESERVES – 1,000 LB											
	DISTANCE TO ALTERNATE - NAM											
	400	500	600	700	800	820	821	900	1,000	1,100	1,200	1,300
400	20.4	24.5	28.6	32.6	36.7	37.5	39.2	42.5	46.6	50.7	54.9	58.9
390	20.2	24.2	28.2	32.1	36.1	36.9	38.6	41.8	45.9	49.9	54.0	57.9
380	19.9	23.8	27.7	31.6	35.6	36.3	38.0	41.2	45.1	49.1	53.1	57.0
370	19.6	23.4	27.2	31.1	35.0	35.8	37.4	40.5	44.5	48.4	52.3	56.1
360	19.3	23.0	26.8	30.6	34.5	35.2	36.9	39.9	43.8	47.6	51.4	55.3
350	19.0	22.6	26.3	30.1	33.9	34.6	36.3	39.3	43.2	46.9	50.6	54.4
340	18.6	22.3	25.9	29.6	33.3	34.1	35.7	38.7	42.5	46.1	49.8	53.6
330	18.4	22.0	25.6	29.2	32.9	33.6	35.2	38.1	41.9	45.5	49.1	52.8
320	18.1	21.7	25.3	28.8	32.4	33.1	34.6	37.5	41.2	44.8	48.4	52.0
310	17.9	21.4	25.0	28.4	31.9	32.6	34.1	37.0	40.6	44.2	47.8	51.2
300	17.6	21.1	24.7	28.1	31.4	32.1	33.6	36.4	40.0	43.6	47.1	50.4
290	17.3	20.8	24.3	27.7	31.1	31.7	33.2	36.0	39.4	43.0	46.6	49.9
280	17.0	20.5	24.0	27.4	30.7	31.4	32.8	35.5	38.9	42.5	46.1	49.4
270	16.6	20.3	24.0	27.2	30.4	31.0	32.4	35.1	38.4	42.0	45.6	48.8
260	16.3	19.8	23.4	26.7	30.0	30.6	32.1	34.6	37.8	41.4	45.0	48.3

NOTES

1. Based upon the greater of fuel burn for one-engine inoperative or for all-engines operating using the following flight profile:
 - a. Emergency descent to 10,000 ft.
 - b. Cruise @ 10,000 ft @ 290 KIAS.
 - c. 250 KIAS descent to landing.
 - d. 5,000 lb. hold fuel.
 - e. Missed approach, approach and land.
 - f. APU Operating.
2. Includes the following fuel allowances:
 - a. 5% for wind forecast errors.
 - b. **5% for weather avoidance (180 minute ETOPS / 821 NAM & beyond).**
3. This data reflects ETOPS data used by FLIGHT CONTROL for ETP Diversion Fuel analysis.
4. The flight planning system adjusts Critical Fuel Reserve data to account for individual ship number performance deterioration
5. For ambient temperatures between ISA + 11°C and ISA + 20°C, increase fuel required by 1.0%.

CRITICAL FUEL RESERVES

FORECAST ICING CONDITIONS
ISA + 10°C & BELOW

ENG & WING ANTI-ICE ON

INITIAL GROSS WT (1,000 LB)	CRITICAL FUEL RESERVES – 1,000 LB											
	DISTANCE TO ALTERNATE - NAM											
	400	500	600	700	800	820	821	900	1,000	1,100	1,200	1,300
400	23.6	28.4	33.3	38.0	42.8	43.7	45.5	49.3	54.1	58.9	63.8	67.7
390	23.3	28.0	32.7	37.4	42.1	43.0	44.8	48.5	53.2	58.0	62.7	66.3
380	23.1	27.6	32.2	36.8	41.5	42.4	44.1	47.7	52.4	57.0	61.7	64.8
370	22.7	27.2	31.7	36.2	40.8	41.7	43.4	47.0	51.6	56.2	60.7	64.2
360	22.3	26.7	31.1	35.6	40.2	41.0	42.7	46.3	50.8	55.3	59.8	63.5
350	21.9	26.2	30.6	35.1	39.5	40.4	42.0	45.6	50.1	54.4	58.8	62.9
340	21.5	25.8	30.1	34.5	38.9	39.7	41.3	44.8	49.3	53.6	57.8	62.3
330	21.2	25.5	29.7	34.0	38.3	39.1	40.7	44.2	48.6	52.8	57.0	61.4
320	20.9	25.1	29.3	33.5	37.7	38.5	40.1	43.5	47.8	52.0	56.3	60.4
310	20.6	24.8	29.0	33.1	37.2	38.0	39.5	42.8	47.1	51.3	55.5	59.5
300	20.3	24.5	28.6	32.6	36.6	37.4	38.9	42.2	46.3	50.5	54.7	58.6
290	19.9	24.1	28.2	32.2	36.2	37.0	38.4	41.7	45.7	49.9	54.1	58.0
280	19.5	23.7	27.9	31.8	35.8	36.5	38.0	41.1	45.1	49.3	53.5	57.3
270	19.2	23.5	27.8	31.6	35.3	36.1	37.5	40.6	44.5	48.7	52.9	56.7
260	18.8	22.9	27.1	31.0	34.9	35.7	37.0	40.1	43.8	48.1	52.3	56.1

NOTES:

1. Based upon the greater of fuel burn for one-engine inoperative or. all-engines operating using the following flight profile:
 - a. Emergency descent to 10,000 ft
 - b. Cruise @ 290 KIAS @ 10,000 ft.
 - c. 250 KIAS descent to landing.
 - d. 5,000 lb. hold fuel.
 - e. Missed approach, approach and land.
 - f. APU Operating .
2. Includes the following fuel allowances.
 - a. 5% for wind forecast errors.
 - b. **5% for weather avoidance (180 minute ETOPS / 821 NAM & beyond).**
 - c. 18% for Engine/Wing Anti-Ice ON and ice accumulation.
3. This data reflects data used by FLIGHT CONTROL for ETP Diversion Fuel analysis.
4. The flight planning system adjusts this critical fuel data to account for individual ship number performance deterioration.
5. For ambient temperatures between ISA + 11°C and ISA + 20°C, increase fuel required by 1.0%.

End of Section