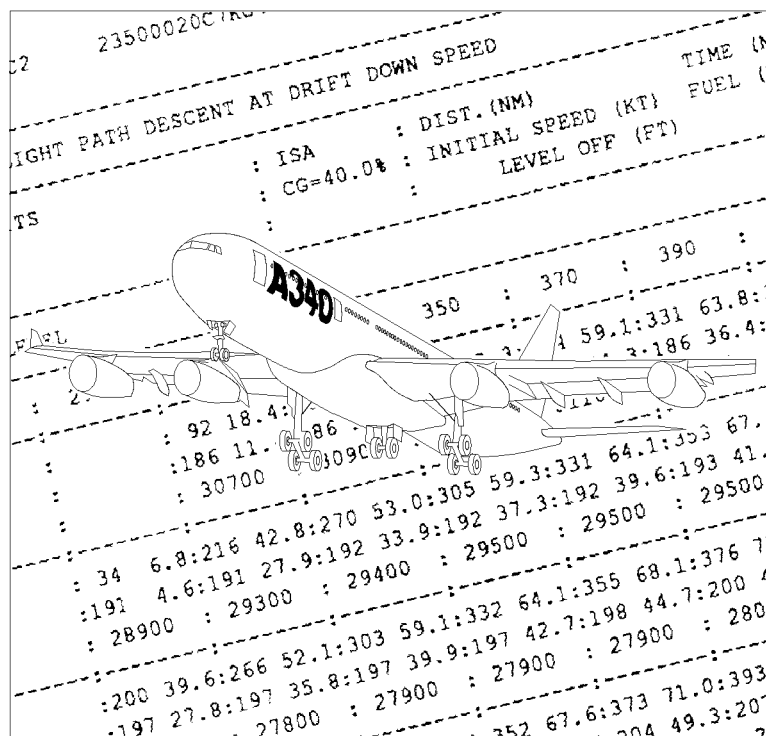


A340

FLIGHT CREW OPERATING MANUAL



FLIGHT PREPARATION

2

 FLIGHT CREW OPERATING MANUAL	GENERAL INFORMATION CONTENTS	2.00.00	P 1
		SEQ 001	REV 10

00.00 CONTENTS

00.10 ORGANIZATION OF THE MANUAL

- FOREWORD 1
- COMMENTS – QUESTIONS – SUGGESTIONS 1
- CONTENT 1
- USE 2
- PAGINATION 3
- REVISIONS 4
- HOW TO INSERT A REVISION 5
- BEST WAY TO GET UPDATED DOCUMENTATION 5

00.20 LIST OF CODES

00.30 LIST OF NORMAL REVISIONS

00.35 RECORD OF TEMPORARY REVISIONS

00.36 LIST OF EFFECTIVE TEMPORARY REVISIONS

00.70 CROSS REFERENCE TABLE

00.75 HIGHLIGHTS

00.80 LIST OF EFFECTIVE PAGES

00.85 LIST OF MODIFICATIONS

FOREWORD

- R This manual complements the approved Flight Manual. Airbus has attempted to ensure that the data contained in this manual agrees with the data in the Flight Manual. If there is any disagreement, the Flight Manual is the final authority.

COMMENTS — QUESTIONS — SUGGESTIONS

All manual holders and users are encouraged to submit any Flight Crew Operating Manual questions and suggestions to :

R

AIRBUS - BP N°33
 1 ROND POINT MAURICE BELLONTE
 31707 BLAGNAC CEDEX - FRANCE
 TELEX TLSBI7X or 530526F
 FAX 33.5.61.93.44.65 / 3.29.68
 ATTN. Flight Operations Support
 - STL

FOR TECHNICAL OR
 PROCEDURAL
 CONTENT

AIRBUS - BP N°33
 1 ROND POINT MAURICE BELLONTE
 31707 BLAGNAC CEDEX - FRANCE
 TELEX TLSBP7X or 530526F
 FAX 33.5.61.93.28.06
 ATTN. Technical Documentation Services
 - SDC

FOR PRINTING AND
 DISTRIBUTION

FFCS-02-0010-001-A001A

CONTENT

This manual provides operating crewmembers with information on the technical, procedural, and performance characteristics of the aircraft.

It is suitable for training purposes and may be used as a flight crew operating manual.

The content is divided into four volumes :

Vol 1 = Systems' description (description of the aircraft systems).

Vol 2 = Flight preparation (performance information, plus loading data).

Vol 3 = Flight operations (operating procedures, techniques, and performance information).

Vol 4 = FMGS pilot's guide (procedures for FMGS use).

 FLIGHT CREW OPERATING MANUAL	GENERAL INFORMATION		2.00.10	P 2
	ORGANIZATION OF THE MANUAL		SEQ 001	REV 11

USE

As a comprehensive set of references, the FCOM :

- can be used by an operator's flight operations department to supplement its own crew manual
- can be issued directly to crew members for training and subsequently for line operations.

WARNINGS, CAUTIONS AND NOTES

WARNING : an operating procedure, technique, etc, which may result in personnel injury or loss of life if not carefully followed.

CAUTION : an operating procedure, technique, etc, which may result in damage to equipment if not carefully followed.

R NOTE : an operating procedure, technique, etc, considered essential to emphasize.

COMPLEMENTARY INFORMATION

The manual includes technical information required for training as well as complementary information.

- Where a paragraph or schematic is preceded by the heading **FOR INFO** the details given are considered to be nice to know. Knowledge of these items is not required for the type rating qualification.
- ECAM warnings and cautions are summarized in a table at the end of each chapter of the volume 1. Numeric values are given for information only.

OPTIONAL EQUIPMENT

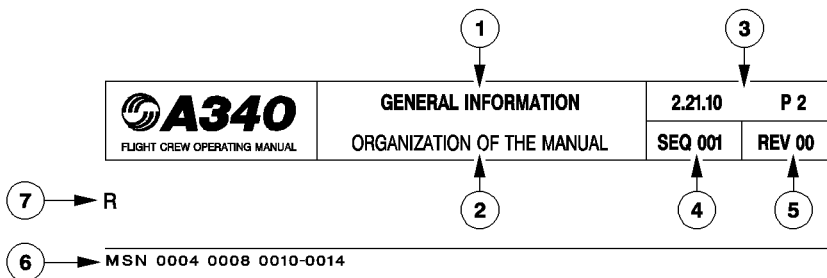
The legend ◁ indicates that a paragraph or a schematic is applicable only if the related equipment is installed.

 A340 FLIGHT CREW OPERATING MANUAL	GENERAL INFORMATION		2.00.10	P 3
	ORGANIZATION OF THE MANUAL		SEQ 001	REV 11

PAGINATION

R

FEC5-02-0010-003-A001AA



- ① Chapter title
- ② Subchapter title
- ③ FCOM volume number, chapter number, section number, page number
- ④ Sequence number is used for Airbus Industrie management of different aircraft configurations and allows to enter into list of effective pages
- ⑤ Revision number of the manual at which the page has been revised
- ⑥ Aircraft MSN :
 - 0004 0008 means that the page is applicable to aircraft MSN 0004 and MSN 0008
 - 0010-0014 means that the page is applicable from aircraft MSN 0010 to MSN 0014
 - ALL means that the page is applicable to all aircraft covered by the manual.
 Correspondance between MSN and registration may be found in the cross reference table
- ⑦ An R in front of a line indicates that the line has been revised.

 A340 FLIGHT CREW OPERATING MANUAL	GENERAL INFORMATION		2.00.10	P 4
	ORGANIZATION OF THE MANUAL		SEQ 001	REV 11

REVISIONS

NORMAL REVISIONS

These are issued periodically to cover non-urgent corrections and changes and to add new data.

- R They are accompanied by filing instructions and an updated list of effective pages that includes customized pages.

A normal revision record sheet is at the front of each volume.

In addition, each volume has a list of modifications affecting the manual that gives a simple explanation of the technical content of each incorporated modification and its validity per aircraft.

- R

INTERMEDIATE REVISIONS

- R They are issued between normal revisions to cover changes in the definition of the aircraft or changes in the composition of the fleet of an airline.

- R They are numbered in ascending sequence e.g. 20A, 20B, 20C... for intermediate revisions issued between normal revisions 20 and 21.

- R They are accompanied by filing instructions and an updated list of effective pages.

TEMPORARY REVISIONS

- R Printed on yellow paper, the Temporary Revisions (TR) are issued to provide information between normal revisions. They are accompanied by filing instructions and an updated customized list of effective TR.

A yellow temporary revision record sheet is at the front of each volume.

INCORPORATION OF SERVICE BULLETINS IN THE MANUAL

When a service bulletin has been accomplished on one or more aircraft of the operator fleet, and notified to Airbus Industrie, all affected manuals will reflect the new aircraft configuration at next revision. If judged necessary by Airbus Industrie or requested by the operator, a temporary revision or an intermediate revision is issued between normal revisions.

- R

OPERATIONS ENGINEERING BULLETINS

The Operations Engineering Bulletins (OEB) are issued as the need arises to give operators revised or new, but significant, technical and procedural information.

- R OEBs are provided with an OEB record sheet. This record sheet is re-issued with each normal revision to update the bulletin embodiment status.

They are accompanied by filing instructions and an updated customized list of effective OEBs.

 FLIGHT CREW OPERATING MANUAL	GENERAL INFORMATION ORGANIZATION OF THE MANUAL	2.00.10	P 5
		SEQ 001	REV 11

HOW TO INSERT A REVISION

FILING INSTRUCTION

Use the filing instructions as follows :

- R – REMOVE : The page must be removed. It may be replaced by a new page if associated with an INSERT instruction. If not, the page is cancelled.
- INSERT : The page must be inserted. If not associated with a REMOVE instruction, the page is new for the operator fleet and does not replace an existing one.
- R The column NOTE indicates EFFECTIVITY CHANGE ONLY if the page is revised due to an
- R effectivity change and not due to a technical content.

LIST OF EFFECTIVE PAGES (LEP)

The manual after revision must comply with the LEP, which lists all the pages that are in the manual. The new pages are indicated by N and the revised pages by R.

BEST WAY TO GET UPDATED DOCUMENTATION

As soon as any change has been completed on any airplane, the best way to get updated documentation is to advise:

AIRBUS INDUSTRIE

BP 33

31707 BLAGNAC CEDEX

FRANCE

Telex : TLSBP7X.. or 530526F

FAX 33.5.61.93.28.06

ATTN : Customer Service Directorate – Technical Documentation Services (AI/SE – D)

 FLIGHT CREW OPERATING MANUAL	GENERAL INFORMATION LIST OF CODES	2.00.20	P 1
		SEQ 001	REV 26

To simplify automatic LEP processing some modifications have been grouped under a common code.

	CODE	DESIGNATION
R	0001	Mod : (40023+40912+46179) = (40023+42750+46179)
	0002	L = Mod : 40624
	0003	Mod : (40023+40624+40912+46179) = (40023+40624+42750+46179)
	0004	Mod : 40912 = 42750
	0005	Mod : (40023+40912) = (40023+42750)
R	0006	Mod : (40023+40624+40912) = (40023+40624+42750)
	0007	Mod : (40912+46179) = (42750+46179)
	0008	Mod : 40023
	0009	Mod : 44366 = (42855+44366) = (44366+45292)
	0010	Mod : (40023+40624+40912) = (40023+40624+42750)
R	0011	Mod : 41300 = (40023+41300)
	0012	Mod : 41300 = (41300+40624) = (41300+46179) = (41300+40624+46179)
	0013	Mod : (47000+52831) = (47000+51767) = (47000+43756+52831) = (47000+51767+43756)
	0014	Mod : 40518 = 41957 = 47755 = (52183+52188+47755)
	0015	Mod : (44366+47279) = (42855+44366+47279) = (44366+45292+47279)
R	0016	Mod : (40257+45122) = (40257+49141) = (40257+49141+42760)
	0017	ALK = CPA = (45096+ALK) = (45096+CPA)
	0018	Mod : (49820+ALK = CPA) = (45096+49820+CPA)
	0019	Mod : 48096 = 51906 = (47244+48096) = (47244+51906) = (48096+52423) = (51906+52423)
	0020	Mod : (47244+48096) = (47244+51906) = (48096+52423) = (51906+52423)
	0021	Mod : (48096+48586) = (51906+48586) = (47244+48096+48586) = (47244+51906+48586) = (48096+52423+48586) = (51906+52423+48586)
	0022	Mod : (47001+48487+47968) = (47001+48487+50812+47968+51767) = (42855+47001+47968+48487+50812+51767)
	0023	Mod : (47000+48487+50812+52831) = (47000+48487+50812+51767+52831) = (42855+47000+48487+50812+51767+52831)
	0024	Mod : (47001+48487+51344+52831) = (47001+48487+50812+51344+51767+52831) = (42855+47001+48487+50812+51344+51767+52831)
	0025	Mod : (47001+48487+47968+52831) = (47001+48487+50812+47968+51767+52831) = (42855+47001+47968+48487+50812+51767+52831)
	0026	Mod : 47001 = (47001+50812+51767) = (42855+47001+50812+51767)
	0027	Mod : (47001+48487) = (47001+48487+50812+51767) = (42855+47001+48487+50812+51767)
	0028	Mod : (47000+50812) = (47000+50812+42855)
	0029	Mod : (47001+ 52831) = (47001+50812+52831) = (42855+47001+50812+52831+51767)
	0030	Mod : (47000+48487+50812) = (47000+48487+50812+51767) = (42855+47000+48487+50812+51767)
	0031	Mod : (47000+50812+51767) = (42855+47000+50812+51767)
	0032	Mod : (47001+51344+52831) = (47001+50812+51767+51644+52831) = (42855+47001+50812+51767+51644+52831)
	0033	Mod : 47000 = (47000+51767) = (47000+51767+52831)

CODE	DESIGNATION
0034	Mod : {47001+47968} = {47001+47968+51767}
0035	Mod : {47001+47968+52831} = {47001+47968+51767+52831}
0036	Mod : {47001+48487+50812+47968} = {47001+47961+48487+50812+51767}
0037	Mod : {47001+48487+52831+50812} = {47001+48487+50812+51767+52831}
0038	Mod : {47000+50812+52831} = {47000+50812+51767} = {47000+50812+51767+52831}
0039	Mod : {47000+48487+50812+52831} = {47000+48487+50812+51767} = {47000+48487+50812+51767+52831}
0040	Mod : {47001+50812+52831} = {47001+50812+51767+52831}
0041	Mod : {47001+47968+48487+50812+52831} = {47001+47968+48487+50812+51767+52831}
0042	Mod : {47001+48487+50812+47968} = {47001+47968+48487+50812+51767}
0043	Mod : {47001+47968+48487+50812+52831} = {47001+47968+48487+50812+51767+52831}
0044	Mod : 48096 = 51906 = {48096+47244+52166} = {48096+47244+52167} = {51906+47244+52166} = {51906+47244+52167}

R

N°	ISSUE DATE	
00	NOV 91	
01	JUN 92	
02	FEB 93	
03	MAR 93	
04	JUN 93	
05	OCT 93	
06	DEC 93	
07	MAR 94	
08	AUG 94	
09	SEP 95	
10	SEP 96	
11	JUN 97	
12	JAN 98	
13	JUL 98	
14	JAN 99	
15	JUN 99	
16	DEC 99	
17	MAY 00	
18	OCT 00	
19	MAR 01	
20	SEP 01	
21	APR 02	
22	SEP 02	
23	MAR 03	
24	NOV 03	
25	JUL 04	

R

[illegible]

R	N°	TITLE	STATUS	LOCATION
	To be filled by the operator, if needed			

THIS TABLE GIVES, FOR EACH AIRCRAFT INCLUDED IN THE MANUAL, THE CROSS REFERENCE BETWEEN :

- THE MANUFACTURING SERIAL NUMBER (MSN) WHICH APPEARS IN THE LIST OF EFFECTIVE PAGES
- THE REGISTRATION NUMBER OF THE AIRCRAFT AS KNOWN BY AIRBUS INDUSTRIE.

MSN	REGISTRATION
0063	LV-ZP0
0074	LV-ZPJ
0080	LV-ZPX
0085	LV-ZRA

ARG

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
 -----REASONS OF CHANGE-----

2 04 10 002 001 REV026
 - TECHNICAL AMENDMENT
 1)Increase of the maximum depth for dry
 snow from 2 inches to 4 inches.

2 04 20 008 001 REV026
 - TECHNICAL AMENDMENT
 1)Update of the ground distance to air
 distance conversion.

2 04 40 020 100 REV026 M:40647
 - TECHNICAL AMENDMENT
 1)Update of the ground distance to air
 distance conversion.

2 04 40 023 100 REV026 M:40647 OR 50667
 - TECHNICAL AMENDMENT
 1)Update of the ground distance to air
 distance conversion.

2 05 60 005 001 REV026
 - TECHNICAL AMENDMENT
 1)Update of the ground distance to air
 distance conversion.

2 05 60 006 001 REV026
 - TECHNICAL AMENDMENT
 1)Update of the ground distance to air
 distance conversion.

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----

		2	00	00	001	001	REV010				ALL
		2	00	10	001	001	REV021				ALL
		2	00	10	002	001	REV011				
		2	00	10	003	001	REV011				ALL
		2	00	10	004	001	REV011				
		2	00	10	005	001	REV011				ALL
R		2	00	20	001	001	REV026	LIST OF CODES			ALL
R		2	00	20	002	001	REV026	LIST OF CODES			
N		2	00	30	001	001	REV025	LIST OF NORMAL REVISIONS			ALL
N		2	00	30	002	001	REV026	LIST OF NORMAL REVISIONS			
		2	00	35	001	001	REV012	RECORD OF TEMPORARY REVISION			ALL
R		2	00	36	001-LTR	001	REV026	LIST OF TEMPORARY REVISIONS			ALL
R		2	00	70	CRT	001	REV026	CROSS REFERENCE TABLE			ALL
R		2	00	75	HL	001	REV026	HIGHLIGHTS			ALL
R		2	00	80	LEP	001	REV026	LIST OF EFFECTIVE PAGES			ALL
R		2	00	85	LOM	001	REV026	LIST OF MOD/MP/SB			ALL
		2	01	00	001	001	REV023				ALL
		2	01	10	001	001	REV021				ALL
		2	01	20	001	001	REV010				ALL
		2	01	20	002	100	REV010	MOD 40023			
		2	01	20	003	001	REV010				ALL
		2	01	20	004	100	REV016	M:41649			
		2	01	20	005	100	REV016	M:41649			ALL
		2	01	20	006	001	REV011				
		2	01	30	001	001	REV013				ALL
		2	01	30	002	102	REV019	M:47930			
		2	01	30	003	001	REV010				ALL
		2	01	30	004	105	REV023	CODE:0009			
		2	01	30	005	102	REV020	40513			ALL
		2	01	30	006	200	REV020	40513+44575			
		2	01	30	007	001	REV015				ALL
		2	01	30	008	001	REV011				
		2	01	30	009	001	REV023				0063
		2	01	30	010	001	REV011				
		2	01	30	009	001	REV023				0074-0085
		2	01	30	010	100	REV019	M:41600			

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----

2	01	30	011			001	REV023				ALL
2	01	30	012			001	REV011				
2	01	30	013			001	REV020				ALL
2	01	40	001			001	REV017				ALL
2	01	40	002			001	REV020				
2	01	40	003			001	REV016				ALL
2	01	40	004			001	REV009				
2	01	40	005			215	REV020	40023+47930			ALL
2	01	40	006			215	REV020	40023+47930			
2	01	40	007			100	REV017	M:40023			ALL
2	01	40	008			001	REV017				
2	01	40	009			001	REV017				ALL
2	01	40	010			100	REV017	M:40023			
2	01	40	011			001	REV017				ALL
2	02	00	001			001	REV015				ALL
2	02	00	002			001	REV012				
2	02	05	001			001	REV012				ALL
2	02	10	001			001	REV012				ALL
2	02	10	002			001	REV015				
2	02	10	003			001	REV015				ALL
2	02	10	004			001	REV015				
2	02	10	005			001	REV015	STD OR CPA			0063
2	02	10	006			001	REV015				
2	02	10	005			100	REV015	40624			0074-0085
2	02	10	006			100	REV015	40624			
2	02	10	007			001	REV015				ALL
2	02	12	001			001	REV015				ALL
2	02	12	002			001	REV015				
2	02	12	003			001	REV015				ALL
2	02	12	004			001	REV015				
2	02	12	005			001	REV012				ALL
2	02	12	006			001	REV012				
2	02	14	001			001	REV012				ALL
2	02	14	002			001	REV021				
2	02	14	003			001	REV015				ALL
2	02	14	004			050	REV015	CFM 56-5C2/5C3			
2	02	14	005			001	REV015				ALL
2	02	14	006			050	REV015	CFM 56-5C2/5C3			

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----

2	02	14	007		050	REV021	CFM 56-5C2/5C3				ALL
2	02	14	008		001	REV023	STD				
2	02	16	001		001	REV012					ALL
2	02	16	002		001	REV012					
2	02	16	003		001	REV015					ALL
2	02	16	004		001	REV015					
2	02	16	005		001	REV015					ALL
2	02	16	006		001	REV015					
2	02	16	007		001	REV015					ALL
2	02	18	001		001	REV012					ALL
2	02	18	002		001	REV015					
2	02	18	003		001	REV015					ALL
2	02	18	004		001	REV015					
2	02	18	005		001	REV015					ALL
2	02	18	006		001	REV012					
2	02	18	007		001	REV012					ALL
2	02	20	001		001	REV012					ALL
2	02	20	002		001	REV012					
2	02	20	003		001	REV015					ALL
2	02	20	004		050	REV015	CFM 56-5-C2/5-C3				
2	02	20	005		001	REV015					ALL
2	02	20	006		050	REV015	CFM 56-5-C2/5-C3				
2	02	20	007		050	REV021	CFM 56-5-C2/5-C3				ALL
2	02	20	008		001	REV024					
2	02	24	001		050	REV021	CFM 56-5C2				ALL
2	02	25	001		150	REV012	CFM 56-5C2 MOD 40023				ALL
2	02	25	002		150	REV012	CFM 56-5C2 MOD 40023				
2	02	25	003		150	REV012	CFM 56-5C2 MOD 40023				ALL
2	02	25	004		150	REV012	CFM 56-5C2 MOD 40023				
2	02	27	001		100	REV020	41150				0074-0085
2	02	27	002		100	REV020	41150				
2	02	27	003		205	REV024	M:40624+41150				0074-0085
2	02	27	004		150	REV016	M:41150/CFM 56-5-C2				
2	02	27	005		150	REV016	M:41150/CFM 56-5-C2				0074-0085
2	02	27	006		150	REV016	M:41150/CFM 56-5-C2				
2	02	27	007		150	REV016	M:41150/CFM 56-5-C2				0074-0085
2	02	27	008		150	REV016	M:41150/CFM 56-5-C2				
2	02	27	009		150	REV016	M:41150/CFM 56-5-C2				0074-0085

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----EFFECTIVITY-----

		2	02 30		001	001	REV011				0063
		2	02 30		002	001	REV010		STD OR CPA		
		2	02 30		001	001	REV011				0074-0085
		2	02 30		002	005	REV010		CODE 0002		
		2	02 30		003	150	REV010		CFM 56-5C2 MOD 40023		0063
		2	02 30		004	150	REV010		CFM 56-5C2 MOD 40023		
		2	02 30		003	254	REV010		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		004	254	REV010		CFM 56-5C2 MOD 40023+40624		
		2	02 30		005	150	REV010		CFM 56-5C2 MOD 40023		0063
		2	02 30		006	150	REV010		CFM 56-5C2 MOD 40023		
		2	02 30		005	254	REV010		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		006	254	REV010		CFM 56-5C2 MOD 40023+40624		
		2	02 30		007	150	REV010		CFM 56-5C2 MOD 40023		0063
		2	02 30		008	150	REV010		CFM 56-5C2 MOD 40023		
		2	02 30		007	254	REV010		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		008	254	REV010		CFM 56-5C2 MOD 40023+40624		
		2	02 30		009	150	REV010		CFM 56-5C2 MOD 40023		0063
		2	02 30		010	001	REV011				
		2	02 30		009	254	REV010		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		010	001	REV011				
		2	02 30		011	150	REV011		CFM 56-5C2 MOD 40023		0063
		2	02 30		012	150	REV011		CFM 56-5C2 MOD 40023		
		2	02 30		011	254	REV011		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		012	254	REV011		CFM 56-5C2 MOD 40023+40624		
		2	02 30		013	150	REV011		CFM 56-5C2 MOD 40023		0063
		2	02 30		014	001	REV011				
		2	02 30		013	254	REV011		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		014	001	REV011				
		2	02 30		015	150	REV011		CFM 56-5C2 MOD 40023		0063
		2	02 30		016	150	REV011		CFM 56-5C2 MOD 40023		
		2	02 30		015	254	REV011		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		016	254	REV011		CFM 56-5C2 MOD 40023+40624		
		2	02 30		017	150	REV011		CFM 56-5C2 MOD 40023		0063
		2	02 30		018	001	REV011				
		2	02 30		017	254	REV011		CFM 56-5C2 MOD 40023+40624		0074-0085
		2	02 30		018	001	REV011				
		2	02 40		001	001	REV016				ALL
		2	02 40		002	050	REV010		CFM 56-5C2/5C3		
		2	02 40		003	050	REV010		CFM 56-5C2/5C3		ALL
		2	02 40		004	050	REV024		CFM 56-5C2/5C3		

M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- ----EFFECTIVITY-----
M V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- ----EFFECTIVITY-----

2	02	40	005	050	REV024	CFM 56-5C2/5C3	ALL
2	02	40	006	050	REV024	CFM 56-5C2/5C3	
2	02	40	007	050	REV024	CFM 56-5C2/5C3	ALL
2	03	00	001	001	REV021		ALL
2	03	10	001	001	REV016		ALL
2	03	10	002	001	REV016		
2	03	10	003	150	REV021	CFM 56-5C2 MOD 40023	0063
2	03	10	004	150	REV021	CFM 56-5C2 MOD 40023	
2	03	10	003	254	REV021	CFM 56-5C2 MOD 40023+40624	0074-0085
2	03	10	004	254	REV021	CFM 56-5C2 MOD 40023+40624	
2	03	10	005	150	REV021	CFM 56-5C2 MOD 40023	0063
2	03	10	005	254	REV021	CFM 56-5C2 MOD 40023+40624	0074-0085
2	03	20	001	001	REV023		0063
2	03	20	002	150	REV021	CFM 56-5C2 MOD 40023	
2	03	20	001	001	REV023		0074-0085
2	03	20	002	254	REV021	CFM 56-5C2 MOD 40023+40624	
2	04	00	001	001	REV010		ALL
2	04	00	002	001	REV025		
R 2	04	10	001	001	REV021		ALL
R 2	04	10	002	001	REV026		
2	04	10	003	001	REV023		ALL
2	04	10	004	001	REV020		
2	04	10	005	001	REV017		0063
2	04	10	006	150	REV013	CFM 56-5C2 MOD 40023	
2	04	10	005	001	REV017		0074-0085
2	04	10	006	254	REV013	CFM 56-5C2 MOD 40023+40624	
2	04	10	007	150	REV013	CFM 56-5C2 MOD 40023	0063
2	04	10	008	150	REV013	CFM 56-5C2 MOD 40023	
2	04	10	007	254	REV013	CFM 56-5C2 MOD 40023+40624	0074-0085
2	04	10	008	254	REV013	CFM 56-5C2 MOD 40023+40624	
2	04	10	009	150	REV013	CFM 56-5C2 MOD 40023	0063
2	04	10	010	150	REV013	CFM 56-5C2 MOD 40023	
2	04	10	009	254	REV013	CFM 56-5C2 MOD 40023+40624	0074-0085
2	04	10	010	254	REV013	CFM 56-5C2 MOD 40023+40624	
2	04	10	011	150	REV013	CFM 56-5C2 MOD 40023	0063
2	04	10	012	150	REV013	CFM 56-5C2 MOD 40023	
2	04	10	011	254	REV013	CFM 56-5C2 MOD 40023+40624	0074-0085
2	04	10	012	254	REV013	CFM 56-5C2 MOD 40023+40624	

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----	EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----	EFFECTIVITY-----

		2	04	10	013	150	REV013	CFM	56-5C2	MOD 40023		0063
		2	04	10	014	150	REV013	CFM	56-5C2	MOD 40023		
		2	04	10	013	254	REV013	CFM	56-5C2	MOD 40023+40624		0074-0085
		2	04	10	014	254	REV013	CFM	56-5C2	MOD 40023+40624		
		2	04	10	015	150	REV013	CFM	56-5C2	MOD 40023		0063
		2	04	10	016	150	REV013	CFM	56-5C2	MOD 40023		
		2	04	10	015	254	REV013	CFM	56-5C2	MOD 40023+40624		0074-0085
		2	04	10	016	254	REV013	CFM	56-5C2	MOD 40023+40624		
		2	04	10	017	150	REV013	CFM	56-5C2	MOD 40023		0063
		2	04	10	018	150	REV024	CFM	56-5C2	MOD 40023		
		2	04	10	017	254	REV013	CFM	56-5C2	MOD 40023+40624		0074-0085
		2	04	10	018	150	REV024	CFM	56-5C2	MOD 40023		
		2	04	10	019	150	REV024	CFM	56-5C2	MOD 40023		ALL
		2	04	10	020	150	REV024	CFM	56-5C2	MOD 40023		
		2	04	10	021	150	REV024	CFM	56-5C2	MOD 40023		ALL
		2	04	10	022	150	REV024	CFM	56-5C2	MOD 40023		
		2	04	10	023	001	REV010					ALL
		2	04	10	024	001	REV011					
		2	04	10	025	001	REV011					0063
		2	04	10	026	150	REV015	M:	40023/CFM	56-5-C2		
		2	04	10	025	001	REV011					0074-0085
		2	04	10	026	254	REV015	M:	40023+40624/CFM	56-5-C2		
		2	04	10	027	150	REV024	M:	40023/CFM	56-5-C2		0063
		2	04	10	028	150	REV024	M:	40023/CFM	56-5-C2		
		2	04	10	027	254	REV024	M:	40023+40624/CFM	56-5-C2		0074-0085
		2	04	10	028	254	REV024	M:	40023+40624/CFM	56-5-C2		
		2	04	20	001	001	REV010					ALL
		2	04	20	002	100	REV017	M:	42154			
		2	04	20	003	100	REV025	CODE	0014			ALL
		2	04	20	004	001	REV010					
		2	04	20	005	001	REV019					ALL
		2	04	20	006	001	REV011					
R		2	04	20	007	150	REV020	CFM	56-5C2/5C3	MOD 40023		ALL
R		2	04	20	008	001	REV026					
		2	04	25	001	001	REV020					ALL
		2	04	25	002	150	REV023	M:	40023/CFM	56-5-C2		
		2	04	25	003	050	REV023	CFM	56-5-C2			ALL
		2	04	25	004	050	REV023	CFM	56-5C2			
		2	04	25	005	050	REV023	CFM	56-5C2			ALL
		2	04	25	006	150	REV023	CFM	56-5C2/C3/40023			

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----
		2	04	25	007	150	REV023		CFM 56-5C2/C3/40023		ALL
		2	04	25	008	150	REV020		CFM 56-5C2/5C3 MOD 40023		
		2	04	25	009	150	REV010		CFM 56-5C2 MOD 40023		ALL
		2	04	25	010	150	REV021		CFM 56-5C2 MOD 40023		
		2	04	25	011	150	REV010		CFM 56-5C2 MOD 40023		ALL
		2	04	30	001	001	REV011				ALL
		2	04	35	001	001	REV010				ALL
		2	04	35	002	001	REV011				
		2	04	40	001	100	REV017		M: 40647		ALL
		2	04	40	002	100	REV011		MOD 40647		
		2	04	40	003	100	REV010		MOD 40647		ALL
		2	04	40	004	100	REV011		MOD 40647		
		2	04	40	005	100	REV024		M: 40647		ALL
		2	04	40	006	100	REV023		M: 40647		
		2	04	40	006A	100	REV023		M: 40647		ALL
		2	04	40	007	100	REV023		M: 40647		ALL
		2	04	40	008	250	REV010		CFM 56-5C2 MOD 40023+40647		
		2	04	40	009	250	REV010		CFM 56-5C2 MOD 40023+40647		ALL
		2	04	40	010	250	REV010		CFM 56-5C2/5C3 M 40023+40647		
		2	04	40	011	250	REV010		CFM 56-5C2/5C3 M 40023+40647		ALL
		2	04	40	012	250	REV010		CFM 56-5C2/5C3 M 40023+40647		
		2	04	40	013	250	REV010		CFM 56-5C2 MOD 40023+40647		ALL
		2	04	40	014	250	REV010		CFM 56-5C2/5C3 M 40023+40647		
		2	04	40	015	250	REV010		CFM 56-5C2/5C3 M 40023+40647		ALL
		2	04	40	016	250	REV010		CFM 56-5C2/5C3 M 40023+40647		
		2	04	40	017	250	REV010		CFM 56-5C2/5C3 M 40023+40647		ALL
		2	04	40	018	250	REV010		CFM 56-5C2/5C3 M 40023+40647		
R		2	04	40	019	250	REV010		CFM 56-5C2/5C3 M 40023+40647		ALL
R		2	04	40	020	100	REV026		M: 40647		
		2	04	40	021	250	REV010		CFM 56-5C2/5C3 M 40023+40647		ALL
		2	04	40	022	250	REV011		CFM 56-5C2/5C3 M 40023+40647		
R		2	04	40	023	100	REV026		M: 40647 OR 50667		ALL
R		2	04	40	024	100	REV009		MOD 40647		
		2	04	50	001	001	REV020				ALL
		2	04	50	002	001	REV020				
		2	04	51	001	105	REV024		M: 44495		ALL
		2	04	51	002	105	REV024		M: 44495=47990=50321=50982		
		2	04	51	003	105	REV024		M: 44495=47990=50321=50982		ALL
		2	04	51	004	105	REV024		M: 44495=47990=50321=50982		

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----	EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----	EFFECTIVITY-----

2	04	51	005			105	REV024		M:44495=47990=50321=50982			ALL
2	05	00	001			001	REV010					ALL
2	05	00	002			001	REV011					
2	05	10	001			001	REV019					ALL
2	05	10	002			001	REV010					
2	05	10	003			001	REV010					ALL
2	05	10	004			001	REV010					
2	05	15	001			001	REV010					ALL
2	05	15	002			001	REV010					
2	05	15	003			001	REV010					ALL
2	05	15	004			001	REV010					
2	05	15	005			150	REV019		M:40023/CFM 56-5-C2/C3			ALL
2	05	15	006			150	REV019		M:40023/CFM 56-5-C2/C3			
2	05	15	007			150	REV019		M:40023/CFM 56-5-C2/C3			ALL
2	05	15	008			150	REV019		M:40023/CFM 56-5-C2/C3			
2	05	15	009			150	REV019		M:40023/CFM 56-5-C2/C3			ALL
2	05	20	001			150	REV011		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	20	002			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	20	003			150	REV024		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	20	004			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	20	005			150	REV021		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	20	006			050	REV011		CFM 56-5C2/5C3 CODE 0008			
2	05	30	001			001	REV010					ALL
2	05	30	002			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	30	003			150	REV010		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	004			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	30	005			150	REV010		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	006			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	30	007			150	REV010		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	008			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	30	009			150	REV010		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	010			150	REV010		CFM 56-5C2/5C3 MOD 40023			
2	05	30	011			150	REV011		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	012			150	REV011		CFM 56-5C2/5C3 MOD 40023			
2	05	30	013			150	REV011		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	014			150	REV011		CFM 56-5C2/5C3 MOD 40023			
2	05	30	015			150	REV011		CFM 56-5C2/5C3 MOD 40023			ALL
2	05	30	016			150	REV011		CFM 56-5C2/5C3 MOD 40023			

M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----EFFECTIVITY-----
M	V	CH	SEC	---	PAGE--	SEQ-	--REV--	----	VALIDATION	CRITERIA-----	-----EFFECTIVITY-----

		2	05	40	011	150	REV011	CFM	56-5C2/5C3	MOD 40023	ALL
		2	05	40	012	150	REV011	CFM	56-5C2/5C3	MOD 40023	
		2	05	40	013	150	REV011	CFM	56-5C2/5C3	MOD 40023	ALL
		2	05	40	014	001	REV009				
		2	05	40	015	150	REV011	CFM	56-5C2/5C3	MOD 40023	ALL
		2	05	40	016	150	REV011	CFM	56-5C2/5C3	MOD 40023	
		2	05	40	017	150	REV011	CFM	56-5C2/5C3	MOD 40023	ALL
		2	05	40	018	001	REV009				
		2	05	50	001	001	REV011				ALL
		2	05	50	002	150	REV011	CFM	56-5C2/5C3	MOD 40023	
		2	05	50	003	150	REV011	CFM	56-5C2/5C3	MOD 40023	ALL
		2	05	60	001	001	REV010				ALL
		2	05	60	002	001	REV016				
		2	05	60	003	001	REV016				ALL
		2	05	60	004	001	REV016				
R		2	05	60	005	001	REV026				ALL
R		2	05	60	006	001	REV026				
		2	05	70	001	050	REV011	CFM	56-5C2/5C3		ALL
		2	05	70	002	050	REV010	CFM	56-5C2/5C3		
		2	05	70	003	050	REV010	CFM	56-5C2/5C3		ALL
		2	05	70	004	050	REV010	CFM	56-5C2/5C3		
		2	05	70	005	050	REV010	CFM	56-5C2/5C3		ALL
		2	05	70	006	050	REV010	CFM	56-5C2/5C3		
		2	05	70	007	050	REV010	CFM	56-5C2/5C3		ALL
		2	05	70	008	050	REV010	CFM	56-5C2/5C3		

M V T	REV	MOD	MP	SB	TITLE	VALIDITY
.	014A	40023	.....		GENERAL- ADAPT BASIC DEFINITION FOR ST2 (A340-200) ALL	
.	014A	40033	.....		POWER PLANT-DEFINE CFM56 POWER PLANT AND ASSOCIATED SYSTEMS ALL	
.	014A	40379	.....		EQUIPMENT/FURNISHINGS-INSTALL PROVISIONS FOR AN UNDERFLOOR CREW REST CONTAINER (BFE) ALL	
.	020	40513	.....		FUEL-REFUEL/DEFUEL SYSTEM-INSTALL A FACILITY TO ENABLE REFUEL PRESELECTION AND INITIATION FROM THE COCKPIT ALL	
		28-4055	01			
.	014A	40624	.....		INDICATING/RECORDING SYSTEMS-FMGEC- REPLACE METERS BY FEET LV-ZPJ LV-ZPX LV-ZRA	
.	014A	40647	.....		CERTIFICATION DOCUMENTS-PROVIDE FERRY FLIGHT CAPABILITY WITH THREE ENGINES OPERATIVE ALL	
.	014A	41150	.....		ENGINE FUEL AND CONTROL - GENERAL - PROVIDE DERATED TAKE OFF FACILITY FOR CFMI ENGINES LV-ZPJ LV-ZPX LV-ZRA	
		76-4003				
.	014A	41600	.....		FUEL-TRIM TRANSFER SYSTEM-FIT FORWARD TRANSFER PUMP IN THE TRIM HORIZONTAL STABILIZER LV-ZPJ LV-ZPX LV-ZRA	
.	016	41649	.....		DOORS-CARGO COMPARTMENT DOOR HYDRAULIC SYSTEM-INTRODUCE MODIFIED ELECTRICAL (MANUAL) SELECTOR VALVE ALL	
.	014A	41957	.....		OXYGEN -PASSENGER OXYGEN-INSTALL ALTERNATIVE OXYGEN BOXES EXTENDED DURATION 22 MINUTES (VENDOR PURITAN) ALL	

M	V	REV	MOD	MP	TITLE	VALIDITY
T				SB		
.	014A	42154	.....		AIR CONTIONING-PRESSURE CONTROL AND MONITORING-IMPROVE CABIN PRESSURE CONTROLLER (CPC)	ALL
.	015	42875	.....		AUTOFLIGHT-FMGEC-INTRODUCE L5 STD	
		22-4005	01		FMGEC ON A340 A/C	ALL
.	014A	44366	.....		FUEL - REFUEL/DEFUEL SYSTEM - INSTALL PRESSURE SWITCH AT WING CENTRE SECTION REAR WALL	ALL
		28-4049	04			
.	015	44495	.....		AUTO FLIGHT - FMGEC - INTRODUCE L6	
		22-4011			STD FOR CFMI	ALL
.	014A	44575	.....		FUEL - FMCS - FIT FCMC (STAGE 7.1) WITH CHANGES TO SOFTWARE FOR A330 AND A340 AIRCRAFT	ALL
		28-4046	01			
.	014A	45006	.....		LANDING GEAR - NORMAL BRAKING - INSTALL BSCU SOFTWARE STANDARD S6D	ALL
		32-4087	02			
.	022A	47930	.....		FUEL - FCMS - INSTALL FCMC STAGE 9.0	
		28-4085	01		ALL	

	01.00	CONTENTS	
	01.10	GENERAL	
	01.20	CARGO LOADING	
		– GENERAL	1
		– DESCRIPTION	1
		– CARGO LOADING SYSTEM	1
		– CARGO CAPACITY	2
		– CARGO DOORS OPERATION	3
		– LOCATION OF SERVICE PANELS	6
	01.30	FUEL	
		– GENERAL INFORMATION	1
R		– APU START/SHUTDOWN DURING REFUELING/DEFUELING . . .	4
		– REFUELING	4
		– GROUND FUEL TRANSFER	8
		– DEFUELING	9
		– OVERWING GRAVITY REFUELING	11
		– REFUELING WITH ONE ENGINE RUNNING	12
R		– USE OF MANUAL MAGNETIC INDICATORS	13
	01.40	WEIGHT AND BALANCE	
		– LOAD and TRIM SHEET	1
		– FUEL INDEX TABLE	5

 A340 FLIGHT CREW OPERATING MANUAL	LOADING GENERAL	2.01.10	P 1
		SEQ 001	REV 21

DEFINITIONS

- R — **MANUFACTURER'S EMPTY WEIGHT (MEW)**
 The weight of the structure, power plant, furnishings, systems and other items of equipment that are considered as an integral part of the aircraft. It is essentially a "dry" weight, including only those fluids contained in closed systems (e.g. hydraulic fluid).
- R — **OPERATIONAL EMPTY WEIGHT (OEW)**
 The manufacturer's weight empty plus the operator's items i.e. the flight and cabin crew and their baggage, unusable fuel, engine oil, emergency equipment, toilet chemicals and fluids, galley structure, catering equipment, seats, documents etc.
- **DRY OPERATING WEIGHT (DOW)**
 R The total weight of an aircraft ready for a specific type of operation excluding all usable
 R fuel and traffic load.
 R Operational Empty Weight plus items specific to the type of flight i.e. catering,
 R newspapers, pantry equipment etc.
- **TAKEOFF FUEL**
 The weight of the fuel onboard at takeoff.
- **OPERATING WEIGHT**
 R The weight obtained by addition of the operational empty weight and the takeoff fuel.
- **TOTAL TRAFFIC LOAD**
 The weight of the payload including cargo loads, passengers and passengers bags.
- **ZERO FUEL WEIGHT (ZFW)**
 R The weight obtained by addition of the total traffic load and the dry operating weight.
- **TAKEOFF WEIGHT (TOW)**
 The weight at take-off. It is equal to the addition of the zero fuel weight and takeoff fuel.
- **TRIP FUEL**
 The weight of the fuel necessary to cover the normal leg without reserves.
- **LANDING WEIGHT**
 The weight at landing. It is equal to takeoff weight minus trip fuel.

 A340 FLIGHT CREW OPERATING MANUAL	LOADING CARGO LOADING	2.01.20	P 1
		SEQ 001	REV 10

GENERAL

The aircraft has three lowerdeck cargo compartments :

- Forward cargo compartments, subdivided into compartments 1 and 2.
- Aft cargo compartment, subdivided into compartments 3 and 4.
- Bulk cargo compartment, compartment 5.

The main access doors to forward and aft compartments are hydraulically operated. The bulk cargo door gives access to the aft cargo compartment. It is manually operated.

DESCRIPTION

Each compartment is divided into sections, and is designed to be category C as defined by FAR.

A placard in each compartment indicates the maximum authorized gross weight. The compartments have separate lighting.

CARGO LOADING SYSTEM

A semi-automatic cargo loading system, which is installed in forward and aft compartments, loads pallets and containers.

CARGO CAPACITY

The maximum cumulative loads for each compartment and section are as follows :

- forward compartment : 18 507 kg (40 800 lb)
- aft compartment : 15 241 kg (33 600 lb)
- bulk compartment : 3 468 kg (7 645 lb)

The following table lists the loading possibilities (including the maximum gross weight per container/pallet).

ULD	ATA	NAS 3610	IATA	Allowable MGW		Maximum number		
				lb	kg	foward	aft	bulk
Half-size	LD3	2K2	E/G	3500	1587	14	12	
Half-size	LD1	2K2	C/H	3500	1587	7	6	
60.4 × 61.5 in		2K3	X/G/E	3500	1587	14	12	
60.4 × 61.5 in		2K3	H	3500	1587	7	6	
Full-size	LD6	2L2	F	7000	3174	7	6	
60.4 × 125 in		2L3/2L4	F	7000	3174	7	6	
88 × 125 in		2A1/2A2	F	10200	4626	5	4	
		2A3/2A4/2A6	F					
96 × 125 in		2M1/2M2/2M3	F	11250	5103	5	4	

CARGO DOORS OPERATION

NORMAL OPERATION

OPENING

On door

- **ACCESS DOOR OPERATING HANDLE RELEASE**
Push handle flap inward.
- **DOOR UNLOCK**
Move door operating handle upward from LOCKED to UNLOCK position.
Indicator flags at the lower part of the door move out from the door contour. This gives a visual indication that the cargo door is unlocked.
- **DIFFERENTIAL PRESSURE CHECK**

— **WARNING** —
Do not operate the latching handle if the red indicator light flashes as an overpressure exists in the cargo hold.

- **DOOR UNLATCH**
Press the pushbutton on the latching handle, then pull the handle down to the unlatched position.

On door service panel

- **SERVICE PANEL ACCESS DOOR OPEN**
- **LEVER OF MANUAL SELECTOR VALVE HOLD ON OPEN**
The yellow hydraulic system is pressurized (YELLOW ELEC PUMP energized).
Operation of the flight controls is inhibited.
- **When the door is fully open (green light on the service panel is on) :**
 - **LEVER OF MANUAL SELECTOR VALVE RELEASE**
When released, the lever returns to the neutral (STOP) position and shuts down the electric pump after a 10 seconds delay.

— **CAUTION** —
Check that the lever has reached the neutral position and the pump operation has stopped. Continuous operation leads to a pump overheating.

CLOSING

On door service panel

- **LEVER OF MANUAL SELECTOR VALVE HOLD ON CLOSE**

At first the lever locks in an intermediate position, maintaining a pre-set pressurization to prevent the door from dropping open. The operator can then move the lever to CLOSE and the door closes. When it is fully closed, the lever returns to the neutral position and shuts down the electric pump.

R Ensure that green indicator light goes out.

- **When the door is fully closed :**

- **LEVER OF MANUAL SELECTOR VALVE RELEASE**

Release within 1 minute after door closure

On door

- **DOOR LATCH AND LOCK**

Push the latching handle back into its recess. Push the door locking handle downwards to the locked position. When the door is locked, the cargo doors indication on ECAM extinguishes and the handle flap mechanism locks the operating handle.

On door service panel

- **ACCESS DOOR CLOSE**

AUXILIARY OPERATION

In case of an electrical failure or if the electric pump fails, the operator can open or close the doors by working the hand pump.

HAND PUMP OPENING

On door

- **DOOR UNLOCK**

Unlock the operating handle as if for normal operation.

On door service panel

- **SERVICE PANEL ACCESS DOOR OPEN**
- **LEVER OF MANUAL SELECTOR VALVE HOLD ON OPEN**

On ground service panel

- **HAND PUMP OPERATE**
The door opens.
- **When the door is fully opened (green light on the service panel is on or sudden increase of force to operate the hand pump) :**

On door service panel

- **LEVER OF MANUAL SELECTOR VALVE RELEASE**

HAND PUMP CLOSING

On door service panel

- **LEVER OF MANUAL SELECTOR VALVE HOLD ON CLOSE**

On ground service panel

- **HAND PUMP OPERATE**
The door closes.

On door service panel

- **LEVER OF MANUAL SELECTOR VALVE RELEASE**
Release when door is fully closed.

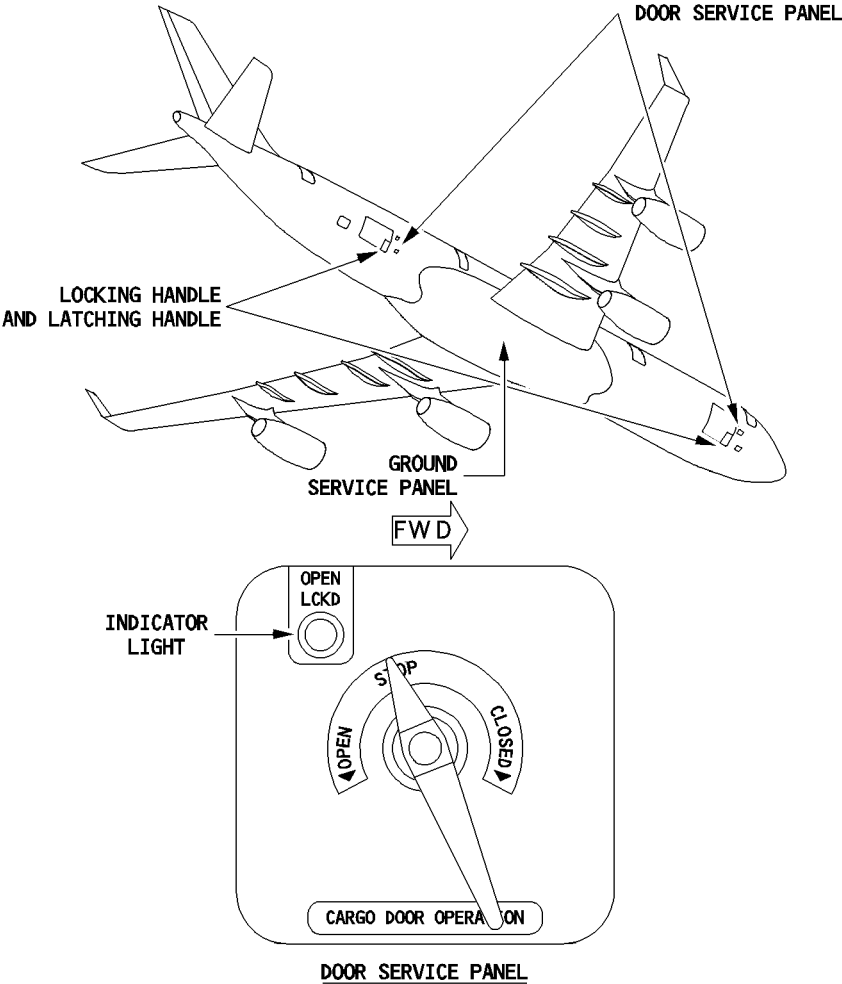
On door

- DOOR LATCH AND LOCK
Lock the operating handle as for normal operation.

On door service panel and ground service panel

- ACCESS DOORS CLOSE

R **LOCATION OF SERVICE PANELS**



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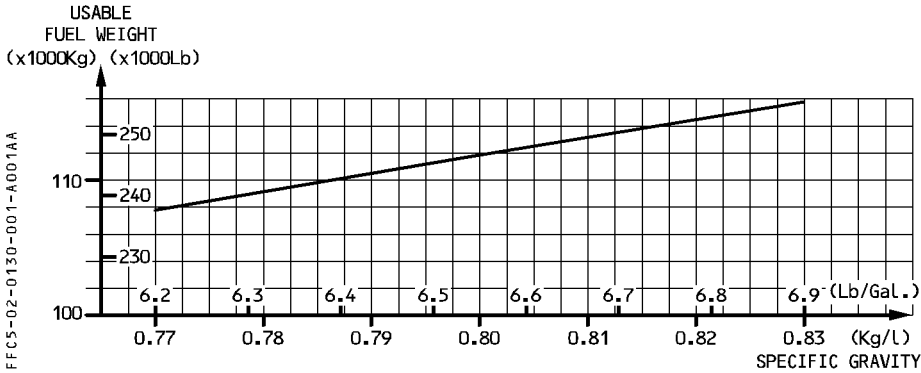
GENERAL INFORMATION

USABLE FUEL VOLUME

R

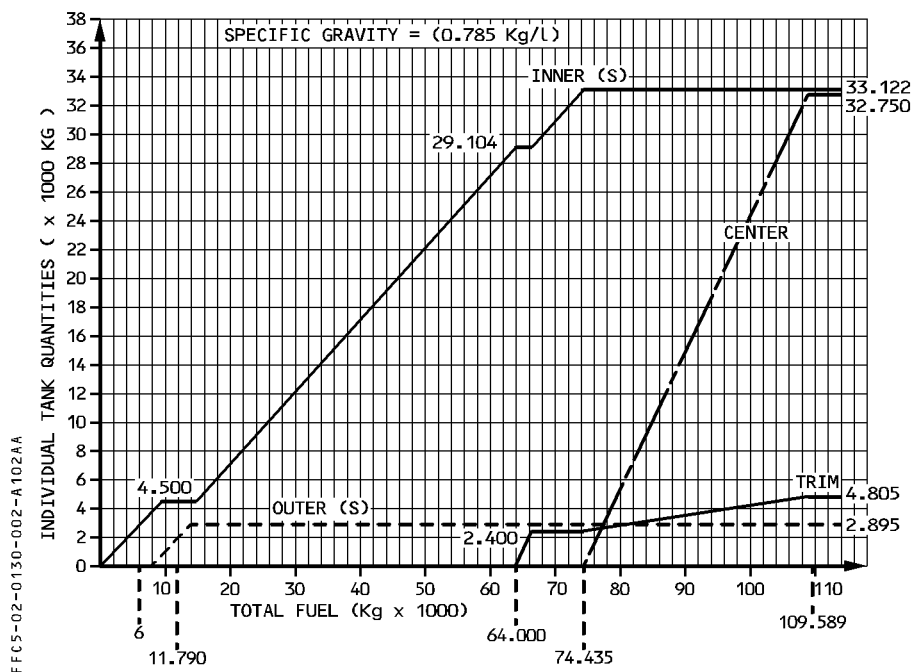
	OUTER TANK	INNER TANK	CENTER TANK	TRIM TANK	TOTAL
LITERS	3 688 × 2	42 194× 2	41 720	6 121	139 605
US GAL	975 × 2	11 147 × 2	11 022	1 617	36 883

USABLE FUEL WEIGHT



REFUELING

- During automatic refueling, the trim tank is filled when the preselected fuel quantity is greater than 64000 kg, whatever the density.
- With the tanks filled to the maximum capacity, there is enough space in each tank to allow for a 2 % thermal expansion of the fuel without its spilling through the vent system.

REFUEL DISTRIBUTION


The graph shows for any FOB, (horizontal axis) the quantities in each individual tank at the end of refuel. (Vertical axis).

Example : Required FOB 90000 kg

Post refuel distribution : OUTERS (each) 2895 kg CENTER 14466 kg
INNERS (each) 33122 kg TRIM 3500 kg

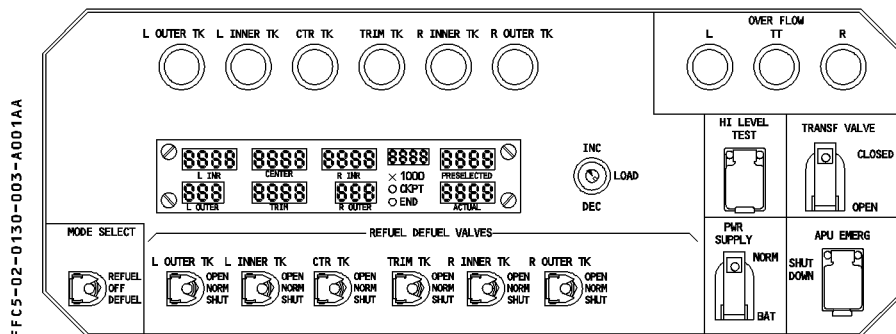
Note : It may happen that before refuel, the center or trim tanks contain fuel when none is required in those tanks for the next flight. This fuel does not have to be transferred as long as the required FOB is achieved, and the center or trim tanks do not contain more than the following quantities :

CTR TK : 500 kg TRIM TK : 200 kg

During automatic refuel, the tanks are filled simultaneously in order to achieve the following distribution at the end of refuel :

1. Inner tanks fueled to 4500 kg each,
2. Outer tanks fueled to full
3. Inner tanks fueled until FOB reaches 64000 kg
4. Trim tanks fueled to 2400 kg
5. Inner tanks fueled to full
6. Center and trim tanks fueled simultaneously to full.

REFUELING CONTROL PANEL



The correct panel configuration for flight is :

- the MODE SELECT switch at OFF (and guarded)
- all REFUEL/DEFUEL VALVES switches at NORM (and guarded).
- the TRANSF VALVE switch at CLOSED (and guarded)
- the PWR SUPPLY switch at NORM (and guarded)
- the refuel control panel access door closed.

If the above conditions are not fulfilled, the following messages are displayed on the ECAM:

- R
- REFUEL IN PROCESS (green) in flight phases 1, 10.
 - REFUEL PNL (amber) in flight phases 2, 3, 4, 5.

R

APU START/SHUTDOWN DURING REFUELING/DEFUELING

- R
- APU starts or shutdowns are permitted during refuel/defuel procedures. If it is necessary
- R
- to operate the APU, the limits that follow apply :
- R
- a) An APU start is not permitted during a refuel/defuel procedure if the APU has failed to
- R
- start or an automatic shutdown has occurred.
- R
- b) A normal APU shutdown must be completed if a fuel spill has occurred during the refuel
- R
- defuel procedure.

REFUELING

PREPARATION

- ACCESS PLATFORM

.....

IN POSITION
- SAFETY PRECAUTIONS

.....

APPLY

Make certain that no HF transmission is performed during refueling and that the tanker and the aircraft are properly grounded. Connect a tanker grounding cable to the aircraft grounding point on the main landing gear.

- R
- Note : Refer to the above procedures for APU start/shutdown during refueling.

HI LEVEL TEST :

From refueling control panel :

- **HI LEVEL TEST PRESS**
During test high level lights and over flow lights come on if their circuits are serviceable. CKPT and END lights come on. The fuel quantity, PRESELECTED and ACTUAL displays show all 8's.
If there is a failure during the high level test the END light flashes and remains flashing after completion. In addition the affected HI LVL light remains on.

From cockpit :

The HI LEVEL TEST is performed automatically when cockpit FUEL REFUEL pushbutton is pressed. Positive test will initiate refueling. If the test fails, END light will illuminate steady.

- **If HI LEVEL TEST is negative :**
A negative HI LEVEL TEST prevents refueling. This situation is latched until FCMC RESET.

- **FCMC 1+ 2 RESET button (cockpit) PULL then PUSH**

Note : After FCMC reset re-enter ZFW/ZFCG in the MCDU INIT B page.

- **MANUAL REFUELING PROCEDURE APPLY**
Apply manual procedure with continual monitoring of refueling.
FOR DISPATCH REFER TO MEL

AUTOMATIC REFUELING

From refueling control panel :

- LOAD PRESELECTOR SET
- REFUEL VALVES CHECK NORM and GUARDED
- MODE SELECT REFUEL

On completion of refueling :

END light comes on. It flashes if after refueling an imbalance greater than 3000 kg (6614 lb) exists.

- ACTUAL QUANTITY CHECK
- MODE SELECT OFF and GUARDED

From cockpit :

- BLOCK FUEL on FMGS MCDU INIT B page CONFIRM/SET
The CKPT light on the refueling control panel comes on.

*Note : Once BLOCK FUEL value has been entered on the MCDU, the aircraft will refuel to the MCDU value.
Refuel to this value can be started from either panel.*

- FUEL REFUEL pushbutton ON
ON light comes on and a HI LEVEL TEST is initiated. If test is positive, the refueling will start. At the refuel couplings a green light comes on to signal that the aircraft is ready for refueling. This light remains on as long as the REFUEL pushbutton is switched at ON.

 A340 FLIGHT CREW OPERATING MANUAL	LOADING FUEL	2.01.30	P 7
		SEQ 001	REV 15

On completion of refueling :

END light comes on. It flashes if after refueling an imbalance greater than 3000 kg (6614 lb) exists.

— **FUEL ON BOARD QUANTITY CHECK**

— **FUEL REFUEL pushbutton OFF**

ON light and END light go out. At the refuel couplings the light goes out to indicate to the ground personnel that hoses can be disconnected.

MANUAL REFUELING

— **DETERMINE FUEL QUANTITY IN EACH TANK**

Respect distribution in accordance with applicable REFUEL DISTRIBUTION graph .

Note : *To refuel the trim tank, one of these conditions must be fulfilled.*

— *the two inner tank inlet valves are open.*

— *both inner tank quantities are each greater than 14000 kg.*

— *one inner tank quantity is greater than 14000 kg and the other inner tank inlet valve is open.*

— **REFUEL VALVES SHUT**

— **REFUEL VALVES (tank(s) to be filled) OPEN**

Note : *Because the Fuel Control and Monitoring System (FCMS) does not have control of all the tanks, the END light will flash.*

— **MODE SELECT REFUEL**

— **REFUEL VALVES (tank(s) to be filled) OPEN**

— **FUEL QTY MONITOR**

● **When the tank contents reach the required level :**

— **Corresponding REFUEL VALVES SHUT**

— **MODE SELECT OFF and GUARDED**

— **REFUEL VALVES NORM and GUARDED**

GROUND FUEL TRANSFER

A ground transfer is possible from tank to tank except to the trim tank.

On cockpit overhead FUEL panel :

- PUMPS (of the tanks not to be defueled) OFF
- PUMPS (of the tanks to be defueled) ON
- X-FEEDS (of the tank to be defueled) ON

On refueling control panel :

- REFUEL VALVES (of tanks not to be filled) SHUT
- REFUEL VALVES (of tanks to be filled) OPEN
- MODE SELECT REFUEL
- TRANSF VALVE OPEN

R

R

R

Note : The TRANSF VALVE switch opens the left aft transfer valve only if ENG 2 main pump is on, and opens the right aft transfer valve only if the ENG 3 main pump is on.

- FUEL QTY MONITOR

R

● When the tank contents reach the required level :

On refueling control panel :

- Corresponding REFUEL VALVES SHUT
- TRANSF VALVE CLOSED and GUARDED
- MODE SELECT OFF and GUARDED

● On completion of ground fuel transfer :

- REFUEL VALVES NORM and GUARDED
- Cockpit FUEL panel SET NORMAL CONFIGURATION

DEFUELING

— **ACCESS PLATFORM IN POSITION**

— **SAFETY PRECAUTIONS APPLY**
Make certain that no HF transmission is performed during defueling and that the tanker and the aircraft are properly grounded. Connect a tanker grounding cable to the aircraft grounding point on the main landing gear.

R *Note :* 1. For APU start/shutdown during defueling, refer to FCOM 2.01.30 p4.
R 2. If only one hose is used for defueling, it must be connected to the coupling marked “USE THIS ADAPTOR TO DEFUEL”.

● **Before defueling is started :**

On cockpit overhead FUEL panel :

— **PUMPS (all) OFF**

DEFUELING BY SUCTION

Note : · Defueling all the tanks by suction is possible.
· If the trim tank contains fuel, then the fuel system interlocks prevent a suction defuel of the inner tanks.

On refueling control panel :

— **MODE SELECT DEFUEL**

— **REFUEL VALVES (of the tanks to be defueled) OPEN**

— **FUEL QTY MONITOR**

● **When the tank contents reach the required level :**

— **REFUEL VALVES NORM and GUARDED**

— **MODE SELECT OFF and GUARDED**

— **Cockpit FUEL panel SET NORMAL CONFIGURATION**

DEFUELING WITH FUEL PUMPS

Note : Defueling of the inner and center tanks only is possible. To defuel the other tanks, their fuel must be first transferred to the center or inner tank.

On refueling control panel :

- REFUEL VALVES CHECK NORM
 - MODE SELECT DEFUEL
 - TRANSF VALVE OPEN
- R
R

The left (right) aft transfer valves open provided all these conditions are met :

 - one (or more) of the left (right) main fuel pumps is (are) on.
 - the trim tank is empty
 - the inner tank and outer tank inlet valves are closed.

On cockpit overhead FUEL panel :

- PUMPS 2 and 3 (and 1 and 4 if greater flow needed) ON
 - X-FEED 2 and 3 (and 1 and 4, if greater flow needed) ON
 - FUEL QTY MONITOR
- R

● When the tank contents reach the required level :

 - Corresponding PUMPS OFF
 - Corresponding X FEED AUTO

On refueling control panel :

- TRANSF VALVE CLOSED and GUARDED
- MODE SELECT OFF and GUARDED
- REFUEL VALVES NORM and GUARDED
- Cockpit FUEL panel SET NORMAL CONFIGURATION

Note : When the fuel quantity in an inner tank decreases to 4 000 kg (8 818 lb) the intertank transfer valves automatically open. The fuel in the outer tanks moves to the inner tanks which can be subsequently defueled.

On cockpit overhead FUEL panel :

DEFUELING

— **ACCESS PLATFORM** **IN POSITION**

— **SAFETY PRECAUTIONS** **APPLY**
Make certain that no HF transmission is performed during defueling and that the tanker and the aircraft are properly grounded. Connect a tanker grounding cable to the aircraft grounding point on the main landing gear.

R *Note* : 1. For APU start/shutdown during defueling, refer to FCOM 2.01.30 p4.
R 2. If only one hose is used for defueling, it must be connected to the coupling marked “USE THIS ADAPTOR TO DEFUEL”.

● **Before defueling is started :**

On cockpit overhead FUEL panel :

— **PUMPS (all)** **OFF**

DEFUELING BY SUCTION

Note : · Defueling all the tanks by suction is possible.
· If the trim tank contains fuel, then the fuel system interlocks prevent a suction defuel of the inner tanks.

On refueling control panel :

— **MODE SELECT** **DEFUEL**

— **REFUEL VALVES (of the tanks to be defueled)** **OPEN**

— **FUEL QTY** **MONITOR**

● **When the tank contents reach the required level :**

— **REFUEL VALVES** **NORM and GUARDED**

— **MODE SELECT** **OFF and GUARDED**

— **Cockpit FUEL panel** **SET NORMAL CONFIGURATION**

DEFUELING WITH FUEL PUMPS

Note : Defueling of the inner and center tanks only is possible. To defuel the other tanks, their fuel must be first transferred to the center or inner tank.

On refueling control panel :

- REFUEL VALVES CHECK NORM
- MODE SELECT DEFUEL
- TRANSF VALVE OPEN
The left (right) aft transfer valves open provided all these conditions are met :
 - one (or more) of the left (right) main fuel pumps is (are) on.
 - the trim tank is empty
 - the inner tank and outer tank inlet valves are closed.

On cockpit overhead FUEL panel :

- PUMPS 2 and 3 (and 1 and 4 if greater flow needed) ON
- X-FEED 2 and 3 (and 1 and 4, if greater flow needed) ON
- FUEL QTY MONITOR
- When the tank contents reach the required level :
 - Corresponding PUMPS OFF
 - Corresponding X FEED AUTO

On refueling control panel :

- TRANSF VALVE CLOSED and GUARDED
- MODE SELECT OFF and GUARDED
- REFUEL VALVES NORM and GUARDED
- Cockpit FUEL panel SET NORMAL CONFIGURATION

Note : When the fuel quantity in an inner tank decreases to 3 500 kg (7 716 lb) the intertank transfer valves automatically open. The fuel in the outer tanks moves to the inner tanks which can be subsequently defueled.

CENTER TANK

On refueling control panel :

- REFUEL VALVES CHECK NORM
- MODE SELECT DEFUEL

On cockpit overhead fuel panel :

- PUMPS L and R ON
- If trim tank has to be defueled
 - T TANK MODE FWD
 - FUEL QTY MONITOR
- When the tank contents reach the required level :
 - Corresponding PUMPS OFF

On refueling control panel :

- MODE SELECT OFF and GUARDED
- REFUEL VALVES NORM and GUARDED
- Cockpit FUEL panel SET NORMAL CONFIGURATION

OVERWING GRAVITY REFUELING

Overwing gravity refueling is done at the refuel point in the top of each wing.

- **SAFETY PRECAUTIONS APPLY**
 Make certain that no HF transmission is performed during refueling and that the tanker and the aircraft are grounded.
 Connect a tanker grounding cable to the aircraft grounding point on the main landing gear.
 Make certain that the slats are retracted, and the flight control safety locks with their warning notices are in position.

R Note : For APU start/shutdown during refueling, refer to FCOM 2.01.30 p4.

INNER TANK REFUELING PROCEDURE

- **OVERWING REFUEL CAP** **REMOVE**
- **REFUELING** **START**
The approximate flowrate per refueling fill is 200 liters/minute.
- **If other tank to be refueled :**
- **GROUND FUEL TRANSFER PROCEDURE** **APPLY**

Note : This procedure is not applicable for trim tank refueling.

REFUELING WITH ONE ENGINE RUNNING

- Refuel with one engine running only at airports where no external ground pneumatic power is available and only when APU is unserviceable.
- Only the RH fuel couplings can be used.
- Overwing gravity filling is not permitted.
- Disembark all passengers.
- Obtain airport authorization.
The Airport Fire Department should standby at the aircraft during the entire refueling procedure.
- Point the aircraft into the wind at a location where the slope is negligible.
Set the parking brake and check its pressure.
Run engine n° 2 at ground idle with its generator connected.
- Do not start engine n° 1, 3, 4, shut down engine n° 2 or attempt to start the APU before all fueling operations have been completed.
- R – Position the fuel truck under the extremity of the right wing. Its pressure should not
- R exceed 50 psi.
- Follow automatic or manual refueling procedure.

Note : The refuel system must be fully operational.

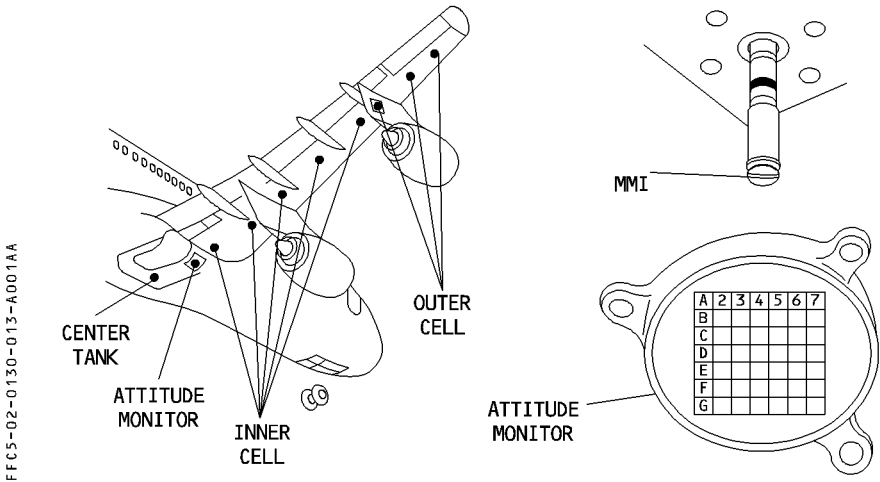
OPERATION MONITORING

During the entire refueling procedure :

- Monitor the fuel truck shut off valve.
- Be sure that the fueling company is keeping permanent control of the emergency fuel shut off device.
- Have a flight crew member in the cockpit monitoring all systems and the running engine.
- Have a qualified ground crew member at the fueling station to operate the refuel valve switches.

USE OF MANUAL MAGNETIC INDICATORS (MMI)

R
 Indicators are installed in each wing tank and in the center tank.



- **AIRCRAFT ATTITUDE** **NOTE**
 Note the grid square letter and grid square number shown by the bubble on the attitude monitor.

— **ACCESS PLATFORM** **IN POSITION**

— **MMI** **UNLOCK and WITHDRAW**
 The crewman must withdraw the MMI slowly until he feels the magnetic attraction between the rod and float magnets.
 Do not use force when withdrawing MMI as this will disengage float magnet from the rod magnet and bring the rod down on to mechanical stop.

— **ROD GRADUATION (which aligns with wing bottom surface)** **READ**

— **MMI** **IN PLACE and LOCKED**

— Use the table for the applicable aircraft attitude with the grid square letter and number, and the applicable MMI stick number to find the volume of fuel in each tank (refer to AMM 12.11.28). Multiply the result by the specific gravity to find the fuel weight.

Note : The manual magnetic indication accuracy is around 5 %.

 A340 FLIGHT CREW OPERATING MANUAL	LOADING		2.01.40	P 1
	WEIGHT and BALANCE		SEQ 001	REV 17

LOAD AND TRIM SHEET

This chart allows to determine the aircraft CG (% MAC) function of dry operating weight, pantry adjustment, cargo loads, passengers and fuel on board.

The operational limits shown on the load and trim sheet are more restrictive than the certified limits because error margins have been taken into account.

The load and trim sheet needs to be updated when :

- a modification which changes the aircraft certified limits is included or
- a modification (cabin layout, cargo arrangement...) which influences the operational limits is made.

It is the airline's responsibility to define a load and trim sheet and to keep it up to date.

Hereafter is a description of the load and trim sheet utilization in the standard Airbus Industrie format (see example 2.01.40 p3) and for a typical passenger cabin arrangement.

R DATA FOR GENERIC EXAMPLE

Dry operating weight = 119 000 kg and CG = 32%

Deviation or adjustment = + 100 kg in zone F

Cargo = 16 500 kg as : cargo 1 = 3 500 kg ; cargo 2 = 4 000 kg ;

cargo 3 = 4 000 kg ; cargo 4 = 2 000 kg ; cargo 5 = 3 000 kg

Passengers (75 kg/PAX) = 295 PAX with the following distribution :

cabin OA = 25 ; cabin OB = 160 ; cabin OC = 110

Fuel = 83 000 kg

 A340 FLIGHT CREW OPERATING MANUAL	LOADING		2.01.40	P 2
	WEIGHT and BALANCE		SEQ 001	REV 20

DESCRIPTION

- a) Enter master data in (1).
- b) Compute dry operating weight index using the formula indicated in (2) and report in (3).
Dry operating index = 124.16.
- c) Enter weight deviation in (4) and read corresponding index in (5) : - 0.51.
- d) Calculate corrected index and report in (6) : CORRECTED INDEX = 123.65.
- e) Enter cargo weight and PAX number in (7).
- f) Enter index scale (8) with corrected index and proceed through cargo and passengers scales as shown in (9). Then, from the final point (cabin OC), draw a vertical line down to the zero fuel line (10) : 157 725 kg.
- g) Check that the intersection with zero fuel line determined in table (11) is within the maximum zero fuel weight and zero fuel operational limits. If not rearrange cargo loading.
- h) Read in table 2.01.40 p5 fuel index correction. Fuel on Board : 83 000 kg.
Fuel density : 0.780.
Read in fuel index table. This example will be continued assuming that FUEL INDEX = + 6 was found.
Carry in scale (12). From this point draw a vertical line down to takeoff weight line (13) at 240 725 kg.
- i) Check that intersection with takeoff line determined in table (11) is within maximum takeoff weight and takeoff operational limits. If not rearrange cargo loading.
- j) Read takeoff CG on CG scale (14) : CG = 30.2 %

R **CAUTION**

When the takeoff CG is more forward than 28 % MAC use a RTOW computed with basic CG.

CAUTION

If there is no customized trim sheet for your airline in this section 2.01.40 do not use the information enclosed herein for day to day operation as margins and load CG vary with cabin and cargo layout.

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		SEQ. 001	REV 09

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FUEL INDEX TABLE

Note : This table is valid only when used with the following formulae for the index :
 $I = W \times (Harm - 34.2155) / 2500 + K$ or $I = [(CG - 25) \times W \times 0.000029] + K$.
 (Weight in kg, Harm in m)

WEIGHT (kg)	DENSITY (kg/l)														
	0.760	0.765	0.770	0.775	0.780	0.785	0.790	0.795	0.800	0.805	0.810	0.815	0.820	0.825	0.830
2000	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
4000	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
6000	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
8000	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
10000	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
12000	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
14000	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
16000	+1	+2	+2	+2	+2	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3
18000	-1	+0	+0	+0	+0	+0	+0	+0	+0	+0	+1	+1	+1	+1	+1
20000	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1
22000	-4	-4	-4	-4	-4	-4	-4	-4	-4	-3	-3	-3	-3	-3	-3
24000	-6	-6	-6	-6	-6	-6	-6	-5	-5	-5	-5	-5	-5	-5	-5
26000	-8	-8	-8	-8	-8	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
28000	-10	-10	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-8	-8
30000	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-10	-10	-10	-10
34000	-15	-15	-15	-15	-15	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14
38000	-18	-18	-18	-18	-18	-18	-18	-17	-17	-17	-17	-17	-17	-17	-17
42000	-21	-21	-21	-21	-21	-21	-21	-21	-20	-20	-20	-20	-20	-20	-20
46000	-23	-24	-24	-24	-24	-24	-23	-23	-23	-23	-23	-23	-23	-23	-23
50000	-25	-25	-25	-25	-25	-25	-25	-25	-26	-26	-26	-26	-26	-26	-26
54000	-26	-26	-26	-26	-26	-26	-26	-27	-27	-27	-27	-27	-27	-27	-27
58000	-25	-25	-26	-26	-26	-26	-26	-27	-27	-27	-27	-27	-28	-28	-28
62000	-23	-24	-24	-25	-25	-25	-26	-26	-26	-27	-27	-27	-27	-27	-28
64000	-22	-23	-23	-23	-24	-24	-25	-25	-25	-26	-26	-26	-27	-27	-27
64500	-17	-17	-18	-18	-19	-19	-19	-20	-20	-21	-21	-21	-21	-22	-22
65000	-12	-12	-13	-13	-14	-14	-14	-15	-15	-15	-16	-16	-16	-17	-17
65500	-7	-7	-8	-8	-8	-9	-9	-10	-10	-10	-11	-11	-11	-11	-12
66000	-1	-2	-2	-3	-3	-4	-4	-4	-5	-5	-5	-6	-6	-6	-7
66500	+3	+2	+2	+1	+1	+1	+0	+0	-1	-1	-1	-2	-2	-2	-2
67000	+3	+3	+2	+2	+1	+1	+1	+0	-1	-1	-1	-1	-2	-2	-2
69000	+5	+4	+4	+3	+3	+2	+2	+1	+1	+1	+0	+0	-1	-1	-1
71000	+7	+6	+6	+5	+5	+4	+4	+3	+3	+2	+2	+1	+1	+0	+0
73000	+8	+8	+8	+8	+7	+6	+6	+5	+4	+4	+3	+3	+2	+2	+1
75000	+8	+8	+8	+8	+8	+8	+8	+7	+7	+6	+5	+5	+4	+4	+3
77000	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+6	+6	+5
79000	+6	+6	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7
81000	+5	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+7	+7
83000	+4	+5	+5	+5	+5	+5	+5	+5	+5	+5	+6	+6	+6	+6	+6
85000	+3	+4	+4	+4	+4	+4	+4	+4	+4	+5	+5	+5	+5	+5	+5
87000	+2	+3	+3	+3	+3	+3	+3	+3	+3	+4	+4	+4	+4	+4	+4
89000	+2	+2	+2	+2	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+3
91000	+1	+1	+1	+1	+1	+1	+1	+1	+1	+2	+2	+2	+2	+2	+2
93000	+0	+0	+0	+0	+0	+0	+0	+0	+0	+1	+1	+1	+1	+1	+1
95000	-1	-1	-1	-1	-1	-1	-1	-1	+0	+0	+0	+0	+0	+0	+0
97000	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1

Continued on next page.

FUEL INDEX TABLE CONT'D

WEIGHT (kg)	DENSITY (kg/l)														
	0.760	0.765	0.770	0.775	0.780	0.785	0.790	0.795	0.800	0.805	0.810	0.815	0.820	0.825	0.830
97000	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1
99000	-3	-3	-3	-3	-3	-3	-2	-2	-2	-2	-2	-2	-2	-2	-2
101000	-4	-4	-4	-4	-4	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
103000	-5	-5	-5	-5	-5	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
105000	-8	-7	-6	-6	-6	-6	-5	-5	-5	-5	-5	-5	-5	-5	-4
107000			-9	-8	-7	-7	-7	-6	-6	-6	-6	-6	-6	-6	-5
109000						-9	-8	-8	-8	-7	-7	-7	-7	-7	-6
111000									-9	-9	-9	-8	-8	-8	-8
113000											-10	-10	-10	-9	-9
115000														-11	-11
FULL	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-11

FUEL INDEX TABLE PER TANK

The fuel index table has been established assuming a fuel distribution in accordance with refuel distribution chart as given in section 2.01.30 of this volume (for a single specific gravity only).

If after refueling the actual distribution deviates from the chart values, the actual and the load sheet CG will show a discrepancy. The following tables allow to determine the fuel index taking into account the actual fuel quantity in each tank. To determine the actual takeoff CG enter the tables with the actual fuel quantities in each tank, read the fuel index for each tank and use their sum to enter the load sheet. Check that the actual CG is inside the operational limits. If CG is outside the limits transfer fuel to achieve a distribution in accordance with the chart or rearrange the load.

Note : These tables are valid only when used with the following formulae for the index :
 $I = W \times (Harm - 34.2155) / 2500 + K$ or $I = [(CG - 25) \times W \times 0.000029] + K$.
(Weight in kg, Harm in m)

Example

DATA : Fuel density = 0.795 kg/l
Fuel in inner fuel tanks = 25500 kg
Fuel in outer fuel tanks = 1930 kg
Fuel in trim tank = 4400 kg
Fuel in center tank = 21000 kg

		Weight (kg)	Index	
Inner tank	Left	25500	–	20
	Right	25500	–	20
Outer tank	Left	1930	+	4
	Right	1930	+	4
Center tank		21000	–	27
Trim tank		4400	+	47
TOTAL		80260	–	12

Enter the load sheet with a fuel index of –12.

FUEL INDEX TABLE FOR INNER TANK

WEIGHTZ (kg)	DENSITY (kg/l)														
	0.760	0.765	0.770	0.775	0.780	0.785	0.790	0.795	0.800	0.805	0.810	0.815	0.820	0.825	0.830
1000	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
2000	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
3000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
4000	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
5000	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
6000	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
7000	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
8000	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
9000	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
10000	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
11000	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
12000	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
13000	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13
14000	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-14	-14
15000	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14
16000	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15
17000	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
18000	-16	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17
19000	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-18	-18
20000	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18
21000	-18	-18	-18	-18	-18	-18	-19	-19	-19	-19	-19	-19	-19	-19	-19
22000	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19
23000	-19	-19	-19	-19	-19	-19	-19	-19	-19	-20	-20	-20	-20	-20	-20
24000	-19	-19	-19	-19	-19	-19	-20	-20	-20	-20	-20	-20	-20	-20	-20
25000	-19	-19	-19	-19	-19	-20	-20	-20	-20	-20	-20	-20	-20	-20	-21
26000	-19	-19	-19	-19	-19	-19	-20	-20	-20	-20	-20	-20	-20	-21	-21
27000	-18	-19	-19	-19	-19	-19	-19	-20	-20	-20	-20	-20	-20	-20	-21
28000	-18	-18	-18	-19	-19	-19	-19	-19	-20	-20	-20	-20	-20	-20	-20
29000	-17	-18	-18	-18	-18	-18	-19	-19	-19	-19	-20	-20	-20	-20	-20
30000	-17	-17	-17	-17	-18	-18	-18	-18	-19	-19	-19	-19	-19	-20	-20
31000	-16	-16	-16	-16	-17	-17	-17	-18	-18	-18	-18	-19	-19	-19	-19
32000	-14	-15	-15	-15	-16	-16	-16	-17	-17	-17	-18	-18	-18	-18	-19
33000						-15	-15	-16	-16	-16	-17	-17	-17	-18	-18
34000											-15	-16	-16	-17	-17
35000															-16
FULL	-14	-14	-14	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-16	-16

FUEL INDEX TABLE FOR OUTER TANK

WEIGHT (kg)	DENSITY (kg/l)														
	0.760	0.765	0.770	0.775	0.780	0.785	0.790	0.795	0.800	0.805	0.810	0.815	0.820	0.825	0.830
100	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
200	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
300	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
400	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
500	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
600	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
700	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
800	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
900	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
1000	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
1100	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
1200	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
1300	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
1400	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
1500	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
1600	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
1700	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
1800	+4	+4	+4	+4	+4	+4	+3	+3	+3	+3	+3	+3	+3	+3	+3
1900	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
2000	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
2100	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
2200	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
2300	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5
2400	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5
2500	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5
2600	+6	+6	+6	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5
2700	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6
2800	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6
2900							+6	+6	+6	+6	+6	+6	+6	+6	+6
3000												+7	+7	+6	+6
FULL	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+7	+7	+7	+7

FUEL INDEX TABLE FOR TRIM TANK

WEIGHT (kg)	DENSITY (kg/l)														
	0.760	0.765	0.770	0.775	0.780	0.785	0.790	0.795	0.800	0.805	0.810	0.815	0.820	0.825	0.830
100	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
200	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
300	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
400	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
500	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5
600	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6
700	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7
800	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8
900	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9
1000	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10
1100	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11
1200	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12
1300	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13
1400	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14
1500	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15
1600	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17
1700	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18
1800	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19
1900	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20
2000	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21
2100	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22
2200	+23	+23	+23	+23	+23	+23	+23	+23	+23	+23	+23	+23	+23	+23	+23
2300	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24
2400	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25
2500	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26
2600	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27
2700	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28
2800	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29
2900	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30
3000	+31	+31	+31	+31	+31	+31	+31	+31	+31	+31	+31	+31	+31	+31	+31
3100	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32
3200	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33
3300	+35	+35	+35	+35	+35	+35	+35	+35	+34	+34	+34	+34	+34	+34	+34
3400	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36
3500	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37
3600	+38	+38	+38	+38	+38	+38	+38	+38	+38	+38	+38	+38	+38	+38	+38
3700	+39	+39	+39	+39	+39	+39	+39	+39	+39	+39	+39	+39	+39	+39	+39
3800	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40
3900	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41
4000	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42
4100	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43
4200	+45	+45	+45	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44
4300	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+45	+45	+45	+45
4400	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47
4500	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48
4600	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49
4700			+50	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50
4800						+51	+51	+51	+51	+51	+51	+51	+51	+51	+51
4900										+52	+52	+52	+52	+52	+52
5000												+53	+53	+53	+53
FULL	+50	+50	+50	+51	+51	+51	+52	+52	+52	+53	+53	+53	+54	+54	+54

FUEL INDEX TABLE FOR CENTER TANK

WEIGHT (kg)	DENSITY (kg/l)														
	0.760	0.765	0.770	0.775	0.780	0.785	0.790	0.795	0.800	0.805	0.810	0.815	0.820	0.825	0.830
1000	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
2000	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
3000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
4000	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
5000	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
6000	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
7000	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
8000	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
9000	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
10000	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
11000	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13
12000	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15
13000	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
14000	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17
15000	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19
16000	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
17000	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21
18000	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23
19000	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24
20000	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
21000	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27
22000	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
23000	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29
24000	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31
25000	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32
26000	-34	-34	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
27000	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
28000	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36
29000	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-37
30000	-40	-40	-40	-40	-39	-39	-39	-39	-39	-39	-39	-39	-39	-39	-39
31000	-42	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41	-40
32000			-43	-43	-43	-43	-43	-43	-43	-43	-42	-42	-42	-42	-42
33000								-45	-44	-44	-44	-44	-44	-44	-44
34000												-46	-46	-46	-46
FULL	-43	-43	-44	-44	-44	-44	-45	-45	-45	-45	-46	-46	-46	-47	-47

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF CONTENTS	2.02.00	P 1
		SEQ 001	REV 15

	02.00	CONTENTS	
	02.05	INTRODUCTION	
	02.10	GENERAL (TEMPERATURE ENTRY)	
		– TAKEOFF PERFORMANCE	1
		– TAKEOFF CHART DESCRIPTION	2
R		– ADDITIONAL INFORMATION	4
	02.12	MTOW CALCULATION (TEMPERATURE ENTRY)	
		– DETERMINATION OF MAXIMUM TAKEOFF WEIGHT AND SPEEDS	1
		– VMU CHECK	5
		– EXTRAPOLATION	5
		– MAXIMUM STRUCTURAL TAKEOFF WEIGHT	5
		– SUMMARY	6
	02.14	FLEXIBLE TAKEOFF (TEMPERATURE ENTRY)	
		– DEFINITION OF FLEXIBLE TAKEOFF	1
		– USE OF FLEXIBLE TAKEOFF	1
		– REQUIREMENTS	1
		– RECOMMENDATION	2
		– DETERMINATION OF FLEXIBLE TAKEOFF TEMPERATURE AND SPEEDS	3
		– FLEXIBLE TAKEOFF NOT POSSIBLE	7
		– SUMMARY	8
	02.16	GENERAL (WEIGHT ENTRY)	
		– TAKEOFF PERFORMANCE	1
		– TAKEOFF CHART DESCRIPTION	2
R		– ADDITIONAL INFORMATION	4
	02.18	MTOW CALCULATION (WEIGHT ENTRY)	
		– DETERMINATION OF MAXIMUM TAKEOFF WEIGHT AND SPEEDS	1
		– VMU CHECK	6
		– EXTRAPOLATION	6
		– MAXIMUM STRUCTURAL TAKEOFF WEIGHT	6
		– SUMMARY	7

R	02.20	FLEXIBLE TAKEOFF (WEIGHT ENTRY)	
R		– DEFINITION OF FLEXIBLE TAKEOFF	1
R		– USE OF FLEXIBLE TAKEOFF	1
R		– REQUIREMENTS	1
R		– RECOMMENDATION	2
R		– DETERMINATION OF FLEXIBLE TAKEOFF	
R		TEMPERATURE AND SPEEDS	3
R		– FLEXIBLE TAKEOFF NOT POSSIBLE	7
R		– SUMMARY	8
R	02.24	QNH/BLEEDS CORRECTION	
R	02.25	MINIMUM SPEEDS	
R		– MINIMUM V1/VR/V2 LIMITED BY VMC	1
R		– MINIMUM V2 LIMITED BY VMU/VMCA	1
R	02.27	DERATED TAKEOFF 	
R		– DEFINITION OF DERATED TAKEOFF	1
R		– USE OF DERATED TAKEOFF	1
R		– TAKEOFF PERFORMANCE IMPROVEMENT BY DERATING	
R		THE ENGINES	1
R		– DETERMINATION OF THE MAXIMUM TAKEOFF WEIGHT AND	
R		ASSOCIATED SPEEDS	2
R		– DETERMINATION OF DERATED TAKEOFF N1	2
R	02.30	QUICK REFERENCE TABLES	
R		– INTRODUCTION	1
R		– USE OF TABLES	1
R		– HOW TO PROCEED	1
R		– CONF 1 + F	4
R		– CONF 2	7
R		– CONF 3	11
02.40	NET TAKEOFF FLIGHT PATH		
		– INTRODUCTION	1
		– HOW TO PROCEED	1
		– CLOSE OBSTACLE CLEARANCE CONF 1 + F	2
		– REMOTE OBSTACLE CLEARANCE CONF 1 + F	3
		– CLOSE OBSTACLE CLEARANCE CONF 2	4
		– REMOTE OBSTACLE CLEARANCE CONF 2	5
		– CLOSE OBSTACLE CLEARANCE CONF 3	6
		– REMOTE OBSTACLE CLEARANCE CONF 3	7

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF INTRODUCTION	2.02.05	P 1
		SEQ 001	REV 12

TAKEOFF CHARTS

Takeoff charts are required to provide performance at takeoff. It is possible to present the charts in two different ways, one of which is selected by the airline. The different presentations are :

- temperature entry (temperature provided in the left column)
- weight entry (weight provided in the left column)

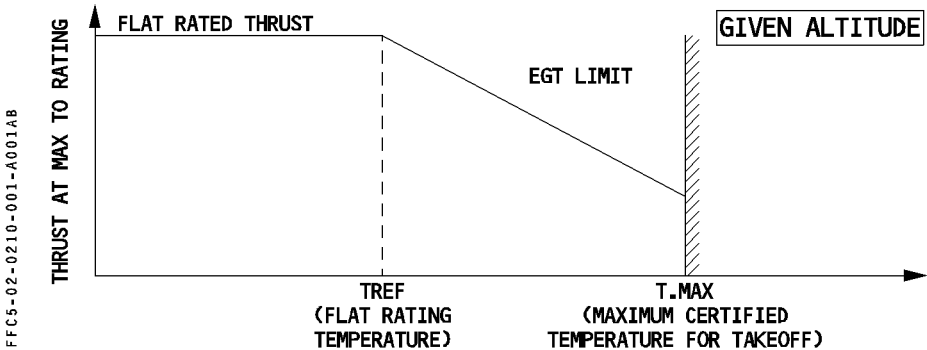
Both presentations are described hereafter. Sections 2.02.10, 2.02.12 and 2.02.14 are relative to temperature entry while 2.02.16, 2.02.18 and 2.02.20 are relative to weight entry.

The airline may request Airbus to delete any one set of sections from the customized FCOM.

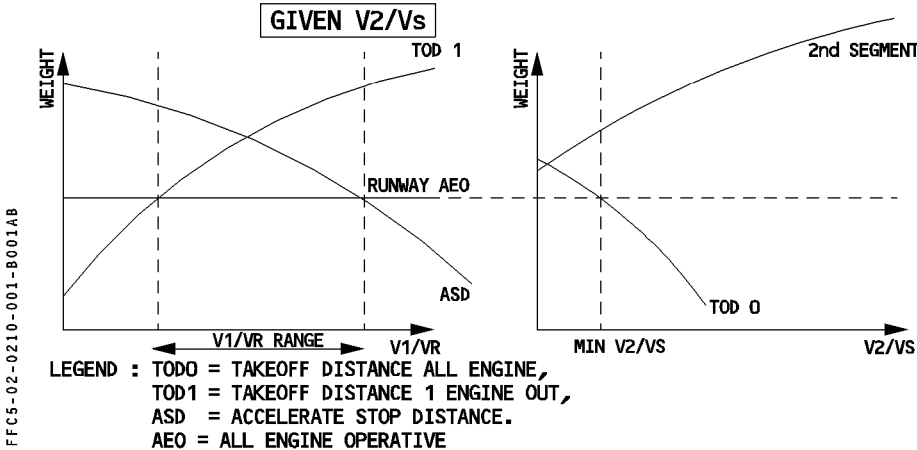
TAKEOFF PERFORMANCE

Takeoff optimization is calculated for a given runway and its obstacles and for given conditions of flap setting, temperature, wind and QNH. The calculation produces a maximum permissible takeoff weight (or a maximum takeoff temperature for an actual weight).

The takeoff thrust produced by the engines varies as follows :



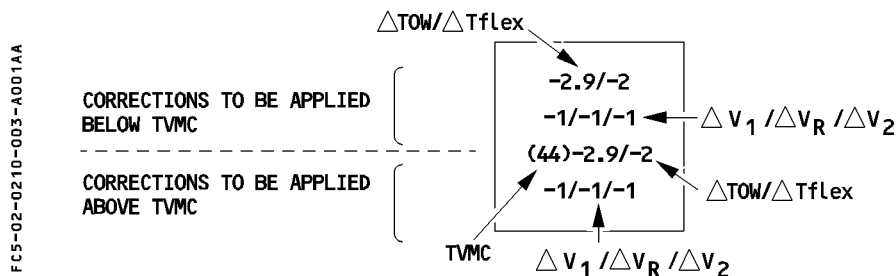
The optimization process calculates the speeds which will produce the maximum takeoff weight. To do so, it takes into account the different takeoff limitations such as TOD, ASD, TOR, second segment..., as shown on the graphs below.



On a typical runway, the performance of a four engine aircraft is generally limited by the all engine operation at takeoff. The optimum V2/VS is close to the minimum value and there is usually a usable range of V1/VR (and consequently a usable range of V1).

DESCRIPTION OF THE CORRECTIONS ON TAKEOFF CHART

The corrections are presented on 4 lines :



TVMC is a temperature value given per column. This is a fictitious value that indicates the temperature above which the speeds are close to a VMC limitation or are VMC limited.

Note : The lower two lines may be shaded on certain chart formats.

R MINIMUM SPEEDS

- R Minimum $V_1/V_R/V_2$ due to VMC are provided on the bottom right side of the takeoff chart.
- R They are only applicable in case of speed corrections.
- R These speeds are conservative. They may be slightly higher than $V_1/V_R/V_2$ displayed in the takeoff chart.

R FLEX TEMPERATURE INDICATOR

- R On the temperature entry chart, the temperature column may display asterisks or have a grey band to indicate temperature values above T_{MAX} and which are flex temperatures only.

 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.10	P 4
	GENERAL (TEMPERATURE ENTRY)		SEQ 001	REV 15

ADDITIONAL INFORMATION

ONE ENGINE OUT CLIMB PROCEDURE

The performance given in the chart is consistent with the flight path specified for the aircraft with one engine out and takes into account significant obstacles.

When the procedure to be followed is not the standard instrument departure, the chart describes a specific procedure (EOSID).

When the specified procedure requires a turn, except if otherwise stated on the RTOW chart, the turn should be performed with a maximum bank of 15° until the aircraft reaches 1500 feet or green dot.

The acceleration height (or altitude) ensures that the net flight path clears the highest obstacle by at least 35 feet when the aircraft is accelerating in level flight to green dot speed after an engine failure, in the most adverse conditions.

TAKEOFF ON A WET RUNWAY

Takeoff charts computed for wet runway with a 15 feet screen height and/or use of reverse thrust may produce, in some conditions, a maximum takeoff weight (or flexible temperature) higher than that obtained for a dry runway. It is thus mandatory to compare both charts (dry and wet) and retain the lower of the two weights (or flexible temperature) and the associated speeds determined for a wet runway.

Note : *The crew need not compare the charts if the top of the WET runway chart specifies "DRY CHECK". (The comparison has already been inserted in the WET runway calculation).*



obstacles	15L	DRY
-----------	-----	-----

CONF 2

DO NOT USE FOR
OPERATIONAL PURPOSES

	145/20/37	//
	14/146/34	//
	136/46/34	//
	133/43/32	//
	131/41/47	//
	142/35/66	//
	143/31/39	//
	140/49/31	//
	136/48/33	//
	132/43/32	//

INFLUENCE OF RUNWAY CONDITION

	+	0	-
+	+0/+0	+0/+0	-2/+0/+0
0	-1/+0/+0	-1/+0/+0	+38/-16.3/-9
-	(+54/-1.0/-1	(+54/+0/+0	+0/+0/+0

↓
TAKEOFF PARAMETERS

TAKEOFF PARAMETERS	MAX WEIGHT (1000 KG) (210.4)	LIMITATION CODE (4-2)
V_1 (KT IAS) - V_R (KT IAS) - V_{LO} (KT IAS)	(135) (140) (140)	(4-2)

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		SEQ 001	REV 15

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DETERMINATION OF MAXIMUM TAKEOFF WEIGHT AND SPEEDS

DIRECT CHART READING

The takeoff chart is computed for a given runway under a set of conditions, which are :

- OAT
- Wind
- Configuration
- QNH, air conditioning, anti ice...

Two configurations are produced on the chart. This enables the crew to select that giving the highest permissible takeoff weight. In case of equivalent performance, retain the configuration giving the best aft body clearance, i.e. the highest flap setting.

For a given configuration, enter the chart with the OAT and wind value to determine the maximum permissible weight. For an OAT or wind value not presented on the chart, interpolate between two consecutive temperature rows and/or two consecutive wind columns. Conservative OAT or wind values can also be considered. No extrapolation is allowed.

CORRECTIONS DUE TO DIFFERENT TAKEOFF CONDITIONS

Retain the maximum takeoff weight, associated configuration and speeds from above.
 For conditions different from those of the chart, apply relevant corrections.

CONSERVATIVE CORRECTIONS FOR QNH AND BLEEDS FROM FCOM 2.02.24 p 1

- Corrections are given for QNH $\neq$ 1013 hPa, air conditioning ON, anti ice ON.
1. For the given wind and temperature conditions, read the maximum takeoff weight (choose the configuration giving the highest weight).
 2. Apply the published weight correction(s) to the maximum takeoff weight (for each correction) to determine the maximum permissible takeoff weight.
 3. Read the speeds associated with the maximum permissible takeoff weight by entering the chart with the retained configuration and wind value.

Example 1

DATA : OAT = 25°C
 Head Wind = 10 kt
 Air conditioning ON
 QNH = 1013 hPa

- R Use the chart from 2.02.10 p 6.
 Enter the 10 kt head wind column and interpolate for 25°C, CONF 1+F,
 Maximum takeoff weight (1000 kg) air conditioning OFF 254.4
 Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
 Maximum takeoff weight (1000 kg) air conditioning OFF 258.9

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.12	P 2
	MTOW CALCULATION (TEMP. ENTRY)		SEQ 001	REV 15

Retain CONF 2 as takeoff configuration.
 Maximum TO weight (1000 kg) air conditioning OFF 258.9
 Air conditioning correction (FCOM 2.02.24 p1) – 17.5
 Maximum permissible TO weight (1000 kg) air conditioning ON 241.4
 Determine takeoff speeds for 241.4 (1000 kg) in the 10 kt head wind column (CONF2)
 V1 = 137 kt, VR = 144 kt, V2 = 151 kt

CORRECTIONS FOR WET OR CONTAMINATED RUNWAYS FROM FCOM 2.04.10

(Refer to FCOM 2.04.10)

R CORRECTIONS PRODUCED ON THE RTOW CHART (SEE EXAMPLE ON 2.02.10 P6)

A description of this correction is given on 2.02.10 P3. The list of corrections is not exhaustive, however the most commonly used corrections are wet runway, QNH, air conditioning and/or anti ice. A maximum of three corrections can be produced on one chart.
 To apply the corrections, proceed as follows :
 1. Enter the chart with given OAT and wind to determine the maximum takeoff weight before correction.
 2. Apply the first correction :
 If OAT is less than or equal to TVMC (line 3), apply ΔW correction from line 1 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 2.
 Else, (for OAT greater than TVMC), apply ΔW correction from line 3 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 4.
 3. To combine a second (and third, as applicable) correction :
 If OAT is less than or equal to TVMC (line 3), apply ΔW correction from line 1 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 2.
 Check that the resulting speeds are higher than the minimum speeds displayed on the RTOW chart and that V2 is higher than the VMU limited speed (FCOM 2.02.25).
 If OAT is higher than TVMC (line3) or if the above speed check is not fulfilled, apply ΔW correction from line 3 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 4. No speed check is required.

Note : – QNH correction is given for ± 10 hPa. It is allowed to extrapolate linearly for greater QNH deviation.
– When using a takeoff chart with failure cases, it is not allowed to combine two failure cases.
– Corrections from the chart must be applied from top to bottom, i.e. in the RTOW on 2.02.10 p6, apply the wet correction first.
– If asterisk or dotted lines appear in the correction boxes, refer to more conservative corrections provided in the FCOM.
– No speed check is required for the first correction. However, if the first influence correction follows a conservative FCOM correction, a speed check is required.

R

Example 2

DATA : OAT = 25°C
Head wind = 10 kt
QNH = 1028 hPa
WET runway

- R Use the chart from 2.02.10 p6.
- Enter the 10 kt head wind column and interpolate for 25°C, CONF 1+F,
max TO weight (1000 kg) 254.4
 - Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
max TO weight (1000 kg) 258.9
 - Retain CONF 2 for takeoff.
 - Read associated speeds as V1 = 140 kt, VR = 149 kt, V2 = 156 kt
 - Apply WET correction
For OAT < TVMC (54°), ΔW = 0.0
Intermediate weight (1000 kg) 258.9
Associated speeds,
V1 = 140 kt – 1 = 139 kt
VR = 149 kt – 0 = 149 kt
V2 = 156 kt – 0 = 156 kt
(No speed check required for first correction)
 - Apply QNH correction
For OAT < TVMC (54°), ΔW = 1.9 × 15/10 = + 2.9
Maximum permissible takeoff weight (1000 kg) 261.8
Associated speeds,
V1 = 139 kt + 1 × 15/10 = 140 kt
VR = 149 kt + 1 × 15/10 = 151 kt
V2 = 156 kt + 1 × 15/10 = 158 kt
 - Check that the speeds are higher than minimum speeds from the chart and from VMU table.

	Takeoff Configuration : 2			
	TOW	V1	VR	V2
TOW (RTOW)	258.9	140	149	156
FCOM correction(s)				
Intermediate value	258.9	140	149	156
WET Correction	0.0	– 1	0	0
Intermediate value	258.9	139	149	156
QNH Correction	+ 2.9	+ 1	+ 2	+ 2
Final value	261.8	140	151	158

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.12	P 4
	MTOW CALCULATION (TEMP. ENTRY)		SEQ. 001	REV 15

COMBINING CORRECTIONS FROM FCOM AND CHART

Proceed as follows :

1. Enter the chart with selected configuration, OAT and wind to read the maximum takeoff weight.
2. Apply corrections from FCOM to determine an intermediate weight. Interpolate associated speeds for intermediate weight in the same column (same wind and configuration).
3. Apply corrections from RTOW chart as explained above.

Example 3

DATA : OAT = 25°C
 Head wind = 10 kt
 Air conditioning ON
 QNH = 1028 hPa
 WET runway

- R 1. Use the chart from 2.02.10 p 6.
 Enter the 10 kt head wind column and interpolate for 25°C, CONF 1+F,
 Max TO weight (1000 kg) air conditioning OFF 254.4
 Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
 Max TO weight (1000 kg) air conditioning OFF 258.9
 Retain CONF 2 for takeoff configuration.
2. First, apply the correction from FCOM page 2.02.24 p 1.
 Max TO weight (1000 kg) air conditioning OFF 258.9
 Air conditioning correction – 17.5
 Intermediate weight 241.4
 Interpolate takeoff speeds for 241.4 (1000 kg) in the 10 kt head wind column,
 V1 = 137 kt, VR = 144 kt, V2 = 151 kt
3. Apply WET correction
 For OAT < TVMC (54°), ΔW = 0.0
 Intermediate weight 241.4
 Associated speeds,
 V1 = 137 kt – 1 = 136 kt
 VR = 144 kt – 0 = 144 kt
 V2 = 151 kt – 0 = 151 kt
 Check that the speeds are higher than minimum speeds from the chart and from VMU table.
 Apply QNH correction
 For OAT < TVMC (54°), ΔW = $1.9 \times 15/10$ = + 2.9
 Maximum permissible takeoff weight 244.3
 Associated speed,
 V1 = 136 kt + 1 $\times$ 15/10 = 137 kt
 VR = 144 kt + 1 $\times$ 15/10 = 146 kt
 V2 = 151 kt + 1 $\times$ 15/10 = 153 kt

 FLIGHT CREW OPERATING MANUAL	TAKEOFF MTOW CALCULATION (TEMP. ENTRY)	2.02.12	P 5
		SEQ 001	REV 12

Check that the speeds are higher than minimum speeds from the chart and from VMU table.
(It is reminded that if the speed checks are not fulfilled, the corrections must be recalculated using those provided on lines 3 and 4).

Since the speed check is fulfilled :

Maximum permissible takeoff weight = 244.3 (1000 kg)

V1 = 137 kt, VR = 146 kt, V2 = 153 kt.

	Takeoff Configuration : 2			
	TOW	V1	VR	V2
TOW (RTOW)	258.9			
FCOM correction(s)	– 17.5			
Intermediate value	241.4	137	144	151
WET Correction	0.0	– 1	0	0
Intermediate value	241.4	136	144	151
QNH Correction	+ 2.9	+ 1	+ 2	+ 2
Final value	244.3	137	146	153

VMU CHECK

- R On 2.02.25 are given the V2 limited by VMU/VMCA values per configuration. For each pressure altitude and weight combination, two speed values are given. The first value applies to all temperatures less than or equal to ISA + 15. The second value applies to ISA + 40. For a temperature between ISA + 15 and ISA + 40, interpolate linearly between the two given speeds.

The speeds in the tables are checked for VMCA limitation.

Note : The minimum V2 speed due to VMCA is given on the RTOW chart.

EXTRAPOLATION

For a takeoff weight lower than those displayed on the chart, associated speeds are calculated as follows :

1. For given configuration and wind, note the speeds associated with the takeoff weight in the row displaying the highest permissible temperature.

2. Apply speed corrections provided at the bottom of the RTOW chart to V1, VR and V2 limited to the minimum speeds.

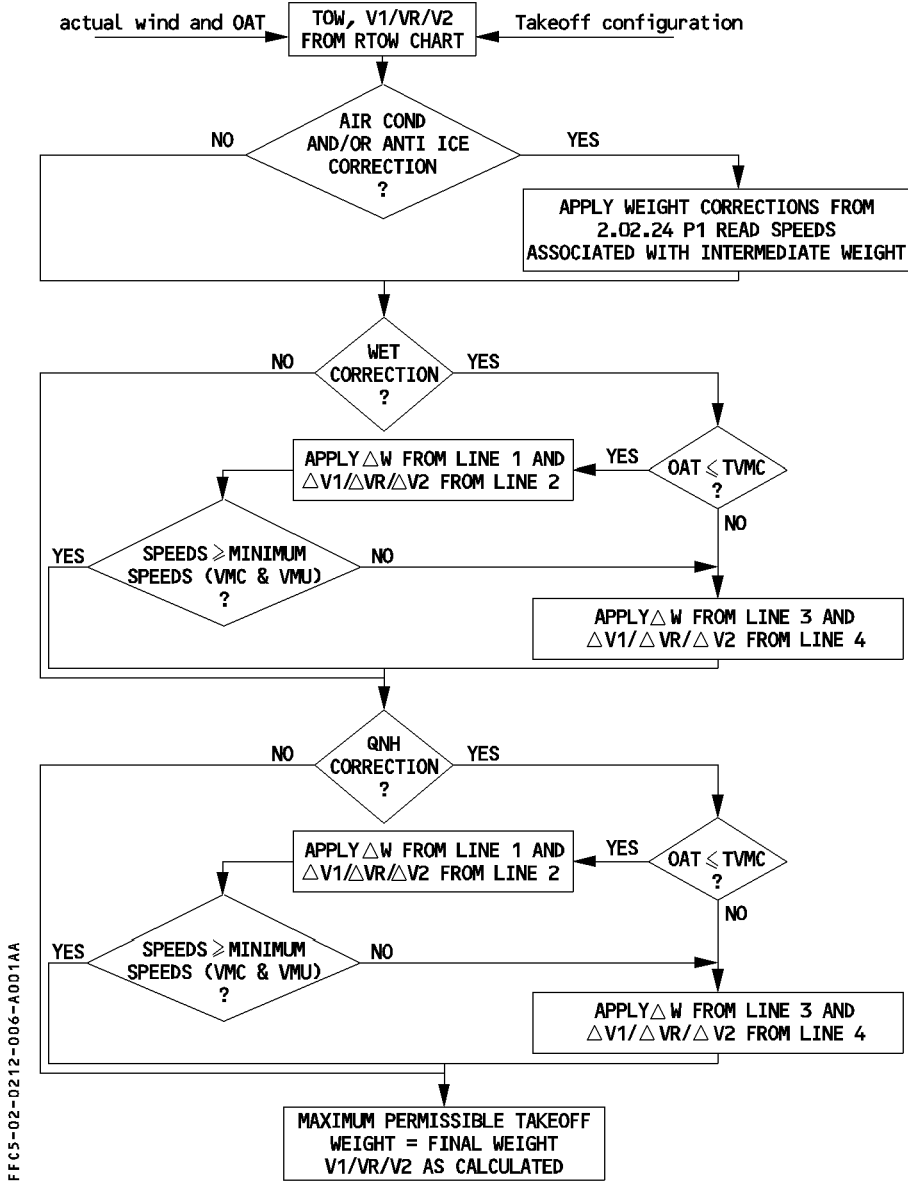
R MAXIMUM STRUCTURAL TAKEOFF WEIGHT

- R The maximum structural takeoff weight is a weight limitation depending on the aircraft.
R This limitation is provided in the Flight Manual and in the chapter limitation of the FCOM3.
R Compare the maximum structural takeoff weight to the maximum permissible takeoff weight computed for given conditions and retain the lower of the two values.

SUMMARY

The following flow diagram gives the different steps to follow.

R



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DEFINITION OF FLEXIBLE TAKEOFF

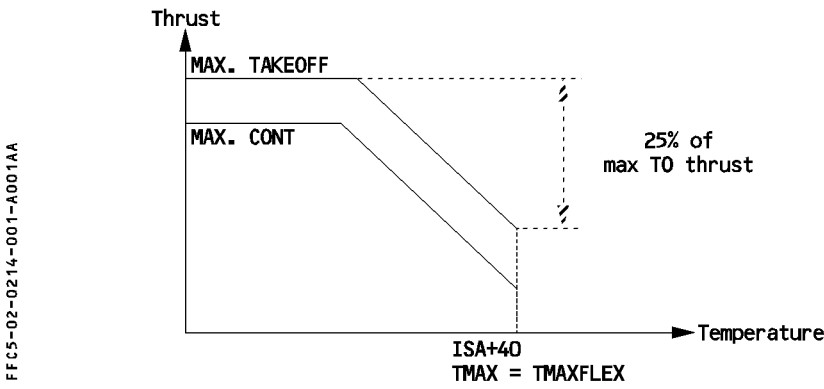
In many cases the aircraft takes off with a weight lower than the maximum permissible takeoff weight. When this happens, it can meet the required performance (runway, second segment, obstacle,...) with a decreased thrust that is adapted to the weight : this is called FLEXIBLE TAKEOFF and the thrust is called FLEXIBLE TAKEOFF THRUST.
The use of flexible takeoff thrust saves engine life.

USE OF FLEXIBLE TAKEOFF

The pilot can use flexible takeoff when the actual takeoff weight is lower than the maximum permissible takeoff weight for the actual temperature. The maximum permissible takeoff weight decreases when temperature increases, so it is possible to assume a temperature at which the actual takeoff weight would be the limiting one. This temperature is called FLEXIBLE TEMPERATURE or assumed temperature and is entered in the FADEC via the MCDU PERF TO page in order to get the adapted thrust.

REQUIREMENTS

- Thrust must not be reduced by more than 25 % of the full rated takeoff thrust.
- The flexible takeoff N1 cannot be lower than the Max Climb N1 at the same flight conditions.
The FADEC takes the above two constraints into account to determine the flexible N1. The above two constraints limit the maximum flexible temperature at ISA + 40 (55° C at sea level).
- The flexible takeoff thrust cannot be lower than the Max Continuous thrust used for the final takeoff flight path computation (at ISA + 40).
- The flexible temperature cannot be lower than the flat rating temperature, TREF (ISA + 15), or the actual temperature (OAT).



 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.14	P 2
	FLEXIBLE TAKEOFF (TEMP. ENTRY)		SEQ. 001	REV 21

- Flexible takeoff is not permitted on contaminated runways.
- The operator should check the maximum thrust (TOGA) at regular intervals in order to detect any engine deterioration, or maintain an adequate engine performance monitoring program to follow up the engine parameters.

RECOMMENDATION

- Extension of engine life will be provided by the use of the highest flexible temperature. However a reduction of a few degrees from a high flexible temperature does not cause significant penalty to engines.
- A higher flap setting will provide additional aft body clearance, lower speeds and more comfort.

Using the same takeoff chart, for a given weight it is possible to :

- Select a temperature lower than the maximum determined one and keep the speeds defined at maximum temperature or,
- Move towards the left side (tailwind) of the takeoff chart while remaining within the same configuration and looking for the same actual takeoff weight at lower temperature. This produces a lower flexible temperature and, in general, lower takeoff speeds (V1/VR/V2).

Using one of the two above possibilities, check that the selected temperature is greater than the actual temperature (OAT) and greater than the flat rating temperature (TREF).

TAKEOFF PROCEDURE

Depending on environmental takeoff conditions, the following procedure is recommended.

CONDITIONS	PROCEDURE	REASON
Dry or wet, well paved runway	Use flap setting giving the optimum performance. If takeoff performance is not limiting, consider the use of higher flap setting.	Extend engine life/improve aft body clearance.
High altitude takeoff	– Use CONF2/CONF3	Improve comfort.
Badly paved runway or Accelerate stop distance limited runway	– Use CONF2/CONF3 or – Move towards left side of the takeoff chart.	Improve comfort. Improve stopping distance.
Windshear expected along takeoff path	– Use maximum thrust.	Maintain acceleration capability.
Contaminated runway	– Use maximum thrust. (flex forbidden).	Improve stopping distance Decrease time on runway. Required by regulations.

DETERMINATION OF FLEXIBLE TAKEOFF TEMPERATURE AND SPEEDS

- Before determining the flexible temperature, calculate the maximum permissible takeoff weight (see previous section) and ensure that the actual takeoff weight is lower than the determined maximum takeoff weight.
- Enter the RTOW chart with the wind condition and selected configuration to interpolate for the actual takeoff weight. Read the flexible temperature in the temperature column corresponding to the actual weight.
 - Repeat this process for the other configuration available. Select that configuration giving the highest flexible temperature.

CORRECTIONS DUE TO DIFFERENT TAKEOFF CONDITIONS

When the takeoff conditions are different from those provided on the chart, apply the associated corrections.

CONSERVATIVE CORRECTIONS FOR QNH AND BLEEDS FROM FCOM 2.02.24 P1

- Corrections are given for QNH $\neq$ 1013 hPa, air conditioning ON, anti ice ON.
1. For a given takeoff weight, wind condition and selected configuration, determine the flexible temperature. Retain the takeoff speeds associated with the actual weight.
 2. Apply the published temperature correction. To combine two or more corrections, add the different corrections and apply to temperature value.
(No speed corrections required).

Example 4

DATA : Actual takeoff weight = 220 000 kg
Head wind = 10 kt
Air conditioning ON
QNH = 1013 hPa

- R Use the chart from 2.02.10 p6. Determine the maximum permissible takeoff weight (see example1). The actual weight being lower than the maximum one, flexible takeoff is possible.
- Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 1+F,
Flexible temperature 48° C
- Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 2,
Flexible temperature 48° C

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.14	P 4
	FLEXIBLE TAKEOFF (TEMP. ENTRY)		SEQ. 050	REV 15

Equivalent performance is obtained from the two different configurations.
 Retain CONF 2 as it improves aft body clearance.
 Takeoff speeds are V1 = 133 kt, VR = 140 kt, V2 = 146 kt
 Flexible temperature with air conditioning OFF 48° C
 Air conditioning correction (FCOM 2.02.24 p1) – 9° C
 Maximum flexible temperature 39° C

CORRECTIONS FOR WET RUNWAY FROM FCOM 2.04.10

(Refer to FCOM 2.04.10)

CORRECTIONS PRODUCED ON THE RTOW CHART (SEE EXAMPLE ON 2.02.10 P6)

A description of this correction is given on 2.02.10 P3. The list of corrections is not exhaustive, however the most commonly used corrections are wet runway, QNH, air conditioning and/or anti ice. A maximum of three corrections can be produced on one chart.

To apply the correction, proceed as follows :

1. Enter the chart with wind and selected configuration. Interpolate for actual takeoff weight. Read flexible temperature associated with this weight.

2. Apply the first correction :

If the flexible temperature is less than or equal to TVMC (line 3), apply ΔT_{flex} correction from line 1 and apply speed corrections ($\Delta V1/\Delta VR/\Delta V2$) from line 2.

Else, (flexible temperature greater than TVMC), apply ΔT_{flex} from line 3 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 4.

R Check V2 against VMU limitation (FCOM 2.02.25). If V2 is lower than V2 limited by VMU,
 R flex takeoff is not possible. Set TOGA thrust and retain the speeds associated with
 R maximum permissible takeoff weight or the speeds read in the chart for the actual
 R weight if they are all lower.

No speed correction is required for QNH and bleeds influence (Not applicable to maximum takeoff weight determination).

3. To combine a second and/or a third correction, proceed as per point 2.

4. Check that the final flexible temperature is :

- higher than OAT and TREF
- limited to TMAXFLEX

If the check is fulfilled, retain final flexible temperature as the one to be inserted in the MCDU.

If the check is not fulfilled, (final flexible temperature lower than OAT or TREF), no flexible takeoff is possible.

Use TOGA thrust and retain speeds that have been calculated for the maximum permissible takeoff weight. (See 2.02.14 p7)

Note : – QNH correction is given for ± 10 hPa. It is allowed to extrapolate linearly for greater QNH deviation.

– Corrections from the chart must be applied from top to bottom, i.e. in the RTOW on 2.02.10 p6, apply the wet influence first.

R

Note : – When the flexible temperature is higher than TVMC, it is allowed to limit the flexible temperature to TVMC and apply only corrections from lines 1 and 2.
– If asterisk or dotted lines appear in the correction boxes, refer to more conservative corrections provided in the FCOM.

Example 5

DATA : Actual takeoff weight = 220 000 kg
Head wind = 10 kt
QNH = 1028 hPa
WET runway
Air conditioning OFF

R Use the chart from 2.02.10 p6. Determine the maximum permissible takeoff weight (see example 2). The actual weight being lower than the maximum one, flexible takeoff is possible.

Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 1+F,

Flexible temperature 48° C

Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 2,

Flexible temperature 48° C

Equivalent performance is obtained from the two different configurations.

Retain CONF 2 as it improves aft body clearance.

Takeoff speeds are V1 = 133 kt, VR = 140 kt, V2 = 146 kt

Apply WET correction

For flexible temperature < TVMC (54°), ΔT_{flex} = 0° C

Intermediate flex temperature 48° C

Associated speeds,

V1 = 133 kt – 1 = 132 kt

VR = 140 kt – 0 = 140 kt

V2 = 146 kt – 0 = 146 kt

R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.

Apply QNH correction

For flex temperature < TVMC (54°), ΔT_{flex} = + 0° C

Maximum flexible temperature 48° C

Check that OAT/TREF < flex temperature ≤ TMAXFLEX

No speed correction.

Takeoff speeds are V1 = 132 kt, VR = 140 kt, V2 = 146 kt

	Takeoff Configuration : 1+ F			
	Tflex	V1	VR	V2
Chart temperature	48	133	140	146
FCOM correction(s)				
Intermediate value	48	133	140	146
WET Correction	0	– 1	0	0
Intermediate value	48	132	140	146
QNH Correction	0	0	0	0
Final value	48	132	140	146

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.14	P 6
	FLEXIBLE TAKEOFF (TEMP. ENTRY)		SEQ. 050	REV 15

COMBINING CORRECTIONS FROM FCOM AND CHART

1. Apply corrections from FCOM (see 2.02.24 p1).
2. Apply corrections from the RTOW chart.
Apply speed corrections except for QNH and bleed influences.

Example 6

DATA : Actual takeoff weight = 220 000 kg
 Head wind = 10 kt
 Air conditioning ON
 QNH = 1028 hPa
 WET runway

- R Use the chart from 2.02.10 p6. Determine the maximum permissible takeoff weight (see example 3). The actual weight being lower than the maximum one, flexible takeoff is possible.
- Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 1+F,
Flexible temperature 48° C
 - Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 2,
Flexible temperature 48° C
 - Equivalent performance is obtained from the two different configurations.
Retain CONF 2 as it improves aft body clearance.
Takeoff speeds are V1 = 133 kt, VR = 140 kt, V2 = 146 kt
 - First, apply the correction from FCOM page 2.02.24 p1.
Flexible temperature with air conditioning OFF 48° C
Air conditioning correction – 9° C
Intermediate flexible temperature 39° C
No speed correction.
 - Apply WET correction
For flexible temperature < TVMC (54°), ΔT_{flex} = 0° C
Intermediate flex temperature 39° C
Associated speeds,
V1 = 133 kt – 1 = 132 kt
VR = 140 kt – 0 = 140 kt
V2 = 146 kt – 0 = 146 kt
 - R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.
 - Apply QNH correction
For flexible temperature < TVMC (54°), ΔT_{flex} = + 0° C
Maximum flexible temperature 39° C
Check that OAT/TREF < flex temperature ≤ TMAXFLEX
No speed correction.
Takeoff speeds are V1 = 132 kt, VR = 140 kt, V2 = 146 kt

	Takeoff Configuration : 2			
	Tflex	V1	VR	V2
Chart temperature	48	133	140	146
FCOM correction(s)	– 9	0	0	0
Intermediate value	39	133	140	146
WET Correction	0	– 1	0	0
Intermediate value	39	132	140	146
QNH Correction	0	0	0	0
Final value	39	132	140	146

FLEXIBLE TAKEOFF NOT POSSIBLE

In some cases when the actual takeoff weight is lower than the maximum permissible one but no flexible takeoff possible (that is flexible temperature lower than TREF or OAT) :

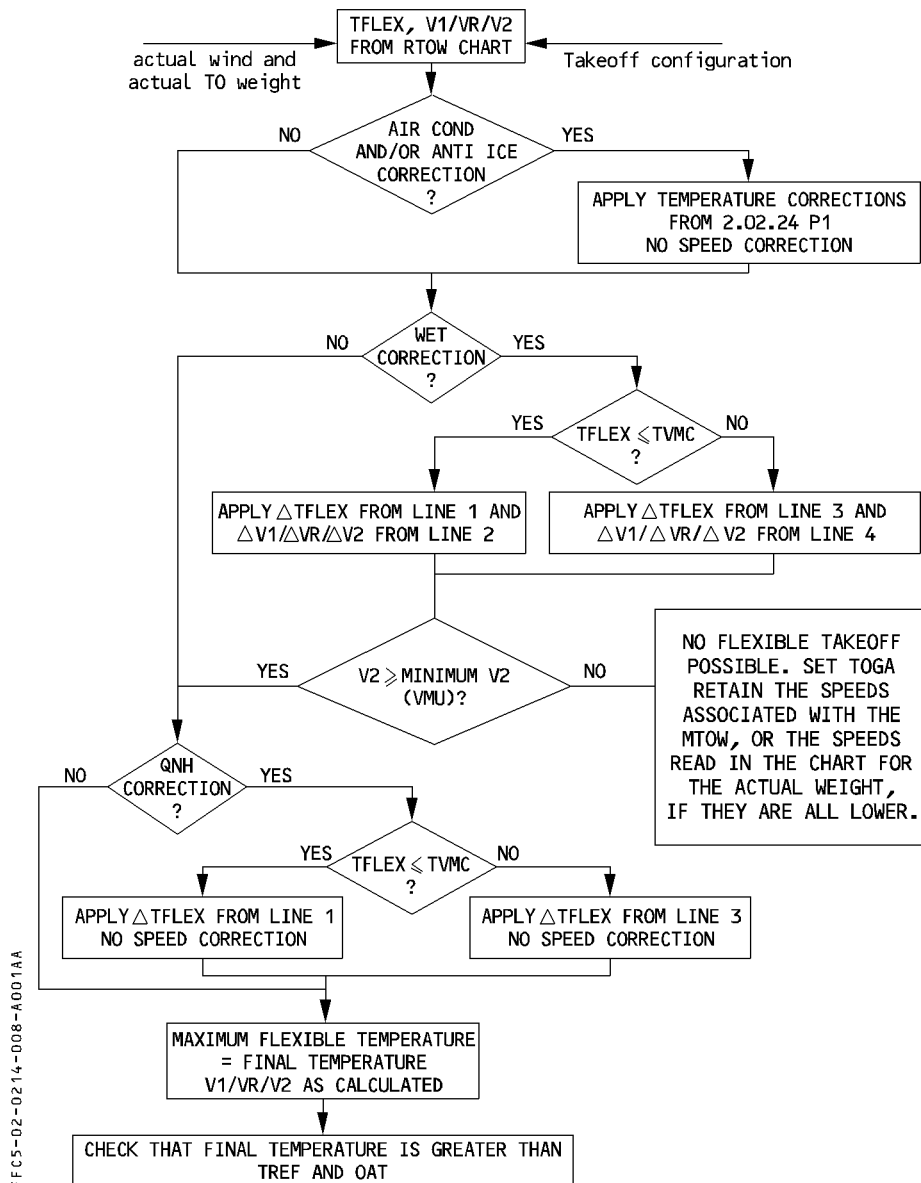
- It is mandatory to use TOGA thrust
- You can retain the speeds that have been calculated for the maximum permissible takeoff weight;

- R
- OR
- R
- You can retain the speeds associated with the actual takeoff weight provided they are
- R
- all lower than the speeds calculated for the maximum permissible takeoff weight.

SUMMARY

The flow diagram gives the different steps to follow.

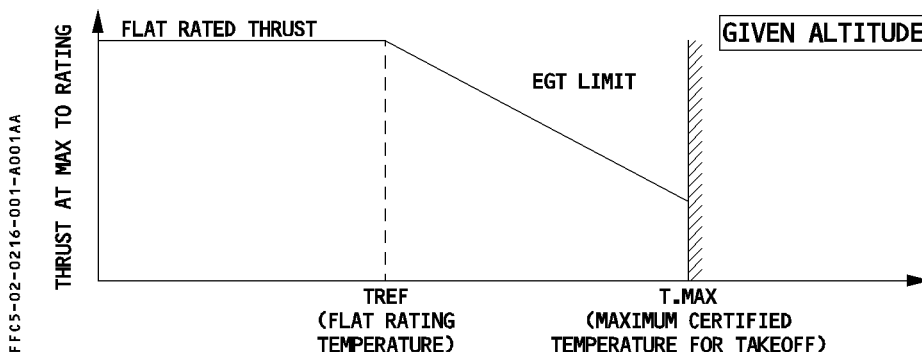
R



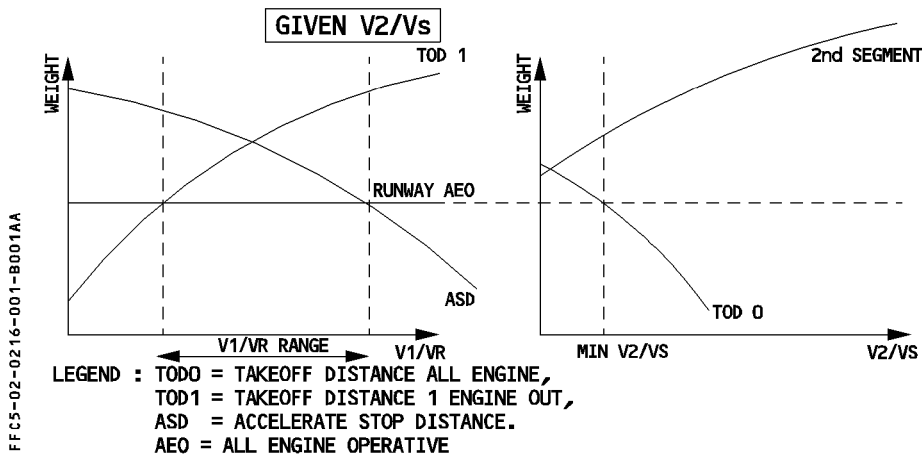
TAKEOFF PERFORMANCE

Takeoff optimization is calculated for a given runway and its obstacles and for given conditions of flap setting, temperature, wind and QNH. The calculation produces a maximum permissible takeoff weight (or a maximum takeoff temperature for an actual weight).

The takeoff thrust produced by the engines varies as follows :



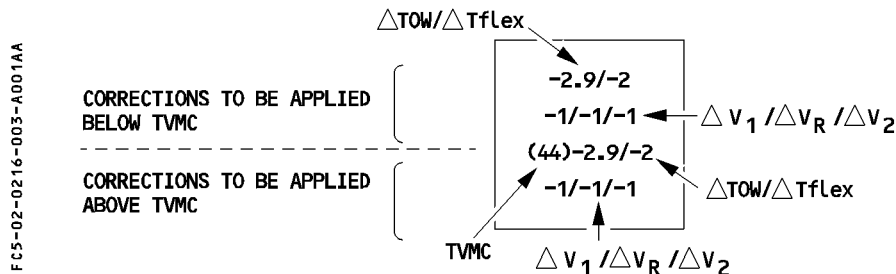
The optimization process calculates the speeds which will produce the maximum takeoff weight. To do so, it takes into account the different takeoff limitations such as TOD, ASD, TOR, second segment..., as shown on the graphs below.



On a typical runway, the performance of a four engine aircraft is generally limited by the all engine operation at takeoff. The optimum V2/VS is close to the minimum value and there is usually a usable range of V1/VR (and consequently a usable range of V1).

DESCRIPTION OF THE CORRECTIONS ON TAKEOFF CHART

The corrections are presented on 4 lines :



TVMC is a temperature value given per column. This is a fictitious value that indicates the temperature above which the speeds are close to a VMC limitation or are VMC limited.

Note : The lower two lines may be shaded on certain chart formats.

R MINIMUM SPEEDS

- R Minimum $V_1/V_R/V_2$ due to VMC are provided on the bottom right side of the takeoff chart.
- R They are only applicable in case of speed corrections.
- R These speeds are conservative. They may be slightly higher than $V_1/V_R/V_2$ displayed in the takeoff chart.

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.16	P 4
	GENERAL (WEIGHT ENTRY)		SEQ 001	REV 15

ADDITIONAL INFORMATION

ONE ENGINE OUT CLIMB PROCEDURE

The performance given in the chart is consistent with the flight path specified for the aircraft with one engine out and takes into account significant obstacles.

When the procedure to be followed is not the standard instrument departure, the chart describes a specific procedure (EOSID).

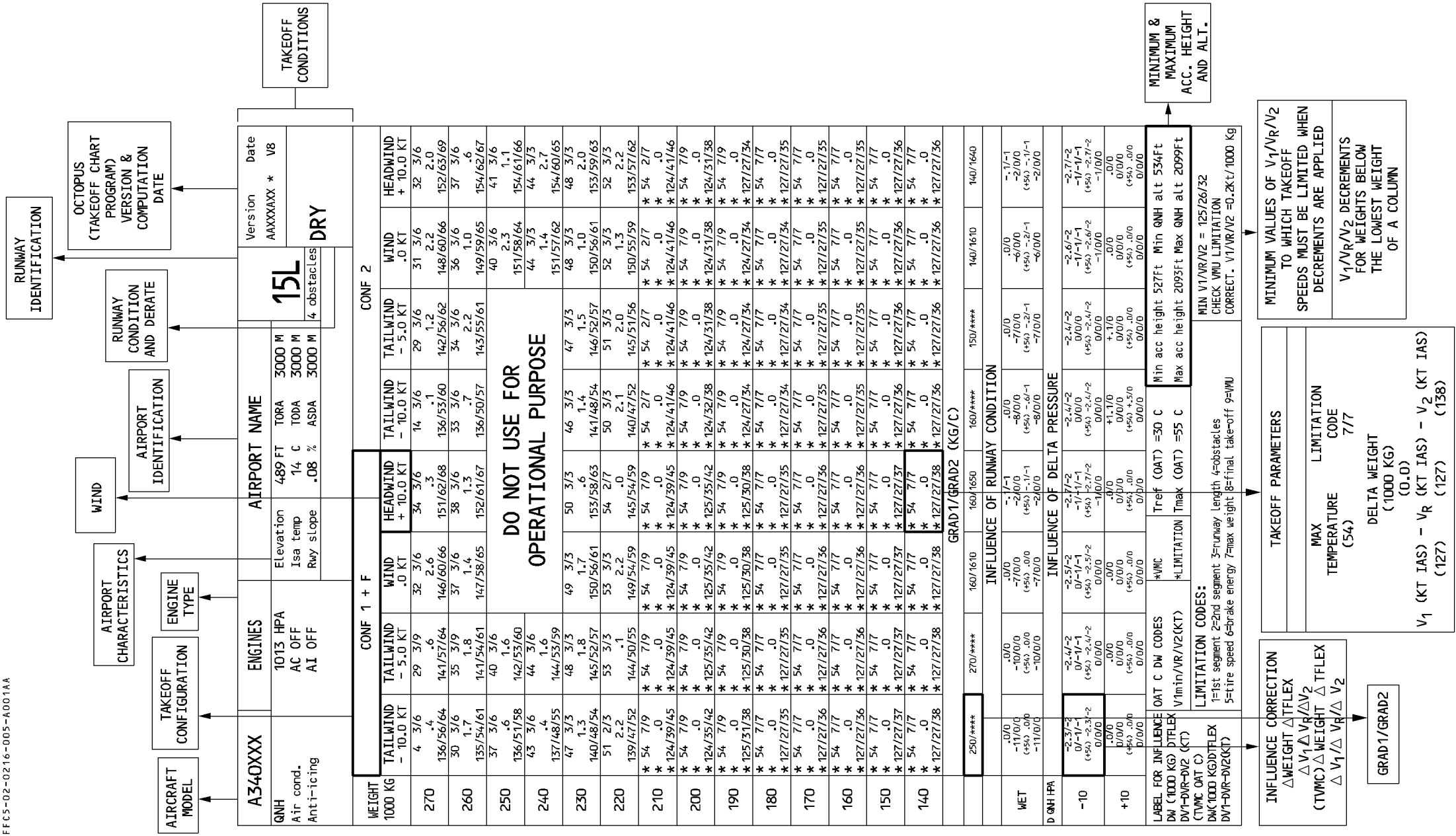
When the specified procedure requires a turn, except if otherwise stated on the RTOW chart, the turn should be performed with a maximum bank of 15° until the aircraft reaches 1500 feet or green dot.

The acceleration height (or altitude) ensures that the net flight path clears the highest obstacle by at least 35 feet when the aircraft is accelerating in level flight to green dot speed after an engine failure, in the most adverse conditions.

TAKEOFF ON A WET RUNWAY

Takeoff charts computed for wet runway with a 15 feet screen height and/or use of reverse thrust may produce, in some conditions, a maximum takeoff weight (or flexible temperature) higher than that obtained for a dry runway. It is thus mandatory to compare both charts (dry and wet) and retain the lower of the two weights (or flexible temperature) and the associated speeds determined for a wet runway.

Note : *The crew need not compare the charts if the top of the WET runway chart specifies "DRY CHECK". (The comparison has already been inserted in the WET runway calculation).*





A340

FLIGHT CREW OPERATING MANUAL

TAKEOFF

2.02.16

P 6

GENERAL (WEIGHT ENTRY)

SEQ 001

REV 15

A340XXX		ENGINES		AIRPORT NAME						15L	Version Date AAXXXXXX	
QNH		1013.00 HPA		Elevation	0	FT	TORA	4000	M			
Air cond.		AC OFF		Isa temp	15	C	TODA	4000	M			
Anti-icing		AI OFF		rwly slope	.00	%	ASDA	4000	M	0 obstacles	DRY	
All reversers operating												
No reversers on dry runway												
WEIGHT 1000 KG	CONF 1 + F				CONF 2							
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT				
270	4 3/6	29 3/9	32 3/6	34 3/6	14 3/6	29 3/6	31 3/6	32 3/6				
	.4	.6	2.6	.3	.1	1.2	2.2	2.0				
260	136/56/64	141/57/64	146/60/66	151/62/68	136/53/60	142/56/62	148/60/66	152/63/69				
	30 3/6	35 3/9	37 3/6	38 3/6	33 3/6	34 3/6	36 3/6	37 3/6				
250	1.7	1.8	1.4	1.3	.7	2.2	1.0	.6				
	135/54/61	141/54/61	147/58/65	152/61/67	136/50/57	143/55/61	149/59/65	154/62/67				
240	37 3/6	40 3/6	41 3/6	42 3/6	38 2/3	39 3/6	40 3/6	41 3/6				
	.6	1.6	2.3	1.7	.2	1.5	2.3	1.1				
230	136/51/58	142/53/60	149/58/64	153/61/66	137/49/56	144/54/60	151/58/64	154/61/66				
	43 3/6	44 3/6	45 3/6	46 3/3	42 2/3	43 3/6	44 3/3	44 3/3				
220	.4	1.6	1.7	.7	1.2	1.9	1.4	2.7				
	137/48/55	144/53/59	150/57/62	153/59/64	139/49/55	146/53/59	151/57/62	154/60/65				
210	47 3/3	48 3/3	49 3/3	50 3/3	46 3/3	47 3/3	48 3/3	48 3/3				
	1.3	1.8	1.7	.6	1.4	1.5	1.0	2.0				
200	140/48/54	145/52/57	150/56/61	153/58/63	141/48/54	146/52/57	150/56/61	153/59/63				
	51 2/3	53 3/3	53 3/3	54 2/7	50 3/3	51 3/3	52 3/3	52 3/3				
190	2.2	.1	2.2	.0	2.1	2.0	1.3	2.2				
	139/47/52	144/50/55	149/54/59	145/54/59	140/47/52	145/51/56	150/55/59	153/57/62				
180	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 2/7	* 54 2/7	* 54 2/7	* 54 2/7				
	.0	.0	.0	.0	.0	.0	.0	.0				
170	* 124/39/45	* 124/39/45	* 124/39/45	* 124/39/45	* 124/41/46	* 124/41/46	* 124/41/46	* 124/41/46				
	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9				
160	.0	.0	.0	.0	.0	.0	.0	.0				
	* 124/35/42	* 125/35/42	* 125/35/42	* 125/35/42	* 124/32/38	* 124/31/38	* 124/31/38	* 124/31/38				
150	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9	* 54 7/9				
	.0	.0	.0	.0	.0	.0	.0	.0				
140	* 125/31/38	* 125/30/38	* 125/30/38	* 125/30/38	* 124/27/34	* 124/27/34	* 124/27/34	* 127/27/34				
	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7				
130	.0	.0	.0	.0	.0	.0	.0	.0				
	* 127/27/35	* 127/27/35	* 127/27/35	* 127/27/35	* 127/27/34	* 127/27/34	* 127/27/34	* 127/27/35				
120	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7				
	.0	.0	.0	.0	.0	.0	.0	.0				
110	* 127/27/36	* 127/27/36	* 127/27/36	* 127/27/36	* 127/27/35	* 127/27/35	* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7				
100	.0	.0	.0	.0	.0	.0	.0	.0				
	* 127/27/36	* 127/27/36	* 127/27/36	* 127/27/36	* 127/27/35	* 127/27/35	* 127/27/35	* 127/27/35				
90	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7				
	.0	.0	.0	.0	.0	.0	.0	.0				
80	* 127/27/37	* 127/27/37	DO NOT USE FOR OPERATIONAL PURPOSE				* 54 7/7	* 54 7/7				
	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
70	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/36	* 127/27/36				
60	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
50	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
40	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
30	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
20	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
10	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
0	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
-10	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
-20	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
-30	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
-40	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
-50	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
-60	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
-70	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
-80	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
-90	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
-100	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
-110	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
-120	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
-130	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
	* 54 7/7	* 54 7/7					* 127/27/35	* 127/27/35				
-140	.0	.0					.0	.0				
	* 127/27/38	* 127/27/38					* 127/27/35	* 127/27/35				
-150	* 54 7/7	* 54 7/7					* 54 7/7	* 54 7/7				
	.0	.0					.0	.0				
-160	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-170	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-180	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-190	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-200	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-210	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-220	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-230	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-240	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-250	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-260	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-270	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-280	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-290	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-300	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-310	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-320	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-330	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-340	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-350	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-360	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-370	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-380	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-390	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-400	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-410	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-420	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-430	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-440	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-450	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-460	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-470	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-480	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-490	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-500	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-510	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-520	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-530	.0	.0	.0	.0								
	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
-540	* 54 7/7	* 54 7/7	* 54 7/7	* 54 7/7								
	.0	.0	.0	.0								
-550	* 127/27/38	* 127/27/38	* 127/27/35	* 127/27/35								
	* 54 7/7	* 54 7/7	* 127/27/35	* 127/27/35								
-560	.0											

AEROLINEAS ARGENTINAS FLIGHT CREW OPERATING MANUAL A340	TAKEOFF GENERAL (WEIGHT ENTRY)	2.02.16	P 7
		SEQ 001	REV 15

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DETERMINATION OF MAXIMUM TAKEOFF WEIGHT AND SPEEDS

GENERAL

The takeoff chart is computed for a given runway under a set of conditions, which are :

- OAT
- Wind
- Configuration
- QNH, air conditioning, anti ice...

Two configurations are produced on the chart. This enables the crew to select that giving the highest permissible takeoff weight. In case of equivalent performance, retain the configuration giving the lower takeoff speeds.

MTOW DETERMINATION

Enter the chart with the first configuration and actual wind column reading the temperature value. This temperature value stands for the OAT. Read the maximum takeoff weight corresponding to the actual OAT. Note that it is allowed to interpolate between two consecutive lines to obtain the maximum takeoff weight.

It is reminded that the takeoff weight is the sum of the weight entry and the delta weight. Similarly determine the takeoff speeds associated with the maximum takeoff weight.

In some cases, it may happen that the first temperature value (displayed for the highest weight entry) is higher than OAT. In this case, it is allowed to extrapolate the weight value to avoid unnecessary penalty. Use the Grad 1/Grad 2 gradients provided at the bottom of the corresponding column.

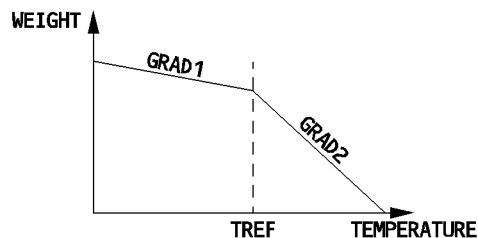
Correction to weight

Grad 1/Grad 2 are gradients provided for both sides of the flat rating temperature (TREF).

Grad 1 applies to temperatures below TREF and Grad 2 applies above TREF.

Read the lowest temperature of the column (corresponding to the highest weight entry).

FFC5-02-0218-001-A001AA



- If the lowest temperature and OAT are above TREF.

Obtain weight increment by multiplying Grad 2 by the difference in temperature between OAT and lowest temperature. Add this weight increment to the maximum takeoff weight calculated for the lowest temperature.

 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.18	P 2
	MTOW CALCULATION (WEIGHT ENTRY)		SEQ. 001	REV 15

- If the lowest temperature and OAT are below TREF.
Obtain weight increment by multiplying Grad 1 by the difference in temperature between OAT and lowest temperature. Add this weight increment to the maximum takeoff weight calculated for the lowest temperature.
- If OAT is below TREF and lowest temperature is above TREF.
The weight increment is calculated in two steps. Step one is multiplying Grad 2 by temperature difference between lowest temperature and TREF. Step two is multiplying Grad 1 by temperature difference between TREF and OAT. Add results from step one and two to maximum takeoff weight calculated for lowest temperature.

Note : Use the weight gradients only to extrapolate above the maximum weight shown in the RTOW chart. They are not valid for interpolation between two boxes, between filled boxes or between one filled and one blank box.

- Repeat the above process for the other available configuration and retain the configuration giving the highest takeoff weight.

CORRECTIONS DUE TO DIFFERENT TAKEOFF CONDITIONS

Retain the maximum takeoff weight, associated configuration and speeds from above.
For conditions different from those of the chart, apply relevant corrections.

CONSERVATIVE CORRECTIONS FOR QNH AND BLEEDS FROM FCOM 2.02.24 p 1

Corrections are given for QNH $\neq$ 1013 hPa, air conditioning ON, anti ice ON.

1. For the given wind and temperature conditions, determine the maximum takeoff weight (choose the configuration giving the highest weight).
2. Apply the published weight correction(s) to the maximum takeoff weight (for each correction) to determine the maximum permissible takeoff weight.
3. Read the speeds associated with the maximum permissible takeoff weight by entering the chart with the retained configuration and weight value.

Example A

DATA : OAT = 25°C
Head Wind = 10 kt
Air conditioning ON
QNH = 1013 hPa

- R Use the chart from 2.02.16 p 6.
Enter the 10 kt head wind column, CONF 1+F, to read for 25°C
The lowest temperature of the column is 34°C, use Grad 1/Grad 2 to extrapolate the maximum takeoff weight.
Max TO weight (1000 kg) air conditioning OFF = $270.3 + 1.65 \times 4 + 0.160 \times 5 = 277.7$
Enter the 10 kt head wind column, CONF 2, to read for 25°C
The lowest temperature of the column is 32°C, use Grad 1/Grad 2 to extrapolate the maximum takeoff weight.

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF MTOW CALCULATION (WEIGHT ENTRY)	2.02.18	P 3
		SEQ 001	REV 15

Max TO weight (1000 kg) air conditioning OFF = $272.0 + 1.64 \times 2 + 0.140 \times 5 = 276.0$
 Retain CONF 1 + F as takeoff configuration.
 Maximum TO weight (1000 kg) air conditioning OFF 277.7
 Air conditioning correction (FCOM 2.02.24 p1) 17.5
 Maximum permissible TO weight (1000 kg) air conditioning ON 260.2
 Read takeoff speeds for 260.2 (1000 kg) in the 10 kt head wind column (CONF1+F)
 V1 = 152 kt, VR = 161 kt, V2 = 167 kt

CORRECTIONS FOR WET OR CONTAMINATED RUNWAYS FROM FCOM 2.04.10

(Refer to FCOM 2.04.10)

R CORRECTIONS PRODUCED ON THE RTOW CHART (SEE EXAMPLE ON 2.02.16 P6)

A description of this correction is given on 2.02.16 P3. The list of corrections is not exhaustive, however the most commonly used corrections are wet runway, QNH, air conditioning and/or anti ice. A maximum of three corrections can be produced on one chart.

To apply the corrections, proceed as follows :

1. Determine the maximum takeoff weight before correction for the given OAT and wind condition.
2. Apply the first correction :
 If OAT is less than or equal to TVMC (line 3), apply ΔW correction from line 1 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 2.
 Else, (for OAT greater than TVMC), apply ΔW correction from line 3 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 4.
3. To combine a second (and third, as applicable) correction :
 If OAT is less than or equal to TVMC (line 3), apply ΔW correction from line 1 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 2.
 Check that the resulting speeds are higher than the minimum speeds displayed on the RTOW chart and that V2 is higher than the VMU limited speed (FCOM 2.02.25).
 If OAT is higher than TVMC (line3) or if the above speed check is not fulfilled, apply ΔW correction from line 3 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 4. No speed check is required.

Note : — QNH correction is given for ± 10 hPa. It is allowed to extrapolate linearly for greater QNH deviation.

- When using a takeoff chart with failure cases, it is not allowed to combine two failure cases.
- Corrections from the chart must be applied from top to bottom, i.e. in the RTOW on 2.02.16 p6, apply the wet correction first.
- If asterisk or dotted lines appear in the correction boxes, refer to more conservative corrections provided in the FCOM.
- No speed check is required for the first correction. However, if the first influence correction follows a conservative FCOM correction, a speed check is required.

Example B

DATA : OAT = 35°C
Head wind = 10 kt
QNH = 998 hPa
WET runway

- R Use the chart from 2.02.16 p6.
- Enter the 10 kt head wind column, CONF 1+F, to read for 35°C
max TO weight (1000 kg) 268.1
 - Enter the 10 kt head wind column, CONF 2, to read for 35°C
max TO weight (1000 kg) 265.2
 - Retain CONF 1+F for takeoff.
 - Read associated speeds as V1 = 151 kt, VR = 162 kt, V2 = 168 kt
 - Apply WET correction
For OAT < TVMC (54°), ΔW = – 0.1
Intermediate weight (1000 kg) 268.0
Associated speeds,
V1 = 151 kt – 2 = 149 kt
VR = 162 kt – 0 = 162 kt
V2 = 168 kt – 0 = 168 kt
(No speed check required for first correction)
 - Apply QNH correction
For OAT < TVMC (54°), ΔW = – 2.7 × 15/10 = – 4.1
Maximum permissible takeoff weight (1000 kg) 263.9
Associated speeds,
V1 = 149 kt – 1 × 15/10 = 147 kt
VR = 162 kt – 1 × 15/10 = 161 kt
V2 = 168 kt – 1 × 15/10 = 167 kt
 - Check that the speeds are higher than minimum speeds from the chart and from VMU table.

	Takeoff Configuration : 1 + F			
	TOW	V1	VR	V2
TOW (RTOW)	268.1	151	162	168
FCOM correction(s)				
Intermediate value	268.1	151	162	168
WET Correction	– 0.1	– 2	0	0
Intermediate value	268.0	149	162	168
QNH Correction	– 4.1	– 2	– 1	– 1
Final value	263.9	147	161	167

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF MTOW CALCULATION (WEIGHT ENTRY)	2.02.18	P 5
		SEQ 001	REV 15

COMBINING CORRECTIONS FROM FCOM AND CHART

Proceed as follows :

1. Determine the maximum takeoff weight by entering the chart with selected configuration, OAT and wind.
2. Apply corrections from FCOM to determine an intermediate weight. Interpolate associated speeds for intermediate weight in the same column (same wind and configuration).
3. Apply corrections from RTOW chart as explained above.

Example C

DATA : OAT = 25°C
 Head wind = 10 kt
 Air conditioning ON
 QNH = 998 hPa
 WET runway

- R 1. Use the chart from 2.02.16 p 6.
 Enter the 10 kt head wind column, CONF 1+F, to read for 25°C
 Max TO weight (1000 kg) air conditioning OFF = $270.3 + 1.65 \times 4 + 0.16 \times 5 = 277.7$
 Enter the 10 kt head wind column CONF 2, to read for 25°C
 Max TO weight (1000 kg) air conditioning OFF = $272.0 + 1.64 \times 2 + 0.14 \times 5 = 276.0$
 Retain CONF 1+F for takeoff configuration.
2. First, apply the correction from FCOM page 2.02.24 p 1.
 Max TO weight (1000 kg) air conditioning OFF 277.7
 Air conditioning correction - 17.5
 Intermediate weight 260.2
 Interpolate takeoff speeds for 260.2 (1000 kg) in the 10 kt head wind column,
 V1 = 152 kt, VR = 161 kt, V2 = 167 kt
3. Apply WET correction
 For OAT < TVMC (54°), $\Delta W =$ - 0.1
 Intermediate weight 260.1
 Associated speeds,
 V1 = 152 kt - 2 = 150 kt
 VR = 161 kt - 0 = 161 kt
 V2 = 167 kt - 0 = 167 kt
 Check that the speeds are higher than minimum speeds from the chart and from VMU table.
 Apply QNH correction
 For OAT < TVMC (54°), $\Delta W = -2.7 \times 15/10 =$ - 4.1
 Maximum permissible takeoff weight 256.0
 Associated speed,
 V1 = 150 kt - 1 $\times$ 15/10 = 148 kt
 VR = 161 kt - 1 $\times$ 15/10 = 160 kt
 V2 = 167 kt - 1 $\times$ 15/10 = 166 kt

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.18	P 6
	MTOW CALCULATION (WEIGHT ENTRY)		SEQ 001	REV 12

Check that the speeds are higher than minimum speeds from the chart and from VMU table.
(It is reminded that if the speed checks are not fulfilled, the corrections must be recalculated using those provided on lines 3 and 4).

Since the speed check is fulfilled :

Maximum permissible takeoff weight = 256.0 (1000 kg)

V1 = 148 kt, VR = 160 kt, V2 = 166 kt.

	Takeoff Configuration : 1 + F			
	TOW	V1	VR	V2
TOW (RTOW)	277.7			
FCOM correction(s)	– 17.5			
Intermediate value	260.2	152	161	167
WET Correction	– 0.1	– 2	0	0
Intermediate value	260.1	150	161	167
QNH Correction	– 4.1	– 2	– 1	– 1
Final value	256.0	148	160	166

VMU CHECK

On 2.02.25 are given the V2 limited by VMU/VMCA values per configuration. For each pressure altitude and weight combination, two speed values are given. The first value applies to all temperatures less than or equal to ISA + 15. The second value applies to ISA + 40. For a temperature between ISA + 15 and ISA + 40, interpolate linearly between the two given speeds.

The speeds in the tables are checked for VMCA limitation.

Note : The minimum V2 speed due to VMCA is given on the RTOW chart.

EXTRAPOLATION

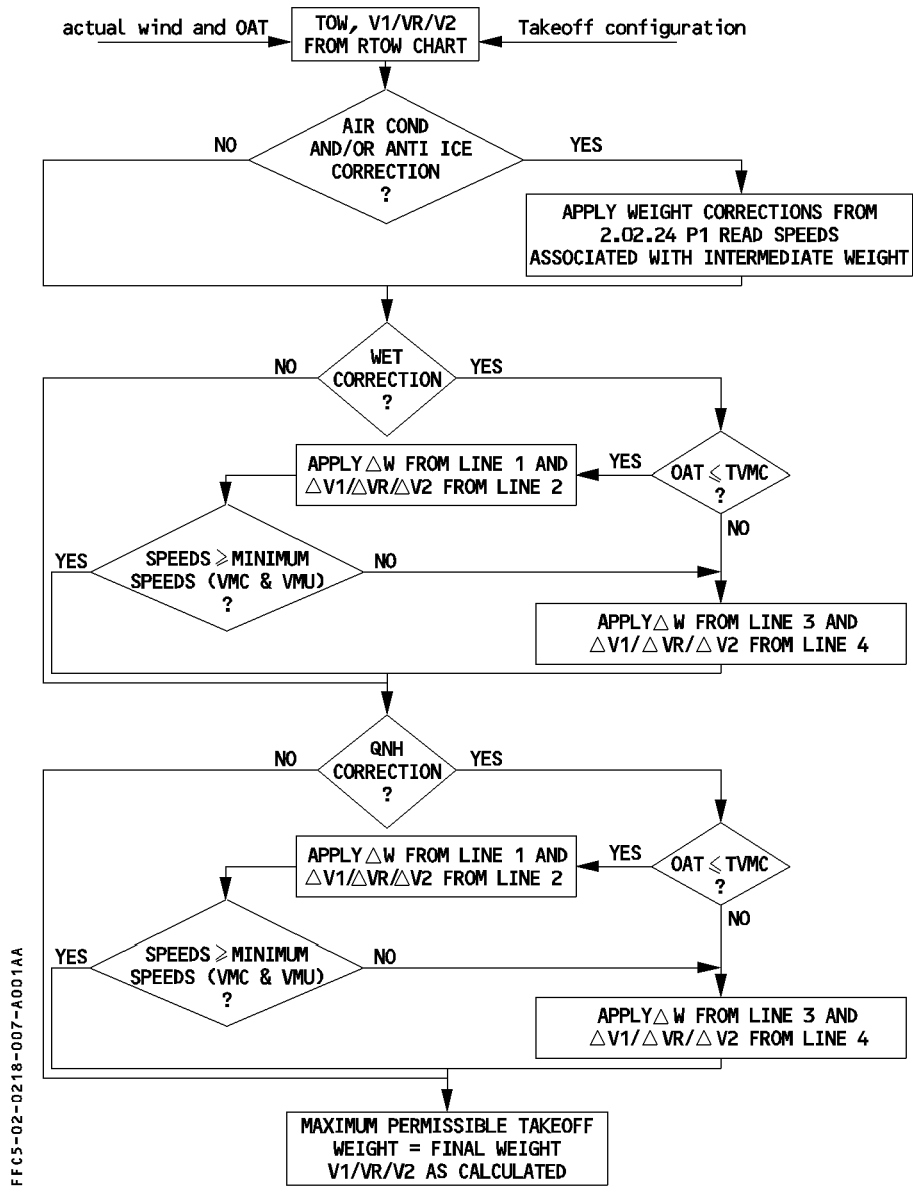
For OAT lower than the lowest temperature value of a wind column, it is possible to obtain a higher maximum permissible takeoff weight by using Grad 1/Grad 2 values. See page 1 for more details.

MAXIMUM STRUCTURAL TAKEOFF WEIGHT

The maximum structural takeoff weight is a weight limitation depending on the aircraft. This limitation is provided in the Flight Manual and in the chapter Limitation of FCOM 3. Compare the maximum structural takeoff weight to the maximum permissible takeoff weight computed for given conditions and retain the lower of the two values.

SUMMARY

The following flow diagram gives the different steps to follow.



DEFINITION OF FLEXIBLE TAKEOFF

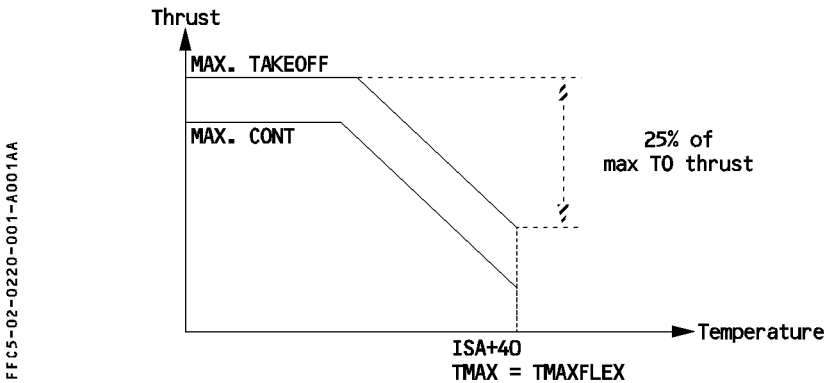
In many cases the aircraft takes off with a weight lower than the maximum permissible takeoff weight. When this happens, it can meet the required performance (runway, second segment, obstacle,...) with a decreased thrust that is adapted to the weight : this is called FLEXIBLE TAKEOFF and the thrust is called FLEXIBLE TAKEOFF THRUST.
The use of flexible takeoff thrust saves engine life.

USE OF FLEXIBLE TAKEOFF

The pilot can use flexible takeoff when the actual takeoff weight is lower than the maximum permissible takeoff weight for the actual temperature. The maximum permissible takeoff weight decreases when temperature increases, so it is possible to assume a temperature at which the actual takeoff weight would be the limiting one. This temperature is called FLEXIBLE TEMPERATURE or assumed temperature and is entered in the FADEC via the MCDU PERF TO page in order to get the adapted thrust.

REQUIREMENTS

- Thrust must not be reduced by more than 25 % of the full rated takeoff thrust.
- The flexible takeoff N1 cannot be lower than the Max Climb N1 at the same flight conditions.
The FADEC takes the above two constraints into account to determine the flexible N1. The above two constraints limit the maximum flexible temperature at ISA + 40 (55° C at sea level).
- The flexible takeoff thrust cannot be lower than the Max Continuous thrust used for the final takeoff flight path computation (at ISA + 40).
- The flexible temperature cannot be lower than the flat rating temperature, TREF (ISA + 15), or the actual temperature (OAT).



FFC5-02-0220-001-A001AA

- Flexible takeoff is not permitted on contaminated runways.
- The operator should check the maximum thrust (TOGA) at regular intervals in order to detect any engine deterioration, or maintain an adequate engine performance monitoring program to follow up the engine parameters.

RECOMMENDATION

- Extension of engine life will be provided by the use of the highest flexible temperature. However a reduction of a few degrees from a high flexible temperature does not cause significant penalty to engines.
- A higher flap setting will provide additional aft body clearance, lower speeds and more comfort.

Using the same takeoff chart, for a given weight it is possible to :

- Select a temperature lower than the maximum determined one and keep the speeds defined at maximum temperature or,
 - Move towards the left side of the takeoff chart (tailwind) while remaining with the same configuration and looking for the same actual takeoff weight.
- This produces a lower flexible temperature and, in general, lower takeoff speeds (V1/VR/V2).

Using one of the two above possibilities, check that the selected temperature is greater than the actual temperature (OAT) and greater than the flat rating temperature (TREF).

TAKEOFF PROCEDURE

Depending on environmental takeoff conditions, the following procedure is recommended.

CONDITIONS	PROCEDURE	REASON
Dry or wet, well paved runway	Use flap setting giving the optimum performance. If takeoff performance is not limiting, consider the use of higher flap setting.	Extend engine life/improve aft body clearance.
High altitude takeoff	– Use CONF2/CONF3	Improve comfort.
Badly paved runway or Accelerate stop distance limited runway	– Use CONF2/CONF3 or – Move towards left side of the takeoff chart.	Improve comfort. Improve stopping distance.
Windshear expected along takeoff path	– Use maximum thrust.	Maintain acceleration capability.
Contaminated runway	– Use maximum thrust. (flex forbidden).	Improve stopping distance Decrease time on runway. Required by regulations.

DETERMINATION OF FLEXIBLE TAKEOFF TEMPERATURE AND SPEEDS

- Before determining the flexible temperature, calculate the maximum permissible takeoff weight (see previous section) and ensure that the actual takeoff weight is lower than the determined maximum takeoff weight.
- For a given configuration and wind value, enter the RTOW chart with the actual takeoff weight to read the flexible temperature and associated speeds.
It is reminded that the takeoff weight is the sum of the weight entry and the delta weight displayed in each box. It is allowed to interpolate between two consecutive rows and/or columns for weight and for wind values not displayed on the chart.
 - Repeat this process for the other configuration available. Select that configuration giving the highest flexible temperature.

CORRECTIONS DUE TO DIFFERENT TAKEOFF CONDITIONS

When the takeoff conditions are different from those provided on the chart, apply the associated corrections.

CONSERVATIVE CORRECTIONS FOR QNH AND BLEEDS FROM FCOM 2.02.24 P1

- Corrections are given for QNH $\neq$ 1013 hPa, air conditioning ON, anti ice ON.
- For a given takeoff weight, wind condition and selected configuration, read the flexible temperature. Retain the takeoff speeds associated with the actual weight.
 - Apply the published temperature correction. To combine two or more corrections, add the different corrections and apply to temperature value.
(No speed corrections required).

Example D

DATA : Actual takeoff weight = 210 000 kg
Head wind = 10 kt
Air conditioning ON
QNH = 1013 hPa

- R Use the chart from 2.02.16 p6. Determine the maximum permissible takeoff weight (see example A). The actual weight being lower than the maximum one, flexible takeoff is possible.
- Enter the 10 kt head wind column and interpolate for 210 000 kg, CONF 1+F,
Flexible temperature 54° C
Enter the 10 kt head wind column and interpolate for 210 000 kg, CONF 2,
Flexible temperature 54° C

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.20	P 4
	FLEXIBLE TAKEOFF (WEIGHT ENTRY)		SEQ 050	REV 15

Equivalent performance is obtained from the two different configurations.
 Retain CONF 2 as it improves aft body clearance.
 Takeoff speeds are V1 = 124 kt, VR = 141 kt, V2 = 146 kt
 Flexible temperature with air conditioning OFF 54° C
 Air conditioning correction (FCOM 2.02.24 p1) – 9° C
 Maximum flexible temperature 45° C

CORRECTIONS FOR WET RUNWAY FROM FCOM 2.04.10

(Refer to FCOM 2.04.10)

R CORRECTIONS PRODUCED ON THE RTOW CHART (SEE EXAMPLE ON 2.02.16 P6)

A description of this correction is given on 2.02.16 P3. The list of corrections is not exhaustive, however the most commonly used corrections are wet runway, QNH, air conditioning and/or anti ice. A maximum of three corrections can be produced on one chart.

To apply the correction, proceed as follows :

1. Enter the chart with selected configuration, wind and actual takeoff weight to read the flexible temperature associated with this weight.

2. Apply the first correction :

If the flexible temperature is less than or equal to TVMC (line 3), apply ΔT_{flex} correction from line 1 and apply speed corrections ($\Delta V1/\Delta VR/\Delta V2$) from line 2.

Else, (flexible temperature greater than TVMC), apply ΔT_{flex} from line 3 and $\Delta V1/\Delta VR/\Delta V2$ corrections from line 4.

R Check V2 against VMU limitation (FCOM 2.02.25). If V2 is lower than V2 limited by VMU,
 R flex takeoff is not possible. Set TOGA thrust and retain the speeds associated with
 R maximum permissible takeoff weight or the speeds read in the chart for the actual
 R weight if they are all lower.

No speed correction is required for QNH and bleeds influence (Not applicable to maximum takeoff weight determination).

3. To combine a second and/or a third correction, proceed as per point 2.

4. Check that the final flexible temperature is :

– higher than OAT and TREF

– limited to TMAXFLEX

If the check is fulfilled, retain final flexible temperature as the one to be inserted in the MCDU.

If the check is not fulfilled, (final flexible temperature lower than OAT or TREF), no flexible takeoff is possible.

Use TOGA thrust and retain speeds that have been calculated for the maximum permissible takeoff weight. (See 2.02.20 p7)

Note : – QNH correction is given for ± 10 hPa. It is allowed to extrapolate linearly for greater QNH deviation.

– Corrections from the chart must be applied from top to bottom, i.e. in the RTOW on 2.02.16 p6, apply the wet influence first.

R

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF FLEXIBLE TAKEOFF (WEIGHT ENTRY)	2.02.20	P 5
		SEQ 001	REV 15

Note : – When the flexible temperature is higher than TVMC, it is allowed to limit the flexible temperature to TVMC and apply only corrections from lines 1 and 2.
– If asterisk or dotted lines appear in the correction boxes, refer to more conservative corrections provided in the FCOM.

Example E

DATA : Actual takeoff weight = 220 000 kg

Head wind = 10 kt

QNH = 1028 hPa

WET runway

Air conditioning OFF

- R Use the chart from 2.02.16 p6. Determine the maximum permissible takeoff weight (see example B). The actual weight being lower than the maximum one, flexible takeoff is possible.

Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 1+F,

Flexible temperature 54° C

Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 2,

Flexible temperature 52° C

- R Retain CONF 1+F.

- R Takeoff speeds are V1 = 145 kt, VR = 154 kt, V2 = 159 kt

Apply WET correction

For flexible temperature ≤ TVMC (54°), ΔT_{flex} = – 1° C

- R Intermediate flex temperature 53° C

Associated speeds,

- R V1 = 145 kt – 2 = 143 kt

- R VR = 154 kt – 0 = 154 kt

- R V2 = 159 kt – 0 = 159 kt

- R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.

Apply QNH correction

For flex temperature ≤ TVMC (54°), ΔT_{flex} = + 0° C

- R Maximum flexible temperature 53° C

Check that OAT/TREF < flex temperature ≤ TMAXFLEX

No speed correction.

Takeoff speeds are V1 = 143 kt, VR = 154 kt, V2 = 159 kt

- R

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	54	145	154	159
FCOM correction(s)				
Intermediate value	54	145	154	159
WET Correction	– 1	– 2	0	0
Intermediate value	53	143	154	159
QNH Correction	0	0	0	0
Final value	53	143	154	159

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.20	P 6
	FLEXIBLE TAKEOFF (WEIGHT ENTRY)		SEQ 050	REV 15

COMBINING CORRECTIONS FROM FCOM AND CHART

1. Apply corrections from FCOM (see 2.02.24 p1).
2. Apply corrections from the RTOW chart.
Apply speed corrections except for QNH and bleed influences.

Example F

DATA : Actual takeoff weight = 220 000 kg
 Head wind = 10 kt
 Air conditioning ON
 QNH = 1028 hPa
 WET runway

- R Use the chart from 2.02.16 p6. Determine the maximum permissible takeoff weight (see example C). The actual weight being lower than the maximum one, flexible takeoff is possible.
- Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 1+F,
Flexible temperature 54° C
 - Enter the 10 kt head wind column and interpolate for 220 000 kg, CONF 2,
Flexible temperature 52° C
- R • Retain CONF 1+F.
- R Takeoff speeds are V1 = 145 kt, VR = 154 kt, V2 = 159 kt
- First, apply the correction from FCOM page 2.02.24 p1.
- R Flexible temperature with air conditioning OFF 54° C
 Air conditioning correction – 9° C
- R Intermediate flexible temperature 45° C
 No speed correction.
- Apply WET correction
For flexible temperature < TVMC (54°), ΔT_{flex} = – 1° C
- R Intermediate flex temperature 44° C
 Associated speeds,
- R V1 = 145 kt – 2 = 143 kt
 R VR = 154 kt – 0 = 154 kt
 R V2 = 159 kt – 0 = 159 kt
- R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.
- Apply QNH correction
For flexible temperature < TVMC (54°), ΔT_{flex} = + 0° C
- R Maximum flexible temperature 44° C
 Check that OAT/TREF < flex temperature ≤ TMAXFLEX
 No speed correction.
- R Takeoff speeds are V1 = 143 kt, VR = 154 kt, V2 = 159 kt

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF FLEXIBLE TAKEOFF (WEIGHT ENTRY)	2.02.20	P 7
		SEQ 050	REV 21

R

	Takeoff Configuration : 1+F			
	Tflex	V1	VR	V2
Chart temperature	54	145	154	159
FCOM correction(s)	– 9	0	0	0
Intermediate value	45	145	154	159
WET Correction	– 1	– 2	0	0
Intermediate value	44	143	154	159
QNH Correction	0	0	0	0
Final value	44	143	154	159

FLEXIBLE TAKEOFF NOT POSSIBLE

In some cases when the actual takeoff weight is lower than the maximum permissible one but no flexible takeoff possible (that is flexible temperature lower than TREF or OAT) :

- It is mandatory to use TOGA thrust
- You can retain the speeds that have been calculated for the maximum permissible takeoff weight;

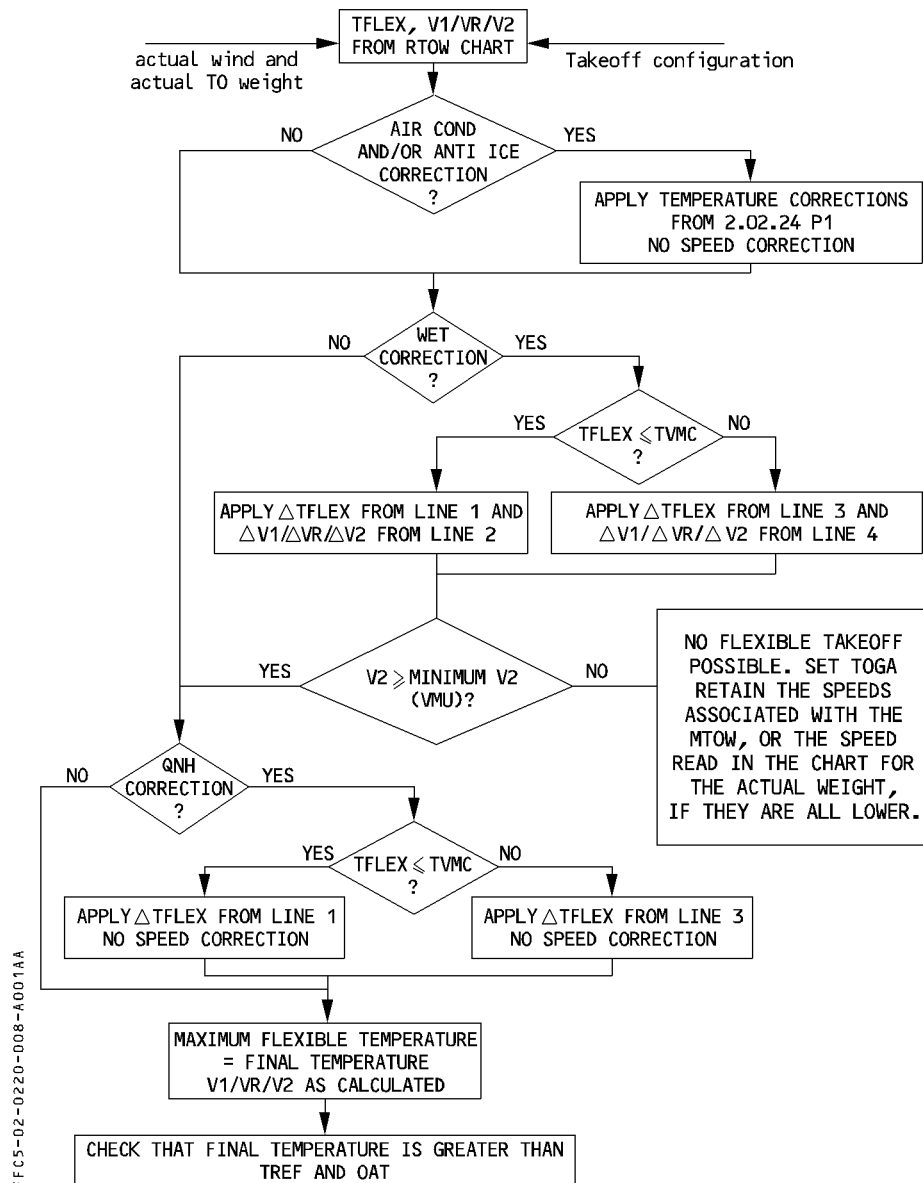
R OR

- R – You can retain the speeds associated with the actual takeoff weight provided they are
- R all lower than the speeds calculated for the maximum permissible takeoff weight.

SUMMARY

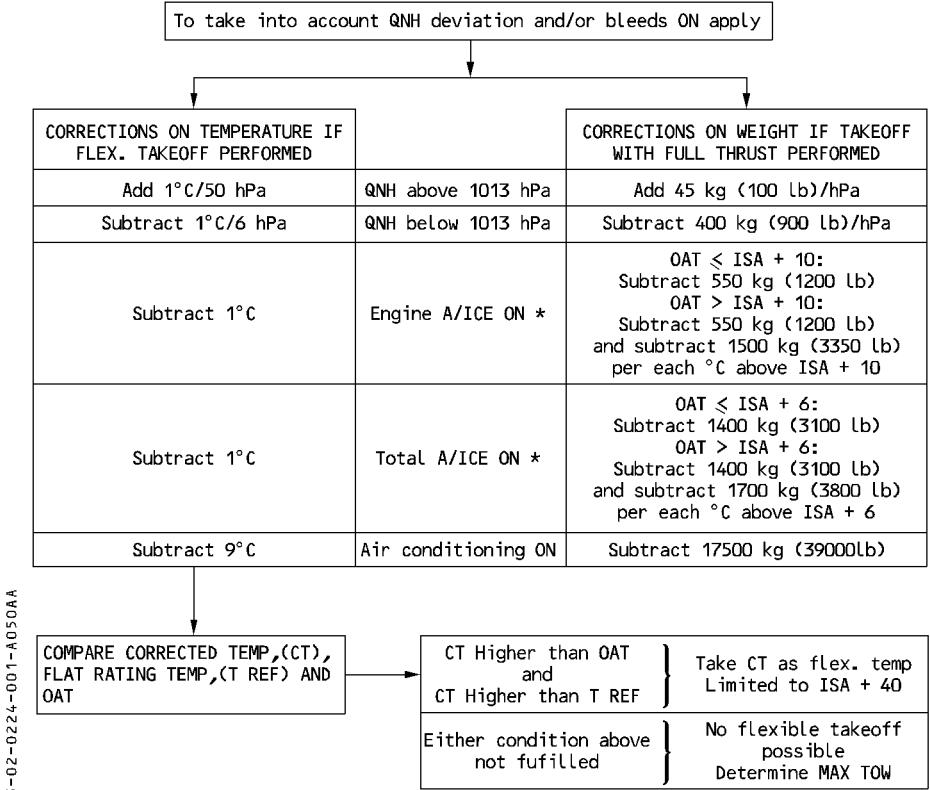
The flow diagram gives the different steps to follow.

R



EFFECT OF QNH AND BLEEDS

R



FFCS-02-0224-001-A050AA

* Note : Corrections valid only for OAT < 10°C

Example :
Airfield elevation = 450 ft
QNH = 1040 hPa
Correction = 45 kg (100 lb) x (450/28) = 723 kg (1600 lb)

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.25	P 1
	MINIMUM SPEEDS		SEQ 150	REV 12

SPEEDS LIMITED BY VMC

Takeoff speeds all have a minimum value limited by control. These minimum control speeds are usually provided on each RTOW chart. If these are not available, use the following conservative values.

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	V1 min = VR min
CONF 1 + F and CONF 2	129	128	127	125	124	122	120	119	114	107	
CONF 3	130	129	128	126	125	123	121	120	114	108	

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	V2 min
CONF 1 + F and CONF 2	136	135	134	132	130	128	127	125	118	109	
CONF 3	137	136	134	132	131	129	127	126	119	110	

V2 LIMITED BY VMU/VMCA

The following tables, one per configuration, provide the V2 limited by minimum unstick speed.

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)														
CONFIGURATION 1+F							MINIMUM V2 AT OAT ≤ ISA + 15 MINIMUM V2 AT OAT = ISA + 40							
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)													
	130	140	150	160	170	180	190	200	210	220	230	240	250	260
-2000	136	136	136	136	136	136	137	140	143	146	149	152	155	158
	136	136	136	136	136	136	136	139	143	146	149	152	155	158
0	135	135	135	135	135	135	137	140	143	146	149	152	155	157
	135	135	135	135	135	135	136	139	143	146	149	152	155	157
1000	134	134	134	134	134	134	137	140	143	146	149	152	155	157
	134	134	134	134	134	134	136	139	143	146	149	152	155	157
2000	132	132	132	132	132	133	137	140	143	146	149	152	155	157
	132	132	132	132	132	132	136	139	143	146	149	152	155	157
3000	130	130	130	130	130	133	136	140	143	146	149	152	155	158
	130	130	130	130	130	132	136	139	143	146	149	152	155	158
4000	129	129	129	129	130	133	136	140	143	146	149	153	156	158
	129	129	129	129	129	132	136	139	143	146	149	153	156	158
5000	127	127	127	127	129	133	136	139	143	146	150	153	156	158
	127	127	127	127	128	132	136	139	143	146	150	153	156	158
6000	125	125	125	126	129	133	136	139	143	146	150	153	156	158
	125	125	125	125	128	132	136	139	143	146	150	153	156	158
7000	123	123	123	126	129	133	136	139	143	147	150	153	156	158
	123	123	123	125	128	132	136	139	143	147	150	153	156	158
8000	122	122	122	125	129	132	136	140	143	147	150	153	156	159
	122	122	122	125	128	132	136	140	143	147	150	153	156	159
9000	120	120	122	125	129	132	136	140	143	147	150	154	157	159
	120	120	121	125	128	132	136	140	143	147	150	154	157	159
10000	118	118	122	125	129	132	136	140	144	147	151	154	157	159
	118	118	121	125	129	132	136	140	144	147	151	154	157	159
11000	116	118	121	125	129	132	136	140	144	147	151	154	157	159
	116	117	121	125	129	132	136	140	144	147	151	154	157	159
12000	114	117	121	125	129	133	137	140	144	148	151	154	157	160
	113	117	121	125	129	133	137	140	144	148	151	154	157	160
13000	113	117	121	125	129	133	137	141	144	148	151	155	158	160
	112	117	121	125	129	133	137	141	144	148	151	155	158	160
14000	113	117	121	125	129	133	137	141	145	148	152	155	158	160
	112	117	121	125	129	133	137	141	145	148	152	155	158	160
14600	113	117	121	125	129	133	137	141	145	148	152	155	158	160
	112	117	121	125	129	133	137	141	145	148	152	155	158	160

FCOM-F0-02-02-20-012-150

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.25	P 3
	MINIMUM SPEEDS		SEQ 150	REV 12

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)														
CONFIGURATION 2							MINIMUM V2 AT OAT ≤ ISA + 15 MINIMUM V2 AT OAT = ISA + 40							
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)													
	130	140	150	160	170	180	190	200	210	220	230	240	250	260
-2000	136	136	136	136	136	136	136	137	140	143	145	148	151	154
	136	136	136	136	136	136	136	136	139	142	145	148	151	154
0	135	135	135	135	135	135	135	137	140	142	146	148	151	153
	135	135	135	135	135	135	135	135	139	142	146	148	151	153
1000	134	134	134	134	134	134	134	137	139	142	146	148	151	153
	134	134	134	134	134	134	134	135	139	142	146	148	151	153
2000	132	132	132	132	132	132	133	136	139	142	146	148	151	153
	132	132	132	132	132	132	132	136	139	142	146	148	151	153
3000	130	130	130	130	130	130	133	136	139	142	146	148	151	153
	130	130	130	130	130	130	132	136	139	142	146	148	151	153
4000	129	129	129	129	129	130	133	136	139	142	146	148	151	153
	129	129	129	129	129	129	132	136	139	142	146	148	151	153
5000	127	127	127	127	127	130	133	136	139	142	146	149	151	153
	127	127	127	127	127	129	132	136	139	142	146	149	151	153
6000	125	125	125	125	126	130	133	136	139	142	146	149	151	153
	125	125	125	125	125	129	132	136	139	142	146	149	151	153
7000	123	123	123	123	126	129	132	136	139	142	146	149	152	154
	123	123	123	123	125	129	132	136	139	142	146	149	152	154
8000	122	122	122	123	126	129	132	136	139	143	146	149	152	154
	122	122	122	122	125	129	132	136	139	143	146	149	152	154
9000	120	120	120	123	126	129	132	136	139	143	146	149	152	154
	120	120	120	121	125	129	132	136	139	143	146	149	152	154
10000	118	118	119	122	125	129	132	136	139	143	146	149	152	154
	118	118	118	121	125	129	132	136	139	143	146	149	152	154
11000	117	117	119	122	125	129	133	136	139	143	146	149	152	154
	117	117	118	121	125	129	133	136	139	143	146	149	152	154
12000	114	115	118	122	125	129	133	136	140	143	147	149	152	154
	114	114	118	121	125	129	133	136	140	143	147	149	152	154
13000	112	115	118	122	125	129	133	136	140	143	147	150	152	154
	112	114	118	122	125	129	133	136	140	143	147	150	152	154
14000	111	115	118	122	125	129	133	136	140	143	147	150	152	154
	110	114	118	122	125	129	133	136	140	143	147	150	152	154
14600	111	114	118	122	126	129	133	136	140	143	147	150	153	155
	110	114	118	122	126	129	133	136	140	143	147	150	153	155

FCOM-F0-02-02-20-013-150

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)														
CONFIGURATION 3							MINIMUM V2 AT OAT ≤ ISA + 15							
							MINIMUM V2 AT OAT = ISA + 40							
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)													
	130	140	150	160	170	180	190	200	210	220	230	240	250	260
-2000	137	137	137	137	137	137	137	137	139	141	144	147	150	152
	137	137	137	137	137	137	137	137	138	141	144	147	150	152
0	136	136	136	136	136	136	136	136	139	142	145	148	150	152
	136	136	136	136	136	136	136	136	138	142	145	148	150	152
1000	134	134	134	134	134	134	134	136	139	142	145	148	150	152
	134	134	134	134	134	134	134	135	138	142	145	148	150	152
2000	132	132	132	132	132	132	133	136	138	142	145	148	150	152
	132	132	132	132	132	132	132	135	138	142	145	148	150	152
3000	131	131	131	131	131	131	133	135	138	142	145	148	150	152
	131	131	131	131	131	131	132	135	138	142	145	148	150	152
4000	129	129	129	129	129	129	132	135	138	142	145	148	150	152
	129	129	129	129	129	129	132	135	138	142	145	148	150	152
5000	127	127	127	127	127	129	132	135	139	142	145	148	150	152
	127	127	127	127	127	128	132	135	139	142	145	148	150	152
6000	126	126	126	126	126	129	132	135	139	142	145	148	151	152
	126	126	126	126	126	128	132	135	139	142	145	148	151	152
7000	124	124	124	124	126	129	132	135	139	142	145	148	151	153
	124	124	124	124	125	128	132	135	139	142	145	148	151	153
8000	122	122	122	122	125	128	132	135	139	142	145	148	151	153
	122	122	122	122	125	128	132	135	139	142	145	148	151	153
9000	121	121	121	122	125	128	132	135	139	142	145	148	151	153
	121	121	121	121	125	128	132	135	139	142	145	148	151	153
10000	119	119	119	122	125	128	132	135	139	142	145	148	151	153
	119	119	119	121	125	128	132	135	139	142	145	148	151	153
11000	117	117	118	121	125	128	132	135	139	142	145	148	151	153
	117	117	117	121	125	128	132	135	139	142	145	148	151	153
12000	114	114	118	121	125	128	132	136	139	142	145	148	151	153
	114	114	117	121	125	128	132	136	139	142	145	148	151	153
13000	112	114	117	121	125	129	132	136	139	142	145	148	151	153
	112	113	117	121	125	129	132	136	139	142	145	148	151	153
14000	111	114	117	121	125	129	132	136	139	142	146	148	151	153
	111	113	117	121	125	129	132	136	139	142	146	148	151	153
14600	110	114	117	121	125	129	132	136	139	142	146	148	151	153
	110	113	117	121	125	129	132	136	139	142	146	148	151	153

FCOM-F0-02-02-20-014-150

DEFINITION OF DERATED TAKEOFF

A derated takeoff is defined as a takeoff at a thrust setting less than the maximum takeoff thrust, where the AFM provides a set of takeoff limitations and performance data corresponding to a derated thrust setting which complies with all the takeoff requirements of JAR 25.

The N1 values corresponding to each derated takeoff thrust setting are given in the AFM and are considered as a normal takeoff limit.

Six derate levels are defined :

D04, D08, D12, D16, D20 and D24, corresponding to 4, 8, 12, 16, 20 and 24 % decrease from the maximum takeoff thrust.

USE OF DERATED TAKEOFF

Derated takeoff may be used when the takeoff weight is limited by VMCG, enabling benefit to be taken from the reduction in VMCG associated with the new rating.

The use of flexible thrust is not permitted when derated thrust is used. Moreover the level of derate is entered on the MCDU PERF TO page in the DRT TO/FLX TO field.

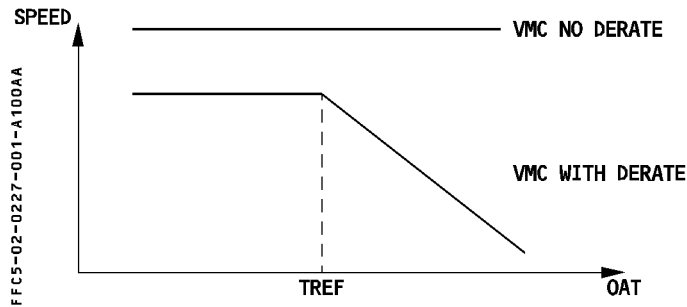
When a derated takeoff is performed, selection of full takeoff thrust by setting thrust levers at TOGA is not permitted below the speeds specified in engine failure procedure (FCOM 3.02.10 page 4)

The use of derated takeoff is allowed on dry, wet and contaminated runway.

TAKEOFF PERFORMANCE IMPROVEMENT BY DERATING THE ENGINES

The minimum control speeds VMCG and VMCA are reduced for two reasons :

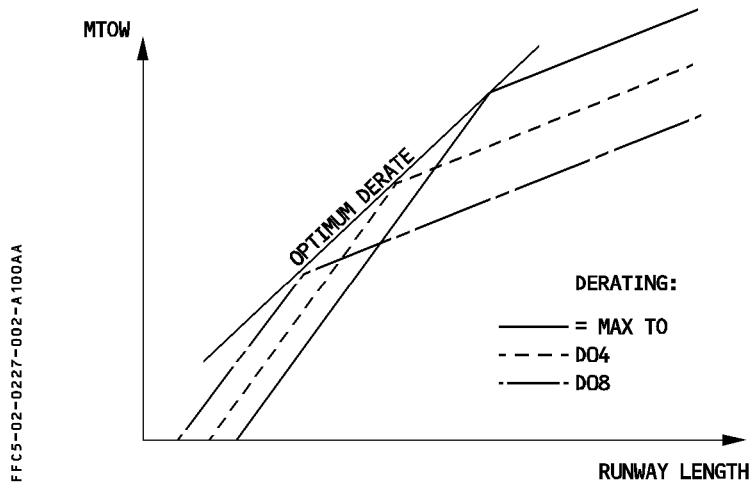
- The derated thrust is lower than the maximum takeoff thrust
- The effect of temperature on VMCG and VMCA is taken into account (which is not the case for takeoff without derate, due to the flexible takeoff concept)



The effect of the derate on the maximum takeoff weight is different depending on whether VMCG or VMCA is limiting. Indeed the effect on maximum takeoff weight is the result of a thrust decrease (downgrading the takeoff performance) and of a VMC decrease (improving the takeoff performance). As VMCG only concerns the accelerate stop distance, the VMCG decrease by far compensates the thrust loss. The VMCG limited weight is then improved by derating.

But as VMCA mainly concerns the airborne phase of the takeoff, the effect of the thrust decrease is more important and not compensated by the effect of a lower VMCA. Therefore derated takeoff would not improve TOW if VMCA limited.

When VMCG limited, an optimum derate can be determined as shown below.



DETERMINATION OF THE MAXIMUM TAKEOFF WEIGHT AND ASSOCIATED SPEEDS

A specific RTOW chart must be computed for each runway on which the derated takeoff is considered. MTOW and associated takeoff speeds will be determined in the RTOW chart.

DETERMINATION OF DERATED TAKEOFF N1

The following pages give the derated takeoff N1 tables for each derate level. For each concerned runway, it is recommended to determine the optimum derate(s) depending on ambient and runway conditions and to issue the corresponding RTOW chart (example below).

- R In the following RTOW chart, at 0°C, using a derate of 4 % will give the best takeoff performance.

 A340	TAKEOFF			2.02.27		P 3	
	DERATED TAKEOFF			SEQ 205		REV 24	

FLIGHT CREW OPERATING MANUAL

A340XXX	ENGINES		AIRPORT NAME					15L	Version	Date			
Wind	0	KT	Elevation	489	FT	TORA	10 000		ft	AAXXXXXX			
QNH	1013.25	HPA	Isa temp	14	C	TODA	10 000		ft				
Air cond.	AC	OFF	rvwy slope	.06	%	ASDA	10 000	ft	0 obstacle	WATER 1/4" CONF 2			
Anti-icing	AI	OFF											
All reversers operating													
OAT C	NO DERATE		D04		D08		D12		D16		D20		
0	* 239.5	3/9	* 244.2	3/9	* 240.1	3/9	* 235.8	3/9	230.8	3/9	225.2	3/9	
	* 128/42/51		* 126/45/52		* 126/44/51		* 126/43/50		126/41/48		125/40/46		
10	* 224.5	3/9	* 231.5	3/9	* 236.2	3/9	* 232.2	3/9	* 227.1	3/9	222.0	3/9	
	* 128/37/46		* 126/40/48		* 125/42/50		* 124/41/48		* 123/40/47		123/39/45		
20	* 209.7	3/9	* 218.5	3/9	* 221.0	3/9	* 223.6	3/9	* 224.0	3/9	* 218.9	3/9	
	* 128/31/42		* 126/35/44		* 125/36/45		* 123/38/46		* 122/39/46		* 122/38/44		
30	* 197.7	3/3	* 208.6	3/9	* 210.9	3/9	* 213.6	3/9	* 217.7	3/9	* 213.9	3/9	
	* 128/29/41		* 127/31/41		* 124/33/41		* 123/34/42		* 121/37/43		* 120/36/42		
32	* 193.4	3/3	* 205.8	3/9	* 210.9	3/9	* 213.7	3/9	* 214.7	3/9	* 209.7	3/9	
	* 128/29/41		* 124/31/40		* 123/33/41		* 121/35/42		* 120/38/43		* 120/35/41		
34	* 188.7	3/3	* 207.4	3/9	* 210.2	3/9	* 214.2	3/9	* 210.4	3/9	* 205.4	3/9	
	* 128/29/40		* 123/31/40		* 122/33/41		* 120/36/42		* 119/35/41		* 119/34/39		
36	* 184.8	3/3	* 206.8	3/9	* 210.0	3/9	* 211.8	3/9	* 206.8	3/9	* 201.9	3/9	
	* 128/29/40		* 122/31/40		* 120/34/41		* 119/35/42		* 119/34/40		* 118/33/38		
38	* 180.6	3/3	* 206.3	3/9	* 209.9	3/9	* 208.3	3/9	* 203.4	3/9	* 198.6	3/9	
	* 128/29/40		* 121/32/40		* 119/34/41		* 118/34/40		* 118/33/39		* 118/32/37		
40	* 176.4	3/3	* 205.8	3/9	* 209.6	3/9	* 204.8	3/9	* 200.1	3/9	* 195.3	3/9	
	* 128/29/40		* 120/32/40		* 118/34/41		* 118/33/39		* 117/32/38		* 117/31/36		
42	* 172.1	3/3	* 207.0	3/9	* 206.1	3/9	* 201.4	3/9	* 196.8	3/9	* 192.0	3/9	
	* 128/29/40		* 119/33/40		* 117/33/40		* 117/32/38		* 117/31/36		* 117/30/35		
44	* 167.6	3/3	DO NOT USE FOR OPERATIONAL PURPOSE									* 188.6	3/9
	* 128/29/39											* 116/29/34	
46	* 163.5	3/3										* 185.4	3/9
	* 128/29/39		* 116/28/32										
48	* 158.9	3/3	* 200.4	3/9	* 195.9	3/9	* 191.5	3/9	* 186.9	3/9	* 182.1	3/9	
	* 128/30/39		* 116/32/38		* 116/30/36		* 116/29/35		* 116/28/33		* 115/27/31		
50	* 154.8	3/3	* 197.1	3/9	* 192.7	3/9	* 188.4	3/9	* 183.7	3/9	* 178.9	3/9	
	* 128/29/38		* 116/31/37		* 115/29/35		* 115/28/34		* 115/27/32		* 114/26/30		
52			* 193.8	3/9	* 189.5	3/9	* 185.2	3/9	* 180.5	3/9	* 175.7	3/9	
			* 115/30/35		* 115/29/34		* 115/27/32		* 115/26/31		* 114/25/29		
54			* 190.7	3/9	* 186.5	3/9	* 182.0	3/9	* 177.3	3/9	* 172.6	3/9	
			* 115/29/34		* 115/28/33		* 114/26/31		* 114/25/30		* 113/24/28		
LABEL FOR INFLUENCE			MTOW(1000 KG) codes		* VMC	Tref (OAT) = 29 C		Min acc height 426 FT		Min QNH alt 915 FT			
DW (1000 KG) DTFLEX			V1min/VR/V2 (kt)		* LIMITATION	Tmax (OAT) = 54 C		Max acc height 2239 FT		Max QNH alt 2728 FT			
DV1-DVR-DV2 (KT)			LIMITATION CODES									Min V1/VR/V2 = 128/30/36	
(TVMC OAT C)			1=1st segment 2=2nd segment 3=runway length 4=obstacles									CHECK VMU LIMITATION	
DW (1000 KG) DTFLEX			5=tire speed 6=brake energy 7=max weight 8=final take-off									Correct. V1/VR/V2 = .1 KT/1000 KG	
DV1-DVR-DV2 (KT)			9=VMU										

CFM56-5C2		N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT > ISA + 15	
D04 DERATED TO N1 NO AIR BLEED MACH = .000								AIR CONDITIONING ON						-2.6		-2.6
		ENGINE ANTI-ICE ON						0.0		-1.3	
		ENGINE ANTI-ICE AND WING ANTI-ICE ON						0.0		-3.0	
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	78.7	80.0	81.2	81.7	82.1	82.7	83.2	83.8	84.5	85.3	
-50.0	79.4	80.7	81.9	82.4	82.8	83.4	83.9	84.5	85.2	86.0	
-46.0	80.1	81.4	82.6	83.1	83.5	84.1	84.7	85.2	86.0	86.7	
-42.0	80.8	82.1	83.3	83.8	84.2	84.8	85.4	85.9	86.7	87.5	
-38.0	81.4	82.7	84.0	84.4	84.9	85.4	86.0	86.6	87.3	88.1	
-34.0	82.1	83.4	84.6	85.1	85.5	86.1	86.7	87.2	88.0	88.8	
-30.0	82.7	84.0	85.3	85.7	86.2	86.8	87.3	87.9	88.7	89.5	
-26.0	83.3	84.7	85.9	86.4	86.8	87.4	88.0	88.6	89.4	90.1	
-22.0	84.0	85.3	86.6	87.0	87.5	88.1	88.7	89.2	90.0	90.8	
-18.0	84.6	85.9	87.2	87.7	88.1	88.7	89.3	89.9	90.7	91.5	
-14.0	85.2	86.6	87.9	88.4	88.8	89.4	90.0	90.6	91.4	92.2	
-10.0	85.8	87.2	88.5	89.0	89.4	90.0	90.6	91.2	92.0	92.8	
-6.0	86.4	87.8	89.1	89.6	90.0	90.7	91.3	91.8	92.6	93.4	
-2.0	87.0	88.4	89.7	90.2	90.7	91.3	91.9	92.5	93.3	94.1	
2.0	87.6	89.0	90.4	90.8	91.3	91.9	92.5	93.1	93.9	94.7	
6.0	88.2	89.6	91.0	91.4	91.9	92.5	93.1	93.7	94.5	95.3	
10.0	88.8	90.2	91.6	92.1	92.5	93.1	93.8	94.3	95.2	96.0	
14.0	89.4	90.8	92.2	92.7	93.1	93.8	94.4	95.0	95.8	96.6	
18.0	90.0	91.4	92.8	93.3	93.7	94.4	95.0	95.6	96.4	96.4	
22.0	90.6	92.0	93.4	93.8	94.3	95.0	95.6	95.4	95.4	95.2	
26.0	91.2	92.6	94.0	94.4	94.9	94.9	94.7	94.5	94.5	94.5	
30.0	91.7	93.2	94.5	94.3	94.2	94.1	94.0	93.8	93.8	93.7	
34.0	92.3	93.0	93.7	93.6	93.6	93.4	93.3	93.1	92.8	92.2	
38.0	91.6	92.3	92.8	92.8	92.9	92.8	92.4	91.8	91.1	90.4	
42.0	90.9	91.5	91.9	91.9	92.1	91.5	90.8	90.1	89.4		
46.0	89.9	90.3	90.7	90.7	90.6						
50.0	88.7	89.2	89.5	89.4	89.0						
54.0	87.6	88.0	88.4								
						OAT < ISA+15					
						OAT > ISA + 15					

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.27	P 5
	DERATED TAKEOFF		SEQ 150	REV 16

CFM56-5C2		N1 CORRECTIONS FOR AIR BLEED						OAT <		OAT >	
								ISA + 15		ISA + 15	
D08 DERATED TO N1 NO AIR BLEED MACH = .000		AIR CONDITIONING ON						-2.6		-2.6	
		ENGINE ANTI-ICE ON						0.0		-1.3	
		ENGINE ANTI-ICE AND WING ANTI-ICE ON						0.0		-3.0	
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	77.5	78.8	80.1	80.5	80.9	81.5	82.0	82.6	83.3	84.1	
-50.0	78.2	79.5	80.7	81.2	81.6	82.2	82.7	83.3	84.0	84.8	
-46.0	78.9	80.2	81.4	81.9	82.3	82.9	83.4	84.0	84.8	85.5	
-42.0	79.6	80.9	82.1	82.6	83.0	83.6	84.1	84.7	85.5	86.2	
-38.0	80.2	81.5	82.8	83.2	83.6	84.2	84.8	85.3	86.1	86.9	
-34.0	80.8	82.1	83.4	83.8	84.3	84.9	85.4	86.0	86.8	87.5	
-30.0	81.4	82.8	84.0	84.5	84.9	85.5	86.1	86.7	87.4	88.2	
-26.0	82.1	83.4	84.7	85.1	85.6	86.2	86.8	87.3	88.1	88.9	
-22.0	82.7	84.0	85.3	85.8	86.2	86.8	87.4	88.0	88.8	89.5	
-18.0	83.3	84.7	86.0	86.4	86.9	87.5	88.1	88.6	89.4	90.2	
-14.0	84.0	85.3	86.6	87.1	87.5	88.1	88.7	89.3	90.1	90.9	
-10.0	84.6	85.9	87.2	87.7	88.1	88.8	89.4	89.9	90.7	91.5	
-6.0	85.2	86.5	87.8	88.3	88.8	89.4	90.0	90.6	91.4	92.1	
-2.0	85.8	87.1	88.4	88.9	89.4	90.0	90.6	91.2	92.0	92.8	
2.0	86.3	87.7	89.1	89.5	90.0	90.6	91.2	91.8	92.6	93.4	
6.0	86.9	88.3	89.7	90.1	90.6	91.2	91.8	92.4	93.2	94.0	
10.0	87.5	88.9	90.3	90.7	91.2	91.8	92.4	93.0	93.9	94.7	
14.0	88.1	89.5	90.9	91.4	91.8	92.5	93.1	93.7	94.5	95.3	
18.0	88.7	90.1	91.5	91.9	92.4	93.0	93.7	94.3	95.1	95.0	
22.0	89.3	90.7	92.0	92.5	93.0	93.6	94.2	94.1	94.0	93.9	
26.0	89.8	91.2	92.6	93.1	93.6	93.5	93.4	93.2	93.2	93.2	
30.0	90.4	91.8	93.2	93.0	92.9	92.8	92.6	92.4	92.4	92.3	
34.0	90.9	91.7	92.3	92.2	92.2	92.1	91.9	91.8	91.5	90.8	
38.0	90.3	90.9	91.5	91.5	91.6	91.4	91.1	90.4	89.8	89.1	
42.0	89.5	90.1	90.5	90.6	90.7	90.1	89.5	88.8	88.0		
46.0	88.5	88.9	89.3	89.4	89.2	OAT < ISA+15 OAT > ISA + 15					
50.0	87.3	87.8	88.2	88.0	87.6						
54.0	86.2	86.7	87.0								

CFM56-5C2		N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT > ISA + 15					
D12 DERATED TO N1 NO AIR BLEED MACH = .000								AIR CONDITIONING ON						-2.6		-2.6
		ENGINE ANTI-ICE ON						0.0		-1.3					
		ENGINE ANTI-ICE AND WING ANTI-ICE ON						0.0		-3.0					
OAT (°C)	PRESSURE ALTITUDE (FT)														
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.					
-54.0	76.4	77.6	78.9	79.3	79.7	80.3	80.8	81.4	82.1	82.9					
-50.0	77.0	78.3	79.5	80.0	80.4	81.0	81.5	82.1	82.8	83.6					
-46.0	77.7	79.0	80.2	80.7	81.1	81.7	82.2	82.8	83.5	84.3					
-42.0	78.3	79.6	80.9	81.3	81.8	82.3	82.9	83.5	84.2	85.0					
-38.0	79.0	80.3	81.5	82.0	82.4	83.0	83.6	84.1	84.9	85.6					
-34.0	79.6	80.9	82.2	82.6	83.0	83.6	84.2	84.8	85.5	86.3					
-30.0	80.2	81.5	82.8	83.3	83.7	84.3	84.9	85.4	86.2	87.0					
-26.0	80.8	82.2	83.4	83.9	84.3	84.9	85.5	86.1	86.9	87.6					
-22.0	81.5	82.8	84.1	84.5	85.0	85.6	86.2	86.7	87.5	88.3					
-18.0	82.1	83.4	84.7	85.2	85.6	86.2	86.8	87.4	88.2	88.9					
-14.0	82.7	84.0	85.4	85.8	86.3	86.9	87.5	88.0	88.8	89.6					
-10.0	83.3	84.6	86.0	86.4	86.9	87.5	88.1	88.7	89.5	90.2					
-6.0	83.9	85.2	86.6	87.0	87.5	88.1	88.7	89.3	90.1	90.9					
-2.0	84.5	85.8	87.2	87.6	88.1	88.7	89.3	89.9	90.7	91.5					
2.0	85.0	86.4	87.8	88.2	88.7	89.3	89.9	90.5	91.3	92.1					
6.0	85.6	87.0	88.4	88.8	89.3	89.9	90.5	91.1	91.9	92.7					
10.0	86.2	87.6	89.0	89.4	89.9	90.5	91.1	91.7	92.5	93.3					
14.0	86.8	88.2	89.6	90.0	90.5	91.1	91.7	92.3	93.2	94.0					
18.0	87.4	88.8	90.1	90.6	91.1	91.7	92.3	92.9	93.8	93.7					
22.0	87.9	89.3	90.7	91.2	91.7	92.3	92.9	92.8	92.7	92.6					
26.0	88.5	89.9	91.3	91.8	92.2	92.2	92.1	91.8	91.9	91.8					
30.0	89.0	90.5	91.9	91.7	91.5	91.4	91.3	91.1	91.1	91.0					
34.0	89.6	90.4	91.0	90.9	90.9	90.7	90.6	90.4	90.1	89.5					
38.0	88.9	89.6	90.1	90.1	90.2	90.1	89.7	89.1	88.4	87.7					
42.0	88.1	88.8	89.1	89.2	89.4	88.8	88.1	87.4	86.7						
46.0	87.1	87.6	87.9	88.0	87.8	OAT < ISA+15									
50.0	86.0	86.4	86.8	86.6	86.3						OAT > ISA + 15				
54.0	84.9	85.3	85.6												

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.27	P 7
	DERATED TAKEOFF		SEQ 150	REV 16

CFM56-5C2		N1 CORRECTIONS FOR AIR BLEED						OAT <		OAT >	
								ISA + 15		ISA + 15	
D16 DERATED TO N1 NO AIR BLEED MACH = .000	AIR CONDITIONING ON						-2.6		-2.6		
	ENGINE ANTI-ICE ON						0.0		-1.3		
	ENGINE ANTI-ICE AND WING ANTI-ICE ON						0.0		-3.0		
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	75.1	76.4	77.6	78.1	78.5	79.0	79.6	80.1	80.9	81.6	
-50.0	75.8	77.1	78.3	78.7	79.2	79.7	80.3	80.8	81.6	82.3	
-46.0	76.4	77.7	79.0	79.4	79.8	80.4	81.0	81.5	82.3	83.0	
-42.0	77.1	78.4	79.6	80.1	80.5	81.1	81.7	82.2	83.0	83.7	
-38.0	77.7	79.0	80.3	80.7	81.1	81.7	82.3	82.9	83.6	84.4	
-34.0	78.3	79.6	80.9	81.3	81.8	82.4	82.9	83.5	84.3	85.0	
-30.0	78.9	80.2	81.5	82.0	82.4	83.0	83.6	84.1	84.9	85.7	
-26.0	79.5	80.9	82.2	82.6	83.0	83.6	84.2	84.8	85.6	86.3	
-22.0	80.2	81.5	82.8	83.2	83.7	84.3	84.9	85.4	86.2	87.0	
-18.0	80.8	82.1	83.4	83.9	84.3	84.9	85.5	86.1	86.9	87.6	
-14.0	81.4	82.7	84.0	84.5	85.0	85.6	86.2	86.7	87.5	88.3	
-10.0	82.0	83.3	84.6	85.1	85.6	86.2	86.8	87.3	88.1	88.9	
-6.0	82.6	83.9	85.2	85.7	86.2	86.8	87.4	87.9	88.8	89.5	
-2.0	83.1	84.5	85.8	86.3	86.8	87.4	88.0	88.6	89.4	90.1	
2.0	83.7	85.1	86.4	86.9	87.4	88.0	88.6	89.2	90.0	90.8	
6.0	84.3	85.7	87.0	87.5	87.9	88.6	89.2	89.8	90.6	91.4	
10.0	84.9	86.3	87.6	88.1	88.5	89.2	89.8	90.4	91.2	92.0	
14.0	85.5	86.9	88.2	88.7	89.1	89.8	90.4	91.0	91.8	92.6	
18.0	86.0	87.4	88.8	89.3	89.7	90.4	91.0	91.6	92.4	92.4	
22.0	86.6	88.0	89.3	89.8	90.3	90.9	91.5	91.4	91.3	91.2	
26.0	87.1	88.5	89.9	90.4	90.9	90.8	90.7	90.5	90.5	90.5	
30.0	87.7	89.1	90.5	90.3	90.1	90.0	89.9	89.7	89.7	89.6	
34.0	88.2	89.0	89.6	89.5	89.5	89.3	89.2	89.0	88.7	88.1	
38.0	87.5	88.2	88.7	88.7	88.8	88.7	88.3	87.7	87.0	86.3	
42.0	86.7	87.3	87.7	87.8	88.0	87.4	86.7	86.0	85.3		
46.0	85.7	86.1	86.5	86.6	86.4						
50.0	84.6	85.0	85.4	85.2	84.8						
54.0	83.4	83.9	84.2								
						OAT < ISA+15					
						OAT > ISA + 15					

CFM56-5C2		N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT > ISA + 15	
D20 DERATED TO N1 NO AIR BLEED MACH = .000								AIR CONDITIONING ON						-2.6		-2.6
		ENGINE ANTI-ICE ON						0.0		-1.3	
		ENGINE ANTI-ICE AND WING ANTI-ICE ON						0.0		-3.0	
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	73.9	75.1	76.4	76.8	77.2	77.8	78.3	78.9	79.6	80.4	
-50.0	74.5	75.8	77.0	77.5	77.9	78.5	79.0	79.6	80.3	81.0	
-46.0	75.2	76.4	77.7	78.1	78.5	79.1	79.7	80.2	81.0	81.7	
-42.0	75.8	77.1	78.3	78.8	79.2	79.8	80.4	80.9	81.7	82.4	
-38.0	76.4	77.7	79.0	79.4	79.8	80.4	81.0	81.5	82.3	83.1	
-34.0	77.0	78.3	79.6	80.0	80.5	81.1	81.6	82.2	83.0	83.7	
-30.0	77.6	78.9	80.2	80.7	81.1	81.7	82.3	82.8	83.6	84.4	
-26.0	78.2	79.5	80.8	81.3	81.7	82.3	82.9	83.5	84.2	85.0	
-22.0	78.8	80.2	81.5	81.9	82.3	82.9	83.5	84.1	84.9	85.7	
-18.0	79.4	80.8	82.1	82.5	83.0	83.6	84.2	84.7	85.5	86.3	
-14.0	80.0	81.4	82.7	83.2	83.6	84.2	84.8	85.4	86.2	86.9	
-10.0	80.6	82.0	83.3	83.7	84.2	84.8	85.4	86.0	86.8	87.6	
-6.0	81.2	82.6	83.9	84.3	84.8	85.4	86.0	86.6	87.4	88.2	
-2.0	81.8	83.1	84.5	84.9	85.4	86.0	86.6	87.2	88.0	88.8	
2.0	82.3	83.7	85.0	85.5	86.0	86.6	87.2	87.8	88.6	89.4	
6.0	82.9	84.3	85.6	86.1	86.6	87.2	87.8	88.4	89.2	90.0	
10.0	83.5	84.9	86.2	86.7	87.2	87.8	88.4	89.0	89.8	90.6	
14.0	84.1	85.5	86.8	87.3	87.7	88.4	89.0	89.6	90.4	91.2	
18.0	84.6	86.0	87.4	87.9	88.3	89.0	89.6	90.2	91.0	91.0	
22.0	85.1	86.6	87.9	88.4	88.9	89.5	90.1	90.0	89.9	89.8	
26.0	85.7	87.1	88.5	89.0	89.4	89.4	89.3	89.1	89.1	89.0	
30.0	86.2	87.7	89.0	88.9	88.7	88.6	88.5	88.3	88.3	88.2	
34.0	86.8	87.5	88.1	88.1	88.0	87.9	87.8	87.6	87.3	86.7	
38.0	86.1	86.7	87.3	87.3	87.4	87.2	86.9	86.2	85.6	84.9	
42.0	85.3	85.9	86.3	86.4	86.5	85.9	85.3	84.5	83.8		
46.0	84.3	84.7	85.1	85.1	85.0	OAT < ISA+15					
50.0	83.1	83.5	83.9	83.8	83.4						
54.0	82.0	82.4	82.7								OAT > ISA + 15

CFM56-5C2		N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT > ISA + 15	
D24 DERATED TO N1 NO AIR BLEED MACH=.000	AIR CONDITIONING ON						-2.6		-2.6		
	ENGINE ANTI-ICE ON						0.0		-1.3		
	ENGINE ANTI-ICE AND WING ANTI-ICE ON						0.0		-3.0		
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	72.6	73.8	75.1	75.5	75.9	76.5	77.0	77.6	78.3	79.1	
-50.0	73.2	74.5	75.7	76.2	76.6	77.2	77.7	78.3	79.0	79.7	
-46.0	73.9	75.1	76.4	76.8	77.2	77.8	78.4	78.9	79.7	80.4	
-42.0	74.5	75.8	77.0	77.5	77.9	78.5	79.0	79.6	80.4	81.1	
-38.0	75.1	76.4	77.6	78.1	78.5	79.1	79.7	80.2	81.0	81.7	
-34.0	75.7	77.0	78.3	78.7	79.1	79.7	80.3	80.9	81.6	82.4	
-30.0	76.3	77.6	78.9	79.3	79.8	80.3	80.9	81.5	82.3	83.0	
-26.0	76.9	78.2	79.5	79.9	80.4	81.0	81.6	82.1	82.9	83.7	
-22.0	77.5	78.8	80.1	80.6	81.0	81.6	82.2	82.7	83.5	84.3	
-18.0	78.1	79.4	80.7	81.2	81.6	82.2	82.8	83.4	84.2	84.9	
-14.0	78.7	80.0	81.3	81.8	82.2	82.8	83.4	84.0	84.8	85.6	
-10.0	79.2	80.6	81.9	82.4	82.8	83.4	84.0	84.6	85.4	86.2	
-6.0	79.8	81.2	82.5	83.0	83.4	84.0	84.6	85.2	86.0	86.8	
-2.0	80.4	81.7	83.1	83.5	84.0	84.6	85.2	85.8	86.6	87.4	
2.0	80.9	82.3	83.7	84.1	84.6	85.2	85.8	86.4	87.2	88.0	
6.0	81.5	82.9	84.2	84.7	85.2	85.8	86.4	87.0	87.8	88.6	
10.0	82.1	83.5	84.8	85.3	85.7	86.4	87.0	87.6	88.4	89.2	
14.0	82.6	84.0	85.4	85.9	86.3	87.0	87.6	88.2	89.0	89.8	
18.0	83.2	84.6	85.9	86.4	86.9	87.5	88.1	88.7	89.6	89.5	
22.0	83.7	85.1	86.5	87.0	87.4	88.1	88.7	88.6	88.5	88.4	
26.0	84.3	85.7	87.0	87.5	88.0	88.0	87.8	87.6	87.6	87.6	
30.0	84.8	86.2	87.6	87.4	87.3	87.2	87.0	86.8	86.8	86.7	
34.0	85.3	86.1	86.7	86.6	86.6	86.5	86.3	86.1	85.9	85.2	
38.0	84.6	85.3	85.8	85.8	85.9	85.8	85.4	84.8	84.1	83.4	
42.0	83.8	84.4	84.8	84.9	85.0	84.4	83.8	83.1	82.6		
46.0	82.8	83.2	83.6	83.7	83.5	OAT < ISA+15 OAT > ISA + 15					
50.0	81.6	82.0	82.4	82.3	81.9						
54.0	80.5	80.9	81.2								

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 1
	QUICK REFERENCE TABLES		SEQ 001	REV 11

INTRODUCTION

These tables enable the crew to quickly determine the takeoff performance at an airport for which no takeoff chart has been established. They are conservative.

USE OF TABLES

- R A first table gives the corrections to be applied to the runway length for wind and runway slope. Nine other tables give, for three different pressure altitudes (0, 1000 and 2000 feet) and three configurations, the maximum takeoff weight, limitation codes and associated speeds as a function of temperature and corrected runway length. TREF and TMAX are given at the top of each table. For pressure altitudes above 2000 feet, use a specific RTOW chart.

Note : 1. Quick reference tables are established at V1 min with air conditioning OFF and anti ice OFF
 2. Do not use quick reference tables in case of tailwind.

R HOW TO PROCEED

1. Enter the first table with runway length, slope and wind data. Determine the corrected runway length by applying the corrections due to slope and wind.
2. Select the configuration as a function of this corrected runway length.
3. Enter the table(s) corresponding to the configuration and airport pressure altitude.
 As far as airport pressure altitude is concerned, two methods may be applied:
 - interpolate the takeoff performance by using the two tables enclosing the airport pressure altitude,
 - for a more conservative figure, use the table corresponding to the pressure altitude immediately above the airport pressure altitude.
4. Enter the appropriate column of the table(s) with the corrected runway length.
 Once again, two methods may be applied :
 - interpolate the takeoff performance between the two columns enclosing the corrected runway length,
 - for a more conservative figure, use the column corresponding to the shorter runway length.
5. Determination of maximum takeoff weight.
 Enter the table(s) and column(s) as explained above with the actual OAT and read maximum takeoff weight, limitation codes, V1, VR and V2. If necessary interpolate weight and speeds.
6. Determination of flexible temperature.
 The determination of flexible temperature is possible only when there is no obstacle on the flight path. Enter the table(s) and column(s) with the actual takeoff weight and read the corresponding temperature as flexible temperature.
7. In case of obstacles, use the graphs from 2.02.40 to determine the corresponding weight penalty.

LIMITATION CODES

- 1 : first segment
 – 2 : second segment
 – 3 : runway
 – 5 : tire speed
 – 6 : brake energy
 – 7 : maximum computation weight
 R – 8 : final takeoff
 – 9 : VMU
- R *Note : 1. Limitation code 4 (obstacles) does not appear in quick reference tables.*
 R *2. VMC limitation appears with an asterisk (*) in the chart.*

CORRECTIONS FOR WIND AND RUNWAY SLOPE

Runway length (m)		2000	2250	2500	2750	3000	3250	3500	3750	4000
Effect of wind	per knot of head wind add (meters)	9	10	11	11.5	12	12.5	13.5	14.5	15
	per percent uphill slope subtract (meters)	110	145	180	215	250	285	320	360	395
Effect of runway slope	per percent downhill slope add (meters)	75	90	105	120	130	145	160	175	190

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 1
	QUICK REFERENCE TABLES		SEQ 001	REV 11

INTRODUCTION

These tables enable the crew to quickly determine the takeoff performance at an airport for which no takeoff chart has been established. They are conservative.

USE OF TABLES

- R A first table gives the corrections to be applied to the runway length for wind and runway slope. Nine other tables give, for three different pressure altitudes (0, 1000 and 2000 feet) and three configurations, the maximum takeoff weight, limitation codes and associated speeds as a function of temperature and corrected runway length. TREF and TMAX are given at the top of each table. For pressure altitudes above 2000 feet, use a specific RTOW chart.

Note : 1. Quick reference tables are established at V1 min with air conditioning OFF and anti ice OFF
 2. Do not use quick reference tables in case of tailwind.

R HOW TO PROCEED

1. Enter the first table with runway length, slope and wind data. Determine the corrected runway length by applying the corrections due to slope and wind.
2. Select the configuration as a function of this corrected runway length.
3. Enter the table(s) corresponding to the configuration and airport pressure altitude.
 As far as airport pressure altitude is concerned, two methods may be applied:
 - interpolate the takeoff performance by using the two tables enclosing the airport pressure altitude,
 - for a more conservative figure, use the table corresponding to the pressure altitude immediately above the airport pressure altitude.
4. Enter the appropriate column of the table(s) with the corrected runway length.
 Once again, two methods may be applied :
 - interpolate the takeoff performance between the two columns enclosing the corrected runway length,
 - for a more conservative figure, use the column corresponding to the shorter runway length.
5. Determination of maximum takeoff weight.
 Enter the table(s) and column(s) as explained above with the actual OAT and read maximum takeoff weight, limitation codes, V1, VR and V2. If necessary interpolate weight and speeds.
6. Determination of flexible temperature.
 The determination of flexible temperature is possible only when there is no obstacle on the flight path. Enter the table(s) and column(s) with the actual takeoff weight and read the corresponding temperature as flexible temperature.
7. In case of obstacles, use the graphs from 2.02.40 to determine the corresponding weight penalty.

LIMITATION CODES

- R
- 1 : first segment
 - 2 : second segment
 - 3 : runway
 - 5 : tire speed
 - 6 : brake energy
 - 7 : maximum computation weight
 - 8 : final takeoff
 - 9 : VMU

*Note : 1. Limitation code 4 (obstacles) does not appear in quick reference tables.
2. VMC limitation appears with an asterisk (*) in the chart.*

CORRECTIONS FOR WIND AND RUNWAY SLOPE

Runway length (ft)		7000	8000	9000	10000	11000	12000	13000
Effect of wind	per knot of head wind add (feet)	31	35	38	40	42	46	49
Effect of runway slope	per percent uphill slope subtract (feet)	420	560	700	840	980	1130	1280
	per percent downhill slope add (feet)	270	330	390	435	495	555	615

EXAMPLE

Pressure altitude : 1400 ft
 Temperature : 30°C
 Runway length : 3 750 m
 Wind : 10 kt head
 Slope : 1 % up
 Takeoff configuration : 1 + F

– **Determination of corrected runway length**

(Refer to 2.02.30 p 2.)
 runway length3 750 m
 correction for wind10 × 14.5 = + 145 m
 correction for slope– 360 m
 corrected runway length3 535 m

– **Determination of a conservative maximum takeoff weight :**

(Refer to 2.02.30 p 6.)
 – Pressure altitude : 1400 ft – Use the table for 2 000 ft.
 – Enter the column corresponding to 3 500 m.
 – Read the maximum takeoff weight on the line corresponding to the temperature of 30°C : 250 800 kg
 R V1 = 138 kt, VR = 145 kt, V2 = 156 kt

– **Determination of a precise flexible temperature for the actual takeoff weight of 220 000 kg :**

(Refer to 2.02.30 p 5 and p 6.)
 – Interpolate the temperature corresponding to 220 000 kg for the runway length of 3535 m at 1000 ft and 2000 ft pressure altitude.
 Results :
 R 1 000 ft : 48°C, V1 = 136 kt, VR = 142 kt, V2 = 151 kt
 2 000 ft : 45°C, V1 = 135 kt, VR = 141 kt, V2 = 150 kt
 – Interpolate between these two values to get the flexible temperature.
 R 1 400 ft : 47°C, V1 = 136 kt, VR = 142 kt, V2 = 151 kt

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 4
	QUICK REFERENCE TABLES		SEQ 150	REV 10

CONFIGURATION 1+F			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	273.5 3/3 144/50/62	278.1 3/6 148/55/66	281.0 3/6 147/58/69	283.4 3/6 147/61/72	285.0 3/7 143/64/74
-10	269.4 3/3 143/48/60	275.8 3/6 146/52/64	278.8 3/6 145/56/67	281.4 3/6 144/59/70	283.7 3/6 143/62/73
0	264.9 3/3 141/47/59	273.5 3/6 143/50/62	276.6 3/6 143/54/65	279.3 3/6 142/57/68	281.7 3/6 141/60/71
10	260.4 3/9 139/46/58	270.1 3/6 142/49/61	274.5 3/6 141/52/63	277.3 3/6 140/55/66	279.9 3/6 139/58/69
20	256.2 3/9 138/45/57	266.1 3/6 141/48/60	272.2 3/6 140/50/62	275.1 3/6 139/53/64	277.7 3/6 138/56/67
30	252.4 3/3 136/44/56	262.8 3/6 141/47/59	269.3 3/6 139/49/61	273.1 3/6 138/52/63	275.8 2/3 137/55/66
32	248.7 3/3 135/43/55	259.0 3/3 140/47/58	265.8 3/6 139/49/60	268.6 3/6 139/52/62	271.1 2/3 138/55/65
34	245.0 3/3 134/42/54	255.1 3/9 139/46/57	261.4 3/6 140/48/59	264.0 3/6 139/51/62	266.4 2/3 138/54/65
36	241.5 3/3 134/41/53	251.3 3/9 138/45/56	257.1 3/6 140/48/59	259.6 3/6 139/51/61	261.8 3/6 139/54/64
38	238.0 3/3 133/40/52	247.6 3/3 137/44/55	252.9 3/6 141/48/58	255.3 3/6 140/51/61	257.4 3/6 139/53/63
40	234.6 3/3 132/40/51	244.0 3/3 136/43/54	248.7 3/6 141/47/58	251.0 3/6 141/50/60	253.0 3/6 140/53/63
42	230.5 3/3 131/39/50	239.6 3/3 135/42/52	243.4 2/3 140/46/57	245.9 3/6 141/50/60	247.8 3/6 141/52/62
44	226.5 3/3 130/38/48	234.3 3/3 135/41/51	238.0 3/3 139/46/56	240.8 3/6 142/49/59	242.5 3/6 142/52/62
46	222.7 3/3 129/37/47	229.3 3/3 134/40/51	232.8 3/3 139/45/55	235.8 3/6 143/49/59	237.4 3/6 143/52/61
48	219.2 3/3 128/36/46	224.7 3/3 134/40/50	228.0 3/3 138/44/54	230.8 2/3 143/49/58	232.7 3/6 145/52/61
50	215.8 3/3 128/35/45	220.2 3/3 133/39/49	223.4 3/3 138/44/53	226.1 2/3 142/48/57	228.3 3/6 146/52/61
52	* 212.3 3/3 * 127/34/44	215.8 3/3 132/39/48	218.9 3/3 137/43/52	221.5 3/3 142/47/56	223.5 3/6 146/51/60
54	* 208.1 3/3 * 127/34/43	211.5 3/3 132/38/47	214.5 3/3 137/43/51	216.9 3/3 142/47/55	218.8 3/3 146/51/59
55	* 206.1 3/3 * 127/33/43	209.3 3/3 132/38/47	212.2 3/3 137/42/51	214.6 3/3 141/46/55	216.4 3/3 146/51/59

OCTO 9.1.2 AA211A09 FCOM-F0-02-30-004-150

EXAMPLE

Pressure altitude : 1400 ft
 Temperature : 30°C
 Runway length : 11 000 ft
 Wind : 10 kt head
 Slope : 1 % up
 Takeoff configuration : 1 + F

– **Determination of corrected runway length**

(Refer to 2.02.30 p 2.)
 runway length11 000 ft
 correction for wind10 × 42 = + 420 ft
 correction for slope– 980 ft
 corrected runway length10 440 ft

– **Determination of a conservative maximum takeoff weight :**

(Refer to 2.02.30 p 6.)
 – Pressure altitude : 1400 ft – Use the table for 2 000 ft.
 – Enter the column corresponding to 10 000 ft.
 – Read the maximum takeoff weight on the line corresponding to the temperature of 30°C : 235 200 kg
 V1 = 132 kt, VR = 140 kt, V2 = 151 kt

– **Determination of a precise flexible temperature for the actual takeoff weight of 220 000 kg :**

(Refer to 2.02.30 p 5 and p 6.)
 – Interpolate the temperature corresponding to 220 000 kg for the runway length of 10 440 ft at 1000 ft and 2000 ft pressure altitude.
 Results:
 1 000 ft : 45°C, V1 = 131 kt, VR = 138 kt, V2 = 148 kt
 2 000 ft : 42°C, V1 = 130 kt, VR = 138 kt, V2 = 148 kt
 – Interpolate between these two values to get the flexible temperature.
 1 400 ft : 44°C, V1 = 130 kt, VR = 138 kt, V2 = 148 kt

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 4
	QUICK REFERENCE TABLES		SEQ 254	REV 10

CONFIGURATION 1+F			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	9000	10000	11000	12000	13000
-20	262.5 3/9 140/46/59	274.5 3/3 145/51/63	279.3 3/6 148/56/68	282.5 3/6 147/60/71	285.0 3/7 145/64/74
	-10	257.6 3/3 138/44/57	271.4 3/3 143/49/61	277.1 3/6 145/54/65	280.5 3/6 144/58/69	283.4 3/6 143/62/72
0		252.9 3/3 136/43/56	266.9 3/3 142/48/60	274.8 3/6 143/52/63	278.3 3/6 142/56/67	281.4 3/6 141/59/70
	10	248.8 3/3 134/42/55	262.6 3/3 140/47/59	272.7 3/6 141/50/61	276.3 3/6 140/54/65	279.5 3/6 139/57/68
20		244.8 3/3 133/41/54	258.3 3/9 139/45/58	268.9 3/6 140/49/60	274.1 3/6 139/52/63	277.3 3/6 138/56/67
	30	241.2 3/3 131/40/53	254.4 3/9 137/45/57	265.5 3/6 140/48/60	272.1 3/6 138/51/62	275.4 2/3 137/55/65
32		237.8 3/3 130/39/52	250.7 3/3 136/44/56	262.3 3/6 140/48/59	267.6 3/6 139/51/61	270.8 2/3 138/54/65
	34	234.3 3/3 129/38/51	247.0 3/3 135/43/54	259.0 3/6 141/47/58	263.1 3/6 139/50/61	266.1 3/6 138/54/64
36		231.0 3/3 128/38/50	243.4 3/3 134/42/53	255.3 3/3 140/46/57	258.7 3/6 140/50/60	261.5 3/6 139/53/64
	38	* 227.7 3/3 * 127/37/49	239.9 3/3 134/41/52	250.8 3/9 139/45/56	254.4 3/6 140/50/60	257.1 3/6 139/53/63
40		* 224.5 3/3 * 126/36/48	236.4 3/3 133/40/51	246.4 3/3 138/45/55	250.2 3/6 141/49/59	252.7 3/6 140/52/62
	42	* 220.7 3/3 * 125/35/46	232.4 3/3 132/39/50	241.2 3/3 138/44/54	245.2 3/6 142/49/59	247.5 3/6 141/52/62
44		* 216.8 3/3 * 125/34/45	228.2 3/3 131/38/49	235.9 3/3 137/43/53	240.0 3/6 142/48/58	242.3 3/6 142/52/61
	46	* 213.3 3/3 * 125/33/44	224.4 3/3 130/37/48	230.8 3/3 136/42/52	234.8 2/3 142/48/57	237.2 3/6 143/51/61
48		* 210.0 3/3 * 125/32/43	220.9 3/3 129/36/47	226.1 3/3 135/42/51	229.8 3/3 141/47/56	232.5 3/6 145/52/61
	50	* 206.8 3/9 * 125/31/42	217.3 3/3 129/36/46	221.6 3/3 135/41/51	225.2 3/3 141/46/56	228.0 3/6 146/51/60
52		* 203.6 3/9 * 125/31/41	213.0 3/3 128/35/45	217.2 3/3 134/41/50	220.6 3/3 140/46/55	223.3 3/3 146/51/59
	54	* 200.6 3/9 * 125/30/40	208.7 3/3 128/35/44	212.7 3/3 134/40/49	216.0 3/3 140/45/54	218.6 3/3 146/50/59
55		* 199.2 3/9 * 125/29/39	206.7 3/3 128/34/44	210.6 3/3 134/40/49	213.8 3/3 140/45/53	216.2 2/3 145/50/58

OCTO 11.0.2 AA211A09 FCOM-FO-02-30-004-254

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30	P 5
		SEQ 150	REV 10

CONFIGURATION 1+F			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	265.9 3/3	271.1 3/6	273.8 3/6	276.3 3/6	278.5 3/6
	142/48/60	146/53/64	146/56/67	145/59/70	144/62/73
-10	261.5 3/3	268.8 3/6	271.7 3/6	274.3 3/6	276.6 3/6
	141/46/59	144/50/62	143/54/65	142/57/68	142/60/70
0	256.8 3/9	266.4 3/6	269.5 3/6	272.2 3/6	274.7 3/6
	139/45/57	142/48/60	141/51/63	140/54/66	139/58/68
10	252.5 3/9	262.3 3/6	267.5 3/6	270.2 3/6	272.8 3/6
	137/44/56	140/47/59	139/49/61	138/53/64	137/56/66
20	248.5 3/3	258.7 3/6	264.9 3/6	268.1 3/6	270.7 3/6
	135/43/55	140/46/58	138/48/59	137/51/62	136/54/65
28	245.6 3/3	255.7 3/6	262.3 3/6	266.7 3/6	269.3 2/3
	134/42/54	139/46/57	138/48/59	137/50/61	136/53/64
30	242.5 3/3	252.4 3/9	259.6 3/6	262.7 3/6	265.2 3/6
	134/42/53	138/45/56	139/47/58	137/50/61	137/53/63
32	239.2 3/3	249.0 3/9	256.2 3/6	258.7 3/6	261.0 3/6
	133/41/52	137/44/55	139/47/57	138/50/60	137/52/63
34	236.0 3/3	245.6 3/3	252.3 3/6	254.7 3/6	256.9 3/6
	132/40/51	136/43/54	139/46/57	138/49/60	138/52/62
36	232.8 3/3	242.2 3/3	248.5 3/6	250.8 3/6	252.9 3/6
	131/39/50	136/42/53	140/46/57	139/49/59	138/52/62
38	229.7 3/3	238.9 3/3	244.5 3/6	247.0 3/6	249.0 3/6
	130/38/49	135/42/52	139/46/56	139/49/59	139/51/61
40	226.3 3/3	235.3 3/3	240.1 3/3	242.8 3/6	244.6 3/6
	129/37/48	134/41/51	138/45/55	140/48/58	139/51/61
42	222.8 3/3	231.7 3/3	235.6 3/3	238.5 3/6	240.3 3/6
	128/36/47	133/40/50	138/44/54	141/48/58	140/51/60
44	219.2 3/3	227.2 3/3	230.7 3/3	233.7 3/6	235.4 3/6
	128/36/46	132/39/49	137/43/53	141/48/57	141/50/59
46	215.2 3/3	221.9 3/3	225.3 3/3	228.2 2/3	230.1 3/6
	127/35/45	132/38/48	136/43/52	141/47/56	143/50/59
48	* 211.5 3/3	216.8 3/3	220.0 3/3	222.7 3/3	224.9 3/6
	* 126/34/43	131/38/47	136/42/51	140/46/55	145/50/59
50	* 207.7 3/3	211.8 3/3	214.9 3/3	217.5 3/3	219.6 3/6
	* 125/33/42	130/37/46	135/41/50	140/45/54	145/49/58
52	* 203.6 3/3	207.0 3/3	209.9 3/3	212.3 3/3	214.3 2/3
	* 125/32/41	130/36/45	134/40/49	139/45/53	144/49/57
53	* 201.3 3/3	204.6 3/3	207.4 3/3	209.7 3/3	211.6 3/3
	* 125/31/41	130/36/45	134/40/49	139/44/53	144/48/56

OCTO 9.1.2 AA211A09 FCOM-FO-02-30-005-150

CONFIGURATION 1+F			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	257.9 3/3 140/46/58	264.0 3/6 144/50/62	266.8 3/6 144/53/65	269.3 3/6 143/57/67	271.4 3/6 142/60/70
-10	253.3 3/9 139/44/56	261.8 3/6 142/48/59	264.7 3/6 141/51/62	267.2 3/6 140/54/65	269.6 3/6 140/57/68
0	248.8 3/9 136/43/55	258.6 3/6 140/46/58	262.5 3/6 139/49/60	265.2 3/6 138/52/63	267.6 3/6 138/55/66
10	244.7 3/3 134/42/54	254.7 3/6 139/45/57	260.5 3/6 137/47/58	263.3 3/6 136/50/61	265.8 3/6 136/53/64
20	240.9 3/3 133/41/53	250.8 3/6 138/44/56	257.1 3/6 137/46/57	261.3 3/6 135/49/60	263.8 3/6 135/52/62
26	238.8 3/3 132/40/52	248.5 3/9 137/44/55	255.3 3/6 137/46/57	260.2 3/6 135/48/59	262.8 2/3 134/51/62
28	236.2 3/3 132/40/51	245.8 3/9 136/43/54	253.2 3/6 137/46/56	256.8 3/6 136/48/59	259.2 3/6 136/51/61
30	233.4 3/3 131/39/51	242.8 3/3 136/42/53	250.8 3/6 138/45/56	253.3 3/6 137/48/58	255.6 2/3 136/51/61
32	230.5 3/3 130/38/50	239.8 3/3 135/42/52	247.4 3/6 138/45/55	249.7 3/6 137/48/58	251.9 3/6 137/50/60
34	227.6 3/3 129/38/49	236.7 3/3 134/41/52	243.8 3/6 138/45/55	246.2 3/6 138/47/57	248.2 3/6 137/50/60
36	224.7 3/3 129/37/48	233.6 3/3 133/40/51	240.0 2/3 138/44/54	242.7 3/6 139/47/57	244.6 3/6 138/50/59
38	221.9 3/3 128/36/47	230.7 3/3 133/39/50	236.4 2/3 137/43/53	239.2 3/6 139/47/57	241.1 3/6 139/50/59
40	219.0 3/3 127/35/46	227.7 3/3 132/39/49	232.7 3/3 136/43/52	235.7 3/6 140/47/56	237.5 3/6 139/49/59
42	215.5 3/3 126/34/45	224.0 3/3 131/38/48	228.0 3/3 135/42/52	231.0 3/6 140/46/55	232.8 3/6 140/49/58
44	211.2 3/3 125/33/43	218.8 3/3 130/37/46	222.2 3/3 135/41/50	225.1 3/3 139/45/54	227.1 3/6 141/49/57
46	* 207.0 3/3 * 124/32/42	213.2 3/3 129/36/45	216.4 3/3 134/40/49	219.1 3/3 138/44/53	221.4 3/6 143/48/57
48	* 202.9 3/3 * 123/31/41	207.7 3/3 129/35/44	210.7 3/3 133/39/48	213.2 3/3 138/43/52	215.4 2/3 142/48/56
50	* 198.8 3/3 * 123/30/39	202.4 3/3 128/34/43	205.3 3/3 132/38/47	207.6 3/3 137/43/51	209.6 2/3 142/47/55
51	* 196.5 3/3 * 122/29/39	199.8 3/3 127/34/43	202.5 3/3 132/38/47	204.9 3/3 136/42/50	206.8 2/3 141/46/54

OCTO 9.1.2 AA211A09 FCOM-F0-02-02-30-006-150

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 5	
		SEQ 254	REV 10

CONFIGURATION 1+F			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	9000	10000	11000	12000	13000
-20	254.5 3/9 138/44/57	267.4 3/3 143/48/60	272.3 3/6 146/54/65	275.4 3/6 145/58/69	278.2 3/6 144/62/72
-10	249.8 3/3 135/43/55	263.4 3/3 141/47/59	270.0 3/6 143/52/63	273.4 3/6 143/56/67	276.3 3/6 142/59/70
0	245.4 3/3 133/41/54	258.9 3/3 140/46/58	267.8 3/6 141/49/61	271.3 3/6 140/53/65	274.3 3/6 139/57/68
10	241.3 3/3 132/40/53	254.6 3/9 138/45/57	264.9 3/6 140/48/59	269.3 3/6 138/51/63	272.4 3/6 138/55/66
20	237.6 3/3 130/39/52	250.5 3/3 136/44/56	261.2 3/6 139/47/58	267.1 3/6 137/50/61	270.4 3/6 136/54/64
28	234.8 3/3 129/38/51	247.6 3/3 135/43/55	258.8 3/6 139/47/58	265.6 3/6 137/49/60	268.9 2/3 136/53/63
30	231.9 3/3 129/38/50	244.4 3/3 134/42/54	256.2 3/6 140/46/57	261.8 3/6 138/49/60	264.9 3/6 137/52/63
32	228.8 3/3 128/37/49	241.1 3/3 134/41/53	252.9 3/6 139/45/56	257.8 3/6 138/49/59	260.7 3/6 137/52/62
34	225.8 3/3 127/36/48	237.8 3/3 133/41/52	249.4 3/9 138/44/55	253.9 3/6 139/48/59	256.6 3/6 138/52/62
36	* 222.8 3/3 * 126/35/47	234.6 3/3 132/40/51	246.0 3/9 137/44/54	250.0 3/6 139/48/58	252.6 3/6 138/51/61
38	* 219.8 3/3 * 125/35/46	231.5 3/3 131/39/50	242.3 3/3 136/43/53	246.2 3/6 140/48/58	248.7 3/6 139/51/61
40	* 216.6 3/3 * 124/34/45	228.0 3/3 130/38/49	237.9 3/3 136/42/52	242.0 3/6 140/47/57	244.4 3/6 139/51/60
42	* 213.4 3/3 * 124/33/44	224.6 3/3 130/37/48	233.5 3/3 135/42/52	237.7 3/6 141/47/57	240.0 3/6 140/50/60
44	* 209.9 3/3 * 124/32/43	220.8 3/3 129/36/47	228.7 3/3 134/41/51	232.7 3/3 140/46/56	235.2 3/6 141/50/59
46	* 206.2 3/3 * 124/31/42	216.9 3/3 128/35/45	223.4 3/3 133/40/50	227.2 3/3 139/45/55	229.9 3/6 143/50/59
48	* 202.6 3/9 * 124/30/40	213.0 3/3 127/34/44	218.1 3/3 133/39/49	221.7 3/3 139/45/54	224.6 3/6 144/50/58
50	* 199.1 3/9 * 124/29/39	* 209.0 3/3 * 126/33/43	213.2 3/3 132/39/48	216.6 3/3 138/44/53	219.3 2/3 144/49/57
52	* 195.5 3/9 * 124/28/38	* 204.3 3/3 * 125/33/42	208.2 3/3 132/38/47	211.5 3/3 137/43/52	214.0 3/3 143/48/56
53	* 193.8 3/9 * 124/28/37	* 201.9 3/3 * 125/32/41	205.8 3/3 132/38/46	208.9 3/3 137/43/51	211.4 2/3 143/48/56

OCTO 11.0.2 AA211A09 FCOM-F0-02-02-30-005-254

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 6
	QUICK REFERENCE TABLES		SEQ 254	REV 10

CONFIGURATION 1+F			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	9000	10000	11000	12000	13000
-20	246.5 3/3 135/42/54	259.7 3/3 141/46/58	265.2 3/6 144/52/63	268.4 3/6 143/55/66	271.1 3/6 142/59/70
	242.0 3/3 133/40/53	255.3 3/3 139/45/57	263.0 3/6 142/49/61	266.3 3/6 141/53/64	269.2 3/6 140/57/68
0	237.8 3/3 131/39/52	250.8 3/9 138/44/56	260.8 3/6 139/47/59	264.2 3/6 138/51/62	267.3 3/6 138/55/65
	233.9 3/3 130/38/51	246.7 3/3 136/43/54	257.2 3/6 138/46/57	262.3 3/6 137/49/60	265.4 3/6 136/53/64
20	230.3 3/3 128/37/50	242.8 3/3 134/42/53	253.7 3/6 138/45/57	260.3 3/6 136/48/59	263.5 3/6 135/51/62
	228.4 3/3 127/37/49	240.7 3/3 133/41/53	251.9 3/6 138/45/56	258.9 3/6 136/47/58	262.4 3/6 135/51/61
26	225.9 3/3 127/36/48	238.1 3/3 133/41/52	249.7 3/6 138/45/55	255.9 3/6 137/47/58	258.9 3/6 136/51/61
	223.3 3/3 126/35/47	235.2 3/3 132/40/51	246.7 3/9 138/44/55	252.4 3/6 137/47/57	255.2 3/6 136/50/60
32	220.6 3/3 125/35/46	232.3 3/3 131/39/50	243.5 3/9 137/43/54	248.9 3/6 138/47/57	251.6 3/6 137/50/60
	* 217.8 3/3 * 124/34/46	229.3 3/3 131/38/49	240.3 3/9 136/42/53	245.4 3/6 138/46/57	247.9 3/6 137/50/60
36	* 215.1 3/3 * 124/33/45	226.4 3/3 129/38/48	237.2 3/3 135/41/52	241.9 3/6 139/46/56	244.3 3/6 138/49/59
	* 212.5 3/3 * 123/32/44	223.6 3/3 129/37/47	234.2 3/3 134/41/51	238.5 3/6 139/46/56	240.8 3/6 139/49/59
40	* 209.8 3/3 * 122/32/43	220.7 3/3 128/36/47	230.6 3/3 133/40/50	234.8 3/6 139/45/55	237.2 3/6 139/49/58
	* 206.4 3/3 * 122/31/42	217.2 3/3 127/35/45	225.9 3/3 133/39/49	229.9 2/3 138/45/54	232.6 3/6 140/49/58
44	* 202.4 3/9 * 122/30/40	212.9 3/3 126/34/44	220.3 3/3 132/39/48	224.1 3/3 138/44/53	226.9 3/6 141/48/57
	* 198.4 3/9 * 122/29/39	208.6 3/3 125/33/43	214.6 3/3 131/38/47	218.2 3/3 137/43/52	221.1 3/6 142/48/56
48	* 194.5 3/9 * 122/27/38	* 204.4 3/3 * 124/32/41	209.0 3/3 130/37/46	212.4 3/3 136/42/51	215.1 2/3 141/47/55
	* 190.6 3/9 * 122/26/36	* 199.7 3/3 * 124/31/40	203.6 3/3 129/36/45	206.8 3/3 135/41/50	209.4 2/3 141/46/54
51	* 188.7 3/9 * 122/26/36	* 197.2 3/3 * 123/30/39	201.0 3/3 129/36/44	204.1 3/3 135/41/49	206.5 2/3 141/46/54

OCTO 11.0.2 AA211A09 FCOM-FO-02-30-006-254

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 7	
		SEQ 150	REV 10

CONFIGURATION 2			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (M)				
	2500	2750	3000	3250	3500
-20	256.2 3/9 136/40/53	266.0 3/3 140/45/56	271.0 3/3 145/50/61	275.2 3/6 149/56/66	277.8 3/6 150/59/69
-10	251.6 3/9 134/39/51	263.3 3/9 138/43/54	268.9 3/3 143/48/59	273.2 3/6 147/53/64	275.9 3/6 147/57/67
0	247.2 3/9 132/38/50	259.1 3/9 137/42/53	266.7 3/3 141/46/57	271.2 3/6 145/51/62	273.9 3/6 144/55/65
10	243.3 3/9 130/37/49	255.2 3/9 135/41/52	264.7 3/3 139/44/55	269.2 3/6 143/49/60	272.0 3/6 142/53/63
20	239.5 3/3 129/36/48	251.3 3/9 134/40/51	261.6 3/9 138/43/54	267.0 3/6 141/47/58	269.9 3/6 141/51/61
30	* 236.3 3/3 * 128/35/47	247.8 3/9 133/39/50	258.0 3/9 137/42/53	264.9 3/3 140/46/56	268.1 3/6 141/50/60
32	* 233.0 3/3 * 127/34/46	244.2 3/9 132/38/49	254.5 3/9 136/41/52	260.5 3/3 140/46/56	263.7 3/6 141/49/59
34	* 229.6 3/3 * 126/33/45	240.7 3/9 131/37/48	250.9 3/9 136/41/51	256.0 3/3 139/45/55	259.3 3/6 142/49/59
36	* 226.4 3/3 * 125/32/44	237.2 3/9 131/36/47	247.5 3/9 135/40/50	251.7 3/3 139/45/54	255.1 3/6 142/49/58
38	* 223.2 3/3 * 125/32/43	233.8 3/3 130/36/46	243.3 3/9 135/39/50	247.4 3/3 139/44/54	250.9 3/6 142/48/58
40	* 220.1 3/3 * 125/31/42	230.5 3/3 129/35/45	239.1 3/9 134/39/49	243.2 3/3 138/43/53	246.5 3/3 142/48/57
42	* 216.3 3/9 * 125/30/41	226.6 3/3 128/34/44	234.1 2/3 133/38/48	238.0 2/3 138/43/52	241.3 3/3 142/47/56
44	* 212.6 3/9 * 125/29/40	* 222.6 3/3 * 128/33/43	228.9 3/3 132/37/47	232.8 2/3 137/42/51	235.9 3/3 141/46/55
46	* 209.1 3/9 * 125/28/39	* 218.9 3/3 * 127/32/42	224.0 3/3 131/37/46	227.7 3/3 136/41/50	230.7 2/3 140/46/54
48	* 205.9 3/3 * 125/27/38	* 215.6 3/3 * 126/31/41	219.4 3/3 131/36/45	223.0 3/3 136/41/49	225.8 2/3 140/45/54
50	* 200.9 3/3 * 125/27/37	* 211.5 3/3 * 126/31/40	215.1 3/3 130/35/44	218.4 3/3 135/40/49	221.2 2/3 140/44/53
52	* 195.5 3/3 * 125/27/37	* 207.4 3/3 * 126/30/39	210.9 3/3 130/35/44	214.0 3/3 135/39/48	216.6 2/3 139/44/52
54	* 190.5 3/3 * 125/27/37	* 203.4 3/3 * 125/30/38	206.7 3/3 130/34/43	209.5 3/3 134/39/47	212.1 3/3 139/43/51
55	* 188.1 3/3 * 125/27/37	* 201.5 3/3 * 125/29/38	204.6 3/3 129/34/43	207.3 3/3 134/39/47	209.8 3/3 139/43/51

OCTO 9.1.2 AA211A09 FCOM-FO-02-02-30-007-150

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 8
	QUICK REFERENCE TABLES		SEQ 150	REV 10

CONFIGURATION 2			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2500	2750	3000	3250	3500
-20	248.5 3/9 134/38/51	259.1 3/3 138/42/54	264.1 3/3 143/48/59	268.2 3/3 147/53/63	270.9 3/6 148/57/67
-10	244.0 3/9 132/37/49	255.6 3/3 136/41/52	262.0 3/3 141/46/57	266.3 3/6 145/51/61	269.0 3/6 145/55/65
0	239.8 3/3 130/36/48	251.6 3/9 135/40/51	259.9 3/3 139/44/55	264.3 3/6 143/49/59	267.1 3/6 143/52/63
10	236.0 3/3 128/35/47	247.6 3/9 134/39/50	257.9 3/3 137/42/53	262.4 3/6 141/47/57	265.2 3/6 141/50/61
20	232.5 3/3 127/34/46	243.9 3/9 132/38/49	254.1 3/3 136/41/52	260.3 3/3 140/45/56	263.2 3/6 140/49/59
28	* 230.0 3/3 * 126/33/45	241.1 3/9 131/37/48	251.3 3/9 135/41/51	258.7 3/3 138/44/54	261.9 3/6 139/48/58
30	* 227.2 3/3 * 125/32/44	238.1 3/9 131/36/48	248.3 3/9 135/40/50	254.8 3/3 138/44/54	258.1 3/6 140/48/57
32	* 224.2 3/3 * 124/32/43	234.9 3/9 130/36/47	245.2 3/9 134/39/50	250.8 3/3 138/43/53	254.3 3/6 141/47/57
34	* 221.3 3/3 * 124/31/42	231.8 3/3 129/35/46	242.0 3/9 134/38/49	246.9 3/3 138/43/53	250.4 3/6 141/47/57
36	* 218.4 3/3 * 124/30/42	228.7 3/3 128/34/45	238.7 3/9 133/38/48	243.0 3/3 137/42/52	246.4 3/6 141/47/56
38	* 215.5 3/3 * 124/29/41	225.7 3/3 127/33/44	235.0 3/9 132/37/47	239.1 3/3 137/42/51	242.5 3/3 141/46/55
40	* 212.4 3/9 * 124/29/40	222.3 3/3 127/33/43	230.9 3/9 132/36/46	234.8 2/3 136/41/50	238.1 3/3 140/45/54
42	* 209.1 3/9 * 124/28/39	* 219.0 3/3 * 126/32/42	226.6 3/3 131/36/45	230.5 2/3 135/40/50	233.7 2/3 139/45/54
44	* 205.8 3/9 * 124/27/38	* 215.4 3/3 * 125/31/41	221.9 3/3 130/35/44	225.7 2/3 135/40/49	228.7 2/3 139/44/53
46	* 202.2 3/9 * 124/26/36	* 211.6 3/3 * 125/30/39	216.8 3/3 129/34/44	220.4 3/3 134/39/48	223.3 2/3 138/43/52
48	* 197.2 3/9 * 124/26/36	* 207.9 3/3 * 124/29/38	211.7 3/3 129/34/43	215.1 3/3 133/38/47	217.9 2/3 138/43/51
50	* 191.1 3/3 * 124/26/35	* 203.5 3/3 * 123/28/37	206.9 3/3 128/33/42	210.1 3/3 133/38/46	212.8 3/3 137/42/50
52	* 185.1 3/3 * 124/26/35	* 199.0 3/3 * 124/28/36	202.3 3/3 127/32/41	205.2 3/3 132/37/45	207.7 3/3 136/41/49
53	* 182.2 3/3 * 124/26/35	* 196.8 3/3 * 124/27/36	200.0 3/3 127/32/40	202.7 3/3 132/37/45	205.2 3/3 136/41/49

OCTO 9.1.2 AA211A09 FCOM-FO-02-02-30-008-150

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 7
	QUICK REFERENCE TABLES		SEQ 254	REV 10

CONFIGURATION 2			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	8000	9000	10000	11000	12000
-20	253.0 3/9 135/39/52	265.8 3/3 140/45/56	271.9 3/3 145/51/62	276.5 3/6 150/57/68	279.1 3/6 149/61/71
	-10	248.4 3/9 133/38/50	263.0 3/9 138/43/54	269.8 3/3 143/49/60	274.5 3/6 147/55/65	277.3 3/6 147/59/69
0	244.1 3/3 130/37/49	258.8 3/9 137/41/53	267.7 3/3 141/47/58	272.4 3/6 145/53/63	275.4 3/6 144/57/67
10	240.2 3/3 129/35/48	254.9 3/9 135/40/52	265.6 3/3 140/45/56	270.4 3/6 143/51/61	273.6 3/6 142/55/65
20	* 236.5 3/3 127/35/47	251.0 3/9 134/39/51	263.3 3/3 138/43/54	268.3 3/6 142/49/59	271.5 3/6 141/53/63
30	* 233.4 3/3 126/34/46	247.5 3/9 133/39/50	259.9 3/9 137/43/53	266.5 3/6 141/48/58	269.7 3/6 140/52/61
32	* 230.1 3/3 125/33/45	243.9 3/9 132/38/49	256.3 3/9 137/42/53	262.1 3/6 141/47/58	265.3 3/6 141/51/61
34	* 226.8 3/3 125/32/44	240.4 3/9 131/37/48	252.6 3/9 136/41/52	257.6 3/3 141/47/57	260.8 3/6 141/51/60
36	* 223.6 3/3 125/31/43	236.9 3/9 131/36/47	248.3 3/9 136/41/51	253.2 3/3 141/46/56	256.4 3/6 142/51/60
38	* 220.5 3/9 125/31/42	233.5 3/3 130/35/46	244.2 2/3 135/40/50	248.9 3/3 140/46/55	252.2 3/6 142/50/59
40	* 217.3 3/9 125/30/41	230.2 3/3 129/35/45	239.9 2/3 135/40/50	244.6 3/3 140/45/55	248.0 3/6 143/50/59
42	* 213.7 3/9 125/29/40	226.3 3/3 128/34/44	234.9 2/3 134/39/49	239.4 3/3 140/45/54	242.9 3/6 144/50/59
44	* 210.0 3/3 125/28/39	* 222.3 3/3 127/33/43	229.7 2/3 133/38/48	234.1 2/3 139/44/53	237.6 3/3 144/49/58
46	* 206.3 3/3 125/27/38	* 218.6 3/3 127/32/42	224.8 3/3 132/37/47	229.0 2/3 138/43/52	232.3 3/3 143/48/57
48	* 200.9 3/3 125/27/38	* 215.3 3/3 126/31/41	220.1 3/3 132/37/46	224.2 3/3 138/42/51	227.3 3/3 143/48/56
50	* 195.5 3/3 125/27/37	* 211.4 3/3 126/30/40	215.7 3/3 131/36/45	219.7 3/3 137/42/50	222.6 2/3 142/47/55
52	* 190.2 3/3 125/27/37	* 207.3 3/3 125/30/39	211.5 3/3 131/36/44	215.1 3/3 136/41/50	217.9 2/3 142/46/54
54	* 185.3 3/3 125/27/37	* 203.3 3/3 125/29/38	207.3 3/3 131/35/44	210.6 3/3 136/41/49	213.3 2/3 142/46/54
55	* 182.9 3/3 125/27/37	* 201.4 3/3 125/29/38	205.2 3/3 130/35/43	208.4 3/3 136/41/48	211.0 2/3 142/46/53

OCTO 11.0.2 AA211A09 FCOM-F0-02-02-30-007-254

CONFIGURATION 2			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (FT)				
	8000	9000	10000	11000	12000
-20	245.4 3/9 133/37/50	259.0 3/3 138/42/54	265.0 3/3 143/49/60	269.6 3/6 148/55/65	272.2 3/6 147/59/69
-10	241.0 3/3 130/36/48	255.3 3/9 136/41/52	262.9 3/3 141/47/58	267.6 3/6 146/53/63	270.4 3/6 145/57/66
0	236.8 3/3 128/35/47	251.3 3/9 135/40/51	260.8 3/3 139/45/56	265.6 3/6 143/50/61	268.6 3/6 142/54/64
10	233.1 3/3 127/34/46	247.3 3/9 133/39/50	258.8 3/3 138/43/54	263.7 3/6 141/48/59	266.8 3/6 140/52/62
20	* 229.6 3/3 125/33/45	243.5 3/9 132/38/49	255.9 3/3 137/42/53	261.7 3/6 140/47/57	264.8 3/6 139/51/61
28	* 227.2 3/3 124/32/44	240.8 3/9 131/37/48	253.1 3/3 136/41/52	260.3 3/6 140/46/56	263.5 3/6 139/50/60
30	* 224.4 3/3 124/31/43	237.8 3/9 130/36/48	250.1 3/9 135/40/51	256.4 3/6 140/46/56	259.6 3/6 140/50/59
32	* 221.5 3/3 124/31/43	234.6 3/3 130/36/47	246.9 3/9 135/40/50	252.4 3/3 139/45/55	255.7 3/6 140/49/59
34	* 218.6 3/3 124/30/42	231.5 3/3 129/35/46	243.6 3/9 134/39/49	248.4 3/3 139/45/54	251.8 3/6 141/49/58
36	* 215.7 3/3 124/29/41	228.4 3/3 128/34/45	239.7 3/9 134/38/49	244.5 3/3 139/44/54	247.9 3/6 141/49/58
38	* 212.9 3/9 124/28/40	225.4 3/3 127/33/44	235.9 3/9 133/38/48	240.6 3/3 138/44/53	244.1 3/6 142/48/57
40	* 209.7 3/9 124/28/39	222.1 3/3 127/32/43	231.7 2/3 133/37/47	236.3 2/3 138/43/52	239.9 3/6 142/48/57
42	* 206.6 3/9 124/27/38	* 218.7 3/3 126/32/42	227.4 3/3 132/37/46	231.9 2/3 137/42/51	235.4 3/3 142/47/56
44	* 203.3 3/3 124/26/37	* 215.2 3/3 125/31/41	222.7 3/3 131/36/45	227.0 2/3 136/41/50	230.4 3/3 142/47/55
46	* 198.0 3/3 124/26/36	* 211.4 3/3 125/30/39	217.5 3/3 130/35/44	221.7 3/3 136/41/49	224.9 3/3 141/46/54
48	* 191.9 3/3 124/26/36	* 207.7 3/3 124/29/38	212.4 3/3 130/35/44	216.4 3/3 135/40/49	219.4 2/3 141/45/53
50	* 186.0 3/3 124/26/36	* 203.4 3/3 124/28/37	207.5 3/3 129/34/43	211.3 3/3 134/39/48	214.1 2/3 140/45/52
52	* 180.0 3/3 124/26/35	* 198.9 3/3 124/27/36	202.8 3/3 128/33/42	206.3 3/3 134/39/47	208.9 2/3 139/44/51
53	* 177.3 3/3 124/26/35	* 196.7 3/3 123/27/36	200.5 3/3 128/33/41	203.8 3/3 134/38/46	206.4 3/3 139/43/51

OCTO 11.0.2 AA211A09 FCOM-FO-02-30-008-254

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 9	
		SEQ 150	REV 10

CONFIGURATION 2			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2500	2750	3000	3250	3500
-20	240.8 3/9 131/36/48	252.0 3/3 136/40/52	257.2 3/3 140/46/56	261.3 3/3 145/51/61	264.1 3/6 146/55/64
	-10	236.5 3/3 129/35/47	248.0 3/3 135/39/50	255.2 3/3 138/43/54	259.4 3/3 143/49/59	262.2 3/6 143/52/62
0	232.5 3/3 128/34/46	243.9 3/9 133/38/49	253.1 3/3 137/41/52	257.4 3/6 141/46/57	260.3 3/6 141/50/60
10	228.8 3/3 126/33/45	240.0 3/9 131/37/48	250.2 3/3 135/40/51	255.6 3/6 139/45/55	258.5 3/6 139/48/58
20	* 225.5 3/3 * 125/32/44	236.4 3/9 130/36/47	246.6 3/3 134/39/50	253.5 3/3 138/43/53	256.6 3/6 138/47/57
26	* 223.7 3/3 * 124/31/43	234.4 3/9 129/35/47	244.6 3/3 134/39/50	252.4 3/3 137/42/52	255.6 3/6 138/46/56
28	* 221.3 3/3 * 123/31/43	231.9 3/3 129/35/46	242.1 3/9 133/38/49	249.0 3/3 137/42/52	252.4 3/6 139/46/56
30	* 218.8 3/3 * 123/30/42	229.2 3/3 128/34/45	239.2 3/3 133/38/48	245.5 3/3 136/42/51	249.0 3/6 140/46/55
32	* 216.1 3/3 * 122/29/41	226.4 3/3 127/33/44	236.2 3/9 132/37/47	241.9 3/3 136/41/51	245.4 3/6 140/45/55
34	* 213.5 3/3 * 122/29/40	223.5 3/3 127/33/43	233.3 3/9 132/36/46	238.4 3/3 136/41/50	241.8 3/3 139/45/54
36	* 210.8 3/3 * 122/28/39	220.7 3/3 126/32/42	230.3 3/9 131/35/45	234.7 2/3 135/40/50	238.1 3/3 139/44/54
38	* 208.3 3/3 * 122/27/38	218.0 3/3 125/31/42	227.3 3/9 130/35/45	231.2 2/3 134/39/49	234.6 3/3 139/44/53
40	* 205.6 3/9 * 122/27/38	* 215.3 3/3 * 125/31/41	223.8 3/3 130/34/44	227.6 2/3 134/39/48	230.9 3/3 138/43/52
42	* 202.3 3/9 * 122/26/36	* 211.8 3/3 * 124/30/40	219.3 3/3 129/34/43	223.0 3/3 133/38/47	226.1 2/3 137/43/51
44	* 198.4 3/9 * 122/25/35	* 207.7 3/3 * 123/29/38	213.8 3/3 128/33/42	217.4 3/3 132/37/46	220.3 2/3 136/42/50
46	* 193.5 3/9 * 122/24/34	* 203.6 3/3 * 122/28/37	208.3 3/3 127/32/41	211.7 3/3 131/37/45	214.5 3/3 136/41/49
48	* 186.6 3/3 * 122/24/34	* 199.4 3/3 * 122/26/36	202.8 3/3 126/31/40	206.1 3/3 131/36/44	208.7 3/3 135/40/48
50	* 180.0 3/3 * 122/24/34	* 194.5 3/3 * 122/26/35	197.7 3/3 125/31/39	200.7 3/3 130/35/43	203.2 3/3 134/39/47
51	* 176.6 3/3 * 122/24/33	* 192.1 3/3 * 122/25/34	195.2 3/3 125/30/38	198.0 3/3 130/35/42	200.5 3/3 134/39/46

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 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 9
	QUICK REFERENCE TABLES		SEQ 254	REV 10

CONFIGURATION 2			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	8000	9000	10000	11000	12000
-20	237.8 3/3 130/35/48	251.7 3/3 136/40/52	258.1 3/3 141/47/57	262.8 3/6 146/53/63	265.4 3/6 146/57/66
	-10	233.5 3/3 128/34/46	247.7 3/3 135/39/50	256.1 3/3 139/44/55	260.8 3/6 144/50/60	263.6 3/6 143/54/64
0	229.6 3/3 126/33/45	243.6 3/9 133/38/49	254.0 3/3 137/42/53	258.8 3/6 142/48/58	261.7 3/6 141/52/62
10	* 226.0 3/3 * 124/32/44	239.7 3/9 131/37/48	252.0 3/3 136/41/52	257.0 3/6 140/46/57	260.0 3/6 139/50/60
	20	* 222.7 3/3 * 123/31/43	236.1 3/9 130/36/47	248.4 3/3 135/40/51	255.1 3/6 139/45/55	258.1 3/6 138/49/58
26	* 221.0 3/3 * 122/30/42	234.2 3/3 129/35/46	246.3 3/3 134/39/50	254.0 3/6 138/44/54	257.2 3/6 138/48/58
	28	* 218.6 3/3 * 122/30/42	231.6 3/3 129/35/46	243.8 3/3 134/39/49	250.6 3/3 138/44/54	253.9 3/6 139/48/57
30	* 216.1 3/3 * 122/29/41	228.9 3/3 128/34/45	241.1 3/3 134/38/49	247.0 3/3 138/43/53	250.4 3/6 139/48/57
	32	* 213.5 3/3 * 122/28/40	226.1 3/3 127/33/44	238.1 3/3 133/38/48	243.4 3/3 138/43/53	246.9 3/6 140/47/57
34	* 210.9 3/9 * 123/28/39	223.3 3/3 127/33/43	235.1 3/9 132/37/47	239.8 3/3 137/42/52	243.4 3/6 140/47/56
	36	* 208.3 3/9 * 122/27/38	220.5 3/3 126/32/42	231.5 3/9 132/36/46	236.2 3/3 137/42/51	239.9 3/6 141/47/56
38	* 205.7 3/9 * 122/26/38	217.8 3/3 125/31/41	228.1 3/9 131/36/45	232.7 3/3 136/41/51	236.3 3/6 141/46/55
	40	* 203.1 3/9 * 122/26/37	* 215.0 3/3 * 124/30/41	224.6 3/3 130/35/45	229.0 2/3 135/41/50	232.6 3/3 141/46/55
42	* 199.9 3/9 * 122/25/36	* 211.6 3/3 * 124/30/39	220.0 3/3 129/34/44	224.3 2/3 135/40/49	227.8 3/3 140/45/54
	44	* 195.2 3/3 * 122/24/35	* 207.4 3/3 * 123/28/38	214.5 3/3 128/34/43	218.6 3/3 134/39/48	221.9 2/3 139/44/53
46	* 188.3 3/3 * 122/24/34	* 203.3 3/3 * 122/27/37	209.0 3/3 128/33/42	212.9 3/3 133/38/47	215.9 2/3 138/43/51
	48	* 181.7 3/3 * 122/24/34	* 199.3 3/3 * 122/26/35	203.5 3/3 127/32/41	207.2 3/3 132/38/46	210.1 2/3 138/43/50
50	* 175.1 3/3 * 122/24/34	* 194.4 3/3 * 122/26/34	198.3 3/3 126/31/40	201.8 3/3 132/37/45	204.5 3/3 137/42/49
	51	* 171.8 3/3 * 122/24/34	* 192.0 3/3 * 122/25/34	195.8 3/3 126/31/39	199.1 3/3 131/36/44

OCTO 11.0.2 AA211A09 FCOM-F0-02-02-30-009-254

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 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 11	
		SEQ 150	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (M)				
	2000	2250	2500	2750	3000
-20	* 231.0 3/9	245.4 3/3	257.6 3/9	263.5 3/3	267.8 3/3
	* 127/31/44	132/37/48	136/41/52	141/47/57	146/52/62
-10	* 226.8 3/3	240.9 3/9	253.5 3/9	261.5 2/3	266.0 3/3
	* 126/30/43	130/35/47	135/39/51	139/44/55	144/50/60
0	* 217.9 3/9	* 236.8 3/9	249.5 3/9	259.5 3/9	264.1 3/3
	* 126/28/42	* 128/34/46	133/38/50	137/42/53	142/48/58
10	* 209.4 3/3	* 233.1 3/3	245.9 3/3	256.9 3/9	262.3 3/3
	* 126/28/42	* 126/33/45	132/37/49	136/41/51	140/46/56
20	* 201.8 3/3	* 229.6 3/9	242.1 3/9	253.2 3/9	260.2 2/3
	* 126/28/42	* 126/32/44	131/36/48	134/40/51	138/44/54
30	* 195.4 3/3	* 226.6 3/3	238.8 3/9	249.9 3/9	258.3 2/3
	* 126/28/42	* 126/31/43	129/35/47	133/39/50	137/43/53
32	* 191.1 3/3	* 222.7 3/3	* 235.4 3/9	246.4 3/9	254.0 2/3
	* 126/28/41	* 126/30/42	* 129/35/46	133/38/49	137/42/52
34	* 186.8 3/3	* 217.7 3/9	* 232.0 3/9	243.0 3/9	249.6 2/3
	* 126/28/41	* 126/28/40	* 128/34/45	133/38/48	136/42/52
36	* 182.7 3/3	* 212.9 3/9	* 228.8 3/9	239.6 3/9	245.3 2/3
	* 126/28/41	* 126/28/40	* 127/33/44	132/37/47	136/41/51
38	* 178.6 3/3	* 208.1 3/3	* 225.6 3/9	236.2 3/9	241.1 2/3
	* 126/28/41	* 126/28/39	* 127/32/43	131/36/46	136/41/50
40	* 174.6 3/3	* 203.4 3/3	* 222.4 3/9	232.7 3/9	236.9 2/3
	* 126/28/41	* 126/28/39	* 126/32/42	131/35/45	135/40/50
42	* 170.1 3/3	* 198.0 3/3	* 218.7 3/9	227.9 3/3	231.9 2/3
	* 126/28/40	* 126/28/39	* 126/31/41	131/35/44	135/40/49
44	* 165.7 3/3	* 192.7 3/3	* 214.9 3/9	223.0 2/3	226.8 2/3
	* 126/28/40	* 126/28/39	* 126/30/39	130/34/43	134/39/48
46	* 161.5 3/3	* 187.8 3/3	* 211.4 3/3	218.3 2/3	221.8 2/3
	* 126/28/40	* 126/28/39	* 126/29/38	129/33/42	134/39/47
48	* 158.0 3/3	* 183.6 3/3	* 208.2 3/3	213.9 2/3	217.1 2/3
	* 126/28/40	* 126/28/38	* 126/28/37	129/33/42	133/38/46
50	* 154.4 3/3	* 179.3 3/3	* 203.2 3/3	* 209.7 2/3	212.7 2/3
	* 126/28/39	* 126/28/38	* 126/28/37	* 128/32/41	133/37/46
52	* 150.8 3/3	* 175.1 3/3	* 197.8 3/3	* 205.6 3/3	208.5 3/3
	* 126/28/39	* 126/28/38	* 126/28/37	* 128/32/40	132/37/45
54	* 147.3 3/3	* 171.1 3/3	* 192.6 3/3	* 201.6 3/3	204.2 3/3
	* 126/28/39	* 126/28/37	* 126/28/36	* 127/31/39	132/36/44
55	* 145.8 3/3	* 169.0 3/3	* 190.0 3/3	* 199.6 3/3	202.1 3/3
	* 126/28/39	* 126/28/37	* 126/28/36	* 127/31/39	132/36/44

OCTO 9.1.2 AA211A09 FCOM-FO-02-02-30-010-150

CONFIGURATION 3			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2000	2250	2500	2750	3000
-20	* 224.1 3/9	238.0 3/9	250.1 3/9	256.8 3/3	261.0 3/3
	* 125/30/42	130/35/46	134/39/50	139/44/55	144/50/60
-10	* 220.1 3/3	233.8 3/9	246.2 3/9	254.8 3/3	259.2 3/3
	* 125/28/41	128/33/45	133/38/49	137/42/53	142/48/58
0	* 211.3 3/3	* 229.8 3/3	242.4 3/9	252.8 3/9	257.4 3/3
	* 125/26/40	* 126/32/44	132/36/48	135/40/51	140/45/56
10	* 203.0 3/3	* 226.2 3/3	238.6 3/9	249.5 3/9	255.6 3/3
	* 125/26/40	* 125/31/43	130/35/47	134/39/50	138/44/54
20	* 195.6 3/3	* 222.9 3/9	235.0 3/9	246.0 3/9	253.7 3/3
	* 125/26/40	* 125/30/42	129/34/46	133/38/49	137/42/52
28	* 190.6 3/3	* 220.6 3/3	232.4 3/9	243.4 3/9	252.2 3/9
	* 125/26/40	* 125/29/41	127/34/45	132/38/48	135/41/51
30	* 187.3 3/3	* 218.0 3/3	* 229.6 3/9	240.5 3/9	248.4 2/3
	* 125/26/40	* 125/29/40	* 127/33/44	132/37/47	135/41/50
32	* 183.2 3/3	* 213.7 3/3	* 226.5 3/3	237.4 3/9	244.5 2/3
	* 125/26/40	* 125/27/39	* 126/32/43	131/36/46	135/40/50
34	* 179.3 3/3	* 209.1 3/9	* 223.6 3/3	234.4 3/9	240.7 2/3
	* 125/26/39	* 125/26/38	* 126/32/42	131/35/45	135/40/49
36	* 175.7 3/3	* 204.8 3/3	* 220.7 3/3	231.2 3/3	236.8 2/3
	* 125/26/39	* 124/26/38	* 125/31/41	130/35/44	134/39/49
38	* 171.9 3/3	* 200.4 3/3	* 217.7 3/3	228.1 3/3	233.1 2/3
	* 125/26/39	* 124/26/38	* 124/30/40	130/34/44	134/39/48
40	* 167.9 3/3	* 195.7 3/3	* 214.6 3/9	224.8 3/9	228.9 2/3
	* 125/26/39	* 124/26/37	* 124/29/39	129/33/43	134/38/47
42	* 164.0 3/3	* 191.1 3/3	* 211.4 3/9	220.6 3/9	224.6 2/3
	* 125/26/39	* 124/26/37	* 125/29/38	128/33/42	133/38/46
44	* 159.9 3/3	* 186.2 3/3	* 208.0 3/3	216.2 2/3	219.9 2/3
	* 125/26/38	* 124/26/37	* 125/28/37	128/32/41	132/37/46
46	* 155.5 3/3	* 181.0 3/3	* 204.4 3/3	* 211.3 2/3	214.7 2/3
	* 125/26/38	* 124/26/37	* 124/27/36	* 127/31/40	131/36/45
48	* 151.5 3/3	* 176.3 3/3	* 199.5 3/3	* 206.4 3/3	209.5 3/3
	* 125/26/38	* 124/26/36	* 124/26/35	* 126/31/39	131/36/44
50	* 147.4 3/3	* 171.5 3/3	* 193.3 3/3	* 201.8 3/3	204.7 3/3
	* 125/26/38	* 124/26/36	* 124/26/35	* 126/30/38	130/35/43
52	* 143.3 3/3	* 166.4 3/3	* 187.1 3/3	* 197.2 3/3	200.0 3/3
	* 125/26/37	* 124/26/36	* 124/26/35	* 125/29/37	130/34/42
53	* 141.4 3/3	* 163.8 3/3	* 184.2 3/3	* 195.0 3/3	197.6 3/3
	* 125/26/37	* 124/26/36	* 124/26/35	* 125/29/37	130/34/42

OCTO 9.1.2 AA211A09 FCOM-F0-02-02-30-011-150

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 11
	QUICK REFERENCE TABLES		SEQ 254	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (FT)				
	7000	8000	9000	10000	11000
-20	* 238.8 3/9	254.7 3/9	263.4 3/3	268.6 3/3	272.5 3/6
	* 129/34/47	135/40/51	141/46/57	147/53/63	152/60/69
-10	* 234.5 3/3	250.6 3/9	261.4 2/3	266.8 3/3	270.8 3/6
	* 126/33/45	134/38/50	139/44/55	145/51/61	149/57/67
0	* 230.5 3/9	246.7 3/9	259.4 3/9	264.9 3/3	269.0 3/6
	* 126/32/44	132/37/49	137/42/53	143/49/59	146/55/64
10	* 226.8 3/3	242.8 3/9	256.6 3/9	263.1 3/3	267.3 3/6
	* 126/30/43	131/36/48	136/41/51	141/47/57	144/52/62
20	* 219.4 3/9	239.1 3/9	252.9 3/9	261.0 3/3	265.4 3/6
	* 126/28/41	129/35/47	134/40/50	139/45/55	143/51/61
30	* 212.8 3/3	* 235.8 3/9	249.6 3/9	259.2 2/3	263.8 3/6
	* 126/28/41	* 128/34/46	133/39/50	138/44/54	142/50/59
32	* 208.2 3/3	* 232.5 3/9	246.2 3/9	254.8 2/3	259.3 3/6
	* 126/28/41	* 127/34/45	133/38/49	138/43/53	142/49/59
34	* 203.5 3/3	* 229.2 3/3	242.7 3/9	250.4 2/3	254.7 3/3
	* 126/28/40	* 126/33/44	132/37/48	137/43/53	142/49/58
36	* 199.0 3/3	* 226.0 3/3	239.3 3/9	246.0 2/3	250.2 3/3
	* 126/28/40	* 126/32/43	132/37/47	137/42/52	142/48/57
38	* 194.5 3/3	* 222.9 3/9	236.0 3/9	241.8 2/3	245.9 3/3
	* 126/28/40	* 126/31/42	131/36/46	136/42/51	141/47/56
40	* 190.1 3/3	* 219.7 3/9	232.6 3/3	237.6 2/3	241.6 3/3
	* 126/28/40	* 126/31/41	131/35/45	136/41/50	141/47/56
42	* 185.2 3/3	* 216.0 3/3	227.7 3/3	232.6 2/3	236.4 3/3
	* 126/28/40	* 126/30/40	131/35/44	136/41/50	141/46/55
44	* 180.3 3/3	* 212.3 3/3	222.9 2/3	227.5 2/3	231.1 3/3
	* 126/28/39	* 126/29/39	130/34/43	135/40/49	140/46/54
46	* 175.7 3/3	* 206.9 3/3	218.2 2/3	222.5 2/3	226.0 3/3
	* 126/28/39	* 126/28/38	129/33/42	135/39/48	140/45/53
48	* 171.9 3/3	* 202.1 3/3	213.8 2/3	217.8 2/3	221.2 3/3
	* 126/28/39	* 126/28/37	129/33/42	134/39/47	140/45/52
50	* 167.9 3/3	* 197.4 3/3	* 209.6 2/3	213.3 2/3	216.6 2/3
	* 126/28/39	* 126/28/37	* 128/32/41	134/38/46	139/44/52
52	* 164.0 3/3	* 192.4 3/3	* 205.5 3/3	209.0 2/3	212.0 2/3
	* 126/28/38	* 126/28/37	* 128/32/40	133/38/46	139/43/51
54	* 160.1 3/3	* 187.4 3/3	* 201.5 3/3	204.7 3/3	207.6 2/3
	* 126/28/38	* 126/28/37	* 127/31/39	133/37/45	139/43/50
55	* 158.2 3/3	* 184.9 3/3	* 199.5 3/3	202.6 3/3	205.4 2/3
	* 126/28/38	* 126/28/37	* 127/31/39	133/37/45	139/43/50

OCTO 11.0.2 AA211A09 FCOM-F0-02-02-30-010-254

CONFIGURATION 3			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (FT)				
	7000	8000	9000	10000	11000
-20	* 231.6 3/9	247.3 3/9	256.6 3/3	261.8 3/3	265.8 3/6
	* 127/32/45	134/38/49	139/44/54	145/51/61	150/57/67
-10	* 227.5 3/3	243.4 3/9	254.7 3/3	260.0 3/3	264.1 3/6
	* 125/31/43	132/37/48	137/42/52	143/49/59	147/55/64
0	* 223.7 3/9	239.4 3/9	252.7 3/9	258.2 3/3	262.3 3/6
	* 125/30/42	130/35/47	135/40/51	141/47/57	145/52/62
10	* 220.2 3/3	235.6 3/9	249.2 3/9	256.4 3/3	260.7 3/6
	* 125/29/41	129/34/46	134/39/50	139/45/55	143/50/60
20	* 212.9 3/9	* 232.1 3/9	245.7 3/9	254.5 3/3	258.9 3/6
	* 125/26/39	* 127/33/45	133/38/49	137/43/53	142/49/58
28	* 207.7 3/3	* 229.5 3/3	243.2 3/9	253.0 3/3	257.7 3/6
	* 125/26/39	* 126/33/44	132/37/48	136/42/52	141/48/57
30	* 204.1 3/3	* 226.7 3/3	240.3 3/9	249.2 3/3	253.7 3/3
	* 125/26/39	* 126/32/43	132/37/47	136/42/51	141/47/57
32	* 199.7 3/3	* 223.8 3/3	237.2 3/9	245.3 2/3	249.6 3/3
	* 125/26/39	* 125/31/42	131/36/46	136/41/51	141/47/56
34	* 195.4 3/3	* 220.9 3/3	234.1 3/9	241.4 2/3	245.6 3/3
	* 125/26/39	* 125/31/41	131/35/45	135/41/50	140/46/55
36	* 191.4 3/3	* 218.0 3/9	231.0 3/3	237.6 2/3	241.6 3/3
	* 125/26/38	* 125/30/40	130/35/44	135/40/49	140/46/55
38	* 187.3 3/3	* 215.1 3/9	227.9 3/9	233.8 2/3	237.7 3/3
	* 125/26/38	* 124/29/40	129/34/43	135/40/49	139/45/54
40	* 182.9 3/3	* 212.0 3/3	224.5 3/9	229.6 2/3	233.4 3/3
	* 125/26/38	* 124/28/39	129/33/42	134/39/48	139/45/53
42	* 178.7 3/3	* 208.9 3/3	220.5 3/9	225.3 2/3	229.1 3/3
	* 125/26/38	* 125/28/38	128/32/42	134/39/47	139/44/52
44	* 174.1 3/3	* 205.4 3/3	216.1 3/9	220.6 2/3	224.2 3/3
	* 125/26/38	* 124/27/36	127/32/41	133/38/46	138/43/52
46	* 169.3 3/3	* 199.5 3/3	* 211.2 2/3	215.3 2/3	218.8 2/3
	* 124/26/37	* 124/26/36	* 127/31/40	133/37/45	138/43/51
48	* 164.9 3/3	* 194.1 3/3	* 206.3 3/3	210.1 3/3	213.5 2/3
	* 124/26/37	* 124/26/36	* 126/31/39	132/37/45	137/42/50
50	* 160.5 3/3	* 188.0 3/3	* 201.7 3/3	205.2 3/3	208.4 2/3
	* 124/26/37	* 124/26/35	* 126/30/38	131/36/44	137/41/49
52	* 156.0 3/3	* 182.0 3/3	* 197.1 3/3	200.4 3/3	203.4 2/3
	* 124/26/36	* 124/26/35	* 125/29/37	131/35/43	136/41/48
53	* 153.9 3/3	* 179.2 3/3	* 194.9 3/3	198.1 3/3	200.9 2/3
	* 124/26/36	* 124/26/35	* 125/29/37	130/35/42	136/41/48

OCTO 11.0.2 AA211A09 FCOM-FO-02-02-30-011-254

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 13
	QUICK REFERENCE TABLES		SEQ 150	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (M)				
	2000	2250	2500	2750	3000
-20	* 217.3 3/9	230.7 3/9	242.7 3/9	250.1 3/3	254.3 3/3
	* 124/28/40	128/33/44	133/37/48	137/42/52	142/47/57
-10	* 213.4 3/3	* 226.6 3/3	238.9 3/9	248.2 3/3	252.5 3/3
	* 123/26/39	* 126/31/43	131/36/47	135/40/50	140/45/55
0	* 204.9 3/3	* 222.8 3/3	235.0 3/9	245.7 3/9	250.7 3/3
	* 123/25/38	* 124/30/42	130/34/46	134/38/49	138/43/53
10	* 196.8 3/3	* 219.4 3/9	231.3 3/9	242.1 3/9	249.0 3/3
	* 123/25/38	* 123/29/41	128/33/45	132/37/48	136/41/51
20	* 189.6 3/3	* 216.2 3/9	227.9 3/9	238.8 3/9	247.1 3/3
	* 123/25/38	* 123/28/40	126/32/43	131/36/47	135/40/50
26	* 185.9 3/3	* 214.5 3/3	* 226.0 3/3	237.0 3/9	246.1 3/3
	* 123/25/38	* 123/28/39	* 125/32/43	131/36/46	134/39/49
28	* 182.9 3/3	* 212.3 3/3	* 223.6 3/3	234.5 3/9	242.7 3/3
	* 123/25/38	* 123/27/39	* 125/31/42	130/35/45	134/39/48
30	* 179.7 3/3	* 209.8 3/3	* 221.0 3/3	231.7 3/3	239.3 3/3
	* 123/25/38	* 123/26/38	* 124/31/41	130/35/45	134/38/48
32	* 176.0 3/3	* 205.5 3/9	* 218.3 3/3	228.8 3/9	235.8 2/3
	* 123/25/38	* 123/25/36	* 124/30/41	129/34/44	133/38/47
34	* 172.5 3/3	* 201.4 3/9	* 215.7 3/3	226.0 3/9	232.4 2/3
	* 123/25/38	* 123/25/36	* 123/29/40	129/33/43	133/38/47
36	* 169.2 3/3	* 197.5 3/3	* 213.0 3/3	223.2 3/9	228.9 2/3
	* 123/25/37	* 123/25/36	* 123/29/39	128/33/42	132/37/46
38	* 165.8 3/3	* 193.4 3/3	* 210.4 3/3	220.4 3/9	225.5 2/3
	* 123/25/37	* 123/25/36	* 123/28/38	127/32/41	132/37/46
40	* 162.4 3/3	* 189.4 3/3	* 207.8 3/9	217.6 3/9	221.9 2/3
	* 123/25/37	* 123/25/36	* 123/27/37	127/31/40	131/36/45
42	* 158.3 3/3	* 184.6 3/3	* 204.5 3/9	213.5 3/9	217.3 2/3
	* 123/25/37	* 123/25/35	* 123/27/36	126/31/39	131/35/44
44	* 153.4 3/3	* 178.9 3/3	* 200.5 3/3	* 208.3 3/3	211.8 3/3
	* 123/25/37	* 123/25/35	* 123/26/35	* 125/30/38	130/35/43
46	* 148.5 3/3	* 173.2 3/3	* 195.7 3/3	* 203.0 3/3	206.2 3/3
	* 123/25/36	* 123/25/35	* 123/25/34	* 124/29/37	129/34/42
48	* 144.2 3/3	* 167.9 3/3	* 188.8 3/3	* 197.8 3/3	200.7 3/3
	* 123/25/36	* 123/25/35	* 123/25/34	* 124/28/37	128/33/41
50	* 139.6 3/3	* 161.8 3/3	* 181.9 3/3	* 192.8 3/3	195.6 3/3
	* 123/25/36	* 123/25/34	* 123/25/33	* 123/28/36	127/32/40
51	* 137.4 3/3	* 158.7 3/3	* 178.6 3/3	* 190.4 3/3	193.0 3/3
	* 123/25/36	* 123/25/34	* 123/25/33	* 123/27/35	127/32/39

OCTO 9.1.2 AA211A09 FCOM-FO-02-02-30-012-150

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 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 13	
		SEQ 254	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (FT)				
	7000	8000	9000	10000	11000
-20	* 224.5 3/3	240.0 3/9	249.9 3/3	255.0 3/3	259.0 3/6
	* 124/30/43	132/36/47	137/42/52	142/48/58	148/55/64
-10	* 220.6 3/3	236.0 3/9	248.0 3/3	253.3 3/3	257.4 3/6
	* 123/29/41	130/35/46	135/40/50	140/46/56	146/52/62
0	* 216.9 3/9	232.0 3/9	245.4 3/9	251.5 3/3	255.7 3/6
	* 123/28/40	128/33/45	133/38/49	139/44/54	143/50/60
10	* 213.5 3/3	228.4 3/9	241.9 3/9	249.8 3/3	254.1 3/6
	* 123/27/39	126/32/44	132/37/48	137/42/52	141/48/58
20	* 206.6 3/9	* 225.1 3/3	238.5 3/9	247.9 3/3	252.5 3/6
	* 123/25/38	* 125/31/43	131/36/47	135/41/51	140/47/56
26	* 202.7 3/3	* 223.2 3/3	236.7 3/9	246.9 3/3	251.4 3/6
	* 123/25/37	* 124/31/42	131/36/46	135/40/50	139/46/55
28	* 199.4 3/3	* 220.9 3/3	234.2 3/9	243.5 3/3	247.9 3/3
	* 123/25/37	* 124/30/41	130/35/45	135/40/49	139/45/55
30	* 196.0 3/3	* 218.3 3/3	231.4 3/9	240.1 3/3	244.3 3/3
	* 123/25/37	* 123/30/41	130/35/45	134/39/49	139/45/54
32	* 191.9 3/3	* 215.7 3/3	228.6 3/9	236.6 3/3	240.7 3/3
	* 123/25/37	* 123/29/40	129/34/44	134/39/48	139/45/53
34	* 188.1 3/3	* 213.1 3/9	225.7 3/9	233.1 2/3	237.1 3/3
	* 123/25/37	* 123/28/39	129/33/43	134/39/48	138/44/53
36	* 184.4 3/3	* 210.5 3/9	222.9 3/9	229.6 2/3	233.5 3/3
	* 123/25/37	* 123/28/38	128/32/42	133/38/47	138/44/52
38	* 180.7 3/3	* 207.9 3/9	220.1 3/9	226.2 2/3	230.0 3/3
	* 123/25/36	* 123/27/37	127/32/41	133/38/46	138/43/52
40	* 177.0 3/3	* 205.3 3/9	217.3 3/9	222.6 2/3	226.4 3/3
	* 123/25/36	* 123/26/36	127/31/40	132/37/46	137/43/51
42	* 172.5 3/3	* 202.0 3/3	213.4 3/9	218.0 2/3	221.7 3/3
	* 123/25/36	* 123/26/35	126/30/39	131/36/45	137/42/50
44	* 167.2 3/3	* 197.4 3/3	* 208.2 3/3	212.4 3/3	216.0 2/3
	* 123/25/36	* 123/25/34	* 125/30/38	131/36/44	136/41/49
46	* 161.9 3/3	* 190.4 3/3	* 202.9 3/3	206.8 3/3	210.2 2/3
	* 123/25/35	* 123/25/34	* 124/29/37	130/35/43	135/40/48
48	* 157.1 3/3	* 183.6 3/3	* 197.7 3/3	201.3 3/3	204.5 2/3
	* 123/25/35	* 123/25/34	* 124/28/36	129/34/42	135/40/47
50	* 152.1 3/3	* 177.0 3/3	* 192.8 3/3	196.1 3/3	199.0 3/3
	* 123/25/35	* 123/25/34	* 123/27/35	129/33/41	134/39/46
51	* 149.5 3/3	* 173.6 3/3	* 190.3 3/3	193.5 3/3	196.3 3/3
	* 123/25/35	* 123/25/33	* 123/27/35	128/33/40	134/38/45

OCTO 11.0.2 AA211A09 FCOM-F0-02-02-30-012-254

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 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 15	
		SEQ 150	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	267.8 3/3	271.3 3/3	273.5 3/6	275.1 3/6	276.4 3/6
	146/52/62	150/58/67	151/61/71	151/65/74	150/68/77
-10	266.0 3/3	269.7 3/6	271.9 3/6	273.7 3/6	275.1 3/6
	144/50/60	148/55/65	149/59/68	148/62/72	148/65/74
0	264.1 3/3	267.9 3/6	270.2 3/6	272.1 3/6	273.7 3/6
	142/48/58	146/53/63	146/57/66	146/60/69	145/63/72
10	262.3 3/3	266.2 3/6	268.6 3/6	270.6 3/6	272.3 3/6
	140/46/56	144/51/61	144/54/64	143/58/67	143/61/70
20	260.2 2/3	264.2 3/6	266.8 3/6	268.8 3/6	270.6 3/6
	138/44/54	143/49/59	143/53/62	142/56/65	141/59/68
30	258.3 2/3	262.4 3/3	265.2 3/6	267.3 3/6	269.2 3/6
	137/43/53	141/48/57	142/52/61	142/55/64	141/58/67
32	254.0 2/3	257.9 3/3	260.7 3/6	262.7 3/6	264.5 3/6
	137/42/52	141/47/57	143/51/60	142/54/63	141/57/66
34	249.6 2/3	253.4 3/3	256.3 3/6	258.2 3/6	259.8 3/6
	136/42/52	140/47/56	143/51/60	143/54/63	142/57/66
36	245.3 2/3	248.9 3/3	251.9 3/6	253.7 3/6	255.2 3/6
	136/41/51	140/46/55	144/51/60	143/54/62	143/56/65
38	241.1 2/3	244.6 3/3	247.6 3/6	249.4 3/6	250.8 3/6
	136/41/50	140/46/55	144/50/59	144/53/62	143/56/64
40	236.9 2/3	240.3 3/3	243.1 3/3	245.0 3/6	246.3 3/6
	135/40/50	139/45/54	143/50/58	145/53/61	144/56/64
42	231.9 2/3	235.2 3/3	237.9 3/3	239.9 3/6	241.0 3/6
	135/40/49	139/44/53	143/49/57	146/53/61	145/55/63
44	226.8 2/3	230.0 2/3	232.5 3/3	234.5 3/6	235.6 3/6
	134/39/48	139/44/52	142/48/56	146/52/60	147/55/63
46	221.8 2/3	225.0 2/3	227.3 3/3	229.2 3/3	230.3 3/6
	134/39/47	138/43/51	142/48/56	146/52/59	148/55/63
48	217.1 2/3	220.2 2/3	222.4 3/3	224.1 3/3	225.2 3/6
	133/38/46	138/43/51	142/47/55	146/51/59	149/55/62
50	212.7 2/3	215.6 2/3	217.8 3/3	219.3 3/3	220.3 3/3
	133/37/46	137/42/50	142/47/54	146/51/58	149/54/62
52	208.5 3/3	211.1 2/3	213.2 3/3	214.6 3/3	215.4 3/3
	132/37/45	137/42/49	142/46/53	145/50/57	149/54/61
54	204.2 3/3	206.6 2/3	208.6 2/3	209.8 3/3	210.5 3/3
	132/36/44	137/41/48	141/46/53	145/50/57	149/54/60
55	202.1 3/3	204.6 2/3	206.3 2/3	207.4 3/3	208.0 3/3
	132/36/44	137/41/48	141/45/52	145/49/56	149/53/60

OCTO 10.0.1 AA211A09 FCOM-F0-02-02-30-013-150

CONFIGURATION 3		PRESSURE ALTITUDE = 1000 FT			
TREF = 28 °C		DRY RUNWAY		MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C		SLOPE = 0 %		IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	261.0 3/3 144/50/60	264.5 3/3 148/55/65	266.8 3/6 150/59/68	268.4 3/6 149/62/71	269.7 3/6 149/65/74
-10	259.2 3/3 142/48/58	262.9 3/3 146/53/63	265.2 3/6 147/57/66	267.0 3/6 146/60/69	268.4 3/6 146/63/72
0	257.4 3/3 140/45/56	261.2 3/6 144/51/60	263.6 3/6 145/54/64	265.4 3/6 144/57/67	267.0 3/6 143/60/70
10	255.6 3/3 138/44/54	259.5 3/6 142/49/59	262.0 3/6 142/52/62	264.0 3/6 142/55/65	265.7 3/6 141/58/68
20	253.7 3/3 137/42/52	257.6 3/3 141/47/57	260.3 3/6 141/51/60	262.3 3/6 141/54/63	264.1 3/6 140/57/66
28	252.2 3/9 135/41/51	256.2 3/3 139/46/55	259.1 3/6 141/50/59	261.1 3/6 140/53/62	262.9 3/6 140/56/65
30	248.4 2/3 135/41/50	252.3 3/3 139/45/55	255.2 3/6 142/50/59	257.2 3/6 141/53/62	258.9 3/6 141/56/64
32	244.5 2/3 135/40/50	248.3 3/3 139/45/54	251.3 3/6 142/49/58	253.1 3/6 142/52/61	254.7 3/6 141/55/64
34	240.7 2/3 135/40/49	244.3 3/3 139/44/54	247.3 3/6 142/49/58	249.1 3/6 142/52/61	250.6 3/6 142/55/63
36	236.8 2/3 134/39/49	240.4 3/3 138/44/53	243.3 3/3 142/48/57	245.2 3/6 143/52/60	246.6 3/6 142/54/63
38	233.1 2/3 134/39/48	236.5 3/3 138/43/52	239.3 3/3 142/48/56	241.3 3/6 144/51/60	242.6 3/6 143/54/62
40	228.9 2/3 134/38/47	232.3 3/3 137/43/51	234.9 3/3 141/47/56	237.0 3/6 144/51/59	238.2 3/6 144/54/62
42	224.6 2/3 133/38/46	227.9 3/3 137/42/51	230.5 3/3 141/47/55	232.6 3/6 145/51/59	233.8 3/6 145/54/61
44	219.9 2/3 132/37/46	223.1 3/3 137/42/50	225.6 3/3 141/46/54	227.5 3/3 144/50/58	228.8 3/6 146/53/61
46	214.7 2/3 131/36/45	217.8 2/3 136/41/49	220.1 3/3 140/45/53	221.9 3/3 144/49/57	223.1 3/6 147/53/61
48	209.5 3/3 131/36/44	212.5 2/3 135/40/48	214.7 3/3 140/45/52	216.3 3/3 144/49/56	217.3 3/3 147/53/60
50	204.7 3/3 130/35/43	207.4 3/3 135/40/47	209.5 3/3 139/44/51	211.0 3/3 143/48/55	211.9 3/3 147/52/59
52	200.0 3/3 130/34/42	202.4 3/3 134/39/46	204.4 3/3 139/43/50	205.7 3/3 143/48/54	206.4 3/3 147/51/58
53	197.6 3/3 130/34/42	200.1 3/3 134/39/46	201.9 2/3 139/43/50	203.0 3/3 143/47/54	203.7 3/3 147/51/58

OCTO 10.0.1 AA211A09 FCOM-FO-02-02-30-014-150

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 15	
		SEQ 254	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 0 FT		
TREF = 30 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 55 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	9000	10000	11000	12000	13000
-20	263.4 3/3 141/46/57	268.6 3/3 147/53/63	272.5 3/6 152/60/69	274.6 3/6 151/63/73	276.3 3/6 151/67/76
	-10	261.4 2/3 139/44/55	266.8 3/3 145/51/61	270.8 3/6 149/57/67	273.1 3/6 148/61/70	274.9 3/6 148/65/74
0	259.4 3/9 137/42/53	264.9 3/3 143/49/59	269.0 3/6 146/55/64	271.5 3/6 146/59/68	273.5 3/6 145/62/72
10	256.6 3/9 136/41/51	263.1 3/3 141/47/57	267.3 3/6 144/52/62	269.9 3/6 144/56/66	272.1 3/6 143/60/70
20	252.9 3/9 134/40/50	261.0 3/3 139/45/55	265.4 3/6 143/51/61	268.1 3/6 142/55/64	270.4 3/6 142/59/68
30	249.6 3/9 133/39/50	259.2 2/3 138/44/54	263.8 3/6 142/50/59	266.6 3/6 142/54/63	268.9 3/6 141/57/66
32	246.2 3/9 133/38/49	254.8 2/3 138/43/53	259.3 3/6 142/49/59	262.0 3/6 142/53/62	264.2 3/6 142/57/66
34	242.7 3/9 132/37/48	250.4 2/3 137/43/53	254.7 3/3 142/49/58	257.5 3/6 143/53/62	259.5 3/6 142/56/65
36	239.3 3/9 132/37/47	246.0 2/3 137/42/52	250.2 3/3 142/48/57	253.1 3/6 143/53/61	255.0 3/6 143/56/65
38	236.0 3/9 131/36/46	241.8 2/3 136/42/51	245.9 3/3 141/47/56	248.8 3/6 144/52/61	250.6 3/6 144/56/64
40	232.6 3/3 131/35/45	237.6 2/3 136/41/50	241.6 3/3 141/47/56	244.5 3/6 145/52/60	246.1 3/6 144/55/64
42	227.7 3/3 131/35/44	232.6 2/3 136/41/50	236.4 3/3 141/46/55	239.3 3/6 145/52/60	240.9 3/6 145/55/63
44	222.9 2/3 130/34/43	227.5 2/3 135/40/49	231.1 3/3 140/46/54	233.8 3/3 145/51/59	235.5 3/6 147/55/63
46	218.2 2/3 129/33/42	222.5 2/3 135/39/48	226.0 3/3 140/45/53	228.5 3/3 145/50/58	230.2 3/6 148/55/62
48	213.8 2/3 129/33/42	217.8 2/3 134/39/47	221.2 3/3 140/45/52	223.5 3/3 144/50/57	225.1 3/3 149/54/62
50	* 209.6 2/3 128/32/41	213.3 2/3 134/38/46	216.6 2/3 139/44/52	218.8 3/3 144/49/57	220.2 3/3 149/54/61
52	* 205.5 3/3 128/32/40	209.0 2/3 133/38/46	212.0 2/3 139/43/51	214.1 3/3 144/49/56	215.3 3/3 148/53/60
54	* 201.5 3/3 127/31/39	204.7 3/3 133/37/45	207.6 2/3 139/43/50	209.4 3/3 144/48/55	210.4 3/3 148/53/60
55	* 199.5 3/3 127/31/39	202.6 3/3 133/37/45	205.4 2/3 139/43/50	207.1 3/3 144/48/55	207.9 3/3 148/53/59

OCTO 11.0.2 AA211A09 FCOM-F0-02-02-30-013-254

CONFIGURATION 3			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 53 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (FT)				
	9000	10000	11000	12000	13000
-20	256.6 3/3 139/44/54	261.8 3/3 145/51/61	265.8 3/6 150/57/67	267.8 3/6 149/61/70	269.6 3/6 149/65/74
	-10	254.7 3/3 137/42/52	260.0 3/3 143/49/59	264.1 3/6 147/55/64	266.4 3/6 147/59/68	268.2 3/6 146/62/71
0		252.7 3/9 135/40/51	258.2 3/3 141/47/57	262.3 3/6 145/52/62	264.8 3/6 144/56/66	266.8 3/6 143/60/69
	10	249.2 3/9 134/39/50	256.4 3/3 139/45/55	260.7 3/6 143/50/60	263.3 3/6 142/54/64	265.4 3/6 141/58/67
20		245.7 3/9 133/38/49	254.5 3/3 137/43/53	258.9 3/6 142/49/58	261.6 3/6 141/53/62	263.8 3/6 140/56/65
	28	243.2 3/9 132/37/48	253.0 3/3 136/42/52	257.7 3/6 141/48/57	260.4 3/6 141/52/61	262.7 3/6 140/55/64
30		240.3 3/9 132/37/47	249.2 3/3 136/42/51	253.7 3/3 141/47/57	256.5 3/6 141/52/61	258.6 3/6 141/55/64
	32	237.2 3/9 131/36/46	245.3 2/3 136/41/51	249.6 3/3 141/47/56	252.5 3/6 142/51/60	254.5 3/6 141/55/63
34		234.1 3/9 131/35/45	241.4 2/3 135/41/50	245.6 3/3 140/46/55	248.5 3/6 143/51/60	250.4 3/6 142/54/63
	36	231.0 3/3 130/35/44	237.6 2/3 135/40/49	241.6 3/3 140/46/55	244.6 3/6 143/51/59	246.4 3/6 143/54/62
38		227.9 3/9 129/34/43	233.8 2/3 135/40/49	237.7 3/3 139/45/54	240.7 3/6 144/50/59	242.4 3/6 143/54/62
	40	224.5 3/9 129/33/42	229.6 2/3 134/39/48	233.4 3/3 139/45/53	236.4 3/6 144/50/58	238.1 3/6 144/53/61
42		220.5 3/9 128/32/42	225.3 2/3 134/39/47	229.1 3/3 139/44/52	231.9 3/3 143/49/57	233.6 3/6 145/53/61
	44	216.1 3/9 127/32/41	220.6 2/3 133/38/46	224.2 3/3 138/43/52	226.8 3/3 143/49/56	228.6 3/6 146/53/61
46		* 211.2 2/3 * 127/31/40	215.3 2/3 133/37/45	218.8 2/3 138/43/51	221.3 3/3 143/48/56	223.0 3/6 147/53/60
	48	* 206.3 3/3 * 126/31/39	210.1 3/3 132/37/45	213.5 2/3 137/42/50	215.8 3/3 142/47/55	217.2 3/3 147/52/59
50		* 201.7 3/3 * 126/30/38	205.2 3/3 131/36/44	208.4 2/3 137/41/49	210.5 3/3 142/47/54	211.8 3/3 146/51/58
	52	* 197.1 3/3 * 125/29/37	200.4 3/3 131/35/43	203.4 2/3 136/41/48	205.3 3/3 142/46/53	206.3 3/3 146/51/57
53		* 194.9 3/3 * 125/29/37	198.1 3/3 130/35/42	200.9 2/3 136/41/48	202.7 3/3 142/46/53	203.6 3/3 146/50/57

OCTO 11.0.2 AA211A09 FCOM-FO-02-02-30-014-254

 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 17
	QUICK REFERENCE TABLES		SEQ 150	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	254.3 3/3	257.8 3/3	260.2 3/6	261.8 3/6	263.1 3/6
	142/47/57	146/53/62	148/57/66	147/60/69	147/63/72
-10	252.5 3/3	256.2 3/3	258.6 3/6	260.3 3/6	261.8 3/6
	140/45/55	144/50/60	145/54/64	145/57/67	144/60/69
0	250.7 3/3	254.5 3/3	256.9 3/6	258.8 3/6	260.4 3/6
	138/43/53	142/48/58	143/52/61	142/55/64	142/58/67
10	249.0 3/3	252.8 3/3	255.4 3/6	257.4 3/6	259.1 3/6
	136/41/51	140/46/56	141/50/59	140/53/62	140/56/65
20	247.1 3/3	251.0 3/3	253.8 3/6	255.8 3/6	257.6 3/6
	135/40/50	139/45/54	140/49/58	139/52/61	139/55/63
26	246.1 3/3	250.0 3/3	252.9 3/6	255.0 3/6	256.8 3/6
	134/39/49	138/44/53	140/48/57	139/51/60	138/54/63
28	242.7 3/3	246.6 3/3	249.6 3/6	251.5 3/6	253.2 3/6
	134/39/48	138/44/53	141/48/57	140/51/60	140/54/62
30	239.3 3/3	243.0 3/3	246.1 3/6	248.0 3/6	249.5 3/6
	134/38/48	137/43/52	141/48/57	141/51/59	140/53/62
32	235.8 2/3	239.4 3/3	242.4 3/6	244.4 3/6	245.9 3/6
	133/38/47	137/43/52	141/47/56	142/50/59	141/53/62
34	232.4 2/3	235.8 3/3	238.7 3/3	240.8 3/6	242.2 3/6
	133/38/47	137/42/51	141/47/55	142/50/59	142/53/61
36	228.9 2/3	232.3 3/3	235.1 3/3	237.2 3/6	238.5 3/6
	132/37/46	136/42/50	140/46/55	143/50/58	142/53/61
38	225.5 2/3	228.8 3/3	231.5 3/3	233.7 3/6	235.0 3/6
	132/37/46	136/41/50	140/46/54	143/50/58	143/52/60
40	221.9 2/3	225.2 3/3	227.9 3/3	230.0 3/6	231.3 3/6
	131/36/45	136/41/49	139/45/53	143/49/57	144/52/60
42	217.3 2/3	220.6 2/3	223.1 3/3	225.1 3/3	226.5 3/6
	131/35/44	135/40/48	139/44/52	143/49/56	145/52/60
44	211.8 3/3	214.9 2/3	217.3 3/3	219.1 3/3	220.5 3/6
	130/35/43	134/39/47	139/44/51	142/48/55	146/52/59
46	206.2 3/3	209.2 2/3	211.5 3/3	213.1 3/3	214.3 3/3
	129/34/42	134/38/46	138/43/50	142/47/54	145/51/58
48	200.7 3/3	203.5 3/3	205.6 2/3	207.1 3/3	208.1 3/3
	128/33/41	133/38/45	137/42/49	142/46/53	145/50/57
50	195.6 3/3	198.1 3/3	200.1 2/3	201.4 3/3	202.2 3/3
	127/32/40	132/37/44	137/41/48	141/46/52	145/49/56
51	193.0 3/3	195.5 3/3	197.3 2/3	198.6 3/3	199.2 3/3
	127/32/39	132/37/44	136/41/48	141/45/52	144/49/55

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 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.30	P 17
	QUICK REFERENCE TABLES		SEQ 254	REV 11

CONFIGURATION 3			PRESSURE ALTITUDE = 2000 FT		
TREF = 26 °C			DRY RUNWAY	MAX TO WEIGHT(1000KG) CODES	
TMAX = 51 °C			SLOPE = 0 %	IAS(KT) : V1 / VR / V2	
TEMP (°C)	CORRECTED RUNWAY LENGTH (FT)				
	9000	10000	11000	12000	13000
-20	249.9 3/3	255.0 3/3	259.0 3/6	261.2 3/6	262.9 3/6
	137/42/52	142/48/58	148/55/64	148/59/68	147/62/71
-10	248.0 3/3	253.3 3/3	257.4 3/6	259.7 3/6	261.6 3/6
	135/40/50	140/46/56	146/52/62	145/56/65	144/60/69
0	245.4 3/9	251.5 3/3	255.7 3/6	258.1 3/6	260.2 3/6
	133/38/49	139/44/54	143/50/60	142/54/63	142/58/67
10	241.9 3/9	249.8 3/3	254.1 3/6	256.7 3/6	258.8 3/6
	132/37/48	137/42/52	141/48/58	141/52/61	140/56/65
20	238.5 3/9	247.9 3/3	252.5 3/6	255.1 3/6	257.3 3/6
	131/36/47	135/41/51	140/47/56	140/50/60	139/54/63
26	236.7 3/9	246.9 3/3	251.4 3/6	254.2 3/6	256.5 3/6
	131/36/46	135/40/50	139/46/55	139/50/59	138/53/62
28	234.2 3/9	243.5 3/3	247.9 3/3	250.8 3/6	252.9 3/6
	130/35/45	135/40/49	139/45/55	140/50/59	140/53/62
30	231.4 3/9	240.1 3/3	244.3 3/3	247.3 3/6	249.3 3/6
	130/35/45	134/39/49	139/45/54	141/50/58	141/53/62
32	228.6 3/9	236.6 3/3	240.7 3/3	243.8 3/6	245.6 3/6
	129/34/44	134/39/48	139/45/53	142/49/58	141/53/61
34	225.7 3/9	233.1 2/3	237.1 3/3	240.2 3/6	242.0 3/6
	129/33/43	134/39/48	138/44/53	142/49/58	142/52/61
36	222.9 3/9	229.6 2/3	233.5 3/3	236.6 3/6	238.3 3/6
	128/32/42	133/38/47	138/44/52	142/49/57	142/52/60
38	220.1 3/9	226.2 2/3	230.0 3/3	233.0 3/3	234.8 3/6
	127/32/41	133/38/46	138/43/52	142/48/56	143/52/60
40	217.3 3/9	222.6 2/3	226.4 3/3	229.3 3/3	231.2 3/6
	127/31/40	132/37/46	137/43/51	142/48/56	144/52/60
42	213.4 3/9	218.0 2/3	221.7 3/3	224.4 3/3	226.3 3/6
	126/30/39	131/36/45	137/42/50	141/47/55	145/52/59
44	* 208.2 3/3	212.4 3/3	216.0 2/3	218.5 3/3	220.3 3/6
	* 125/30/38	131/36/44	136/41/49	141/46/54	145/51/58
46	* 202.9 3/3	206.8 3/3	210.2 2/3	212.6 3/3	214.1 3/3
	* 124/29/37	130/35/43	135/40/48	141/46/53	145/50/57
48	* 197.7 3/3	201.3 3/3	204.5 2/3	206.7 3/3	208.0 3/3
	* 124/28/36	129/34/42	135/40/47	140/45/52	145/50/56
50	* 192.8 3/3	196.1 3/3	199.0 3/3	201.0 3/3	202.1 3/3
	* 123/27/35	129/33/41	134/39/46	140/44/51	144/49/55
51	* 190.3 3/3	193.5 3/3	196.3 3/3	198.2 2/3	199.2 3/3
	* 123/27/35	128/33/40	134/38/45	139/44/50	144/48/55

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 A340 FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.40	P 1
	NET TAKEOFF FLIGHT PATH		SEQ 001	REV 16

INTRODUCTION

The following graphs enable the crew to quickly determine the takeoff performance out of an airport by positioning obstacles.

They must be used with the corresponding quick reference table so as to determine weight decrement and required gradient.

The net takeoff flight path and the associated weight decrement are conservative.

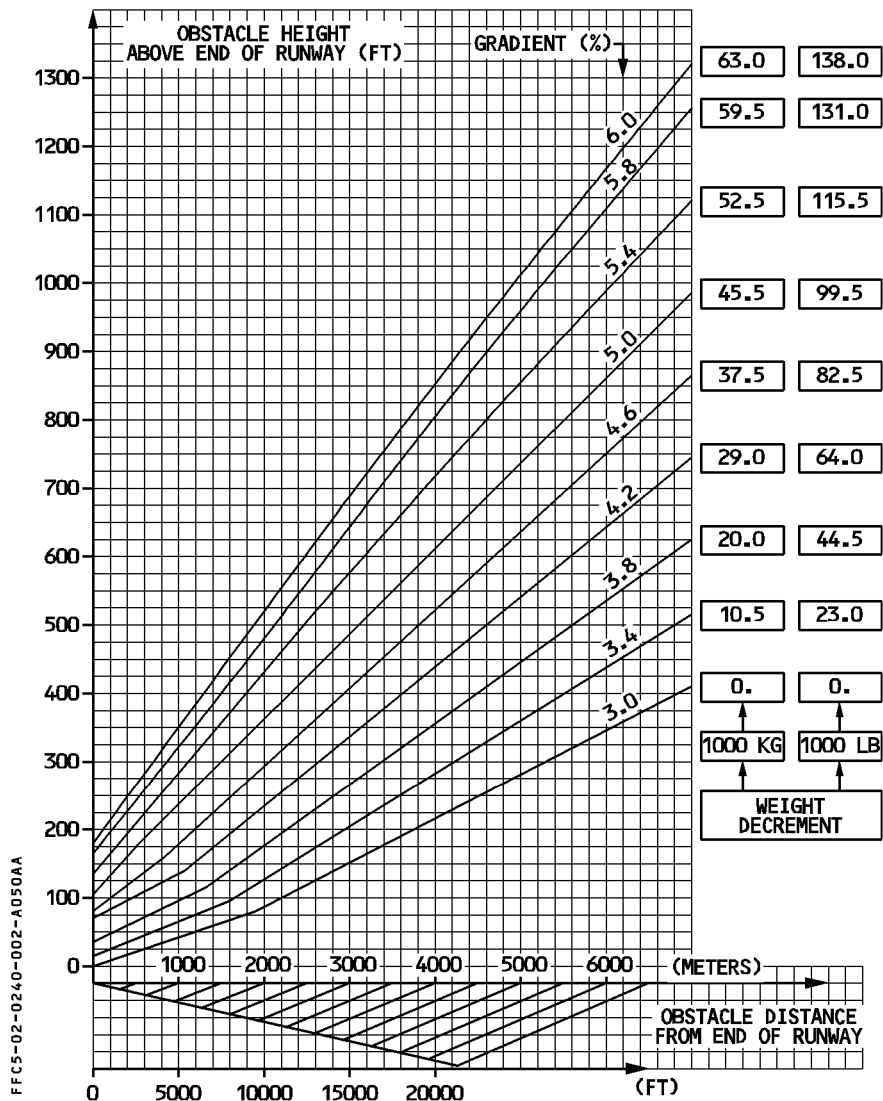
HOW TO PROCEED

1. Position the obstacle by entering its distance from end of runway and its height above the end of runway (No 35 feet margin is required as this is already included).
In case of an ascending runway, increase the obstacle height by an additional value as indicated below each graph.
2. Read the associated weight correction. Interpolate if necessary. The second segment gradient is given for information only.
3. Decrease the takeoff speeds by 0.3 knot per 1000 kg (0.14 kt/1000 lb) weight decrement.

R Limit the final speeds to the minimum values as given on 2.02.25 p1.

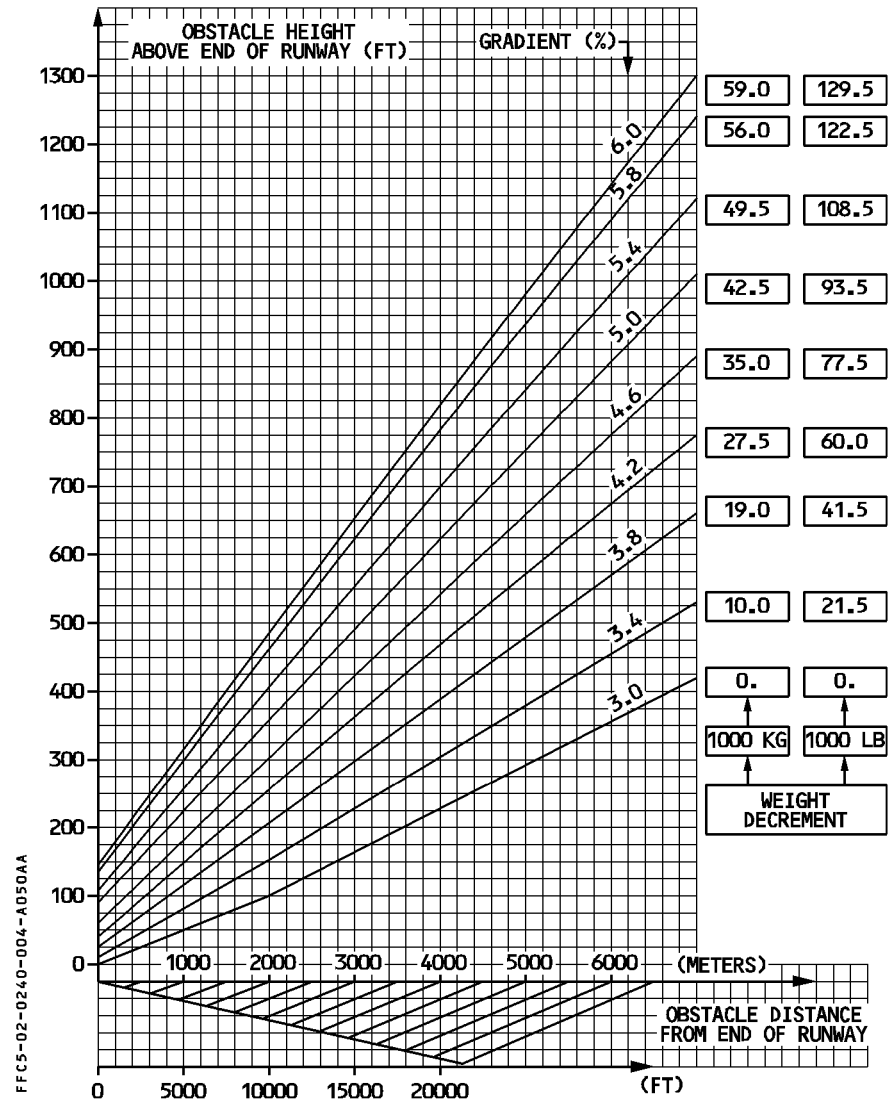
Note : *In case of tailwind, do not use the obstacle clearance graphs.*

CLOSE OBSTACLE CLEARANCE CONF 1 + F



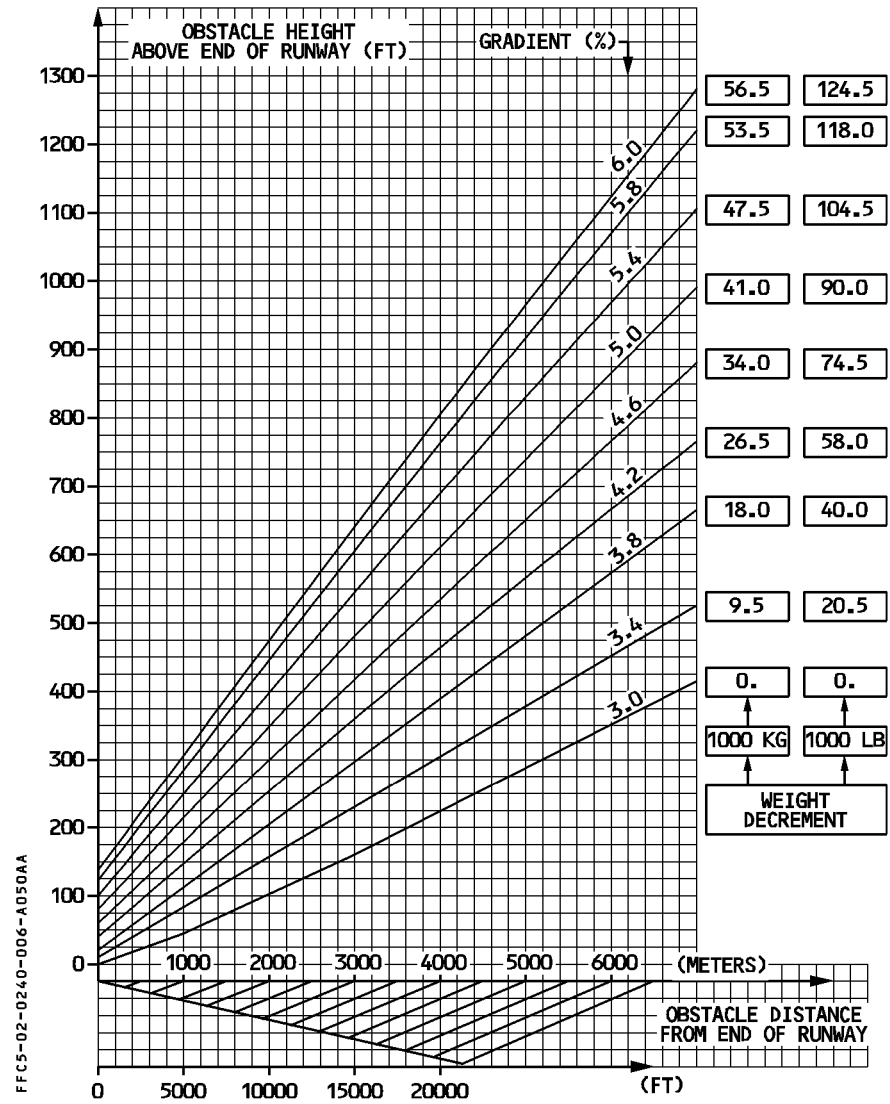
Note : In case of ascending runway, increase obstacle height by 50 feet per percent runway slope.

CLOSE OBSTACLE CLEARANCE CONF 2



R Note : In case of ascending runway, increase obstacle height by 40 feet per percent runway slope.

CLOSE OBSTACLE CLEARANCE CONF 3



R Note : In case of ascending runway, increase obstacle height by 40 feet per percent runway slope.

 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE CONTENTS	2.03.00	P 1
		SEQ 001	REV 21

	03.00	CONTENTS	
	03.10	LANDING	
		– GENERAL	1
		– DISPATCH	1
		– FAILURE IN FLIGHT	2
		– ACTUAL LANDING DISTANCES	3
		– REQUIRED LANDING DISTANCES	5
	03.20	USE OF THE AUTOBRAKE SYSTEM	
		– GENERAL	1
R		– MANUAL LANDING WITH AUTOBRAKE	2

 A340 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE LANDING	2.03.10	P 1
		SEQ 001	REV 16

GENERAL

ACTUAL LANDING DISTANCE

The actual landing distance is the distance measured between a point 50 feet above the runway threshold and the point where the complete stop of the aircraft is achieved.

It assumes that :

- the approach speed is :
 - VLS (1.23 VS of the configuration) for manual landing
 - VLS + 5 kt for CAT II/CAT III automatic landing.
- the pilot applies maximum braking and the antiskid system is operating.
- the ground spoilers are operating.

It does not consider the use of reverse thrust.

REQUIRED LANDING DISTANCE

MANUAL LANDING

Regulation defines the required landing distance as the actual landing distance divided by 0.6, assuming the surface is dry.

If the surface is wet, the required landing distance must be at least 115 % of that for a dry surface.

- R For JAR-OPS operators, if the surface is contaminated, the required landing distance must
 R be at least the greater of the required landing distance on wet runway (see previous
 R paragraph) and 115 % of the landing distance determined in accordance with approved
 R contaminated landing distance data.

AUTOMATIC LANDING

- R Regulation defines the required landing distance for automatic landing as the actual landing
 R distance in automatic landing multiplied by 1.15. This distance must be retained for
 R automatic landing whenever it is greater than the required landing distance in manual
 mode.

DISPATCH

The pilot must check before departure that the available runway length at destination is at least equal to the required landing distance for the forecasted landing weight.

In case of aircraft system failure affecting landing distance known before the dispatch, the available runway length must be at least equal to the required landing distance with failure, i.e. the required landing distance without failure multiplied by the coefficient given in the Flight Manual or the MMEL.

FAILURE IN FLIGHT

In case of an aircraft system failure occurring in flight and affecting the landing performance, the runway length to be considered for landing is the actual landing distance without failure multiplied by the landing distance coefficient associated with the failure. The coefficients are given in FCOM 3.02.80 and in the QRH.
The concept of required landing distance no longer applies.

RECOMMENDATIONS

R For most cases of abnormal landing configuration, the increased actual landing distance does not exceed the required runway length for landing in normal configuration. However, the addition of several of these factors can very quickly lead to an overrun. Special notice should be taken of the runway condition. A slippery runway is the most common reason for overrun at landing. The combination of a slippery runway and a factor such as tailwind or an increase in approach speed should be avoided.
As far as possible, avoid the combination of any failure affecting the braking capability of the aircraft (spoilers, reversers) with landing on a contaminated runway, or prepare for it carefully by checking the available runway length against the forecasted landing distance. During a visual approach, use all means of monitoring the flight path ; use the ILS together with available visual aids such as VASI or PAPI. Monitor the approach speed along with the wind and ground speed, especially during final approach.

 A340 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE			2.03.10	P 3
	LANDING			SEQ 150	REV 21

ACTUAL LANDING DISTANCES

CONFIGURATION FULL

R

ACTUAL LANDING DISTANCE (METERS)									
WEIGHT (1000 KG)			130	150	170	190	210	230	250
RUNWAY CONDITION	DRY		890	920	1000	1140	1300	1480	1660
	WET		1170	1190	1280	1430	1580	1740	1880
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1550	1600	1740	1970	2230	2440	2620
		12.7 MM (1/2 INCH) WATER	1450	1510	1640	1840	2070	2250	2430
		6.3 MM (1/4 INCH) SLUSH	1490	1540	1650	1850	2070	2300	2450
		12.7 MM (1/2 INCH) SLUSH	1420	1470	1580	1760	1970	2150	2300
		COMPACTED SNOW	1520	1550	1650	1820	2000	2130	2240
		ICE	2950	3080	3310	3640	3990	4260	4480

CORRECTIONS

R

	CORRECTION ON ACTUAL LANDING DISTANCE							
	dry runway	wet runway	runway covered with					
			1/4 inch water	1/2 inch water	1/4 inch slush	1/2 inch slush	compacted snow	ice
per 1000 ft above SL	+ 4 %	+ 4 %	+ 4 %	+ 4 %	+ 5 %	+ 5 %	+ 3 %	+ 4 %
per 10 kt headwind	No correction for headwind due to wind correction on approach speed							
per 10 kt tailwind	+ 19 %	+ 21 %	+ 27 %	+ 24 %	+ 26 %	+ 23 %	+ 21 %	+ 31 %
4 reversers operative	− 3 %	− 7 %	− 12 %	− 10 %	− 12 %	− 10 %	− 11 %	− 27 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE				2.03.10 P 4	
	LANDING				SEQ 150	REV 21

CONFIGURATION 3

R

ACTUAL LANDING DISTANCE (METERS)									
WEIGHT (1000 KG)			130	150	170	190	210	230	250
RUNWAY CONDITION	DRY		890	910	1030	1190	1360	1540	1730
	WET		1170	1190	1320	1480	1640	1800	1950
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1570	1620	1820	2080	2350	2560	2760
		12.7 MM (1/2 INCH) WATER	1470	1530	1710	1920	2160	2360	2540
		6.3 MM (1/4 INCH) SLUSH	1510	1550	1710	1950	2190	2390	2570
		12.7 MM (1/2 INCH) SLUSH	1430	1480	1630	1840	2060	2240	2410
		COMPACTED SNOW	1530	1560	1710	1880	2070	2200	2300
		ICE	3050	3180	3490	3840	4200	4480	4710

CORRECTIONS

R

	CORRECTION ON ACTUAL LANDING DISTANCE							
	dry runway	wet runway	runway covered with					
			1/4 inch water	1/2 inch water	1/4 inch slush	1/2 inch slush	compacted snow	ice
per 1000 ft above SL	+ 4 %	+ 4 %	+ 4 %	+ 4 %	+ 5 %	+ 5 %	+ 4 %	+ 4 %
per 10 kt headwind	No correction for headwind due to wind correction on approach speed							
per 10 kt tailwind	+ 19 %	+ 21 %	+ 27 %	+ 24 %	+ 27 %	+ 25 %	+ 20 %	+ 31 %
4 reversers operative	− 3 %	− 7 %	− 12 %	− 11 %	− 12 %	− 11 %	− 11 %	− 28 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

ACTUAL LANDING DISTANCES

CONFIGURATION FULL

R

ACTUAL LANDING DISTANCE (FEET)									
WEIGHT (1000 KG)			130	150	170	190	210	230	250
RUNWAY CONDITION	DRY		2920	3000	3280	3750	4270	4860	5430
	WET		3840	3900	4180	4670	5180	5680	6150
	COVERED WITH	6.3 MM (1/4 INCH) WATER	5070	5250	5710	6440	7290	7990	8580
		12.7 MM (1/2 INCH) WATER	4760	4940	5380	6040	6770	7370	7970
		6.3 MM (1/4 INCH) SLUSH	4890	5040	5400	6080	6800	7520	8020
		12.7 MM (1/2 INCH) SLUSH	4660	4820	5170	5780	6450	7050	7550
		COMPACTED SNOW	4980	5090	5420	5970	6540	6990	7330
		ICE	9680	10100	10840	11930	13080	13960	14690

CORRECTIONS

R

	CORRECTION ON ACTUAL LANDING DISTANCE							
	dry runway	wet runway	runway covered with					
			1/4 inch water	1/2 inch water	1/4 inch slush	1/2 inch slush	compacted snow	ice
per 1000 ft above SL	+ 4 %	+ 4 %	+ 4 %	+ 4 %	+ 5 %	+ 5 %	+ 3 %	+ 4 %
per 10 kt headwind	No correction for headwind due to wind correction on approach speed							
per 10 kt tailwind	+ 19 %	+ 21 %	+ 27 %	+ 25 %	+ 26 %	+ 24 %	+ 21 %	+ 31 %
4 reversers operative	− 3 %	− 7 %	− 12 %	− 10 %	− 11 %	− 10 %	− 11 %	− 27 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

	LANDING PERFORMANCE		2.03.10	P 4
	LANDING		SEQ. 254	REV 21

CONFIGURATION 3

R

ACTUAL LANDING DISTANCE (FEET)									
WEIGHT (1000 KG)			130	150	170	190	210	230	250
RUNWAY CONDITION	DRY		2900	2990	3380	3880	4450	5060	5660
	WET		3840	3910	4320	4840	5380	5890	6390
	COVERED WITH	6.3 MM (1/4 INCH) WATER	5130	5300	5960	6800	7710	8390	9060
		12.7 MM (1/2 INCH) WATER	4800	5000	5600	6270	7090	7740	8310
		6.3 MM (1/4 INCH) SLUSH	4930	5070	5600	6380	7180	7830	8410
		12.7 MM (1/2 INCH) SLUSH	4690	4850	5340	6020	6750	7360	7900
		COMPACTED SNOW	5010	5110	5600	6170	6770	7210	7550
		ICE	10010	10430	11430	12580	13790	14690	15450

CORRECTIONS

R

	CORRECTION ON ACTUAL LANDING DISTANCE							
	dry runway	wet runway	runway covered with					
			1/4 inch water	1/2 inch water	1/4 inch slush	1/2 inch slush	compacted snow	ice
per 1000 ft above SL	+ 4 %	+ 4 %	+ 4 %	+ 4 %	+ 5 %	+ 5 %	+ 4 %	+ 4 %
per 10 kt headwind	No correction for headwind due to wind correction on approach speed							
per 10 kt tailwind	+ 19 %	+ 21 %	+ 27 %	+ 24 %	+ 27 %	+ 25 %	+ 21 %	+ 31 %
4 reversers operative	− 3 %	− 7 %	− 12 %	− 10 %	− 11 %	− 11 %	− 11 %	− 28 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

REQUIRED LANDING DISTANCE

MANUAL LANDING

R

REQUIRED LANDING DISTANCE (METERS)							
WEIGHT (1000 KG)	130	140	150	160	170	180	190
CONF 3	1470	1490	1520	1610	1720	1840	1970
CONF FULL	1490	1500	1530	1560	1670	1780	1910

Corrections on landing distances

R

Wind : per 10 kt tailwind add 19 %
No correction for headwind due to wind correction on approach speed.
Airport elevation : per 1000 ft above sea level add 4 %.

AUTOMATIC LANDING

For automatic landing, use the same required landing distances and corrections as for manual landing.

 A340 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE		2.03.10	P 5
	LANDING		SEQ 254	REV 21

REQUIRED LANDING DISTANCE

MANUAL LANDING

R

REQUIRED LANDING DISTANCE (FEET)							
WEIGHT (1000 KG)	130	140	150	160	170	180	190
CONF 3	4820	4890	4980	5270	5640	6040	6460
CONF FULL	4860	4910	4990	5110	5460	5840	6240

Corrections on landing distances

R

Wind : per 10 kt tailwind add 19 %
No correction for headwind due to wind correction on approach speed.
Airport elevation : per 1000 ft above sea level add 4 %.

AUTOMATIC LANDING

For automatic landing, use the same required landing distances and corrections as for manual landing.

 A340 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE USE OF THE AUTOBRAKE SYSTEM	2.03.20	P 1
		SEQ 001	REV 23

GENERAL

The autobrake system is designed to help the pilot in case of :

- aborted takeoff or
- landing on short runways
- operation with low visibility weather conditions

Furthermore, it ensures a straight roll-out and optimizes the landing distance on contaminated runways provided the contamination is evenly distributed.

The following tables cover :

- dry runway
- wet runway
- runway covered with water, slush or compacted snow
- icy runway

At landing, select the braking mode according to :

- runway length
- configuration
- runway condition

A correction is necessary :

- if landing is not performed at sea level
- if reverse thrust is used
- in windy conditions

MANUAL LANDING WITH AUTOBRAKE

CONFIGURATION 3

R

ACTUAL LANDING DISTANCE (METERS)									CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)		130	150	170	190	210	230	250	PER 1000FT ABOVE SL	4 REV OP	PER 10KT TAIL WIND	
RUNWAY CONDITION	MODE											
DRY	MED	1370	1380	1490	1620	1760	1910	2060	+ 3	0	+17	
	LOW	1790	1810	1970	2150	2340	2520	2690	+ 3	0	+18	
WET	MED	1370	1380	1500	1660	1820	1980	2130	+ 4	0	+19	
	LOW	1790	1810	1970	2150	2340	2520	2690	+ 3	-1	+18	
COVERED W I T H	6.3 MM (1/4 INCH) WATER	MED	1640	1700	1880	2130	2400	2610	2840	+ 4	-12	+27
		LOW	1740	1780	1940	2170	2430	2660	2860	+ 4	-3	+24
	12.7 MM (1/2 INCH) WATER	MED	1540	1600	1750	1970	2200	2410	2590	+ 4	-10	+24
		LOW	1660	1710	1860	2050	2260	2460	2660	+ 4	-2	+21
	6.3 MM (1/4 INCH) SLUSH	MED	1610	1670	1820	2010	2250	2470	2650	+ 5	-12	+24
		LOW	1710	1740	1900	2090	2280	2490	2680	+ 5	-3	+24
	12.7 MM (1/2 INCH) SLUSH	MED	1530	1580	1730	1910	2100	2290	2460	+ 5	-11	+22
		LOW	1640	1680	1830	2000	2180	2350	2520	+ 5	-3	+20
COMPACTED SNOW	MED	1670	1710	1860	2040	2230	2370	2480	+ 4	-12	+20	
	LOW	1790	1820	1980	2160	2350	2510	2650	+ 4	-3	+20	
ICE	MED	3110	3240	3550	3900	4270	4550	4780	+ 4	-28	+30	
	LOW	3140	3270	3580	3940	4310	4590	4820	+ 4	-28	+30	

CONFIGURATION FULL

R

ACTUAL LANDING DISTANCE (METERS)									CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)		130	150	170	190	210	230	250	PER 1000FT ABOVE SL	4 REV OP	PER 10KT TAIL WIND	
RUNWAY CONDITION	MODE											
DRY		MED	1350	1370	1440	1570	1690	1830	1980	+ 3	0	+17
		LOW	1760	1790	1890	2060	2240	2420	2580	+ 3	0	+18
WET		MED	1350	1370	1450	1590	1750	1900	2050	+ 4	0	+19
		LOW	1760	1790	1890	2060	2240	2420	2580	+ 3	-1	+18
COVERED WITH	6.3 MM (1/4 INCH) WATER	MED	1620	1680	1790	2030	2270	2490	2690	+ 4	-12	+27
		LOW	1720	1760	1870	2070	2300	2510	2730	+ 4	-3	+25
	12.7 MM (1/2 INCH) WATER	MED	1530	1590	1690	1890	2110	2300	2470	+ 4	-10	+23
		LOW	1650	1690	1800	1970	2160	2350	2520	+ 4	-3	+22
	6.3 MM (1/4 INCH) SLUSH	MED	1590	1640	1760	1940	2140	2340	2510	+ 5	-12	+24
		LOW	1680	1720	1830	2010	2190	2370	2550	+ 5	-3	+23
	12.7 MM (1/2 INCH) SLUSH	MED	1510	1570	1680	1840	2020	2190	2350	+ 5	-10	+23
		LOW	1620	1660	1770	1930	2100	2260	2410	+ 5	-2	+20
COMPACTED SNOW	MED	1650	1690	1800	1970	2150	2290	2400	+ 4	-11	+20	
	LOW	1770	1790	1900	2080	2260	2420	2550	+ 4	-3	+20	
ICE	MED	3000	3130	3360	3700	4050	4320	4550	+ 4	-27	+31	
	LOW	3030	3160	3390	3730	4080	4350	4580	+ 4	-27	+31	

Note : – Max mode is not recommended at landing
– Per 5 knot speed increment (and no failure) add 8 % (all runways)
– No correction for headwind due to wind correction on approach speed

 FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE USE OF THE AUTOBRAKE SYSTEM	2.03.20	P 1
		SEQ. 001	REV 23

GENERAL

The autobrake system is designed to help the pilot in case of :

- aborted takeoff or
- landing on short runways
- operation with low visibility weather conditions

Furthermore, it ensures a straight roll-out and optimizes the landing distance on contaminated runways provided the contamination is evenly distributed.

The following tables cover :

- dry runway
- wet runway
- runway covered with water, slush or compacted snow
- icy runway

At landing, select the braking mode according to :

- runway length
- configuration
- runway condition

A correction is necessary :

- if landing is not performed at sea level
- if reverse thrust is used
- in windy conditions

MANUAL LANDING WITH AUTOBRAKE**CONFIGURATION 3**

R

ACTUAL LANDING DISTANCE (FEET)									CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)		130	150	170	190	210	230	250	PER 1000FT ABOVE SL	4 REV OP	PER 10KT TAIL WIND	
RUNWAY CONDITION	MODE											
DRY		MED	4480	4500	4880	5310	5750	6240	6750	+ 3	0	+17
		LOW	5860	5920	6450	7040	7650	8250	8800	+ 3	0	+18
WET		MED	4480	4500	4910	5420	5970	6470	6970	+ 4	0	+19
		LOW	5860	5920	6450	7040	7650	8250	8800	+ 3	-1	+18
COVERED	6.3 MM (1/4 INCH) WATER	MED	5380	5560	6160	6980	7860	8570	9300	+ 4	-12	+27
		LOW	5710	5830	6360	7110	7960	8730	9380	+ 4	-3	+25
	12.7 MM (1/2 INCH) WATER	MED	5050	5240	5740	6460	7210	7880	8480	+ 4	-10	+24
		LOW	5450	5590	6100	6700	7400	8070	8710	+ 4	-2	+22
	6.3 MM (1/4 INCH) SLUSH	MED	5270	5450	5980	6600	7360	8080	8690	+ 5	-12	+24
		LOW	5590	5710	6220	6830	7480	8160	8760	+ 5	-3	+24
	12.7 MM (1/2 INCH) SLUSH	MED	5000	5190	5680	6250	6890	7500	8050	+ 5	-11	+22
		LOW	5370	5510	6000	6560	7150	7710	8240	+ 5	-2	+21
WITH	COMPACTED SNOW	MED	5460	5600	6100	6690	7300	7750	8110	+ 4	-11	+20
		LOW	5860	5960	6470	7080	7690	8220	8670	+ 4	-3	+20
	ICE	MED	10190	10630	11620	12790	14010	14920	15680	+ 4	-28	+31
		LOW	10290	10710	11730	12900	14120	15030	15790	+ 4	-28	+30

CONFIGURATION FULL

R

ACTUAL LANDING DISTANCE (FEET)									CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)		130	150	170	190	210	230	250	PER 1000FT ABOVE SL	4 REV OP	PER 10KT TAIL WIND	
RUNWAY CONDITION	MODE											
DRY		MED LOW	4430 5760	4470 5850	4700 6180	5130 6760	5540 7340	6000 7920	6490 8450	+ 3 + 3	0 0	+17 +19
WET		MED LOW	4430 5760	4470 5850	4730 6180	5220 6760	5740 7340	6230 7920	6700 8450	+ 4 + 3	0 -1	+19 +19
COVERED WITH	6.3 MM (1/4 INCH) WATER	MED LOW	5320 5640	5490 5760	5870 6120	6640 6780	7430 7540	8170 8240	8820 8940	+ 4 + 4	-11 -3	+27 +25
	12.7 MM (1/2 INCH) WATER	MED LOW	5000 5390	5190 5530	5550 5880	6180 6440	6900 7080	7540 7690	8100 8260	+ 4 + 4	-9 -2	+23 +22
	6.3 MM (1/4 INCH) SLUSH	MED LOW	5210 5510	5390 5640	5760 5990	6350 6580	7000 7180	7670 7780	8230 8360	+ 5 + 5	-12 -3	+24 +24
	12.7 MM (1/2 INCH) SLUSH	MED LOW	4950 5310	5130 5440	5490 5780	6040 6330	6610 6890	7190 7400	7700 7900	+ 5 + 5	-10 -2	+23 +21
	COMPACTED SNOW	MED LOW	5400 5780	5540 5880	5880 6220	6450 6810	7040 7400	7510 7920	7860 8350	+ 4 + 4	-11 -3	+20 +20
	ICE	MED LOW	9830 9920	10270 10340	11020 11120	12130 12230	13270 13360	14160 14260	14900 15000	+ 4 + 4	-27 -27	+31 +31

Note : – Max mode is not recommended at landing

– Per 5 knot speed increment (and no failure) add 8 % (all runways)

– No correction for headwind due to wind correction on approach speed

04.00 CONTENTS

04.10 FLUID CONTAMINATED RUNWAY

	– GENERAL	1
	– DEFINITIONS	1
	– OPERATIONAL CONDITIONS	2
	– TAKEOFF PERFORMANCE	3
	– TAKEOFF FROM A :	
R	. WET RUNWAY	4
R	. 6.3 MM (1/4 INCH) WATER COVERED RUNWAY. . .	18
R	. 12.7 MM (1/2 INCH) WATER COVERED RUNWAY ..	19
R	. 6.3 MM (1/4 INCH) SLUSH COVERED RUNWAY ..	20
R	. 12.7 MM (1/2 INCH) SLUSH COVERED RUNWAY ..	21
R	. COMPACTED SNOW COVERED RUNWAY	22
R	– SPRAY PATTERN	23
R	– CROSSWIND	23
R	– TAXIING	24
R	– TAKEOFF	25
R	– LANDING	25
R	– EXAMPLES	26

04.20 FLIGHT WITHOUT CABIN PRESSURIZATION

– GENERAL	1
– OXYGEN REQUIREMENTS	1
– FLIGHT PLANNING AND EXECUTION	2
– SYSTEMS	3
– PERFORMANCE DATA	5

04.25 FLIGHT WITH GEAR DOWN

– GENERAL	1
– LIMITATIONS	1
– PROCEDURES	1
– PERFORMANCE	1

04.30 HIGH ALTITUDE OPERATION

04.35 FLIGHT OVER MOUNTAINOUS AREA

	– INTRODUCTION	1
	– ENGINE FAILURE	1
R	– DEPRESSURIZATION	2
	– CONCLUSION	2

04.40	THREE-ENGINE FERRY FLIGHT ◀	
	– GENERAL	1
	– TECHNICAL CONDITION OF THE AIRCRAFT	1
	– OPERATIONAL LIMITATIONS	2
	– NORMAL OPERATING PROCEDURES	3
	– ABNORMAL OPERATING PROCEDURES	6
	– PERFORMANCE	6
04.45	ENGINE INTERMIX OPERATIONS ◀	
	– GENERAL	1
	– LIMITATIONS	1
	– PERFORMANCE	1
04.50	REDUCED VERTICAL SEPARATION MINIMUM (RVSM)	
	– GENERAL	1
	– OPERATIONAL APPROVAL	1
	– REQUIRED EQUIPMENT FOR RVSM	1
	– PROCEDURES	1
04.51	RNP	
	– GENERAL	1
	– BRNAV IN EUROPEAN AIRSPACE	2
	– RNP-10 IN OCEANIC OR REMOTE AREAS	3
R	– P-RNAV FOR EUROPEAN TERMINAL PROCEDURES	4

GENERAL

This section presents the recommendations of Airbus Industrie for operations from wet runways or from runways which are covered with contaminants such as standing water, slush or snow.

CAUTION

R Takeoff from icy runway is not recommended

DEFINITIONS

- DAMP** : A runway is damp when the surface is not dry, but when the water on it does not give it a shiny appearance.
- WET** : A runway is considered as wet when the surface has a shiny appearance due to a thin layer of water. When this layer does not exceed 3 mm depth, there is no substantial risk of hydroplaning.
- STANDING WATER** : Is caused by heavy rainfall and/or insufficient runway drainage with a depth of more than 3 mm.
- SLUSH** : Is water saturated with snow which spatters when stepping firmly on it. It is encountered at temperatures around 5°C and its density is approximately 0.85 kg/liter (7.1 lb/US GAL).
- WET SNOW** : Is a condition where, if compacted by hand, snow will stick together and tend to form a snowball. Its density is approximately 0.4 kg/liter (3.35 lb/US GAL).
- DRY SNOW** : Is a condition where snow can be blown if loose, or if compacted by hand, will fall apart again upon release. Its density is approximately 0.2 kg/liter (1.7 lb/US GAL).
- COMPACTED SNOW** : Is a condition where snow has been compressed (a typical friction coefficient is 0.2).
- ICY** : Is a condition where the friction coefficient is 0.05 or below.
- The performance given in this chapter has been divided into two categories which are determined by the depth of the contaminant. For each of these categories an equivalent depth of contaminant has been defined for which the performance deterioration is the same.

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.10	P 2
	FLUID CONTAMINATED RUNWAY		SEQ 001	REV 26

1. WET RUNWAY and EQUIVALENT

Equivalent of a wet runway is a runway covered with or less than :

- 2 mm (0.08 inch) slush
- 3 mm (0.012 inch) water
- 4 mm (0.16 inch) wet snow
- 15 mm (0.59 inch) dry snow

2. CONTAMINATED RUNWAY

A linear equivalence between depth of slush and snow has been defined :

- 12.7 mm (1/2 inch) wet snow is equivalent to 6.3 mm (1/4 inch) slush
- 50.8 mm (2 inches) dry snow is equivalent to 6.3 mm (1/4 inch) slush

Note : 1. On a damp runway no performance degradation should be considered.

R 2. It is not recommended to take off from a runway covered with more than 4 inches of dry snow or 1 inch of wet snow.

OPERATIONAL CONDITIONS

Performance penalties for takeoff as published in this section are computed with the following assumptions :

- The contaminant is in a layer of uniform depth and density over the entire length of the runway
- Antiskid and spoilers are operative
- The friction coefficient is based on studies and checked by actual tests
- The screen height at the end of the takeoff segment is 15 feet, not 35 feet.

In addition, for contaminated runways only :

- There is drag due to rolling resistance of the wheels
- There is drag due to spray on the airframe and gears
- Reverse thrust is used for the deceleration phase
- Maximum thrust is used for takeoff.

Note : The net flight path clears obstacles by 15 feet instead of 35 feet.

TAKEOFF PERFORMANCE

R

CAUTION

The method is based on the use of the RTOW charts established at optimum V2/VS and optimum V1/VR. In addition, when applying corrections for a wet runway, the RTOW charts should also have been established with V1 min (minimum V1 of the V1 range). The method should not be used with takeoff charts computed for other conditions. All tables have been established for TOGA (and Flexible Takeoff for wet runways). Do not use them for Derated thrust.

Correct the determined maximum takeoff weight on dry runway to take into account QNH and bleed effects, then apply the corrections given on the following pages.

- Note :
1. The results obtained with this method may be different from the influence given at the bottom of the RTOW chart.
 2. On contaminated runway, in some cases, no MTOW can be determined with this method (box dashed below a given weight). A specific RTOW chart must then be computed.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.10	P 4
	FLUID CONTAMINATED RUNWAY		SEQ 001	REV 20

TAKEOFF FROM A WET RUNWAY

1. Determine the maximum takeoff weight or flexible temperature and associated speeds on dry runway.
2. Four sets of three tables are given depending on the use of thrust reversers, configuration and the presence of clearway.
Select the table applicable to your case. The runway length in the table corresponds to the available takeoff run (TORA).
Do not interpolate for runway length. Use the shorter runway length.
3. Apply the corrections shown in the following tables :
 - The first two lines give the weight or flexible temperature corrections and the associated speeds corrections to be applied when OAT (for maximum takeoff weight determination) or flexible temperature is below or equal to the temperature value given in line 3 (TVMC).
 - The fourth and fifth lines give the weight, flexible temperature and speed corrections when OAT or flex temperature is above TVMC.

The above corrections are valid for airfields up to 2000 feet pressure altitude. Above 2000 feet pressure altitude TVMC must be decreased by 1°C per 300 feet above 2000 feet.
4. Check that the corrected V1 is greater than the minimum V1 (V1 limited by VMCG) value shown on the RTOW chart.
If the corrected V1 is below minimum V1 :
 - Actual TOW is limited by maximum TOW, retain minimum V1 as V1 and further decrease weight by 5000 kg per 1 knot difference between V1 values.
 - Actual TOW lower than maximum TOW
 - * If the maximum TOW has a corrected V1 equal to or above minimum V1, retain minimum V1 as V1 and decrease flexible temperature by 2°C per knot difference between minimum V1 and V1 corresponding to actual TOW.
 - * In the rare cases when the corrected V1 corresponding to maximum TOW falls below minimum V1, retain minimum V1 as V1 and either decrease maximum TOW by 5000 kg per knot difference between V1 values or decrease flexible temperature by 2°C per knot difference between minimum V1 and V1 corresponding to corrected actual TOW.

In any case, check that the corrected flexible temperature is higher than OAT and Tref.
5. Check that VR and V2 are above the minimum VR and V2 values shown on the RTOW chart.
6. Check that V2 is above the minimum V2 value due to VMU (Refer to 2.02)
If V2 or VR are below the minimum values, this method is not valid, a specific takeoff chart must be computed.

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS FLUID CONTAMINATED RUNWAY	2.04.10	P 5
		SEQ. 001	REV 17

- Note :
- Do not interpolate between values, always refer to the lower runway length.
 - Do not extrapolate below the shortest runway length provided in the tables.
 - When using the following tables, the flexible temperature is limited to a maximum of 51°C.
 - If no minimum speed value is available, use the conservative values provided on 2.02.25.

R

R

CAUTION

The following tables have been established for TOGA or FLEXIBLE thrust. Do not use them for BUMP or derated thrust.

ALL THRUST REVERSERS OPERATIVE						CONF 1+F
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
2500	-35.8/-18 0/0/0 (+1)	-27.5/-15 0/0/0 (+1)	-17.3/-11 0/0/0 (+1)	0.0/0 -5/0/0 (+11)	0.0/0 -8/0/0 (+9)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
	-35.8/-18 0/0/0	-27.5/-15 0/0/0	-17.3/-11 0/0/0	-2.2/-2 0/0/0	0.0/0 0/0/0	
2600	-32.0/-16 0/0/0 (+1)	-25.5/-15 0/0/0 (+1)	0.0/0 -4/0/0 (+7)	0.0/0 -7/0/0 (+9)	0.0/0 -10/0/0 (+9)	
	-32.0/-16 0/0/0	-25.5/-15 0/0/0	-9.7/-7 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
2700	-29.5/-15 0/0/0 (+1)	-23.3/-15 0/0/0 (+1)	0.0/0 -6/0/0 (+9)	0.0/0 -9/0/0 (+9)	0.0/0 -12/0/0 (+11)	
	-29.5/-15 0/0/0	-23.3/-15 0/0/0	-1.0/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
2800	-26.9/-14 0/0/0 (+1)	0.0/0 -4/0/0 (+5)	0.0/0 -8/0/0 (+9)	0.0/0 -11/0/0 (+9)	0.0/0 -10/0/0 (+27)	
	-26.9/-14 0/0/0	-16.7/-11 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
2900	-25.1/-14 0/0/0 (+1)	0.0/0 -6/0/0 (+9)	0.0/0 -10/0/0 (+9)	0.0/0 -12/0/0 (+13)	0.0/0 -12/0/0 (+31)	
	-25.1/-14 0/0/0	-8.7/-6 0/0/0	0.0/0 0/0/0	0/-1 0/0/0	0.0/0 0/0/0	
3000	0.0/0 -3/0/0 (+3)	0.0/0 -8/0/0 (+9)	0.0/0 -12/0/0 (+9)	0.0/0 -11/0/0 (+27)	0.0/0 -11/0/0 (+35)	
	-23.2/-15 0/0/0	0.0/0 0/0/0	0/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3100	0.0/0 -5/0/0 (+7)	0.0/0 -9/0/0 (+7)	0.0/0 -10/0/0 (+27)	0.0/0 -11/0/0 (+33)	0.0/0 -11/0/0 (+41)	
	-16.4/-10 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3200	0.0/0 -7/0/0 (+9)	0.0/0 -11/0/0 (+9)	0.0/0 -12/0/0 (+27)	0.0/0 -11/0/0 (+39)	0.0/0 -10/0/0 (+49)	
	-8.3/-5 0/0/0	-1/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3300	0.0/0 -8/0/0 (+11)	0.0/0 -9/0/0 (+27)	0.0/0 -11/0/0 (+35)	0.0/0 -11/0/0 (+45)	0.0/0 -9/0/0 (+51)	
	-1/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3400	0.0/0 -7/0/0 (+27)	0.0/0 -10/0/0 (+27)	0.0/0 -11/0/0 (+41)	0.0/0 -9/0/0 (+51)	0.0/0 -8/0/0 (+51)	
	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3500	0.0/0 -5/0/0 (+33)	0.0/0 -8/0/0 (+41)	0.0/0 -9/0/0 (+49)	0.0/0 -8/0/0 (+51)	0.0/0 -8/0/0 (+51)	
	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3600 and above	0.0/0 -3/0/0 (+41)	0.0/0 -5/0/0 (+51)	0.0/0 -6/0/0 (+51)	0.0/0 -7/0/0 (+51)	0.0/0 -8/0/0 (+51)	
	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	

OCTO 9.1.2 AA211A09

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS FLUID CONTAMINATED RUNWAY	2.04.10	P 5
		SEQ. 001	REV 17

- Note :
- Do not interpolate between values, always refer to the lower runway length.
 - Do not extrapolate below the shortest runway length provided in the tables.
 - When using the following tables, the flexible temperature is limited to a maximum of 51°C.
 - If no minimum speed value is available, use the conservative values provided on 2.02.25.

R
R

CAUTION

The following tables have been established for TOGA or FLEXIBLE thrust. Do not use them for BUMP or derated thrust.

ALL THRUST REVERSERS OPERATIVE						CONF 1 + F
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
8200	-35.8/-18 0/0/0 (+1)	-27.9/-15 0/0/0 (+1)	-16.2/-11 0/0/0 (+1)	.0/0 -4/0/0 (+11)	.0/0 -7/0/0 (+9)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
	-35.8/-18 0/0/0	-27.9/-15 0/0/0	-16.2/-11 0/0/0	-1.3/-1 0/0/0	.0/0 0/0/0	
	-32.0/-16 0/0/0 (+1)	-25.8/-15 0/0/0 (+1)	.0/0 -4/0/0 (+5)	.0/0 -6/0/0 (+9)	.0/0 -9/0/0 (+7)	
8500	-32.0/-16 0/0/0	-25.8/-15 0/0/0	-9.6/-6 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	-30.2/-15 0/0/0 (+1)	-23.3/-15 0/0/0 (+1)	.0/0 -5/0/0 (+7)	.0/0 -8/0/0 (+9)	.0/0 -11/0/0 (+9)	
	-30.2/-15 0/0/0	-23.3/-15 0/0/0	-1.6/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
8800	-27.9/-14 0/0/0 (+1)	.0/0 -3/0/0 (+1)	.0/-1 -7/0/0 (+9)	.0/0 -10/0/0 (+9)	.0/0 -10/0/0 (+27)	
	-27.9/-14 0/0/0	-17.3/-11 0/0/0	.0/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	-25.8/-14 0/0/0 (+1)	.0/0 -4/0/0 (+9)	.0/0 -9/0/0 (+9)	.0/0 -11/0/0 (+11)	.0/0 -12/0/0 (+27)	
9400	-25.8/-14 0/0/0	-10.6/-7 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	-23.9/-14 0/0/0 (+1)	.0/0 -6/0/0 (+9)	.0/0 -10/0/0 (+9)	.0/0 -10/0/0 (+27)	.0/0 -11/0/0 (+33)	
	-23.9/-14 0/0/0	-2.7/-2 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
9700	.0/0 -4/0/0 (+7)	.0/0 -8/0/0 (+7)	.0/0 -11/0/0 (+17)	.0/0 -11/0/0 (+31)	.0/0 -11/0/0 (+39)	
	-19.0/-12 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	.0/0 -5/0/0 (+9)	.0/-1 -9/0/0 (+9)	.0/0 -11/0/0 (+27)	.0/0 -11/0/0 (+35)	.0/0 -11/0/0 (+43)	
10000	-12.9/-8 0/0/0	.0/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	.0/0 -7/0/0 (+9)	.0/0 -11/0/0 (+11)	.0/0 -11/0/0 (+33)	.0/0 -11/0/0 (+39)	.0/0 -10/0/0 (+49)	
	-4.4/-3 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10300	.0/0 -7/0/0 (+17)	.0/0 -9/0/0 (+27)	.0/0 -11/0/0 (+37)	.0/0 -11/0/0 (+45)	.0/0 -9/0/0 (+51)	
	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	.0/0 -7/0/0 (+29)	.0/0 -9/0/0 (+27)	.0/0 -11/0/0 (+41)	.0/0 -9/0/0 (+51)	.0/0 -8/0/0 (+51)	
10600	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	.0/0 -7/0/0 (+17)	.0/0 -9/0/0 (+27)	.0/0 -11/0/0 (+37)	.0/0 -11/0/0 (+45)	.0/0 -9/0/0 (+51)	
	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10900	.0/0 -7/0/0 (+17)	.0/0 -9/0/0 (+27)	.0/0 -11/0/0 (+37)	.0/0 -11/0/0 (+45)	.0/0 -9/0/0 (+51)	
	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	.0/0 -7/0/0 (+29)	.0/0 -9/0/0 (+27)	.0/0 -11/0/0 (+41)	.0/0 -9/0/0 (+51)	.0/0 -8/0/0 (+51)	
11200	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
	.0/0 -5/0/0 (+33)	.0/0 -7/0/0 (+41)	.0/0 -9/0/0 (+51)	.0/0 -9/0/0 (+51)	.0/0 -8/0/0 (+51)	
	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
11500 and above	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	

OCTO 10.0.1 AA211A09 FCOM-FO-2-04-10-006-254

ALL THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
2100		-40.3/-23 0/ 0/ 0 (+1) -40.3/-23 0/ 0/ 0	-32.9/-16 0/ 0/ 0 (+1) -32.9/-16 0/ 0/ 0	-27.8/-13 0/ 0/ 0 (+1) -27.8/-13 0/ 0/ 0	-20.2/-10 0/ 0/ 0 (+1) -20.2/-10 0/ 0/ 0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
2200	-42.3/-26 0/ 0/ 0 (+1) -42.3/-26 0/ 0/ 0	-37.6/-20 0/ 0/ 0 (+1) -37.6/-20 0/ 0/ 0	-30.0/-14 0/ 0/ 0 (+1) -30.0/-14 0/ 0/ 0	-24.7/-12 0/ 0/ 0 (+1) -24.7/-12 0/ 0/ 0	0.0/ 0 -3.0/ 0 (+1) -16.4/-9 0/ 0/ 0	
2300	-42.5/-24 0/ 0/ 0 (+1) -42.5/-24 0/ 0/ 0	-33.7/-17 0/ 0/ 0 (+1) -33.7/-17 0/ 0/ 0	-26.5/-12 0/ 0/ 0 (+1) -26.5/-12 0/ 0/ 0	-21.4/-12 0/ 0/ 0 (+1) -21.4/-12 0/ 0/ 0	0.0/ 0 -5.0/ 0 (+9) -7.8/-5 0/ 0/ 0	
2400	-38.7/-21 0/ 0/ 0 (+1) -38.7/-21 0/ 0/ 0	-31.5/-15 0/ 0/ 0 (+1) -31.5/-15 0/ 0/ 0	-24.1/-12 0/ 0/ 0 (+1) -24.1/-12 0/ 0/ 0	0.0/ 0 -4.0/ 0 (+7) -15.1/-9 0/ 0/ 0	0.0/ 0 -8.0/ 0 (+9) -2/-1 0/ 0/ 0	
2500	-35.1/-18 0/ 0/ 0 (+1) -35.1/-18 0/ 0/ 0	-28.1/-13 0/ 0/ 0 (+1) -28.1/-13 0/ 0/ 0	0.0/ 0 -4.0/ 0 (+1) -21.7/-12 0/ 0/ 0	0.0/ 0 -7.0/ 0 (+9) -3.0/-2 0/ 0/ 0	0.0/ 0 -10.0/ 0 (+7) 0/-1 0/ 0/ 0	
2600	-32.1/-15 0/ 0/ 0 (+1) -32.1/-15 0/ 0/ 0	-26.1/-12 0/ 0/ 0 (+1) -26.1/-12 0/ 0/ 0	0.0/ 0 -6.0/ 0 (+9) -11.4/-6 0/ 0/ 0	0.0/ 0 -9.0/ 0 (+7) 0/-1 0/ 0/ 0	0.0/ 0 -12.0/ 0 (+7) -1/-1 0/ 0/ 0	
2700	-30.0/-14 0/ 0/ 0 (+1) -30.0/-14 0/ 0/ 0	0.0/ 0 -3.0/ 0 (+1) -23.7/-12 0/ 0/ 0	0.0/ 0 -8.0/ 0 (+7) -2/-1 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+9) 0/-1 0/ 0/ 0	0.0/ 0 -10.0/ 0 (+27) 0.0/ 0 0/ 0/ 0	
2800	-27.2/-12 0/ 0/ 0 (+1) -27.2/-12 0/ 0/ 0	0.0/ 0 -5.0/ 0 (+7) -17.5/-9 0/ 0/ 0	0.0/ 0 -10.0/ 0 (+7) -1/-1 0/ 0/ 0	0.0/ 0 -12.0/ 0 (+7) -1/-1 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+31) 0.0/ 0 0/ 0/ 0	
2900	-25.4/-12 0/ 0/ 0 (+1) -25.4/-12 0/ 0/ 0	0.0/ 0 -7.0/ 0 (+9) -7.4/-4 0/ 0/ 0	0.0/ 0 -12.0/ 0 (+9) -1/-1 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+31) 0.0/ 0 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+37) 0.0/ 0 0/ 0/ 0	
3000	0.0/ 0 -4/ 0/ 0 (+7) -23.2/-12 0/ 0/ 0	0.0/ 0 -9.0/ 0 (+9) -1/-1 0/ 0/ 0	0.0/ 0 -9.0/ 0 (+27) 0.0/ 0 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+35) 0.0/ 0 0/ 0/ 0	0.0/ 0 -10.0/ 0 (+45) 0.0/ 0 0/ 0/ 0	
3100	0.0/ 0 -6.0/ 0 (+7) -15.3/-8 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+9) -1/-1 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+33) 0.0/ 0 0/ 0/ 0	0.0/ 0 -10.0/ 0 (+41) 0.0/ 0 0/ 0/ 0	0.0/ 0 -8.0/ 0 (+51) 0.0/ 0 0/ 0/ 0	
3200 and above	0.0/ 0 -9.0/ 0 (+5) -6.3/-3 0/ 0/ 0	0.0/ 0 -9.0/ 0 (+27) 0.0/ 0 0/ 0/ 0	0.0/ 0 -11.0/ 0 (+39) 0.0/ 0 0/ 0/ 0	0.0/ 0 -10.0/ 0 (+49) 0.0/ 0 0/ 0/ 0	0.0/ 0 -9.0/ 0 (+49) 0.0/ 0 0/ 0/ 0	

OCTO 9.1.2 AA211A09

ALL THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
7600	-38.4/-22 0/0/0 (+1)	-31.4/-16 0/0/0 (+1)	-22.5/-11 0/0/0 (+1)	-14.4/-8 0/0/0 (+1)	.0/0 -4/0/0 (+7)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
	-38.4/-22 0/0/0	-31.4/-16 0/0/0	-22.5/-11 0/0/0	-14.4/-8 0/0/0	-4.2/-3 0/0/0	
7900	-35.7/-20 0/0/0 (+1)	-29.9/-15 0/0/0 (+1)	-19.8/-11 0/0/0 (+1)	.0/0 -4/0/0 (+3)	.0/0 -6/0/0 (+9)	
	-35.7/-20 0/0/0	-29.9/-15 0/0/0	-19.8/-11 0/0/0	-12.0/-8 0/0/0	.0/0 0/0/0	
8200	-33.5/-17 0/0/0 (+1)	-27.5/-13 0/0/0 (+1)	-17.3/-10 0/0/0 (+1)	.0/-1 -5/0/0 (+11)	.0/0 -8/0/0 (+9)	
	-33.5/-17 0/0/0	-27.5/-13 0/0/0	-17.3/-10 0/0/0	-1.9/-2 0/0/0	.0/0 0/0/0	
8500	-31.1/-15 0/0/0 (+1)	-25.5/-13 0/0/0 (+1)	.0/0 -4/0/0 (+9)	.0/0 -7/0/0 (+9)	.0/0 -10/0/0 (+9)	
	-31.1/-15 0/0/0	-25.5/-13 0/0/0	-10.8/-7 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
8800	-29.3/-14 0/0/0 (+1)	-23.0/-13 0/0/0 (+1)	.0/-1 -6/0/0 (+9)	.0/-1 -9/0/0 (+9)	.0/0 -9/0/0 (+27)	
	-29.3/-14 0/0/0	-23.0/-13 0/0/0	-6/-1 0/0/0	.0/-1 0/0/0	.0/0 0/0/0	
9100	-27.2/-13 0/0/0 (+1)	.0/0 -4/0/0 (+5)	.0/-1 -7/0/0 (+13)	.0/0 -11/0/0 (+7)	.0/0 -11/0/0 (+27)	
	-27.2/-13 0/0/0	-18.3/-11 0/0/0	.0/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
9400	-25.4/-13 0/0/0 (+1)	.0/0 -5/0/0 (+11)	.0/0 -10/0/0 (+7)	.0/0 -10/0/0 (+27)	.0/0 -11/0/0 (+31)	
	-25.4/-13 0/0/0	-9.5/-6 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
9700	.0/0 -3/0/0 (+1)	.0/-1 -7/0/0 (+9)	.0/0 -11/0/0 (+11)	.0/0 -11/0/0 (+31)	.0/0 -10/0/0 (+39)	
	-23.4/-13 0/0/0	-4/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10000	.0/-1 -4/0/0 (+9)	.0/-1 -9/0/0 (+9)	.0/0 -10/0/0 (+27)	.0/0 -11/0/0 (+33)	.0/0 -10/0/0 (+45)	
	-18.6/-10 0/0/0	.0/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10300	.0/-1 -6/0/0 (+9)	.0/0 -11/0/0 (+5)	.0/0 -11/0/0 (+31)	.0/0 -10/0/0 (+41)	.0/0 -8/0/0 (+51)	
	-10.4/-6 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10600	.0/0 -8/0/0 (+9)	.0/0 -12/0/0 (+9)	.0/0 -10/0/0 (+35)	.0/0 -10/0/0 (+47)	.0/0 -8/0/0 (+51)	
	-2.4/-2 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10900 and above	.0/0 -7/0/0 (+27)	.0/0 -11/0/0 (+27)	.0/0 -10/0/0 (+43)	.0/0 -8/0/0 (+51)	.0/0 -7/0/0 (+51)	
	-1.3/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	

OC10 10.0.1 AA211A09 FCOM-F0-2-04-10-007-254

ALL THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
7000	-39.4/-25 0/0/0 (+1)	-39.0/-22 0/0/0 (+1)	-31.5/-15 0/0/0 (+1)	-27.0/-13 0/0/0 (+1)	-18.0/-9 0/0/0 (+1)	ΔW (1000 KG) $\Delta TFLEX$ $\Delta V1-\Delta VR-\Delta V2$ (KT) (TVMC OAT C) ΔW (1000 KG) $\Delta TFLEX$ $\Delta V1-\Delta VR-\Delta V2$ (KT)
	-39.4/-25 0/0/0	-39.0/-22 0/0/0	-31.5/-15 0/0/0	-27.0/-13 0/0/0	-18.0/-9 0/0/0	
7300	-41.2/-25 0/0/0 (+1)	-35.9/-19 0/0/0 (+1)	-29.1/-13 0/0/0 (+1)	-23.6/-12 0/0/0 (+1)	.0/0 -4/0/0 (+3)	
	-41.2/-25 0/0/0	-35.9/-19 0/0/0	-29.1/-13 0/0/0	-23.6/-12 0/0/0	-14.5/-8 0/0/0	
7600	-40.4/-23 0/0/0 (+1)	-33.4/-17 0/0/0 (+1)	-26.4/-13 0/0/0 (+1)	-19.7/-11 0/0/0 (+1)	.0/-1 -5/0/0 (+9)	
	-40.4/-23 0/0/0	-33.4/-17 0/0/0	-26.4/-13 0/0/0	-19.7/-11 0/0/0	-4.6/-3 0/0/0	
7900	-38.6/-21 0/0/0 (+1)	-31.1/-15 0/0/0 (+1)	-24.1/-12 0/0/0 (+1)	.0/-1 -4/0/0 (+9)	.0/-1 -7/0/0 (+11)	
	-38.6/-21 0/0/0	-31.1/-15 0/0/0	-24.1/-12 0/0/0	-13.2/-8 0/0/0	.0/-1 0/0/0	
8200	-34.6/-18 0/0/0 (+1)	-28.6/-13 0/0/0 (+1)	.0/0 -3/0/0 (+1)	.0/-1 -6/0/0 (+9)	.0/0 -9/0/0 (+7)	
	-34.6/-18 0/0/0	-28.6/-13 0/0/0	-20.8/-12 0/0/0	-2.1/-2 0/0/0	.0/0 0/0/0	
8500	-32.0/-15 0/0/0 (+1)	-26.3/-12 0/0/0 (+1)	-.5/-1 -5/0/0 (+9)	.0/-1 -8/0/0 (+7)	.0/0 -11/0/0 (+7)	
	-32.0/-15 0/0/0	-26.3/-12 0/0/0	-11.4/-6 0/0/0	.0/-1 0/0/0	.0/0 0/0/0	
8800	-30.5/-14 0/0/0 (+1)	-23.9/-12 0/0/0 (+1)	.0/-1 -7/0/0 (+9)	.0/0 -10/0/0 (+9)	.0/0 -10/0/0 (+27)	
	-30.5/-14 0/0/0	-23.9/-12 0/0/0	-.6/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
9100	-28.2/-12 0/0/0 (+1)	.0/-1 -4/0/0 (+7)	.0/0 -9/0/0 (+7)	.0/0 -12/0/0 (+7)	.0/0 -11/0/0 (+31)	
	-28.2/-12 0/0/0	-19.1/-10 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
9400	-26.1/-12 0/0/0 (+1)	.0/-1 -5/0/0 (+9)	.0/0 -11/0/0 (+7)	.0/0 -10/0/0 (+27)	.0/0 -11/0/0 (+35)	
	-26.1/-12 0/0/0	-9.9/-5 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
9700	.0/0 -3/0/0 (+1)	.0/0 -8/0/0 (+7)	.0/0 -11/0/0 (+11)	.0/0 -11/0/0 (+33)	.0/0 -10/0/0 (+41)	
	-24.1/-12 0/0/0	-.5/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10000	.0/0 -5/0/0 (+7)	.0/0 -10/0/0 (+7)	.0/0 -10/0/0 (+31)	.0/0 -11/0/0 (+37)	.0/0 -10/0/0 (+49)	
	-19.1/-10 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10300 and above	.0/-1 -6/0/0 (+9)	.0/0 -10/0/0 (+13)	.0/0 -11/0/0 (+35)	.0/0 -10/0/0 (+43)	.0/0 -7/0/0 (+51)	
	-10.7/-5 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	

OCTO 10.0.1 AA211A09 FCOM-F0-02-04-10-008-254

ALL THRUST REVERSERS OPERATIVE						CONF 1+F
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
2100	-45.5/-30 0/0/0 (+1)	-35.8/-21 0/0/0 (+1)	-31.4/-16 0/0/0 (+1)	-27.0/-13 0/0/0 (+1)	-22.0/-12 0/0/0 (+1)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
	-45.5/-30 0/0/0	-35.8/-21 0/0/0	-31.4/-16 0/0/0	-27.0/-13 0/0/0	-22.0/-12 0/0/0	
2200	-41.7/-26 0/0/0 (+1)	-37.8/-20 0/0/0 (+1)	-28.4/-13 0/0/0 (+1)	-24.1/-12 0/0/0 (+1)	0.0/0 0/-1/-1 (+3)	
	-41.7/-26 0/0/0	-37.8/-20 0/0/0	-28.4/-13 0/0/0	-24.1/-12 0/0/0	-19.2/-12 0/0/0	
2300	-41.3/-24 0/0/0 (+1)	-33.2/-17 0/0/0 (+1)	-26.0/-13 0/0/0 (+1)	-21.5/-13 0/0/0 (+1)	0.0/0 0/-1/-1 (+19)	
	-41.3/-24 0/0/0	-33.2/-17 0/0/0	-26.0/-13 0/0/0	-21.5/-13 0/0/0	-10.7/-7 0/0/0	
2400	-38.1/-21 0/0/0 (+1)	-30.7/-15 0/0/0 (+1)	-24.1/-13 0/0/0 (+1)	0.0/0 0/-1/-1 (+15)	0.0/0 0/-1/-1 (+27)	
	-38.1/-21 0/0/0	-30.7/-15 0/0/0	-24.1/-13 0/0/0	-17.7/-11 0/0/0	-4/-1 0/0/0	
2500	-34.1/-17 0/0/0 (+1)	-27.4/-13 0/0/0 (+1)	0.0/0 0/-1/-1 (+9)	0.0/0 0/-1/-1 (+27)	0.0/0 0/-1/-1 (+31)	
	-34.1/-17 0/0/0	-27.4/-13 0/0/0	-22.2/-13 0/0/0	-7.0/-5 0/0/0	-4/-1 0/0/0	
2600	-32.0/-16 0/0/0 (+1)	-26.0/-13 0/0/0 (+1)	0/0 0/-1/-1 (+21)	0.0/0 0/-1/-1 (+31)	0/-1 0/0/0 (+39)	
	-32.0/-16 0/0/0	-26.0/-13 0/0/0	-15.1/-9 0/0/0	-.2/-1 0/0/0	-.1/-1 0/0/0	
2700	-29.5/-14 0/0/0 (+1)	-.7/-1 0/0/0 (+5)	0.0/0 0/-1/-1 (+29)	-.5/-1 0/0/0 (+35)	0/-1 0/0/0 (+41)	
	-29.5/-14 0/0/0	-24.0/-13 0/0/0	-3.9/-3 0/0/0	-.5/-1 0/0/0	-.1/-1 0/0/0	
2800	-27.2/-12 0/0/0 (+1)	-.7/-1 0/0/0 (+17)	0.0/0 0/-1/-1 (+33)	-.1/-1 0/0/0 (+39)	0/-1 0/0/0 (+47)	
	-27.2/-12 0/0/0	-21.3/-13 0/0/0	-.1/-1 0/0/0	-.1/-1 0/0/0	0/-1 0/0/0	
2900	-1.1/-1 -1/-1/-1 (+3)	-.7/-1 0/0/0 (+29)	-.1/-1 0/0/0 (+39)	0/-1 0/0/0 (+45)	0/-1 0/0/0 (+51)	
	-25.6/-13 0/0/0	-11.6/-7 0/0/0	-.1/-1 0/0/0	0/-1 0/0/0	0/-1 0/0/0	
3000	-1.1/-1 -1/-1/-1 (+13)	-.7/-1 0/0/0 (+31)	-.3/-1 0/0/0 (+41)	0/-1 0/0/0 (+51)	0/-1 0/0/0 (+51)	
	-23.3/-12 0/0/0	-1.4/-1 0/0/0	-.3/-1 0/0/0	0/-1 0/0/0	0/-1 0/0/0	
3100	-1.1/-1 -1/-1/-1 (+25)	-.5/-1 0/0/0 (+35)	-.1/-1 0/0/0 (+51)	-.1/-1 0/0/0 (+51)	0/-1 0/0/0 (+51)	
	-20.0/-11 0/0/0	-.5/-1 0/0/0	-.1/-1 0/0/0	-.1/-1 0/0/0	0/-1 0/0/0	
3200 and above	-.6/-1 -1/0/0 (+29)	-.6/-1 0/0/0 (+39)	-.1/-1 0/0/0 (+51)	0/-1 0/0/0 (+51)	0.0/0 0/0/0 (+51)	
	-10.3/-6 0/0/0	-.6/-1 0/0/0	-.1/-1 0/0/0	0/-1 0/0/0	0.0/0 0/0/0	

OCTO 9.1.2 AA211A09

ALL THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	WIND
1900		-36.0/-25 0/ 0/ 0 (+1)	-36.7/-22 0/ 0/ 0 (+1)	-32.5/-18 0/ 0/ 0 (+1)	-27.5/-13 0/ 0/ 0 (+1)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
2000		-38.6/-24 0/ 0/ 0 (+1)	-33.8/-19 0/ 0/ 0 (+1)	-30.2/-15 0/ 0/ 0 (+1)	-25.0/-11 0/ 0/ 0 (+1)	
2100	-38.8/-26 0/ 0/ 0 (+1)	-37.7/-22 0/ 0/ 0 (+1)	-30.9/-16 0/ 0/ 0 (+1)	-26.6/-13 0/ 0/ 0 (+1)	-22.1/-11 0/ 0/ 0 (+1)	
2200	-41.1/-25 0/ 0/ 0 (+1)	-34.7/-19 0/ 0/ 0 (+1)	-28.0/-14 0/ 0/ 0 (+1)	-23.8/-11 0/ 0/ 0 (+1)	0.0/ 0 0/-1/-1 (+5)	
2300	-39.2/-23 0/ 0/ 0 (+1)	-31.8/-16 0/ 0/ 0 (+1)	-25.6/-12 0/ 0/ 0 (+1)	-1/-1 0/-1/-1 (+3)	-3/-1 0/0 (+21)	
2400	-36.5/-20 0/ 0/ 0 (+1)	-29.8/-15 0/ 0/ 0 (+1)	-23.7/-11 0/ 0/ 0 (+1)	-1/-1 0/-1/-1 (+15)	-1/-1 0/0 (+31)	
2500	-33.3/-17 0/ 0/ 0 (+1)	-27.0/-12 0/ 0/ 0 (+1)	-6/-1 0/0 (+9)	-2/-1 0/0 (+29)	-1/-1 0/0 (+37)	
2600	-31.2/-15 0/ 0/ 0 (+1)	-25.8/-12 0/ 0/ 0 (+1)	-4/-1 0/0 (+23)	-3/-1 0/0 (+33)	0/-1 0/0 (+41)	
2700	-28.5/-13 0/ 0/ 0 (+1)	-1.0/-1 0/-1/-1 (+7)	-4/-1 0/0 (+31)	-1/-1 0/0 (+39)	0/-1 0/0 (+47)	
2800	-27.1/-12 0/ 0/ 0 (+1)	-6/-1 0/0 (+19)	-3/-1 0/0 (+37)	-2/-1 0/0 (+45)	0/-1 0/0 (+51)	
2900	-1.3/-1 -1/-1/-1 (+1)	-8/-1 0/0 (+29)	-4/-1 0/0 (+43)	-2/-1 0/0 (+51)	-1/-1 0/0 (+51)	
3000 and above	-7/-1 -1/-1/-1 (+15)	-5/-1 0/0 (+35)	-8/-1 0/0 (+51)	-1/-1 0/0 (+51)	-1/-1 0/0 (+51)	

OCTO 9.1.2 AA211A09

ALL THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
6400		-37.0/-24 0/0/0 (+1)	-34.8/-20 0/0/0 (+1)	-30.8/-16 0/0/0 (+1)	-26.3/-12 0/0/0 (+1)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
		-37.0/-24 0/0/0	-34.8/-20 0/0/0	-30.8/-16 0/0/0	-26.3/-12 0/0/0	
6700		-37.7/-23 0/0/0 (+1)	-32.7/-17 0/0/0 (+1)	-28.8/-14 0/0/0 (+1)	-24.0/-11 0/0/0 (+1)	
		-37.7/-23 0/0/0	-32.7/-17 0/0/0	-28.8/-14 0/0/0	-24.0/-11 0/0/0	
7000	-38.9/-25 0/0/0 (+1)	-36.3/-21 0/0/0 (+1)	-29.9/-15 0/0/0 (+1)	-25.9/-12 0/0/0 (+1)	-19.7/-10 0/0/0 (+1)	
	-38.9/-25 0/0/0	-36.3/-21 0/0/0	-29.9/-15 0/0/0	-25.9/-12 0/0/0	-19.7/-10 0/0/0	
7300	-40.0/-24 0/0/0 (+1)	-33.6/-18 0/0/0 (+1)	-27.6/-13 0/0/0 (+1)	-22.5/-11 0/0/0 (+1)	-3/-1 0/-1/-1 (+9)	
	-40.0/-24 0/0/0	-33.6/-18 0/0/0	-27.6/-13 0/0/0	-22.5/-11 0/0/0	-16.7/-10 0/0/0	
7600	-38.5/-22 0/0/0 (+1)	-31.3/-16 0/0/0 (+1)	-25.5/-12 0/0/0 (+1)	-2/-1 0/-1/-1 (+5)	-6/-1 0/0/0 (+23)	
	-38.5/-22 0/0/0	-31.3/-16 0/0/0	-25.5/-12 0/0/0	-19.9/-10 0/0/0	-6.3/-4 0/0/0	
7900	-35.7/-20 0/0/0 (+1)	-29.6/-14 0/0/0 (+1)	-23.0/-11 0/0/0 (+1)	-4/-1 0/0/0 (+17)	-4/-1 0/0/0 (+31)	
	-35.7/-20 0/0/0	-29.6/-14 0/0/0	-23.0/-11 0/0/0	-14.8/-8 0/0/0	-1.2/-1 0/0/0	
8200	-33.5/-17 0/0/0 (+1)	-27.3/-13 0/0/0 (+1)	-5/-1 0/-1/-1 (+9)	-5/-1 0/0/0 (+29)	-4/-1 0/0/0 (+37)	
	-33.5/-17 0/0/0	-27.3/-13 0/0/0	-20.3/-11 0/0/0	-3.7/-2 0/0/0	-7/-1 0/0/0	
8500	-31.1/-15 0/0/0 (+1)	-26.1/-12 0/0/0 (+1)	-6/-1 0/-1/-1 (+21)	-5/-1 0/0/0 (+33)	-8/-1 0/0/0 (+41)	
	-31.1/-15 0/0/0	-26.1/-12 0/0/0	-13.0/-7 0/0/0	-1.0/-1 0/0/0	-1.0/-1 0/0/0	
8800	-29.3/-14 0/0/0 (+1)	-8/-1 0/-1/-1 (+3)	-7/-1 0/0/0 (+31)	-5/-1 0/0/0 (+39)	-5/-1 0/0/0 (+47)	
	-29.3/-14 0/0/0	-23.7/-11 0/0/0	-2.4/-2 0/0/0	-8/-1 0/0/0	-5/-1 0/0/0	
9100	-27.5/-12 0/0/0 (+1)	-7/-1 0/-1/-1 (+15)	-6/-1 0/0/0 (+35)	-6/-1 0/-1/-1 (+43)	-5/-1 0/0/0 (+51)	
	-27.5/-12 0/0/0	-20.8/-11 0/0/0	-9/-1 0/0/0	-6/-1 0/0/0	-5/-1 0/0/0	
9400	-26.1/-11 0/0/0 (+1)	-9/-1 0/-1/-1 (+27)	-6/-1 0/-1/-1 (+39)	-5/-1 0/0/0 (+51)	-4/-1 0/-1/-1 (+51)	
	-26.1/-11 0/0/0	-12.1/-6 0/0/0	-7/-1 0/0/0	-5/-1 0/0/0	-4/-1 0/0/0	
9700 and above	-1.0/-1 -1/-1/-1 (+7)	-8/-1 -1/-1/-1 (+33)	-5/-1 0/-1/-1 (+45)	-5/-1 0/-1/-1 (+51)	-4/-1 0/-1/-1 (+51)	
	-24.5/-11 0/0/0	-2.1/-1 0/0/0	-5/-1 0/0/0	-5/-1 0/0/0	-4/-1 0/0/0	

OCTO 10.0.1 AA211A09 FCOM-F0-02-04-10-010-254

ALL THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	WIND
1700				-37.2/-23 0/ 0/ 0 (+1) -37.2/-23 0/ 0/ 0	-36.9/-20 0/ 0/ 0 (+1) -36.9/-20 0/ 0/ 0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
1800			-37.5/-24 0/ 0/ 0 (+1) -37.5/-24 0/ 0/ 0	-38.0/-21 0/ 0/ 0 (+1) -38.0/-21 0/ 0/ 0	-33.6/-17 0/ 0/ 0 (+1) -33.6/-17 0/ 0/ 0	
1900			-39.4/-23 0/ 0/ 0 (+1) -39.4/-23 0/ 0/ 0	-35.3/-18 0/ 0/ 0 (+1) -35.3/-18 0/ 0/ 0	-29.8/-14 0/ 0/ 0 (+1) -29.8/-14 0/ 0/ 0	
2000		-40.0/-24 0/ 0/ 0 (+1) -40.0/-24 0/ 0/ 0	-37.2/-20 0/ 0/ 0 (+1) -37.2/-20 0/ 0/ 0	-31.7/-15 0/ 0/ 0 (+1) -31.7/-15 0/ 0/ 0	-25.8/-11 0/ 0/ 0 (+1) -25.8/-11 0/ 0/ 0	
2100		-40.4/-23 0/ 0/ 0 (+1) -40.4/-23 0/ 0/ 0	-32.9/-16 0/ 0/ 0 (+1) -32.9/-16 0/ 0/ 0	-27.8/-13 0/ 0/ 0 (+1) -27.8/-13 0/ 0/ 0	-23.2/-11 0/ 0/ 0 (+1) -23.2/-11 0/ 0/ 0	
2200	-42.3/-26 0/ 0/ 0 (+1) -42.3/-26 0/ 0/ 0	-37.6/-20 0/ 0/ 0 (+1) -37.6/-20 0/ 0/ 0	-30.1/-14 0/ 0/ 0 (+1) -30.1/-14 0/ 0/ 0	-25.0/-11 0/ 0/ 0 (+1) -25.0/-11 0/ 0/ 0	-4/-1 0/0/0 (+13) -19.4/-10 0/ 0/ 0	
2300	-42.5/-24 0/ 0/ 0 (+1) -42.5/-24 0/ 0/ 0	-33.7/-17 0/ 0/ 0 (+1) -33.7/-17 0/ 0/ 0	-26.5/-12 0/ 0/ 0 (+1) -26.5/-12 0/ 0/ 0	-5/-1 0/0/0 (+5) -22.2/-10 0/ 0/ 0	-4/-1 0/0/0 (+25) -9.9/-5 0/ 0/ 0	
2400	-39.1/-21 0/ 0/ 0 (+1) -39.1/-21 0/ 0/ 0	-31.5/-15 0/ 0/ 0 (+1) -31.5/-15 0/ 0/ 0	-24.5/-11 0/ 0/ 0 (+1) -24.5/-11 0/ 0/ 0	-4/-1 0/0/0 (+19) -17.1/-9 0/ 0/ 0	-2/-1 0/0/0 (+33) -2/-1 0/ 0/ 0	
2500	-35.3/-18 0/ 0/ 0 (+1) -35.3/-18 0/ 0/ 0	-28.1/-13 0/ 0/ 0 (+1) -28.1/-13 0/ 0/ 0	-6/-1 0/0/0 (+13) -21.7/-10 0/ 0/ 0	-3/-1 0/0/0 (+31) -4.7/-3 0/ 0/ 0	-2/-1 0/0/0 (+39) -2/-1 0/ 0/ 0	
2600	-32.1/-15 0/ 0/ 0 (+1) -32.1/-15 0/ 0/ 0	-26.5/-11 0/ 0/ 0 (+1) -26.5/-11 0/ 0/ 0	-5/-1 0/-1/-1 (+23) -13.3/-7 0/ 0/ 0	-3/-1 0/0/0 (+37) -3/-1 0/ 0/ 0	-2/-1 0/0/0 (+45) -2/-1 0/ 0/ 0	
2700	-29.6/-14 0/ 0/ 0 (+1) -29.6/-14 0/ 0/ 0	-5/-1 -1/-1/-1 (+9) -24.0/-11 0/ 0/ 0	-5/-1 -1/-1/-1 (+33) -1.5/-1 0/ 0/ 0	-3/-1 0/-1/-1 (+41) -3/-1 0/ 0/ 0	-3/-1 0/-1/-1 (+51) -3/-1 0/ 0/ 0	
2800 and above	-27.4/-12 0/ 0/ 0 (+1) -27.4/-12 0/ 0/ 0	-7/-1 -1/-1/-1 (+21) -19.8/-10 0/ 0/ 0	-4/-1 -1/-1/-1 (+39) -4/-1 0/ 0/ 0	-3/-1 0/0/0 (+51) -3/-1 0/ 0/ 0	-2/-1 0/0/0 (+51) -2/-1 0/ 0/ 0	

OCTO 9.1.2 AA211A09

NO THRUST REVERSERS OPERATIVE						CONF 1+F
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
2500	-60.8/-31 0/0/0 (+1)	-50.6/-27 0/0/0 (+1)	-39.9/-25 0/0/0 (+1)	0.0/0 -5/0/0 (+11)	0.0/0 -8/0/0 (+9)	ΔW (1000 KG) $\Delta TFLEX$ $\Delta V1-\Delta VR-\Delta V2$ (KT) (TVMC OAT C) ΔW (1000 KG) $\Delta TFLEX$ $\Delta V1-\Delta VR-\Delta V2$ (KT)
	-60.8/-31 0/0/0	-50.6/-27 0/0/0	-39.9/-25 0/0/0	-25.6/-17 0/0/0	-8.9/-6 0/0/0	
2600	-58.7/-28 0/0/0 (+1)	-48.8/-28 0/0/0 (+1)	0.0/0 0/0/0 (+7)	0.0/0 -7/0/0 (+9)	0.0/0 -10/0/0 (+9)	
	-58.7/-28 0/0/0	-48.8/-28 0/0/0	-32.3/-21 0/0/0	-17.3/-11 0/0/0	0.0/0 0/0/0	
2700	-57.0/-28 0/0/0 (+1)	-46.5/-30 0/0/0 (+1)	0.0/0 -6/0/0 (+7)	0.0/0 -9/0/0 (+9)	0.0/0 -12/0/0 (+11)	
	-57.0/-28 0/0/0	-46.5/-30 0/0/0	-24.4/-15 0/0/0	-6.0/-4 0/0/0	0.0/0 0/0/0	
2800	-49.2/-26 0/0/0 (+1)	0.0/0 -4/0/0 (+5)	0.0/0 -8/0/0 (+11)	0.0/0 -11/0/0 (+9)	0.0/0 -10/0/0 (+27)	
	-49.2/-26 0/0/0	-38.5/-24 0/0/0	-15.0/-9 0/0/0	-1.3/-1 0/0/0	0.0/0 0/0/0	
2900	-48.5/-27 0/0/0 (+1)	0.0/0 -6/0/0 (+9)	0.0/0 -10/0/0 (+9)	0.0/0 -12/0/0 (+15)	0.0/0 -12/0/0 (+31)	
	-48.5/-27 0/0/0	-31.5/-20 0/0/0	-4.8/-3 0/0/0	-4.4/-3 0/0/0	0.0/0 0/0/0	
3000	0.0/0 -3/0/0 (+3)	0.0/0 -8/0/0 (+9)	0.0/0 -11/0/0 (+11)	0.0/0 -11/0/0 (+27)	0.0/0 -11/0/0 (+35)	
	-45.2/-28 0/0/0	-23.0/-14 0/0/0	-6.9/-4 0/0/0	-4.6/-3 0/0/0	0.0/0 0/0/0	
3100	0.0/0 -5/0/0 (+9)	0.0/0 -9/0/0 (+9)	0.0/0 -10/0/0 (+27)	0.0/0 -12/0/0 (+33)	0.0/0 -11/0/0 (+41)	
	-39.0/-24 0/0/0	-15.0/-9 0/0/0	-7.8/-4 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3200	0.0/0 -7/0/0 (+9)	0.0/0 -11/0/0 (+9)	0.0/0 -11/0/0 (+27)	0.0/0 -11/0/0 (+39)	0.0/0 -10/0/0 (+47)	
	-31.5/-18 0/0/0	-15.0/-8 0/0/0	-10.7/-5 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3300	0.0/0 -8/0/0 (+11)	0.0/0 -9/0/0 (+27)	0.0/0 -11/0/0 (+37)	0.0/0 -10/0/0 (+45)	0.0/0 -9/0/0 (+51)	
	-23.3/-13 0/0/0	-13.4/-7 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3400	0.0/0 -7/0/0 (+27)	0.0/0 -10/0/0 (+27)	0.0/0 -11/0/0 (+41)	0.0/0 -9/0/0 (+51)	0.0/0 -8/0/0 (+51)	
	-18.8/-10 0/0/0	-16.5/-8 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3500	0.0/0 -5/0/0 (+33)	0.0/0 -8/0/0 (+39)	0.0/0 -9/0/0 (+49)	0.0/0 -8/0/0 (+51)	0.0/0 -8/0/0 (+51)	
	-10.1/-5 0/0/0	-2.3/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3600 and above	0.0/0 -3/0/0 (+41)	0.0/0 -5/0/0 (+49)	0.0/0 -6/0/0 (+51)	0.0/0 -7/0/0 (+51)	0.0/0 -8/0/0 (+51)	
	-1.4/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	

OCTO 9.1.2 AA211A09

ALL THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
5800			-37.2/-24 0/0/0 (+1) -37.2/-24 0/0/0	-37.4/-22 0/0/0 (+1) -37.4/-22 0/0/0	-34.7/-18 0/0/0 (+1) -34.7/-18 0/0/0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
6100			-37.7/-22 0/0/0 (+1) -37.7/-22 0/0/0	-36.4/-20 0/0/0 (+1) -36.4/-20 0/0/0	-30.8/-15 0/0/0 (+1) -30.8/-15 0/0/0	
6400		-38.3/-25 0/0/0 (+1) -38.3/-25 0/0/0	-38.0/-21 0/0/0 (+1) -38.0/-21 0/0/0	-33.3/-17 0/0/0 (+1) -33.3/-17 0/0/0	-27.6/-13 0/0/0 (+1) -27.6/-13 0/0/0	
6700		-39.4/-23 0/0/0 (+1) -39.4/-23 0/0/0	-34.7/-18 0/0/0 (+1) -34.7/-18 0/0/0	-30.0/-14 0/0/0 (+1) -30.0/-14 0/0/0	-24.9/-11 0/0/0 (+1) -24.9/-11 0/0/0	
7000	-39.4/-25 0/0/0 (+1) -39.4/-25 0/0/0	-38.9/-22 0/0/0 (+1) -38.9/-22 0/0/0	-31.5/-15 0/0/0 (+1) -31.5/-15 0/0/0	-27.0/-12 0/0/0 (+1) -27.0/-12 0/0/0	-7/-1 0/-1/-1 (+1) -21.1/-10 0/0/0	
7300	-41.2/-24 0/0/0 (+1) -41.2/-24 0/0/0	-35.9/-19 0/0/0 (+1) -35.9/-19 0/0/0	-29.1/-13 0/0/0 (+1) -29.1/-13 0/0/0	-24.0/-11 0/0/0 (+1) -24.0/-11 0/0/0	-6/-1 0/-1/-1 (+13) -17.7/-9 0/0/0	
7600	-40.3/-23 0/0/0 (+1) -40.3/-23 0/0/0	-33.4/-17 0/0/0 (+1) -33.4/-17 0/0/0	-26.3/-12 0/0/0 (+1) -26.3/-12 0/0/0	-7/-1 0/-1/-1 (+7) -20.8/-10 0/0/0	-5/-1 0/-1/-1 (+25) -6.3/-3 0/0/0	
7900	-38.7/-21 0/0/0 (+1) -38.7/-21 0/0/0	-31.1/-15 0/0/0 (+1) -31.1/-15 0/0/0	-8/-1 0/-1/-1 (+1) -23.8/-11 0/0/0	-6/-1 0/-1/-1 (+19) -15.3/-8 0/0/0	-6/-1 0/-1/-1 (+33) -1.0/-1 0/0/0	
8200	-35.3/-18 0/0/0 (+1) -35.3/-18 0/0/0	-28.5/-13 0/0/0 (+1) -28.5/-13 0/0/0	-7/-1 0/-1/-1 (+13) -20.8/-10 0/0/0	-8/-1 0/-1/-1 (+31) -3.8/-2 0/0/0	-6/-1 0/-1/-1 (+39) -9/-1 0/0/0	
8500	-32.0/-15 0/0/0 (+1) -32.0/-15 0/0/0	-26.2/-11 0/0/0 (+1) -26.2/-11 0/0/0	-8/-1 -1/-1/-1 (+23) -13.3/-7 0/0/0	-7/-1 0/-1/-1 (+37) -9/-1 0/0/0	-6/-1 0/-1/-1 (+45) -7/-1 0/0/0	
8800	-30.4/-14 0/0/0 (+1) -30.4/-14 0/0/0	-9/-1 -1/-1/-1 (+7) -24.4/-11 0/0/0	-8/-1 -1/-1/-1 (+33) -2.3/-2 0/0/0	-6/-1 0/-1/-1 (+41) -7/-1 0/0/0	-6/-1 0/-1/-1 (+51) -6/-1 0/0/0	
9100 and above	-28.4/-13 0/0/0 (+1) -28.4/-13 0/0/0	-9/-1 -1/-1/-1 (+19) -21.3/-10 0/0/0	-8/-1 -1/-1/-1 (+39) -8/-1 0/0/0	-5/-1 -1/-1/-1 (+47) -5/-1 0/0/0	-7/-1 0/-1/-1 (+51) -7/-1 0/0/0	

OC20 10.0.1 AA2111A09 FCOM-F0-02-04-10-011-254

NO THRUST REVERSERS OPERATIVE						CONF 1 + F
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
8200		-50.5/-26 0/0/0 (+1)	-39.7/-25 0/0/0 (+1)	.0/0 -4/0/0 (+11)	.0/0 -7/0/0 (+9)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
		-50.5/-26 0/0/0	-39.7/-25 0/0/0	-24.7/-16 0/0/0	-8.0/-5 0/0/0	
8500		-48.1/-27 0/0/0 (+1)	.0/0 -4/0/0 (+5)	.0/-1 -6/0/0 (+9)	.0/0 -9/0/0 (+9)	
		-48.1/-27 0/0/0	-32.0/-21 0/0/0	-17.1/-11 0/0/0	.0/0 0/0/0	
8800		-46.9/-29 0/0/0 (+1)	.0/0 -5/0/0 (+7)	.0/0 -8/0/0 (+9)	.0/0 -11/0/0 (+9)	
		-46.9/-29 0/0/0	-24.9/-16 0/0/0	-7.1/-5 0/0/0	-5/-1 0/0/0	
9100	-49.8/-25 0/0/0 (+1)	.0/0 -3/0/0 (+1)	.0/-1 -6/0/0 (+11)	.0/0 -10/0/0 (+9)	.0/0 -12/0/0 (+17)	
	-49.8/-25 0/0/0	-39.3/-25 0/0/0	-16.8/-10 0/0/0	-1.7/-1 0/0/0	-1.4/-1 0/0/0	
9400	-48.3/-26 0/0/0 (+1)	.0/0 -4/0/0 (+9)	.0/0 -9/0/0 (+9)	.0/0 -11/0/0 (+11)	.0/0 -12/0/0 (+27)	
	-48.3/-26 0/0/0	-33.0/-21 0/0/0	-6.9/-4 0/0/0	-5.7/-3 0/0/0	-3.1/-2 0/0/0	
9700	-47.2/-28 0/0/0 (+1)	.0/0 -6/0/0 (+9)	.0/0 -10/0/0 (+9)	.0/0 -10/0/0 (+27)	.0/0 -12/0/0 (+33)	
	-47.2/-28 0/0/0	-26.1/-16 0/0/0	-8.0/-5 0/0/0	-6.1/-3 0/0/0	.0/0 0/0/0	
10000	.0/0 -4/0/0 (+7)	.0/0 -8/0/0 (+7)	.0/0 -11/0/0 (+17)	.0/0 -11/0/0 (+31)	.0/0 -11/0/0 (+39)	
	-41.3/-25 0/0/0	-17.8/-10 0/0/0	-10.7/-6 0/0/0	-3.0/-2 0/0/0	.0/0 0/0/0	
10300	.0/0 -5/0/0 (+9)	.0/-1 -9/0/0 (+9)	.0/0 -11/0/0 (+27)	.0/0 -11/0/0 (+35)	.0/0 -11/0/0 (+43)	
	-35.5/-22 0/0/0	-14.5/-8 0/0/0	-12.0/-6 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10600	.0/0 -7/0/0 (+7)	.0/0 -11/0/0 (+11)	.0/0 -11/0/0 (+33)	.0/0 -11/0/0 (+41)	.0/0 -10/0/0 (+49)	
	-28.0/-16 0/0/0	-17.0/-9 0/0/0	-5.1/-3 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
10900	.0/0 -8/0/0 (+15)	.0/0 -10/0/0 (+27)	.0/0 -11/0/0 (+37)	.0/0 -10/0/0 (+45)	.0/0 -9/0/0 (+51)	
	-24.0/-13 0/0/0	-16.5/-8 0/0/0	-1.5/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
11200	.0/0 -7/0/0 (+29)	.0/0 -9/0/0 (+27)	.0/0 -11/0/0 (+41)	.0/0 -9/0/0 (+51)	.0/0 -8/0/0 (+51)	
	-17.4/-9 0/0/0	-18.7/-9 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/0 0/0/0	
11500 and above	.0/0 -5/0/0 (+33)	.0/0 -7/0/0 (+41)	.0/0 -9/0/0 (+51)	.0/0 -8/0/0 (+51)	.0/-1 -7/0/0 (+51)	
	-12.1/-6 0/0/0	-1.3/-1 0/0/0	.0/0 0/0/0	.0/0 0/0/0	.0/-1 0/0/0	

OCTO 10.0.1 AA211A09 FCOM-F0-2-04-10-012-254

NO THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	WIND
2300	-60.0/-35 0/0/0 (+1)	-58.7/-30 0/0/0 (+1)	-45.9/-22 0/0/0 (+1)	-38.3/-21 0/0/0 (+1)	0.0/0 -4.0/0 (+9)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
	-60.0/-35 0/0/0	-58.7/-30 0/0/0	-45.9/-22 0/0/0	-38.3/-21 0/0/0	-30.0/-18 0/0/0	
2400	-60.4/-33 0/0/0 (+1)	-57.5/-28 0/0/0 (+1)	-43.1/-23 0/0/0 (+1)	0.0/0 -3.0/0 (+3)	0.0/0 -7.0/0 (+9)	
	-60.4/-33 0/0/0	-57.5/-28 0/0/0	-43.1/-23 0/0/0	-35.6/-21 0/0/0	-18.4/-11 0/0/0	
2500	-60.2/-31 0/0/0 (+1)	-51.3/-24 0/0/0 (+1)	-40.8/-24 0/0/0 (+1)	0.0/0 -6.0/0 (+11)	0.0/0 -9.0/0 (+9)	
	-60.2/-31 0/0/0	-51.3/-24 0/0/0	-40.8/-24 0/0/0	-25.7/-15 0/0/0	-6.5/-4 0/0/0	
2600	-59.8/-29 0/0/0 (+1)	-47.5/-25 0/0/0 (+1)	0.0/0 -5.0/0 (+11)	0.0/0 -8.0/0 (+11)	0.0/0 -11.0/0 (+9)	
	-59.8/-29 0/0/0	-47.5/-25 0/0/0	-32.9/-19 0/0/0	-14.9/-8 0/0/0	-6.4/-3 0/0/0	
2700	-56.8/-26 0/0/0 (+1)	-45.9/-26 0/0/0 (+1)	0.0/0 -7.0/0 (+9)	0.0/0 -10.0/0 (+9)	0.0/0 -10.0/0 (+27)	
	-56.8/-26 0/0/0	-45.9/-26 0/0/0	-22.7/-12 0/0/0	-10.0/-5 0/0/0	-5.8/-3 0/0/0	
2800	-49.6/-23 0/0/0 (+1)	0.0/0 -4.0/0 (+9)	0.0/0 -9.0/0 (+9)	0.0/0 -11.0/0 (+13)	0.0/0 -11.0/0 (+31)	
	-49.6/-23 0/0/0	-38.8/-22 0/0/0	-14.2/-7 0/0/0	-10.6/-5 0/0/0	-1.0/-1 0/0/0	
2900	-47.0/-24 0/0/0 (+1)	0.0/0 -6.0/0 (+9)	0.0/0 -11.0/0 (+9)	0.0/0 -11.0/0 (+27)	0.0/0 -11.0/0 (+35)	
	-47.0/-24 0/0/0	-29.7/-16 0/0/0	-15.3/-8 0/0/0	-8.6/-4 0/0/0	0.0/0 0/0/0	
3000	-1.5/-1 -4/-1/-1 (+7)	0.0/0 -8.0/0 (+9)	0.0/0 -10.0/0 (+27)	0.0/0 -11.0/0 (+31)	0.0/0 -10.0/0 (+43)	
	-45.4/-25 0/0/0	-21.9/-11 0/0/0	-13.6/-7 0/0/0	-5.6/-3 0/0/0	0.0/0 0/0/0	
3100	0.0/0 -6.0/0 (+9)	0.0/0 -10.0/0 (+7)	0.0/0 -11.0/0 (+31)	0.0/0 -10.0/0 (+39)	0.0/0 -10.0/0 (+49)	
	-37.2/-20 0/0/0	-23.1/-11 0/0/0	-10.4/-5 0/0/0	-2/-1 0/0/0	0.0/0 0/0/0	
3200	0.0/0 -8.0/0 (+7)	0.0/0 -11.0/0 (+11)	0.0/0 -11.0/0 (+35)	0.0/0 -10.0/0 (+45)	0.0/0 -7.0/0 (+51)	
	-30.0/-15 0/0/0	-23.3/-11 0/0/0	-5.8/-3 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3300	0.0/0 -9.0/0 (+9)	0.0/0 -10.0/0 (+27)	0.0/0 -10.0/0 (+41)	0.0/0 -7.0/0 (+51)	0.0/0 -7.0/0 (+51)	
	-30.1/-14 0/0/0	-20.9/-10 0/0/0	-1.6/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3400 and above	0.0/0 -7.0/0 (+29)	0.0/0 -10.0/0 (+33)	0.0/0 -10.0/0 (+49)	0.0/0 -7.0/0 (+51)	0.0/0 -7.0/0 (+51)	
	-24.8/-12 0/0/0	-14.1/-7 0/0/0	-4/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	

OCTO 9.1.2 AA211A09

NO THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
2100			-60.3/-30 0/0/0 (+1)	-57.2/-26 0/0/0 (+1)	-43.9/-22 0/0/0 (+1)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
2200		-61.9/-33 0/0/0 (+1)	-56.7/-26 0/0/0 (+1)	-48.7/-24 0/0/0 (+1)	0.0/0 -3.0/0 (+1)	
2300		-61.1/-30 0/0/0 (+1)	-51.1/-23 0/0/0 (+1)	-45.2/-24 0/0/0 (+1)	0.0/0 -6.0/0 (+7)	
2400	-62.5/-33 0/0/0 (+1)	-58.9/-28 0/0/0 (+1)	-47.5/-24 0/0/0 (+1)	0.0/0 -4.0/0 (+7)	0.0/0 -7.0/0 (+11)	
2500	-61.7/-31 0/0/0 (+1)	-57.6/-25 0/0/0 (+1)	0.0/0 -4.0/0 (+1)	0.0/0 -7.0/0 (+9)	0.0/0 -10.0/0 (+7)	
2600	-60.9/-29 0/0/0 (+1)	-49.5/-23 0/0/0 (+1)	0.0/0 -5.0/0 (+9)	0.0/0 -9.0/0 (+9)	0.0/0 -12.0/0 (+9)	
2700	-60.4/-27 0/0/0 (+1)	-6.5/-4 -3/-2/-2 (+1)	0.0/0 -8.0/0 (+9)	0.0/0 -11.0/0 (+9)	0.0/0 -10.0/0 (+27)	
2800	-57.2/-25 0/0/0 (+1)	0.0/0 -5.0/0 (+7)	0.0/0 -10.0/0 (+7)	0.0/0 -12.0/0 (+11)	0.0/0 -11.0/0 (+31)	
2900	-48.9/-23 0/0/0 (+1)	0.0/0 -7.0/0 (+9)	0.0/0 -12.0/0 (+9)	0.0/0 -11.0/0 (+29)	0.0/0 -11.0/0 (+37)	
3000	-4.5/-3 -4/-3/-3 (+7)	0.0/0 -9.0/0 (+9)	0.0/0 -10.0/0 (+27)	0.0/0 -11.0/0 (+35)	0.0/0 -10.0/0 (+45)	
3100	-45.1/-22 0/0/0	-24.7/-12 0/0/0	-19.1/-9 0/0/0	-6.9/-4 0/0/0	0.0/0 0/0/0	
3200 and above	0.0/0 -8.0/0 (+7)	0.0/0 -9.0/0 (+27)	0.0/0 -11.0/0 (+39)	0.0/0 -10.0/0 (+49)	0.0/0 -9.0/0 (+49)	
	-31.0/-15 0/0/0	-23.1/-11 0/0/0	-8.7/-4 0/0/0	-4/-1 0/0/0	0.0/0 0/0/0	

OCTO 9.1.2 AA211A09

NO THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
7000				-50.6/-23 0/0/0 (+1) -50.6/-23 0/0/0	-42.7/-22 0/0/0 (+1) -42.7/-22 0/0/0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
7300			-56.5/-26 0/0/0 (+1) -56.5/-26 0/0/0	-47.1/-23 0/0/0 (+1) -47.1/-23 0/0/0	-0/0 -4/0/0 (+3) -39.6/-22 0/0/0	
7600			-49.5/-23 0/0/0 (+1) -49.5/-23 0/0/0	-44.6/-24 0/0/0 (+1) -44.6/-24 0/0/0	-0/-1 -5/0/0 (+9) -28.4/-15 0/0/0	
7900			-47.1/-24 0/0/0 (+1) -47.1/-24 0/0/0	-0/0 -4/0/0 (+7) -36.1/-20 0/0/0	-0/0 -7/0/0 (+9) -17.3/-9 0/0/0	
8200		-56.2/-25 0/0/0 (+1) -56.2/-25 0/0/0	-0/0 -3/0/0 (+1) -45.1/-25 0/0/0	-0/-1 -6/0/0 (+9) -25.8/-13 0/0/0	-0/0 -9/0/0 (+7) -13.9/-7 0/0/0	
8500		-48.8/-23 0/0/0 (+1) -48.8/-23 0/0/0	-0/-1 -5/0/0 (+9) -34.1/-18 0/0/0	-0/0 -8/0/0 (+9) -17.8/-9 0/0/0	-0/0 -11/0/0 (+7) -14.8/-7 0/0/0	
8800		-47.2/-24 0/0/0 (+1) -47.2/-24 0/0/0	-0/-1 -7/0/0 (+9) -24.4/-12 0/0/0	-0/-1 -10/0/0 (+9) -17.8/-9 0/0/0	-0/0 -10/0/0 (+27) -12.1/-6 0/0/0	
9100	-56.6/-25 0/0/0 (+1) -56.6/-25 0/0/0	-2/-1 -4/0/0 (+7) -41.3/-21 0/0/0	-0/0 -9/0/0 (+7) -21.7/-11 0/0/0	-0/0 -11/0/0 (+11) -17.4/-8 0/0/0	-0/0 -11/0/0 (+31) -8.9/-4 0/0/0	
9400	-49.5/-22 0/0/0 (+1) -49.5/-22 0/0/0	-5/-1 -6/0/0 (+9) -32.9/-16 0/0/0	-0/0 -11/0/0 (+7) -20.9/-10 0/0/0	-0/0 -10/0/0 (+27) -16.4/-8 0/0/0	-0/0 -11/0/0 (+35) -5.8/-3 0/0/0	
9700	-11.1/-6 -3/-4/-4 (+1) -47.4/-23 0/0/0	-0/0 -8/0/0 (+7) -26.9/-13 0/0/0	-0/0 -9/0/0 (+27) -20.2/-10 0/0/0	-0/0 -11/0/0 (+33) -10.5/-5 0/0/0	-0/0 -10/0/0 (+41) -1.3/-1 0/0/0	
10000	-3.9/-2 -5/0/0 (+7) -41.3/-20 0/0/0	-0/0 -10/0/0 (+7) -26.9/-13 0/0/0	-0/0 -10/0/0 (+31) -16.9/-8 0/0/0	-0/0 -10/0/0 (+37) -8.9/-4 0/0/0	-0/0 -10/0/0 (+49) -0/0 0/0/0	
10300 and above	-0/-1 -6/0/0 (+9) -34.9/-17 0/0/0	-0/0 -10/0/0 (+13) -28.1/-13 0/0/0	-0/0 -11/0/0 (+35) -13.3/-6 0/0/0	-0/0 -10/0/0 (+45) -3.2/-2 0/0/0	-0/0 -7/0/0 (+51) -0/0 0/0/0	

OCTO 10.0.1 AA211A09 FCOM-F0-02-04-10-014-254

NO THRUST REVERSERS OPERATIVE						CONF 1+F
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
2100		-62.6/-36 0/ 0/ 0 (+1)	-58.0/-29 0/ 0/ 0 (+1)	-53.9/-25 0/ 0/ 0 (+1)	-45.7/-25 0/ 0/ 0 (+1)	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
2200		-62.6/-36 0/ 0/ 0	-58.0/-29 0/ 0/ 0	-53.9/-25 0/ 0/ 0	-45.7/-25 0/ 0/ 0	
2300	-65.3/-37 0/ 0/ 0 (+1)	-61.0/-32 0/ 0/ 0 (+1)	-58.9/-27 0/ 0/ 0 (+1)	-47.7/-24 0/ 0/ 0 (+1)	-1.7/-2 -1/-1/-1 (+3)	
2400	-65.3/-37 0/ 0/ 0	-61.5/-31 0/ 0/ 0	-49.2/-23 0/ 0/ 0	-45.6/-26 0/ 0/ 0	-1.7/-2 -1/-1/-1 (+19)	
2500	-62.5/-34 0/ 0/ 0 (+1)	-59.2/-28 0/ 0/ 0 (+1)	-46.8/-24 0/ 0/ 0 (+1)	-45.6/-26 0/ 0/ 0	-34.1/-21 0/ 0/ 0	
2600	-62.5/-34 0/ 0/ 0	-59.2/-28 0/ 0/ 0	-46.8/-24 0/ 0/ 0	-40.1/-25 0/ 0/ 0	-1.7/-2 -2/-1/-1 (+15)	
2700	-60.8/-31 0/ 0/ 0 (+1)	-56.6/-25 0/ 0/ 0 (+1)	-2.3/-2 -3/-1/-1 (+7)	-1.8/-2 -2/-1/-1 (+27)	-1.9/-1 -2/-1/-1 (+33)	
2800	-60.8/-31 0/ 0/ 0	-56.6/-25 0/ 0/ 0	-43.9/-26 0/ 0/ 0	-30.4/-18 0/ 0/ 0	-11.2/-6 0/ 0/ 0	
2900	-61.0/-29 0/ 0/ 0 (+1)	-48.8/-24 0/ 0/ 0 (+1)	-2.4/-2 -3/-1/-1 (+21)	-2.1/-2 -2/-1/-1 (+29)	-1.6/-1 -2/-1/-1 (+39)	
3000	-61.0/-29 0/ 0/ 0	-48.8/-24 0/ 0/ 0	-37.6/-23 0/ 0/ 0	-19.8/-11 0/ 0/ 0	-1.6/-1 0/ 0/ 0	
3100	-58.7/-27 0/ 0/ 0 (+1)	-5.0/-3 -4/-2/-2 (+3)	-2.4/-2 -3/-1/-1 (+27)	-2.2/-2 -2/-1/-1 (+35)	-1.8/-1 -2/-1/-1 (+41)	
3200	-58.7/-27 0/ 0/ 0	-46.8/-25 0/ 0/ 0	-27.5/-16 0/ 0/ 0	-8.1/-5 0/ 0/ 0	-1.8/-1 0/ 0/ 0	
3300	-54.9/-25 0/ 0/ 0 (+1)	-2.8/-2 -4/-1/-1 (+15)	-2.4/-2 -3/-1/-1 (+31)	-2.0/-1 -3/-1/-1 (+39)	-1.6/-1 -2/-1/-1 (+47)	
3400	-54.9/-25 0/ 0/ 0	-43.1/-25 0/ 0/ 0	-17.3/-9 0/ 0/ 0	-2.0/-1 0/ 0/ 0	-1.6/-1 0/ 0/ 0	
3500	-17.5/-9 -3/-6/-6 (+1)	-5.9/-4 -4/-1/-1 (+27)	-2.2/-2 -3/-1/-1 (+37)	-2.2/-1 -3/-1/-1 (+45)	-8/-1 -3/-1/-1 (+51)	
3600	-48.5/-23 0/ 0/ 0	-34.6/-19 0/ 0/ 0	-6.2/-3 0/ 0/ 0	-2.2/-1 0/ 0/ 0	-8/-1 0/ 0/ 0	
3700	-5.6/-3 -5/-2/-2 (+9)	-2.9/-2 -4/-1/-1 (+29)	-2.3/-2 -3/-1/-1 (+41)	-9/-1 -3/-1/-1 (+51)	-8/-1 -3/-1/-1 (+51)	
3800	-44.9/-23 0/ 0/ 0	-25.4/-13 0/ 0/ 0	-3.4/-2 0/ 0/ 0	-9/-1 0/ 0/ 0	-8/-1 0/ 0/ 0	
3900	-3.2/-2 -5/-1/-1 (+15)	-2.5/-2 -4/-1/-1 (+33)	-1.7/-1 -4/-1/-1 (+51)	-1.0/-1 -4/-1/-1 (+51)	-7/-1 -3/-1/-1 (+51)	
4000	-42.1/-23 0/ 0/ 0	-16.2/-8 0/ 0/ 0	-1.7/-1 0/ 0/ 0	-1.0/-1 0/ 0/ 0	-7/-1 0/ 0/ 0	
4100	-8.6/-5 -5/-1/-1 (+27)	-2.6/-2 -4/-1/-1 (+39)	-1.8/-1 -4/-1/-1 (+51)	-9/-1 -4/-1/-1 (+51)	-8/-1 -3/-1/-1 (+51)	
4200 and above	-33.9/-18 0/ 0/ 0	-10.1/-5 0/ 0/ 0	-1.8/-1 0/ 0/ 0	-9/-1 0/ 0/ 0	-8/-1 0/ 0/ 0	

OCTO 9.1.2 AA211A09

NO THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
1900			-58.4/-34 0/0/0 (+1) -58.4/-34 0/0/0	-58.2/-31 0/0/0 (+1) -58.2/-31 0/0/0	-54.4/-26 0/0/0 (+1) -54.4/-26 0/0/0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
2000			-58.3/-32 0/0/0 (+1) -58.3/-32 0/0/0	-56.2/-28 0/0/0 (+1) -56.2/-28 0/0/0	-48.9/-22 0/0/0 (+1) -48.9/-22 0/0/0	
2100		-59.3/-34 0/0/0 (+1) -59.3/-34 0/0/0	-56.2/-28 0/0/0 (+1) -56.2/-28 0/0/0	-52.3/-24 0/0/0 (+1) -52.3/-24 0/0/0	-44.9/-22 0/0/0 (+1) -44.9/-22 0/0/0	
2200		-59.6/-32 0/0/0 (+1) -59.6/-32 0/0/0	-55.3/-26 0/0/0 (+1) -55.3/-26 0/0/0	-46.3/-21 0/0/0 (+1) -46.3/-21 0/0/0	-2.2/-2 -2/-1/-1 (+5) -41.8/-23 0/0/0	
2300	-60.0/-35 0/0/0 (+1) -60.0/-35 0/0/0	-58.8/-30 0/0/0 (+1) -58.8/-30 0/0/0	-50.9/-23 0/0/0 (+1) -50.9/-23 0/0/0	-2.5/-2 -3/-1/-1 (+1) -43.8/-22 0/0/0	-1.9/-1 -2/-1/-1 (+21) -32.2/-17 0/0/0	
2400	-60.5/-33 0/0/0 (+1) -60.5/-33 0/0/0	-57.5/-28 0/0/0 (+1) -57.5/-28 0/0/0	-45.6/-21 0/0/0 (+1) -45.6/-21 0/0/0	-2.6/-2 -3/-1/-1 (+15) -38.7/-21 0/0/0	-1.8/-1 -2/-1/-1 (+29) -20.6/-10 0/0/0	
2500	-60.3/-31 0/0/0 (+1) -60.3/-31 0/0/0	-53.6/-24 0/0/0 (+1) -53.6/-24 0/0/0	-2.8/-2 -3/-1/-1 (+7) -44.1/-23 0/0/0	-1.8/-1 -3/-1/-1 (+27) -27.9/-14 0/0/0	-1.2/-1 -3/-1/-1 (+35) -8.1/-4 0/0/0	
2600	-59.8/-29 0/0/0 (+1) -59.8/-29 0/0/0	-49.0/-22 0/0/0 (+1) -49.0/-22 0/0/0	-1.3/-1 -4/-1/-1 (+23) -35.1/-18 0/0/0	-2.2/-1 -3/-1/-1 (+31) -17.0/-8 0/0/0	-1.0/-1 -3/-1/-1 (+41) -2.3/-2 0/0/0	
2700	-57.0/-26 0/0/0 (+1) -57.0/-26 0/0/0	-8.9/-5 -4/-3/-3 (+5) -45.9/-22 0/0/0	-2.4/-2 -4/-1/-1 (+29) -24.8/-12 0/0/0	-1.1/-1 -3/-1/-1 (+39) -7.1/-4 0/0/0	-9/-1 -3/-1/-1 (+43) -1.5/-1 0/0/0	
2800	-54.1/-24 0/0/0 (+1) -54.1/-24 0/0/0	-1.5/-1 -5/-2/-2 (+13) -41.0/-21 0/0/0	-1.2/-1 -4/-1/-1 (+35) -15.7/-8 0/0/0	-1.1/-1 -3/-1/-1 (+43) -3.8/-2 0/0/0	-8/-1 -3/-1/-1 (+51) -8/-1 0/0/0	
2900	-21.3/-10 -3/-6/-6 (+1) -47.7/-21 0/0/0	-10.5/-5 -4/-2/-2 (+27) -31.8/-15 0/0/0	-1.3/-1 -4/-1/-1 (+41) -9.5/-5 0/0/0	-1.0/-1 -4/-1/-1 (+51) -1.0/-1 0/0/0	-9/-1 -3/-1/-1 (+51) -9/-1 0/0/0	
3000 and above	-7.7/-4 -5/-2/-2 (+9) -44.4/-21 0/0/0	-1.4/-1 -5/-1/-1 (+31) -24.1/-11 0/0/0	-1.1/-1 -4/-1/-1 (+49) -5.0/-3 0/0/0	-9/-1 -4/-1/-1 (+51) -9/-1 0/0/0	-9/-1 -3/-1/-1 (+51) -9/-1 0/0/0	

9.1.2 AA211A09

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.10	P 15
	FLUID CONTAMINATED RUNWAY		SEQ 254	REV 13

NO THRUST REVERSERS OPERATIVE						CONF 1+F
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	WIND
7000				-49.2/-23 0/0/0 (+1) -49.2/-23 0/0/0	-44.7/-25 0/0/0 (+1) -44.7/-25 0/0/0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
7300			-57.2/-26 0/0/0 (+1) -57.2/-26 0/0/0	-46.5/-24 0/0/0 (+1) -46.5/-24 0/0/0	-1.5/-1 -1/-1/-1 (+7) -40.0/-25 0/0/0	
7600			-48.0/-23 0/0/0 (+1) -48.0/-23 0/0/0	-1.9/-2 -2/-1/-1 (+1) -45.0/-26 0/0/0	-1.6/-1 -2/-1/-1 (+21) -31.6/-20 0/0/0	
7900			-46.6/-25 0/0/0 (+1) -46.6/-25 0/0/0	-1.8/-2 -2/-1/-1 (+15) -38.5/-24 0/0/0	-1.7/-1 -2/-1/-1 (+29) -21.2/-13 0/0/0	
8200		-55.3/-25 0/0/0 (+1) -55.3/-25 0/0/0	-2.2/-2 -3/-1/-1 (+7) -42.9/-25 0/0/0	-1.9/-2 -3/-1/-1 (+25) -29.5/-18 0/0/0	-1.8/-1 -2/-1/-1 (+33) -10.3/-6 0/0/0	
8500		-48.1/-23 0/0/0 (+1) -48.1/-23 0/0/0	-2.2/-2 -3/-1/-1 (+21) -37.6/-23 0/0/0	-2.0/-2 -3/-1/-1 (+29) -19.6/-11 0/0/0	-1.5/-1 -2/-1/-1 (+37) -1.5/-1 0/0/0	
8800		-7.3/-4 -3/-2/-2 (+1) -46.9/-25 0/0/0	-2.3/-2 -3/-1/-1 (+27) -28.3/-16 0/0/0	-2.1/-2 -3/-1/-1 (+33) -9.2/-5 0/0/0	-1.6/-1 -2/-1/-1 (+41) -1.6/-1 0/0/0	
9100	-54.1/-24 0/0/0 (+1) -54.1/-24 0/0/0	-5.6/-4 -4/0/0 (+13) -43.4/-25 0/0/0	-2.3/-2 -3/-1/-1 (+31) -19.2/-10 0/0/0	-1.8/-1 -3/-1/-1 (+39) -2.4/-2 0/0/0	-1.8/-1 -2/-1/-1 (+47) -1.8/-1 0/0/0	
9400	-48.3/-23 0/0/0 (+1) -48.3/-23 0/0/0	-9.6/-6 -3/0/0 (+25) -36.8/-21 0/0/0	-2.0/-1 -4/-1/-1 (+35) -9.7/-5 0/0/0	-2.0/-1 -3/-1/-1 (+43) -2.0/-1 0/0/0	-1.1/-1 -3/-1/-1 (+51) -1.1/-1 0/0/0	
9700	-13.1/-7 -4/0/0 (+7) -47.2/-24 0/0/0	-4.3/-3 -4/-1/-1 (+29) -28.5/-15 0/0/0	-2.1/-1 -4/-1/-1 (+39) -5.2/-3 0/0/0	-1.4/-1 -4/-1/-1 (+51) -1.4/-1 0/0/0	-1.2/-1 -3/-1/-1 (+51) -1.2/-1 0/0/0	
10000	-9.9/-6 -5/0/0 (+13) -43.0/-23 0/0/0	-4.6/-3 -4/-1/-1 (+33) -20.2/-10 0/0/0	-2.3/-1 -4/-1/-1 (+43) -3.4/-2 0/0/0	-1.3/-1 -4/-1/-1 (+51) -1.3/-1 0/0/0	-1.1/-1 -3/-1/-1 (+51) -1.1/-1 0/0/0	
10300 and above	-15.3/-9 -4/0/0 (+27) -37.9/-20 0/0/0	-4.6/-3 -4/-1/-1 (+37) -12.5/-6 0/0/0	-1.7/-1 -4/-1/-1 (+51) -1.7/-1 0/0/0	-1.6/-1 -4/-1/-1 (+51) -1.6/-1 0/0/0	-1.2/-1 -3/-1/-1 (+51) -1.2/-1 0/0/0	

OCTO 10.0.1 AA211A09 FCOM-F0-2-04-10-015-254

NO THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
6400					-49.4/-23 0/0/0 (+1) -49.4/-23 0/0/0	ΔW (1000 KG) ΔTFLEXΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C)ΔW (1000 KG) ΔTFLEXΔV1-ΔVR-ΔV2 (KT)
6700				-53.5/-26 0/0/0 (+1) -53.5/-26 0/0/0	-46.3/-21 0/0/0 (+1) -46.3/-21 0/0/0	
7000				-50.6/-23 0/0/0 (+1) -50.6/-23 0/0/0	-44.0/-22 0/0/0 (+1) -44.0/-22 0/0/0	
7300			-52.9/-25 0/0/0 (+1) -52.9/-25 0/0/0	-45.6/-21 0/0/0 (+1) -45.6/-21 0/0/0	-2.1/-2 -2/-1/-1 (+9) -39.3/-22 0/0/0	
7600			-50.0/-22 0/0/0 (+1) -50.0/-22 0/0/0	-2.4/-2 -3/-1/-1 (+3) -43.5/-22 0/0/0	-1.7/-1 -2/-1/-1 (+23) -29.4/-16 0/0/0	
7900		-55.8/-27 0/0/0 (+1) -55.8/-27 0/0/0	-45.6/-22 0/0/0 (+1) -45.6/-22 0/0/0	-2.4/-2 -3/-1/-1 (+17) -36.9/-20 0/0/0	-1.8/-1 -3/-1/-1 (+31) -18.7/-9 0/0/0	
8200		-53.5/-24 0/0/0 (+1) -53.5/-24 0/0/0	-2.7/-2 -4/-1/-1 (+7) -44.1/-23 0/0/0	-2.1/-1 -3/-1/-1 (+27) -27.0/-14 0/0/0	-1.4/-1 -3/-1/-1 (+35) -8.7/-4 0/0/0	
8500		-49.3/-22 0/0/0 (+1) -49.3/-22 0/0/0	-2.5/-2 -4/-1/-1 (+21) -35.1/-18 0/0/0	-2.1/-1 -3/-1/-1 (+31) -17.5/-9 0/0/0	-1.2/-1 -3/-1/-1 (+41) -2.9/-2 0/0/0	
8800	-56.0/-26 0/0/0 (+1) -56.0/-26 0/0/0	-11.1/-6 -3/-3/-3 (+1) -45.7/-22 0/0/0	-2.4/-2 -4/-1/-1 (+29) -25.7/-13 0/0/0	-1.3/-1 -4/-1/-1 (+37) -9.8/-5 0/0/0	-1.2/-1 -3/-1/-1 (+43) -2.5/-2 0/0/0	
9100	-53.4/-24 0/0/0 (+1) -53.4/-24 0/0/0	-8.6/-5 -4/0/0 (+11) -42.3/-21 0/0/0	-1.6/-1 -4/-1/-1 (+33) -19.3/-9 0/0/0	-1.3/-1 -4/-1/-1 (+43) -5.7/-3 0/0/0	-1.3/-1 -3/-1/-1 (+51) -1.3/-1 0/0/0	
9400	-50.9/-22 0/0/0 (+1) -50.9/-22 0/0/0	-14.5/-7 -3/-2/-2 (+27) -34.1/-17 0/0/0	-1.5/-1 -4/-2/-2 (+39) -13.1/-6 0/0/0	-1.3/-1 -4/-1/-1 (+51) -1.3/-1 0/0/0	-1.2/-1 -4/-1/-1 (+51) -1.2/-1 0/0/0	
9700 and above	-14.5/-7 -4/0/0 (+5) -46.6/-21 0/0/0	-3.6/-2 -5/-1/-1 (+29) -28.3/-13 0/0/0	-1.5/-1 -5/-2/-2 (+39) -13.6/-7 0/0/0	-1.4/-1 -4/-2/-2 (+51) -1.4/-1 0/-2/-2	-1.2/-1 -4/-1/-1 (+51) -1.2/-1 0/0/0	

10.0.1 AA211A09 FCOM-F0-2.04-10-016-254

NO THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	WIND
1700					-59.4/-33 0/ 0/ 0 (+1) -59.4/-33 0/ 0/ 0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
1800				-59.6/-33 0/ 0/ 0 (+1) -59.6/-33 0/ 0/ 0	-59.2/-30 0/ 0/ 0 (+1) -59.2/-30 0/ 0/ 0	
1900				-59.7/-31 0/ 0/ 0 (+1) -59.7/-31 0/ 0/ 0	-58.9/-27 0/ 0/ 0 (+1) -58.9/-27 0/ 0/ 0	
2000			-60.4/-32 0/ 0/ 0 (+1) -60.4/-32 0/ 0/ 0	-59.1/-28 0/ 0/ 0 (+1) -59.1/-28 0/ 0/ 0	-53.2/-23 0/ 0/ 0 (+1) -53.2/-23 0/ 0/ 0	
2100			-60.3/-30 0/ 0/ 0 (+1) -60.3/-30 0/ 0/ 0	-57.3/-26 0/ 0/ 0 (+1) -57.3/-26 0/ 0/ 0	-47.1/-21 0/ 0/ 0 (+1) -47.1/-21 0/ 0/ 0	
2200		-61.9/-33 0/ 0/ 0 (+1) -61.9/-33 0/ 0/ 0	-57.2/-26 0/ 0/ 0 (+1) -57.2/-26 0/ 0/ 0	-51.7/-22 0/ 0/ 0 (+1) -51.7/-22 0/ 0/ 0	-1.2/-1 -3/-1/-1 (+11) -43.7/-21 0/ 0/ 0	
2300		-61.2/-30 0/ 0/ 0 (+1) -61.2/-30 0/ 0/ 0	-54.7/-24 0/ 0/ 0 (+1) -54.7/-24 0/ 0/ 0	-3.9/-2 -4/-2/-2 (+3) -45.8/-21 0/ 0/ 0	-1.1/-1 -4/-1/-1 (+25) -33.3/-16 0/ 0/ 0	
2400	-62.4/-33 0/ 0/ 0 (+1) -62.4/-33 0/ 0/ 0	-58.9/-28 0/ 0/ 0 (+1) -58.9/-28 0/ 0/ 0	-47.4/-20 0/ 0/ 0 (+1) -47.4/-20 0/ 0/ 0	-1.2/-1 -4/-1/-1 (+17) -40.0/-19 0/ 0/ 0	-1.1/-1 -4/-1/-1 (+31) -21.0/-10 0/ 0/ 0	
2500	-61.8/-31 0/ 0/ 0 (+1) -61.8/-31 0/ 0/ 0	-57.8/-25 0/ 0/ 0 (+1) -57.8/-25 0/ 0/ 0	-1.2/-1 -5/-1/-1 (+7) -44.9/-21 0/ 0/ 0	-2.5/-2 -4/-2/-2 (+29) -28.6/-14 0/ 0/ 0	-1.2/-1 -4/-1/-1 (+39) -9.5/-5 0/ 0/ 0	
2600	-61.0/-29 0/ 0/ 0 (+1) -61.0/-29 0/ 0/ 0	-54.5/-23 0/ 0/ 0 (+1) -54.5/-23 0/ 0/ 0	-1.3/-1 -5/-1/-1 (+19) -36.0/-17 0/ 0/ 0	-1.3/-1 -5/-2/-2 (+35) -18.2/-9 0/ 0/ 0	-1.1/-1 -4/-1/-1 (+41) -8.6/-4 0/ 0/ 0	
2700	-60.5/-27 0/ 0/ 0 (+1) -60.5/-27 0/ 0/ 0	-10.5/-5 -4/-6/-6 (+7) -46.9/-20 0/ 0/ 0	-1.3/-1 -5/-2/-2 (+31) -26.0/-12 0/ 0/ 0	-1.2/-1 -5/-1/-1 (+39) -13.0/-6 0/ 0/ 0	-9/-1 -4/-1/-1 (+51) -9/-1 0/ 0/ 0	
2800 and above	-57.4/-24 0/ 0/ 0 (+1) -57.4/-24 0/ 0/ 0	-1.4/-1 -5/-2/-2 (+13) -42.0/-20 0/ 0/ 0	-1.2/-1 -5/-1/-1 (+37) -18.7/-9 0/ 0/ 0	-1.0/-1 -5/-1/-1 (+49) -6.2/-3 0/ 0/ 0	-8/-1 -4/-1/-1 (+51) -8/-1 0/ 0/ 0	

OCTO 9.1.2 AA211A09

TAKEOFF FROM A 6.3 MM (1/4 INCH) WATER COVERED RUNWAY

- Determine maximum takeoff weight on dry runway.
 R – Apply the following weight decrement versus takeoff configuration, runway length and
 R clearway availability to determine a corrected weight.
 R

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway Without clearway	31.1 23.0	30.3 23.0	27.8 22.0	20.4 18.0	26.2 18.0	24.7 18.0	19.6 17.0	22.1 14.0	19.1 14.0	20.2 18.0

- Enter the following tables with the corrected weight to determine MTOW. If the MTOW on dry runway is obstacle limited, check that MTOW is at least 27000 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 27000 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 223	223	230	240	240 to 260				
	MTOW (1000 kg)	–	193	210	240	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	< 193	193	200	210	220	230	240	250	260
	V2 (kt IAS)	137	137	140	143	146	149	153	156	158
	VR (kt IAS)	128	128	131	134	137	140	144	147	149
	V1 (kt IAS)	128	128	128	128	128	128	128	131	133

CONF 2	CORRECTED WEIGHT (1000 kg)	< 230	230	240	250	250 to 260				
	MTOW (1000 kg)	–	205	225	250	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	< 205	205	210	220	230	240	250	260	
	V2 (kt IAS)	137	137	139	142	146	148	151	153	
	VR (kt IAS)	128	128	130	133	137	139	142	144	
	V1 (kt IAS)	128	128	128	128	128	128	128	130	

CONF 3	CORRECTED WEIGHT (1000 kg)	< 233	233	240	250	255	255 to 260			
	MTOW (1000 kg)	—	207	225	245	255	EQUAL TO CORRECTED WEIGHT			
	ACTUAL WEIGHT (1000 kg)	< 207	207	210	220	230	240	250	255	260
	V2 (kt IAS)	137	137	138	142	145	148	150	151	152
	VR (kt IAS)	129	129	130	134	137	140	142	143	144
	V1 (kt IAS)	129	129	129	129	129	129	129	129	130

NO THRUST REVERSERS OPERATIVE						CONF 3
RUNWAY LENGTH (FEET)	TAKEOFF ON WET RUNWAY (WITH CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	
6400					-54.7/-25 0/0/0 (+1) -54.7/-25 0/0/0	ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT) (TVMC OAT C) ΔW (1000 KG) ΔTFLEX ΔV1-ΔVR-ΔV2 (KT)
6700					-48.4/-21 0/0/0 (+1) -48.4/-21 0/0/0	
7000				-53.3/-23 0/0/0 (+1) -53.3/-23 0/0/0	-4.3/-2 -3/-1/-1 (+1) -45.9/-21 0/0/0	
7300			-56.6/-26 0/0/0 (+1) -56.6/-26 0/0/0	-47.6/-20 0/0/0 (+1) -47.6/-20 0/0/0	-1.6/-1 -4/-1/-1 (+11) -41.3/-21 0/0/0	
7600			-52.5/-23 0/0/0 (+1) -52.5/-23 0/0/0	-2.0/-1 -4/-1/-1 (+5) -45.1/-21 0/0/0	-1.6/-1 -4/-1/-1 (+25) -30.3/-15 0/0/0	
7900			-15.1/-7 -3/-5/-5 (+1) -47.0/-20 0/0/0	-2.3/-2 -4/-1/-1 (+17) -38.2/-18 0/0/0	-1.4/-1 -4/-1/-1 (+31) -20.4/-10 0/0/0	
8200		-56.4/-25 0/0/0 (+1) -56.4/-25 0/0/0	-5.7/-3 -4/-1/-1 (+9) -45.1/-21 0/0/0	-2.8/-2 -4/-1/-1 (+27) -28.2/-13 0/0/0	-1.4/-1 -4/-1/-1 (+39) -10.8/-5 0/0/0	
8500		-52.9/-22 0/0/0 (+1) -52.9/-22 0/0/0	-5.4/-3 -4/-1/-1 (+19) -36.0/-17 0/0/0	-4.6/-3 -4/-1/-1 (+35) -18.8/-9 0/0/0	-1.7/-1 -4/-2/-2 (+41) -10.3/-5 0/0/0	
8800		-14.0/-6 -4/-1/-1 (+5) -47.3/-20 0/0/0	-3.6/-2 -5/-1/-1 (+29) -28.2/-13 0/0/0	-1.3/-1 -5/-2/-2 (+39) -15.2/-7 0/0/0	-1.2/-1 -4/-2/-2 (+51) -1.2/-1 0/-2/-2	
9100 and above	-56.8/-25 0/0/0 (+1) -56.8/-25 0/0/0	-8.2/-4 -5/0/0 (+11) -43.1/-20 0/0/0	-2.8/-2 -5/-1/-1 (+35) -23.1/-11 0/0/0	-1.3/-1 -5/-2/-2 (+39) -15.8/-7 0/0/0	-1.5/-1 -4/-1/-1 (+51) -1.5/-1 0/0/0	

OCT0 10.0.1 AA211A09 FCOM-F0-02-04-10-017-254

TAKEOFF FROM A 6.3 MM (1/4 INCH) WATER COVERED RUNWAY

- Determine maximum takeoff weight on dry runway.
 R – Apply the following weight decrement versus takeoff configuration, runway length and
 R clearway availability to determine a corrected weight.
 R

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway Without clearway	31.1 23.0	30.3 23.0	27.8 22.0	20.4 18.0	26.2 18.0	24.7 18.0	19.6 17.0	22.1 14.0	19.1 14.0	20.2 18.0

- Enter the following tables with the corrected weight to determine MTOW. If the MTOW on dry runway is obstacle limited, check that MTOW is at least 27000 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 27000 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 223	223	230	240	240 to 260				
	MTOW (1000 kg)	–	193	210	240	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	< 193	193	200	210	220	230	240	250	260
	V2 (kt IAS)	137	137	140	143	146	149	153	156	158
	VR (kt IAS)	128	128	131	134	137	140	144	147	149
	V1 (kt IAS)	128	128	128	128	128	128	128	131	133

CONF 2	CORRECTED WEIGHT (1000 kg)	< 230	230	240	250	250 to 260				
	MTOW (1000 kg)	–	205	225	250	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	< 205	205	210	220	230	240	250	260	
	V2 (kt IAS)	137	137	139	142	146	148	151	153	
	VR (kt IAS)	128	128	130	133	137	139	142	144	
	V1 (kt IAS)	128	128	128	128	128	128	128	130	

CONF 3	CORRECTED WEIGHT (1000 kg)	< 233	233	240	250	255	255 to 260			
	MTOW (1000 kg)	–	207	225	245	255	EQUAL TO CORRECTED WEIGHT			
	ACTUAL WEIGHT (1000 kg)	< 207	207	210	220	230	240	250	255	260
	V2 (kt IAS)	137	137	138	142	145	148	150	151	152
	VR (kt IAS)	129	129	130	134	137	140	142	143	144
	V1 (kt IAS)	129	129	129	129	129	129	129	129	130

TAKEOFF FROM A 12.7 MM (1/2 INCH) WATER COVERED RUNWAY

- R
- R
- R
- Determine maximum takeoff weight on dry runway.
 - Apply the following weight decrement versus takeoff configuration, runway length and clearway availability to determine a corrected weight.

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway Without clearway	51.1 43.0	50.3 43.0	50.8 45.0	43.4 41.0	50.2 42.0	48.7 42.0	41.6 39.0	46.1 38.0	43.1 38.0	36.2 34.0

- Enter the following tables with the corrected weight to determine MTOW. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 201	201	210	210 to 260						
	MTOW (1000 kg)	–	187	210	EQUAL TO CORRECTED WEIGHT						
	ACTUAL WEIGHT (1000 kg)	< 187	187	190	200	210	220	230	240	250	260
	V2 (kt IAS)	135	135	136	140	143	146	149	153	156	158
	VR (kt IAS)	128	128	129	133	136	139	142	146	149	151
	V1 (kt IAS)	128	128	128	128	128	131	134	138	141	143

CONF 2	CORRECTED WEIGHT (1000 kg)	< 209	209	220	220 to 260					
	MTOW (1000 kg)	–	197	220	EQUAL TO CORRECTED WEIGHT					
	ACTUAL WEIGHT (1000 kg)	< 197	197	200	210	220	230	240	250	260
	V2 (kt IAS)	135	135	136	139	142	146	148	151	153
	VR (kt IAS)	128	128	129	132	135	139	141	144	146
	V1 (kt IAS)	128	128	128	128	128	132	134	137	139

CONF 3	CORRECTED WEIGHT (1000 kg)	< 216	216	220	223	223 to 260				
	MTOW (1000 kg)	–	203	215	223	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	< 203	203	210	220	223	230	240	250	260
	V2 (kt IAS)	136	136	138	142	143	145	148	150	152
	VR (kt IAS)	129	129	131	135	136	138	141	143	145
	V1 (kt IAS)	129	129	129	129	129	131	134	136	138

TAKEOFF FROM A 12.7 MM (1/2 INCH) SLUSH COVERED RUNWAY

- R
- R
- R
- Determine maximum takeoff weight on dry runway.
 - Apply the following weight decrement versus takeoff configuration, runway length and clearway availability to determine a corrected weight.

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
△WEIGHT (1000 kg) With clearway Without clearway	49.1 41.0	48.3 41.0	48.8 43.0	42.4 40.0	48.2 40.0	46.7 40.0	38.6 36.0	44.1 36.0	41.1 36.0	33.2 31.0

- Enter the following tables with the corrected weight to determine MTOW. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 201	201	210	210 to 260						
	MTOW (1000 kg)	–	187	210	EQUAL TO CORRECTED WEIGHT						
	ACTUAL WEIGHT (1000 kg)	< 187	187	190	200	210	220	230	240	250	260
	V2 (kt IAS)	135	135	136	140	143	146	149	153	156	158
	VR (kt IAS)	128	128	129	133	136	139	142	146	149	151
	V1 (kt IAS)	128	128	128	128	128	131	134	138	141	143

CONF 2	CORRECTED WEIGHT (1000 kg)	< 207	207	210	217	217 to 260					
	MTOW (1000 kg)	–	193	200	217	EQUAL TO CORRECTED WEIGHT					
	ACTUAL WEIGHT (1000 kg)	< 193	193	200	210	217	220	230	240	250	260
	V2 (kt IAS)	134	134	136	139	141	142	146	148	151	153
	VR (kt IAS)	128	128	130	133	135	136	140	142	145	147
	V1 (kt IAS)	128	128	128	128	128	129	133	135	138	140

CONF 3	CORRECTED WEIGHT (1000 kg)	< 214	214	220	220 to 260					
	MTOW (1000 kg)	–	203	220	EQUAL TO CORRECTED WEIGHT					
	ACTUAL WEIGHT (1000 kg)	< 203	203	210	220	230	240	250	260	
	V2 (kt IAS)	136	136	138	142	145	148	150	152	
	VR (kt IAS)	130	130	132	136	139	142	144	146	
	V1 (kt IAS)	129	129	129	129	132	135	137	139	

TAKEOFF FROM A COMPACTED SNOW COVERED RUNWAY

- Determine maximum takeoff weight on dry runway.
- Apply the following weight decrement versus takeoff configuration, runway length and clearway availability to determine a corrected weight.

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway Without clearway	8.1 0	7.3 0	10.8 5.0	11.4 9.0	11.2 3.0	9.7 3.0	18.6 16.0	14.1 6.0	11.1 6.0	20.2 18.0

- Enter the following tables with the corrected weight to determine MTOW. If the MTOW on dry runway is obstacle limited, check that MTOW is at least 27000 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 27000 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 234	234	240	250	260				
	MTOW (1000 kg)	–	198	215	240	260				
	ACTUAL WEIGHT (1000 kg)	< 198	198	200	210	220	230	240	250	260
	V2 (kt IAS)	139	139	140	143	146	149	153	156	158
	VR (kt IAS)	128	128	129	132	135	138	142	145	147
	V1 (kt IAS)	128	128	128	128	128	128	128	128	128

CONF 2	CORRECTED WEIGHT (1000 kg)	< 238	238	240	250	260				
	MTOW (1000 kg)	–	210	215	240	260				
	ACTUAL WEIGHT (1000 kg)	< 210	210	220	230	240	250	260		
	V2 (kt IAS)	139	139	142	146	148	151	153		
	VR (kt IAS)	128	128	131	135	137	140	142		
	V1 (kt IAS)	128	128	128	128	128	128	128		

CONF 3	CORRECTED WEIGHT (1000 kg)	< 241	241	250	260	267	267 to 270			
	MTOW (1000 kg)	–	213	230	250	267	EQUAL TO CORRECTED WEIGHT			
	ACTUAL WEIGHT (1000 kg)	< 213	213	220	230	240	250	260	267	270
	V2 (kt IAS)	139	139	142	145	148	150	152	154	155
	VR (kt IAS)	129	129	132	135	138	140	142	144	145
	V1 (kt IAS)	129	129	129	129	129	129	129	129	130

SPRAY PATTERN

R There is a little chance of the engines ingesting fluid, which in any case should not
R jeopardize safety. The risk of ingestion is independent of the depth of the contaminant.

CROSSWIND

R To optimize directional control during the low speed phase of the takeoff and landing roll
R and according to the reported braking action given by the control tower, it is not
R recommended to take off or to land with a crosswind component higher than :

Reported braking action	Reported runway friction coefficient	Maximum crosswind (kt)	Equivalent runway condition**
Good	≥ 0.4	27 *	1
Good/medium	0.39 to 0.36	27	1
Medium	0.35 to 0.3	20	2/3
Medium/poor	0.29 to 0.26	20	2/3
Poor	≤ 0.25	15	3/4
Unreliable		5	4/5

* This is the maximum crosswind demonstrated for dry and wet runway.

R ** Equivalent runway condition (only valid for maximum cross wind determination) :

1. Dry, damp or wet runway (less than 3 mm water depth)
2. Runway covered with slush
3. Runway covered with dry snow
4. Runway covered with standing water with risk of hydroplaning or wet snow
5. Icy runway or high risk of hydroplaning.

TAXIING

- **FOLLOWING TAXIING PROCEDURES CONSIDER**
 - Avoid high thrust settings.
 - When taxiing on slippery surfaces, stay well behind preceding aircraft.
 - R – Taxi at low speed. Note that antiskid does not operate at low taxi speeds.
 - On slippery taxiways during turns with large nose wheel steering angles, noise and vibration may result from the wheels slipping sideways. Keep speed as low as possible to make a smooth turn with minimum radius. Differential power may be needed.
 - If taxiing in icing conditions with precipitation on runways and taxiways contaminated with slush or snow :
 - Before takeoff keep flaps/slats retracted until reaching the holding point on the takeoff runway to avoid contaminating the mechanism. Hold the BEFORE TO checklist at FLAP SETTING and finish it after extending flaps/slats.
 - When taxiing-in after landing, do not retract the flaps/slats to avoid damage of the structure.
After engine shutdown make a visual inspection to determine that the flap/slat mechanism is free of contamination.
 - R · When the mechanism is clean, use the following procedure to retract the flaps/slats before the aircraft electric network is de-energized :
 - Select ON the GREEN and YELLOW ELEC PUMP.
 - Retract the FLAPS and monitor retraction on ECAM page.
 - Select OFF the GREEN and YELLOW ELEC PUMP and resume with normal procedure.

TAKEOFF

- **FOLLOWING TAKEOFF PROCEDURES CONSIDER**
 - For contaminated runways, select MAX TO.
 - Do not abort takeoff for minor deficiencies even at low speeds.
 - R If you have to abort takeoff, maintain directional control with the rudder and small inputs to the nose wheel. If necessary, use differential braking to regain the center line when stopping distance permits.
 - Do not lift the nose wheel before VR in an attempt to avoid splashing slush on the aircraft, because this produces additional aerodynamic drag.
 - Rotate, lift off and retract gear and high lift devices in the normal manner.

LANDING

— **FOLLOWING LANDING PROCEDURES CONSIDER**

- R — Avoid landing on contaminated runways if the antiskid is not functioning. The use of
- R autobrake LOW or MED is recommended provided that the contamination is evenly distributed.
- Approach at the normal speed.
- Make a positive touchdown after a brief flare.
- As soon as the aircraft has touched down, lower the nose wheel onto the runway and select maximum reverse thrust.
- Do not hold the nose wheel off the ground.
- If necessary, the maximum reverse thrust can be used until the aircraft is fully stopped.
- If the runway length is limiting, apply the brakes before lowering the nose gear onto the runway, but be prepared to apply back stick to counter the nose down pitch produced by the brakes application. (The strength of this pitching moment will
- R depend on the brake torque attainable on the slippery runway).
- Maintain directional control with the rudder as long as possible, use nose wheel steering with care.
- When the aircraft is at taxi speed, follow the recommendations for taxiing.

Note : *If there is snow, visibility may be reduced by snow blowing forward at low speeds if reversers are not cancelled.*

EXAMPLES

TAKEOFF PERFORMANCE ON DRY RUNWAY

Data

Runway length : 3000 m, OAT = 34°C, 10 kt head wind, CONF 2.

R Determination of takeoff performance from RTOW chart (Refer to FCOM 2.02.10 p 6) :

FFCS-02-04.10-026-A150AA

32.0	232.3 3/3 130/40/48	240.0 3/3 133/42/50	247.8 3/4 137/45/53	253.1 3/4 140/47/54	258.5 3/4 142/49/56
34.0	229.2 3/3 129/39/47	236.8 3/3 133/42/50	244.5 3/4 137/44/52	249.7 3/4 139/46/53	254.7 3/4 142/48/55
36.0	226.3 3/3 129/38/46	233.7 3/4 132/41/49	241.3 3/4 136/44/51	246.1 3/4 139/45/52	250.9 3/4 141/47/54

Maximum TOW = 249700 kg, V1 = 139 kt, VR = 146 kt, V2 = 153 kt

TAKEOFF PERFORMANCE ON WET RUNWAY

See table on 2.04.10 p 7 for CONF 2. Read the weight or flex temperature penalty and the associated speed corrections. A sample is given herebelow :

FFCS-02-04-10-026-B150AA

ALL THRUST REVERSERS OPERATIVE						CONF 2
RUNWAY LENGTH (METERS)	TAKEOFF ON WET RUNWAY (NO CLEARWAY)					
	-10 KT	-5 KT	0 KT	10 KT	20 KT	WIND
3000	0.0/0 -4/0/0 (+7)	0.0/0 -8/0/0 (+17)	0.0/0 -9/0/0 (+27)	0.0/0 -10/0/0 (+31)	0.0/0 -10/0/0 (+41)	Δ W<1000 KG) ΔTFLEX Δ V1- ΔVR- ΔV2 (KT) (TVMC OAT C) Δ W<1000 KG) ΔTFLEX Δ V1- ΔVR- ΔV2 (KT)
	-22.8/-13 0/0/0	-2/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	
3100	0.0/0 -6/0/0 (+9)	0.0/0 -10/0/0 (+7)	0.0/0 -11/0/0 (+31)	0.0/0 -10/0/0 (+37)	0.0/0 -10/0/0 (+49)	
	-14.9/-8 0/0/0	-3/-1 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	0.0/0 0/0/0	

- Maximum takeoff weight correction :
For OAT = 34° C > 31° C (TVMC) ⇒ apply corrections from lines 4 and 5
MTOW = 249700 – 0 = 249700 kg
V1 = 139 kt, VR = 146 kt, V2 = 153 kt
- Flex temperature correction :
Assuming an actual TOW of 220000 kg and initial flex temperature = 48°C.
For a Tflex = 48° C > 31° C (TVMC) ⇒ apply corrections from lines 4 and 5. Corrected flex temperature = 48 – 0 = 48° C
V1 = 133 kt, VR = 140 kt, V2 = 146 kt

LANDING

- **FOLLOWING LANDING PROCEDURES CONSIDER**
- R — Avoid landing on contaminated runways if the antiskid is not functioning. The use of
- R autobrake LOW or MED is recommended provided that the contamination is evenly distributed.
- Approach at the normal speed.
- Make a positive touchdown after a brief flare.
- As soon as the aircraft has touched down, lower the nose wheel onto the runway and select maximum reverse thrust.
- Do not hold the nose wheel off the ground.
- If necessary, the maximum reverse thrust can be used until the aircraft is fully stopped.
- If the runway length is limiting, apply the brakes before lowering the nose gear onto the runway, but be prepared to apply back stick to counter the nose down pitch produced by the brakes application. (The strength of this pitching moment will
- R depend on the brake torque attainable on the slippery runway).
- Maintain directional control with the rudder as long as possible, use nose wheel steering with care.
- When the aircraft is at taxi speed, follow the recommendations for taxiing.

Note : *If there is snow, visibility may be reduced by snow blowing forward at low speeds if reversers are not cancelled.*

TAKEOFF PERFORMANCE ON RUNWAY COVERED WITH 1/2 INCH SLUSH

Data

- R
- Runway length 3000 m (no clearway), OAT 5°C, no wind, CONF 2
- Determine maximum takeoff weight on dry runway (Refer to FCOM 2.02.10 p 6)

FFC5-02-04.10-027-A150AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
0	246.4 3/4 133/43/52	254.7 3/4 137/46/55	262.8 3/4 141/49/57	268.1 3/4 144/51/59	271.6 3/4 147/54/61
10	242.9 3/3 132/42/51	251.1 3/4 136/45/54	259.5 3/4 140/48/56	264.9 3/4 143/50/58	269.7 3/4 145/52/60

Maximum takeoff weight on dry runway = 261000 kg

- R
- Determine a corrected weight (Refer to FCOM 2.04.10 p 21). As no clearway, use the correction displayed on the second line (without clearway).
- R
-

FFC5-02-04.10-027-B150AA

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway	49.1	48.3	48.8	42.4	48.2	46.7	38.6	44.1	41.1	33.2
Without clearway	41.0	41.0	43.0	40.0	40.0	40.0	36.0	36.0	36.0	31.0

Corrected weight = 261000 – 40000 = 221000 kg

- R
- Determine maximum takeoff weight and associated speeds.

FFC5-02-04.10-027-C150AA

CONF 2	CORRECTED WEIGHT (1000 kg)	<207	207	210	217	217 to 260					
	MTOW (1000 kg)	-	193	200	217	EQUAL TO CORRECTED WEIGHT					
	ACTUAL WEIGHT (1000 kg)	<193	193	200	210	217	220	230	240	250	260
	V2 (kt IAS)	134	134	136	139	141	142	146	148	151	153
	VR (kt IAS)	128	128	130	133	135	136	140	142	145	147
	V1 (kt IAS)	128	128	128	128	128	129	133	135	138	140

MTOW = 221000 kg

- R
- V1 = 129 kt, VR = 137 kt, V2 = 143 kt

TAKEOFF PERFORMANCE ON RUNWAY COVERED WITH 1/2 INCH SLUSH

Data

- R
- Runway length 9843 ft (no clearway), OAT 5°C, no wind, CONF 2
- Determine maximum takeoff weight on dry runway (Refer to FCOM 2.02.10 p 6)

FFCS-02-0410-027-A254AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
0	246.4 3/4 133/43/52	254.7 3/4 137/46/55	262.8 3/4 141/49/57	268.1 3/4 144/51/59	271.6 3/4 147/54/61
10	242.9 3/3 132/42/51	251.1 3/4 136/45/54	259.5 3/4 140/48/56	264.9 3/4 143/50/58	269.7 3/4 145/52/60

- R
- Maximum takeoff weight on dry runway = 261000 kg
- Determine a corrected weight (Refer to FCOM 2.04.10 p 21). As no clearway, use the correction displayed on the second line (without clearway).
- R
- R

FFCS-02-0410-027-B254AA

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway	49.1	48.3	48.8	42.4	48.2	46.7	38.6	44.1	41.1	33.2
Without clearway	41.0	41.0	43.0	40.0	40.0	40.0	36.0	36.0	36.0	31.0

- Corrected weight = 261000 – 40000 = 221000 kg
- Determine maximum takeoff weight and associated speeds.

FFCS-02-0410-027-C254AA

CONF 2	CORRECTED WEIGHT (1000 kg)	<207	207	210	217	217 to 260					
	MTOW (1000 kg)	-	193	200	217	EQUAL TO CORRECTED WEIGHT					
	ACTUAL WEIGHT (1000 kg)	<193	193	200	210	217	220	230	240	250	260
	V2 (kt IAS)	134	134	136	139	141	142	146	148	151	153
	VR (kt IAS)	128	128	130	133	135	136	140	142	145	147
	V1 (kt IAS)	128	128	128	128	128	129	133	135	138	140

- MTOW = 221000 kg
- R V1 = 129 kt, VR = 137 kt, V2 = 143 kt

TAKEOFF PERFORMANCE ON RUNWAY COVERED WITH 1/4 INCH WATER

Data

- R
- Runway length 9843 ft (no clearway), no wind, OAT 40° C, CONF 2
- Determine maximum takeoff weight on dry runway (Refer to FCOM 2.02.10 p 6)

FFC5-02-0410-028-A254AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
38	223.3 3/4 128/37/46	230.6 3/4 132/40/48	237.8 3/4 135/43/50	242.5 3/4 137/44/51	246.7 3/4 139/46/53
40	220.0 3/4 127/36/44	227.3 3/4 131/39/47	234.0 3/4 134/42/49	238.6 3/4 136/43/50	242.3 3/4 139/46/52
42	216.5 3/4 127/35/43	223.3 3/4 130/38/46	230.0 3/4 132/41/48	234.5 3/4 134/42/49	237.6 3/4 138/45/51

Maximum takeoff weight on dry runway = 234000 kg

- R
- Determine a corrected weight (Refer to FCOM 2.04.10 p 18). As no clearway, use the correction displayed on the second line (without clearway).
- R
-
- R
-

FFC5-02-0410-028-B254AA

TAKEOFF CONFIGURATION	CONF 1 + F				CONF 2			CONF 3		
RUNWAY LENGTH (m) (ft)	2500 8000	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2500 8000	3000 10000	3500 11500 and above
ΔWEIGHT (1000 kg) With clearway	31.1	30.3	27.8	20.4	26.2	24.7	19.6	22.1	19.1	20.2
Without clearway	23.0	23.0	22.0	18.0	18.0	18.0	17.0	14.0	14.0	18.0

Corrected weight = 234000 – 18000 = 216000 kg

- Determine maximum takeoff weight :

FFC5-02-0410-028-C254AA

C
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2

CORRECTED WEIGHT (1000 kg)	<230	230	240	250	250 to 260				
MTOW (1000 kg)	-	205	225	250	EQUAL TO CORRECTED WEIGHT				
ACTUAL WEIGHT (1000 kg)	<203	203	210	220	230	240	250	260	
V2 (kt IAS)	137	137	139	142	146	148	151	153	
VR (kt IAS)	128	128	130	133	137	139	142	144	
V1 (kt IAS)	128	128	128	128	128	128	128	130	

For corrected weight 216000 kg < 230000 kg no takeoff weight can be determined with this method.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS FLIGHT WITHOUT CAB PRESSURIZATION	2.04.20	P 1
		SEQ 001	REV 10

GENERAL

R The aircraft may fly without cabin pressurization because of an aircraft system deficiency
 R (see MEL) or after a decompression in flight. The pilot's choice of flight level and airspeed
 R depends on the cause of the depressurization, the distance to fly, the topographic
 R conditions and the meteorological conditions.

OXYGEN REQUIREMENTS

CREW MEMBERS

R See FAR 121.329 or JAR-OPS 1.770

PASSENGERS

R For flight at cabin pressure altitudes above 10000 feet, up to and including 14000 feet,
 R there must be enough oxygen to supply 10 % of the passengers for the flight at those
 R altitudes that lasts more than 30 minutes.
 R For flight at cabin pressure altitudes above 14000 feet, up to and including 15000 feet,
 R there must be enough oxygen for 30 % of the passengers.
 R For flight at cabin pressure altitudes above 15000 feet, there must be enough oxygen for
 R all passengers.

FLIGHT PLANNING AND EXECUTION

ALTITUDE

Flight route planning should consider the above-stated restriction in cabin altitude.

- R The EXCESS CAB ALT warning on the ECAM will be activated, if the cabin altitude exceeds:
- R – In climb or descent : The higher of both 9950 ($\pm$ 350) feet, or takeoff/landing field
- R pressure altitude + 1000 feet, or
- R – In cruise : 9550 feet.

When above 14000 feet, the passenger oxygen masks will be automatically provided. Therefore, the recommended maximum altitude for prolonged flight is FL100. The minimum altitude should be selected by respecting :

- The Minimum Safe Altitude (MSA),
- Turbulence, which is uncomfortable for passengers and,
- Low Outside Air Temperature (OAT), which can be uncomfortable for passengers when the cabin is ventilated by ram air only.

AIRSPEED

If decompression is due to structural damage, consider airspeed reduction. Use slats and flaps, as necessary, to establish low speed conditions. In addition, turbulent conditions are uncomfortable for passengers, and gust response should be minimized by reducing airspeed.

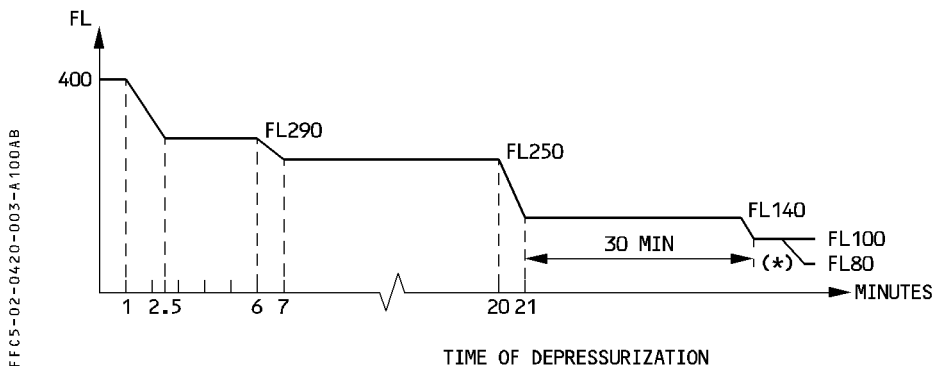
CLIMB AND DESCENT RATE

Takeoff must be performed normally, and the rate of climb must be limited to about 500 feet/minute, to ease the pressure change felt by passengers and crew.

- R Likewise, the rate of descent must be limited to about 1000 feet/minute, except for the final approach which must be performed normally. Notify the ATC of any performance deficiency by a remark in the flight plan.

EMERGENCY DESCENT IN CASE OF RAPID DEPRESSURIZATION

In case of depressurization, oxygen is supplied to passengers in individual units. Their capacity is such that the aircraft must descend and remain below the following profile.



- R (*) : Between FL 80 and FL 150, oxygen must be provided for 2 % of the passengers. This is provided by the portable oxygen system. When it is no longer available, descend to FL 80.
- For performance at FL 80/250 knots : Use data for FL 100/LRC given in 3.05.15. Fuel consumption will be lower by several percent, depending on the aircraft weight.

AEROLINEAS ARGENTINAS A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS FLIGHT WITHOUT CAB PRESSURIZATION	2.04.20	P 4
		SEQ. 001	REV 10

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SYSTEMS

FAILURE OCCURRING IN FLIGHT

Apply the abnormal and emergency procedures required by the ECAM.

FAILURE PRESENT AT DISPATCH

- If flight, with both packs inoperative :
 - PACK 1 and 2 OFF
 - RAM AIR ON
- If both CAB PRESS systems are inoperative, or if there is structural damage :
 - PACK 1 and 2 ON
 - MODE SEL MAN
 - MAN VALVE SEL BOTH
 - R — MAN V/S CTL AS RQRD
 - R Use MAN V/S CTL to set the outflow valve opening to 50 %.
 - OUTFLOW VALVE HALF OPEN CHECK
 - The outflow valve opening is limited to 50%, to avoid cabin air suction effect.
 - MAX FL 100 or MSA

TAKEOFF

Limit the aircraft’s rate of climb to about 500 feet/minute.

CLIMB

Note : The EXCESS CAB ALT warning may occur.
Use the ECAM CLR pushbutton to clear the warning.

DESCENT

Limit the aircraft’s rate of descent to about 1000 feet/minute. Perform the final approach normally.

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.20	P 6
	FLIGHT WITHOUT CAB PRESSURIZATION		SEQ 001	REV 11

PERFORMANCE DATA

The following table enables the fuel consumption and the time needed from takeoff to landing to be determined in case of flight without cabin pressurization.

The table is established for :

- Takeoff
- R – Climb from 1500 feet at 250 knots
- Long range cruise speed at FL100
- R – Descent to 1500 feet at 250 knots
- Approach and landing : IMC procedure 330 kg or 730 lb (6 min)
- ISA temperature
- CG = 30 %
- Normal air conditioning
- Anti-ice OFF

The table on page 8 gives the conversion from ground distance to air distance.

Note : For each degree Celsius above ISA temperature apply a correction of 0.015 (kg/°C/NM) or 0.033 (lb/°C/NM).

R

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250 KT - CRUISE : LONG RANGE - DESCENT : 250KT IMC PROCEDURE : 330 KG (6MIN)								FL 100
NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG = 30.0%		FUEL CONSUMED (KG) TIME (H.MIN)			
AIR DIST. (NM)	INITIAL WEIGHT (1000KG)							
	130	150	170	190	210	230	250	
300	5524 1.14	5859 1.12	6215 1.09	6566 1.07	6915 1.06	7288 1.05	7707 1.03	
400	7070 1.36	7506 1.33	7963 1.28	8407 1.25	8839 1.24	9293 1.23	9803 1.19	
500	8609 1.59	9145 1.54	9703 1.48	10239 1.44	10755 1.41	11290 1.40	11888 1.36	
600	10139 2.22	10776 2.16	11434 2.08	12063 2.03	12663 1.59	13279 1.58	13962 1.53	
700	11662 2.45	12399 2.37	13157 2.29	13880 2.21	14562 2.17	15259 2.15	16028 2.09	
800	13178 3.08	14015 2.59	14871 2.49	15688 2.40	16455 2.36	17232 2.33	18083 2.26	
900	14684 3.31	15623 3.21	16576 3.09	17489 2.59	18339 2.54	19196 2.50	20129 2.44	
1000	16178 3.55	17223 3.43	18273 3.30	19282 3.18	20216 3.12	21150 3.08	22167 3.01	
1100	17663 4.18	18816 4.04	19962 3.51	21067 3.37	22086 3.30	23097 3.26	24195 3.19	
1200	19141 4.43	20402 4.26	21643 4.11	22843 3.56	23948 3.49	25036 3.43	26214 3.37	
1300	20610 5.07	21979 4.48	23316 4.32	24612 4.16	25803 4.07	26967 4.01	28222 3.54	
1400	22070 5.31	23545 5.11	24981 4.53	26374 4.35	27651 4.25	28891 4.19	30221 4.12	
1500	23523 5.56	25103 5.33	26638 5.15	28128 4.54	29489 4.44	30806 4.37	32211 4.29	
1600	24968 6.21	26653 5.55	28287 5.36	29875 5.14	31319 5.02	32714 4.55	34191 4.47	
1700	26405 6.46	28196 6.18	29924 5.57	31615 5.34	33142 5.21	34615 5.13	36163 5.05	
1800	27835 7.12	29731 6.41	31549 6.19	33348 5.53	34958 5.40	36508 5.31	38126 5.23	
1900	29257 7.37	31260 7.03	33166 6.41	35074 6.13	36767 5.59	38393 5.49	40081 5.42	
2000		32781 7.26	34775 7.03	36788 6.33	38569 6.17	40272 6.07	42027 6.00	
2100		34295 7.49	36376 7.25	38485 6.54	40364 6.36	42143 6.25	43973 6.18	
2200		35803 8.12	37969 7.48	40174 7.15	42151 6.55	44007 6.43	45911 6.35	
2300		37303 8.35	39554 8.10	41855 7.36	43931 7.14	45864 7.01	47842 6.53	
2400		38792 8.58	41132 8.33	43528 7.57	45697 7.33	47715 7.20	49766 7.11	
2500		40273 9.22	42702 8.56	45194 8.18	47456 7.53	49558 7.38	51682 7.29	
2600		41747 9.46	44264 9.19	46852 8.39	49208 8.12	51395 7.56	53591 7.46	
2700		43214 10.09	45822 9.41	48502 9.01	50953 8.31	53222 8.15	55492 8.04	
AIR CONDITIONING OFF ΔFUEL = - 2 %			ENGINE ANTI ICE ON ΔFUEL = + 4 %		TOTAL ANTI ICE ON ΔFUEL = + 7 %			

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+ 90	+ 60	+ 30	0	−30	−60	−90
300	236	254	275	300	330	366	411
400	315	339	367	400	440	488	548
500	394	424	459	500	549	610	685
600	473	509	551	600	659	731	822
700	551	593	642	700	769	853	958
800	630	678	734	800	879	975	1095
900	709	763	826	900	989	1097	1232
1000	788	848	918	1000	1099	1219	1369
1100	866	932	1009	1100	1209	1341	1506
1200	945	1017	1101	1200	1319	1463	1643
1300	1024	1102	1193	1300	1428	1585	1780
1400	1103	1187	1285	1400	1538	1707	1917
1500	1181	1271	1376	1500	1648	1829	2054
1600	1260	1356	1468	1600	1758	1951	2191
1700	1339	1441	1560	1700	1868	2073	2328
1800	1418	1526	1652	1800	1978	2194	2465
1900	1496	1610	1743	1900	2088	2316	2601
2000	1575	1695	1835	2000	2198	2438	2738
2100	1654	1780	1927	2100	2307	2560	2875
2200	1733	1865	2019	2200	2417	2682	3012
2300	1812	1950	2110	2300	2527	2804	3149
2400	1890	2034	2202	2400	2637	2926	3286
2500	1969	2119	2294	2500	2747	3048	3423
2600	2048	2204	2386	2600	2857	3170	3560
2700	2127	2289	2477	2700	2967	3292	3697

GENERAL

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

LIMITATIONS

- The maximum altitude is 35,000 feet.
- The aft doors of the center landing gear must be removed.
- Do not fly into expected icing conditions.
- Ditching with landing gear down has not been demonstrated.
- R – Disregard FM fuel predictions. Other predictions should also be disregarded (altitude,
- R speed and time), except time predictions at waypoints when in cruise.
- R – Do not use managed speed (except in approach) and CLB and DES autopilot modes.

Note : Automatic fuel aft transfer is lost.

PROCEDURES

PREFLIGHT

VMO/MMO with landing gear down is 255 knots/M.60. In the avionics compartment, on 808VU, the VMO-MMO switch must be set to the “L/G DOWN” position.

PERFORMANCE

Consider the increase in drag to determine the takeoff weight and fuel consumption. CONF 1 + F is the recommended takeoff configuration.

Note : Takeoff with tailwind is not recommended.

Penalties on takeoff performance affect second segment gradient, final takeoff, and enroute conditions. The takeoff weight to be retained is the most limiting of these three conditions.

SECOND SEGMENT GRADIENT CONDITION

The RTOW charts, or the quick reference tables, give the basic information for normal takeoff. To simplify, a constant weight reduction is applied, whatever the limitation. This weight reduction covers the most critical case presented, for flying over an obstacle.

Takeoff configuration	1 + F	2	3
Weight reduction	22 %	19 %	19 %

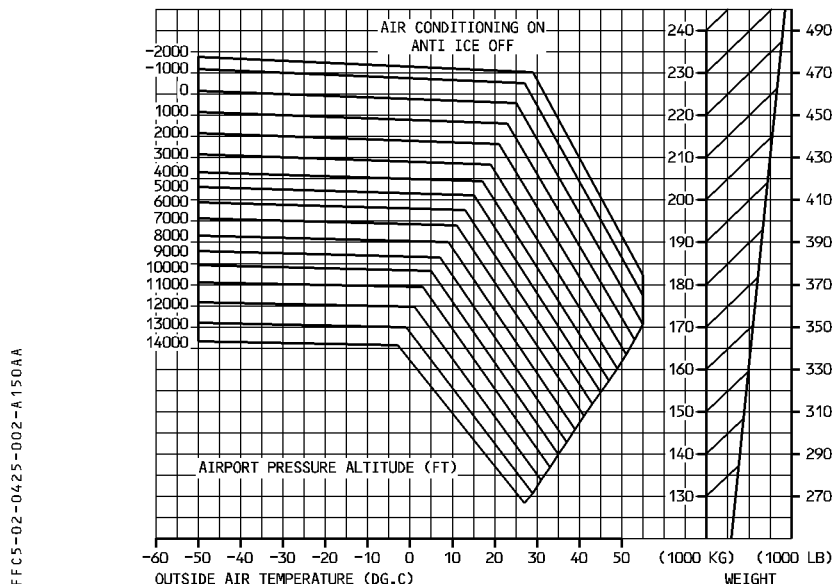
METHOD

Use the RTOW chart or the quick reference tables to define the maximum takeoff weight for the conditions on the airport (temperature, pressure, wind, runway,...), then apply the above weight reduction.

FINAL TAKEOFF CONDITION

The final takeoff speed is $VLS + 12$

Use the graph below to determine the maximum takeoff weight associated with the final takeoff condition.



R EN-ROUTE CONDITION

R Retain the lowest weight according to the most limiting condition (second segment or final takeoff). Use the en-route net flight path on page 9 to check that, in case of engine(s) failure(s), the aircraft can clear the terrain on the route by 1000 feet (climbing) or 2000 feet (descending). If necessary, reduce the takeoff weight. Read the speeds corresponding to this weight in the RTOW chart or in the quick reference tables.

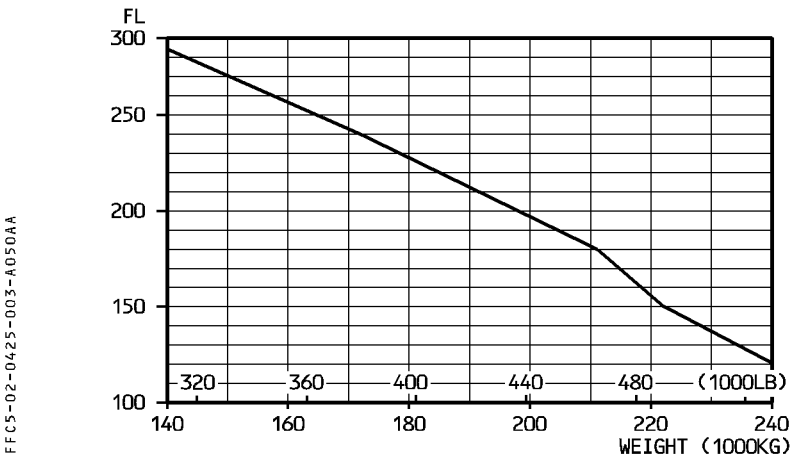
R GO AROUND PERFORMANCE

R See 3.05.35 for go around requirements.
R Further decrease the basic limiting weight by 12 %.

FLIGHT PLANNING

MAXIMUM ALTITUDE

In order to ensure that there is at any moment of the flight a minimum range of 20 kts between VLS and the maximum speed (limited by thrust or VMO/MMO), the aircraft must remain below the following profile.



CLIMB

Climb at 240 kt/M.51 with all engines at maximum climb thrust. The tables on pages 4 and 5 give the time, distance and fuel consumption according to takeoff weight.

CRUISE/DESCENT

The recommended cruise/descent speed is 240 kt/M.51.
The ceiling with one or two engines inoperative may be a limiting factor, and the choice of the route should reflect this concern.

ENGINE FAILURE

In case of engine(s) failure(s), the airplane will drift down to the ceiling shown on page 10.
The thrust for drift down will be Maximum Continuous.
The drift down speed is equal to VLS + 5.

HOLDING

Page 8 gives the holding parameters with slats out, this configuration being the least penalizing for holding.

R

CLIMB - 240KT/M.51 - ALL ENGINES - L/G DOWN											
MAX. CLIMB THRUST				ISA				FROM BRAKE RELEASE			
NORMAL AIR CONDITIONING				CG=30.0%				TIME (MIN)		FUEL (KG)	
ANTI-ICING OFF								DISTANCE (NM)		TAS (KT)	
	WEIGHT AT BRAKE RELEASE (1000KG)										
FL	130		140		150		160		170	180	190
310	26	5022	29	5667	34	6457	40	7508			
	123	287	141	288	164	289	196	291			
290	23	4613	25	5153	29	5782	33	6537	38	7492	
	107	285	121	286	138	287	158	288	185	290	
270	20	4245	22	4713	25	5241	28	5845	32	6567	43
	94	283	105	284	118	285	133	286	152	287	8691
250	18	3900	20	4311	22	4767	24	5274	27	5862	35
	83	280	92	281	102	282	114	283	128	284	7430
240	17	3731	18	4117	20	4543	23	5012	25	5549	32
	77	278	86	279	95	280	106	281	118	282	6945
220	15	3393	16	3734	18	4106	20	4508	22	4961	27
	67	274	75	275	82	276	91	277	101	278	6095
200	13	3050	14	3348	16	3671	17	4015	19	4398	23
	58	269	64	270	70	271	77	272	85	273	5330
180	11	2681	12	2934	13	3206	14	3495	16	3811	19
	48	261	53	262	58	263	64	264	70	265	4563
160	9	2302	10	2511	11	2735	12	2970	13	3227	16
	39	252	43	253	47	254	51	255	56	256	3825
140	8	1965	8	2138	9	2321	10	2513	11	2722	17
	31	243	34	244	37	244	40	245	44	246	2950
120	6	1671	7	1812	8	1963	8	2120	9	2291	13
	25	233	27	234	29	235	32	236	35	236	3200
100	5	1401	6	1516	6	1638	7	1766	7	1903	48
	19	222	21	223	23	224	25	225	27	226	247
50	3	798	3	855	3	916	3	981	4	1050	52
	9	183	9	184	10	185	11	186	12	187	248
15	1	417	1	439	2	463	2	490	2	520	10
	3	115	3	115	3	115	3	115	3	115	2676
											41
											238
											2211
											31
											228
											4
											1203
											13
											189
											2
											585
											4
											117

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS FLIGHT WITH GEAR DOWN	2.04.25 P 5	
		SEQ 050	REV 23

R

CLIMB - 240KT/M.51 - ALL ENGINES - L/G DOWN															
MAX. CLIMB THRUST				ISA		FROM BRAKE RELEASE									
NORMAL AIR CONDITIONING				CG=30.0%		TIME (MIN)		FUEL (KG)							
ANTI-ICING OFF						DISTANCE (NM)		TAS (KT)							
FL	WEIGHT AT BRAKE RELEASE (1000KG)														
	200		210		220		230		240		250		260		
310															
290															
270															
250	41 8570 195 289	49 10152 237 291													
240	37 7904 174 286	43 9183 206 288	52 11035 254 291												
220	30 6834 143 282	35 7755 164 283	40 8946 192 285	48 10606 232 288											
200	25 5916 117 276	29 6625 132 277	33 7493 152 279	38 8603 176 281	45 10117 211 284	56 12479 267 287									
180	21 5023 94 268	23 5562 105 269	26 6197 118 270	29 6968 134 272	34 7934 154 274	40 9285 183 276	48 11182 225 280								
160	17 4182 73 258	19 4589 81 259	21 5057 90 260	23 5603 100 262	26 6262 113 263	29 7113 130 265	34 8190 152 267								
140	14 3479 57 249	15 3792 62 249	16 4145 69 250	18 4545 76 252	20 5015 84 253	22 5588 95 254	25 6268 107 256								
120	11 2899 44 239	12 3145 48 240	13 3419 53 241	14 3725 58 242	16 4078 64 243	17 4496 71 244	19 4978 79 246								
100	9 2388 34 229	10 2581 37 229	11 2795 40 230	11 3030 44 231	12 3297 48 233	14 3608 53 234	15 3958 59 235								
50	5 1290 14 191	5 1383 16 192	5 1483 17 193	6 1592 18 194	6 1711 20 195	7 1844 21 197	7 1989 23 199								
15	2 622 4 118	2 660 4 119	2 701 5 121	2 745 5 122	3 791 5 124	3 839 6 125	3 889 6 126								

R

CRUISE - 240KT/M.51 - ALL ENGINES - L/G DOWN										
MAX. CLIMB THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF						ISA CG=30.0%	N1 (%) KG/H/ENG NM/1000KG		MACH IAS (KT) TAS (KT)	
WEIGHT (1000KG)	FL100		FL150		FL200		FL250		FL270	
130	80.3	.434	84.5	.477	87.2	.510	86.6	.510	86.6	.510
	2452	240	2468	240	2327	233	1914	210	1779	201
	28.3	277	30.3	299	33.7	313	40.1	307	42.8	304
140	80.5	.434	84.7	.477	87.5	.510	87.1	.510	87.3	.510
	2474	240	2490	240	2351	233	1947	210	1817	201
	28.0	277	30.0	299	33.3	313	39.4	307	41.9	304
150	80.8	.434	85.0	.477	87.8	.510	87.7	.510	88.2	.510
	2497	240	2514	240	2374	233	1984	210	1861	201
	27.8	277	29.7	299	33.0	313	38.7	307	40.9	304
160	81.0	.434	85.2	.477	88.1	.510	88.5	.510	89.2	.510
	2521	240	2537	240	2402	233	2029	210	1914	201
	27.5	277	29.5	299	32.6	313	37.8	307	39.8	304
170	81.3	.434	85.5	.477	88.5	.510	89.4	.510	90.3	.510
	2549	240	2565	240	2438	233	2081	210	1980	201
	27.2	277	29.1	299	32.1	313	36.9	307	38.4	304
180	81.7	.434	85.9	.477	89.0	.510	90.3	.510	91.4	.510
	2580	240	2596	240	2476	233	2140	210	2050	201
	26.9	277	28.8	299	31.6	313	35.9	307	37.1	304
190	82.0	.434	86.2	.477	89.5	.510	91.3	.510	92.9	.510
	2614	240	2629	240	2521	233	2209	210	2129	201
	26.5	277	28.4	299	31.1	313	34.7	307	35.8	304
200	82.4	.434	86.6	.477	90.1	.510	92.6	.510		
	2653	240	2668	240	2569	233	2285	210		
	26.1	277	28.0	299	30.5	313	33.6	307		
210	82.9	.434	87.1	.477	90.9	.510	93.9	.510		
	2694	240	2710	240	2623	233	2363	210		
	25.7	277	27.6	299	29.9	313	32.5	307		
220	83.3	.434	87.5	.477	91.7	.510				
	2739	240	2755	240	2681	233				
	25.3	277	27.1	299	29.2	313				
230	83.8	.434	88.0	.477	92.5	.510				
	2786	240	2802	240	2750	233				
	24.9	277	26.7	299	28.5	313				
240	84.3	.434	88.6	.477	93.3	.510				
	2842	240	2859	240	2821	233				
	24.4	277	26.1	299	27.8	313				
250	84.9	.434	89.2	.477	94.4	.510				
	2901	240	2919	240	2902	233				
	23.9	277	25.6	299	27.0	313				

R

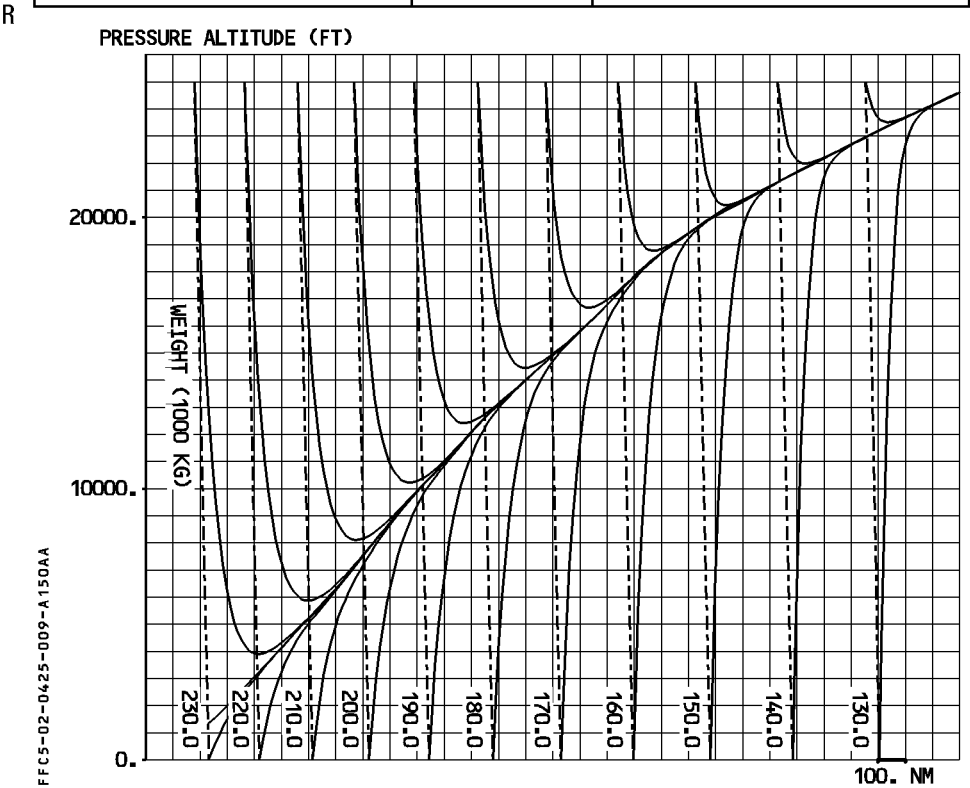
DESCENT - M.51/240KT - ALL ENGINES - L/G DOWN									
IDLE THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=30.0%		MAXIMUM CABIN RATE OF DESCENT 350FT/MIN				
WEIGHT (1000KG)	150				200				IAS (KT)
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	
310	8.7	179	42	IDLE	10.6	219	51	IDLE	184
290	8.0	169	38	IDLE	9.8	208	47	IDLE	192
270	7.4	159	35	IDLE	9.1	197	43	IDLE	201
250	6.8	150	32	IDLE	8.4	186	40	IDLE	210
240	6.5	145	31	IDLE	8.1	181	38	IDLE	214
220	5.9	137	28	IDLE	7.4	171	35	IDLE	223
200	5.4	128	25	IDLE	6.8	161	31	IDLE	233
180	4.9	120	23	IDLE	6.2	150	28	IDLE	240
160	4.4	109	20	IDLE	5.5	136	25	IDLE	240
140	3.8	95	17	IDLE	4.7	119	21	IDLE	240
120	3.2	80	14	IDLE	4.0	100	18	IDLE	240
100	2.6	64	11	IDLE	3.3	80	14	IDLE	240
50	1.1	24	4	IDLE	1.3	31	6	IDLE	240
15	.0	0	0	IDLE	.0	0	0	IDLE	240

R

RACE TRACK HOLDING PATTERN - S SPEED - ALL ENGINES - L/G DOWN									
MAX. CRUISE THRUST LIMITS CONFIGURATION 1 NORMAL AIR CONDITIONING ANTI-ICING OFF					ISA CG=30.0%		N1 (%) FF (KG/H/ENG)		
WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL150	FL160	FL180	FL200
130	60.4 1541	63.1 1527	67.3 1526	69.1 1530	70.8 1529	71.8 1530	72.7 1532	74.8 1540	76.7 1543
140	62.4 1662	65.2 1652	69.5 1656	71.2 1655	73.1 1659	74.1 1663	75.1 1666	77.0 1669	78.8 1671
150	64.4 1786	67.3 1783	71.6 1785	73.4 1788	75.4 1794	76.3 1796	77.2 1797	79.1 1799	80.9 1803
160	66.3 1916	69.3 1916	73.6 1920	75.6 1925	77.4 1928	78.3 1928	79.2 1930	81.0 1934	83.0 1939
170	68.0 2040	71.0 2042	75.5 2049	77.4 2052	79.2 2054	80.1 2056	81.0 2059	82.9 2064	84.8 2069
180	69.7 2166	72.7 2168	77.3 2177	79.1 2180	80.8 2185	81.7 2188	82.7 2191	84.6 2198	86.6 2202
190	71.3 2286	74.2 2289	78.8 2298	80.6 2303	82.4 2310	83.3 2313	84.3 2318	86.2 2322	88.4 2335
200	72.7 2406	75.8 2413	80.3 2423	82.0 2430	83.9 2438	84.8 2443	85.8 2446	87.8 2457	90.3 2478
210	74.4 2561	77.6 2566	82.0 2580	83.8 2590	85.7 2600	86.6 2603	87.6 2608	89.8 2623	92.6 2664

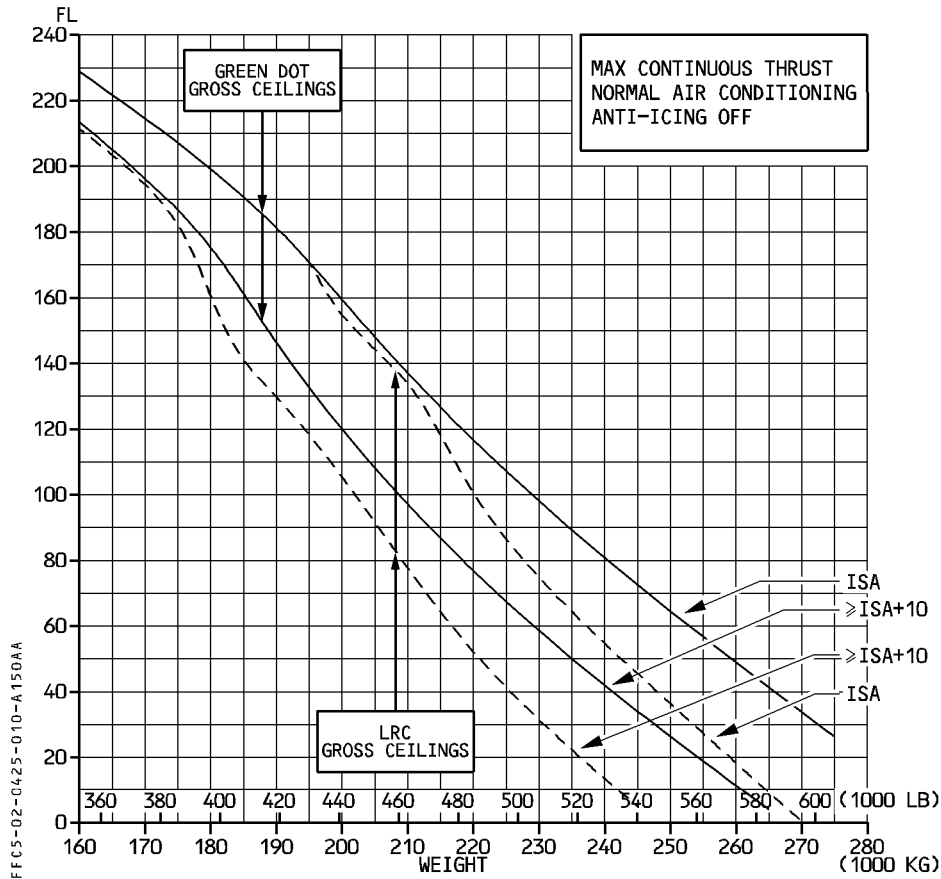
R

EN ROUTE NET FLIGHT PATH - L/G DOWN - ONE ENGINE OUT		
MAX. CONTINUOUS THRUST	ISA	Required gradient : 1.6 %
NORMAL AIR CONDITIONING		Minimum engine
ANTI-ICING OFF	CG = 19 %	



GROSS CEILINGS AT LONG RANGE AND GREEN DOT SPEEDS - ONE ENGINE OUT

R

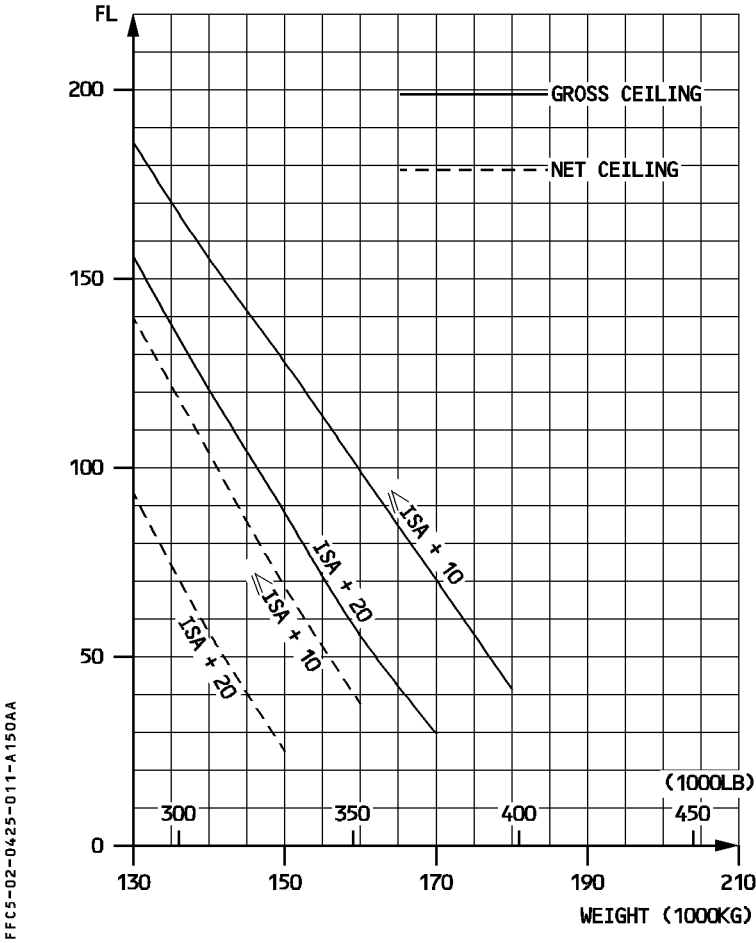


BLEED CORRECTIONS

R

		ISA	$\geq$ ISA + 10
LONG RANGE	ENGINE ANTI ICE ON	- 400	- 3600
	TOTAL ANTI ICE ON	- 1000	- 4900
GREEN DOT	ENGINE ANTI ICE ON	- 100	- 2200
	TOTAL ANTI ICE ON	- 400	- 3500

EN ROUTE NET AND GROSS FLIGHT PATH - L/G DOWN - TWO ENGINES OUT		
MAX. CONTINUOUS THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF	ISA CG = 19 %	Minimum engine



 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS HIGH ALTITUDE OPERATION	2.04.30	P 1
		SEQ 001	REV 11

OPERATION ABOVE 8000 FEET

The STANDARD OPERATING PROCEDURES (Refer to FCOM 3.03) and ABNORMAL and EMERGENCY PROCEDURES (Refer to FCOM 3.02) remain applicable for operation at high altitude airfields.

SYSTEM OPERATION

— PRESS

In case the aircraft takes off from an airfield higher than 8000 feet the cabin altitude remains at takeoff altitude until the cruise conditions are fulfilled (i.e. aircraft altitude 5000 feet above takeoff altitude and aircraft climb rate lower than 50 SLFPM for more than 32 seconds). After level off the cabin altitude is controlled to the scheduled cruise cabin altitude. On the ECAM PRESS or CRUISE page it can be observed that the cabin altitude starts changing 32 seconds after level off.

Note : After a takeoff with packs off the Cabin Pressure Controller (CLB mode) will control the cabin altitude to takeoff altitude + 250 feet.

— HYD

If on ground the «RSVR LO AIR PR» ECAM caution is triggered, switch OFF the associated hydraulic pumps (engines and electrical) before engine start to allow reservoir pressurization before hydraulic pump operation.

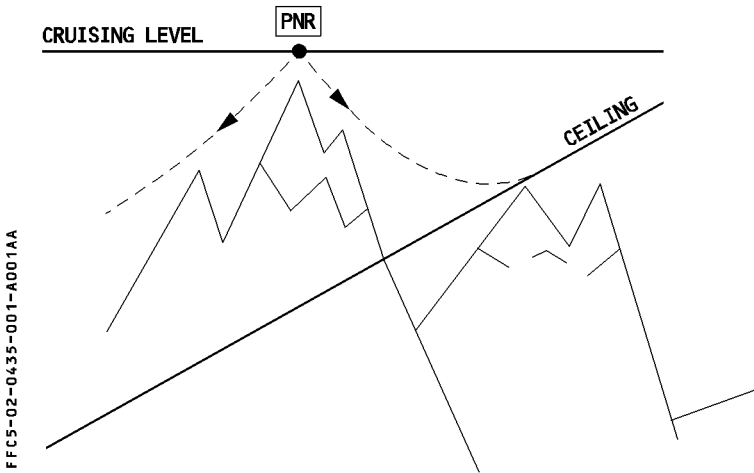
INTRODUCTION

Two failures must be taken into consideration for en route obstacle clearance over mountainous area :

- R — Engine failure that forces a descent to a lower cruise level
- R — Depressurization which, due to the passenger oxygen system, requires a descent to
- R 10000 feet before supplementary oxygen is exhausted.

ENGINE FAILURE

- R If the standard strategy does not allow the aircraft to clear obstacles, the pilot must use
- R a drift down procedure. If an engine failure occurs at any point on the route, the net flight
- R path must clear the obstacles on the drift down part by 2000 feet and on the climb part by 1000 feet.
- R If the aircraft cannot clear the en route obstacles a point of no return (PNR) must be determined.



- R If an engine failure occurs after the PNR, the aircraft must drift down on course. If the
- R failure occurs before the PNR, the aircraft must turn back.
- R For en route net flight paths, refer to the Aircraft Flight Manual.

DEPRESSURIZATION

In case of depressurization, the passengers receive oxygen through individual modules. An emergency descent in accordance with a certain profile depending on passenger oxygen equipment installed has to be performed (Refer to 2.04.20) FLIGHT WITHOUT CABIN PRESSURIZATION.

CONCLUSION

A detailed study of each route over mountainous area must show that one engine out net flight path and passenger oxygen system performance allow the aircraft to clear the obstacles by 1000 feet in climb and by 2000 feet in cruise or descent. If the aircraft in these circumstances cannot clear the obstacles on the route, a PNR must be determined, and diversion procedures must be established.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS THREE ENGINE FERRY FLIGHT	2.04.40	P 1
		SEQ 100	REV 17

GENERAL

The aircraft is certified in accordance with the relevant regulations for a three engine ferry flight with non revenue load provided such a flight is authorized in the AFM. It is the airline responsibility to obtain operational approval from its own national authorities.

TECHNICAL CONDITION OF THE AIRCRAFT

If not affected by inoperative engine, the following systems must be fully operative (the associated MMEL references are reminded for information only).

- 27-22-01 Rudder Trim System
- 27-23-01 Rudder Travel Limiter System
- 27-51-01 Flaps System
- 27-64-01 Spoilers
- 27-81-01 Slats system
- 27-93-01 PRIM
- 27-94-01 SEC
- 28-42-01 Fuel Quantity Indication

A) OUTER

B) INNER

- R 29-22-01 Blue elec pump in case of engine 2 rotor locked.

- R *Note : In case of blue elec pump inoperative, ensure that blue*
- R *accumulator pressure is in the green range before dispatch.*

- 32-42-01 Main Wheel Brakes
- 32-51-01 Nose Wheel Steering Control System
- 73-25-01 FADEC (on the remaining engines)
- 74-31-01 Ignition system
- A) System A (on the remaining engines)
- B) System B (on the remaining engines)

- 80-11-01 Start valve (on the remaining engines)

With one engine inoperative, the following associated systems are lost and then the corresponding MMEL requirements must be fulfilled.

- 24-22-01 A/C Main generation (IDG, GCU, Line contactor)
- 36-11-01 Bleed air supply system (Engines).

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.40	P 2
	THREE ENGINE FERRY FLIGHT		SEQ. 100	REV 11

ENGINE

All four engines with complete cowlings must be installed. Any one engine may be unserviceable. Prior to ferry flight the unserviceable engine has to be conditioned in accordance to the engine manufacturer maintenance manual in either of the following configurations :

- Windmilling. Fan rotor and core engine freely rotating in the airflow.
- Locked rotor. Fan rotor and core engine locked by maintenance measures.

R Depending upon whether rotating part, vanes, abradable seals etc. have sustained damage it is the airline responsibility to choose the correct engine configuration.

OPERATING LIMITATIONS

GENERAL

The following gives only the additional restrictions applicable to three engine operation. Where not explicitly mentioned, the basic limitations remain valid throughout three engine ferry flight.

FLIGHT DURATION

FERRY FLIGHT WITH ROTOR LOCKED :

No flight duration limitation.

FERRY FLIGHT IN WINDMILLING :

The duration of the ferry flight depends on :

- the flight time performed after the engine failure during the previous flight
- the status of the lubrication system during this period of time (which depends on the type of failure).

The total flight time (with engine failed during the previous flight plus the ferry flight) must not exceed :

- 7 hours without lubrication,
- 9 hours with lubrication.

During the ferry flight, the lubrication system is always considered inoperative, so, the duration of the ferry flight itself is in all cases limited to 7 hours.

FLIGHT CREW

Ferry flights are carried out by crews acquainted with the special requirements and procedures by specific training.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS THREE ENGINE FERRY FLIGHT	2.04.40	P 3
		SEQ 100	REV 10

WEIGHT AND CG LIMITATIONS

For ferry flights the operating weight is limited to the minimum necessary for each particular leg.

- R The maximum aft CG at takeoff is limited to 35%. This permits to keep sufficient nose wheel steering capability in combination with special power application procedure and to limit the tendency of auto-rotation at high speeds on ground.
 Refueling of trim tank is not allowed for three engine ferry flight.

TAKEOFF AND LANDING CONFIGURATION

- R For maximum performance at takeoff the packs and anti ice must be switched off. Slat/flap configuration for takeoff is CONF 2 only. Slat/flap configuration for landing is CONF 3 only.

WEATHER CONDITIONS

Icing conditions must be avoided because the associated engine anti ice system is not available on the inoperative engine.

Takeoff is only authorized on a smooth and hard-surfaced runway. The runway must be dry or wet. Takeoff on a runway covered with standing water, slush, snow or ice is not permitted.

X WIND

- R The maximum crosswind allowed for takeoff is 10 knot.

LANDING GEAR

Dispatch for a flight with landing gear down is not permitted.

POWER PLANT

Takeoff with flexible or derated thrust is not permitted.

NORMAL OPERATING PROCEDURES

GENERAL

The standard operating procedures given in FCOM 3.03 remain applicable for a three engine ferry flight.

In addition specific actions due to the engine shut down are indicated by ECAM messages. The flight crew has to comply with the actions required by the ECAM.

TAKEOFF PROCEDURE

- Align with a 5 meters offset towards the two engine operative side
- Specific takeoff thrust setting procedures have been defined for the two following cases:

Takeoff procedure with an OUTER engine inoperative :

- Set TOGA on the two inner engines and 50 % N1 on the operative outer engine prior to brake release
- R · After brake release, progressively accelerate the operative outer engine to reach 70 %
- R N1 at 100 knots and TOGA at 130 knots.

R *Note : Do not rush to increase power on operative outer engine. N1 target is 70 % at 100 knots.*

- Apply and maintain half forward sidestick until just prior to VR
- At VR, apply normal rotation technique
- After lift-off, follow β-target guidance.

Takeoff procedure with an INNER engine inoperative :

- Set TOGA on the two outer engines and 50 % N1 on the operative inner engine prior to brake release.
- R · After brake release, accelerate the operative inner engine to reach TOGA by 100 knots.
- Apply and maintain half forward sidestick until just prior to VR
- At VR, apply normal rotation technique
- After lift-off, follow β-target guidance.

SYSTEM OPERATION

– **BLEED/AIR COND :**

- R · **Before takeoff**
The two packs must be switched OFF.
To avoid warnings occurring at takeoff power application :
ENG BLEED (affected)OFF
XBLEEDOPEN
PACK FLOWLO
FWD CARGO COOLING (if installed)OFF
- R · **After takeoff**
PACK operation according to standard operating procedures.

– **FMGS :**

It is recommended to set the ACCEL ALT at 1000 feet AGL, if there is no performance and/or obstacle constraint.

– **ELEC :**

The generator associated with the inoperative engine must be switched off throughout the ferry flight. The complete AC and DC network remains supplied. No specific shedding of commercial loads is required.

– **FLT CTL :**

UNSERVICEABLE ENGINE	CONSEQUENCE
2	Slats slow Spoilers partially lost Pitch trim 2 lost
3	Flaps slow Yaw damper 2 lost Spoilers partially lost Pitch trim 1 lost
1 or 4	Normal operation

In case the spoilers are partially lost, the landing distance has to be increased according to the ECAM indication on the STATUS page.

With an outer engine inoperative, alpha floor protection is inhibited when the slats/flaps are extended.

– **ANTI ICE**

For takeoff, wing and engine anti-ice must be selected OFF.

– **FUEL :**

As for normal operation the fuel pumps are selected ON, including the one of the inoperative engine. After takeoff consider fuel imbalance, refer to FUEL IMBALANCE procedure (Refer to FCOM 3.02.28).

R Before the flight, check that the Fuel Used of the inoperative engine is set to zero.

– **HYD :**

The engine-driven pump of the inoperative engine must be selected OFF. Before takeoff, the electric pump of the affected engine should be selected as follows :

ENG INOPERATIVE	SWITCHING	REMARKS
1 or 4	G ELEC : AUTO	As in normal operation
2	B ELEC : Off	As in normal operation
3	Y ELEC : OFF	To avoid transients, when the electric pump is started automatically at T0 when passing 100 knots (not required by ECAM).

Note : When the unserviceable engine is windmilling, do not push the ENG FIRE pushbutton, as this may cause hydraulic pump damage.

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.40	P 6
	THREE ENGINE FERRY FLIGHT		SEQ 100	REV 23

– **INDICATING/RECORDING :**

At application of TO power the «ENG 1(2)(3)(4) SHUT DOWN» caution is triggered on ECAM. Since the ignition system might be damaged due to prolonged activation, disregard the action «ENG START SEL IGN», unless severe turbulence or heavy rain is encountered. Additionally when ENG 2 or 3 are inoperative «B (Y) SYS LO PR» caution is triggered. No action being displayed, ECAM can be cleared.

– **BRAKES :**

Alternate braking is not available when engine 2 is inoperative.

ABNORMAL OPERATING PROCEDURES

The abnormal operating procedures given in FCOM 3.02, remain applicable for three engine ferry flight. (Additional failures will be taken into account by the ECAM).

In case of dispatch with one outer engine inoperative, if the remaining outer engine fails during takeoff :

- do not select landing gear up (retraction is lost but landing gear doors would open).
- use VLS + 12 as final takeoff speed.

In case of ferry flight with engine 2 unserviceable.

- If blue brake accumulator pressure is low, recharge it by using the blue hydraulic electrical pump. If the blue hydraulic electrical pump is not available, check the brake accumulator pressure on the triple indicator, before slats extension. If it is not in the green range, select the blue (ENG 2) engine driven pump to recharge the blue accumulator. Check that the accumulator pressure is in the green range, then select engine driven pump to off.

Note : The airspeed before slats extension is sufficiently high to allow recharging of the blue brake accumulator within approximately one minute.

PERFORMANCE

REQUIREMENTS

The following requirements replace, for the 3 engine ferry flight case, the regulatory requirements usually applicable.

TAKEOFF

- For takeoff distance and takeoff run determination, no additional engine failure is taken into account. The required TOD and TOR are equal to 1.15 the actual distances. No clearway may be taken into account.
- R – The ferrying V1 (also termed as VSTOP) is the maximum speed to which the aircraft can
- R be accelerated all serviceable engines operating and then stopped within the available
- R accelerate – stop distance.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS THREE ENGINE FERRY FLIGHT	2.04.40 P 6a	
		SEQ 100	REV 23

- VR must be above VMCG-2
- VR must be above 1.03 VMCA-2
- V2 must be above 1.07 VMCA-2
- There is no requirement concerning the first segment
- R — The following takeoff flight path requirements are based on two outer engine inoperative
- R and landing gear down (most adverse condition after failure of an additional engine).
- R · Second segment requirement : a gradient of 1.5 % at 400 ft height is required.
- R · Final takeoff requirement : a gradient of 1.2 % is required. The en route climb speed
- R must not be less than 1.18 Vs.
- R · The net takeoff flight path is the gross flight path reduced by a gradient of 0.5 %.

APPROACH AND LANDING

- There is no requirement concerning the approach climb
- R — For landing climb, a gradient of 2 % is required with one engine inoperative, landing
- R configuration, gear down, TOGA thrust and a speed not less than 1.23 Vs and VMCL.
- R — Landing distance calculation accounts for the two engine inoperative case.

EN ROUTE

- The en route flight path is considered with two engine inoperative on the same wing and gear up
- The net gradient is the gross gradient decreased by 1 %.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS THREE ENGINE FERRY FLIGHT	2.04.40	P 7
		SEQ 100	REV 23

PERFORMANCE DATA

TAKEOFF

A specific takeoff chart must be computed for each runway from which a three engine ferry flight is performed. It is not recommended to take off with tailwind.

FUEL PLANNING

The performance data are provided for the rotor locked case. Fuel consumption for the windmilling case is about 3 % lower.

The recommended speeds are 250kt/M.70 for climb, M.70 for cruise, M.70/250 kt for descent and green dot speed for holding.

Pages 8 to 12 give the corresponding performance tables.

The landing climb performance is never limiting for airports up to 4000 feet (5300 feet with air conditioning OFF). For higher airport elevations, the corresponding maximum limiting weight must be determined using the performance programs.

In case of a second engine failure, the aircraft will drift down to the ceiling drawn on page 13.

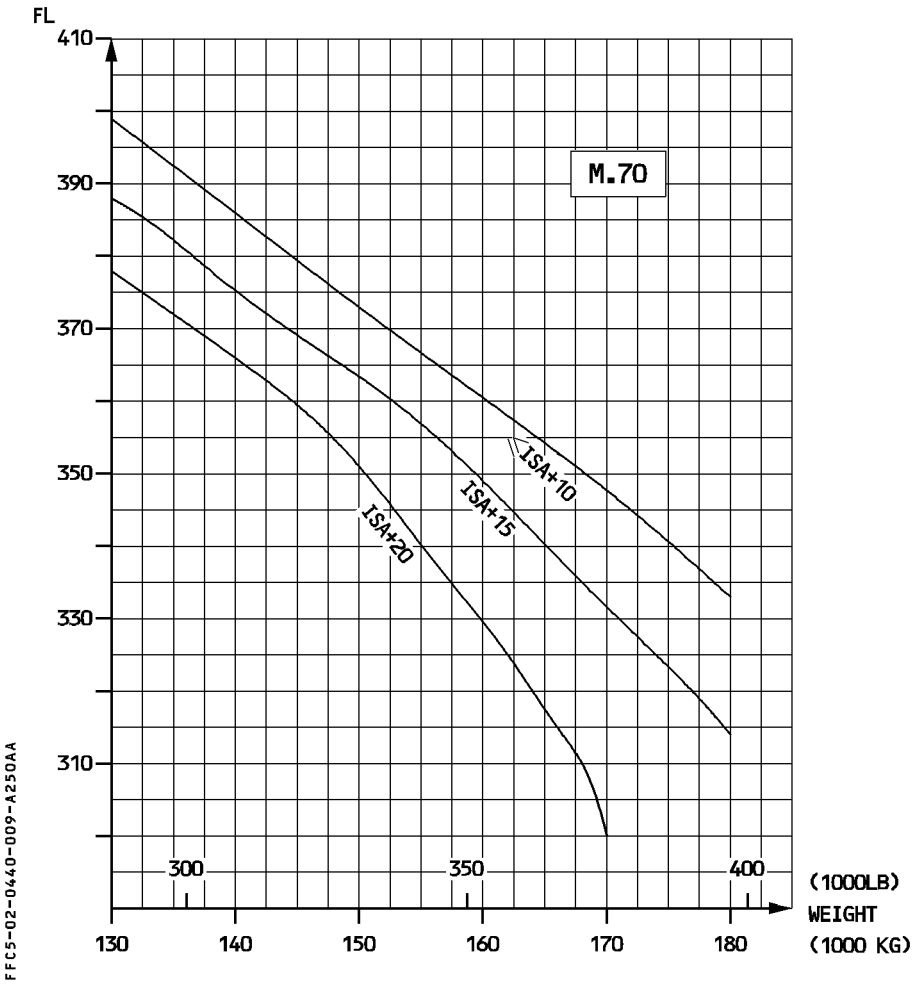
A flight planning table (page 19) allows the fuel and time required from brake release to landing to be determined. In cruise quick check (page 21) and alternate table (page 22) are also provided.

CLIMB - 250KT/M.70 - 1 ENGINE OUT - ROTOR LOCKED

MAX. CONTINUOUS THRUST LIMITS				ISA				FROM BRAKE RELEASE							
PACK FLOW LO				CG=30.0%				TIME (MIN)				FUEL (KG)			
ANTI-ICING OFF								DISTANCE (NM)				GRADIENT (%)			
	WEIGHT AT BRAKE RELEASE (1000KG)														
FL	140		145		150		155		160		165		170		
390	38	4658	43	5142											
	228	2.8	261	2.5											
370	30	4033	32	4315	35	4639	39	5023	43	5501					
	174	3.5	189	3.2	207	2.9	230	2.6	259	2.4					
350	25	3650	27	3868	29	4107	31	4372	33	4668	36	5004	40	5397	
	144	4.0	154	3.7	166	3.5	179	3.2	193	3.0	211	2.7	232	2.5	
330	22	3355	24	3538	25	3735	27	3949	28	4179	30	4431	32	4708	
	123	4.4	131	4.1	139	3.9	148	3.7	158	3.4	170	3.2	183	3.0	
310	19	3056	20	3211	22	3376	23	3552	24	3739	25	3939	27	4154	
	103	5.0	109	4.7	115	4.4	122	4.2	130	3.9	138	3.7	146	3.5	
290	17	2781	18	2915	19	3056	20	3205	21	3363	22	3529	23	3704	
	87	5.5	91	5.2	96	5.0	102	4.7	107	4.5	113	4.2	119	4.0	
270	15	2541	15	2659	16	2782	17	2911	18	3047	19	3189	20	3338	
	74	6.0	77	5.8	81	5.5	85	5.2	90	4.9	94	4.7	99	4.5	
250	13	2327	14	2431	14	2540	15	2654	16	2773	16	2896	17	3026	
	63	6.5	66	6.2	69	6.0	73	5.6	76	5.4	80	5.1	84	4.9	
240	12	2227	13	2326	13	2428	14	2535	15	2647	15	2763	16	2884	
	58	6.8	61	6.5	64	6.2	67	5.9	70	5.6	74	5.3	77	5.1	
220	11	2037	11	2125	12	2217	12	2312	13	2411	13	2513	14	2619	
	50	7.2	52	7.0	55	6.6	57	6.4	60	6.0	63	5.7	66	5.5	
200	10	1857	10	1936	10	2018	11	2102	11	2190	12	2281	12	2375	
	43	7.7	45	7.3	47	7.0	49	6.7	51	6.5	53	6.2	56	5.9	
180	8	1687	9	1757	9	1830	10	1905	10	1983	10	2063	11	2147	
	37	8.0	38	7.8	40	7.4	42	7.1	44	6.7	46	6.4	48	6.2	
160	7	1523	8	1586	8	1650	8	1716	9	1785	9	1856	9	1930	
	31	8.5	33	8.0	34	7.7	35	7.5	37	7.1	39	6.8	40	6.6	
140	6	1365	7	1420	7	1477	7	1535	8	1595	8	1658	8	1722	
	26	8.9	27	8.5	28	8.2	30	7.7	31	7.4	32	7.2	34	6.8	
120	6	1213	6	1260	6	1310	6	1360	6	1413	7	1467	7	1523	
	22	9.0	23	8.6	24	8.2	24	8.2	26	7.6	27	7.3	28	7.1	
100	5	1063	5	1104	5	1146	5	1189	5	1234	6	1281	6	1329	
	17	9.7	18	9.1	19	8.7	20	8.2	21	7.8	21	7.8	22	7.5	
50	3	694	3	719	3	744	3	770	3	797	3	825	3	854	
	8	10.3	9	9.1	9	9.1	9	9.1	10	8.2	10	8.2	11	7.5	
15	1	439	2	452	2	466	2	480	2	495	2	511	2	528	
	3	8.2	3	8.2	3	8.2	3	8.2	3	8.2	3	8.2	4	6.2	

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MAXIMUM AND OPTIMUM ALTITUDES



OPTIMUM ALTITUDES AND MAXIMUM ALTITUDES ARE IDENTICAL.

CRUISE - M.70 - 1 ENGINE OUT - ROTOR LOCKED									
MAX. CONTINUOUS THRUST LIMITS PACK FLOW LO ANTI-ICING OFF					ISA CG=30.0%	N1 (%) KG/H/ENG NM/1000KG	MACH IAS (KT) TAS (KT)		
WEIGHT (1000KG)	FL250	FL270	FL290	FL310	FL330	FL350	FL370	FL390	
130	84.9 .700	84.7 .700	84.6 .700	84.6 .700	84.8 .700	85.4 .700	86.7 .700	89.4 .700	
	1975 292	1835 280	1707 269	1593 257	1495 246	1411 235	1346 224	1318 214	
	71.1 421	75.9 418	80.9 414	85.9 411	90.7 407	95.3 403	99.4 401	101.5 401	
135	85.0 .700	84.9 .700	84.8 .700	84.9 .700	85.3 .700	85.9 .700	87.6 .700	90.4 .700	
	1989 292	1849 280	1724 269	1613 257	1519 246	1434 235	1378 224	1359 214	
	70.6 421	75.3 418	80.1 414	84.9 411	89.3 407	93.8 403	97.1 401	98.5 401	
140	85.2 .700	85.1 .700	85.1 .700	85.3 .700	85.7 .700	86.4 .700	88.5 .700	91.5 .700	
	2003 292	1865 280	1741 269	1634 257	1542 246	1459 235	1415 224	1402 214	
	70.1 421	74.7 418	79.3 414	83.8 411	88.0 407	92.2 403	94.6 401	95.5 401	
145	85.4 .700	85.3 .700	85.3 .700	85.6 .700	86.2 .700	87.2 .700	89.5 .700	92.8 .700	
	2018 292	1881 280	1760 269	1657 257	1566 246	1491 235	1454 224	1447 214	
	69.6 421	74.0 418	78.5 414	82.6 411	86.7 407	90.2 403	92.0 401	92.5 401	
150	85.5 .700	85.5 .700	85.6 .700	86.0 .700	86.7 .700	88.1 .700	90.5 .700		
	2033 292	1898 280	1780 269	1681 257	1590 246	1525 235	1495 224		
	69.1 421	73.4 418	77.6 414	81.4 411	85.4 407	88.2 403	89.5 401		
155	85.7 .700	85.7 .700	86.0 .700	86.4 .700	87.2 .700	88.9 .700	91.5 .700		
	2049 292	1917 280	1803 269	1705 257	1616 246	1564 235	1540 224		
	68.5 421	72.7 418	76.6 414	80.3 411	84.0 407	86.0 403	86.9 401		
160	85.9 .700	86.0 .700	86.3 .700	86.9 .700	87.9 .700	89.8 .700	92.7 .700		
	2066 292	1936 280	1826 269	1729 257	1649 246	1604 235	1585 224		
	68.0 421	71.9 418	75.6 414	79.2 411	82.3 407	83.9 403	84.4 401		
165	86.1 .700	86.3 .700	86.7 .700	87.3 .700	88.7 .700	90.7 .700			
	2084 292	1957 280	1852 269	1754 257	1686 246	1645 235			
	67.4 421	71.2 418	74.6 414	78.1 411	80.5 407	81.8 403			
170	86.3 .700	86.6 .700	87.1 .700	87.8 .700	89.4 .700	91.6 .700			
	2103 292	1980 280	1876 269	1780 257	1726 246	1689 235			
	66.8 421	70.3 418	73.6 414	76.9 411	78.6 407	79.6 403			
175	86.6 .700	86.9 .700	87.5 .700	88.4 .700	90.3 .700	92.7 .700			
	2123 292	2005 280	1901 269	1815 257	1766 246	1736 235			
	66.2 421	69.5 418	72.7 414	75.4 411	76.8 407	77.5 403			
180	86.8 .700	87.2 .700	87.9 .700	89.1 .700	91.1 .700	93.7 .700			
	2144 292	2030 280	1926 269	1853 257	1807 246	1782 235			
	65.5 421	68.6 418	71.7 414	73.9 411	75.1 407	75.5 403			
185	87.1 .700	87.6 .700	88.3 .700	89.8 .700	91.9 .700				
	2167 292	2056 280	1954 269	1893 257	1850 246				
	64.8 421	67.8 418	70.7 414	72.3 411	73.3 407				
190	87.4 .700	87.9 .700	88.8 .700	90.6 .700	92.8 .700				
	2192 292	2081 280	1986 269	1933 257	1900 246				
	64.1 421	66.9 418	69.5 414	70.8 411	71.4 407				

091 -08F0A340-211 CFM56-5C2 12100010C6KG300 0 018590 0 0 3 1.0 .01 0 01 .700 .000 .000 0 FCOM-F0-02-04-40-010-250

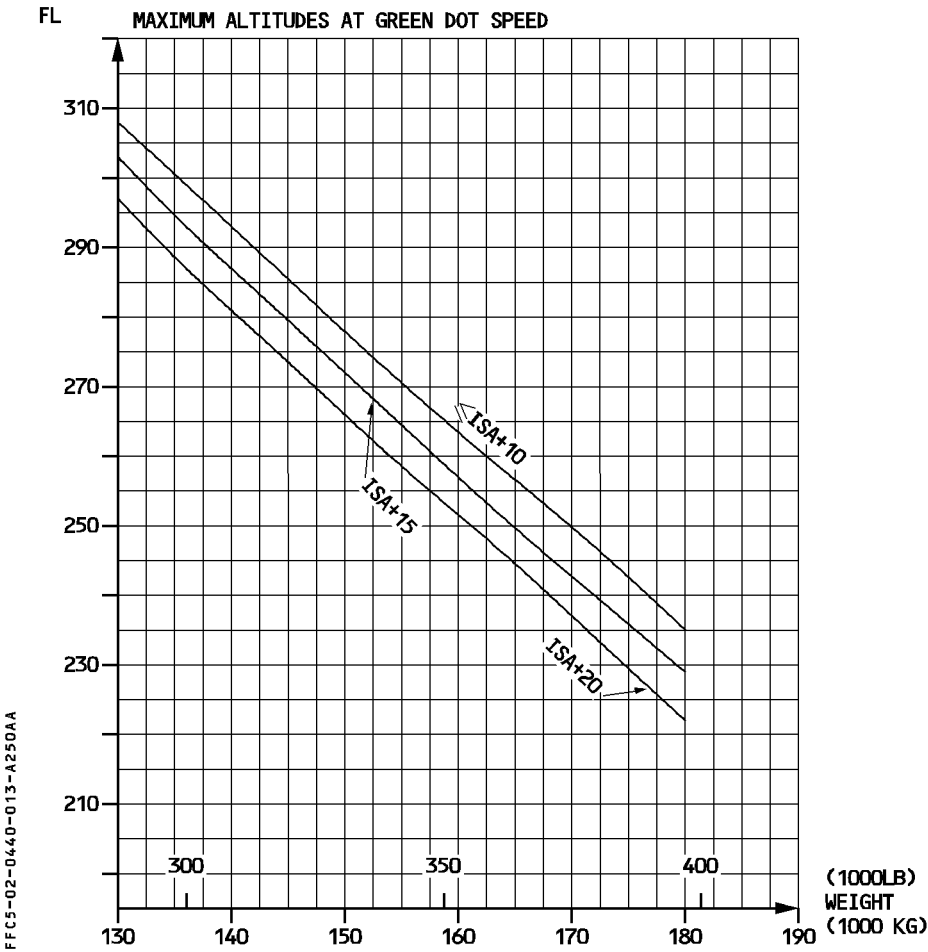
DESCENT - M.70/250KT - 1 ENGINE OUT - ROTOR LOCKED									
IDLE THRUST PACK FLOW LO ANTI-ICING OFF			ISA CG=30.0%		MAXIMUM CABIN RATE OF DESCENT 350FT/MIN				
WEIGHT (1000KG)	130				150				IAS (KT)
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	
390	20.5	378	113	IDLE	22.2	410	123	IDLE	214
370	19.5	361	107	IDLE	21.2	393	116	IDLE	224
350	18.6	346	101	IDLE	20.3	377	110	IDLE	235
330	17.8	333	95	IDLE	19.4	363	104	IDLE	246
310	16.9	318	89	IDLE	18.4	347	97	IDLE	250
290	15.9	302	83	IDLE	17.3	329	90	IDLE	250
270	14.9	285	76	IDLE	16.2	311	83	IDLE	250
250	13.8	268	70	IDLE	15.1	293	76	IDLE	250
240	13.3	259	66	IDLE	14.5	283	73	IDLE	250
220	12.2	241	60	IDLE	13.3	263	66	IDLE	250
200	11.1	222	54	IDLE	12.2	243	59	IDLE	250
180	10.1	203	48	IDLE	11.0	222	53	IDLE	250
160	8.9	183	42	IDLE	9.8	200	46	IDLE	250
140	7.8	162	36	IDLE	8.5	177	40	IDLE	250
120	6.6	138	30	IDLE	7.2	150	33	IDLE	250
100	5.3	112	24	IDLE	5.9	123	26	IDLE	250
50	2.2	48	10	IDLE	2.4	52	11	IDLE	250
15	.0	0	0	IDLE	.0	0	0	IDLE	250

091 -08FOA340-211 CFM56-5C2 23100010C6KG300 0 018590 0 0-1-350.0 15.0 .01 0 02 .700250.000 .000 0 FCOM-F0-02-04-40-011-250

RACE TRACK HOLDING PATTERN AT GREEN DOT SPEED - 1 ENGINE OUT - ROTOR LOCKED									
MAX. CONTINUOUS THRUST LIMITS CLEAN CONFIGURATION PACK FLOW LO ANTI-ICING OFF					ISA CG=30.0%		N1 (%) FF (KG/H/ENG)		
WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200	FL250
130	52.6 1223	55.5 1215	59.3 1198	60.8 1192	62.5 1189	64.1 1186	65.8 1186	67.5 1185	72.4 1210
135	53.6 1270	56.4 1259	60.2 1243	61.8 1238	63.4 1235	65.1 1233	66.8 1232	68.4 1232	73.5 1261
140	54.7 1318	57.3 1304	61.1 1288	62.7 1284	64.3 1281	66.0 1280	67.7 1279	69.4 1280	74.6 1312
145	55.6 1365	58.2 1350	62.0 1334	63.6 1330	65.2 1328	67.0 1327	68.6 1326	70.3 1328	75.5 1362
150	56.4 1410	59.0 1397	62.9 1380	64.4 1377	66.1 1375	67.8 1374	69.5 1373	71.3 1378	76.4 1414
155	57.2 1455	59.9 1442	63.7 1427	65.3 1424	67.0 1422	68.6 1420	70.3 1421	72.2 1430	77.3 1468
160	58.0 1501	60.6 1487	64.5 1474	66.1 1471	67.9 1469	69.5 1467	71.2 1470	73.1 1481	78.3 1525
165	58.8 1548	61.4 1533	65.3 1520	67.0 1518	68.7 1516	70.3 1515	72.1 1521	74.0 1533	79.2 1580
170	59.6 1594	62.1 1578	66.1 1567	67.8 1565	69.4 1562	71.1 1564	72.9 1573	75.0 1585	80.0 1633

091 -08F0A340-311 CFM56-5C2 14300010C6KG300 0 018590 0 0 3 1.0 180.0 30.01 0 01 1.000 .000 .000 0 FCOM-F0-02-04-40-012-250

TWO ENGINES INOPERATIVE – ONE ROTOR LOCKED



GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED - 2 ENG - 1 ROTOR LOCKED									
MAX. CONTINUOUS THRUST LIMITS				ISA		DISTANCE (NM)		TIME (MIN)	
PACK FLOW HI				CG=30.0%		INITIAL SPEED(KT)		FUEL(1000KG)	
ANTI-ICING OFF				LEVEL OFF (FT)					
INIT. GW (1000KG)	INITIAL FLIGHT LEVEL								
	270	290	310	330	350	370	390		
130			39 7 194 .5 30900	212 40 196 2.4 31200	265 49 198 2.9 31300	301 56 200 3.2 31300	328 60 202 3.4 31400		
135			148 28 197 1.8 30400	233 44 199 2.7 30500	278 52 201 3.1 30600	310 57 203 3.4 30600	336 61 205 3.6 30600		
140			191 36 200 2.3 29700	253 47 202 3.0 29800	291 54 204 3.4 29900	318 58 206 3.6 29900	343 62 208 3.8 29900		
145		90 17 201 1.2 28800	220 42 203 2.8 29000	270 51 205 3.3 29100	304 56 207 3.6 29100	330 61 209 3.8 29200	354 64 211 4.0 29200		
150		159 30 204 2.1 28200	238 45 206 3.1 28300	280 52 208 3.5 28400	310 57 210 3.8 28400	334 61 212 4.0 28500	357 65 214 4.2 28500		
155		193 37 207 2.6 27600	253 48 209 3.3 27700	288 54 211 3.7 27700	317 59 213 4.0 27800	340 62 215 4.2 27800	361 65 217 4.3 27800		
160	102 20 208 1.5 26700	216 41 210 3.0 26900	265 50 212 3.6 27000	298 55 214 3.9 27000	324 60 216 4.1 27100	346 63 218 4.3 27100	366 66 220 4.5 27100		
165	159 30 211 2.3 26100	233 44 213 3.3 26300	276 52 215 3.8 26300	306 57 217 4.1 26400	330 61 219 4.3 26400	351 64 221 4.5 26400	370 67 223 4.6 26500		
170	190 36 214 2.8 25500	248 47 216 3.6 25600	285 53 218 4.0 25700	312 58 220 4.3 25700	336 61 222 4.5 25800	355 64 224 4.6 25800	373 67 226 4.8 25800		
175	213 40 217 3.2 24900	260 49 219 3.8 25000	293 55 221 4.2 25100	318 59 223 4.4 25100	341 62 225 4.7 25100	360 65 227 4.8 25200	378 68 229 4.9 25200		
180	234 44 220 3.6 24300	275 52 222 4.1 24400	305 57 224 4.4 24400	330 61 226 4.7 24500	350 64 228 4.9 24500	369 67 230 5.0 24500	386 69 232 5.2 24500		
185	251 47 223 3.9 23700	286 53 225 4.4 23700	315 58 227 4.7 23800	338 62 229 4.9 23800	357 65 231 5.1 23800	376 68 233 5.3 23900	393 70 235 5.4 23900		
190	264 50 226 4.2 23100	296 55 228 4.6 23100	324 60 230 4.9 23200	345 63 232 5.1 23200	365 66 234 5.3 23200	382 69 236 5.4 23200	398 71 238 5.6 23200		

09| -08FOA340-211 CFM56-5C3 23500020C7KG300 0 018590 0 0 3 .0 .0 .01 0 02 1.000 1.000 .000 0 FCOM-FO-02-04-40-014-250

CRUISE AT GREEN DOT SPEED - 2 ENGINES OUT - 1 ROTOR LOCKED																
MAX. CONTINUOUS THRUST LIMITS					ISA	N1 (%)		MACH								
PACK FLOW HI					CG=30.0%	KG/H/ENG		IAS (KT)								
ANTI-ICING OFF						NM/1000KG		TAS (KT)								
WEIGHT (1000KG)	FL150		FL170		FL190		FL210		FL230		FL250		FL270		FL290	
130	73.3	.366	75.3	.380	77.2	.396	79.0	.414	81.0	.436	83.0	.459	85.2	.484	89.3	.510
	1624	183	1630	183	1636	183	1647	184	1660	186	1674	188	1691	190	1787	192
	70.5	229	72.5	236	74.6	244	76.9	253	79.7	265	82.6	276	85.3	289	84.4	302
135	74.4	.372	76.5	.386	78.2	.402	80.1	.421	82.1	.443	84.1	.466	86.6	.491	91.0	.517
	1690	186	1695	186	1702	186	1712	187	1726	189	1741	191	1771	193	1882	195
	68.9	233	70.9	240	72.8	248	75.2	257	77.9	269	80.6	281	82.7	293	81.3	306
140	75.5	.377	77.4	.393	79.2	.408	81.1	.427	83.1	.450	85.2	.473	88.4	.498	92.8	.525
	1756	189	1761	189	1769	189	1779	190	1792	192	1808	194	1869	196	1975	198
	67.3	236	69.3	244	71.2	252	73.5	261	76.1	273	78.8	285	79.6	297	78.6	311
145	76.6	.383	78.3	.399	80.2	.415	82.1	.434	84.1	.456	86.3	.480	90.2	.506		
	1820	192	1828	192	1836	192	1846	193	1860	195	1878	197	1981	199		
	66.0	240	67.8	248	69.7	256	71.9	266	74.5	277	77.0	289	76.2	302		
150	77.6	.389	79.3	.405	81.2	.421	83.1	.441	85.1	.463	87.5	.487	92.0	.513		
	1886	195	1895	195	1903	195	1914	196	1929	198	1958	200	2088	202		
	64.7	244	66.4	252	68.2	260	70.4	270	72.9	281	74.9	293	73.3	306		
155	78.4	.395	80.2	.411	82.1	.427	84.0	.447	86.1	.470	89.1	.494	93.6	.520		
	1954	198	1963	198	1971	198	1982	199	1998	201	2057	203	2183	205		
	63.4	248	65.1	255	66.9	264	69.0	274	71.4	285	72.3	298	71.1	311		
160	79.3	.401	81.2	.417	83.0	.434	84.9	.454	87.1	.477	90.8	.502				
	2022	201	2031	201	2040	201	2051	202	2071	204	2172	206				
	62.1	251	63.8	259	65.6	268	67.7	278	69.9	289	69.5	302				
165	80.2	.407	82.1	.423	84.0	.440	85.9	.460	88.2	.484	92.5	.509				
	2091	204	2100	204	2110	204	2120	205	2151	207	2289	209				
	60.9	255	62.6	263	64.3	271	66.4	282	68.2	294	66.9	306				
170	81.1	.413	82.9	.429	84.8	.446	86.8	.467	89.5	.491	94.1	.516				
	2161	207	2171	207	2179	207	2191	208	2243	210	2390	212				
	59.8	259	61.5	267	63.2	275	65.2	286	66.4	298	64.9	310				
175	82.0	.419	83.8	.435	85.7	.453	87.7	.473	91.1	.497						
	2230	210	2241	210	2250	210	2265	211	2359	213						
	58.8	262	60.4	271	62.1	279	63.9	290	64.0	302						
180	82.8	.425	84.6	.441	86.5	.459	88.7	.480	92.7	.504						
	2301	213	2312	213	2322	213	2347	214	2480	216						
	57.8	266	59.3	274	61.0	283	62.5	294	61.7	306						
185	83.6	.430	85.4	.447	87.4	.465	89.9	.486	94.4	.511						
	2373	216	2383	216	2394	216	2439	217	2596	219						
	56.8	270	58.4	278	59.9	287	61.0	298	59.7	310						
190	84.4	.436	86.2	.454	88.3	.472	91.3	.493								
	2444	219	2454	219	2471	219	2543	220								
	55.9	273	57.4	282	58.9	291	59.3	302								

091 -08F0A340-211 CFM56-5C3 12200020C7KG300 0 018590 0 0 3 1.0 .0 .01 0 01 -1.000 .000 .000 0 FCOM-F0-02-04-40-015-250

CRUISE AT GREEN DOT SPEED - 2 ENGINES OUT - 1 ROTOR LOCKED									
MAX. CONTINUOUS THRUST LIMITS PACK FLOW HI ANTI-ICING OFF					ISA + 10 CG=30.0%		N1 (%) KG/H/ENG NM/1000KG		MACH IAS (KT) TAS (KT)
WEIGHT (1000KG)	FL150	FL170	FL190	FL210	FL230	FL250	FL270	FL290	
130	74.7 .366	76.8 .380	78.7 .396	80.6 .414	82.7 .436	84.7 .459	87.0 .484	91.2 .510	
	1656 183	1660 183	1667 183	1680 184	1696 186	1713 188	1734 190	1846 192	
	70.5 233	72.6 241	74.7 249	77.0 259	79.6 270	82.4 282	85.0 295	83.4 308	
135	75.8 .372	78.0 .386	79.7 .402	81.7 .421	83.7 .443	85.8 .466	88.4 .491	92.9 .517	
	1722 186	1725 186	1735 186	1748 187	1765 189	1783 191	1819 193	1944 195	
	68.9 237	71.0 245	72.9 253	75.1 263	77.7 274	80.3 286	82.2 299	80.4 313	
140	77.0 .377	78.9 .393	80.7 .408	82.7 .427	84.8 .450	86.9 .473	90.2 .498	94.7 .525	
	1788 189	1794 189	1805 189	1818 190	1834 192	1853 194	1929 196	2040 198	
	67.4 241	69.3 249	71.2 257	73.4 267	75.9 278	78.4 291	78.7 304	77.8 317	
145	78.1 .383	79.9 .399	81.8 .415	83.7 .434	85.8 .456	88.0 .480	92.1 .506		
	1854 192	1864 192	1874 192	1888 193	1905 195	1927 197	2044 199		
	66.0 245	67.8 253	69.6 261	71.7 271	74.2 283	76.6 295	75.4 308		
150	79.1 .389	80.8 .405	82.8 .421	84.8 .441	86.8 .463	89.3 .487	93.8 .513		
	1923 195	1934 195	1945 195	1958 196	1977 198	2017 200	2154 202		
	64.6 249	66.3 257	68.1 265	70.2 275	72.6 287	74.3 299	72.6 313		
155	80.0 .395	81.8 .411	83.7 .427	85.7 .447	87.8 .470	90.9 .494	95.5 .520		
	1993 198	2005 198	2016 198	2029 199	2049 201	2122 203	2255 205		
	63.3 252	64.9 260	66.7 269	68.8 279	71.0 291	71.6 304	70.3 317		
160	80.9 .401	82.7 .417	84.7 .434	86.6 .454	88.9 .477	92.6 .502			
	2064 201	2076 201	2088 201	2102 202	2129 204	2240 206			
	62.0 256	63.7 264	65.3 273	67.4 283	69.4 295	68.8 308			
165	81.7 .407	83.7 .423	85.6 .440	87.6 .460	90.0 .484	94.4 .509			
	2136 204	2148 204	2161 204	2175 205	2217 207	2361 209			
	60.8 260	62.4 268	64.1 277	66.0 287	67.6 300	66.2 312			
170	82.6 .413	84.5 .429	86.5 .446	88.5 .467	91.3 .491	96.0 .516			
	2208 207	2222 207	2234 207	2251 208	2313 210	2470 212			
	59.7 264	61.2 272	62.9 281	64.7 291	65.7 304	64.1 317			
175	83.5 .419	85.4 .435	87.3 .453	89.5 .473	92.9 .497				
	2280 210	2295 210	2307 210	2333 211	2432 213				
	58.6 267	60.1 276	61.7 285	63.3 295	63.3 308				
180	84.4 .425	86.3 .441	88.2 .459	90.5 .480	94.5 .504				
	2355 213	2369 213	2383 213	2418 214	2556 216				
	57.6 271	59.0 280	60.6 289	61.9 300	61.1 312				
185	85.2 .430	87.1 .447	89.1 .465	91.7 .486	96.2 .511				
	2430 216	2443 216	2462 216	2513 217	2682 219				
	56.6 275	58.0 284	59.5 293	60.4 304	59.0 316				
190	86.0 .436	87.9 .454	90.0 .472	93.0 .493					
	2505 219	2518 219	2544 219	2620 220					
	55.6 279	57.1 287	58.3 297	58.7 308					

091 -08F0A340-211 CFM56-5C3 12200020C7KG300 0 018590 0 0 3 1.0 .0 .01 0 01 -1.000 .000 .000 10 FCOM-F0-02-04-40-016-250

CRUISE AT GREEN DOT SPEED - 2 ENGINES OUT - 1 ROTOR LOCKED

MAX. CONTINUOUS THRUST LIMITS						ISA +20 CG=30.0%		N1 (%) KG/H/ENG NM/1000KG						MACH IAS (KT) TAS (KT)		
PACK FLOW HI ANTI-ICING OFF																
WEIGHT (1000KG)	FL150		FL170		FL190		FL210		FL230		FL250		FL270		FL290	
130	76.1	.366	78.2	.380	80.2	.396	82.2	.414	84.3	.436	86.4	.459	88.7	.484	93.0	.510
	1686	183	1692	183	1701	183	1717	184	1736	186	1756	188	1783	190	1904	192
	70.5	.238	72.6	.246	74.6	.254	76.8	.264	79.3	.275	81.9	.288	84.3	.301	82.5	.314
135	77.3	.372	79.4	.386	81.2	.402	83.3	.421	85.4	.443	87.5	.466	90.1	.491		
	1754	186	1759	186	1772	186	1787	187	1808	189	1829	191	1876	193		
	68.9	.242	70.9	.249	72.7	.258	74.9	.268	77.3	.280	79.9	.292	81.4	.305		
140	78.4	.377	80.4	.393	82.3	.408	84.3	.427	86.4	.450	88.6	.473	92.0	.498		
	1822	189	1831	189	1844	189	1860	190	1880	192	1905	194	1989	196		
	67.4	.245	69.2	.253	71.0	.262	73.1	.272	75.5	.284	77.8	.297	77.9	.310		
145	79.6	.383	81.4	.399	83.3	.415	85.3	.434	87.4	.456	89.8	.480	93.9	.506		
	1891	192	1904	192	1916	192	1934	193	1954	195	1986	197	2108	199		
	65.9	.249	67.6	.257	69.4	.266	71.4	.276	73.7	.288	75.8	.301	74.6	.314		
150	80.5	.389	82.4	.405	84.3	.421	86.4	.441	88.5	.463	91.0	.487				
	1963	195	1977	195	1990	195	2007	196	2030	198	2077	200				
	64.5	.253	66.1	.261	67.8	.270	69.8	.280	72.0	.293	73.5	.305				
155	81.5	.395	83.3	.411	85.3	.427	87.3	.447	89.5	.470	92.7	.494				
	2036	198	2051	198	2065	198	2081	199	2109	201	2185	203				
	63.1	.257	64.7	.265	66.3	.274	68.3	.284	70.4	.297	70.9	.310				
160	82.4	.401	84.3	.417	86.3	.434	88.3	.454	90.6	.477	94.4	.502				
	2110	201	2125	201	2140	201	2157	202	2192	204	2307	206				
	61.8	.261	63.4	.269	64.9	.278	66.9	.289	68.7	.301	68.1	.314				
165	83.3	.407	85.2	.423	87.2	.440	89.2	.460	91.7	.484						
	2185	204	2201	204	2216	204	2236	205	2282	207						
	60.5	.265	62.1	.273	63.6	.282	65.5	.293	66.9	.305						
170	84.2	.413	86.1	.429	88.1	.446	90.2	.467	93.1	.491						
	2260	207	2277	207	2293	207	2316	208	2381	210						
	59.4	.268	60.8	.277	62.4	.286	64.1	.297	65.1	.310						
175	85.1	.419	87.0	.435	89.0	.453	91.2	.473	94.7	.497						
	2336	210	2354	210	2371	210	2401	211	2504	213						
	58.3	.272	59.7	.281	61.2	.290	62.7	.301	62.7	.314						
180	85.9	.425	87.9	.441	89.9	.459	92.2	.480								
	2414	213	2431	213	2451	213	2489	214								
	57.2	.276	58.6	.285	60.0	.294	61.3	.305								
185	86.7	.430	88.7	.447	90.8	.465	93.4	.486								
	2492	216	2509	216	2532	216	2586	217								
	56.2	.280	57.6	.289	58.9	.298	59.8	.309								
190	87.6	.436	89.5	.454	91.7	.472	94.8	.493								
	2570	219	2588	219	2617	219	2697	220								
	55.2	.284	56.6	.293	57.8	.302	58.1	.314								

091 -08F0A340-211 CFM56-5C3 12200020C7KG300 0 018590 0 0 3 1.0 .0 .01 0 01 -1.000 .000 .000 0 FCOM-FO-02-04-40-018-250

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
1 ENGINE OUT - ROTOR LOCKED									
CLIMB : 250KT/250KT/M.70 - CRUISE : M.70 - DESCENT : M.70/250KT/250KT									
IMC PROCEDURE : 330 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG				ISA		FUEL CONSUMED (KG)			
PACK FLOW LO				CG = 30.0 %					
ANTI-ICING OFF				TIME (H.MIN)					
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	270	290	310	330	350	370	FL270 FL290	FL310 FL330	FL350 FL370
200	3796 0.43	3773 0.43	3775 0.44				12	14	
300	5106 0.57	5010 0.58	4950 0.58	4920 0.58	4907 0.58	4914 0.58	15	18	21
400	6418 1.12	6251 1.12	6129 1.13	6048 1.13	5988 1.13	5965 1.13	18	22	25
500	7735 1.26	7495 1.27	7312 1.27	7179 1.28	7074 1.28	7021 1.28	21	26	30
600	9055 1.41	8744 1.41	8501 1.42	8318 1.43	8167 1.43	8085 1.43	23	30	35
700	10379 1.55	9996 1.56	9694 1.57	9462 1.57	9265 1.58	9155 1.58	26	34	40
800	11705 2.10	11252 2.11	10891 2.11	10609 2.12	10367 2.13	10258 2.13*	29	38	48
900	13035 2.24	12511 2.25	12093 2.26	11761 2.27	11473 2.28	11409 2.28*	32	42	61
1000	14368 2.38	13774 2.40	13298 2.41	12918 2.42	12583 2.43	12564 2.43*	35	46	73
1100	15704 2.53	15040 2.54	14507 2.55	14079 2.57	13697 2.58	13722 2.58*	38	49	85
1200	17044 3.07	16310 3.09	15720 3.10	15244 3.11	14816 3.13	14885 3.12*	41	53	97
1300	18389 3.22	17586 3.23	16938 3.25	16414 3.26	15939 3.27	16052 3.27*	45	57	105
1400	19737 3.36	18867 3.38	18161 3.39	17587 3.41	17066 3.42	17223 3.42*	48	61	110
1500	21089 3.50	20151 3.52	19389 3.54	18764 3.56	18204 3.57	18399 3.57*	52	66	115
1600	22446 4.05	21440 4.07	20622 4.09	19945 4.10	19348 4.12	19579 4.12*	55	70	120
1700	23807 4.19	22736 4.21	21861 4.23	21131 4.25	20498 4.27	20763 4.26*	59	74	125
1800	25172 4.34	24036 4.36	23106 4.38	22325 4.40	21656 4.42	21954 4.41*	63	79	131
1900	26541 4.48	25340 4.50	24355 4.53	23523 4.55	22821 4.57	23152 4.56*	67	83	140
2000	27913 5.02	26649 5.05	25610 5.07	24726 5.10	23993 5.12	24353 5.11*	70	88	150
2100	29289 5.17	27962 5.20	26869 5.22	25934 5.24	25170 5.27	25560 5.25*	74	92	159
2200	30669 5.31	29279 5.34	28134 5.37	27146 5.39	26354 5.42	26770 5.40*	77	97	168
2300	32053 5.46	30601 5.49	29403 5.51	28363 5.54	27565 5.57*	27986 5.55*	81	101	177
2400	33441 6.00	31927 6.03	30677 6.06	29585 6.09	28831 6.11*	29206 6.10*	84	105	186
2500	34832 6.15	33258 6.18	31956 6.21	30811 6.24	30101 6.26*	30431 6.25*	88	110	195
2600	36231 6.29	34594 6.32	33241 6.35	32042 6.38	31376 6.41*	31660 6.39*	93	115	203
2700	37633 6.43	35937 6.47	34530 6.50	33278 6.53	32656 6.55*	32895 6.54*	97	120	211

M.70

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
100	72	79	88	100	115	136	165
200	143	158	177	200	230	272	331
300	215	237	265	300	346	407	496
400	287	317	353	400	461	543	662
500	358	396	442	500	576	679	827
600	430	475	530	600	691	815	993
700	502	554	618	700	806	951	1158
800	573	633	707	800	922	1087	1324
900	645	712	795	900	1037	1222	1489
1000	717	791	883	1000	1152	1358	1655
1100	788	870	972	1100	1267	1494	1820
1200	860	950	1060	1200	1382	1630	1986
1300	931	1029	1149	1300	1497	1766	2151
1400	1003	1108	1237	1400	1613	1902	2316
1500	1075	1187	1325	1500	1728	2037	2482
1600	1146	1266	1414	1600	1843	2173	2647
1700	1218	1345	1502	1700	1958	2309	2813
1800	1290	1424	1590	1800	2073	2445	2978
1900	1361	1503	1679	1900	2189	2581	3144
2000	1433	1583	1767	2000	2304	2717	3309
2100	1505	1662	1855	2100	2419	2852	3475
2200	1576	1741	1944	2200	2534	2988	3640
2300	1648	1820	2032	2300	2649	3124	3806
2400	1720	1899	2120	2400	2765	3260	3971
2500	1791	1978	2209	2500	2880	3396	4137
2600	1863	2057	2297	2600	2995	3531	4302
2700	1935	2136	2385	2700	3110	3667	4468

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.40	P 21
	THREE ENGINE FERRY FLIGHT		SEQ 250	REV 10

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING 1 ENGINE OUT - ROTOR LOCKED - CRUISE : M.70 - DESCENT : M.70/250KT/250KT IMC PROCEDURE : 330 KG (6MIN)										
REF. INITIAL WEIGHT = 160000 KG				ISA CG = 30.0 %		FUEL CONSUMED (KG)				
PACK FLOW LO										
ANTI-ICING OFF				TIME (H.MIN)						
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	250	270	290	310	330	370	FL250 FL270	FL290 FL310	FL330 FL370
200	2346 0.39	2172 0.39	2021 0.39	1890 0.39	1775 0.40	1633 0.40		1	1	2
300	3758 0.53	3507 0.53	3293 0.54	3110 0.54	2946 0.54	2772 0.55		3	5	8
400	5167 1.07	4840 1.08	4561 1.08	4326 1.09	4113 1.09	3902 1.10		6	8	13
500	6573 1.21	6169 1.22	5825 1.23	5537 1.23	5275 1.24	5024 1.25		8	12	19
600	7976 1.36	7494 1.36	7084 1.37	6743 1.38	6434 1.38	6139 1.39		11	15	24
700	9375 1.50	8816 1.51	8339 1.52	7945 1.52	7587 1.53	7245 1.54		13	19	29
800	10771 2.04	10134 2.05	9590 2.06	9142 2.07	8737 2.08	8344 2.09		15	22	34
900	12164 2.18	11449 2.19	10837 2.20	10335 2.22	9882 2.23	9436 2.24		17	26	39
1000	13553 2.32	12760 2.34	12079 2.35	11523 2.36	11023 2.37	10519 2.39		20	29	44
1100	14940 2.47	14068 2.48	13318 2.49	12707 2.51	12159 2.52	11596 2.54		22	32	49
1200	16324 3.01	15372 3.02	14553 3.04	13887 3.05	13292 3.07	12666 3.09		24	35	53
1300	17705 3.15	16674 3.17	15784 3.18	15062 3.20	14420 3.22	13728 3.24		26	38	58
1400	19083 3.29	17972 3.31	17011 3.33	16234 3.35	15545 3.36	14785 3.39		28	41	63
1500	20459 3.44	19268 3.45	18236 3.47	17401 3.49	16666 3.51	15834 3.54		31	44	67
1600	21832 3.58	20561 4.00	19458 4.02	18564 4.04	17783 4.06	16877 4.09		33	47	71
1700	23202 4.12	21850 4.14	20677 4.16	19723 4.18	18895 4.20	17915 4.24		35	50	76
1800	24569 4.26	23136 4.28	21893 4.31	20877 4.33	20004 4.35	18948 4.39		37	53	80
1900	25934 4.40	24420 4.43	23104 4.45	22028 4.47	21108 4.50	19976 4.54		38	56	84
2000	27296 4.55	25701 4.57	24314 5.00	23175 5.02	22209 5.05	20997 5.08		40	58	88
2100	28655 5.09	26979 5.11	25519 5.14	24318 5.17	23306 5.19	22013 5.23		42	61	92
2200	30011 5.23	28254 5.26	26722 5.28	25458 5.31	24399 5.34	23023 5.38		44	63	96
2300	31365 5.37	29525 5.40	27921 5.43	26593 5.46	25489 5.49	24027 5.53		46	66	100
2400	32715 5.51	30794 5.54	29117 5.57	27725 6.00	26576 6.03	25027 6.08		48	68	103
2500	34064 6.06	32060 6.09	30309 6.12	28853 6.15	27658 6.18	26021 6.23		50	71	107
2600	35411 6.20	33324 6.23	31498 6.26	29977 6.30	28737 6.33	27010 6.38		52	73	110
2700	36754 6.34	34586 6.37	32685 6.41	31098 6.44	29812 6.48	27993 6.53		53	75	114

FLIP22B A340-211 CFM56-5C2 3610 03001.001011 0250250 .7000 .000000 330 0100350160 0 257200100174 18590 FCOM-FO-02-04-40-021-250

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT

1 ENGINE OUT - ROTOR LOCKED

GO-AROUND : 600 KG - CLIMB : 250KT/250KT/M.70 - CRUISE : LONG RANGE

DESCENT : M.70/250KT/250KT - VMC PROCEDURE : 220 KG (4MIN)

REF. LANDING WEIGHT = 140000 KG								ISA	FUEL CONSUMED (KG)			
PACK FLOW LO								CG = 30.0 %	TIME (H.MIN)			
ANTI-ICING OFF								CORRECTION ON FUEL CONSUMPTION (KG/1000KG)				
AIR DIST.	FLIGHT LEVEL								FL100	FL140	FL180	FL220
(NM)	100	120	140	160	180	200	220		FL120	FL160	FL200	
40	1569 0.13								3			
60	1895 0.17	1900 0.17							4			
80	2221 0.21	2215 0.21	2214 0.21	2220 0.21					5	5		
100	2548 0.26	2530 0.25	2518 0.25	2513 0.25	2507 0.25	2513 0.24			6	6	6	
120	2875 0.30	2845 0.29	2822 0.29	2807 0.29	2790 0.28	2788 0.28	2819 0.28		7	7	8	9
140	3203 0.34	3160 0.33	3127 0.33	3100 0.32	3073 0.32	3064 0.32	3090 0.31		8	8	9	10
160	3530 0.38	3476 0.38	3432 0.37	3394 0.36	3356 0.36	3340 0.36	3361 0.35		9	9	10	11
180	3859 0.43	3793 0.42	3737 0.41	3689 0.40	3640 0.40	3616 0.40	3633 0.38		10	10	11	12
200	4187 0.47	4109 0.46	4042 0.45	3983 0.44	3924 0.44	3894 0.44	3904 0.42		11	11	12	13
220	4516 0.51	4426 0.50	4348 0.49	4278 0.48	4209 0.48	4171 0.47	4176 0.45		13	12	14	15
240	4845 0.55	4743 0.54	4654 0.53	4573 0.52	4493 0.52	4449 0.51	4448 0.49		14	13	15	16
260	5175 0.59	5061 0.58	4960 0.57	4868 0.56	4778 0.56	4727 0.55	4720 0.52		15	14	16	17
280	5505 1.04	5379 1.02	5267 1.01	5164 1.00	5063 1.00	5006 0.99	4993 0.56		16	15	17	18
300	5836 1.08	5697 1.06	5574 1.05	5460 1.03	5349 1.04	5284 1.03	5266 0.59		17	16	18	19
320	6166 1.12	6016 1.10	5882 1.09	5756 1.07	5635 1.07	5564 1.07	5540 1.03		18	17	20	21
340	6498 1.16	6335 1.14	6189 1.13	6053 1.11	5921 1.11	5843 1.10	5814 1.06		19	18	21	22
360	6829 1.20	6654 1.18	6497 1.17	6349 1.15	6207 1.15	6123 1.14	6088 1.09		20	19	22	23
380	7161 1.25	6974 1.22	6806 1.20	6647 1.19	6494 1.19	6403 1.18	6363 1.13		21	20	23	24
400	7493 1.29	7294 1.26	7114 1.24	6944 1.23	6781 1.23	6684 1.22	6638 1.16		22	21	25	25
420	7825 1.33	7614 1.30	7423 1.28	7242 1.27	7068 1.27	6965 1.26	6913 1.20		23	22	26	26
440	8157 1.37	7934 1.34	7732 1.32	7540 1.30	7356 1.31	7246 1.30	7189 1.23		24	23	27	27
460	8490 1.41	8255 1.39	8041 1.36	7838 1.34	7644 1.35	7528 1.33	7465 1.26		25	24	28	28
480	8824 1.45	8576 1.43	8351 1.40	8136 1.38	7932 1.39	7810 1.37	7742 1.30		26	25	30	30
500	9157 1.50	8897 1.47	8661 1.44	8435 1.42	8221 1.42	8093 1.41	8017 1.33		27	26	31	31

FLIP23A A340-211 CFM56-5C2 3520 03001.001010 0250250 .7001 .00000 220 600300350140 0 275186120174 18590 FCOM-02-04-40-022-250

LONG RANGE CRUISE

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
100	69	77	87	100	118	143	182
120	83	92	104	120	141	171	218
140	97	108	122	140	165	200	254
160	110	123	139	160	188	228	291
180	124	139	157	180	212	257	327
200	138	154	174	200	235	286	363
220	152	169	191	220	259	314	400
240	166	185	209	240	282	343	436
260	179	200	226	260	306	371	472
280	193	215	244	280	329	400	509
300	207	231	261	300	353	428	545
320	221	246	278	320	376	457	581
340	235	262	296	340	400	485	618
360	248	277	313	360	423	514	654
380	262	292	330	380	447	543	690
400	276	308	348	400	470	571	726
420	290	323	365	420	494	600	763
440	304	339	383	440	518	628	799
460	317	354	400	460	541	657	835
480	331	369	417	480	565	685	872
500	345	385	435	500	588	714	908

AEROLINEAS ARGENTINAS A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS THREE ENGINE FERRY FLIGHT	2.04.40	P 24
		SEQ 100	REV 09

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 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS RVSM	2.04.50	P 1
		SEQ 001	REV 20

GENERAL

Reduced Vertical Separation Minimum (RVSM) airspace is any airspace or route between FL290 and FL410 (inclusive), where aircraft are vertically separated by 1000 feet, instead of 2000 feet. The A340 system design complies with the design criteria of the JAA Information Leaflet N° 23, and the FAA 91-RVSM Interim Guidance Material for RVSM operations. The statement of RVSM capability is also indicated in the AFM.

OPERATIONAL APPROVAL

The above capability statement does not constitute an approval to fly RVSM. Operational approval is to be granted by the Operator's national authorities, after assessment of the airline's capability to meet RVSM requirements. The above-mentioned JAA and FAA documents also cover requirements to obtain operational approval.

REQUIRED EQUIPMENT/FUNCTIONS FOR RVSM

RVSM regulations require the following equipment/functions to be operative :

- 2 ADRs + 2 DMCs
- 1 transponder
- 1 Autopilot function
- 2 PFDs
- 1 FCU channel (for altitude target selection and OP CLB/OP DES mode engagement)
- 1 FWC (for altitude alert function)

R *Note : In case of an FCU B+C channel failure, the autopilot function is lost (see*
R *3.02.22). RVSM operation is, consequently, not allowed.*

PROCEDURES

The SOPs (FCOM 3.03) and the ABN and EMER (FCOM 3.02) procedures apply. In addition, flights in RVSM airspace must be completed by the following :

FLIGHT PREPARATION

The crew must pay particular attention to conditions that may affect operation in RVSM airspace. These include, but may not be limited to :

- Verifying that the airframe is approved for RVSM operations.
- Reported and forecast weather on the flight route.
- Review of maintenance logs and forms to determine the condition of equipment required for flight in RVSM airspace. Ensure that maintenance action has been taken to correct defects to required equipment.
- Check, on ground, that the two primary altitude indications are within tolerances of 3.04.34 (PFD indication from onside ADR or ADR 3).

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.50	P 2
	RVSM		SEQ 001	REV 20

IN FLIGHT PROCEDURES

PRIOR TO RVSM AIRSPACE ENTRY

The required equipment for RVSM listed above must be operating normally. Should any of this equipment fail prior entering the RVSM airspace, the crew must request a new clearance so as to avoid flight in this airspace.

The two primary altitude indications (PFD indication from onside ADR or ADR 3) should be checked to be in accordance with the instrument tolerances (3.04.34).

If only two ADR are operative, the altimeter indications on PFD and standby altimeters should be recorded. This information may be useful in case of subsequent PFD altitude discrepancy or loss of both remaining ADR.

WITHIN RVSM AIRSPACE

- Autopilot should be engaged within RVSM airspace for cruise and flight level changes.
- During cleared transitions between flight levels, the aircraft should not overshoot or undershoot the cleared flight levels by more than 150 feet.
- At intervals of approximately one hour, check that PFD altimeter indications agree in accordance with the instrument tolerances (3.04.34). The usual scan of flight deck instruments should be sufficient.
- R – Use the transponder and autopilot, associated with one of the ADR(s) that is within
- R tolerance.

POST FLIGHT

The crew must report any malfunction in the height-keeping systems including :

- the malfunction or the loss of any required equipment
 - altimeter readings outside the tolerances of 3.04.34,
- and provide sufficient details to enable maintenance to troubleshoot and repair the system.

ABN AND EMER PROCEDURES

When in RVSM airspace, the following contingencies which affect the ability to maintain the cleared flight level will be notified to ATC.

- failure of both autopilot,
- loss of altimeter system redundancy (only one PFD indication remaining),
- failure of any other equipment affecting the ability to maintain the cleared flight level, or
- encountering greater than moderate turbulence.

Note : *Appendix 5 of above mentioned JAA/FAA regulation contains detailed guidance for contingency procedures for North Atlantic airspace.*

If unable to notify ATC and obtain ATC clearance before deviating from the assigned cleared flight level, the crew should follow the established contingency procedure and obtain ATC clearance as soon as possible.

GENERAL

The aircraft navigation system required by regulation to fly within a Required Navigation Performance (RNP) airspace shall comply with RNAV functionality criteria and with navigation position accuracy and integrity criteria.

When referring to RNP-X, the value of X is the navigation accuracy expressed in NM, which has to be met with a probability of 95 %.

An RNP value can be associated with an airspace, a route, a SID, a STAR, a RNAV approach or an RNAV missed approach procedure.

Depending of the RNP value, and on the airspace environment (ground radio navaid), different navigation equipment may be necessary.

An operational approval from the airline's national authorities may be necessary.

NAVIGATION SYSTEM CAPABILITY (for reference only)

- R European BRNAV (RNP-5) and P-RNAV (RNP-1) capability meets the certification requirements of JAA TGL2 and TGL10.
- R RNP-10 capability in oceanic or remote areas complies with paragraph 12.b.(1) of FAA Notice 8400.12A or with paragraph 12.a. or 12.b.(5), if GPS is installed and is operative.
- R Navigation system with the GPS PRIMARY function (if GPS installed) meets the certification requirements of FAA AC 20-130A and TSO C 129A in class C1 (for navigation system with multiple sensor inputs including GPS).

RNP CAPABILITY

In order to match a given RNP value, the FMS-estimated position accuracy (also called Estimated Position Error) must be better than the RNP value. Obviously, this is dependent on the FMS navigation-updating mode (GPS, DME/DME, VORDME, or IRS).

On the MCDU PROG page the required and the estimated position accuracy are displayed and determine the HIGH/LOW accuracy indication (refer to FCOM 1.22.20).

The required accuracy can be the default value, which is a function of the flight phase, or a value manually-entered by the crew.

When flying in RNP environment, the crew can insert the appropriate RNP value in the REQUIRED ACCUR field of the PROG page.

- when HIGH is displayed, the RNP requirement is estimated to be fulfilled
- when LOW is displayed, the RNP requirement is estimated not to be fulfilled. In this case :

- crew crosscheck navigation with raw data if available,
- if the crosscheck is negative, or if raw data is not available, crew inform ATC

When leaving RNP environment, the crew will clear the manually entered required accuracy.

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS		2.04.51	P 2
	RNP		SEQ 105	REV 24

Without GPS PRIMARY function

RNP accuracy criteria are met, provided radio navaid coverage supports it for :

- RNP-1 en route and in the terminal area, provided a required accuracy of 1 NM(1) is checked or manually entered in the MCDU.
- RNP-0.3 in approach, provided a required accuracy of 0.3NM(1) is checked or, manually entered in the MCDU.

Note : (1) It is possible to enter the radial equivalent to the specified Crosstrack (XTK) accuracy, that is the RNP multiplied by 1.2, the EPE being an estimated radial position error.

With the GPS PRIMARY function

RNP requirements are met, provided GPS PRIMARY is available, for :

- RNP-1 en route
- RNP-0.5 in the terminal area, provided the AP or FD in NAV mode is used
- RNP-0.3 in approach, provided the AP or FD in NAV mode is used

BRNAV IN EUROPEAN AIRSPACE

In this airspace, radio navaid coverage is assumed to support RNP-5 accuracy.

The minimum required equipment to enter BRNAV airspace is :

- One RNAV system which means :
 - One FMGC
 - One MCDU
 - One VOR for FM navigation update
 - One DME for FM navigation update
 - One IRS
- Flight Plan Data on two NDs.

PROCEDURES

When GPS PRIMARY is not available, periodically crosscheck the FM position with the navaid raw data.

Manual selection of a required accuracy on the MCDU is optional.

- If manual entry of a required is desired, enter 5 Nm, or use the radial equivalent to 5NM XTK accuracy that is 6.1NM.

When leaving RNP-5 airspace, or when entering the terminal area, revert to the default required accuracy or enter the appropriate value on the MCDU.

- If one of the following MCDU or ECAM messages is displayed, check the navigation accuracy with navaid raw data or GPS MONITOR page (if GPS installed) :
 - NAV ACCUR DOWNGRAD
 - FMS1/FMS2 POS DIFF
 - CHECK IRS 1(2)(3)/FM POSITION
 - ECAM : FM/GPS POS DISAGREE (if GPS installed)
 - ECAM : FM/IR POS DISAGREE
- If accuracy check confirms that RNP-5 capability is lost or if both FMGC are failed : inform ATC and revert to conventional navigation.
- If accuracy check confirms that only one FMGC position is incorrect, resume navigation with the other FMGC.

In inertial navigation, the BRNAV capability is kept during 2 hours independently of the estimated accuracy displayed on MCDU.

RNP-10 IN OCEANIC OR REMOTE AREAS

In this kind of airspace the aircraft is expected to fly for a long period of time outside radio navaid coverage.

For aircraft without GPS the flight time outside radio navaid coverage is limited. According to FAA Notice 8400.12A this limitation is :

- 6.2 hours since IRS ground alignment, or
- 5.7 hours since last FM radio update.

There is no limitation for aircraft fitted with GPS.

Minimum required equipment to enter a RNP-10 airspace is :

- Two long range navigation systems, which means :
 - Two FMGC (or 1 FMGC + 1 BACK UP NAV)
 - Two MCDU
 - One GPS if required by flight time outside radio navaid coverage
 - Two IRS

Refer also to Regional Supplementary Procedures of ICAO Doc 7030 for specific requirements in a particular airspace.

PROCEDURES

The manual selection of a required accuracy on MCDU is optional.

- If manual entry of a required accuracy is desired, enter 10NM or use the radial equivalent to 10NM XTK accuracy that is 12.2NM.

 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS RNP	2.04.51	P 4
		SEQ 105	REV 24

When leaving RNP-10 airspace, revert to the default required accuracy or enter the appropriate value.

- If one of the following MCDU or ECAM messages is displayed, check navigation with POSITION MONITOR page, IRS MONITOR pages and GPS MONITOR page (if GPS installed),
 - FMS1/FMS2 POS DIFF
 - CHECK IRS 1(2)(3)/FM POSITION
 - ECAM : FM/GPS POS DISAGREE (if GPS installed)
 - ECAM : FM/IR POS DISAGREE
- Use the AP, with the navigation system checked correct.
- If unable to determine which system is correct, inform the ATC and look for navaid raw data confirmation as soon as possible.

R In inertial navigation, RNP-10 capability is maintained for 5.7 hours, since the last radio
R update the (according to FAA Notice 8400.12A), independently of the estimated accuracy displayed on MCDU.

R **P-RNAV FOR EUROPEAN TERMINAL PROCEDURES**

R For terminal procedures requiring P-RNAV capability within European airspace, radio navaid
R coverage can be assumed to support the RNP-1 accuracy.

R The minimum required equipment to fly a P-RNAV procedure is :

- One RNAV system, which means :

- R · One FMGC
- R · One MCDU
- R · One VOR or GPS receiver for FM navigation update
- R · One DME or GPS receiver for FM navigation update
- R · One IRS
- R · One FD in NAV mode

- R – Flight Plan data for two NDs.

R For terminal procedures with legs below the MSA, or without appropriate radar coverage,
R two RNAV systems may be mandated by the procedure chart.

R **PROCEDURES**

R When GPS PRIMARY is not available, crosscheck the FM position with the navaid raw
R data, prior to starting the procedure.

R The terminal procedure (RNAV SID, RNAV STAR, RNAV TRANSITION, ...) must be loaded
R from the FM navigation database and checked for reasonableness, by comparing the F-PLN
R page waypoint sequencing, tracks, distances and altitude constraints with the procedure
R chart.

R The procedure, as loaded from the navigation database should not be modified unless
R instructed to do so by the ATC (DIR TO., HDG to intercept the F-PLN, insertion of waypoints
R loaded from the navigation database).

R If GPS PRIMARY is not available, check or enter RNP-1 in the MCDU and check HIGH
R accuracy.

 A340 FLIGHT CREW OPERATING MANUAL	SPECIAL OPERATIONS RNP	2.04.51	P 5
		SEQ 105	REV 24

When leaving the terminal procedure, revert to the default or enter the appropriate value on the MCDU.

- If one of the following messages is displayed, check navigation accuracy with navaid raw data or the GPS monitor page (if GPS is installed),
 - NAV ACCUR DOWNGRAD
 - FMS1/FMS2 POS DIFF
 - CHECK IRS 1(2)(3)/FM POSITION
 - ECAM : FM/GPS DISAGREE (if GPS installed)
 - ECAM : FM/IR POS DISAGREE
- If the accuracy check confirms that RNP-1 is lost, or if both FMGC are failed : Inform the ATC and revert to conventional navigation.
- If the accuracy check confirms that only one FMGC position is incorrect, resume navigation with the other system.

	05.00	CONTENTS	
	05.10	GENERAL	
		– INTRODUCTION	1
		– MINIMUM RECOMMENDED FUEL REQUIREMENTS	2
		– FLIGHT PLAN	3
	05.15	CALCULATION TABLES	
	05.20	CRUISE LEVEL	
		– CLIMB CEILING	1
		– OPTIMUM AND MAXIMUM ALTITUDES	3
		– OPTIMUM ALTITUDE ON SHORT STAGE	6
	05.30	INTEGRATED CRUISE	
		– GENERAL	1
		– INTEGRATED CRUISE M.80	2
		– INTEGRATED CRUISE M.82	5
		– INTEGRATED CRUISE M.84	8
		– INTEGRATED CRUISE LR SPEED	11
		– CLIMB CORRECTION	45
R		– STEP CLIMB CORRECTION	45
		– DESCENT CORRECTION	46
	05.40	QUICK DETERMINATION OF FLIGHT PLANNING	
		– INTRODUCTION	1
		– CORRECTION FOR DEVIATION FROM REFERENCE LANDING WEIGHT	1
		– EXAMPLE	1
		– FLIGHT PLANNING M.80	3
		– FLIGHT PLANNING M.82	7
		– FLIGHT PLANNING M.84	11
		– FLIGHT PLANNING LR SPEED	15

05.50	ALTERNATE	
	– GENERAL	1
	– CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT . . .	1
05.60	GROUND DISTANCE/AIR DISTANCE CONVERSION	
05.70	FUEL TANKERING	

 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING GENERAL	2.05.10	P 1
		SEQ 001	REV 19

INTRODUCTION

Use this flight planning chapter when no precalculated flight plan is available.

It contains the following general graphs and tables :

- R
- Climb ceilings at 300 feet/minute for M.78, M.80, M.82, M.84
 - Maximum and optimum cruise altitudes for M.80, M.82, M.84 and long range speed
 - Optimum altitude on short stage
 - Ground distance to air distance conversion for M.80, M.82, M.84 and long range speed.

The integrated range method includes the following tables :

- Integrated cruise tables for M.80, M.82, M.84 and long range speed at optimum FL
- Integrated cruise tables for long range speed for FL100 up to FL410
- Climb, step climb and descent correction tables

These tables allow the flight planning to be done segment by segment.

Chapter 2.05.15 contains calculation tables and a comprehensive example to show how to use them.

The quick determination method is shown in chapter 2.05.40 for M.80, M.82, M.84 and long range speed.

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.10	P 2
	GENERAL		SEQ 001	REV 10

MINIMUM RECOMMENDED FUEL REQUIREMENTS

The total fuel quantity required to fly a given sector is the sum of the following quantities:

TAXI FUEL

- R Quantity required for startup and taxi. Fuel calculation is based on a consumption of
25 kg/min or **55 lb/min**
Average quantity (12 minutes) → **300 kg** or **660 lb**

TRIP FUEL

- Fuel required from departure to destination includes the following quantities :
- R – Takeoff and climb at selected speed.
– Cruise at selected speed.
– Descent from cruising level to 1500 feet above destination airport.
- R – Approach and landing. Fuel calculation is based on a consumption of
55 kg/min or **120 lb/min**.
Average quantity (6 minute IFR) → **330 kg** or **720 lb**

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.10	P 3
	GENERAL		SEQ 001	REV 10

RESERVE FUEL

This quantity includes :

- R **“En Route” reserve fuel (contingency fuel)**
- According to national regulations and company policy (generally based on a percentage of trip fuel).

Alternate fuel

- Fuel required to fly from destination to alternate airport.
- It includes go-around **600 kg** or **1300 lb** , climb to cruising level, cruise at long range speed, descent and approach procedure.
- R **220 kg or 490 lb for 4 minute VFR**

Holding Fuel

- R Calculation of holding fuel should take into account the altitude of the alternate and the landing weight at the alternate, using holding charts of chapter 3.05.25.
- R A conservative quantity corresponding to 30 minutes holding at 1500 feet above alternate airport elevation at green dot speed in the clean configuration is
- R **2800 kg** or **6200 lb** .

APU FUEL

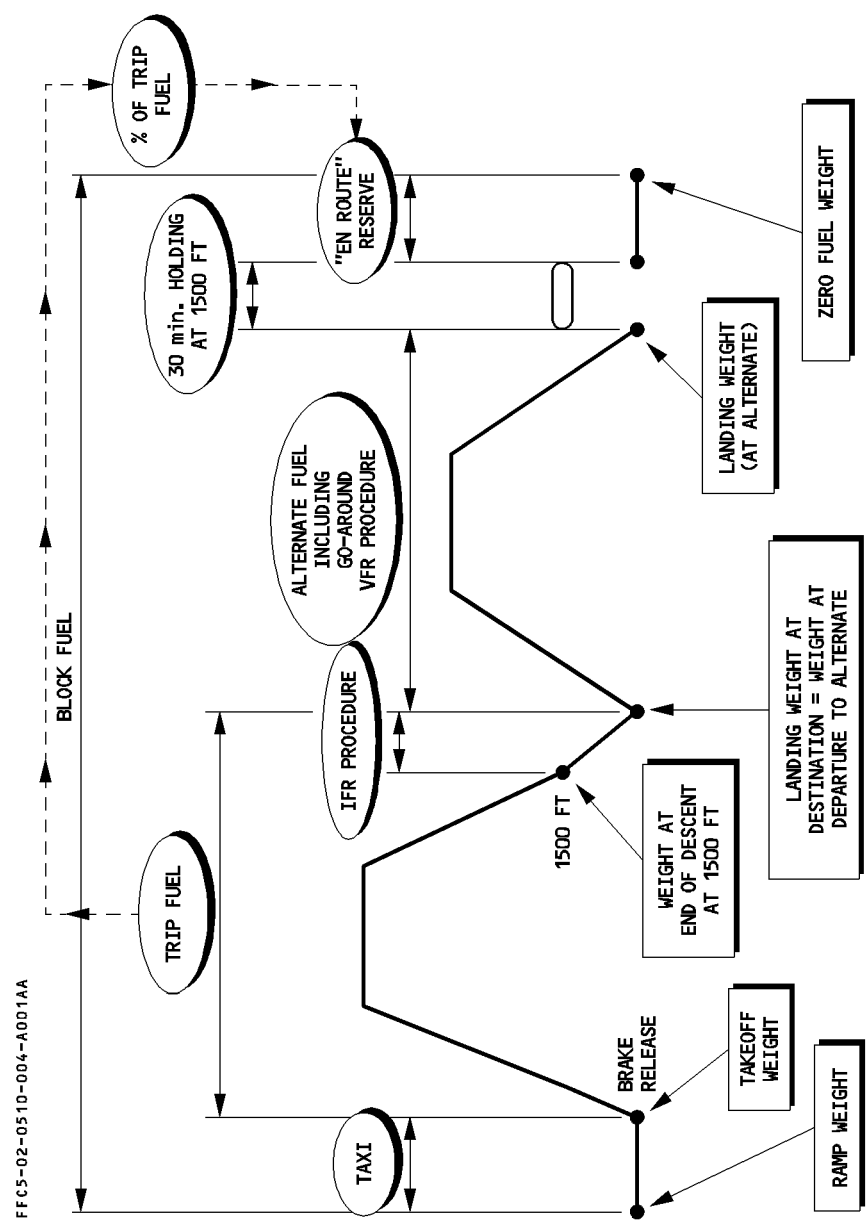
- During ground operations, the APU fuel consumption is about :
200 kg/h (440 lb/h) Packs on and APU Gen on.
140 Kg/h (310 lb/h) APU Gen only.
- In flight, APU fuel consumption is about :
130 kg/h (290 lb/h) at FL200 Packs on and APU Gen on
65 kg/h (140 lb/h) at FL300 APU Gen only.
55 kg/h (120 lb/h) at FL410 APU Gen only.

FLIGHT PLAN

When no precalculated flight plan is available, flight planning can be determined by using the tables given in this chapter.

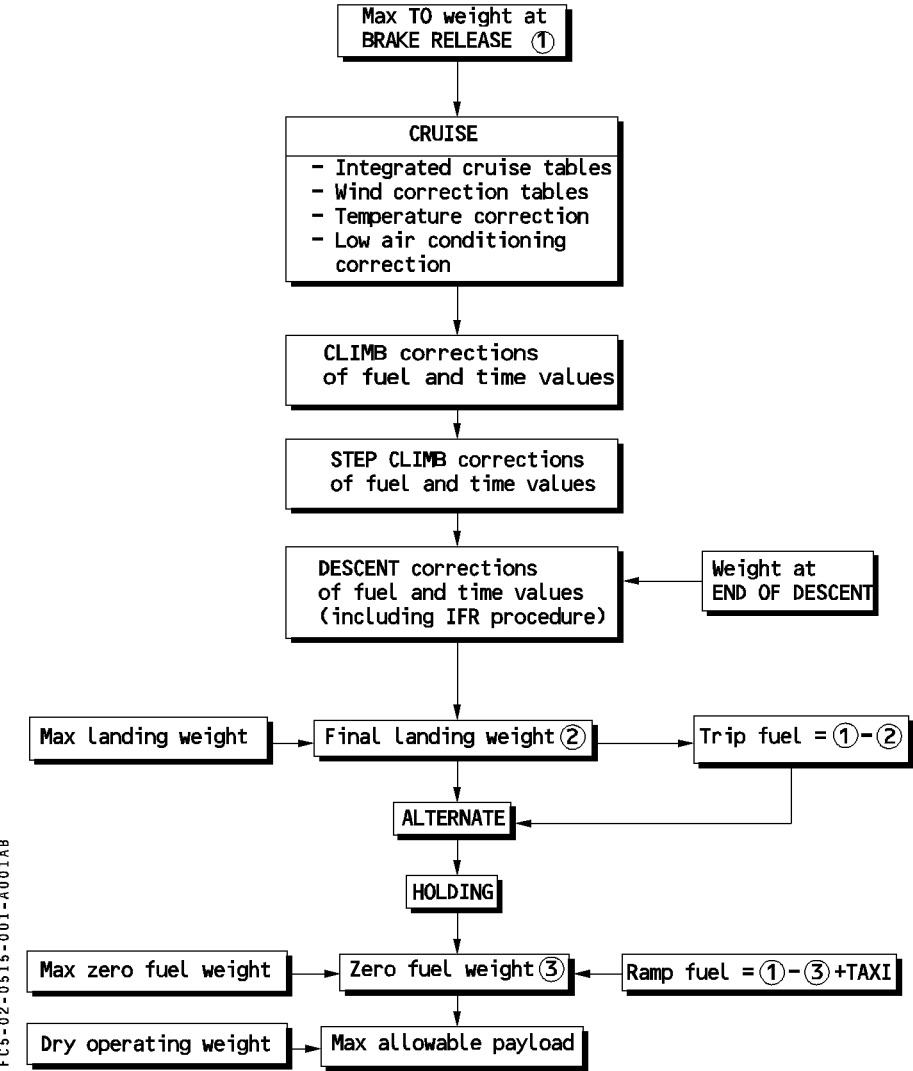
Fuel policy will be the same as for precalculated flight plan.

- R The graph on the following page defines the different terms used in this chapter.



FFC5-02-0510-004-A001AA

GENERAL



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 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.15	P 2
	CALCULATION TABLES		SEQ 001	REV 10

The following tables can be used for the flight planning.

R The first table allows the planner to calculate fuel and time during cruise including up to two step climbs (see p3).

R The second table shows the fuel and time planning for the whole flight plan (see p4).

R At the end of the section an example shows how to use both tables for a given mission.

R

R Note : – Differences in fuel consumption during step climb sections will be taken into account in the calculation table of page 4.

R – To find optimum aircraft weight to proceed to next flight level (4000 feet step) (Refer to 2.05.20 p3).

R – Integrated cruise tables are established for ISA in conditions only. Corrections due to differences from ISA temperature are included in the calculation table of page 4.

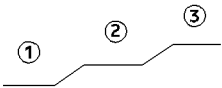
R – Overhead departure weight is assumed to be equal to weight at brake release.

R – Overhead destination weight must be entered in the calculation table of page 4.

CALCULATION TABLE

MACHNUMBER	
INITIAL FLIGHT LEVEL:	
GROUND DISTANCE:	
WIND ('-' HEAD/'+' TAIL):	
AIR DISTANCE:	

FLIGHT PROFILE



FL:

OVERHEAD DEPARTURE	START OF FIRST STEP CLIMB	1
WEIGHT:	WEIGHT:	FUEL:
DISTANCE:	DISTANCE:	DISTANCE:
TIME:	TIME:	TIME:
		REMAINING DISTANCE:

FL:

BEGIN OF SECOND CRUISE SEGMENT	START OF SECOND STEP CLIMB	2
WEIGHT:	WEIGHT:	FUEL:
DISTANCE:	DISTANCE:	DISTANCE:
TIME:	TIME:	TIME:
		REMAINING DISTANCE:

FL:

BEGIN OF FINAL CRUISE SEGMENT	OVERHEAD DESTINATION	3
WEIGHT:	WEIGHT:	FUEL:
DISTANCE:	DISTANCE:	DISTANCE:
TIME:	TIME:	TIME:
		REMAINING DISTANCE = 0 NM

REMAINING DISTANCE:

TOTAL VALUES	
WEIGHT OVERHEAD DEPARTURE:	
WEIGHT OVERHEAD DESTINATION:	
FUEL:	
TIME:	

FFC5-02-0515-003-A001AA

1	(1) Max TO Weight at BRAKE RELEASE	►				•	
2	WEIGHT Overhead Destination	►				•	
3	– Temperature Correction for CRUISE	–				•	
4	+ Correction for Air Conditioning (+ for LO, – for HI)	+				•	
5	– CLIMB correction	–				•	
6	+ TO Altitude correction	+				•	
7	– STEP CLIMB correction	–				•	
8	= Corrected Weight Overhead Destination	=				•	
9	+ DESCENT correction (including 6 min IFR)	+				•	
10	(2) Landing Weight at Destination	=				•	
11	– ALTERNATE Fuel	–				•	
12	= ALTERNATE Landing Weight	=				•	
13	– HOLDING	–				•	
14	= Weight at END OF HOLDING	=				•	
15	TRIP FUEL (1) – (2)				•		//////////
16	– “En Route” Reserve	–				•	
17	(3) ZERO FUEL WEIGHT	=				•	
18	– OPERATING WEIGHT EMPTY	–				•	
19	= Max Allowable Payload	=				•	

BLOCK FUEL CALCULATION

20	Required Fuel (1) – (3)	►				•	
21	+ Taxi	+				•	
22	= Block Fuel	=				•	

FLIGHT TIME CALCULATION (H. MIN)

23	Time from integrated Cruise Tables	►				•	
24	+ CLIMB Correction	+				•	
25	+ DESCENT Correction (including 6 min IFR)	+				•	
26	= Flight Time	=				•	

Note : Line 3 : temperature correction :

R $0.015 \text{ (kg/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$ or
R $0.033 \text{ (lb/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$

R Line 6 : TO altitude correction :

R $0.5 \text{ (kg/1000 kg/1000 ft)} \times \text{TOW (1000 kg)} \times \text{airport elevation (1000 ft)}$ or
R $0.5 \text{ (lb/1000 lb/1000 ft)} \times \text{TOW (1000 lb)} \times \text{airport elevation (1000 ft)}$

R Line 10 : Check that landing weight at destination is lower than maximum landing weight.

R Line 17 : Check that the zero fuel weight is lower than maximum zero fuel weight.

Line 22 : Check that the block fuel value is lower than maximum tank capacity.

Example

DATA

- TO weight : 225000 kg
- Ground distance to destination : 5000 NM
- Wind : – 40 kt (head wind)
- Selected initial FL : 330
- Long range cruise
- Temperature : ISA + 10

DETERMINATION OF CRUISE FUEL AND TIME

- A : Enter the chosen flight Mach number and flight level, ground distance to be covered and forecast windspeed in the calculation table of page 7.
Calculate the air distance (Refer to 2.05.60)
here : long range speed, 40 kt head wind, 5000 NM ground distance
→ air distance : 5485 NM

CRUISE TABLE FL330

- B : Read from integrated cruise table (long range speed, FL330) the values for time and distance for a weight of 225000 kg (Refer to 2.05.30 p34)
→ distance : 7812 NM → time : 1066 min.

- C : Read from 2.05.20 p3 the value for the optimum aircraft weight to proceed to FL370
→ 214000 kg

- D : Enter integrated cruise table and read the values for a weight of 214000 kg (begin of first step climb)
→ distance : 7036 NM → time : 966 min.

- E : Calculate the values for the first cruise segment
Fuel : 225000 – 214000 = 11000 kg

- R Distance : 7812 – 7036 = 776 NM

- Time : 1066 – 966 = 100 min

- R Remaining distance : 5485 – 776 = 4709 NM

CRUISE TABLE FL370

- F : Read from integrated cruise table (long range speed, FL370) the values for time and distance for the weight of 214000 kg (Refer to 2.05.30 p39)
→ distance : 7419 NM → time : 984 min.

- G : The optimum aircraft weight to proceed to FL410 is 177000 kg. Read from integrated cruise table the values for time and distance for the weight of 177000 kg.
→ distance : 4471 NM → time : 603 min.

- H : Calculate the values for the second cruise segment
Fuel : 214000 – 177000 = 37000 kg

- Distance : 7419 – 4471 = 2948 NM

- Time : 984 – 603 = 381 min

- R Remaining distance : 4709 – 2948 = 1761 NM

CRUISE TABLE FL410

I : Proceed to final table ; enter distance and time values corresponding to an aircraft weight of 177000 kg at FL410 and long range speed (Refer to 2.05.30 p44).

→ distance : 4692 NM → time : 606 min

R J : Subtract remaining distance : $4692 - 1761 = 2931$ NM

K : Interpolate in integrated cruise table weight and time values corresponding to a distance of 2931 NM (Refer to 2.05.30 p43)

R → weight : 158000 kg → time : 381 min

L : Calculate values for last cruise segment :

Fuel : $177000 - 158000 = 19000$ kg

R Distance : $4692 - 2931 = 1761$ NM

Time : $606 - 381 = 225$ min

Crosscheck that remaining distance equals zero.

M : Fill in the final table with weight overhead departure (225000 kg) and weight overhead destination (158000 kg).

N : Calculate total values

Fuel : $225000 - 158000 = 67000$ kg

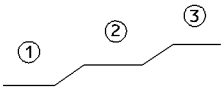
Time : $100 + 381 + 225 = 706$ min = 11 h 46 min

R

CALCULATION TABLE

MACHNUMBER	LRC
INITIAL FLIGHT LEVEL:	FL330
GROUND DISTANCE:	5000 NM
WIND ('-' HEAD/'+' TAIL):	-40 KT
AIR DISTANCE:	5485 NM

FLIGHT PROFILE



FL: 330

OVERHEAD DEPARTURE	START OF FIRST STEP CLIMB	1
WEIGHT: 225 000 Kg	WEIGHT: 214 000 Kg	FUEL: 11 000 Kg
DISTANCE: 7812 NM	DISTANCE: 7036 NM	DISTANCE: 776 NM
TIME: 1066 min	TIME: 966 min	TIME: 100 min
		REMAINING DISTANCE: 4709 NM

FL: 370

BEGIN OF SECOND CRUISE SEGMENT	START OF SECOND STEP CLIMB	2
WEIGHT: 214 000 Kg	WEIGHT: 177 000 Kg	FUEL: 37 000 Kg
DISTANCE: 7419 NM	DISTANCE: 4471 NM	DISTANCE: 2948 NM
TIME: 984 min	TIME: 603 min	TIME: 381 min
		REMAINING DISTANCE: 1761 NM

FL: 410

BEGIN OF FINAL CRUISE SEGMENT	OVERHEAD DESTINATION	3
WEIGHT: 177 000 Kg	WEIGHT: 158 000 Kg	FUEL: 19 000 Kg
DISTANCE: 4692 NM	DISTANCE: 2931 NM	DISTANCE: 1761 NM
TIME: 606 min	TIME: 381 min	TIME: 225 min
		REMAINING DISTANCE = 0 NM

REMAINING DISTANCE: 1761 NM

TOTAL VALUES	
WEIGHT OVERHEAD DEPARTURE:	225 000 Kg
WEIGHT OVERHEAD DESTINATION:	158 000 Kg
FUEL:	67 000 Kg
TIME:	706 min

FFC5-02-0515-007-A150AA

 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.15	P 8
	CALCULATION TABLES		SEQ 150	REV 19

DATA : – TO weight : 225 000 kg
– Ground distance to destination 5000 NM
– Wind : – 40 kt (headwind)
– Selected first flight level : FL330
– Long range speed
– Temperature : ISA + 10 along the whole flight profile
– Airport elevation : 1500 ft
– Normal air conditioning

STEPS

- 1 : Fill in Max TO weight → 225 000 kg
- 2 : Enter the integrated cruise table corresponding to chosen FL with TO weight at brake release point and calculate weight overhead destination (see 2.05.15 p7)
Fill in → 158 000 kg.
- 3 : Apply temperature correction for given air distance
 $5485 \text{ NM} \times 10^{\circ}\text{C} \times 0.015 \text{ kg}/^{\circ}\text{C}/\text{NM} = 823 \text{ kg}$
- 4 : Correction for air conditioning → here = 0
- 5 : Subtract climb correction for chosen FL (See 2.05.30 p45) → 3000 kg
- 6 : Add TO altitude correction $0.5 \times 225 \times 1.5 = 169 \text{ kg}$
- R 7 : Subtract value for step climb correction (see 2.05.30 p45) $2 \times 200 = 400 \text{ kg}$
- R 8 : Calculate corrected weight overhead destination → 153 800 kg
- 9 : Enter weight overhead destination and find descent correction (including 6 min IFR) (See 2.05.30 p46) → 300 kg
- R 10 : Calculate landing weight at destination → 154 100 kg
- R 11 : Subtract alternate fuel e.g. 140 NM at FL120
(see 2.05.50 p2) → 3265 kg
- R Landing weight at alternate $154\ 100 - 3265 = 150\ 835 \text{ kg}$
- R Correction due to deviation from reference landing weight at alternate (see 2.05.50 p2) $(150.9 - 150) \times 7 = 6.3 \text{ kg}$
- R Corrected alternate fuel $3265 + 7 = 3272 \text{ kg}$
- R 12 : Calculate alternate landing weight → 150 800 kg
- 13 : Subtract holding fuel : (Refer to 2.05.10 p3) → 2800 kg
- R 14 : Calculate weight at end of holding → 148 000 kg
- R 15 : Calculate trip fuel → 70 900 kg
- R 16 : Subtract "en route" reserve (standard amount is 5 % of trip fuel → 3545 kg)
- R 17 : Calculate zero fuel weight → 144 400 kg
- 18–19 : Subtract dry operating weight to obtain maximum allowable payload
- 20–22 : Calculate block fuel
- 23–26 : Calculate flight time

R

1	(1) Max TO Weight at BRAKE RELEASE	►	2	2	5	•	0
2	WEIGHT Overhead Destination	►	1	5	8	•	0
3	– Temperature Correction for CRUISE	–			0	•	9
4	+ Correction for Air Conditioning	+			0	•	0
5	– CLIMB correction	–			3	•	0
6	+ TO Altitude correction	+			0	•	1
7	– STEP CLIMB correction	–			0	•	4
8	= Corrected Weight Overhead Destination	=	1	5	3	•	8
9	+ DESCENT correction (including 6 min IFR)	+			0	•	3
10	(2) Landing Weight at Destination	=	1	5	4	•	1
11	– ALTERNATE Fuel	–			3	•	3
12	= ALTERNATE Landing Weight	=	1	5	0	•	8
13	– HOLDING	–			2	•	8
14	= Weight at END OF HOLDING	=	1	4	8	•	0
15	TRIP FUEL (1) – (2)		7	0	•	9	//////////
16	– “En Route” Reserve	–			3	•	6
17	(3) ZERO FUEL WEIGHT	=	1	4	4	•	4
18	– OPERATING WEIGHT EMPTY	–	1	2	7	•	0
19	= Max Allowable Payload	=		1	7	•	4

R

BLOCK FUEL CALCULATION							
20	Required Fuel (1) – (3)	►		8	0	•	6
21	+ Taxi	+			0	•	3
22	= Block Fuel	=		8	0	•	9

R

FLIGHT TIME CALCULATION (H. MIN)							
23	Time from integrated Cruise Tables	►	1	1	•	4	6
24	+ CLIMB Correction	+		0	•	0	6
25	+ DESCENT Correction (including 6 min IFR)	+		0	•	1	1
26	= Flight Time	=	1	2	•	0	3

Note : Line 3 : temperature correction :

$$0.015 \text{ (kg/}^{\circ}\text{C/NM)} \times \text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$$

Line 6 : TO altitude correction :

$$0.5 \text{ (kg/1000 kg/1000 ft)} \times \text{TOW (1000 kg)} \times \text{airport elevation (1000 ft)}$$

Line 10 : Check that landing weight at destination is lower than maximum landing weight.

Line 17 : Check that the zero fuel weight is lower than maximum zero fuel weight

Line 22 : Check that the block fuel value is lower than maximum tank capacity.

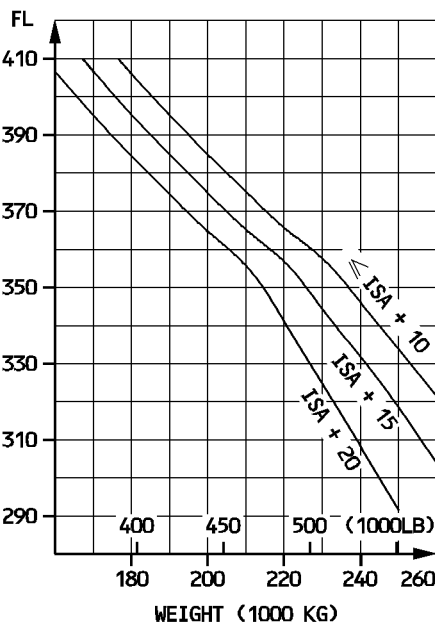
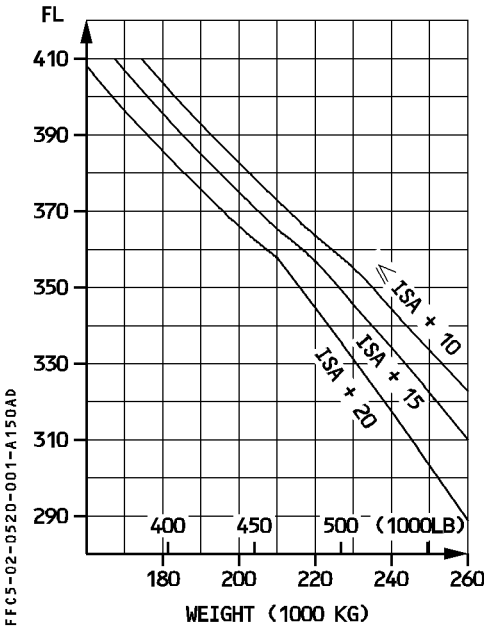
CLIMB CEILING

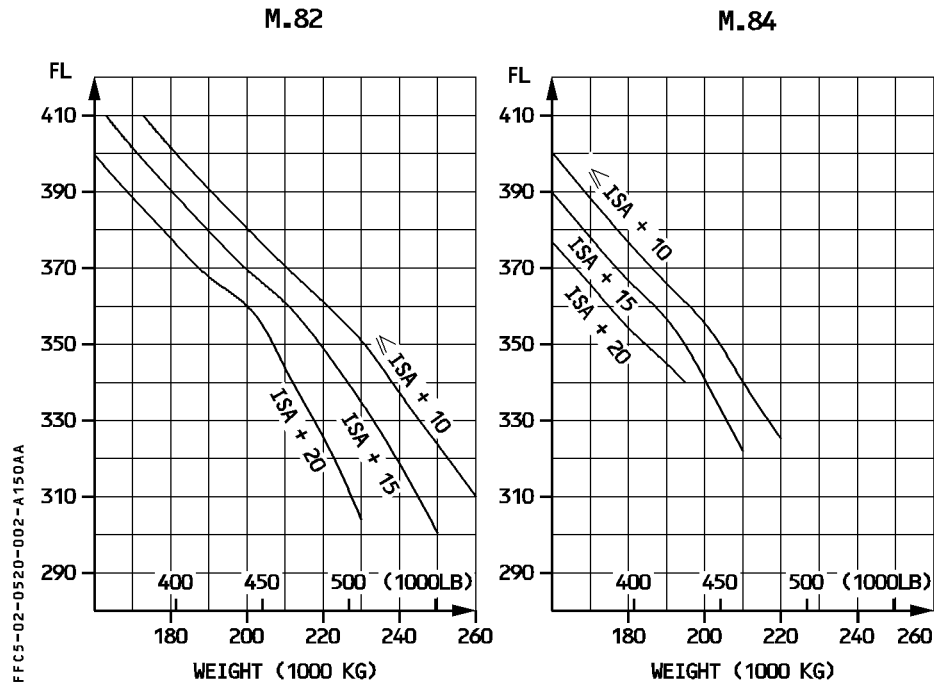
R A minimum climb rate of 300 feet/minute is usually used to define the climb ceiling. The following graphs show for M.78, M.80, M.82, M.84 the flight levels that can be reached with a minimum rate of climb of 300 feet/minute.

R

M.78

M.80





BLEED CORRECTIONS

R

	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PACK FLOW HI AND/OR CARGO COOL ON
≤ ISA + 4	– 100 FT	– 250 FT	– 300 FT
ISA + 20	– 2000 FT	– 2500 FT	– 900 FT

OPTIMUM AND MAXIMUM ALTITUDES

DEFINITIONS

- Optimum altitude : the altitude at which the airplane covers the maximum distance per kilogram of fuel (best specific range). It depends on the actual weight and the deviation from ISA.
- Maximum altitude : Maximum altitude which can be flown in level flight without acceleration at maximum cruise thrust.

Note : Definition of the maximum altitude in the FMGC is different (Refer to FCOM 4).

CRUISE LEVEL CHARTS

These charts have been established for a center of gravity at 37 % MAC.
Maximum and optimum altitudes are given for different temperatures at long range speed, M.80, M.82 and M.84.

- Note :*
1. Optimum and maximum altitudes curves do not cover for M.80, M.82 and M.84 the whole weight range because above a given weight these Mach numbers cannot be maintained, whatever the altitude.
 2. The $n = 1.3g$ ($n = 1.4g$) curve indicates the buffet margin.

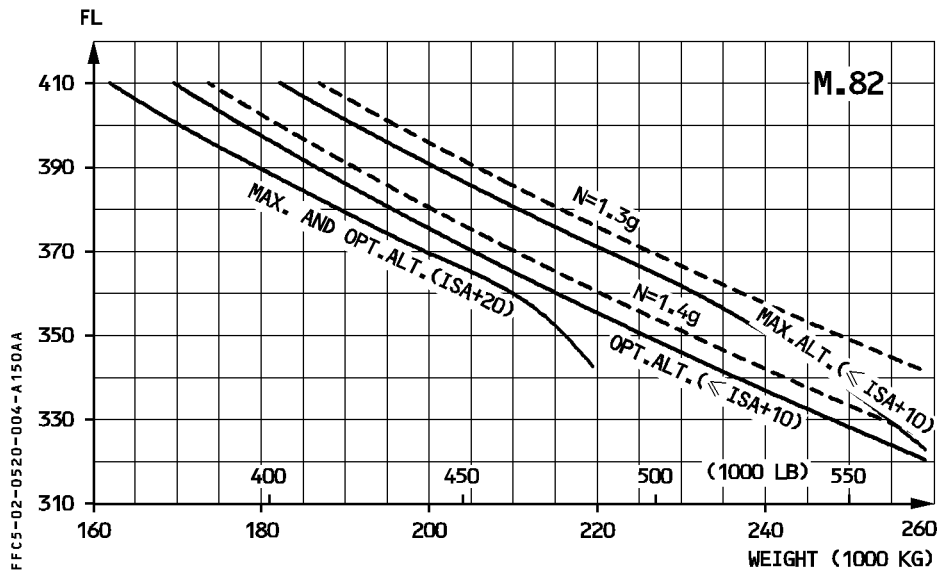
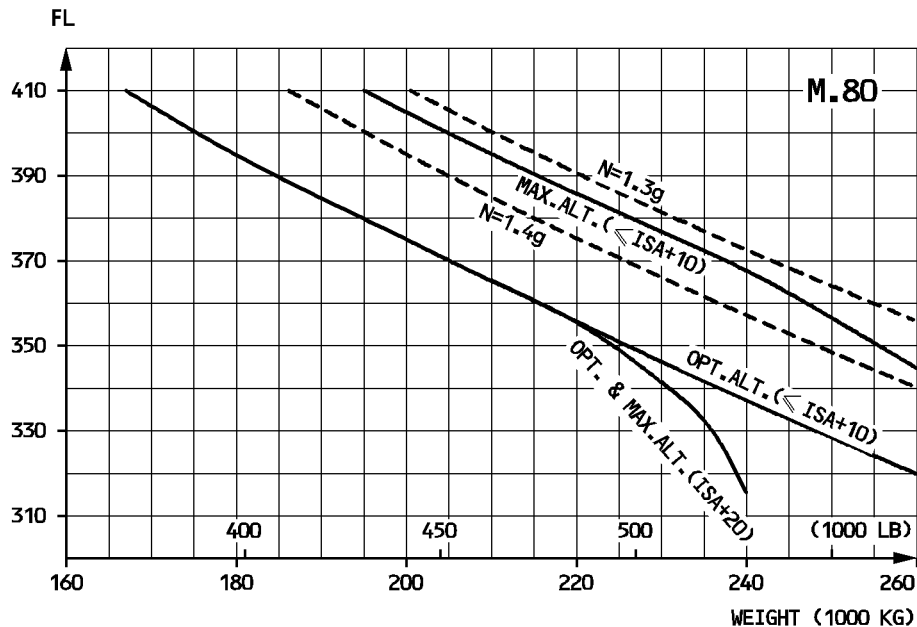
OPTIMUM WEIGHT FOR 4000 FEET STEP CLIMB

R

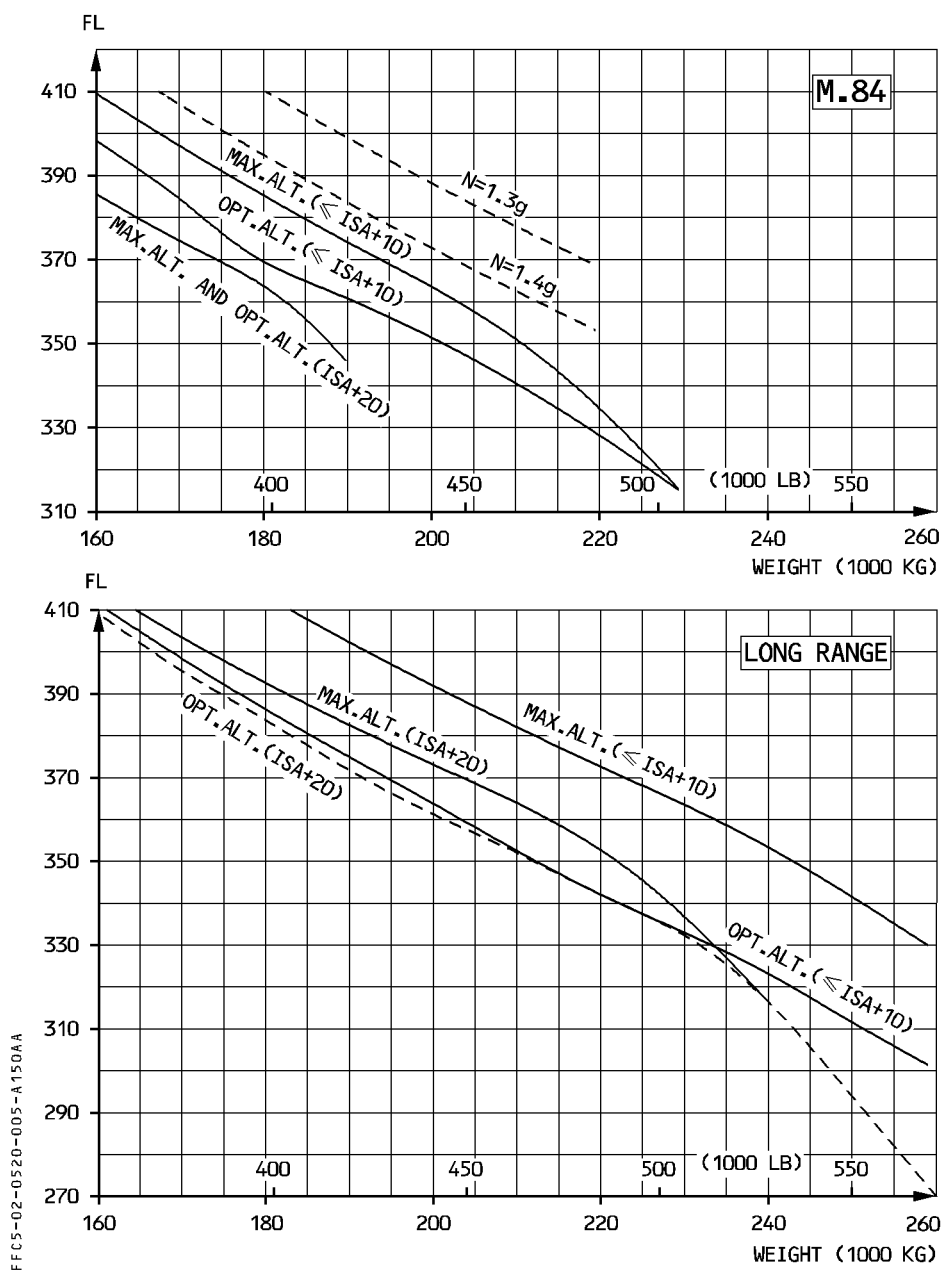
STEP CLIMB FROM/TO	WEIGHT (1000 KG)											
	≤ ISA + 10				ISA + 15				ISA + 20			
	LR	M.80	M.82	M.84	LR	M.80	M.82	M.84	LR	M.80	M.82	M.84
310/350	233	238	232	206	227	227	220	196	215	215	207	183
330/370	214	217	212	188	206	206	201	179	195	195	189	168
350/390	194	196	192	170	186	186	181	162	175	175	169	150
370/410	177	177	174	154	168	168	164	146	158	158	153	135

BLEED CORRECTIONS

	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PACK FLOW HI AND/OR CARGO COOL ON
≤ ISA + 4	–	– 100 FT	– 200 FT
ISA + 20	– 1400 FT	– 1600 FT	– 300 FT



FFC5-02-0520-004-A150AA



OPTIMUM ALTITUDE ON SHORT STAGE

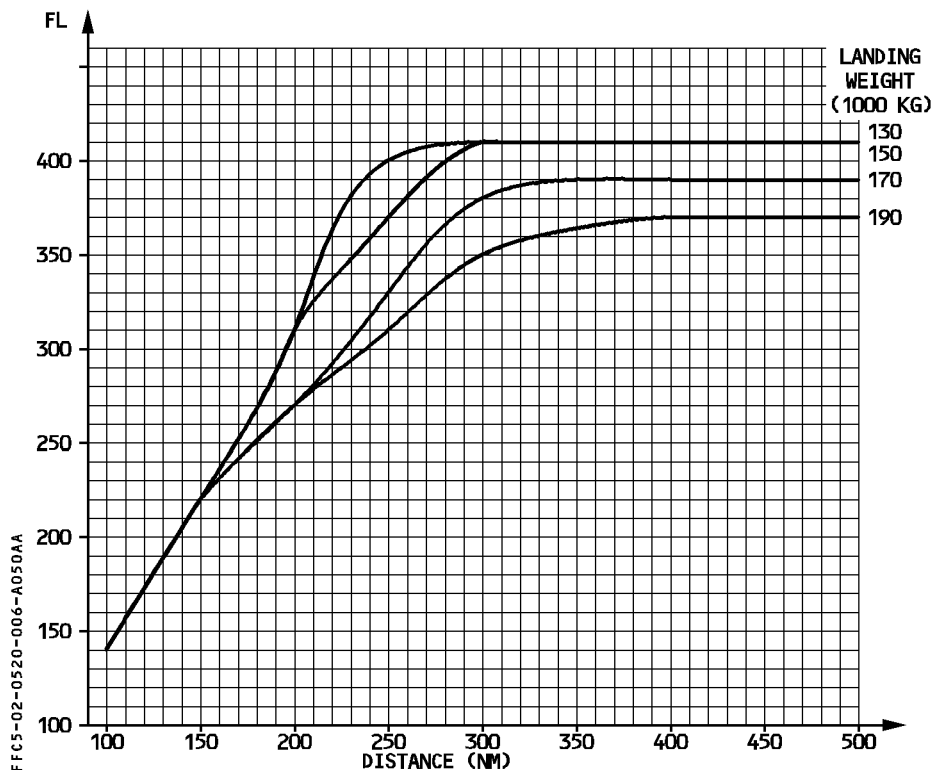
According to the air distance (from brake release point to landing), the cruise flight level is limited by the distance required to perform climb and descent. The graph determines the optimum altitude.

It includes the following profiles :

- Takeoff
- Climb : 250kt/300kt/M.78
- Long range cruise (during at least 5 minutes)
- Descent : M.80/300kt/250kt
- Approach and landing

and it is established for :

- ISA
- CG = 37 %
- Normal air conditioning
- Anti ice OFF



 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING INTEGRATED CRUISE	2.05.30	P 1
		SEQ 001	REV 10

GENERAL

- R Integrated cruise tables allow the planner to calculate the cruise fuel consumption and the
R cruise time required to cover a given air distance.
In the tables, the difference between two gross weights represents the fuel consumption.
The difference between the corresponding distances and times respectively represents the
cruise distance covered and the cruise time for this fuel consumption.
- R Integrated cruise tables are established for M.80, M.82, M.84 and long range speed at
R optimum level (with 4000 feet step climb) and for long range speed at fixed levels from
R FL100 to FL410.
Corrections are given on separate tables to allow for step climbs and to take into account
the climb and the descent phases.

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG=37.0%DISTANCE
(NM)
TIME (MIN)

M.80 OPT FL

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	443 58	465 61	487 64	508 66	530 69	552 72	574 75	596 78	618 81	640 84	459
136	661 86	683 89	705 92	727 95	748 98	770 101	792 104	813 106	835 109	857 112	459
138	878 115	900 118	922 121	943 123	965 126	986 129	1008 132	1029 135	1051 137	1072 140	459
140	1094 143	1115 146	1136 149	1158 151	1179 154	1201 157	1222 160	1243 163	1264 165	1286 168	459
142	1307 171	1328 174	1349 176	1371 179	1392 182	1413 185	1434 188	1455 190	1476 193	1498 196	459
144	1519 199	1540 201	1561 204	1582 207	1603 210	1624 212	1645 215	1666 218	1687 221	1708 223	459
146	1729 226	1749 229	1770 231	1791 234	1812 237	1833 240	1854 242	1874 245	1895 248	1916 251	459
148	1937 253	1957 256	1978 259	1998 261	2019 264	2040 267	2060 269	2081 272	2102 275	2122 277	459
150	2143 280	2163 283	2184 286	2204 288	2225 291	2245 294	2265 296	2286 299	2306 302	2327 304	459
152	2347 307	2367 310	2388 312	2408 315	2428 317	2448 320	2469 323	2489 325	2509 328	2529 331	459
154	2549 333	2569 336	2590 339	2610 341	2630 344	2650 346	2670 349	2690 352	2710 354	2730 357	459
156	2750 360	2770 362	2790 365	2809 367	2829 370	2849 373	2869 375	2889 378	2909 380	2928 383	459
158	2948 386	2968 388	2988 391	3007 393	3027 396	3047 398	3066 401	3086 404	3106 406	3125 409	459
160	3145 411	3164 414	3184 416	3203 419	3223 421	3242 424	3262 427	3281 429	3301 432	3320 434	459
162	3339 437	3359 439	3378 442	3397 444	3417 447	3436 449	3455 452	3474 454	3493 457	3513 459	459
164	3532 462	3551 464	3570 467	3589 469	3608 472	3627 474	3646 477	3665 479	3684 482	3703 484	459
166	3722 487	3741 489	3760 492	3779 494	3797 497	3816 499	3835 501	3854 504	3872 506	3891 509	459
168	3910 511	3929 514	3947 516	3966 519	3984 521	4003 523	4022 526	4040 528	4059 531	4077 533	459
170	4096 536	4114 538	4133 540	4151 543	4169 545	4188 548	4206 550	4224 552	4242 555	4261 557	459
172	4279 560	4297 562	4315 564	4334 567	4352 569	4369 571	4384 573	4399 575	4417 578	4435 580	459
174	4453 582	4471 585	4489 587	4507 589	4525 592	4543 594	4561 596	4579 599	4597 601	4614 603	459
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON			TOTAL ANTI-ICE ON		
△ FUEL = -0.5 %			△FUEL = +1.0 %			△ FUEL = +2.0 %			△ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000C5KG370 0 018590 0 1 1.0 .0 00 0 01 .800 .000 .000 0 FCOM-G0-02-05-30-002-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		M.80 OPT FL			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4632 606	4650 608	4668 610	4686 613	4703 615	4721 617	4739 620	4757 622	4774 624	4792 627	459
178	4810 629	4827 631	4845 634	4863 636	4880 638	4898 640	4915 643	4933 645	4950 647	4968 650	459
180	4985 652	5003 654	5020 656	5038 659	5055 661	5073 663	5090 666	5107 668	5125 670	5142 672	459
182	5159 675	5177 677	5194 679	5211 681	5228 684	5246 686	5263 688	5280 690	5297 693	5314 695	459
184	5331 697	5348 699	5365 702	5382 704	5400 706	5417 708	5434 710	5451 713	5467 715	5484 717	459
186	5501 719	5518 722	5535 724	5552 726	5569 728	5586 730	5603 733	5619 735	5636 737	5653 739	459
188	5670 741	5686 744	5703 746	5720 748	5736 750	5753 752	5769 754	5786 757	5803 759	5819 761	459
190	5835 763	5848 765	5862 766	5878 769	5895 771	5911 773	5928 775	5944 777	5960 779	5977 782	459
192	5993 784	6010 786	6026 788	6042 790	6058 792	6075 794	6091 796	6107 799	6124 801	6140 803	459
194	6156 805	6172 807	6188 809	6205 811	6221 813	6237 816	6253 818	6269 820	6285 822	6301 824	459
196	6318 826	6334 828	6350 830	6366 832	6382 834	6398 837	6414 839	6430 841	6446 843	6462 845	459
198	6478 847	6493 849	6509 851	6525 853	6541 855	6557 857	6573 859	6589 862	6604 864	6620 866	459
200	6636 868	6652 870	6668 872	6683 874	6699 876	6715 878	6730 880	6746 882	6762 884	6777 886	459
202	6793 888	6809 890	6824 892	6840 894	6855 896	6871 898	6886 900	6902 902	6917 905	6933 907	459
204	6948 909	6964 911	6979 913	6995 915	7010 917	7025 919	7041 921	7056 923	7071 925	7087 927	459
206	7102 929	7117 931	7133 933	7148 935	7163 937	7178 939	7194 941	7209 943	7224 945	7239 947	459
208	7254 949	7269 951	7284 953	7299 954	7315 956	7330 958	7345 960	7357 962	7369 964	7383 965	459
210	7398 967	7413 969	7428 971	7443 973	7458 975	7473 977	7488 979	7502 981	7517 983	7532 985	461
212	7547 987	7562 989	7577 991	7591 993	7606 994	7621 996	7636 998	7651 1000	7665 1002	7680 1004	461
214	7695 1006	7710 1008	7724 1010	7739 1012	7754 1014	7768 1016	7783 1017	7798 1019	7812 1021	7827 1023	461
216	7841 1025	7856 1027	7871 1029	7885 1031	7900 1033	7914 1035	7929 1036	7943 1038	7958 1040	7972 1042	461
PACK FLOW LO Δ FUEL = -0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = +1.0 %			ENGINE ANTI-ICE ON Δ FUEL = +2.0 %			TOTAL ANTI-ICE ON Δ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000CSKG370 0 018590 0 0 1 1.0 .0 .00 0 01 .800 .000 .000 0 FCOM-G0-02-05-30-003-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG=37.0%DISTANCE
(NM)
TIME (MIN)

M.80 OPT FL

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7987 1044	8001 1046	8016 1048	8030 1050	8045 1051	8059 1053	8073 1055	8088 1057	8102 1059	8116 1061	461
220	8131 1063	8145 1065	8159 1066	8174 1068	8188 1070	8202 1072	8217 1074	8231 1076	8245 1078	8259 1079	461
222	8274 1081	8288 1083	8302 1085	8316 1087	8330 1089	8344 1090	8359 1092	8373 1094	8387 1096	8401 1098	461
224	8415 1100	8429 1101	8443 1103	8457 1105	8471 1107	8485 1109	8499 1111	8513 1112	8527 1114	8541 1116	461
226	8555 1118	8569 1120	8583 1122	8597 1123	8611 1125	8624 1127	8638 1129	8652 1131	8666 1132	8680 1134	461
228	8694 1136	8707 1138	8721 1139	8735 1141	8749 1143	8762 1145	8776 1147	8789 1148	8800 1150	8811 1151	461
230	8824 1153	8838 1155	8851 1156	8865 1158	8879 1160	8892 1162	8906 1163	8919 1165	8933 1167	8947 1169	465
232	8960 1170	8974 1172	8987 1174	9001 1176	9014 1177	9028 1179	9041 1181	9055 1183	9068 1184	9082 1186	465
234	9095 1188	9109 1190	9122 1191	9135 1193	9149 1195	9162 1196	9176 1198	9189 1200	9202 1202	9216 1203	465
236	9229 1205	9242 1207	9256 1209	9269 1210	9282 1212	9296 1214	9309 1215	9322 1217	9335 1219	9349 1221	465
238	9362 1222	9375 1224	9388 1226	9402 1227	9415 1229	9428 1231	9441 1232	9454 1234	9467 1236	9481 1238	465
240	9494 1239	9507 1241	9520 1243	9533 1244	9546 1246	9559 1248	9572 1249	9585 1251	9598 1253	9611 1254	465
242	9624 1256	9637 1258	9650 1259	9663 1261	9676 1263	9689 1264	9702 1266	9715 1268	9728 1269	9741 1271	465
244	9754 1273	9767 1274	9779 1276	9792 1278	9805 1279	9818 1281	9831 1283	9844 1284	9856 1286	9869 1288	465
246	9882 1289	9895 1291	9907 1293	9920 1294	9933 1296	9946 1298	9958 1299	9971 1301	9984 1302	9996 1304	465
248	10009 1306	10022 1307	10034 1309	10047 1311	10059 1312	10072 1314	10085 1315	10097 1317	10110 1319	10122 1320	465
250	10135 1322	10147 1324	10160 1325	10171 1327	10181 1328	10192 1329	10203 1331	10216 1332	10228 1334	10241 1335	465
252	10253 1337	10266 1339	10278 1340	10290 1342	10303 1343	10315 1345	10328 1347	10340 1348	10352 1350	10365 1351	469
254	10377 1353	10389 1354	10402 1356	10414 1358	10426 1359	10439 1361	10451 1362	10463 1364	10476 1365	10488 1367	469
256	10500 1369	10512 1370	10525 1372	10537 1373	10549 1375	10561 1376	10573 1378	10586 1380	10598 1381	10610 1383	469
258	10622 1384	10634 1386	10647 1387	10659 1389	10671 1390	10683 1392	10695 1394	10707 1395	10719 1397	10731 1398	469
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON			TOTAL ANTI-ICE ON		
△ FUEL = -0.5 %			△FUEL = +1.0 %			△ FUEL = +2.0 %			△ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000C5KG370 0 018590 0 0 1 1.0 .0 00 0 01 .800 .000 .000 0 FCOM-G0-02-05-30-004-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		M.82 OPT FL			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	433 55	454 58	476 61	497 63	519 66	540 69	561 72	583 74	604 77	626 80	470
136	647 83	668 85	690 88	711 91	732 93	753 96	775 99	796 102	817 104	838 107	470
138	859 110	881 112	902 115	923 118	944 120	965 123	986 126	1007 129	1028 131	1049 134	470
140	1070 137	1091 139	1112 142	1133 145	1154 147	1175 150	1196 153	1217 155	1238 158	1259 161	470
142	1280 163	1301 166	1321 169	1342 171	1363 174	1384 177	1405 179	1425 182	1446 184	1467 187	470
144	1488 190	1508 192	1529 195	1549 198	1570 200	1591 203	1611 206	1632 208	1652 211	1673 213	470
146	1694 216	1714 219	1734 221	1755 224	1775 226	1796 229	1816 232	1837 234	1857 237	1877 240	470
148	1898 242	1918 245	1938 247	1959 250	1979 252	1999 255	2020 258	2040 260	2060 263	2080 265	470
150	2100 268	2121 271	2141 273	2161 276	2181 278	2201 281	2221 283	2241 286	2261 288	2281 291	470
152	2301 294	2321 296	2341 299	2361 301	2381 304	2401 306	2421 309	2441 311	2460 314	2480 316	470
154	2500 319	2520 321	2540 324	2559 327	2579 329	2599 332	2619 334	2638 337	2658 339	2678 342	470
156	2697 344	2717 347	2736 349	2756 352	2775 354	2795 357	2815 359	2834 362	2853 364	2873 367	470
158	2892 369	2912 371	2931 374	2951 376	2970 379	2989 381	3009 384	3028 386	3047 389	3066 391	470
160	3086 394	3105 396	3124 399	3143 401	3163 403	3182 406	3201 408	3220 411	3239 413	3258 416	470
162	3277 418	3296 420	3315 423	3334 425	3353 428	3372 430	3391 433	3410 435	3429 437	3448 440	470
164	3467 442	3486 445	3504 447	3523 449	3542 452	3561 454	3580 457	3598 459	3617 461	3636 464	470
166	3654 466	3673 469	3692 471	3710 473	3729 476	3747 478	3766 480	3785 483	3803 485	3822 488	470
168	3840 490	3858 492	3877 495	3895 497	3914 499	3932 502	3950 504	3969 506	3987 509	4005 511	470
170	4024 513	4042 516	4060 518	4078 520	4096 523	4115 525	4133 527	4151 530	4169 532	4187 534	470
172	4205 536	4223 539	4241 541	4259 543	4277 546	4295 548	4313 550	4331 552	4348 555	4366 557	470
174	4384 559	4402 562	4420 564	4437 566	4455 568	4473 571	4490 573	4508 575	4525 577	4540 579	470
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON			TOTAL ANTI-ICE ON		
Δ FUEL = -0.5 %			ΔFUEL = +1.0 %			Δ FUEL = +2.0 %			Δ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 2270000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .820 .000 .000 0 FCOM-G0-02-05-30-005-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG = 37.0%DISTANCE
(NM)
TIME (MIN)

M.82 OPT FL

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4555 581	4571 583	4589 585	4606 588	4624 590	4641 592	4659 594	4676 597	4693 599	4711 601	470
178	4728 603	4745 605	4763 608	4780 610	4797 612	4815 614	4832 616	4849 619	4866 621	4884 623	470
180	4901 625	4918 627	4935 630	4952 632	4970 634	4987 636	5004 638	5021 641	5038 643	5055 645	470
182	5072 647	5089 649	5106 651	5123 654	5140 656	5157 658	5174 660	5191 662	5208 664	5225 667	470
184	5242 669	5258 671	5275 673	5292 675	5309 677	5326 679	5342 682	5359 684	5376 686	5393 688	470
186	5409 690	5426 692	5443 694	5459 696	5476 699	5493 701	5509 703	5526 705	5542 707	5559 709	470
188	5575 711	5592 713	5608 715	5625 718	5641 720	5658 722	5674 724	5690 726	5707 728	5723 730	470
190	5740 732	5756 734	5772 736	5788 738	5805 740	5821 743	5837 745	5853 747	5869 749	5885 751	470
192	5902 753	5918 755	5934 757	5950 759	5966 761	5982 763	5998 765	6014 767	6028 769	6041 771	470
194	6055 772	6071 774	6087 776	6102 778	6118 781	6134 783	6150 785	6166 787	6182 789	6197 791	470
196	6213 793	6229 795	6245 797	6261 799	6276 801	6292 803	6308 805	6323 807	6339 809	6355 811	470
198	6370 813	6386 815	6402 817	6417 819	6433 821	6448 823	6464 825	6480 827	6495 829	6511 831	470
200	6526 833	6542 835	6557 837	6573 838	6588 840	6604 842	6619 844	6634 846	6650 848	6665 850	470
202	6681 852	6696 854	6711 856	6727 858	6742 860	6757 862	6773 864	6788 866	6803 868	6818 870	470
204	6834 872	6849 874	6864 876	6879 878	6894 880	6910 881	6925 883	6940 885	6955 887	6970 889	470
206	6985 891	7000 893	7015 895	7030 897	7045 899	7060 901	7075 903	7090 904	7105 906	7120 908	470
208	7135 910	7150 912	7165 914	7180 916	7194 918	7209 920	7224 922	7239 923	7254 925	7268 927	470
210	7283 929	7298 931	7313 933	7327 935	7342 937	7357 939	7371 940	7386 942	7401 944	7415 946	470
212	7430 948	7444 950	7459 952	7473 953	7488 955	7502 957	7516 959	7529 960	7541 962	7554 964	470
214	7568 965	7583 967	7597 969	7611 971	7626 973	7640 975	7655 976	7669 978	7683 980	7698 982	473
216	7712 984	7726 986	7740 987	7755 989	7769 991	7783 993	7797 995	7812 996	7826 998	7840 1000	473
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON			TOTAL ANTI-ICE ON		
△ FUEL = -0.5 %			△ FUEL = +1.0 %			△ FUEL = +2.0 %			△ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000C5KG370 0 018590 0 1 1.0 .0 .00 0 01 .820 .000 .000 0 FCOM-G0-02-05-30-006-150

	FLIGHT PLANNING		2.05.30	P 7
	INTEGRATED CRUISE		SEQ 150	REV 10

FLIGHT CREW OPERATING MANUAL

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		M.82 OPT FL				
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7854	7868	7883	7897	7911	7925	7939	7953	7967	7981	473
	1002	1004	1005	1007	1009	1011	1013	1014	1016	1018	
220	7996	8010	8024	8038	8052	8066	8080	8094	8108	8122	473
	1020	1021	1023	1025	1027	1029	1030	1032	1034	1036	
222	8136	8149	8163	8177	8191	8205	8219	8233	8247	8260	473
	1037	1039	1041	1043	1045	1046	1048	1050	1052	1053	
224	8274	8288	8302	8316	8329	8343	8357	8371	8384	8398	473
	1055	1057	1059	1060	1062	1064	1066	1067	1069	1071	
226	8412	8425	8439	8453	8466	8480	8494	8507	8521	8534	473
	1073	1074	1076	1078	1079	1081	1083	1085	1086	1088	
228	8548	8562	8575	8589	8602	8616	8629	8643	8656	8669	473
	1090	1092	1093	1095	1097	1098	1100	1102	1104	1105	
230	8683	8696	8710	8723	8736	8750	8763	8776	8790	8803	473
	1107	1109	1110	1112	1114	1115	1117	1119	1121	1122	
232	8816	8829	8843	8856	8869	8882	8894	8905	8917	8929	473
	1124	1126	1127	1129	1131	1132	1134	1135	1137	1138	
234	8942	8955	8968	8981	8994	9007	9021	9034	9047	9060	477
	1140	1141	1143	1145	1146	1148	1150	1151	1153	1155	
236	9073	9086	9099	9112	9125	9138	9151	9164	9177	9190	477
	1156	1158	1160	1161	1163	1164	1166	1168	1169	1171	
238	9202	9215	9228	9241	9254	9267	9280	9293	9305	9318	477
	1173	1174	1176	1177	1179	1181	1182	1184	1186	1187	
240	9331	9344	9357	9369	9382	9395	9408	9421	9433	9446	477
	1189	1190	1192	1194	1195	1197	1198	1200	1202	1203	
242	9459	9471	9484	9497	9509	9522	9535	9547	9560	9573	477
	1205	1206	1208	1210	1211	1213	1214	1216	1218	1219	
244	9585	9598	9610	9623	9636	9648	9661	9673	9686	9698	477
	1221	1222	1224	1225	1227	1229	1230	1232	1233	1235	
246	9711	9723	9736	9748	9761	9773	9786	9798	9810	9823	477
	1237	1238	1240	1241	1243	1244	1246	1248	1249	1251	
248	9835	9848	9860	9872	9885	9897	9909	9922	9934	9946	477
	1252	1254	1255	1257	1258	1260	1262	1263	1265	1266	
250	9959	9971	9983	9995	10008	10019	10029	10040	10051	10062	477
	1268	1269	1271	1272	1274	1275	1277	1278	1279	1281	
252	10074	10087	10099	10111	10123	10135	10147	10159	10171	10183	481
	1282	1284	1285	1287	1288	1290	1291	1293	1294	1296	
254	10195	10207	10219	10231	10243	10255	10267	10279	10291	10303	481
	1297	1299	1300	1302	1303	1305	1306	1308	1309	1311	
256	10315	10327	10339	10350	10362	10374	10386	10398	10410	10422	481
	1312	1314	1315	1317	1318	1320	1321	1323	1324	1326	
258	10434	10445	10457	10469	10481	10493	10504	10516	10528	10540	481
	1327	1328	1330	1331	1333	1334	1336	1337	1339	1340	
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON			TOTAL ANTI-ICE ON		
△ FUEL = -0.5 %			△FUEL = +1.0 %			△ FUEL = +2.0 %			△ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .820 .000 .000 0 FCOM-G0-02-05-30-007-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG=37.0%DISTANCE
(NM)
TIME (MIN)

M.84 OPT FL

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	405 50	425 53	445 55	465 58	485 60	505 63	525 65	545 68	565 70	584 73	482
136	604 75	624 78	644 80	664 83	684 85	703 88	723 90	743 93	763 95	782 97	482
138	802 100	822 102	841 105	861 107	881 110	900 112	920 115	939 117	959 119	978 122	482
140	998 124	1017 127	1037 129	1056 132	1076 134	1095 136	1114 139	1134 141	1153 144	1172 146	482
142	1192 148	1211 151	1230 153	1249 156	1268 158	1288 160	1307 163	1326 165	1345 167	1364 170	482
144	1383 172	1402 175	1421 177	1440 179	1459 182	1478 184	1497 186	1516 189	1535 191	1554 194	482
146	1573 196	1592 198	1610 201	1629 203	1648 205	1667 208	1685 210	1704 212	1723 215	1741 217	482
148	1760 219	1779 221	1797 224	1816 226	1834 228	1853 231	1871 233	1890 235	1908 238	1927 240	482
150	1945 242	1963 244	1982 247	2000 249	2018 251	2037 254	2055 256	2073 258	2091 260	2109 263	482
152	2128 265	2146 267	2164 269	2182 272	2200 274	2218 276	2236 278	2254 281	2272 283	2289 285	482
154	2307 287	2325 290	2343 292	2361 294	2378 296	2396 298	2412 300	2427 302	2443 304	2461 306	482
156	2478 309	2496 311	2513 313	2531 315	2548 317	2566 320	2583 322	2601 324	2618 326	2636 328	482
158	2653 330	2670 333	2688 335	2705 337	2722 339	2740 341	2757 343	2774 345	2792 348	2809 350	482
160	2826 352	2843 354	2860 356	2878 358	2895 360	2912 363	2929 365	2946 367	2963 369	2980 371	482
162	2997 373	3014 375	3031 377	3048 380	3065 382	3082 384	3099 386	3116 388	3133 390	3150 392	482
164	3167 394	3183 396	3200 399	3217 401	3234 403	3250 405	3267 407	3284 409	3300 411	3317 413	482
166	3334 415	3350 417	3367 419	3383 421	3400 423	3417 425	3433 428	3450 430	3466 432	3482 434	482
168	3499 436	3515 438	3532 440	3548 442	3564 444	3581 446	3597 448	3613 450	3629 452	3645 454	482
170	3662 456	3678 458	3693 460	3707 462	3720 463	3736 465	3752 467	3768 469	3784 471	3800 473	482
172	3816 475	3832 477	3848 479	3864 481	3880 483	3896 485	3912 487	3928 489	3943 491	3959 493	482
174	3975 495	3991 497	4007 499	4022 501	4038 503	4054 505	4070 507	4085 509	4101 511	4117 513	482
PACK FLOW LO △ FUEL = -0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON △FUEL = +1.0 %			ENGINE ANTI-ICE ON △ FUEL = +2.0 %			TOTAL ANTI-ICE ON △ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .840 .000 .000 0 FCOM-G0-02-05-30-008-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		M.84 OPT FL			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4133 515	4148 517	4164 519	4179 520	4195 522	4211 524	4226 526	4242 528	4257 530	4273 532	482
178	4289 534	4304 536	4319 538	4335 540	4350 542	4366 544	4381 546	4397 548	4412 549	4427 551	482
180	4443 553	4458 555	4473 557	4489 559	4504 561	4519 563	4535 565	4550 567	4565 568	4580 570	482
182	4595 572	4611 574	4626 576	4641 578	4656 580	4671 582	4686 584	4701 585	4716 587	4731 589	482
184	4746 591	4761 593	4776 595	4791 597	4806 599	4821 600	4836 602	4851 604	4866 606	4880 608	482
186	4895 610	4910 611	4925 613	4939 615	4954 617	4969 619	4984 621	4996 622	5008 624	5022 625	482
188	5037 627	5051 629	5066 631	5080 633	5095 634	5109 636	5124 638	5138 640	5153 642	5167 643	484
190	5182 645	5196 647	5211 649	5225 651	5239 652	5254 654	5268 656	5283 658	5297 659	5311 661	484
192	5326 663	5340 665	5354 667	5369 668	5383 670	5397 672	5411 674	5426 675	5440 677	5454 679	484
194	5468 681	5483 682	5497 684	5511 686	5525 688	5539 689	5553 691	5567 693	5581 695	5596 696	484
196	5610 698	5624 700	5638 702	5652 703	5666 705	5680 707	5694 709	5708 710	5722 712	5735 714	484
198	5749 716	5763 717	5777 719	5791 721	5805 722	5819 724	5833 726	5846 728	5860 729	5874 731	484
200	5888 733	5902 734	5915 736	5929 738	5943 739	5956 741	5970 743	5984 745	5997 746	6011 748	484
202	6025 750	6038 751	6052 753	6065 755	6079 756	6093 758	6106 760	6120 761	6133 763	6147 765	484
204	6160 766	6173 768	6187 770	6200 771	6214 773	6227 775	6240 776	6254 778	6267 780	6279 781	484
206	6291 783	6302 784	6315 786	6328 787	6341 789	6355 790	6368 792	6381 794	6394 795	6407 797	484
208	6420 799	6434 800	6447 802	6460 803	6473 805	6486 807	6499 808	6512 810	6525 811	6538 813	489
210	6551 815	6564 816	6577 818	6590 819	6603 821	6616 823	6629 824	6642 826	6655 827	6668 829	489
212	6681 831	6694 832	6707 834	6720 835	6733 837	6746 838	6759 840	6771 842	6784 843	6797 845	489
214	6810 846	6823 848	6835 850	6848 851	6861 853	6874 854	6886 856	6899 857	6912 859	6925 860	489
216	6937 862	6950 864	6963 865	6975 867	6988 868	7001 870	7013 871	7026 873	7038 874	7051 876	489
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON			TOTAL ANTI-ICE ON		
Δ FUEL = -0.5 %			ΔFUEL = +1.0 %			Δ FUEL = +2.0 %			Δ FUEL = +4.0 %		

H09C -08B1A340-211 CFM56-5C2 22700000CSKG370 0 018590 0 0 1 1.0 .0 .00 0 01 .840 .000 .000 0 FCOM-G0-02-05-30-009-150

H09C -08B1A340-211 CFM56-5C2 22700000C5KG370 0 018590 0 0 1 1.0 0.00 0 01.840.000.000 0 FCOM-GO-02-05-30-010-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR OPT FL			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	442 58	464 61	486 63	508 66	530 69	552 72	573 75	595 78	617 81	639 83	459
136	661 86	682 89	704 92	726 95	747 98	769 100	791 103	812 106	834 109	855 112	459
138	877 114	899 117	920 120	942 123	963 126	985 128	1006 131	1027 134	1049 137	1070 140	459
140	1092 142	1113 145	1134 148	1155 151	1177 153	1198 156	1219 159	1240 162	1262 164	1283 167	459
142	1304 170	1325 173	1346 175	1367 178	1388 181	1410 184	1430 186	1451 189	1472 192	1493 195	459
144	1514 197	1535 200	1556 203	1577 205	1598 208	1619 211	1640 213	1661 216	1681 219	1702 222	459
146	1723 224	1744 227	1764 230	1785 232	1806 235	1827 238	1847 240	1868 243	1888 246	1909 248	459
148	1930 251	1950 254	1971 256	1991 259	2012 262	2032 264	2053 267	2073 270	2093 272	2114 275	459
150	2134 277	2155 280	2175 283	2195 285	2216 288	2236 291	2256 293	2276 296	2297 298	2317 301	459
152	2337 304	2357 306	2377 309	2397 311	2417 314	2438 317	2458 319	2478 322	2498 324	2518 327	459
154	2538 330	2558 332	2578 335	2597 337	2617 340	2637 342	2657 345	2677 348	2697 350	2717 353	459
156	2736 355	2756 358	2776 360	2795 363	2815 365	2835 368	2855 370	2874 373	2894 376	2913 378	459
158	2933 381	2952 383	2972 386	2991 388	3011 391	3030 393	3050 396	3069 398	3089 401	3108 403	459
160	3127 406	3147 408	3166 411	3185 413	3205 416	3224 418	3243 420	3262 423	3281 425	3301 428	459
162	3320 430	3339 433	3358 435	3377 438	3396 440	3415 443	3434 445	3453 447	3472 450	3491 452	459
164	3510 455	3529 457	3548 460	3567 462	3585 464	3604 467	3623 469	3642 472	3660 474	3679 476	459
166	3698 479	3717 481	3735 484	3754 486	3773 488	3791 491	3810 493	3828 495	3847 498	3865 500	459
168	3884 503	3902 505	3921 507	3939 510	3958 512	3976 514	3994 517	4013 519	4031 521	4049 524	459
170	4068 526	4086 528	4104 531	4122 533	4140 535	4158 538	4176 540	4195 542	4213 545	4231 547	459
172	4249 549	4264 551	4278 553	4295 555	4313 557	4331 560	4349 562	4367 564	4385 567	4402 569	459
174	4420 571	4438 574	4456 576	4474 578	4491 580	4509 583	4527 585	4545 587	4562 590	4580 592	459
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08FOA340-211 CFM56-5C3 2280000C5KG370 0 018590 0 0 1 1.0 0 .00 0 01 .990 .000 .000 0 FCOM-02-05-30-011-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG = 37.0%DISTANCE
(NM)
TIME (MIN)

LR OPT FL

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4598 594	4615 596	4633 599	4650 601	4668 603	4686 606	4703 608	4721 610	4738 612	4756 615	459
178	4773 617	4791 619	4808 621	4825 623	4843 626	4860 628	4878 630	4895 632	4912 635	4930 637	459
180	4947 639	4964 641	4981 644	4999 646	5016 648	5033 650	5050 652	5067 655	5084 657	5102 659	459
182	5119 661	5136 663	5153 666	5170 668	5187 670	5204 672	5221 674	5238 676	5255 679	5272 681	459
184	5289 683	5306 685	5322 687	5339 689	5356 692	5373 694	5390 696	5407 698	5423 700	5440 702	459
186	5457 705	5474 707	5490 709	5507 711	5524 713	5540 715	5557 717	5574 719	5590 722	5607 724	459
188	5623 726	5640 728	5657 730	5672 732	5685 734	5699 736	5715 738	5731 740	5748 742	5764 744	459
190	5780 746	5797 748	5813 750	5829 752	5846 755	5862 757	5878 759	5895 761	5911 763	5927 765	459
192	5943 767	5960 769	5976 771	5992 773	6008 776	6024 778	6040 780	6056 782	6073 784	6089 786	459
194	6105 788	6121 790	6137 792	6153 794	6169 796	6185 798	6201 800	6217 803	6233 805	6249 807	459
196	6265 809	6280 811	6296 813	6312 815	6328 817	6344 819	6360 821	6376 823	6391 825	6407 827	459
198	6423 829	6439 831	6454 833	6470 835	6486 837	6501 839	6517 841	6533 843	6548 845	6564 847	459
200	6580 849	6595 851	6611 853	6626 855	6642 857	6657 859	6673 861	6688 863	6704 865	6719 867	459
202	6735 869	6750 871	6766 873	6781 875	6797 877	6812 879	6827 881	6843 883	6858 885	6873 887	459
204	6889 889	6904 891	6919 893	6935 895	6950 897	6965 899	6980 901	6995 903	7011 905	7026 907	459
206	7041 909	7056 910	7071 912	7086 914	7101 916	7117 918	7132 920	7144 922	7156 923	7170 925	459
208	7185 927	7200 929	7215 931	7229 933	7244 935	7259 937	7274 939	7289 941	7304 942	7319 944	461
210	7334 946	7349 948	7363 950	7378 952	7393 954	7408 956	7423 958	7437 960	7452 962	7467 963	461
212	7482 965	7496 967	7511 969	7526 971	7540 973	7555 975	7570 977	7584 979	7599 981	7614 982	461
214	7628 984	7643 986	7657 988	7672 990	7687 992	7701 994	7716 996	7730 997	7745 999	7759 1001	461
216	7774 1003	7788 1005	7802 1007	7817 1009	7831 1010	7846 1012	7860 1014	7875 1016	7889 1018	7903 1020	461
PACK FLOW LO Δ FUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON Δ FUEL = + 1 %			ENGINE ANTI ICE ON Δ FUEL = + 2.5 %			TOTAL ANTI ICE ON Δ FUEL = + 3.5 %		

10B -08FOA340-211 CFM56-5C3 22800000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 0 FCOM-02-05-30-012-150

 A340 FLIGHT CREW OPERATING MANUAL	PLANNING		2.05.30	P 13
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR OPT FL			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7918 1022	7932 1023	7946 1025	7961 1027	7975 1029	7989 1031	8003 1033	8018 1034	8032 1036	8046 1038	461
220	8060 1040	8075 1042	8089 1044	8103 1045	8117 1047	8131 1049	8145 1051	8159 1053	8174 1054	8188 1056	461
222	8202 1058	8216 1060	8230 1062	8244 1063	8258 1065	8272 1067	8286 1069	8300 1071	8314 1072	8328 1074	461
224	8342 1076	8356 1078	8370 1080	8384 1081	8398 1083	8412 1085	8425 1087	8439 1089	8453 1090	8467 1092	461
226	8481 1094	8495 1096	8508 1097	8522 1099	8536 1101	8550 1103	8564 1105	8577 1106	8591 1108	8605 1110	461
228	8616 1111	8627 1113	8639 1114	8653 1116	8666 1118	8680 1120	8694 1121	8707 1123	8721 1125	8734 1127	461
230	8748 1128	8762 1130	8775 1132	8789 1133	8802 1135	8816 1137	8829 1139	8843 1140	8856 1142	8870 1144	466
232	8883 1146	8897 1147	8910 1149	8923 1151	8937 1152	8950 1154	8964 1156	8977 1158	8990 1159	9004 1161	466
234	9017 1163	9031 1164	9044 1166	9057 1168	9071 1170	9084 1171	9097 1173	9110 1175	9124 1176	9137 1178	466
236	9150 1180	9163 1181	9177 1183	9190 1185	9203 1187	9216 1188	9229 1190	9243 1192	9256 1193	9269 1195	466
238	9282 1197	9295 1198	9308 1200	9321 1202	9335 1203	9348 1205	9361 1207	9374 1208	9387 1210	9400 1212	466
240	9413 1213	9426 1215	9439 1217	9452 1218	9465 1220	9478 1222	9491 1223	9504 1225	9517 1227	9530 1228	466
242	9543 1230	9555 1232	9568 1233	9581 1235	9594 1237	9607 1238	9620 1240	9633 1242	9646 1243	9658 1245	466
244	9671 1246	9684 1248	9697 1250	9710 1251	9722 1253	9735 1255	9748 1256	9761 1258	9773 1259	9786 1261	466
246	9799 1263	9811 1264	9824 1266	9837 1268	9849 1269	9862 1271	9875 1272	9887 1274	9900 1276	9912 1277	466
248	9925 1279	9938 1281	9950 1282	9963 1284	9975 1285	9988 1287	10000 1289	10012 1290	10023 1291	10033 1293	466
250	10044 1294	10056 1296	10069 1297	10081 1299	10093 1300	10106 1302	10118 1304	10131 1305	10143 1307	10156 1308	466
252	10168 1310	10180 1312	10193 1313	10205 1315	10217 1316	10230 1318	10242 1319	10254 1321	10267 1323	10279 1324	470
254	10291 1326	10304 1327	10316 1329	10328 1330	10340 1332	10353 1333	10365 1335	10377 1337	10389 1338	10402 1340	470
256	10414 1341	10426 1343	10438 1344	10450 1346	10463 1347	10475 1349	10487 1351	10499 1352	10511 1354	10523 1355	470
258	10535 1357	10548 1358	10560 1360	10572 1361	10584 1363	10596 1364	10608 1366	10620 1368	10632 1369	10644 1371	470
260	10656 1372	10668 1374	10680 1375	10692 1377	10704 1378	10716 1380	10728 1381	10740 1383	10752 1384	10764 1386	470
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08F0A340-211 CFM56-5C3 2280000C5KG370 0 018590 0 0 1 1.0 0 .00 0 01 .990 .000 .000 0 FCOM-02 -05-30-013-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 30.0%

DISTANCE
(NM)
TIME (MIN)

LR FL 100

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	252 55	264 58	277 61	289 63	302 66	314 69	327 71	339 74	352 77	364 79	276
136	377 82	389 85	402 87	414 90	426 93	439 96	451 98	464 101	476 104	488 106	277
138	501 109	513 112	525 114	538 117	550 119	562 122	575 125	587 127	599 130	612 133	279
140	624 135	636 138	648 141	661 143	673 146	685 148	697 151	710 154	722 156	734 159	280
142	746 161	758 164	771 167	783 169	795 172	807 174	819 177	831 180	844 182	856 185	282
144	868 187	880 190	892 192	904 195	916 198	928 200	941 203	953 205	965 208	977 210	283
146	989 213	1001 215	1013 218	1025 220	1037 223	1049 225	1061 228	1073 230	1085 233	1097 236	285
148	1109 238	1121 241	1133 243	1145 246	1157 248	1169 251	1181 253	1193 255	1205 258	1216 260	287
150	1228 263	1240 265	1252 268	1264 270	1276 273	1288 275	1300 278	1311 280	1323 283	1335 285	289
152	1347 287	1359 290	1371 292	1382 295	1394 297	1406 300	1418 302	1430 304	1441 307	1453 309	292
154	1465 312	1477 314	1488 316	1500 319	1512 321	1524 323	1535 326	1547 328	1559 331	1570 333	294
156	1582 335	1594 338	1605 340	1617 342	1629 345	1640 347	1652 349	1664 352	1675 354	1687 356	297
158	1699 359	1710 361	1722 363	1733 366	1745 368	1757 370	1768 373	1780 375	1791 377	1803 380	300
160	1814 382	1826 384	1837 386	1849 389	1860 391	1872 393	1883 396	1895 398	1906 400	1918 402	302
162	1929 405	1941 407	1952 409	1964 411	1975 414	1987 416	1998 418	2010 420	2021 423	2032 425	304
164	2044 427	2055 429	2067 432	2078 434	2089 436	2101 438	2112 440	2123 443	2135 445	2146 447	307
166	2158 449	2169 451	2180 454	2191 456	2203 458	2214 460	2225 462	2237 464	2248 467	2259 469	310
168	2271 471	2282 473	2293 475	2304 477	2316 480	2327 482	2338 484	2349 486	2361 488	2372 490	313
170	2383 492	2394 495	2405 497	2417 499	2428 501	2439 503	2450 505	2461 507	2473 509	2484 512	315
172	2495 514	2506 516	2517 518	2528 520	2539 522	2551 524	2562 526	2573 528	2584 530	2595 532	318
174	2606 535	2617 537	2628 539	2639 541	2650 543	2661 545	2673 547	2684 549	2695 551	2706 553	320
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON					
Δ FUEL = - 0.5 %		Δ FUEL = + 1 %		Δ FUEL = + 3.5 %		Δ FUEL = + 5 %					

10B -08F0A340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 01001 .990 .000 .000 0 FCOM-02-05-30-014-150

 A340 FLIGHT CREW OPERATING MANUAL	PLANNING		2.05.30	P 15
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=30.0%		DISTANCE (NM) TIME (MIN)		LR FL 100			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	2717 555	2728 557	2739 559	2750 561	2761 564	2772 566	2783 568	2794 570	2805 572	2816 574	321
178	2827 576	2838 578	2849 580	2860 582	2871 584	2882 586	2893 588	2904 590	2914 592	2925 594	323
180	2936 596	2947 598	2958 600	2969 602	2980 604	2991 606	3002 608	3013 610	3024 612	3035 614	324
182	3045 616	3056 618	3067 620	3078 622	3089 624	3100 626	3111 628	3121 630	3132 632	3143 634	325
184	3154 636	3165 638	3176 640	3186 642	3197 644	3208 646	3219 648	3230 650	3240 652	3251 654	327
186	3262 656	3273 658	3283 660	3294 662	3305 664	3316 666	3326 668	3337 670	3348 672	3359 674	328
188	3369 676	3380 678	3391 680	3402 682	3412 683	3423 685	3434 687	3444 689	3455 691	3466 693	329
190	3476 695	3487 697	3498 699	3508 701	3519 703	3530 705	3540 707	3551 709	3562 711	3572 713	330
192	3583 714	3594 716	3604 718	3615 720	3625 722	3636 724	3647 726	3657 728	3668 730	3678 732	331
194	3689 734	3700 736	3710 737	3721 739	3731 741	3742 743	3752 745	3763 747	3774 749	3784 751	333
196	3795 753	3805 755	3816 756	3826 758	3837 760	3847 762	3858 764	3868 766	3879 768	3889 770	334
198	3900 772	3910 773	3921 775	3931 777	3942 779	3952 781	3963 783	3973 785	3984 787	3994 788	335
200	4004 790	4015 792	4025 794	4036 796	4046 798	4057 800	4067 801	4077 803	4088 805	4098 807	336
202	4109 809	4119 811	4129 812	4140 814	4150 816	4161 818	4171 820	4181 822	4192 824	4202 825	338
204	4212 827	4223 829	4233 831	4244 833	4254 835	4264 836	4275 838	4285 840	4295 842	4305 844	339
206	4316 845	4326 847	4336 849	4347 851	4357 853	4367 855	4378 856	4388 858	4398 860	4408 862	340
208	4419 864	4429 865	4439 867	4449 869	4460 871	4470 873	4480 874	4490 876	4501 878	4511 880	341
210	4521 882	4531 883	4542 885	4552 887	4562 889	4572 891	4582 892	4593 894	4603 896	4613 898	341
212	4623 900	4633 901	4644 903	4654 905	4664 907	4674 908	4684 910	4694 912	4704 914	4715 916	342
214	4725 917	4735 919	4745 921	4755 923	4765 924	4775 926	4786 928	4796 930	4806 932	4816 933	343
216	4826 935	4836 937	4846 939	4856 940	4866 942	4876 944	4886 946	4896 947	4907 949	4917 951	344
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 3.5 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG300 0 018590 0 0 1 1.0 0 .00 01001 .990 .000 0 FCOM-02-05-30-015-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 30.0%		DISTANCE (NM) TIME (MIN)		LR FL 100			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	4927 953	4937 954	4947 956	4957 958	4967 960	4977 961	4987 963	4997 965	5007 967	5017 968	345
220	5027 970	5037 972	5047 973	5057 975	5067 977	5077 979	5087 980	5097 982	5107 984	5117 986	346
222	5127 987	5137 989	5147 991	5157 993	5167 994	5177 996	5187 998	5196 999	5206 1001	5216 1003	346
224	5226 1005	5236 1006	5246 1008	5256 1010	5266 1011	5276 1013	5286 1015	5296 1017	5305 1018	5315 1020	347
226	5325 1022	5335 1023	5345 1025	5355 1027	5365 1028	5375 1030	5384 1032	5394 1034	5404 1035	5414 1037	348
228	5424 1039	5434 1040	5443 1042	5453 1044	5463 1045	5473 1047	5483 1049	5493 1050	5502 1052	5512 1054	349
230	5522 1055	5532 1057	5541 1059	5551 1060	5561 1062	5571 1064	5581 1065	5590 1067	5600 1069	5610 1070	352
232	5620 1072	5629 1074	5639 1075	5649 1077	5658 1079	5668 1080	5678 1082	5688 1083	5697 1085	5707 1087	355
234	5717 1088	5726 1090	5736 1092	5746 1093	5755 1095	5765 1096	5775 1098	5785 1100	5794 1101	5804 1103	359
236	5814 1104	5823 1106	5833 1108	5842 1109	5852 1111	5862 1112	5871 1114	5881 1116	5891 1117	5900 1119	362
238	5910 1120	5919 1122	5929 1123	5939 1125	5948 1127	5958 1128	5967 1130	5977 1131	5987 1133	5996 1134	366
240	6006 1136	6015 1137	6025 1139	6034 1141	6044 1142	6053 1144	6063 1145	6073 1147	6082 1148	6092 1150	370
242	6101 1151	6111 1153	6120 1154	6130 1156	6139 1157	6149 1159	6158 1161	6168 1162	6177 1164	6187 1165	373
244	6196 1167	6206 1168	6215 1170	6225 1171	6234 1173	6243 1174	6253 1176	6262 1177	6272 1179	6281 1180	376
246	6291 1182	6300 1183	6310 1185	6319 1186	6328 1188	6338 1189	6347 1191	6357 1192	6366 1194	6376 1195	379
248	6385 1197	6394 1198	6404 1200	6413 1201	6423 1202	6432 1204	6441 1205	6451 1207	6460 1208	6470 1210	379
250	6479 1211	6488 1213	6498 1214	6507 1216	6516 1217	6526 1219	6535 1220	6545 1222	6554 1223	6563 1225	379
252	6573 1226	6582 1228	6591 1229	6601 1231	6610 1232	6619 1234	6629 1235	6638 1237	6647 1238	6657 1240	379
254	6666 1241	6675 1243	6685 1244	6694 1245	6703 1247	6713 1248	6722 1250	6731 1251	6741 1253	6750 1254	379
256	6759 1256	6769 1257	6778 1259	6787 1260	6796 1262	6806 1263	6815 1265	6824 1266	6834 1268	6843 1269	379
258	6852 1270	6861 1272	6871 1273	6880 1275	6889 1276	6899 1278	6908 1279	6917 1281	6926 1282	6936 1284	379
260	6945 1285	6954 1287	6963 1288	6973 1290	6982 1291	6991 1292	7000 1294	7009 1295	7019 1297	7028 1298	379
PACK FLOW LO Δ FUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON Δ FUEL = + 1 %			ENGINE ANTI ICE ON Δ FUEL = + 3.5 %			TOTAL ANTI ICE ON Δ FUEL = + 5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 .00 01001 .990 .000 .000 0 FCOM-02-05-30-016-150

 A340 FLIGHT CREW OPERATING MANUAL	PLANNING		2.05.30	P 17
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=30.0%			DISTANCE (NM) TIME (MIN)		LR FL 150			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	278 56	291 59	305 62	319 64	333 67	347 70	360 73	374 75	388 78	401 81	300
136	415 83	429 86	442 89	456 91	470 94	483 97	497 99	511 102	524 105	538 107	304
138	552 110	565 113	579 115	592 118	606 121	619 123	633 126	646 129	660 131	674 134	307
140	687 136	701 139	714 142	727 144	741 147	754 149	768 152	781 155	795 157	808 160	310
142	822 162	835 165	848 168	862 170	875 173	889 175	902 178	915 180	929 183	942 185	313
144	955 188	969 191	982 193	995 196	1009 198	1022 201	1035 203	1048 206	1062 208	1075 211	314
146	1088 213	1101 216	1115 218	1128 221	1141 223	1154 226	1168 228	1181 231	1194 233	1207 236	315
148	1220 238	1234 241	1247 243	1260 246	1273 248	1286 251	1299 253	1312 256	1326 258	1339 261	316
150	1352 263	1365 266	1378 268	1391 271	1404 273	1417 276	1430 278	1443 281	1456 283	1470 286	317
152	1483 288	1496 290	1509 293	1522 295	1535 298	1548 300	1561 303	1574 305	1587 308	1600 310	318
154	1613 312	1626 315	1638 317	1651 320	1664 322	1677 325	1690 327	1703 329	1716 332	1729 334	320
156	1742 337	1755 339	1768 341	1780 344	1793 346	1806 349	1819 351	1832 353	1845 356	1857 358	321
158	1870 361	1883 363	1896 365	1909 368	1921 370	1934 373	1947 375	1960 377	1973 380	1985 382	323
160	1998 384	2011 387	2023 389	2036 391	2049 394	2062 396	2074 398	2087 401	2100 403	2112 405	324
162	2125 408	2138 410	2150 412	2163 415	2176 417	2188 419	2201 422	2214 424	2226 426	2239 429	325
164	2251 431	2264 433	2277 436	2289 438	2302 440	2314 443	2327 445	2339 447	2352 449	2364 452	327
166	2377 454	2389 456	2402 459	2414 461	2427 463	2440 465	2452 468	2464 470	2477 472	2489 475	328
168	2502 477	2514 479	2527 481	2539 484	2552 486	2564 488	2576 490	2589 493	2601 495	2614 497	329
170	2626 499	2638 502	2651 504	2663 506	2676 508	2688 511	2700 513	2713 515	2725 517	2737 520	331
172	2750 522	2762 524	2774 526	2787 528	2799 531	2811 533	2823 535	2836 537	2848 540	2860 542	332
174	2873 544	2885 546	2897 548	2909 551	2922 553	2934 555	2946 557	2958 559	2970 562	2983 564	333
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 3.5 %		TOTAL ANTI ICE ON ΔFUEL = + 5 %			

10B -08FOA340-311 CFM56-5C3 2220000C5KG300 0 018590 0 0 1 1.0 0 .00 01501 .990 .000 0 FCOM-02-05-30-017-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 30.0%		DISTANCE (NM) TIME (MIN)		LR FL 150			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	2995 566	3007 568	3019 570	3031 573	3043 575	3056 577	3068 579	3080 581	3092 583	3104 586	334
178	3116 588	3128 590	3141 592	3153 594	3165 596	3177 599	3189 601	3201 603	3213 605	3225 607	335
180	3237 609	3249 611	3261 614	3273 616	3285 618	3297 620	3309 622	3321 624	3333 626	3345 629	337
182	3357 631	3369 633	3381 635	3393 637	3405 639	3417 641	3429 643	3441 645	3453 648	3465 650	338
184	3477 652	3489 654	3501 656	3513 658	3524 660	3536 662	3548 664	3560 666	3572 669	3584 671	340
186	3596 673	3608 675	3619 677	3631 679	3643 681	3655 683	3667 685	3678 687	3690 689	3702 691	342
188	3714 693	3726 695	3737 698	3749 700	3761 702	3773 704	3784 706	3796 708	3808 710	3820 712	343
190	3831 714	3843 716	3855 718	3866 720	3878 722	3890 724	3902 726	3913 728	3925 730	3937 732	346
192	3948 734	3960 736	3971 738	3983 740	3995 742	4006 744	4018 746	4030 748	4041 750	4053 752	351
194	4064 754	4076 756	4088 758	4099 760	4111 762	4122 764	4134 765	4145 767	4157 769	4168 771	355
196	4180 773	4191 775	4203 777	4214 779	4226 781	4237 783	4249 785	4260 787	4272 788	4283 790	359
198	4295 792	4306 794	4318 796	4329 798	4341 800	4352 802	4363 804	4375 805	4386 807	4398 809	363
200	4409 811	4421 813	4432 815	4443 817	4455 819	4466 820	4477 822	4489 824	4500 826	4511 828	367
202	4523 830	4534 831	4545 833	4557 835	4568 837	4579 839	4591 841	4602 842	4613 844	4625 846	371
204	4636 848	4647 850	4658 851	4670 853	4681 855	4692 857	4703 859	4715 860	4726 862	4737 864	374
206	4748 866	4760 868	4771 869	4782 871	4793 873	4804 875	4816 876	4827 878	4838 880	4849 882	376
208	4860 884	4871 885	4883 887	4894 889	4905 891	4916 892	4927 894	4938 896	4949 898	4960 899	377
210	4972 901	4983 903	4994 905	5005 907	5016 908	5027 910	5038 912	5049 914	5060 915	5071 917	378
212	5082 919	5093 921	5104 922	5115 924	5126 926	5137 928	5148 929	5159 931	5170 933	5181 934	379
214	5192 936	5203 938	5214 940	5225 941	5236 943	5247 945	5258 947	5269 948	5280 950	5291 952	380
216	5302 953	5313 955	5324 957	5335 959	5346 960	5357 962	5368 964	5379 966	5390 967	5400 969	381
PACK FLOW LO ΔFUEL = - 0.5 %				PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %		ENGINE ANTI ICE ON ΔFUEL = + 3.5 %		TOTAL ANTI ICE ON ΔFUEL = + 5 %			

10B -08F0A340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 .00 01501 .990 .000 .000 0 FCOM-02-05-30-018-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 19
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=30.0%			DISTANCE (NM) TIME (MIN)		LR FL 150			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	5411 971	5422 972	5433 974	5444 976	5455 978	5466 979	5477 981	5488 983	5498 984	5509 986	382
220	5520 988	5531 989	5542 991	5553 993	5563 995	5574 996	5585 998	5596 1000	5607 1001	5618 1003	382
222	5628 1005	5639 1006	5650 1008	5661 1010	5672 1012	5682 1013	5693 1015	5704 1017	5715 1018	5725 1020	383
224	5736 1022	5747 1023	5758 1025	5768 1027	5779 1028	5790 1030	5801 1032	5811 1033	5822 1035	5833 1037	383
226	5844 1038	5854 1040	5865 1042	5876 1043	5886 1045	5897 1047	5908 1048	5918 1050	5929 1052	5940 1053	385
228	5950 1055	5961 1057	5972 1058	5982 1060	5993 1062	6004 1063	6014 1065	6025 1067	6035 1068	6046 1070	386
230	6057 1072	6067 1073	6078 1075	6088 1076	6099 1078	6110 1080	6120 1081	6131 1083	6141 1085	6152 1086	387
232	6162 1088	6173 1090	6184 1091	6194 1093	6205 1094	6215 1096	6226 1098	6236 1099	6247 1101	6257 1103	388
234	6268 1104	6278 1106	6289 1107	6299 1109	6310 1111	6320 1112	6331 1114	6341 1116	6352 1117	6362 1119	389
236	6373 1120	6383 1122	6394 1124	6404 1125	6414 1127	6425 1128	6435 1130	6446 1132	6456 1133	6467 1135	390
238	6477 1136	6488 1138	6498 1140	6508 1141	6519 1143	6529 1144	6540 1146	6550 1148	6560 1149	6571 1151	391
240	6581 1152	6592 1154	6602 1156	6612 1157	6623 1159	6633 1160	6643 1162	6654 1163	6664 1165	6674 1167	392
242	6685 1168	6695 1170	6705 1171	6716 1173	6726 1174	6736 1176	6747 1178	6757 1179	6767 1181	6778 1182	393
244	6788 1184	6798 1185	6808 1187	6819 1189	6829 1190	6839 1192	6850 1193	6860 1195	6870 1196	6880 1198	395
246	6891 1200	6901 1201	6911 1203	6921 1204	6932 1206	6942 1207	6952 1209	6962 1210	6972 1212	6983 1213	396
248	6993 1215	7003 1217	7013 1218	7024 1220	7034 1221	7044 1223	7054 1224	7064 1226	7074 1227	7085 1229	398
250	7095 1230	7105 1232	7115 1233	7125 1235	7135 1236	7146 1238	7156 1239	7166 1241	7176 1242	7186 1244	399
252	7196 1245	7206 1247	7216 1249	7227 1250	7237 1252	7247 1253	7257 1255	7267 1256	7277 1258	7287 1259	401
254	7297 1261	7307 1262	7317 1264	7327 1265	7337 1267	7348 1268	7358 1270	7368 1271	7378 1272	7388 1274	403
256	7398 1275	7408 1277	7418 1278	7428 1280	7438 1281	7448 1283	7458 1284	7468 1286	7478 1287	7488 1289	406
258	7498 1290	7508 1292	7518 1293	7528 1295	7538 1296	7548 1298	7558 1299	7568 1301	7578 1302	7588 1303	407
260	7598 1305	7608 1306	7618 1308	7628 1309	7638 1311	7648 1312	7658 1314	7667 1315	7677 1317	7687 1318	407
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 3.5 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 0 .00 01501 .990 .000 0 FCOM-02-05-30-019-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 30.0%

DISTANCE
(NM)
TIME (MIN)

LR FL 200

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	308 58	324 61	339 64	354 67	370 70	385 73	400 76	415 79	431 81	446 84	318
136	461 87	476 90	491 93	507 96	522 99	537 101	552 104	567 107	582 110	597 113	320
138	612 116	628 118	643 121	658 124	673 127	688 130	703 132	718 135	733 138	748 141	321
140	763 144	778 146	793 149	808 152	823 155	838 158	853 160	868 163	882 166	897 169	322
142	912 171	927 174	942 177	957 180	972 182	987 185	1001 188	1016 191	1031 193	1046 196	323
144	1061 199	1075 202	1090 204	1105 207	1120 210	1134 213	1149 215	1164 218	1178 221	1193 223	324
146	1208 226	1223 229	1237 232	1252 234	1266 237	1281 240	1296 242	1310 245	1325 248	1339 250	325
148	1354 253	1369 256	1383 258	1398 261	1412 264	1427 266	1441 269	1456 272	1470 274	1485 277	326
150	1499 280	1514 282	1528 285	1543 288	1557 290	1571 293	1586 296	1600 298	1615 301	1629 303	328
152	1643 306	1658 309	1672 311	1686 314	1701 316	1715 319	1729 322	1744 324	1758 327	1772 329	331
154	1786 332	1801 334	1815 337	1829 339	1843 342	1858 345	1872 347	1886 350	1900 352	1914 355	334
156	1928 357	1943 360	1957 362	1971 365	1985 367	1999 370	2013 372	2027 375	2041 377	2055 380	337
158	2069 382	2083 384	2097 387	2111 389	2125 392	2139 394	2153 397	2167 399	2181 401	2195 404	344
160	2209 406	2223 409	2237 411	2251 413	2265 416	2279 418	2292 420	2306 423	2320 425	2334 427	351
162	2348 430	2362 432	2375 434	2389 437	2403 439	2417 441	2431 444	2444 446	2458 448	2472 450	357
164	2486 453	2499 455	2513 457	2527 460	2541 462	2554 464	2568 466	2582 469	2595 471	2609 473	361
166	2623 475	2636 478	2650 480	2664 482	2677 484	2691 487	2704 489	2718 491	2732 493	2745 495	365
168	2759 498	2772 500	2786 502	2799 504	2813 506	2826 509	2840 511	2853 513	2867 515	2880 517	368
170	2894 520	2907 522	2921 524	2934 526	2948 528	2961 531	2975 533	2988 535	3002 537	3015 539	370
172	3028 541	3042 544	3055 546	3068 548	3082 550	3095 552	3109 554	3122 557	3135 559	3149 561	371
174	3162 563	3175 565	3188 567	3202 569	3215 572	3228 574	3242 576	3255 578	3268 580	3281 582	372
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 3.5 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 .00 02001 .990 .000 .000 0 FCOM-02-05-30-020-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=30.0%		DISTANCE (NM) TIME (MIN)		LR FL 200			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	3295 584	3308 586	3321 589	3334 591	3348 593	3361 595	3374 597	3387 599	3400 601	3414 603	373
178	3427 606	3440 608	3453 610	3466 612	3479 614	3492 616	3506 618	3519 620	3532 622	3545 625	374
180	3558 627	3571 629	3584 631	3597 633	3610 635	3624 637	3637 639	3650 641	3663 643	3676 645	375
182	3689 648	3702 650	3715 652	3728 654	3741 656	3754 658	3767 660	3780 662	3793 664	3806 666	376
184	3819 668	3832 670	3844 672	3857 674	3870 676	3883 679	3896 681	3909 683	3922 685	3935 687	377
186	3948 689	3961 691	3973 693	3986 695	3999 697	4012 699	4025 701	4038 703	4050 705	4063 707	379
188	4076 709	4089 711	4102 713	4114 715	4127 717	4140 719	4153 721	4165 723	4178 725	4191 727	380
190	4204 729	4216 731	4229 733	4242 735	4255 737	4267 739	4280 741	4293 743	4305 745	4318 747	381
192	4331 749	4343 751	4356 753	4369 755	4381 757	4394 759	4407 761	4419 763	4432 765	4444 767	382
194	4457 769	4470 771	4482 773	4495 775	4507 777	4520 779	4533 781	4545 783	4558 785	4570 787	383
196	4583 789	4595 790	4608 792	4620 794	4633 796	4645 798	4658 800	4670 802	4683 804	4695 806	385
198	4708 808	4720 810	4733 812	4745 814	4758 816	4770 818	4783 820	4795 822	4807 823	4820 825	386
200	4832 827	4845 829	4857 831	4869 833	4882 835	4894 837	4907 839	4919 841	4931 843	4944 845	387
202	4956 846	4968 848	4981 850	4993 852	5005 854	5018 856	5030 858	5042 860	5055 862	5067 863	389
204	5079 865	5091 867	5104 869	5116 871	5128 873	5140 875	5153 877	5165 878	5177 880	5189 882	392
206	5202 884	5214 886	5226 888	5238 890	5250 891	5263 893	5275 895	5287 897	5299 899	5311 901	395
208	5324 902	5336 904	5348 906	5360 908	5372 910	5384 912	5396 913	5408 915	5421 917	5433 919	398
210	5445 920	5457 922	5469 924	5481 926	5493 927	5505 929	5517 931	5529 933	5541 935	5553 936	409
212	5565 938	5577 940	5589 942	5601 943	5613 945	5625 947	5637 949	5649 950	5661 952	5673 954	412
214	5685 955	5697 957	5709 959	5721 961	5733 962	5745 964	5757 966	5769 968	5781 969	5793 971	415
216	5805 973	5816 974	5828 976	5840 978	5852 979	5864 981	5876 983	5888 985	5900 986	5911 988	418
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL= - 0.5 %			ΔFUEL = + 1 %			ΔFUEL = + 3.5 %			ΔFUEL = + 5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG300 0 018590 0 0 1 1.0 0 .00 02001 .990 .000 0 FCOM-02-05-30-021-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=30.0%		DISTANCE (NM) TIME (MIN)		LR FL 200			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	5923 990	5935 991	5947 993	5959 995	5971 996	5982 998	5994 1000	6006 1001	6018 1003	6030 1005	421
220	6041 1006	6053 1008	6065 1010	6077 1011	6088 1013	6100 1015	6112 1016	6124 1018	6135 1020	6147 1021	422
222	6159 1023	6171 1025	6182 1026	6194 1028	6206 1030	6217 1031	6229 1033	6241 1035	6253 1036	6264 1038	424
224	6276 1040	6288 1041	6299 1043	6311 1045	6323 1046	6334 1048	6346 1049	6358 1051	6369 1053	6381 1054	425
226	6392 1056	6404 1058	6416 1059	6427 1061	6439 1063	6451 1064	6462 1066	6474 1067	6485 1069	6497 1071	427
228	6508 1072	6520 1074	6532 1076	6543 1077	6555 1079	6566 1080	6578 1082	6589 1084	6601 1085	6612 1087	429
230	6624 1088	6635 1090	6647 1092	6658 1093	6670 1095	6681 1096	6693 1098	6704 1100	6716 1101	6727 1103	431
232	6739 1104	6750 1106	6762 1108	6773 1109	6784 1111	6796 1112	6807 1114	6819 1115	6830 1117	6842 1119	432
234	6853 1120	6864 1122	6876 1123	6887 1125	6898 1127	6910 1128	6921 1130	6933 1131	6944 1133	6955 1134	434
236	6967 1136	6978 1137	6989 1139	7001 1141	7012 1142	7023 1144	7034 1145	7046 1147	7057 1148	7068 1150	435
238	7080 1151	7091 1153	7102 1155	7113 1156	7125 1158	7136 1159	7147 1161	7158 1162	7170 1164	7181 1165	436
240	7192 1167	7203 1168	7215 1170	7226 1172	7237 1173	7248 1175	7259 1176	7270 1178	7282 1179	7293 1181	437
242	7304 1182	7315 1184	7326 1185	7338 1187	7349 1188	7360 1190	7371 1191	7382 1193	7393 1195	7404 1196	438
244	7416 1198	7427 1199	7438 1201	7449 1202	7460 1204	7471 1205	7482 1207	7493 1208	7504 1210	7515 1211	438
246	7527 1213	7538 1214	7549 1216	7560 1217	7571 1219	7582 1220	7593 1222	7604 1223	7615 1225	7626 1226	438
248	7637 1228	7648 1229	7659 1231	7670 1232	7681 1234	7692 1236	7703 1237	7714 1239	7725 1240	7736 1242	438
250	7747 1243	7758 1245	7769 1246	7780 1248	7791 1249	7802 1251	7813 1252	7824 1254	7835 1255	7846 1257	438
252	7857 1258	7868 1260	7879 1261	7890 1263	7901 1264	7912 1266	7923 1267	7934 1269	7945 1270	7956 1272	438
254	7967 1273	7977 1275	7988 1276	7999 1278	8010 1279	8021 1281	8032 1282	8043 1284	8054 1285	8065 1286	438
256	8075 1288	8086 1289	8097 1291	8108 1292	8119 1294	8130 1295	8141 1297	8151 1298	8162 1300	8173 1301	438
258	8184 1303	8195 1304	8206 1306	8216 1307	8227 1309	8238 1310	8249 1312	8260 1313	8270 1315	8281 1316	438
260	8292 1318	8303 1319	8314 1321	8324 1322	8335 1324	8346 1325	8357 1327	8367 1328	8378 1329	8389 1331	438
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1 %			ΔFUEL = + 3.5 %			ΔFUEL = + 5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02001 .990 .000 .000 0 FCOM-02-05-30-022-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 23
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=30.0%		DISTANCE (NM) TIME (MIN)		LR FL 250				
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	337 59	354 62	370 65	387 68	404 70	420 73	437 76	453 79	470 82	486 84	352
136	503 87	520 90	536 93	553 95	569 98	586 101	602 104	618 106	635 109	651 112	359
138	668 115	684 117	700 120	717 123	733 125	750 128	766 131	782 133	798 136	815 139	362
140	831 142	847 144	864 147	880 150	896 152	912 155	928 158	945 160	961 163	977 166	364
142	993 168	1009 171	1025 174	1042 176	1058 179	1074 182	1090 184	1106 187	1122 189	1138 192	365
144	1154 195	1170 197	1186 200	1202 203	1218 205	1234 208	1250 210	1266 213	1282 216	1298 218	366
146	1314 221	1330 224	1346 226	1362 229	1378 231	1394 234	1409 236	1425 239	1441 242	1457 244	367
148	1473 247	1489 249	1504 252	1520 255	1536 257	1552 260	1567 262	1583 265	1599 267	1615 270	369
150	1630 272	1646 275	1662 277	1677 280	1693 283	1709 285	1724 288	1740 290	1756 293	1771 295	371
152	1787 298	1802 300	1818 303	1834 305	1849 308	1865 310	1880 313	1896 315	1911 318	1927 320	373
154	1942 323	1958 325	1973 328	1989 330	2004 332	2020 335	2035 337	2050 340	2066 342	2081 345	374
156	2097 347	2112 350	2127 352	2143 355	2158 357	2173 360	2189 362	2204 364	2219 367	2235 369	376
158	2250 372	2265 374	2281 377	2296 379	2311 381	2326 384	2342 386	2357 389	2372 391	2387 394	377
160	2402 396	2418 398	2433 401	2448 403	2463 406	2478 408	2493 410	2509 413	2524 415	2539 417	379
162	2554 420	2569 422	2584 425	2599 427	2614 429	2629 432	2644 434	2659 436	2674 439	2689 441	381
164	2705 444	2720 446	2734 448	2749 451	2764 453	2779 455	2794 458	2809 460	2824 462	2839 465	383
166	2854 467	2869 469	2884 472	2899 474	2914 476	2929 478	2943 481	2958 483	2973 485	2988 488	386
168	3003 490	3018 492	3032 494	3047 497	3062 499	3077 501	3091 504	3106 506	3121 508	3136 510	389
170	3150 513	3165 515	3180 517	3195 519	3209 521	3224 524	3239 526	3253 528	3268 530	3283 533	395
172	3297 535	3312 537	3326 539	3341 541	3356 543	3370 546	3385 548	3399 550	3414 552	3428 554	399
174	3443 556	3458 559	3472 561	3487 563	3501 565	3516 567	3530 569	3544 571	3559 574	3573 576	404
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL= + 1 %			ENGINE ANTI ICE ON ΔFUEL= + 3.5 %			TOTAL ANTI ICE ON ΔFUEL= + 5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG300 0 018590 0 0 1 1.0 0 .00 02501 .990 .000 0 FCOM-02-05-30-023-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG = 30.0%DISTANCE
(NM)
TIME (MIN)

LR FL 250

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	3588 578	3602 580	3617 582	3631 584	3645 586	3660 588	3674 591	3689 593	3703 595	3717 597	408
178	3732 599	3746 601	3760 603	3775 605	3789 607	3803 609	3818 611	3832 613	3846 616	3860 618	412
180	3875 620	3889 622	3903 624	3918 626	3932 628	3946 630	3960 632	3974 634	3989 636	4003 638	415
182	4017 640	4031 642	4045 644	4059 646	4074 648	4088 650	4102 652	4116 654	4130 656	4144 658	418
184	4158 660	4172 662	4186 664	4200 666	4215 668	4229 670	4243 672	4257 674	4271 676	4285 678	422
186	4299 680	4313 682	4327 684	4341 686	4355 688	4369 690	4382 692	4396 694	4410 696	4424 698	424
188	4438 700	4452 702	4466 704	4480 706	4494 708	4508 710	4521 712	4535 714	4549 716	4563 718	426
190	4577 720	4591 721	4604 723	4618 725	4632 727	4646 729	4660 731	4673 733	4687 735	4701 737	427
192	4715 739	4728 741	4742 743	4756 745	4770 747	4783 748	4797 750	4811 752	4824 754	4838 756	428
194	4852 758	4865 760	4879 762	4893 764	4906 766	4920 768	4933 769	4947 771	4961 773	4974 775	430
196	4988 777	5001 779	5015 781	5029 783	5042 785	5056 786	5069 788	5083 790	5096 792	5110 794	431
198	5123 796	5137 798	5150 800	5164 801	5177 803	5191 805	5204 807	5218 809	5231 811	5245 813	431
200	5258 815	5272 816	5285 818	5298 820	5312 822	5325 824	5339 826	5352 828	5365 829	5379 831	432
202	5392 833	5406 835	5419 837	5432 839	5446 841	5459 842	5472 844	5486 846	5499 848	5512 850	433
204	5526 852	5539 854	5552 855	5565 857	5579 859	5592 861	5605 863	5619 865	5632 866	5645 868	433
206	5658 870	5672 872	5685 874	5698 876	5711 877	5724 879	5738 881	5751 883	5764 885	5777 887	434
208	5790 888	5803 890	5817 892	5830 894	5843 896	5856 897	5869 899	5882 901	5895 903	5909 905	434
210	5922 907	5935 908	5948 910	5961 912	5974 914	5987 916	6000 917	6013 919	6026 921	6039 923	434
212	6052 925	6065 926	6078 928	6092 930	6105 932	6118 934	6131 935	6144 937	6157 939	6170 941	435
214	6183 943	6195 944	6208 946	6221 948	6234 950	6247 951	6260 953	6273 955	6286 957	6299 959	435
216	6312 960	6325 962	6338 964	6351 966	6364 967	6376 969	6389 971	6402 973	6415 975	6428 976	435
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 3.5 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG300 0 018590 0 0 1 1.0 .00 02501 .990 .000 .000 0 FCOM-02-05-30-024-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 25
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=30.0%		DISTANCE (NM) TIME (MIN)		LR FL 250			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	6441 978	6454 980	6466 982	6479 983	6492 985	6505 987	6518 989	6530 990	6543 992	6556 994	436
220	6569 996	6582 997	6594 999	6607 1001	6620 1003	6633 1005	6645 1006	6658 1008	6671 1010	6684 1012	436
222	6696 1013	6709 1015	6722 1017	6734 1019	6747 1020	6760 1022	6773 1024	6785 1026	6798 1027	6811 1029	436
224	6823 1031	6836 1032	6849 1034	6861 1036	6874 1038	6886 1039	6899 1041	6912 1043	6924 1045	6937 1046	437
226	6949 1048	6962 1050	6975 1052	6987 1053	7000 1055	7012 1057	7025 1058	7037 1060	7050 1062	7063 1064	437
228	7075 1065	7088 1067	7100 1069	7113 1070	7125 1072	7138 1074	7150 1076	7163 1077	7175 1079	7188 1081	437
230	7200 1082	7212 1084	7225 1086	7237 1088	7250 1089	7262 1091	7275 1093	7287 1094	7299 1096	7312 1098	438
232	7324 1099	7337 1101	7349 1103	7361 1105	7374 1106	7386 1108	7399 1110	7411 1111	7423 1113	7436 1115	438
234	7448 1116	7460 1118	7473 1120	7485 1121	7497 1123	7510 1125	7522 1126	7534 1128	7546 1130	7559 1131	439
236	7571 1133	7583 1135	7596 1137	7608 1138	7620 1140	7632 1142	7645 1143	7657 1145	7669 1147	7681 1148	440
238	7693 1150	7706 1152	7718 1153	7730 1155	7742 1157	7754 1158	7767 1160	7779 1161	7791 1163	7803 1165	440
240	7815 1166	7827 1168	7839 1170	7852 1171	7864 1173	7876 1175	7888 1176	7900 1178	7912 1180	7924 1181	441
242	7936 1183	7948 1185	7960 1186	7972 1188	7984 1189	7997 1191	8009 1193	8021 1194	8033 1196	8045 1198	442
244	8057 1199	8069 1201	8081 1202	8093 1204	8105 1206	8117 1207	8129 1209	8141 1211	8153 1212	8165 1214	443
246	8177 1215	8188 1217	8200 1219	8212 1220	8224 1222	8236 1224	8248 1225	8260 1227	8272 1228	8284 1230	444
248	8296 1232	8308 1233	8319 1235	8331 1236	8343 1238	8355 1240	8367 1241	8379 1243	8391 1244	8402 1246	444
250	8414 1248	8426 1249	8438 1251	8450 1252	8462 1254	8473 1256	8485 1257	8497 1259	8509 1260	8520 1262	445
252	8532 1263	8544 1265	8556 1267	8567 1268	8579 1270	8591 1271	8603 1273	8614 1274	8626 1276	8638 1278	446
254	8649 1279	8661 1281	8673 1282	8685 1284	8696 1285	8708 1287	8720 1289	8731 1290	8743 1292	8755 1293	447
256	8766 1295	8778 1296	8789 1298	8801 1300	8813 1301	8824 1303	8836 1304	8847 1306	8859 1307	8871 1309	448
258	8882 1310	8894 1312	8905 1313	8917 1315	8928 1317	8940 1318	8952 1320	8963 1321	8975 1323	8986 1324	449
260	8998 1326	9009 1327	9021 1329	9032 1330	9044 1332	9055 1333	9067 1335	9078 1336	9089 1338	9101 1340	450
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 3.5 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG300 0 01890 0 0 1 1.0 .0 .00 02501 .990 .000 0 FCOM-02-05-30-025-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 37.0%

DISTANCE
(NM)
TIME (MIN)

LR FL 290

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	361 58	378 61	396 64	414 67	432 70	450 73	468 75	486 78	503 81	521 84	373
136	539 87	557 90	574 93	592 95	610 98	628 101	645 104	663 107	681 109	698 112	376
138	716 115	733 118	751 121	769 123	786 126	804 129	821 132	839 134	856 137	874 140	379
140	891 143	909 145	926 148	944 151	961 154	979 156	996 159	1014 162	1031 165	1048 167	382
142	1066 170	1083 173	1100 175	1118 178	1135 181	1152 183	1170 186	1187 189	1204 191	1221 194	385
144	1239 197	1256 199	1273 202	1290 205	1307 207	1325 210	1342 213	1359 215	1376 218	1393 221	388
146	1410 223	1427 226	1444 228	1461 231	1478 234	1496 236	1513 239	1530 241	1547 244	1564 246	393
148	1581 249	1597 252	1614 254	1631 257	1648 259	1665 262	1682 264	1699 267	1716 270	1733 272	396
150	1750 275	1766 277	1783 280	1800 282	1817 285	1834 287	1850 290	1867 292	1884 295	1901 297	399
152	1917 300	1934 302	1951 305	1968 307	1984 310	2001 312	2018 314	2034 317	2051 319	2067 322	405
154	2084 324	2101 327	2117 329	2134 331	2150 334	2167 336	2183 339	2200 341	2216 343	2233 346	412
156	2249 348	2266 350	2282 353	2299 355	2315 358	2331 360	2348 362	2364 365	2380 367	2397 369	416
158	2413 372	2429 374	2446 376	2462 379	2478 381	2495 383	2511 386	2527 388	2543 390	2560 393	419
160	2576 395	2592 397	2608 399	2624 402	2641 404	2657 406	2673 409	2689 411	2705 413	2721 416	421
162	2737 418	2753 420	2769 422	2785 425	2801 427	2818 429	2834 431	2850 434	2866 436	2882 438	423
164	2898 441	2914 443	2929 445	2945 447	2961 450	2977 452	2993 454	3009 456	3025 459	3041 461	424
166	3057 463	3073 465	3089 468	3104 470	3120 472	3136 474	3152 476	3168 479	3184 481	3199 483	425
168	3215 485	3231 488	3247 490	3263 492	3278 494	3294 496	3310 499	3326 501	3341 503	3357 505	426
170	3373 508	3388 510	3404 512	3420 514	3435 516	3451 519	3467 521	3482 523	3498 525	3514 527	426
172	3529 530	3545 532	3560 534	3576 536	3592 538	3607 541	3623 543	3638 545	3654 547	3669 549	427
174	3685 551	3700 554	3716 556	3731 558	3747 560	3762 562	3778 564	3793 567	3809 569	3824 571	427
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 02901 .990 .000 .000 0 FCOM-02-05-30-026-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 27
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 290			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	3840 573	3855 575	3871 577	3886 580	3901 582	3917 584	3932 586	3947 588	3963 590	3978 593	428
178	3994 595	4009 597	4024 599	4039 601	4055 603	4070 605	4085 608	4101 610	4116 612	4131 614	428
180	4147 616	4162 618	4177 620	4192 623	4207 625	4223 627	4238 629	4253 631	4268 633	4283 635	429
182	4299 637	4314 640	4329 642	4344 644	4359 646	4374 648	4389 650	4405 652	4420 654	4435 656	429
184	4450 659	4465 661	4480 663	4495 665	4510 667	4525 669	4540 671	4555 673	4570 675	4585 677	429
186	4600 680	4615 682	4630 684	4645 686	4660 688	4675 690	4690 692	4705 694	4720 696	4735 698	430
188	4750 700	4764 702	4779 705	4794 707	4809 709	4824 711	4839 713	4854 715	4868 717	4883 719	430
190	4898 721	4913 723	4928 725	4943 727	4957 729	4972 731	4987 733	5002 735	5016 738	5031 740	431
192	5046 742	5061 744	5075 746	5090 748	5105 750	5119 752	5134 754	5149 756	5163 758	5178 760	432
194	5193 762	5207 764	5222 766	5237 768	5251 770	5266 772	5280 774	5295 776	5309 778	5324 780	433
196	5339 782	5353 784	5368 786	5382 788	5397 790	5411 792	5426 794	5440 796	5455 798	5469 800	433
198	5484 802	5498 804	5513 806	5527 808	5541 810	5556 812	5570 814	5585 816	5599 818	5613 820	434
200	5628 822	5642 824	5657 826	5671 828	5685 830	5700 832	5714 834	5728 836	5743 838	5757 840	435
202	5771 842	5785 844	5800 846	5814 848	5828 850	5842 852	5857 854	5871 856	5885 858	5899 860	436
204	5914 861	5928 863	5942 865	5956 867	5970 869	5984 871	5999 873	6013 875	6027 877	6041 879	437
206	6055 881	6069 883	6083 885	6097 887	6111 889	6126 891	6140 892	6154 894	6168 896	6182 898	439
208	6196 900	6210 902	6224 904	6238 906	6252 908	6266 910	6280 912	6294 913	6308 915	6322 917	440
210	6336 919	6349 921	6363 923	6377 925	6391 927	6405 929	6419 931	6433 932	6447 934	6461 936	441
212	6474 938	6488 940	6502 942	6516 944	6530 946	6544 947	6557 949	6571 951	6585 953	6599 955	442
214	6613 957	6626 959	6640 960	6654 962	6667 964	6681 966	6695 968	6709 970	6722 972	6736 973	444
216	6750 975	6763 977	6777 979	6791 981	6804 983	6818 984	6832 986	6845 988	6859 990	6872 992	445
PACK FLOW LO ΔFUEL= − 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 02901 .990 .000 0 FCOM-02-05-30-027-150

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 02901 .990 .000 .000 0 FCOM-02-05-30-028-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 29
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=37.0%			DISTANCE (NM) TIME (MIN)		LR FL 310			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	374 58	393 61	411 64	430 67	448 70	467 72	485 75	503 78	522 81	540 84	390
136	559 86	577 89	595 92	614 95	632 98	651 100	669 103	687 106	705 109	724 112	393
138	742 114	760 117	778 120	797 123	815 125	833 128	851 131	869 134	887 136	906 139	396
140	924 142	942 144	960 147	978 150	996 152	1014 155	1032 158	1050 160	1068 163	1086 166	403
142	1104 168	1122 171	1140 173	1157 176	1175 179	1193 181	1211 184	1229 186	1247 189	1265 192	410
144	1282 194	1300 197	1318 199	1336 202	1353 205	1371 207	1389 210	1406 212	1424 215	1442 217	414
146	1459 220	1477 222	1495 225	1512 227	1530 230	1547 233	1565 235	1582 238	1600 240	1617 243	416
148	1635 245	1652 248	1670 250	1687 253	1705 255	1722 258	1740 260	1757 263	1774 265	1792 267	419
150	1809 270	1826 272	1844 275	1861 277	1878 280	1896 282	1913 285	1930 287	1948 290	1965 292	421
152	1982 295	1999 297	2016 300	2034 302	2051 304	2068 307	2085 309	2102 312	2120 314	2137 317	421
154	2154 319	2171 321	2188 324	2205 326	2222 329	2239 331	2256 334	2273 336	2291 338	2308 341	422
156	2325 343	2342 346	2359 348	2376 351	2393 353	2410 355	2427 358	2443 360	2460 363	2477 365	423
158	2494 367	2511 370	2528 372	2545 375	2562 377	2579 379	2596 382	2612 384	2629 386	2646 389	424
160	2663 391	2680 394	2697 396	2713 398	2730 401	2747 403	2764 405	2780 408	2797 410	2814 413	424
162	2831 415	2847 417	2864 420	2881 422	2897 424	2914 427	2931 429	2947 431	2964 434	2980 436	424
164	2997 438	3014 441	3030 443	3047 445	3063 448	3080 450	3096 452	3113 455	3130 457	3146 459	425
166	3163 462	3179 464	3196 466	3212 469	3228 471	3245 473	3261 476	3278 478	3294 480	3311 483	425
168	3327 485	3343 487	3360 490	3376 492	3393 494	3409 497	3425 499	3442 501	3458 503	3474 506	426
170	3490 508	3507 510	3523 513	3539 515	3556 517	3572 519	3588 522	3604 524	3620 526	3637 529	426
172	3653 531	3669 533	3685 535	3701 538	3718 540	3734 542	3750 544	3766 547	3782 549	3798 551	427
174	3814 553	3830 556	3846 558	3862 560	3879 563	3895 565	3911 567	3927 569	3943 571	3959 574	428
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %		TOTAL ANTI ICE ON ΔFUEL = + 3.5 %			

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 03101 .990 .000 0 FCOM-02-05-30-029-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0%		DISTANCE (NM) TIME (MIN)		LR FL 310			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	3975 576	3991 578	4007 580	4022 583	4038 585	4054 587	4070 589	4086 592	4102 594	4118 596	429
178	4134 598	4150 600	4166 603	4181 605	4197 607	4213 609	4229 612	4245 614	4261 616	4276 618	430
180	4292 620	4308 623	4324 625	4339 627	4355 629	4371 631	4387 633	4402 636	4418 638	4434 640	431
182	4449 642	4465 644	4481 647	4496 649	4512 651	4528 653	4543 655	4559 657	4574 660	4590 662	431
184	4606 664	4621 666	4637 668	4652 670	4668 673	4683 675	4699 677	4714 679	4730 681	4745 683	433
186	4761 685	4776 688	4792 690	4807 692	4823 694	4838 696	4853 698	4869 700	4884 702	4900 705	434
188	4915 707	4930 709	4946 711	4961 713	4976 715	4992 717	5007 719	5022 721	5037 724	5053 726	435
190	5068 728	5083 730	5099 732	5114 734	5129 736	5144 738	5159 740	5175 742	5190 744	5205 747	437
192	5220 749	5235 751	5250 753	5266 755	5281 757	5296 759	5311 761	5326 763	5341 765	5356 767	438
194	5371 769	5386 771	5401 773	5416 775	5431 777	5446 779	5461 782	5476 784	5491 786	5506 788	440
196	5521 790	5536 792	5551 794	5566 796	5581 798	5596 800	5611 802	5626 804	5640 806	5655 808	442
198	5670 810	5685 812	5700 814	5715 816	5730 818	5744 820	5759 822	5774 824	5789 826	5804 828	443
200	5818 830	5833 832	5848 834	5862 836	5877 838	5892 840	5907 842	5921 843	5936 845	5951 847	445
202	5965 849	5980 851	5995 853	6009 855	6024 857	6038 859	6053 861	6068 863	6082 865	6097 866	459
204	6111 868	6126 870	6140 872	6155 874	6170 876	6184 878	6199 880	6213 882	6228 883	6242 885	460
206	6257 887	6271 889	6285 891	6300 893	6314 895	6329 897	6343 899	6357 900	6372 902	6386 904	460
208	6401 906	6415 908	6429 910	6444 912	6458 914	6472 915	6487 917	6501 919	6515 921	6530 923	461
210	6544 925	6558 927	6572 928	6587 930	6601 932	6615 934	6629 936	6644 938	6658 939	6672 941	462
212	6686 943	6700 945	6714 947	6729 949	6743 950	6757 952	6771 954	6785 956	6799 958	6813 960	463
214	6827 961	6841 963	6855 965	6870 967	6884 969	6898 970	6912 972	6926 974	6940 976	6954 978	464
216	6968 980	6982 981	6996 983	7010 985	7023 987	7037 989	7051 990	7065 992	7079 994	7093 996	465
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1 %			ΔFUEL = + 2.5 %			ΔFUEL = + 3.5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .00 03101 .990 .000 .000 0 FCOM-02-05-30-030-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 310			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7107 997	7121 999	7135 1001	7149 1003	7162 1005	7176 1006	7190 1008	7204 1010	7218 1012	7232 1013	466
220	7245 1015	7259 1017	7273 1019	7287 1021	7301 1022	7314 1024	7328 1026	7342 1028	7355 1029	7369 1031	467
222	7383 1033	7397 1035	7410 1036	7424 1038	7438 1040	7451 1042	7465 1043	7479 1045	7492 1047	7506 1049	467
224	7520 1050	7533 1052	7547 1054	7560 1056	7574 1057	7588 1059	7601 1061	7615 1063	7628 1064	7642 1066	468
226	7655 1068	7669 1070	7682 1071	7696 1073	7709 1075	7723 1077	7736 1078	7750 1080	7763 1082	7777 1083	468
228	7790 1085	7804 1087	7817 1089	7830 1090	7844 1092	7857 1094	7871 1095	7884 1097	7897 1099	7911 1101	468
230	7924 1102	7938 1104	7951 1106	7964 1107	7978 1109	7991 1111	8004 1113	8017 1114	8031 1116	8044 1118	469
232	8057 1119	8071 1121	8084 1123	8097 1124	8110 1126	8124 1128	8137 1130	8150 1131	8163 1133	8176 1135	469
234	8190 1136	8203 1138	8216 1140	8229 1141	8242 1143	8255 1145	8269 1146	8282 1148	8295 1150	8308 1151	470
236	8321 1153	8334 1155	8347 1156	8360 1158	8373 1160	8386 1161	8399 1163	8412 1165	8425 1166	8438 1168	470
238	8451 1170	8464 1171	8477 1173	8490 1175	8503 1176	8516 1178	8529 1180	8542 1181	8555 1183	8568 1185	470
240	8581 1186	8594 1188	8607 1190	8620 1191	8632 1193	8645 1194	8658 1196	8671 1198	8684 1199	8697 1201	470
242	8710 1203	8722 1204	8735 1206	8748 1208	8761 1209	8774 1211	8786 1212	8799 1214	8812 1216	8825 1217	471
244	8837 1219	8850 1221	8863 1222	8876 1224	8888 1225	8901 1227	8914 1229	8926 1230	8939 1232	8952 1234	471
246	8964 1235	8977 1237	8990 1238	9002 1240	9015 1242	9028 1243	9040 1245	9053 1246	9065 1248	9078 1250	471
248	9091 1251	9103 1253	9116 1254	9128 1256	9141 1258	9153 1259	9166 1261	9178 1262	9191 1264	9203 1266	471
250	9216 1267	9228 1269	9241 1270	9253 1272	9266 1274	9278 1275	9291 1277	9303 1278	9315 1280	9328 1281	471
252	9340 1283	9353 1285	9365 1286	9377 1288	9390 1289	9402 1291	9414 1292	9427 1294	9439 1296	9451 1297	471
254	9464 1299	9476 1300	9488 1302	9500 1303	9513 1305	9525 1307	9537 1308	9549 1310	9562 1311	9574 1313	471
256	9586 1314	9598 1316	9610 1317	9623 1319	9635 1321	9647 1322	9659 1324	9671 1325	9683 1327	9696 1328	471
258	9708 1330	9720 1331	9732 1333	9744 1334	9756 1336	9768 1338	9780 1339	9792 1341	9804 1342	9816 1344	471
260	9828 1345	9840 1347	9852 1348	9864 1350	9876 1351	9888 1353	9900 1354	9912 1356	9924 1357	9936 1359	471
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG370 0 018990 0 0 1 1.0 .0 .00 03101 .990 .000 0 FCOM-02-05-30-031-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 330			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	386 57	405 59	424 62	443 65	462 68	482 70	501 73	520 76	539 79	558 81	413
136	577 84	595 87	614 90	633 92	652 95	671 98	690 101	709 103	728 106	746 109	416
138	765 111	784 114	803 117	821 119	840 122	859 125	878 127	896 130	915 133	934 136	418
140	952 138	971 141	990 144	1008 146	1027 149	1046 152	1064 154	1083 157	1101 160	1120 162	419
142	1138 165	1157 167	1175 170	1194 173	1212 175	1231 178	1249 181	1268 183	1286 186	1305 189	420
144	1323 191	1341 194	1360 196	1378 199	1397 202	1415 204	1433 207	1452 210	1470 212	1488 215	420
146	1507 217	1525 220	1543 223	1561 225	1580 228	1598 230	1616 233	1634 236	1652 238	1671 241	421
148	1689 243	1707 246	1725 249	1743 251	1761 254	1780 256	1798 259	1816 261	1834 264	1852 267	421
150	1870 269	1888 272	1906 274	1924 277	1942 279	1960 282	1978 285	1996 287	2014 290	2032 292	422
152	2050 295	2068 297	2085 300	2103 302	2121 305	2139 307	2157 310	2175 313	2193 315	2210 318	422
154	2228 320	2246 323	2264 325	2282 328	2299 330	2317 333	2335 335	2353 338	2370 340	2388 343	423
156	2406 345	2423 348	2441 350	2459 353	2476 355	2494 358	2512 360	2529 363	2547 365	2564 368	423
158	2582 370	2599 373	2617 375	2634 378	2652 380	2669 383	2687 385	2704 388	2722 390	2739 392	424
160	2757 395	2774 397	2792 400	2809 402	2826 405	2844 407	2861 410	2879 412	2896 415	2913 417	425
162	2931 419	2948 422	2965 424	2982 427	3000 429	3017 432	3034 434	3051 436	3069 439	3086 441	426
164	3103 444	3120 446	3137 449	3155 451	3172 453	3189 456	3206 458	3223 461	3240 463	3257 465	427
166	3274 468	3291 470	3308 473	3325 475	3342 477	3360 480	3376 482	3393 484	3410 487	3427 489	428
168	3444 492	3461 494	3478 496	3495 499	3512 501	3529 503	3546 506	3563 508	3580 510	3596 513	430
170	3613 515	3630 517	3647 520	3664 522	3680 524	3697 527	3714 529	3731 531	3747 534	3764 536	431
172	3781 538	3798 541	3814 543	3831 545	3848 548	3864 550	3881 552	3897 554	3914 557	3931 559	433
174	3947 561	3964 564	3980 566	3997 568	4013 570	4030 573	4047 575	4063 577	4079 580	4096 582	435
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL= - 0.5 %			ΔFUEL = + 1 %			ΔFUEL = + 2.5 %			ΔFUEL = + 3.5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .00 03301 .990 .000 .000 0 FCOM-02-05-30-032-150

	FLIGHT PLANNING		2.05.30	P 33
	INTEGRATED CRUISE		SEQ 150	REV 11

FLIGHT CREW OPERATING MANUAL

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 330				
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4112 584	4129 586	4145 589	4162 591	4178 593	4195 595	4211 598	4227 600	4244 602	4260 604	437
178	4276 607	4293 609	4309 611	4325 613	4342 616	4358 618	4374 620	4391 622	4407 624	4423 627	438
180	4439 629	4455 631	4472 633	4488 635	4504 638	4520 640	4536 642	4553 644	4569 646	4585 648	440
182	4601 650	4617 652	4633 655	4649 657	4665 659	4681 661	4697 663	4713 665	4729 667	4745 669	455
184	4761 672	4777 674	4793 676	4809 678	4825 680	4841 682	4857 684	4873 686	4889 688	4905 690	456
186	4921 692	4937 695	4952 697	4968 699	4984 701	5000 703	5016 705	5032 707	5047 709	5063 711	457
188	5079 713	5095 715	5110 717	5126 719	5142 721	5158 723	5173 726	5189 728	5205 730	5220 732	458
190	5236 734	5252 736	5267 738	5283 740	5299 742	5314 744	5330 746	5345 748	5361 750	5377 752	459
192	5392 754	5408 756	5423 758	5439 760	5454 762	5470 764	5485 766	5501 768	5516 770	5531 772	460
194	5547 774	5562 776	5578 778	5593 780	5608 782	5624 784	5639 786	5655 788	5670 790	5685 792	462
196	5701 794	5716 796	5731 798	5746 800	5762 802	5777 804	5792 806	5807 808	5823 810	5838 812	463
198	5853 814	5868 816	5883 818	5899 820	5914 822	5929 824	5944 826	5959 828	5974 830	5989 832	464
200	6005 834	6020 835	6035 837	6050 839	6065 841	6080 843	6095 845	6110 847	6125 849	6140 851	465
202	6155 853	6170 855	6185 857	6200 859	6215 861	6230 863	6245 864	6260 866	6274 868	6289 870	465
204	6304 872	6319 874	6334 876	6349 878	6364 880	6379 882	6393 884	6408 886	6423 887	6438 889	466
206	6453 891	6467 893	6482 895	6497 897	6512 899	6526 901	6541 903	6556 905	6570 906	6585 908	466
208	6600 910	6615 912	6629 914	6644 916	6659 918	6673 920	6688 922	6702 923	6717 925	6732 927	466
210	6746 929	6761 931	6775 933	6790 935	6804 937	6819 938	6833 940	6848 942	6862 944	6877 946	466
212	6892 948	6906 950	6920 951	6935 953	6949 955	6964 957	6978 959	6993 961	7007 963	7021 964	467
214	7036 966	7050 968	7065 970	7079 972	7093 974	7108 976	7122 977	7136 979	7151 981	7165 983	467
216	7179 985	7193 987	7208 988	7222 990	7236 992	7250 994	7265 996	7279 998	7293 999	7307 1001	467
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL= + 1 %			ENGINE ANTI ICE ON ΔFUEL= + 2.5 %			TOTAL ANTI ICE ON ΔFUEL= + 3.5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 03301 .990 .000 0 FCOM-02-05-30-033-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0%		DISTANCE (NM) TIME (MIN)		LR FL 330			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7321 1003	7336 1005	7350 1007	7364 1008	7378 1010	7392 1012	7406 1014	7420 1016	7435 1018	7449 1019	467
220	7463 1021	7477 1023	7491 1025	7505 1027	7519 1028	7533 1030	7547 1032	7561 1034	7575 1036	7589 1037	467
222	7603 1039	7617 1041	7631 1043	7645 1045	7659 1046	7673 1048	7687 1050	7701 1052	7715 1053	7729 1055	467
224	7742 1057	7756 1059	7770 1061	7784 1062	7798 1064	7812 1066	7826 1068	7839 1069	7853 1071	7867 1073	467
226	7881 1075	7895 1077	7908 1078	7922 1080	7936 1082	7950 1084	7963 1085	7977 1087	7991 1089	8004 1091	467
228	8018 1092	8032 1094	8045 1096	8059 1098	8073 1099	8086 1101	8100 1103	8114 1105	8127 1106	8141 1108	468
230	8154 1110	8168 1112	8181 1113	8195 1115	8209 1117	8222 1119	8236 1120	8249 1122	8263 1124	8276 1126	468
232	8290 1127	8303 1129	8316 1131	8330 1132	8343 1134	8357 1136	8370 1138	8383 1139	8397 1141	8410 1143	468
234	8424 1144	8437 1146	8450 1148	8464 1150	8477 1151	8490 1153	8503 1155	8517 1156	8530 1158	8543 1160	468
236	8557 1161	8570 1163	8583 1165	8596 1167	8609 1168	8623 1170	8636 1172	8649 1173	8662 1175	8675 1177	469
238	8688 1178	8702 1180	8715 1182	8728 1183	8741 1185	8754 1187	8767 1188	8780 1190	8793 1192	8806 1193	469
240	8819 1195	8832 1197	8845 1198	8858 1200	8871 1202	8884 1203	8897 1205	8910 1207	8923 1208	8936 1210	469
242	8949 1212	8962 1213	8975 1215	8988 1217	9000 1218	9013 1220	9026 1222	9039 1223	9052 1225	9065 1226	469
244	9078 1228	9090 1230	9103 1231	9116 1233	9129 1235	9141 1236	9154 1238	9167 1240	9180 1241	9192 1243	469
246	9205 1244	9218 1246	9230 1248	9243 1249	9256 1251	9268 1253	9281 1254	9294 1256	9306 1257	9319 1259	469
248	9331 1261	9344 1262	9356 1264	9369 1265	9382 1267	9394 1269	9407 1270	9419 1272	9432 1273	9444 1275	469
250	9457 1277	9469 1278	9481 1280	9494 1281	9506 1283	9519 1285	9531 1286	9543 1288	9556 1289	9568 1291	468
252	9581 1292	9593 1294	9605 1296	9617 1297	9630 1299	9642 1300	9654 1302	9667 1303	9679 1305	9691 1307	469
254	9703 1308	9715 1310	9728 1311	9740 1313	9752 1314	9764 1316	9776 1317	9788 1319	9800 1321	9812 1322	470
256	9825 1324	9837 1325	9849 1327	9861 1328	9873 1330	9885 1331	9897 1333	9909 1334	9921 1336	9933 1337	470
258	9945 1339	9956 1340	9968 1342	9980 1344	9992 1345	10004 1347	10016 1348	10028 1350	10040 1351	10051 1353	471
260	10063 1354	10075 1356	10087 1357	10099 1359	10110 1360	10122 1362	10134 1363	10146 1365	10157 1366	10169 1368	471
PACK FLOW LO Δ FUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON Δ FUEL = + 1 %			ENGINE ANTI ICE ON Δ FUEL = + 2.5 %			TOTAL ANTI ICE ON Δ FUEL = + 3.5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .00 03301 .990 .000 .000 0 FCOM-02-05-30-034-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30 P 35	
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 350			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	400 58	419 60	439 63	459 66	479 69	499 72	518 75	538 77	558 80	578 83	417
136	597 86	617 89	637 92	656 94	676 97	696 100	715 103	735 106	754 108	774 111	418
138	793 114	813 117	832 120	852 122	872 125	891 128	910 131	930 134	949 136	969 139	418
140	988 142	1008 145	1027 147	1046 150	1066 153	1085 156	1104 159	1124 161	1143 164	1162 167	419
142	1182 170	1201 172	1220 175	1239 178	1258 181	1278 183	1297 186	1316 189	1335 192	1354 194	420
144	1373 197	1393 200	1412 202	1431 205	1450 208	1469 211	1488 213	1507 216	1526 219	1545 221	421
146	1564 224	1583 227	1602 229	1621 232	1640 235	1659 238	1677 240	1696 243	1715 246	1734 248	422
148	1753 251	1772 254	1791 256	1809 259	1828 262	1847 264	1866 267	1884 270	1903 272	1922 275	423
150	1940 277	1959 280	1978 283	1996 285	2015 288	2034 291	2052 293	2071 296	2089 298	2108 301	425
152	2127 304	2145 306	2164 309	2182 312	2201 314	2219 317	2238 319	2256 322	2274 324	2293 327	426
154	2311 330	2330 332	2348 335	2366 337	2385 340	2403 342	2421 345	2440 348	2458 350	2476 353	428
156	2494 355	2513 358	2531 360	2549 363	2567 365	2586 368	2604 370	2622 373	2640 376	2658 378	430
158	2676 381	2694 383	2712 386	2731 388	2749 391	2767 393	2785 396	2803 398	2821 401	2839 403	432
160	2857 406	2875 408	2893 411	2910 413	2928 415	2946 418	2964 420	2982 423	3000 425	3018 428	434
162	3036 430	3053 433	3071 435	3089 437	3107 440	3125 442	3142 445	3160 447	3178 449	3195 452	437
164	3213 454	3231 456	3248 459	3266 461	3284 463	3301 466	3319 468	3337 470	3354 473	3372 475	452
166	3389 477	3407 480	3424 482	3442 484	3459 487	3477 489	3494 491	3512 494	3529 496	3547 498	453
168	3564 501	3582 503	3599 505	3616 507	3634 510	3651 512	3668 514	3686 517	3703 519	3720 521	454
170	3738 523	3755 526	3772 528	3789 530	3807 532	3824 535	3841 537	3858 539	3875 542	3893 544	456
172	3910 546	3927 548	3944 551	3961 553	3978 555	3995 557	4012 559	4030 562	4047 564	4064 566	457
174	4081 568	4098 571	4115 573	4132 575	4149 577	4166 580	4182 582	4199 584	4216 586	4233 588	458
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL= + 1 %			ENGINE ANTI ICE ON ΔFUEL= + 2.5 %			TOTAL ANTI ICE ON ΔFUEL= + 3.5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 03501 .990 .000 0 FCOM-02-05-30-035-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0%		DISTANCE (NM) TIME (MIN)		LR FL 350			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4250 591	4267 593	4284 595	4301 597	4318 599	4334 602	4351 604	4368 606	4385 608	4401 610	460
178	4418 612	4435 615	4452 617	4468 619	4485 621	4502 623	4518 626	4535 628	4552 630	4568 632	461
180	4585 634	4602 636	4618 639	4635 641	4652 643	4668 645	4685 647	4701 649	4718 651	4734 654	461
182	4751 656	4767 658	4784 660	4800 662	4817 664	4833 666	4850 669	4866 671	4883 673	4899 675	461
184	4916 677	4932 679	4948 681	4965 684	4981 686	4997 688	5014 690	5030 692	5046 694	5063 696	462
186	5079 698	5095 701	5111 703	5128 705	5144 707	5160 709	5176 711	5193 713	5209 715	5225 717	462
188	5241 719	5257 722	5273 724	5290 726	5306 728	5322 730	5338 732	5354 734	5370 736	5386 738	462
190	5402 740	5418 742	5434 744	5450 747	5466 749	5482 751	5498 753	5514 755	5530 757	5546 759	463
192	5562 761	5578 763	5594 765	5610 767	5626 769	5642 771	5657 773	5673 775	5689 778	5705 780	463
194	5721 782	5737 784	5752 786	5768 788	5784 790	5800 792	5815 794	5831 796	5847 798	5863 800	463
196	5878 802	5894 804	5910 806	5925 808	5941 810	5957 812	5972 814	5988 816	6003 818	6019 820	464
198	6035 822	6050 824	6066 826	6081 828	6097 830	6112 832	6128 834	6143 836	6159 838	6174 840	464
200	6190 842	6205 844	6221 846	6236 848	6252 850	6267 852	6282 854	6298 856	6313 858	6328 860	464
202	6344 862	6359 864	6374 866	6390 868	6405 870	6420 872	6436 874	6451 876	6466 878	6481 880	464
204	6497 882	6512 884	6527 886	6542 888	6557 890	6573 892	6588 894	6603 896	6618 898	6633 900	464
206	6648 902	6663 904	6678 905	6694 907	6709 909	6724 911	6739 913	6754 915	6769 917	6784 919	464
208	6799 921	6814 923	6829 925	6844 927	6859 929	6873 931	6888 933	6903 935	6918 936	6933 938	464
210	6948 940	6963 942	6978 944	6992 946	7007 948	7022 950	7037 952	7052 954	7066 956	7081 957	465
212	7096 959	7110 961	7125 963	7140 965	7155 967	7169 969	7184 971	7199 973	7213 974	7228 976	465
214	7242 978	7257 980	7272 982	7286 984	7301 986	7315 988	7330 990	7344 991	7359 993	7373 995	466
216	7388 997	7402 999	7417 1001	7431 1003	7445 1004	7460 1006	7474 1008	7489 1010	7503 1012	7517 1014	466
PACK FLOW LO ΔFUEL = - 0.5 %				PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %		ENGINE ANTI ICE ON ΔFUEL = + 2.5 %		TOTAL ANTI ICE ON ΔFUEL = + 3.5 %			

10B -08FOA340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .00 03501 .990 .000 0 FCOM-02-05-30-036-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 350			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7532 1016	7546 1017	7560 1019	7575 1021	7589 1023	7603 1025	7617 1027	7632 1028	7646 1030	7660 1032	467
220	7674 1034	7689 1036	7703 1037	7717 1039	7731 1041	7745 1043	7759 1045	7774 1047	7788 1048	7802 1050	467
222	7816 1052	7830 1054	7844 1056	7858 1057	7872 1059	7886 1061	7900 1063	7914 1065	7928 1066	7942 1068	467
224	7956 1070	7970 1072	7984 1074	7998 1075	8012 1077	8026 1079	8040 1081	8053 1083	8067 1084	8081 1086	467
226	8095 1088	8109 1090	8123 1091	8136 1093	8150 1095	8164 1097	8178 1099	8191 1100	8205 1102	8219 1104	466
228	8233 1106	8246 1107	8260 1109	8274 1111	8287 1113	8301 1114	8315 1116	8328 1118	8342 1120	8355 1121	466
230	8369 1123	8382 1125	8396 1127	8409 1128	8423 1130	8436 1132	8450 1134	8463 1135	8477 1137	8490 1139	467
232	8504 1140	8517 1142	8530 1144	8544 1146	8557 1147	8570 1149	8584 1151	8597 1152	8610 1154	8623 1156	467
234	8637 1158	8650 1159	8663 1161	8676 1163	8689 1164	8703 1166	8716 1168	8729 1169	8742 1171	8755 1173	468
236	8768 1174	8781 1176	8794 1178	8807 1179	8820 1181	8833 1183	8846 1184	8859 1186	8872 1188	8885 1189	468
238	8898 1191	8911 1193	8924 1194	8937 1196	8950 1198	8963 1199	8976 1201	8988 1203	9001 1204	9014 1206	468
240	9027 1208	9040 1209	9052 1211	9065 1212	9078 1214	9091 1216	9103 1217	9116 1219	9129 1221	9141 1222	468
242	9154 1224	9166 1225	9179 1227	9192 1229	9204 1230	9217 1232	9229 1233	9242 1235	9254 1237	9267 1238	468
244	9279 1240	9292 1241	9304 1243	9317 1245							468
246											
248											
250											
252											
254											
256											
258											
260											
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03501 .990 .000 0 FCOM-02-05-30-037-150

INTEGRATED CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFFISA
CG = 37.0%DISTANCE
(NM)
TIME (MIN)

LR FL 370

WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	416 59	436 62	457 65	477 68	498 71	518 74	539 77	559 80	580 83	600 86	421
136	621 89	641 92	662 94	682 97	702 100	723 103	743 106	763 109	784 112	804 115	422
138	824 117	844 120	865 123	885 126	905 129	925 132	946 135	966 137	986 140	1006 143	424
140	1026 146	1046 149	1066 152	1086 154	1106 157	1126 160	1146 163	1166 166	1186 168	1206 171	426
142	1226 174	1246 177	1266 180	1286 182	1306 185	1326 188	1345 191	1365 194	1385 196	1405 199	428
144	1424 202	1444 205	1464 207	1484 210	1503 213	1523 215	1543 218	1562 221	1582 224	1602 226	431
146	1621 229	1641 232	1660 234	1680 237	1699 240	1719 242	1738 245	1758 248	1777 250	1797 253	433
148	1816 255	1836 258	1855 261	1874 263	1894 266	1913 268	1932 271	1952 273	1971 276	1990 279	449
150	2009 281	2029 284	2048 286	2067 289	2086 291	2106 294	2125 296	2144 299	2163 302	2182 304	451
152	2201 307	2220 309	2239 312	2258 314	2277 317	2296 319	2315 322	2334 324	2353 327	2372 329	453
154	2391 332	2410 334	2429 337	2448 339	2467 342	2486 344	2505 347	2523 349	2542 352	2561 354	454
156	2580 357	2599 359	2617 362	2636 364	2655 366	2673 369	2692 371	2711 374	2729 376	2748 379	456
158	2767 381	2785 384	2804 386	2822 388	2841 391	2860 393	2878 396	2897 398	2915 401	2934 403	458
160	2952 405	2970 408	2989 410	3007 413	3026 415	3044 417	3062 420	3081 422	3099 425	3117 427	459
162	3136 429	3154 432	3172 434	3191 437	3209 439	3227 441	3245 444	3264 446	3282 449	3300 451	459
164	3318 453	3337 456	3355 458	3373 460	3391 463	3409 465	3427 467	3445 470	3463 472	3481 475	460
166	3500 477	3518 479	3536 482	3554 484	3572 486	3590 489	3608 491	3626 493	3644 496	3661 498	460
168	3679 500	3697 503	3715 505	3733 507	3751 510	3769 512	3787 514	3804 517	3822 519	3840 521	460
170	3858 524	3876 526	3893 528	3911 531	3929 533	3947 535	3964 537	3982 540	4000 542	4017 544	461
172	4035 547	4052 549	4070 551	4088 554	4105 556	4123 558	4140 560	4158 563	4175 565	4193 567	461
174	4210 570	4228 572	4245 574	4263 576	4280 579	4298 581	4315 583	4333 585	4350 588	4367 590	462
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .00 03701 .990 .000 0 FCOM-02-05-30-038-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 370			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4385 592	4402 594	4419 597	4437 599	4454 601	4471 603	4489 606	4506 608	4523 610	4540 612	462
178	4558 615	4575 617	4592 619	4609 621	4626 624	4643 626	4661 628	4678 630	4695 632	4712 635	462
180	4729 637	4746 639	4763 641	4780 643	4797 646	4814 648	4831 650	4848 652	4865 655	4882 657	462
182	4899 659	4916 661	4933 663	4950 665	4967 668	4984 670	5000 672	5017 674	5034 676	5051 679	463
184	5068 681	5085 683	5101 685	5118 687	5135 689	5152 692	5168 694	5185 696	5202 698	5218 700	463
186	5235 702	5252 705	5268 707	5285 709	5302 711	5318 713	5335 715	5351 718	5368 720	5384 722	463
188	5401 724	5417 726	5434 728	5450 730	5467 732	5483 735	5500 737	5516 739	5533 741	5549 743	463
190	5565 745	5582 747	5598 749	5614 752	5631 754	5647 756	5663 758	5680 760	5696 762	5712 764	464
192	5728 766	5744 768	5761 770	5777 773	5793 775	5809 777	5825 779	5841 781	5857 783	5874 785	464
194	5890 787	5906 789	5922 791	5938 793	5954 795	5970 798	5986 800	6002 802	6018 804	6034 806	465
196	6050 808	6065 810	6081 812	6097 814	6113 816	6129 818	6145 820	6160 822	6176 824	6192 826	465
198	6208 828	6224 830	6239 832	6255 834	6271 836	6286 838	6302 840	6318 842	6333 844	6349 846	466
200	6365 848	6380 850	6396 852	6411 854	6427 856	6442 858	6458 860	6473 862	6489 864	6504 866	466
202	6520 868	6535 870	6551 872	6566 874	6581 876	6597 878	6612 880	6628 882	6643 884	6658 886	467
204	6674 888	6689 890	6704 892	6719 894	6735 896	6750 898	6765 900	6780 902	6796 904	6811 906	467
206	6826 908	6841 910	6856 912	6871 914	6886 915	6901 917	6917 919	6932 921	6947 923	6962 925	466
208	6977 927	6992 929	7007 931	7022 933	7037 935	7051 937	7066 939	7081 941	7096 942	7111 944	466
210	7126 946	7141 948	7155 950	7170 952	7185 954	7200 956	7214 958	7229 960	7244 961	7259 963	467
212	7273 965	7288 967	7302 969	7317 971	7332 973	7346 975	7361 976	7375 978	7390 980	7404 982	467
214	7419 984	7433 986	7448 988	7462 989	7476 991	7491 993	7505 995	7519 997	7534 999	7548 1001	467
216	7562 1002	7577 1004	7591 1006	7605 1008	7619 1010	7634 1012	7648 1013	7662 1015	7676 1017	7690 1019	467
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL= - 0.5 %			ΔFUEL= + 1 %			ΔFUEL= + 2.5 %			ΔFUEL= + 3.5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 03701 .990 .000 0 FCOM-02-05-30-039-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0%		DISTANCE (NM) TIME (MIN)		LR FL 370			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
218	7704 1021	7719 1022	7733 1024	7747 1026	7761 1028	7775 1030	7789 1031	7803 1033	7817 1035	7831 1037	467
220	7845 1039	7858 1040	7872 1042	7886 1044	7900 1046	7914 1048	7928 1049	7941 1051	7955 1053	7969 1055	467
222	7983 1056	7996 1058	8010 1060	8024 1062	8037 1063	8051 1065	8065 1067	8078 1069	8092 1070	8105 1072	467
224	8119 1074	8133 1076	8146 1077	8160 1079							466
226											
228											
230											
232											
234											
236											
238											
240											
242											
244											
246											
248											
250											
252											
254											
256											
258											
260											
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08FOA340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03701 .990 .000 .000 0 FCOM-02-05-30-040-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 41
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF			ISA CG=37.0%			DISTANCE (NM) TIME (MIN)		LR FL 390			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	429 59	451 62	472 64	493 67	514 70	536 73	557 76	578 79	599 81	620 84	450
136	641 87	662 90	683 93	704 95	725 98	746 101	767 104	788 106	809 109	830 112	452
138	851 115	872 118	893 120	914 123	934 126	955 129	976 131	997 134	1017 137	1038 140	454
140	1059 142	1080 145	1100 148	1121 150	1141 153	1162 156	1183 159	1203 161	1224 164	1244 167	455
142	1265 169	1285 172	1306 175	1326 177	1347 180	1367 183	1388 185	1408 188	1428 191	1449 193	457
144	1469 196	1489 199	1509 201	1530 204	1550 207	1570 209	1590 212	1611 215	1631 217	1651 220	459
146	1671 222	1691 225	1711 228	1732 230	1752 233	1772 236	1792 238	1812 241	1832 243	1852 246	459
148	1872 249	1892 251	1912 254	1932 257	1952 259	1972 262	1992 264	2011 267	2031 270	2051 272	460
150	2071 275	2091 277	2111 280	2131 282	2150 285	2170 288	2190 290	2210 293	2229 295	2249 298	460
152	2269 300	2288 303	2308 306	2328 308	2347 311	2367 313	2386 316	2406 318	2426 321	2445 323	460
154	2465 326	2484 329	2504 331	2523 334	2543 336	2562 339	2581 341	2601 344	2620 346	2640 349	461
156	2659 351	2678 354	2697 356	2717 359	2736 361	2755 364	2775 366	2794 369	2813 371	2832 374	461
158	2851 376	2871 379	2890 381	2909 384	2928 386	2947 389	2966 391	2985 394	3004 396	3023 399	462
160	3042 401	3061 404	3080 406	3099 408	3118 411	3137 413	3156 416	3175 418	3194 421	3213 423	462
162	3232 426	3250 428	3269 431	3288 433	3307 435	3326 438	3344 440	3363 443	3382 445	3401 448	463
164	3419 450	3438 452	3457 455	3475 457	3494 460	3512 462	3531 464	3550 467	3568 469	3587 472	463
166	3605 474	3624 476	3642 479	3661 481	3679 484	3698 486	3716 488	3734 491	3753 493	3771 496	463
168	3790 498	3808 500	3826 503	3845 505	3863 507	3881 510	3899 512	3918 514	3936 517	3954 519	464
170	3972 522	3990 524	4009 526	4027 529	4045 531	4063 533	4081 536	4099 538	4117 540	4135 543	464
172	4153 545	4171 547	4189 550	4207 552	4225 554	4243 557	4261 559	4279 561	4297 563	4314 566	464
174	4332 568	4350 570	4368 573	4386 575	4403 577	4421 580	4439 582	4457 584	4474 586	4492 589	465
PACK FLOW LO ΔFUEL= − 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL= + 1 %			ENGINE ANTI ICE ON ΔFUEL= + 2.5 %		TOTAL ANTI ICE ON ΔFUEL= + 3.5 %			

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 03701 .990 .000 0 FCOM-02-05-30-041-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 390			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4510 591	4527 593	4545 595	4562 598	4580 598	4598 602	4615 605	4633 607	4650 609	4668 611	465
178	4685 614	4703 616	4720 618	4737 620	4755 623	4772 625	4790 627	4807 629	4824 631	4842 634	466
180	4859 636	4876 638	4893 640	4911 643	4928 645	4945 647	4962 649	4979 651	4996 654	5014 656	467
182	5031 658	5048 660	5065 662	5082 665	5099 667	5116 669	5133 671	5150 673	5167 675	5184 678	468
184	5201 680	5218 682	5234 684	5251 686	5268 688	5285 691	5302 693	5319 695	5335 697	5352 699	469
186	5369 701	5386 703	5402 706	5419 708	5436 710	5452 712	5469 714	5486 716	5502 718	5519 720	468
188	5536 723	5552 725	5569 727	5585 729	5602 731	5618 733	5635 735	5651 737	5667 740	5684 742	468
190	5700 744	5717 746	5733 748	5749 750	5765 752	5782 754	5798 756	5814 758	5830 760	5847 763	468
192	5863 765	5879 767	5895 769	5911 771	5927 773	5943 775	5959 777	5975 779	5991 781	6007 783	468
194	6023 785	6039 787	6055 789	6071 791	6087 793	6103 795	6118 797	6134 799	6150 801	6166 803	468
196	6182 805	6197 807	6213 809	6229 812	6244 814	6260 816	6276 818	6291 820	6307 822	6322 824	468
198	6338 826	6353 828	6369 829	6384 831	6400 833	6415 835	6431 837	6446 839	6461 841	6477 843	468
200	6492 845	6507 847	6522 849	6538 851	6553 853	6568 855	6583 857	6598 859	6613 861	6629 863	468
202	6644 865	6659 867	6674 869	6689 871	6704 872	6719 874	6734 876	6749 878	6764 880	6779 882	468
204	6793 884	6808 886	6823 888	6838 890	6853 892						463
206											
208											
210											
212											
214											
216											
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .00 03901 .990 .000 .000 0 FCOM-02-05-30-042-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 43
	INTEGRATED CRUISE		SEQ 150	REV 11

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=37.0%		DISTANCE (NM) TIME (MIN)		LR FL 410			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
134	442 58	464 61	486 63	508 66	530 69	552 72	573 75	595 78	617 81	639 83	460
136	661 86	682 89	704 92	726 95	747 98	769 100	791 103	812 106	834 109	855 112	460
138	877 114	899 117	920 120	942 123	963 126	985 128	1006 131	1027 134	1049 137	1070 140	461
140	1092 142	1113 145	1134 148	1155 151	1177 153	1198 156	1219 159	1240 162	1262 164	1283 167	461
142	1304 170	1325 173	1346 175	1367 178	1388 181	1410 184	1431 186	1452 189	1473 192	1494 195	462
144	1515 197	1535 200	1556 203	1577 205	1598 208	1619 211	1640 214	1661 216	1681 219	1702 222	463
146	1723 224	1744 227	1764 230	1785 232	1806 235	1827 238	1847 240	1868 243	1888 246	1909 248	463
148	1930 251	1950 254	1971 256	1991 259	2012 262	2032 264	2053 267	2073 270	2093 272	2114 275	464
150	2134 277	2155 280	2175 283	2195 285	2216 288	2236 291	2256 293	2276 296	2297 298	2317 301	464
152	2337 304	2357 306	2377 309	2397 311	2417 314	2438 317	2458 319	2478 322	2498 324	2518 327	465
154	2538 330	2558 332	2578 335	2597 337	2617 340	2637 342	2657 345	2677 348	2697 350	2717 353	465
156	2736 355	2756 358	2776 360	2796 363	2815 365	2835 368	2855 370	2874 373	2894 376	2913 378	465
158	2933 381	2952 383	2972 386	2991 388	3011 391	3030 393	3050 396	3069 398	3089 401	3108 403	466
160	3127 406	3147 408	3166 411	3185 413	3205 416	3224 418	3243 421	3262 423	3281 425	3301 428	466
162	3320 430	3339 433	3358 435	3377 438	3396 440	3415 443	3434 445	3453 447	3472 450	3491 452	467
164	3510 455	3529 457	3548 460	3567 462	3585 464	3604 467	3623 469	3642 472	3661 474	3679 476	468
166	3698 479	3717 481	3735 484	3754 486	3773 488	3791 491	3810 493	3828 495	3847 498	3865 500	469
168	3884 503	3902 505	3921 507	3939 510	3958 512	3976 514	3994 517	4013 519	4031 521	4049 524	470
170	4068 526	4086 528	4104 531	4122 533	4140 535	4159 538	4177 540	4195 542	4213 545	4231 547	470
172	4249 549	4267 552	4285 554	4303 556	4321 558	4339 561	4357 563	4375 565	4392 568	4410 570	470
174	4428 572	4446 574	4464 577	4481 579	4499 581	4517 583	4534 586	4552 588	4570 590	4587 592	470
PACK FLOW LO ΔFUEL= - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL= + 1 %			ENGINE ANTI ICE ON ΔFUEL= + 2.5 %			TOTAL ANTI ICE ON ΔFUEL= + 3.5 %		

10B -08FOA340-311 CFM56-5C3 2220000C5KG370 0 018590 0 0 1 1.0 0 .00 04101 .990 .000 0 FCOM-02-05-30-043-150

INTEGRATED CRUISE											
MAX. CRUISE THRUST LIMITS NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0%		DISTANCE (NM) TIME (MIN)		LR FL 410			
WEIGHT (1000KG)	0	.2	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	TAS (KT)
176	4605 595	4622 597	4640 599	4657 601	4675 604	4692 606	4710 608	4727 610	4744 612	4762 615	470
178	4779 617	4796 619	4813 621	4831 623	4848 626	4865 628	4882 630	4899 632	4916 634	4934 637	469
180	4951 639	4968 641	4985 643	5002 645	5019 648	5036 650	5052 652	5069 654	5086 656	5103 658	469
182	5120 660	5136 663	5153 665	5170 667	5187 669	5203 671	5220 673	5236 675	5253 678	5270 680	469
184	5286 682	5303 684	5319 686	5336 688	5352 690						466
186											
188											
190											
192											
194											
196											
198											
200											
202											
204											
206											
208											
210											
212											
214											
216											
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 2.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3.5 %		

10B -08F0A340-311 CFM56-5C3 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 04101 .990 .000 .000 0 FCOM-02-05-30-044-150

CLIMB CORRECTION

The planner must correct the values for the fuel and the time obtained from the integrated cruise tables with the numbers given in the following tables. The tables which are established for M.80, M.82, M.84 and long range speed, take into account climbing from the brake release point at 250KT/300KT/M.78.

LONG RANGE SPEED

CORRECTION ON FUEL CONSUMPTION (1000 kg)							
FL	WEIGHT AT BRAKE RELEASE (1000 kg)						time correction
	150	170	190	210	230	250	
410	2.4	2.7					4 min
390	2.3	2.6	2.9				4 min
370	2.2	2.5	2.8	3.0			5 min
350	2.1	2.4	2.7	2.9	3.2		6 min
330	2.0	2.3	2.5	2.8	3.1	3.4	6 min
310	1.9	2.1	2.4	2.7	3.0	3.3	6 min
290	1.7	2.0	2.3	2.5	2.8	3.1	5 min
250	1.6	1.8	2.0	2.3	2.5	2.8	4 min
200	1.3	1.5	1.7	1.9	2.1	2.3	4 min
150	1.1	1.2	1.4	1.6	1.7	1.9	3 min
100	0.8	0.9	1.0	1.2	1.3	1.5	2 min

CLIMB TO OPTIMUM FL

CORRECTION ON FUEL CONSUMPTION (1000 kg)							
SPEED	WEIGHT AT BRAKE RELEASE (1000 kg)						time correction
	150	170	190	210	230	250	
LR	2.4	2.7	2.8	2.9	3.1	3.3	6 min
M.80	2.4	2.7	2.8	2.9	3.1	3.3	6 min
M.82	2.4	2.7	2.9	3.0	3.2	3.4	6 min
M.84	2.2	2.4	2.5	2.6	2.7		6 min

STEP CLIMB CORRECTION

When the flight includes one or more step climbs (2000 feet below FL290, 4000 feet above), apply a correction of 200 kg per step climb to the fuel consumption.

DESCENT CORRECTION

Correct the fuel and time values determined in the integrated cruise tables as follows to take into account the descent down to 1500 feet followed by 6 minute IFR approach and landing.

R **LONG RANGE CRUISE SPEED**

R

CORRECTION ON FUEL CONSUMPTION (1000 kg)						
FL	WEIGHT OVERHEAD DESTINATION (1000 kg)					time correction
	150	160	170	180	190	
310 and above	0.3	0.4	0.5	0.5	0.6	11 min
290	0.3	0.4	0.5	0.5	0.6	10 min
250	0.3	0.3	0.4	0.4	0.5	10 min
200	0.2	0.2	0.3	0.3	0.4	9 min
150	0.1	0.1	0.2	0.2	0.2	8 min
100	0.0	0.0	0.0	0.0	0.0	8 min

DESCENT FROM OPTIMUM FL

R

CORRECTION ON FUEL CONSUMPTION (1000 kg)						
SPEED	WEIGHT OVERHEAD DESTINATION (1000 kg)					time correction
	150	160	170	180	190	
LR	0.4	0.5	0.6	0.7	0.7	11 min
M.80	0.4	0.5	0.6	0.6	0.8	11 min
M.82	0.4	0.5	0.6	0.7	0.8	11 min
M.84	0.5	0.6	0.7	0.8	0.8	11 min

INTRODUCTION

The following flight planning tables allow the planner to determine trip fuel consumption and trip time required to cover a given air distance.

These tables are established for :

- Takeoff
- R – Climb profile : 250kt/300kt/M.78
- Cruise Mach number : M.80/M.82/M.84/LR
- Descent profile : Cruise Mach number/300kt/250kt
- Approach and landing : 330 kt – 6 minute IFR
- ISA
- CG = 37 %
- Normal air conditioning
- Anti ice OFF

They are based upon a reference landing weight of 150 000 kg.

Note : 1. In the tables, the asterisk () means that a step climb of 4000 feet must be flown to reach the corresponding FL.*

2. To obtain a flight plan at optimum cruise level, the highest flight level desired within the flight has to be selected in the table.

3. For each degree Celsius above ISA temperature apply fuel correction $0.015 \text{ (kg/}^{\circ}\text{C/NM)} \times \Delta \text{ ISA}(^{\circ}\text{C)} \times \text{air distance (NM)}$.

CORRECTION FOR DEVIATION FROM REFERENCE LANDING WEIGHT

The fuel consumption must be corrected when the actual landing weight is different from the reference landing weight.

If it is lower (or greater) than the reference landing weight, subtract (or add) the value given in the correction part of the table per 1000 kg below (or above) the reference landing weight.

EXAMPLE

The following is an example of a complete flight plan based on the assumptions :

- Zero fuel weight (OWE + PAYLOAD) : 165 000 kg = landing weight at alternate airport.
- Cruise M.80 at FL390
- Ground distance from departure to destination : 2600 NM
- Average wind during flight : – 50 kt (headwind)
- ISA conditions
- “En route” reserve : 5 %
- Ground distance from destination to alternate : 200 NM, no wind at FL200

To calculate the flight plan, a reverse calculation is needed, i.e. start with the landing weight at alternate (the schematic on 2.05.10 p4 gives an overview of the calculation to be performed).

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 2
	QUICK DETERMINATION OF F-PLN		SEQ. 150	REV 11

1. Alternate fuel and time
 - From 2.05.50 p2 ;
 - Alternate time = 41 min
- R Alternate fuel : $4\,024 + 10 \times (165 - 150) = 4\,174$ kg
2. Holding fuel and time
 - A 30 min holding is assumed at 1500 feet. Read from 2.05.10 p3, holding fuel = 2800 kg
- R 3. At destination, the landing weight = $165\,000 + 4\,174 + 2800 = 171\,974$ kg
4. Evaluation of the air distance between departure and destination.
 - The "Ground distance/Air distance" conversion tables from 2.05.60 p2, shows that the corresponding air distance is : 2847 NM.
5. Trip fuel and time
 - Enter air distance and flight level 390 (see table on 2.05.40 p4), interpolate to find the corresponding values of fuel consumption and time, for the reference landing weight and without deviation from ISA.
- R Fuel = 32 772 kg
- Time = 6 h 26 min
- Correction for landing weight
- R Δ fuel consumption = $167 \times (171.974 - 150) = 3670$ kg
- R – Trip reserves (5 %) = $0.05 \times (32\,772 + 3\,670) = 1\,822$ kg
6. Taxi fuel = 300 kg (2.05.10 p2)
7. Total fuel on board (Block fuel) :
- R $32\,772 + 3\,670 + 1\,822 + 2\,800 + 4\,174 + 300 = 45\,538$ kg

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %		TIME (H.MIN)				
ANTI-ICING OFF										
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3934 0.39	3921 0.39	3921 0.39					13	14	
300	5211 0.52	5121 0.52	5051 0.52	5005 0.52	4983 0.52	4979 0.52		15	18	20
400	6491 1.05	6323 1.05	6184 1.05	6083 1.05	6019 1.05	5983 1.05		17	21	25
500	7773 1.17	7527 1.18	7320 1.18	7163 1.18	7058 1.18	6992 1.18		19	24	29
600	9057 1.30	8734 1.31	8459 1.31	8247 1.31	8101 1.32	8006 1.32		21	27	34
700	10344 1.43	9944 1.44	9600 1.44	9334 1.45	9148 1.45	9024 1.45		23	30	38
800	11633 1.56	11157 1.57	10745 1.57	10426 1.58	10199 1.58	10047 1.58		25	33	43
900	12925 2.09	12373 2.09	11894 2.10	11521 2.11	11255 2.11	11075 2.11		28	37	48
1000	14220 2.21	13591 2.22	13046 2.23	12621 2.24	12316 2.24	12109 2.24		30	40	53
1100	15517 2.34	14812 2.35	14200 2.36	13725 2.37	13381 2.37	13149 2.37		32	43	58
1200	16817 2.47	16036 2.48	15358 2.49	14832 2.50	14449 2.50	14193 2.50		34	47	63
1300	18118 3.00	17262 3.01	16519 3.02	15943 3.03	15523 3.03	15242 3.03		37	50	68
1400	19423 3.13	18491 3.14	17683 3.15	17058 3.16	16600 3.16	16296 3.16		39	54	74
1500	20731 3.26	19724 3.27	18851 3.29	18177 3.29	17682 3.29	17355 3.30		42	58	79
1600	22041 3.38	20959 3.40	20022 3.42	19300 3.43	18768 3.43	18427 3.43		44	62	85
1700	23353 3.51	22197 3.53	21196 3.55	20427 3.56	19860 3.56	19501 3.56		47	65	91
1800	24669 4.04	23438 4.06	22374 4.08	21559 4.09	20956 4.09	20580 4.09		50	69	97
1900	25988 4.17	24683 4.19	23555 4.21	22694 4.22	22056 4.22	21665 4.22		52	73	104
2000	27311 4.30	25930 4.32	24740 4.34	23834 4.35	23161 4.35	22756 4.35		55	77	110
2100	28637 4.42	27182 4.45	25930 4.47	24978 4.48	24288 4.48	23852 4.48		58	82	117
2200	29965 4.55	28436 4.58	27125 5.00	26126 5.01	25405 5.01	24954 5.01		61	86	123
2300	31296 5.08	29693 5.10	28324 5.13	27280 5.14	26529 5.14	26069 5.14		63	91	130
2400	32630 5.21	30954 5.23	29527 5.26	28438 5.27	27659 5.27	27193 5.27		66	95	137
2500	33966 5.34	32217 5.36	30733 5.39	29628 5.40	28794 5.41	28323 5.41		69	101	143
2600	35307 5.47	33483 5.49	31942 5.52	30799 5.54	29934 5.54	29460 5.54		72	105	150
2700	36650 5.59	34754 6.02	33156 6.05	31974 6.07	31079 6.07	30605 6.07		75	110	157
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
Δ FUEL = - 0.5 %		Δ FUEL = + 1 %			Δ FUEL = + 2 %		Δ FUEL = + 4 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-003-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %						
ANTI-ICING OFF						TIME (H.MIN)				
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	37996 6.12	36027 6.15	34374 6.18	33154 6.20	32229 6.20	31782 6.20*		78	115	164
2900	39344 6.25	37303 6.28	35631 6.31	34340 6.33	33385 6.33	32963 6.33*		82	120	171
3000	40697 6.38	38583 6.41	36862 6.44	35532 6.46	34549 6.46	34149 6.46*		86	124	178
3100	42055 6.51	39865 6.54	38096 6.57	36728 6.59	35718 6.59	35342 6.59*		89	129	186
3200	43416 7.03	41155 7.07	39335 7.10	37929 7.12	36893 7.12	36540 7.12*		93	134	193
3300	44780 7.16	42490 7.20	40583 7.23	39135 7.25	38073 7.25	37743 7.25*		98	139	201
3400	46146 7.29	43792 7.33	41837 7.36	40347 7.38	39259 7.38	38951 7.39*		101	144	209
3500	47516 7.42	45098 7.46	43096 7.49	41566 7.52	40453 7.52	40164 7.52*		105	149	218
3600	48890 7.55	46408 7.59	44360 8.02	42791 8.05	41658 8.05	41384 8.05*		109	155	226
3700	50316 8.08	47722 8.11	45629 8.16	44022 8.18	42872 8.18	42610 8.18*		112	160	234
3800	51701 8.20	49040 8.24	46903 8.29	45258 8.31	44092 8.31	43843 8.31*		116	166	242
3900	53090 8.33	50363 8.37	48182 8.42	46499 8.44	45318 8.44	45081 8.44*		120	171	250
4000	54482 8.46	51689 8.50	49467 8.55	47747 8.57	46551 8.57	46326 8.57*		124	177	257
4100	55880 8.59	53020 9.03	50757 9.08	49001 9.10	47791 9.10	47577 9.10*		128	183	265
4200	57283 9.12	54355 9.16	52053 9.21	50261 9.23	49039 9.23	48835 9.24*		132	189	273
4300	58690 9.25	55700 9.29	53353 9.34	51528 9.36	50336 9.37*	50100 9.37*		136	195	280
4400	60100 9.37	57054 9.42	54659 9.47	52801 9.50	51635 9.50*	51371 9.50*		141	201	288
4500	61514 9.50	58414 9.55	55972 10.00	54079 10.03	52938 10.03*	52649 10.03*		145	207	297
4600	62932 10.03	59778 10.08	57293 10.13	55363 10.16	54250 10.16*	53934 10.16*		150	215	305
4700	64355 10.16	61147 10.21	58620 10.26	56658 10.29	55566 10.29*	55224 10.29*		155	221	314
4800	65781 10.29	62520 10.34	59952 10.39	57960 10.42	56890 10.42*	56523 10.42*		160	228	322
4900	67212 10.41	63899 10.47	61290 10.52	59268 10.55	58220 10.55*	57830 10.55*		165	236	330
5000	68647 10.54	65284 11.00	62633 11.05	60583 11.08	59556 11.08*	59144 11.08*		171	243	340
5100	70086 11.07	66674 11.13	63984 11.18	61905 11.21	60899 11.21*	60467 11.22*		176	251	348
5200	71537 11.20	68069 11.26	65341 11.31	63233 11.35	62247 11.34*	61798 11.35*		181	259	358
5300	72992 11.33	69469 11.38	66705 11.44	64615 11.48	63602 11.47*	63137 11.48*		187	268	367
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
△ FUEL = - 0.5 %		△ FUEL = + 1 %			△ FUEL = + 2 %		△ FUEL = + 4 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-004-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %						
ANTI-ICING OFF				TIME (H.MIN)						
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
5400	74452 11.46	70879 11.51	68074 11.57	65965 12.01	64966 12.00*	64510 12.01*		193	277	375
5500	75917 11.58	72301 12.04	69450 12.10	67322 12.14	66336 12.13*	65871 12.14*		199	285	383
5600	77386 12.11	73730 12.17	70832 12.24	68686 12.27	67712 12.26*	67240 12.27*		205	293	392
5700	78859 12.24	75164 12.30	72226 12.37	70057 12.40	69095 12.39*	68617 12.40*		211	301	401
5800	80339 12.37	76605 12.43	73679 12.50	71443 12.53*	70485 12.52*	70002 12.53*		218	309	410
5900	81824 12.50	78051 12.56	75091 13.03	72878 13.06*	71887 13.05*	71392 13.06*		225	318	419
6000	83312 13.03	79506 13.09	76511 13.16	74318 13.19*	73297 13.18*	72826 13.19*		231	327	428
6100	84806 13.16	80967 13.22	77937 13.29	75766 13.32*	74714 13.32*	74267 13.32*		238	335	437
6200	86312 13.28	82434 13.35	79373 13.42	77219 13.45*	76138 13.45*	75714 13.45*		244	344	447
6300	87834 13.41	83907 13.48	80817 13.55	78680 13.58*	77571 13.58*	77167 13.58*		251	354	455
6400	89361 13.54	85386 14.01	82269 14.08	80150 14.11*	79028 14.11*	78628 14.11*		259	364	465
6500	90894 14.07	86941 14.14	83727 14.21	81628 14.24*	80481 14.24*	80098 14.24*		267	373	475
6600	92434 14.20	88446 14.27	85194 14.34	83112 14.37*	81943 14.37*	81575 14.37*		274	383	485
6700	93980 14.33	89958 14.40	86671 14.47	84604 14.50*	83413 14.50*	83060 14.50*		281	393	495
6800	95534 14.45	91477 14.53	88162 15.00	86104 15.03*	84891 15.03*	84551 15.03*		289	403	506
6900	97093 14.58	93004 15.06	89662 15.13	87613 15.16*	86379 15.16*	86051 15.16*		297	412	516
7000	98720 15.11	94540 15.19	91169 15.26	89130 15.29*	87886 15.29*	87561 15.29*		305	421	526
7100	100296 15.24	96084 15.32	92685 15.39	90654 15.42*	89403 15.42*	89079 15.42*		311	430	535
7200	101885 15.37	97636 15.45	94258 15.52*	92186 15.54*	90930 15.55*	90604 15.55*		319	440	545
7300	103488 15.50	99195 15.58	95839 16.05*	93726 16.07*	92466 16.08*	92137 16.08*		327	449	555
7400	105098 16.03	100762 16.10	97427 16.18*	95278 16.20*	94029 16.21*	93678 16.21*		338	459	564
7500	106714 16.15	102342 16.23	99023 16.31*	96837 16.33*	95609 16.34*	95231 16.34*		348	468	574
7600	108338 16.28	103932 16.36	100626 16.44*	98419 16.46*	97196 16.47*	96792 16.47*		356	479	584
7700	109972 16.41	105531 16.49	102239 16.57*	99998 16.59*	98790 17.00*	98363 17.00*		366	490	596
7800	111614 16.54	107137 17.02	103860 17.10*	101587 17.12*	100392 17.13*	99942 17.13*		376	501	607
7900	113263 17.07	108753 17.15	105490 17.22*	103188 17.25*	102004 17.26*	101531 17.26*		385	512	618
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
Δ FUEL = - 0.5 %		Δ FUEL = + 1 %			Δ FUEL = + 2 %		Δ FUEL = + 4 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-005-150

INTENTIONALLY LEFT BLANK

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/300KT/M.78 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT									
IMC PROCEDURE : 330 KG (6MIN)									
REF. LANDING WEIGHT = 150000 KG					ISA		FUEL CONSUMED (KG)		
NORMAL AIR CONDITIONING					CG = 37.0 %		TIME (H.MIN)		
ANTI-ICING OFF									
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3952 0.39	3935 0.39					12		
300	5286 0.51	5180 0.52	5101 0.52	5045 0.52	5014 0.52	5003 0.52	14	17	20
400	6621 1.04	6428 1.04	6273 1.04	6152 1.05	6071 1.05	6026 1.05	16	20	24
500	7958 1.16	7677 1.17	7448 1.17	7262 1.17	7132 1.18	7053 1.18	17	22	28
600	9298 1.29	8929 1.29	8625 1.30	8375 1.30	8197 1.30	8084 1.30	19	25	33
700	10639 1.41	10184 1.42	9806 1.43	9492 1.43	9266 1.43	9120 1.43	21	28	37
800	11982 1.54	11442 1.55	10989 1.55	10612 1.56	10339 1.56	10161 1.56	23	31	42
900	13328 2.06	12702 2.07	12176 2.08	11736 2.09	11417 2.09	11207 2.09	25	34	47
1000	14676 2.19	13966 2.20	13366 2.21	12864 2.21	12499 2.21	12259 2.22	27	37	51
1100	16025 2.31	15231 2.32	14559 2.34	13995 2.34	13585 2.34	13316 2.34	29	40	56
1200	17377 2.44	16499 2.45	15754 2.46	15130 2.47	14675 2.47	14378 2.47	31	43	61
1300	18730 2.56	17770 2.58	16953 2.59	16268 3.00	15770 3.00	15445 3.00	33	47	66
1400	20087 3.09	19044 3.10	18154 3.12	17409 3.13	16868 3.13	16517 3.13	35	50	71
1500	21445 3.21	20320 3.23	19360 3.24	18554 3.25	17971 3.25	17601 3.26	38	53	77
1600	22805 3.34	21600 3.36	20568 3.37	19704 3.38	19079 3.38	18685 3.38	40	57	82
1700	24168 3.46	22881 3.48	21779 3.50	20856 3.51	20192 3.51	19777 3.51	43	60	88
1800	25535 3.59	24166 4.01	22993 4.03	22013 4.04	21308 4.04	20874 4.04	45	64	95
1900	26905 4.11	25456 4.13	24211 4.15	23173 4.16	22429 4.17	21977 4.17	48	68	101
2000	28278 4.24	26749 4.26	25433 4.28	24336 4.29	23569 4.29	23086 4.30	50	71	108
2100	29654 4.37	28045 4.39	26659 4.41	25506 4.42	24702 4.42	24200 4.42	53	76	114
2200	31032 4.49	29344 4.51	27888 4.54	26681 4.55	25842 4.55	25320 4.55	56	80	121
2300	32412 5.02	30646 5.04	29121 5.06	27861 5.08	26990 5.08	26450 5.08	58	84	128
2400	33795 5.14	31951 5.16	30358 5.19	29045 5.20	28142 5.21	27586 5.21	61	88	135
2500	35181 5.27	33259 5.29	31597 5.32	30258 5.33	29300 5.33	28729 5.34	64	93	142
2600	36569 5.39	34571 5.42	32840 5.44	31453 5.46	30463 5.46	29879 5.46	67	97	149
2700	37960 5.52	35886 5.54	34087 5.57	32653 5.59	31632 5.59	31046 5.59*	70	101	156
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
△ FUEL = - 0.5 %		△FUEL = + 1 %			△ FUEL = + 2 %		△ FUEL = + 4 %		

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-007-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %						
ANTI-ICING OFF						TIME (H.MIN)				
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	39354 6.04	37205 6.07	35338 6.10	33859 6.12	32806 6.12	32247 6.12*		73	106	163
2900	40755 6.17	38526 6.20	36621 6.23	35069 6.24	33987 6.25	33454 6.25*		77	111	170
3000	42160 6.29	39850 6.32	37883 6.35	36285 6.37	35175 6.37	34667 6.38*		80	115	178
3100	43568 6.42	41181 6.45	39148 6.48	37505 6.50	36368 6.50	35885 6.50*		84	120	185
3200	44979 6.54	42516 6.57	40420 7.01	38730 7.03	37567 7.03	37109 7.03*		87	125	193
3300	46393 7.07	43893 7.10	41699 7.14	39960 7.16	38772 7.16	38337 7.16*		92	130	201
3400	47810 7.19	45239 7.23	42982 7.26	41198 7.28	39983 7.29	39572 7.29*		95	135	210
3500	49231 7.32	46588 7.35	44270 7.39	42444 7.41	41204 7.41	40811 7.42*		99	140	218
3600	50655 7.44	47942 7.48	45561 7.52	43694 7.54	42435 7.54	42058 7.54*		103	145	227
3700	52125 7.57	49300 8.01	46858 8.05	44950 8.07	43672 8.07	43311 8.07*		107	151	236
3800	53559 8.09	50662 8.13	48158 8.17	46211 8.20	44916 8.20	44570 8.20*		110	156	244
3900	54999 8.22	52028 8.26	49464 8.30	47477 8.32	46166 8.33	45836 8.33*		114	162	251
4000	56446 8.34	53398 8.38	50775 8.43	48750 8.45	47423 8.45	47108 8.46*		118	168	259
4100	57898 8.47	54772 8.51	52091 8.55	50030 8.58	48687 8.58	48387 8.58*		122	174	267
4200	59354 8.59	56154 9.04	53411 9.08	51315 9.11	49991 9.11*	49673 9.11*		125	180	275
4300	60814 9.12	57542 9.16	54736 9.21	52606 9.24	51316 9.24*	50967 9.24*		130	186	284
4400	62277 9.24	58935 9.29	56072 9.34	53903 9.36	52646 9.37*	52266 9.37*		134	193	292
4500	63744 9.37	60331 9.42	57418 9.46	55205 9.49	53984 9.49*	53573 9.50*		138	200	300
4600	65217 9.49	61732 9.54	58770 9.59	56520 10.02	55326 10.02*	54885 10.02*		142	206	309
4700	66693 10.02	63137 10.07	60127 10.12	57844 10.15	56677 10.15*	56206 10.15*		147	213	317
4800	68173 10.14	64548 10.20	61490 10.25	59175 10.28	58034 10.27*	57535 10.28*		151	221	326
4900	69657 10.27	65964 10.32	62858 10.37	60512 10.40	59398 10.40*	58871 10.41*		156	230	335
5000	71151 10.40	67384 10.45	64233 10.50	61856 10.53	60768 10.53*	60215 10.54*		161	238	345
5100	72653 10.52	68809 10.57	65615 11.03	63207 11.06	62145 11.06*	61566 11.06*		166	246	354
5200	74159 11.05	70238 11.10	67002 11.16	64608 11.19	63529 11.18*	62924 11.19*		171	256	364
5300	75669 11.17	71681 11.23	68395 11.28	65980 11.32	64922 11.31*	64314 11.32*		177	264	372
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
△ FUEL = - 0.5 %		△ FUEL = + 1 %			△ FUEL = + 2 %		△ FUEL = + 4 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-008-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/300KT/M.78 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT									
IMC PROCEDURE : 330 KG (6MIN)									
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING				CG = 37.0 %					
ANTI-ICING OFF				TIME (H.MIN)					
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
5400	77184 11.30	73130 11.35	69794 11.41	67360 11.45	66321 11.44*	65695 11.45*	182	273	382
5500	78704 11.42	74585 11.48	71201 11.54	68746 11.57	67727 11.57*	67083 11.58*	187	282	390
5600	80230 11.55	76044 12.01	72622 12.07	70140 12.10	69141 12.09*	68479 12.11*	193	291	399
5700	81760 12.07	77509 12.13	74049 12.19	71579 12.23*	70561 12.22*	69883 12.23*	198	299	409
5800	83295 12.20	78980 12.26	75528 12.32	73047 12.36*	71993 12.35*	71314 12.36*	205	309	418
5900	84835 12.32	80458 12.39	76972 12.45	74521 12.48*	73432 12.48*	72781 12.49*	211	318	427
6000	86382 12.45	81942 12.51	78423 12.58	76003 13.01*	74880 13.00*	74254 13.01*	217	328	436
6100	87940 12.57	83430 13.04	79884 13.10	77491 13.14*	76334 13.13*	75734 13.14*	223	337	446
6200	89503 13.10	84924 13.16	81353 13.23	78987 13.26*	77796 13.26*	77221 13.27*	229	348	455
6300	91072 13.22	86426 13.29	82828 13.36	80492 13.39*	79284 13.39*	78716 13.39*	237	359	465
6400	92645 13.35	87997 13.42	84311 13.49	82005 13.51*	80768 13.51*	80220 13.52*	244	368	476
6500	94225 13.48	89530 13.54	85800 14.01	83525 14.04*	82261 14.04*	81731 14.05*	250	380	487
6600	95811 14.00	91069 14.07	87306 14.14	85054 14.17*	83762 14.17*	83251 14.17*	257	391	498
6700	97403 14.13	92614 14.20	88825 14.27	86591 14.29*	85271 14.30*	84778 14.30*	265	400	509
6800	99000 14.25	94169 14.32	90351 14.40	88137 14.42*	86792 14.43*	86313 14.43*	272	410	520
6900	100602 14.38	95732 14.45	91884 14.53	89692 14.55*	88327 14.55*	87860 14.55*	279	420	529
7000	102270 14.50	97301 14.58	93426 15.05	91254 15.07*	89872 15.08*	89414 15.08*	285	430	539
7100	103898 15.03	98878 15.10	95060 15.18*	92824 15.20*	91425 15.21*	90976 15.21*	293	440	550
7200	105533 15.15	100461 15.23	96684 15.31*	94405 15.33*	92988 15.34*	92546 15.33*	302	450	560
7300	107174 15.28	102056 15.36	98316 15.43*	96005 15.45*	94596 15.46*	94126 15.46*	312	461	570
7400	108822 15.40	103671 15.48	99956 15.56*	97609 15.58*	96218 15.59*	95717 15.59*	322	471	580
7500	110479 15.53	105294 16.01	101605 16.08*	99222 16.11*	97848 16.11*	97319 16.11*	331	483	591
7600	112143 16.06	106925 16.14	103264 16.21*	100845 16.23*	99485 16.24*	98931 16.24*	342	494	603
7700	113812 16.18	108563 16.26	104932 16.33*	102480 16.36*	101131 16.37*	100551 16.37*	354	506	615
7800	115488 16.31	110208 16.39	106610 16.46*	104126 16.49*	102788 16.49*	102185 16.49*	367	518	627
7900	117175 16.43	111862 16.52	108297 16.58*	105782 17.01*	104453 17.02*	103829 17.02*	359	531	639
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
△ FUEL = - 0.5 %		△FUEL = + 1 %			△ FUEL = + 2 %		△ FUEL = + 4 %		

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-009-150

INTENTIONALLY LEFT BLANK

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %		TIME (H.MIN)				
ANTI-ICING OFF										
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3978 0.39	3950 0.39						11		
300	5410 0.51	5280 0.51	5184 0.51	5119 0.52	5081 0.52	5062 0.52		12	16	19
400	6843 1.03	6612 1.04	6431 1.04	6300 1.04	6220 1.04	6188 1.04		14	19	25
500	8279 1.15	7946 1.16	7681 1.16	7485 1.17	7365 1.17	7321 1.17		15	23	31
600	9716 1.28	9283 1.28	8934 1.29	8673 1.29	8515 1.29	8463 1.29		17	26	38
700	11154 1.40	10622 1.40	10191 1.41	9867 1.42	9671 1.42	9614 1.42		19	30	45
800	12595 1.52	11963 1.53	11451 1.54	11066 1.54	10834 1.54	10778 1.54		20	33	52
900	14038 2.04	13308 2.05	12716 2.06	12270 2.07	12004 2.07	11954 2.07		22	37	59
1000	15483 2.16	14654 2.17	13985 2.18	13479 2.19	13181 2.19	13141 2.19		24	41	67
1100	16929 2.29	16003 2.30	15257 2.31	14692 2.31	14364 2.32	14339 2.32		26	45	75
1200	18377 2.41	17355 2.42	16532 2.43	15910 2.44	15554 2.44	15562 2.44*		28	49	85
1300	19827 2.53	18709 2.54	17811 2.56	17133 2.56	16750 2.57	16786 2.57*		30	53	93
1400	21280 3.05	20065 3.07	19094 3.08	18360 3.09	17953 3.09	18015 3.09*		32	58	102
1500	22733 3.18	21425 3.19	20382 3.21	19594 3.21	19164 3.22	19252 3.22*		34	62	111
1600	24190 3.30	22786 3.31	21673 3.33	20832 3.34	20382 3.34	20494 3.34*		37	67	121
1700	25650 3.42	24151 3.44	22967 3.45	22075 3.46	21606 3.47	21743 3.47*		39	72	129
1800	27113 3.54	25524 3.56	24265 3.58	23322 3.59	22861 3.59	22998 3.59*		42	77	138
1900	28578 4.06	26900 4.08	25572 4.10	24575 4.11	24104 4.12	24259 4.12*		45	82	147
2000	30045 4.19	28280 4.21	26883 4.23	25840 4.24	25362 4.24	25527 4.24*		47	88	156
2100	31514 4.31	29664 4.33	28199 4.35	27113 4.36	26635 4.37	26802 4.37*		50	94	164
2200	32986 4.43	31050 4.45	29519 4.48	28423 4.49	27918 4.49	28084 4.49*		53	99	171
2300	34460 4.55	32440 4.58	30844 5.00	29713 5.01	29210 5.02	29373 5.02*		56	106	179
2400	35937 5.08	33834 5.10	32173 5.12	31010 5.14	30513 5.14	30672 5.14*		59	112	187
2500	37415 5.20	35231 5.22	33507 5.25	32314 5.26	31842 5.27	31979 5.27*		62	118	195
2600	38896 5.32	36632 5.35	34846 5.37	33626 5.39	33185 5.39*	33295 5.39*		66	125	203
2700	40384 5.44	38037 5.47	36226 5.50	34945 5.51	34536 5.52	34619 5.52*		70	131	212
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
Δ FUEL = - 0.5 %		Δ FUEL = + 1 %			Δ FUEL = + 2 %		Δ FUEL = + 4 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-011-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/300KT/M.78 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT									
IMC PROCEDURE : 330 KG (6MIN)									
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING				CG = 37.0 %					
ANTI-ICING OFF						TIME (H.MIN)			
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	41877 5.56	39444 5.59	37579 6.02	36272 6.04	35894 6.04*	35951 6.04*	74	138	220
2900	43373 6.09	40861 6.12	38938 6.15	37607 6.16	37259 6.16*	37295 6.17*	78	146	229
3000	44872 6.21	42285 6.24	40305 6.27	38948 6.29	38631 6.29*	38644 6.29*	82	155	237
3100	46374 6.33	43754 6.36	41683 6.40	40300 6.41	40009 6.41*	40001 6.42*	87	163	246
3200	47878 6.45	45192 6.49	43067 6.52	41667 6.54	41395 6.54*	41368 6.54*	92	171	255
3300	49386 6.58	46635 7.01	44457 7.04	43044 7.06	42789 7.06*	42744 7.07*	96	180	263
3400	50897 7.10	48082 7.13	45853 7.17	44430 7.19	44193 7.19*	44129 7.19*	101	189	272
3500	52411 7.22	49535 7.26	47256 7.29	45825 7.31	45606 7.31*	45527 7.32*	106	198	280
3600	53927 7.34	50993 7.38	48664 7.42	47228 7.44	47027 7.44*	46941 7.44*	111	207	289
3700	55491 7.47	52455 7.50	50080 7.54	48642 7.57	48456 7.56*	48367 7.57*	115	216	298
3800	57034 7.59	53923 8.03	51503 8.07	50101 8.09*	49895 8.08*	49819 8.10*	121	226	308
3900	58581 8.11	55399 8.15	52932 8.19	51581 8.21*	51343 8.21*	51297 8.22*	126	235	319
4000	60133 8.23	56889 8.27	54367 8.32	53068 8.34*	52800 8.33*	52782 8.34*	132	245	330
4100	61688 8.35	58385 8.40	55817 8.44	54562 8.46*	54265 8.46*	54275 8.47*	138	257	342
4200	63248 8.48	59887 8.52	57290 8.56	56065 8.58*	55740 8.58*	55777 8.59*	142	268	354
4300	64813 9.00	61395 9.04	58773 9.09	57578 9.11*	57226 9.11*	57288 9.11*	148	279	366
4400	66382 9.12	62908 9.17	60264 9.21	59100 9.23*	58721 9.23*	58809 9.24*	154	291	378
4500	67956 9.24	64429 9.29	61764 9.34	60630 9.35*	60232 9.36*	60338 9.36*	161	303	390
4600	69533 9.37	65956 9.41	63272 9.46	62169 9.48*	61754 9.48*	61875 9.48*	168	315	402
4700	71127 9.49	67489 9.54	64792 9.59	63718 10.00*	63287 10.00*	63422 10.01*	175	326	412
4800	72733 10.01	69028 10.06	66320 10.11	65276 10.12*	64864 10.13*	64980 10.13*	186	336	422
4900	74346 10.13	70574 10.18	67935 10.24*	66844 10.25*	66426 10.25*	66546 10.25*	196	348	432
5000	75963 10.26	72141 10.31	69552 10.36*	68421 10.37*	68011 10.38*	68122 10.38*	206	361	442
5100	77586 10.38	73716 10.43	71179 10.48*	70008 10.49*	69629 10.50*	69708 10.50*	216	373	453
5200	79215 10.50	75298 10.55	72817 11.00*	71609 11.02*	71257 11.02*	71307 11.02*	226	386	463
5300	80851 11.02	76887 11.08	74464 11.13*	73224 11.14*	72895 11.15*	72921 11.15*	236	399	474
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
Δ FUEL = - 0.5 %		Δ FUEL = + 1 %			Δ FUEL = + 2 %		Δ FUEL = + 4 %		

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7800 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-012-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : M.84 - DESCENT: M.84/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %						
ANTI-ICING OFF				TIME (H.MIN)						
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
5400	82492 11.15	78484 11.20	76120 11.25*	74849 11.27*	74542 11.27*	74545 11.27*		246	410	484
5500	84139 11.27	80177 11.33*	77786 11.37*	76485 11.39*	76199 11.39*	76181 11.39*		253	422	494
5600	85792 11.39	81911 11.45*	79463 11.49*	78132 11.51*	77866 11.51*	77827 11.52*		261	431	503
5700	87473 11.51	83653 11.57*	81150 12.02*	79793 12.04*	79543 12.04*	79487 12.04*		269	439	512
5800	89175 12.04*	85403 12.09*	82847 12.14*	81548 12.16*	81231 12.16*	81215 12.16*		277	446	524
5900	90874 12.16*	87164 12.21*	84557 12.26*	83288 12.28*	82928 12.28*	82954 12.28*		285	452	536
6000	92579 12.29*	88936 12.33*	86280 12.38*	85037 12.40*	84639 12.40*	84701 12.41*		293	458	547
6100	94290 12.41*	90717 12.45*	88015 12.51*	86795 12.52*	86363 12.53*	86457 12.53*		300	464	558
6200	96008 12.53*	92508 12.58*	89713 13.03*	88565 13.04*	88100 13.05*	88226 13.05*		307	470	569
6300	97732 13.06*	94181 13.10*	91414 13.15*	90344 13.17*	89794 13.17*	90003 13.17*		312	475	580
6400	99462 13.18*	95902 13.23*	93121 13.28*	92133 13.29*	91495 13.30*	91791 13.29*		316	481	590
6500	101197 13.31*	97628 13.36*	94834 13.40*	93822 13.41*	93202 13.42*	93588 13.41*		320	486	600
6600	102941 13.43*	99360 13.49*	96554 13.53*	95541 13.54*	94915 13.55*	95398 13.54*		323	490	611
6700	104691 13.56*	101098 14.02*	98279 14.05*	97267 14.07*	96636 14.07*	97217 14.06*		326	493	619
6800	106446 14.08*	102843 14.14*	100011 14.18*	98997 14.20*	98361 14.19*	99047 14.18*		329	496	626
6900	108209 14.20*	104593 14.27*	101749 14.30*	100734 14.33*	100093 14.32*	100888 14.30*		332	499	633
7000	109981 14.33*	106350 14.40*	103495 14.42*	102477 14.45*	101832 14.44*	102742 14.42*		335	501	640
7100	111760 14.45*	108113 14.53*	105247 14.55*	104227 14.58*	103578 14.57*	104608 14.54*		341	506	647
7200	113545 14.58*	109883 15.06*	107004 15.07*	105982 15.11*	105330 15.09*			347	509	586
7300	115337 15.10*	111660 15.18*	108770 15.20*	107744 15.24*	107088 15.22*			352	513	592
7400	117137 15.23*	113444 15.31*	110545 15.32*	109513 15.36*	108854 15.34*			351	520	599
7500	118945 15.35*	115233 15.44*	112326 15.45*	111288 15.49*	110629 15.46*			357	526	605
7600		117030 15.57*	114114 15.57*	113070 16.02*	112410 15.59*			402	532	612
7700		118835 16.10*	115908 16.10*	114858 16.15*	114198 16.11*			407	537	628
7800			117712 16.22*	116654 16.28*	115994 16.24*				543	634
7900			119522 16.34*	118457 16.41*	117800 16.36*				549	641
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
△ FUEL = - 0.5 %		△FUEL = + 1 %			△ FUEL = + 2 %		△ FUEL = + 4 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7801 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-013-150

INTENTIONALLY LEFT BLANK

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE - DESCENT : M.80/300KT/250KT									
IMC PROCEDURE : 330 KG (6MIN)									
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING				CG = 37.0 %					
ANTI-ICING OFF				TIME (H.MIN)					
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3888 0.39	3894 0.39	3905 0.39				14	15	
300	5064 0.54	5028 0.53	5000 0.53	4982 0.52	4969 0.52	4966 0.52	18	19	20
400	6246 1.08	6165 1.08	6101 1.07	6051 1.06	6007 1.05	5979 1.05	22	24	25
500	7432 1.22	7307 1.22	7206 1.21	7125 1.19	7048 1.18	6996 1.18	26	28	30
600	8623 1.36	8453 1.36	8316 1.35	8203 1.32	8094 1.31	8018 1.31	30	33	35
700	9818 1.51	9604 1.50	9430 1.49	9286 1.45	9144 1.44	9045 1.44	34	37	40
800	11017 2.05	10758 2.04	10549 2.03	10373 1.58	10198 1.57	10078 1.57	38	41	45
900	12220 2.19	11917 2.19	11672 2.17	11466 2.12	11258 2.10	11116 2.10	42	46	50
1000	13429 2.33	13081 2.33	12801 2.31	12563 2.25	12323 2.24	12160 2.23	46	51	55
1100	14641 2.47	14249 2.47	13934 2.45	13666 2.38	13393 2.37	13210 2.36	51	55	61
1200	15858 3.01	15421 3.01	15072 2.59	14773 2.51	14467 2.50	14265 2.49	55	60	66
1300	17079 3.16	16598 3.15	16214 3.12	15886 3.04	15546 3.03	15326 3.01	59	64	71
1400	18305 3.30	17779 3.29	17361 3.26	17003 3.17	16630 3.16	16392 3.14	63	69	77
1500	19536 3.44	18964 3.44	18513 3.40	18125 3.30	17718 3.29	17463 3.27	67	74	83
1600	20772 3.58	20155 3.58	19671 3.54	19253 3.43	18812 3.41	18540 3.40	72	78	89
1700	22012 4.12	21350 4.12	20834 4.07	20386 3.56	19911 3.54	19638 3.53	76	83	95
1800	23256 4.26	22550 4.26	22001 4.21	21524 4.09	21016 4.07	20731 4.06	80	88	102
1900	24505 4.40	23754 4.40	23173 4.34	22667 4.22	22125 4.20	21830 4.19	84	93	109
2000	25758 4.54	24965 4.54	24351 4.48	23816 4.35	23239 4.33	22936 4.32	89	98	115
2100	27016 5.08	26182 5.08	25532 5.01	24967 4.48	24381 4.46	24048 4.44	93	103	122
2200	28278 5.23	27404 5.22	26720 5.14	26117 5.01	25508 4.59	25167 4.57	97	108	129
2300	29545 5.37	28631 5.35	27913 5.27	27273 5.14	26642 5.12	26295 5.10	102	114	136
2400	30817 5.51	29864 5.49	29111 5.39	28465 5.27	27782 5.25	27432 5.23	106	120	143
2500	32094 6.05	31102 6.03	30314 5.52	29634 5.40	28928 5.38	28575 5.36	111	125	150
2600	33375 6.19	32344 6.17	31522 6.05	30808 5.53	30079 5.51	29725 5.48	117	131	156
2700	34662 6.33	33592 6.30	32791 6.16	31987 6.06	31237 6.04	30883 6.01	122	135	164
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
△ FUEL = - 0.5 %		△FUEL = + 1 %			△ FUEL = + 2.5 %		△ FUEL = + 3.5 %		

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7801 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-015-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 330 KG (6MIN)										
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)				
NORMAL AIR CONDITIONING				CG = 37.0 %						
ANTI-ICING OFF						TIME (H.MIN)				
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	35954 6.47	34847 6.44	34017 6.28	33171 6.19	32400 6.17	32070 6.14*		127	140	171
2900	37250 7.01	36175 6.57	35251 6.40	34361 6.32	33569 6.30	33259 6.27*		134	146	178
3000	38551 7.15	37448 7.11	36490 6.53	35556 6.45	34746 6.43	34454 6.40*		139	149	185
3100	39858 7.29	38728 7.25	37735 7.05	36757 6.58	35930 6.56	35655 6.53*		145	154	193
3200	41249 7.43	40010 7.38	38987 7.16	37963 7.11	37119 7.09	36861 7.06*		151	159	200
3300	42572 7.56	41297 7.52	40244 7.29	39174 7.24	38315 7.21	38073 7.19*		154	165	208
3400	43901 8.10	42591 8.05	41509 7.42	40395 7.37	39517 7.34	39291 7.32*		157	170	216
3500	45235 8.24	43891 8.19	42780 7.55	41625 7.50	40729 7.47	40514 7.45*		163	175	224
3600	46575 8.38	45197 8.32	44058 8.07	42862 8.03	41953 8.00	41745 7.58*		168	180	232
3700	47921 8.52	46509 8.45	45343 8.20	44105 8.16	43185 8.13	42982 8.11*		174	185	240
3800	49273 9.06	47827 8.59	46634 8.33	45355 8.29	44425 8.26	44225 8.24*		179	191	248
3900	50632 9.20	49153 9.12	47932 8.45	46610 8.42	45672 8.39	45476 8.37*		185	196	255
4000	51996 9.34	50485 9.25	49239 8.58	47873 8.55	46926 8.51	46733 8.50*		190	202	263
4100	53366 9.48	51824 9.38	50552 9.11	49142 9.08	48188 9.04	47997 9.03*		196	208	271
4200	54744 10.01	53169 9.52	51873 9.23	50420 9.21	49460 9.17	49268 9.16*		202	215	279
4300	56132 10.15	54521 10.05	53201 9.36	51704 9.34	50786 9.30*	50547 9.29*		207	221	287
4400	57528 10.28	55878 10.17	54536 9.48	52994 9.47	52091 9.43*	51833 9.42*		213	228	295
4500	58932 10.42	57243 10.28	55863 10.01	54292 9.59	53401 9.56*	53126 9.55*		219	234	303
4600	60342 10.55	58615 10.40	57188 10.14	55596 10.12	54723 10.09*	54426 10.08*		225	242	312
4700	61759 11.09	59993 10.51	58520 10.27	56906 10.25	56047 10.22*	55733 10.21*		231	249	321
4800	63182 11.22	61378 11.02	59856 10.40	58223 10.38	57380 10.35*	57049 10.34*		237	256	330
4900	64614 11.36	62771 11.13	61197 10.53	59548 10.51	58720 10.48*	58373 10.47*		243	264	339
5000	66054 11.49	64171 11.24	62545 11.06	60879 11.04	60066 11.01*	59706 10.59*		250	272	348
5100	67500 12.02	65579 11.35	63899 11.19	62218 11.17	61418 11.14*	61050 11.12*		257	279	356
5200	68954 12.15	66995 11.46	65261 11.32	63614 11.30	62777 11.27*	62402 11.25*		264	288	365
5300	70414 12.29	68418 11.57	66629 11.45	64976 11.43	64144 11.40*	63764 11.38*		271	296	374
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
Δ FUEL = - 0.5 %		Δ FUEL = + 1 %			Δ FUEL = + 2.5 %		Δ FUEL = + 3.5 %			

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7801 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-016-150

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE - DESCENT : M.80/300KT/250KT									
IMC PROCEDURE : 330 KG (6MIN)									
REF. LANDING WEIGHT = 150000 KG				ISA		FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING				CG = 37.0 %					
ANTI-ICING OFF				TIME (H.MIN)					
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
5400	71878 12.42	69849 12.07	68004 11.58	66345 11.55	65519 11.53*	65165 11.51*	280	304	382
5500	73350 12.55	71286 12.19	69385 12.11	67722 12.08	66901 12.06*	66551 12.04*	287	312	391
5600	74829 13.08	72728 12.32	70773 12.24	69107 12.21	68290 12.19*	67945 12.17*	295	320	399
5700	76315 13.21	74179 12.44	72251 12.37	70500 12.34	69686 12.32*	69348 12.29*	305	326	409
5800	77809 13.34	75637 12.57	73675 12.50	71935 12.47*	71091 12.45*	70761 12.42*	313	334	418
5900	79311 13.47	77190 13.09	75107 13.02	73375 13.00*	72509 12.57*	72199 12.55*	320	339	427
6000	80821 14.00	78671 13.22	76548 13.15	74823 13.13*	73935 13.10*	73641 13.08*	327	347	436
6100	82340 14.13	80161 13.34	77996 13.28	76277 13.26*	75368 13.23*	75089 13.21*	334	355	446
6200	83967 14.26	81661 13.47	79455 13.41	77739 13.38*	76810 13.36*	76545 13.34*	341	363	455
6300	85510 14.39	83169 13.59	80924 13.53	79209 13.51*	78261 13.49*	78008 13.47*	347	373	464
6400	87068 14.51	84686 14.12	82401 14.06	80687 14.04*	79742 14.02*	79480 13.59*	351	382	474
6500	88635 15.03	86215 14.24	83886 14.19	82173 14.17*	81216 14.15*	80960 14.12*	358	392	483
6600	90211 15.16	87763 14.36	85381 14.32	83667 14.30*	82699 14.28*	82447 14.25*	362	402	493
6700	91797 15.28	89321 14.48	86885 14.45	85168 14.43*	84191 14.41*	83943 14.38*	368	412	503
6800	93392 15.40	90890 15.01	88396 14.57	86679 14.56*	85692 14.54*	85446 14.51*	375	421	513
6900	94999 15.52	92468 15.13	89915 15.10	88198 15.09*	87209 15.06*	86960 15.04*	381	431	523
7000	96616 16.04	94058 15.25	91444 15.23	89726 15.22*	88739 15.19*	88482 15.17*	388	440	532
7100	98243 16.16	95660 15.37	92982 15.36	91261 15.35*	90279 15.32*	90012 15.30*	396	450	542
7200	99880 16.28	97274 15.49	94583 15.49*	92805 15.47*	91830 15.45*	91550 15.43*	403	460	552
7300	101521 16.40	98898 16.01	96167 16.02*	94359 16.00*	93392 15.58*	93097 15.55*	412	470	562
7400	103155 16.50	100533 16.13	97759 16.14*	95923 16.13*	94976 16.10*	94654 16.08*	420	480	572
7500	104796 17.00	102167 16.25	99359 16.27*	97501 16.26*	96561 16.23*	96224 16.21*	428	489	582
7600	106446 17.10	103773 16.38	100967 16.40*	99106 16.39*	98155 16.36*	97807 16.34*	437	499	593
7700	108106 17.19	105383 16.51	102586 16.53*	100707 16.52*	99757 16.49*	99400 16.47*	445	510	603
7800	109778 17.29	107001 17.03	104214 17.06*	102321 17.04*	101368 17.02*	101003 17.00*	454	520	614
7900	111461 17.39	108629 17.16	105849 17.18*	103946 17.17*	102990 17.15*	102620 17.13*	465	530	624
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
△ FUEL = - 0.5 %		△FUEL = + 1 %			△ FUEL = + 2.5 %		△ FUEL = + 3.5 %		

FLIP23A A340-211 CFM56-5C2 3420 03701.000011 0250300 .7801 .000000 330 0300350150 0 280190100178 18590 FCOM-F0-02-05-40-017-150

 A340 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.50	P 1
	ALTERNATE		SEQ 001	REV 11

GENERAL

The alternate planning tables allow the flight crew to determine fuel consumption and time required to cover a given air distance from go-around at the destination airport to landing at the alternate airport.

These tables are established for :

- Go-around : 600 kg or 1320 lb
- Climb profile : 250kt/300kt/M.78
- Long range cruise
- Descent profile : M.80/300kt/250kt
- Approach and landing at alternate airport : 220 kg or 490 lb (4 minutes)
- ISA
- CG = 30 %
- Normal air conditioning (Packs NORM/Cargo cooling OFF or Packs LO/Cargo cool NORM)
- Anti ice OFF

Note : 1. In the tables, the asterisk () means that a step climb of 4000 feet must be flown to reach the corresponding flight level.*

2. The flight level shown on the top of each column is the final flight level.

*3. For each degree Celsius above ISA temperature apply a fuel correction of
 $0.015 \text{ (kg/}^\circ\text{C/NM)} \times \Delta\text{ISA (}^\circ\text{C)} \times \text{air distance (NM)}$
 or $0.033 \text{ (lb/}^\circ\text{C/NM)} \times \Delta\text{ISA (}^\circ\text{C)} \times \text{air distance (NM)}$*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The alternate planning tables are based on a reference landing weight at the alternate. The fuel consumption must be corrected when the actual weight is different from the reference weight.

If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT GO-AROUND : 600 KG - CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE DESCENT : M.80/300KT/250KT - VMC PROCEDURE : 220 KG (4MIN)									
REF. LDG WT AT ALTERNATE = 150000 KG				ISA		FUEL CONSUMED (KG)			
NORMAL AIR CONDITIONING				CG = 30.0 %		TIME (H.MIN)			
AIR DIST.		FLIGHT LEVEL					CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
(NM)	100	120	140	160	180	200	FL100 FL120	FL140 FL160	FL180 FL200
50	1766 0.15						3		
100	2610 0.25	2611 0.24	2605 0.24	2604 0.23	2611 0.23	2624 0.23	5	5	5
150	3457 0.36	3428 0.34	3391 0.33	3358 0.33	3335 0.32	3323 0.32	8	7	8
200	4307 0.46	4247 0.44	4179 0.43	4113 0.42	4062 0.41	4024 0.41	10	10	10
250	5158 0.56	5069 0.54	4969 0.52	4870 0.51	4790 0.51	4727 0.50	13	12	13
300	6012 1.06	5893 1.03	5761 1.02	5629 1.01	5521 1.00	5432 0.99	16	14	15
350	6867 1.17	6718 1.13	6554 1.11	6389 1.10	6252 1.09	6138 1.08	18	16	18
400	7725 1.27	7546 1.23	7349 1.20	7151 1.19	6986 1.18	6847 1.17	21	19	20
450	8586 1.37	8375 1.32	8145 1.30	7915 1.29	7720 1.27	7557 1.26	23	21	23
500	9448 1.47	9207 1.42	8943 1.39	8680 1.38	8457 1.36	8269 1.34	26	23	25
550	10313 1.57	10040 1.52	9743 1.49	9447 1.47	9195 1.46	8983 1.43	28	25	28
600	11180 2.07	10876 2.01	10544 1.98	10216 1.95	9934 1.92	9699 1.89	31	28	30
650	12049 2.17	11713 2.11	11347 2.07	10987 2.06	10675 2.04	10416 2.01	34	30	33
700	12921 2.27	12553 2.20	12152 2.17	11759 2.15	11418 2.13	11136 2.09	36	32	36
750	13795 2.37	13395 2.30	12958 2.26	12534 2.24	12163 2.22	11857 2.18	39	34	38
800	14671 2.46	14239 2.39	13766 2.35	13309 2.33	12909 2.31	12581 2.26	41	37	41
850	15550 2.56	15085 2.48	14576 2.45	14087 2.43	13657 2.40	13306 2.35	44	39	43
900	16430 3.06	15933 2.58	15387 2.54	14867 2.52	14407 2.49	14033 2.43	46	41	46
950	17314 3.16	16783 3.07	16201 3.03	15648 3.01	15158 2.98	14763 2.92	49	44	49
1000	18199 3.25	17636 3.16	17015 3.13	16431 3.10	15911 3.08	15494 3.00	52	46	51
1050	19087 3.35	18490 3.26	17832 3.22	17216 3.19	16666 3.17	16227 3.08	54	48	54
1100	19977 3.45	19347 3.35	18650 3.31	18002 3.28	17422 3.26	16962 3.17	57	51	56
1150	20869 3.54	20206 3.44	19470 3.41	18791 3.37	18180 3.35	17699 3.25	59	53	59
1200	21763 4.04	21066 3.53	20292 3.50	19581 3.46	18940 3.44	18438 3.33	62	56	62
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %		ΔFUEL = + 1 %			ΔFUEL = + 3.5 %		ΔFUEL = + 5 %		

FLIP23A A340-211 CFM56-5C2 3520 03001.000010 600250300 .7801 .00000 220 0300350150 0 275851201173 18590 FCOM-EO-02-05-50-002-150

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT GO-AROUND : 600 KG - CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE DESCENT : M.80/300KT/250KT - VMC PROCEDURE : 220 KG (4MIN)									
REF. LDG WT AT ALTERNATE = 150000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF					ISA CG = 30.0 %		FUEL CONSUMED (KG)		
AIR DIST. (NM)	FLIGHT LEVEL					TIME (H.MIN) CORRECTION ON FUEL CONSUMPTION (KG/1000KG)			
	230	270	310	350	390	FL230 FL270	FL310 FL350	FL390	
150	3320 0.30	3337 0.30				8		0	
200	3989 0.39	3959 0.37	3955 0.36	3970 0.36		10	11	0	
250	4659 0.47	4583 0.45	4540 0.43	4515 0.43	4514 0.42	12	13	14	
300	5331 0.55	5208 0.53	5127 0.51	5061 0.50	5030 0.49	15	15	16	
350	6004 1.03	5834 1.01	5714 0.58	5608 0.57	5547 0.56	17	17	19	
400	6679 1.11	6462 1.09	6303 1.05	6156 1.04	6064 1.02	19	19	21	
450	7355 1.19	7091 1.17	6894 1.12	6706 1.11	6583 1.09	21	21	23	
500	8032 1.28	7721 1.24	7485 1.19	7257 1.18	7104 1.15	24	23	25	
550	8711 1.36	8353 1.32	8077 1.26	7809 1.25	7625 1.22	26	26	28	
600	9391 1.44	8986 1.40	8670 1.33	8361 1.32	8147 1.28	28	28	30	
650	10072 1.52	9621 1.48	9265 1.40	8915 1.39	8670 1.35	30	30	32	
700	10756 2.00	10257 1.55	9860 1.47	9470 1.46	9195 1.41	33	32	35	
750	11440 2.08	10894 2.03	10456 1.55	10027 1.53	9721 1.48	35	34	37	
800	12126 2.16	11533 2.10	11054 2.02	10584 2.00	10247 1.54	37	36	39	
850	12814 2.24	12173 2.18	11653 2.09	11143 2.07	10776 2.01	39	38	42	
900	13503 2.33	12814 2.26	12253 2.16	11703 2.14	11305 2.07	42	40	44	
950	14194 2.41	13457 2.33	12854 2.23	12264 2.21	11836 2.14	44	42	46	
1000	14886 2.49	14102 2.41	13456 2.30	12826 2.28	12368 2.20	46	45	49	
1050	15579 2.57	14748 2.48	14059 2.37	13390 2.35	12901 2.27	49	47	51	
1100	16274 3.05	15395 2.56	14663 2.44	13954 2.42	13435 2.33	51	49	53	
1150	16971 3.13	16043 3.03	15269 2.51	14520 2.49	13970 2.40	53	51	56	
1200	17669 3.21	16693 3.11	15875 2.58	15087 2.56	14507 2.46	56	53	58	
PACK FLOW LO △ FUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON △FUEL = + 1 %			ENGINE ANTI ICE ON △FUEL = + 3.5 %		TOTAL ANTI ICE ON △FUEL = + 5 %		

FLIP23A A340-211 CFM56-5C2 3520 03001.000010 600250300.7801.00000 220 0300350150 0 275851201173 18590 FCOM-F0-02-05-50-003-150

 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING GROUND DISTANCE/AIR DISTANCE	2.05.60	P 1
		SEQ 001	REV 10

GENERAL

- R The ground distance/air distance conversion tables show the air distance for a given ground distance due to influence of the wind.
Tables are given for:
- M.80
 - M.82
 - M.84
- R — Long range cruise
below FL250
above FL250.

M.80

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
10	8	8	9	10	11	13	15
20	15	16	18	20	22	26	30
30	23	25	27	30	34	38	44
40	30	33	36	40	45	51	59
50	38	41	45	50	56	64	74
100	75	82	90	100	112	128	148
200	151	164	180	200	224	255	296
300	226	247	271	300	336	383	445
400	302	329	361	400	449	511	593
500	377	411	451	500	561	638	741
1000	755	822	902	1000	1122	1277	1482
1500	1132	1233	1353	1500	1682	1915	2223
2000	1509	1644	1804	2000	2243	2554	2964
2500	1886	2054	2255	2500	2804	3192	3705
3000	2264	2465	2707	3000	3365	3831	4446
3500	2641	2876	3158	3500	3926	4469	5187
4000	3018	3287	3609	4000	4486	5108	5928
4500	3395	3698	4060	4500	5047	5746	6669
5000	3773	4109	4511	5000	5608	6385	7411
5500	4150	4520	4962	5500	6169	7023	8152
6000	4527	4931	5413	6000	6730	7661	8893
6500	4905	5342	5864	6500	7290	8300	9634
7000	5282	5753	6315	7000	7851	8938	10375
7500	5659	6163	6766	7500	8412	9577	11116
8000	6036	6574	7217	8000	8973	10215	11857
8500	6414	6985	7669	8500	9534	10854	12598
9000	6791	7396	8120	9000	10095	11492	13339
9500	7168	7807	8571	9500	10655	12131	14080
10000	7546	8218	9022	10000	11216	12769	14821

M.82

GROUND DIST (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENT (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
10	8	8	9	10	11	13	15
20	15	17	18	20	22	25	29
30	23	25	27	30	34	38	44
40	30	33	36	40	45	51	59
50	38	41	45	50	56	63	73
100	76	83	90	100	112	127	146
200	152	165	181	200	224	254	293
300	228	248	271	300	335	381	439
400	304	330	362	400	447	507	586
500	380	413	452	500	559	634	732
1000	759	825	904	1000	1118	1268	1465
1500	1139	1238	1357	1500	1677	1903	2197
2000	1518	1651	1809	2000	2237	2537	2930
2500	1898	2063	2261	2500	2796	3171	3662
3000	2277	2476	2713	3000	3355	3805	4395
3500	2657	2889	3165	3500	3914	4439	5127
4000	3036	3302	3617	4000	4473	5073	5860
4500	3416	3714	4070	4500	5032	5708	6592
5000	3795	4127	4522	5000	5591	6342	7324
5500	4175	4540	4974	5500	6151	6976	8057
6000	4555	4952	5426	6000	6710	7610	8789
6500	4934	5365	5878	6500	7269	8244	9522
7000	5314	5778	6330	7000	7828	8878	10254
7500	5693	6190	6783	7500	8387	9513	10987
8000	6073	6603	7235	8000	8946	10147	11719
8500	6452	7016	7687	8500	9506	10781	12451
9000	6832	7428	8139	9000	10065	11415	13184
9500	7211	7841	8591	9500	10624	12049	13916
10000	7591	8254	9043	10000	11183	12683	14649

M.84

GROUND DIST (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENT (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
10	8	8	9	10	11	13	14
20	15	17	18	20	22	25	29
30	23	25	27	30	33	38	43
40	31	33	36	40	45	50	58
50	38	41	45	50	56	63	72
100	76	83	91	100	112	126	145
200	153	166	181	200	223	252	290
300	229	249	272	300	335	378	435
400	305	332	363	400	446	504	580
500	382	414	453	500	558	630	724
1000	763	829	906	1000	1115	1260	1449
1500	1145	1243	1360	1500	1673	1890	2173
2000	1527	1658	1813	2000	2230	2521	2898
2500	1909	2072	2266	2500	2788	3151	3622
3000	2290	2486	2719	3000	3345	3781	4347
3500	2672	2901	3172	3500	3903	4411	5071
4000	3054	3315	3626	4000	4461	5041	5795
4500	3436	3730	4079	4500	5018	5671	6520
5000	3817	4144	4532	5000	5576	6301	7244
5500	4199	4559	4985	5500	6133	6932	7969
6000	4581	4973	5438	6000	6691	7562	8693
6500	4963	5387	5892	6500	7249	8192	9417
7000	5344	5802	6345	7000	7806	8822	10142
7500	5726	6216	6798	7500	8364	9452	10866
8000	6108	6631	7251	8000	8921	10082	11591
8500	6490	7045	7704	8500	9479	10712	12315
9000	6871	7459	8158	9000	10036	11343	13040
9500	7253	7874	8611	9500	10594	11973	13764
10000	7635	8288	9064	10000	11152	12603	14488

LONG RANGE CRUISE BELOW FL250

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
10	7	8	9	10	11	13	16
20	14	16	18	20	23	27	33
30	22	24	27	30	34	40	49
40	29	32	35	40	46	54	65
50	36	40	44	50	57	67	82
100	72	79	89	100	115	135	163
200	144	159	177	200	230	270	327
300	216	238	266	300	345	405	490
400	288	318	354	400	459	539	653
500	360	397	443	500	574	674	817
1000	721	795	886	1000	1148	1348	1633
1500	1081	1192	1328	1500	1723	2023	2450
2000	1441	1589	1771	2000	2297	2697	3266
2500	1802	1987	2214	2500	2871	3371	4083
3000	2162	2384	2657	3000	3445	4045	4899
3500	2522	2781	3100	3500	4019	4720	5716
4000	2883	3179	3542	4000	4594	5394	6532
4500	3243	3576	3985	4500	5168	6068	7349
5000	3603	3973	4428	5000	5742	6742	8165
5500	3964	4371	4871	5500	6316	7417	8982
6000	4324	4768	5313	6000	6890	8091	9798
6500	4684	5165	5756	6500	7465	8765	10615
7000	5045	5563	6199	7000	8039	9439	11431
7500	5405	5960	6642	7500	8613	10114	12248
8000	5765	6357	7085	8000	9187	10788	13064
8500	6126	6754	7527	8500	9761	11462	13881
9000	6486	7152	7970	9000	10335	12136	14697
9500	6846	7549	8413	9500	10910	12811	15514
10000	7206	7946	8856	10000	11484	13485	16330

LONG RANGE CRUISE ABOVE FL250

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
10	8	8	9	10	11	13	15
20	15	16	18	20	22	26	30
30	23	25	27	30	34	38	44
40	30	33	36	40	45	51	59
50	38	41	45	50	56	64	74
100	76	82	90	100	112	128	148
200	151	164	180	200	224	255	296
300	227	247	271	300	336	383	444
400	302	329	361	400	449	510	592
500	378	411	451	500	561	638	740
1000	755	822	902	1000	1121	1276	1480
1500	1133	1233	1354	1500	1682	1914	2220
2000	1510	1644	1805	2000	2243	2552	2961
2500	1888	2055	2256	2500	2803	3190	3701
3000	2265	2466	2707	3000	3364	3828	4441
3500	2643	2878	3158	3500	3924	4466	5181
4000	3020	3289	3610	4000	4485	5104	5921
4500	3398	3700	4061	4500	5046	5742	6661
5000	3775	4111	4512	5000	5606	6380	7402
5500	4153	4522	4963	5500	6167	7018	8142
6000	4530	4933	5414	6000	6728	7656	8882
6500	4908	5344	5866	6500	7288	8294	9622
7000	5285	5755	6317	7000	7849	8932	10362
7500	5663	6166	6768	7500	8410	9570	11102
8000	6040	6577	7219	8000	8970	10208	11843
8500	6418	6988	7670	8500	9531	10846	12583
9000	6795	7399	8122	9000	10091	11484	13323
9500	7173	7810	8573	9500	10652	12122	14063
10000	7550	8222	9024	10000	11213	12760	14803

FUEL TANKERING

GENERAL

Fuel tankering graphs allow to determine the optimum fuel quantity to be tankered as a function of the fuel price ratio between departure and destination airports. The following pages present for one FL per page the optimum aircraft takeoff weight depending on the fuel price ratio (departure fuel price divided by destination fuel price) and on the air distance to fly.

The computed optimum takeoff weight is based on the additional fuel consumption needed for the transport of the extra (tankered) fuel and it is the weight at which the maximum profit can be achieved. The quantity of extra fuel that can be loaded is calculated as the difference between the optimum takeoff weight (including extra fuel) and the planned takeoff weight (without fuel tankering).

The graphs are established for :

- FL 290, 310, 330, 350, 370, 390
- Air distances from 500 to 7500 NM
- Flight profile :

R Climb : 250kt/300kt/M.78
 Cruise : M.80
 Descent : M.80/300kt/250kt

Note : 1. If necessary, step climbs are performed to reach the indicated flight levels.
 2. The crew/operator has to verify that the found aircraft weight complies with basic aircraft limitations (e.g. max fuel capacity) as well as with mission dependent restrictions (e.g. MLW at destination).

EXAMPLES

1. Fuel price ratio = 0.920

Cruising Altitude = FL310

Planned TOW = 190000 kg (mission weight without fuel tankering)

Air Distance = 4000 NM

Enter graph on page 2.05.70 p4.

For the given air distance, the optimum fuel tankering weight is 185000 kg, which is lower than the planned TOW weight → no fuel tankering recommended.

 FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.70	P 2
	FUEL TANKERING		SEQ 050	REV 10

2. fuel price ratio = 0.907

Cruising Altitude = FL350

Planned TOW = 200000 kg (mission weight without fuel tankering)

Air Distance = 1750 NM

Enter graph on page 2.05.70 p6.

For the given air distance, the optimum fuel tankering weight is 225000 kg, which is 25000 kg higher than the planned takeoff weight → optimum quantity of extra fuel is 25000 kg.

Check :

- a) new TOW less or equal MTOW from departure airport
- b) total fuel to be loaded less or equal maximum fuel capacity
- c) MLW at destination.

3. fuel price ratio = 0.865

Cruising Altitude = FL390

Planned TOW = 190000 kg (mission weight without fuel tankering)

Air Distance = 2250 NM

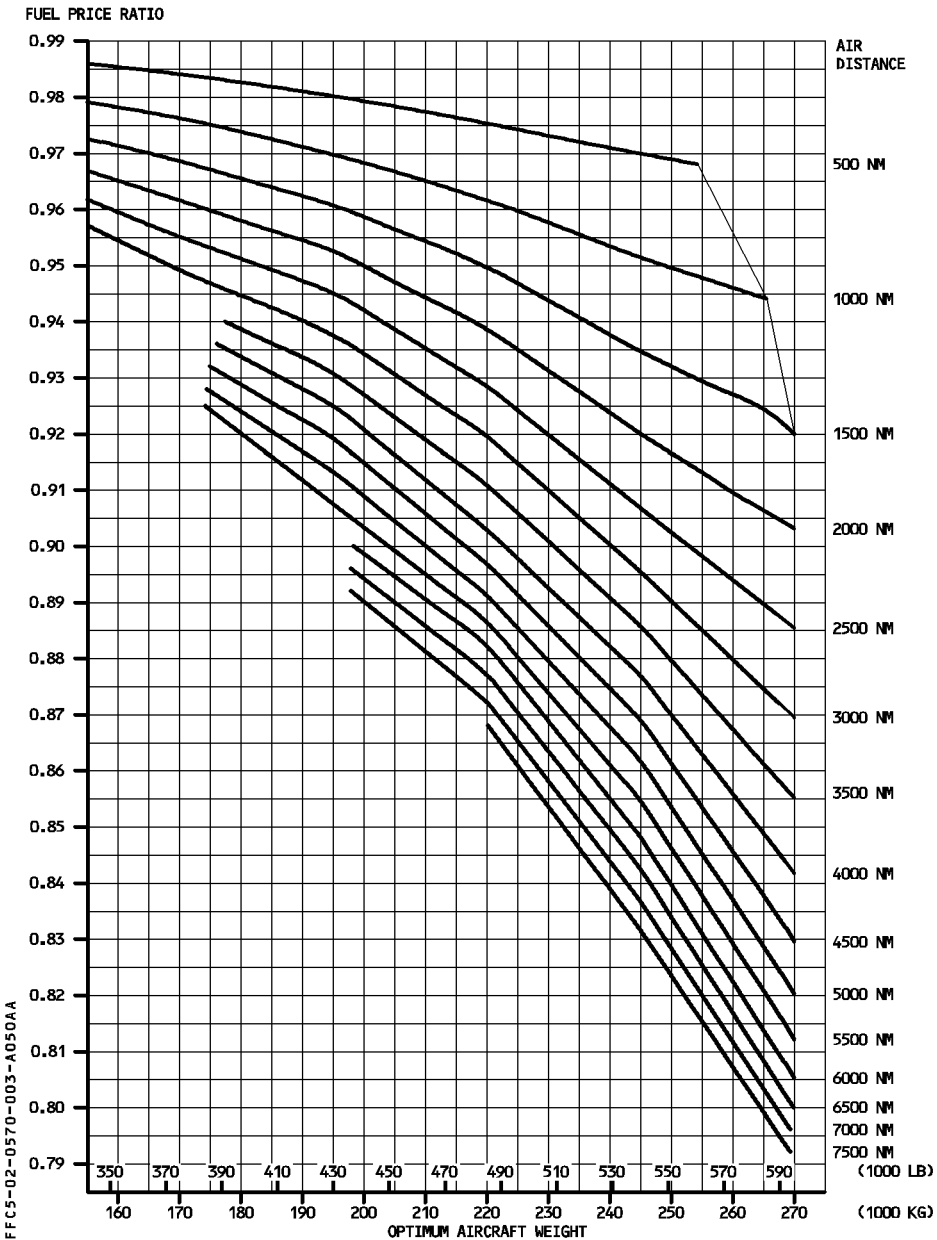
Enter graph on page 2.05.70 p8.

Interpolate for the air distance of 2250 NM between borderline and 2500 NM. The optimum fuel tankering weight is 205000 kg, which is 15000 kg higher than the planned takeoff weight → optimum quantity of extra fuel is 15000 kg.

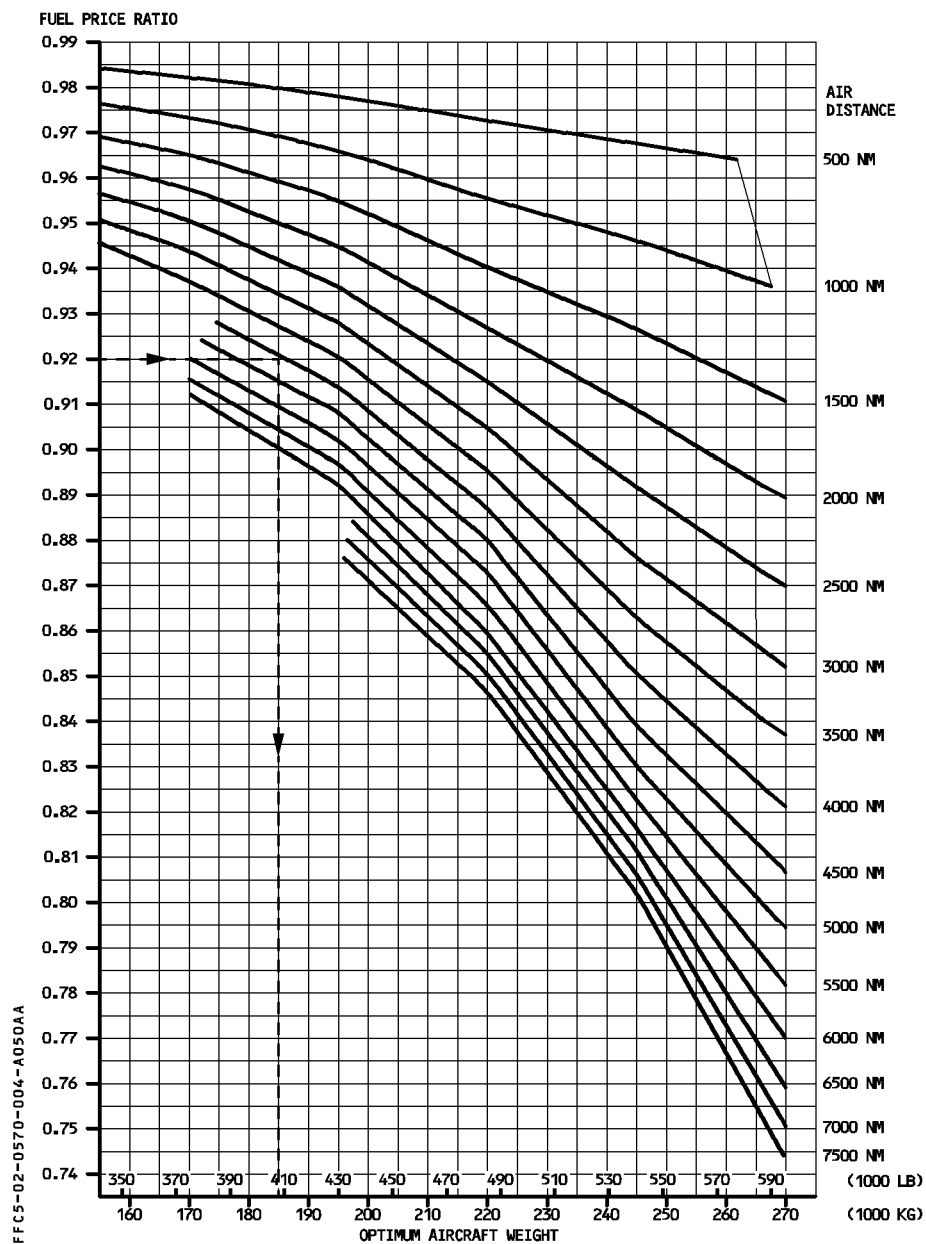
Check :

- a) new TOW less or equal MTOW from departure airport
- b) total fuel to be loaded less or equal maximum fuel capacity
- c) MLW at destination.

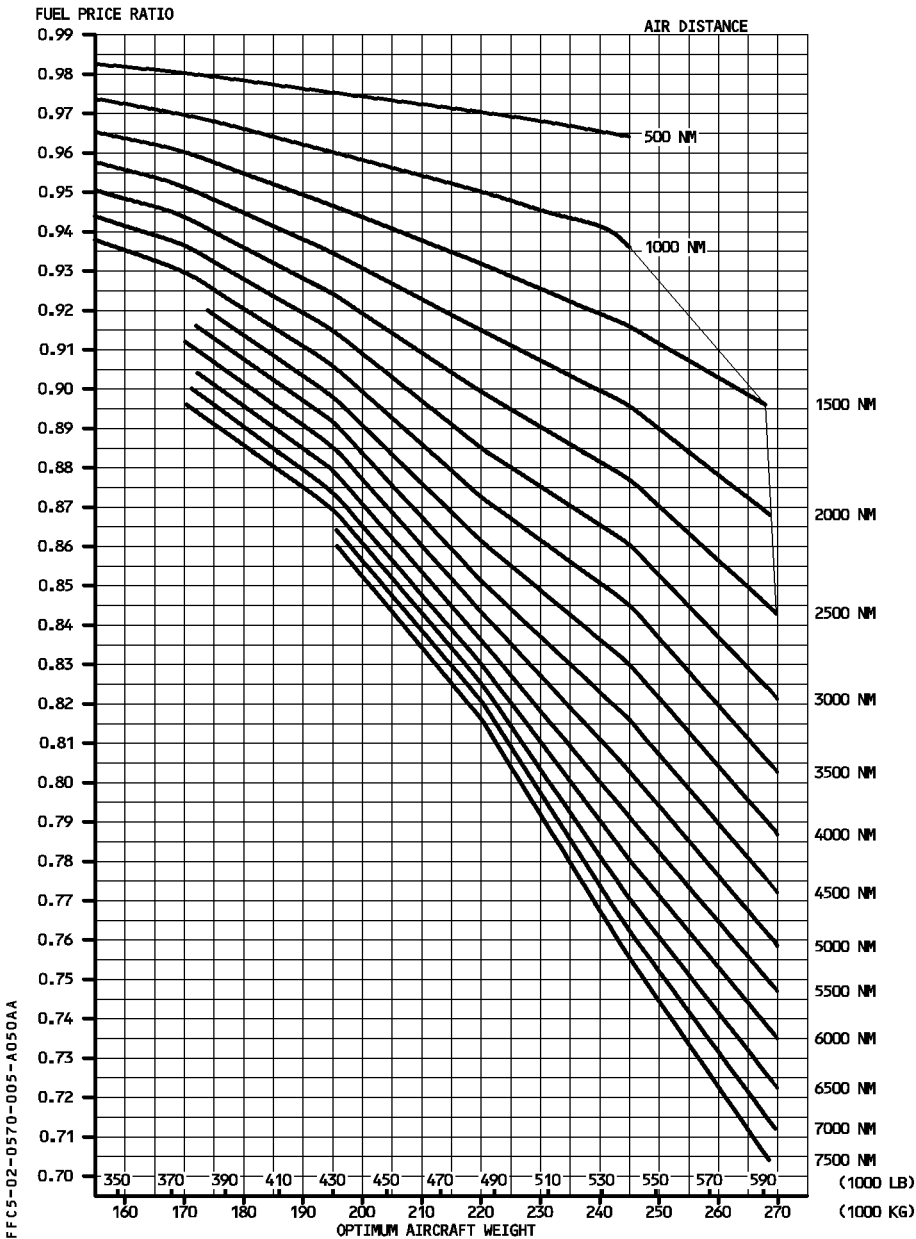
FL290



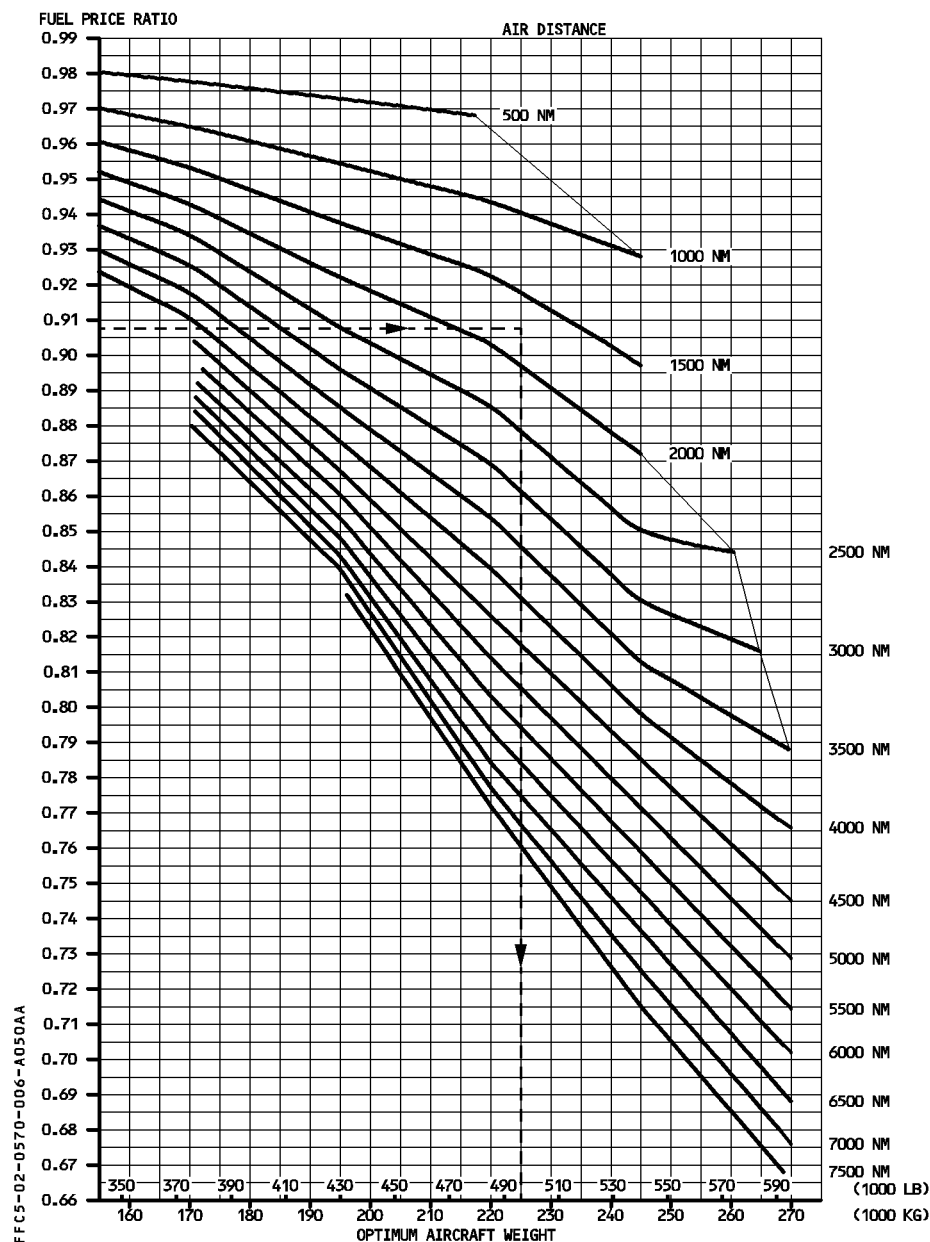
FL310



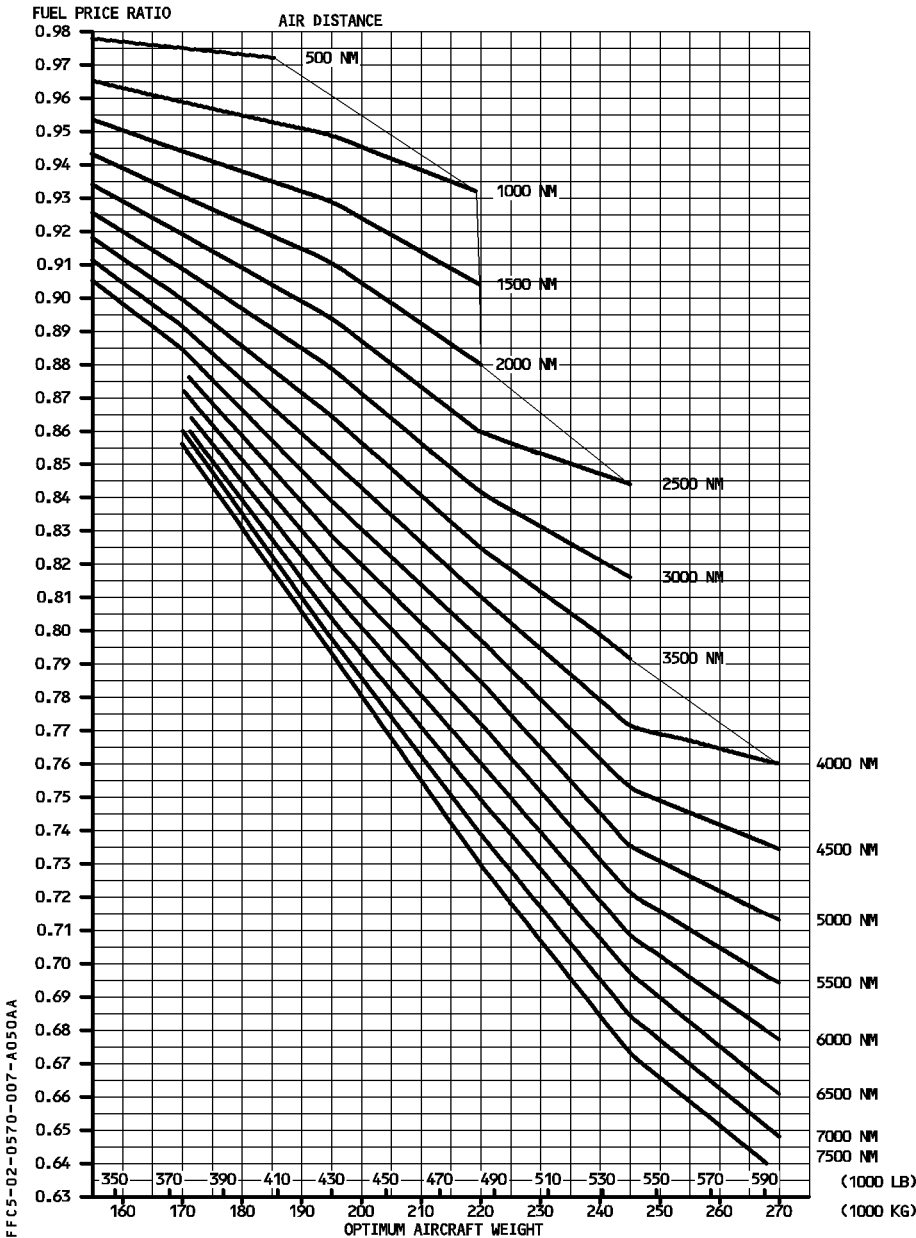
FL330



FL350



FL370



FL390