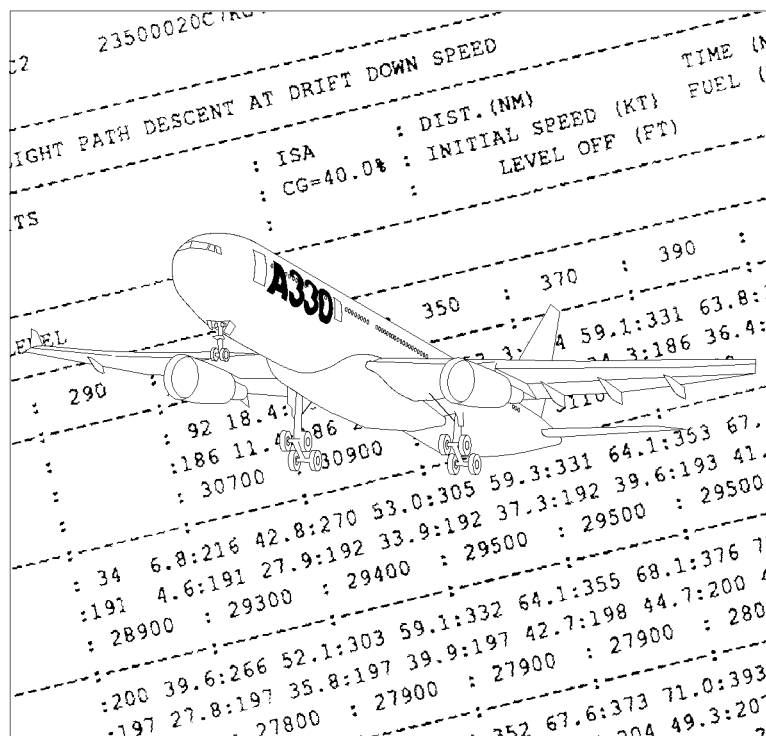


A330

FLIGHT CREW OPERATING MANUAL



FLIGHT PREPARATION

2

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	GENERAL INFORMATION		2.00.00	P 1
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00.30 LIST OF NORMAL REVISIONS

00.35 RECORD OF TEMPORARY REVISIONS

00.36 LIST OF EFFECTIVE TEMPORARY REVISIONS

00.70 CROSS REFERENCE TALBE

00.75 HIGHLIGHTS

00.80 LIST OF EFFECTIVE PAGES

00.85 LIST OF MODIFICATIONS

DAH ALL

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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.

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.

- R – ECAM warnings and cautions are summarized in a table at the end of each chapter of
- R 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.

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REVISIONS

NORMAL REVISIONS

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

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
R or changes in the composition of the fleet of an airline. They are numbered in ascending
R sequence e.g. 20A, 20B, 20C... for intermediate revisions issued between normal revisions
R 20 and 21.

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

TEMPORARY REVISIONS

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. It is to be filled by the FCOM's owner.

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
R operator, a temporary revision or an intermediate revision is issued between normal
R revisions.

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.

OEBs are provided with an OEB record sheet. It is to be filled by the FCOM's owner.

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

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HOW TO INSERT A REVISION

FILING INSTRUCTIONS

Use the filing instructions as follows :

- 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.

The column NOTE indicates EFFECTIVITY CHANGE ONLY if the page is revised due to an 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)

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

CODE	DESIGNATION
0001	Mod : 43359 = (43359+43620) = (44575+45481) = (43359+43620+44575) = (43620+44575+45481)
0002	Mod : 44644 = (43359+43620+44575+44644) = (43359+43620+43756+44575+44644)
0003	Mod : 44367 = (43620+44367) = (43308+43620+44367)
0004	Mod : (46028+47930) = (43359+46028+47930) = (43359+43756+46028+47930)
0005	Mod : 44905 = (43359+44905) = (43359+43756+44905)
0006	Mod : (40624+40912) = (40912+SSV)
0007	Mod : (40624+43037) = (40624+45055) = (40624+44629)
0008	Mod : (43359+47930) = (43359+43620+47930) = (44575+45481+47930) = (43359+43620+44575+47930) = (43620+44575+45481+47930)
0009	Mod : (43620+43756) = (43756+44575) = (43620+43756+44575)
0010	Mod : (43359+43756) = (43359+43620+43756) = (43756+44575+45481) = (43359+43620+43756+44575) = (43620+43756+44575+45481)
0011	Mod : (44644+47930) = (43359+43620+44575+44644+47930) = (43359+43620+43756+44575+44644+47930)
0012	Mod : 46028 = (43359+46028) = (43359+43756+46028)
0013	Mod : (43359+44905+47930) = (43359+43756+44905+47930)
0014	Mod : (44367+47279) = (43620+44367+47279) = (43308+43620+44367+47279)
0015	Mod : 40325+43359+43620+43756+44575
0016	Mod : 40325+43359+43620+43756+44575+47930
0017	Mod : 43359+43620+43756+44575+47930
0018	Mod : (40325+43359+44644) = (40325+43359+44644+43620+43756+44575)
0019	Mod : (43359+43620+44575+46028) = (43359+43620+44575+46028+43756)
0020	Mod : (40325+43359+44575+46028) = (40325+43359+43620+43756+44575+46028)
0021	Mod : (43359+43620+44575+46028+47930) = (43359+43620+43756+44575+46028+47930)
0022	Mod : (43359+43620+44575+46028) = (43359+43620+43756+44575+46028)
0023	Mod : 40325+43359+44575+46028+47930
0024	Mod : (43724+45509) = (44661+45509) = (44662+45509)
0025	Mod : (40325+43359+44644+47930) = (40325+43359+43620+43756+44575+44644+47930)
0026	Mod : (40325+43359+44575+46028+47930) = (40325+43359+43620+43756+44575+46028+47930)
0027	Mod : 46028 = (40624+46028+CPA)

R

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

N°	TITLE	STATUS	LOCATION
R	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
0054	F-OMSA
0644	

DAH

M	V	CH	SEC	---	PAGE--	SEQ	--REV--	----	VALIDATION CRITERIA-----	-----	EFFECTIVITY-----
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2	00	10	001			001	REV016				ALL
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2	00	10	003			001	REV007				ALL
2	00	10	004			001	REV007				
2	00	10	005			001	REV006				ALL
2	00	20	001			001	REV019	LIST OF CODES			ALL
2	00	30	001			001	REV019	LIST OF NORMAL REVISIONS			ALL
2	00	35	001			001	REV007	RECORD OF TEMPORARY REVISION			ALL
2	00	36	001-LTR			001	REV018	LIST OF TEMPORARY REVISIONS			ALL
2	00	70	CRT			001	REV019	CROSS REFERENCE TABLE			ALL
2	00	75	HL			001	REV019	HIGHLIGHTS			ALL
2	00	80	LEP			001	REV019	LIST OF EFFECTIVE PAGES			ALL
2	00	85	LOM			001	REV019	LIST OF MOD/MP/SB			ALL
2	01	00	001			001	REV018				ALL
2	01	10	001			001	REV016				ALL
2	01	20	001			001	REV006				0054
2	01	20	002			001	REV006				
2	01	20	001			001	REV006				0644
2	01	20	002			110	REV010	44905			
2	01	20	003			001	REV006				ALL
2	01	20	004			100	REV011	41649			
2	01	20	005			100	REV011	41649			ALL
2	01	20	006			001	REV006				
2	01	30	001			100	REV015	43620+44575+43620+44575			0054
2	01	30	002			108	REV015	47930+43620+44575+47930			
2	01	30	001			103	REV011	CODE:0002			0644
2	01	30	002			208	REV015	CODE: 0011			
2	01	30	003			001	REV006				0054
2	01	30	004			106	REV018	CODE:0003			
2	01	30	003			100	REV008	44644			0644
2	01	30	004			212	REV018	CODE:0014			
2	01	30	005			002	REV015	STD=43620			0054
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2	01	30	005			200	REV015	43620+40513			0644
2	01	30	006			200	REV015	44575+40513			

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		2	01	30	010	001	REV006				
		2	01	30	009	100	REV018	47279			0644
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		2	01	30	014	001	REV006				
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		2	01	40	005	305	REV015	CODE:0013			0644
		2	01	40	006	305	REV015	CODE:0013			
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		2	01	40	009	001	REV012				0054
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		2	02	00	002	001	REV017				
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		2	02	10	001	001	REV007				ALL
		2	02	10	002	001	REV010				

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		2	02	18	004	001	REV010					
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		2	02	18	006	010	REV010		GE80E1A2			
		2	02	18	005	115	REV010		44905/80E1A4/A3			0644
		2	02	18	006	115	REV010		44905/80E1A4/A3			
		2	02	18	007	001	REV007					ALL
		2	02	20	001	010	REV012		GE80E1A2/A3/A4			ALL
		2	02	20	002	001	REV007					
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		2	02	20	006	005	REV010		GE80E1A2			
		2	02	20	005	001	REV010					0644
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		2	02	20	008	001	REV019					
		2	02	20	007	010	REV016		GE80E1A4			0644
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		2	02	24	001	010	REV016		GE80E1A2			0054
		2	02	24	001	115	REV016		44905/GE80E1A4			0644
		2	02	25	001	010	REV007		GE80E1A2			0054
		2	02	25	002	010	REV007		GE80E1A2			
		2	02	25	001	115	REV013		44905/GE80E1A4			0644
		2	02	25	002	115	REV013		44905/GE80E1A4			
		2	02	25	003	010	REV007		GE80E1A2			0054
		2	02	25	004	010	REV007		GE80E1A2			
		2	02	25	003	115	REV013		44905/GE80E1A4			0644
		2	02	25	004	115	REV013		44905/GE80E1A4			
		2	02	27	001	100	REV015		43037=44629=45055			0644
		2	02	27	002	100	REV015		43037=44629=45055			
		2	02	27	003	100	REV007		43037=44629=45055=CPA			0644
		2	02	27	004	120	REV008		45055/80E1A4			
		2	02	27	005	120	REV008		45055/GE80E1A4			0644
		2	02	27	006	120	REV008		45055/GE80E1A4			

M	V	CH	SEC	---	PAGE--	SEQ	--REV--	----	VALIDATION CRITERIA-----	----	EFFECTIVITY-----
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2	02	27	009			120	REV008		45055/GE80E1A4		0644
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2	02	30	002			001	REV006		STD=40624+CPA		
2	02	30	003			110	REV006		40912/GE80E1A2		0054
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2	02	30	005			110	REV006		40912/GE80E1A2		0054
2	02	30	006			110	REV006		40912/GE80E1A2		
2	02	30	005			115	REV013		44905/80E1A4		0644
2	02	30	006			115	REV013		44905/GE80E1A4		
2	02	30	007			110	REV006		40912/GE80E1A2		0054
2	02	30	008			110	REV006		40912/GE80E1A2		
2	02	30	007			115	REV013		44905/GE80E1A4		0644
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2	02	30	009			110	REV006		40912/GE80E1A2		0054
2	02	30	010			001	REV006				
2	02	30	009			115	REV013		44905/80E1A4		0644
2	02	30	010			001	REV006				
2	02	30	011			110	REV006		40912/GE80E1A2		0054
2	02	30	012			110	REV006		40912/GE80E1A2		
2	02	30	011			115	REV013		44905/80E1A4		0644
2	02	30	012			115	REV013		44905/80E1A4		
2	02	30	013			110	REV006		40912/GE80E1A2		0054
2	02	30	013			115	REV013		44905/80E1A4		0644
2	02	40	001			001	REV010				0054
2	02	40	002			010	REV006		GE80E1A2		
2	02	40	001			001	REV010				0644
2	02	40	002			115	REV009		44905/80E1A4		
2	02	40	003			010	REV006		GE80E1A2		0054
2	02	40	004			010	REV006		GE80E1A2		
2	02	40	003			115	REV009		44905/GE80E1A4		0644
2	02	40	004			115	REV009		44905/GE80E1A4		
2	02	40	005			010	REV006		GE80E1A2		0054
2	02	40	006			010	REV006		GE80E1A2		
2	02	40	005			115	REV009		44905/GE80E1A4		0644
2	02	40	006			115	REV009		44905/GE80E1A4		

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

		2	02	40	007	010	REV006		GE80E1A2			0054
		2	02	40	007	115	REV009		44905/GE80E1A4			0644
		2	03	00	001	001	REV016					ALL
		2	03	10	001	001	REV011					ALL
		2	03	10	002	001	REV011					
		2	03	10	003	110	REV016		40912/GE80E1A2			0054
		2	03	10	004	110	REV016		40912/GE80E1A2			
		2	03	10	003	120	REV016		44905/GE80E1A4/A3			0644
		2	03	10	004	120	REV016		44905/GE80E1A4/A3			
		2	03	10	005	110	REV016		40912/GE80E1A2			0054
		2	03	10	006	001	REV006					
		2	03	10	005	120	REV016		44905/GE80E1A3/A4			0644
		2	03	10	006	001	REV006					
		2	03	20	001	001	REV018		STD			0054
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		2	03	20	001	001	REV018		STD			0644
		2	03	20	002	120	REV016		44905/GE80E1A4/A3			
		2	04	00	001	001	REV006					ALL
		2	04	00	002	001	REV010					
		2	04	10	001	001	REV017		STD			ALL
		2	04	10	002	001	REV018		STD			
		2	04	10	003	001	REV015					0054
		2	04	10	004	010	REV012		GE80E1A2			
		2	04	10	003	001	REV015					0644
		2	04	10	004	115	REV012		44905/GE80E1A4			
		2	04	10	005	010	REV012		GE80E1A2			0054
		2	04	10	006	010	REV019		GE80E1A2			
		2	04	10	005	115	REV012		44905/GE80E1A4			0644
		2	04	10	006	115	REV019		44905/GE80E1A4			
		2	04	10	007	010	REV019		GE80E1A2			0054
		2	04	10	008	010	REV019		GE80E1A2			
		2	04	10	007	115	REV019		44905/GE80E1A4			0644
		2	04	10	008	115	REV019		44905/GE80E1A4			
		2	04	10	009	010	REV019		GE80E1A2			0054
		2	04	10	010	010	REV019		GE80E1A2			
		2	04	10	009	115	REV019		44905/GE80E1A4			0644
		2	04	10	010	115	REV019		44905/GE80E1A4			
		2	04	10	011	001	REV006					ALL
		2	04	10	012	001	REV006					

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2	05	10	003	001	REV006		ALL
2	05	10	004	001	REV006		

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		2	05	40	002	115	REV009		44905/80E1A4/A3/A2		
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		2	05	40	004	010	REV007		GE80E1A2/A4		

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M	V	REV	MOD	MP	T	SB	TITLE	VALIDITY
.	019A	40197					POWER PLANT-DEFINE CF6 80E1 POWER PLANT AND ASSOCIATED SYSTEMS F-OMSA	
.	019A	40513	.....				FUEL-REFUEL/DEFUEL SYSTEM-INSTALL A FACILITY TO ENABLE REFUEL PRESELECTION AND INITIATION FROM THE COCKPIT MSN 0644	
.	019A	40912	.....				LANDING GEAR - WHEELS AND BRAKES FIT ALLIED SIGANL BRAKES GEAR F-OMSA	
.	019A	41649	.....				DOORS-CARGO COMPARTMENT DOOR HYDRAULIC SYSTEM-INTRODUCE MODIFIED ELECTRICAL (MANUAL) SELECTOR VALVE ALL	
.	019A	43359	.....				FUEL - GENERAL - ADAPT A330 EIS FUEL SYSTEM TO SUIT A330A+ MSN 0644	
.	019A	43620	.....				FUEL - FCMS - INSTALL STAGE 6.12 FCMC WITH CHANGES TO SOFTWARE FOR A330 AND A340 A/C ALL	
.	019A	43724	.....				AUTOFLIGHT - FMEGC - INSTALL IMPROVED AUTOPILOT FOR GE ENGINES ALL	
.	019A	43756	.....				FUEL - TANKS - INCREASE TRIM TANK CAPACITY BY 230 LITRES MSN 0644	
.	019A	44367	.....				FUEL - REFUEL/DEFUEL SYSTEM - INSTALL PRESSURE SWITCH AT WING CENTRE SECTION REAR WALL (A330 ONLY) ALL	
.	019A	44575	.....				FUEL - FCMS - FIT FCMC (STAGE 7.1) WITH CHANGES TO SOFTWARE FOR A330 AND A340 AIRCRAFT ALL	

M	V	REV	MOD	MP	T	SB	TITLE	VALIDITY
.	019A	44644	.....				FUEL - DISTRIBUTION - INSTALL STRUCTURE AND SYSTEM PROVISIONS FOR ACTIVATION OF CENTER TANK (A330-200) MSN 0644	
.	019A	44905	.....				FLIGHT CONTROLS - GENERAL - ADAPT FLIGHT CONTROLS FOR ST7 MSN 0644	
.	019A	45006	.....				LANDING GEAR - NORMAL BRAKING - INSTALL BSCU SOFTWARE STANDARD S6D ALL	
.	019A	45055	.....				ENGINE FUEL AND CONTROL - GENERAL - PROVIDE DERATED TAKE-OFF FACILITIES FOR G.E. ENGINES MSN 0644	
.	019A	45554	.....				AUTOFLIGHT-FCU-DEFINE LONG RANGE VERSION OF MODULAR F.C.U. MSN 0644	
.	019A	45900	.....				LANDING GEAR - NORMAL BRAKING - INSTALL BSCU SOFTWARE STANDARD S7A ALL	
.	019A	47279	.....				COMMUNICATIONS - HF SYSTEM - INSTALL A "GROUND HF DATA LINK" PUSHBUTTON SWITCH MSN 0644	
.	019A	47457	.....				AUTO FLIGHT - FMGEC - INSTALL FMGEC P1-B7 FOR GE ENGINES MSN 0644	
.	019A	47500	.....				LANDING GEAR - NORMAL BRAKING - INSTALL BSCU SOFTWARE STANDARD S8D MSN 0644	
.	019A	47930	.....				FUEL - FCMS - INSTALL FCME STAGE 9.0 ALL	
.	019A	49144	.....				FLIGHT CONTROLS - ELECTRICAL FLIGHT CONTROL SYSTEM (EFCS) - INSTALL RUDDER FLY-BY WIRE ON A330/A340 MSN 0644	

A330 FCOM
VOLUME : 2 FLIGHT PREPARATION
LIST OF MOD/MP/SB AFFECTING THE MANUAL

REVISION : 019A

M	V	REV	MOD	MP	TITLE	VALIDITY
T				SB		

.	019A	49820			FUEL - MANUAL MAGNETIC INDICATORS -	
					DELETE ATTITUDE MONITOR (FIN 5000QT)	
					MSN 0644	

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DEFINITIONS

R — **MANUFACTURER'S EMPTY WEIGHT (MEW)**

The weight of the structure, power plant, furnishings, systems and other items of equipment that are considered 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.

R — **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 takeoff. 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.

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	LOADING		2.01.20	P 1
	CARGO LOADING		SEQ 001	REV 06

GENERAL

The aircraft has three lower deck cargo compartments :

- Forward cargo compartment 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 : 22 861 kg (50 400 lb)
- aft compartment : 18 507 kg (40 800 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	forward	aft	bulk
Half-size	LD3	2K2	E/G	3500	1587	18	14	
Half-size	LD1	2K2	C/H	3500	1587	9	7	
60.4 × 61.5 in		2K3	X/G/E	3500	1587	18	14	
60.4 × 61.5 in		2K3	H	3500	1587	9	7	
Full-size	LD6	2L2	F	7000	3174	9	7	
60.4 × 125 in		2L3/2L4	F	7000	3174	9	7	
88 × 125 in		2A1/2A2	F	10200	4626	6	5	
		2A3/2A4/2A6	F					
96 × 125 in		2M1/2M2/2M3	F	11250	5103	6	4	

Note : It is possible to load 2 pallets 88 × 125 inches plus 3 pallets 96 × 125 inches in the aft compartment.

 A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	LOADING CARGO LOADING	2.01.20	P 1
		SEQ 001	REV 06

GENERAL

The aircraft has three lower deck cargo compartments :

- Forward cargo compartment 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 :

- R
- forward compartment : 18 869 kg (40 200 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).

R

ULD	ATA	NAS 3610	IATA	Allowable MGW		Maximum number		
				lb	kg	forward	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	4	4	
		2A3/2A4/2A6	F					
96 × 125 in		2M1/2M2/2M3	F	11250	5103	4	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 may exist 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 overheat.

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.
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 door 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 door 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.

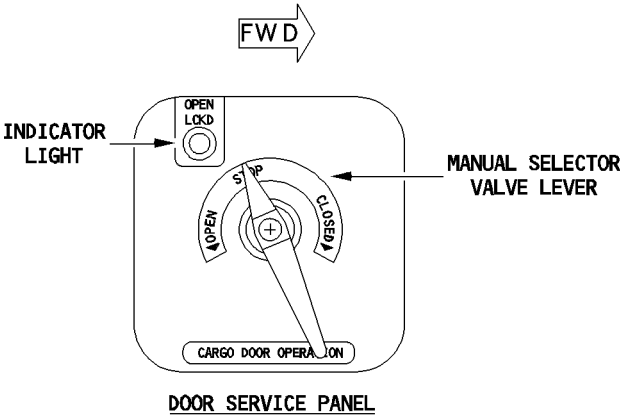
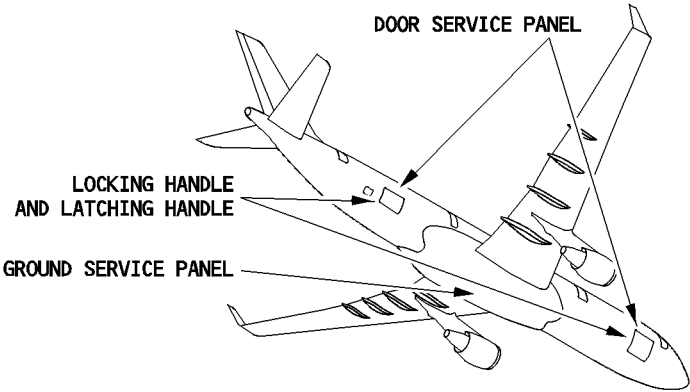
On door

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

On door service panel and ground service panel

- **ACCESS DOORS** **CLOSE**

LOCATION OF SERVICE PANELS



6FC5-02-0120-006-A001AA

GENERAL INFORMATION

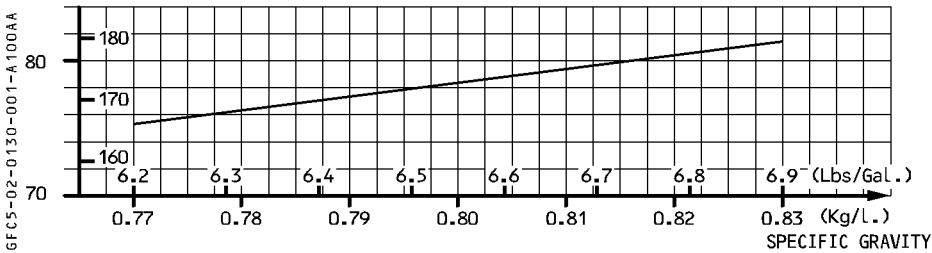
USABLE FUEL VOLUME

R

	OUTER TANK	INNER TANK	TRIM TANK	TOTAL
LITERS	3 624 × 2	41 904 × 2	6 115	97 171
US GAL	957 × 2	11 071 × 2	1 615	25 671

USABLE FUEL WEIGHT

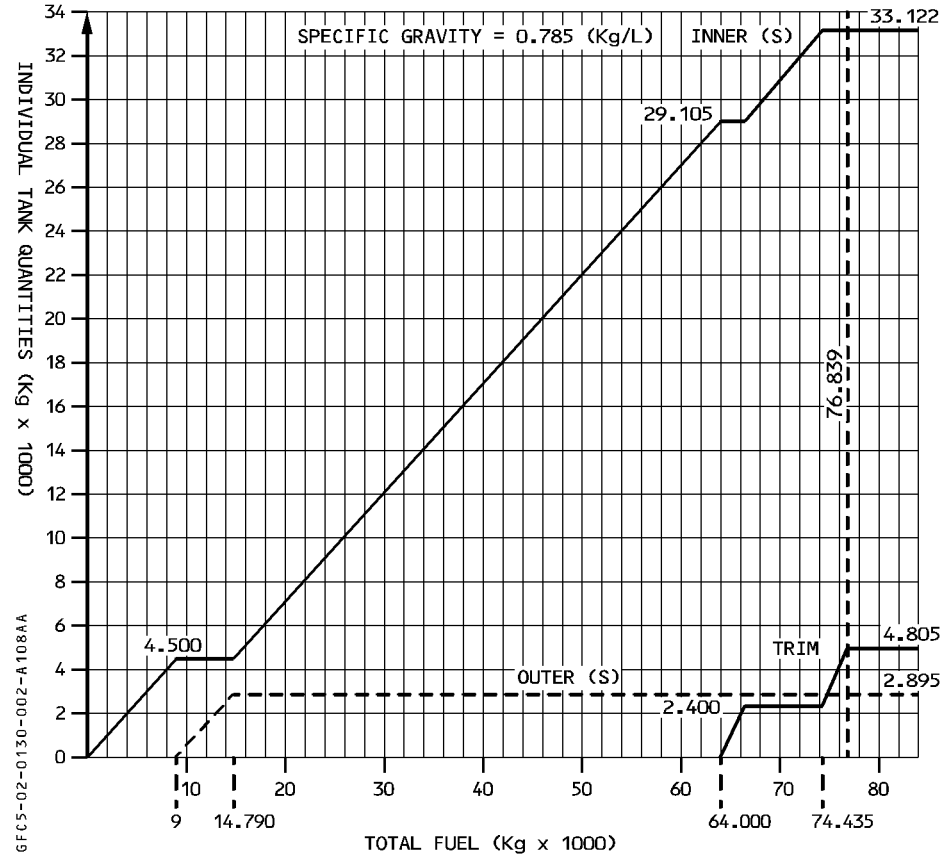
USABLE
FUEL WEIGHT
(×1000Kg) (×1000Lbs)



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



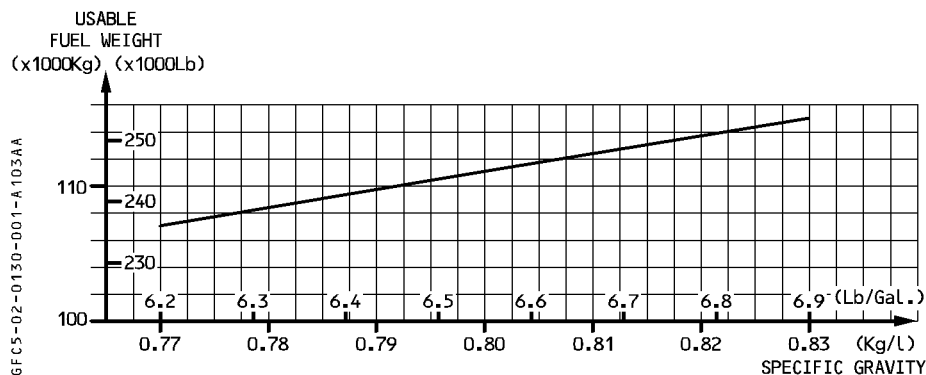
Example : Required FOB 70000 kg
Post refuel distribution :
OUTERS (each) 2895 kg
INNERS (each) 30905 kg
TRIM 2400 kg

GENERAL INFORMATION

USABLE FUEL VOLUME

R

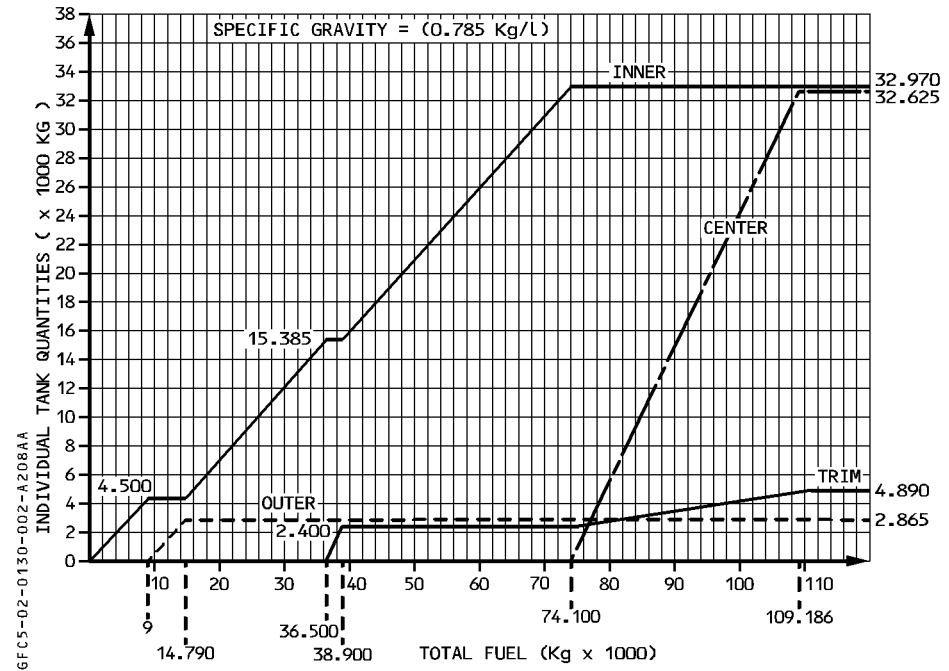
	OUTER TANK	INNER TANK	CENTER TANK	TRIM TANK	TOTAL
LITERS	3 650 × 2	42 000 × 2	41 560	6 230	139 090
US GAL	964 × 2	11 095 × 2	10 979	1 646	36 743

USABLE FUEL WEIGHT

REFUELING

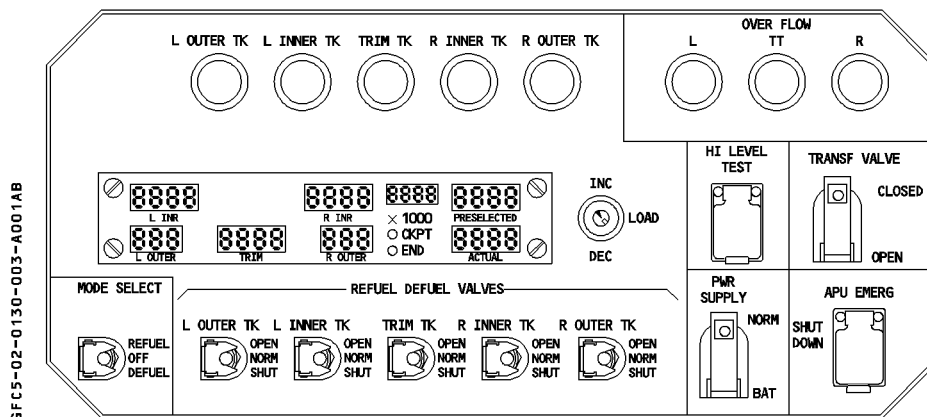
- During automatic refueling, the trim tank is filled when the preselected fuel quantity is greater than 36500 kg, whatever the density.
- With the tanks filled to the maximum capacity, there is enough space in each tank to allow for a 2 % thermal expansion of the fuel without its spilling through the vent system.

REFUEL DISTRIBUTION



Example : Required FOB 100000 kg
Post refuel distribution :
OUTERS (each) 2865 kg
INNERS (each) 32970 kg
CENTER 24230 kg
TRIM 4100 kg

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:

- REFUEL IN PROCESS (green) in flight phase 1,10.
- R – 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

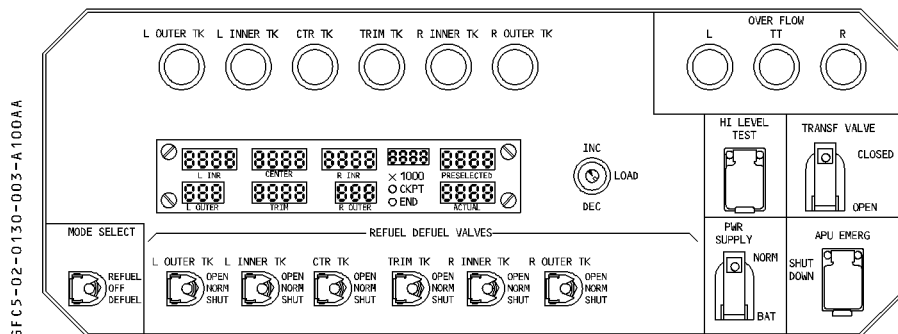
PREPARATION

- **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.

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)
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- 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
- Ensure that no HF transmission (including HF transmission via the HF DATA LINK pushbutton) 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 :

- R
- **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.
 - **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
- R – MODE SELECT OFF and GUARDED

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.

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 test fails, “END” It 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 continuous 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 ON.

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 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 14 000 kg,
- one inner tank quantity is greater than 14 000 kg and the other inner tank inlet valve is open.

- **REFUEL VALVES** **SHUT**
- **REFUEL VALVES (tank(s) to be filled)** **OPEN**

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

- **MODE SELECT** **REFUEL**
- **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

On refueling control panel :

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

R

R

R

Note : The TRANSF VALVE opens the left hand aft transfer valve only if one ENG 1 main pump is on, and opens the right hand aft transfer valve only if one ENG 2 main pump is on.

– FUEL QTY **MONITOR**

- 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.
2. If only one hose is used for defueling, it must be connected to the coupling marked *USE THIS ADAPTOR TO DEFUEL*.

On cockpit overhead FUEL panel :

– PUMPS (all) **OFF**

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	LOADING		2.01.30	P 10
	FUEL		SEQ 001	REV 06

R DEFUELING BY SUCTION

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

On refueling control panel :

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

R DEFUELING WITH FUEL PUMPS

- R Note : It is only possible to defuel the inner tank. To defuel the other tanks, their fuel must
R be first transferred to the inner tank.

On refueling control panel :

- R — **REFUEL VALVES** **CHECK NORM**
— **MODE SELECT** **DEFUEL**
— **TRANSF VALVE** **OPEN**
R The LH (RH) aft transfer valves open provided all these conditions are met :
— one or more of the LH (RH) 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 L1 and R1 (and L2 and R2 if greater flow needed)** **ON**
— **FUEL QTY** **MONITOR**

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	LOADING FUEL	2.01.30	P 9
		SEQ 100	REV 18

– FUEL QTY **MONITOR**

- When the tank contents reach the required level :

On the refueling control panel :

– Corresponding REFUEL VALVES **SHUT**

– TRANSF VALVE **CLOSED and GUARDED**

– MODE SELECT **OFF and GUARDED**

- Upon completion of the ground fuel transfer :

– REFUEL VALVES **NORM and GUARDED**

– Cockpit FUEL panel **SET NORMAL CONFIGURATION**

DEFUELING

– ACCESS PLATFORM **IN POSITION**

– SAFETY PRECAUTIONS **APPLY**

Ensure that no HF transmission (including HF transmission via the HF DATA LINK pushbutton) 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.
2. If only one hose is used for defueling, it must be connected to the coupling marked "USE THIS ADAPTOR TO DEFUEL".

On the cockpit's 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 fuel-system interlocks prevent a suction defuel of 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 : It is only possible to defuel the inner and center tanks. To defuel the other tanks, their fuel must be first transferred to the inner tank.

INNER TANK

On refueling control panel :

- REFUEL VALVES CHECK NORM
- MODE SELECT DEFUEL
- TRANSF VALVE OPEN
 - The LH (RH) aft transfer valves open provided all these conditions are met :
 - one or more of the LH (RH) 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 L1 and R1 (and L2 and R2 if greater flow needed) ON
- FUEL QTY MONITOR

● When the tank contents reach the required level :

- Corresponding PUMPS OFF

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.

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

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

● When the tank contents reach the required level :

- Corresponding PUMPS OFF

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.

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

OVERWING GRAVITY REFUELING

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

- SAFETY PRECAUTIONS APPLY
Make sure that the slats are retracted, and the flight control safety-locks with their warning notices are in position.
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.

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 outer tank to be refueled :
- GROUND FUEL TRANSFER PROCEDURE APPLY

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

	LOADING		2.01.30	P 12
	FUEL		SEQ 001	REV 06

R **REFUELING WITH ONE ENGINE RUNNING**

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

R Note : *The refuel system must be fully operational.*

R **OPERATION MONITORING**

R **During the entire refueling procedure :**

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

OVERWING GRAVITY REFUELING

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

- SAFETY PRECAUTIONS

Ensure that the slats are retracted, and the flight control safety-locks, with their warning notices, are in position.

Ensure that no HF transmission (including HF transmission via the HF DATA LINK pushbutton) 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.

APPLY

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

INNER TANK REFUELING PROCEDURE

- OVERWING REFUEL CAP

REMOVE
- REFUELING

The approximate flow rate per refueling fill is 200 liters/minute.

START
- If the outer tank is to be refueled :

 - GROUND FUEL TRANSFER PROCEDURE

APPLY

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

	LOADING		2.01.30	P 12
	FUEL		SEQ 001	REV 06

R **REFUELING WITH ONE ENGINE RUNNING**

- R — Refuel with one engine running only at airports where no external ground pneumatic power is available and only when APU is unserviceable.
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- R — Follow automatic or manual refueling procedure.

R Note : *The refuel system must be fully operational.*

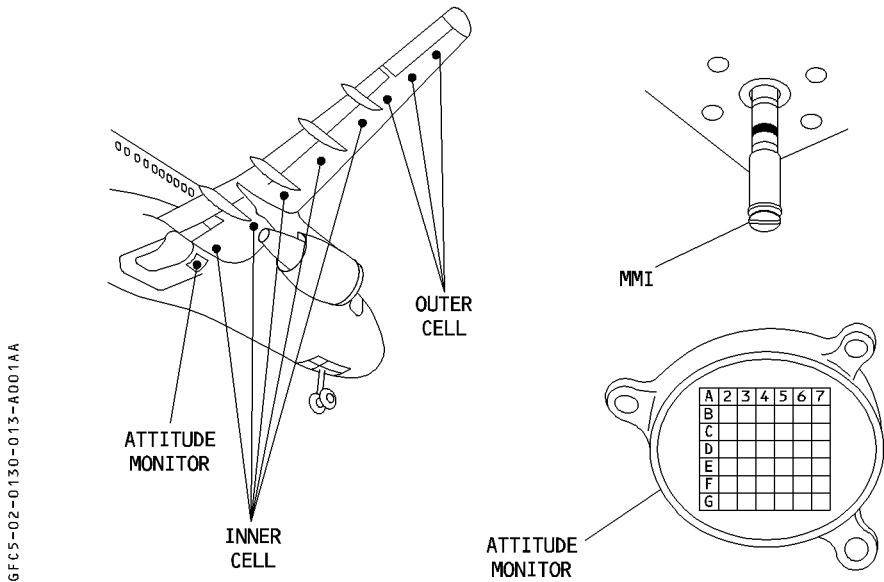
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USE OF MANUAL MAGNETIC INDICATORS (MMI)

R Indicators are installed in each wing tank.

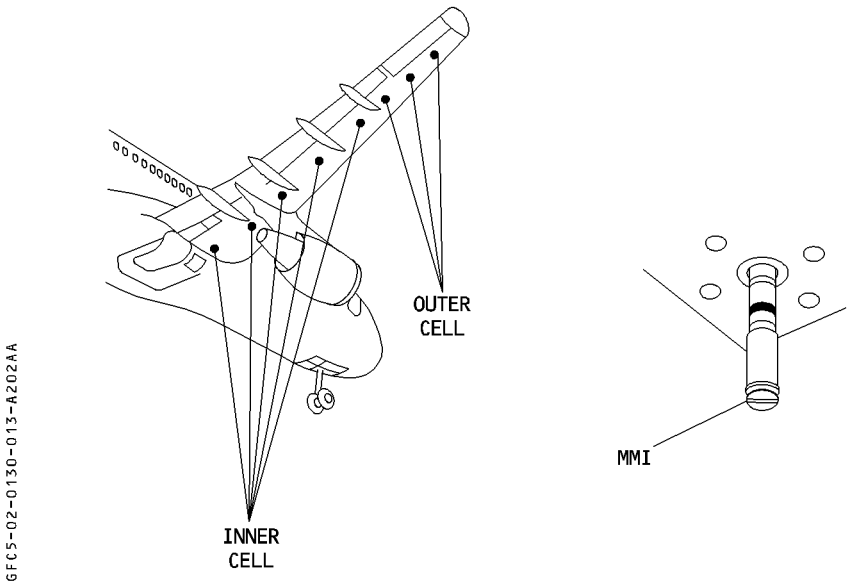


- **AIRCRAFT ATTITUDE** **NOTE**
 Note the grid square letter and grid square number shown by the bubble on the attitude monitor.
- **ACCESS PLATFORM** **IN POSITION**
- **MMI** **UNLOCK and WITHDRAW**
 The crewman must withdraw the MMI slowly until he feels the magnetic attraction between the rod and the 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 the 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). Mutiply the result by the specific gravity to find the fuel weight.

LEFT INTENTIONALLY BLANK

USE OF MANUAL MAGNETIC INDICATORS (MMI)

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



- AIRCRAFT ATTITUDE

DETERMINE

Refer to AMM 12.11.28 to determine the aircraft’s pitch and roll from the ADIRU, and the equivalent attitude monitor letter and number.
- ACCESS PLATFORM

IN POSITION
- MMI

UNLOCK and WITHDRAW

The crewmember must slowly withdraw the MMI, until magnetic attraction is felt between the rod and float magnets.
Do not use force when withdrawing the MMI, as this will disengage the float magnet from the rod magnet and bring the rod down on to the 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). Mutiply the result by the specific gravity to find the fuel weight.

LEFT INTENTIONALLY BLANK

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	LOADING		2.01.40	P 1
	WEIGHT and BALANCE		SEQ 001	REV 12

LOAD AND TRIM SHEET

This chart allows the determination of the aircraft CG location 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 p3) and for a typical passenger cabin arrangement. Refer to customized load and trim sheet for preparing a revenue flight.

R DATA FOR GENERIC EXAMPLE

Dry operating weight = 110 000 kg and CG = 31%

Deviation or adjustment = + 100 kg in zone F

Cargo = 11 500 kg as : cargo 1 = 2 500 kg ; cargo 2 = 3 000 kg ;

cargo 3 = 3 000 kg ; cargo 4 = 2 000 kg ; cargo 5 = 1 000 kg

Passengers (75 kg/PAX) = 240 PAX with the following distribution :

cabin OA = 20 ; cabin OB = 120 ; cabin OC = 100

Fuel = 72 000 kg

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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 = 119.1.
- c) Enter weight deviation in (4) and read corresponding index in (5) : - 0.51.
- d) Calculate corrected index and report in (6) : CORRECTED INDEX = 118.6
- 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) : 139600 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 : 72 000 kg.
Fuel density : 0.780.
- R Read in fuel index table. This example will be continued assuming FUEL INDEX = + 8
- R was found.
- Carry in scale (12). From this point draw a vertical line down to takeoff weight line (13) at 211 600 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.
- R j) Read takeoff CG on CG scale (14) : CG = 29.8 %

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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FUEL INDEX TABLE

Note : This table is valid only when used with the following formulae for the index :
 $I = W \times (\text{Harm} - 36.3495) / 2500 + K$ 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
9000	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
10000	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
11000	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
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	-8	-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
32000	-13	-13	-13	-13	-13	-13	-13	-12	-12	-12	-12	-12	-12	-12	-12
34000	-15	-15	-15	-15	-15	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14
36000	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-15	-15	-15
38000	-18	-18	-18	-18	-18	-18	-18	-17	-17	-17	-17	-17	-17	-17	-17
40000	-20	-20	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19
45000	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-22	-22	-22
50000	-25	-25	-25	-25	-25	-25	-25	-25	-25	-26	-26	-26	-26	-26	-26
55000	-26	-26	-26	-26	-26	-26	-27	-27	-27	-27	-27	-27	-27	-27	-27
60000	-24	-25	-25	-25	-26	-26	-26	-26	-27	-27	-27	-27	-28	-28	-28
64000	-22	-23	-23	-23	-24	-24	-25	-25	-25	-26	-26	-26	-27	-27	-27
64500	-17	-17	-17	-18	-18	-19	-19	-20	-20	-20	-20	-21	-21	-21	-22
65000	-11	-11	-12	-12	-13	-13	-13	-14	-14	-15	-15	-15	-15	-16	-16
65500	-5	-6	-6	-7	-7	-7	-8	-8	-9	-9	-9	-10	-10	-10	-10
66000	+0	+0	-1	-1	-1	-2	-2	-3	-3	-3	-4	-4	-4	-5	-5
66500	+5	+4	+4	+4	+3	+3	+2	+2	+2	+1	+1	+1	+0	+0	+0
66750	+5	+5	+4	+4	+3	+3	+3	+2	+2	+1	+1	+1	+0	+0	+0
67000	+5	+5	+4	+4	+3	+3	+3	+2	+2	+2	+1	+1	+1	+0	+0
68000	+6	+6	+5	+5	+4	+4	+3	+3	+2	+2	+2	+1	+1	+1	+0
69000	+7	+6	+6	+5	+5	+4	+4	+4	+3	+3	+2	+2	+1	+1	+1
70000	+8	+7	+7	+6	+6	+5	+5	+4	+4	+3	+3	+2	+2	+2	+1
71000	+9	+9	+8	+7	+7	+6	+6	+5	+5	+4	+4	+3	+3	+2	+2
72000	+10	+10	+9	+8	+8	+7	+7	+6	+5	+5	+4	+4	+3	+3	+3
72250	+12	+10	+9	+9	+8	+7	+7	+6	+6	+5	+5	+4	+4	+3	+3
72500	+15	+10	+10	+9	+8	+8	+7	+7	+6	+5	+5	+4	+4	+3	+3
72750	+18	+12	+10	+9	+9	+8	+7	+7	+6	+6	+5	+5	+4	+4	+3
73000	+20	+15	+10	+10	+9	+8	+8	+7	+6	+6	+5	+5	+4	+4	+3
73250	+23	+18	+13	+10	+9	+9	+8	+7	+7	+6	+6	+5	+4	+4	+3
73500	+26	+21	+15	+10	+10	+9	+8	+8	+7	+6	+6	+5	+5	+4	+4
73750	+29	+24	+18	+13	+10	+9	+9	+8	+7	+7	+6	+6	+5	+4	+4
74000	+32	+27	+21	+16	+10	+9	+9	+8	+8	+7	+6	+6	+5	+5	+4
74250	+35	+30	+24	+19	+13	+10	+9	+8	+8	+7	+7	+6	+5	+5	+4
74500		+33	+27	+22	+16	+11	+9	+9	+8	+7	+7	+6	+6	+5	+5
74750		+36	+30	+25	+19	+14	+10	+9	+8	+8	+7	+7	+6	+5	+5

Continued on next page.

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
74750		+36	+30	+25	+19	+14	+10	+9	+8	+8	+7	+7	+6	+5	+5
75000			+33	+28	+22	+16	+11	+9	+9	+8	+7	+7	+6	+6	+5
75250			+36	+31	+25	+19	+14	+10	+9	+8	+8	+7	+6	+6	+5
75500				+34	+28	+22	+17	+11	+9	+9	+8	+7	+7	+6	+6
75750				+37	+31	+25	+20	+14	+10	+9	+8	+8	+7	+6	+6
76000					+34	+28	+23	+17	+12	+9	+9	+8	+7	+7	+6
76250					+37	+31	+26	+20	+15	+10	+9	+8	+8	+7	+6
76500						+34	+29	+23	+18	+12	+9	+8	+8	+7	+7
76750						+37	+32	+26	+20	+15	+10	+9	+8	+7	+7
77000							+35	+29	+23	+18	+13	+9	+8	+8	+7
77250							+38	+32	+26	+21	+15	+10	+9	+8	+7
77500								+35	+29	+24	+18	+13	+9	+8	+8
77750								+38	+32	+27	+21	+16	+10	+9	+8
78000									+35	+30	+24	+19	+13	+9	+8
78250									+38	+33	+27	+22	+16	+11	+9
78500										+36	+30	+25	+19	+14	+9
78750										+39	+33	+27	+22	+16	+11
79000											+36	+30	+25	+19	+14
79250											+39	+33	+28	+22	+17
79500												+37	+31	+25	+20
79750												+40	+34	+28	+23
80000													+37	+31	+26
80250													+40	+34	+29
80500														+37	+32
80750														+40	+35
81000															+38
FULL	+37	+37	+38	+38	+38	+38	+39	+39	+39	+39	+40	+40	+40	+40	+41

FUEL INDEX TABLE

Note : This table is valid only when used with the following formulae for the index :
 $I = W \times (\text{Harm} - 33.1555) / 2500 + K$ 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	+1	+1	+2	+2	+2	+2	+2	+2	+2	+2	+2	+3	+3	+3
18000	-1	-1	-1	+0	+0	+0	+0	+0	+0	+0	+0	+0	+1	+1	+1
20000	-3	-3	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1
22000	-5	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-3	-3	-3	-3
24000	-6	-6	-6	-6	-6	-6	-6	-6	-5	-5	-5	-5	-5	-5	-5
26000	-8	-8	-8	-8	-8	-8	-8	-8	-7	-7	-7	-7	-7	-7	-7
28000	-10	-10	-10	-10	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
30000	-12	-12	-12	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-10	-10
32000	-13	-13	-13	-13	-13	-13	-13	-13	-13	-13	-12	-12	-12	-12	-12
34000	-15	-15	-15	-15	-15	-15	-15	-14	-14	-14	-14	-14	-14	-14	-14
36000	-17	-17	-17	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
36500	-17	-17	-17	-17	-17	-17	-17	-17	-16	-16	-16	-16	-16	-16	-16
37000	-12	-12	-12	-12	-12	-12	-12	-11	-11	-11	-11	-11	-11	-11	-11
37500	-7	-7	-7	-7	-7	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
38000	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	+0
38500	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+5	+5	+5
39000	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+9	+9	+9	+9	+9
41500	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+7	+7	+7	+7	+7
44000	+4	+4	+4	+4	+4	+4	+4	+4	+4	+5	+5	+5	+5	+5	+5
46500	+2	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+3	+3	+3	+3
49000	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
51500	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
54000	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2
56500	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3
59000	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3
61500	+0	+0	-1	-1	-1	-1	-2	-2	-2	-2	-2	-3	-3	-3	-3
64000	+1	+1	+0	+0	+0	-1	-1	-1	-2	-2	-2	-2	-3	-3	-3
66500	+3	+2	+2	+1	+1	+1	+0	+0	-1	-1	-1	-2	-2	-2	-2
69000	+5	+4	+4	+3	+3	+2	+2	+1	+1	+0	+0	+0	-1	-1	-1
71000	+7	+6	+6	+5	+5	+4	+3	+3	+2	+2	+1	+1	+1	+0	+0
73000	+8	+8	+8	+7	+7	+6	+6	+5	+4	+4	+3	+3	+2	+2	+1
75000	+7	+7	+7	+7	+7	+7	+7	+7	+7	+6	+5	+5	+4	+3	+3
77000	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+6	+6	+5
79000	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6
81000	+5	+5	+5	+5	+5	+5	+5	+6	+6	+6	+6	+6	+6	+6	+6
83000	+4	+4	+4	+4	+4	+4	+5	+5	+5	+5	+5	+5	+5	+5	+5
85000	+3	+3	+3	+3	+3	+3	+4	+4	+4	+4	+4	+4	+4	+4	+4
87000	+2	+2	+2	+2	+2	+2	+3	+3	+3	+3	+3	+3	+3	+3	+3
89000	+1	+1	+1	+1	+1	+2	+2	+2	+2	+2	+2	+2	+2	+2	+3
91000	+0	+0	+0	+0	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+2
93000	-1	-1	-1	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+1
95000	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	+0	+0
97000	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-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	-2	-2	-2	-2	-2	-1	-1	-1
99000	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-2	-2	-2	-2
101000	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-3	-3	-3	-3
103000	-6	-6	-5	-5	-5	-5	-5	-5	-5	-4	-4	-4	-4	-4	-4
105000	-8	-7	-7	-6	-6	-6	-6	-6	-6	-5	-5	-5	-5	-5	-5
107000			-9	-8	-8	-7	-7	-7	-7	-6	-6	-6	-6	-6	-6
109000						-9	-9	-8	-8	-8	-8	-7	-7	-7	-7
111000									-9	-9	-9	-9	-8	-8	-8
113000											-9	-9	-10	-10	-9
115000															-9
FULL	-9	-9	-9	-9	-9	-9	-9	-9	-9	-10	-10	-10	-10	-10	-10

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 sheed 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 quantites 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 :
 $I = Wx(Harm - 36.3495) / 2500 + K$ or $I = [(CG - 25) \times Wx 0.00029] + K$
(Weight in kg, Harm in m)

Example

DATA : Fuel density = 0.795 kg/l
Fuel in inner fuel tanks = 28250 kg
Fuel in outer fuel tanks = 2850 kg
Fuel in trim tank = 1400 kg

		Weight (kg)	Index	
Inner tank	Left	28250	–	19
	Right	28250	–	19
Outer tank	Left	2850	+	6
	Right	2850	+	6
Trim tank		1400	+	16
TOTAL		63600	–	10

Enter the load sheet with a fuel index of – 10.

FUEL INDEX TABLE FOR INNER 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	-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 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 sheed 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 quantites 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 :
 $I = Wx(Harm-33.1555) / 2500 + K$ or $I = [(CG-25)xWx 0.00029] + K$
(Weight in kg, Harm in m)

Example

DATA : Fuel density = 0.795 kg/l
Fuel in inner fuel tanks = 28250 kg
Fuel in outer fuel tanks = 2200 kg
Fuel in trim tank = 4400 kg
Fuel in center tank = 21000 kg

		Weight (kg)	Index	
Inner tank	Left	28250	–	19
	Right	28250	–	19
Outer tank	Left	2200	+	4
	Right	2200	+	4
Center tank		21000	–	27
Trim tank		4400	+	47
TOTAL		86300	–	10

Enter the load sheet with a fuel index of – 10.

FUEL INDEX TABLE FOR INNER 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	-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	-19	-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		-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
FULL	-14	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-16	-16	-16	-16

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	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6
600	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7
700	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8
800	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9
900	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10
1000	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11	+11
1100	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12	+12
1200	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13	+13
1300	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15
1400	+16	+16	+16	+16	+16	+16	+16	+16	+16	+16	+16	+16	+16	+16	+16
1500	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17	+17
1600	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18	+18
1700	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19	+19
1800	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20	+20
1900	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21	+21
2000	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22
2100	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24	+24
2200	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25	+25
2300	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26	+26
2400	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27	+27
2500	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28	+28
2600	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29	+29
2700	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30	+30
2800	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+32	+31
2900	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33	+33
3000	+34	+34	+34	+34	+34	+34	+34	+34	+34	+34	+34	+34	+34	+34	+34
3100	+35	+35	+35	+35	+35	+35	+35	+35	+35	+35	+35	+35	+35	+35	+35
3200	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36	+36
3300	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37	+37
3400	+39	+39	+39	+39	+39	+39	+39	+38	+38	+38	+38	+38	+38	+38	+38
3500	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40	+40
3600	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41	+41
3700	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42	+42
3800	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43	+43
3900	+45	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44	+44
4000	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46	+46
4100	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47	+47
4200	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48	+48
4300	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49	+49
4400	+51	+51	+51	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50
4500	+52	+52	+52	+52	+52	+52	+52	+52	+52	+52	+52	+52	+52	+52	+52
4600	+53	+53	+53	+53	+53	+53	+53	+53	+53	+53	+53	+53	+53	+53	+53
4700			+54	+54	+54	+54	+54	+54	+54	+54	+54	+54	+54	+54	+54
4800						+55	+55	+55	+55	+55	+55	+55	+55	+55	+55
4900										+56	+56	+56	+56	+56	+56
5000												+58	+58	+58	+58
FULL	+54	+54	+54	+55	+55	+55	+56	+56	+56	+57	+57	+58	+58	+58	+59

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	+45	+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	+50	+50
4800				+51	+51	+51		+51	+51	+51	+51	+51	+51	+51	+51
4900							+52	+52	+52	+52	+52	+52	+52	+52	+52
5000										+53	+53	+53	+53	+53	+53
5100												+55	+55	+55	+54
FULL	+51	+51	+51	+52	+52	+52	+53	+53	+53	+54	+54	+54	+55	+55	+55

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
FULL	-43	-43	-43	-44	-44	-44	-44	-45	-45	-45	-46	-46	-46	-46	-47

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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)

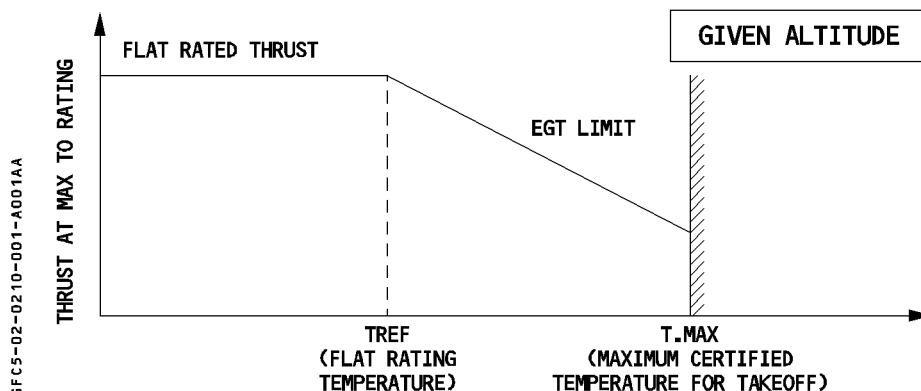
Both presentations are described hereafter. Sections 2.02.10, 2.02.12 and 2.02.14 are relative to temperature entry while 2.02.16, 2.02.18 and 2.02.20 are relative to weight entry.

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

TAKEOFF PERFORMANCE

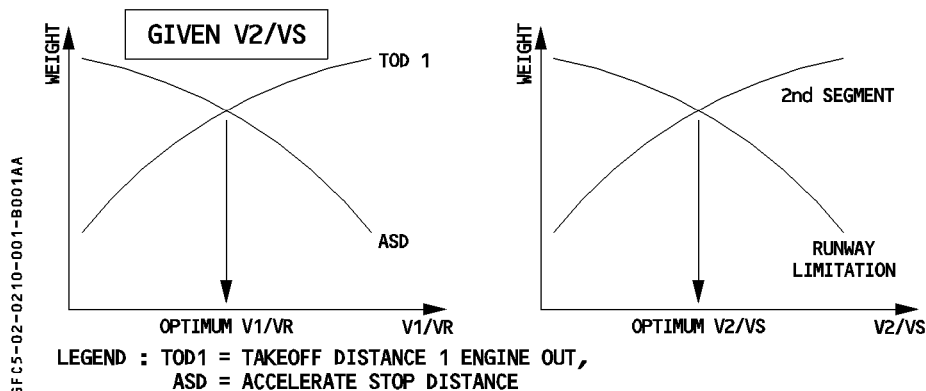
Takeoff optimization is calculated for a given runway and its obstacles and for given conditions of flap setting, temperature, wind and QNH. The calculation produces a maximum permissible takeoff weight (or a maximum takeoff temperature for an actual weight).

The takeoff thrust produced by the engine 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.

R



On a typical runway, the performance of a twin engine aircraft is generally limited by the one engine out operation at takeoff. The optimum V2/VS and optimum V1/VR are consequently unique.

The takeoff chart (RTOW : Regulatory Takeoff Weight) is calculated for a specific aircraft version and for a particular runway specified at the top of the chart. The top of the chart also gives some information about the runway and lists the calculation assumptions. The chart is given for 2 different configurations and 5 wind values per configuration. This allows the crew to select the configuration that gives either :

- the highest permissible takeoff weight, or, for a given weight,
- the highest flexible temperature.

If different configurations give equivalent performance the crew should select the configuration associated with the lowest takeoff speeds.

For each temperature value (and for a given configuration and wind), the chart provides the following information :

THE PRESENCE OF ASTERISKS OR GREY BAND INDICATES A TEMPERATURE ABOVE TMAX

MAX PERMISSIBLE TAKEOFF WEIGHT

LIMITATION CODES

OAT

THE PRESENCE OF ASTERISKS OR GREY BAND INDICATES VMC LIMITATION

SPEEDS (V1/VR/V2)

* 38	* 234.0 3/4 * 127/38/47

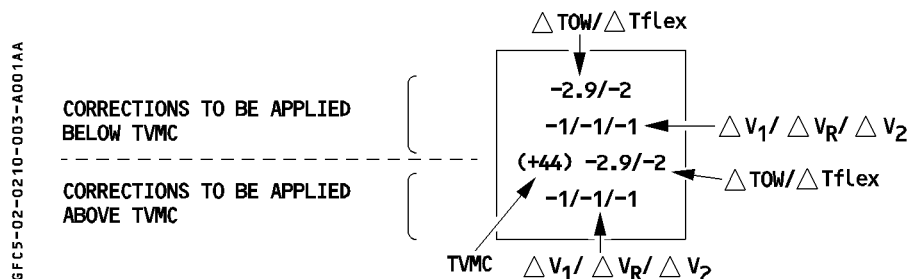
- First segment : 1
- Second segment : 2
- Runway length : 3
- Obstacles : 4
- Tire speed : 5
- Brake energy : 6
- Maximum computation weight : 7
- Final takeoff : 8
- VMU : 9

Each takeoff chart is computed for a given set of conditions (air conditioning, QNH, anti ice...) specified at the top of the chart. If the actual takeoff conditions are different, the crew must apply corrections. Two types of corrections are available :

- Conservative corrections on 2.02.24 p 1 (to be used when not provided on the chart).
- Corrections (less restrictive) listed on the chart, to be applied as explained below.

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 SPEED

- R Minimum V1/VR/V2 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 V1/VR/V2 displayed on 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 TMAX and which are flex temperature.

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	GENERAL (TEMPERATURE ENTRY)		SEQ 001	REV 10

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).

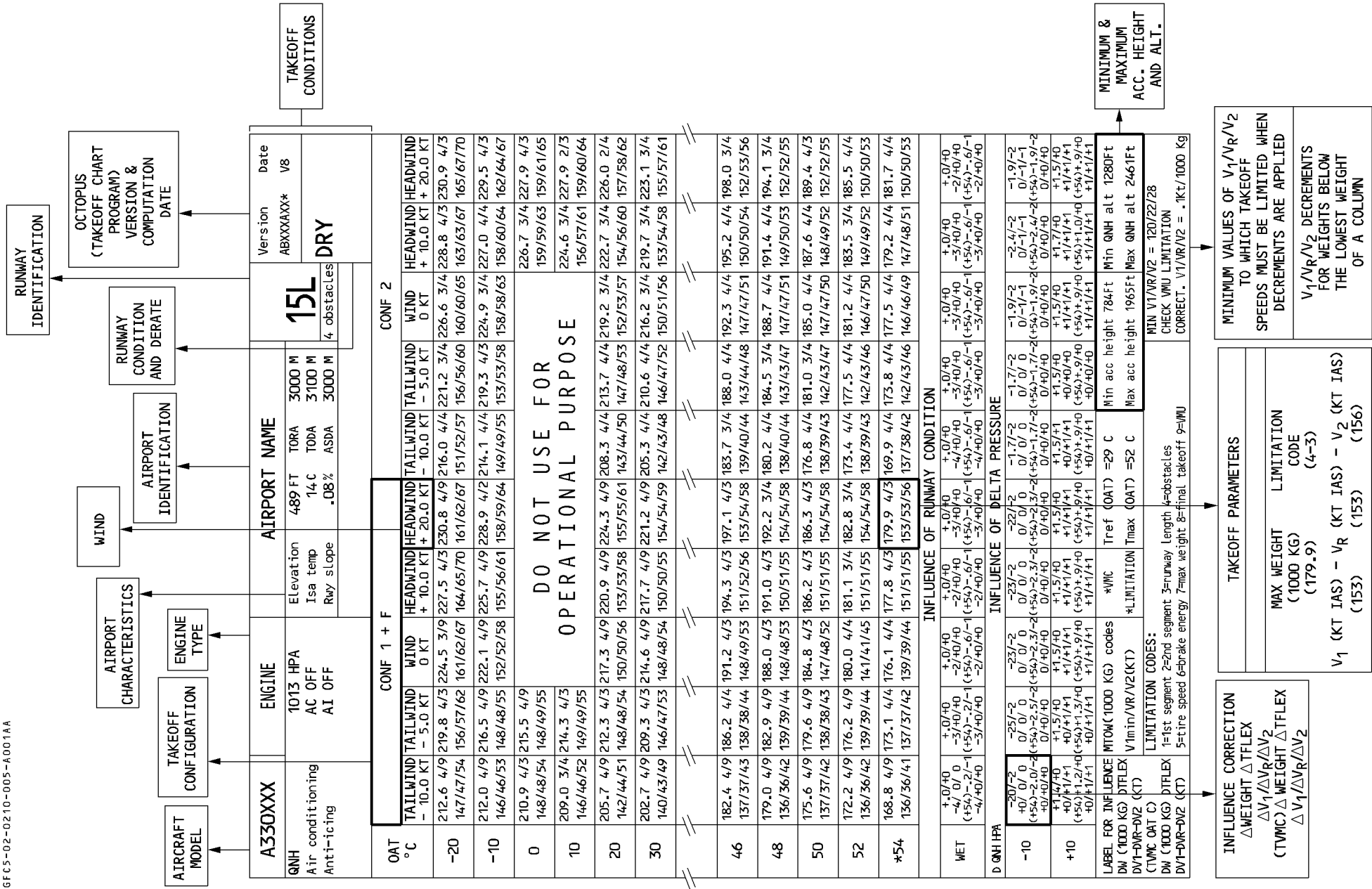
When the specified procedure requires a turn, except if otherwise stated on the RTOW chart, the turn should be performed with a maximum bank of 15° until the aircraft reaches 1500 feet or green dot.

The acceleration height (or altitude) ensures that the net flight path clears the highest obstacle by at least 35 feet when 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).





TAKEOFF

2.02.10

P 6

GENERAL (TEMPERATURE ENTRY)

SEQ 001

REV 11

R

A330XXX		ENGINE		AIRPORT NAME						Version	DATE		
QNH		1013.00 HPA		Elevation	489 FT	TORA	3000 M	15L		ABXXXXXX * V8			
Air cond.		AC OFF		Isa temp	14 C	TODA	3000 M						
Anti-icing		AI OFF		rvwy slope	.08 %	ASDA	3000 M	4 obstacles		DRY			
All reversers operating													
No reversers on dry runway													
OAT		CONF 1+F						CONF 2					
C	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT			
-20	214.9 3/4 149/49/56	220.3 3/4 154/54/60	225.6 3/4 159/59/64	228.9 3/4 160/60/66	232.3 3/4 164/64/69	215.8 3/4 149/51/56	221.1 3/4 154/56/61	226.3 3/4 159/60/64	229.2 3/4 162/63/68	231.1 3/4 166/68/72			
-10	213.3 3/4 147/47/54	218.7 3/4 152/52/58	224.1 3/4 156/56/62	227.5 3/4 160/60/65	230.8 3/4 162/62/67	214.0 3/4 147/49/55	219.4 3/4 152/54/59	224.6 3/4 156/58/63	227.9 3/4 160/61/65	230.0 3/4 163/65/69			
0	211.6 3/4 145/45/52	217.1 3/4 150/50/56	DO NOT USE FOR OPERATIONAL PURPOSE						226.5 3/4 157/59/63	228.8 3/4 161/63/67			
10	209.9 3/4 143/43/50	215.5 3/4 148/48/54							225.0 3/4 155/57/61	227.6 3/4 158/60/65			
20	207.9 3/4 142/43/49	214.0 3/4 146/46/52	219.4 3/4 150/50/56	222.8 3/4 153/53/58	226.3 3/4 156/56/61	209.1 3/4 141/44/49	214.5 3/4 146/48/53	219.9 3/4 150/52/57	223.5 3/4 153/55/59	226.3 3/4 156/58/63			
30	205.2 3/4 140/42/48	211.4 3/4 144/45/51	217.1 3/4 148/48/54	220.6 3/4 151/51/56	223.8 3/4 154/54/59	206.8 3/4 139/42/47	212.2 3/4 144/46/51	217.6 3/4 148/50/55	221.1 3/4 151/53/57	224.0 3/4 154/56/61			
32	203.3 3/4 139/41/48	209.5 3/4 143/44/50	214.9 3/4 148/48/53	218.4 3/4 151/51/56	221.6 3/4 154/54/59	204.8 3/4 139/42/47	210.1 3/4 143/46/51	215.4 3/4 148/50/54	218.9 3/4 151/52/57	221.7 3/4 154/56/60			
34	201.5 3/4 139/41/47	207.5 3/4 143/43/49	212.8 3/4 147/47/53	216.1 3/4 150/50/55	219.4 3/4 153/53/58	202.8 3/4 139/41/47	208.0 3/4 143/45/50	213.2 3/4 147/49/54	216.6 3/4 150/52/56	219.4 3/4 153/56/60			
36	199.5 3/4 139/40/46	205.4 3/4 143/43/49	210.5 3/4 147/47/52	213.8 3/4 150/50/55	217.0 3/4 153/53/58	200.7 3/4 138/41/46	205.8 3/4 143/45/50	210.9 3/4 147/49/53	214.3 3/4 150/51/56	217.0 3/4 153/55/59			
38	197.5 3/4 138/39/46	203.2 3/4 142/42/48	208.1 3/4 147/47/52	211.3 3/4 150/50/55	214.5 3/4 152/52/57	198.5 3/4 138/40/46	203.5 3/4 142/44/49	208.5 3/4 147/48/53	211.9 3/4 150/51/55	214.5 3/4 153/54/59			
40	195.4 3/4 138/39/45	200.6 3/4 142/42/48	205.4 3/4 147/47/52	208.6 3/4 149/49/54	211.7 3/4 152/52/57	196.1 3/4 138/40/45	201.0 3/4 142/44/49	205.9 3/4 146/48/53	209.2 3/4 149/51/55	211.8 3/4 152/54/58			
42	193.1 3/4 138/38/44	197.9 3/4 142/42/48	202.5 3/4 146/46/52	205.5 3/4 148/48/53	208.5 3/4 151/51/56	193.5 3/4 138/40/45	198.3 3/4 142/44/49	203.1 3/4 146/48/52	206.2 3/4 149/50/54	208.8 3/4 152/54/57			
44	190.4 3/4 138/38/44	195.1 3/4 142/42/48	199.4 3/4 145/45/50	202.5 4/4 147/47/52	205.4 3/4 150/50/55	190.8 3/4 138/39/44	195.5 3/4 142/44/48	200.1 3/4 146/48/52	203.2 3/4 149/50/54	205.8 3/4 152/53/57			
46	186.5 3/4 137/37/43	191.1 3/4 141/41/46	195.5 3/4 144/44/49	198.3 4/4 145/45/50	201.4 2/4 150/50/54	187.1 3/4 137/39/44	191.7 3/4 141/43/47	196.1 3/4 146/47/51	199.1 3/4 149/49/53	201.7 3/4 152/52/56			
48	182.6 3/4 137/37/42	187.0 3/4 140/40/45	191.3 4/4 143/43/48	194.1 4/4 145/45/50	196.9 2/4 149/49/53	183.4 3/4 137/39/43	187.6 3/4 141/43/47	191.9 3/4 146/46/50	194.8 3/4 148/49/53	197.4 3/4 151/52/55			
50	178.6 4/4 135/35/41	182.9 4/4 139/39/44	187.0 4/4 142/42/47	190.0 4/4 144/44/48	192.1 4/4 148/48/52	179.4 3/4 137/38/43	183.5 3/4 141/42/46	187.6 3/4 145/46/49	190.4 3/4 148/48/52	192.8 3/4 151/51/54			
52	174.6 4/4 134/34/40	178.6 4/4 138/38/43	182.6 4/4 141/41/45	185.4 4/4 143/43/47	187.8 2/4 147/47/51	175.3 3/4 136/38/42	179.3 3/4 141/41/45	183.2 3/4 145/45/49	185.8 3/4 148/48/51	188.1 3/4 150/50/53			
*54	170.3 4/4 133/33/39	174.3 4/4 137/37/42	178.1 4/4 140/40/44	180.7 4/4 142/42/46	183.0 2/4 146/46/50	171.2 3/4 136/37/41	174.9 3/4 140/41/45	178.6 3/4 144/44/48	180.9 3/4 146/46/50	183.0 2/4 149/49/52			
INFLUENCE OF RUNWAY CONDITION													
WET	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0	+0/ +0		
	-4/ 0/ 0	-3/ 0/ 0	-2/ +0/ +0	-2/ +0/ +0	-3/ +0/ +0	-4/ +0/ +0	-3/ +0/ +0	-3/ +0/ +0	-3/ +0/ +0	-3/ +0/ +0	-2/ +0/ +0		
	(+54) -2/-1	(+54) -2/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1	(+54) -6/-1		
	-4/ +0/ +0	-3/ +0/ +0	-2/ +0/ +0	-2/ +0/ +0	-3/ +0/ +0	-4/ +0/ +0	-3/ +0/ +0	-3/ +0/ +0	-3/ +0/ +0	-3/ +0/ +0	-2/ +0/ +0		
INFLUENCE OF DELTA PRESSURE													
D QNH HPA		-2.0/ -2	-2.5/ -2	-2.3/ -2	-2.3/ -2	-2.2/ -2	-1.7/ -2	-1.7/ -2	-1.9/ -2	-2.4/ -2	-1.9/ -2		
-10		+0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ -1/ -1	0/ -1/ -1	0/ -1/ -1		
		(+54) -2.0/-2	(+54) -2.5/-2	(+54) -2.3/-2	(+54) -2.3/-2	(+54) -2.3/-2	(+54) -1.7/-2	(+54) -1.7/-2	(+54) -1.9/-2	(+54) -2.4/-2	(+54) -1.9/-2		
		+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		
+10		+1.4/ +0	+1.5/ +0	+1.5/ +0	+1.5/ +0	+1.5/ +0	+1.5/ +1	+1.5/ +0	+1.5/ +0	+1.7/ +0	+1.5/ +0		
		+0/ +1/ +1	+0/ +1/ +1	+1/ +1/ +1	+1/ +1/ +1	+1/ +1/ +1	+0/ +1/ +1	+0/ +0/ +0	+1/ +1/ +1	+1/ +1/ +1	+1/ +1/ +1		
		(+54) +1.2/+0	(+54) +1.3/+0	(+54) +9/+0	(+54) +9/+0	(+54) +9/+0	(+54) +9/+0	(+54) +9/+0	(+54) +9/+0	(+54) +1.0/+0	(+54) +9/+0		
		+0/ +1/ +1	+0/ +1/ +1	+1/ +1/ +1	+1/ +1/ +1	+1/ +1/ +1	+0/ +1/ +1	+0/ +0/ +0	+1/ +1/ +1	+1/ +1/ +1	+1/ +1/ +1		
LABEL FOR INFLUENCE		MTOW(1000 KG) codes			* VMC	Tref (OAT)	= 29 C		Min acc height 784 FT		Min QNH alt 1280 FT		
DW (1000 KG) DTFLEX		V1min/VR/V2 (kt)			*LIMITATION	Tmax (OAT)	= 52 C		Max acc height 1965 FT		Max QNH alt 2461 FT		
DV1-DVR-DV2 (KT)		LIMITATION CODES :											
(TVMC OAT C)		1=1st segment 2=2nd segment 3=runway length 4=obstacles											
DW (1000KG) DTFLEX		5=tire speed 6=brake energy 7=max weight 8=final takeoff 9=VMU											
DV1-DVR-DV2 (KT)													

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 lower takeoff speeds.

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 221.7
 Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
 Maximum takeoff weight (1000 kg) air conditioning OFF 222.3

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Retain CONF 2 as takeoff configuration.

	Maximum TO weight (1000 kg) air conditioning OFF	222.3
R	Air conditioning correction (FCOM 2.02.24 p1)	– 6.4
R	Maximum permissible TO weight (1000 kg) air conditioning ON	215.9
R	Determine takeoff speeds for 215.9 (1000 kg) in the 10 kt head wind column (CONF2)	
	V1 = 150 kt, VR = 152 kt, V2 = 156 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 P 6)

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 p 6, 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.

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 lower takeoff speeds.

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 ≠ 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
. 221.7
Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
Maximum takeoff weight (1000 kg) air conditioning OFF
. 222.3

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.12	P 2
	MTOW CALCULATION (TEMP. ENTRY)		SEQ 115	REV 10

Retain CONF 2 as takeoff configuration.

Maximum TO weight (1000 kg) air conditioning OFF 222.3

Air conditioning correction (FCOM 2.02.24 p1) – 7.1

Maximum permissible TO weight (1000 kg) air conditioning ON 215.2

Determine takeoff speeds for 215.2 (1000 kg) in the 10 kt head wind column (CONF2)

R V1 = 150 kt, VR = 152 kt, V2 = 156 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 P 6)

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 p 6, 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 p 6.

- Enter the 10 kt head wind column and interpolate for 25°C, CONF 1+F,
max TO weight (1000 kg) 221.7
- Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
max TO weight (1000 kg) 222.3
- Retain CONF 2 for takeoff.
- Read associated speeds as V1 = 152 kt, VR = 154 kt, V2 = 158 kt
- Apply WET correction
For OAT < TVMC (54°), $\Delta W =$ 0.0
Intermediate weight (1000 kg) 222.3
Associated speeds,
V1 = 152 kt – 3 = 149 kt
VR = 154 kt – 0 = 154 kt
V2 = 158 kt – 0 = 158 kt
(No speed check required for first correction)
- Apply QNH correction
For OAT < TVMC (54°), $\Delta W = 1.7 \times 15/10 =$ + 2.6
Maximum permissible takeoff weight (1000 kg) 224.9
Associated speeds,
V1 = 149 kt + 1 $\times$ 15/10 = 150 kt
VR = 154 kt + 1 $\times$ 15/10 = 156 kt
V2 = 158 kt + 1 $\times$ 15/10 = 160 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)	222.3	152	154	158
FCOM correction(s)				
Intermediate value	222.3	152	154	158
WET Correction	0.0	– 3	0	0
Intermediate value	222.3	149	154	158
QNH Correction	+ 2.6	+ 1	+ 2	+ 2
Final value	224.9	150	156	160

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.12	P 4
	MTOW CALCULATION (TEMP. ENTRY)		SEQ 010	REV 10

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 221.7
Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
Max TO weight (1000 kg) air conditioning OFF 222.3
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 222.3
R Air conditioning correction - 6.4
R Intermediate weight 215.9
R Interpolate takeoff speeds for 215.9 (1000 kg) in the 10 kt head wind column,
V1 = 150 kt, VR = 152 kt, V2 = 156 kt
3. Apply WET correction
For OAT < TVMC (54°), ΔW = ... 0.0
R Intermediate weight 215.9
Associated speeds,
V1 = 150 kt - 3 = 147 kt
VR = 152 kt - 0 = 152 kt
V2 = 156 kt - 0 = 156 kt
Check that the speeds are higher than minimum speeds from the chart and from VMU table.
Apply QNH correction
For OAT < TVMC (54°), $\Delta W = 1.7 \times 15/10 =$ + 2.6
R Maximum permissible takeoff weight 218.5
Associated speed,
V1 = 147 kt + 1 $\times$ 15/10 = 148 kt
VR = 152 kt + 1 $\times$ 15/10 = 154 kt
V2 = 156 kt + 1 $\times$ 15/10 = 158 kt

Example 2

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

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,
max TO weight (1000 kg) 221.7
- Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
max TO weight (1000 kg) 222.3
- Retain CONF 2 for takeoff.
- Read associated speeds as V1 = 152 kt, VR = 154 kt, V2 = 158 kt
- Apply WET correction
For OAT < TVMC (54°), ΔW = ... 0.0
Intermediate weight (1000 kg) 222.3
Associated speeds,
V1 = 152 kt – 3 = 149 kt
VR = 154 kt – 0 = 154 kt
V2 = 158 kt – 0 = 158 kt
(No speed check required for first correction)
- Apply QNH correction
For OAT < TVMC (54°), ΔW = $1.7 \times 15/10$ = ... + 2.6
Maximum permissible takeoff weight (1000 kg) 224.9
Associated speeds,
V1 = 149 kt + $1 \times 15/10$ = 150 kt
VR = 154 kt + $1 \times 15/10$ = 156 kt
V2 = 158 kt + $1 \times 15/10$ = 160 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)	222.3	152	154	158
FCOM correction(s)				
Intermediate value	222.3	152	154	158
WET Correction	0.0	– 3	0	0
Intermediate value	222.3	149	154	158
QNH Correction	+ 2.6	+ 1	+ 2	+ 2
Final value	224.9	150	156	160

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.12	P 4
	MTOW CALCULATION (TEMP. ENTRY)		SEQ. 115	REV 10

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 221.7
Enter the 10 kt head wind column and interpolate for 25°C, CONF 2,
Max TO weight (1000 kg) air conditioning OFF 222.3
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 222.3
Air conditioning correction - 7.1
Intermediate weight 215.2
Interpolate takeoff speeds for 215.2 (1000 kg) in the 10 kt head wind column,
- R V1 = 150 kt, VR = 152 kt, V2 = 156 kt
3. Apply WET correction
For OAT < TVMC (54°), ΔW = ... 0.0
Intermediate weight 215.2
Associated speeds,
V1 = 150 kt - 3 = 147 kt
R VR = 152 kt - 0 = 152 kt
V2 = 156 kt - 0 = 156 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 = $1.7 \times 15/10$ = ... + 2.6
Maximum permissible takeoff weight 217.8
Associated speed,
V1 = 147 kt + $1 \times 15/10$ = 148 kt
R VR = 152 kt + $1 \times 15/10$ = 154 kt
V2 = 156 kt + $1 \times 15/10$ = 158 kt

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF MTOW CALCULATION (TEMP. ENTRY)	2.02.12	P 5
		SEQ 010	REV 10

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 :

R Maximum permissible takeoff weight = 218.5 (1000 kg)

V1 = 148 kt, VR = 154 kt, V2 = 158 kt.

R

	Takeoff Configuration : 2			
	TOW	V1	VR	V2
TOW (RTOW)	222.3			
FCOM correction(s)	– 6.4			
Intermediate value	215.9	150	152	156
WET Correction	0.0	– 3	0	0
Intermediate value	215.9	147	152	156
QNH Correction	+ 2.6	+ 1	+ 2	+ 2
Final value	218.5	148	154	158

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.

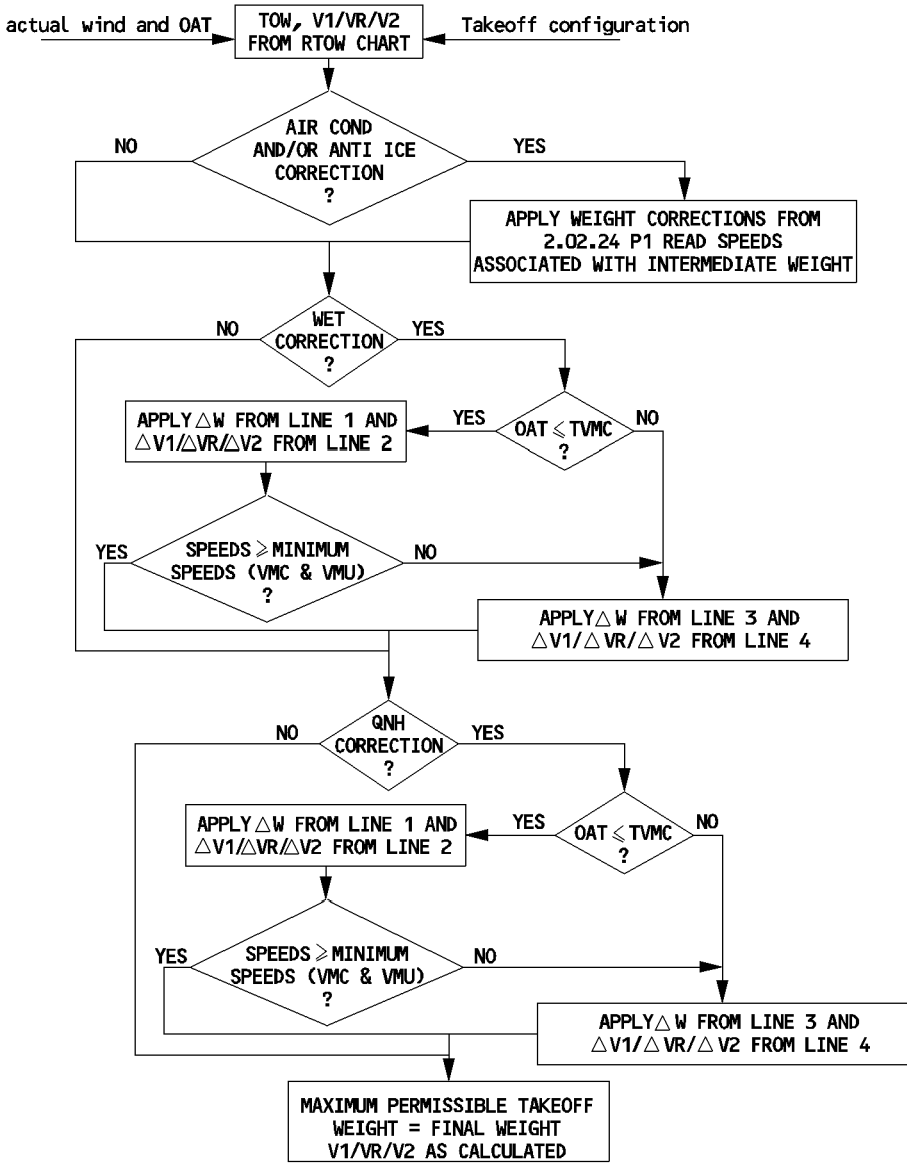
MAXIMUM STRUCTURAL TAKEOFF WEIGHT

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 the FCOM3. 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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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 = 217.8 (1000 kg)

R V1 = 148 kt, VR = 154 kt, V2 = 158 kt.

R

	Takeoff Configuration : 2			
	TOW	V1	VR	V2
TOW (RTOW)	222.3			
FCOM correction(s)	- 7.1			
Intermediate value	215.2	150	152	156
WET Correction	0.0	- 3	0	0
Intermediate value	215.2	147	152	156
QNH Correction	+ 2.6	+ 1	+ 2	+ 2
Final value	217.8	148	154	158

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.

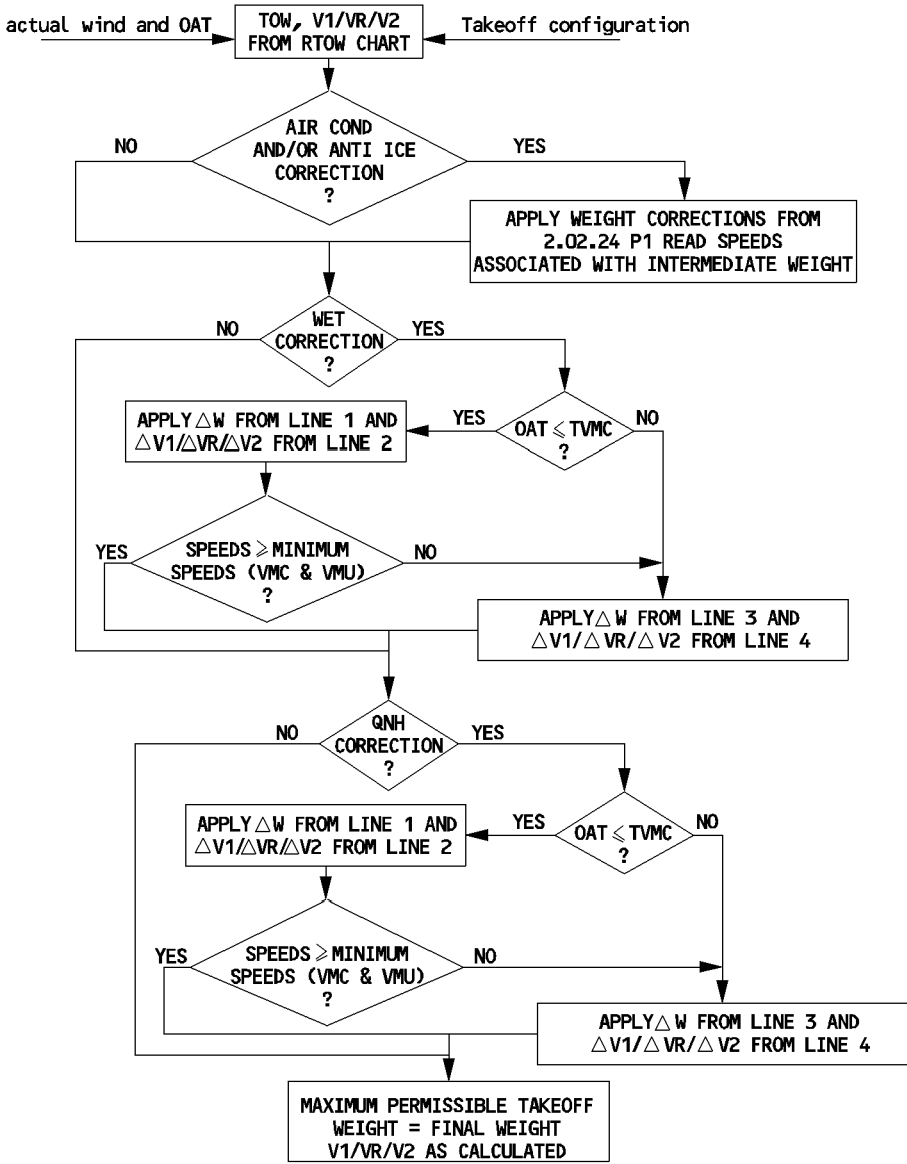
MAXIMUM STRUCTURAL TAKEOFF WEIGHT

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 the FCOM3. 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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A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.14	P 2
	FLEXIBLE TAKEOFF (TEMP. ENTRY)		SEQ. 001	REV 16

- 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

- In order to extend engine life, it is recommended to use the greatest thrust reduction level.
- However, to improve the takeoff performance the thrust can be increased by selecting a lower flex temperature.

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 the configuration giving the maximum flex. – If equivalent flex is obtained, choose the configuration giving the lowest speeds.	Extend engine life.
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 P 1

- 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 = 190 000 kg
Head wind = 10 kt
Air conditioning ON
QNH = 1013 hPa

- R Use the chart from 2.02.10 p 6. 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 190 000 kg, CONF 1+F,
Flexible temperature 50° C
- Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	TAKEOFF FLEXIBLE TAKEOFF (TEMP. ENTRY)	2.02.14	P 4
		SEQ 010	REV 10

Equivalent performance is obtained from the two different configurations.

Retain CONF 1 + F as the speeds are lower.

Takeoff speeds are V1 = 144 kt, VR = 144 kt, V2 = 148 kt

Flexible temperature with air conditioning OFF 50° C

Air conditioning correction (FCOM 2.02.24 p1) – 5° 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 2.02.10 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 flexible 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

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 P 1

- 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 = 190 000 kg
 Head wind = 10 kt
 Air conditioning ON
 QNH = 1013 hPa

- R Use the chart from 2.02.10 p 6. 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 190 000 kg, CONF 1+F,
 Flexible temperature 50° C
- Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
 Flexible temperature 50° C

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF FLEXIBLE TAKEOFF (TEMP. ENTRY)	2.02.14	P 4
		SEQ 045	REV 10

Equivalent performance is obtained from the two different configurations.

Retain CONF 1 + F as the speeds are lower.

Takeoff speeds are V1 = 144 kt, VR = 144 kt, V2 = 148 kt

Flexible temperature with air conditioning OFF 50° C

Air conditioning correction (FCOM 2.02.24 p1) – 3° C

Maximum flexible temperature 47° 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 2.02.10 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 flexible 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 = 190 000 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 190 000 kg, CONF 1 + F,
Flexible temperature 50° C
Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C
Equivalent performance is obtained from the two different configurations.

Retain CONF 1 + F as the speeds are lower.

Takeoff speeds are V1 = 144 kt, VR = 144 kt, V2 = 148 kt

Apply WET correction

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

Intermediate flex temperature 50° C

Associated speeds,

V1 = 144 kt – 2 = 142 kt

VR = 144 kt – 0 = 144 kt

V2 = 148 kt – 0 = 148 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 50° C

Check that OAT/TREF < flex temperature ≤ TMAXFLEX

No speed correction.

Takeoff speeds are V1 = 142 kt, VR = 144 kt, V2 = 148 kt

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	50	144	144	148
FCOM correction(s)				
Intermediate value	50	144	144	148
WET Correction	0	– 2	0	0
Intermediate value	50	142	144	148
QNH Correction	0	0	0	0
Final value	50	142	144	148

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.14	P 6
	FLEXIBLE TAKEOFF (TEMP. ENTRY)		SEQ. 010	REV 10

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 = 190 000 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 190 000 kg, CONF 1+F,
Flexible temperature 50° C
 - Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C
 - Equivalent performance is obtained from the two different configurations.
Retain CONF 1 + F as the speeds are lower.
Takeoff speeds are V1 = 144 kt, VR = 144 kt, V2 = 148 kt
 - First, apply the correction from FCOM page 2.02.24 p1.
Flexible temperature with air conditioning OFF 50° C
 - R Air conditioning correction – 3° C
 - R Intermediate flexible temperature 47° C
 - No speed correction.
 - Apply WET correction
For flexible temperature < TVMC (54°), ΔT_{flex} = ... 0° C
 - R Intermediate flex temperature 47° C
 - Associated speeds,
V1 = 144 kt – 2 = 142 kt
VR = 144 kt – 0 = 144 kt
V2 = 148 kt – 0 = 148 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 47° C
 - Check that OAT/TREF < flex temperature ≤ TMAXFLEX
No speed correction.
Takeoff speeds are V1 = 142 kt, VR = 144 kt, V2 = 148 kt

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 = 190 000 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 190 000 kg, CONF 1 + F,

Flexible temperature 50° C

Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,

Flexible temperature 50° C

Equivalent performance is obtained from the two different configurations.

Retain CONF 1 + F as the speeds are lower.

Takeoff speeds are V1 = 144 kt, VR = 144 kt, V2 = 148 kt

Apply WET correction

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

Intermediate flex temperature 50° C

Associated speeds,

V1 = 144 kt – 2 = 142 kt

VR = 144 kt – 0 = 144 kt

V2 = 148 kt – 0 = 148 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 50° C

Check that OAT/TREF < flex temperature ≤ TMAXFLEX

No speed correction.

Takeoff speeds are V1 = 142 kt, VR = 144 kt, V2 = 148 kt

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	50	144	144	148
FCOM correction(s)				
Intermediate value	50	144	144	148
WET Correction	0	– 2	0	0
Intermediate value	50	142	144	148
QNH Correction	0	0	0	0
Final value	50	142	144	148

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.14	P 6
	FLEXIBLE TAKEOFF (TEMP. ENTRY)		SEQ. 015	REV. 10

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 = 190 000 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 190 000 kg, CONF 1+F,
Flexible temperature 50° C
 - Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C
 - Equivalent performance is obtained from the two different configurations.
Retain CONF 1 + F as the speeds are lower.
Takeoff speeds are V1 = 144 kt, VR = 144 kt, V2 = 148 kt
 - First, apply the correction from FCOM page 2.02.24 p1.
Flexible temperature with air conditioning OFF 50° C
Air conditioning correction - 5° C
Intermediate flexible temperature 45° C
No speed correction.
 - Apply WET correction
For flexible temperature < TVMC (54°), ΔT_{flex} = ... 0° C
Intermediate flex temperature 45° C
Associated speeds,
V1 = 144 kt - 2 = 142 kt
VR = 144 kt - 0 = 144 kt
V2 = 148 kt - 0 = 148 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 45° C
Check that OAT/TREF < flex temperature ≤ TMAXFLEX
No speed correction.
Takeoff speeds are V1 = 142 kt, VR = 144 kt, V2 = 148 kt

R

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	50	144	144	148
FCOM correction(s)	– 3	0	0	0
Intermediate value	47	144	144	148
WET Correction	0	– 2	0	0
Intermediate value	47	142	144	148
QNH Correction	0	0	0	0
Final value	47	142	144	148

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;

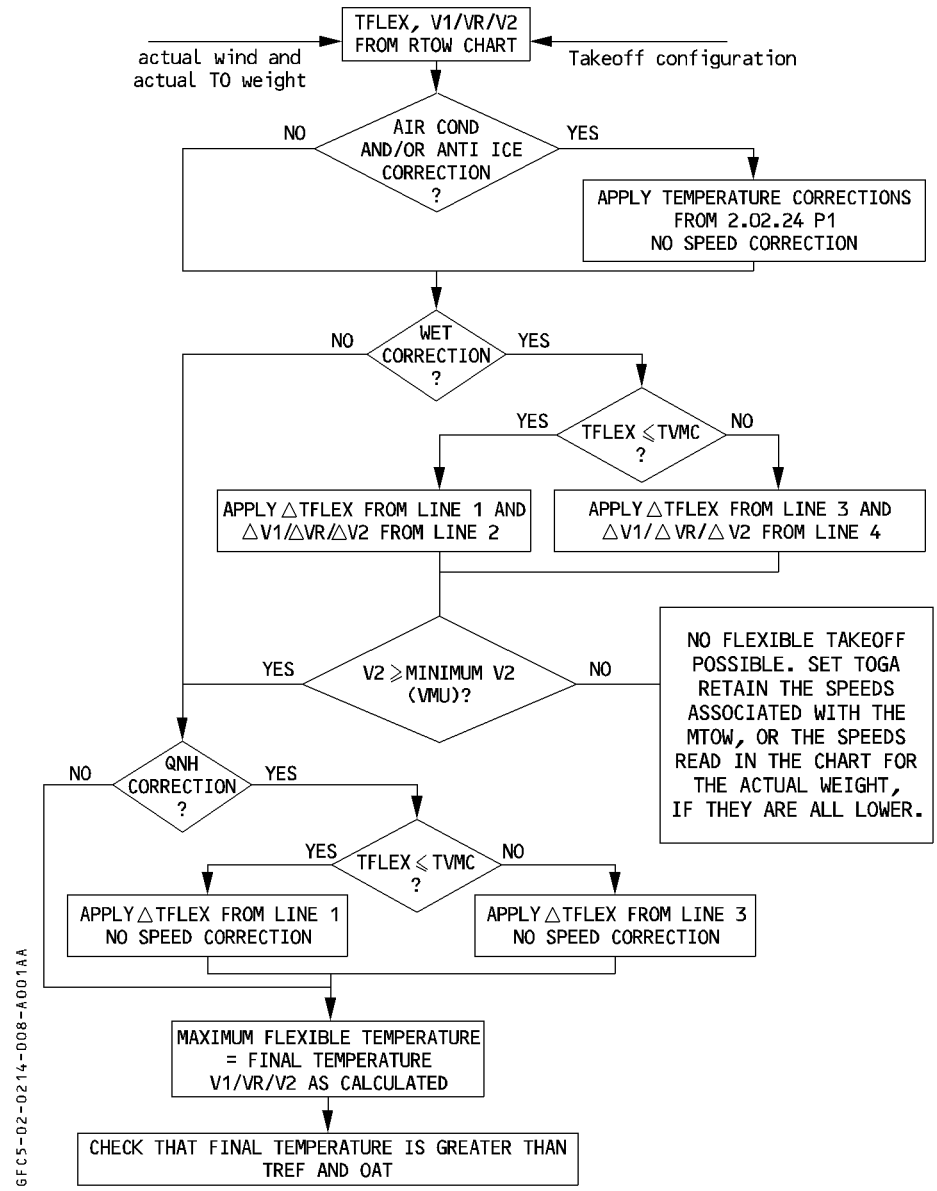
R OR

- 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 Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	50	144	144	148
FCOM correction(s)	– 5	0	0	0
Intermediate value	45	144	144	148
WET Correction	0	– 2	0	0
Intermediate value	45	142	144	148
QNH Correction	0	0	0	0
Final value	45	142	144	148

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;

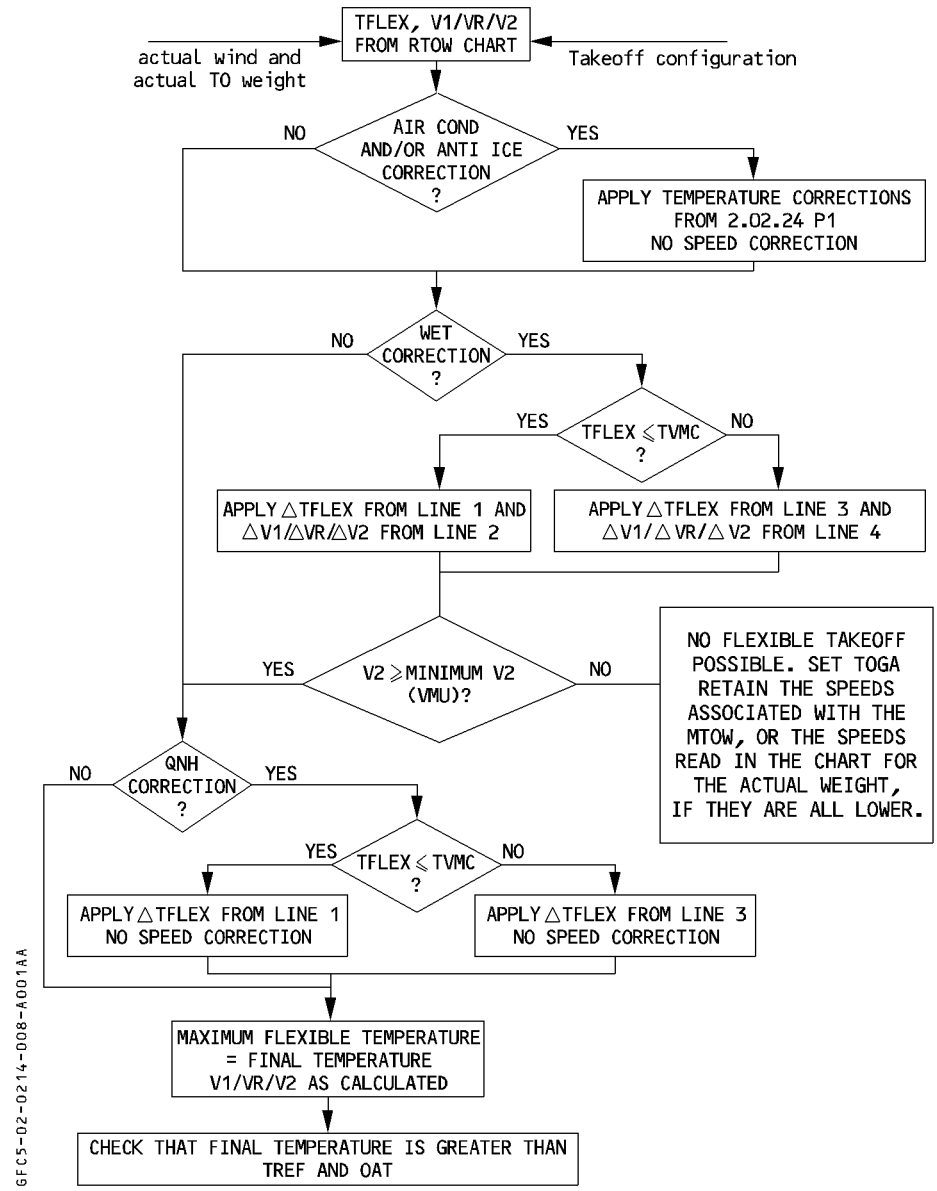
R OR

- 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

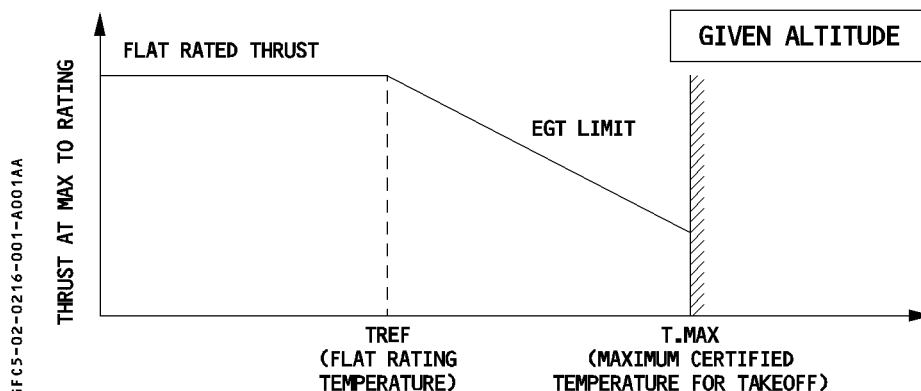


GFC5-02-0214-008-A001AA

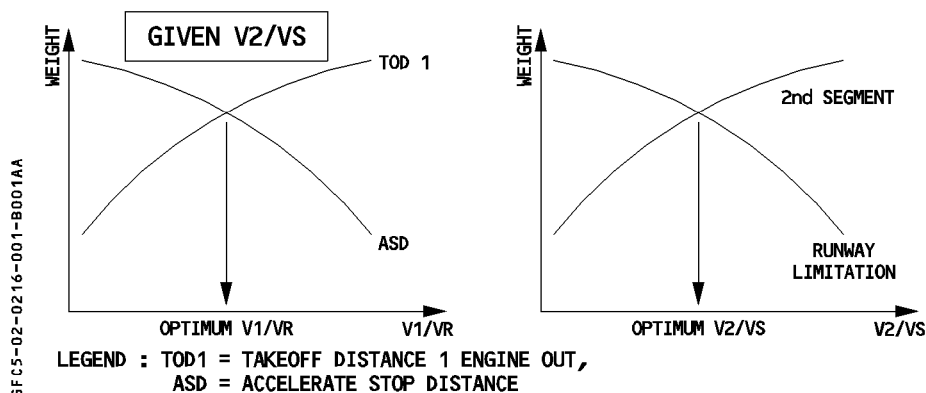
TAKEOFF PERFORMANCE

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 engine varies as follows :



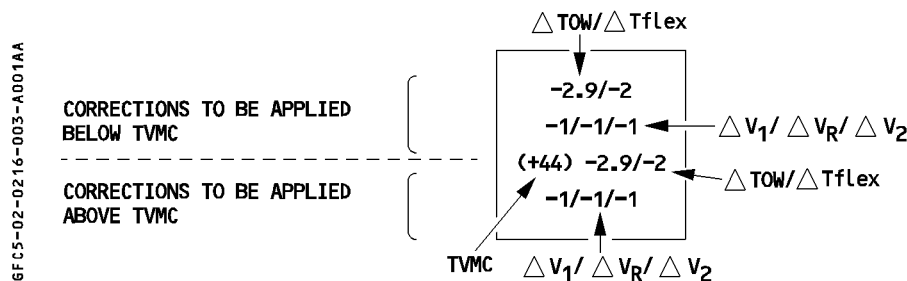
The optimization process calculates the speeds which will produce the maximum takeoff weight. To do so, it takes into account the different takeoff limitations, such as TOD, ASD, TOR, second segment..., as shown on the graphs below.



On a typical runway, the performance of a twin engine aircraft is generally limited by the one engine out operation at takeoff. The optimum V2/VS and optimum V1/VR are consequently unique.

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 SPEED

- R Minimum $V_1/VR/V_2$ 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 $V_1/VR/V_2$ displayed on the takeoff chart.

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.16	P 4
	GENERAL (WEIGHT ENTRY)		SEQ 001	REV 10

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 failure 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 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).

A330XXX		ENGINE		AIRPORT NAME						Version Date	
QNH		1013.00 HPA		Elevation	489	FT	TORA	3000	M	15L	
Air cond.		AC OFF		Isla temp	14	C	TODA	3000	M		
Anti-icing		AI OFF		rwy slope	.08	%	ASDA	3000	M	0 obstacle	
All reversers operating										DRY	
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			
220	-15 3/3 .3	7 3/3 .1	28 3/3 .0	31 3/3 .2	-15 3/3 .2	6 3/3 .1	26 3/3 .0	30 3/3 .5			
	147/48/54	148/48/55	149/50/55	151/52/57	147/49/54	148/49/54	149/51/55	151/53/57			
210	19 3/3 .1	33 3/3 .4	37 3/3 .0	38 3/3 1.3	30 3/3 .3	33 3/3 .8	36 3/3 .6	38 3/3 .1			
	142/44/50	143/44/50	147/48/53	150/51/55	139/41/46	143/45/49	147/49/53	150/51/55			
200	36 3/3 .5	41 3/3 .8	44 3/3 .1	45 3/3 .7	38 3/3 .6	41 3/3 .3	43 3/3 .7	44 3/3 1.2			
	139/41/47	142/42/48	145/46/51	148/49/53	138/39/44	141/43/47	145/47/51	148/49/53			
190	45 3/3 .4	47 3/3 1.6	49 3/3 1.6	51 3/3 .1	45 3/3 .8	47 3/3 1.0	49 3/3 .7	50 3/3 .6			
	137/37/43	140/41/46	145/45/49	147/47/51	136/37/42	140/41/45	144/45/49	147/48/51			
180	51 3/3 1.5	53 3/3 1.5	56 2/3 .2	57 3/7 .0	51 3/3 1.3	53 3/3 1.2	55 3/3 .8	56 3/3 .7			
	135/35/41	139/39/44	143/43/47	144/44/48	135/36/40	139/40/43	144/44/47	147/47/50			
170	57 3/7 0 *	* 57 3/7 .0 *	* 57 7/9 .0 *	* 57 7/9 .0 *	57 3/7 .0 *	57 3/7 .0 *	* 57 3/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	
	127/30/35	* 120/30/35	* 120/30/35	* 120/30/35	128/31/34	124/31/35	* 121/31/34	* 120/31/34	* 120/31/34	* 120/31/34	
160	* 57 7/9 .0 *	* 57 7/9 .0 *	* 57 7/9 .0 *	* 57 7/9 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	
	* 120/25/31	* 120/25/31	* 120/25/31	* 120/25/31	* 120/24/28	* 120/24/28	* 120/24/28	* 120/24/28	* 120/24/28	* 120/24/28	
150	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	
	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	
140	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	
	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/29	* 120/23/29	* 120/23/29	* 120/23/29	
130	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	* 57 7/7 .0 *	
	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/30	* 123/23/29	* 120/23/29	* 120/23/29	* 120/23/29	* 120/23/29	
GRAD1/GRAD2 (KG/C)											
220/****		210/****		160/****		150/****		150/****		140/1040	
INFLUENCE OF RUNWAY CONDITION											
WET	-.0/-1 -2/0/0 (+57) .0/-1 -2/0/0	-.0/-1 -1/0/0 (+57) -.2/-1 -1/0/0	-.0/0 -1/0/0 (+57) -.4/-1 -1/0/0	-.0/0 0/0/0 (+57) -.4/-1 0/0/0	-.2/-1 -3/0/0 (+57) -.4/-1 -3/0/0	-.1/-1 -3/0/0 (+57) -.1/-1 -3/0/0	-.2/-1 -2/0/0 (+57) -.2/-1 -2/0/0	-.2/-1 -2/0/0 (+57) -.2/-1 -2/0/0			
D QNH HPA	INFLUENCE OF DELTA PRESSURE										
-10	-2.2/-2 0/-1/-1 (+54) -2.2/-2 0/0/0	-2.5/-2 0/-1/-1 (+54) -2.5/-2 0/0/0	-2.6/-2 0/-1/-1 (+54) -2.6/-2 0/0/0	-2.2/-2 -1/-1/-1 (+54) -2.2/-2 -1/0/0	-1.8/-2 0/0/0 (+54) -1.8/-2 0/0/0	-2.0/-2 0/-1/-1 (+54) -2.0/-2 0/0/0	-2.1/-2 0/0/0 (+54) -2.1/-2 0/0/0	-2.1/-2 0/0/0 (+54) -2.1/-2 0/0/0			
+10	+1.5/+1 0/+1/+1 (+57) +1.5/+1 0/+1/+1	+1.6/+1 +1/+1/+1 (+57) +1.4/0 +1/+1/+1	+1.5/0 +1/+1/+1 (+57) +1.1/0 +1/+1/+1	+1.5/0 +1/+1/+1 (+57) +1.1/0 +1/+1/+1	+1.5/+1 0/+1/+1 (+57) +1.3/0 0/+1/+1	+9/0 +1/+1/+1 (+57) +9/0 +1/+1/+1	+1/0/0 +1/+1/+1 (+57) +1.0/0 +1/+1/+1	+1.4/0 +1/+1/+1 (+57) +1.2/0 +1/+1/+1			
LABEL FOR INFLUENCE DW (1000 KG) DTFLEX DV1-DVR-DV2 (KT) (TVMC OAT C) DW (1000 KG) DTFLEX DV1-DVR-DV2 (KT)		OAT C DW CODES V1min/VVR/V2 (kt) *LIMITATION LIMITATION CODES : 1=1st segment 2=2nd segment 3=runway length 4=obstacles 5=tire speed 6=brake energy 7=max weight 8=final take-off 9=VMU		Tref (OAT) = 29 C Tmax (OAT) = 54 C		Min acc height 535 FT Max acc height 1907 FT Min V1/VR/V2 = 120/22/28 CHECK VMU LIMITATION Correct. V1/VR/V2 = .3 KT/1000 KG		Min QNH alt 1031 FT Max QNH alt 2403 FT			

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.

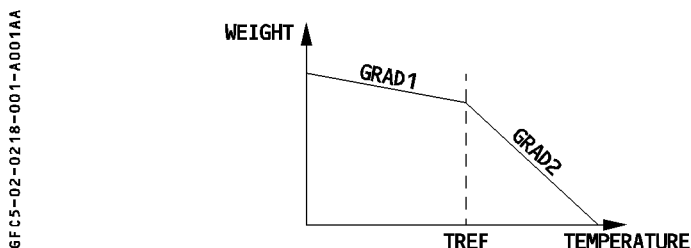
In some cases, it may happen that the first temperature value (displayed for the highest weight entry) is higher than OAT. In this case, it is allowed to extrapolate the weight value to avoid unnecessary penalty. Use the Grad 1/Grad 2 gradients provided at the bottom of the corresponding column.

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).



- 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.

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	MTOW CALCULATION (WEIGHT ENTRY)		SEQ 001	REV 10

- 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 31°C, use Grad 1/Grad 2 to extrapolate the maximum takeoff weight.
Max TO weight (1000 kg) air conditioning OFF = $220.2 + 1.010 \times 2 + 0.160 \times 4 = 222.9$
Enter the 10 kt head wind column, CONF 2, to read for 25°C.
The lowest temperature of the column is 30°C, use Grad 1/Grad 2 to extrapolate the maximum takeoff weight.
Max TO weight (1000 kg) air conditioning OFF = $220.5 + 1.040 \times 1 + 0.140 \times 4 = 222.1$

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		SEQ 010	REV 10

MTOW CALCULATION (WEIGHT ENTRY)

- Retain CONF 1+F as takeoff configuration.
- Maximum TO weight (1000 kg) air conditioning OFF 222.9
- R Air conditioning correction (FCOM 2.02.24 p1) – 6.4
- R Maximum permissible TO weight (1000 kg) air conditioning ON 216.5
- R Determine takeoff speeds for 216.5 (1000 kg) in the 10 kt head wind column (CONF 1+F)
- R $V1 = 151$ kt, $VR = 152$ kt, $V2 = 156$ 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 P 6)

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 p 6.
- Enter the 10 kt head wind column, CONF 1+F, to read for 35°C
max TO weight (1000 kg) 215.1
 - Enter the 10 kt head wind column, CONF 2, to read for 35°C
max TO weight (1000 kg) 214.0
 - Retain CONF 1+F for takeoff.
 - Read associated speeds as V1 = 150 kt, VR = 151 kt, V2 = 156 kt
 - Apply WET correction
For OAT < TVMC (57°), ΔW = ... 0.0
Intermediate weight (1000 kg) 215.1
Associated speeds,
V1 = 150 kt – 0 = 150 kt
VR = 151 kt – 0 = 151 kt
V2 = 156 kt – 0 = 156 kt
(No speed check required for first correction)
 - Apply QNH correction
For OAT < TVMC (54°), ΔW = – 2.2 × 15/10 = ... – 3.3
Maximum permissible takeoff weight (1000 kg) 211.8
Associated speeds,
V1 = 150 kt – 1 × 15/10 = 148 kt
VR = 151 kt – 1 × 15/10 = 150 kt
V2 = 156 kt – 1 × 15/10 = 155 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)	215.1	150	151	156
FCOM correction(s)				
Intermediate value	215.1	150	151	156
WET Correction	0.0	0	0	0
Intermediate value	215.1	150	151	156
QNH Correction	– 3.3	– 2	– 1	– 1
Final value	211.8	148	150	155

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		SEQ 115	REV 10

Retain CONF 1+F as takeoff configuration.
Maximum TO weight (1000 kg) air conditioning OFF 222.9
Air conditioning correction (FCOM 2.02.24 p1) – 7.1
Maximum permissible TO weight (1000 kg) air conditioning ON 215.8
Determine takeoff speeds for 215.8 (1000 kg) in the 10 kt head wind column
(CONF1+F)

R V1 = 150 kt, VR = 152 kt, V2 = 156 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 P 6)

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 p 6.
- Enter the 10 kt head wind column, CONF 1+F, to read for 35°C
max TO weight (1000 kg) 215.1
 - Enter the 10 kt head wind column, CONF 2, to read for 35°C
max TO weight (1000 kg) 214.0
 - Retain CONF 1+F for takeoff.
 - Read associated speeds as V1 = 150 kt, VR = 151 kt, V2 = 156 kt
 - Apply WET correction
For OAT < TVMC (57°), ΔW = ... 0.0
Intermediate weight (1000 kg) 215.1
Associated speeds,
V1 = 150 kt – 0 = 150 kt
VR = 151 kt – 0 = 151 kt
V2 = 156 kt – 0 = 156 kt
(No speed check required for first correction)
 - Apply QNH correction
For OAT < TVMC (54°), ΔW = – 2.2 × 15/10 = ... – 3.3
Maximum permissible takeoff weight (1000 kg) 211.8
Associated speeds,
V1 = 150 kt – 1 × 15/10 = 148 kt
VR = 151 kt – 1 × 15/10 = 150 kt
V2 = 156 kt – 1 × 15/10 = 155 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)	215.1	150	151	156
FCOM correction(s)				
Intermediate value	215.1	150	151	156
WET Correction	0.0	0	0	0
Intermediate value	215.1	150	151	156
QNH Correction	– 3.3	– 2	– 1	– 1
Final value	211.8	148	150	155

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 = $220.2 + 1.010 \times 2 + 0.160 \times 4 = 222.9$
 Enter the 10 kt head wind column, CONF 2, to read for 25°C
 Max TO weight (1000 kg) air conditioning OFF = $220.5 + 1.040 \times 1 + 0.140 \times 4 = 222.1$
 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 222.9
 R Air conditioning correction - 6.4
 R Intermediate weight 216.5
 R Interpolate takeoff speeds for 216.5 (1000 kg) in the 10 kt head wind column,
 R V1 = 151 kt, VR = 152 kt, V2 = 156 kt
3. Apply WET correction
 For OAT < TVMC (57°), $\Delta W = ... 0.0$
 R Intermediate weight 216.5
 Associated speeds,
 V1 = 151 kt - 0 = 151 kt
 VR = 152 kt - 0 = 152 kt
 R V2 = 156 kt - 0 = 156 kt
 Check that the speeds are higher than minimum speeds from the chart and from VMU table.
 Apply QNH correction
 For OAT < TVMC (54°), $\Delta W = - 2.2 \times 15/10 = ... - 3.3$
 R Maximum permissible takeoff weight 213.2
 Associated speed,
 V1 = 151 kt - 1 $\times$ 15/10 = 149 kt
 VR = 152 kt - 1 $\times$ 15/10 = 151 kt
 R V2 = 156 kt - 1 $\times$ 15/10 = 155 kt

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 :

R Maximum permissible takeoff weight = 213.2 (1000 kg)

R V1 = 149 kt, VR = 151 kt, V2 = 155 kt.

R

	Takeoff Configuration : 1+F			
	TOW	V1	VR	V2
TOW (RTOW)	222.9			
FCOM correction(s)	– 6.4			
Intermediate value	216.5	151	152	156
WET Correction	0.0	0	0	0
Intermediate value	216.5	151	152	156
QNH Correction	– 3.3	– 2	– 1	– 1
Final value	213.2	149	151	155

EXTRAPOLATION

For OAT lower than the lowest temperature value at 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 the FCOM3. Compare the maximum structural takeoff weight to the maximum permissible takeoff weight computed for given conditions and retain the lower of the two values.

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 = $220.2 + 1.010 \times 2 + 0.160 \times 4 = 222.9$
Enter the 10 kt head wind column, CONF 2, to read for 25°C
Max TO weight (1000 kg) air conditioning OFF = $220.5 + 1.040 \times 1 + 0.140 \times 4 = 222.1$
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 222.9
Air conditioning correction - 7.1
Intermediate weight 215.8
Interpolate takeoff speeds for 215.8 (1000 kg) in the 10 kt head wind column,
V1 = 150 kt, VR = 152 kt, V2 = 156 kt
- R 3. Apply WET correction
For OAT < TVMC (57°), $\Delta W = ... 0.0$
Intermediate weight 215.8
Associated speeds,
R V1 = 150 kt - 0 = 150 kt
VR = 152 kt - 0 = 152 kt
V2 = 156 kt - 0 = 156 kt
Check that the speeds are higher than minimum speeds from the chart and from VMU table.
Apply QNH correction
For OAT < TVMC (54°), $\Delta W = - 2.2 \times 15/10 = ... - 3.3$
Maximum permissible takeoff weight 212.5
Associated speed,
R V1 = 150 kt - 1 $\times$ 15/10 = 148 kt
VR = 152 kt - 1 $\times$ 15/10 = 151 kt
V2 = 156 kt - 1 $\times$ 15/10 = 155 kt

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 = 212.5 (1000 kg)

V1 = 148 kt, VR = 151 kt, V2 = 155 kt.

	Takeoff Configuration : 1+F			
	TOW	V1	VR	V2
TOW (RTOW)	222.9			
FCOM correction(s)	– 7.1			
Intermediate value	215.8	150	152	156
WET Correction	0.0	0	0	0
Intermediate value	215.8	150	152	156
QNH Correction	– 3.3	– 2	– 1	– 1
Final value	212.5	148	151	155

EXTRAPOLATION

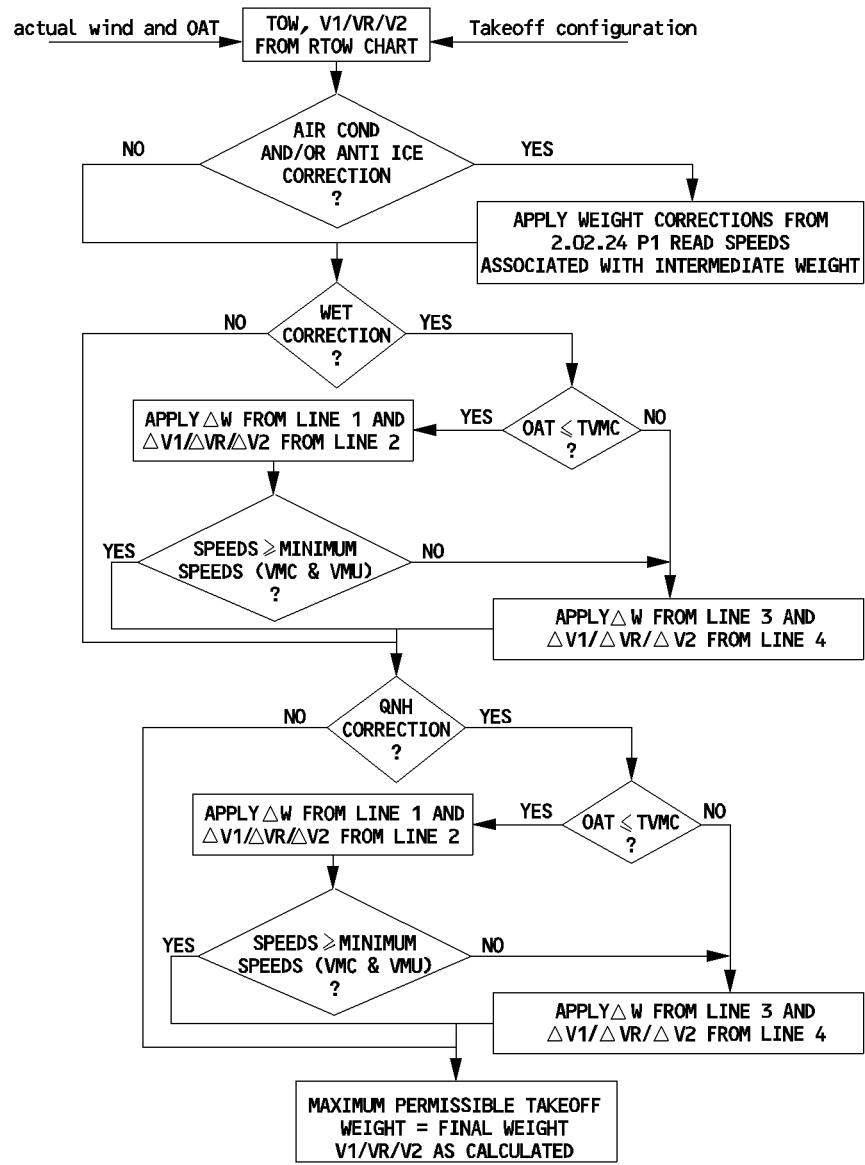
For OAT lower than the lowest temperature value at a wind column, it is possible to obtain a higher maximum permissible takeoff weight by using Grad 1/Grad 2 values. See page 1 for more details.

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 the FCOM3. 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.



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	FLEXIBLE TAKEOFF (WEIGHT ENTRY)		SEQ 001	REV 07

- 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

- In order to extend engine life, it is recommended to use the greatest thrust reduction level.
- However, to improve the takeoff performance the thrust can be increased by selecting a lower flex temperature.

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 the configuration giving the maximum flex. – If equivalent flex is obtained, choose the configuration giving the lowest speeds.	Extend engine life.
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 = 170 000 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 170 000 kg, CONF 1+F,
Flexible temperature 57° C
- Enter the 10 kt head wind column and interpolate for 170 000 kg, CONF 2,
Flexible temperature 57° C

	TAKEOFF		2.02.20	P 4
	FLEXIBLE TAKEOFF (WEIGHT ENTRY)		SEQ 005	REV 10

Equivalent performance is obtained from the two different configurations.
 Retain CONF 1 + F as the speeds are lower.

Takeoff speeds are V1 = 120 kt, VR = 130 kt, V2 = 135 kt

Flexible temperature with air conditioning OFF 57° C

R Air conditioning correction (FCOM 2.02.24 p1) - 3° C

R Maximum flexible temperature 54° 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 flexible 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

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 = 170 000 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 170 000 kg, CONF 1+F,
Flexible temperature 57° C
- Enter the 10 kt head wind column and interpolate for 170 000 kg, CONF 2,
Flexible temperature 57° C

Equivalent performance is obtained from the two different configurations.
 Retain CONF 1 + F as the speeds are lower.
 Takeoff speeds are V1 = 120 kt, VR = 130 kt, V2 = 135 kt
 Flexible temperature with air conditioning OFF 57° C
 Air conditioning correction (FCOM 2.02.24 p1) – 5° C
 Maximum flexible temperature 52° 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 flexible 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

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 = 190 000 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 190 000 kg, CONF 1 + F,
Flexible temperature 51° C

Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C

Retain CONF 1 + F for take off as the flexible temperature is higher.

Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt

Apply WET correction

For flexible temperature < TVMC (57°), ΔT_{flex} = ... 0° C

Intermediate flex temperature 51° C

Associated speeds,

V1 = 147 kt – 0 = 147 kt

VR = 147 kt – 0 = 147 kt

V2 = 151 kt – 0 = 151 kt

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

Apply QNH correction

For flex temperature < TVMC (57°), ΔT_{flex} = ... + 0° C

Maximum flexible temperature 51° C

Check that OAT/TREF < flex temperature ≤ TMAXFLEX

No speed correction.

Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	51	147	147	151
FCOM correction(s)				
Intermediate value	51	147	147	151
WET Correction	0	0	0	0
Intermediate value	51	147	147	151
QNH Correction	0	0	0	0
Final value	51	147	147	151

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.20	P 6
	FLEXIBLE TAKEOFF (WEIGHT ENTRY)		SEQ 005	REV 10

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 = 190 000 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 190 000 kg, CONF 1+F,
Flexible temperature 51° C
 - Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C
 - Retain CONF 1 + F for takeoff as the flexible temperature is higher.
Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt
 - First, apply the correction from FCOM page 2.02.24 p1.
Flexible temperature with air conditioning OFF 51° C
 - R Air conditioning correction – 3° C
 - R Intermediate flexible temperature 48° C
 - No speed correction.
 - Apply WET correction
For flexible temperature < TVMC (57°), ΔT_{flex} = ... 0° C
 - R Intermediate flex temperature 48° C
 - Associated speeds,
V1 = 147 kt – 0 = 147 kt
VR = 147 kt – 0 = 147 kt
V2 = 151 kt – 0 = 151 kt
 - R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.
 - Apply QNH correction
For flexible temperature < TVMC (57°), ΔT_{flex} = ... 0° C
 - R Maximum flexible temperature 48° C
 - Check that OAT/TREF < flex temperature ≤ TMAXFLEX
No speed correction.
Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt

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 = 190 000 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 190 000 kg, CONF 1 + F,
Flexible temperature 51° C
Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C
Retain CONF 1 + F for take off as the flexible temperature is higher.

Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt
Apply WET correction
For flexible temperature < TVMC (57°), ΔTflex = ... 0° C
Intermediate flex temperature 51° C
Associated speeds,

V1 = 147 kt – 0 = 147 kt
VR = 147 kt – 0 = 147 kt
V2 = 151 kt – 0 = 151 kt

- R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.
Apply QNH correction
For flex temperature < TVMC (57°), ΔTflex = ... + 0° C
Maximum flexible temperature 51° C
Check that OAT/TREF < flex temperature ≤ TMAXFLEX
No speed correction.
Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	51	147	147	151
FCOM correction(s)				
Intermediate value	51	147	147	151
WET Correction	0	0	0	0
Intermediate value	51	147	147	151
QNH Correction	0	0	0	0
Final value	51	147	147	151

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.20	P 6
	FLEXIBLE TAKEOFF (WEIGHT ENTRY)		SEQ 010	REV 10

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 = 190 000 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 190 000 kg, CONF 1+F,
Flexible temperature 51° C
 - Enter the 10 kt head wind column and interpolate for 190 000 kg, CONF 2,
Flexible temperature 50° C
 - Retain CONF 1 + F for takeoff as the flexible temperature is higher.
Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt
 - First, apply the correction from FCOM page 2.02.24 p1.
Flexible temperature with air conditioning OFF 51° C
Air conditioning correction - 5° C
Intermediate flexible temperature 46° C
No speed correction.
 - Apply WET correction
For flexible temperature < TVMC (57°), ΔT_{flex} = ... 0° C
Intermediate flex temperature 46° C
Associated speeds,
V1 = 147 kt - 0 = 147 kt
VR = 147 kt - 0 = 147 kt
V2 = 151 kt - 0 = 151 kt
- R Since the correction on V2 is 0, no V2 check against VMU limitation is necessary.
- Apply QNH correction
For flexible temperature < TVMC (57°), ΔT_{flex} = ... 0° C
Maximum flexible temperature 46° C
Check that OAT/TREF < flex temperature ≤ TMAXFLEX
No speed correction.
Takeoff speeds are V1 = 147 kt, VR = 147 kt, V2 = 151 kt

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		SEQ 005	REV 10

R

	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	51	147	147	151
FCOM correction(s)	– 3	0	0	0
Intermediate value	48	147	147	151
WET Correction	0	0	0	0
Intermediate value	48	147	147	151
QNH Correction	0	0	0	0
Final value	48	147	147	151

FLEXIBLE TAKEOFF NOT POSSIBLE

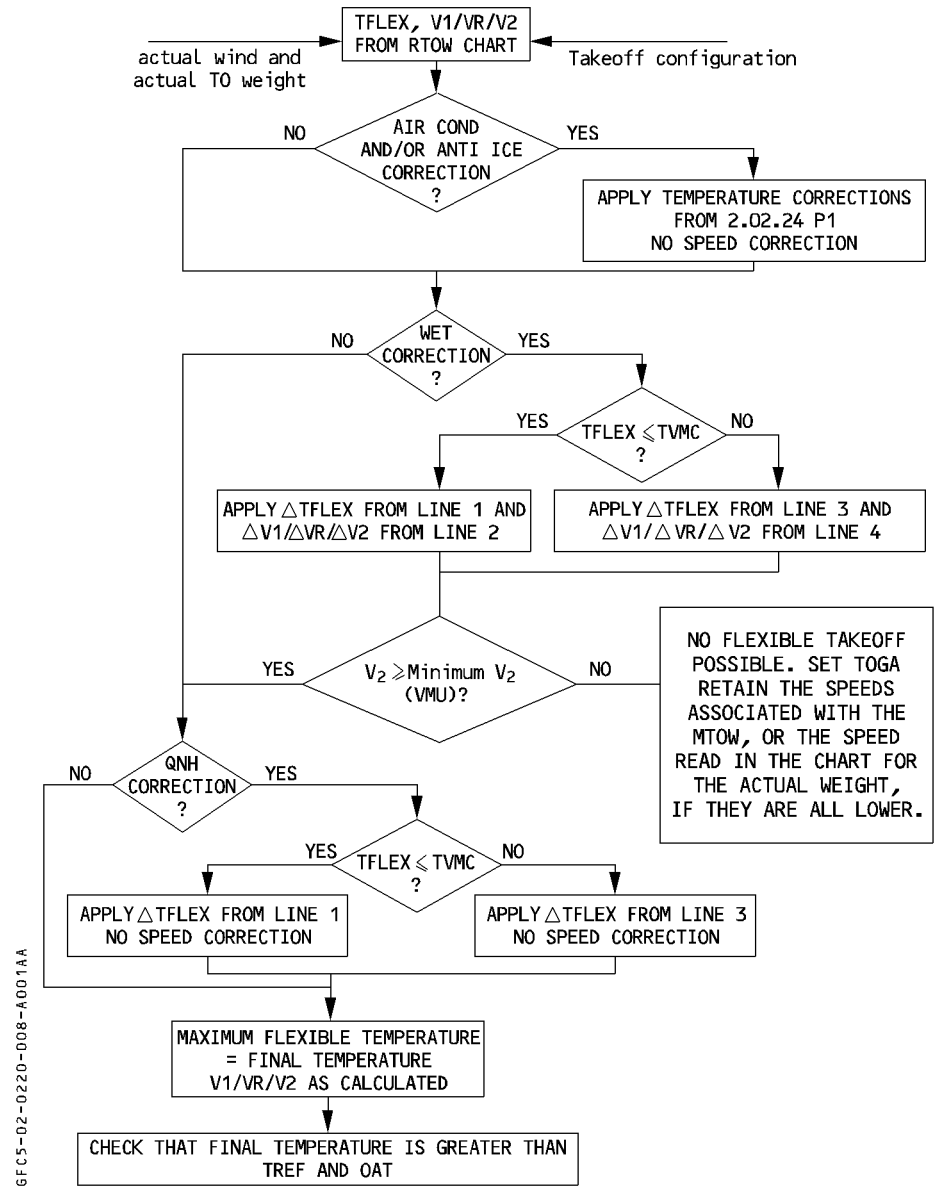
In some cases when the actual takeoff weight is lower than the maximum permissible one but no flexible takeoff possible (that is flexible temperature lower than TREF or OAT), TOGA thrust is mandatory.

Retain the speeds that have been calculated for the maximum permissible takeoff weight.

SUMMARY

The flow diagram gives the different steps to follow.

R



	Takeoff Configuration : 1 + F			
	Tflex	V1	VR	V2
Chart temperature	51	147	147	151
FCOM correction(s)	– 5	0	0	0
Intermediate value	46	147	147	151
WET Correction	0	0	0	0
Intermediate value	46	147	147	151
QNH Correction	0	0	0	0
Final value	46	147	147	151

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;

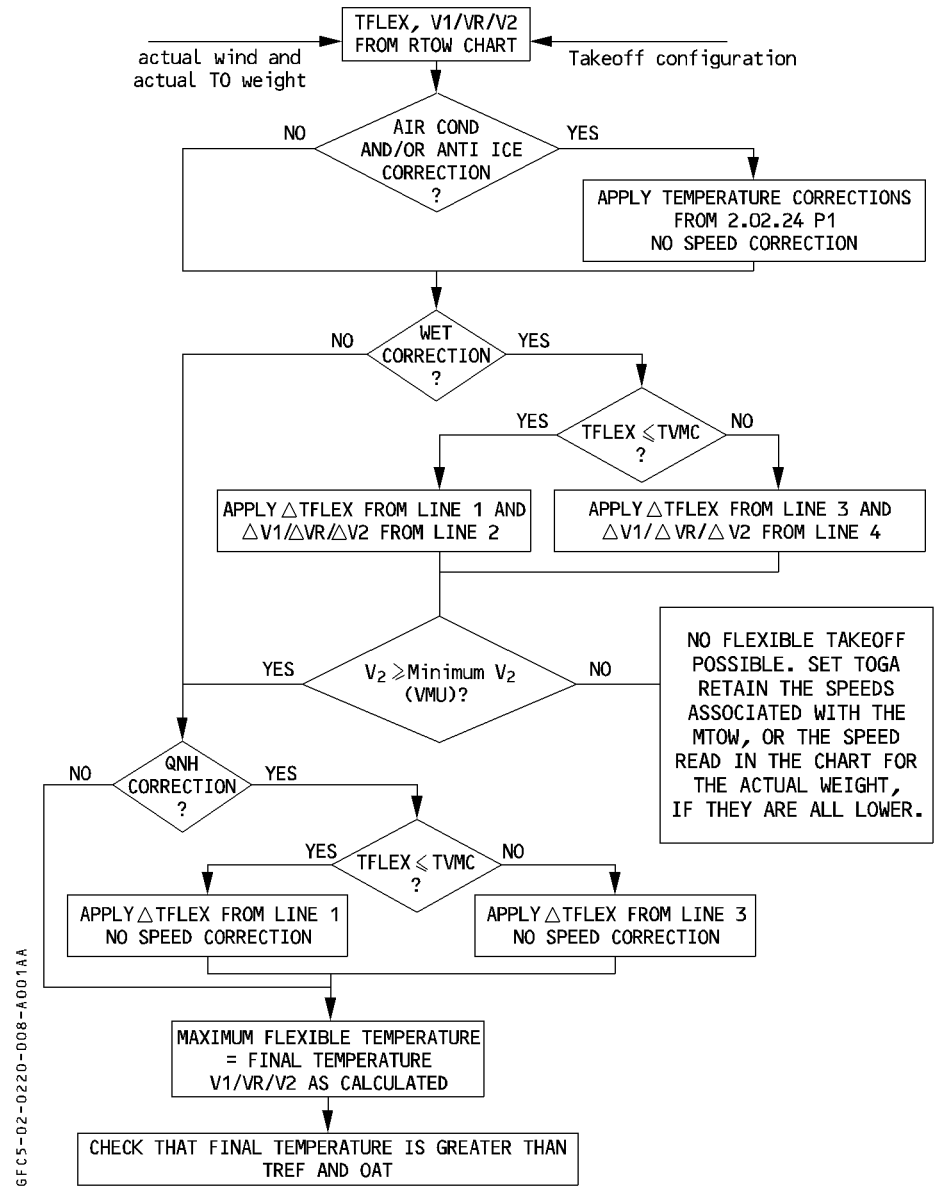
R OR

- 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

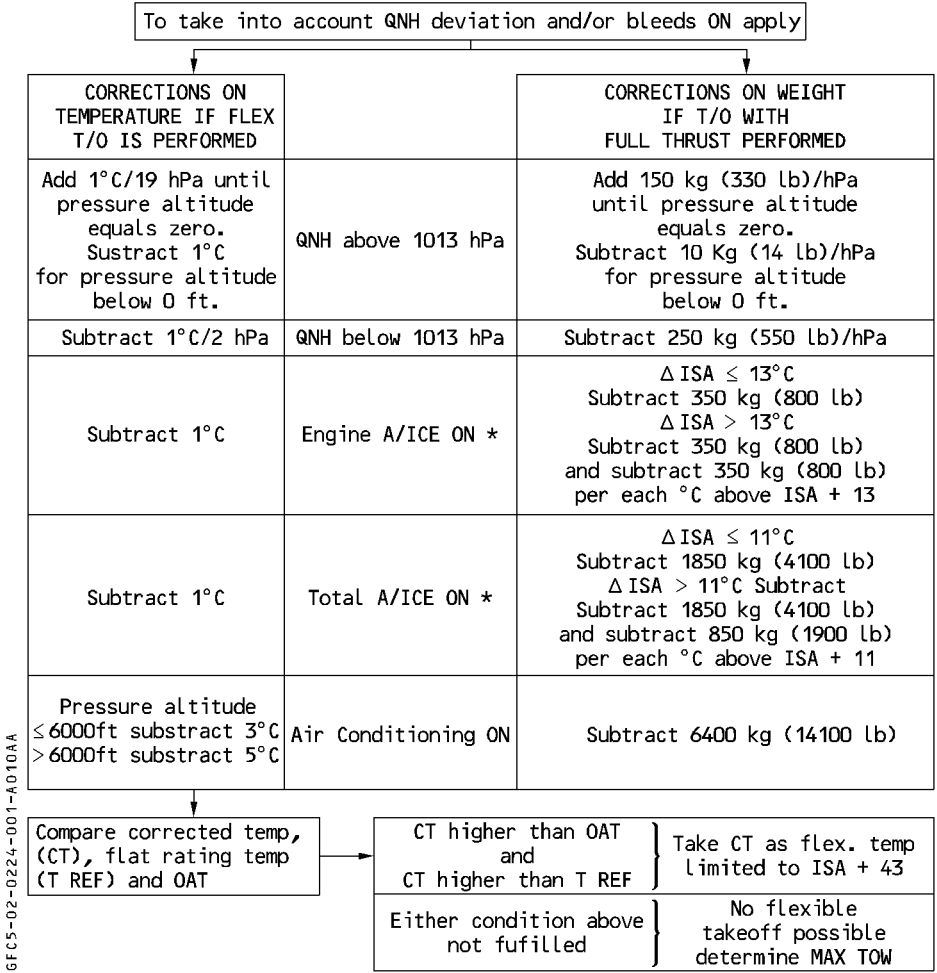
The flow diagram gives the different steps to follow.

R



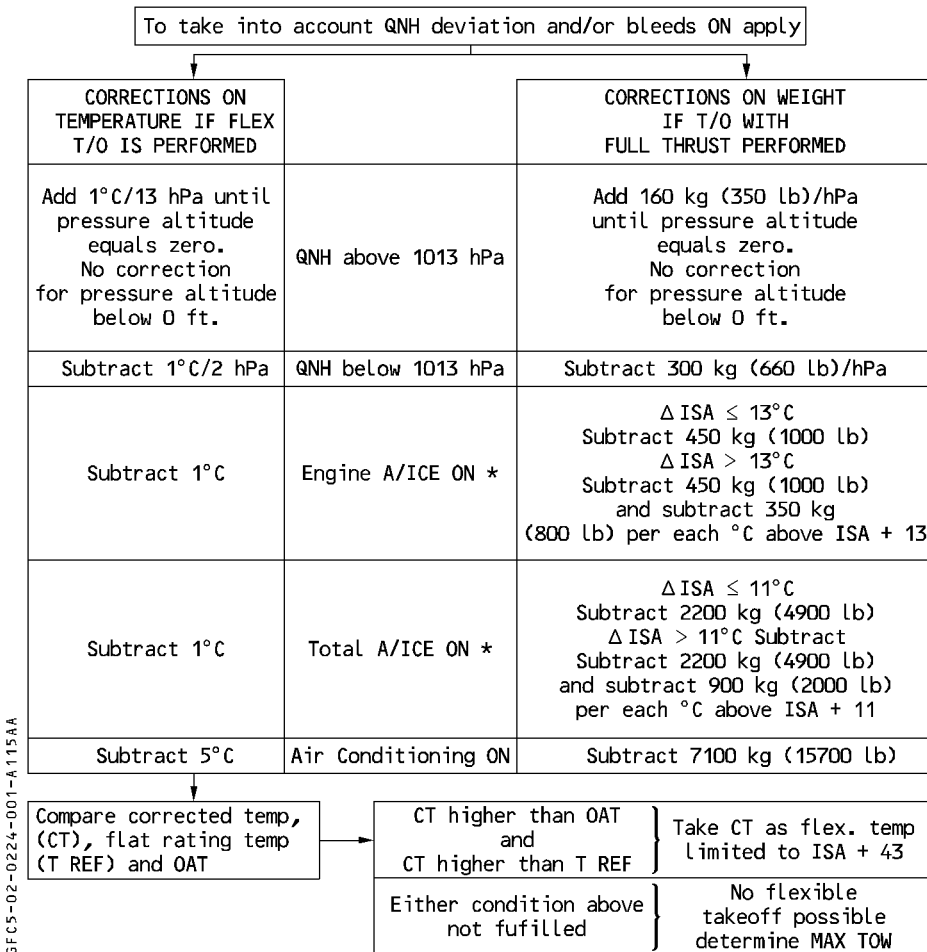
EFFECT OF QNH AND BLEEDS

R



EFFECT OF QNH AND BLEEDS

R



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	MINIMUM SPEEDS		SEQ 010	REV 07

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
CONF 1 + F and CONF 2	126	123	122	120	119	117	116	114	109	102	
CONF 3	127	124	122	121	119	118	116	115	109	102	

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	VR min
CONF 1 + F and CONF 2	126	123	122	120	119	117	117	117	117	117	
CONF 3	127	124	122	121	119	118	118	118	118	118	

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	V2 min
CONF 1 + F and CONF 2	132	128	127	125	123	122	122	122	122	122	
CONF 3	132	129	127	126	124	123	123	123	123	123	

V2 LIMITED BY VMU/VMCA

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

R

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)										
CONFIGURATION 1+F										
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)									
	130	140	150	160	170	180	190	200	210	220
-2000	132	132	132	132	135	139	143	146	150	154
0	128	128	128	131	135	139	143	147	150	154
1000	127	127	127	131	135	139	143	147	150	154
2000	125	125	127	131	135	139	143	147	150	154
3000	123	123	127	131	135	139	143	147	150	154
4000	122	122	127	131	135	139	143	147	150	154
5000	122	122	127	131	135	139	143	147	150	154
6000	122	122	127	131	135	139	143	147	150	154
7000	122	122	127	131	135	139	143	147	150	154
8000	122	122	127	131	135	139	143	147	150	154
9000	122	122	127	131	135	139	143	147	150	154
10000	122	122	127	131	135	139	143	147	150	154
11000	122	122	127	131	135	139	143	147	151	154
12000	122	123	127	131	135	139	143	147	151	154
13000	122	123	127	131	135	139	143	147	151	155
14000	122	123	127	131	135	139	143	147	151	155
14600	122	123	127	131	135	139	143	147	151	155

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.

R

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	
CONF 1 + F	114	113	112	111	109	108	106	105	99	93	V1 min
CONF 2	114	113	112	111	109	108	107	105	99	94	
CONF 3	114	113	112	111	110	108	107	105	100	94	

R

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	
CONF 1 + F	114	113	112	111	109	108	106	105	99	93	VR min
CONF 2	114	113	112	111	109	108	107	105	99	94	
CONF 3	114	113	112	111	110	108	107	105	100	94	

R

Pressure altitude (ft)	-2000	0	1000	2000	3000	4000	5000	6000	10000	14600	
CONF 1 + F	117	116	115	114	112	110	109	107	100	93	V2 min
CONF 2	117	116	114	113	112	110	109	107	100	94	
CONF 3	117	117	115	114	112	111	109	108	101	94	

V2 LIMITED BY VMU/VMCA

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

R

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)												
CONFIGURATION 1 + F												
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)											
	130	140	150	160	170	180	190	200	210	220	230	240
-2000	118	121	125	129	134	137	141	145	149	152	155	158
0	117	121	125	130	134	137	141	145	149	152	155	159
1000	117	121	126	130	134	138	141	145	149	152	155	159
2000	117	121	126	130	134	138	141	145	149	152	155	159
3000	117	121	126	130	134	138	141	145	149	152	156	159
4000	117	121	126	130	134	138	141	145	149	152	156	159
5000	117	121	126	130	134	138	142	145	149	152	156	159
6000	117	121	126	130	134	138	142	145	149	152	156	159
7000	117	121	126	130	134	138	142	145	149	152	156	159
8000	117	121	126	130	134	138	142	145	149	152	156	159
9000	117	122	126	130	134	138	142	145	149	153	156	159
10000	117	122	126	130	134	138	142	146	149	153	156	159
11000	117	122	126	130	134	138	142	146	149	153	156	159
12000	117	122	126	130	134	138	142	146	149	153	156	160
13000	117	122	126	130	134	138	142	146	150	153	157	160
14000	117	122	126	130	134	138	142	146	150	153	157	160
14600	117	122	126	130	134	138	142	146	150	154	157	161

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	MINIMUM SPEEDS		SEQ 010	REV 07

R

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)										
CONFIGURATION 2										
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)									
	130	140	150	160	170	180	190	200	210	220
-2000	132	132	132	132	132	133	137	140	144	147
0	128	128	128	128	130	133	137	140	144	147
1000	127	127	127	127	130	133	137	140	144	147
2000	125	125	125	126	130	133	137	140	144	147
3000	123	123	123	126	129	133	137	140	144	147
4000	122	122	122	126	129	133	137	140	144	147
5000	122	122	122	126	129	133	137	140	144	147
6000	122	122	122	126	129	133	137	140	144	147
7000	122	122	122	125	129	133	137	140	144	147
8000	122	122	122	125	129	133	137	140	144	147
9000	122	122	122	125	129	133	137	140	144	147
10000	122	122	122	125	129	133	137	140	144	147
11000	122	122	122	125	129	133	137	140	144	147
12000	122	122	122	125	129	133	137	140	144	148
13000	122	122	122	125	129	133	137	140	144	148
14000	122	122	122	125	129	133	137	141	144	148
14600	122	122	122	125	129	133	137	141	145	148

R

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)										
CONFIGURATION 3										
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)									
	130	140	150	160	170	180	190	200	210	220
-2000	132	132	132	132	132	132	132	135	139	142
0	129	129	129	129	129	129	132	135	139	142
1000	127	127	127	127	127	128	132	135	139	142
2000	126	126	126	126	126	128	132	135	139	142
3000	124	124	124	124	125	129	132	135	139	142
4000	123	123	123	123	125	128	132	135	139	142
5000	123	123	123	123	125	128	132	135	139	142
6000	123	123	123	123	125	128	132	135	139	142
7000	123	123	123	123	125	128	132	135	139	142
8000	123	123	123	123	125	128	132	135	139	142
9000	123	123	123	123	125	128	132	135	139	142
10000	123	123	123	123	125	128	132	135	139	142
11000	123	123	123	123	125	128	132	135	139	142
12000	123	123	123	123	125	128	132	135	139	142
13000	123	123	123	123	125	128	132	135	139	142
14000	123	123	123	123	125	128	132	135	139	143
14600	123	123	123	123	125	128	132	136	139	143

R

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)												
CONFIGURATION 2												
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)											
	130	140	150	160	170	180	190	200	210	220	230	240
-2000	117	117	119	123	126	130	133	137	140	144	147	150
0	116	116	119	123	126	130	133	137	141	144	147	150
1000	114	116	119	123	126	130	133	137	141	144	147	150
2000	113	116	119	123	126	130	133	137	141	144	147	150
3000	112	115	119	123	126	130	133	137	141	144	147	150
4000	112	115	119	123	126	130	133	137	141	144	147	150
5000	112	115	119	123	126	130	133	137	141	144	147	150
6000	111	115	119	123	126	130	133	137	141	144	147	150
7000	111	115	119	123	126	130	133	137	141	144	147	150
8000	111	115	119	123	126	130	134	137	141	144	147	150
9000	111	115	119	123	126	130	134	137	141	144	147	150
10000	111	115	119	123	126	130	134	137	141	144	147	151
11000	111	115	119	123	126	130	134	137	141	144	148	151
12000	111	115	119	123	126	130	134	137	141	145	148	151
13000	111	115	119	123	126	130	134	138	142	145	148	152
14000	111	115	119	123	126	130	134	138	142	145	149	152
14600	111	115	119	123	126	130	134	138	142	145	149	152

R

MINIMUM V2 LIMITED BY VMU/VMCA (KT IAS)													
CONFIGURATION 3													
PRESSURE ALTITUDE (FT)	TAKEOFF WEIGHT (1000 KG)												
	130	140	150	160	170	180	190	200	210	220	230	240	
-2000	117	117	117	120	123	127	130	134	137	140	143	146	
0	117	117	117	120	123	127	130	134	137	140	143	146	
1000	115	115	117	120	123	127	130	134	137	140	143	146	
2000	114	114	117	120	123	127	130	134	137	140	143	146	
3000	112	113	116	120	123	127	130	134	137	140	143	146	
4000	111	113	116	120	123	127	130	134	137	140	143	146	
5000	109	113	116	119	123	127	130	134	137	140	143	146	
6000	109	112	116	119	123	127	130	134	137	140	143	146	
7000	109	112	116	119	123	127	130	134	137	141	143	146	
8000	109	112	116	119	123	127	130	134	138	141	143	146	
9000	108	112	116	119	123	127	130	134	138	141	143	146	
10000	108	112	116	119	123	127	130	134	138	141	143	146	
11000	108	112	116	119	123	127	130	134	138	141	144	147	
12000	108	112	116	119	123	127	130	134	138	141	144	147	
13000	108	112	116	119	123	127	131	134	138	141	144	147	
14000	108	112	116	119	123	127	131	134	138	141	145	148	
14600	108	112	116	119	123	127	131	134	138	142	145	148	

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/EPR 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.

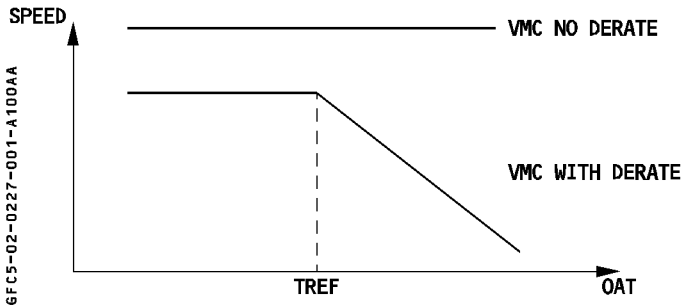
When a derated takeoff is performed, selection of full takeoff thrust by setting thrust levers at TOGA is not permitted below the speeds specified in engine failure procedure (FCOM 3.02.10 page 4).

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 :

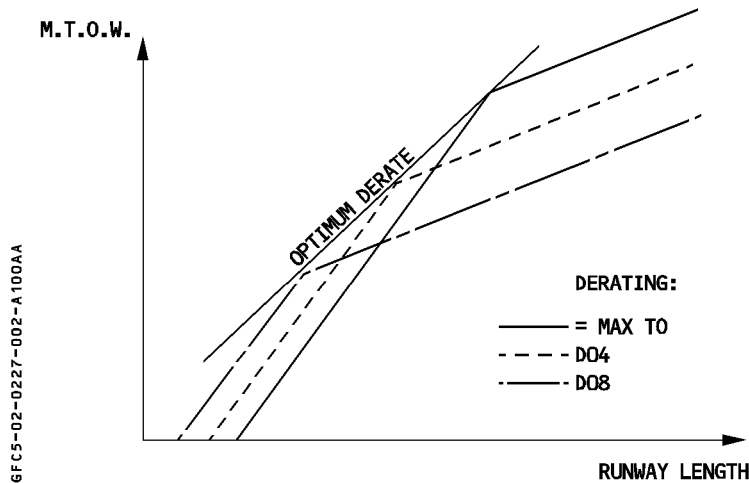
- The derated thrust is lower than the maximum takeoff thrust
- The effect of temperature on VMCG and VMCA is taken into account (which is not the case for the takeoff without derate, due to the flexible takeoff concept)



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 compensates amply 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 loss is more important and not compensated by the effect of the VMCA decrease. 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/EPR

The following pages give the derated takeoff N1/EPR 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 30°C, using a derate of 4 % will give the best takeoff performance.

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF		2.02.27	P 3
	DERATED TAKEOFF		SEQ 100	REV 07

A330XXX	ENGINES		AIRPORT NAME						15L	Version	Date	
Wind	0 KT		Elevation	489	FT	TORA	2300	M		ABXXXXXX		
QNH	1013.25 HPA		Isa temp	14	C	TODA	2300	M				
Air cond.	AC OFF		rvwy slope	.06	%	ASDA	2300	M		0 obstacle		
Anti-icing	AI OFF										WATER 1/4" CONF 2	
All reversers operating												
OAT C	NO DERATE		D04		D08		D12		D16		D20	
0	205.3	3/9 126/37/42	201.9	3/9 126/36/41	199.0	3/9 126/36/40	195.1	3/9 126/35/39	191.0	3/9 125/33/37	186.8	3/9 124/32/35
10	* 201.7	3/9 * 125/36/41	198.4	3/9 124/35/40	194.9	3/9 124/34/39	191.8	3/9 124/33/37	187.9	3/9 123/32/36	183.6	3/9 123/31/34
20	* 198.1	3/9 * 123/35/40	* 195.0	3/9 * 123/34/39	191.6	3/9 122/33/38	187.9	3/9 122/32/36	184.7	3/9 122/31/35	180.6	3/9 121/30/33
30	* 182.7	3/9 * 123/29/35	* 191.1	3/9 * 121/32/37	* 187.8	3/9 * 120/31/36	184.2	3/9 120/30/35	180.7	3/9 120/29/33	177.2	3/9 120/28/32
32	* 178.4	3/9 * 123/27/33	* 189.3	3/9 * 120/32/37	* 185.9	3/9 * 120/31/35	182.3	3/9 120/30/34	179.0	3/9 119/29/33	175.4	3/9 119/27/31
34	* 173.9	3/9 * 123/26/32	* 187.3	3/9 * 120/31/36	* 183.9	3/9 * 119/30/35	180.4	3/9 119/29/33	177.2	3/9 119/28/32	173.5	3/9 119/27/31
36	* 170.9	3/3 * 123/26/32	* 185.3	3/9 * 119/30/35	* 181.9	3/9 * 119/29/34	178.4	3/9 119/28/33	175.3	3/9 119/27/31	171.5	3/9 118/26/30
38	* 167.3	3/3 * 123/26/32	* 183.3	3/9 * 119/30/35	* 179.9	3/9 * 119/29/33	176.6	3/9 118/28/32	173.4	3/9 118/27/31	169.6	3/9 118/26/29
40	* 163.6	3/3 * 123/26/32	* 181.3	3/9 * 118/29/34	* 178.0	3/9 * 118/28/32	174.8	3/9 118/27/31	171.5	3/9 118/26/30	167.7	3/9 117/25/28
42	* 160.0	3/3 * 123/26/32	* 179.4	3/9 * 118/28/33	* 176.0	3/9 * 118/27/32	173.2	3/9 118/27/31	169.7	3/9 117/25/29	165.8	3/9 117/24/28
44	* 156.5	3/3 * 123/26/32	DO NOT USE FOR OPERATIONAL PURPOSE								164.0	3/9 116/24/27
46	* 152.9	3/3 * 123/26/32									162.2	3/9 116/23/26
48	* 149.4	3/3 * 123/26/32									* 173.5	3/9 * 117/26/31	* 170.5	3/9 * 117/26/29	167.5	3/9 116/25/28	163.9	3/9 116/24/27	160.3	3/9 115/22/25
50	* 146.3	3/3 * 123/26/32	* 171.4	3/9 * 116/26/30	* 168.8	3/9 * 116/25/29	165.5	3/9 116/24/27	161.9	3/9 115/23/26	158.4	3/9 115/22/25
52	* 143.0	3/3 * 123/26/32	* 169.5	3/9 * 116/25/29	* 166.8	3/9 * 116/24/28	163.5	3/9 115/23/27	160.0	3/9 115/22/25	156.5	3/9 114/21/24
54	* 139.7	3/3 * 123/26/32	* 167.7	3/9 * 116/25/28	* 164.9	3/9 * 115/24/27	161.5	3/9 115/23/26	158.1	3/9 115/22/24	* 154.6	3/9 * 114/20/23
LABEL FOR INFLUENCE DW (1000 KG) DTFLEX DV1-DVR-DV2 (KT) (TVMC OAT C) DW (1000 KG) DTFLEX DV1-DVR-DV2 (KT)			MTOW(1000 KG) codes		* VMC	Tref (OAT) = 29 C		Min acc height 425 FT		Min QNH alt 914 FT		
			V1min/VR/V2 (kt)		* LIMITATION	Tmax (OAT) = 54 C		Max acc height 1966 FT		Max QNH alt 2455 FT		
			LIMITATION CODES 1=1st segment 2=2nd segment 3=runway length 4=obstacles 5=tire speed 6=brake energy 7=max weight 8=final take-off 9=VMU							Min V1/VR/V2 = 123/26/31 CHECK VMU LIMITATION Correct. V1/VR/V2 = .1 KT/1000 KG		

OCTO FCOM-F0-02-02-27-003-140

CF6-80E1A4		N1 CORRECTIONS FOR AIR BLEED					OAT < ISA + 15		OAT ≥ ISA + 15	
D04 DERATED TO N1 NO AIR BLEED MACH=.000							AIR CONDITIONING ON		- .8		- .8
		ENGINE ANTI-ICE ON					0.0		- .6	
		ENGINE ANTI-ICE AND WING ANTI-ICE ON					0.0		-1.0	
OAT (°C)	PRESSURE ALTITUDE (FT)									
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
-54.0	90.0	91.6	93.2	94.0	94.7	95.5	96.3	97.1	98.0	98.5
-50.0	90.8	92.4	94.0	94.8	95.5	96.3	97.1	97.9	98.7	99.3
-46.0	91.6	93.2	94.8	95.6	96.3	97.1	97.9	98.7	99.5	100.1
-42.0	92.4	94.0	95.6	96.4	97.1	97.9	98.6	99.5	100.3	100.9
-38.0	93.1	94.8	96.4	97.1	97.8	98.6	99.4	100.2	101.0	101.6
-34.0	93.9	95.5	97.1	97.9	98.6	99.4	100.1	101.0	101.8	102.3
-30.0	94.6	96.3	97.9	98.6	99.4	100.1	100.9	101.7	102.5	103.1
-26.0	95.4	97.0	98.6	99.4	100.1	100.9	101.6	102.4	103.2	103.8
-22.0	96.1	97.8	99.4	100.1	100.8	101.6	102.3	103.1	103.9	104.5
-18.0	96.8	98.5	100.1	100.8	101.6	102.3	103.0	103.9	104.7	105.2
-14.0	97.5	99.2	100.9	101.6	102.3	103.0	103.8	104.6	105.4	105.9
-10.0	98.2	99.9	101.6	102.3	103.0	103.7	104.5	105.3	106.1	106.7
-6.0	99.0	100.6	102.3	103.0	103.7	104.4	105.2	106.0	106.8	107.4
-2.0	99.7	101.4	103.0	103.7	104.4	105.2	105.9	106.7	107.5	108.1
2.0	100.4	102.1	103.7	104.4	105.1	105.9	106.6	107.4	108.2	108.8
6.0	101.0	102.7	104.4	105.1	105.8	106.6	107.3	108.1	108.9	109.5
10.0	101.7	103.4	105.1	105.8	106.5	107.3	108.0	108.8	109.7	110.2
14.0	102.4	104.1	105.8	106.5	107.2	108.0	108.7	109.5	110.4	110.9
18.0	103.1	104.8	106.5	107.2	107.9	108.7	109.4	110.2	111.0	110.8
22.0	103.7	105.5	107.2	107.9	108.6	109.3	110.1	110.0	109.8	109.8
26.0	104.4	106.1	107.8	108.6	109.3	109.1	108.9	108.9	108.9	108.9
30.0	105.1	106.8	108.5	108.4	108.2	108.1	108.1	108.1	107.9	107.8
34.0	105.7	107.0	107.7	107.5	107.3	107.3	107.2	107.1	106.9	106.6
38.0	105.9	106.7	106.9	106.7	106.5	106.4	106.2	106.1	105.8	105.5
42.0	106.1	106.4	106.0	105.8	105.6	105.4	105.3	105.3	105.0	
46.0	105.5	105.2	105.0	104.8	104.5	OAT < ISA + 15 OAT ≥ ISA + 15				
50.0	104.3	104.1	103.9	103.7	103.4					
54.0	103.4	103.1	102.8							

CF6-80E1A4	N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT ≥ ISA + 15	
D08	AIR CONDITIONING ON ENGINE ANTI-ICE ON ENGINE ANTI-ICE AND WING ANTI-ICE ON						-8		-8	
DERATED TO N1 NO AIR BLEED							0.0		-6	
MACH = .000							0.0		-1.0	
OAT (°C)	PRESSURE ALTITUDE (FT)									
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
-54.0	88.7	90.3	91.9	92.6	93.3	94.1	94.9	95.7	96.6	97.1
-50.0	89.5	91.1	92.6	93.4	94.1	94.9	95.7	96.5	97.3	97.9
-46.0	90.2	91.9	93.4	94.2	94.9	95.7	96.5	97.3	98.1	98.7
-42.0	91.0	92.6	94.2	95.0	95.7	96.5	97.2	98.1	98.9	99.4
-38.0	91.8	93.4	95.0	95.7	96.4	97.2	98.0	98.8	99.6	100.2
-34.0	92.5	94.1	95.7	96.5	97.2	98.0	98.7	99.5	100.4	100.9
-30.0	93.2	94.9	96.5	97.2	97.9	98.7	99.5	100.3	101.1	101.7
-26.0	94.0	95.6	97.2	98.0	98.7	99.4	100.2	101.0	101.8	102.4
-22.0	94.7	96.4	98.0	98.7	99.4	100.2	100.9	101.7	102.5	103.1
-18.0	95.4	97.1	98.7	99.4	100.1	100.9	101.6	102.4	103.2	103.8
-14.0	96.1	97.8	99.4	100.2	100.9	101.6	102.3	103.1	103.9	104.5
-10.0	96.8	98.5	100.2	100.9	101.6	102.3	103.0	103.8	104.6	105.2
-6.0	97.5	99.2	100.9	101.6	102.3	103.0	103.7	104.6	105.4	105.9
-2.0	98.2	99.9	101.6	102.3	103.0	103.7	104.5	105.3	106.1	106.7
2.0	98.9	100.6	102.3	103.0	103.7	104.4	105.2	106.0	106.8	107.4
6.0	99.6	101.3	103.0	103.7	104.4	105.1	105.9	106.7	107.5	108.1
10.0	100.3	102.0	103.7	104.4	105.1	105.8	106.6	107.4	108.2	108.8
14.0	101.0	102.7	104.4	105.1	105.8	106.5	107.3	108.1	108.9	109.5
18.0	101.6	103.4	105.0	105.8	106.5	107.2	107.9	108.8	109.6	109.4
22.0	102.3	104.0	105.7	106.4	107.1	107.9	108.6	108.5	108.4	108.4
26.0	103.0	104.7	106.4	107.1	107.8	107.7	107.5	107.4	107.4	107.4
30.0	103.6	105.4	107.0	107.0	106.7	106.6	106.6	106.7	106.5	106.3
34.0	104.3	105.5	106.2	106.0	105.8	105.8	105.7	105.6	105.4	105.1
38.0	104.4	105.2	105.4	105.2	105.0	104.9	104.7	104.6	104.3	104.0
42.0	104.6	104.9	104.6	104.3	104.1	103.9	103.8	103.9	103.5	
46.0	104.0	103.7	103.5	103.3	103.0					
50.0	102.8	102.6	102.4	102.2	101.9					
54.0	101.8	101.6	101.3							

CF6-80E1A4		N1 CORRECTIONS FOR AIR BLEED					OAT < ISA + 15		OAT ≥ ISA + 15	
D12 DERATED TO N1 NO AIR BLEED MACH=.000							AIR CONDITIONING ON		- .8		- .8
		ENGINE ANTI-ICE ON					0.0		- .6	
		ENGINE ANTI-ICE AND WING ANTI-ICE ON					0.0		-1.0	
OAT (°C)	PRESSURE ALTITUDE (FT)									
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
-54.0	87.3	88.9	90.5	91.2	92.0	92.8	93.5	94.4	95.2	95.7
-50.0	88.1	89.7	91.3	92.0	92.8	93.5	94.3	95.1	95.9	96.5
-46.0	88.9	90.5	92.1	92.8	93.5	94.3	95.1	95.9	96.7	97.3
-42.0	89.7	91.3	92.9	93.6	94.3	95.1	95.8	96.7	97.5	98.0
-38.0	90.4	92.0	93.6	94.3	95.1	95.8	96.6	97.4	98.2	98.8
-34.0	91.1	92.8	94.4	95.1	95.8	96.6	97.3	98.1	98.9	99.5
-30.0	91.9	93.5	95.1	95.8	96.6	97.3	98.1	98.9	99.7	100.2
-26.0	92.6	94.2	95.8	96.6	97.3	98.0	98.8	99.6	100.4	101.0
-22.0	93.3	95.0	96.6	97.3	98.0	98.8	99.5	100.3	101.1	101.7
-18.0	94.0	95.7	97.3	98.0	98.7	99.5	100.2	101.0	101.8	102.4
-14.0	94.7	96.4	98.0	98.7	99.4	100.2	100.9	101.7	102.5	103.1
-10.0	95.4	97.1	98.7	99.5	100.1	100.9	101.6	102.4	103.2	103.8
-6.0	96.1	97.8	99.4	100.2	100.8	101.6	102.3	103.1	103.9	104.5
-2.0	96.8	98.5	100.1	100.9	101.5	102.3	103.0	103.8	104.7	105.2
2.0	97.5	99.2	100.8	101.6	102.3	103.0	103.7	104.6	105.4	105.9
6.0	98.2	99.9	101.5	102.2	102.9	103.7	104.4	105.3	106.1	106.6
10.0	98.8	100.6	102.2	102.9	103.6	104.4	105.1	106.0	106.8	107.3
14.0	99.5	101.2	102.9	103.6	104.3	105.1	105.8	106.7	107.5	108.0
18.0	100.2	101.9	103.6	104.3	105.0	105.8	106.5	107.3	108.2	107.9
22.0	100.8	102.6	104.2	105.0	105.7	106.4	107.2	107.1	106.9	106.9
26.0	101.5	103.2	104.9	105.6	106.4	106.2	106.0	106.0	106.0	106.0
30.0	102.2	103.9	105.6	105.5	105.3	105.2	105.2	105.2	105.0	104.8
34.0	102.8	104.0	104.7	104.6	104.3	104.4	104.3	104.1	103.9	103.6
38.0	103.0	103.7	104.0	103.8	103.5	103.5	103.3	103.2	102.8	102.6
42.0	103.1	103.4	103.1	102.9	102.7	102.4	102.3	102.4	102.1	
46.0	102.5	102.2	102.0	101.8	101.5	OAT < ISA + 15 OAT ≥ ISA + 15				
50.0	101.3	101.1	100.9	100.7	100.4					
54.0	100.3	100.1	99.8							

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.27	P 7
	DERATED TAKEOFF		SEQ 120	REV 08

CF6-80E1A4		N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT ≥ ISA + 15	
D16 DERATED TO N1 NO AIR BLEED MACH=.000								AIR CONDITIONING ON		-8		-8
		ENGINE ANTI-ICE ON		0.0		-6					
		ENGINE ANTI-ICE AND WING ANTI-ICE ON		0.0		-1.0					
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	86.0	87.6	89.1	89.9	90.6	91.4	92.2	93.0	93.8	94.3	
-50.0	86.8	88.4	89.9	90.7	91.4	92.2	92.9	93.7	94.5	95.1	
-46.0	87.5	89.1	90.7	91.5	92.2	92.9	93.7	94.5	95.3	95.9	
-42.0	88.3	89.9	91.5	92.2	92.9	93.7	94.5	95.3	96.1	96.6	
-38.0	89.0	90.6	92.2	93.0	93.7	94.5	95.2	96.0	96.8	97.4	
-34.0	89.8	91.4	93.0	93.7	94.4	95.2	95.9	96.7	97.5	98.1	
-30.0	90.5	92.1	93.7	94.5	95.2	95.9	96.7	97.5	98.3	98.8	
-26.0	91.2	92.8	94.5	95.2	95.9	96.6	97.4	98.2	99.0	99.5	
-22.0	91.9	93.6	95.2	95.9	96.6	97.4	98.1	98.9	99.7	100.2	
-18.0	92.6	94.3	95.9	96.6	97.3	98.1	98.8	99.6	100.4	100.9	
-14.0	93.3	95.0	96.6	97.3	98.0	98.8	99.5	100.3	101.1	101.7	
-10.0	94.0	95.7	97.3	98.0	98.7	99.5	100.2	101.0	101.8	102.4	
-6.0	94.7	96.4	98.0	98.7	99.4	100.2	100.9	101.7	102.5	103.1	
-2.0	95.4	97.1	98.7	99.4	100.1	100.9	101.6	102.4	103.2	103.8	
2.0	96.1	97.8	99.4	100.1	100.8	101.6	102.3	103.1	103.9	104.5	
6.0	96.7	98.4	100.1	100.8	101.5	102.3	103.0	103.8	104.6	105.2	
10.0	97.4	99.1	100.8	101.5	102.2	102.9	103.7	104.5	105.3	105.9	
14.0	98.1	99.8	101.5	102.2	102.9	103.6	104.4	105.2	106.0	106.6	
18.0	98.7	100.5	102.1	102.9	103.6	104.3	105.0	105.9	106.7	106.5	
22.0	99.4	101.1	102.8	103.5	104.2	105.0	105.7	105.6	105.5	105.5	
26.0	100.0	101.8	103.5	104.2	104.9	104.8	104.6	104.5	104.5	104.5	
30.0	100.7	102.4	104.1	104.0	103.8	103.7	103.7	103.7	103.6	103.4	
34.0	101.3	102.6	103.3	103.1	102.9	102.9	102.8	102.6	102.5	102.2	
38.0	101.5	102.2	102.5	102.3	102.1	102.0	101.8	101.7	101.4	101.1	
42.0	101.6	101.9	101.6	101.4	101.2	101.0	100.8	100.9	100.6		
46.0	101.0	100.7	100.5	100.3	100.0	OAT < ISA + 15 OAT ≥ ISA + 15					
50.0	99.8	99.6	99.4	99.2	98.9						
54.0	98.8	98.6	98.3								

CF6-80E1A4	N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT ≥ ISA + 15	
D20	AIR CONDITIONING ON ENGINE ANTI-ICE ON ENGINE ANTI-ICE AND WING ANTI-ICE ON						-8		-8	
DERATED TO N1 NO AIR BLEED							0.0		-6	
MACH=.000							0.0		-1.0	
OAT (°C)	PRESSURE ALTITUDE (FT)									
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
-54.0	84.7	86.3	87.8	88.5	89.3	90.0	90.8	91.6	92.4	93.0
-50.0	85.4	87.0	88.6	89.3	90.0	90.8	91.6	92.4	93.2	93.7
-46.0	86.2	87.8	89.4	90.1	90.8	91.6	92.3	93.1	93.9	94.5
-42.0	86.9	88.5	90.1	90.9	91.6	92.3	93.1	93.9	94.7	95.3
-38.0	87.7	89.3	90.9	91.6	92.3	93.1	93.8	94.6	95.4	96.0
-34.0	88.4	90.0	91.6	92.3	93.0	93.8	94.5	95.4	96.1	96.7
-30.0	89.1	90.7	92.3	93.1	93.8	94.5	95.3	96.1	96.9	97.4
-26.0	89.8	91.5	93.1	93.8	94.5	95.2	96.0	96.8	97.6	98.1
-22.0	90.5	92.2	93.8	94.5	95.2	96.0	96.7	97.5	98.3	98.8
-18.0	91.2	92.9	94.5	95.2	95.9	96.7	97.4	98.2	99.0	99.5
-14.0	91.9	93.6	95.2	95.9	96.6	97.4	98.1	98.9	99.7	100.2
-10.0	92.6	94.3	95.9	96.6	97.3	98.1	98.8	99.6	100.4	100.9
-6.0	93.3	95.0	96.6	97.3	98.0	98.7	99.5	100.3	101.1	101.6
-2.0	94.0	95.7	97.3	98.0	98.7	99.4	100.2	101.0	101.8	102.4
2.0	94.6	96.3	98.0	98.7	99.4	100.1	100.9	101.7	102.5	103.1
6.0	95.3	97.0	98.7	99.4	100.1	100.8	101.6	102.4	103.2	103.7
10.0	96.0	97.7	99.3	100.1	100.8	101.5	102.2	103.1	103.9	104.4
14.0	96.6	98.4	100.0	100.7	101.4	102.2	102.9	103.8	104.6	105.1
18.0	97.3	99.0	100.7	101.4	102.1	102.9	103.6	104.4	105.3	105.0
22.0	97.9	99.7	101.3	102.1	102.8	103.5	104.3	104.2	104.0	104.0
26.0	98.6	100.3	102.0	102.7	103.4	103.3	103.1	103.0	103.1	103.0
30.0	99.2	101.0	102.7	102.6	102.3	102.2	102.2	102.3	102.1	101.9
34.0	99.8	101.1	101.8	101.6	101.4	101.4	101.3	101.2	101.0	100.7
38.0	100.0	100.8	101.0	100.8	100.6	100.5	100.3	100.2	99.9	99.6
42.0	100.2	100.4	100.1	99.9	99.7	99.5	99.3	99.4	99.1	
46.0	99.5	99.2	99.0	98.8	98.5	OAT < ISA + 15 OAT ≥ ISA + 15				
50.0	98.3	98.1	97.9	97.6	97.4					
54.0	97.3	97.1	96.8							

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CF6-80E1A4	N1 CORRECTIONS FOR AIR BLEED						OAT < ISA + 15		OAT ≥ ISA + 15		
D24	DERATED TO N1 NO AIR BLEED MACH = .000						AIR CONDITIONING ON		-8		
ENGINE ANTI-ICE ON							0.0		-6		
ENGINE ANTI-ICE AND WING ANTI-ICE ON							0.0		-1.0		
OAT (°C)	PRESSURE ALTITUDE (FT)										
	-2000.	-1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	
-54.0	83.4	84.9	86.5	87.2	87.9	88.7	89.4	90.3	91.0	91.6	
-50.0	84.1	85.7	87.2	88.0	88.7	89.5	90.2	91.0	91.8	92.4	
-46.0	84.9	86.4	88.0	88.7	89.5	90.2	91.0	91.8	92.6	93.1	
-42.0	85.6	87.2	88.8	89.5	90.2	91.0	91.7	92.5	93.3	93.9	
-38.0	86.3	87.9	89.5	90.2	90.9	91.7	92.4	93.2	94.0	94.6	
-34.0	87.0	88.6	90.2	91.0	91.7	92.4	93.2	94.0	94.8	95.3	
-30.0	87.7	89.4	91.0	91.7	92.4	93.1	93.9	94.7	95.5	96.0	
-26.0	88.5	90.1	91.7	92.4	93.1	93.9	94.6	95.4	96.2	96.7	
-22.0	89.1	90.8	92.4	93.1	93.8	94.6	95.3	96.1	96.9	97.4	
-18.0	89.8	91.5	93.1	93.8	94.5	95.3	96.0	96.8	97.6	98.1	
-14.0	90.5	92.2	93.8	94.5	95.2	96.0	96.7	97.5	98.3	98.8	
-10.0	91.2	92.9	94.5	95.2	95.9	96.6	97.4	98.2	99.0	99.5	
-6.0	91.9	93.6	95.2	95.9	96.6	97.3	98.0	98.9	99.7	100.2	
-2.0	92.6	94.2	95.9	96.6	97.3	98.0	98.7	99.6	100.4	100.9	
2.0	93.2	94.9	96.6	97.3	98.0	98.7	99.4	100.3	101.1	101.6	
6.0	93.9	95.6	97.2	97.9	98.6	99.4	100.1	100.9	101.8	102.3	
10.0	94.5	96.2	97.9	98.6	99.3	100.1	100.8	101.6	102.4	103.0	
14.0	95.2	96.9	98.6	99.3	100.0	100.7	101.5	102.3	103.1	103.7	
18.0	95.8	97.6	99.2	100.0	100.7	101.4	102.2	103.0	103.8	103.6	
22.0	96.5	98.2	99.9	100.6	101.3	102.1	102.8	102.7	102.6	102.6	
26.0	97.1	98.9	100.5	101.3	102.0	101.9	101.6	101.6	101.6	101.6	
30.0	97.7	99.5	101.2	101.1	100.9	100.8	100.8	100.8	100.6	100.4	
34.0	98.4	99.6	100.3	100.2	99.9	99.9	99.9	99.7	99.5	99.2	
38.0	98.5	99.3	99.5	99.3	99.1	99.0	98.8	98.7	98.4	98.1	
42.0	98.7	98.9	98.6	98.4	98.2	98.0	97.8	97.9	97.6		
46.0	98.0	97.7	97.5	97.3	97.0	OAT < ISA + 15 OAT ≥ ISA + 15					
50.0	96.7	96.6	96.4	96.1	95.9						
54.0	95.8	95.5	95.2								

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

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.

- R *Note : 1. Quick reference tables are established at V1 min (minimum V1 in the V1 range) with air conditioning OFF and anti ice OFF*
2. Do not use quick reference tables in case of tailwind.

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 corrected 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 a 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	12	12	13	13	14	14
	per percent uphill slope subtract (meters)	130	160	200	250	300	350	420	480	520
Effect of runway slope	per percent downhill slope add (meters)	50	58	66	75	83	92	100	108	120

EXAMPLE

Pressure altitude : 1400 ft
 Temperature : 30°C
 Runway length : 3750 m
 Wind : 10 kt head
 Slope : 1 % up
 Takeoff configuration : 1 + F

– **Determination of corrected runway length**

R

(Refer to 2.02.30 p2.)

runway length	.....	3750 m
correction for wind	.....	$10 \times 14 = + 140$ m
correction for slope	.....	$- 480$ m
corrected runway length	.....	<u>3410 m</u>

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

R

(Refer to 2.02.30 p6.)

- Pressure altitude: 1400 ft – Use the table for 2000 ft.
- Enter the column corresponding to 3250 m.
- Read the maximum takeoff weight on the line corresponding to the temperature of

R

30°C: 212 000 kg

V1 = 149 kt, VR = 151 kt, V2 = 156 kt

– **Determination of a precise flexible temperature for the actual takeoff weight of 199 000 kg :**

R

(Refer to 2.02.30 p5 and 6.)

- Interpolate the temperature corresponding to 199 000 kg for the runway length of 3410m at 1000 ft and 2000 ft pressure altitude.

Results:

1 000 ft: 45°C, V1 = 152 kt, VR = 153 kt, V2 = 157 kt

2 000 ft: 41°C, V1 = 150 kt, VR = 152 kt, V2 = 156 kt

R

- Interpolate between these two values to get the flexible temperature.

1 400 ft: 44°C, V1 = 151 kt, VR = 153 kt, V2 = 157 kt

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EXAMPLE

Pressure altitude : 1400 ft
Temperature : 30°C
Runway length : 3750 m
Wind : 10 kt head
Slope : 1 % up
Takeoff configuration : 1 + F

– **Determination of corrected runway length**

(Refer to 2.02.30 p2.)
runway length 3750 m
correction for wind 10 × + 14 = + 140 m
correction for slope– 480 m
corrected runway length 3410 m

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

(Refer to 2.02.30 p6.)
– Pressure altitude: 1400 ft – Use the table for 2000 ft.
– Enter the column corresponding to 3250 m.
– Read the maximum takeoff weight on the line corresponding to the temperature of
R 30°C: 224 000 kg
R V1 = 143 kt, VR = 147 kt, V2 = 155 kt

– **Determination of a precise flexible temperature for the actual takeoff weight of 200 000 kg :**

(Refer to 2.02.30 p5 and 6.)
– Interpolate the temperature corresponding to 200 000 kg for the runway length of 3410 m at 1000 ft and 2000 ft pressure altitude.
Results:
R 1000 ft: 53°C, V1 = 149 kt, VR = 150 kt, V2 = 156 kt
R 2000 ft: 49°C, V1 = 147 kt, VR = 149 kt, V2 = 154 kt
– Interpolate between these two values to get the flexible temperature.
R 1400 ft: 51°C, V1 = 148 kt, VR = 150 kt, V2 = 155 kt

202.8 3/6
152/57/62

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.30	P 5
	QUICK REFERENCE TABLES		SEQ 110	REV 06

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	228.2 3/2	231.2 6/2	232.7 2/6	234.1 3/2	235.3 3/2
	158/59/64	160/63/68	159/65/70	159/67/72	158/69/73
-10	226.3 2/3	229.0 2/6	230.7 6/2	232.2 2/6	233.5 3/2
	156/57/62	157/60/65	156/62/67	156/64/69	155/66/71
0	224.3 6/3	226.9 2/6	228.6 2/6	230.2 3/6	231.7 2/6
	153/54/60	154/58/63	154/60/65	153/62/67	152/64/69
10	222.1 6/3	224.7 6/2	226.5 2/6	228.2 2/6	229.7 3/6
	151/52/58	152/56/61	151/58/63	151/60/65	150/62/67
20	220.0 3/6	222.6 6/2	224.5 6/2	226.2 2/6	227.8 2/6
	150/51/56	150/54/59	150/56/61	149/58/63	148/60/65
28	218.3 3/6	221.2 6/2	223.1 6/2	224.8 2/6	226.4 2/6
	148/49/55	149/53/58	149/55/60	148/57/62	147/59/64
30	215.9 3/6	219.0 6/2	220.7 6/2	222.4 2/6	224.0 2/6
	148/49/54	149/52/58	149/55/59	148/57/61	147/59/63
32	213.5 3/3	216.7 6/2	218.4 6/2	220.0 6/2	221.5 2/6
	147/48/54	149/52/57	149/54/59	148/56/61	148/58/63
34	211.0 3/3	214.5 6/2	216.1 6/2	217.6 6/2	219.0 2/6
	147/48/53	150/52/57	149/54/59	148/56/61	148/58/62
36	208.4 3/3	212.1 6/2	213.7 6/2	215.1 6/2	216.4 2/6
	147/47/53	150/52/57	149/54/59	149/56/60	148/58/62
38	205.8 3/3	209.7 6/3	211.2 6/2	212.6 6/3	213.8 2/6
	146/47/52	150/52/56	150/54/58	149/56/60	149/57/62
40	203.0 3/3	207.0 3/6	208.6 6/2	209.8 6/3	211.0 2/6
	146/46/51	150/51/56	150/54/58	150/55/60	149/57/61
42	200.1 3/3	204.0 3/6	205.8 6/2	207.0 6/2	208.1 6/2
	145/46/51	150/51/55	151/53/58	150/55/59	150/57/61
44	196.9 3/3	200.7 3/3	202.8 6/3	203.9 6/3	204.9 6/2
	145/45/50	150/50/55	152/53/58	151/55/59	151/57/61
46	193.6 3/3	197.1 3/3	199.7 3/6	200.7 6/3	201.6 6/3
	144/44/49	149/50/54	153/54/58	152/55/59	152/57/61
48	190.1 3/2	193.6 3/3	196.4 3/6	197.4 3/6	198.2 6/3
	144/44/49	149/49/53	153/54/58	153/56/59	153/57/61
50	186.4 3/3	190.1 3/2	192.8 3/6	194.3 3/6	195.0 3/6
	143/43/48	148/48/53	153/53/57	155/56/60	155/58/61
52	182.8 3/3	186.2 3/3	189.0 3/2	191.2 3/6	191.7 2/3
	142/42/47	148/48/52	153/53/56	157/57/61	157/59/62
54	179.8 3/2	182.8 3/3	185.7 3/2	187.7 3/3	189.0 3/2
	142/42/46	147/47/51	152/52/55	157/57/60	159/60/63
56	177.4 3/2	180.3 3/2	182.7 3/3	184.9 3/2	186.4 3/6
	141/41/45	146/46/50	151/51/55	156/56/59	160/60/63

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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	222.4 3/2 156/56/62	225.6 6/2 159/61/66	227.1 2/6 158/63/68	228.4 6/2 157/65/69	229.6 3/6 157/67/71
-10	220.4 2/3 153/54/60	223.5 2/6 156/58/63	225.1 6/2 155/60/65	226.5 2/6 154/62/67	227.9 3/6 154/64/69
0	218.4 3/6 151/52/58	221.4 2/6 153/56/61	223.1 2/6 152/58/63	224.6 6/2 152/60/65	226.1 2/6 151/62/67
10	216.3 3/6 149/50/56	219.3 2/6 151/54/59	221.0 2/6 150/56/61	222.7 2/6 150/58/63	224.2 3/6 149/60/65
20	214.2 3/3 148/48/54	217.3 6/2 149/52/57	219.1 2/6 149/54/59	220.8 2/6 148/56/61	222.3 2/6 147/58/63
26	213.0 3/3 147/48/53	216.3 6/2 148/51/56	218.1 6/2 148/53/58	219.8 2/6 147/55/60	221.3 2/6 147/57/62
28	210.8 3/3 146/47/52	214.2 6/2 149/51/56	216.0 6/2 148/53/58	217.6 2/6 147/55/60	219.1 2/6 147/57/62
30	208.3 3/3 146/46/52	212.0 6/3 149/51/56	213.6 6/2 148/53/58	215.1 2/6 147/55/59	216.6 2/6 147/57/61
32	205.9 3/3 145/46/51	209.7 6/3 149/51/55	211.3 6/2 148/53/57	212.8 2/6 148/54/59	214.2 2/6 147/56/61
34	203.5 3/3 145/45/51	207.6 3/6 149/50/55	209.1 6/2 149/52/57	210.5 2/6 148/54/59	211.8 2/6 148/56/60
36	200.9 3/3 144/45/50	205.0 3/6 149/50/55	206.7 6/2 149/52/57	208.0 2/6 149/54/59	209.2 2/6 148/56/60
38	198.4 3/3 144/44/49	202.3 3/6 149/49/54	204.2 6/3 150/52/57	205.5 6/2 149/54/58	206.6 2/6 149/56/60
40	195.7 3/3 144/44/49	199.5 3/6 148/49/53	201.7 6/3 150/52/56	202.8 6/2 150/54/58	203.9 2/3 149/56/60
42	192.7 3/3 143/43/48	196.3 3/3 148/48/53	198.9 3/6 151/52/56	199.9 6/2 150/54/58	200.9 2/6 150/56/59
44	189.4 3/3 143/43/48	192.9 3/3 147/48/52	195.9 3/6 152/52/56	196.8 3/6 151/54/58	197.7 2/3 151/56/59
46	185.9 3/2 142/42/47	189.5 3/3 147/47/51	192.4 3/6 152/52/56	193.7 3/6 153/54/58	194.5 3/2 152/56/59
48	182.6 3/2 141/41/46	186.2 3/2 146/46/51	189.0 3/3 151/51/55	190.7 3/6 154/55/58	191.4 3/2 154/56/60
50	178.9 3/3 141/41/45	182.6 3/3 146/46/50	185.5 3/2 151/51/54	187.7 3/3 155/55/59	188.4 3/2 155/57/60
52	176.3 3/2 140/40/44	179.3 3/3 145/45/49	182.2 3/2 150/50/53	184.4 3/2 155/55/58	185.7 3/2 157/58/61
54	173.7 3/2 139/39/43	176.9 3/2 144/44/48	179.3 3/3 149/49/53	181.5 3/2 154/54/57	183.1 3/6 158/58/61

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	QUICK REFERENCE TABLES		SEQ 115	REV 13

R

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	243.0 3/6 153/56/64	245.4 3/6 152/59/67	247.6 3/6 152/61/69	249.6 3/6 151/64/71	251.6 3/6 150/66/73
-10	240.5 3/6 151/54/62	243.1 3/6 150/57/65	245.4 3/6 149/59/67	247.5 3/6 148/62/69	249.5 3/6 148/64/71
0	238.1 3/6 149/52/60	240.7 3/6 148/54/62	243.1 3/6 147/57/65	245.3 3/6 146/59/67	247.4 3/6 146/62/69
10	235.6 3/6 146/50/58	238.2 3/6 146/52/60	240.7 3/6 145/55/63	243.0 3/6 144/57/65	245.1 3/6 143/60/67
20	232.4 3/6 145/48/56	235.6 3/6 144/50/58	238.2 3/6 143/53/61	240.5 3/6 142/55/63	242.7 3/6 141/58/65
28	229.7 3/6 143/47/55	233.7 3/6 142/49/57	236.3 3/6 141/51/59	238.6 3/6 141/54/61	240.9 3/6 140/56/64
30	227.9 3/6 144/47/55	231.4 3/6 143/49/56	233.9 3/6 142/51/59	236.2 3/6 141/54/61	238.4 3/6 140/56/63
32	226.0 3/6 144/47/54	229.0 3/6 143/49/56	231.4 3/6 142/51/58	233.6 3/6 142/53/61	235.7 3/6 141/56/63
34	224.0 3/6 144/46/54	226.5 3/6 143/49/56	228.8 3/6 143/51/58	231.0 3/6 142/53/60	232.9 3/6 141/56/63
36	221.5 3/6 144/46/53	224.1 3/6 144/49/56	226.3 3/6 143/51/58	228.3 3/6 143/53/60	230.3 3/6 142/55/62
38	218.6 2/3 144/45/53	221.6 3/6 145/49/56	223.7 3/6 144/51/58	225.6 3/6 143/53/60	227.5 3/6 143/55/62
40	216.0 2/3 144/45/52	219.3 3/6 145/48/55	221.3 3/6 144/51/58	223.2 3/6 144/53/60	225.0 3/6 143/55/62
42	213.3 2/3 144/45/51	216.9 3/6 146/48/55	218.8 3/6 145/51/57	220.7 3/6 144/53/59	222.3 3/6 144/55/61
44	210.1 2/3 143/44/51	214.1 3/6 146/49/55	215.9 3/6 146/51/57	217.7 3/6 145/53/59	219.2 3/6 144/55/61
46	206.7 2/3 143/44/50	211.0 3/6 147/49/55	212.8 3/6 147/51/57	214.3 3/6 146/53/59	215.8 3/6 145/55/61
48	203.3 2/3 143/43/50	207.5 2/3 147/48/54	209.6 3/6 147/51/57	211.0 3/6 147/53/59	212.4 3/6 146/55/61
50	199.5 2/3 143/43/49	203.6 2/3 147/48/54	206.1 3/6 149/51/57	207.4 3/6 148/53/59	208.6 3/6 148/55/61
52	195.8 2/3 142/42/48	199.7 2/3 147/47/53	202.6 3/6 150/52/57	203.8 3/6 149/53/59	204.9 3/6 149/55/61
54	192.6 2/3 142/42/48	196.5 2/3 146/47/53	199.6 3/6 150/52/57	200.9 3/6 150/54/59	201.8 3/6 150/55/61
56	190.2 2/3 141/41/47	194.0 2/3 146/47/52	197.1 2/3 150/51/57	198.5 3/6 151/54/59	199.4 3/6 150/55/61

R

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	237.3 3/6 152/55/63	239.7 3/6 151/57/65	241.8 3/6 151/60/67	243.8 3/6 150/62/69	245.6 3/6 150/64/71
-10	234.9 3/6 150/52/60	237.3 3/6 149/55/63	239.6 3/6 148/57/65	241.7 3/6 148/60/67	243.6 3/6 147/62/69
0	232.5 3/6 148/50/58	235.0 3/6 147/53/60	237.3 3/6 146/55/63	239.5 3/6 145/58/65	241.5 3/6 145/60/67
10	230.0 3/6 146/48/56	232.5 3/6 145/51/58	234.9 3/6 144/53/61	237.1 3/6 143/56/63	239.2 3/6 143/58/65
20	226.8 3/6 144/47/54	230.0 3/6 143/49/56	232.5 3/6 142/51/59	234.8 3/6 141/54/61	236.8 3/6 141/56/63
26	224.8 3/6 143/46/54	228.6 3/6 142/48/55	231.1 3/6 141/50/58	233.4 3/6 140/52/60	235.5 3/6 139/55/62
28	223.0 3/6 143/46/53	226.3 3/6 142/47/55	228.7 3/6 141/50/57	230.9 3/6 141/52/59	233.0 3/6 140/54/62
30	221.2 3/6 143/45/53	224.0 3/6 143/47/55	226.3 3/6 142/50/57	228.5 3/6 141/52/59	230.5 3/6 140/54/61
32	218.7 3/6 143/44/52	221.6 3/6 143/47/54	223.8 3/6 142/50/57	225.9 3/6 142/52/59	227.8 3/6 141/54/61
34	216.0 2/3 143/44/51	219.1 3/6 144/47/54	221.2 3/6 143/50/57	223.2 3/6 142/52/59	225.0 3/6 142/54/61
36	213.1 2/3 143/44/51	216.6 3/6 144/47/54	218.6 3/6 143/50/56	220.4 3/6 143/52/58	222.2 3/6 142/54/60
38	210.8 2/3 142/43/50	214.6 3/6 144/47/54	216.5 3/6 144/49/56	218.3 3/6 143/52/58	220.0 3/6 143/54/60
40	208.5 2/3 142/43/50	212.5 3/6 145/47/54	214.3 3/6 144/49/56	216.1 3/6 144/51/58	217.7 3/6 143/53/60
42	205.7 2/3 142/42/49	210.0 3/6 146/47/54	211.7 3/6 145/49/56	213.4 3/6 144/51/58	215.0 3/6 144/53/60
44	202.4 2/3 142/42/48	206.7 3/6 146/47/53	208.7 3/6 146/49/56	210.2 3/6 145/51/58	211.6 3/6 145/53/59
46	199.0 2/3 141/41/48	203.2 2/3 145/46/53	205.6 3/6 147/50/56	207.0 3/6 146/52/57	208.3 3/6 146/53/59
48	195.3 2/3 141/41/47	199.4 2/3 145/46/52	202.2 3/6 148/50/56	203.5 3/6 147/52/57	204.7 3/6 147/54/59
50	191.6 2/3 140/40/46	195.7 2/3 145/46/51	198.9 3/6 149/50/56	200.1 3/6 148/52/57	201.2 3/6 148/54/59
52	188.5 2/3 140/40/45	192.6 2/3 145/45/51	195.8 2/3 149/50/55	197.3 3/6 149/52/58	198.2 3/6 149/54/59
54	186.2 2/3 139/39/45	190.2 2/3 144/45/50	193.3 2/3 148/49/55	195.0 3/6 150/52/58	195.9 3/6 149/54/59

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	223.0 3/2	228.0 3/2	231.9 3/2	234.4 3/6	235.0 3/6
	148/49/55	154/56/61	160/62/67	165/68/72	165/70/73
-10	221.1 3/2	226.3 2/3	230.4 2/3	232.9 3/6	233.7 3/6
	146/47/53	152/54/59	158/60/64	162/65/69	161/67/70
0	219.1 3/2	224.5 3/2	228.8 2/3	231.3 6/2	232.3 3/6
	144/45/51	150/52/57	155/58/62	159/62/66	158/64/68
10	217.0 3/2	222.5 3/2	227.0 2/3	229.5 3/6	230.6 3/2
	142/43/49	148/50/55	153/56/60	156/60/64	155/62/66
20	214.8 3/3	220.4 3/2	225.0 2/3	227.7 6/3	228.9 3/6
	140/42/47	146/48/53	151/54/58	154/58/62	153/59/64
30	212.6 3/3	218.3 3/2	223.1 2/3	226.0 6/2	227.3 6/3
	139/40/46	144/46/51	150/52/57	152/56/60	152/58/62
32	210.3 3/3	215.9 3/2	220.6 2/3	223.7 6/2	224.9 3/6
	138/40/45	144/46/51	149/51/56	153/56/60	152/58/62
34	208.0 3/3	213.5 3/2	218.0 2/3	221.3 6/2	222.5 3/6
	138/39/45	144/45/50	149/51/55	153/56/60	152/58/62
36	205.5 3/2	210.9 3/2	215.3 2/3	218.9 6/2	219.9 6/2
	138/39/44	143/45/50	148/50/55	153/56/60	153/57/61
38	203.1 3/2	208.3 3/2	212.7 2/3	216.1 6/2	217.4 3/6
	137/38/44	143/44/49	148/50/54	153/55/59	153/57/61
40	200.6 3/2	205.7 3/2	210.0 2/3	213.4 6/2	214.8 3/6
	137/38/43	142/44/48	147/49/54	152/54/58	153/57/61
42	197.7 3/2	202.8 3/3	206.9 3/2	210.2 2/3	211.8 2/3
	136/37/43	142/43/48	147/49/53	152/54/58	154/57/61
44	194.8 3/2	199.7 3/3	203.7 3/2	206.9 2/3	208.7 3/2
	136/37/42	141/43/47	146/48/52	151/53/57	155/57/61
46	191.7 3/2	196.5 3/3	200.3 2/3	203.3 2/3	205.4 2/6
	135/36/41	141/42/46	146/47/51	151/53/56	156/58/61
48	188.6 3/2	193.2 3/3	196.9 3/2	199.7 2/3	201.5 2/6
	135/36/41	140/42/46	146/47/51	151/52/55	155/57/60
50	185.4 3/2	189.8 3/3	193.3 3/2	195.9 2/3	197.5 2/3
	135/35/40	140/41/45	145/46/50	150/51/55	155/56/59
52	182.3 3/2	186.5 3/3	189.7 3/2	192.0 3/2	193.2 2/3
	134/35/39	140/41/44	145/46/49	150/51/54	155/56/59
54	179.1 3/2	183.1 3/3	186.1 3/3	188.1 2/3	188.8 2/3
	134/35/39	139/40/44	145/45/49	150/50/53	154/55/58
56	176.4 3/2	180.2 3/3	183.0 3/2	184.6 3/2	184.9 2/3
	134/34/38	139/40/43	144/45/48	149/50/53	153/54/56
58	174.3 3/2	177.8 3/3	180.3 3/2	181.6 3/2	181.7 2/3
	134/34/38	139/40/43	144/45/48	149/50/53	150/52/55

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A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 7	
		SEQ 115	REV 13

R

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	238.5 2/3 146/48/56	244.8 2/3 151/54/62	249.4 3/6 155/59/66	251.5 3/6 154/62/69	253.3 3/6 154/64/71
-10	236.1 2/3 144/46/54	242.5 2/3 149/52/59	247.2 3/6 153/57/64	249.3 3/6 152/59/66	251.3 3/6 151/62/69
0	233.6 2/3 142/44/52	240.1 2/3 147/50/57	245.0 3/6 150/55/62	247.1 3/6 150/57/64	249.1 3/6 149/60/66
10	231.0 2/3 141/42/50	237.7 2/3 145/48/56	242.5 3/6 148/53/60	244.9 3/6 147/55/62	246.9 3/6 147/58/64
20	228.3 2/3 139/40/48	235.1 2/3 143/46/54	239.9 3/6 146/51/58	242.3 3/6 145/53/60	244.5 3/6 145/55/62
30	225.7 2/3 137/38/46	232.5 2/3 142/44/52	237.4 3/6 144/49/56	239.9 3/6 143/51/58	242.2 3/6 143/54/60
32	223.2 2/3 137/38/46	229.9 2/3 141/44/51	235.0 3/6 145/49/56	237.4 3/6 144/51/58	239.6 3/6 143/53/60
34	220.6 2/3 137/37/45	227.3 2/3 141/43/51	232.5 3/6 145/49/56	234.8 3/6 144/51/58	237.0 3/6 144/53/60
36	218.0 2/3 137/37/45	224.6 2/3 141/43/50	230.1 3/6 145/49/55	232.4 3/6 145/51/58	234.4 3/6 144/53/60
38	215.5 2/3 136/37/44	222.0 2/3 141/43/50	227.3 2/3 145/48/55	229.9 3/6 145/51/58	231.8 3/6 145/53/60
40	212.8 2/3 136/36/44	219.2 2/3 141/42/49	224.5 2/3 145/48/54	227.3 3/6 146/51/57	229.1 3/6 145/53/59
42	210.1 2/3 136/36/43	216.3 2/3 140/42/49	221.6 2/3 145/47/54	224.6 3/6 147/51/57	226.3 3/6 146/53/59
44	207.1 2/3 136/36/42	213.1 2/3 140/41/48	218.2 2/3 144/47/53	221.6 3/6 147/51/57	223.2 3/6 147/53/59
46	203.8 2/3 135/35/42	209.8 2/3 140/41/48	214.7 2/3 144/46/53	218.5 3/6 148/51/57	220.0 3/6 148/53/59
48	200.5 2/3 135/35/41	206.5 2/3 140/41/47	211.1 2/3 144/46/52	214.9 3/6 148/51/57	216.6 3/6 149/54/59
50	197.2 2/3 134/34/40	203.2 2/3 139/40/46	207.5 2/3 144/46/52	211.2 2/3 148/51/56	213.1 3/6 150/54/59
52	193.5 2/3 133/33/39	199.4 2/3 139/40/46	203.5 2/3 144/45/51	207.0 2/3 148/50/56	209.1 3/6 151/54/60
54	189.9 2/3 133/33/39	195.7 2/3 139/39/45	199.6 2/3 143/45/50	202.6 2/3 148/50/55	204.9 3/6 152/55/60
56	186.9 2/3 132/32/38	192.5 2/3 139/39/45	196.3 2/3 143/44/50	199.1 2/3 148/50/55	201.3 2/3 152/54/59
58	184.6 2/3 132/32/37	190.1 2/3 138/39/44	193.8 2/3 143/44/49	196.4 2/3 147/49/54	198.3 2/3 152/54/59

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.30	P 9
	QUICK REFERENCE TABLES		SEQ 110	REV 06

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	211.7 3/3 144/45/50	216.6 3/3 150/51/56	220.5 3/3 155/58/62	223.3 3/6 161/63/67	224.3 3/6 162/66/69
-10	209.8 3/3 142/43/48	214.9 3/3 148/49/54	219.0 2/3 153/55/59	222.1 3/6 158/61/65	223.0 3/6 159/63/66
0	207.9 3/3 140/41/47	213.1 3/2 146/47/52	217.3 3/3 151/53/57	220.7 3/6 156/58/62	221.6 3/6 156/60/64
10	205.8 3/3 138/39/45	211.1 3/3 144/45/50	215.5 3/3 149/51/55	218.9 3/2 154/56/60	219.9 3/6 153/58/62
20	203.7 3/3 137/37/43	209.2 3/2 142/43/48	213.7 3/3 147/49/54	217.2 3/6 152/54/58	218.3 3/2 151/56/60
26	202.5 3/3 136/37/42	208.0 3/2 141/42/47	212.6 2/3 146/48/53	216.3 3/6 151/53/57	217.5 3/2 150/55/59
28	200.4 3/3 135/36/42	205.7 3/2 141/42/47	210.3 2/3 146/48/52	214.0 6/3 151/53/57	215.3 3/2 151/55/59
30	198.0 3/3 135/36/41	203.3 3/3 140/42/46	207.7 2/3 145/47/51	211.3 3/6 150/52/56	212.8 3/6 151/55/58
32	195.7 3/3 134/35/41	200.9 3/3 140/41/46	205.3 2/3 145/47/51	208.8 6/3 150/52/56	210.5 3/6 151/55/58
34	193.5 3/3 134/35/40	198.6 3/3 139/41/45	202.8 3/2 144/46/50	206.2 3/3 149/51/55	208.2 3/2 152/55/58
36	191.1 3/3 134/34/40	196.1 3/3 139/40/45	200.2 3/2 144/46/50	203.5 3/3 149/51/54	205.7 3/2 152/55/58
38	188.7 3/3 133/34/39	193.6 3/3 138/40/44	197.6 3/3 143/45/49	200.8 3/2 148/50/54	203.1 2/3 153/55/58
40	186.3 3/3 133/34/38	191.0 3/3 138/39/44	194.9 3/3 143/44/48	198.0 3/2 148/49/53	200.3 2/3 153/54/57
42	183.5 3/3 132/33/38	188.1 3/3 138/39/43	191.9 3/3 143/44/48	194.9 3/2 147/49/52	197.0 3/2 152/54/57
44	180.6 3/2 132/33/37	185.0 3/3 137/38/42	188.7 3/2 142/43/47	191.5 3/2 147/48/52	193.4 2/3 152/53/56
46	177.6 3/2 132/32/37	181.9 3/3 137/38/42	185.4 3/3 142/43/46	188.0 3/2 147/48/51	189.7 2/3 151/53/55
48	174.8 3/2 131/32/36	178.9 3/3 136/37/41	182.2 3/2 141/42/46	184.7 3/2 146/47/50	186.1 2/3 151/52/55
50	172.0 3/2 131/31/35	175.9 3/3 136/36/40	179.0 3/3 141/42/45	181.2 3/2 146/47/49	182.3 2/3 151/51/54
52	169.5 3/2 131/31/35	173.2 3/3 136/36/40	176.1 3/3 141/41/44	178.1 3/2 146/46/49	178.8 2/3 150/51/53
54	167.4 3/2 131/31/34	171.0 3/3 136/36/39	173.7 3/3 141/41/44	175.3 3/2 145/46/49	175.7 2/3 149/50/52

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LEFT INTENTIONALLY BLANK

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 9	
		SEQ 115	REV 13

R

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	226.5 2/3 143/44/52	232.6 2/3 148/50/57	237.5 2/3 152/56/62	239.9 3/6 153/59/65	241.6 3/6 152/61/67
-10	224.1 2/3 141/42/49	230.3 2/3 146/48/55	235.5 3/6 150/54/60	237.8 3/6 150/56/63	239.7 3/6 150/58/65
0	221.6 2/3 139/40/47	228.0 2/3 144/46/53	233.4 3/6 148/51/58	235.7 3/6 148/54/61	237.6 3/6 147/56/63
10	219.1 2/3 137/38/45	225.7 2/3 142/44/51	231.1 3/6 146/49/56	233.4 3/6 146/52/59	235.3 3/6 145/54/61
20	216.6 2/3 136/36/44	223.2 2/3 140/42/49	228.7 3/6 144/47/54	231.0 3/6 144/50/57	233.1 3/6 143/52/59
26	215.2 2/3 135/35/43	221.8 2/3 139/41/48	227.3 3/6 143/46/53	229.6 3/6 142/49/56	231.8 3/6 142/51/58
28	212.7 2/3 134/35/42	219.2 2/3 139/41/48	224.8 3/6 143/46/53	227.3 3/6 143/49/55	229.4 3/6 142/51/57
30	210.2 2/3 134/34/41	216.7 2/3 138/40/47	222.1 2/3 143/46/52	224.9 3/6 143/49/55	226.9 3/6 143/51/57
32	207.6 2/3 134/34/41	214.0 2/3 138/40/47	219.3 2/3 142/45/52	222.4 3/6 144/48/55	224.2 3/6 143/51/57
34	204.9 3/3 134/34/41	211.2 2/3 138/39/46	216.4 2/3 142/45/51	219.8 3/6 144/49/55	221.5 3/6 144/51/57
36	202.1 3/3 133/33/40	208.4 2/3 138/39/45	213.5 2/3 142/44/51	217.2 3/6 145/49/55	218.8 3/6 144/51/57
38	199.9 2/3 132/32/39	206.2 2/3 137/39/45	211.2 2/3 142/44/50	215.1 3/6 145/49/55	216.6 3/6 145/51/56
40	197.7 2/3 132/32/39	204.0 2/3 137/38/44	208.8 2/3 141/43/50	212.7 3/6 146/48/54	214.4 3/6 145/51/56
42	195.0 3/3 132/32/38	201.3 2/3 137/38/44	206.0 2/3 141/43/49	209.7 2/3 145/48/54	211.7 3/6 146/51/56
44	191.7 2/3 131/31/37	198.0 2/3 137/37/43	202.6 2/3 141/43/48	206.2 2/3 145/47/53	208.5 3/6 147/51/56
46	188.5 2/3 130/30/36	194.7 2/3 136/37/43	199.1 2/3 141/42/48	202.6 2/3 145/47/52	205.2 3/6 148/51/56
48	185.1 2/3 130/30/35	191.2 2/3 136/36/42	195.4 2/3 140/42/47	198.8 2/3 145/47/52	201.3 3/6 149/51/56
50	181.7 2/3 129/29/35	187.8 2/3 136/36/41	191.7 2/3 140/41/47	194.9 2/3 144/46/51	197.2 2/3 149/51/56
52	179.0 2/3 128/28/34	184.9 2/3 136/36/41	188.7 2/3 140/41/46	191.7 2/3 144/46/51	193.9 2/3 148/51/55
54	176.8 2/3 128/28/33	182.7 2/3 135/35/40	186.4 2/3 140/41/45	189.2 2/3 144/46/50	191.3 2/3 148/50/55

LEFT INTENTIONALLY BLANK

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 11	
		SEQ 110	REV 06

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	207.9 3/3 137/37/43	214.2 3/2 144/46/50	218.7 2/3 151/53/57	221.6 2/3 157/60/63	223.1 3/2 164/67/70
-10	205.9 3/2 135/35/41	212.4 3/2 142/43/48	217.2 3/2 148/51/55	220.6 2/3 155/58/61	222.5 2/3 161/64/67
0	203.9 3/2 133/33/39	210.6 3/2 139/41/46	215.7 3/2 146/49/53	219.4 2/3 152/55/59	221.7 2/3 159/62/65
10	201.6 3/2 131/31/37	208.6 3/2 138/39/44	213.9 3/2 144/46/51	217.9 2/3 150/53/57	220.6 3/2 156/60/63
20	198.8 3/9 129/29/35	206.5 2/3 136/37/42	212.0 3/2 142/44/49	216.2 3/3 148/51/55	219.2 3/2 154/58/61
30	195.9 3/9 128/28/34	204.5 3/2 134/35/40	210.2 3/2 140/42/47	214.6 3/3 146/49/53	217.9 3/2 152/55/59
32	194.1 3/9 128/28/34	202.3 3/2 134/35/40	207.8 3/2 140/42/46	212.2 3/2 146/49/52	215.3 3/2 152/55/58
34	* 192.3 3/9 * 127/27/33	200.1 3/2 134/34/40	205.5 3/2 140/42/46	209.7 2/3 146/48/52	212.8 2/3 151/54/57
36	* 190.4 3/9 * 126/26/32	197.7 3/2 133/34/39	203.0 3/2 139/41/45	207.1 2/3 145/48/51	210.1 2/3 151/54/57
38	* 188.4 3/9 * 126/26/32	195.3 3/2 133/34/39	200.5 3/2 139/41/45	204.5 3/2 145/47/51	207.4 2/3 150/53/56
40	* 186.3 3/2 * 126/26/31	192.9 3/2 132/33/38	198.0 2/3 138/40/44	201.9 2/3 144/47/50	204.7 3/2 150/53/56
42	* 183.9 3/3 * 126/26/31	190.2 3/2 132/33/38	195.1 3/2 138/40/44	198.9 3/2 144/46/49	201.5 2/3 150/52/55
44	* 181.3 3/3 * 125/25/31	187.4 3/2 132/33/37	192.2 3/2 137/39/43	195.7 3/2 143/45/49	198.1 3/2 149/51/54
46	* 178.5 3/2 * 125/25/30	184.4 3/2 131/32/37	189.0 3/2 137/39/42	192.4 3/2 143/45/48	194.5 2/3 149/51/53
48	* 175.6 3/2 * 125/25/30	181.3 3/2 131/32/36	185.7 3/2 137/38/42	188.9 3/2 143/44/47	190.6 2/3 148/50/53
50	* 172.1 3/3 * 125/25/30	178.2 3/2 130/31/35	182.4 3/2 136/38/41	185.3 2/3 142/44/47	186.6 2/3 148/50/52
52	* 168.3 3/3 * 125/25/30	175.1 3/2 130/31/35	179.1 3/2 136/37/41	181.6 2/3 142/44/46	182.3 2/3 146/48/50
54	* 164.6 3/3 * 125/25/30	172.0 3/2 130/31/34	175.7 3/2 136/37/40	177.8 2/3 142/43/46	178.1 2/3 145/47/49
56	* 161.5 3/3 * 125/26/30	169.4 3/2 130/30/34	172.8 3/2 136/37/40	174.4 2/3 142/43/45	174.5 2/3 142/45/47
58	* 159.0 3/3 * 125/26/30	167.3 3/2 130/30/34	170.4 3/2 136/37/39	171.6 2/3 141/43/45	171.5 2/3 139/43/46

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A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 11	
		SEQ 115	REV 13

R

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	221.6 3/3 137/37/46	230.5 2/3 142/44/52	236.3 2/3 148/51/59	240.7 2/3 153/58/65	244.1 3/6 159/64/70
-10	218.8 3/3 135/35/44	228.3 2/3 140/42/50	234.4 2/3 145/49/56	239.1 2/3 151/55/62	242.7 3/6 156/61/68
0	216.1 3/3 133/33/42	226.1 2/3 138/39/48	232.5 2/3 143/47/54	237.4 2/3 149/53/60	241.2 3/6 154/59/66
10	213.2 3/3 132/32/41	223.6 2/3 136/37/46	230.3 2/3 141/45/52	235.3 2/3 147/51/58	239.4 3/6 151/57/64
20	210.3 3/3 130/30/39	221.1 2/3 135/35/44	227.9 2/3 140/43/50	233.2 2/3 145/49/56	237.3 3/6 149/55/61
30	207.6 3/3 129/29/38	218.6 2/3 133/33/42	225.6 2/3 138/41/48	231.1 2/3 143/47/54	235.2 3/6 147/52/59
32	205.3 3/3 128/28/37	216.2 2/3 133/33/41	223.1 2/3 138/40/48	228.4 2/3 143/47/54	232.6 3/6 147/52/59
34	202.9 3/3 128/28/37	213.5 2/3 133/33/41	220.3 2/3 138/40/48	225.4 2/3 142/46/53	229.7 3/6 147/52/59
36	200.6 3/3 128/28/37	211.1 2/3 132/32/41	217.7 2/3 137/40/47	222.7 2/3 142/46/53	226.8 2/3 147/52/58
38	198.2 3/3 126/26/35	208.5 2/3 132/32/40	215.0 2/3 137/39/47	219.9 2/3 142/46/52	223.8 2/3 147/51/58
40	195.8 3/3 126/26/35	206.0 2/3 132/32/40	212.2 2/3 137/39/46	217.0 2/3 142/45/52	220.8 2/3 147/51/57
42	193.3 3/3 126/26/34	203.4 2/3 132/32/39	209.4 2/3 137/39/46	214.0 2/3 142/45/52	217.6 2/3 146/51/57
44	190.4 3/3 125/25/33	200.3 2/3 131/31/39	206.3 2/3 136/38/45	210.6 2/3 141/44/51	214.1 2/3 146/50/56
46	187.5 3/3 124/24/32	197.2 2/3 131/31/38	203.0 2/3 136/38/45	207.2 2/3 141/44/50	210.3 2/3 146/50/56
48	184.6 3/3 124/24/32	194.0 2/3 130/30/38	199.7 2/3 136/37/44	203.7 2/3 141/44/50	206.7 2/3 146/49/55
50	181.6 3/3 123/23/31	190.9 2/3 130/30/37	196.3 2/3 136/37/44	200.2 2/3 141/43/49	203.0 2/3 146/49/55
52	178.4 3/3 123/23/30	187.4 2/3 130/30/37	192.5 2/3 135/37/43	196.1 2/3 141/43/49	198.7 2/3 145/48/54
54	175.3 3/3 122/22/29	183.9 2/3 129/29/36	188.7 2/3 135/37/43	192.0 2/3 140/43/48	194.3 2/3 145/48/54
56	172.7 3/3 121/21/28	180.9 2/3 129/29/35	185.7 2/3 135/36/42	188.7 2/3 140/42/48	190.8 2/3 145/48/53
58	170.6 3/3 120/20/27	178.7 2/3 129/29/35	183.3 2/3 135/36/42	186.2 2/3 140/42/48	188.1 2/3 145/48/53

CONFIGURATION 3			PRESSURE ALTITUDE = 1000 FT		
TREF = 28 °C TMAX = 53 °C			DRY RUNWAY SLOPE = 0 %	MAX TO WEIGHT(1000KG) CODES IAS(KT) : V1 / VR / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2000	2250	2500	2750	3000
-20	215.5 3/3 135/35/44	224.7 2/3 140/42/50	230.4 2/3 146/49/56	234.8 2/3 151/56/62	238.2 2/3 157/62/68
-10	212.8 3/3 133/33/42	222.5 2/3 138/40/48	228.6 2/3 144/47/54	233.2 2/3 149/53/60	236.8 2/3 154/59/66
0	210.1 3/3 131/31/41	220.3 2/3 136/37/46	226.6 2/3 142/45/52	231.4 2/3 147/51/58	235.2 2/3 152/57/64
10	207.4 3/3 130/30/39	217.8 2/3 135/35/44	224.4 2/3 140/43/50	229.5 2/3 145/49/56	233.5 3/6 150/55/61
20	204.7 3/3 129/29/38	215.4 2/3 133/33/42	222.1 2/3 138/41/48	227.4 2/3 143/47/54	231.6 3/6 148/53/59
28	202.6 3/3 127/27/36	213.3 2/3 132/32/40	220.4 2/3 137/39/47	225.8 2/3 141/45/53	230.1 3/6 146/51/58
30	200.4 3/3 127/27/36	211.0 2/3 132/32/40	217.9 2/3 136/39/46	223.2 2/3 141/45/52	227.4 2/3 146/51/57
32	198.0 3/3 126/26/35	208.5 3/3 131/31/40	215.2 2/3 136/38/46	220.4 2/3 141/44/52	224.5 2/3 146/50/57
34	195.6 3/3 126/26/34	205.9 3/3 131/31/39	212.4 2/3 136/38/45	217.4 2/3 141/44/51	221.4 2/3 146/50/56
36	193.2 3/3 125/25/34	203.4 3/3 131/31/39	209.8 2/3 136/38/45	214.6 2/3 141/44/51	218.5 2/3 145/49/56
38	190.7 3/3 125/25/33	200.8 3/3 131/31/38	207.0 2/3 135/37/45	211.6 2/3 140/43/50	215.3 2/3 145/49/55
40	188.5 3/3 124/24/32	198.4 3/3 130/30/38	204.6 2/3 135/37/44	209.0 2/3 140/43/50	212.6 2/3 145/49/55
42	186.1 3/3 124/24/32	195.9 2/3 129/29/37	202.0 2/3 135/37/44	206.3 2/3 140/43/49	209.7 2/3 145/48/54
44	183.4 3/3 123/23/31	192.9 3/3 129/29/37	199.0 2/3 135/36/43	203.1 2/3 140/42/49	206.3 2/3 144/48/54
46	180.5 3/3 122/22/30	189.8 2/3 129/29/36	195.7 2/3 134/36/43	199.6 2/3 139/42/48	202.7 2/3 144/47/53
48	177.5 3/3 122/22/29	186.6 2/3 128/28/35	192.3 2/3 134/35/42	196.1 2/3 139/42/48	199.0 2/3 144/47/53
50	174.4 3/3 121/21/28	183.3 2/3 128/28/34	188.6 2/3 134/35/42	192.2 2/3 139/41/47	194.9 2/3 144/47/52
52	171.4 3/3 120/20/27	179.9 2/3 127/27/34	185.0 2/3 134/35/41	188.3 2/3 139/41/47	190.7 2/3 144/46/52
54	168.9 3/3 120/20/26	177.2 2/3 127/27/33	182.0 2/3 133/35/41	185.2 2/3 138/41/46	187.3 2/3 143/46/51
56	166.9 3/3 119/19/25	175.0 2/3 127/27/33	179.8 2/3 133/34/40	182.8 2/3 138/40/46	184.8 2/3 143/46/51

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.30	P 13
	QUICK REFERENCE TABLES		SEQ 110	REV 06

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	197.3 3/3 133/33/39	203.4 3/3 140/41/46	207.9 2/3 146/48/52	211.0 2/3 153/55/58	212.8 3/3 159/62/64
	-10	195.3 3/3 131/31/37	201.7 3/3 138/39/44	206.4 3/2 144/46/50	209.9 2/3 150/53/56	212.1 3/2 156/59/62
0	193.1 3/3 129/29/35	199.8 3/2 136/37/42	204.9 3/2 142/44/48	208.6 2/3 148/51/54	211.1 3/2 154/57/60
10	190.7 3/9 127/27/33	197.9 3/3 134/35/40	203.1 3/2 140/42/46	207.1 2/3 146/48/52	209.9 2/3 152/55/58
20	188.0 3/9 125/25/31	195.9 3/2 132/33/38	201.3 3/2 138/40/44	205.5 3/2 144/46/50	208.6 3/2 150/53/56
26	186.3 3/9 125/25/31	194.8 3/2 131/32/37	200.2 3/2 137/39/43	204.5 3/2 143/45/49	207.8 3/2 149/51/55
28	184.7 3/9 124/24/30	192.7 3/2 131/32/37	198.1 3/3 137/38/43	202.3 3/2 143/45/48	205.5 3/2 148/51/54
30	* 182.8 3/9 * 124/24/30	190.5 3/2 130/31/36	195.7 3/2 136/38/42	199.9 3/2 142/44/48	202.9 3/2 148/50/53
32	* 181.0 3/9 * 123/23/29	188.3 3/2 130/31/36	193.5 3/3 136/37/42	197.5 2/3 142/44/47	200.5 2/3 147/50/53
34	* 179.2 3/9 * 123/23/29	186.1 3/2 130/30/35	191.2 3/3 136/37/41	195.1 2/3 141/43/47	198.0 3/2 147/49/52
36	* 177.2 3/9 * 123/23/28	183.9 3/2 129/30/35	188.8 3/3 135/37/41	192.6 3/2 141/43/46	195.3 3/2 146/49/51
38	* 175.1 3/9 * 122/22/28	181.5 3/2 129/30/34	186.4 3/3 135/36/40	190.0 3/2 140/42/45	192.6 3/2 146/48/51
40	* 172.8 3/3 * 122/22/27	179.1 3/2 129/29/34	183.8 3/3 134/36/39	187.4 3/2 140/42/45	189.8 2/3 145/47/50
42	* 170.4 3/3 * 122/22/27	176.5 3/2 128/29/33	181.0 3/3 134/35/39	184.4 3/3 140/41/44	186.6 2/3 145/47/50
44	* 167.8 3/2 * 121/21/26	173.6 3/2 128/28/33	177.9 3/2 134/35/38	181.1 3/3 139/41/44	183.1 2/3 145/46/49
46	* 164.8 3/3 * 122/22/26	170.7 3/2 127/28/32	174.8 3/2 133/34/38	177.8 3/3 139/40/43	179.4 2/3 144/46/48
48	* 161.5 3/3 * 122/22/26	168.0 3/2 127/28/31	171.9 3/3 133/34/37	174.6 3/3 138/40/42	175.8 2/3 144/45/48
50	* 157.9 3/3 * 122/22/26	165.2 3/2 127/27/31	168.9 3/2 133/33/36	171.3 3/3 138/39/42	172.0 2/3 142/44/46
52	* 154.9 3/3 * 122/22/26	162.7 3/2 127/27/30	166.2 3/2 132/33/36	168.3 3/3 138/39/41	168.6 2/3 141/43/45
54	* 152.5 3/3 * 122/22/26	160.6 3/2 127/27/30	163.3 2/3 130/31/34	165.7 3/3 138/39/41	165.8 2/3 138/41/43

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A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	TAKEOFF QUICK REFERENCE TABLES	2.02.30 P 13	
		SEQ 115	REV 13

R

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	209.4 3/3 133/33/42	218.8 2/3 139/40/48	224.5 2/3 144/47/54	228.8 2/3 149/53/60	232.2 2/3 155/59/66
-10	206.9 3/3 131/31/40	216.7 2/3 137/38/46	222.7 2/3 142/45/52	227.3 2/3 147/51/58	230.8 2/3 152/57/63
0	204.3 3/3 130/30/39	214.4 2/3 135/35/44	220.7 2/3 140/43/50	225.5 2/3 145/49/56	229.3 2/3 150/55/61
10	201.7 3/3 128/28/37	212.0 2/3 133/33/42	218.6 2/3 138/41/48	223.5 2/3 143/47/54	227.5 2/3 148/53/59
20	199.1 3/3 127/27/36	209.5 2/3 131/31/40	216.4 2/3 136/38/46	221.6 2/3 141/45/52	225.7 2/3 146/51/57
26	197.5 3/3 126/26/35	208.1 3/3 131/31/39	215.0 2/3 135/37/45	220.4 2/3 140/44/51	224.6 2/3 145/49/56
28	195.3 3/3 125/25/34	205.7 3/3 130/30/38	212.6 2/3 135/37/45	217.8 2/3 140/43/50	221.9 2/3 145/49/56
30	193.0 3/3 125/25/33	203.3 3/3 130/30/38	210.0 2/3 135/37/44	215.1 2/3 140/43/50	219.1 2/3 144/48/55
32	190.6 3/3 124/24/33	200.7 3/3 130/30/38	207.3 2/3 134/36/44	212.2 2/3 139/42/49	216.1 2/3 144/48/54
34	188.1 3/3 124/24/32	198.1 3/3 129/29/37	204.7 2/3 134/36/43	209.3 2/3 139/42/49	213.1 2/3 144/48/54
36	185.6 3/3 123/23/31	195.5 3/3 129/29/37	201.9 2/3 134/36/43	206.4 2/3 139/42/48	209.9 2/3 144/47/54
38	183.7 3/3 123/23/31	193.4 3/3 128/28/36	199.7 2/3 134/35/42	204.1 2/3 139/41/48	207.6 2/3 143/47/53
40	181.6 3/3 122/22/30	191.2 3/3 128/28/35	197.5 2/3 133/35/42	201.8 2/3 138/41/47	205.1 2/3 143/47/53
42	179.2 3/3 122/22/29	188.6 3/3 128/28/35	194.8 2/3 133/34/41	199.0 2/3 138/41/47	202.2 2/3 143/46/52
44	176.3 3/3 121/21/28	185.5 3/3 127/27/34	191.6 2/3 133/34/41	195.5 2/3 138/40/46	198.6 2/3 143/46/51
46	173.4 3/3 120/20/27	182.4 2/3 126/26/33	188.2 2/3 133/34/40	192.1 2/3 137/40/46	194.9 2/3 142/45/51
48	170.4 3/3 119/19/26	179.1 2/3 126/26/32	184.8 2/3 132/33/40	188.4 2/3 137/39/45	191.0 2/3 142/45/50
50	167.5 3/3 119/19/26	175.9 2/3 125/25/32	181.3 2/3 132/33/39	184.6 2/3 137/39/45	187.1 2/3 142/44/50
52	165.1 3/3 118/18/25	173.3 2/3 125/25/31	178.4 2/3 132/33/39	181.6 2/3 137/39/44	183.9 2/3 142/44/49
54	163.2 3/3 117/17/24	171.2 2/3 125/25/31	176.2 2/3 132/32/38	179.3 2/3 137/38/44	181.4 2/3 141/44/49

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.40	P 1
	NET TAKEOFF FLIGHT PATH		SEQ 001	REV 10

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.

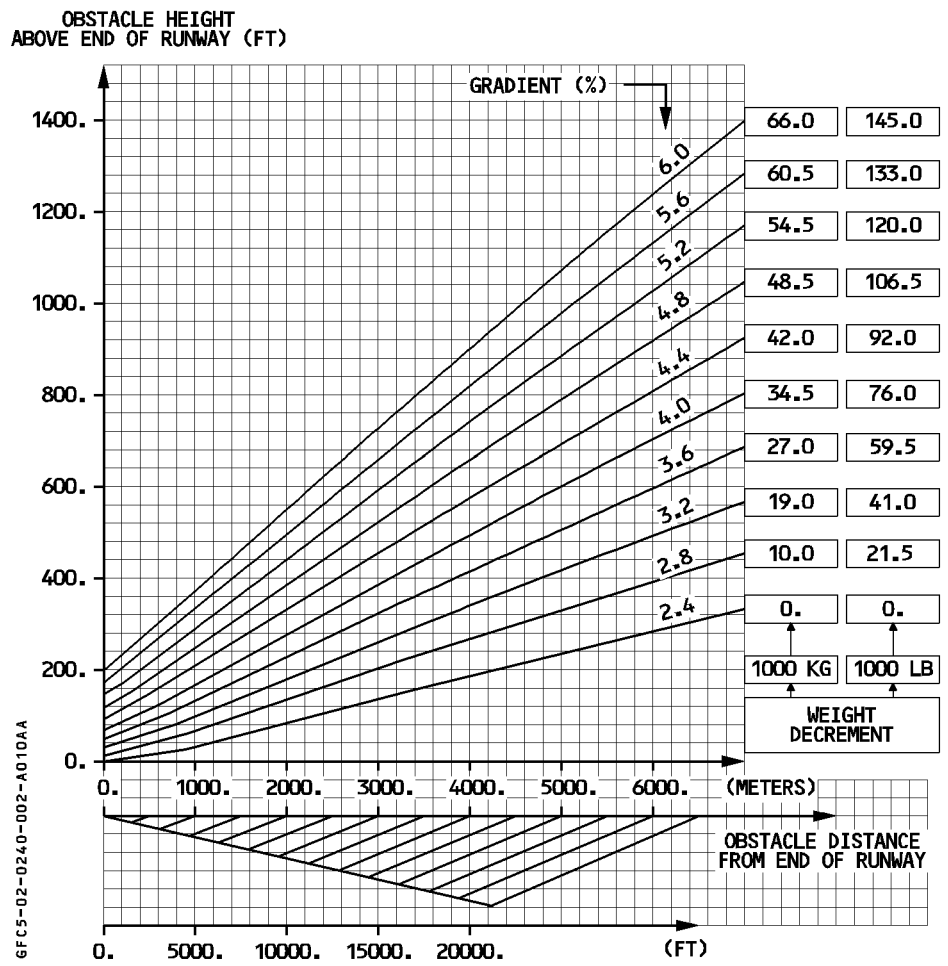
HOW TO PROCEED

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 0.1 knot per 1000 kg (0.05 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.

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	TAKEOFF		2.02.40	P 1
	NET TAKEOFF FLIGHT PATH		SEQ 001	REV 10

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.

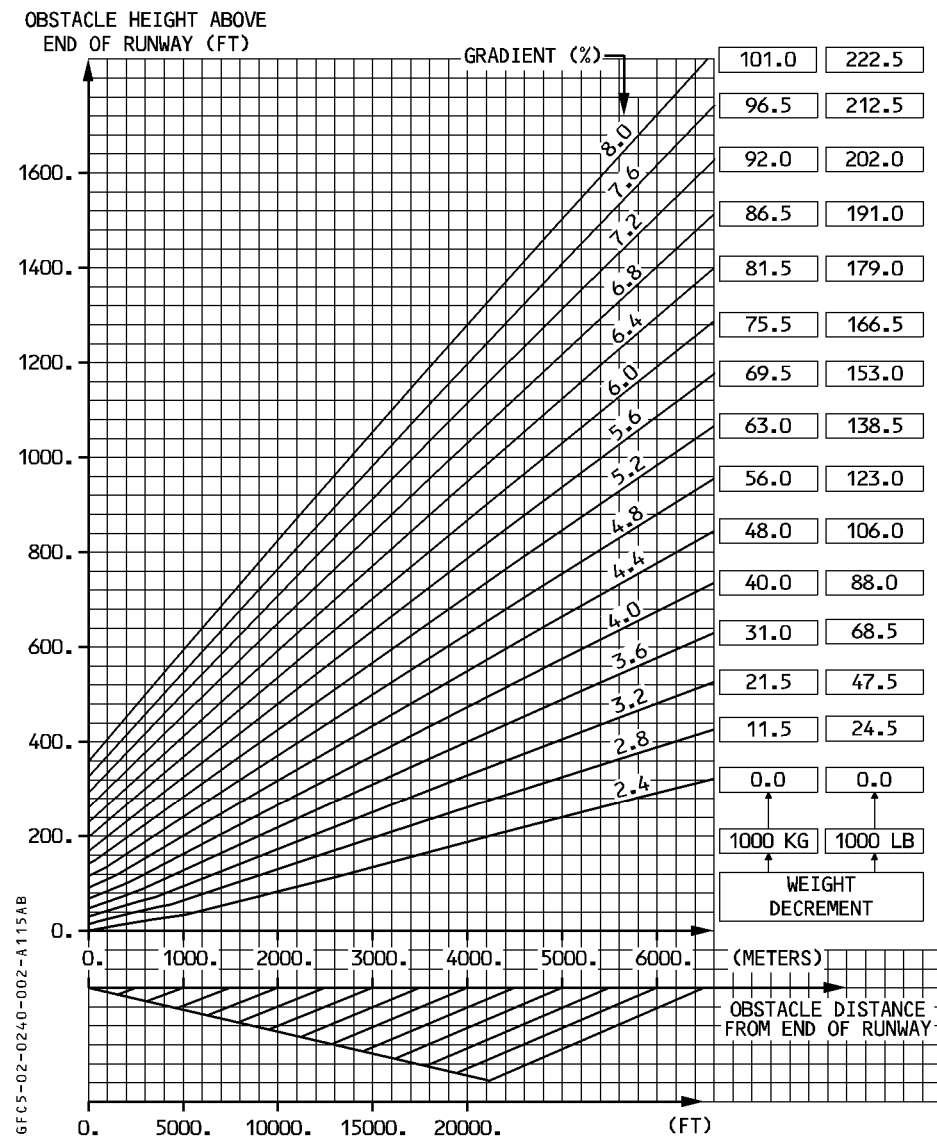
HOW TO PROCEED

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 0.1 knot per 1000 kg (0.05 kt/1000 lb) weight decrement.

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

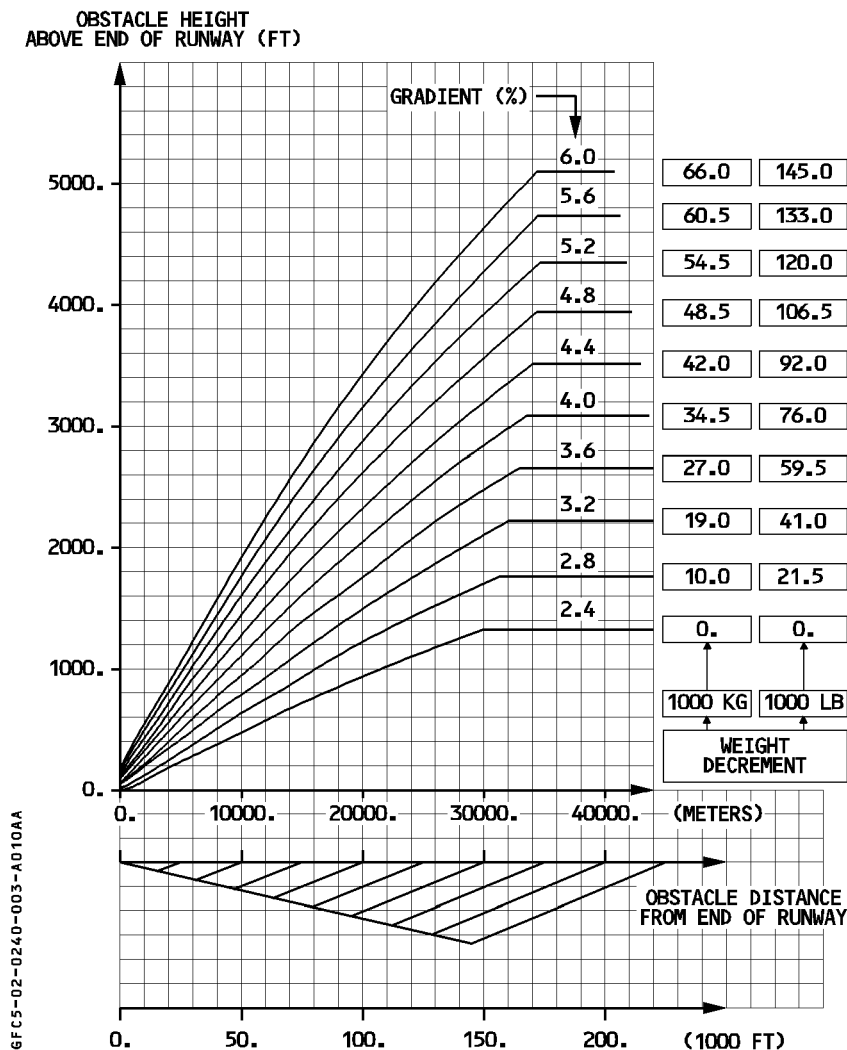
Note : In case of tailwind, do not use the obstacle clearance graphs.

CLOSE OBSTACLE CLEARANCE CONF 1 + F



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

REMOTE OBSTACLE CLEARANCE CONF 1 + F

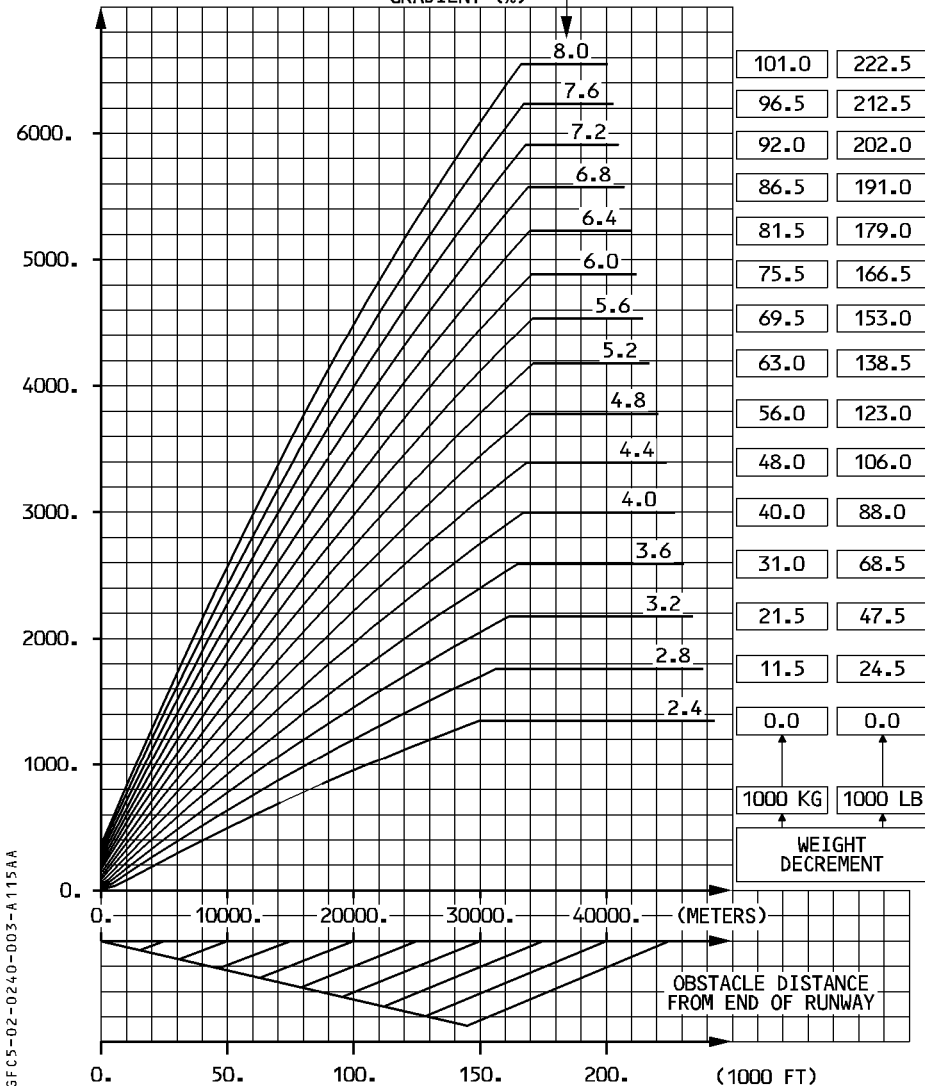


Note : In case of ascending runway, increase obstacle height by 50 feet per percent runway slope.

REMOTE OBSTACLE CLEARANCE CONF 1 + F

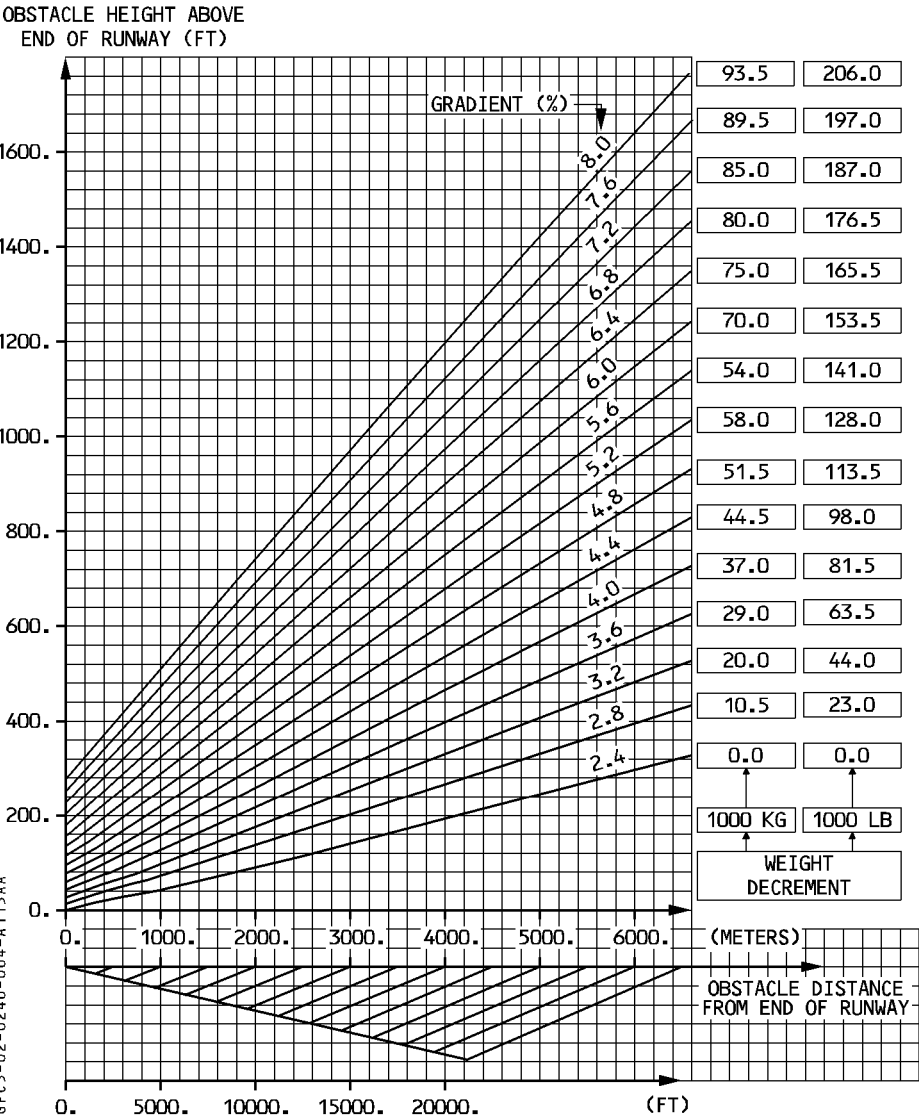
OBSTACLE HEIGHT ABOVE
END OF RUNWAY (FT)

GRADIENT (%)



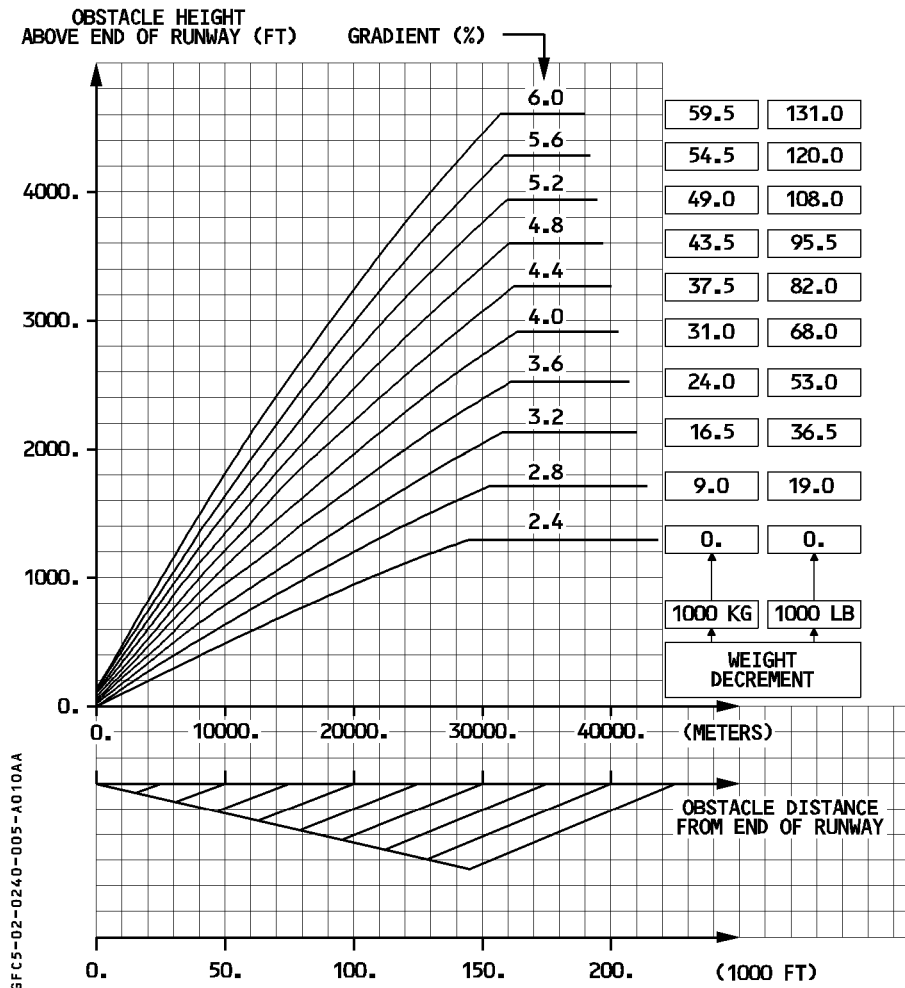
Note : In case of ascending runway, increase obstacle height by 50 feet per percent runway slope.

CLOSE OBSTACLE CLEARANCE CONF 2



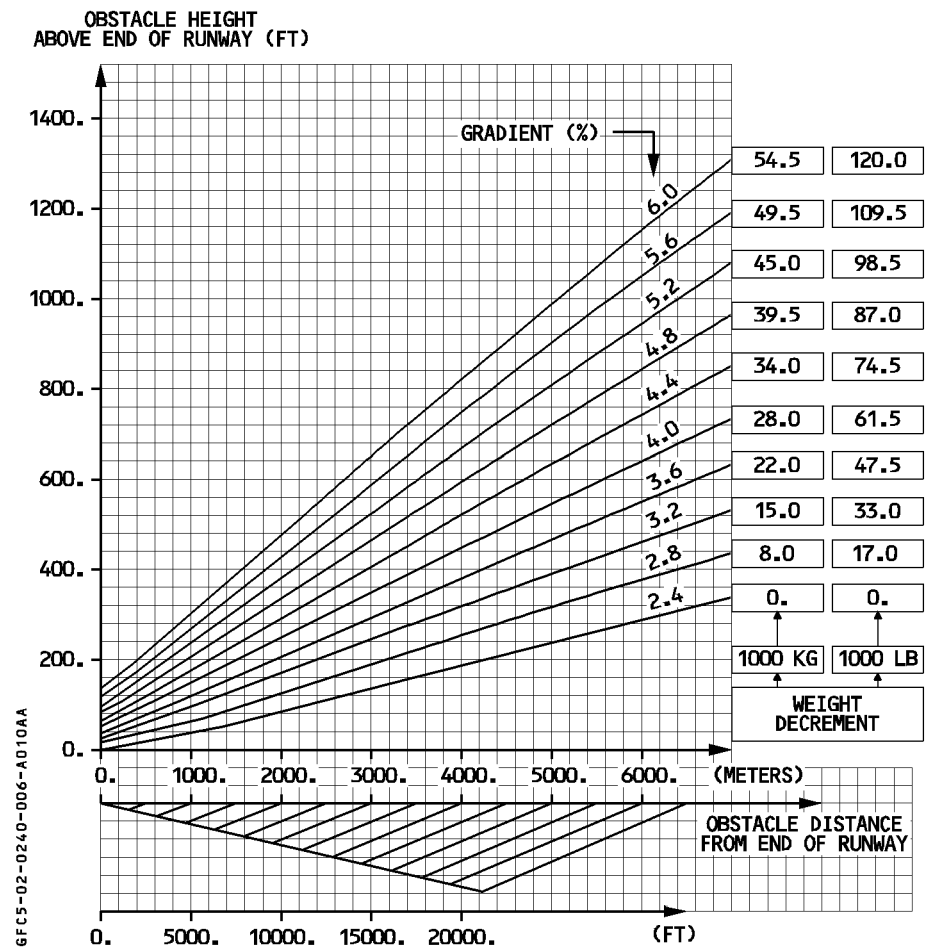
Note : In case of ascending runway, increase obstacle height by 50 feet per percent runway slope.

REMOTE OBSTACLE CLEARANCE CONF 2



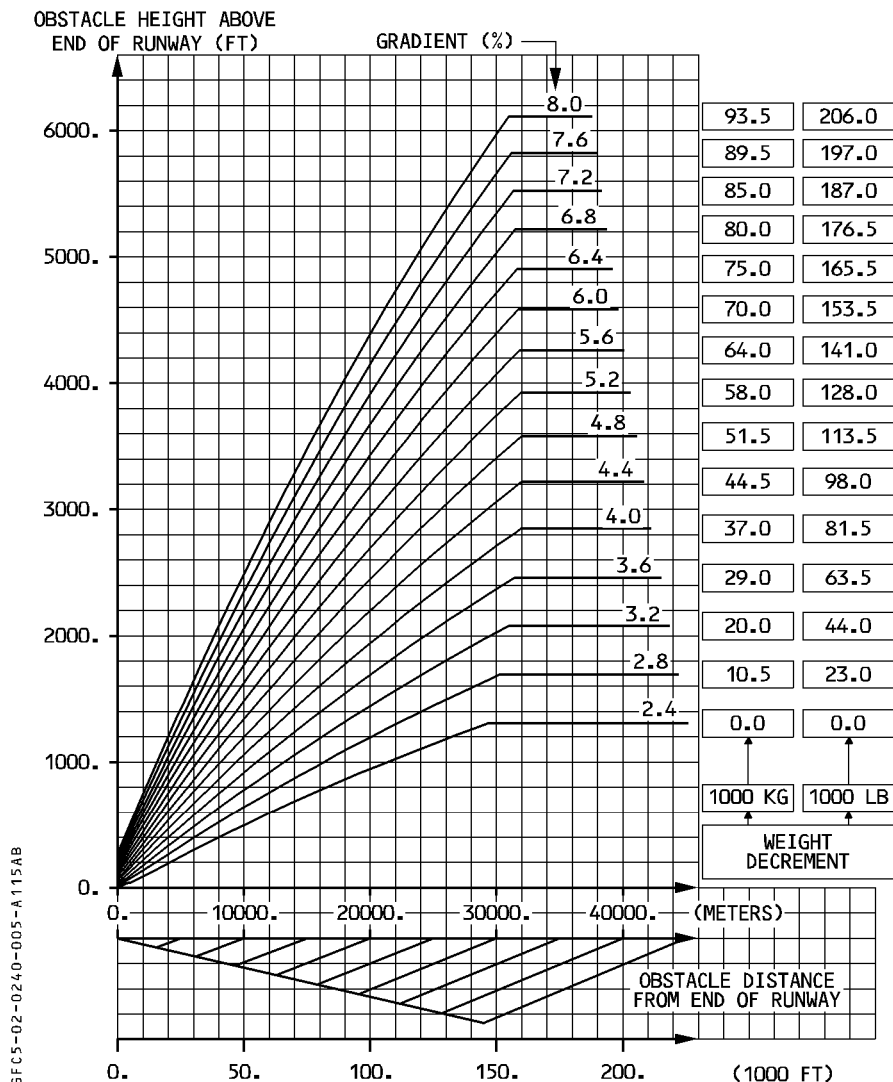
Note : In case of ascending runway, increase obstacle height by 50 feet per percent runway slope.

CLOSE OBSTACLE CLEARANCE CONF 3



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

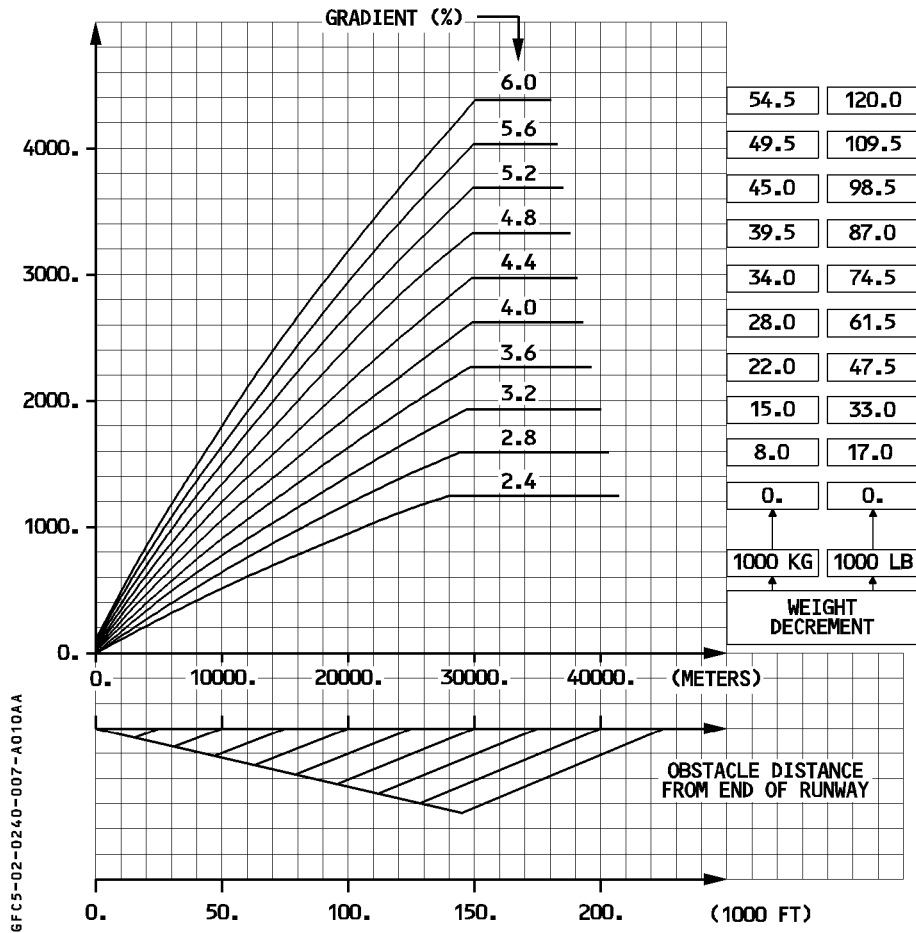
REMOTE OBSTACLE CLEARANCE CONF 2



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

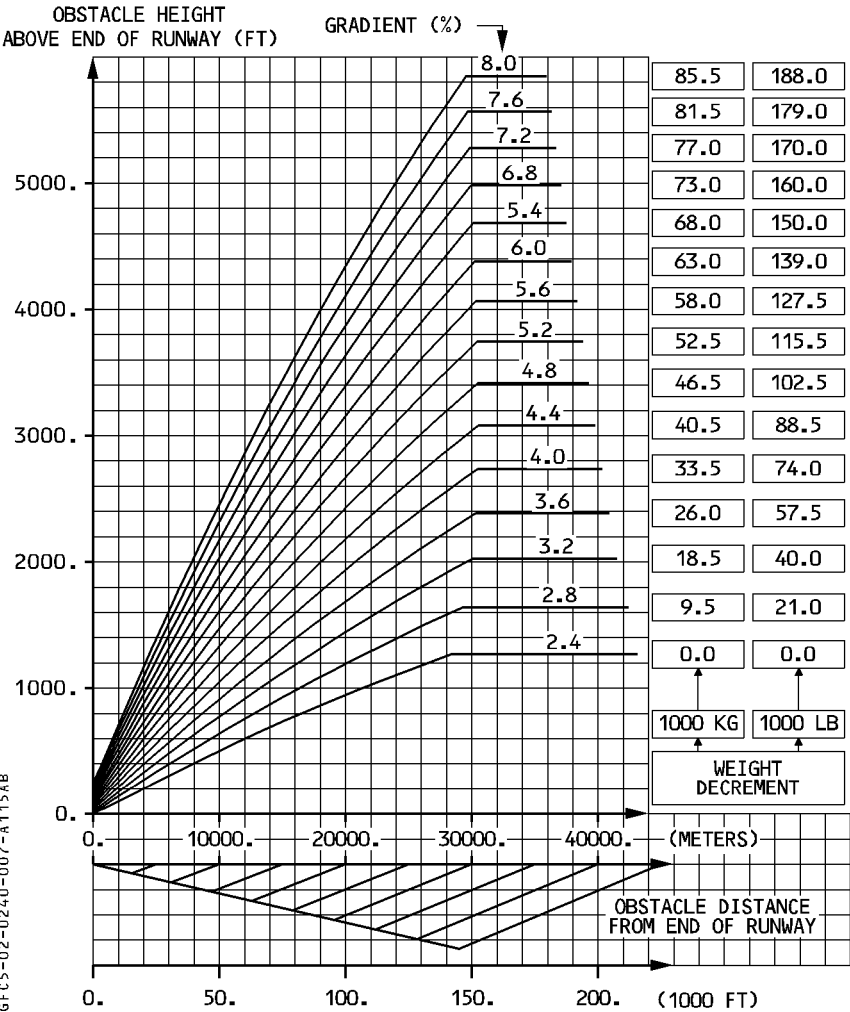
REMOTE OBSTACLE CLEARANCE CONF 3

OBSTACLE HEIGHT
ABOVE END OF RUNWAY (FT)



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

REMOTE OBSTACLE CLEARANCE CONF 3



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

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	LANDING PERFORMANCE CONTENTS	2.03.00 P 1	
		SEQ 001	REV 16

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03.20	USE OF THE AUTOBRAKE SYSTEM	
	– GENERAL	1
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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 be at least the greater of the required landing distance on wet runway (see previous paragraph) and 115 % of the landing distance determined in accordance with approved contaminated landing distance data.

R AUTOMATIC LANDING

- R Regulation defines the required landing distance for automatic landing as the actual landing distance in automatic landing multiplied by 1.15. This distance must be retained for 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.

ACTUAL LANDING DISTANCES

CONFIGURATION FULL

R

ACTUAL LANDING DISTANCE (METERS)								
WEIGHT (1000 KG)			130	150	170	190	210	230
RUNWAY CONDITION	DRY		830	880	1010	1150	1300	1430
	WET		1050	1070	1170	1290	1430	1550
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1410	1460	1660	1870	2060	2300
		12.7 MM (1/2 INCH) WATER	1340	1390	1570	1770	1950	2150
		6.3 MM (1/4 INCH) SLUSH	1380	1420	1570	1750	1950	2130
		12.7 MM (1/2 INCH) SLUSH	1320	1370	1510	1670	1850	2020
		COMPACTED SNOW	1400	1430	1560	1700	1830	1970
ICE		2590	2700	2960	3230	3500	3770	

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	+ 2 %	+ 3 %	+ 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	+ 16 %	+ 18 %	+ 23 %	+ 21 %	+ 22 %	+ 20 %	+ 16 %	+ 28 %
2 reversers operative	− 2 %	− 4 %	− 6 %	− 6 %	− 6 %	− 6 %	− 7 %	− 19 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

CONFIGURATION 3

R

ACTUAL LANDING DISTANCE (METERS)								
WEIGHT (1000 KG)		130	150	170	190	210	230	
RUNWAY CONDITION	DRY		830	910	1060	1210	1350	1490
	WET		1040	1100	1220	1340	1480	1610
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1420	1540	1770	1980	2200	2450
		12.7 MM (1/2 INCH) WATER	1350	1460	1650	1850	2050	2280
		6.3 MM (1/4 INCH) SLUSH	1380	1470	1640	1850	2050	2270
		12.7 MM (1/2 INCH) SLUSH	1330	1420	1570	1760	1930	2140
		COMPACTED SNOW	1390	1480	1620	1760	1900	2040
		ICE	2640	2830	3110	3390	3670	3960

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	+ 2 %	+ 3 %	+ 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	+ 16 %	+ 18 %	+ 24 %	+ 21 %	+ 22 %	+ 20 %	+ 17 %	+ 28 %
2 reversers operative	− 1 %	− 4 %	− 7 %	− 5 %	− 6 %	− 6 %	− 6 %	− 19 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

ACTUAL LANDING DISTANCES

CONFIGURATION FULL

R

ACTUAL LANDING DISTANCE (METERS)								
WEIGHT (1000 KG)		130	150	170	190	210	230	
RUNWAY CONDITION	DRY		880	930	1010	1080	1220	1390
	WET		1070	1160	1290	1430	1580	1730
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1420	1560	1780	1990	2230	2420
		12.7 MM (1/2 INCH) WATER	1350	1480	1670	1870	2060	2240
		6.3 MM (1/4 INCH) SLUSH	1390	1500	1670	1880	2080	2280
		12.7 MM (1/2 INCH) SLUSH	1330	1440	1600	1790	1970	2150
		COMPACTED SNOW	1340	1430	1570	1710	1840	1960
		ICE	2580	2770	3040	3320	3590	3840

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	+ 3 %	+ 4 %	+ 4 %	+ 4 %	+ 5 %	+ 4 %	+ 3 %	+ 4 %
per 10 kt headwind	No correction for headwind due to wind correction on approach speed							
per 10 kt tailwind	+ 18 %	+ 22 %	+ 24 %	+ 22 %	+ 23 %	+ 21 %	+ 17 %	+ 29 %
2 reversers operative	− 1 %	− 4 %	− 7 %	− 7 %	− 7 %	− 6 %	− 6 %	− 19 %
Per 5 kt speed increment (and no failure) add 8 % (all runways)								

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	LANDING PERFORMANCE		2.03.10	P 4
	LANDING		SEQ 120	REV 16

CONFIGURATION 3

R

ACTUAL LANDING DISTANCE (METERS)								
WEIGHT (1000 KG)			130	150	170	190	210	230
RUNWAY CONDITION	DRY		890	970	1050	1130	1290	1480
	WET		1090	1240	1390	1550	1710	1880
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1450	1680	1920	2160	2410	2630
		12.7 MM (1/2 INCH) WATER	1380	1580	1790	1990	2220	2420
		6.3 MM (1/4 INCH) SLUSH	1420	1610	1810	2030	2260	2460
		12.7 MM (1/2 INCH) SLUSH	1350	1530	1710	1920	2130	2310
		COMPACTED SNOW	1370	1520	1660	1810	1950	2070
		ICE	2720	3020	3320	3610	3920	4180

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	+ 3 %	+ 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	+ 17 %	+ 22 %	+ 25 %	+ 22 %	+ 23 %	+ 21 %	+ 17 %	+ 29 %
2 reversers operative	− 1 %	− 4 %	− 8 %	− 7 %	− 8 %	− 7 %	− 7 %	− 21 %
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	1380	1420	1520	1640	1760	1880	2010
CONF FULL	1390	1420	1470	1570	1680	1800	1920

Corrections on landing distances

R

Wind : per 10 kt tailwind add 16 %
 No correction for headwind due to wind correction on approach speed.

R

Airport elevation : per 1000 ft above sea level add 2 %.

AUTOMATIC LANDING

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

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A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	LANDING PERFORMANCE		2.03.10	P 5
	LANDING		SEQ 120	REV 16

REQUIRED LANDING DISTANCE

MANUAL LANDING

R

REQUIRED LANDING DISTANCE (METERS)							
WEIGHT (1000 KG)	130	140	150	160	170	180	190
CONF 3	1490	1550	1610	1680	1750	1810	1880
CONF FULL	1470	1480	1550	1610	1670	1740	1800

Corrections on landing distances

R

Wind

: per 10 kt tailwind add 18 %

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

Airport elevation : per 1000 ft above sea level add 3 %.

AUTOMATIC LANDING

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

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 A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	LANDING PERFORMANCE USE OF THE AUTOBRAKE SYSTEM	2.03.20	P 1
		SEQ 001	REV 18

GENERAL

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

- aborted takeoff or
- landing on short runways or
- 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

CONFIGURATION 3

ACTUAL LANDING DISTANCE (METERS)									CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)			130	150	170	190	210	230	PER 1000FT ABOVE SL	2 REV OP	PER 10K' TAIL WIND	
RUNWAY CONDITION		MODE										
DRY			MED	1290	1350	1480	1600	1720	1860	+ 3	0	+15
			LOW	1690	1790	1970	2150	2320	2500	+ 3	0	+17
WET			MED	1290	1350	1480	1600	1720	1860	+ 3	0	+15
			LOW	1690	1790	1970	2150	2320	2500	+ 3	0	+17
C O V E R E D	6.3 MM (1/4 INCH) WATER		MED	1500	1610	1810	2010	2260	2490	+ 5	-7	+23
			LOW	1660	1770	1950	2160	2380	2610	+ 4	0	+19
	12.7 MM (1/2 INCH) WATER		MED	1430	1530	1700	1900	2100	2310	+ 4	-6	+21
			LOW	1600	1710	1890	2070	2270	2470	+ 4	0	+22
W I T H	6.3 MM (1/4 INCH) SLUSH		MED	1470	1580	1730	1900	2110	2330	+ 5	-7	+22
			LOW	1630	1730	1910	2080	2260	2460	+ 5	0	+18
	12.7 MM (1/2 INCH) SLUSH		MED	1410	1510	1660	1810	1990	2190	+ 5	-6	+20
			LOW	1570	1680	1850	2020	2190	2370	+ 4	0	+15
	COMPACTED SNOW		MED	1510	1610	1750	1900	2050	2200	+ 4	-7	+17
			LOW	1680	1790	1960	2140	2320	2490	+ 4	0	+16
ICE		MED	2690	2880	3170	3450	3730	4020	+ 4	-19	+28	
		LOW	2710	2900	3190	3480	3770	4060	+ 4	-19	+28	

Actual Landing Distance (Meters)								Corrections (%) on Landing Distance			
Weight (1000 kg)		130	150	170	190	210	230	Per 1000ft Above SL	2 Rev OP	Per 10K Tail Wind	
Runway Condition	Mode										
	DRY	MED LOW	1280 1670	1300 1710	1410 1880	1530 2040	1640 2210	1770 2380	+ 3 + 3	0 0	+15 +17
	WET	MED LOW	1280 1670	1300 1710	1410 1880	1530 2040	1640 2210	1770 2380	+ 3 + 3	0 0	+15 +17
COVERED	6.3 MM (1/4 INCH) WATER	MED LOW	1500 1650	1540 1690	1710 1860	1920 2050	2130 2250	2340 2470	+ 4 + 4	-6 0	+22 +19
	12.7 MM (1/2 INCH) WATER	MED LOW	1420 1580	1470 1630	1620 1800	1800 1970	1990 2150	2180 2340	+ 4 + 4	-6 0	+21 +17
	6.3 MM (1/4 INCH) SLUSH	MED LOW	1460 1610	1510 1650	1670 1820	1820 1980	1990 2140	2190 2330	+ 5 + 5	-6 0	+22 +17
	12.7 MM (1/2 INCH) SLUSH	MED LOW	1400 1560	1450 1610	1600 1770	1740 1930	1890 2090	2070 2250	+ 5 + 4	-6 0	+20 +16
WINTER	COMPACTED SNOW	MED LOW	1510 1670	1550 1700	1690 1870	1830 2040	1970 2210	2110 2370	+ 4 + 4	-6 0	+16 +16
	ICE	MED LOW	2630 2660	2750 2770	3020 3040	3290 3310	3560 3590	3830 3860	+ 4 + 4	-18 -18	+28 +28

Note : – Max mode is not recommended at landing
– Per 5 knot speed increment (and no failure) add 6 % (all runways)
– No correction for headwind due to wind correction on approach speed

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	LANDING PERFORMANCE		2.03.20	P 1
	USE OF THE AUTOBRAKE SYSTEM		SEQ 001	REV 18

GENERAL

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

- aborted takeoff or
- landing on short runways or
- 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

CONFIGURATION 3

ACTUAL LANDING DISTANCE (METERS)									CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)			130	150	170	190	210	230	PER 1000FT ABOVE SL	2 REV OP	PER 10K TAIL WIND	
RUNWAY CONDITION		MODE										
DRY			MED	1220	1350	1470	1590	1700	1820	+ 3	0	+16
			LOW	1670	1850	2040	2220	2400	2560	+ 3	0	+17
WET			MED	1260	1420	1570	1730	1890	2030	+ 4	-2	+20
			LOW	1670	1850	2040	2220	2400	2560	+ 3	0	+17
C O V E R E D	6.3 MM (1/4 INCH) WATER		MED	1560	1750	1980	2220	2470	2710	+ 4	-9	+23
			LOW	1650	1840	2040	2290	2540	2780	+ 4	-2	+22
	12.7 MM (1/2 INCH) WATER		MED	1470	1640	1840	2050	2280	2480	+ 4	-7	+21
			LOW	1570	1750	1940	2130	2350	2560	+ 4	0	+19
W I T H	6.3 MM (1/4 INCH) SLUSH		MED	1530	1710	1900	2090	2330	2530	+ 5	-9	+22
			LOW	1620	1810	2000	2180	2390	2600	+ 5	-2	+21
	12.7 MM (1/2 INCH) SLUSH		MED	1450	1620	1800	1970	2170	2370	+ 5	-8	+20
			LOW	1550	1730	1910	2080	2260	2440	+ 5	0	+18
	COMPACTED SNOW		MED	1510	1670	1830	1980	2130	2260	+ 4	-8	+17
			LOW	1660	1850	2030	2200	2380	2540	+ 4	0	+17
ICE		MED	2780	3080	3380	3690	3990	4250	+ 5	-20	+29	
		LOW	2820	3130	3420	3730	4040	4310	+ 4	-21	+28	

ACTUAL LANDING DISTANCE (METERS)								CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT (1000 KG)		130	150	170	190	210	230	PER 1000FT ABOVE SL	2 REV OP	PER 10K TAIL WIND	
RUNWAY CONDITION	MODE										
DRY	MED	1200	1290	1400	1520	1630	1730	+ 3	0	+16	
	LOW	1630	1760	1930	2100	2270	2430	+ 3	0	+17	
WET	MED	1220	1320	1460	1600	1750	1880	+ 4	-1	+19	
	LOW	1630	1760	1930	2100	2270	2430	+ 3	0	+17	
COVERED	6.3 MM (1/4 INCH) WATER	MED	1500	1640	1830	2050	2280	2480	+ 4	-7	+22
		LOW	1600	1740	1920	2120	2350	2550	+ 4	0	+21
	12.7 MM (1/2 INCH) WATER	MED	1420	1550	1710	1910	2120	2300	+ 4	-6	+22
		LOW	1540	1670	1840	2010	2210	2390	+ 4	0	+22
WINTER	6.3 MM (1/4 INCH) SLUSH	MED	1470	1600	1770	1950	2150	2330	+ 5	-8	+22
		LOW	1570	1700	1880	2050	2230	2410	+ 5	0	+20
	12.7 MM (1/2 INCH) SLUSH	MED	1400	1530	1690	1850	2020	2200	+ 5	-7	+20
		LOW	1520	1650	1810	1980	2140	2290	+ 5	0	+18
	COMPACTED SNOW	MED	1460	1570	1720	1860	2000	2120	+ 4	-6	+17
		LOW	1630	1760	1930	2100	2270	2420	+ 4	0	+17
	ICE	MED	2600	2820	3100	3380	3660	3900	+ 4	-19	+29
		LOW	2650	2870	3150	3420	3700	3950	+ 4	-19	+29

Note : – Max mode is not recommended at landing
– Per 5 knot speed increment (and no failure) add 6 % (all runways)
– No correction for headwind due to wind correction on approach speed

04.00 CONTENTS

04.10 FLUID CONTAMINATED RUNWAY

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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.

The following conservative penalties may be used instead of a specific RTOW.

CAUTION

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.

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 (0.12 inch) water
- 4 mm (0.16 inch) wet snow
- 15 mm (0.59 inch) dry snow

R

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.
2. It is not recommended to take off from a runway covered with more than 2 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

CAUTION

R
R
R
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R

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.

TAKEOFF FROM A WET RUNWAY

1. Determine the maximum takeoff weight or flexible temperature and associated speeds on dry runway.
2. Two sets of tables are given depending on the use of thrust reversers and the presence of clearway. Select the table to use as applicable to your case.
The runway length in the table corresponds to the available takeoff run (TORA).
3. Apply the corrections shown in the table to the maximum takeoff weight or flexible temperature and associated speeds determined on dry runway.
4. Check that takeoff speeds are above the minimum values shown on the RTOW chart. If one or more speeds are below these values apply the following procedure :
Actual TOW = maximum TOW
 - if V1 is lower than the minimum V1 (V1 limited by VMCG), take this last value as V1 and further decrease weight by 4000 kg (8800 lb) per knot difference between both values.
Check that VR and V2 are higher or equal to the minimum values.
 - if VR or/and V2 fall below the minimum value, takeoff is not possible.
 Actual TOW lower than maximum TOW
 - If V1 corresponding to the actual TOW is lower than the minimum V1 (V1 limited by VMCG) :
 - If maximum TOW has a V1 equal or above minimum V1, retain minimum V1 as V1 and decrease flexible temperature by 3°C per knot difference between them.
 - In the rare case when the V1 corresponding to the maximum TOW falls below the minimum V1, decrease maximum TOW by 4000 kg (8800 lb) per knot difference between them. Limit the actual TOW to the value found after this decrement. Take V1 equal to minimum V1 and decrease flexible temperature by 3°C per knot difference between this value and the V1 corresponding to the actual TOW.
 - If VR or V2 corresponding to actual TOW falls below minimum values, and if VR and V2 corresponding to maximum TOW are above the minimum values, retain the minimum speed value for VR and V2.
5. Check that V2 is above the minimum V2 value due to VMU (Refer to 2.02.25).
6. Check that the corrected flexible temperature is higher than OAT and Tref.

Note : · Do not extrapolate below the shortest runway length provided in the table.
· If no minimum speed value is available, use the conservative values provided on 2.02.25.

NO THRUST REVERSERS OPERATIVE (NO CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	1	1	2	2	2	1	1	2	1
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	0.3 0.7	1.0 2.2	1.5 3.3	1.8 4.0	1.9 4.2	1.3 2.9	1.1 2.4	1.5 3.3	1.0 2.2
V1 DECREMENT (KT)	7	7	8	6	7	7	6	8	8
VR AND V2 DECREMENT (KT)	0	1	2	0	2	2	1	2	2

ALL THRUST REVERSERS OPERATIVE (NO CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	0	0	1	0	1	1	0	1	1
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	0.0 0.0	0.0 0.0	0.3 0.7	0.0 0.0	0.3 0.7	0.6 1.3	0.0 0.0	0.4 0.9	0.4 0.9
V1 DECREMENT (KT)	6	5	5	5	4	4	5	5	4
VR AND V2 DECREMENT (KT)	0	0	1	0	0	1	0	0	1

TAKEOFF FROM A WET RUNWAY

1. Determine the maximum takeoff weight or flexible temperature and associated speeds on dry runway.
2. Two sets of tables are given depending on the use of thrust reversers and the presence of clearway. Select the table to use as applicable to your case.
The runway length in the table corresponds to the available takeoff run (TORA).
3. Apply the corrections shown in the table to the maximum takeoff weight or flexible temperature and associated speeds determined on dry runway.
4. Check that takeoff speeds are above the minimum values shown on the RTOW chart. If one or more speeds are below these values apply the following procedure :
Actual TOW = maximum TOW
 - if V1 is lower than the minimum V1 (V1 limited by VMCG), take this last value as V1 and further decrease weight by 4000 kg (8800 lb) per knot difference between both values.
Check that VR and V2 are higher or equal to the minimum values.
 - if VR or/and V2 fall below the minimum value, takeoff is not possible.
 Actual TOW lower than maximum TOW
 - If V1 corresponding to the actual TOW is lower than the minimum V1 (V1 limited by VMCG) :
 - If maximum TOW has a V1 equal or above minimum V1, retain minimum V1 as V1 and decrease flexible temperature by 3°C per knot difference between them.
 - In the rare case when the V1 corresponding to the maximum TOW falls below the minimum V1, decrease maximum TOW by 4000 kg (8800 lb) per knot difference between them. Limit the actual TOW to the value found after this decrement. Take V1 equal to minimum V1 and decrease flexible temperature by 3°C per knot difference between this value and the V1 corresponding to the actual TOW.
 - If VR or V2 corresponding to actual TOW falls below minimum values, and if VR and V2 corresponding to maximum TOW are above the minimum values, retain the minimum speed value for VR and V2.
5. Check that V2 is above the minimum V2 value due to VMU (Refer to 2.02.25).
6. Check that the corrected flexible temperature is higher than OAT and Tref.

Note : · Do not extrapolate below the shortest runway length provided in the table.
· If no minimum speed value is available, use the conservative values provided on 2.02.25.

NO THRUST REVERSERS OPERATIVE (NO CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	6	6	8	3	5	7	3	5	5
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	5.0 11.0	5.0 11.0	6.0 13.2	3.0 6.6	5.5 12.1	5.5 12.1	2.0 4.4	4.5 9.9	3.8 8.4
V1 DECREMENT (KT)	14	14	15	12	14	13	12	13	14
VR AND V2 DECREMENT (KT)	2	4	5	1	3	5	2	4	5

ALL THRUST REVERSERS OPERATIVE (NO CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	1	2	4	1	3	6	0	2	3
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	1.0 2.2	1.5 3.3	3.0 6.6	1.0 2.2	3.0 6.6	4.0 8.8	0.0 0.0	1.5 3.3	2.3 5.1
V1 DECREMENT (KT)	8	9	9	9	9	9	8	8	9
VR AND V2 DECREMENT (KT)	0	1	2	1	1	2	1	1	3

NO THRUST REVERSERS OPERATIVE (WITH CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	3	3	2	4	3	2	3	3	2
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	3.0 6.6	3.0 6.6	2.5 5.5	3.8 8.4	3.0 6.6	2.0 4.4	3.5 7.7	3.0 6.6	1.6 3.5
V1 DECREMENT (KT)	7	7	8	7	7	7	7	8	7
VR AND V2 DECREMENT (KT)	3	3	4	4	4	4	4	4	4

ALL THRUST REVERSERS OPERATIVE (WITH CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	2	2	1	2	2	1	2	2	1
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	1.9 4.2	1.9 4.2	1.2 2.6	2.0 4.4	1.6 3.5	1.0 2.2	2.0 4.4	2.0 4.4	0.8 1.8
V1 DECREMENT (KT)	4	4	5	4	4	4	3	4	4
VR AND V2 DECREMENT (KT)	2	2	2	2	2	2	1	3	2

TAKEOFF FROM A 6.3 MM (1/4 INCH) WATER 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	29.2 23.5	26.5 23.5	23.7 21.5	13.4 11.5	23.3 20.5	21.8 20.0	21.0 20.0	20.9 19.0	19.9 19.0	19.0 19.0

- 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 20 000 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 20 000 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 160	160	165	165 to 220							
	MTOW (1000 kg)	–	155	165	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	< 155	155	160	162.5	165	170	180	190	200	210	220
	V2 (kt IAS)	132	132	134	135	136	138	143	147	150	155	159
	VR (kt IAS)	129	129	131	132	133	135	140	144	147	152	156
	V1 (kt IAS)	125	125	125	125	126	128	133	137	140	145	149

CONF 2	CORRECTED WEIGHT (1000 kg)	< 177	177	180	180 to 220							
	MTOW (1000 kg)	–	174	180	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	< 174	174	180	190	200	210	220				
	V2 (kt IAS)	132	132	135	139	142	146	150				
	VR (kt IAS)	129	129	132	136	139	143	147				
	V1 (kt IAS)	125	125	125	129	132	136	140				

CONF 3	CORRECTED WEIGHT (1000 kg)	< 195	195	197.5	197.5 to 220							
	MTOW (1000 kg)	–	190	197.5	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	< 190	190	197.5	200	210	220					
	V2 (kt IAS)	134	134	137	138	142	146					
	VR (kt IAS)	131	131	134	135	139	143					
	V1 (kt IAS)	128	128	128	129	133	137					

NO THRUST REVERSERS OPERATIVE (WITH CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	10	9	9	9	8	9	12	9	9
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	8.0 17.6	7.0 15.4	6.5 14.3	7.5 16.5	6.5 14.3	6.5 14.3	10.0 22.0	7.0 15.4	6.0 13.2
V1 DECREMENT (KT)	13	14	14	12	13	13	12	12	13
VR AND V2 DECREMENT (KT)	6	7	7	5	6	7	5	6	7

ALL THRUST REVERSERS OPERATIVE (WITH CLEARWAY)

R

TAKEOFF CONFIGURATION	1 + F			2			3		
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 and above	2500 8000	3000 10000	3500 11500 and above	2000 6500	2500 8000	3000 10000 and above
FLEX TO TEMPERATURE DECREMENT (°C)	3	3	2	5	3	2	10	3	2
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	4.4 9.7	3.6 8.0	3.0 6.6	6.1 13.5	3.8 8.4	3.0 6.6	12.0 26.5	3.5 7.7	2.7 6.0
V1 DECREMENT (KT)	9	9	11	12	9	10	13	8	9
VR AND V2 DECREMENT (KT)	5	5	5	6	5	5	5	4	5

TAKEOFF FROM A 6.3 MM (1/4 INCH) WATER 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	33.8 27.0	33.2 28.7	27.1 24.0	23.2 20.5	29.0 24.4	24.7 21.5	25.5 23.3	20.1 16.9	19.1 17.2	23.2 22.2

- 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 25 900 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 25 90 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	<154	154	160	167.5	167.5 to 240									
	MTOW (1000 kg)	–	132.5	148	167.5	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<132.5	132.5	140	150	160	167.5	170	180	190	200	210	220	230	240
	V2 (kt IAS)	121	121	124	129	133	136	137	141	145	149	153	156	160	163
	VR (kt IAS)	114	114	117	122	126	129	130	134	138	142	146	149	153	156
	V1 (kt IAS)	114	114	114	114	114	114	115	119	123	127	131	134	138	141

CONF 2	CORRECTED WEIGHT (1000 kg)	< 165.9	165.9	170	180	180 to 240									
	MTOW (1000 kg)	–	145	154	180	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<145	145	150	160	170	180	190	200	210	220	230	240		
	V2 (kt IAS)	120	120	122	126	129	133	137	141	144	148	151	154		
	VR (kt IAS)	114	114	116	120	123	127	131	135	138	142	145	148		
	V1 (kt IAS)	114	114	114	114	114	114	118	122	125	129	132	135		

CONF 3	CORRECTED WEIGHT (1000 kg)	<173.5	173.5	180	185	185 to 240									
	MTOW (1000 kg)	–	155	172	185	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<155	155	160	170	180	185	190	200	210	220	230	240		
	V2 (kt IAS)	120	120	122	126	130	132	134	138	141	144	147	150		
	VR (kt IAS)	114	114	116	120	124	126	128	132	135	138	141	144		
	V1 (kt IAS)	114	114	114	114	114	114	116	120	123	126	129	132		

TAKEOFF FROM A 12.7 MM (1/2 INCH) WATER 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
△WEIGHT (1000 kg) With clearway Without clearway	44.7 39.0	46.0 43.0	47.7 45.5	57.9 56.0	38.8 36.0	50.3 48.5	54.5 53.5	35.4 33.0	39.9 39.0	56.5 56.5

- 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)	< 155	155 to 220							
	MTOW (1000 kg)	–	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	< 155	155	160	170	180	190	200	210	220
	V2 (kt IAS)	132	132	134	138	143	147	150	155	159
	VR (kt IAS)	131	131	133	137	142	146	149	154	158
	V1 (kt IAS)	130	130	132	136	141	145	148	153	157

CONF 2	CORRECTED WEIGHT (1000 kg)	< 174	174 to 220							
	MTOW (1000 kg)	–	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	< 174	174	180	190	200	210	220		
	V2 (kt IAS)	132	132	135	139	142	146	150		
	VR (kt IAS)	129	129	132	136	139	143	147		
	V1 (kt IAS)	126	126	129	133	136	140	144		

CONF 3	CORRECTED WEIGHT (1000 kg)	< 190	190 to 220			
	MTOW (1000 kg)	–	EQUAL TO CORRECTED WEIGHT			
	ACTUAL WEIGHT (1000 kg)	< 190	190	200	210	220
	V2 (kt IAS)	134	134	138	142	146
	VR (kt IAS)	132	132	136	140	144
	V1 (kt IAS)	129	129	133	137	141

TAKEOFF FROM A 12.7 MM (1/2 INCH) WATER 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
△WEIGHT (1000 kg) With clearway Without clearway	48.5 41.7	53.7 49.2	50.9 47.8	47.7 45.0	42.6 38.0	46.4 43.2	44.6 42.4	36.9 33.7	32.5 30.6	30.0 29.0

- 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 25 900 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 25 90 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	<139.8	139.8	140	146	146 to 240										
	MTOW (1000 kg)	–	127.5	128	146	EQUAL TO CORRECTED WEIGHT										
	ACTUAL WEIGHT (1000 kg)	<127.5	127.5	130	140	146	150	160	170	180	190	200	210	220	230	240
	V2 (kt IAS)	119	119	120	124	127	129	133	137	141	145	149	153	156	160	163
	VR (kt IAS)	114	114	115	119	122	124	128	132	136	140	144	148	151	155	158
	V1 (kt IAS)	114	114	114	114	114	116	120	124	128	132	136	140	143	147	150

CONF 2	CORRECTED WEIGHT (1000 kg)	<149.2	149.2	150	155	155 to 240										
	MTOW (1000 kg)	–	140	142	155	EQUAL TO CORRECTED WEIGHT										
	ACTUAL WEIGHT (1000 kg)	<140	140	150	155	160	170	180	190	200	210	220	230	240		
	V2 (kt IAS)	118	118	122	124	126	129	133	137	141	144	148	151	154		
	VR (kt IAS)	114	114	118	120	122	125	129	133	137	140	144	147	150		
	V1 (kt IAS)	114	114	114	114	116	119	123	127	131	134	138	141	144		

CONF 3	CORRECTED WEIGHT (1000 kg)	<160.8	160.8	167.5	167.5 to 240										
	MTOW (1000 kg)	–	150	167.5	EQUAL TO CORRECTED WEIGHT										
	ACTUAL WEIGHT (1000 kg)	<150	150	160	167.5	170	180	190	200	210	220	230	240		
	V2 (kt IAS)	118	118	122	125	126	130	134	138	141	144	147	150		
	VR (kt IAS)	114	114	118	121	122	126	130	134	137	140	143	146		
	V1 (kt IAS)	114	114	114	114	115	119	123	127	130	133	136	139		

TAKEOFF FROM A 6.3 MM (1/4 INCH) SLUSH 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	35.0 28.2	32.1 27.6	26.9 23.8	22.2 19.5	28.3 23.7	24.1 20.9	25.5 23.3	21.3 18.1	19.1 17.2	23.1 22.1

- 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 25 900 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 25 900 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	<148.7	148.7	150	160	160 to 240									
	MTOW (1000 kg)	—	130	134	160	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<130	130	140	150	160	170	180	190	200	210	220	230	240	
	V2 (kt IAS)	120	120	124	129	133	137	141	145	149	153	156	160	163	
	VR (kt IAS)	114	114	118	123	127	131	135	139	143	147	150	154	157	
V1 (kt IAS)		114	114	114	114	114	118	122	126	130	134	137	141	144	

CONF 2	CORRECTED WEIGHT (1000 kg)	<161.1	161.1	170	175	175 to 240									
	MTOW (1000 kg)	–	142.5	162	175	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<142.5	142.5	150	160	170	175	180	190	200	210	220	230	240	
	V2 (kt IAS)	119	119	122	126	129	131	133	137	141	144	148	151	154	
	VR (kt IAS)	114	114	117	121	124	126	128	132	136	139	143	146	149	
	V1 (kt IAS)	114	114	114	114	114	114	116	120	124	127	131	134	137	

CONF 3	CORRECTED WEIGHT (1000 kg)	<171.9	171.9	180	182.5	182.5 to 240							
	MTOW (1000 kg)	—	155	176	182.5	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	<155	155	160	170	180	182.5	190	200	210	220	230	240
	V2 (kt IAS)	120	120	122	126	130	131	134	138	141	144	147	150
	VR (kt IAS)	114	114	116	120	124	125	128	132	135	138	141	144
	V1 (kt IAS)	114	114	114	114	114	114	117	121	124	127	130	133

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	45.2 39.5	53.0 50.0	58.7 56.5	58.4 56.5	35.8 33.0	46.8 45.0	54.0 53.0	38.9 37.0	36.9 36.0	48.0 48.0

- 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)	< 155	155	155 to 220						
	MTOW (1000 kg)	–	155	EQUAL TO CORRECTED WEIGHT						
	ACTUAL WEIGHT (1000 kg)	< 155	155	160	170	180	190	200	210	220
	V2 (kt IAS)	132	132	134	138	143	147	150	155	159
	VR (kt IAS)	130	130	132	136	141	145	148	153	157
	V1 (kt IAS)	128	128	130	134	139	143	146	151	155

CONF 2	CORRECTED WEIGHT (1000 kg)	< 174	174	174 to 220						
	MTOW (1000 kg)	–	174	EQUAL TO CORRECTED WEIGHT						
	ACTUAL WEIGHT (1000 kg)	< 174	174	175	180	190	200	210	220	
	V2 (kt IAS)	132	132	133	135	139	142	146	150	
	VR (kt IAS)	130	130	131	133	137	140	144	148	
	V1 (kt IAS)	128	128	129	131	135	138	142	146	

CONF 3	CORRECTED WEIGHT (1000 kg)	< 190	190	190 to 220		
	MTOW (1000 kg)	–	190	EQUAL TO CORRECTED WEIGHT		
	ACTUAL WEIGHT (1000 kg)	< 190	190	200	210	220
	V2 (kt IAS)	134	134	138	142	146
	VR (kt IAS)	132	132	136	140	144
	V1 (kt IAS)	130	130	134	138	142

TAKEOFF FROM A COMPACTED SNOW 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	11.7 6.0	5.0 2.0	11.7 9.5	14.4 12.5	8.3 5.5	16.3 14.5	21.5 20.5	14.9 13.0	19.9 19.0	19.0 19.0

- 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 20000 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is the MTOW on dry runway minus 20 000 kg. Then determine take-off speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	< 168.3	168.3	170	173.3	173.3 to 220					
	MTOW (1000 kg)	–	155	160	173.3	EQUAL TO CORRECTED WEIGHT					
	ACTUAL WEIGHT (1000 kg)	<155	155	160	170	173.3	180	190	200	210	220
	V2 (kt IAS)	132	132	134	138	140	143	147	150	155	159
	VR (kt IAS)	125	125	127	131	133	136	140	143	148	152
	V1 (kt IAS)	125	125	125	125	125	128	132	135	140	144

CONF 2	CORRECTED WEIGHT (1000 kg)	< 184.7	184.7	185	190	190 to 220				
	MTOW (1000 kg)	–	174	175	190	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	< 174	174	180	190	200	210	220		
	V2 (kt IAS)	132	132	135	139	142	146	150		
	VR (kt IAS)	127	127	130	134	137	141	145		
	V1 (kt IAS)	125	125	125	125	128	132	136		

CONF 3	CORRECTED WEIGHT (1000 kg)	< 190	190	190 to 220			
	MTOW (1000 kg)	–	190	EQUAL TO CORRECTED WEIGHT			
	ACTUAL WEIGHT (1000 kg)	< 190	190	200	210	220	
	V2 (kt IAS)	134	134	138	142	146	
	VR (kt IAS)	129	129	133	137	141	
	V1 (kt IAS)	129	129	133	137	141	

TAKEOFF FROM A 12.7 MM (1/2 INCH) SLUSH 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
△WEIGHT (1000 kg) With clearway Without clearway	51.0 44.2	52.6 48.1	50.4 47.3	56.0 53.3	48.4 43.8	49.2 46.0	56.6 54.4	39.4 36.2	46.7 44.8	50.5 49.5

- 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)	<137.3	137.3	140	144	144 to 240											
	MTOW (1000 kg)	—	125	132	144	EQUAL TO CORRECTED WEIGHT											
	ACTUAL WEIGHT (1000 kg)	<125	125	130	140	144	150	160	170	180	190	200	210	220	230	240	
	V2 (kt IAS)	118	118	120	124	126	129	133	137	141	145	149	153	156	160	163	
	VR (kt IAS)	114	114	116	120	122	125	129	133	137	141	145	149	152	156	159	
	V1 (kt IAS)	114	114	114	114	114	117	121	125	129	133	137	141	144	148	151	

CONF 2	CORRECTED WEIGHT (1000 kg)	<149.8	149.8	150	157.5	157.5 to 240									
	MTOW (1000 kg)	–	137.5	138	157.5	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<137.5	137.5	140	150	157.5	160	170	180	190	200	210	220	230	240
	V2 (kt IAS)	117	117	118	122	125	126	129	133	137	141	144	148	151	154
	VR (kt IAS)	114	114	115	119	122	123	126	130	134	138	141	145	148	151
	V1 (kt IAS)	114	114	114	114	114	115	118	122	126	130	133	137	140	143

CONF 3	CORRECTED WEIGHT (1000 kg)	<156.7	156.7	160	162.5	162.5 to 240									
	MTOW (1000 kg)	–	147.5	156	162.5	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<147.5	147.5	150	160	162.5	170	180	190	200	210	220	230	240	
	V2 (kt IAS)	117	117	118	122	123	126	130	134	138	141	144	147	150	
	VR (kt IAS)	114	114	115	119	120	123	127	131	135	138	141	144	147	
	V1 (kt IAS)	114	114	114	114	114	117	121	125	129	132	135	138	141	

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	17.1 10.3	14.2 9.7	8.9 5.8	14.9 12.2	11.3 6.7	14.0 10.8	25.5 23.3	11.9 8.7	19.4 17.5	22.9 21.9

- 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 25900 kg below the MTOW on dry runway. If not, the MTOW on contaminated runway is MTOW on dry runway minus 25900 kg. Then determine takeoff speeds associated with actual TOW.

CONF 1 + F	CORRECTED WEIGHT (1000 kg)	<153.5	153.5	160	165	165 to 240									
	MTOW (1000 kg)	–	135	152	165	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<135	135	140	150	160	165	170	180	190	200	210	220	230	240
	V2 (kt IAS)	122	122	124	129	133	135	137	141	145	149	153	156	160	163
	VR (kt IAS)	114	114	116	121	125	127	129	133	137	141	145	148	152	155
	V1 (kt IAS)	114	114	114	114	114	114	116	120	124	128	132	135	139	142

CONF 2	CORRECTED WEIGHT (1000 kg)	<170	170	180	182.5	182.5 to 240									
	MTOW (1000 kg)	–	150	176	182.5	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<150	150	160	170	180	182.5	190	200	210	220	230	240		
	V2 (kt IAS)	122	122	126	129	133	134	137	141	144	148	151	154		
	VR (kt IAS)	114	114	118	121	125	126	129	133	136	140	143	146		
	V1 (kt IAS)	114	114	114	114	114	114	117	121	124	128	131	134		

CONF 3	CORRECTED WEIGHT (1000 kg)	<178.5	178.5	180	190	190 to 240									
	MTOW (1000 kg)	–	160	164	190	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<160	160	170	180	190	200	210	220	230	240				
	V2 (kt IAS)	122	122	126	130	134	138	141	144	147	150				
	VR (kt IAS)	114	114	118	122	126	130	133	136	139	142				
	V1 (kt IAS)	114	114	114	114	114	118	121	124	127	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 takeoff and to land with a crosswind component higher than :

Reported braking action	Reported runway friction coefficient	Maximum crosswind (kt)	Equivalent runway condition**
Good	≥ 0.4	32*	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		Not defined	4/5

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

** 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**

- R
- R
- R
- R
- R
- Avoid high thrust settings.
 - When taxiing on slippery surfaces, stay well behind preceding aircraft.
 - Taxi at low taxi speed. Note that antiskid does not operate at low 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 of 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.
 - 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 RECOMMENDATIONS **CONSIDER**

- R
- For contaminated runways, select MAX TO.
 - Do not abort takeoff for minor deficiencies even at low speeds.
 - 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

- R — **FOLLOWING LANDING PROCEDURES CONSIDER**
- Avoid landing on contaminated runways if the antiskid is not functioning. The use of autobrake LOW or MED is recommended provided that the contamination is evenly distributed.
 - Approach at the normal speed.
- R — 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 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.
- R — 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, no wind, CONF 2

- Determine maximum takeoff weight on dry runway from RTOW chart (Refer to FCOM 2.02.10 p 6)

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
32.0	204.8 3/4 139/42/47	210.1 3/4 143/46/51	215.4 3/4 148/50/54	218.9 3/4 151/52/57	221.7 3/4 154/56/60
34.0	202.8 3/4 139/41/47	208.0 3/4 143/45/50	213.2 3/4 147/49/54	216.6 3/4 150/52/56	219.4 3/4 153/56/60
36.0	200.7 3/4 138/41/46	205.8 3/4 143/45/50	210.9 3/4 147/49/53	214.3 3/4 150/51/56	217.0 3/4 153/55/59

Maximum TOW = 213200 kg, V1 = 147 kt, VR = 149 kt, V2 = 154 kt.

TAKEOFF PERFORMANCE ON WET RUNWAY

With thrust reversers operating and assuming that no clearway was used to compute the dry RTOW chart, use the lower table from 2.04.10 p 4.

TAKEOFF CONFIGURATION	1+F			2		3			
RUNWAY LENGTH (M) (FT)	3000 10000	3500 11500	4000 13000 AND ABOVE	2500 8000	3000 10000	3500 11500 AND ABOVE	2000 6500	2500 8000	3000 10000 AND ABOVE
FLEX TO TEMPERATURE DECREMENT (°C)	0	0	1	0	1	1	0	1	1
MAX TO WEIGHT DECREMENT (1000 KG) (1000 LB)	0.0 0.0	0.0 0.0	0.3 0.7	0.0 0.0	0.3 0.7	0.6 1.3	0.0 0.0	0.4 0.9	0.4 0.9
V1 DECREMENT (KT)	6	5	5	5	4	4	5	5	4
VR AND V2 DECREMENT (KT)	0	0	1	0	0	1	0	0	1

- Maximum takeoff weight correction :
 MTOW = 213200 – 300 = 212900 kg, V1 = 147 – 4 = 143 kt, VR = 149 kt, V2 = 154 kt.
 • Flex temperature correction :
 Assuming an actual takeoff weight of 200000 kg and an initial flex temperature of 44°C
 TOW = 200000 kg ⇒ Flex temperature = 44 – 1 = 43°C
 V1 = 146 – 4 = 142 kt, VR = 148 kt, V2 = 152 kt.

LANDING

- R — FOLLOWING LANDING PROCEDURES **CONSIDER**
- Avoid landing on contaminated runways if the antiskid is not functioning. The use of autobrake LOW or MED is recommended provided that the contamination is evenly distributed.

— Approach at the normal speed.

R — 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 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.

R — 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)

6FC5-02-04.10-015-A010AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
0.0	212.3 3/4 145/47/53	217.7 3/4 149/51/57	223.0 3/4 154/56/61	226.5 3/4 157/59/63	228.8 3/4 161/63/67
10.0	210.7 3/4 143/45/51	216.1 3/4 147/50/55	221.4 3/4 152/54/59	225.0 3/4 155/57/61	227.6 3/4 158/60/65

- R
- Maximum takeoff weight on dry runway = 222200 kg
- Determine a corrected weight (Refer to FCOM 2.04.10 p 9). As no clearway, use the correction displayed on the second line (without clearway).
- R
- R

6FC5-02-04.10-015-B010AA

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	45.2	53.0	58.7	58.4	35.8	46.8	54.0	38.9	36.9	48.0
Without clearway	39.5	50.0	56.5	56.5	33.0	45.0	53.0	37.0	36.0	48.0

- Corrected weight = 222200 – 45000 = 177200 kg
- Determine maximum takeoff weight and associated speeds :

6FC5-02-04.10-015-C010AA

C O N F 2	CORRECTED WEIGHT (1000 kg)	<174	174 to 220							
	MTOW (1000 kg)	-	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	<174	174	180	190	200	210	220		
	V2 (kt IAS)	132	132	135	139	142	146	150		
	VR (kt IAS)	130	130	133	137	140	144	148		
	V1 (kt IAS)	128	128	131	135	138	142	146		

- R
- MTOW = 177200 kg
- V1 = 129 kt, VR = 132 kt, V2 = 134 kt

TAKEOFF PERFORMANCE ON RUNWAY COVERED WITH 1/4 INCH WATER

Data

- R
- Runway length 3000 m (no clearway), OAT = 46°C, no wind, CONF 2
- Determine maximum takeoff weight on dry runway (Refer to FCOM 2.02.10 p 6)

GFC5-02-0410-016-A010AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
44.0	190.8 3/4 138/39/44	195.5 3/4 142/44/48	200.1 3/4 146/48/52	203.2 3/4 149/50/54	205.8 3/4 152/53/57
46.0	187.1 3/4 137/39/44	191.7 3/4 141/43/47	196.1 3/4 146/47/51	199.1 3/4 149/49/53	201.7 3/4 152/52/56
48.0	183.4 3/4 137/39/43	187.6 3/4 141/43/47	191.9 3/4 146/46/50	194.8 3/4 148/49/53	197.4 3/4 151/52/55

Maximum takeoff weight on dry runway = 196100 kg

- R
- Determine a corrected weight (Refer to FCOM 2.04.10 p 6). As no clearway, use the
- R
- correction displayed on the second line (without clearway).
- R

GFC5-02-0410-016-B010AA

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	29.2	26.5	23.7	13.4	23.3	21.8	21.0	20.9	19.9	19.0
Without clearway	23.5	23.5	21.5	11.5	20.5	20.0	20.0	19.0	19.0	19.0

Corrected weight = 196100 – 20000 = 176100 kg

- Determine maximum takeoff weight :

GFC5-02-0410-016-C010AA

CONF 2	CORRECTED WEIGHT (1000 kg)	<177	177	180	180 to 220				
	MTOW (1000 kg)	-	174	180	EQUAL TO CORRECTED WEIGHT				
	ACTUAL WEIGHT (1000 kg)	<174	174	180	190	200	210	220	
	V2 (kt IAS)	132	132	135	139	142	146	150	
	VR (kt IAS)	129	129	132	136	139	143	147	
	V1 (kt IAS)	125	125	125	129	132	136	140	

For corrected weight 176100 kg < 177000 kg no takeoff weight can be determined with this method.

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).

6FC5-02-04.10-015-A115AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
0.0	212.3 3/4 145/47/53	217.7 3/4 149/51/57	223.0 3/4 154/56/61	226.5 3/4 157/59/63	228.8 3/4 161/63/67
10.0	210.7 3/4 143/45/51	216.1 3/4 147/50/55	221.4 3/4 152/54/59	225.0 3/4 155/57/61	227.6 3/4 158/60/65

- R
- Maximum takeoff weight on dry runway = 222200 kg
- Determine a corrected weight (Refer to FCOM 2.04.10 p 9). As no clearway, use the correction displayed on the second line (without clearway).
- R
- R

6FC5-02-04.10-015-B115AA

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	51.0	52.6	50.4	56.0	48.4	49.2	56.6	39.4	46.7	50.5
Without clearway	44.2	48.1	47.3	53.3	43.8	46.0	54.4	36.2	44.8	49.5

- Corrected weight = 222200 – 46000 = 176200
- Determine maximum takeoff weight and associated speeds :

6FC5-02-04.10-015-C115AA

C O N F I D	CORRECTED WEIGHT (1000 kg)	<149.8	149.8	150	157.5	157.5 to 240									
	MTOW (1000 kg)	-	137.5	138	157.5	EQUAL TO CORRECTED WEIGHT									
	ACTUAL WEIGHT (1000 kg)	<137.5	137.5	140	150	157.5	160	170	180	190	200	210	220	230	240
	V2 (kt IAS)	117	117	118	122	125	126	129	133	137	141	144	148	151	154
	VR (kt IAS)	114	114	115	119	122	123	126	130	134	138	141	145	148	151
	V1 (kt IAS)	114	114	114	114	114	115	118	122	126	130	133	137	140	143

MTOW = 176200 kg

V1 = 120 kt, VR = 129 kt, V2 = 132 kt

TAKEOFF PERFORMANCE ON RUNWAY COVERED WITH 1/4 INCH WATER

Data

- R
- Runway length : 3000 m (no clearway), OAT = 50°C, 10 kt tailwind, CONF 2
- Determine maximum takeoff weight on dry runway (Refer to FCOM 2.02.10 p 6).

GFC5-02-04.10-016-A115AA

OAT °C	CONF 2				
	TAILWIND -10 KT	TAILWIND -5 KT	WIND 0 KT	HEADWIND 10 KT	HEADWIND 20 KT
48.0	183.4 3/4 137/39/43	187.7 3/4 141/43/47	191.9 3/4 146/46/50	194.8 3/4 148/49/53	197.4 3/4 151/52/55
50.0	179.4 3/4 137/38/43	183.5 3/4 141/42/46	187.6 3/4 145/46/49	190.4 3/4 148/48/52	192.8 3/4 151/51/54
52.0	175.3 3/4 136/38/42	179.3 3/4 141/41/45	183.2 3/4 145/45/49	185.8 3/4 148/48/51	188.1 3/4 150/50/53

Maximum takeoff weight on dry runway = 179400 kg

- R
- Determine a corrected weight (Refer to FCOM 2.04.10 p 6). As no clearway, use the
- R
- correction displayed on the second line (without clearway).
- R

GFC5-02-04.10-016-B115AA

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	33.8	33.2	27.1	23.2	29.0	24.7	25.5	20.1	19.1	23.2
Without clearway	27.0	28.7	24.0	20.5	24.4	21.5	23.3	16.9	17.2	22.2

Corrected weight = 179400 – 21500 = 157900 kg

- Determine maximum takeoff weight :

GFC5-02-04.10-016-C115AA

C O N F I D	CORRECTED WEIGHT (1000 kg)	<165.9	165.9	170	180	180 to 240							
	MTOW (1000 kg)	-	145	154	180	EQUAL TO CORRECTED WEIGHT							
	ACTUAL WEIGHT (1000 kg)	<145	145	150	160	170	180	190	200	210	220	230	240
	V2 (kt IAS)	120	120	122	126	129	133	137	141	144	148	151	154
	VR (kt IAS)	114	114	116	120	123	127	131	135	138	142	145	148
	V1 (kt IAS)	114	114	114	114	114	114	118	122	125	129	132	135

For corrected weight 157900 kg < 165900 kg no takeoff weight can be determined with this method.

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	SPECIAL OPERATIONS		2.04.20	P 1
	FLIGHT WITHOUT CAB PRESSURIZATION		SEQ 001	REV 06

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. If cabin altitude exceeds 9950 ($\pm$ 350) feet, the EXCESS CAB ALT warning on the ECAM will be activated. 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.

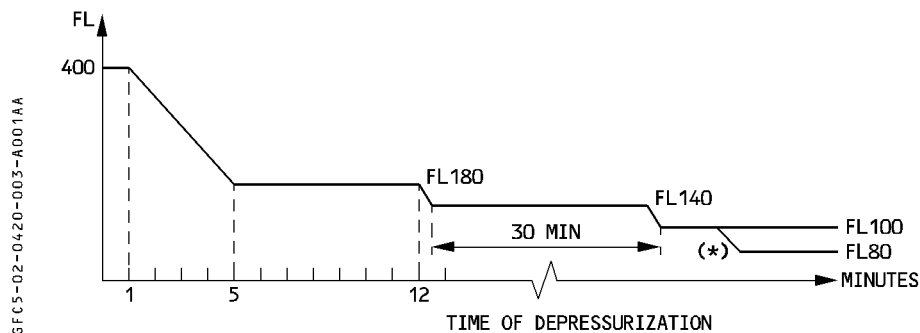
CLIMB AND DESCENT RATE

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 through individual modules, the capacity of which is so that the aircraft must descend and remain below the following profile.



- R (*) Between FL 80 and FL 100, oxygen must be provided for 2 % of the passengers.
- R This is achieved by portable oxygen. When this is no longer achievable, descend
- R to FL 80.
- R For performance at FL 80/250 kt, use data for FL 100/LRC given in 3.05.15, fuel
- R consumption will be lower by several percent depending on the aircraft weight.

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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
 - MAN V/S CTL AS RQRD
- R
- 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.

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
- Climb from 1500 ft at 250 kt
- Long range cruise speed at FL100
- Descent to 1500 ft at 250 kt
- Approach and landing : IMC procedure 240 kg or 530 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 0.010 kg/°C/NM or 0.022 lb/°C/NM.

R

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250 KT - CRUISE : LONG RANGE - DESCENT : 250KT IMC PROCEDURE : 240 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)						
	140	160	180	200	220	240	
300	5197 1.11	5526 1.08	5871 1.07	6242 1.06	6616 1.04	6994 1.03	
400	6663 1.32	7088 1.28	7523 1.26	7988 1.24	8454 1.22	8916 1.20	
500	8123 1.53	8642 1.48	9168 1.45	9727 1.42	10285 1.39	10829 1.36	
600	9577 2.14	10190 2.08	10805 2.04	11457 2.00	12107 1.56	12734 1.53	
700	11023 2.35	11730 2.27	12435 2.23	13179 2.19	13923 2.13	14630 2.09	
800	12464 2.56	13263 2.47	14057 2.42	14893 2.37	15730 2.31	16518 2.26	
900	13898 3.18	14789 3.07	15672 3.02	16599 2.56	17529 2.48	18398 2.43	
1000	15325 3.39	16309 3.27	17280 3.21	18297 3.14	19320 3.06	20271 3.00	
1100	16747 4.01	17819 3.48	18881 3.40	19987 3.33	21104 3.23	22135 3.17	
1200	18163 4.22	19322 4.08	20475 3.59	21668 3.52	22881 3.41	23992 3.34	
1300	19572 4.44	20818 4.28	22062 4.19	23341 4.10	24651 3.58	25841 3.51	
1400	20976 5.05	22308 4.49	23642 4.38	25006 4.29	26413 4.16	27682 4.08	
1500	22372 5.27	23790 5.10	25216 4.58	26663 4.48	28168 4.34	29516 4.25	
1600	23760 5.49	25266 5.30	26781 5.17	28312 5.07	29914 4.52	31343 4.42	
1700	25141 6.11	26735 5.51	28339 5.37	29954 5.26	31643 5.10	33162 5.00	
1800	26516 6.33	28198 6.12	29890 5.57	31589 5.45	33364 5.28	34974 5.17	
1900	27885 6.55	29654 6.33	31434 6.16	33216 6.04	35077 5.47	36779 5.34	
2000	29249 7.17	31104 6.55	32972 6.36	34836 6.23	36782 6.05	38577 5.52	
2100	30606 7.39	32544 7.16	34503 6.56	36448 6.43	38479 6.24	40367 6.09	
2200	31957 8.02	33975 7.38	36028 7.16	38053 7.02	40168 6.43	42150 6.27	
2300	33303 8.24	35400 7.59	37546 7.36	39650 7.21	41850 7.02	43926 6.45	
2400	34643 8.46	36819 8.21	39058 7.56	41240 7.41	43524 7.21	45696 7.02	
2500	35977 9.09	38231 8.43	40564 8.16	42824 8.00	45192 7.40	47458 7.20	
2600	37304 9.32	39637 9.05	42060 8.36	44401 8.20	46852 7.59	49214 7.38	
2700	38613 9.56	41037 9.27	43548 8.56	45971 8.39	48505 8.18	50964 7.56	
AIR CONDITIONING OFF ΔFUEL = - 2 %		ENGINE ANTI ICE ON ΔFUEL = + 3 %		TOTAL ANTI ICE ON ΔFUEL = + 4 %			

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)				HEAD WIND
	+ 90	+ 60	+ 30	0	-30	-60	-90
300	241	258	277	300	327	359	398
400	321	343	370	400	436	479	531
500	401	429	462	500	545	599	664
600	481	515	554	600	654	718	797
700	561	601	647	700	763	838	930
800	641	687	739	800	872	958	1063
900	722	773	831	900	981	1078	1195
1000	802	859	924	1000	1090	1197	1328
1100	882	944	1016	1100	1199	1317	1461
1200	962	1030	1109	1200	1308	1437	1594
1300	1042	1116	1201	1300	1417	1556	1727
1400	1123	1202	1293	1400	1526	1676	1860
1500	1203	1288	1386	1500	1635	1796	1992
1600	1283	1374	1478	1600	1744	1916	2125
1700	1363	1460	1571	1700	1853	2035	2258
1800	1443	1545	1663	1800	1962	2155	2391
1900	1523	1631	1755	1900	2071	2275	2524
2000	1604	1717	1848	2000	2180	2395	2657
2100	1684	1803	1940	2100	2289	2514	2789
2200	1764	1889	2033	2200	2398	2634	2922
2300	1844	1975	2125	2300	2507	2754	3055
2400	1924	2060	2217	2400	2615	2873	3188
2500	2005	2146	2310	2500	2724	2993	3321
2600	2085	2232	2402	2600	2833	3113	3454
2700	2165	2318	2494	2700	2942	3233	3586

R

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING						
CLIMB : 250 KT - CRUISE : LONG RANGE - DESCENT : 250KT						
IMC PROCEDURE : 240 KG (6MIN)						
FL 100						
NORMAL AIR CONDITIONING			ISA		FUEL CONSUMED (KG)	
ANTI-ICING OFF			CG = 30.0%		TIME (H.MIN)	
AIR DIST. (NM)	INITIAL WEIGHT (1000KG)					
	140	160	180	200	220	240
300	5068 1.11	5377 1.09	5710 1.08	6058 1.07	6423 1.05	6786 1.04
400	6490 1.33	6889 1.29	7311 1.27	7749 1.25	8209 1.22	8656 1.21
500	7905 1.54	8393 1.49	8905 1.46	9433 1.44	9987 1.40	10518 1.38
600	9314 2.15	9890 2.10	10493 2.05	11109 2.02	11758 1.58	12373 1.54
700	10717 2.37	11381 2.30	12072 2.25	12776 2.21	13521 2.15	14221 2.11
800	12114 2.58	12864 2.50	13645 2.44	14437 2.40	15274 2.33	16061 2.28
900	13504 3.20	14341 3.11	15211 3.04	16090 2.58	17017 2.51	17894 2.45
1000	14889 3.41	15812 3.32	16770 3.23	17735 3.17	18751 3.09	19720 3.03
1100	16268 4.03	17274 3.53	18322 3.43	19373 3.36	20477 3.27	21539 3.20
1200	17642 4.25	18729 4.13	19868 4.02	21003 3.55	22195 3.46	23351 3.37
1300	19009 4.46	20177 4.35	21407 4.22	22624 4.14	23905 4.04	25153 3.54
1400	20371 5.08	21618 4.56	22940 4.42	24239 4.33	25606 4.23	26945 4.12
1500	21727 5.30	23053 5.17	24466 5.01	25846 4.52	27300 4.41	28730 4.29
1600	23073 5.53	24482 5.38	25986 5.21	27446 5.12	28986 5.00	30508 4.47
1700	24411 6.16	25904 6.00	27496 5.41	29038 5.31	30664 5.19	32278 5.04
1800	25743 6.39	27320 6.22	28999 6.01	30624 5.50	32335 5.38	34041 5.22
1900	27069 7.02	28729 6.43	30496 6.21	32203 6.10	33999 5.56	35797 5.40
2000	28389 7.25	30133 7.05	31987 6.41	33775 6.29	35655 6.15	37546 5.58
2100	29703 7.48	31530 7.27	33471 7.02	35340 6.49	37304 6.34	39287 6.16
2200	31012 8.12	32925 7.49	34949 7.22	36901 7.08	38946 6.53	41019 6.34
2300	32314 8.36	34315 8.10	36421 7.42	38455 7.28	40581 7.12	42744 6.52
2400	33611 9.00	35699 8.32	37887 8.03	40002 7.47	42209 7.31	44462 7.10
2500	34902 9.24	37078 8.53	39346 8.23	41543 8.07	43830 7.50	46173 7.28
2600	36188 9.48	38451 9.15	40800 8.44	43079 8.27	45443 8.10	47877 7.46
2700	37467 10.13	39819 9.37	42243 9.05	44608 8.46	47048 8.29	49574 8.04
AIR CONDITIONING OFF ΔFUEL = - 2 %		ENGINE ANTI ICE ON ΔFUEL = + 3 %		TOTAL ANTI ICE ON ΔFUEL = + 4 %		

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)			HEAD WIND	
	+ 90	+ 60	+ 30	0	-30	-60	-90
300	241	258	277	300	327	359	398
400	321	343	370	400	436	479	531
500	401	429	462	500	545	599	664
600	481	515	554	600	654	718	797
700	561	601	647	700	763	838	930
800	641	687	739	800	872	958	1063
900	722	773	831	900	981	1078	1195
1000	802	859	924	1000	1090	1197	1328
1100	882	944	1016	1100	1199	1317	1461
1200	962	1030	1109	1200	1308	1437	1594
1300	1042	1116	1201	1300	1417	1556	1727
1400	1123	1202	1293	1400	1526	1676	1860
1500	1203	1288	1386	1500	1635	1796	1992
1600	1283	1374	1478	1600	1744	1916	2125
1700	1363	1460	1571	1700	1853	2035	2258
1800	1443	1545	1663	1800	1962	2155	2391
1900	1523	1631	1755	1900	2071	2275	2524
2000	1604	1717	1848	2000	2180	2395	2657
2100	1684	1803	1940	2100	2289	2514	2789
2200	1764	1889	2033	2200	2398	2634	2922
2300	1844	1975	2125	2300	2507	2754	3055
2400	1924	2060	2217	2400	2615	2873	3188
2500	2005	2146	2310	2500	2724	2993	3321
2600	2085	2232	2402	2600	2833	3113	3454
2700	2165	2318	2494	2700	2942	3233	3586

GENERAL

R 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.
- Do not fly into expected icing conditions.
- Ditching with landing gear down has not been demonstrated.
- Disregard FM fuel predictions. Other predictions should also be disregarded (altitude, speed and time), except time predictions at waypoints when in cruise.
- 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.

R

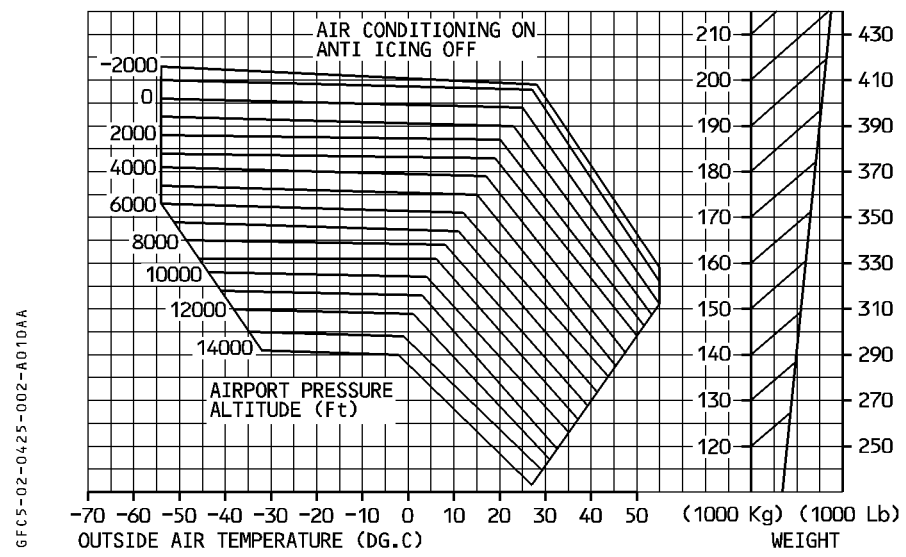
Takeoff configuration	1 + F	2	3
Weight reduction	21 %	16 %	15 %

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 + 11
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 8 to check that, in case of engine failure, 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 %.

GENERAL

R 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.
- Do not fly into expected icing conditions.
- Ditching with landing gear down has not been demonstrated.
- Disregard FM fuel predictions. Other predictions should also be disregarded (altitude, speed and time), except time predictions at waypoints when in cruise.
- 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.

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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.

R

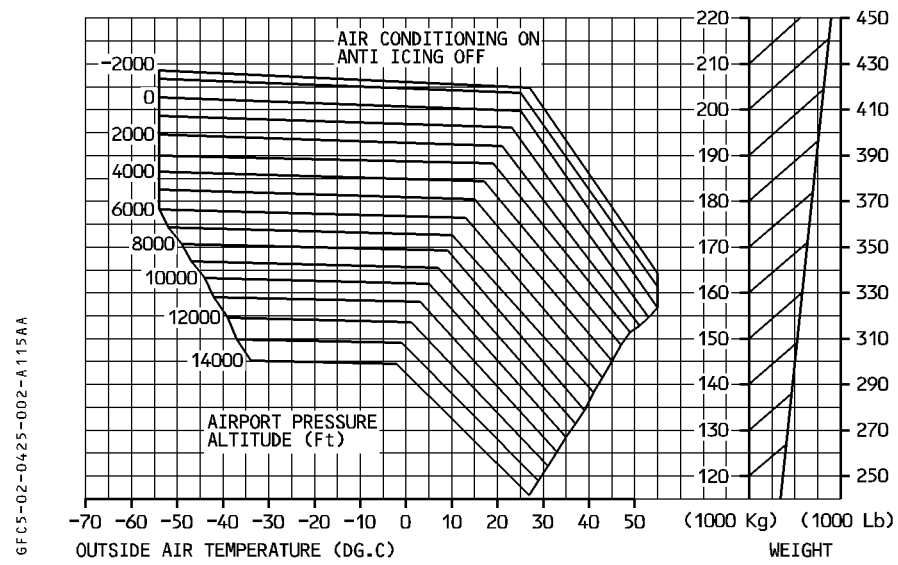
Takeoff configuration	1 + F	2	3
Weight reduction	21 %	16 %	15 %

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 + 11
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 8 to check that, in case of engine failure, 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.

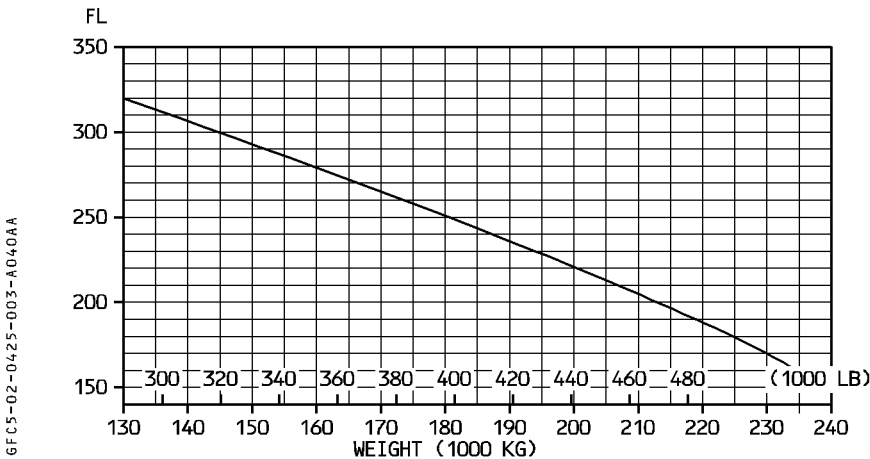
R GO AROUND PERFORMANCE

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.52 with all engines at maximum climb thrust. The tables on page 4 give the time, distance and fuel consumption according to takeoff weight.

CRUISE/DESCENT

The recommended cruise/descent speed is 240 kt/M.52.
The ceiling with an engine inoperative may be a limiting factor, and the choice of the route should reflect this concern.

ENGINE FAILURE

In case of engine failure, the airplane will drift down to the ceiling shown on page 9.
The thrust for drift down will be Maximum Continuous.
The drift down speed is equal to VLS + 5.

HOLDING

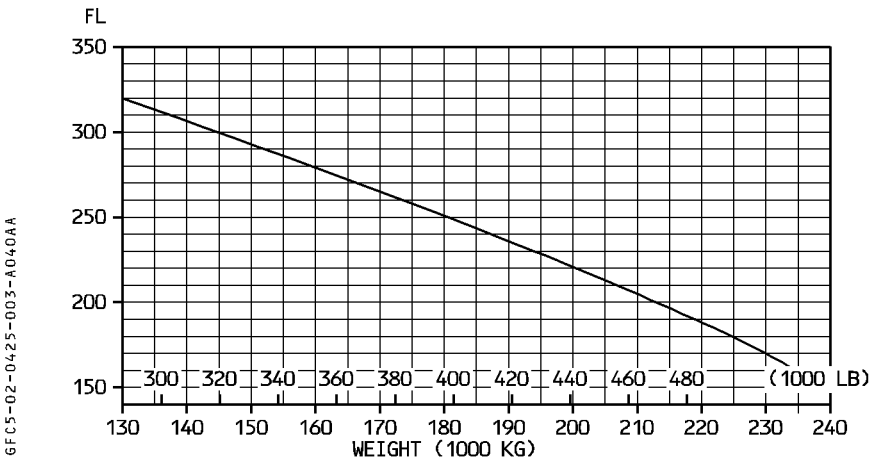
Page 7 gives the holding parameters with slats out, this configuration being the least penalizing for holding.

10D -08F0A330-301 CF6-80E1A2 21101000C5KG300 0 018590 0 0 2 1.3 500.0 300.0 1 02240,000 .520 .000 0 FCOM-G0-02-04-25-004-010

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.52 with all engines at maximum climb thrust. The tables on page 4 give the time, distance and fuel consumption according to takeoff weight.

CRUISE/DESCENT

The recommended cruise/descent speed is 240 kt/M.52.
 The ceiling with an engine inoperative may be a limiting factor, and the choice of the route should reflect this concern.

ENGINE FAILURE

In case of engine failure, the airplane will drift down to the ceiling shown on page 9.
 The thrust for drift down will be Maximum Continuous.
 The drift down speed is equal to VLS + 5.

HOLDING

Page 7 gives the holding parameters with slats out, this configuration being the least penalizing for holding.

11.0-08FOA330-200 CF6-80E1A4 21101000C5KG300 0 018590 0 0 2 1.3 520.0 300.0 1 02240.000 .520 .000 0 FCOM-GO-02-04-25-004-015

CRUISE - 240KT/M.52 - ALL ENGINES - L/G DOWN

MAX. CRUISE THRUST LIMITS 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		FL290		FL310			
130	86.1	.434	90.3	.477	94.2	.520	93.6	.520	93.5	.520	93.7	.520	94.1	.520		
	4324	240	4368	240	4349	237	3606	214	3361	205	3150	196	2969	188		
	32.1	277	34.2	299	36.7	319	43.4	313	46.2	310	48.9	308	51.4	305		
140	86.4	.434	90.6	.477	94.5	.520	94.1	.520	94.2	.520	94.6	.520	95.3	.520		
	4371	240	4416	240	4401	237	3673	214	3443	205	3244	196	3080	188		
	31.7	277	33.9	299	36.3	319	42.6	313	45.1	310	47.4	308	49.5	305		
150	86.7	.434	90.9	.477	94.9	.520	94.7	.520	95.0	.520	95.6	.520	96.6	.520		
	4420	240	4465	240	4455	237	3753	214	3535	205	3351	196	3200	188		
	31.4	277	33.5	299	35.9	319	41.7	313	43.9	310	45.9	308	47.7	305		
160	87.0	.434	91.2	.477	95.3	.520	95.5	.520	95.9	.520	96.8	.520				
	4473	240	4520	240	4515	237	3844	214	3639	205	3472	196				
	31.0	277	33.1	299	35.4	319	40.7	313	42.7	310	44.3	308				
170	87.4	.434	91.6	.477	95.7	.520	96.2	.520	97.0	.520						
	4531	240	4579	240	4582	237	3945	214	3758	205						
	30.6	277	32.6	299	34.9	319	39.7	313	41.3	310						
180	87.8	.434	92.0	.477	96.2	.520	97.1	.520	98.1	.520						
	4594	240	4644	240	4660	237	4057	214	3883	205						
	30.2	277	32.2	299	34.3	319	38.6	313	40.0	310						
190	88.3	.434	92.5	.477	96.7	.520	98.2	.520								
	4666	240	4722	240	4748	237	4181	214								
	29.7	277	31.7	299	33.6	319	37.4	313								
200	88.8	.434	92.9	.477	97.3	.520										
	4749	240	4809	240	4844	237										
	29.2	277	31.1	299	33.0	319										
210	89.2	.434	93.5	.477	98.0	.520										
	4838	240	4902	240	4949	237										
	28.7	277	30.5	299	32.3	319										
220	89.7	.434	94.0	.477	98.7	.520										
	4934	240	5001	240	5061	237										
	28.1	277	29.9	299	31.6	319										

10D -08FOA330-301 CF6-80E1A2 12101000C5KG300 0 018590 0 0 1 1.3 .0 .00 0 02240.000 520 .000 0 FCOM-G0-02-04-25-005-010

DESCENT - M.52/240KT - 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	9.4	171	46	IDLE	11.4	206	55	IDLE	188
290	8.7	160	42	IDLE	10.6	194	51	IDLE	196
270	8.0	149	38	IDLE	9.8	182	47	IDLE	205
250	7.3	138	35	IDLE	9.0	170	43	IDLE	214
240	7.0	133	33	IDLE	8.6	164	41	IDLE	218
220	6.4	123	30	IDLE	8.0	153	37	IDLE	228
200	5.9	114	27	IDLE	7.3	142	34	IDLE	237
180	5.3	105	24	IDLE	6.6	130	30	IDLE	240
160	4.7	94	21	IDLE	5.8	116	26	IDLE	240
140	4.1	83	18	IDLE	5.1	102	23	IDLE	240
120	3.5	71	15	IDLE	4.3	88	19	IDLE	240
100	2.8	59	12	IDLE	3.5	73	15	IDLE	240
50	1.2	26	5	IDLE	1.5	32	6	IDLE	240
15	.0	0	0	IDLE	.0	0	0	IDLE	240

10D -08FOA330-301 CF6-80E1A2 23101000C5KG300 0 018590 0 0-1-350.0 15.0 .00 0 02 .520240.000 .000 0 FCOM-G0-02-04-025-006-010

CRUISE - 240KT/M.52 - ALL ENGINES - L/G DOWN

MAX. CRUISE THRUST LIMITS 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		FL290		FL310			
130	85.8	.434	90.0	.477	93.9	.520	93.2	.520	93.1	.520	93.2	.520	93.5	.520		
	4274	240	4323	240	4307	237	3560	214	3312	205	3097	196	2911	188		
	32.4	277	34.6	299	37.1	319	44.0	313	46.9	310	49.7	308	52.4	305		
140	86.1	.434	90.2	.477	94.2	.520	93.7	.520	93.7	.520	94.0	.520	94.5	.520		
	4316	240	4365	240	4354	237	3620	214	3386	205	3182	196	3008	188		
	32.1	277	34.2	299	36.7	319	43.2	313	45.8	310	48.4	308	50.7	305		
150	86.3	.434	90.5	.477	94.6	.520	94.3	.520	94.5	.520	94.9	.520	95.8	.520		
	4360	240	4410	240	4402	237	3693	214	3470	205	3276	196	3123	188		
	31.8	277	33.9	299	36.3	319	42.4	313	44.7	310	47.0	308	48.8	305		
160	86.6	.434	90.8	.477	94.9	.520	94.9	.520	95.3	.520	96.0	.520				
	4407	240	4459	240	4457	237	3776	214	3563	205	3388	196				
	31.5	277	33.5	299	35.8	319	41.5	313	43.6	310	45.4	308				
170	87.0	.434	91.2	.477	95.3	.520	95.6	.520	96.2	.520	97.2	.520				
	4460	240	4513	240	4518	237	3866	214	3668	205	3511	196				
	31.1	277	33.1	299	35.4	319	40.5	313	42.3	310	43.8	308				
180	87.3	.434	91.6	.477	95.7	.520	96.4	.520	97.3	.520						
	4517	240	4573	240	4587	237	3965	214	3787	205						
	30.7	277	32.7	299	34.8	319	39.5	313	41.0	310						
190	87.7	.434	92.0	.477	96.2	.520	97.3	.520	98.5	.520						
	4580	240	4640	240	4668	237	4079	214	3924	205						
	30.3	277	32.2	299	34.2	319	38.4	313	39.5	310						
200	88.2	.434	92.4	.477	96.8	.520	98.3	.520								
	4648	240	4715	240	4755	237	4204	214								
	29.8	277	31.7	299	33.6	319	37.2	313								
210	88.6	.434	92.9	.477	97.4	.520										
	4723	240	4798	240	4849	237										
	29.4	277	31.2	299	32.9	319										
220	89.1	.434	93.4	.477	98.0	.520										
	4807	240	4886	240	4950	237										
	28.8	277	30.6	299	32.3	319										

10D-08E0A330-200 CF6-80E1A4 12101000C5KG300 0 018590 0 0 1 1.3 0 00 0 02240.000 520 000 0 ECQM-G0-02-04-25-005-015

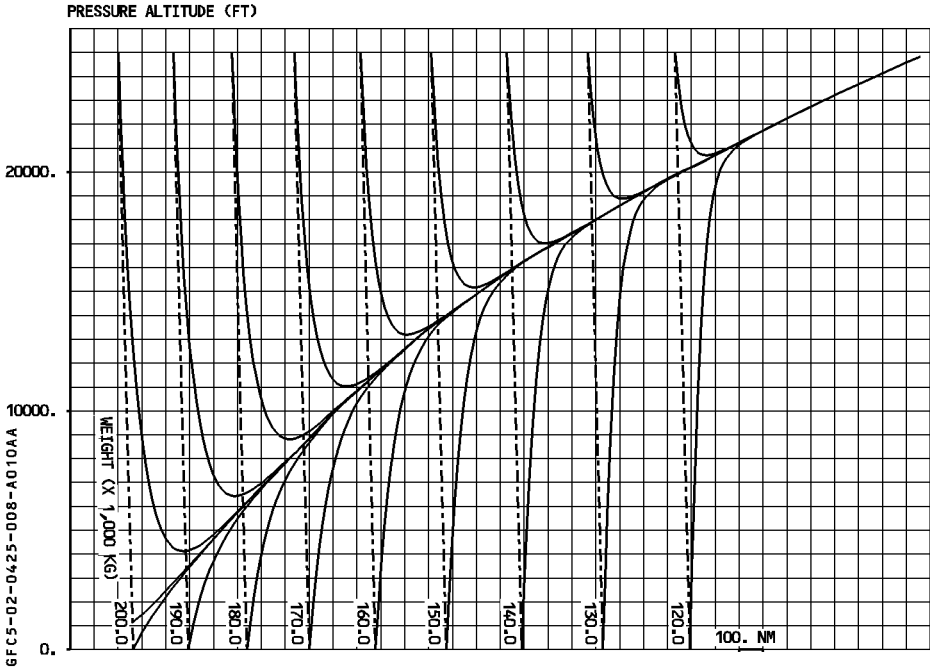
DESCENT - M.52/240KT - ALL ENGINES - L/G DOWN									
IDLE THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG=30.0%		MAXIMUM CABIN RATE OF DESCENT 350FT/MIN			
WEIGHT (1000KG)	150				200				IAS (KT)
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1	
310	9.6	174	46	IDLE	11.6	211	56	IDLE	188
290	8.8	162	42	IDLE	10.8	198	52	IDLE	196
270	8.1	151	39	IDLE	10.0	186	48	IDLE	205
250	7.4	140	35	IDLE	9.2	174	44	IDLE	214
240	7.1	135	34	IDLE	8.8	168	42	IDLE	218
220	6.5	125	31	IDLE	8.1	156	38	IDLE	228
200	6.0	116	28	IDLE	7.5	145	35	IDLE	237
180	5.4	106	25	IDLE	6.7	132	31	IDLE	240
160	4.8	95	22	IDLE	6.0	119	27	IDLE	240
140	4.2	84	18	IDLE	5.2	105	23	IDLE	240
120	3.5	72	15	IDLE	4.4	90	19	IDLE	240
100	2.9	60	12	IDLE	3.6	75	16	IDLE	240
50	1.2	26	5	IDLE	1.5	33	6	IDLE	240
15	.0	0	0	IDLE	.0	0	0	IDLE	240

10D -08FOA330-200 CF6-80E1A4 23101000C5KG300 0 018590 0 0-1-350.0 15.0 .00 0 02 .520240.000 .000 0 FCOM-G0-02-04-025-006-015

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	65.9 2677	68.9 2672	73.1 2651	74.8 2658	76.5 2667	77.4 2668	78.3 2668	80.1 2670	82.0 2681
140	68.1 2894	71.0 2880	75.2 2875	77.0 2886	78.7 2887	79.6 2887	80.5 2890	82.3 2900	84.1 2912
150	70.2 3111	73.0 3090	77.3 3108	79.0 3111	80.8 3112	81.7 3117	82.6 3122	84.4 3133	86.2 3149
160	72.1 3326	75.0 3315	79.3 3338	81.0 3338	82.8 3348	83.7 3351	84.5 3356	86.3 3373	88.2 3394
170	73.9 3544	76.8 3554	81.1 3568	82.9 3578	84.6 3583	85.5 3591	86.4 3599	88.2 3620	90.1 3644
180	75.7 3777	78.7 3800	82.9 3810	84.7 3813	86.4 3828	87.3 3837	88.2 3848	90.0 3873	92.0 3902
190	77.4 4023	80.4 4041	84.6 4047	86.3 4059	88.1 4079	89.0 4091	89.9 4104	91.8 4132	93.8 4167
200	79.2 4296	82.2 4301	86.4 4309	88.1 4330	89.9 4354	90.7 4369	91.7 4384	93.7 4416	95.8 4460
210	81.0 4566	83.8 4562	88.0 4586	89.8 4610	91.6 4641	92.5 4656	93.5 4672	95.5 4714	97.8 4774
220	82.7 4857	85.5 4847	89.8 4891	91.5 4923	93.4 4953	94.3 4972	95.3 4994	97.5 5050	100.1 5128

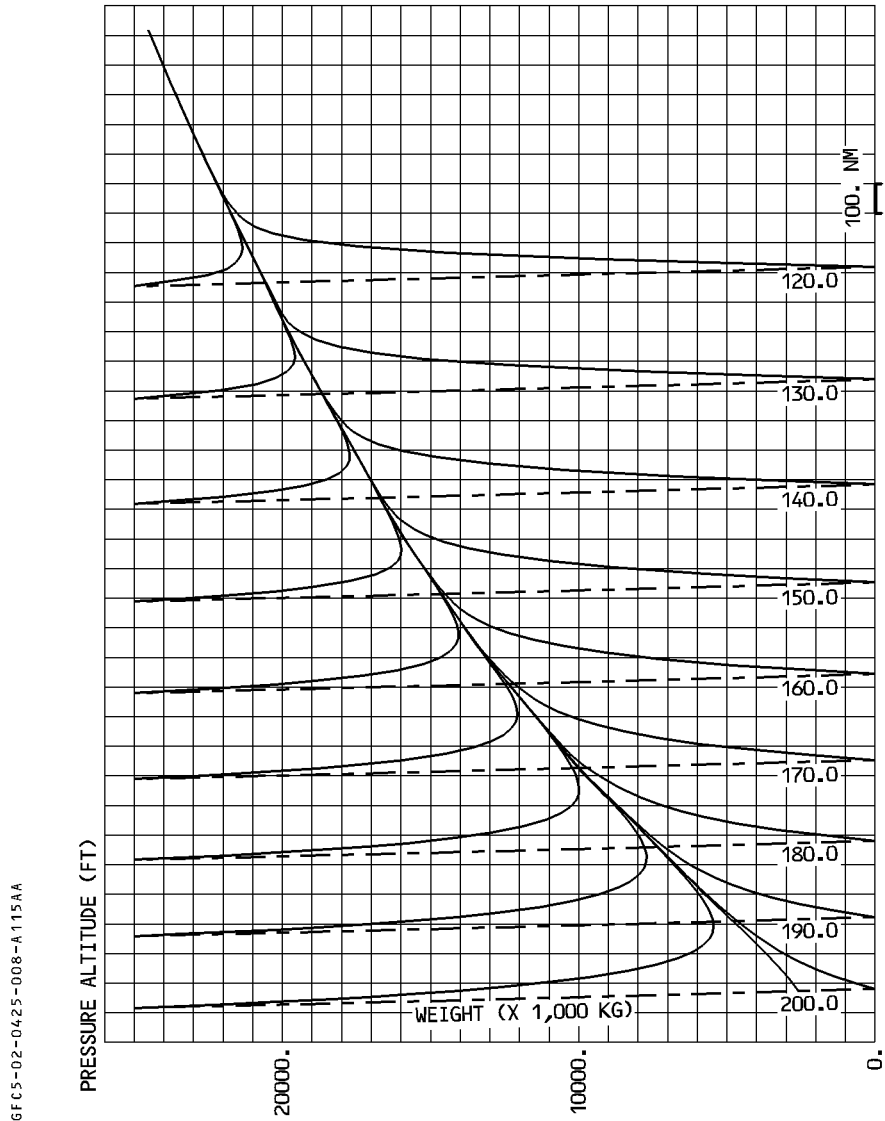
EN ROUTE NET FLIGHT PATH - L/G DOWN - ONE ENGINE OUT		
MAX. CONTINUOUS THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF	ISA C.G. = 14 %	Required gradient : 1.1 % Minimum engine



R

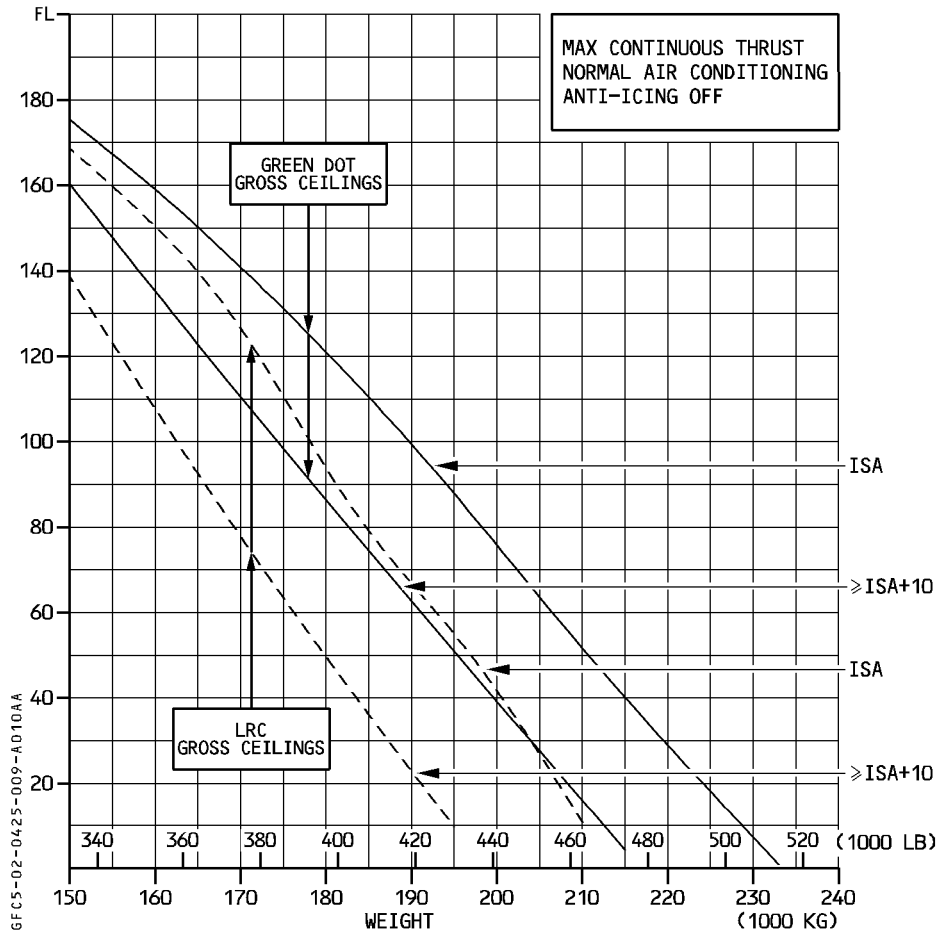
RACE TRACK HOLDING PATTERN - S SPEED - ALL ENGINES - L/G DOWN									
MAX. CRUISE THRUST LIMITS CONFIGURATION 1 NORMAL AIR CONDITIONING ANTI-ICING OFF					ISA CG=30.0%		N1 (%) FF (KG/H/ENG)		
WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL150	FL160	FL180	FL200
130	65.1 2608	68.2 2604	72.4 2584	74.1 2588	75.8 2598	76.7 2600	77.6 2601	79.4 2602	81.3 2612
140	67.3 2819	70.3 2810	74.5 2800	76.3 2812	78.0 2815	78.9 2815	79.8 2816	81.6 2826	83.4 2835
150	69.4 3033	72.3 3015	76.6 3029	78.3 3033	80.1 3033	81.0 3038	81.9 3044	83.7 3050	85.4 3067
160	71.4 3245	74.3 3231	78.5 3253	80.3 3255	82.1 3264	83.0 3264	83.8 3268	85.6 3285	87.4 3303
170	73.2 3457	76.1 3460	80.4 3480	82.2 3487	83.9 3489	84.8 3495	85.6 3504	87.5 3522	89.3 3548
180	75.0 3680	77.9 3701	82.2 3713	83.9 3713	85.6 3726	86.5 3735	87.4 3744	89.2 3769	91.2 3796
190	76.7 3915	79.6 3937	83.9 3942	85.6 3950	87.3 3969	88.2 3979	89.1 3992	91.0 4020	93.0 4050
200	78.5 4180	81.4 4190	85.6 4193	87.3 4210	89.1 4233	90.0 4247	90.9 4262	92.8 4290	94.9 4330
210	80.2 4442	83.1 4438	87.2 4455	89.0 4477	90.7 4507	91.6 4523	92.6 4536	94.6 4574	96.8 4626
220	81.9 4724	84.7 4710	88.9 4747	90.7 4775	92.5 4806	93.4 4820	94.4 4839	96.5 4889	98.9 4956

EN ROUTE NET FLIGHT PATH - L/G DOWN - ONE ENGINE OUT		
MAX. CONTINUOUS THRUST NORMAL AIR CONDITIONING ANTI-ICING OFF	ISA	Required gradient : 1.1 % Minimum engine



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

R



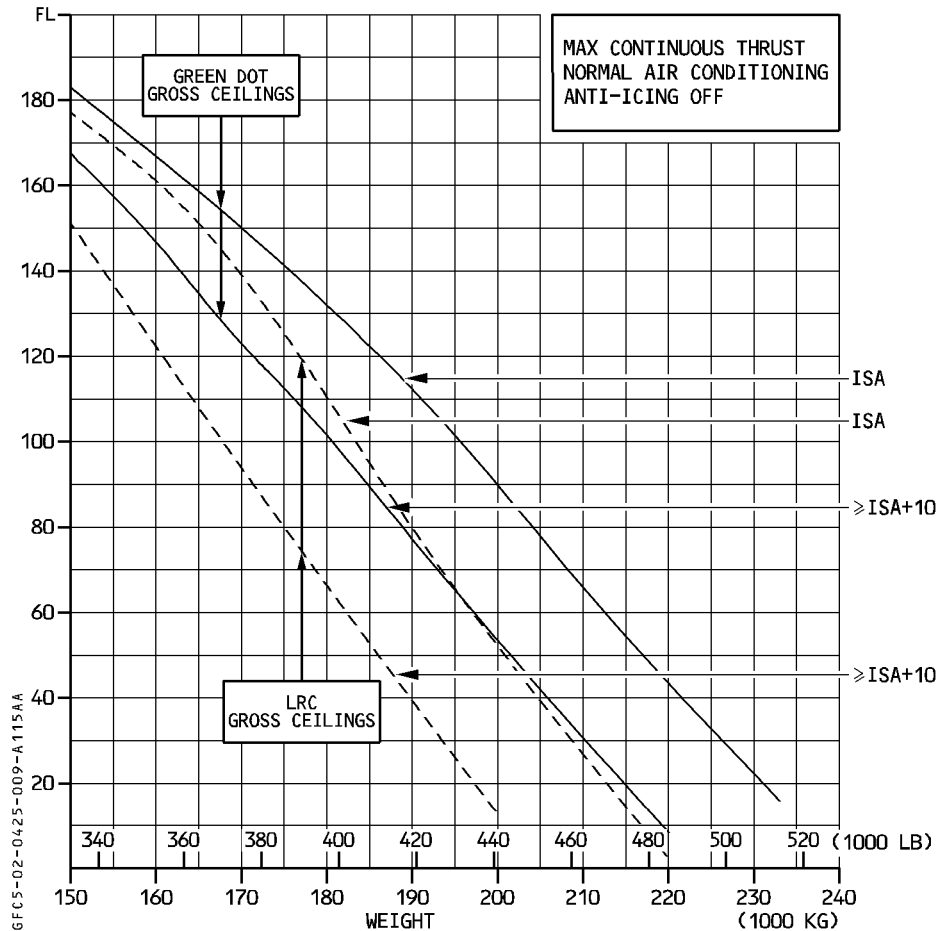
BLEED CORRECTIONS

R

		ISA	≥ ISA + 10
LONG RANGE	ENGINE ANTI ICE ON	– 200	– 1100
	TOTAL ANTI ICE ON	– 700	– 2500
GREEN DOT	ENGINE ANTI ICE ON	– 100	– 800
	TOTAL ANTI ICE ON	– 500	– 2100

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	- 200	- 1100
	TOTAL ANTI ICE ON	- 600	- 2400
GREEN DOT	ENGINE ANTI ICE ON	- 100	- 700
	TOTAL ANTI ICE ON	- 500	- 2000

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

R In case the aircraft takes off from an airfield higher than 8000 feet the cabin altitude
R remains at takeoff altitude until the cruise conditions are fulfilled (i.e. aircraft altitude
R 5000 feet above takeoff altitude and aircraft climb rate lower than 50 SLFPM for more
R 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.

R Note : After a takeoff with packs off the Cabin Pressure Controller (CLB mode) will
R control the cabin altitude to takeoff altitude + 250 feet.

— HYD

R 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.

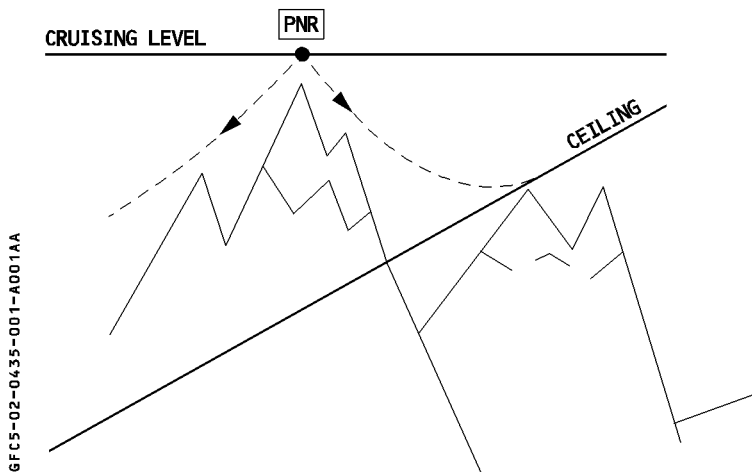
INTRODUCTION

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
- Depressurization which, due to the passenger oxygen system, requires a descent to 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 a drift down procedure. If an engine failure occurs at any point on the route, the net flight 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 failure occurs before the PNR, the aircraft must turn back.
- 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

- R A detailed study of each route over mountainous area must show that single-engine net
- R flight path and passenger oxygen system performance allow the obstacles to be cleared by
- R 1000 feet in climb and 2000 feet in cruise or descent.
- R If the aircraft in these circonstances cannot clear obstacles on the route, a PNR must be
- R determined and diversion procedures must be established.

GENERAL

- R The system design and the reliability of the engine installation of this airplane comply with the criteria for Extended Twin Operations (ETOPS) flights set forth in IL N° 20 (JAA) or AC 120-42 A (FAA) when the aircraft is configured, maintained and operated in accordance with the provisions of the appropriate Airbus Industrie document "Standard for Extended Range Operations" in the latest approved revision which is the Airbus CMP (Configuration, Maintenance and Procedure) document.
- This statement of ability does not constitute an approval to conduct Extended-Range Operations.
- The section 6 of the Flight Manual refers to the approved Standard for Extended-Range Operations and the applicable limitations, procedures and performance references.
- The operator is responsible for showing that he is complying with the regulation of his nation and for obtaining operational approval from his national authorities.
- The airplane must be configured in accordance with the Airbus Industrie Standard for Extended-Range Operations. However, the authorities may under certain conditions allow the operator to conduct ETOPS flights with limited maximum diversion time (for example, 75 minute diversion time in a benign area of operation) without showing full compliance with these standards.

OPERATIONAL LIMITATIONS

DEFINITIONS

- R For the purpose of AC 120-42 A and IL N° 20 Extended Range Operations are those intended to be conducted over a route that contains a point more than 60 minutes from an adequate airport at the selected one-engine-inoperative speed in still air and ISA (or prevailing delta ISA) conditions.
- An adequate airport is an airport which satisfies the aircraft performance requirements applicable at the expected landing weight, and sufficiently equipped to be safely used. In particular, at the anticipated time of use, it should be available and equipped with the necessary services, including ATC, weather information and at least one let down aid for an instrument approach.
- A suitable airport is a confirmed adequate airport which satisfies the dispatch weather minima requirements for ceiling and visibility within the required validity period. Airport conditions should also ensure that a safe landing with one engine and/or airframe system inoperative is possible.

AREA OF OPERATION

The maximum distance from an adequate airport must be determined for ISA (or prevailing delta ISA) and no-wind conditions, taking into account aircraft performance with one engine inoperative and the remaining engine operating at not more than MCT.

To determine the maximum distance from an adequate airport, the operator must define a diversion speed strategy as well as an aircraft reference weight for performance computation.

The same diversion speed strategy (Refer to FCOM 3.06) must be considered for :

- establishing the area of operation ;
- calculating the single-engine fuel planning,
- conducting the diversion in case of engine failure (conditions permitting).

The operator establishes the ETOPS reference gross weight for each route or area of operation. This must be a representative but conservative value of the aircraft gross weight at the critical point of the route or at the various critical points of all the routes included in the area of operation.

The one-engine-inoperative descent and cruise speed law must be chosen so that the associated net flight path clears the enroute obstacles with the regulatory margin.

FCOM section 3.06 gives data for two speed schedules. The associated approved net flight paths are published in the section 6 of the Flight Manual.

When the diversion strategy is chosen, the maximum distance from a diversion airport, can be directly determined for different maximum diversion times, with the help of the tables provided in this section. The area of possible ETOPS operation can then be drawn on plotting charts.

Another way to determine the maximum distance to a diversion airport is to read the one-engine-inoperative cruise TAS (for the reference gross weight and at the FL for best TAS) in the cruise tables in section 3.06 taking into consideration the appropriate speed strategy and the minimum altitude for clearing possible obstacles. The maximum distance the aircraft can travel to a diversion airport is this one-engine-inoperative-TAS multiplied by the maximum allowed diversion time granted to the operator.

Operators whose authorities require that an approved one-engine-inoperative speed be published in the Flight Manual must use this approved speed.

DISPATCH CONSIDERATION

MMEL

The MMEL has been approved taking into consideration the duration of the average ETOPS flight and the maximum diversion time granted to the airframe/engine combination.

The MMEL published by Airbus Industrie and approved by the French DGAC can be used to establish the airline MEL, which must be approved by the operator's national authorities. This MEL will probably be adapted to the airline network, environment and organization.

Other determining parameters will be :

- The maximum and the average diversion times on the route.
- The equipment of the enroute alternates.
- The navigation and communication facilities.
- The average meteorological conditions.

COMMUNICATION AND NAVIGATION FACILITIES

The aircraft communication system has provision to install three VHF transceivers and two HF radios ensuring full compliance with ETOPS requirements on any kind of route.

The aircraft navigation system meets the ETOPS requirements for en route navigation.

The aircraft has three inertial reference systems which, in conjunction with 2 FMS comply with MNPS criteria and this combination of systems is approved as the sole means of navigation for flight up to the maximum aircraft range.

See the MEL for a definition of the authorized dispatch configuration.

Note : For operation within the MNPS area, airlines must obtain approval from their national authorities.

FUEL AND OIL SUPPLY

The aircraft fuel and oil supply must be adequate to allow the aircraft to reach its destination or a planned alternate after the combined failures of an engine and pressurization or the failure of pressurization alone at the critical point on the route. Planners must consider forecast wind and temperature conditions, as well as forecast icing conditions.

The operator must establish a routine for ETOPS critical fuel planning and compare it with the standard (non-ETOPS) fuel planning.

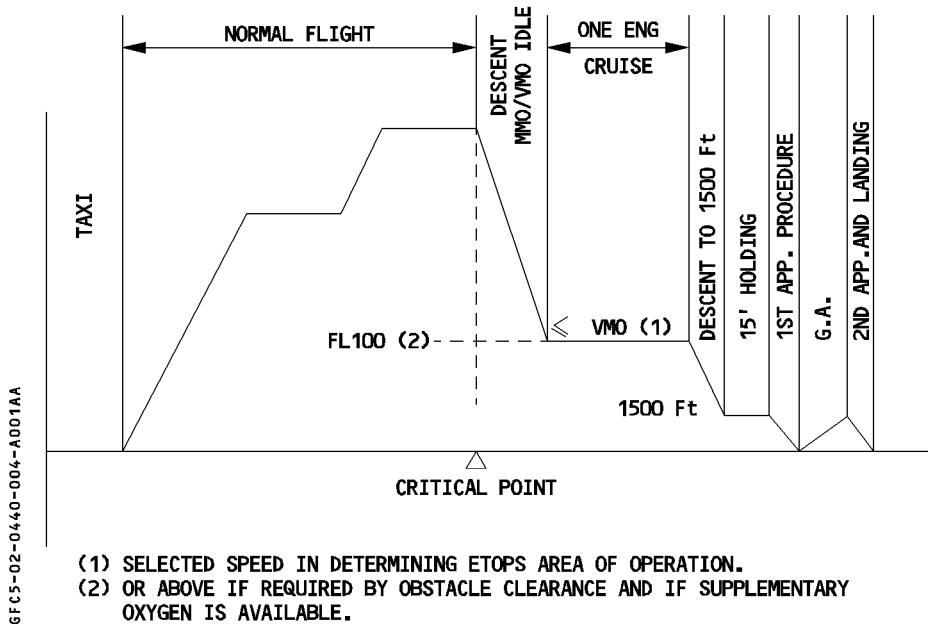
R ELECTRICAL GENERATORS

- R Refer to MEL for a definition of the authorized dispatch configuration.

ETOPS FUEL SCENARIOS

For establishing the ETOPS critical fuel reserves, the planner must consider two diversion scenarios.

Pressurization failure + engine failure



Pressurization failure

Same flight profile, but with 2 engines operating and diversion cruise set at LRC.

Fuel requirements

For each scenario, the required block fuel must be computed in accordance with the operator's ETOPS fuel policy and using the regulatory ETOPS critical fuel reserves described below.

Depending on the strategy and the one-engine-inoperative speed selected for the single-engine diversion scenario, either of these two scenarios may result in the higher fuel requirement.

The scenario resulting in the higher fuel requirement is the ETOPS critical fuel scenario, and the associated minimum block fuel requirement is the ETOPS critical fuel plan.

ETOPS CRITICAL FUEL RESERVES

For the computation of the ETOPS critical fuel reserves and of the complete ETOPS critical fuel planning, the diversion fuel must include the following fuel provisions :

- fuel burn-off from the critical point to the end of descent (for example 1500 feet) at the diversion airport,
- 5 % of the above fuel burn-off as contingency fuel,
- fuel for 15 minutes of holding at 1500 feet and green dot speed,
- fuel for first (IFR) approach, a go-around and second (VFR) approach,
- 5 % fuel mileage penalty or a demonstrated performance factor,
- effect of any Configuration Deviation List (CDL) or MEL item,
- if icing conditions are forecast :
 - * effect of Nacelle Anti Icing (NAI) and Wing Anti Icing (WAI) systems,
 - * effect of ice accretion on the unheated surfaces of the aircraft :

The fuel provisions associated with the effects of NAI and WAI systems and of ice accretion on the unheated surfaces are adjusted to take into account the horizontal extent of the forecast icing areas (exposure time).

The fuel provision factor for ice accretion on the unheated surfaces is a percentage equal to three times the forecast exposure time in hours. For example, assuming a one-hour exposure en route to and (e.g. the 15 minute holding) at the diversion airport, the fuel provision is 3 % of the fuel burned during the considered exposure time. If moderate icing is forecast, the above fuel provision is divided by two.

- for operations above 138 minutes diversion time, if the above effect of ice accretion is less than 5 %, this effect should be rounded-up to 5 % to provide a provision for weather avoidance.
- if the APU is needed as a power source (MEL), its fuel consumption must be considered:

R

130 kg/h or 286 lb/h (APU GEN ON, APU BLEED OFF).

In view of our experience, Airbus Industrie recommends that the operator considers the following non mandatory fuel practices :

- Include the effect of a demonstrated performance factor, in all standard and ETOPS fuel requirement computations,
- Include a contingency fuel provision from departure to the Critical Point (CP), when computing the ETOPS critical fuel planning.

The complete ETOPS critical fuel planning for the ETOPS critical fuel scenario (from the departure to the Critical Point and then from the Critical Point to the diversion airport) must be compared with the standard fuel planning (for example, from the departure to the destination and alternate) computed in accordance with the company fuel policy and applicable operational requirements. The higher of the two fuel requirements must be considered as the minimum required block fuel for the flight.

DISPATCH FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING

ETOPS diversion fuel requirements for dispatch are provided at the end of this section. Data for the engine failure case alone is not provided as this scenario is never critical.

WEATHER MINIMA

R Weather forecasts for en route alternates must meet the operator’s applicable weather minimum requirements. If this applicable requirement is AC 120-42A or IL N° 20 following applies :

An airplane cannot be dispatched unless the meteorological forecasts at en route alternate airports meet the weather minimums listed here for a period starting one hour before the earliest expected time of landing and ending one hour after the latest expected time of landing.

A. AC 120-42A dispatch weather minima (FAA)

AIRPORT EQUIPMENT	Ceiling (ft)	Visibility (m)
1 ILS/MLS	DH + 400	Greater of (3200, published minima + 1600)
2 ILS/MLS on separate runways *	DH + 200	Greater of (1600, published minima + 800)
Non precision approach	Greater of (800, MDH + 400)	Greater of (3200, published minima + 1600)
CAT II/CAT III capability with engine failure	Lower than above minima, approved on a case-by-case basis considering aircraft performance under failure conditions	

* separate runways are runways which do not touch each other.

DH : decision height

MDH : minimum descent height

- R B. IL N° 20 dispatch weather minima (JAA)
- R The operator must use either table 1 or table 2, but not a combination of both.
- R Table 1

Approach Facility Configuration	Alternate Airfield Ceiling	Weather Minima Visibility
For aerodromes with at least one operational navigation facility, providing a precision or non-precision runway approach procedure or a circling manoeuvre from an instrument approach procedure	A ceiling derived by adding 400 feet to the authorised DH, MDH (DA/MDA) or circling minima	A visibility derived by adding 1500 meters to the authorised landing minima
The weather minima below apply at airports which are equipped with precision or non-precision approaches on at least two separate runways (two separate landing surfaces)		
For airports with at least two operational navigation facilities providing a precision or non-precision runway approach procedure to separate suitable runways	A ceiling derived by adding 200 feet to the higher of the two authorised DH/MDH (DA/MDA) for the approaches	A visibility derived by adding 800 meters to the higher of the two authorised landing minima

- R Table 2
- R

Type of Approach	Planning Minima (RVR visibility required and ceiling if applicable)			
	Aerodrome with			
	at least 2 separate approach procedures based on 2 separate aids serving 2 separate runways	at least 2 separate approach procedures based on 2 separate aids serving 1 runway	or	at least 1 approach procedure based on 1 aid serving 1 runway
Precision Approach Cat II, III (ILS, MLS)	Precision Approach Cat I Minima	Non-Precision Approach Minima		
Precision Approach Cat I (ILS, MLS)	Non-Precision Approach Minima	Circling minima or, if not available, non-precision approach minima plus 200 ft/1000 m		
Non-Precision Approach	The lower of non-precision approach minima plus 200 ft/1000 m or circling minima	The higher of circling minima or non-precision approach minima plus 200 ft/1000 m		
Circling Approach	Circling minima			

DIVERSION DURING EXTENDED RANGE OPERATIONS

DIVERSION DECISION MAKING

The technical criteria governing a re-routing or diversion decision can be classified into four categories, as follows :

- Loss of MNPS capability, before entering the MNPS area (as applicable).
- Weather minima at diversion airport(s) going below the company/crew en-route minima, before reaching the ETOPS Entry Point, or diversion airport(s) becoming unsuitable for any reason.
- Failure cases requiring a diversion to the nearest airport (cases leading to a LAND ASAP message on the ECAM and/or in the QRH).
- Failure cases resulting in increased fuel consumption, exceeding the available fuel reserves.

Comments and recommendations

· Electrical generation

Diversion is required in case of :

- only one generator (either one IDG, APU GEN or EMER GEN) remaining available following a multiple failure,
- R – only one main generator (either one IDG or APU GEN) remaining available and green hydraulic circuit low level.

· Fuel system

Some failure cases may lead to fuel gravity feeding which implies flight at lower altitude or to some fuel being unusable. The flight crew's evaluation of the actual situation and the fuel remaining may lead to the decision that a diversion is required.

DIVERSION PERFORMANCE DATA

FCOM section 3.06 gives three single engine descent and cruise procedures :

1. The standard strategy.
2. The obstacle strategy.
3. Fixed speed strategies (ETOPS).

For ETOPS operations, any one of the above diversion strategies can be used provided that the selected strategy and speed schedule are used in :

- establishing the area of operation (maximum diversion distance),
- calculating the diversion fuel requirements for the single-engine ETOPS fuel scenario.
- demonstrating the applicable obstacle clearance requirements (net flight path and net ceiling).

During the diversion, the flight crew is expected to use the planned speed schedule. However, based on the evaluation of the actual situation, the pilot in command has the authority to deviate from this planned one-engine-inoperative speed.

	SPECIAL OPERATIONS EXTENDED RANGE OPERATIONS	2.04.40	P 9
		SEQ 001	REV 14

GUIDELINES FOR DIVERSION PROCEDURE

- Complete the related failure procedure.
- Inform ATC.
- Initiate the descent.
- Determine which en route alternate is the most suitable one (per company procedure).
- Divert to the chosen en route alternate.
- Comply with the pre-planned diversion strategy and speed schedule, or adjust the speed schedule, as dictated by the evaluation of the actual situation.

Note : For detailed guidelines and procedures for conducting the diversion (lateral and vertical navigation), see FCOM Vol 4, the FMGS Pilot's Guide.

PROCEDURES

R The SOP (Refer to FCOM 3.03) and the ABNORMAL and EMERGENCY procedures (Refer to FCOM 3.02) apply. For ETOPS flights, the flight crew must complete them using the procedures given below :

ABNORMAL AND EMERGENCY PROCEDURES

GEN 1 or 2 FAULT

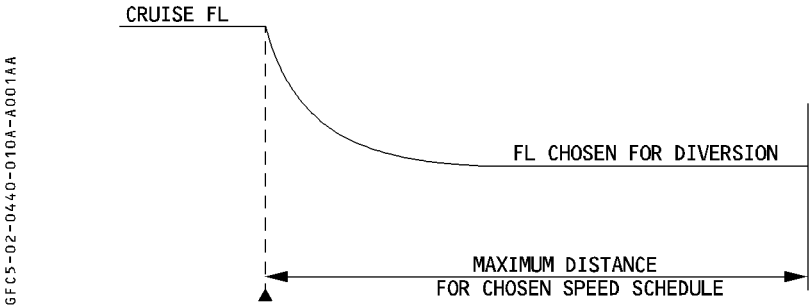
● **When in ETOPS segment :**

— **APU GEN (if available)** **USE**

PERFORMANCE

In electrical emergency configuration, the engine anti ice valves are permanently open, it results in a fuel consumption increase.

MAXIMUM DISTANCE (Still air) TO DIVERSION AIRPORT IN NAUTICAL MILES



GFC5-02-0440-010A-A001AA

Determination of 60 minutes maximum diversion distance (JAR-OPS 1.245)

Use the distance given within the table below to decide if a route is an ETOPS one according to JAR-OPS 1.245.

The following computation conditions have been used in accordance with the interpretation of the JAR-OPS 1.245 :

- Reference weight : the aircraft gross weight after one hour of flight having taken off at sea level at the maximum structural takeoff weight given by the flight manual
- ISA conditions
- No wind
- Diversion level after engine failure : FL170
- Single engine diversion speed schedule : VMO/MMO

Note : using the JAR-OPS 1.245 method, obstacles have not to be considered to determine if a route is or is not an ETOPS route.

R

Aircraft	MTOW		Distance (NM)
	(kg)	(lb)	
A330-201 (GE 80E1A2)	Up to 202 000	Up to 445333	423
A330-202 (GE 80E1A4)	Up to 233 000	Up to 513671	422
A330-203 (GE 80E1A3)	Up to 233 000	Up to 513671	422
A330-301 (GE 80E1A2)	Up to 218 000	Up to 480603	415
A330-223 (PW 4168A)	Up to 233 000	Up to 513671	430
A330-321 (PW 4164)	Up to 218 000	Up to 480603	423
A330-322 (PW 4168)	Up to 218 000	Up to 480603	433
A330-323 (PW 4168A)	Up to 233 000	Up to 513671	428
A330-243 (RR TRENT 772B)	Up to 233 000	Up to 513671	429
A330-341 (RR TRENT 768)	Up to 218 000	Up to 480603	418
A330-342 (RR TRENT 772)	Up to 218 000	Up to 480603	431
A330-343 (RR TRENT 772B)	Up to 233000	Up to 513671	426

R

ISA							
SPEED SCHEDULE	A/C WEIGHT AT CRITICAL POINT (KG)	FL FOR DIVERSION	DIVERSION TIME (MIN)				
			60	90	120	150	180
MCT/330KT	150000	160	430	636	843	1049	1256
	160000	160	429	634	841	1047	1254
	170000	160	427	631	836	1042	1248
	180000	150	425	628	832	1035	1239
	190000	150	424	625	827	1030	1233
	200000	140	422	622	823	1023	1224
	210000	130	420	618	816	1014	1212
	220000	130	418	614	811	1009	1207
	230000	120	416	611	806	1001	1196
MCT/310KT	150000	190	423	626	829	1033	1236
	160000	190	421	624	827	1030	1234
	170000	190	419	619	821	1023	1225
	180000	180	418	618	819	1019	1219
	190000	180	415	614	812	1012	1212
	200000	170	415	612	810	1007	1204
	210000	170	411	607	803	1000	1197
	220000	160	410	604	799	993	1188
	230000	150	407	599	791	983	1174

Note : For temperatures higher than ISA + 10, use ISA values

R

ISA + 10							
SPEED SCHEDULE	A/C WEIGHT AT CRITICAL POINT (KG)	FL FOR DIVERSION	DIVERSION TIME (MIN)				
			60	90	120	150	180
MCT/330KT	150000	160	438	648	859	1069	1280
	160000	160	437	646	856	1066	1276
	170000	160	435	643	851	1060	1270
	180000	150	433	640	847	1054	1262
	190000	140	432	637	841	1046	1250
	200000	140	430	633	837	1042	1246
	210000	130	428	630	831	1033	1234
	220000	130	426	625	825	1026	1228
	230000	120	424	622	821	1020	1218
MCT/310KT	150000	190	431	639	846	1053	1261
	160000	190	429	635	842	1049	1257
	170000	180	428	632	836	1041	1245
	180000	180	426	630	834	1038	1243
	190000	170	424	626	827	1028	1229
	200000	170	423	624	825	1026	1227
	210000	160	421	619	817	1015	1214
	220000	160	418	615	813	1012	1210
	230000	150	415	610	806	1001	1197

ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING

ALL ENGINES—LONG RANGE CRUISE

Including: emergency descent—long range cruise at FL100

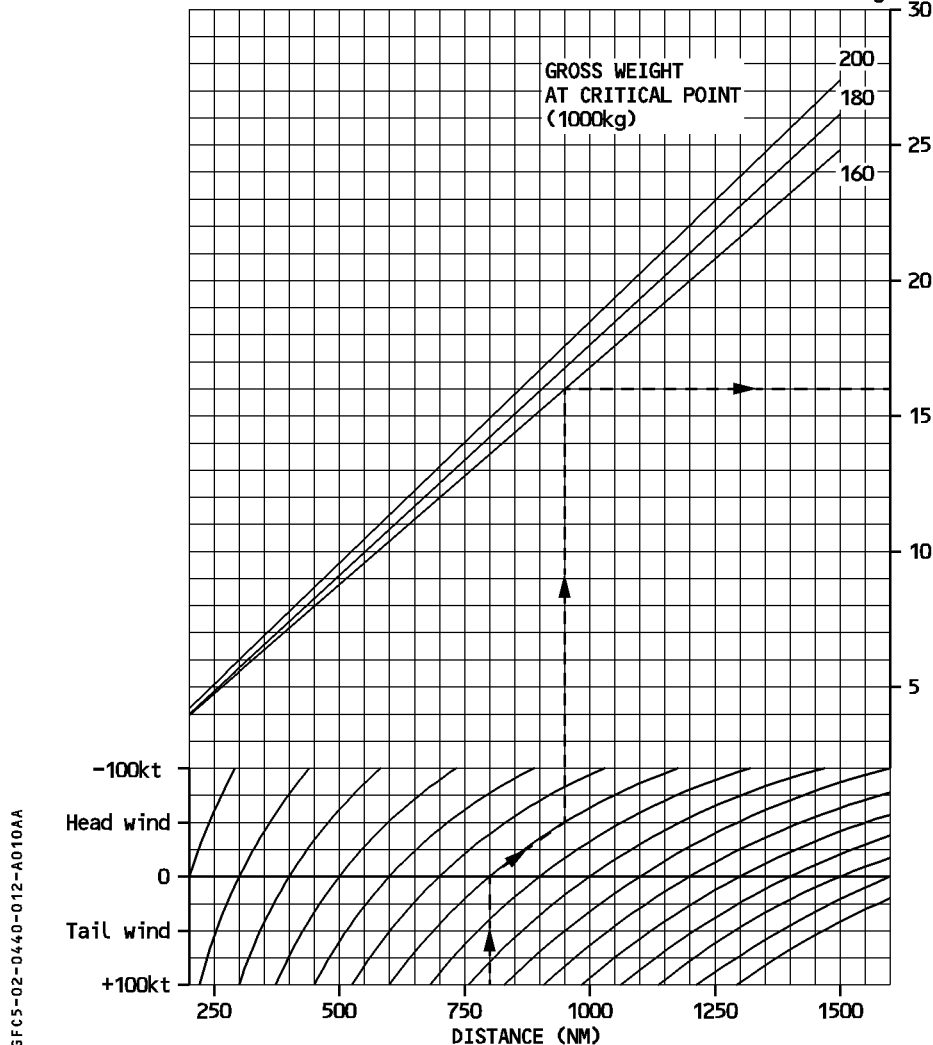
final descent 250kt—holding 15 min at FL15

IFR procedure—Go Around—2nd VFR procedure

5% allowance for wind errors

(NAI + WAI + effect of ice accretion + performance factor not included)

FUEL
CONSUMPTION
(1000kg)



ISA							
SPEED SCHEDULE	A/C WEIGHT AT CRITICAL POINT (KG)	FL FOR DIVERSION	DIVERSION TIME (MIN)				
			60	90	120	150	180
MCT/330KT	150000	190	440	653	867	1081	1296
	160000	190	438	650	863	1076	1289
	170000	180	438	650	862	1075	1287
	180000	170	436	646	857	1068	1280
	190000	170	436	645	855	1064	1274
	200000	170	433	641	850	1059	1269
	210000	170	433	637	844	1051	1259
	220000	160	430	636	842	1049	1255
	230000	150	428	632	836	1039	1243
MCT/310 KT	150000	220	434	645	857	1070	1282
	160000	210	432	641	851	1060	1270
	170000	210	430	638	847	1056	1266
	180000	200	428	634	840	1047	1253
	190000	200	428	630	835	1041	1248
	200000	190	424	627	831	1034	1237
	210000	190	421	622	825	1029	1232
	220000	180	420	620	820	1021	1221
	230000	170	416	614	811	1008	1206

Note : For temperatures higher than ISA + 10, use ISA values

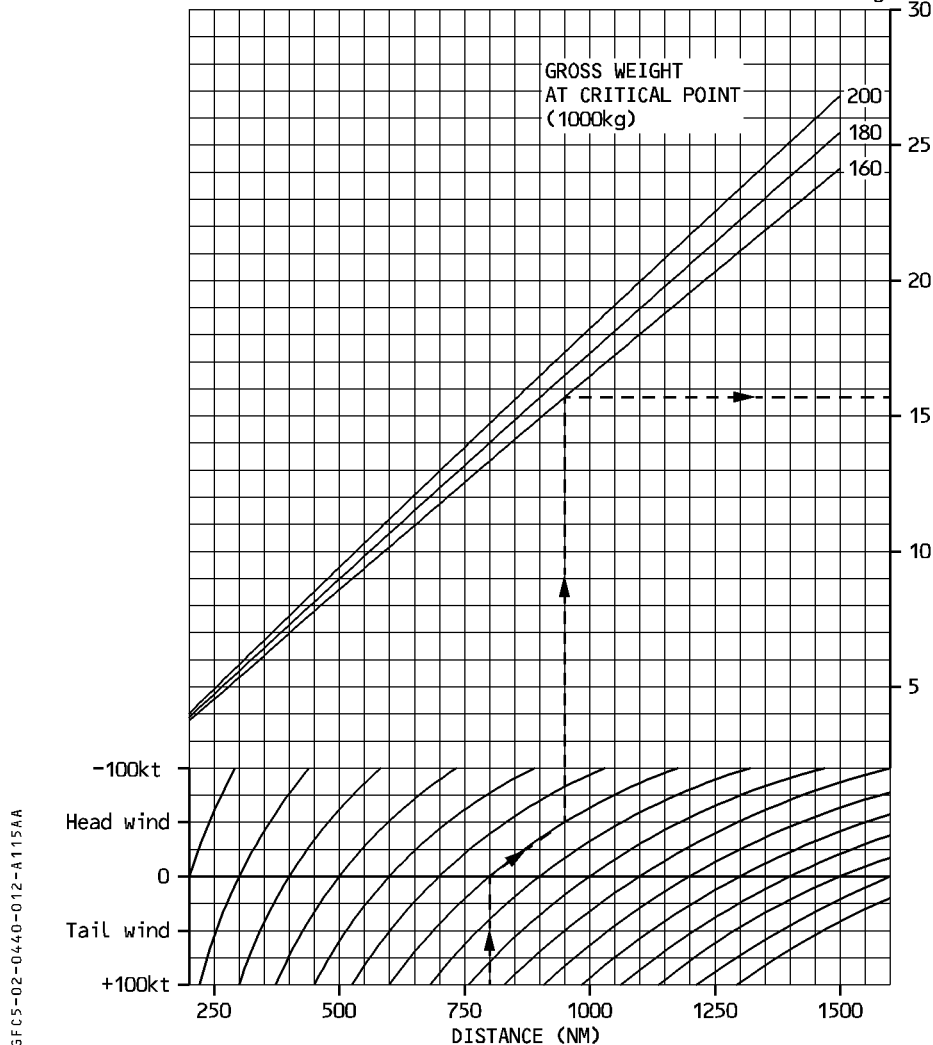
ISA + 10							
SPEED SCHEDULE	A/C WEIGHT AT CRITICAL POINT (KG)	FL FOR DIVERSION	DIVERSION TIME (MIN)				
			60	90	120	150	180
MCT/330KT	150000	180	449	666	883	1099	1316
	160000	180	448	665	882	1098	1315
	170000	180	446	662	878	1094	1311
	180000	180	445	659	873	1086	1300
	190000	170	444	657	871	1085	1298
	200000	170	442	653	866	1078	1292
	210000	170	442	649	859	1070	1282
	220000	160	439	648	857	1068	1279
	230000	150	437	644	852	1059	1267
MCT/310 KT	150000	220	442	657	873	1090	1307
	160000	210	440	654	868	1082	1295
	170000	210	438	650	863	1076	1290
	180000	200	436	646	857	1067	1278
	190000	200	433	641	851	1060	1271
	200000	200	432	635	842	1049	1258
	210000	180	429	633	838	1042	1246
	220000	180	428	632	836	1041	1245
	230000	170	425	626	827	1029	1230

ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING

ALL ENGINES—LONG RANGE CRUISE

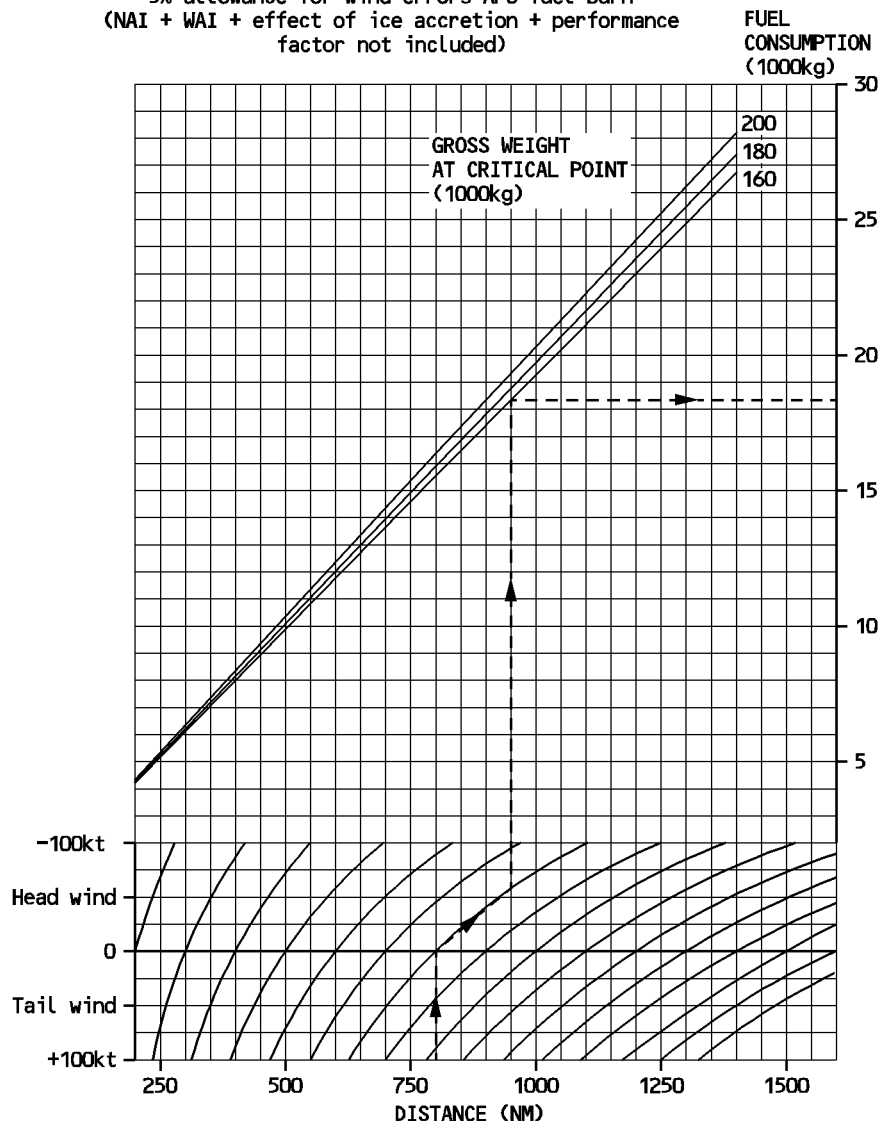
Including: emergency descent—Long range cruise at FL100
final descent 250kt—holding 15 min at FL15
IFR procedure—Go Around—2nd VFR procedure
5% allowance for wind errors
(NAI + WAI + effect of ice accretion + performance
factor not included)

FUEL
CONSUMPTION
(1000kg)



ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING ONE ENGINE OUT-CRUISE AT 310KT

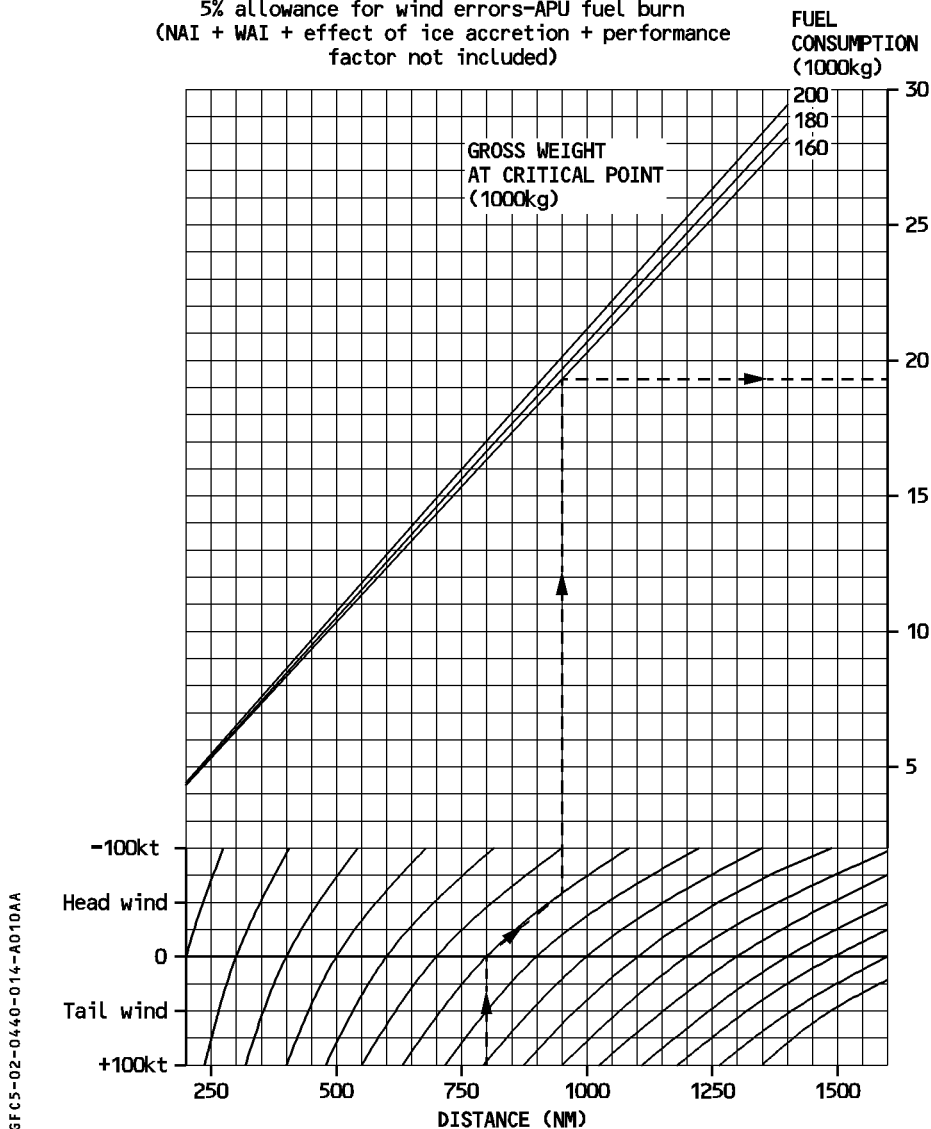
Including: emergency descent-cruise 310kt at FL100
final descent 250kt-holding 15 min at FL15
IFR procedure-Go Around-2nd VFR procedure
5% allowance for wind errors-APU fuel burn
(NAI + WAI + effect of ice accretion + performance
factor not included)



6FC5-02-0440-013-A010AA

ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING ONE ENGINE OUT-CRUISE AT 330KT

Including: emergency descent-cruise 330kt at FL100
final descent 250kt-holding 15 min at FL15
IFR procedure-Go Around-2nd VFR procedure
5% allowance for wind errors-APU fuel burn
(NAI + WAI + effect of ice accretion + performance
factor not included)

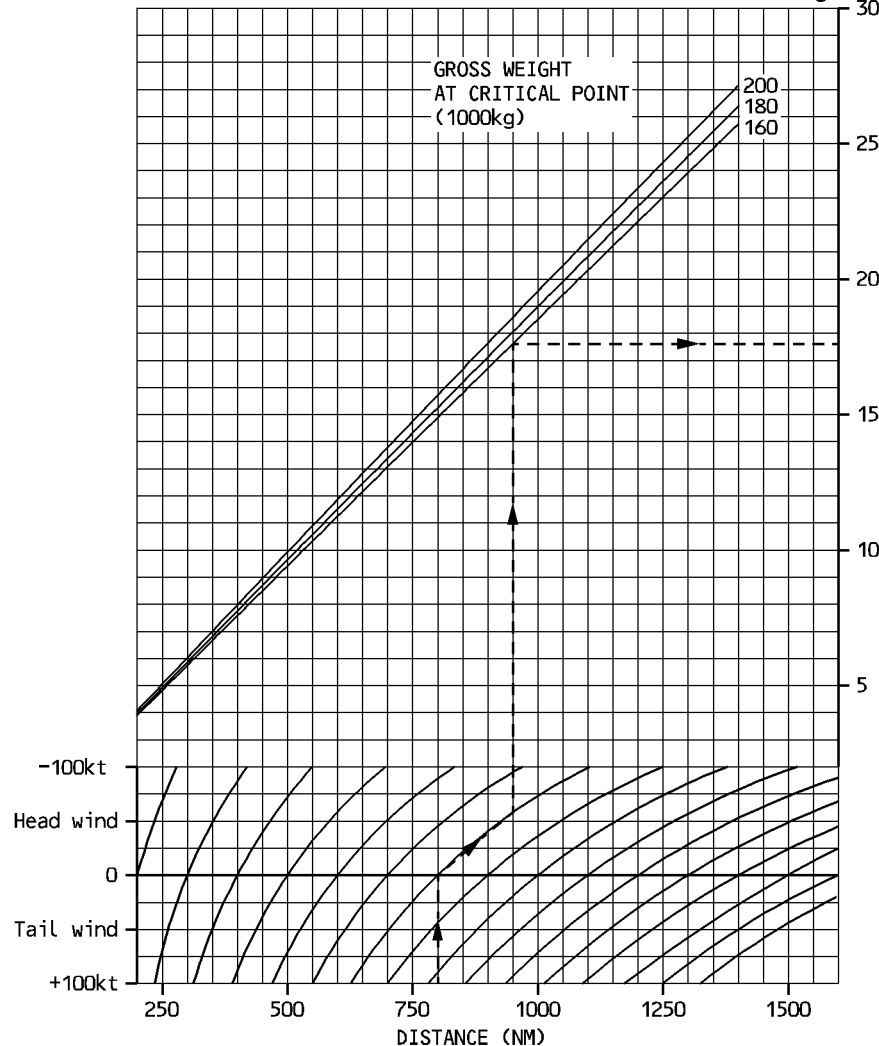


GFCS-02-0440-014-A010AA

ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING ONE ENGINE OUT-CRUISE AT 310KT

Including: emergency descent-cruise 310kt at FL100
final descent 250kt-holding 15 min at FL15
IFR procedure-Go Around-2nd VFR procedure
5% allowance for wind errors-APU fuel burn
(NAI + WAI + effect of ice accretion + performance
factor not included)

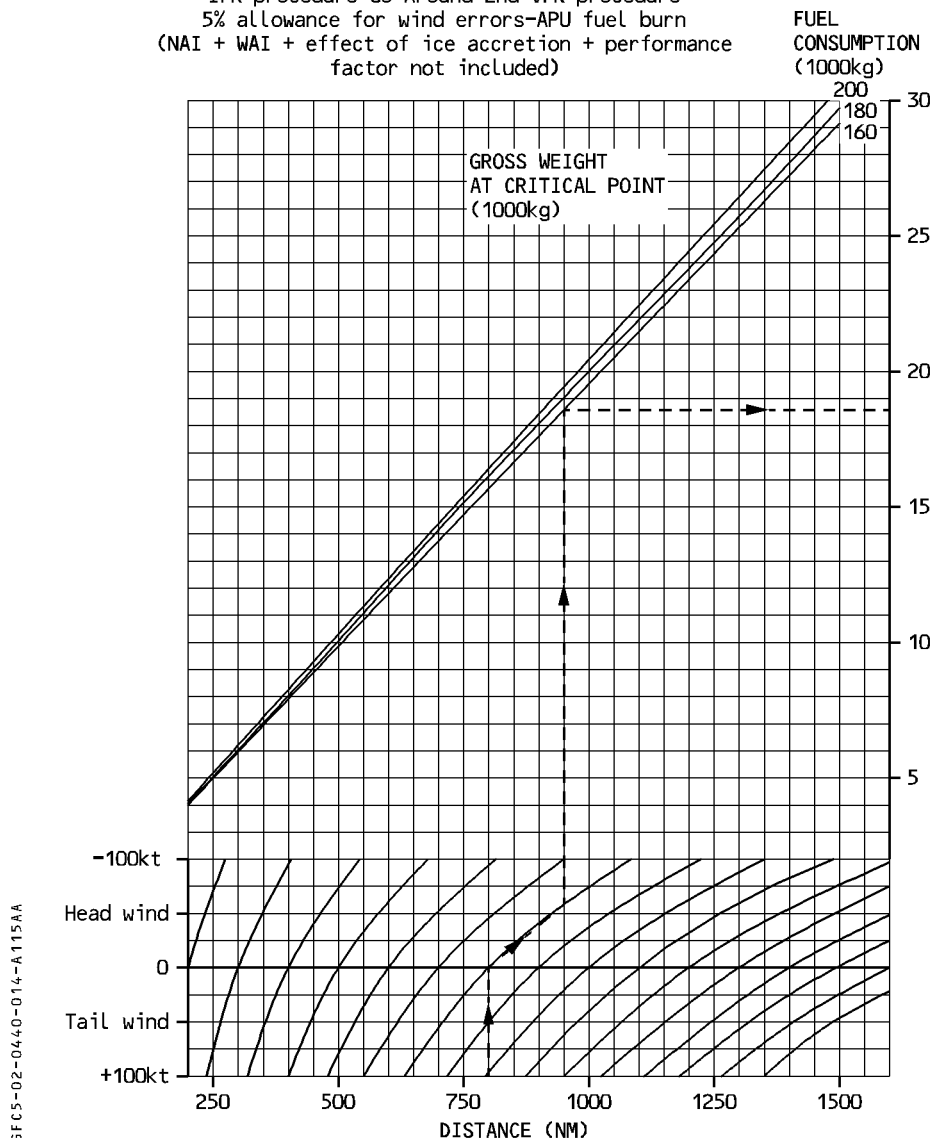
FUEL
CONSUMPTION
(1000kg)



6FC5-02-0440-013-A115AA

ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING ONE ENGINE OUT-CRUISE AT 330KT

Including: emergency descent-cruise 330kt at FL100
final descent 250kt-holding 15 min at FL15
IFR procedure-Go Around-2nd VFR procedure
5% allowance for wind errors-APU fuel burn
(NAI + WAI + effect of ice accretion + performance
factor not included)



GFCS-02-0440-014-A115AA

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 A330 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), and 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 outside ADR or ADR 3).

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 instruments tolerances (3.04.34). The usual scan of flight deck instruments should be sufficient.
- R – Use the transponder and the autopilot, associated with one of the ADRs which 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.

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 A330 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.

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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)

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).

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	SPECIAL OPERATIONS		2.04.45	P 2
	RVSM		SEQ 001	REV 15

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 instruments tolerances (3.04.34). The usual scan of flight deck instruments should be sufficient.
- R – Use the transponder and the autopilot, associated with one of the ADRs which 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.

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	SPECIAL OPERATIONS		2.04.45	P 3
	RVSM		SEQ 001	REV 07

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 autopilots,
- 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 contain detailed guidance for contingency procedures for North Atlantic airspace.

If unable to notify ATC and obtain ATC clearance prior to 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 on 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 TGL 2 and TGL 10.

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. Navigation system with the GPS PRIMARY function (if GPS installed) meets 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 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 either a function of the flight phase, or a value manually-entered by the crew.

When flying in an 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 the fulfilled
- When LOW is displayed, the RNP requirement is estimated not to fulfilled. In this case :

- The crew crosschecks navigation with raw data, if available,
- If the crosscheck is negative, or if raw data is not available, the crew informs the ATC.

When leaving the RNP environment, the crew will clear the manually-entered required accuracy.

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Without GPS PRIMARY function

RNP accuracy criteria are met, provided radio navaid coverage supports it for :

- R – RNP-1 en route, and in terminal area, provided a required accuracy of 1 NM(1) is checked or manually entered in the MCDU.
- R – RNP-0.3 in approach, provided a required accuracy of 0.3 NM(1) is checked, or manually entered in the MCDU.

R *Note : (1) It is possible to enter the radial equivalent to the specified Crosstrack (XTK)*
R *accuracy, that is the RNP multiplied by 1.2, the EPE being an estimated radial*
R *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.

- R – If manual entry of a required accuracy 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.

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 on 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 TGL 2 and TGL 10.
- 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 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 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 a default value, which is either a function of the flight phase, or a navigation database procedure value, or a value manually-entered by the crew.

When flying in an 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 fulfilled. In this case :

- The crew crosschecks navigation with raw data, if available.
- If the crosscheck is negative, or if raw data is unavailable, the crew informs the ATC.

When leaving the RNP environment, the crew will clear the manually-entered required accuracy.

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Without GPS PRIMARY function

RNP accuracy criteria are met, provided radio navaid coverage supports it for :

- R – RNP-1 en route, and in terminal area, provided a required accuracy of 1 NM(1) is checked or manually entered in the MCDU.
- R – RNP-0.3 in approach, provided a required accuracy of 0.3 NM(1) is checked, or manually entered in the MCDU.

R *Note : (1) It is possible to enter the radial equivalent to the specified Crosstrack (XTK)*
R *accuracy, that is the RNP multiplied by 1.2, the EPE being an estimated radial*
R *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.

- R – If manual entry of a required accuracy 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 10 NM or use the radial equivalent to 10NM XTK accuracy that is 12.2NM.**

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.

In inertial navigation, the RNP-10 capability is maintained for 5.7 hours, since the last radio update (according to FAA Notice 8400.12A), independently of the estimated accuracy displayed on the 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 equipment to fly a P-RNAV procedure is :
- R – 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.

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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 FMGCs 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.

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INTRODUCTION

Use this flight planning chapter when no precalculated flight plan is available.

It contains the following general graphs and tables :

- Maximum and optimum cruise altitudes for M.80, M.82, M.84 and long range speed
- Optimum altitude on short stage

R – 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, long range speed at optimum flight level
- Integrated cruise tables at 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.

R The quick determination method is shown in chapter 2.05.40 for M.80, M.82, M.84 and

R long range speed.

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MINIMUM RECOMMENDED FUEL REQUIREMENTS

The total fuel quantity required to fly a given sector is the sum of the following quantities:

TAXI FUEL

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 :

- Takeoff and climb at selected speed.
- Cruise at selected speed.
- Descent from cruising level to 1500 feet above destination airport.
- Approach and landing. Fuel calculation is based on a consumption of

40 kg/min or **90 lb/min**.

Average quantity (6 minute IFR) → **240 kg** or **540 lb**

RESERVE FUEL

This quantity includes :

“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 **500 kg** or **1100 lb** , climb to cruising level, cruise at long range speed, descent and approach procedure.

160 kg or 360 lb for 4 minutes VFR

Holding Fuel

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.

A conservative quantity corresponding to 30 minute holding at 1500 feet above alternate airport elevation at green dot speed in the clean configuration is

2400 kg or **5300 lb** .

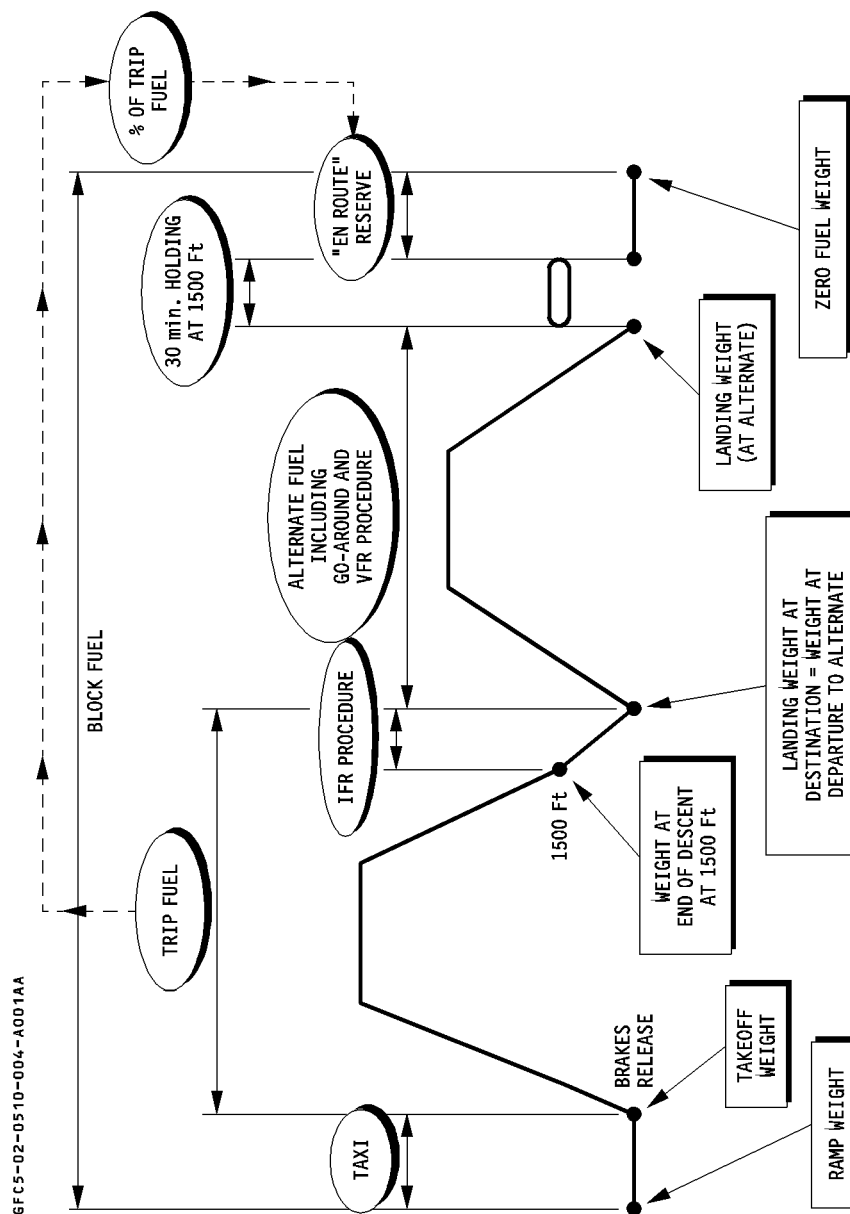
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APU FUEL

- During ground operation, 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 Pack 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

R **FLIGHT PLAN**

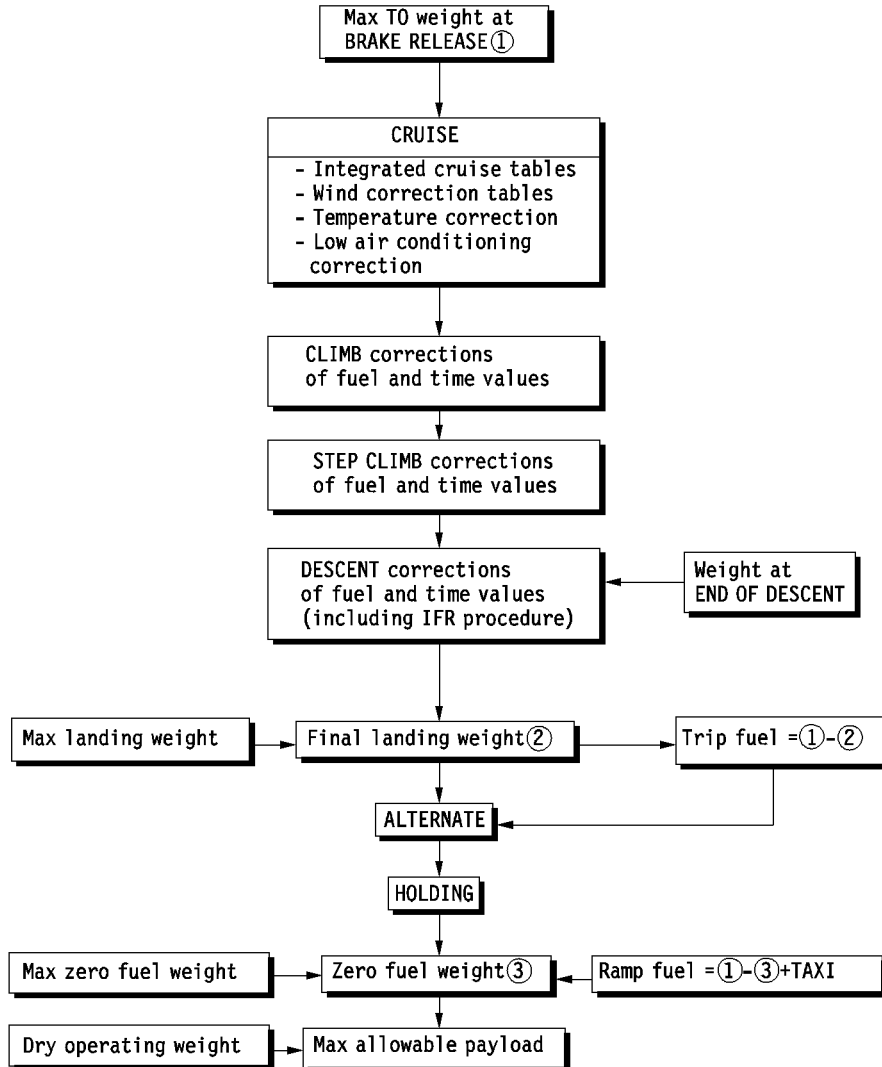
- R When no precalculated flight plan is available, flight planning can be determined by using
- R the tables given in this chapter.
- R Fuel policy will be the same as for precalculated flight plan.
- R The graph on the following page defines the different terms used in this chapter.



GENERAL

R

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The following tables can be used for the flight planning.
The first table allows the planner to calculate fuel and time during cruise, including up to two step climbs (see p3).
The second table shows the fuel and time planning for the whole flight plan (see p4).
At the end of the section an example shows how to use both tables for a given mission.

- Note :
- Differences in fuel consumption during step climb sections will be taken into account in the calculation table of page 4.
 - To find optimum aircraft weight to proceed to next flight level (4000 feet step) (Refer to 2.05.20 p 1).
 - Integrated cruise tables are established for ISA conditions only. Corrections due to differences from ISA temperature are included in the calculation table of page 4.
 - Overhead departure weight is assumed to be equal to weight at brake release.
 - Overhead destination weight must be entered in the calculation table of page 4.

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 $0.010 \text{ (kg/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)} \text{ or}$

R $0.022 \text{ (lb/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$

R Line 4 : in case of low air conditioning refer to cruise table correction box.

R Line 6 : TO altitude correction :

R $0.9 \text{ (kg/1000 kg/1000 ft)} \times \text{TOW (1000 kg)} \times \text{airport elevation (1000}$
R $\text{ft)} \text{ or}$

R $0.9 \text{ (lb/1000 lb/1000 ft)} \times \text{TOW (1000 lb)} \times \text{airport elevation (1000 ft)}$

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

- T/O weight : 200 000 kg
- Ground distance to destination : 4000 NM
- Wind : – 40 kt (head wind)
- R – Selected initial FL : 310
- Long range speed
- Temperature : ISA + 10
- Airport elevation : 1500 ft
- Normal air conditioning

DETERMINATION OF CRUISE FUEL AND TIME

A : Enter the chosen flight Mach number, flight level, ground distance to be covered and forecast windspeed in the calculation table of page 7.

Calculate the air distance (see 2.05.60 p 6).

here : long range speed, 40 kt head wind, 4000 NM ground distance → air distance : 4380 NM

R CRUISE TABLE FL310

R B : Read from integrated cruise table (long range speed, FL310) the values for time and distance for the weight of 200 000 kg (see 2.05.30 p 30)

R → distance : 6616 NM → time : 945 min.

R C : After 250 NM a step climb to FL350 is performed.

Calculate the new value of the distance in the integrated cruise table

R → 6616 – 250 = 6366 NM

R D : Enter integrated cruise table and interpolate the values for the distance of 6366 NM (begin of first step climb)

R → weight : 196800 kg → time : 912 min.

E : Calculate the values for the first cruise segment

R Fuel : 200 000 – 196 800 = 3200 kg

Distance : 250 NM

R Time : 945 – 912 = 33 min

Remaining distance : 4380 – 250 = 4130 NM

R CRUISE TABLE FL350

R F : Read from integrated cruise table (long range speed, FL350) the values for time and distance for the weight of 196 800 kg (see 2.05.30 p 36)

R → distance : 6759 NM → time : 923 min.

R G : The optimum aircraft weight to proceed to FL390 is 191 000 kg. (see 2.05.20 p 1) Read from integrated cruise table the values for time and distance for the weight of 191 000 kg

R → distance : 6276 NM → time : 860 min.

H : Calculate the values for the second cruise segment

R Fuel : 196 800 – 191 000 = 5 800 kg

Distance : 6759 – 6276 = 483 NM

R Time : 923 – 860 = 63 min

R Remaining distance : 4130 – 483 = 3647 NM

- R CRUISE TABLE FL390
- I : Proceed to final table ; enter distance and time values corresponding to an aircraft weight of 191 000 kg at FL390 and long range speed. (see 2.05.30 p 42)
- R → distance : 6560 NM → time : 859 min
- R J : Subtract remaining distance : $6560 - 3647 = 2913$ NM
- R K : Interpolate in integrated cruise table weight and time values corresponding to a distance of 2913 NM (see 2.05.30 p 41)
- R → weight : 152 400 kg → time : 389 min
- R L : Calculate values for last cruise segment :
- R Fuel : $191\ 000 - 152\ 400 = 38\ 600$ kg
- R Distance : $6560 - 2913 = 3647$ NM
- R Time : $859 - 389 = 470$ min
- Cross-check that remaining air distance equals zero
- R M : Fill in the final table with weight overhead departure (200 000 kg) and overhead destination (152 400 kg).
- R N : Calculate total values
- R Fuel : $200\ 000 - 152\ 400 = 47\ 600$ kg
- R Time : $33 + 63 + 470 = 566$ min = 9 h 26 min

Example

DATA

- T/O weight : 200 000 kg
- Ground distance to destination : 4000 NM
- Wind : – 40 kt (head wind)
- Selected initial FL : 330
- Long range speed
- Temperature : ISA + 10
- Airport elevation : 1500 ft
- Normal air conditioning

DETERMINATION OF CRUISE FUEL AND TIME

- A** : Enter the chosen flight Mach number, flight level, ground distance to be covered and forecast windspeed in the calculation table of page 7.
Calculate the air distance (see 2.05.60 p 6).
here : long range speed, 40 kt head wind, 4000 NM ground distance → air distance : 4380 NM

CRUISE TABLE FL330

- B** : Read from integrated cruise table (long range speed, FL330) the values for time and distance for the weight of 200 000 kg (see 2.05.30 p 33)
→ distance : 6896 NM → time : 961 min.
- C** : After 250 NM a step climb to FL370 is performed.
Calculate the new value of the distance in the integrated cruise table
→ 6896 – 250 = 6646 NM
- D** : Enter integrated cruise table and interpolate the values for the distance of 6646 NM (begin of first step climb)
→ weight : 196905 kg → time : 930 min.
- E** : Calculate the values for the first cruise segment
Fuel : 200 000 – 196 905 = 3095 kg
Distance : 250 NM
Time : 961 – 930 = 31 min
Remaining distance : 4380 – 250 = 4130 NM

CRUISE TABLE FL370

- F** : Read from integrated cruise table (long range speed, FL370) the values for time and distance for the weight of 196 905 kg (see 2.05.30 p 39)
→ distance : 6992 NM → time : 932 min.
- R G** : The optimum aircraft weight to proceed to FL410 is 175 000 kg. (see 2.05.20 p 1) Read from integrated cruise table the values for time and distance for the weight of 175 000 kg
→ distance : 5061 NM → time : 682 min.
- H** : Calculate the values for the second cruise segment
- R** Fuel : 196 905 – 175 000 = 21 905 kg
Distance : 6992 – 5061 = 1931 NM
- R** Time : 932 – 682 = 250 min
- R** Remaining distance : 4130 – 1931 = 2199 NM

CRUISE TABLE FL410

I : Proceed to final table ; enter distance and time values corresponding to an aircraft weight of 175 000 kg at FL410 and long range speed. (see 2.05.30 p 45)

→ distance : 5261 NM → time : 681 min

J : Subtract remaining distance : 5261 – 2199 = 3062 NM

K : Interpolate in integrated cruise table weight and time values corresponding to a distance of 3062 NM (see 2.05.30 p 44)
→ weight : 152 885 kg → time : 399 min

L : Calculate values for last cruise segment :

Fuel : 175 000 – 152 885 = 22 115 kg

Distance : 5261 – 3062 = 2199 NM

Time : 681 – 399 = 282 min

Cross-check that remaining air distance equals zero

M : Fill in the final table with weight overhead departure (200 000 kg) and overhead destination (152 885 kg).

N : Calculate total values

Fuel : 200 000 – 152 885 = 47 115 kg

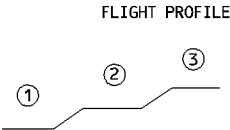
Time : 31 + 250 + 282 = 563 min = 9 h 23 min

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- DATA : – TO weight : 200 000 kg
– Ground distance to destination 4000 NM
– Wind : – 40 kt (headwind)
- R : – Selected first flight level : FL310
– 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 → 200 000 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)
- R : Fill in → 152 400 kg
- 3 : Apply temperature correction for given air distance
 $4380 \text{ NM} \times 10^{\circ}\text{C} \times 0.010 \text{ kg}/^{\circ}\text{C}/\text{NM} = 438 \text{ kg}$
- 4 : Correction for air conditioning → here = 0
- R : 5 : Subtract climb correction for chosen FL (see 2.05.30 p47) → 2600 kg
- 6 : Add TO altitude correction $0.9 \times 200 \times 1.5 = 270 \text{ kg}$
- 7 : Subtract value for step climb correction (see 2.05.30 p47) $2 \times 160 = 320 \text{ kg}$
- R : 8 : Calculate corrected weight overhead destination → 149 100 kg
- 9 : Enter weight overhead destination and find descent correction (including 6 min IFR) (see 2.05.30 p48) → 400 kg
- R : 10 : Calculate landing weight at destination → 149 500 kg
- 11 : Alternate fuel e.g. 200 NM at FL310
(see 2.05.50 p3) → 3533 kg
- R : Landing weight at alternate $149\,500 - 3533 = 145\,967 \text{ kg}$
Correction due to deviation from reference landing weight at alternate (see 2.05.50 p3) $(146 - 140) \times 11 = 66 \text{ kg}$
- R : Corrected alternate fuel $3533 + 66 = 3599 \text{ kg}$
- R : 12 : Calculate alternate landing weight → 145 900 kg
- 13 : Subtract holding fuel : (Refer to 2.05.10 p2) → 2400 kg
- R : 14 : Calculate weight at end of holding → 143 500 kg
- R : 15 : Calculate trip fuel → 50 500 kg
- R : 16 : Subtract "en route" reserve (standard amount is 5 % of trip fuel) → 2525 kg
- R : 17 : Calculate zero fuel weight → 140 900 kg
- 18–19 : Subtract dry operating weight to obtain maximum allowable payload
- 20–22 : Calculate block fuel
- 23–26 : Calculate flight time

R

MACHNUMBER	LRC
INITIAL FLIGHT LEVEL:	FL330
GROUND DISTANCE:	4000 NM
WIND ('-' HEAD/'+' TAIL):	- 40 Kt
AIR DISTANCE:	4380 NM



FL: 330

OVERHEAD DEPARTURE	
WEIGHT:	200 000 kg
DISTANCE:	6896 NM
TIME:	961 min

START OF FIRST STEP CLIMB	
WEIGHT:	196 905 kg
DISTANCE:	6646 NM
TIME:	930 min

1	
FUEL:	3095 kg
DISTANCE:	250 NM
TIME:	31 min
REMAINING DISTANCE: 4130 NM	

FL: 370

BEGIN OF SECOND CRUISE SEGMENT	
WEIGHT:	196 905 kg
DISTANCE:	6992 NM
TIME:	932 min

START OF SECOND STEP CLIMB	
WEIGHT:	175 000 kg
DISTANCE:	5061 NM
TIME:	682 min

2	
FUEL:	21 905 kg
DISTANCE:	1931 NM
TIME:	250 min
REMAINING DISTANCE: 2199 NM	

FL: 410

BEGIN OF FINAL CRUISE SEGMENT	
WEIGHT:	175 000 kg
DISTANCE:	5261 NM
TIME:	681 min

OVERHEAD DESTINATION	
WEIGHT:	152 885 kg
DISTANCE:	3062 NM
TIME:	399 min

3	
FUEL:	22 115 kg
DISTANCE:	2199 NM
TIME:	282 min
REMAINING DISTANCE : 0 NM	

REMAINING DISTANCE: 2199 NM

TOTAL VALUES	
WEIGHT OVERHEAD DEPARTURE:	200 000 kg
WEIGHT OVERHEAD DESTINATION:	152 885 kg
FUEL:	47 115 kg
TIME:	563 min

GFC5-02-0515-007-A115AA

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	FLIGHT PLANNING		2.05.15	P 8
	CALCULATION TABLES		SEQ 115	REV 14

DATA : – TO weight : 200 000 kg
– Ground distance to destination 4000 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 → 200 000 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 → 152 885 kg
- 3 : Apply temperature correction for given air distance
 $4380 \text{ NM} \times 10^{\circ}\text{C} \times 0.010 \text{ kg}/^{\circ}\text{C}/\text{NM} = 438 \text{ kg}$
- 4 : Correction for air conditioning → here = 0
- 5 : Subtract climb correction for chosen FL (see 2.05.30 p47) → 2700 kg
- 6 : Add TO altitude correction $0.9 \times 200 \times 1.5 = 270 \text{ kg}$
- 7 : Subtract value for step climb correction (see 2.05.30 p47) $2 \times 160 = 320 \text{ kg}$
- R 8 : Calculate corrected weight overhead destination → 149 500 kg
- 9 : Enter weight overhead destination and find descent correction (including 6 min IFR) (see 2.05.30 p48) → 400 kg
- R 10 : Calculate landing weight at destination → 149 900 kg
- 11 : Alternate fuel e.g. 200 NM at FL310
(see 2.05.50 p3) → 3484 kg
- R Landing weight at alternate $149\,900 - 3484 = 146\,416 \text{ kg}$
Correction due to deviation from reference landing weight at alternate (see 2.05.50 p3) $(146.5 - 140) \times 11 = 72 \text{ kg}$
- R Corrected alternate fuel $3484 + 72 = 3556 \text{ kg}$
- R 12 : Calculate alternate landing weight → 146 300 kg
- 13 : Subtract holding fuel : (Refer to 2.05.10 p2) → 2400 kg
- R 14 : Calculate weight at end of holding → 143 900 kg
- R 15 : Calculate trip fuel → 50 100 kg
- R 16 : Subtract "en route" reserve (standard amount is 5 % of trip fuel) → 2505 kg
- R 17 : Calculate zero fuel weight → 141 400 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	0	0	•	0
2	WEIGHT Overhead Destination	►	1	5	2	•	4
3	– Temperature Correction for CRUISE	–			0	•	5
4	+ Correction for Air Conditioning (+ for LO, – for HI)	+			0	•	0
5	– CLIMB correction	–			2	•	6
6	+ TO Altitude correction	+			0	•	2
7	– STEP CLIMB correction	–			0	•	4
8	= Corrected Weight Overhead Destination	=	1	4	9	•	1
9	+ DESCENT correction (including 6 min IFR)	+			0	•	4
10	(2) Landing Weight at Destination	=	1	4	9	•	5
11	– ALTERNATE Fuel	–			3	•	6
12	= ALTERNATE Landing Weight	=	1	4	5	•	9
13	– HOLDING	–			2	•	4
14	= Weight at END OF HOLDING	=	1	4	3	•	5
15	TRIP FUEL (1) – (2)		5	0	•	5	//////////
16	– “En Route” Reserve	–			2	•	6
17	(3) ZERO FUEL WEIGHT	=	1	4	0	•	9
18	– OPERATING WEIGHT EMPTY	–	1	1	8	•	0
19	= Max Allowable Payload	=		2	2	•	9

R

BLOCK FUEL CALCULATION							
20	Required Fuel (1) – (3)	►		5	9	•	1
21	+ Taxi	+			0	•	3
22	= Block Fuel	=		5	9	•	4

R

FLIGHT TIME CALCULATION (H. MIN)							
23	Time from integrated Cruise Tables	►		9	•	2	6
24	+ CLIMB Correction	+		0	•	0	5
25	+ DESCENT Correction (including 6 min IFR)	+		0	•	1	1
26	= Flight Time	=		9	•	4	2

Note : Line 3 : temperature correction :

$0.010 \text{ (kg/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$ or

$0.022 \text{ (lb/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$

Line 4 : in case of low air conditioning refer to cruise table correction box.

Line 6 : TO altitude correction :

$0.9 \text{ (kg/1000 kg/1000 ft)} \times \text{TOW (1000 kg)} \times \text{airport elevation (1000 ft)}$ or

$0.9 \text{ (lb/1000 lb/1000 ft)} \times \text{TOW (1000 lb)} \times \text{airport elevation (1000 ft)}$

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.

R

1	(1) Max TO Weight at BRAKE RELEASE	►	2	0	0	•	0
2	WEIGHT Overhead Destination	►	1	5	2	•	9
3	– Temperature Correction for CRUISE	–			0	•	5
4	+ Correction for Air Conditioning (+ for LO, – for HI)	+			0	•	0
5	– CLIMB correction	–			2	•	7
6	+ TO Altitude correction	+			0	•	2
7	– STEP CLIMB correction	–			0	•	4
8	= Corrected Weight Overhead Destination	=	1	4	9	•	5
9	+ DESCENT correction (including 6 min IFR)	+			0	•	4
10	(2) Landing Weight at Destination	=	1	4	9	•	9
11	– ALTERNATE Fuel	–			3	•	6
12	= ALTERNATE Landing Weight	=	1	4	6	•	3
13	– HOLDING	–			2	•	4
14	= Weight at END OF HOLDING	=	1	4	3	•	9
15	TRIP FUEL (1) – (2)		5	0	•	1	//////////
16	– “En Route” Reserve	–			2	•	5
17	(3) ZERO FUEL WEIGHT	=	1	4	1	•	4
18	– OPERATING WEIGHT EMPTY	–	1	1	8	•	0
19	= Max Allowable Payload	=		2	3	•	4

BLOCK FUEL CALCULATION

20	Required Fuel (1) – (3)	►		5	8	•	6
21	+ Taxi	+			0	•	3
22	= Block Fuel	=		5	8	•	9

R

FLIGHT TIME CALCULATION (H. MIN)

23	Time from integrated Cruise Tables	►		9	•	2	3
24	+ CLIMB Correction	+		0	•	0	5
25	+ DESCENT Correction (including 6 min IFR)	+		0	•	1	1
26	= Flight Time	=		9	•	3	9

Note : Line 3 : temperature correction :

$0.010 \text{ (kg/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$ or

$0.022 \text{ (lb/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{air distance (NM)}$

Line 4 : in case of low air conditioning refer to cruise table correction box.

Line 6 : TO altitude correction :

$0.9 \text{ (kg/1000 kg/1000 ft)} \times \text{TOW (1000 kg)} \times \text{airport elevation (1000 ft)}$ or

$0.9 \text{ (lb/1000 lb/1000 ft)} \times \text{TOW (1000 lb)} \times \text{airport elevation (1000 ft)}$

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.

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 deviation from ISA.
- Maximum altitude is defined as the lower of :
 - maximum altitude at maximum cruise thrust in level flight and
 - maximum altitude at maximum climb thrust with 300 feet/minute vertical speed.

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 and M.80, M.82, M.84

- Note : 1. Optimum and maximum altitude 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 $n = 1.3$ g (1.4 g) curve indicates the buffet margin.

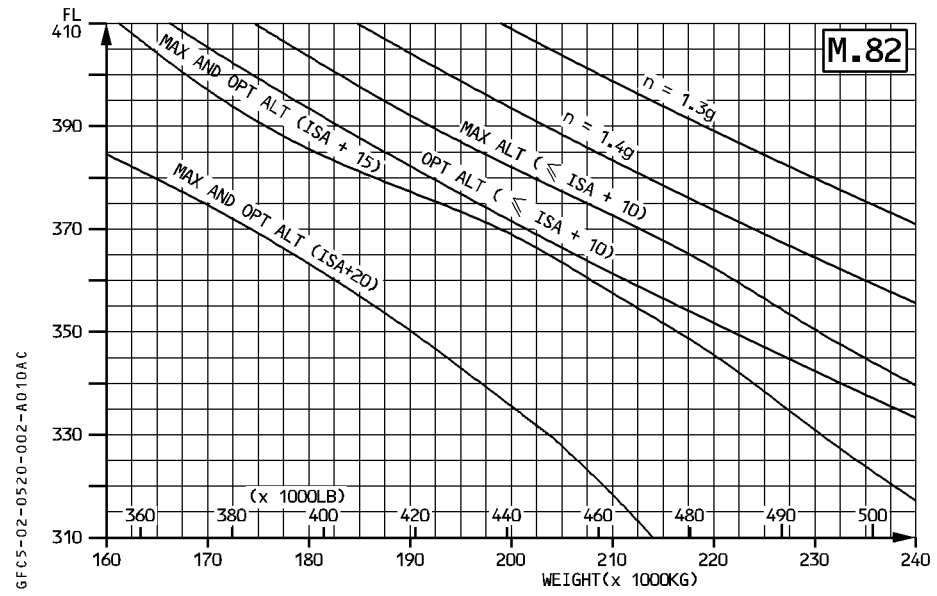
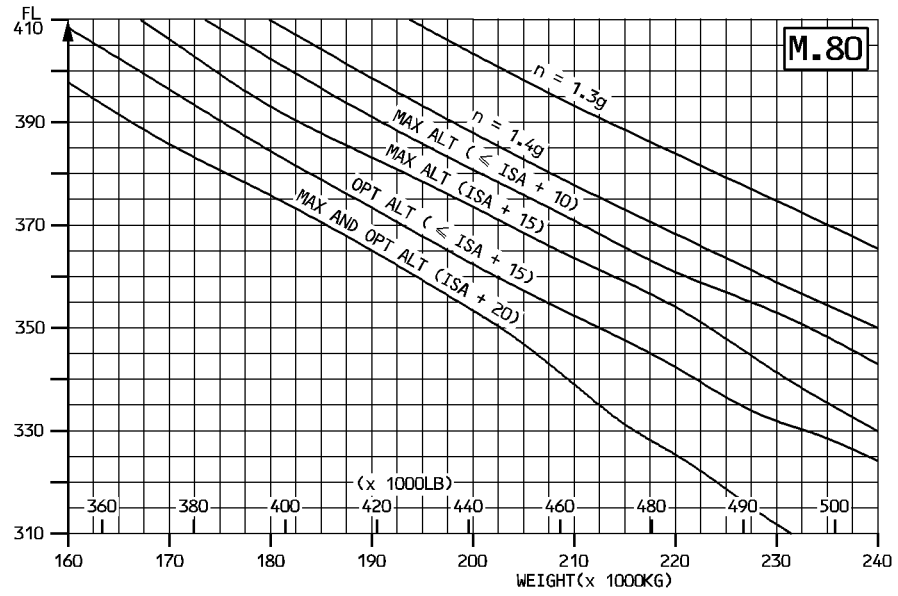
OPTIMUM WEIGHT FOR 4000 FEET STEP CLIMB

STEP CLIMB FROM/TO	WEIGHT (1000 kg)											
	$\leq$ 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	236	235	232	212	228	224	217	194	216	203	190	162
330/370	215	213	213	194	208	205	199	178	196	186	175	148
350/390	191	193	192	175	187	183	175	157	176	166	155	129
370/410	176	176	175	159	170	167	161	144	161	151	141	126

BLEED CORRECTIONS

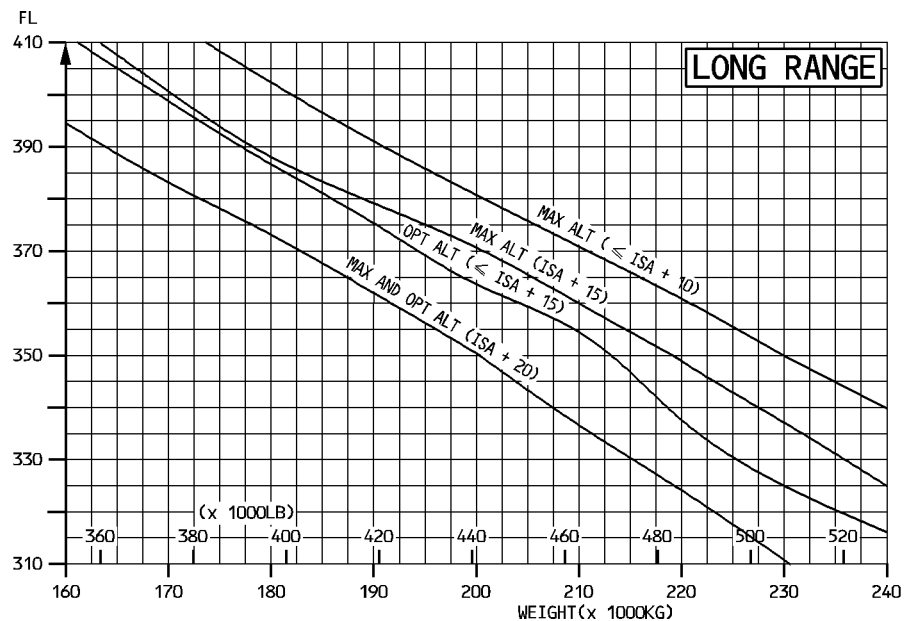
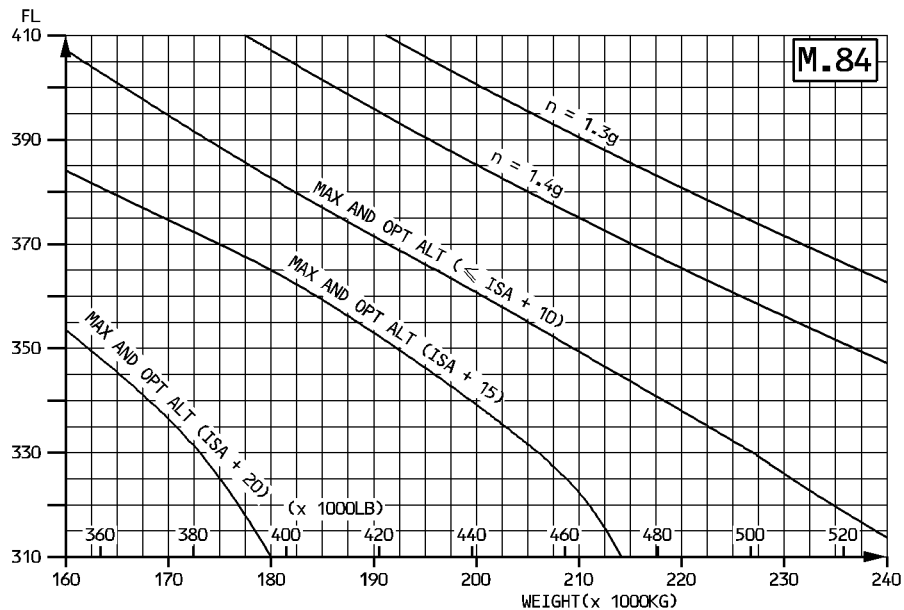
	ENG ANTI ICE ON	TOTAL ANTI ICE ON	PACK FLOW HI AND/OR CARGO COOL ON
$\leq$ ISA + 9	– 100 ft	– 300 ft	– 400 ft
ISA + 15	– 1100 ft	– 1300 ft	– 600 ft
ISA + 20	– 1300 ft	– 1700 ft	– 1200 ft

R



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OPTIMUM ALTITUDE ON SHORT STAGE

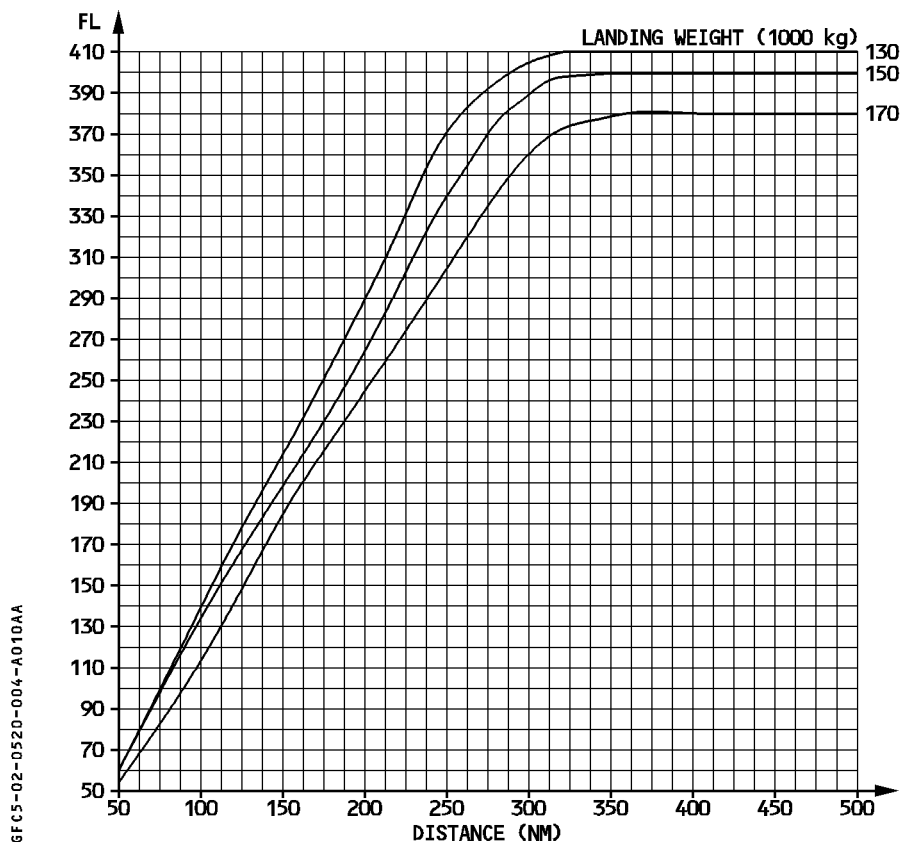
According to the air distance (from brake release point to landing), the cruise flight level is limited by the distance required to perform climb and descent. The graph determines the optimum altitude.

It includes the following profiles :

- Takeoff
- Climb : 250kt/300kt/M.80
- 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 PLANNING INTEGRATED CRUISE	2.05.30	P 1
		SEQ 001	REV 06

GENERAL

Integrated cruise tables allow the planner to calculate the cruise fuel consumption and the 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.

Integrated cruise tables are established for M.80, M.82, M.84 (and long range speed) at optimum level (with 4000 feet step climb) and for long range speed at fixed levels from FL100 to FL410 (with 4000 feet step climb).

Corrections are given on separate tables to allow for step climbs and to take into account the climb and the descent phases.

	FLIGHT PLANNING INTEGRATED CRUISE	2.05.30	P 1
		SEQ 001	REV 06

GENERAL

Integrated cruise tables allow the planner to calculate the cruise fuel consumption and the 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.

Integrated cruise tables are established for M.80, M.82, M.84 (and long range speed) at optimum level (with 4000 feet step climb) and for long range speed at fixed levels from FL100 to FL410 (with 4000 feet step climb).

Corrections are given on separate tables to allow for step climbs and to take into account the climb and the descent phases.

11.1-08F0A330-200 CF6-80E1A4 227000000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .800 000 .000 0 FCOM-G0-02-05-30-002-115

R

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)
174	5146 673	5165 675	5184 678	5203 680	5222 683	5241 685	5259 688	5278 690	5297 693	5315 695	459
176	5334 697	5353 700	5371 702	5390 705	5408 707	5427 710	5446 712	5464 714	5483 717	5501 719	459
178	5520 722	5538 724	5556 727	5575 729	5593 731	5612 734	5630 736	5648 739	5667 741	5685 743	459
180	5703 746	5721 748	5740 751	5758 753	5776 755	5794 758	5812 760	5830 762	5848 765	5866 767	459
182	5885 769	5903 772	5921 774	5939 777	5957 779	5974 781	5992 784	6010 786	6028 788	6046 791	459
184	6064 793	6082 795	6098 797	6111 799	6127 801	6145 804	6163 806	6180 808	6198 810	6216 813	459
186	6233 815	6251 817	6269 820	6286 822	6304 824	6322 827	6339 829	6357 831	6374 833	6392 836	459
188	6409 838	6427 840	6444 843	6461 845	6479 847	6496 849	6514 852	6531 854	6548 856	6566 859	459
190	6583 861	6600 863	6618 865	6635 868	6652 870	6670 872	6687 874	6704 877	6721 879	6738 881	459
192	6756 883	6773 886	6790 888	6807 890	6824 892	6841 895	6858 897	6875 899	6892 901	6909 903	459
194	6926 906	6943 908	6960 910	6977 912	6994 915	7011 917	7028 919	7045 921	7062 923	7078 926	459
196	7095 928	7112 930	7129 932	7146 934	7162 937	7179 939	7196 941	7213 943	7229 945	7246 947	459
198	7263 950	7279 952	7296 954	7312 956	7329 958	7346 961	7362 963	7379 965	7395 967	7412 969	459
200	7428 971	7445 973	7461 976	7477 978	7494 980	7510 982	7527 984	7543 986	7559 988	7576 991	459
202	7592 993	7608 995	7624 997	7641 999	7657 1001	7673 1003	7689 1005	7705 1008	7718 1009	7731 1011	459
204	7747 1013	7763 1015	7779 1017	7795 1019	7811 1021	7827 1023	7843 1025	7859 1028	7875 1030	7891 1032	461
206	7907 1034	7923 1036	7939 1038	7955 1040	7971 1042	7987 1044	8003 1046	8019 1048	8034 1050	8050 1052	461
208	8066 1055	8082 1057	8098 1059	8114 1061	8129 1063	8145 1065	8161 1067	8177 1069	8192 1071	8208 1073	461
210	8224 1075	8239 1077	8255 1079	8271 1081	8286 1083	8302 1085	8318 1087	8333 1089	8349 1091	8364 1093	461
212	8380 1095	8396 1097	8411 1099	8427 1101	8442 1103	8458 1105	8473 1107	8489 1109	8504 1111	8519 1113	461
214	8535 1116	8550 1118	8566 1120	8581 1122	8596 1124	8612 1126	8627 1128	8642 1129	8658 1131	8673 1133	461
216	8688 1135	8704 1137	8719 1139	8734 1141	8749 1143	8765 1145	8780 1147	8795 1149	8810 1151	8825 1153	461
218	8840 1155	8855 1157	8871 1159	8886 1161	8901 1163	8916 1165	8931 1167	8946 1169	8961 1171	8976 1173	461
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3 %		

10E -08FA330-301 CF6-80E1A2 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .800 .000 .000 0 FCOM-G0-02-05-30-003-010

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)
174	5195 679	5214 682	5233 684	5252 687	5271 689	5290 692	5309 694	5328 697	5347 699	5365 702	459
176	5384 704	5403 707	5422 709	5441 711	5460 714	5478 716	5497 719	5516 721	5534 724	5553 726	459
178	5572 729	5590 731	5609 733	5627 736	5646 738	5665 741	5683 743	5702 746	5720 748	5738 750	459
180	5757 753	5775 755	5794 758	5812 760	5830 762	5849 765	5867 767	5885 770	5903 772	5922 774	459
182	5940 777	5958 779	5976 781	5994 784	6012 786	6030 789	6049 791	6067 793	6085 796	6103 798	459
184	6121 800	6134 802	6149 804	6167 806	6185 809	6203 811	6221 813	6239 816	6256 818	6274 820	459
186	6292 823	6310 825	6328 827	6345 830	6363 832	6381 834	6399 837	6416 839	6434 841	6452 844	459
188	6470 846	6487 848	6505 851	6522 853	6540 855	6558 857	6575 860	6593 862	6610 864	6628 867	459
190	6645 869	6663 871	6680 873	6698 876	6715 878	6732 880	6750 883	6767 885	6785 887	6802 889	459
192	6819 892	6836 894	6854 896	6871 898	6888 901	6906 903	6923 905	6940 907	6957 910	6974 912	459
194	6992 914	7009 916	7026 919	7043 921	7060 923	7077 925	7094 928	7111 930	7128 932	7145 934	459
196	7162 937	7179 939	7196 941	7213 943	7230 945	7247 948	7264 950	7280 952	7297 954	7314 956	459
198	7331 959	7348 961	7364 963	7381 965	7398 967	7415 970	7431 972	7448 974	7465 976	7481 978	459
200	7498 980	7515 983	7531 985	7548 987	7564 989	7581 991	7597 993	7614 996	7630 998	7647 1000	459
202	7663 1002	7679 1004	7696 1006	7712 1008	7729 1011	7744 1013	7757 1014	7771 1016	7787 1018	7803 1020	459
204	7819 1022	7836 1025	7852 1027	7868 1029	7884 1031	7901 1033	7917 1035	7933 1037	7949 1039	7965 1041	461
206	7981 1044	7998 1046	8014 1048	8030 1050	8046 1052	8062 1054	8078 1056	8094 1058	8110 1060	8126 1062	461
208	8142 1064	8158 1066	8174 1069	8190 1071	8206 1073	8222 1075	8238 1077	8254 1079	8269 1081	8285 1083	461
210	8301 1085	8317 1087	8333 1089	8349 1091	8364 1093	8380 1095	8396 1097	8412 1100	8427 1102	8443 1104	461
212	8459 1106	8475 1108	8490 1110	8506 1112	8522 1114	8537 1116	8553 1118	8568 1120	8584 1122	8600 1124	461
214	8615 1126	8631 1128	8646 1130	8662 1132	8677 1134	8693 1136	8708 1138	8724 1140	8739 1142	8755 1144	461
216	8770 1146	8786 1148	8801 1150	8816 1152	8832 1154	8847 1156	8862 1158	8878 1160	8893 1162	8908 1164	461
218	8924 1166	8939 1168	8954 1170	8969 1172	8984 1174	9000 1176	9015 1178	9030 1180	9045 1182	9060 1184	461
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 = + 1.5 %			ΔFUEL = + 3 %		

11.1-08F0A330-200 CF6-80E1A4 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .800 .000 .000 0 FCOM-G0-02-05-30-003-115

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)
220	9075 1186	9090 1188	9105 1190	9121 1192	9136 1194	9151 1196	9166 1198	9181 1200	9196 1202	9211 1203	461
222	9226 1205	9241 1207	9255 1209	9270 1211	9285 1213	9300 1215	9315 1217	9329 1219	9340 1220	9353 1222	461
224	9367 1224	9382 1226	9397 1228	9412 1230	9427 1231	9441 1233	9456 1235	9471 1237	9485 1239	9500 1241	465
226	9515 1243	9530 1245	9544 1247	9559 1249	9574 1250	9588 1252	9603 1254	9617 1256	9632 1258	9647 1260	465
228	9661 1262	9676 1264	9690 1265	9705 1267	9719 1269	9734 1271	9748 1273	9763 1275	9777 1277	9792 1279	465
230	9806 1280	9821 1282	9835 1284	9850 1286	9864 1288	9879 1290	9893 1292	9907 1293	9922 1295	9936 1297	465
232	9950 1299	9965 1301	9979 1303	9993 1305	10008 1306	10022 1308	10036 1310	10050 1312	10065 1314	10079 1316	465
234	10093 1317	10107 1319	10121 1321	10136 1323	10150 1325	10164 1327	10178 1328	10192 1330	10206 1332	10220 1334	465
236	10235 1336	10249 1337	10263 1339	10277 1341	10291 1343	10305 1345	10319 1347	10333 1348	10347 1350	10361 1352	465
238	10375 1354	10389 1356	10403 1357	10417 1359	10431 1361	10445 1363	10458 1364	10472 1366	10486 1368	10500 1370	465
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3 %		

11.1-08FOA330-200 CF6-80E1A4 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .800 .000 .000 0 FCOM-GO-02-05-30-004-115

R

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)
126	0 0	23 3	46 6	70 9	93 12	116 15	139 18	163 21	186 24	209 27	470
128	232 30	255 33	278 35	301 38	324 41	347 44	370 47	393 50	416 53	439 56	470
130	462 59	485 62	508 65	531 68	554 71	577 74	600 76	622 79	645 82	668 85	470
132	691 88	713 91	736 94	759 97	782 100	804 103	827 105	850 108	872 111	895 114	470
134	917 117	940 120	963 123	985 126	1008 129	1030 131	1053 134	1075 137	1097 140	1120 143	470
136	1142 146	1165 149	1187 151	1209 154	1232 157	1254 160	1276 163	1299 166	1321 168	1343 171	470
138	1365 174	1388 177	1410 180	1432 183	1454 185	1476 188	1498 191	1520 194	1542 197	1564 200	470
140	1587 202	1609 205	1631 208	1652 211	1674 214	1696 216	1718 219	1740 222	1762 225	1784 228	470
142	1806 230	1828 233	1849 236	1871 239	1893 242	1915 244	1937 247	1958 250	1980 253	2002 255	470
144	2023 258	2045 261	2067 264	2088 266	2110 269	2131 272	2153 275	2175 277	2196 280	2218 283	470
146	2239 286	2261 288	2282 291	2303 294	2325 297	2346 299	2368 302	2389 305	2410 307	2432 310	470
148	2453 313	2474 316	2495 318	2517 321	2538 324	2559 326	2580 329	2601 332	2622 335	2644 337	470
150	2665 340	2686 343	2707 345	2728 348	2749 351	2770 353	2791 356	2812 359	2833 361	2854 364	470
152	2875 367	2895 369	2916 372	2937 375	2958 377	2979 380	2999 383	3020 385	3041 388	3062 391	470
154	3082 393	3103 396	3124 398	3144 401	3165 404	3185 406	3206 409	3227 412	3247 414	3268 417	470
156	3288 419	3308 422	3329 425	3349 427	3370 430	3390 432	3410 435	3431 438	3451 440	3471 443	470
158	3492 445	3512 448	3532 451	3552 453	3573 456	3593 458	3613 461	3633 463	3653 466	3673 469	470
160	3693 471	3713 474	3734 476	3754 479	3774 481	3794 484	3813 486	3833 489	3853 492	3873 494	470
162	3893 497	3913 499	3933 502	3953 504	3972 507	3992 509	4012 512	4032 514	4051 517	4071 519	470
164	4091 522	4110 524	4130 527	4150 529	4169 532	4189 534	4208 537	4228 539	4247 542	4267 544	470
166	4286 547	4306 549	4325 552	4345 554	4364 557	4383 559	4403 562	4422 564	4441 567	4461 569	470
168	4480 571	4499 574	4518 576	4537 579	4557 581	4576 584	4595 586	4614 589	4633 591	4652 593	470
170	4671 596	4690 598	4709 601	4728 603	4747 606	4766 608	4785 610	4804 613	4822 615	4841 618	470
172	4860 620	4879 622	4898 625	4916 627	4935 630	4954 632	4972 634	4991 637	5010 639	5028 641	470
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 = + 1.5 %			ΔFUEL = + 3 %		

10E -08FA330-301 CF6-80E1A2 22700000C5KG370 0 018590 0 0 1 1.0 ,0 ,00 0 01 ,820 ,000 ,000 0 FCOM-GO-02-05-30-005-010

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)
126	0 0	23 3	47 6	70 9	94 12	117 15	141 18	164 21	188 24	211 27	470
128	234 30	258 33	281 36	304 39	328 42	351 45	374 48	398 51	421 54	444 57	470
130	467 60	490 63	513 66	537 68	560 71	583 74	606 77	629 80	652 83	675 86	470
132	698 89	721 92	744 95	767 98	790 101	813 104	836 107	859 110	881 112	904 115	470
134	927 118	950 121	973 124	995 127	1018 130	1041 133	1064 136	1086 139	1109 141	1132 144	470
136	1154 147	1177 150	1199 153	1222 156	1245 159	1267 162	1290 165	1312 167	1335 170	1357 173	470
138	1380 176	1402 179	1424 182	1447 185	1469 187	1492 190	1514 193	1536 196	1559 199	1581 202	470
140	1603 205	1625 207	1648 210	1670 213	1692 216	1714 219	1736 221	1758 224	1780 227	1803 230	470
142	1825 233	1847 236	1869 238	1891 241	1913 244	1935 247	1957 250	1979 252	2001 255	2022 258	470
144	2044 261	2066 264	2088 266	2110 269	2132 272	2154 275	2175 277	2197 280	2219 283	2240 286	470
146	2262 289	2284 291	2305 294	2327 297	2349 300	2370 302	2392 305	2413 308	2435 311	2457 313	470
148	2478 316	2500 319	2521 322	2542 324	2564 327	2585 330	2607 333	2628 335	2649 338	2671 341	470
150	2692 343	2713 346	2735 349	2756 352	2777 354	2798 357	2819 360	2841 362	2862 365	2883 368	470
152	2904 370	2925 373	2946 376	2967 379	2988 381	3009 384	3030 387	3051 389	3072 392	3093 395	470
154	3114 397	3135 400	3156 403	3176 405	3197 408	3218 411	3239 413	3259 416	3280 418	3301 421	470
156	3322 424	3342 426	3363 429	3383 432	3404 434	3425 437	3445 440	3466 442	3486 445	3507 447	470
158	3527 450	3548 453	3568 455	3589 458	3609 460	3629 463	3650 466	3670 468	3690 471	3711 473	470
160	3731 476	3751 479	3771 481	3792 484	3812 486	3832 489	3852 491	3872 494	3892 497	3912 499	470
162	3933 502	3953 504	3973 507	3993 509	4013 512	4033 514	4052 517	4072 520	4092 522	4112 525	470
164	4132 527	4152 530	4172 532	4191 535	4211 537	4231 540	4251 542	4270 545	4290 547	4310 550	470
166	4329 552	4349 555	4369 557	4388 560	4408 562	4427 565	4447 567	4466 570	4486 572	4505 575	470
168	4525 577	4544 580	4563 582	4583 585	4602 587	4621 590	4641 592	4660 594	4679 597	4698 599	470
170	4718 602	4737 604	4756 607	4775 609	4794 612	4813 614	4832 616	4851 619	4870 621	4889 624	470
172	4908 626	4927 629	4946 631	4965 633	4984 636	5003 638	5021 641	5040 643	5059 645	5078 648	470
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 = + 1.5 %			ΔFUEL = + 3 %		

11.1-08F0A330-200 CF6-80E1A4 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .820 .000 .000 0 FCOM-GO-02-05-30-005-115

11.1-08F0A330-200 CF6-80E1A4 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .800 000 .000 0 FCOM-G0-02-05-30-006-115

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				
126	0 0	22 3	44 5	66 8	88 11	110 14	132 16	154 19	176 22	198 25	482
128	220 27	242 30	264 33	286 36	308 38	330 41	352 44	374 47	396 49	418 52	482
130	440 55	461 57	483 60	505 63	527 66	549 68	570 71	592 74	614 76	635 79	482
132	657 82	679 85	701 87	722 90	744 93	766 95	787 98	809 101	830 103	852 106	482
134	873 109	895 111	916 114	938 117	959 119	981 122	1002 125	1024 127	1045 130	1067 133	482
136	1088 135	1109 138	1131 141	1152 143	1173 146	1195 149	1216 151	1237 154	1258 157	1280 159	482
138	1301 162	1322 165	1343 167	1364 170	1385 173	1407 175	1428 178	1449 180	1470 183	1491 186	482
140	1512 188	1533 191	1554 194	1575 196	1596 199	1617 201	1638 204	1658 207	1679 209	1700 212	482
142	1721 214	1742 217	1763 220	1783 222	1804 225	1825 227	1846 230	1866 232	1887 235	1908 238	482
144	1928 240	1949 243	1969 245	1990 248	2011 250	2031 253	2052 255	2072 258	2092 261	2113 263	482
146	2133 266	2154 268	2174 271	2195 273	2215 276	2235 278	2256 281	2276 283	2296 286	2316 288	482
148	2337 291	2357 293	2377 296	2397 299	2417 301	2437 304	2458 306	2478 309	2498 311	2518 314	482
150	2538 316	2558 319	2578 321	2598 323	2618 326	2638 328	2657 331	2677 333	2697 336	2717 338	482
152	2737 341	2757 343	2776 346	2796 348	2816 351	2836 353	2855 356	2875 358	2895 360	2914 363	482
154	2934 365	2953 368	2973 370	2992 373	3012 375	3031 378	3051 380	3070 382	3090 385	3109 387	482
156	3128 390	3148 392	3167 394	3186 397	3206 399	3225 402	3244 404	3263 406	3282 409	3302 411	482
158	3321 414	3340 416	3359 418	3378 421	3397 423	3416 425	3435 428	3454 430	3473 432	3491 435	482
160	3510 437	3528 439	3544 441	3560 443	3578 446	3597 448	3616 450	3634 453	3653 455	3671 457	482
162	3690 460	3708 462	3727 464	3745 466	3764 469	3782 471	3801 473	3819 476	3837 478	3856 480	482
164	3874 482	3893 485	3911 487	3929 489	3947 492	3966 494	3984 496	4002 498	4020 501	4039 503	482
166	4057 505	4075 507	4093 510	4111 512	4129 514	4148 517	4166 519	4184 521	4202 523	4220 525	482
168	4238 528	4256 530	4274 532	4292 534	4310 537	4328 539	4345 541	4363 543	4381 546	4399 548	482
170	4417 550	4435 552	4452 554	4470 557	4488 559	4506 561	4523 563	4541 565	4559 568	4576 570	482
172	4594 572	4611 574	4629 576	4647 579	4664 581	4682 583	4699 585	4717 587	4734 590	4752 592	482
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 = + 1.5 %		ΔFUEL = + 3 %			

11.1-08FOA330-200 CF6-80E1A4 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .840 .000 .000 0 FCOM-GO-02-05-30-008-115

R

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				
174	4721 588	4738 590	4756 592	4773 594	4790 597	4805 598	4820 600	4835 602	4852 604	4868 606	482
176	4885 608	4902 610	4919 613	4936 615	4953 617	4970 619	4986 621	5003 623	5020 625	5037 627	482
178	5054 629	5070 631	5087 634	5104 636	5121 638	5137 640	5154 642	5171 644	5187 646	5204 648	482
180	5221 650	5237 652	5254 654	5270 656	5287 658	5303 660	5320 663	5336 665	5353 667	5369 669	482
182	5386 671	5402 673	5419 675	5435 677	5452 679	5468 681	5485 683	5501 685	5517 687	5534 689	482
184	5550 691	5566 693	5583 695	5599 697	5615 699	5631 701	5648 703	5664 705	5680 707	5696 709	482
186	5712 711	5729 713	5745 715	5761 717	5777 719	5793 721	5809 723	5825 725	5841 727	5857 729	482
188	5873 731	5889 733	5905 735	5921 737	5937 739	5953 741	5969 743	5985 745	6001 747	6017 749	482
190	6032 751	6048 753	6064 755	6080 757	6096 759	6111 761	6127 763	6143 765	6159 767	6174 769	482
192	6190 771	6206 773	6221 775	6237 777	6252 779	6268 781	6284 783	6298 784	6311 786	6324 788	482
194	6339 789	6354 791	6370 793	6385 795	6400 797	6416 799	6431 801	6446 803	6462 805	6477 806	484
196	6492 808	6507 810	6523 812	6538 814	6553 816	6568 818	6583 820	6598 822	6614 823	6629 825	484
198	6644 827	6659 829	6674 831	6689 833	6704 835	6719 837	6734 838	6749 840	6764 842	6780 844	484
200	6795 846	6810 848	6824 850	6839 851	6854 853	6869 855	6884 857	6899 859	6914 861	6929 863	484
202	6944 864	6959 866	6974 868	6988 870	7003 872	7018 874	7033 875	7048 877	7062 879	7077 881	484
204	7092 883	7107 885	7121 886	7136 888	7151 890	7166 892	7180 894	7195 895	7209 897	7224 899	484
206	7239 901	7253 903	7268 905	7282 906	7297 908	7312 910	7326 912	7341 914	7355 915	7370 917	484
208	7384 919	7399 921	7413 922	7427 924	7442 926	7456 928	7471 930	7485 931	7499 933	7514 935	484
210	7528 937	7542 939	7557 940	7571 942	7585 944	7599 946	7614 947	7628 949	7642 951	7655 953	484
212	7667 954	7679 955	7693 957	7707 959	7721 961	7735 962	7749 964	7762 966	7776 967	7790 969	484
214	7804 971	7818 973	7832 974	7846 976	7860 978	7874 979	7888 981	7902 983	7915 984	7929 986	489
216	7943 988	7957 990	7971 991	7985 993	7998 995	8012 996	8026 998	8040 1000	8053 1001	8067 1003	489
218	8081 1005	8095 1006	8108 1008	8122 1010	8136 1012	8149 1013	8163 1015	8177 1017	8190 1018	8204 1020	489
PACK FLOW LO ΔFUEL = − 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3 %		

10E -08FA330-301 CF6-80E1A2 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .840 .000 .000 0 FCOM-G0-02-05-30-009-010

R

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				
220	8218 1022	8231 1023	8245 1025	8259 1027	8272 1028	8286 1030	8299 1032	8313 1033	8326 1035	8340 1037	489
222	8353 1038	8367 1040	8380 1042	8394 1043	8407 1045	8421 1047	8434 1048	8448 1050	8461 1052	8475 1053	489
224	8488 1055	8501 1056	8515 1058	8528 1060	8542 1061	8555 1063	8568 1065	8582 1066	8595 1068	8608 1070	489
226	8622 1071	8635 1073	8648 1074	8661 1076	8675 1078	8688 1079	8701 1081	8714 1083	8727 1084	8741 1086	489
228	8754 1087	8767 1089	8780 1091	8793 1092	8806 1094	8820 1096	8832 1097	8843 1098	8854 1100	8866 1101	489
230	8878 1103	8891 1104	8904 1106	8917 1107	8930 1109	8943 1111	8956 1112	8968 1114	8981 1115	8994 1117	493
232	9007 1118	9020 1120	9032 1121	9045 1123	9058 1125	9071 1126	9084 1128	9096 1129	9109 1131	9122 1132	493
234	9134 1134	9147 1135	9160 1137	9173 1139	9185 1140	9198 1142	9211 1143	9223 1145	9236 1146	9249 1148	493
236	9261 1149	9274 1151	9286 1152	9299 1154	9312 1155	9324 1157	9337 1159	9349 1160	9362 1162	9374 1163	493
238	9387 1165	9400 1166	9412 1168	9425 1169	9437 1171	9450 1172	9462 1174	9475 1175	9487 1177	9500 1178	493
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %			TOTAL ANTI ICE ON ΔFUEL = + 3 %		

10E -08FA330-301 CF6-80E1A2 22700000C5KG370 0 018590 0 0 1 1.0 .00 .00 0 01 .840 .000 .000 0 FCOM-GO-02-05-30-010-010

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)
174	4769 594	4786 596	4804 598	4821 600	4838 602	4855 605	4873 607	4890 609	4907 611	4924 613	482
176	4942 615	4956 617	4970 619	4986 621	5003 623	5020 625	5037 627	5054 629	5071 632	5088 634	482
178	5105 636	5122 638	5139 640	5156 642	5173 644	5189 646	5206 648	5223 650	5240 653	5257 655	482
180	5273 657	5290 659	5307 661	5324 663	5340 665	5357 667	5374 669	5391 671	5407 673	5424 675	482
182	5441 678	5457 680	5474 682	5490 684	5507 686	5524 688	5540 690	5557 692	5573 694	5590 696	482
184	5606 698	5623 700	5639 702	5655 704	5672 706	5688 708	5705 710	5721 712	5737 715	5754 717	482
186	5770 719	5786 721	5803 723	5819 725	5835 727	5852 729	5868 731	5884 733	5900 735	5916 737	482
188	5933 739	5949 741	5965 743	5981 745	5997 747	6013 749	6029 751	6045 753	6061 755	6077 757	482
190	6093 759	6109 761	6125 763	6141 765	6157 767	6173 769	6189 771	6205 773	6221 775	6236 777	482
192	6252 779	6268 781	6284 783	6300 785	6315 786	6331 788	6347 790	6362 792	6378 794	6393 796	482
194	6409 798	6425 800	6440 802	6456 804	6469 806	6482 807	6496 809	6511 811	6527 813	6542 815	482
196	6558 817	6573 819	6588 820	6604 822	6619 824	6634 826	6650 828	6665 830	6680 832	6696 834	484
198	6711 836	6726 837	6741 839	6757 841	6772 843	6787 845	6802 847	6818 849	6833 851	6848 853	484
200	6863 854	6878 856	6893 858	6908 860	6924 862	6939 864	6954 866	6969 868	6984 869	6999 871	484
202	7014 873	7029 875	7044 877	7059 879	7074 881	7089 882	7104 884	7119 886	7134 888	7149 890	484
204	7163 892	7178 894	7193 895	7208 897	7223 899	7238 901	7252 903	7267 905	7282 906	7297 908	484
206	7312 910	7326 912	7341 914	7356 915	7370 917	7385 919	7400 921	7414 923	7429 925	7444 926	484
208	7458 928	7473 930	7488 932	7502 934	7517 935	7531 937	7546 939	7560 941	7575 943	7589 944	484
210	7604 946	7618 948	7633 950	7647 952	7661 953	7676 955	7690 957	7705 959	7719 961	7733 962	484
212	7748 964	7762 966	7776 968	7790 969	7805 971	7819 973	7832 974	7843 976	7855 977	7869 979	484
214	7883 981	7897 983	7911 984	7925 986	7939 988	7954 989	7968 991	7982 993	7996 995	8010 996	489
216	8024 998	8037 1000	8051 1001	8065 1003	8079 1005	8093 1007	8107 1008	8121 1010	8135 1012	8149 1013	489
218	8163 1015	8176 1017	8190 1019	8204 1020	8218 1022	8232 1024	8246 1025	8259 1027	8273 1029	8287 1030	489
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 = + 1.5 %			ΔFUEL = + 3 %		

11.1-08F0A330-200 CF6-80E1A4 22700000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .840 .000 .000 0 FCOM-G0-02-05-30-009-115

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 11
	INTEGRATED CRUISE		SEQ 010	REV 07

R

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)
126	0 0	24 3	48 6	72 10	96 13	121 16	144 19	168 22	192 26	216 29	467
128	240 32	264 35	288 38	312 41	336 45	360 48	384 51	407 54	431 57	455 60	467
130	478 64	502 67	526 70	549 73	573 76	597 79	620 82	644 85	667 88	691 92	467
132	714 95	738 98	761 101	784 104	808 107	831 110	855 113	878 116	901 119	924 122	467
134	948 125	971 129	994 132	1017 135	1040 138	1064 141	1087 144	1110 147	1133 150	1156 153	467
136	1179 156	1202 159	1225 162	1248 165	1271 168	1294 171	1316 174	1339 177	1362 180	1385 183	467
138	1408 186	1430 189	1453 192	1476 195	1498 198	1521 201	1544 204	1566 207	1589 210	1612 212	467
140	1634 215	1657 218	1679 221	1702 224	1724 227	1747 230	1769 233	1791 236	1814 239	1836 242	467
142	1858 245	1881 248	1903 250	1925 253	1947 256	1970 259	1992 262	2014 265	2036 268	2058 271	467
144	2080 274	2102 276	2124 279	2146 282	2168 285	2190 288	2212 291	2234 294	2256 296	2278 299	467
146	2300 302	2322 305	2344 308	2365 311	2387 313	2409 316	2431 319	2452 322	2474 325	2496 327	467
148	2518 330	2539 333	2561 336	2582 339	2604 341	2625 344	2647 347	2668 350	2690 353	2711 355	467
150	2733 358	2754 361	2776 364	2797 366	2818 369	2840 372	2861 375	2882 377	2903 380	2925 383	467
152	2946 386	2967 388	2988 391	3009 394	3030 397	3051 399	3072 402	3093 405	3114 407	3135 410	467
154	3156 413	3177 416	3198 418	3219 421	3240 424	3261 426	3282 429	3302 432	3323 434	3344 437	467
156	3365 440	3385 442	3406 445	3427 448	3447 450	3468 453	3488 456	3509 458	3529 461	3550 464	467
158	3571 466	3591 469	3611 471	3632 474	3652 477	3673 479	3693 482	3713 485	3733 487	3754 490	467
160	3774 492	3794 495	3814 498	3835 500	3855 503	3875 505	3895 508	3915 511	3935 513	3955 516	467
162	3975 518	3995 521	4015 523	4035 526	4055 528	4075 531	4095 534	4115 536	4134 539	4154 541	467
164	4174 544	4194 546	4213 549	4233 551	4253 554	4272 556	4292 559	4312 561	4331 564	4351 566	467
166	4370 569	4390 571	4409 574	4429 576	4448 579	4467 581	4487 584	4506 586	4522 588	4537 590	467
168	4556 593	4575 595	4594 598	4613 600	4633 603	4652 605	4671 607	4690 610	4709 612	4728 615	467
170	4747 617	4766 620	4785 622	4804 625	4823 627	4842 630	4861 632	4880 635	4899 637	4918 639	467
172	4937 642	4956 644	4975 647	4994 649	5012 652	5031 654	5050 656	5069 659	5087 661	5106 664	467
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %		TOTAL ANTI ICE ON ΔFUEL = + 5 %			

10E-08FA330-301 CF6-80E1A2 22800000CSKG370 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-GO-02-05-30-011-010

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)
126	0 0	24 3	49 6	73 10	97 13	121 16	146 19	170 22	194 26	218 29	468
128	242 32	266 35	290 38	314 42	338 45	362 48	386 51	410 54	434 57	458 61	468
130	482 64	506 67	530 70	553 73	577 76	601 79	625 82	648 86	672 89	696 92	468
132	719 95	743 98	766 101	790 104	814 107	837 110	861 113	884 117	908 120	931 123	468
134	954 126	978 129	1001 132	1024 135	1048 138	1071 141	1094 144	1118 147	1141 150	1164 153	468
136	1187 156	1210 159	1233 162	1257 165	1280 168	1303 171	1326 174	1349 177	1372 180	1395 183	468
138	1418 186	1441 189	1464 192	1486 195	1509 198	1532 201	1555 204	1578 207	1600 210	1623 213	468
140	1646 216	1669 219	1691 222	1714 225	1737 228	1759 231	1782 234	1804 237	1827 240	1849 242	468
142	1872 245	1894 248	1917 251	1939 254	1962 257	1984 260	2006 263	2029 266	2051 269	2073 271	468
144	2095 274	2118 277	2140 280	2162 283	2184 286	2206 289	2228 292	2251 294	2273 297	2295 300	468
146	2317 303	2339 306	2361 309	2383 312	2405 314	2427 317	2448 320	2470 323	2492 326	2514 329	468
148	2536 331	2558 334	2579 337	2601 340	2623 343	2645 345	2666 348	2688 351	2710 354	2731 357	468
150	2753 359	2774 362	2796 365	2817 368	2839 371	2860 373	2882 376	2903 379	2925 382	2946 384	468
152	2967 387	2989 390	3010 393	3031 395	3053 398	3074 401	3095 404	3116 406	3137 409	3159 412	468
154	3180 414	3201 417	3222 420	3243 423	3264 425	3285 428	3306 431	3327 433	3348 436	3369 439	468
156	3390 441	3410 444	3431 447	3452 449	3473 452	3494 455	3514 458	3535 460	3556 463	3576 465	468
158	3597 468	3618 471	3638 473	3659 476	3679 479	3700 481	3720 484	3741 487	3761 489	3782 492	468
160	3802 494	3823 497	3843 500	3863 502	3884 505	3904 508	3924 510	3944 513	3965 515	3985 518	468
162	4005 520	4025 523	4045 526	4065 528	4085 531	4105 533	4125 536	4145 538	4165 541	4185 544	468
164	4205 546	4225 549	4245 551	4265 554	4285 556	4304 559	4324 561	4344 564	4363 566	4383 569	468
166	4403 571	4422 574	4442 576	4461 579	4477 581	4493 583	4512 585	4531 588	4551 590	4570 593	468
168	4590 595	4609 598	4629 600	4648 603	4667 605	4687 608	4706 610	4725 613	4745 615	4764 618	468
170	4783 620	4802 623	4822 625	4841 628	4860 630	4879 633	4898 635	4917 638	4936 640	4955 642	468
172	4974 645	4993 647	5012 650	5031 652	5050 655	5069 657	5088 660	5107 662	5126 664	5145 667	468
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

11.1-08FOA330-200 CF6-80E1A4 2280000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-GO-02-05-30-011-115

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)
174	5164 669	5182 672	5201 674	5220 676	5239 679	5257 681	5276 684	5295 686	5313 689	5332 691	468
176	5351 693	5369 696	5388 698	5406 700	5425 703	5444 705	5462 708	5480 710	5499 712	5517 715	468
178	5536 717	5554 719	5573 722	5591 724	5609 726	5628 729	5646 731	5664 733	5682 736	5701 738	468
180	5719 741	5737 743	5755 745	5773 747	5792 750	5810 752	5828 754	5846 757	5864 759	5882 761	468
182	5900 764	5918 766	5936 768	5954 771	5968 772	5982 774	5999 776	6017 779	6035 781	6053 783	468
184	6070 786	6088 788	6106 790	6124 792	6142 795	6159 797	6177 799	6195 802	6212 804	6230 806	468
186	6248 808	6265 811	6283 813	6300 815	6318 818	6336 820	6353 822	6371 824	6388 827	6406 829	468
188	6423 831	6441 833	6458 836	6475 838	6493 840	6510 842	6528 845	6545 847	6562 849	6580 851	468
190	6597 853	6614 856	6631 858	6649 860	6666 862	6683 865	6700 867	6717 869	6735 871	6752 873	468
192	6769 876	6786 878	6803 880	6820 882	6837 884	6854 887	6871 889	6888 891	6905 893	6922 895	468
194	6939 897	6956 900	6973 902	6990 904	7007 906	7024 908	7041 910	7057 913	7074 915	7091 917	468
196	7108 919	7125 921	7141 923	7158 926	7175 928	7192 930	7208 932	7225 934	7242 936	7258 938	468
198	7275 940	7291 943	7308 945	7325 947	7341 949	7358 951	7374 953	7391 955	7407 957	7423 960	468
200	7440 962	7456 964	7473 966	7489 968	7505 970	7522 972	7535 974	7548 975	7563 977	7579 979	468
202	7595 982	7612 984	7628 986	7644 988	7660 990	7677 992	7693 994	7709 996	7725 998	7741 1000	470
204	7757 1002	7773 1004	7789 1006	7805 1009	7822 1011	7838 1013	7854 1015	7870 1017	7886 1019	7902 1021	470
206	7918 1023	7934 1025	7950 1027	7965 1029	7981 1031	7997 1033	8013 1035	8029 1037	8045 1039	8061 1041	470
208	8077 1043	8092 1045	8108 1047	8124 1049	8140 1051	8156 1053	8171 1055	8187 1057	8203 1059	8218 1061	470
210	8234 1063	8250 1065	8265 1067	8281 1069	8297 1071	8312 1073	8328 1075	8343 1077	8359 1079	8374 1081	470
212	8390 1083	8406 1085	8421 1087	8437 1089	8452 1091	8467 1093	8483 1095	8498 1097	8514 1099	8529 1101	470
214	8545 1103	8560 1105	8575 1107	8591 1109	8606 1111	8621 1113	8637 1115	8652 1117	8667 1119	8682 1121	470
216	8698 1123	8713 1125	8728 1127	8743 1129	8758 1131	8774 1132	8789 1134	8804 1136	8819 1138	8834 1140	470
218	8849 1142	8864 1144	8879 1146	8894 1148	8909 1150	8925 1152	8939 1154	8954 1156	8969 1157	8984 1159	470
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1.5 %			ΔFUEL = + 3 %			ΔFUEL = + 5 %		

11.1-08F0A330-200 CF6-80E1A4 22800000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-G0-02-05-30-012-115

10E-08FA330-301 CF6-80E1A2 228000000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-G0-02-05-30-013-010

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)
220	8999	9014	9029	9044	9059	9071	9082	9096	9111	9125	470
	1161	1163	1165	1167	1169	1170	1172	1174	1175	1177	
222	9140	9155	9170	9185	9199	9214	9229	9244	9258	9273	474
	1179	1181	1183	1185	1187	1189	1190	1192	1194	1196	
224	9288	9302	9317	9332	9346	9361	9375	9390	9405	9419	474
	1198	1200	1202	1204	1205	1207	1209	1211	1213	1215	
226	9434	9448	9463	9477	9492	9506	9521	9535	9550	9564	474
	1217	1218	1220	1222	1224	1226	1228	1230	1231	1233	
228	9579	9593	9608	9622	9636	9651	9665	9679	9694	9708	474
	1235	1237	1239	1241	1242	1244	1246	1248	1250	1251	
230	9722	9737	9751	9765	9779	9794	9808	9822	9836	9851	474
	1253	1255	1257	1259	1261	1262	1264	1266	1268	1270	
232	9865	9879	9893	9907	9921	9935	9950	9964	9978	9992	474
	1271	1273	1275	1277	1279	1280	1282	1284	1286	1287	
234	10066	10020	10034	10048	10062	10076	10090	10104	10118	10132	474
	1289	1291	1293	1295	1296	1298	1300	1302	1303	1305	
236	10146	10160	10174	10187	10201	10215	10229	10243	10257	10271	474
	1307	1309	1311	1312	1314	1316	1318	1319	1321	1323	
238	10284	10298	10312	10326	10340	10353	10367	10381	10394	10408	474
	1325	1326	1328	1330	1332	1333	1335	1337	1338	1340	

11.1-08F0A330-200	CF6-80E1A4	228000000C5KG370	0	018590	0	0	1	1.0	0	.00	0	01	.990	.000	.000	0	FCOM-GO-02-05-30-013-115

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)
126	0 0	14 3	29 6	43 9	58 12	72 16	87 19	101 22	115 25	130 28	278
128	144 31	158 34	173 37	187 40	201 43	216 46	230 49	244 52	259 55	273 58	280
130	287 62	301 65	316 68	330 71	344 74	358 77	373 80	387 83	401 86	415 89	282
132	429 92	443 95	458 98	472 101	486 104	500 107	514 110	528 113	542 116	557 119	283
134	571 122	585 125	599 128	613 131	627 134	641 137	655 139	669 142	683 145	697 148	284
136	711 151	725 154	739 157	753 160	767 163	781 166	795 169	809 172	823 175	837 178	285
138	851 181	865 184	879 187	892 189	906 192	920 195	934 198	948 201	962 204	976 207	286
140	990 210	1003 213	1017 216	1031 218	1045 221	1059 224	1072 227	1086 230	1100 233	1114 236	287
142	1128 239	1141 242	1155 244	1169 247	1183 250	1196 253	1210 256	1224 259	1237 261	1251 264	288
144	1265 267	1278 270	1292 273	1306 276	1319 278	1333 281	1347 284	1360 287	1374 290	1387 293	290
146	1401 295	1415 298	1428 301	1442 304	1455 306	1469 309	1482 312	1496 315	1509 318	1523 320	292
148	1536 323	1550 326	1563 329	1577 331	1590 334	1604 337	1617 339	1631 342	1644 345	1657 348	294
150	1671 350	1684 353	1698 356	1711 358	1724 361	1738 364	1751 367	1765 369	1778 372	1791 375	296
152	1805 377	1818 380	1831 383	1844 385	1858 388	1871 391	1884 393	1898 396	1911 399	1924 401	299
154	1937 404	1951 407	1964 409	1977 412	1990 414	2003 417	2017 420	2030 422	2043 425	2056 428	301
156	2069 430	2082 433	2096 435	2109 438	2122 441	2135 443	2148 446	2161 448	2174 451	2187 453	303
158	2200 456	2213 459	2227 461	2240 464	2253 466	2266 469	2279 471	2292 474	2305 477	2318 479	305
160	2331 482	2344 484	2357 487	2370 489	2383 492	2396 494	2409 497	2421 499	2434 502	2447 504	306
162	2460 507	2473 509	2486 512	2499 515	2512 517	2525 520	2538 522	2550 525	2563 527	2576 530	307
164	2589 532	2602 535	2615 537	2628 540	2640 542	2653 544	2666 547	2679 549	2692 552	2704 554	309
166	2717 557	2730 559	2743 562	2755 564	2768 567	2781 569	2794 572	2806 574	2819 577	2832 579	310
168	2844 581	2857 584	2870 586	2882 589	2895 591	2908 594	2920 596	2933 599	2946 601	2958 603	311
170	2971 606	2984 608	2996 611	3009 613	3021 615	3034 618	3047 620	3059 623	3072 625	3084 628	312
172	3097 630	3109 632	3122 635	3134 637	3147 640	3159 642	3172 644	3184 647	3197 649	3209 651	313
PACK FLOW LO				PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %				ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %			

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 01001 .990 .000 .000 0 FCOM-GO-02-05-30-014-115

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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)
174	3123 626	3135 628	3147 630	3159 633	3171 635	3183 637	3195 639	3207 642	3219 644	3231 646	318
176	3243 648	3255 651	3267 653	3279 655	3291 657	3303 660	3315 662	3327 664	3339 666	3351 669	319
178	3363 671	3375 673	3387 675	3399 678	3411 680	3423 682	3435 684	3447 687	3459 689	3471 691	321
180	3482 693	3494 695	3506 698	3518 700	3530 702	3542 704	3554 706	3565 709	3577 711	3589 713	322
182	3601 715	3613 717	3625 720	3636 722	3648 724	3660 726	3672 728	3684 731	3695 733	3707 735	323
184	3719 737	3731 739	3742 741	3754 744	3766 746	3778 748	3789 750	3801 752	3813 754	3824 757	325
186	3836 759	3848 761	3859 763	3871 765	3883 767	3894 769	3906 772	3918 774	3929 776	3941 778	326
188	3953 780	3964 782	3976 784	3987 786	3999 789	4011 791	4022 793	4034 795	4045 797	4057 799	327
190	4069 801	4080 803	4092 806	4103 808	4115 810	4126 812	4138 814	4149 816	4161 818	4172 820	328
192	4184 822	4195 824	4207 826	4218 829	4230 831	4241 833	4253 835	4264 837	4276 839	4287 841	331
194	4298 843	4310 845	4321 847	4333 849	4344 851	4356 853	4367 855	4378 857	4390 859	4401 861	333
196	4412 864	4424 866	4435 868	4446 870	4458 872	4469 874	4481 876	4492 878	4503 880	4514 882	335
198	4526 884	4537 886	4548 888	4560 890	4571 892	4582 894	4594 896	4605 898	4616 900	4627 902	337
200	4639 904	4650 906	4661 908	4672 910	4683 912	4695 914	4706 916	4717 918	4728 920	4739 922	339
202	4751 924	4762 925	4773 927	4784 929	4795 931	4807 933	4818 935	4829 937	4840 939	4851 941	341
204	4862 943	4873 945	4884 947	4896 949	4907 951	4918 953	4929 955	4940 957	4951 959	4962 960	343
206	4973 962	4984 964	4995 966	5006 968	5017 970	5028 972	5039 974	5050 976	5062 978	5073 980	345
208	5084 982	5095 983	5106 985	5117 987	5128 989	5139 991	5150 993	5161 995	5172 997	5182 999	346
210	5193 1001	5204 1002	5215 1004	5226 1006	5237 1008	5248 1010	5259 1012	5270 1014	5281 1016	5292 1018	348
212	5303 1019	5314 1021	5325 1023	5336 1025	5346 1027	5357 1029	5368 1031	5379 1033	5390 1034	5401 1036	349
214	5412 1038	5423 1040	5433 1042	5444 1044	5455 1046	5466 1047	5477 1049	5488 1051	5498 1053	5509 1055	350
216	5520 1057	5531 1058	5542 1060	5552 1062	5563 1064	5574 1066	5585 1068	5595 1069	5606 1071	5617 1073	352
218	5628 1075	5639 1077	5649 1079	5660 1080	5671 1082	5682 1084	5693 1086	5703 1088	5714 1089	5724 1091	354
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1.5 %			ΔFUEL = + 3 %			ΔFUEL = + 5 %		

10E -08FA330-301 CF6-80E1A2 22200000C5KG300 0 018590 0 0 1 1.0 0 .00 01001 .990 .000 .000 0 FCOM-GO-02-05-30-015-010

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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)
220	5735 1093	5746 1095	5756 1097	5767 1099	5778 1100	5789 1102	5799 1104	5810 1106	5821 1107	5831 1109	356
222	5842 1111	5853 1113	5863 1115	5874 1116	5884 1118	5895 1120	5906 1122	5916 1124	5927 1125	5938 1127	357
224	5948 1129	5959 1131	5969 1132	5980 1134	5991 1136	6001 1138	6012 1139	6022 1141	6033 1143	6043 1145	359
226	6054 1146	6065 1148	6075 1150	6086 1152	6096 1153	6107 1155	6117 1157	6128 1159	6138 1160	6149 1162	361
228	6159 1164	6170 1166	6180 1167	6191 1169	6201 1171	6212 1173	6222 1174	6233 1176	6243 1178	6254 1179	363
230	6264 1181	6275 1183	6285 1185	6296 1186	6306 1188	6316 1190	6327 1192	6337 1193	6348 1195	6358 1197	365
232	6369 1198	6379 1200	6389 1202	6400 1203	6410 1205	6421 1207	6431 1209	6441 1210	6452 1212	6462 1214	366
234	6472 1215	6483 1217	6493 1219	6504 1220	6514 1222	6524 1224	6535 1225	6545 1227	6555 1229	6566 1231	367
236	6576 1232	6586 1234	6597 1236	6607 1237	6617 1239	6627 1241	6638 1242	6648 1244	6658 1246	6669 1247	369
238	6679 1249	6689 1251	6699 1252	6710 1254	6720 1256	6730 1257	6740 1259	6751 1261	6761 1262	6771 1264	370
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E-08FA330-301 CF6-80E1A2 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 01001 .990 .000 .000 0 FCOM-GO-02-05-30-016-010

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)
174	3222 654	3234 656	3247 659	3259 661	3272 663	3284 666	3297 668	3309 670	3322 673	3334 675	315
176	3346 678	3359 680	3371 682	3384 685	3396 687	3408 689	3421 692	3433 694	3445 696	3458 699	316
178	3470 701	3482 703	3495 706	3507 708	3519 710	3532 713	3544 715	3556 717	3569 720	3581 722	317
180	3593 724	3605 727	3618 729	3630 731	3642 733	3654 736	3667 738	3679 740	3691 743	3703 745	318
182	3715 747	3728 750	3740 752	3752 754	3764 756	3776 759	3789 761	3801 763	3813 766	3825 768	320
184	3837 770	3849 772	3861 775	3873 777	3886 779	3898 781	3910 784	3922 786	3934 788	3946 790	321
186	3958 793	3970 795	3982 797	3994 799	4006 802	4018 804	4030 806	4042 808	4054 811	4066 813	322
188	4078 815	4090 817	4102 819	4114 822	4126 824	4138 826	4150 828	4162 830	4174 833	4186 835	324
190	4198 837	4210 839	4222 841	4234 844	4245 846	4257 848	4269 850	4281 852	4293 855	4305 857	325
192	4317 859	4329 861	4340 863	4352 866	4364 868	4376 870	4388 872	4400 874	4411 876	4423 879	326
194	4435 881	4447 883	4459 885	4470 887	4482 889	4494 892	4506 894	4517 896	4529 898	4541 900	327
196	4553 902	4564 904	4576 907	4588 909	4599 911	4611 913	4623 915	4634 917	4646 919	4658 921	328
198	4670 924	4681 926	4693 928	4704 930	4716 932	4728 934	4739 936	4751 938	4763 940	4774 943	330
200	4786 945	4797 947	4809 949	4821 951	4832 953	4844 955	4855 957	4867 959	4878 961	4890 964	331
202	4901 966	4913 968	4924 970	4936 972	4948 974	4959 976	4971 978	4982 980	4994 982	5005 984	333
204	5016 986	5028 988	5039 990	5051 992	5062 994	5074 996	5085 999	5097 1001	5108 1003	5119 1005	335
206	5131 1007	5142 1009	5154 1011	5165 1013	5176 1015	5188 1017	5199 1019	5211 1021	5222 1023	5233 1025	337
208	5245 1027	5256 1029	5267 1031	5279 1033	5290 1035	5301 1037	5313 1039	5324 1041	5335 1043	5347 1045	339
210	5358 1047	5369 1049	5380 1051	5392 1053	5403 1055	5414 1057	5425 1059	5437 1061	5448 1063	5459 1065	341
212	5470 1067	5482 1069	5493 1070	5504 1072	5515 1074	5526 1076	5538 1078	5549 1080	5560 1082	5571 1084	343
214	5582 1087	5593 1088	5605 1090	5616 1092	5627 1094	5638 1096	5649 1098	5660 1100	5671 1102	5683 1103	345
216	5694 1105	5705 1107	5716 1109	5727 1111	5738 1113	5749 1115	5760 1117	5771 1119	5782 1121	5793 1123	347
218	5804 1125	5816 1126	5827 1128	5838 1130	5849 1132	5860 1134	5871 1136	5882 1138	5893 1140	5904 1142	348
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 01001 .990 .000 .000 0 FCOM-GO-02-05-30-015-115

11.1-08F0A330-200 CF6-80E1A4 222000000C5KG300 0 018590 0 0 1 1.0 .0 .00 01001 .990 .000 .000 0 FCOM-GO-02-05-30-016-115

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 17
	INTEGRATED CRUISE		SEQ 010	REV 07

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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)
126	0 0	15 3	31 6	46 9	62 12	77 15	92 19	108 22	123 25	139 28	299
128	154 31	169 34	185 37	200 40	215 43	230 46	246 49	261 52	276 55	291 58	300
130	307 61	322 64	337 67	352 70	367 73	383 76	398 79	413 82	428 85	443 88	302
132	458 91	473 94	488 97	504 100	519 103	534 106	549 109	564 112	579 115	594 118	304
134	609 121	624 124	639 127	654 130	669 133	684 136	699 139	714 142	729 145	744 147	305
136	758 150	773 153	788 156	803 159	818 162	833 165	848 168	863 171	877 174	892 177	306
138	907 179	922 182	937 185	951 188	966 191	981 194	996 197	1010 199	1025 202	1040 205	308
140	1054 208	1069 211	1084 214	1098 217	1113 219	1128 222	1142 225	1157 228	1172 231	1186 234	310
142	1201 236	1215 239	1230 242	1245 245	1259 248	1274 250	1288 253	1303 256	1317 259	1332 262	311
144	1346 264	1361 267	1375 270	1390 273	1404 275	1419 278	1433 281	1447 284	1462 286	1476 289	313
146	1491 292	1505 295	1519 297	1534 300	1548 303	1562 306	1577 308	1591 311	1605 314	1620 317	314
148	1634 319	1648 322	1663 325	1677 327	1691 330	1705 333	1720 336	1734 338	1748 341	1762 344	316
150	1776 346	1791 349	1805 352	1819 354	1833 357	1847 360	1861 362	1876 365	1890 368	1904 370	317
152	1918 373	1932 376	1946 378	1960 381	1974 384	1988 386	2002 389	2016 392	2030 394	2044 397	318
154	2058 399	2072 402	2086 405	2100 407	2114 410	2128 413	2142 415	2156 418	2170 420	2184 423	320
156	2198 426	2212 428	2226 431	2240 433	2253 436	2267 438	2281 441	2295 444	2309 446	2323 449	322
158	2336 451	2350 454	2364 456	2378 459	2392 461	2405 464	2419 467	2433 469	2447 472	2460 474	325
160	2474 477	2488 479	2502 482	2515 484	2529 487	2543 489	2556 492	2570 494	2584 497	2597 499	327
162	2611 502	2624 504	2638 507	2652 509	2665 511	2679 514	2692 516	2706 519	2720 521	2733 524	330
164	2747 526	2760 529	2774 531	2787 533	2801 536	2814 538	2828 541	2841 543	2855 546	2868 548	333
166	2882 550	2895 553	2908 555	2922 558	2935 560	2949 562	2962 565	2975 567	2989 570	3002 572	335
168	3016 574	3029 577	3042 579	3056 581	3069 584	3082 586	3096 589	3109 591	3122 593	3136 596	337
170	3149 598	3162 600	3175 603	3189 605	3202 607	3215 610	3229 612	3242 614	3255 617	3268 619	339
172	3281 621	3295 624	3308 626	3321 628	3334 631	3347 633	3361 635	3374 638	3387 640	3400 642	340
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E-08FA330-301 CF6-80E1A2 2220000C5KG300 0 018590 0 0 1 1.0 .0 .00 01501 .990 .000 .000 0 FCOM-GO-02-05-30-017-010

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)
126	0 0	16 3	32 6	48 10	64 13	80 16	95 19	111 23	127 26	143 29	294
128	159 32	175 35	190 39	206 42	222 45	238 48	254 51	269 55	285 58	301 61	297
130	317 64	332 67	348 70	364 74	379 77	395 80	411 83	426 86	442 89	457 92	298
132	473 95	489 99	504 102	520 105	535 108	551 111	566 114	582 117	597 120	613 123	300
134	628 126	644 129	659 133	675 136	690 139	706 142	721 145	736 148	752 151	767 154	302
136	783 157	798 160	813 163	829 166	844 169	859 172	875 175	890 178	905 181	920 184	303
138	936 187	951 190	966 193	981 196	997 199	1012 202	1027 205	1042 208	1057 211	1073 214	305
140	1088 217	1103 220	1118 223	1133 226	1148 229	1163 232	1179 235	1194 238	1209 241	1224 244	306
142	1239 247	1254 250	1269 252	1284 255	1299 258	1314 261	1329 264	1344 267	1359 270	1374 273	308
144	1389 276	1404 279	1419 282	1434 284	1449 287	1463 290	1478 293	1493 296	1508 299	1523 302	309
146	1538 305	1553 307	1567 310	1582 313	1597 316	1612 319	1627 322	1641 325	1656 327	1671 330	311
148	1686 333	1700 336	1715 339	1730 342	1745 344	1759 347	1774 350	1789 353	1803 356	1818 359	312
150	1833 361	1847 364	1862 367	1877 370	1891 372	1906 375	1920 378	1935 381	1949 384	1964 386	314
152	1979 389	1993 392	2008 395	2022 397	2037 400	2051 403	2066 406	2080 408	2095 411	2109 414	315
154	2123 417	2138 419	2152 422	2167 425	2181 428	2196 430	2210 433	2224 436	2239 439	2253 441	316
156	2267 444	2282 447	2296 449	2310 452	2325 455	2339 457	2353 460	2368 463	2382 465	2396 468	318
158	2410 471	2425 474	2439 476	2453 479	2467 482	2481 484	2496 487	2510 490	2524 492	2538 495	319
160	2552 497	2566 500	2581 503	2595 505	2609 508	2623 511	2637 513	2651 516	2665 519	2679 521	321
162	2693 524	2707 526	2721 529	2735 532	2750 534	2764 537	2778 539	2792 542	2805 545	2819 547	322
164	2833 550	2847 552	2861 555	2875 557	2889 560	2903 563	2917 565	2931 568	2945 570	2959 573	324
166	2973 575	2986 578	3000 580	3014 583	3028 586	3042 588	3056 591	3069 593	3083 596	3097 598	327
168	3111 601	3125 603	3138 606	3152 608	3166 611	3180 613	3193 616	3207 618	3221 621	3234 623	329
170	3248 626	3262 628	3276 631	3289 633	3303 635	3317 638	3330 640	3344 643	3357 645	3371 648	332
172	3385 650	3398 653	3412 655	3425 657	3439 660	3452 662	3466 665	3480 667	3493 670	3507 672	334
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1.5 %			ΔFUEL = + 3 %			ΔFUEL = + 5 %		

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)
174	3520 674	3534 677	3547 679	3561 682	3574 684	3588 686	3601 689	3614 691	3628 694	3641 696	337
176	3655 698	3668 701	3682 703	3695 705	3708 708	3722 710	3735 713	3749 715	3762 717	3775 720	339
178	3789 722	3802 724	3815 727	3829 729	3842 731	3855 734	3869 736	3882 738	3895 741	3908 743	340
180	3922 745	3935 748	3948 750	3961 752	3975 755	3988 757	4001 759	4014 762	4028 764	4041 766	342
182	4054 769	4067 771	4080 773	4093 775	4107 778	4120 780	4133 782	4146 785	4159 787	4172 789	344
184	4185 791	4199 794	4212 796	4225 798	4238 801	4251 803	4264 805	4277 807	4290 810	4303 812	345
186	4316 814	4329 816	4342 819	4355 821	4368 823	4381 825	4394 828	4407 830	4420 832	4433 834	347
188	4446 837	4459 839	4472 841	4485 843	4498 845	4511 848	4524 850	4537 852	4550 854	4563 856	349
190	4576 859	4588 861	4601 863	4614 865	4627 867	4640 870	4653 872	4666 874	4679 876	4691 878	351
192	4704 881	4717 883	4730 885	4743 887	4755 889	4768 891	4781 894	4794 896	4807 898	4819 900	353
194	4832 902	4845 904	4858 907	4870 909	4883 911	4896 913	4908 915	4921 917	4934 919	4947 922	355
196	4959 924	4972 926	4985 928	4997 930	5010 932	5023 934	5035 936	5048 939	5060 941	5073 943	357
198	5086 945	5098 947	5111 949	5124 951	5136 953	5149 955	5161 958	5174 960	5186 962	5199 964	359
200	5211 966	5224 968	5237 970	5249 972	5262 974	5274 976	5287 978	5299 980	5312 983	5324 985	360
202	5337 987	5349 989	5362 991	5374 993	5386 995	5399 997	5411 999	5424 1001	5436 1003	5449 1005	361
204	5461 1007	5473 1009	5486 1011	5498 1013	5511 1016	5523 1018	5535 1020	5548 1022	5560 1024	5572 1026	363
206	5585 1028	5597 1030	5609 1032	5622 1034	5634 1036	5646 1038	5659 1040	5671 1042	5683 1044	5696 1046	364
208	5708 1048	5720 1050	5732 1052	5745 1054	5757 1056	5769 1058	5781 1060	5794 1062	5806 1064	5818 1066	366
210	5830 1068	5842 1070	5855 1072	5867 1074	5879 1076	5891 1078	5903 1080	5916 1082	5928 1084	5940 1086	367
212	5952 1088	5964 1090	5976 1092	5988 1094	6000 1096	6013 1098	6025 1100	6037 1102	6049 1104	6061 1106	369
214	6073 1108	6085 1109	6097 1111	6109 1113	6121 1115	6133 1117	6145 1119	6157 1121	6170 1123	6182 1125	370
216	6194 1127	6206 1129	6218 1131	6230 1133	6242 1135	6254 1137	6266 1139	6277 1140	6289 1142	6301 1144	372
218	6313 1146	6325 1148	6337 1150	6349 1152	6361 1154	6373 1156	6385 1158	6397 1160	6409 1161	6421 1163	374
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 01501 .990 .000 0 FCOM-GO-02-05-30-018-115

10E-08FA330-301 CF6-80E1A2 22200000C5KG300 0 018590 0 0 1 1.0 0.00 01501.990.000.000 0 FCOM-GO-02-05-30-019-010

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)
220	6432 1165	6444 1167	6456 1169	6468 1171	6480 1173	6492 1175	6504 1177	6516 1179	6527 1180	6539 1182	376
222	6551 1184	6563 1186	6575 1188	6586 1190	6598 1192	6610 1194	6622 1195	6634 1197	6645 1199	6657 1201	378
224	6669 1203	6681 1205	6692 1207	6704 1208	6716 1210	6728 1212	6739 1214	6751 1216	6763 1218	6774 1220	379
226	6786 1221	6798 1223	6810 1225	6821 1227	6833 1229	6845 1231	6856 1232	6868 1234	6880 1236	6891 1238	381
228	6903 1240	6914 1242	6926 1243	6938 1245	6949 1247	6961 1249	6973 1251	6984 1252	6996 1254	7007 1256	382
230	7019 1258	7030 1260	7042 1262	7054 1263	7065 1265	7077 1267	7088 1269	7100 1271	7111 1272	7123 1274	384
232	7134 1276	7146 1278	7157 1279	7169 1281	7180 1283	7192 1285	7203 1287	7215 1288	7226 1290	7238 1292	386
234	7249 1294	7261 1296	7272 1297	7284 1299	7295 1301	7307 1303	7318 1304	7329 1306	7341 1308	7352 1310	387
236	7364 1311	7375 1313	7386 1315	7398 1317	7409 1318	7421 1320	7432 1322	7443 1324	7455 1325	7466 1327	389
238	7477 1329	7489 1331	7500 1332	7511 1334	7523 1336	7534 1338	7545 1339	7557 1341	7568 1343	7579 1345	390
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1.5 %			ΔFUEL = + 3 %			ΔFUEL = + 5 %		

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 01501 .990 .000 .000 0 FCOM-GO-02-05-30-019-115

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)
126	0 0	17 3	35 7	52 10	70 13	87 17	104 20	122 24	139 27	157 30	310
128	174 34	191 37	208 40	226 44	243 47	260 50	277 53	295 57	312 60	329 63	312
130	346 67	363 70	381 73	398 76	415 80	432 83	449 86	466 90	483 93	500 96	314
132	517 99	534 102	551 106	568 109	585 112	602 115	619 119	636 122	653 125	670 128	316
134	687 131	704 135	721 138	738 141	754 144	771 147	788 150	805 153	822 157	838 160	319
136	855 163	872 166	889 169	905 172	922 175	939 178	955 182	972 185	989 188	1005 191	322
138	1022 194	1039 197	1055 200	1072 203	1088 206	1105 209	1122 212	1138 215	1155 218	1171 221	325
140	1188 224	1204 227	1220 230	1237 233	1253 236	1270 239	1286 242	1303 245	1319 248	1335 251	328
142	1352 254	1368 257	1384 260	1401 263	1417 266	1433 269	1450 272	1466 275	1482 278	1499 281	330
144	1515 284	1531 287	1547 290	1563 293	1580 295	1596 298	1612 301	1628 304	1644 307	1660 310	332
146	1677 313	1693 316	1709 319	1725 322	1741 324	1757 327	1773 330	1789 333	1805 336	1821 339	334
148	1837 342	1853 345	1869 347	1885 350	1901 353	1917 356	1933 359	1949 362	1965 364	1981 367	336
150	1997 370	2013 373	2029 376	2044 378	2060 381	2076 384	2092 387	2108 390	2124 392	2139 395	338
152	2155 398	2171 401	2187 404	2203 406	2218 409	2234 412	2250 415	2265 417	2281 420	2297 423	341
154	2313 426	2328 428	2344 431	2360 434	2375 437	2391 439	2406 442	2422 445	2438 447	2453 450	343
156	2469 453	2484 456	2500 458	2515 461	2531 464	2547 466	2562 469	2578 472	2593 474	2609 477	345
158	2624 480	2639 482	2655 485	2670 488	2686 490	2701 493	2717 496	2732 498	2747 501	2763 504	348
160	2778 506	2794 509	2809 512	2824 514	2840 517	2855 519	2870 522	2885 525	2901 527	2916 530	350
162	2931 532	2947 535	2962 538	2977 540	2992 543	3007 545	3023 548	3038 551	3053 553	3068 556	351
164	3083 558	3099 561	3114 564	3129 566	3144 569	3159 571	3174 574	3189 576	3204 579	3219 581	353
166	3235 584	3250 587	3265 589	3280 592	3295 594	3310 597	3325 599	3340 602	3355 604	3370 607	355
168	3385 609	3400 612	3414 614	3429 617	3444 619	3459 622	3474 624	3489 627	3504 629	3519 632	356
170	3534 634	3549 637	3563 639	3578 642	3593 644	3608 647	3623 649	3638 652	3652 654	3667 657	358
172	3682 659	3697 662	3711 664	3726 667	3741 669	3756 671	3770 674	3785 676	3800 679	3814 681	360
PACK FLOW LO				PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %				ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %			

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02001 .990 .000 .000 0 FCOM-GO-02-05-30-020-115

R

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)
174	3724 653	3738 656	3753 658	3767 660	3781 663	3795 665	3810 667	3824 670	3838 672	3852 674	369
176	3866 677	3881 679	3895 681	3909 683	3923 686	3937 688	3951 690	3966 693	3980 695	3994 697	371
178	4008 699	4022 702	4036 704	4050 706	4064 708	4078 711	4093 713	4107 715	4121 717	4135 720	373
180	4149 722	4163 724	4177 726	4191 729	4205 731	4219 733	4233 735	4247 738	4261 740	4275 742	375
182	4289 744	4303 747	4316 749	4330 751	4344 753	4358 755	4372 758	4386 760	4400 762	4414 764	377
184	4428 766	4441 769	4455 771	4469 773	4483 775	4497 777	4511 780	4524 782	4538 784	4552 786	379
186	4566 788	4580 790	4593 793	4607 795	4621 797	4635 799	4648 801	4662 803	4676 806	4689 808	380
188	4703 810	4717 812	4730 814	4744 816	4758 818	4771 821	4785 823	4799 825	4812 827	4826 829	382
190	4840 831	4853 833	4867 835	4880 838	4894 840	4908 842	4921 844	4935 846	4948 848	4962 850	384
192	4975 852	4989 854	5002 857	5016 859	5029 861	5043 863	5056 865	5070 867	5083 869	5097 871	386
194	5110 873	5124 875	5137 877	5151 880	5164 882	5178 884	5191 886	5204 888	5218 890	5231 892	387
196	5245 894	5258 896	5271 898	5285 900	5298 902	5311 904	5325 906	5338 908	5351 910	5365 913	389
198	5378 915	5391 917	5404 919	5418 921	5431 923	5444 925	5458 927	5471 929	5484 931	5497 933	390
200	5511 935	5524 937	5537 939	5550 941	5563 943	5577 945	5590 947	5603 949	5616 951	5629 953	392
202	5642 955	5656 957	5669 959	5682 961	5695 963	5708 965	5721 967	5734 969	5747 971	5761 973	394
204	5774 975	5787 977	5800 979	5813 981	5826 983	5839 985	5852 987	5865 989	5878 991	5891 993	395
206	5904 995	5917 997	5930 999	5943 1001	5956 1003	5969 1005	5982 1007	5995 1008	6008 1010	6021 1012	397
208	6034 1014	6047 1016	6060 1018	6073 1020	6085 1022	6098 1024	6111 1026	6124 1028	6137 1030	6150 1032	399
210	6163 1034	6176 1036	6188 1037	6201 1039	6214 1041	6227 1043	6240 1045	6253 1047	6265 1049	6278 1051	403
212	6291 1053	6304 1055	6317 1056	6329 1058	6342 1060	6355 1062	6368 1064	6380 1066	6393 1068	6406 1070	406
214	6419 1071	6431 1073	6444 1075	6457 1077	6469 1079	6482 1081	6495 1083	6507 1084	6520 1086	6533 1088	409
216	6545 1090	6558 1092	6571 1094	6583 1096	6596 1097	6609 1099	6621 1101	6634 1103	6646 1105	6659 1107	412
218	6672 1108	6684 1110	6697 1112	6709 1114	6722 1116	6734 1117	6747 1119	6759 1121	6772 1123	6785 1125	414
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E -08FA330-301 CF6-80E1A2 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02001 .990 .000 .000 0 FCOM-G0-02-05-30-021-010

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)
174	3829 684	3844 686	3858 688	3873 691	3888 693	3902 696	3917 698	3932 701	3946 703	3961 705	362
176	3975 708	3990 710	4004 713	4019 715	4034 717	4048 720	4063 722	4077 725	4092 727	4106 729	364
178	4121 732	4135 734	4149 736	4164 739	4178 741	4193 743	4207 746	4222 748	4236 750	4250 753	367
180	4265 755	4279 758	4294 760	4308 762	4322 765	4337 767	4351 769	4365 771	4380 774	4394 776	368
182	4408 778	4422 781	4437 783	4451 785	4465 788	4480 790	4494 792	4508 795	4522 797	4536 799	371
184	4551 801	4565 804	4579 806	4593 808	4607 811	4622 813	4636 815	4650 817	4664 820	4678 822	373
186	4692 824	4706 826	4720 829	4734 831	4749 833	4763 835	4777 838	4791 840	4805 842	4819 844	375
188	4833 847	4847 849	4861 851	4875 853	4889 856	4903 858	4917 860	4931 862	4945 864	4959 867	377
190	4973 869	4987 871	5000 873	5014 875	5028 878	5042 880	5056 882	5070 884	5084 886	5098 889	378
192	5112 891	5125 893	5139 895	5153 897	5167 900	5181 902	5195 904	5208 906	5222 908	5236 910	380
194	5250 913	5263 915	5277 917	5291 919	5305 921	5318 923	5332 926	5346 928	5360 930	5373 932	382
196	5387 934	5401 936	5414 938	5428 940	5442 943	5455 945	5469 947	5483 949	5496 951	5510 953	384
198	5523 955	5537 957	5551 960	5564 962	5578 964	5591 966	5605 968	5618 970	5632 972	5646 974	386
200	5659 976	5673 979	5686 981	5700 983	5713 985	5727 987	5740 989	5754 991	5767 993	5780 995	387
202	5794 997	5807 999	5821 1001	5834 1003	5848 1006	5861 1008	5874 1010	5888 1012	5901 1014	5915 1016	389
204	5928 1018	5941 1020	5955 1022	5968 1024	5981 1026	5995 1028	6008 1030	6021 1032	6035 1034	6048 1036	391
206	6061 1038	6075 1040	6088 1042	6101 1044	6114 1046	6128 1048	6141 1050	6154 1053	6167 1055	6181 1057	392
208	6194 1059	6207 1061	6220 1063	6233 1065	6247 1067	6260 1069	6273 1071	6286 1073	6299 1075	6312 1077	394
210	6326 1079	6339 1081	6352 1083	6365 1085	6378 1087	6391 1089	6404 1091	6417 1092	6430 1094	6444 1096	396
212	6457 1098	6470 1100	6483 1102	6496 1104	6509 1106	6522 1108	6535 1110	6548 1112	6561 1114	6574 1116	397
214	6587 1118	6600 1120	6613 1122	6626 1124	6639 1126	6652 1128	6665 1130	6678 1132	6691 1134	6703 1135	399
216	6716 1137	6729 1139	6742 1141	6755 1143	6768 1145	6781 1147	6794 1149	6807 1151	6819 1153	6832 1155	403
218	6845 1157	6858 1158	6871 1160	6884 1162	6896 1164	6909 1166	6922 1168	6935 1170	6948 1172	6960 1174	405
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1.5 %			ΔFUEL = + 3 %			ΔFUEL = + 5 %		

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02001 .990 .000 .000 0 FCOM-GO-02-05-30-021-115

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02001 .990 .000 .000 0 FCOM-GO-02-05-30-022-115

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 23
	INTEGRATED CRUISE		SEQ 010	REV 07

R

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)
126	0 0	19 3	37 6	56 10	74 13	93 16	111 19	129 23	148 26	166 29	342
128	185 32	203 36	221 39	240 42	258 45	276 48	295 51	313 55	331 58	350 61	344
130	368 64	386 67	404 70	423 74	441 77	459 80	477 83	495 86	513 89	532 92	346
132	550 96	568 99	586 102	604 105	622 108	640 111	658 114	676 117	694 120	712 123	348
134	730 126	748 130	766 133	784 136	802 139	819 142	837 145	855 148	873 151	891 154	351
136	909 157	926 160	944 163	962 166	980 169	997 172	1015 175	1033 178	1050 181	1068 184	354
138	1086 187	1103 190	1121 193	1139 196	1156 199	1174 202	1191 204	1209 207	1227 210	1244 213	358
140	1262 216	1279 219	1297 222	1314 225	1332 228	1349 231	1366 234	1384 236	1401 239	1419 242	360
142	1436 245	1453 248	1471 251	1488 254	1505 257	1523 259	1540 262	1557 265	1575 268	1592 271	362
144	1609 274	1626 277	1644 279	1661 282	1678 285	1695 288	1712 291	1729 293	1747 296	1764 299	365
146	1781 302	1798 305	1815 307	1832 310	1849 313	1866 316	1883 319	1900 321	1917 324	1934 327	367
148	1951 330	1968 332	1985 335	2002 338	2019 341	2036 343	2053 346	2070 349	2087 352	2104 354	370
150	2121 357	2137 360	2154 362	2171 365	2188 368	2205 371	2222 373	2238 376	2255 379	2272 381	372
152	2289 384	2305 387	2322 389	2339 392	2355 395	2372 397	2389 400	2405 403	2422 405	2439 408	374
154	2455 411	2472 413	2489 416	2505 419	2522 421	2538 424	2555 427	2571 429	2588 432	2604 434	376
156	2621 437	2637 440	2654 442	2670 445	2687 447	2703 450	2720 453	2736 455	2753 458	2769 460	378
158	2785 463	2802 466	2818 468	2834 471	2851 473	2867 476	2883 479	2900 481	2916 484	2932 486	380
160	2949 489	2965 491	2981 494	2997 496	3014 499	3030 502	3046 504	3062 507	3078 509	3095 512	382
162	3111 514	3127 517	3143 519	3159 522	3175 524	3191 527	3208 529	3224 532	3240 534	3256 537	384
164	3272 539	3288 542	3304 544	3320 547	3336 549	3352 552	3368 554	3384 557	3400 559	3416 562	386
166	3432 564	3448 566	3463 569	3479 571	3495 574	3511 576	3527 579	3543 581	3559 584	3575 586	389
168	3590 588	3606 591	3622 593	3638 596	3654 598	3669 601	3685 603	3701 605	3717 608	3732 610	391
170	3748 613	3764 615	3780 617	3795 620	3811 622	3827 624	3842 627	3858 629	3874 632	3889 634	394
172	3905 636	3920 639	3936 641	3952 643	3967 646	3983 648	3998 650	4014 653	4029 655	4045 657	398
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %		TOTAL ANTI ICE ON ΔFUEL = + 5 %			

10E-08FA330-301 CF6-80E1A2 22200000CSKG300 0 018590 0 0 1 1.0 .0 .00 02501 .990 .000 .000 0 FCOM-GO-02-05-30-023-010

R

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)
174	4060 660	4076 662	4091 664	4107 667	4122 669	4138 671	4153 673	4169 676	4184 678	4200 680	401
176	4215 683	4230 685	4246 687	4261 689	4277 692	4292 694	4307 696	4323 699	4338 701	4353 703	404
178	4369 705	4384 708	4399 710	4414 712	4430 714	4445 717	4460 719	4475 721	4491 723	4506 725	407
180	4521 728	4536 730	4552 732	4567 734	4582 737	4597 739	4612 741	4627 743	4642 745	4658 748	410
182	4673 750	4688 752	4703 754	4718 756	4733 759	4748 761	4763 763	4778 765	4793 767	4808 770	412
184	4823 772	4838 774	4853 776	4868 778	4883 780	4898 783	4913 785	4928 787	4943 789	4958 791	414
186	4973 793	4988 796	5003 798	5018 800	5033 802	5048 804	5062 806	5077 808	5092 811	5107 813	416
188	5122 815	5137 817	5151 819	5166 821	5181 823	5196 825	5211 828	5225 830	5240 832	5255 834	418
190	5270 836	5284 838	5299 840	5314 842	5329 844	5343 847	5358 849	5373 851	5387 853	5402 855	419
192	5417 857	5431 859	5446 861	5461 863	5475 865	5490 867	5504 870	5519 872	5534 874	5548 876	420
194	5563 878	5577 880	5592 882	5606 884	5621 886	5636 888	5650 890	5665 892	5679 894	5694 896	421
196	5708 899	5723 901	5737 903	5752 905	5766 907	5780 909	5795 911	5809 913	5824 915	5838 917	422
198	5853 919	5867 921	5881 923	5896 925	5910 927	5925 929	5939 931	5953 933	5968 935	5982 937	423
200	5996 939	6011 941	6025 943	6039 946	6053 948	6068 950	6082 952	6096 954	6111 956	6125 958	424
202	6139 960	6153 962	6167 964	6182 966	6196 968	6210 970	6224 972	6238 974	6253 976	6267 978	426
204	6281 980	6295 982	6309 984	6323 986	6337 988	6352 989	6366 991	6380 993	6394 995	6408 997	427
206	6422 999	6436 1001	6450 1003	6464 1005	6478 1007	6492 1009	6506 1011	6520 1013	6534 1015	6548 1017	429
208	6562 1019	6576 1021	6590 1023	6604 1025	6618 1027	6632 1029	6646 1031	6660 1032	6674 1034	6688 1036	431
210	6701 1038	6715 1040	6729 1042	6743 1044	6757 1046	6771 1048	6785 1050	6798 1052	6812 1054	6826 1056	432
212	6840 1057	6854 1059	6867 1061	6881 1063	6895 1065	6909 1067	6923 1069	6936 1071	6950 1073	6964 1075	434
214	6978 1076	6991 1078	7005 1080	7019 1082	7032 1084	7046 1086	7060 1088	7073 1090	7087 1092	7101 1093	436
216	7114 1095	7128 1097	7142 1099	7155 1101	7169 1103	7183 1105	7196 1106	7210 1108	7223 1110	7237 1112	437
218	7251 1114	7264 1116	7278 1118	7291 1119	7305 1121	7318 1123	7332 1125	7345 1127	7359 1129	7372 1131	439
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		

10E-08FA330-301 CF6-80E1A2 22200000C5KG300 0 018590 0 0 1 1.0 0.00 02501.990 000 000 0 FCOM-GO-02-05-30-024-010

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)
126	0 0	19 3	38 7	57 10	76 13	95 17	114 20	133 24	152 27	171 30	337
128	190 34	208 37	227 40	246 44	265 47	284 50	303 53	321 57	340 60	359 63	340
130	378 67	396 70	415 73	434 76	452 80	471 83	490 86	508 90	527 93	546 96	342
132	564 99	583 102	601 106	620 109	638 112	657 115	675 119	694 122	712 125	731 128	344
134	749 131	768 135	786 138	804 141	823 144	841 147	859 151	878 154	896 157	914 160	346
136	933 163	951 166	969 169	987 173	1006 176	1024 179	1042 182	1060 185	1078 188	1097 191	348
138	1115 194	1133 198	1151 201	1169 204	1187 207	1205 210	1223 213	1241 216	1259 219	1277 222	350
140	1295 225	1313 228	1331 231	1349 234	1367 237	1385 240	1403 243	1421 247	1439 250	1456 253	353
142	1474 256	1492 259	1510 262	1528 265	1546 268	1563 271	1581 274	1599 276	1616 279	1634 282	356
144	1652 285	1670 288	1687 291	1705 294	1722 297	1740 300	1758 303	1775 306	1793 309	1810 312	359
146	1828 315	1846 318	1863 321	1881 323	1898 326	1916 329	1933 332	1950 335	1968 338	1985 341	361
148	2003 344	2020 347	2038 349	2055 352	2072 355	2090 358	2107 361	2124 364	2142 367	2159 369	363
150	2176 372	2193 375	2211 378	2228 381	2245 384	2262 386	2280 389	2297 392	2314 395	2331 398	366
152	2348 400	2365 403	2382 406	2400 409	2417 411	2434 414	2451 417	2468 420	2485 423	2502 425	368
154	2519 428	2536 431	2553 434	2570 436	2587 439	2604 442	2621 445	2638 447	2655 450	2672 453	371
156	2688 455	2705 458	2722 461	2739 464	2756 466	2773 469	2790 472	2806 474	2823 477	2840 480	373
158	2857 482	2873 485	2890 488	2907 490	2924 493	2940 496	2957 498	2974 501	2990 504	3007 506	375
160	3024 509	3040 512	3057 514	3074 517	3090 520	3107 522	3123 525	3140 527	3156 530	3173 533	377
162	3189 535	3206 538	3222 541	3239 543	3255 546	3272 548	3288 551	3305 553	3321 556	3338 559	380
164	3354 561	3370 564	3387 566	3403 569	3420 572	3436 574	3452 577	3469 579	3485 582	3501 584	382
166	3517 587	3534 589	3550 592	3566 594	3582 597	3599 600	3615 602	3631 605	3647 607	3664 610	384
168	3680 612	3696 615	3712 617	3728 620	3744 622	3760 625	3777 627	3793 630	3809 632	3825 635	386
170	3841 637	3857 640	3873 642	3889 645	3905 647	3921 650	3937 652	3953 654	3969 657	3985 659	388
172	4001 662	4017 664	4033 667	4049 669	4065 672	4080 674	4096 677	4112 679	4128 681	4144 684	390
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

11.1-08FOA330-200 CF6-80E1A4 22200000CSKG300 0 018590 0 0 1 1.0 .0 .00 02501 .990 .000 .000 0 FCOM-GO-02-05-30-023-115

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02501 .990 .000 .000 0 FCDM-G0-02-05-30-024-115

10E-08FA330-301 CF6-80E1A2 22200000C5KG300 0 018590 0 0 1 1.0 0.00 02501.990.000.000 0 FCOM-GO-02-05-30-025-010

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)
220	7541 1171	7555 1173	7568 1175	7582 1177	7596 1179	7609 1181	7623 1182	7636 1184	7650 1186	7664 1188	441
222	7677 1190	7691 1192	7704 1193	7718 1195	7731 1197	7745 1199	7759 1201	7772 1203	7786 1204	7799 1206	443
224	7813 1208	7826 1210	7840 1212	7853 1214	7867 1215	7880 1217	7893 1219	7907 1221	7920 1223	7934 1224	445
226	7947 1226	7961 1228	7974 1230	7987 1232	8001 1233	8014 1235	8028 1237	8041 1239	8054 1241	8068 1242	447
228	8081 1244	8094 1246	8108 1248	8121 1250	8134 1251	8148 1253	8161 1255	8174 1257	8187 1258	8201 1260	448
230	8214 1262	8227 1264	8241 1265	8254 1267	8267 1269	8280 1271	8293 1273	8307 1274	8320 1276	8333 1278	450
232	8346 1280	8359 1281	8373 1283	8386 1285	8399 1286	8412 1288	8425 1290	8438 1292	8452 1293	8465 1295	453
234	8478 1297	8491 1299	8504 1300	8517 1302	8530 1304	8543 1306	8556 1307	8569 1309	8582 1311	8595 1312	454
236	8608 1314	8622 1316	8635 1318	8648 1319	8661 1321	8674 1323	8687 1324	8700 1326	8712 1328	8725 1329	456
238	8738 1331	8751 1333	8764 1335	8777 1336	8790 1338	8803 1340	8816 1341	8829 1343	8842 1345	8855 1346	458
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02501 .990 .000 .000 0 FCOM-GO-02-05-30-025-115

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)
126	0 0	20 3	41 7	61 10	81 13	101 17	122 20	142 24	162 27	182 30	360
128	202 34	222 37	243 40	263 43	283 47	303 50	323 53	343 57	363 60	383 63	363
130	403 67	423 70	443 73	463 76	483 80	503 83	522 86	542 89	562 93	582 96	366
132	602 99	622 102	641 105	661 109	681 112	701 115	720 118	740 121	760 125	779 128	369
134	799 131	819 134	838 137	858 141	877 144	897 147	916 150	936 153	955 156	975 159	371
136	994 163	1014 166	1033 169	1053 172	1072 175	1092 178	1111 181	1130 184	1150 187	1169 191	373
138	1188 194	1207 197	1227 200	1246 203	1265 206	1285 209	1304 212	1323 215	1342 218	1361 221	376
140	1380 224	1400 227	1419 230	1438 233	1457 236	1476 239	1495 242	1514 245	1533 248	1552 251	378
142	1571 254	1590 257	1609 260	1628 263	1647 266	1666 269	1685 272	1703 275	1722 278	1741 281	380
144	1760 284	1779 287	1798 290	1816 293	1835 296	1854 299	1873 302	1891 305	1910 308	1929 310	383
146	1948 313	1966 316	1985 319	2003 322	2022 325	2041 328	2059 331	2078 334	2096 336	2115 339	386
148	2133 342	2152 345	2170 348	2189 351	2207 353	2226 356	2244 359	2263 362	2281 365	2300 368	390
150	2318 370	2336 373	2355 376	2373 379	2391 382	2410 384	2428 387	2446 390	2464 393	2483 395	394
152	2501 398	2519 401	2537 404	2556 406	2574 409	2592 412	2610 415	2628 417	2646 420	2664 423	397
154	2683 426	2701 428	2719 431	2737 434	2755 436	2773 439	2791 442	2809 444	2827 447	2845 450	400
156	2863 452	2881 455	2899 458	2916 460	2934 463	2952 466	2970 468	2988 471	3006 474	3024 476	403
158	3041 479	3059 482	3077 484	3095 487	3113 489	3130 492	3148 495	3166 497	3183 500	3201 503	406
160	3219 505	3236 508	3254 510	3272 513	3289 516	3307 518	3325 521	3342 523	3360 526	3377 528	408
162	3395 531	3412 534	3430 536	3447 539	3465 541	3482 544	3500 546	3517 549	3535 551	3552 554	410
164	3570 556	3587 559	3604 562	3622 564	3639 567	3656 569	3674 572	3691 574	3708 577	3726 579	412
166	3743 582	3760 584	3778 587	3795 589	3812 592	3829 594	3846 597	3864 599	3881 602	3898 604	413
168	3915 607	3932 609	3950 612	3967 614	3984 617	4001 619	4018 621	4035 624	4052 626	4069 629	415
170	4086 631	4103 634	4120 636	4137 639	4154 641	4171 644	4188 646	4205 648	4222 651	4239 653	416
172	4256 656	4273 658	4290 661	4307 663	4324 665	4340 668	4357 670	4374 673	4391 675	4408 678	417
PACK FLOW LO				PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %				ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %			

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG300 0 018590 0 0 1 1.0 .0 .00 02901 .990 .000 .000 0 FCOM-GO-02-05-30-026-115

R

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)
220	7878 1136	7892 1138	7906 1140	7921 1142	7935 1144	7949 1146	7963 1147	7977 1149	7992 1151	8006 1153	462
222	8020 1155	8034 1157	8048 1158	8062 1160	8076 1162	8091 1164	8105 1166	8119 1168	8133 1169	8147 1171	462
224	8161 1173	8175 1175	8189 1177	8203 1179	8217 1180	8231 1182	8245 1184	8259 1186	8273 1188	8287 1189	463
226	8301 1191	8315 1193	8329 1195	8343 1197	8357 1198	8371 1200	8385 1202	8399 1204	8413 1206	8427 1207	463
228	8440 1209	8454 1211	8468 1213	8482 1215	8496 1216	8510 1218	8524 1220	8537 1222	8551 1224	8565 1225	464
230	8579 1227	8593 1229	8606 1231	8620 1232	8634 1234	8648 1236	8661 1238	8675 1240	8689 1241	8703 1243	465
232	8716 1245	8730 1247	8744 1248	8757 1250	8771 1252	8785 1254	8798 1255	8812 1257	8826 1259	8839 1261	466
234	8853 1262	8867 1264	8880 1266	8894 1268	8907 1269	8921 1271	8935 1273	8948 1275	8962 1276	8975 1278	466
236	8989 1280	9002 1282	9016 1283	9029 1285	9043 1287	9056 1289	9070 1290	9083 1292	9097 1294	9110 1296	467
238	9124 1297	9137 1299	9151 1301	9164 1302	9177 1304	9191 1306	9204 1308	9218 1309	9231 1311	9244 1313	468
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E -08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 0 .00 02901 .990 .000 .000 0 FCOM-G0-02-05-30-028-010

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)
174	4425 680	4441 682	4458 685	4475 687	4492 690	4508 692	4525 694	4542 697	4559 699	4575 701	419
176	4592 704	4609 706	4625 709	4642 711	4658 713	4675 716	4692 718	4708 720	4725 723	4741 725	421
178	4758 727	4774 730	4791 732	4807 734	4824 737	4840 739	4857 741	4873 744	4890 746	4906 748	423
180	4923 751	4939 753	4955 755	4972 758	4988 760	5005 762	5021 765	5037 767	5054 769	5070 771	425
182	5086 774	5103 776	5119 778	5135 781	5151 783	5168 785	5184 787	5200 790	5216 792	5232 794	428
184	5249 796	5265 799	5281 801	5297 803	5313 805	5329 808	5346 810	5362 812	5378 814	5394 817	431
186	5410 819	5426 821	5442 823	5458 825	5474 828	5490 830	5506 832	5522 834	5538 836	5554 839	434
188	5570 841	5586 843	5602 845	5618 847	5634 850	5650 852	5665 854	5681 856	5697 858	5713 860	437
190	5729 863	5745 865	5760 867	5776 869	5792 871	5808 873	5824 875	5839 878	5855 880	5871 882	440
192	5887 884	5902 886	5918 888	5934 890	5949 892	5965 895	5981 897	5996 899	6012 901	6028 903	444
194	6043 905	6059 907	6074 909	6090 911	6106 913	6121 916	6137 918	6152 920	6168 922	6183 924	447
196	6199 926	6214 928	6230 930	6245 932	6261 934	6276 936	6292 938	6307 940	6323 942	6338 944	449
198	6353 947	6369 949	6384 951	6400 953	6415 955	6430 957	6446 959	6461 961	6476 963	6492 965	451
200	6507 967	6522 969	6538 971	6553 973	6568 975	6583 977	6599 979	6614 981	6629 983	6644 985	453
202	6659 987	6675 989	6690 991	6705 993	6720 995	6735 997	6750 999	6766 1001	6781 1003	6796 1005	455
204	6811 1007	6826 1009	6841 1011	6856 1013	6871 1015	6886 1017	6901 1019	6916 1021	6931 1023	6946 1025	456
206	6961 1027	6976 1029	6991 1031	7006 1033	7021 1035	7036 1037	7051 1039	7066 1040	7081 1042	7096 1044	458
208	7111 1046	7126 1048	7141 1050	7156 1052	7170 1054	7185 1056	7200 1058	7215 1060	7230 1062	7245 1064	459
210	7260 1066	7274 1068	7289 1070	7304 1072	7319 1073	7333 1075	7348 1077	7363 1079	7378 1081	7392 1083	460
212	7407 1085	7422 1087	7437 1089	7451 1091	7466 1093	7481 1095	7495 1096	7510 1098	7525 1100	7539 1102	460
214	7554 1104	7568 1106	7583 1108	7598 1110	7612 1112	7627 1114	7641 1115	7656 1117	7671 1119	7685 1121	461
216	7700 1123	7714 1125	7729 1127	7743 1129	7758 1131	7772 1132	7787 1134	7801 1136	7816 1138	7830 1140	462
218	7845 1142	7859 1144	7873 1146	7888 1147	7902 1149	7917 1151	7931 1153	7945 1155	7960 1157	7974 1159	463
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON</		

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 02901 .990 .000 .000 0 FCOM-GO-02-05-30-027-115

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 02901 .990 .000 .000 0 FCOM-GO-02-05-30-028-115

10E -08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03101 .990 .000 .000 0 FCOM-GO-02-05-30-029-010

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)
126	0 0	21 3	42 7	63 10	84 14	105 17	126 20	147 24	168 27	188 30	372
128	209 34	230 37	251 40	272 44	292 47	313 50	334 54	355 57	375 60	396 63	375
130	417 67	437 70	458 73	478 76	499 80	520 83	540 86	561 90	581 93	602 96	378
132	622 99	643 102	663 106	683 109	704 112	724 115	745 118	765 122	785 125	806 128	380
134	826 131	846 134	866 138	887 141	907 144	927 147	947 150	967 153	988 156	1008 159	384
136	1028 163	1048 166	1068 169	1088 172	1108 175	1128 178	1148 181	1168 184	1188 187	1208 190	389
138	1228 193	1248 196	1268 199	1288 202	1308 205	1327 208	1347 211	1367 214	1387 217	1407 220	393
140	1426 223	1446 226	1466 229	1486 232	1505 235	1525 238	1545 241	1564 244	1584 247	1604 250	396
142	1623 253	1643 256	1662 259	1682 262	1701 265	1721 268	1740 271	1760 274	1779 277	1799 280	399
144	1818 282	1838 285	1857 288	1876 291	1896 294	1915 297	1935 300	1954 303	1973 306	1992 308	401
146	2012 311	2031 314	2050 317	2069 320	2089 323	2108 326	2127 328	2146 331	2165 334	2185 337	404
148	2204 340	2223 343	2242 345	2261 348	2280 351	2299 354	2318 357	2337 359	2356 362	2375 365	406
150	2394 368	2413 371	2432 373	2451 376	2470 379	2489 382	2508 384	2526 387	2545 390	2564 393	408
152	2583 395	2602 398	2620 401	2639 404	2658 406	2677 409	2695 412	2714 415	2733 417	2752 420	409
154	2770 423	2789 426	2808 428	2826 431	2845 434	2864 437	2882 439	2901 442	2919 445	2938 447	411
156	2956 450	2975 453	2993 455	3012 458	3030 461	3049 463	3067 466	3086 469	3104 472	3122 474	412
158	3141 477	3159 480	3178 482	3196 485	3214 487	3233 490	3251 493	3269 495	3287 498	3306 501	414
160	3324 503	3342 506	3360 509	3378 511	3397 514	3415 516	3433 519	3451 522	3469 524	3487 527	416
162	3505 529	3523 532	3541 535	3559 537	3578 540	3596 542	3614 545	3632 547	3649 550	3667 553	419
164	3685 555	3703 558	3721 560	3739 563	3757 565	3775 568	3793 570	3811 573	3828 575	3846 578	421
166	3864 581	3882 583	3899 586	3917 588	3935 591	3953 593	3970 596	3988 598	4006 601	4023 603	423
168	4041 606	4059 608	4076 610	4094 613	4112 615	4129 618	4147 620	4164 623	4182 625	4199 628	426
170	4217 630	4234 633	4252 635	4269 638	4287 640	4304 642	4322 645	4339 647	4357 650	4374 652	429
172	4391 655	4409 657	4426 659	4443 662	4461 664	4478 667	4495 669	4513 671	4530 674	4547 676	432
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03101 .990 .000 .000 0 FCDM-GO-02-05-30-030-115

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 31
	INTEGRATED CRUISE		SEQ 010	REV 07

R

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)
220	8123 1141	8138 1142	8152 1144	8167 1146	8181 1148	8196 1150	8210 1152	8225 1154	8239 1156	8254 1157	466
222	8268 1159	8283 1161	8297 1163	8311 1165	8326 1167	8340 1169	8355 1170	8369 1172	8383 1174	8398 1176	467
224	8412 1178	8427 1180	8441 1181	8455 1183	8470 1185	8484 1187	8498 1189	8512 1191	8527 1192	8541 1194	468
226	8555 1196	8569 1198	8584 1200	8598 1202	8612 1203	8626 1205	8641 1207	8655 1209	8669 1211	8683 1212	469
228	8697 1214	8711 1216	8726 1218	8740 1220	8754 1221	8768 1223	8782 1225	8796 1227	8810 1229	8824 1230	470
230	8838 1232	8852 1234	8866 1236	8880 1238	8894 1239	8908 1241	8922 1243	8936 1245	8950 1247	8964 1248	470
232	8978 1250	8992 1252	9006 1254	9020 1255	9034 1257	9048 1259	9062 1261	9076 1263	9090 1264	9103 1266	471
234	9117 1268	9131 1270	9145 1271	9159 1273	9173 1275	9186 1277	9200 1278	9214 1280	9228 1282	9242 1284	471
236	9255 1285	9269 1287	9283 1289	9297 1291	9310 1292	9324 1294	9338 1296	9351 1298	9365 1299	9379 1301	471
238	9392 1303	9406 1305	9420 1306	9433 1308	9447 1310	9461 1312	9474 1313	9488 1315	9501 1317	9515 1318	472
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E -08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .00 03101 .990 .000 .000 0 FCOM-G0-02-05-30-031-010

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)
126	0 0	22 3	43 7	65 10	87 13	108 17	130 20	152 23	173 27	195 30	388
128	216 33	238 37	259 40	281 43	302 46	324 50	345 53	366 56	388 59	409 63	392
130	431 66	452 69	473 72	494 76	516 79	537 82	558 85	579 88	601 92	622 95	395
132	643 98	664 101	685 104	706 107	727 111	748 114	769 117	790 120	811 123	832 126	399
134	853 130	874 133	895 136	916 139	937 142	958 145	979 148	1000 151	1020 154	1041 158	401
136	1062 161	1083 164	1103 167	1124 170	1145 173	1166 176	1186 179	1207 182	1227 185	1248 188	403
138	1269 191	1289 194	1310 197	1330 200	1351 204	1371 207	1392 210	1412 213	1433 216	1453 219	405
140	1474 222	1494 225	1514 228	1535 231	1555 234	1575 237	1596 240	1616 243	1636 246	1657 249	407
142	1677 252	1697 255	1717 257	1737 260	1758 263	1778 266	1798 269	1818 272	1838 275	1858 278	408
144	1878 281	1898 284	1918 287	1938 290	1958 293	1978 296	1998 299	2018 301	2038 304	2058 307	411
146	2078 310	2098 313	2118 316	2138 319	2157 322	2177 325	2197 327	2217 330	2237 333	2256 336	413
148	2276 339	2296 342	2315 344	2335 347	2355 350	2374 353	2394 356	2413 359	2433 361	2453 364	416
150	2472 367	2492 370	2511 373	2531 375	2550 378	2570 381	2589 384	2608 387	2628 389	2647 392	418
152	2667 395	2686 398	2705 400	2725 403	2744 406	2763 409	2783 411	2802 414	2821 417	2840 420	421
154	2859 422	2879 425	2898 428	2917 430	2936 433	2955 436	2974 438	2993 441	3013 444	3032 447	424
156	3051 449	3070 452	3089 455	3108 457	3127 460	3146 463	3165 465	3183 468	3202 470	3221 473	427
158	3240 476	3259 478	3278 481	3297 484	3316 486	3334 489	3353 492	3372 494	3391 497	3409 499	430
160	3428 502	3447 505	3466 507	3484 510	3503 512	3522 515	3540 517	3559 520	3577 523	3596 525	433
162	3615 528	3633 530	3652 533	3670 535	3689 538	3707 540	3726 543	3744 545	3763 548	3781 550	436
164	3800 553	3818 555	3836 558	3855 560	3873 563	3891 565	3910 568	3928 570	3946 573	3965 575	441
166	3983 578	4001 580	4019 583	4038 585	4056 588	4074 590	4092 593	4110 595	4128 597	4147 600	444
168	4165 602	4183 605	4201 607	4219 610	4237 612	4255 614	4273 617	4291 619	4309 622	4327 624	447
170	4345 627	4363 629	4381 631	4399 634	4417 636	4435 638	4453 641	4471 643	4488 646	4506 648	449
172	4524 650	4542 653	4560 655	4578 657	4595 660	4613 662	4631 665	4649 667	4666 669	4684 672	451
PACK FLOW LO				PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %				ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %			

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.30	P 33
	INTEGRATED CRUISE		SEQ 010	REV 07

R

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)
174	4645 663	4662 665	4680 668	4697 670	4715 672	4732 675	4750 677	4767 679	4785 682	4802 684	449
176	4820 686	4837 689	4854 691	4872 693	4889 696	4907 698	4924 700	4941 702	4959 705	4976 707	451
178	4993 709	5011 712	5028 714	5045 716	5062 719	5080 721	5097 723	5114 725	5131 728	5148 730	452
180	5166 732	5183 734	5200 737	5217 739	5234 741	5251 744	5269 746	5286 748	5303 750	5320 753	453
182	5337 755	5354 757	5371 759	5388 762	5405 764	5422 766	5439 768	5456 771	5473 773	5490 775	454
184	5507 777	5524 780	5541 782	5557 784	5574 786	5591 788	5608 791	5625 793	5642 795	5659 797	455
186	5675 799	5692 802	5709 804	5726 806	5743 808	5759 811	5776 813	5793 815	5810 817	5826 819	456
188	5843 822	5860 824	5876 826	5893 828	5910 830	5926 832	5943 835	5959 837	5976 839	5993 841	457
190	6009 843	6026 846	6042 848	6059 850	6075 852	6092 854	6108 856	6125 858	6141 861	6158 863	458
192	6174 865	6191 867	6207 869	6224 871	6240 874	6256 876	6273 878	6289 880	6305 882	6322 884	459
194	6338 886	6354 889	6371 891	6387 893	6403 895	6420 897	6436 899	6452 901	6468 903	6485 905	459
196	6501 908	6517 910	6533 912	6549 914	6566 916	6582 918	6598 920	6614 922	6630 924	6646 927	460
198	6662 929	6678 931	6695 933	6711 935	6727 937	6743 939	6759 941	6775 943	6791 945	6807 947	461
200	6823 949	6839 952	6855 954	6871 956	6886 958	6902 960	6918 962	6934 964	6950 966	6966 968	462
202	6982 970	6998 972	7013 974	7029 976	7045 978	7061 980	7077 982	7092 984	7108 986	7124 989	463
204	7140 991	7155 993	7171 995	7187 997	7203 999	7218 1001	7234 1003	7250 1005	7265 1007	7281 1009	464
206	7296 1011	7312 1013	7328 1015	7343 1017	7359 1019	7374 1021	7390 1023	7405 1025	7421 1027	7436 1029	465
208	7452 1031	7467 1033	7483 1035	7498 1037	7514 1039	7529 1041	7545 1043	7560 1045	7575 1047	7591 1049	466
210	7606 1051	7622 1053	7637 1055	7652 1057	7668 1059	7683 1061	7698 1062	7714 1064	7729 1066	7744 1068	467
212	7759 1070	7775 1072	7790 1074	7805 1076	7820 1078	7836 1080	7851 1082	7866 1084	7881 1086	7896 1088	467
214	7911 1090	7927 1092	7942 1094	7957 1096	7972 1098	7987 1100	8002 1101	8017 1103	8032 1105	8047 1107	468
216	8062 1109	8077 1111	8092 1113	8107 1115	8122 1117	8137 1119	8152 1121	8167 1123	8182 1125	8197 1126	468
218	8212 1128	8227 1130	8242 1132	8257 1134	8272 1136	8287 1138	8301 1140	8316 1142	8331 1144	8346 1146	468
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E-08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03301 .990 .000 .000 0 FCOM-G0-02-05-30-033-010

R

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)
220	8361 1147	8376 1149	8390 1151	8405 1153	8420 1155	8435 1157	8449 1159	8464 1161	8479 1163	8493 1164	469
222	8508 1166	8523 1168	8538 1170	8552 1172	8567 1174	8582 1176	8596 1178	8611 1179	8625 1181	8640 1183	469
224	8654 1185	8669 1187	8684 1189	8698 1191	8713 1192	8727 1194	8742 1196	8756 1198	8771 1200	8785 1202	470
226	8800 1204	8814 1205	8828 1207	8843 1209	8857 1211	8872 1213	8886 1215	8900 1216	8915 1218	8929 1220	470
228	8943 1222	8958 1224	8972 1225	8986 1227	9000 1229	9015 1231	9029 1233	9043 1235	9057 1236	9072 1238	471
230	9086 1240	9100 1242	9114 1244	9128 1245	9142 1247	9157 1249	9171 1251	9185 1253	9199 1254	9213 1256	472
232	9227 1258	9241 1260	9255 1262	9269 1263	9283 1265	9297 1267	9311 1269	9325 1270	9339 1272	9353 1274	472
234	9367 1276	9381 1277	9395 1279	9409 1281	9423 1283	9437 1285	9450 1286	9464 1288	9478 1290	9492 1292	473
236	9506 1293	9520 1295	9533 1297	9547 1299	9561 1300	9575 1302	9589 1304	9602 1306	9616 1307	9630 1309	473
238	9643 1311	9657 1313	9671 1314	9684 1316	9698 1318	9712 1319	9725 1321	9739 1323	9753 1325	9766 1326	473
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

10E-08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03301 .990 .000 .000 0 FCOM-GO-02-05-30-034-010

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)
174	4702 674	4719 676	4737 679	4755 681	4772 683	4790 686	4808 688	4825 690	4843 693	4861 695	452
176	4878 697	4896 700	4913 702	4931 704	4948 707	4966 709	4983 711	5001 714	5018 716	5036 718	453
178	5053 720	5071 723	5088 725	5105 727	5123 730	5140 732	5158 734	5175 737	5192 739	5210 741	454
180	5227 743	5244 746	5262 748	5279 750	5296 753	5313 755	5331 757	5348 759	5365 762	5382 764	455
182	5399 766	5417 768	5434 771	5451 773	5468 775	5485 777	5502 780	5519 782	5536 784	5554 786	456
184	5571 789	5588 791	5605 793	5622 795	5639 798	5656 800	5673 802	5690 804	5707 806	5724 809	457
186	5741 811	5758 813	5774 815	5791 818	5808 820	5825 822	5842 824	5859 826	5876 829	5892 831	458
188	5909 833	5926 835	5943 837	5960 840	5976 842	5993 844	6010 846	6027 848	6043 850	6060 853	459
190	6077 855	6093 857	6110 859	6127 861	6143 864	6160 866	6177 868	6193 870	6210 872	6226 874	460
192	6243 877	6260 879	6276 881	6293 883	6309 885	6326 887	6342 889	6359 892	6375 894	6392 896	461
194	6408 898	6425 900	6441 902	6457 904	6474 907	6490 909	6507 911	6523 913	6539 915	6556 917	462
196	6572 919	6588 921	6605 923	6621 926	6637 928	6654 930	6670 932	6686 934	6702 936	6718 938	463
198	6735 940	6751 942	6767 945	6783 947	6799 949	6816 951	6832 953	6848 955	6864 957	6880 959	464
200	6896 961	6912 963	6928 965	6944 967	6960 970	6976 972	6992 974	7008 976	7024 978	7040 980	464
202	7056 982	7072 984	7088 986	7104 988	7120 990	7136 992	7152 994	7168 996	7184 998	7200 1000	465
204	7216 1002	7231 1004	7247 1006	7263 1009	7279 1011	7295 1013	7310 1015	7326 1017	7342 1019	7358 1021	466
206	7373 1023	7389 1025	7405 1027	7421 1029	7436 1031	7452 1033	7468 1035	7483 1037	7499 1039	7515 1041	467
208	7530 1043	7546 1045	7561 1047	7577 1049	7592 1051	7608 1053	7624 1055	7639 1057	7655 1059	7670 1061	467
210	7686 1063	7701 1065	7717 1067	7732 1069	7747 1071	7763 1073	7778 1075	7794 1077	7809 1079	7825 1081	468
212	7840 1083	7855 1085	7871 1087	7886 1089	7901 1090	7917 1092	7932 1094	7947 1096	7963 1098	7978 1100	468
214	7993 1102	8008 1104	8024 1106	8039 1108	8054 1110	8069 1112	8084 1114	8100 1116	8115 1118	8130 1120	469
216	8145 1122	8160 1124	8175 1126	8190 1127	8206 1129	8221 1131	8236 1133	8251 1135	8266 1137	8281 1139	469
218	8296 1141	8311 1143	8326 1145	8341 1147	8356 1149	8371 1151	8386 1152	8401 1154	8416 1156	8431 1158	470

PACK FLOW LO

ΔFUEL = - 0.5 %

PACK FLOW HI OR/
AND CARGO COOL ON

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-G0-02-05-30-033-115

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03301 .990 .000 .000 0 FCOM-GO-02-05-30-034-115

R

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)
126	0 0	22 3	44 7	66 10	88 13	110 16	132 20	154 23	176 26	198 29	403
128	220 33	242 36	264 39	286 42	308 46	330 49	352 52	373 55	395 58	417 62	406
130	439 65	460 68	482 71	504 74	526 78	547 81	569 84	590 87	612 90	634 93	408
132	655 97	677 100	698 103	720 106	741 109	763 112	784 115	805 118	827 122	848 125	411
134	870 128	891 131	912 134	933 137	955 140	976 143	997 146	1018 149	1040 152	1061 156	413
136	1082 159	1103 162	1124 165	1145 168	1166 171	1187 174	1208 177	1229 180	1250 183	1271 186	415
138	1292 189	1313 192	1334 195	1355 198	1376 201	1397 204	1418 207	1439 210	1460 213	1480 216	418
140	1501 219	1522 222	1543 225	1563 228	1584 231	1605 233	1625 236	1646 239	1667 242	1687 245	421
142	1708 248	1729 251	1749 254	1770 257	1790 260	1811 263	1831 266	1852 268	1872 271	1893 274	424
144	1913 277	1934 280	1954 283	1974 286	1995 289	2015 291	2035 294	2056 297	2076 300	2096 303	426
146	2117 306	2137 308	2157 311	2177 314	2197 317	2218 320	2238 322	2258 325	2278 328	2298 331	429
148	2318 334	2338 336	2358 339	2378 342	2398 345	2418 348	2438 350	2458 353	2478 356	2498 359	432
150	2518 361	2538 364	2558 367	2577 369	2597 372	2617 375	2637 378	2657 380	2676 383	2696 386	436
152	2716 388	2736 391	2755 394	2775 396	2795 399	2814 402	2834 404	2854 407	2873 410	2893 412	440
154	2912 415	2932 418	2951 420	2971 423	2990 426	3010 428	3029 431	3049 434	3068 436	3088 439	442
156	3107 441	3126 444	3146 447	3165 449	3184 452	3204 454	3223 457	3242 460	3261 462	3281 465	445
158	3300 467	3319 470	3338 473	3358 475	3377 478	3396 480	3415 483	3434 485	3453 488	3472 491	446
160	3492 493	3511 496	3530 498	3549 501	3568 503	3587 506	3606 508	3625 511	3644 514	3663 516	447
162	3682 519	3700 521	3719 524	3738 526	3757 529	3776 531	3795 534	3814 536	3832 539	3851 541	449
164	3870 544	3889 546	3908 549	3926 551	3945 554	3964 556	3982 559	4001 561	4020 564	4038 566	450
166	4057 569	4076 571	4094 574	4113 576	4131 579	4150 581	4169 584	4187 586	4206 588	4224 591	451
168	4243 593	4261 596	4280 598	4298 601	4316 603	4335 606	4353 608	4372 610	4390 613	4408 615	452
170	4427 618	4445 620	4463 623	4482 625	4500 627	4518 630	4537 632	4555 635	4573 637	4591 640	453
172	4610 642	4628 644	4646 647	4664 649	4682 652	4700 654	4718 656	4737 659	4755 661	4773 664	454
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		

10E-08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03501 .990 .000 .000 0 FCDM-G0-02-05-30-035-010

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)
126	00	223	457	6710	9013	11217	13420	15723	17927	20130	401
128	22433	24637	26840	29043	31247	33550	35753	37956	40160	42363	402
130	44566	46770	48973	51176	53379	55583	57786	59989	62192	64395	405
132	66599	686102	708105	730108	752112	773115	795118	817121	838124	860127	408
134	882131	903134	925137	946140	968143	990146	1011149	1033153	1054156	1075159	410
136	1097162	1118165	1140168	1161171	1182174	1204177	1225180	1246184	1267187	1289190	413
138	1310193	1331196	1352199	1373202	1395205	1416208	1437211	1458214	1479217	1500220	416
140	1521223	1542226	1563229	1584232	1605235	1626238	1647241	1668244	1688247	1709250	420
142	1730253	1751256	1772259	1793262	1813265	1834268	1855270	1875273	1896276	1917279	423
144	1937282	1958285	1979288	1999291	2020294	2040297	2061299	2081302	2102305	2122308	426
146	2143311	2163314	2183317	2204319	2224322	2245325	2265328	2285331	2306334	2326336	430
148	2346339	2366342	2387345	2407348	2427350	2447353	2467356	2487359	2508361	2528364	433
150	2548367	2568370	2588372	2608375	2628378	2648381	2668383	2688386	2708389	2728392	437
152	2748394	2767397	2787400	2807402	2827405	2847408	2867410	2886413	2906416	2926418	441
154	2946421	2965424	2985426	3005429	3024432	3044434	3064437	3083440	3103442	3122445	444
156	3142448	3162450	3181453	3201455	3220458	3240461	3259463	3278466	3298468	3317471	446
158	3337474	3356476	3375479	3395481	3414484	3433487	3453489	3472492	3491494	3510497	448
160	3530499	3549502	3568505	3587507	3606510	3626512	3645515	3664517	3683520	3702522	450
162	3721525	3740528	3759530	3778533	3797535	3816538	3835540	3854543	3873545	3892548	451
164	3911550	3930553	3949555	3968558	3987560	4006563	4024565	4043568	4062570	4081573	452
166	4100575	4118578	4137580	4156583	4175585	4193588	4212590	4231593	4249595	4268597	453
168	4287600	4305602	4324605	4342607	4361610	4379612	4398615	4417617	4435620	4454622	454
170	4472624	4490627	4509629	4527632	4546634	4564637	4583639	4601641	4619644	4638646	455
172	4656649	4674651	4693653	4711656	4729658	4748661	4766663	4784665	4802668	4820670	456

PACK FLOW LO

PACK FLOW HI OR/ AND CARGO COOL ON

ENGINE ANTI ICE ON

TOTAL ANTI ICE ON

ΔFUEL = - 0.5 %

ΔFUEL = + 1.5 %

ΔFUEL = + 3 %

ΔFUEL = + 5 %

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03501 .990 .000 .000 0 FCOM-GO-02-05-30-035-115

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)
174	4839 673	4857 675	4875 677	4893 680	4911 682	4930 685	4948 687	4966 689	4984 692	5002 694	457
176	5020 696	5038 699	5056 701	5074 704	5092 706	5110 708	5128 711	5146 713	5164 715	5182 718	458
178	5200 720	5218 722	5236 725	5253 727	5271 729	5289 732	5307 734	5325 736	5343 739	5360 741	459
180	5378 743	5396 746	5414 748	5431 750	5449 753	5467 755	5485 757	5502 759	5520 762	5538 764	460
182	5555 766	5573 769	5590 771	5608 773	5626 776	5643 778	5661 780	5678 782	5696 785	5713 787	461
184	5731 789	5748 791	5766 794	5783 796	5801 798	5818 801	5836 803	5853 805	5870 807	5888 810	462
186	5905 812	5922 814	5940 816	5957 819	5974 821	5992 823	6009 825	6026 828	6043 830	6061 832	462
188	6078 834	6095 836	6112 839	6129 841	6147 843	6164 845	6181 848	6198 850	6215 852	6232 854	463
190	6249 856	6266 859	6283 861	6300 863	6317 865	6334 867	6351 870	6368 872	6385 874	6402 876	464
192	6419 878	6436 881	6453 883	6470 885	6487 887	6504 889	6521 892	6537 894	6554 896	6571 898	464
194	6588 900	6605 902	6621 905	6638 907	6655 909	6672 911	6688 913	6705 915	6722 918	6739 920	465
196	6755 922	6772 924	6789 926	6805 928	6822 930	6838 933	6855 935	6872 937	6888 939	6905 941	465
198	6921 943	6938 945	6954 947	6971 950	6987 952	7004 954	7020 956	7037 958	7053 960	7069 962	466
200	7086 964	7102 967	7118 969	7135 971	7151 973	7168 975	7184 977	7200 979	7216 981	7233 983	466
202	7249 985	7265 987	7281 990	7298 992	7314 994	7330 996	7346 998	7362 1000	7378 1002	7395 1004	467
204	7411 1006	7427 1008	7443 1010	7459 1012	7475 1014	7491 1017	7507 1019	7523 1021	7539 1023	7555 1025	467
206	7571 1027	7587 1029	7603 1031	7619 1033	7635 1035	7651 1037	7667 1039	7683 1041	7698 1043	7714 1045	467
208	7730 1047	7746 1049	7762 1051	7777 1053	7793 1055	7809 1057	7825 1059	7840 1061	7856 1063	7872 1065	468
210	7888 1067	7903 1069	7919 1071	7935 1073	7950 1075	7966 1077	7981 1079	7997 1081	8012 1083	8028 1085	469
212	8044 1087	8059 1089	8075 1091	8090 1093	8106 1095	8121 1097	8136 1099	8152 1101	8167 1103	8183 1105	469
214	8198 1107	8213 1109	8229 1111	8244 1113	8260 1115	8275 1117	8290 1119	8305 1121	8321 1123	8336 1125	470
216	8351 1127	8366 1129	8382 1130	8397 1132	8412 1134	8427 1136	8442 1138	8457 1140	8473 1142	8488 1144	470
218	8503 1146	8518 1148	8533 1150	8548 1152	8563 1154	8578 1156	8593 1157	8608 1159	8623 1161	8638 1163	470
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03501 .990 .000 0 FCOM-GO-02-05-30-036-115

10E-08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 0.00 03501.990.000.000 0 FCOM-GO-02-05-30-037-010

TOTAL ANTI ICE ON

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				
126	0 0	23 3	46 7	69 10	92 13	115 17	138 20	161 23	184 27	207 30	414
128	230 33	253 36	276 40	299 43	321 46	344 50	367 53	390 56	412 59	435 62	418
130	458 66	480 69	503 72	526 75	548 79	571 82	593 85	616 88	638 91	661 94	422
132	683 98	706 101	728 104	750 107	773 110	795 113	817 117	840 120	862 123	884 126	425
134	907 129	929 132	951 135	973 138	995 141	1017 144	1039 148	1061 151	1083 154	1106 157	429
136	1128 160	1149 163	1171 166	1193 169	1215 172	1237 175	1259 178	1281 181	1303 184	1325 187	433
138	1346 190	1368 193	1390 196	1412 199	1433 202	1455 205	1477 208	1498 211	1520 214	1542 217	437
140	1563 220	1585 223	1606 225	1628 228	1649 231	1671 234	1692 237	1714 240	1735 243	1757 246	440
142	1778 249	1799 252	1821 255	1842 257	1863 260	1885 263	1906 266	1927 269	1948 272	1969 275	443
144	1991 277	2012 280	2033 283	2054 286	2075 289	2096 292	2117 294	2138 297	2159 300	2180 303	446
146	2201 306	2222 309	2243 311	2264 314	2285 317	2306 320	2327 323	2348 325	2369 328	2389 331	448
148	2410 334	2431 336	2452 339	2472 342	2493 345	2514 348	2535 350	2555 353	2576 356	2597 359	449
150	2617 361	2638 364	2658 367	2679 369	2699 372	2720 375	2740 378	2761 380	2781 383	2802 386	451
152	2822 389	2843 391	2863 394	2884 397	2904 399	2924 402	2945 405	2965 407	2985 410	3006 413	452
154	3026 416	3046 418	3066 421	3087 424	3107 426	3127 429	3147 432	3167 434	3187 437	3207 440	453
156	3228 442	3248 445	3268 448	3288 450	3308 453	3328 455	3348 458	3368 461	3388 463	3408 466	454
158	3428 469	3448 471	3467 474	3487 476	3507 479	3527 482	3547 484	3567 487	3586 490	3606 492	455
160	3626 495	3646 497	3666 500	3685 503	3705 505	3725 508	3744 510	3764 513	3784 515	3803 518	457
162	3823 521	3842 523	3862 526	3881 528	3901 531	3921 533	3940 536	3959 538	3979 541	3998 544	458
164	4018 546	4037 549	4057 551	4076 554	4095 556	4115 559	4134 561	4153 564	4173 566	4192 569	459
166	4211 571	4231 574	4250 576	4269 579	4288 581	4307 584	4327 586	4346 589	4365 591	4384 594	459
168	4403 596	4422 599	4441 601	4460 604	4479 606	4498 609	4517 611	4536 614	4555 616	4574 619	460
170	4593 621	4612 624	4631 626	4650 629	4669 631	4688 634	4707 636	4725 638	4744 641	4763 643	461
172	4782 646	4801 648	4819 651	4838 653	4857 655	4875 658	4894 660	4913 663	4931 665	4950 668	462
PACK FLOW LO				PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %				ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %			

10E -08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03701 .990 .000 .000 0 FCOM-GO-02-05-30-039-010

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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)
174	4969 670	4987 672	5006 675	5024 677	5043 680	5061 682	5080 684	5098 687	5117 689	5135 692	462
176	5154 694	5172 696	5191 699	5209 701	5228 704	5246 706	5264 708	5283 711	5301 713	5319 715	463
178	5338 718	5356 720	5374 723	5392 725	5411 727	5429 730	5447 732	5465 734	5483 737	5501 739	463
180	5520 741	5538 744	5556 746	5574 748	5592 751	5610 753	5628 755	5646 758	5664 760	5682 762	464
182	5700 765	5718 767	5736 769	5754 772	5772 774	5790 776	5807 779	5825 781	5843 783	5861 785	465
184	5879 788	5897 790	5914 792	5932 795	5950 797	5968 799	5985 801	6003 804	6021 806	6038 808	465
186	6056 811	6074 813	6091 815	6109 817	6126 820	6144 822	6162 824	6179 826	6197 829	6214 831	465
188	6232 833	6249 835	6266 838	6284 840	6301 842	6319 844	6336 847	6353 849	6371 851	6388 853	466
190	6405 856	6423 858	6440 860	6457 862	6474 864	6492 867	6509 869	6526 871	6543 873	6560 876	466
192	6577 878	6594 880	6611 882	6629 884	6646 887	6663 889	6680 891	6697 893	6714 895	6731 897	467
194	6748 900	6765 902	6781 904	6798 906	6815 908	6832 910	6849 913	6866 915	6883 917	6899 919	467
196	6916 921	6933 923	6950 926	6967 928	6983 930	7000 932	7017 934	7033 936	7050 938	7067 941	468
198	7083 943	7100 945	7116 947	7133 949	7149 951	7166 953	7182 955	7199 957	7215 960	7232 962	468
200	7248 964	7265 966	7281 968	7297 970	7314 972	7330 974	7346 976	7363 978	7379 981	7395 983	469
202	7412 985	7428 987	7444 989	7460 991	7476 993	7493 995	7509 997	7525 999	7541 1001	7557 1003	469
204	7573 1005	7589 1007	7605 1009	7621 1011	7637 1013	7653 1016	7669 1018	7685 1020	7701 1022	7717 1024	470
206	7733 1026	7749 1028	7765 1030	7780 1032	7796 1034	7812 1036	7828 1038	7843 1040	7859 1042	7875 1044	471
208	7891 1046	7906 1048	7922 1050	7938 1052	7953 1054	7969 1056	7985 1058	8000 1060	8016 1062	8031 1064	471
210	8047 1066	8062 1068	8078 1070	8093 1072	8109 1074	8124 1076	8140 1078	8155 1079	8170 1081	8186 1083	471
212	8201 1085	8216 1087	8232 1089	8247 1091	8262 1093	8277 1095	8293 1097	8308 1099	8323 1101		471
214											
216											
218											
PACK FLOW LO			PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %			ΔFUEL = + 1.5 %			ΔFUEL = + 3 %			ΔFUEL = + 5 %		

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03701 .990 .000 .000 0 FCOM-GO-02-05-30-039-115

R

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)
126	0 0	23 3	47 6	70 10	94 13	117 16	141 19	164 22	187 26	210 29	437
128	234 32	257 35	280 38	303 41	327 45	350 48	373 51	396 54	419 57	442 60	440
130	465 63	488 67	511 70	534 73	557 76	580 79	603 82	626 85	649 88	672 91	443
132	694 94	717 97	740 100	763 104	785 107	808 110	831 113	854 116	876 119	899 122	445
134	921 125	944 128	967 131	989 134	1012 137	1034 140	1057 143	1079 146	1102 149	1124 152	447
136	1146 155	1169 158	1191 161	1213 164	1236 167	1258 170	1280 173	1303 176	1325 179	1347 182	449
138	1369 185	1391 188	1414 191	1436 194	1458 197	1480 200	1502 202	1524 205	1546 208	1568 211	450
140	1590 214	1612 217	1634 220	1656 223	1678 226	1700 229	1722 232	1743 235	1765 237	1787 240	451
142	1809 243	1831 246	1852 249	1874 252	1896 255	1918 258	1939 261	1961 263	1983 266	2004 269	452
144	2026 272	2047 275	2069 278	2090 281	2112 283	2134 286	2155 289	2176 292	2198 295	2219 298	453
146	2241 300	2262 303	2283 306	2305 309	2326 312	2348 315	2369 317	2390 320	2411 323	2433 326	455
148	2454 329	2475 331	2496 334	2517 337	2538 340	2560 342	2581 345	2602 348	2623 351	2644 354	456
150	2665 356	2686 359	2707 362	2728 365	2749 367	2770 370	2791 373	2811 376	2832 378	2853 381	457
152	2874 384	2895 386	2916 389	2936 392	2957 395	2978 397	2998 400	3019 403	3040 405	3060 408	458
154	3081 411	3102 413	3122 416	3143 419	3163 422	3184 424	3204 427	3225 430	3245 432	3266 435	459
156	3286 438	3307 440	3327 443	3347 446	3368 448	3388 451	3408 453	3429 456	3449 459	3469 461	460
158	3489 464	3510 467	3530 469	3550 472	3570 475	3590 477	3610 480	3631 482	3651 485	3671 488	461
160	3691 490	3711 493	3731 495	3751 498	3771 501	3791 503	3811 506	3831 508	3851 511	3870 514	462
162	3890 516	3910 519	3930 521	3950 524	3970 526	3989 529	4009 532	4029 534	4049 537	4068 539	462
164	4088 542	4108 544	4127 547	4147 549	4166 552	4186 554	4206 557	4225 559	4245 562	4264 565	463
166	4284 567	4303 570	4323 572	4342 575	4361 577	4381 580	4400 582	4419 585	4439 587	4458 590	463
168	4477 592	4497 595	4516 597	4535 600	4554 602	4574 605	4593 607	4612 610	4631 612	4650 614	464
170	4669 617	4688 619	4707 622	4726 624	4745 627	4764 629	4783 632	4802 634	4821 637	4840 639	465
172	4859 641	4878 644	4897 646	4915 649	4934 651	4953 653	4972 656	4990 658	5009 661	5028 663	466
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %		TOTAL ANTI ICE ON ΔFUEL = + 5 %			

10E-08FA330-301 CF6-80E1A2 2220000C5KG370 0 018590 0 0 1 1.0 .0 .00 03901 .990 .000 .000 0 FCOM-GO-02-05-30-041-010

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)
126	0 0	24 3	47 6	71 10	95 13	118 16	142 19	165 23	189 26	212 29	439
128	236 32	259 35	283 38	306 42	329 45	353 48	376 51	399 54	423 57	446 61	442
130	469 64	492 67	516 70	539 73	562 76	585 79	608 82	631 86	654 89	677 92	445
132	700 95	723 98	746 101	769 104	792 107	815 110	838 113	861 116	883 119	906 122	447
134	929 125	952 128	975 131	997 135	1020 138	1043 141	1065 144	1088 147	1111 150	1133 153	449
136	1156 156	1178 159	1201 162	1223 165	1246 168	1268 171	1291 174	1313 177	1335 180	1358 183	450
138	1380 186	1403 188	1425 191	1447 194	1469 197	1492 200	1514 203	1536 206	1558 209	1581 212	452
140	1603 215	1625 218	1647 221	1669 224	1691 227	1713 230	1735 233	1757 235	1779 238	1801 241	453
142	1823 244	1845 247	1867 250	1889 253	1911 256	1933 259	1954 261	1976 264	1998 267	2020 270	454
144	2042 273	2063 276	2085 279	2107 282	2128 284	2150 287	2172 290	2193 293	2215 296	2236 299	456
146	2258 301	2280 304	2301 307	2323 310	2344 313	2366 316	2387 318	2408 321	2430 324	2451 327	457
148	2473 330	2494 332	2515 335	2537 338	2558 341	2579 344	2600 346	2622 349	2643 352	2664 355	458
150	2685 357	2706 360	2727 363	2749 366	2770 368	2791 371	2812 374	2833 377	2854 379	2875 382	459
152	2896 385	2917 388	2938 390	2959 393	2979 396	3000 399	3021 401	3042 404	3063 407	3084 409	460
154	3104 412	3125 415	3146 417	3167 420	3187 423	3208 426	3229 428	3249 431	3270 434	3291 436	461
156	3311 439	3332 442	3352 444	3373 447	3393 450	3414 452	3434 455	3455 458	3475 460	3496 463	462
158	3516 466	3536 468	3557 471	3577 473	3597 476	3618 479	3638 481	3658 484	3678 487	3699 489	462
160	3719 492	3739 494	3759 497	3779 500	3799 502	3820 505	3840 508	3860 510	3880 513	3900 515	463
162	3920 518	3940 520	3960 523	3980 526	4000 528	4020 531	4039 533	4059 536	4079 539	4099 541	464
164	4119 544	4139 546	4158 549	4178 551	4198 554	4218 556	4237 559	4257 561	4277 564	4296 567	464
166	4316 569	4336 572	4355 574	4375 577	4394 579	4414 582	4433 584	4453 587	4472 589	4492 592	465
168	4511 594	4531 597	4550 599	4569 602	4589 604	4608 607	4627 609	4647 612	4666 614	4685 617	465
170	4704 619	4724 622	4743 624	4762 627	4781 629	4800 632	4819 634	4838 636	4858 639	4877 641	466
172	4896 644	4915 646	4934 649	4953 651	4972 654	4991 656	5009 658	5028 661	5047 663	5066 666	466
PACK FLOW LO ΔFUEL = - 0.5 %			PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1.5 %			ENGINE ANTI ICE ON ΔFUEL = + 3 %			TOTAL ANTI ICE ON ΔFUEL = + 5 %		

11.1-08FOA330-200 CF6-80E1A4 22200000CSKG370 0 018590 0 0 1 1.0 .0 .00 03901 .990 .000 .000 0 FCOM-G0-02-05-30-041-115

11.1-08F0A330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 03901 .990 .000 .000 0 FCOM-GO-02-05-30-042-115

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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				
126	0 0	24 3	49 6	73 10	97 13	121 16	146 19	170 22	194 26	218 29	452
128	242 32	266 35	290 38	314 42	338 45	362 48	386 51	410 54	434 57	458 61	454
130	482 64	506 67	530 70	553 73	577 76	601 79	625 82	648 86	672 89	696 92	455
132	719 95	743 98	766 101	790 104	814 107	837 110	861 113	884 117	908 120	931 123	457
134	954 126	978 129	1001 132	1024 135	1048 138	1071 141	1094 144	1118 147	1141 150	1164 153	458
136	1187 156	1210 159	1233 162	1257 165	1280 168	1303 171	1326 174	1349 177	1372 180	1395 183	459
138	1418 186	1441 189	1464 192	1486 195	1509 198	1532 201	1555 204	1578 207	1600 210	1623 213	460
140	1646 216	1669 219	1691 222	1714 225	1737 228	1759 231	1782 234	1804 237	1827 240	1849 242	461
142	1872 245	1894 248	1917 251	1939 254	1962 257	1984 260	2006 263	2029 266	2051 269	2073 271	462
144	2095 274	2118 277	2140 280	2162 283	2184 286	2206 289	2228 292	2251 294	2273 297	2295 300	463
146	2317 303	2339 306	2361 309	2383 312	2405 314	2427 317	2448 320	2470 323	2492 326	2514 329	464
148	2536 331	2558 334	2579 337	2601 340	2623 343	2645 345	2666 348	2688 351	2710 354	2731 357	464
150	2753 359	2774 362	2796 365	2817 368	2839 371	2860 373	2882 376	2903 379	2925 382	2946 384	465
152	2967 387	2989 390	3010 393	3031 395	3053 398	3074 401	3095 404	3116 406	3137 409	3159 412	465
154	3180 414	3201 417	3222 420	3243 423	3264 425	3285 428	3306 431	3327 433	3348 436	3369 439	466
156	3390 441	3410 444	3431 447	3452 449	3473 452	3494 455	3514 458	3535 460	3556 463	3576 465	466
158	3597 468	3618 471	3638 473	3659 476	3679 479	3700 481	3720 484	3741 487	3761 489	3782 492	467
160	3802 494	3823 497	3843 500	3863 502	3884 505	3904 508	3924 510	3944 513	3965 515	3985 518	468
162	4005 520	4025 523	4045 526	4065 528	4085 531	4105 533	4125 536	4145 538	4165 541	4185 544	468
164	4205 546	4225 549	4245 551	4265 554	4285 556	4304 559	4324 561	4344 564	4364 566	4383 569	469
166	4403 571	4423 574	4442 576	4462 579	4481 581	4501 584	4520 586	4540 589	4559 591	4579 594	470
168	4598 596	4618 599	4637 601	4656 604	4676 606	4695 609	4714 611	4733 614	4752 616	4772 618	470
170	4791 621	4810 623	4829 626	4848 628	4867 631	4886 633	4905 635	4924 638	4943 640	4962 643	471
172	4981 645	5000 648	5019 650	5038 652	5056 655	5075 657	5094 659	5113 662	5131 664	5150 667	471
PACK FLOW LO				PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %				ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %			

11.1-08FOA330-200 CF6-80E1A4 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 04101 .990 .000 .000 0 FCOM-GO-02-05-30-044-115

10E -08FA330-301 CF6-80E1A2 22200000C5KG370 0 018590 0 0 1 1.0 .0 .00 04101 .990 .000 .000 0 FCOM-GO-02-05-30-045-010

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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.80.

LONG RANGE SPEED

R

CORRECTION ON FUEL CONSUMPTION (1000 kg)												
FL	WEIGHT AT BRAKE RELEASE (1000 kg)											time correction
	140	150	160	170	180	190	200	210	220	230	240	
410	2.2	2.5	2.5	2.7	—	—	—	—	—	—	—	3 min
390	2.1	2.3	2.4	2.6	2.8	2.9	—	—	—	—	—	4 min
370	2.0	2.2	2.4	2.5	2.6	2.8	2.9	2.9	—	—	—	4 min
350	2.0	2.2	2.3	2.4	2.5	2.7	2.8	2.9	3.1	3.2	—	5 min
330	1.9	2.1	2.2	2.3	2.4	2.5	2.7	2.9	3.1	3.1	3.2	5 min
310	1.8	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.8	3.0	3.1	5 min
290	1.7	1.9	1.9	2.1	2.1	2.3	2.4	2.5	2.6	2.8	2.9	5 min
270	1.6	1.8	1.8	2.0	2.0	2.2	2.3	2.4	2.5	2.6	2.8	5 min
250	1.5	1.6	1.7	1.9	1.9	2.1	2.1	2.3	2.3	2.5	2.6	5 min
200	1.2	1.4	1.4	1.4	1.6	1.7	1.8	1.9	2.0	2.1	2.2	4 min
150	1.0	1.1	1.1	1.2	1.4	1.4	1.5	1.5	1.6	1.7	1.8	3 min
100	0.7	0.8	0.8	1.0	1.0	1.0	1.1	1.1	1.2	1.3	1.3	2 min

CLIMB TO OPTIMUM FL

R

CORRECTION ON FUEL CONSUMPTION (1000 kg)												
SPEED	WEIGHT AT BRAKE RELEASE (1000 kg)											time correction
	140	150	160	170	180	190	200	210	220	230	240	
LRC	2.4	2.5	2.5	2.6	2.6	2.8	2.8	2.9	3.0	3.1	3.1	5 min
M.80	2.2	2.3	2.3	2.6	2.6	2.8	2.8	3.0	3.2	3.1	3.1	5 min
M.82	2.2	2.4	2.5	2.6	2.7	2.8	2.9	2.9	3.0	3.0	3.2	6 min
M.84	2.2	2.3	2.3	2.5	2.5	2.7	2.7	2.8	2.8	2.9	3.1	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 160 kg per step climb to the fuel consumption.

DESCENT CORRECTION

Correct the fuel and the time values determined in the integrated cruise tables as follows to take into account the descent down to 1500 feet followed by 6 min IFR approach and landing.

R **LONG RANGE CRUISE SPEED**

R

CORRECTION ON FUEL CONSUMPTION (1000 kg)								
FL	WEIGHT OVERHEAD DESTINATION (1000 kg)							time correction
	130	140	150	160	170	180	190	
290 and above	0.3	0.3	0.4	0.5	0.5	0.6	0.7	11 min
270	0.2	0.3	0.4	0.4	0.5	0.6	0.6	10 min
250	0.2	0.3	0.3	0.4	0.5	0.5	0.6	10 min
200	0.2	0.2	0.3	0.3	0.4	0.4	0.5	9 min
150	0.1	0.1	0.2	0.2	0.2	0.3	0.3	8 min
100	0.0	0.0	0.0	0.0	0.0	0.1	0.1	8 min

LRC, M.80, M.82, M.84 FROM OPTIMUM FL

R

CORRECTION ON FUEL CONSUMPTION (1000 kg)							
WEIGHT OVERHEAD DESTINATION (1000 kg)							time correction
130	140	150	160	170	180	190	
0.4	0.4	0.5	0.6	0.7	0.8	0.8	11 min

INTRODUCTION

R 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 :

- R — Takeoff
- R — Climb profile : 250kt/300kt/M.80
- R — Cruise mach number : M.80, M.82, M.84, LR
- R — Descent profile : Cruise Mach number/300kt/250kt
- R — Approach and landing : 240 kg – 6 minute IFR
- R — ISA
- R — CG = 37 %
- Normal air conditioning
- Anti ice OFF

R *Note : 1. In the tables, the asterisk (*) means that a step climb of 4000 feet must be flown to reach the corresponding FL.*

R *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 $0.010 (kg/°C/NM) \times \Delta ISA(°C) \times Air\ Distance\ (NM)$.

CORRECTION FOR DEVIATION FROM REFERENCE LANDING WEIGHT

R 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

R The following is an example of a complete flight plan based on the assumptions :

- R — Zero fuel weight (OWE + PAYLOAD) : 160 000 kg = landing weight at alternate airport.
- R — Cruise M.82 at FL390
- R — Ground distance from departure to destination : 2500 NM
- R — Average wind during flight : – 50 kt (headwind)
- R — ISA conditions
- R — “Enroute” reserve : 5 %
- R — Ground distance from destination to alternate : 200 NM, no wind at FL200
- R 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 p 4 gives an overview of the calculation to be performed).

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	FLIGHT PLANNING		2.05.40	P 2
	QUICK DETERMINATION OF F-PLN		SEQ 010	REV 06

1. Alternate fuel and time
 - From 2.05.50 p2 ;
- R Alternate time = 41 min
- R Alternate fuel : $3559 + 10 \times (160 - 140) = 3759$ kg
2. Holding fuel and time
 - A 30 min holding is assumed at 1500 feet. Read from 2.05.10 p2, holding fuel = 2400 kg
3. At destination, the landing weight = $160\ 000 + 3759 + 2400 = 166\ 159$ kg
4. Evaluation of the air distance between departure and destination.
- R – The “Ground distance/Air distance” conversion tables from 2.05.60 p3, shows that the corresponding air distance is : 2796 NM ($\sim$ 2800 NM).
5. Trip fuel and time
 - Enter air distance and flight level 390 (see tables on 2.05.40 p7), interpolate to find the corresponding values of fuel consumption and time, for the reference landing weight and without deviation from ISA.
 - Fuel = 29 812kg
 - Time = 6 h 11 min
 - Correction for landing weight
- R Δ fuel consumption = $134 \times (166.2 - 140) = 3510$ kg
- R – Trip reserves (5 %) = $0.05 \times (29\ 812 + 3510) = 1666$ kg
- R 6. Taxi fuel = 300 kg (2.05.10 p2)
- R 7. Total fuel on board (Block fuel) :
- R $29812 + 3759 + 2400 + 3510 + 1666 + 300 = 41447$ kg

INTRODUCTION

R 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 :

- R – Takeoff
- R – Climb profile : 250kt/300kt/M.80
- R – Cruise mach number : M.80, M.82, M.84, LR
- R – Descent profile : Cruise Mach number/300kt/250kt
- R – Approach and landing : 240 kg – 6 minute IFR
- R – ISA
- R – CG = 37 %
- Normal air conditioning
- Anti ice OFF

R *Note : 1. In the tables, the asterisk (*) means that a step climb of 4000 feet must be flown to reach the corresponding FL.*

R *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 $0.010 (kg/°C/NM) \times \Delta ISA(°C) \times Air\ Distance\ (NM)$.

CORRECTION FOR DEVIATION FROM REFERENCE LANDING WEIGHT

R 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

R The following is an example of a complete flight plan based on the assumptions :

- R – Zero fuel weight (OWE + PAYLOAD) : 160 000 kg = landing weight at alternate airport.
- R – Cruise M.82 at FL390
- R – Ground distance from departure to destination : 2500 NM
- R – Average wind during flight : – 50 kt (headwind)
- R – ISA conditions
- R – “Enroute” reserve : 5 %
- R – Ground distance from destination to alternate : 200 NM, no wind at FL200
- R 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 p 4 gives an overview of the calculation to be performed).

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING QUICK DETERMINATION OF F-PLN	2.05.40 P 2	
		SEQ 115	REV 09

1. Alternate fuel and time
 - From 2.05.50 p2 ;
 - Alternate time = 41 min
 - Alternate fuel : $3489 + 10 \times (160 - 140) = 3689$ kg
2. Holding fuel and time
 - A 30 min holding is assumed at 1500 feet. Read from 2.05.10 p2, holding fuel = 2400 kg
3. At destination, the landing weight = $160\,000 + 3689 + 2400 = 166\,089$ kg
4. Evaluation of the air distance between departure and destination.
 - The "Ground distance/Air distance" conversion tables from 2.05.60 p3, shows that the corresponding air distance is : 2796 NM ($\sim$ 2800 NM).
5. Trip fuel and time
 - Enter air distance and flight level 390 (see tables on 2.05.40 p8), interpolate to find the corresponding values of fuel consumption and time, for the reference landing weight and without deviation from ISA.
 - Fuel = 29 496 kg
 - Time = 6 h 11 min
 - Correction for landing weight
 - Δ fuel consumption = $135 \times (166.1 - 140) = 3523$ kg
 - Trip reserves (5 %) = $0.05 \times (29\,496 + 3523) = 1650$ kg
6. Taxi fuel = 300 kg (2.05.10 p2)
7. Total fuel on board (Block fuel) :
 $29496 + 3689 + 2400 + 3523 + 1650 + 300 = 41058$ kg

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 3
	QUICK DETERMINATION OF F-PLN		SEQ 010	REV 07

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)				
							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	3532 0.38	3519 0.38	3516 0.38	3523 0.38				12	14	
300	4690 0.51	4610 0.51	4547 0.51	4504 0.52	4479 0.52	4470 0.52		14	16	19
400	5852 1.04	5703 1.04	5581 1.04	5488 1.05	5422 1.05	5381 1.05		16	19	22
500	7015 1.17	6799 1.17	6618 1.18	6475 1.18	6367 1.18	6295 1.18		19	22	26
600	8181 1.30	7897 1.30	7657 1.31	7464 1.31	7316 1.31	7213 1.31		21	25	30
700	9350 1.42	8998 1.43	8700 1.44	8457 1.44	8268 1.44	8135 1.44		23	28	34
800	10521 1.55	10102 1.56	9745 1.57	9453 1.57	9224 1.57	9061 1.57		26	31	38
900	11695 2.08	11208 2.09	10793 2.10	10452 2.10	10182 2.10	9990 2.10		28	35	42
1000	12871 2.21	12317 2.22	11844 2.23	11454 2.23	11144 2.23	10923 2.23		30	38	46
1100	14050 2.34	13429 2.35	12899 2.36	12460 2.36	12110 2.36	11860 2.36		33	41	51
1200	15231 2.46	14543 2.48	13956 2.49	13468 2.49	13079 2.49	12801 2.49		35	44	55
1300	16414 2.59	15660 3.00	15016 3.02	14479 3.02	14052 3.02	13746 3.02		38	47	59
1400	17601 3.12	16780 3.13	16079 3.15	15494 3.16	15027 3.16	14695 3.16		40	51	64
1500	18789 3.25	17903 3.26	17146 3.28	16512 3.29	16007 3.29	15647 3.29		43	54	68
1600	19981 3.38	19029 3.39	18216 3.41	17533 3.42	16990 3.42	16604 3.42		46	58	73
1700	21174 3.50	20157 3.52	19288 3.54	18558 3.55	17978 3.55	17565 3.55		48	61	78
1800	22371 4.03	21289 4.05	20364 4.07	19586 4.08	18969 4.08	18531 4.08		51	64	82
1900	23570 4.16	22423 4.18	21444 4.20	20617 4.21	19964 4.21	19502 4.21		54	68	87
2000	24772 4.29	23561 4.31	22526 4.33	21652 4.34	20963 4.34	20476 4.34		57	71	93
2100	25976 4.42	24701 4.44	23612 4.46	22690 4.47	21965 4.47	21455 4.47		59	75	98
2200	27185 4.55	25844 4.57	24700 4.59	23732 5.00	22972 5.00	22457 5.00		62	79	104
2300	28395 5.07	26992 5.10	25792 5.12	24776 5.13	23982 5.13	23448 5.13		65	82	109
2400	29609 5.20	28143 5.23	26888 5.25	25825 5.27	24997 5.27	24443 5.27		68	86	115
2500	30826 5.33	29297 5.36	27987 5.38	26877 5.40	26015 5.40	25443 5.40		72	90	121
2600	32045 5.46	30454 5.48	29089 5.51	27932 5.53	27037 5.53	26450 5.53		75	93	127
2700	33267 5.59	31615 6.01	30194 6.04	28991 6.06	28095 6.06	27466 6.06		78	97	133
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 = + 1.5 %		ΔFUEL = + 3 %			

FLIP23E A330-301 CF6-80E1 A2 3420 03701.000011 0250300 .8000 .000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-003-010

FLIP23 A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-004-010

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 3
	QUICK DETERMINATION OF F-PLN		SEQ 115	REV 09

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
							TIME (H.MIN)		
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3500 0.38	3488 0.38	3486 0.39	3494 0.39			12	13	
300	4645 0.51	4567 0.51	4506 0.52	4465 0.52	4441 0.52	4432 0.52	14	16	18
400	5793 1.04	5649 1.04	5529 1.05	5438 1.05	5374 1.05	5334 1.05	16	19	22
500	6944 1.17	6733 1.17	6554 1.18	6414 1.18	6310 1.18	6240 1.18	18	22	26
600	8097 1.30	7820 1.30	7582 1.31	7394 1.31	7249 1.31	7149 1.31	21	25	30
700	9253 1.42	8910 1.43	8613 1.44	8377 1.44	8192 1.44	8062 1.44	23	28	34
800	10411 1.55	10002 1.56	9647 1.57	9362 1.57	9138 1.57	8979 1.57	25	31	38
900	11572 2.08	11096 2.09	10684 2.10	10350 2.10	10087 2.10	9900 2.10	28	34	42
1000	12735 2.21	12193 2.22	11723 2.23	11342 2.23	11040 2.23	10824 2.23	30	37	46
1100	13901 2.34	13292 2.35	12766 2.36	12336 2.36	11995 2.36	11752 2.36	33	41	50
1200	15070 2.47	14395 2.48	13811 2.49	13334 2.49	12954 2.49	12683 2.49	35	44	54
1300	16240 2.59	15500 3.01	14859 3.02	14334 3.03	13916 3.03	13618 3.03	37	47	59
1400	17413 3.12	16608 3.13	15911 3.15	15338 3.16	14882 3.16	14558 3.16	40	50	63
1500	18589 3.25	17718 3.26	16966 3.28	16346 3.29	15851 3.29	15502 3.29	42	54	67
1600	19766 3.38	18831 3.39	18023 3.41	17356 3.42	16825 3.42	16450 3.42	45	57	72
1700	20947 3.51	19947 3.52	19084 3.54	18370 3.55	17802 3.55	17402 3.55	48	61	77
1800	22131 4.03	21066 4.05	20148 4.07	19386 4.08	18783 4.08	18358 4.08	50	64	81
1900	23318 4.16	22188 4.18	21215 4.20	20407 4.21	19768 4.21	19318 4.21	53	68	86
2000	24507 4.29	23313 4.31	22286 4.33	21431 4.34	20756 4.34	20282 4.34	56	71	91
2100	25698 4.42	24441 4.44	23361 4.46	22458 4.47	21749 4.47	21251 4.47	59	75	97
2200	26892 4.55	25571 4.57	24438 4.59	23489 5.00	22746 5.00	22225 5.00	62	79	103
2300	28089 5.07	26704 5.10	25518 5.12	24524 5.14	23746 5.14	23224 5.14	65	82	108
2400	29289 5.20	27840 5.23	26601 5.25	25561 5.27	24751 5.27	24210 5.27	68	86	114
2500	30493 5.33	28980 5.36	27688 5.38	26602 5.40	25759 5.40	25201 5.40	71	90	121
2600	31700 5.46	30124 5.49	28779 5.51	27646 5.53	26770 5.53	26196 5.53	74	93	126
2700	32910 5.59	31271 6.01	29872 6.04	28695 6.06	27817 6.06	27196 6.06	77	97	132
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 = + 1.5 %		ΔFUEL = + 3 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-003-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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	34123 6.11	32422 6.14	30969 6.17	29746 6.19	28842 6.19	28202 6.19		80	101	138
2900	35338 6.24	33576 6.27	32070 6.30	30802 6.32	29870 6.32	29213 6.32		83	105	144
3000	36557 6.37	34734 6.40	33173 6.43	31860 6.45	30904 6.45	30232 6.45		87	111	149
3100	37778 6.50	35894 6.53	34281 6.56	32923 6.58	31942 6.58	31261 6.58		90	115	155
3200	39003 7.03	37058 7.06	35391 7.10	34033 7.11	32985 7.11	32296 7.11		94	119	161
3300	40230 7.16	38225 7.19	36505 7.23	35108 7.25	34032 7.25	33337 7.24		97	126	168
3400	41460 7.28	39395 7.32	37623 7.36	36187 7.38	35085 7.38	34385 7.38		100	129	175
3500	42693 7.41	40568 7.45	38744 7.49	37270 7.51	36142 7.51	35441 7.51		104	133	183
3600	43930 7.54	41745 7.58	39928 8.02	38357 8.04	37204 8.04	36502 8.04		107	138	190
3700	45171 8.07	42925 8.11	41063 8.15	39448 8.17	38271 8.17	37569 8.17		114	140	198
3800	46414 8.20	44110 8.24	42201 8.28	40543 8.30	39342 8.30	38643 8.30		118	144	205
3900	47661 8.32	45370 8.37	43343 8.41	41643 8.43	40418 8.43	39723 8.43		121	149	213
4000	48911 8.45	46569 8.49	44491 8.54	42748 8.56	41501 8.56	40811 8.56		129	154	220
4100	50164 8.58	47773 9.02	45642 9.07	43859 9.09	42589 9.09	41932 9.09*		130	159	227
4200	51420 9.11	48980 9.15	46797 9.20	44976 9.22	43681 9.22	43043 9.22*		134	164	234
4300	52760 9.24	50192 9.28	47957 9.33	46098 9.36	44779 9.36	44160 9.35*		138	169	241
4400	54029 9.36	51407 9.41	49122 9.46	47225 9.49	45883 9.49	45280 9.49*		138	174	248
4500	55302 9.49	52627 9.54	50291 9.59	48358 10.02	46991 10.02	46406 10.02*		142	179	256
4600	56579 10.02	53850 10.07	51464 10.12	49495 10.15	48107 10.15	47538 10.15*		146	184	263
4700	57862 10.15	55078 10.20	52641 10.25	50637 10.28	49228 10.28	48675 10.28*		150	189	268
4800	59150 10.28	56311 10.33	53822 10.38	51783 10.41	50355 10.41	49817 10.41*		154	195	276
4900	60440 10.41	57548 10.46	55009 10.51	52935 10.54	51487 10.54	50964 10.54*		159	200	283
5000	61736 10.53	58789 10.59	56200 11.04	54092 11.07	52624 11.07	52117 11.07*		163	206	290
5100	63035 11.06	60034 11.12	57396 11.17	55255 11.20	53768 11.20	53275 11.20*		168	211	300
5200	64338 11.19	61284 11.25	58596 11.30	56423 11.33	54919 11.33	54439 11.33*		172	217	309
5300	65645 11.32	62539 11.38	59801 11.43	57597 11.47	56076 11.47	55609 11.47*		177	222	318
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 = + 1.5 %		ΔFUEL = + 3 %			

F1P23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-004-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
AIR DIST. (NM)		FLIGHT LEVEL					CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
		310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
5400	67749 11.45	64537 11.50	61691 11.56	59415 12.00	57901 12.00	57424 12.00*	185	229	332
5500	69085 11.57	65815 12.03	62920 12.09	60614 12.13	59123 12.13*	58620 12.13*	190	235	341
5600	70426 12.10	67098 12.16	64154 12.22	61820 12.26	60348 12.26*	59823 12.26*	194	241	350
5700	71774 12.23	68387 12.29	65393 12.35	63031 12.39	61579 12.39*	61032 12.39*	199	248	357
5800	73126 12.36	69680 12.42	66636 12.49	64248 12.52	62814 12.52*	62251 12.52*	204	256	366
5900	74484 12.49	70979 12.55	67885 13.02	65471 13.05	64063 13.05*	63479 13.05*	208	263	375
6000	75847 13.02	72284 13.08	69139 13.15	66699 13.18	65311 13.18*	64713 13.18*	213	270	383
6100	77214 13.14	73594 13.21	70399 13.28	67989 13.31	66566 13.31*	65954 13.31*	218	276	391
6200	78586 13.27	74909 13.34	71667 13.41	69236 13.44	67826 13.44*	67202 13.44*	223	283	400
6300	79963 13.40	76230 13.47	72943 13.54	70489 13.58	69093 13.57*	68460 13.58*	229	290	408
6400	81345 13.53	77556 14.00	74225 14.07	71750 14.11	70365 14.10*	69725 14.11*	234	298	417
6500	82732 14.06	78886 14.13	75513 14.20	73018 14.24	71646 14.23*	70997 14.24*	239	310	426
6600	84125 14.18	80222 14.26	76807 14.33	74293 14.37	72933 14.36*	72306 14.37*	244	317	435
6700	85523 14.31	81564 14.39	78107 14.46	75577 14.50	74226 14.49*	73597 14.50*	249	326	444
6800	86926 14.44	82911 14.51	79413 14.59	76868 15.03	75528 15.02*	74898 15.03*	254	336	453
6900	88335 14.57	84264 15.04	80800 15.12	78165 15.16	76836 15.15*	76211 15.16*	260	345	462
7000	89750 15.10	85623 15.17	82125 15.25	79503 15.29*	78151 15.28*	77536 15.29*	265	355	470
7100	91170 15.23	86987 15.30	83456 15.38	80853 15.42*	79472 15.41*	78870 15.42*	271	365	479
7200	92595 15.35	88358 15.43	84794 15.51	82210 15.55*	80801 15.54*	80224 15.55*	280	371	489
7300	94025 15.48	89815 15.56	86142 16.04	83573 16.08*	82138 16.07*	81578 16.08*	286	380	499
7400	95462 16.01	91203 16.09	87497 16.17	84943 16.21*	83482 16.21*	82938 16.21*	292	389	508
7500	96904 16.14	92597 16.22	88862 16.30	86318 16.34*	84834 16.34*	84305 16.34*	303	397	518
7600	98352 16.27	93996 16.35	90233 16.43	87701 16.47*	86197 16.47*	85678 16.47*	309	405	527
7700	99807 16.40	95404 16.48	91611 16.56	89090 17.00*	87569 17.00*	87056 17.00*	311	413	536
7800	101361 16.52	96818 17.01	92996 17.09	90486 17.13*	88977 17.13*	88443 17.13*	317	421	545
7900	102835 17.05	98238 17.14	94389 17.23	91891 17.26*	90370 17.26*	89836 17.26*	324	429	554
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 = + 1.5 %		ΔFUEL = + 3 %		

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-005-010

FLIP23C A33Q-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 ECOM-GO-02-05-40-006-010

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 5
	QUICK DETERMINATION OF F-PLN		SEQ 115	REV 09

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.80 - DESCENT : M.80/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
							TIME (H.MIN)		
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
5400	66956 11.45	63799 11.50	61011 11.56	58777 12.00	57239 12.00	56785 12.00*	182	228	327
5500	68272 11.57	65062 12.03	62227 12.09	59963 12.13	58465 12.13	57966 12.13*	186	234	335
5600	69591 12.10	66330 12.16	63447 12.22	61155 12.26	59671 12.26*	59153 12.26*	191	240	344
5700	70920 12.23	67603 12.29	64671 12.36	62353 12.39	60888 12.39*	60345 12.39*	196	246	351
5800	72256 12.36	68881 12.42	65901 12.49	63556 12.52	62110 12.52*	61550 12.52*	201	252	360
5900	73596 12.49	70164 12.55	67135 13.02	64766 13.05	63336 13.05*	62763 13.05*	206	258	369
6000	74942 13.02	71453 13.08	68375 13.15	65980 13.18	64575 13.18*	63982 13.18*	211	268	378
6100	76293 13.14	72747 13.21	69621 13.28	67201 13.31	65814 13.31*	65207 13.31*	216	274	388
6200	77648 13.27	74046 13.34	70871 13.41	68487 13.45	67059 13.44*	66440 13.44*	221	281	396
6300	79008 13.40	75351 13.47	72131 13.54	69726 13.58	68311 13.57*	67681 13.58*	227	288	405
6400	80373 13.53	76661 14.00	73396 14.07	70972 14.11	69569 14.10*	68930 14.11*	232	295	413
6500	81743 14.06	77975 14.13	74667 14.20	72226 14.24	70833 14.23*	70186 14.24*	237	303	422
6600	83118 14.18	79295 14.26	75945 14.33	73486 14.37	72104 14.36*	71450 14.37*	242	315	430
6700	84498 14.31	80620 14.39	77228 14.46	74755 14.50	73380 14.49*	72721 14.50*	248	321	440
6800	85884 14.44	81951 14.51	78517 14.59	76031 15.03	74664 15.02*	74032 15.03*	253	330	449
6900	87275 14.57	83288 15.04	79811 15.12	77314 15.16	75954 15.15*	75330 15.16*	258	340	457
7000	88673 15.10	84629 15.17	81190 15.25	78604 15.29	77251 15.28*	76638 15.29*	263	349	467
7100	90075 15.23	85977 15.30	82503 15.38	79901 15.42	78554 15.41*	77955 15.42*	269	359	476
7200	91482 15.35	87330 15.43	83822 15.51	81255 15.55*	79864 15.55*	79281 15.56*	274	369	484
7300	92895 15.48	88690 15.56	85151 16.04	82601 16.08*	81181 16.08*	80622 16.09*	284	374	493
7400	94313 16.01	90056 16.09	86491 16.17	83954 16.21*	82506 16.21*	81966 16.22*	290	383	503
7500	95737 16.14	91516 16.22	87838 16.30	85312 16.34*	83840 16.34*	83315 16.34*	296	393	512
7600	97166 16.27	92899 16.35	89193 16.43	86677 16.47*	85185 16.47*	84671 16.47*	307	402	521
7700	98602 16.40	94288 16.48	90555 16.56	88049 17.00*	86537 17.00*	86033 17.00*	313	410	530
7800	100044 16.52	95684 17.01	91923 17.09	89427 17.13*	87899 17.13*	87401 17.13*	315	417	540
7900	101589 17.05	97086 17.14	93299 17.23	90814 17.26*	89295 17.26*	88777 17.26*	322	425	549
PACK FLOW LO ΔFUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %		TOTAL ANTI ICE ON ΔFUEL = + 3 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-005-115

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 ECOM-GO-02-05-40-006-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
AIR DIST.		FLIGHT LEVEL					CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
							FL310 FL330	FL350 FL370	FL390 FL410
(NM)	310	330	350	370	390	410			
200	3555 0.38	3538 0.38	3532 0.38				11	13	
300	4763 0.51	4675 0.51	4602 0.51	4547 0.51	4514 0.51	4500 0.51	13	16	18
400	5974 1.03	5813 1.03	5674 1.04	5561 1.04	5481 1.04	5433 1.04	16	18	22
500	7187 1.16	6954 1.16	6749 1.16	6578 1.17	6452 1.17	6369 1.17	18	21	26
600	8403 1.28	8098 1.29	7826 1.29	7598 1.29	7426 1.30	7309 1.30	20	24	30
700	9622 1.41	9244 1.41	8907 1.42	8620 1.42	8403 1.42	8253 1.42	22	26	34
800	10843 1.53	10393 1.54	9990 1.55	9646 1.55	9384 1.55	9201 1.55	25	29	38
900	12067 2.06	11544 2.07	11075 2.07	10674 2.08	10368 2.08	10153 2.08	27	32	42
1000	13293 2.18	12698 2.19	12163 2.20	11704 2.21	11356 2.21	11108 2.21	29	35	46
1100	14522 2.31	13854 2.32	13254 2.33	12738 2.33	12347 2.33	12067 2.33	32	37	50
1200	15754 2.43	15013 2.44	14348 2.46	13775 2.46	13343 2.46	13030 2.46	34	40	54
1300	16989 2.56	16174 2.57	15444 2.58	14814 2.59	14341 2.59	13998 2.59	37	43	59
1400	18227 3.08	17339 3.10	16543 3.11	15857 3.12	15343 3.12	14969 3.12	39	46	63
1500	19468 3.21	18507 3.22	17646 3.24	16902 3.25	16349 3.25	15944 3.25	42	49	67
1600	20711 3.33	19677 3.35	18751 3.36	17951 3.37	17359 3.37	16923 3.37	44	52	72
1700	21958 3.46	20850 3.47	19859 3.49	19002 3.50	18372 3.50	17908 3.50	47	56	77
1800	23207 3.58	22026 4.00	20970 4.02	20057 4.03	19389 4.03	18896 4.03	49	59	81
1900	24459 4.11	23204 4.13	22084 4.15	21114 4.16	20410 4.16	19889 4.16	52	62	87
2000	25713 4.23	24385 4.25	23201 4.27	22175 4.28	21435 4.28	20887 4.29	54	65	92
2100	26970 4.36	25569 4.38	24320 4.40	23239 4.41	22464 4.41	21905 4.41	57	69	97
2200	28229 4.48	26757 4.50	25442 4.53	24306 4.54	23496 4.54	22914 4.54	59	72	102
2300	29490 5.01	27948 5.03	26569 5.05	25376 5.07	24533 5.07	23928 5.07	62	76	108
2400	30755 5.13	29141 5.16	27698 5.18	26450 5.20	25573 5.20	24947 5.20	65	80	113
2500	32022 5.26	30338 5.28	28831 5.31	27531 5.32	26617 5.32	25971 5.32	67	83	119
2600	33292 5.38	31537 5.41	29966 5.44	28615 5.45	27694 5.45	27003 5.45	70	87	124
2700	34565 5.51	32740 5.54	31105 5.56	29702 5.58	28751 5.58	28041 5.58	73	91	130
PACK FLOW LO △ FUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON △FUEL = + 1 %			ENGINE ANTI-ICE ON △ FUEL = + 1.5 %		TOTAL ANTI-ICE ON △ FUEL = + 3 %		

FLIP23 A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .000000 240 0300350140 0 220200 90164 18590 FCOM-G0-02-05-40-006-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
AIR DIST. (NM)		FLIGHT LEVEL					TIME (H.MIN)		
							CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	35841 6.03	33945 6.06	32247 6.09	30794 6.11	29812 6.11	29084 6.11	75	97	134
2900	37121 6.16	35153 6.19	33392 6.22	31889 6.23	30878 6.24	30132 6.24	78	101	140
3000	38403 6.28	36365 6.31	34540 6.35	32988 6.36	31948 6.36	31187 6.36	81	105	145
3100	39688 6.41	37580 6.44	35691 6.47	34129 6.49	33023 6.49	32248 6.49	84	110	151
3200	40977 6.53	38798 6.57	36846 7.00	35239 7.02	34103 7.02	33314 7.02	87	114	157
3300	42268 7.06	40019 7.09	38004 7.13	36358 7.15	35187 7.15	34386 7.15	90	119	164
3400	43562 7.18	41243 7.22	39166 7.25	37481 7.27	36277 7.27	35465 7.28	93	123	172
3500	44860 7.31	42471 7.34	40378 7.38	38608 7.40	37371 7.40	36549 7.40	96	128	180
3600	46162 7.43	43701 7.47	41551 7.51	39739 7.53	38470 7.53	37638 7.53	102	132	187
3700	47467 7.56	44935 8.00	42728 8.04	40876 8.06	39575 8.06	38732 8.06	106	135	195
3800	48775 8.08	46229 8.12	43908 8.16	42017 8.19	40684 8.19	39832 8.19	109	139	203
3900	50087 8.21	47475 8.25	45092 8.29	43163 8.31	41799 8.31	40981 8.32*	116	144	210
4000	51465 8.33	48724 8.37	46281 8.42	44313 8.44	42919 8.44	42124 8.44*	117	149	218
4100	52788 8.46	49977 8.50	47473 8.54	45469 8.57	44044 8.57	43273 8.57*	121	153	226
4200	54116 8.58	51234 9.03	48669 9.07	46630 9.10	45175 9.10	44427 9.10*	121	158	234
4300	55448 9.11	52495 9.15	49869 9.20	47796 9.23	46315 9.23	45586 9.23*	125	163	242
4400	56784 9.23	53759 9.28	51074 9.33	48967 9.35	47461 9.35	46750 9.35*	129	168	248
4500	58124 9.36	55030 9.41	52282 9.45	50144 9.48	48612 9.48	47920 9.48*	132	173	255
4600	59468 9.48	56305 9.53	53494 9.58	51325 10.01	49771 10.01	49095 10.01*	136	178	262
4700	60815 10.01	57584 10.06	54713 10.11	52512 10.14	50936 10.14	50276 10.14*	140	184	269
4800	62166 10.13	58867 10.18	55937 10.24	53704 10.26	52106 10.27	51463 10.27*	144	190	279
4900	63521 10.26	60153 10.31	57166 10.36	54902 10.39	53283 10.39	52655 10.39*	147	196	288
5000	64881 10.38	61444 10.44	58399 10.49	56105 10.52	54467 10.52	53853 10.52*	151	202	297
5100	66245 10.51	62739 10.56	59637 11.02	57314 11.05	55695 11.05	55058 11.05*	155	208	307
5200	67613 11.03	64039 11.09	60880 11.15	58529 11.18	56903 11.18	56269 11.18*	159	214	316
5300	68986 11.16	65344 11.22	62126 11.27	59750 11.30	58139 11.30*	57487 11.31*	163	220	325
PACK FLOW LO △ FUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON △FUEL = + 1 %			ENGINE ANTI-ICE ON △ FUEL = + 1.5 %		TOTAL ANTI-ICE ON △ FUEL = + 3 %		

FLIP23 A330-301 CF6-80E1A2 3420 03701.000011 0250300.8000.000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-007-010

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 7
	QUICK DETERMINATION OF F-PLN		SEQ 115	REV 09

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
							TIME (H.MIN)		
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3523 0.38	3507 0.38	3502 0.38				11	12	
300	4717 0.51	4631 0.51	4560 0.51	4507 0.51	4475 0.51	4461 0.51	13	15	18
400	5915 1.03	5757 1.04	5621 1.04	5511 1.04	5432 1.04	5384 1.04	15	18	22
500	7114 1.16	6885 1.16	6684 1.17	6517 1.17	6392 1.17	6311 1.17	18	21	25
600	8316 1.28	8016 1.29	7750 1.29	7527 1.30	7355 1.30	7241 1.30	20	23	29
700	9521 1.41	9150 1.41	8819 1.42	8539 1.42	8323 1.42	8176 1.42	22	26	33
800	10729 1.53	10285 1.54	9891 1.55	9554 1.55	9293 1.55	9114 1.55	24	29	37
900	11938 2.06	11424 2.07	10964 2.07	10571 2.08	10267 2.08	10055 2.08	27	32	41
1000	13150 2.18	12564 2.19	12041 2.20	11591 2.21	11243 2.21	11001 2.21	29	34	45
1100	14365 2.31	13708 2.32	13120 2.33	12614 2.33	12224 2.34	11949 2.34	31	37	50
1200	15583 2.43	14854 2.44	14202 2.46	13640 2.46	13207 2.46	12902 2.46	34	40	54
1300	16804 2.56	16003 2.57	15287 2.58	14669 2.59	14194 2.59	13859 2.59	36	43	58
1400	18027 3.08	17154 3.10	16374 3.11	15701 3.12	15185 3.12	14820 3.12	39	46	62
1500	19252 3.21	18309 3.22	17465 3.24	16736 3.25	16180 3.25	15784 3.25	41	49	67
1600	20480 3.33	19466 3.35	18558 3.36	17773 3.37	17178 3.37	16754 3.37	44	52	71
1700	21712 3.46	20626 3.47	19654 3.49	18814 3.50	18180 3.50	17728 3.50	46	55	76
1800	22947 3.58	21789 4.00	20753 4.02	19858 4.03	19186 4.03	18706 4.03	49	58	81
1900	24184 4.11	22955 4.13	21856 4.15	20905 4.16	20195 4.16	19689 4.16	51	62	85
2000	25424 4.23	24124 4.25	22961 4.27	21955 4.29	21209 4.29	20676 4.29	54	65	91
2100	26667 4.36	25296 4.38	24070 4.40	23009 4.41	22228 4.41	21684 4.41	57	68	96
2200	27912 4.48	26470 4.51	25181 4.53	24066 4.54	23249 4.54	22684 4.54	59	72	102
2300	29161 5.01	27647 5.03	26295 5.06	25126 5.07	24275 5.07	23689 5.07	62	76	107
2400	30412 5.13	28827 5.16	27412 5.18	26188 5.20	25304 5.20	24698 5.20	65	79	114
2500	31665 5.26	30011 5.28	28532 5.31	27254 5.32	26337 5.32	25712 5.33	67	83	118
2600	32921 5.38	31197 5.41	29655 5.44	28324 5.45	27374 5.45	26730 5.45	70	86	124
2700	34181 5.51	32387 5.54	30782 5.56	29396 5.58	28447 5.58	27756 5.58	73	90	129
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 = + 1.5 %		ΔFUEL = + 3 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-007-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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
2800	35443 6.03	33579 6.06	31913 6.09	30475 6.11	29496 6.11	28786 6.11		76	93	135
2900	36708 6.16	34775 6.19	33046 6.22	31558 6.24	30551 6.24	29821 6.24		78	99	139
3000	37975 6.28	35974 6.31	34182 6.35	32645 6.36	31610 6.36	30863 6.36		81	103	145
3100	39246 6.41	37176 6.44	35322 6.47	33736 6.49	32673 6.49	31911 6.49		84	107	151
3200	40519 6.53	38380 6.57	36465 7.00	34873 7.02	33741 7.02	32964 7.02		87	112	157
3300	41796 7.06	39587 7.09	37611 7.13	35976 7.15	34815 7.15	34024 7.15		90	116	163
3400	43075 7.18	40798 7.22	38760 7.25	37083 7.27	35893 7.28	35090 7.28		93	121	169
3500	44359 7.31	42012 7.34	39912 7.38	38195 7.40	36975 7.40	36162 7.40		96	126	177
3600	45646 7.43	43229 7.47	41119 7.51	39310 7.53	38063 7.53	37240 7.53		100	131	185
3700	46936 7.56	44450 8.00	42283 8.04	40429 8.06	39155 8.06	38323 8.06		105	135	192
3800	48230 8.08	45674 8.12	43451 8.16	41554 8.19	40252 8.19	39413 8.19		109	137	200
3900	49527 8.21	46964 8.25	44624 8.29	42683 8.31	41355 8.31	40508 8.32		116	142	207
4000	50827 8.33	48200 8.38	45799 8.42	43818 8.44	42463 8.44	41639 8.44*		117	146	215
4100	52197 8.46	49441 8.50	46978 8.55	44961 8.57	43576 8.57	42774 8.57*		120	151	223
4200	53509 8.58	50685 9.03	48162 9.07	46108 9.10	44697 9.10	43914 9.10*		124	156	230
4300	54824 9.11	51932 9.15	49350 9.20	47260 9.23	45823 9.23	45059 9.23*		125	161	238
4400	56143 9.23	53183 9.28	50541 9.33	48418 9.35	46955 9.35	46209 9.35*		128	166	246
4500	57468 9.36	54438 9.41	51736 9.45	49581 9.48	48094 9.48	47364 9.48*		132	171	254
4600	58796 9.48	55696 9.53	52935 9.58	50749 10.01	49239 10.01	48526 10.01*		135	176	260
4700	60128 10.01	56960 10.06	54138 10.11	51921 10.14	50389 10.14	49693 10.14*		139	182	267
4800	61464 10.13	58228 10.18	55345 10.24	53099 10.27	51545 10.27	50866 10.26*		143	187	276
4900	62804 10.26	59501 10.31	56557 10.36	54282 10.39	52706 10.39	52044 10.39*		146	192	283
5000	64148 10.38	60777 10.44	57777 10.49	55471 10.52	53873 10.52	53228 10.52*		150	198	292
5100	65495 10.51	62058 10.56	59002 11.02	56665 11.05	55080 11.05	54418 11.05*		154	203	301
5200	66846 11.04	63343 11.09	60232 11.15	57865 11.18	56264 11.18	55615 11.18*		158	209	310
5300	68202 11.16	64632 11.22	61467 11.27	59070 11.30	57455 11.31	56818 11.30*		162	215	319
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 = + 1.5 %		ΔFUEL = + 3 %			

F1P23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-008-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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	70367 11.29	66660 11.34	63415 11.40	60983 11.43	59393 11.43*	58721 11.43*		167	226	334
5500	71748 11.41	67973 11.47	64679 11.53	62215 11.56	60649 11.56*	59950 11.56*		171	233	341
5600	73133 11.54	69290 11.59	65948 12.05	63454 12.09	61910 12.08*	61187 12.09*		175	242	350
5700	74523 12.06	70612 12.12	67222 12.18	64698 12.22	63184 12.21*	62431 12.22*		179	249	358
5800	75918 12.19	71939 12.25	68503 12.31	65947 12.34	64459 12.34*	63681 12.34*		184	257	367
5900	77316 12.31	73270 12.37	69789 12.44	67203 12.47	65739 12.47*	64937 12.47*		188	263	375
6000	78719 12.44	74607 12.50	71080 12.56	68517 13.00	67026 12.59*	66200 13.00*		193	271	382
6100	80126 12.56	75948 13.03	72385 13.09	69791 13.13	68319 13.12*	67470 13.13*		197	278	389
6200	81537 13.09	77294 13.15	73695 13.22	71071 13.26	69619 13.25*	68749 13.26*		202	285	397
6300	82954 13.21	78644 13.28	75012 13.35	72360 13.38	70924 13.38*	70034 13.38*		207	292	405
6400	84375 13.34	79999 13.40	76336 13.47	73657 13.51	72237 13.50*	71348 13.51*		211	303	412
6500	85804 13.46	81359 13.53	77665 14.00	74962 14.04	73556 14.03*	72649 14.04*		216	313	422
6600	87237 13.59	82724 14.06	79001 14.13	76275 14.17	74884 14.16*	73958 14.17*		221	323	432
6700	88676 14.11	84093 14.18	80408 14.26	77594 14.30	76219 14.29*	75278 14.30*		226	334	442
6800	90120 14.24	85472 14.31	81763 14.38	78921 14.42	77560 14.41*	76605 14.42*		231	344	450
6900	91569 14.36	86856 14.44	83124 14.51	80324 14.55*	78909 14.54*	77940 14.55*		236	354	460
7000	93022 14.49	88247 14.56	84491 15.04	81712 15.07*	80264 15.07*	79302 15.08*		246	364	470
7100	94481 15.01	89644 15.09	85867 15.16	83107 15.20*	81628 15.20*	80685 15.20*		253	370	480
7200	95945 15.14	91045 15.21	87250 15.29	84508 15.33*	82999 15.32*	82075 15.33*		260	380	490
7300	97414 15.26	92452 15.34	88642 15.42	85915 15.45*	84377 15.45*	83471 15.46*		267	390	500
7400	98889 15.39	93933 15.47	90041 15.55	87329 15.58*	85763 15.58*	84874 15.58*		274	396	510
7500	100370 15.51	95357 15.59	91448 16.07	88752 16.11*	87154 16.10*	86283 16.11*		281	404	520
7600	101858 16.04	96787 16.12	92861 16.20	90181 16.23*	88577 16.23*	87700 16.23*		292	415	528
7700	103351 16.16	98223 16.25	94282 16.33	91617 16.36*	89989 16.36*	89124 16.36*		296	425	536
7800	104925 16.29	99689 16.37	95714 16.46	93062 16.49*	91409 16.49*	90555 16.49*		303	436	546
7900	106434 16.42	101165 16.50	97153 16.58	94514 17.01*	92836 17.01*	91993 17.01*		311	446	557
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 = + 1.5 %		ΔFUEL = + 3 %			

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-009-010

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 ECOM-GO-02-05-40-010-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.82 - DESCENT : M.82/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
							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	69561 11.29	65925 11.34	62707 11.40	60281 11.43	58662 11.43	58026 11.43*	166	221	328
5500	70926 11.41	67221 11.47	63951 11.53	61500 11.56	59906 11.56*	59240 11.56*	170	228	337
5600	72295 11.54	68523 11.59	65199 12.05	62723 12.09	61151 12.09*	60461 12.09*	174	234	344
5700	73668 12.06	69829 12.12	66452 12.18	63953 12.22	62403 12.21*	61689 12.22*	178	243	352
5800	75046 12.19	71141 12.25	67711 12.31	65188 12.34	63664 12.34*	62924 12.34*	183	250	361
5900	76429 12.31	72457 12.37	68974 12.44	66428 12.47	64928 12.47*	64165 12.47*	187	257	370
6000	77815 12.44	73777 12.50	70243 12.56	67725 13.00	66198 13.00*	65412 13.00*	191	264	378
6100	79205 12.56	75103 13.03	71524 13.09	68984 13.13	67473 13.12*	66665 13.13*	196	272	386
6200	80600 13.09	76434 13.15	72816 13.22	70248 13.26	68756 13.25*	67927 13.26*	200	279	394
6300	82000 13.21	77768 13.28	74115 13.35	71520 13.38	70044 13.38*	69196 13.38*	205	286	401
6400	83404 13.34	79108 13.40	75420 13.47	72798 13.51	71340 13.50*	70472 13.51*	210	297	409
6500	84814 13.46	80451 13.53	76732 14.00	74083 14.04	72642 14.03*	71755 14.04*	215	304	417
6600	86230 13.59	81801 14.06	78050 14.13	75378 14.17	73951 14.16*	73069 14.17*	219	314	426
6700	87652 14.11	83155 14.18	79374 14.26	76679 14.30	75268 14.29*	74370 14.30*	224	324	436
6800	89078 14.24	84514 14.31	80703 14.38	77987 14.42	76592 14.41*	75680 14.42*	229	335	445
6900	90510 14.36	85881 14.44	82114 14.51	79301 14.55	77923 14.54*	76998 14.55*	234	345	455
7000	91946 14.49	87254 14.56	83463 15.04	80663 15.08*	79260 15.07*	78324 15.08*	239	355	463
7100	93387 15.01	88633 15.09	84819 15.16	82039 15.20*	80604 15.20*	79657 15.21*	249	365	473
7200	94833 15.14	90017 15.21	86184 15.29	83421 15.33*	81957 15.32*	81027 15.33*	255	371	483
7300	96284 15.26	91406 15.34	87556 15.42	84809 15.46*	83317 15.45*	82405 15.46*	261	381	493
7400	97741 15.39	92800 15.47	88938 15.55	86203 15.58*	84684 15.58*	83788 15.58*	268	391	502
7500	99204 15.51	94271 15.59	90326 16.07	87605 16.11*	86057 16.11*	85178 16.11*	274	399	512
7600	100673 16.04	95682 16.12	91721 16.20	89013 16.24*	87437 16.23*	86574 16.24*	281	407	522
7700	102148 16.16	97098 16.25	93123 16.33	90430 16.36*	88848 16.36*	87978 16.36*	292	414	531
7800	103629 16.29	98526 16.37	94533 16.46	91854 16.49*	90248 16.49*	89388 16.49*	295	426	540
7900	105194 16.41	99971 16.50	95953 16.58	93285 17.01*	91656 17.02*	90807 17.02*	302	436	549
PACK FLOW LO ΔFUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %		TOTAL ANTI ICE ON ΔFUEL = + 3 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-009-115

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 ECOM-GO-02-05-40-010-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
							TIME (H.MIN)		
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3594 0.38	3565 0.38	3551 0.38				10	12	
300	4897 0.50	4785 0.51	4694 0.51	4626 0.51	4578 0.51	4551 0.51	12	15	17
400	6202 1.03	6007 1.03	5839 1.03	5707 1.03	5606 1.03	5539 1.03	14	17	21
500	7510 1.15	7231 1.15	6987 1.16	6791 1.16	6636 1.16	6531 1.16	16	20	25
600	8821 1.27	8458 1.27	8139 1.28	7879 1.28	7670 1.28	7528 1.28	18	23	29
700	10134 1.39	9688 1.40	9293 1.40	8969 1.41	8707 1.41	8530 1.41	20	25	33
800	11450 1.51	10920 1.52	10450 1.53	10062 1.53	9748 1.53	9537 1.53	22	28	38
900	12768 2.04	12154 2.04	11610 2.05	11158 2.06	10792 2.06	10548 2.06	24	31	42
1000	14089 2.16	13391 2.17	12772 2.18	12257 2.18	11839 2.18	11564 2.18	27	34	46
1100	15413 2.28	14630 2.29	13938 2.30	13360 2.31	12890 2.31	12585 2.31	29	36	51
1200	16739 2.40	15872 2.41	15107 2.42	14465 2.43	13945 2.43	13611 2.43	31	39	55
1300	18067 2.52	17117 2.54	16278 2.55	15573 2.56	15002 2.56	14642 2.56	33	42	60
1400	19399 3.05	18365 3.06	17453 3.07	16685 3.08	16064 3.08	15677 3.08	35	46	65
1500	20733 3.17	19615 3.18	18631 3.20	17800 3.21	17130 3.21	16717 3.21	38	49	70
1600	22069 3.29	20867 3.31	19812 3.32	18918 3.33	18200 3.33	17763 3.33	40	52	76
1700	23409 3.41	22123 3.43	20996 3.45	20040 3.46	19275 3.46	18814 3.46	42	55	83
1800	24750 3.53	23381 3.55	22183 3.57	21164 3.58	20354 3.58	19870 3.58	44	58	91
1900	26095 4.06	24642 4.08	23374 4.09	22292 4.11	21436 4.11	20931 4.11	47	61	99
2000	27443 4.18	25905 4.20	24567 4.22	23424 4.23	22523 4.23	22017 4.23	49	64	107
2100	28793 4.30	27173 4.32	25764 4.34	24558 4.36	23614 4.36	23093 4.36	52	68	115
2200	30146 4.42	28443 4.44	26964 4.47	25696 4.48	24708 4.48	24196 4.48*	54	71	124
2300	31503 4.54	29716 4.57	28168 4.59	26838 5.00	25807 5.01	25336 5.01*	57	74	132
2400	32861 5.07	30992 5.09	29375 5.12	27984 5.13	26913 5.13	26481 5.13*	60	78	141
2500	34223 5.19	32271 5.21	30586 5.24	29133 5.25	28057 5.26	27630 5.26*	62	81	149
2600	35587 5.31	33552 5.34	31799 5.36	30286 5.38	29182 5.38	28783 5.38*	65	85	158
2700	36955 5.43	34837 5.46	33017 5.49	31442 5.50	30311 5.51	29941 5.51*	68	88	166
PACK FLOW LO △ FUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON △FUEL = + 1 %			ENGINE ANTI-ICE ON △ FUEL = + 1.5 %		TOTAL ANTI-ICE ON △ FUEL = + 3 %		

FLIP23 A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-009-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI-ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
AIR DIST.	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	(NM)	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	38325 5.56	36126 5.58	34237 6.01	32602 6.03	31447 6.03	31103 6.03*	71	94	170
2900	39698 6.08	37420 6.11	35461 6.14	33765 6.15	32589 6.16	32270 6.16*	74	98	176
3000	41074 6.20	38717 6.23	36689 6.26	34966 6.28	33735 6.28	33441 6.28*	77	102	182
3100	42453 6.32	40017 6.35	37920 6.39	36142 6.40	34888 6.40	34618 6.41*	80	106	190
3200	43835 6.44	41321 6.48	39155 6.51	37324 6.53	36048 6.53	35801 6.53*	83	111	200
3300	45220 6.57	42628 7.00	40437 7.03	38509 7.05	37215 7.05	36989 7.06*	86	115	209
3400	46609 7.09	43938 7.12	41684 7.16	39698 7.18	38388 7.18	38182 7.18*	89	120	218
3500	48001 7.21	45251 7.25	42934 7.28	40892 7.30	39568 7.30	39380 7.31*	95	122	227
3600	49396 7.33	46571 7.37	44189 7.41	42090 7.43	40811 7.43*	40584 7.43*	99	127	236
3700	50795 7.45	47951 7.49	45448 7.53	43293 7.55	42062 7.55*	41793 7.56*	102	132	245
3800	52196 7.58	49284 8.02	46712 8.06	44500 8.08	43319 8.08*	43008 8.08*	109	137	254
3900	53601 8.10	50621 8.14	47979 8.18	45718 8.20	44580 8.20*	44231 8.21*	110	142	263
4000	55068 8.22	51962 8.26	49251 8.30	46943 8.33	45846 8.33*	45462 8.33*	114	148	272
4100	56486 8.34	53307 8.39	50528 8.43	48173 8.45	47117 8.45*	46698 8.46*	115	153	278
4200	57907 8.47	54657 8.51	51808 8.55	49410 8.58	48393 8.58*	47941 8.58*	118	159	284
4300	59332 8.59	56011 9.03	53092 9.08	50651 9.10	49674 9.10*	49190 9.11*	122	165	291
4400	60760 9.11	57370 9.16	54383 9.20	51898 9.23	50961 9.22*	50446 9.23*	126	171	297
4500	62192 9.23	58733 9.28	55679 9.33	53149 9.35	52253 9.35*	51708 9.36*	129	179	305
4600	63630 9.35	60100 9.40	56980 9.45	54408 9.48	53550 9.47*	52977 9.48*	134	189	313
4700	65073 9.48	61471 9.53	58285 9.57	55681 10.00	54852 10.00*	54254 10.01*	138	199	323
4800	66519 10.00	62846 10.05	59595 10.10	56961 10.13	56164 10.12*	55538 10.13*	142	209	333
4900	67970 10.12	64228 10.17	60910 10.22	58248 10.25	57483 10.25*	56828 10.26*	146	218	343
5000	69425 10.24	65615 10.29	62230 10.35	59612 10.38*	58809 10.37*	58126 10.38*	151	228	353
5100	70884 10.37	67006 10.42	63554 10.47	60989 10.50*	60141 10.49*	59487 10.50*	155	238	363
5200	72347 10.49	68402 10.54	64885 11.00	62372 11.02*	61479 11.02*	60864 11.03*	160	249	373
5300	73823 11.01	69803 11.06	66220 11.12	63760 11.15*	62824 11.14*	62246 11.15*	165	259	383
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 = + 1.5 %		△ FUEL = + 3 %		

FILP23 A330-301 CF6-80E1A2 03420 03701 000011 0250300 .8000 .000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-010-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)				
							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	3560 0.38	3533 0.38	3520 0.38					10	12	
300	4849 0.50	4740 0.51	4651 0.51	4584 0.51	4539 0.51	4512 0.51		12	14	17
400	6140 1.03	5949 1.03	5785 1.03	5654 1.03	5555 1.03	5490 1.04		14	17	21
500	7434 1.15	7160 1.15	6921 1.16	6726 1.16	6575 1.16	6472 1.16		16	19	25
600	8730 1.27	8374 1.28	8060 1.28	7801 1.28	7598 1.28	7459 1.29		18	22	29
700	10029 1.39	9590 1.40	9201 1.40	8880 1.41	8624 1.41	8451 1.41		20	25	33
800	11330 1.51	10809 1.52	10345 1.53	9961 1.53	9654 1.53	9447 1.54		22	27	37
900	12633 2.04	12030 2.04	11492 2.05	11045 2.06	10687 2.06	10448 2.06		24	30	42
1000	13939 2.16	13253 2.17	12641 2.18	12132 2.18	11722 2.18	11453 2.18		26	33	46
1100	15248 2.28	14479 2.29	13792 2.30	13222 2.31	12761 2.31	12463 2.31		28	36	51
1200	16559 2.40	15708 2.41	14947 2.43	14315 2.43	13804 2.43	13478 2.43		31	39	55
1300	17873 2.52	16939 2.54	16105 2.55	15411 2.56	14850 2.56	14498 2.56		33	41	60
1400	19190 3.05	18173 3.06	17266 3.07	16511 3.08	15899 3.08	15523 3.08		35	45	65
1500	20509 3.17	19410 3.18	18431 3.20	17614 3.21	16955 3.21	16553 3.21		37	48	70
1600	21831 3.29	20649 3.31	19598 3.32	18719 3.33	18015 3.33	17589 3.33		40	51	75
1700	23156 3.41	21891 3.43	20769 3.45	19828 3.46	19078 3.46	18630 3.46		42	54	80
1800	24484 3.54	23137 3.55	21943 3.57	20941 3.58	20145 3.58	19676 3.58		44	57	89
1900	25814 4.06	24385 4.08	23121 4.10	22057 4.11	21217 4.11	20744 4.11		47	61	97
2000	27147 4.18	25635 4.20	24301 4.22	23177 4.23	22294 4.23	21806 4.23		49	64	105
2100	28483 4.30	26888 4.32	25484 4.34	24300 4.36	23374 4.36	22874 4.36		52	67	114
2200	29821 4.42	28144 4.45	26671 4.47	25426 4.48	24459 4.48	23947 4.48		54	71	121
2300	31163 4.55	29403 4.57	27861 4.59	26555 5.01	25547 5.01	25072 5.01*		57	74	130
2400	32507 5.07	30666 5.09	29054 5.12	27688 5.13	26639 5.13	26204 5.13*		59	78	139
2500	33853 5.19	31932 5.22	30251 5.24	28824 5.26	27762 5.26	27340 5.25*		62	81	147
2600	35203 5.31	33201 5.34	31451 5.37	29964 5.38	28867 5.38	28481 5.38*		64	84	155
2700	36556 5.43	34472 5.46	32655 5.49	31108 5.51	29980 5.51	29626 5.50*		67	88	163
PACK FLOW LO ΔFUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %		TOTAL ANTI ICE ON ΔFUEL = + 3 %			

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-011-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
							TIME (H.MIN)		
AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
2800	37911 5.56	35747 5.58	33862 6.01	32256 6.03	31105 6.03	30776 6.03*	70	91	170
2900	39269 6.08	37025 6.11	35073 6.14	33407 6.15	32235 6.16	31929 6.15*	73	97	174
3000	40629 6.20	38305 6.23	36287 6.26	34596 6.28	33371 6.28	33087 6.28*	76	101	180
3100	41993 6.32	39589 6.35	37504 6.39	35760 6.40	34513 6.41	34249 6.40*	78	105	186
3200	43360 6.44	40875 6.48	38725 6.51	36926 6.53	35662 6.53	35416 6.53*	81	112	196
3300	44731 6.57	42165 7.00	39948 7.03	38097 7.05	36816 7.06	36592 7.05*	84	115	205
3400	46105 7.09	43457 7.12	41222 7.16	39272 7.18	37976 7.18	37772 7.18*	87	119	214
3500	47482 7.21	44757 7.25	42458 7.28	40450 7.30	39143 7.31	38959 7.30*	90	124	224
3600	48862 7.33	46060 7.37	43699 7.41	41634 7.43	40315 7.43	40150 7.43*	96	126	233
3700	50245 7.46	47366 7.49	44944 7.53	42821 7.55	41568 7.55*	41348 7.55*	100	131	242
3800	51631 7.58	48733 8.02	46193 8.06	44019 8.08	42810 8.08*	42552 8.08*	104	135	251
3900	53020 8.10	50052 8.14	47447 8.18	45224 8.20	44056 8.20*	43761 8.20*	110	140	260
4000	54469 8.22	51374 8.26	48704 8.30	46434 8.33	45306 8.33*	44976 8.33*	112	145	269
4100	55870 8.34	52700 8.39	49966 8.43	47650 8.45	46562 8.45*	46198 8.45*	116	151	278
4200	57276 8.47	54030 8.51	51232 8.55	48871 8.58	47823 8.57*	47425 8.58*	116	157	283
4300	58686 8.59	55365 9.03	52502 9.08	50097 9.10	49091 9.10*	48658 9.10*	120	163	289
4400	60100 9.11	56703 9.16	53776 9.20	51328 9.23	50363 9.22*	49899 9.23*	123	169	295
4500	61517 9.23	58050 9.28	55055 9.33	52564 9.35	51641 9.35*	51147 9.35*	127	176	302
4600	62939 9.36	59402 9.40	56338 9.45	53805 9.48	52924 9.47*	52401 9.48*	131	182	308
4700	64364 9.48	60757 9.53	57627 9.58	55052 10.00	54213 10.00*	53662 10.00*	135	195	318
4800	65793 10.00	62118 10.05	58922 10.10	56305 10.13	55507 10.12*	54931 10.13*	139	204	328
4900	67225 10.12	63483 10.17	60222 10.22	57568 10.25	56808 10.24*	56206 10.25*	143	214	338
5000	68661 10.24	64852 10.30	61527 10.35	58852 10.38	58114 10.37*	57489 10.38*	147	224	348
5100	70102 10.37	66225 10.42	62837 10.47	60142 10.50	59425 10.49*	58777 10.50*	152	234	358
5200	71550 10.49	67602 10.54	64152 11.00	61586 11.02*	60744 11.02*	60073 11.03*	156	244	367
5300	73001 11.01	68985 11.07	65471 11.12	62957 11.15*	62074 11.14*	61506 11.15*	160	254	377
PACK FLOW LO ΔFUEL = - 0.5 %		PACK FLOW HI OR/ AND CARGO COOL ON ΔFUEL = + 1 %			ENGINE ANTI ICE ON ΔFUEL = + 1.5 %		TOTAL ANTI ICE ON ΔFUEL = + 3 %		

FUP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .0000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-012-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)				
							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	75321 11.13	71215 11.19	67568 11.25	65181 11.27*	64221 11.26*	63743 11.27*		169	273	396
5500	76806 11.25	72626 11.31	68913 11.37	66581 11.39*	65581 11.39*	65137 11.39*		174	277	406
5600	78296 11.38	74042 11.43	70263 11.49	67986 11.51*	66948 11.51*	66536 11.52*		179	283	416
5700	79790 11.50	75463 11.56	71623 12.02	69398 12.04*	68323 12.04*	67942 12.04*		184	289	419
5800	81289 12.02	76890 12.08	72994 12.14	70818 12.16*	69705 12.16*	69353 12.16*		189	305	426
5900	82793 12.14	78321 12.20	74372 12.27	72244 12.28*	71095 12.29*	70773 12.29*		194	317	438
6000	84303 12.27	79757 12.33	75757 12.39	73677 12.41*	72491 12.41*	72200 12.41*		198	329	449
6100	85821 12.39	81198 12.45	77148 12.52	75117 12.53*	73895 12.54*	73632 12.53*		203	341	460
6200	87344 12.51	82645 12.57	78698 13.04*	76564 13.05*	75308 13.06*	75073 13.06*		208	353	471
6300	88874 13.03	84097 13.10	80207 13.16*	78018 13.18*	76759 13.18*	76520 13.18*		213	365	482
6400	90409 13.16	85556 13.22	81722 13.28*	79478 13.30*	78258 13.31*	77974 13.30*		218	377	493
6500	91948 13.28	87022 13.34	83244 13.40*	80946 13.42*	79765 13.43*	79435 13.43*		223	390	504
6600	93493 13.40	88495 13.47	84772 13.53*	82421 13.55*	81279 13.55*	80903 13.55*		231	402	515
6700	95044 13.52	89973 13.59	86306 14.05*	83905 14.07*	82799 14.07*	82379 14.07*		243	404	525
6800	96600 14.05	91456 14.12	87847 14.17*	85399 14.19*	84325 14.19*	83863 14.20*		255	411	536
6900	98161 14.17	92945 14.24	89396 14.29*	86900 14.32*	85858 14.32*	85358 14.32*		267	418	544
7000	99731 14.29	94499 14.36	90950 14.42*	88411 14.44*	87396 14.44*	86860 14.44*		279	430	552
7100	101308 14.41	96107 14.48*	92514 14.54*	89929 14.56*	88943 14.56*	88372 14.57*		294	442	565
7200	102891 14.53	97747 15.00*	94086 15.06*	91456 15.09*	90496 15.08*	89892 15.09*		303	453	577
7300	104479 15.06	99392 15.12*	95666 15.18*	92991 15.21*	92056 15.21*	91429 15.21*		315	465	589
7400	106139 15.18	101044 15.25*	97255 15.30*	94563 15.33*	93626 15.33*	92967 15.34*		328	476	601
7500	107744 15.30	102705 15.37*	98851 15.43*	96204 15.45*	95204 15.45*	94515 15.46*		396	488	613
7600	109356 15.42	104372 15.49*	100454 15.55*	97843 15.58*	96791 15.57*	96152 15.58*		400	499	625
7700	110974 15.55	106047 16.01*	102067 16.07*	99489 16.10*	98385 16.10*	97791 16.10*		407	511	637
7800	113782 16.06*	107729 16.13*	103689 16.19*	101142 16.22*	99986 16.22*	99437 16.22*		466	522	649
7900	115436 16.19*	109419 16.25*	105318 16.32*	102803 16.34*	101597 16.34*	101089 16.34*		474	532	661
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 = + 1.5 %		ΔFUEL = + 3 %			

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-013-010

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 ECOM-GO-02-05-40-014-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - CRUISE : M.84 - DESCENT : M.84/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF			ISA CG = 37.0 %		FUEL CONSUMED (KG)				
							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	74458 11.13	70373 11.19	66795 11.25	64333 11.27*	63410 11.27*	62876 11.27*	164	265	387
5500	75918 11.26	71767 11.31	68124 11.37	65714 11.39*	64752 11.39*	64252 11.39*	169	275	398
5600	77383 11.38	73165 11.43	69459 11.49	67101 11.52*	66102 11.51*	65633 11.52*	173	285	408
5700	78852 11.50	74569 11.56	70799 12.02	68495 12.04*	67458 12.04*	67019 12.04*	178	287	418
5800	80324 12.02	75978 12.08	72151 12.14	69896 12.16*	68823 12.16*	68412 12.16*	183	293	422
5900	81802 12.14	77392 12.20	73510 12.27	71303 12.29*	70194 12.29*	69813 12.29*	188	306	429
6000	83284 12.27	78811 12.33	74875 12.39	72717 12.41*	71573 12.41*	71220 12.41*	193	317	437
6100	84776 12.39	80234 12.45	76247 12.52	74137 12.53*	72958 12.54*	72633 12.53*	198	329	450
6200	86279 12.51	81664 12.57	77624 13.04	75565 13.06*	74352 13.06*	74054 13.06*	203	341	461
6300	87787 13.03	83098 13.10	79007 13.17	76999 13.18*	75755 13.19*	75482 13.18*	209	353	472
6400	89301 13.16	84537 13.22	80595 13.28*	78440 13.30*	77165 13.31*	76916 13.30*	214	365	483
6500	90819 13.28	85985 13.34	82096 13.41*	79887 13.43*	78617 13.43*	78357 13.43*	220	378	494
6600	92343 13.40	87438 13.47	83604 13.53*	81343 13.55*	80136 13.55*	79805 13.55*	225	390	505
6700	93872 13.52	88898 13.59	85117 14.05*	82807 14.07*	81635 14.08*	81260 14.07*	234	402	516
6800	95407 14.04	90364 14.11	86636 14.17*	84281 14.20*	83141 14.20*	82725 14.20*	240	407	527
6900	96947 14.17	91834 14.24	88163 14.30*	85762 14.32*	84652 14.32*	84199 14.32*	252	414	536
7000	98493 14.29	93310 14.36	89696 14.42*	87251 14.44*	86170 14.44*	85680 14.44*	263	421	547
7100	100049 14.41	94855 14.49	91238 14.54*	88749 14.57*	87694 14.57*	87170 14.57*	275	430	555
7200	101612 14.53	96348 15.01	92787 15.06*	90255 15.09*	89225 15.09*	88669 15.09*	290	441	563
7300	103180 15.06	97934 15.13*	94344 15.19*	91768 15.21*	90764 15.21*	90176 15.21*	303	452	575
7400	104755 15.18	99563 15.25*	95910 15.31*	93291 15.34*	92312 15.33*	91691 15.34*	312	463	587
7500	106404 15.30	101199 15.37*	97483 15.43*	94848 15.46*	93866 15.46*	93214 15.46*	324	475	599
7600	107995 15.42	102842 15.49*	99064 15.55*	96393 15.58*	95430 15.58*	94759 15.58*	336	486	611
7700	109593 15.55	104492 16.01*	100652 16.07*	98018 16.10*	97001 16.10*	96303 16.11*	353	497	622
7800	111197 16.07	106149 16.14*	102250 16.20*	99647 16.22*	98580 16.22*	97922 16.23*	353	509	634
7900	112809 16.19	107814 16.26*	103856 16.32*	101284 16.35*	100166 16.34*	99551 16.35*	360	520	646
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 = + 1.5 %		ΔFUEL = + 3 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-013-115

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 ECOM-GO-02-05-40-014-115

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 15
	QUICK DETERMINATION OF F-PLN		SEQ 010	REV 07

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - CRUISE : LONG RANGE - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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	3419 0.39	3428 0.39	3440 0.39	3455 0.38				13	14	
300	4469 0.54	4442 0.53	4423 0.53	4410 0.52	4403 0.52	4401 0.51		17	18	19
400	5524 1.09	5461 1.08	5410 1.07	5371 1.06	5336 1.05	5313 1.04		22	22	23
500	6583 1.24	6485 1.23	6402 1.21	6335 1.19	6274 1.18	6229 1.18		26	27	28
600	7647 1.39	7512 1.37	7397 1.35	7303 1.33	7216 1.31	7149 1.31		30	31	32
700	8715 1.53	8545 1.52	8397 1.49	8276 1.46	8162 1.45	8074 1.44		35	36	37
800	9787 2.08	9582 2.06	9401 2.03	9252 2.00	9112 1.58	9004 1.57		39	40	42
900	10864 2.23	10623 2.20	10409 2.17	10233 2.13	10066 2.11	9938 2.10		43	45	47
1000	11945 2.37	11669 2.35	11421 2.31	11217 2.27	11024 2.24	10877 2.23		48	49	51
1100	13031 2.52	12720 2.49	12437 2.45	12206 2.40	11986 2.38	11819 2.35		52	54	56
1200	14121 3.07	13775 3.03	13458 2.59	13200 2.54	12952 2.51	12768 2.48		56	58	61
1300	15216 3.21	14835 3.18	14484 3.13	14198 3.07	13923 3.04	13720 3.01		61	63	66
1400	16314 3.36	15900 3.32	15513 3.27	15200 3.20	14898 3.17	14677 3.14		65	68	71
1500	17415 3.50	16968 3.46	16548 3.40	16206 3.33	15878 3.30	15639 3.27		69	72	76
1600	18521 4.05	18040 4.00	17588 3.54	17215 3.47	16861 3.43	16606 3.40		74	77	82
1700	19630 4.19	19116 4.14	18633 4.07	18228 4.00	17850 3.56	17576 3.53		78	81	87
1800	20744 4.34	20197 4.28	19683 4.21	19245 4.13	18842 4.09	18549 4.06		83	86	92
1900	21863 4.48	21282 4.42	20738 4.34	20266 4.27	19839 4.22	19527 4.19		87	91	98
2000	22985 5.03	22372 4.56	21798 4.47	21291 4.40	20840 4.35	20509 4.32		92	96	104
2100	24112 5.17	23467 5.10	22863 5.00	22321 4.53	21846 4.48	21497 4.45		96	100	110
2200	25244 5.32	24566 5.24	23932 5.13	23355 5.06	22857 5.01	22511 4.58		101	105	116
2300	26382 5.46	25670 5.38	25007 5.26	24393 5.20	23872 5.14	23511 5.11		105	110	122
2400	27525 6.00	26777 5.52	26086 5.39	25436 5.33	24892 5.27	24517 5.23		110	115	128
2500	28672 6.15	27887 6.05	27165 5.52	26483 5.46	25916 5.40	25527 5.36		115	119	134
2600	29825 6.29	29002 6.19	28249 6.06	27533 5.59	26980 5.53	26547 5.49		120	124	140
2700	30982 6.43	30121 6.33	29337 6.19	28588 6.12	28015 6.06	27576 6.02		125	129	146
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON		TOTAL ANTI-ICE ON			
Δ FUEL = - 0.5 %		ΔFUEL = + 1.5 %			Δ FUEL = + 3 %		Δ FUEL = + 5 %			

FLIP23 A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8001 .000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-012-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - CRUISE : LONG RANGE - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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	32145 6.57	31245 6.47	30430 6.32	29647 6.26	29055 6.19	28612 6.15		130	136	153
2900	33312 7.11	32374 7.00	31528 6.45	30710 6.39	30099 6.32	29654 6.28		135	141	157
3000	34484 7.25	33508 7.14	32631 6.59	31836 6.52	31150 6.45	30703 6.40		141	146	163
3100	35662 7.39	34646 7.28	33738 7.12	32916 7.05	32205 6.58	31758 6.53		146	152	170
3200	36846 7.53	35789 7.41	34934 7.24	34000 7.18	33265 7.11	32821 7.06		151	157	177
3300	38035 8.07	36936 7.55	36055 7.37	35090 7.31	34330 7.24	33889 7.19		162	162	184
3400	39230 8.21	38088 8.08	37181 7.50	36185 7.44	35401 7.37	34965 7.32		174	162	192
3500	40430 8.34	39353 8.21	38313 8.04	37286 7.57	36480 7.49	36048 7.44		175	167	199
3600	41770 8.47	40526 8.34	39449 8.17	38393 8.10	37563 8.02	37135 7.57		182	173	207
3700	42994 9.00	41704 8.47	40591 8.30	39505 8.23	38653 8.15	38229 8.10		188	178	215
3800	44223 9.14	42887 9.00	41739 8.43	40622 8.36	39748 8.28	39347 8.23*		187	183	222
3900	45452 9.28	44077 9.13	42892 8.56	41746 8.49	40850 8.41	40461 8.36*		192	189	230
4000	46688 9.41	45280 9.25	44050 9.09	42874 9.01	41957 8.54	41580 8.49*		197	194	237
4100	47929 9.54	46490 9.38	45212 9.22	44009 9.14	43071 9.07	42708 9.02*		202	200	244
4200	49177 10.08	47707 9.50	46378 9.35	45150 9.27	44190 9.19	43839 9.15*		207	205	252
4300	50431 10.21	48931 10.02	47549 9.48	46295 9.40	45317 9.32	44978 9.27*		212	211	260
4400	51691 10.35	50161 10.14	48726 10.01	47446 9.53	46454 9.45	46122 9.40*		217	217	266
4500	52957 10.48	51399 10.25	49909 10.14	48604 10.05	47596 9.58	47271 9.53*		222	223	273
4600	54226 11.01	52644 10.37	51098 10.27	49768 10.18	48746 10.10	48425 10.06*		227	229	281
4700	55499 11.14	53892 10.49	52292 10.40	50938 10.31	49904 10.23	49585 10.19*		232	235	289
4800	56777 11.27	55130 11.02	53492 10.52	52114 10.44	51069 10.36	50752 10.32*		237	241	299
4900	58061 11.41	56374 11.15	54697 11.05	53297 10.56	52240 10.49	51924 10.45*		242	247	307
5000	59352 11.54	57624 11.28	55907 11.18	54487 11.09	53419 11.01	53102 10.58*		247	252	316
5100	60649 12.07	58879 11.41	57122 11.31	55683 11.22	54653 11.14	54287 11.11*		252	258	324
5200	61953 12.20	60140 11.53	58343 11.44	56885 11.34	55857 11.27	55478 11.24*		257	264	333
5300	63262 12.33	61407 12.06	59571 11.57	58095 11.47	57068 11.39	56678 11.37*		262	270	342
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI-ICE ON		TOTAL ANTI-ICE ON			
△ FUEL = - 0.5 %		△ FUEL = + 1.5 %			△ FUEL = + 3 %		△ FUEL = + 5 %			

FLIP23 A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8001 .000000 240 0300350140 0 220200 90164 18590 FCOM-GO-02-05-40-013-010

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL	FLIGHT PLANNING		2.05.40	P 15
	QUICK DETERMINATION OF F-PLN		SEQ 115	REV 09

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING CLIMB : 250KT/300KT/M.80 - LONG RANGE CRUISE - DESCENT : M.80/300KT/250KT IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 KG NORMAL AIR CONDITIONING ANTI ICING OFF				ISA CG = 37.0 %		FUEL CONSUMED (KG)			
AIR DIST. (NM)		FLIGHT LEVEL					CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
		310	330	350	370	390	410	FL310 FL330	FL350 FL370	FL390 FL410
200	3386 0.39	3397 0.39	3411 0.39	3426 0.38			13	14	
300	4419 0.54	4398 0.54	4383 0.53	4373 0.52	4366 0.52	4365 0.51	17	18	18
400	5456 1.09	5402 1.08	5360 1.07	5324 1.06	5293 1.05	5270 1.04	22	23	23
500	6498 1.24	6411 1.23	6341 1.21	6280 1.19	6223 1.18	6179 1.17	26	27	27
600	7544 1.39	7425 1.38	7326 1.35	7240 1.33	7158 1.31	7092 1.30	31	32	32
700	8595 1.54	8443 1.52	8316 1.49	8204 1.46	8096 1.44	8010 1.43	35	36	36
800	9650 2.09	9466 2.07	9310 2.03	9173 2.00	9039 1.58	8932 1.56	40	41	41
900	10710 2.24	10493 2.21	10308 2.17	10146 2.13	9985 2.11	9858 2.09	44	45	46
1000	11774 2.39	11524 2.36	11311 2.31	11124 2.26	10936 2.24	10788 2.22	49	50	50
1100	12843 2.53	12560 2.50	12318 2.45	12106 2.40	11890 2.37	11722 2.35	53	55	55
1200	13916 3.08	13601 3.04	13330 2.59	13092 2.53	12849 2.50	12660 2.48	58	59	60
1300	14995 3.23	14647 3.19	14347 3.13	14083 3.06	13811 3.03	13602 3.01	62	64	65
1400	16076 3.37	15696 3.33	15368 3.26	15079 3.19	14778 3.16	14550 3.14	67	68	70
1500	17161 3.52	16750 3.47	16394 3.40	16077 3.33	15750 3.29	15502 3.27	72	73	75
1600	18251 4.07	17808 4.01	17423 3.53	17078 3.46	16724 3.42	16458 3.40	77	78	80
1700	19345 4.21	18871 4.15	18458 4.07	18082 3.59	17704 3.55	17419 3.53	81	83	85
1800	20444 4.36	19939 4.30	19497 4.20	19090 4.12	18687 4.09	18384 4.06	86	88	91
1900	21548 4.50	21011 4.44	20541 4.33	20102 4.26	19674 4.22	19354 4.19	91	92	96
2000	22657 5.05	22089 4.58	21590 4.47	21119 4.39	20666 4.35	20329 4.32	96	97	102
2100	23770 5.19	23172 5.12	22644 5.00	22140 4.52	21663 4.48	21310 4.44	100	102	108
2200	24888 5.34	24260 5.25	23704 5.13	23166 5.05	22665 5.00	22295 4.57	105	106	114
2300	26011 5.48	25352 5.39	24768 5.26	24196 5.18	23671 5.13	23312 5.10	110	111	120
2400	27138 6.02	26450 5.53	25836 5.39	25229 5.32	24681 5.26	24311 5.23	115	116	126
2500	28271 6.17	27552 6.07	26910 5.52	26267 5.45	25696 5.39	25316 5.36	120	120	135
2600	29408 6.31	28660 6.21	27990 6.05	27310 5.58	26715 5.52	26326 5.49	125	125	139
2700	30549 6.45	29772 6.34	29074 6.18	28357 6.11	27782 6.05	27342 6.02	130	130	146
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %		ΔFUEL = + 1.5 %			ΔFUEL = + 3 %		ΔFUEL = + 5 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8001 .00000 240 0300350140 0 260169 90179 18590 FCOM-G0-02-05-40-015-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING									
CLIMB : 250KT/300KT/M.80 - LONG RANGE CRUISE - DESCENT : M.80/300KT/250KT									
IMC PROCEDURE : 240 KG (6MIN)									
REF. LANDING WEIGHT = 140000 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	31695 6.59	30886 6.48	30161 6.31	29409 6.24	28817 6.18	28364 6.14	136	135	152
2900	32846 7.13	32005 7.01	31249 6.44	30465 6.37	29856 6.31	29392 6.27	141	143	157
3000	34001 7.28	33129 7.15	32342 6.57	31525 6.50	30898 6.44	30428 6.40	146	149	163
3100	35162 7.42	34258 7.28	33439 7.10	32652 7.03	31946 6.57	31472 6.53	151	157	170
3200	36328 7.56	35393 7.42	34627 7.22	33728 7.16	32999 7.10	32522 7.06	156	159	177
3300	37499 8.10	36532 7.55	35743 7.35	34809 7.29	34058 7.22	33579 7.18	166	164	184
3400	38674 8.24	37787 8.07	36865 7.48	35896 7.42	35122 7.35	34644 7.31	172	164	191
3500	39855 8.38	38948 8.20	37992 8.01	36988 7.55	36192 7.48	35716 7.44	185	168	198
3600	41042 8.52	40115 8.33	39125 8.14	38085 8.08	37267 8.01	36794 7.57	185	173	205
3700	42377 9.04	41288 8.46	40264 8.27	39187 8.21	38348 8.14	37879 8.09	191	177	213
3800	43587 9.18	42467 8.59	41409 8.40	40295 8.34	39434 8.27	38971 8.22	190	182	220
3900	44804 9.32	43647 9.12	42560 8.52	41408 8.46	40526 8.39	40070 8.35	196	187	227
4000	46026 9.45	44831 9.25	43705 9.05	42528 8.59	41625 8.52	41203 8.48*	202	192	234
4100	47255 9.58	46021 9.37	44853 9.19	43651 9.12	42729 9.05	42317 9.01*	207	197	241
4200	48491 10.12	47217 9.50	46004 9.32	44777 9.25	43839 9.18	43438 9.14*	212	202	248
4300	49733 10.25	48420 10.02	47161 9.45	45909 9.38	44953 9.31	44564 9.27*	217	207	255
4400	50982 10.38	49629 10.15	48324 9.58	47047 9.51	46072 9.44	45695 9.39*	223	213	262
4500	52237 10.52	50844 10.27	49492 10.11	48191 10.03	47198 9.56	46831 9.52*	228	218	267
4600	53499 11.05	52065 10.39	50665 10.24	49341 10.16	48332 10.09	47974 10.05*	233	223	275
4700	54769 11.18	53293 10.51	51843 10.37	50496 10.29	49471 10.22	49123 10.18*	239	228	283
4800	56046 11.31	54527 11.03	53027 10.50	51657 10.42	50617 10.35	50277 10.31*	244	234	290
4900	57321 11.44	55768 11.16	54216 11.03	52825 10.55	51769 10.47	51438 10.44*	250	239	301
5000	58601 11.57	57013 11.28	55412 11.16	53998 11.07	52927 11.00	52605 10.57*	256	245	309
5100	59888 12.09	58259 11.40	56613 11.29	55178 11.20	54093 11.13	53777 11.10*	262	252	317
5200	61181 12.22	59512 11.53	57824 11.42	56365 11.33	55311 11.26	54958 11.23*	267	259	326
5300	62481 12.35	60772 12.05	59042 11.55	57557 11.45	56495 11.38	56144 11.36*	272	265	334
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
ΔFUEL = - 0.5 %		ΔFUEL = + 1.5 %			ΔFUEL = + 3 %		ΔFUEL = + 5 %		

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8001 .00000 240 0300350140 0 260169 90179 18590 FCOM-GO-02-05-40-016-115

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - LONG RANGE CRUISE - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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
5400	64564 12.45	62693 12.19	60821 12.10	59288 12.00	58239 11.53*	57866 11.50*		270	280	347
5500	65883 12.57	63977 12.31	62061 12.23	60510 12.13	59464 12.06*	59078 12.03*		275	286	356
5600	67208 13.10	65268 12.44	63308 12.36	61740 12.26	60694 12.19*	60296 12.16*		280	296	362
5700	68540 13.23	66565 12.56	64560 12.48	62977 12.38	61938 12.32*	61523 12.29*		286	302	371
5800	69879 13.35	67870 13.09	65819 13.01	64292 12.51	63183 12.45*	62757 12.42*		292	309	380
5900	71232 13.47	69182 13.21	67084 13.14	65549 13.03	64434 12.58*	64001 12.54*		298	316	387
6000	72596 13.59	70501 13.34	68357 13.27	66814 13.16	65691 13.11*	65253 13.07*		305	323	397
6100	73968 14.10	71813 13.47	69637 13.40	68088 13.28	66953 13.24*	66513 13.20*		310	331	406
6200	75348 14.22	73128 14.00	70923 13.52	69371 13.41	68223 13.37*	67781 13.33*		315	338	415
6300	76736 14.33	74451 14.12	72218 14.05	70662 13.53	69499 13.50*	69059 13.46*		321	347	424
6400	78132 14.44	75781 14.25	73617 14.17	71944 14.06	70781 14.03*	70375 13.58*		326	356	433
6500	79537 14.55	77118 14.38	74934 14.30	73228 14.19	72070 14.16*	71673 14.11*		337	359	442
6600	80950 15.07	78459 14.51	76259 14.42	74521 14.32	73370 14.28*	72980 14.24*		342	367	451
6700	82526 15.16	79807 15.03	77592 14.55	75823 14.45	74678 14.41*	74296 14.37*		354	375	460
6800	83960 15.27	81281 15.16	78933 15.07	77132 14.58	75994 14.54*	75623 14.49*		353	383	470
6900	85370 15.40	82652 15.28	80281 15.19	78504 15.10*	77318 15.07*	76958 15.02*		359	391	477
7000	86785 15.52	84030 15.41	81640 15.32	79854 15.23*	78649 15.20*	78311 15.15*		365	399	486
7100	88207 16.05	85416 15.54	83006 15.44	81212 15.36*	79987 15.33*	79660 15.28*		363	407	495
7200	89638 16.18	86809 16.06	84381 15.57	82576 15.49*	81335 15.45*	81016 15.41*		369	415	506
7300	91076 16.30	88211 16.19	85755 16.09	83947 16.02*	82691 15.58*	82380 15.54*		375	423	515
7400	92521 16.43	89621 16.31	87134 16.22	85325 16.15*	84056 16.11*	83750 16.06*		381	432	524
7500	93975 16.55	91039 16.44	88524 16.34	86709 16.27*	85428 16.24*	85127 16.19*		387	441	533
7600	95436 17.08	92466 16.57	89923 16.47	88101 16.40*	86810 16.37*	86510 16.32*		393	449	543
7700	96906 17.20	93900 17.09	91330 16.59	89501 16.53*	88235 16.49*	87901 16.45*		401	458	553
7800	98387 17.33	95345 17.22	92745 17.12	90908 17.06*	89643 17.02*	89300 16.58*		410	467	563
7900	99880 17.45	96798 17.34	94238 17.24*	92321 17.19*	91059 17.15*	90706 17.11*		419	476	573
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %		ΔFUEL = + 1.5 %			ΔFUEL = + 3 %		ΔFUEL = + 5 %			

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8000 .00000 240 0300350140 0 260200 90164 18590 FCOM-G0-02-05-40-017-010

FLIP23C A330-301 CF6-80E1A2 3420 03701.000011 0250300 .8001 .00000 240 0300350140 0 260169 90179 18590 ECOM-GO-02-05-40-018-010

FLIGHT PLANNING FROM BRAKE RELEASE TO LANDING										
CLIMB : 250KT/300KT/M.80 - LONG RANGE CRUISE - DESCENT : M.80/300KT/250KT										
IMC PROCEDURE : 240 KG (6MIN)										
REF. LANDING WEIGHT = 140000 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	63787 12.47	62037 12.18	60265 12.08	58753 11.58	57692 11.51	57336 11.49*		278	272	343
5500	65101 13.00	63310 12.30	61496 12.20	59956 12.11	58918 12.04*	58535 12.02*		283	279	352
5600	66422 13.12	64589 12.43	62734 12.33	61166 12.24	60137 12.17*	59741 12.14*		288	288	361
5700	67750 13.24	65874 12.55	63978 12.46	62383 12.37	61362 12.30*	60953 12.27*		293	295	367
5800	69086 13.37	67167 13.07	65228 12.59	63607 12.49	62592 12.43*	62175 12.40*		299	302	375
5900	70428 13.49	68467 13.20	66485 13.11	64837 13.02	63838 12.56*	63406 12.53*		305	310	384
6000	71769 14.01	69775 13.32	67749 13.24	66148 13.15	65083 13.09*	64644 13.06*		311	317	392
6100	73118 14.13	71086 13.44	69020 13.36	67397 13.28	66334 13.21*	65890 13.19*		317	324	400
6200	74473 14.24	72399 13.57	70299 13.49	68656 13.40	67592 13.34*	67143 13.31*		323	328	410
6300	75837 14.36	73719 14.09	71578 14.02	69922 13.53	68856 13.47*	68406 13.44*		329	339	419
6400	77207 14.47	75047 14.22	72859 14.14	71195 14.06	70128 14.00*	69677 13.57*		334	347	428
6500	78585 14.59	76383 14.34	74244 14.27	72474 14.18	71406 14.13*	70955 14.10*		344	357	437
6600	79969 15.10	77724 14.47	75545 14.39	73761 14.31	72691 14.26*	72276 14.23*		349	361	446
6700	81362 15.22	79202 14.59	76854 14.52	75058 14.44	73984 14.39*	73575 14.35*		362	369	455
6800	82914 15.31	80567 15.11	78170 15.05	76362 14.56	75285 14.52*	74885 14.48*		368	378	464
6900	84328 15.43	81941 15.23	79493 15.17	77675 15.09	76593 15.04*	76204 15.01*		367	386	473
7000	85746 15.55	83324 15.36	80823 15.30	79037 15.22*	77908 15.17*	77533 15.14*		373	395	480
7100	87171 16.07	84699 15.48	82163 15.42	80379 15.35*	79230 15.30*	78878 15.26*		370	403	489
7200	88606 16.18	86069 16.01	83510 15.55	81729 15.47*	80559 15.43*	80220 15.39*		375	412	498
7300	90049 16.30	87446 16.14	84868 16.08	83086 16.00*	81898 15.56*	81569 15.52*		380	422	509
7400	91500 16.42	88831 16.27	86238 16.20	84450 16.13*	83244 16.09*	82925 16.05*		385	431	518
7500	92961 16.53	90223 16.40	87618 16.32	85820 16.26*	84598 16.21*	84287 16.17*		390	438	527
7600	94430 17.05	91622 16.52	89007 16.45	87197 16.39*	85964 16.34*	85657 16.30*		395	446	537
7700	95909 17.16	93029 17.05	90406 16.57	88583 16.51*	87339 16.47*	87034 16.43*		401	454	546
7800	97398 17.28	94444 17.18	91813 17.10	89976 17.04*	88756 17.00*	88419 16.56*		406	463	556
7900	98869 17.40	95868 17.31	93228 17.22	91376 17.17*	90155 17.12*	89811 17.09*		412	471	566
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON			ENGINE ANTI ICE ON		TOTAL ANTI ICE ON			
ΔFUEL = - 0.5 %		ΔFUEL = + 1.5 %			ΔFUEL = + 3 %		ΔFUEL = + 5 %			

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8001 .00000 240 0300350140 0 260169 90179 18590 FCOM-G0-02-05-40-017-115

FLIP23D A330-200 CF6-80E1A4 3420 03701.000011 0250300 .8001 .00000 240 0300350140 0 260169 90179 18590 ECOM-GO-02-05-40-018-115

GENERAL

The alternate planning tables allow the flight crew to determine the fuel consumption and time required to cover a given air distance from go-around at destination airport to landing at alternate airport.

These tables are established for :

- Go-around : 500 kg or 1100 lb
- Climb profile : 250kt/300kt/M.80
- Long Range Cruise
- Descent profile : M.80/300kt/250kt
- Approach and landing at alternate airport : 160 kg or 350 lb (4 min)
- ISA
- CG = 30%
- Normal air conditioning (Packs NORM/Cargo cooling OFF or Packs LO/cargo cooling 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
0.01 (kg/°C/NM) × Δ ISA (°C) × Air Distance (NM)
or 0.022 (lb/°C/NM) × Δ ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The alternate planning tables are based on a reference landing weight at 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.

FLIP23 A330-301 CF6-80E1A2 3520 03001.000010 0250300 .8001 .00000 160 500300350140 0 217179100169 18590 ECOM-GO-02-05-50-002-010

GENERAL

The alternate planning tables allow the flight crew to determine the fuel consumption and time required to cover a given air distance from go-around at destination airport to landing at alternate airport.

These tables are established for :

- Go-around : 500 kg or 1100 lb
- Climb profile : 250kt/300kt/M.80
- Long Range Cruise
- Descent profile : M.80/300kt/250kt
- Approach and landing at alternate airport : 160 kg or 350 lb (4 min)
- ISA
- CG = 30%
- Normal air conditioning (Packs NORM/Cargo cooling OFF or Packs LO/cargo cooling 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
 $0.01 \text{ (kg/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{Air Distance (NM)}$
or $0.022 \text{ (lb/}^{\circ}\text{C/NM)} \times \Delta\text{ISA (}^{\circ}\text{C)} \times \text{Air Distance (NM)}$

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The alternate planning tables are based on a reference landing weight at 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.

FLIP23D A330-200 CF6-80E1A4 3520 03001.300010 500250300 .8001 .00000 160 0300350140 0 217179100169 18590 FCOM-GO-02-05-50-002-115

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT GO-AROUND : 500 KG - CLIMB : 250KT/300KT/M.80 - CRUISE : LONG RANGE DESCENT : M.80/300KT/250KT - VMC PROCEDURE 160 KG (4MIN)								
REF. LDG WT AT ALTERNATE = 140000 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	2927 0.31	2954 0.30				8		
200	3526 0.39	3515 0.38	3533 0.36	3555 0.36		10	11	
250	4127 0.48	4076 0.46	4058 0.44	4046 0.43	4053 0.42	12	13	14
300	4730 0.56	4639 0.54	4584 0.51	4538 0.50	4519 0.49	15	15	16
350	5334 1.05	5203 1.02	5111 0.59	5032 0.57	4986 0.55	17	18	19
400	5939 1.13	5768 1.10	5639 1.06	5526 1.04	5454 1.02	19	20	21
450	6545 1.22	6334 1.18	6168 1.13	6021 1.11	5922 1.09	21	22	23
500	7153 1.30	6902 1.26	6698 1.21	6518 1.18	6392 1.15	24	24	25
550	7762 1.39	7470 1.34	7230 1.28	7015 1.25	6863 1.22	26	26	27
600	8373 1.47	8040 1.42	7762 1.36	7514 1.32	7335 1.29	28	28	30
650	8985 1.56	8611 1.50	8295 1.43	8014 1.39	7808 1.35	31	31	32
700	9598 2.04	9183 1.58	8830 1.50	8515 1.46	8282 1.42	33	33	34
750	10213 2.13	9756 2.06	9365 1.58	9016 1.53	8757 1.48	35	35	36
800	10829 2.21	10331 2.13	9902 2.05	9519 2.00	9233 1.55	37	37	39
850	11447 2.29	10907 2.21	10440 2.12	10023 2.07	9710 2.02	40	39	41
900	12066 2.38	11483 2.29	10978 2.20	10528 2.14	10188 2.08	42	42	43
950	12687 2.46	12062 2.37	11518 2.27	11035 2.21	10667 2.15	44	44	46
1000	13309 2.54	12641 2.45	12059 2.34	11542 2.28	11147 2.22	47	46	48
1050	13932 3.02	13222 2.53	12601 2.42	12050 2.35	11629 2.28	49	48	50
1100	14557 3.11	13803 3.01	13145 2.49	12560 2.42	12111 2.35	51	50	53
1150	15183 3.19	14386 3.09	13689 2.56	13071 2.49	12594 2.41	54	53	55
1200	15810 3.27	14971 3.16	14234 3.04	13583 2.56	13079 2.48	56	55	57
PACK FLOW LO △ FUEL – 0.5		PACK FLOW HI OR/ AND CARGO COOL ON △ FUEL = + 1.5 %		ENGINE ANTI-ICE ON △ FUEL = + 3 %		TOTAL ANTI-ICE ON △ FUEL = + 5 %		

FLIP23 A330-301 CF6-80E1A2 3520 03001.000010 0250300 .8001 .00000 160 500300350140 0 217179100169 18590 FCOM-GO-02-05-50-003-010

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT								
GO-AROUND : 500 KG - CLIMB : 250KT/300KT/M.80 - CRUISE : LONG RANGE								
DESCENT : M.80/300KT/250KT - VMC PROCEDURE : 160 KG (4MIN)								
REF. LDG WT AT ALT = 140000 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	2880 0.31	2913 0.30				8		0
200	3463 0.40	3459 0.38	3484 0.36	3508 0.36		10	11	0
250	4048 0.48	4007 0.46	3998 0.44	3992 0.43	4000 0.42	12	13	14
300	4633 0.57	4555 0.54	4513 0.52	4478 0.50	4460 0.49	14	15	16
350	5220 1.06	5104 1.02	5029 0.59	4964 0.57	4921 0.55	17	18	18
400	5808 1.14	5655 1.11	5546 1.07	5451 1.04	5383 1.02	19	20	20
450	6398 1.23	6207 1.19	6064 1.14	5940 1.11	5847 1.09	21	22	23
500	6988 1.31	6760 1.27	6584 1.22	6429 1.18	6311 1.15	23	24	25
550	7580 1.40	7315 1.35	7104 1.29	6919 1.25	6776 1.22	26	26	27
600	8173 1.49	7870 1.43	7626 1.37	7411 1.32	7242 1.28	28	29	29
650	8768 1.57	8427 1.51	8149 1.44	7904 1.39	7709 1.35	30	31	31
700	9364 2.06	8985 1.59	8673 1.51	8398 1.46	8177 1.42	33	33	34
750	9961 2.14	9545 2.07	9198 1.59	8892 1.54	8646 1.48	35	35	36
800	10559 2.23	10105 2.15	9724 2.06	9388 2.00	9116 1.55	37	38	38
850	11159 2.31	10667 2.23	10251 2.14	9885 2.07	9587 2.01	39	40	40
900	11760 2.40	11230 2.31	10779 2.21	10383 2.14	10059 2.08	42	42	43
950	12363 2.48	11795 2.39	11309 2.28	10883 2.21	10532 2.15	44	44	45
1000	12966 2.57	12360 2.47	11839 2.36	11383 2.28	11006 2.21	46	47	47
1050	13571 3.05	12927 2.55	12371 2.43	11884 2.35	11481 2.28	49	49	49
1100	14178 3.14	13495 3.03	12904 2.50	12387 2.42	11957 2.34	51	51	52
1150	14786 3.22	14065 3.11	13439 2.58	12890 2.49	12435 2.41	53	54	54
1200	15395 3.31	14636 3.19	13974 3.05	13395 2.56	12913 2.47	56	56	56
PACK FLOW LO		PACK FLOW HI OR/ AND CARGO COOL ON		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		
ΔFUEL = - 0.5		ΔFUEL = + 1.5 %		ΔFUEL = + 3 %		ΔFUEL = + 5 %		

FLIP23D A330-200 CF6-80E1A4 3520 03001.300010 500250300 .8001 .00000 160 0300350140 0 217179100169 18590 FCOM-GO-02-05-50-003-115

A330 الخطوط الجوية الجزائرية AIR ALGERIE FLIGHT CREW OPERATING MANUAL 	FLIGHT PLANNING		2.05.60	P 1
	GROUND DISTANCE/AIR DISTANCE		SEQ. 001	REV 06

GENERAL

- R The ground to air miles conversion tables show the air distance for a given ground distance due to influence of the wind.
- R The tables are given for:
- M.80, M.82, M.84
- R — Long range cruise

M.80

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	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

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENT (KT)			HEAD WIND	
	+150	+100	+ 50	0	-50	-100	-150
10	7	8	9	10	12	14	17
20	14	16	18	20	23	27	33
30	22	24	27	30	35	41	50
40	29	32	35	40	46	54	66
50	36	40	44	50	58	68	83
100	72	79	88	100	115	136	165
200	143	158	177	200	230	271	330
300	215	238	265	300	345	407	495
400	287	317	354	400	461	543	660
500	359	396	442	500	576	678	825
1000	717	792	884	1000	1151	1357	1651
1500	1076	1188	1326	1500	1727	2035	2476
2000	1434	1584	1768	2000	2303	2713	3302
2500	1793	1980	2210	2500	2878	3391	4127
3000	2152	2376	2652	3000	3454	4070	4953
3500	2510	2772	3093	3500	4030	4748	5778
4000	2869	3167	3535	4000	4605	5426	6604
4500	3227	3563	3977	4500	5181	6105	7429
5000	3586	3959	4419	5000	5757	6783	8254
5500	3945	4355	4861	5500	6332	7461	9080
6000	4303	4751	5303	6000	6908	8139	9905
6500	4662	5147	5745	6500	7484	8818	10731
7000	5021	5543	6187	7000	8059	9496	11556
7500	5379	5939	6629	7500	8635	10174	12382
8000	5738	6335	7071	8000	9210	10853	13207
8500	6096	6731	7513	8500	9786	11531	14033
9000	6455	7127	7955	9000	10362	12209	14858
9500	6814	7523	8397	9500	10937	12887	15684
10000	7172	7919	8838	10000	11513	13566	16509

LONG RANGE CRUISE ABOVE FL250

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	16	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	64	74
100	76	82	90	100	112	127	147
200	151	165	181	200	224	254	295
300	227	247	271	300	336	382	442
400	303	330	361	400	448	509	589
500	379	412	452	500	560	636	736
1000	757	824	903	1000	1120	1272	1473
1500	1136	1236	1355	1500	1680	1908	2209
2000	1514	1648	1807	2000	2240	2544	2945
2500	1893	2059	2258	2500	2799	3180	3681
3000	2271	2471	2710	3000	3359	3817	4418
3500	2650	2883	3162	3500	3919	4453	5154
4000	3028	3295	3613	4000	4479	5089	5890
4500	3407	3707	4065	4500	5039	5725	6627
5000	3785	4119	4517	5000	5599	6361	7363
5500	4164	4531	4968	5500	6159	6997	8099
6000	4542	4943	5420	6000	6719	7633	8836
6500	4921	5354	5872	6500	7279	8269	9572
7000	5299	5766	6324	7000	7839	8905	10308
7500	5678	6178	6775	7500	8398	9541	11044
8000	6056	6590	7227	8000	8958	10177	11781
8500	6435	7002	7679	8500	9518	10814	12517
9000	6813	7414	8130	9000	10078	11450	13253
9500	7192	7826	8582	9500	10638	12086	13990
10000	7570	8238	9034	10000	11198	12722	14726

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 flight level 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 5000 NM
- Flight profile :
 - Climb : 250kt/300kt/M.80
 - 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 = 0.934

Cruising Altitude = FL310

Planned TOW = 190 000 kg (mission weight without fuel tankering)

Air Distance = 2500 NM

Enter graph on page 2.05.70 p.4.

For the given air distance, the optimum fuel tankering weight is 180 000 kg, which is lower than the planned takeoff weight → no fuel tankering recommended.

A330 الخطوط الجوية الجزائرية AIR ALGÉRIE FLIGHT CREW OPERATING MANUAL 	FLIGHT PLANNING		2.05.70	P 2
	FUEL TANKERING		SEQ 010	REV 06

2. fuel price ratio = 0.908

Cruising Altitude = FL 350

Planned TOW = 190 000 kg (mission weight without fuel tankering)

Air Distance = 2250 NM

Enter graph on page 2.05.70 P.6.

For the given air distance, the optimum fuel tankering weight is 203 000 kg, which is 13 000 kg higher than the planned takeoff weight → optimum quantity of extra fuel is 13 000 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 = 0.874

Cruising Altitude = FL 390

Planned TOW = 190 000 kg (mission weight without fuel tankering)

Air Distance = 2250 NM

Enter graph on page 2.05.70 P. 8.

Interpolate for the air distance of 2250 NM between borderline and 2000 NM.

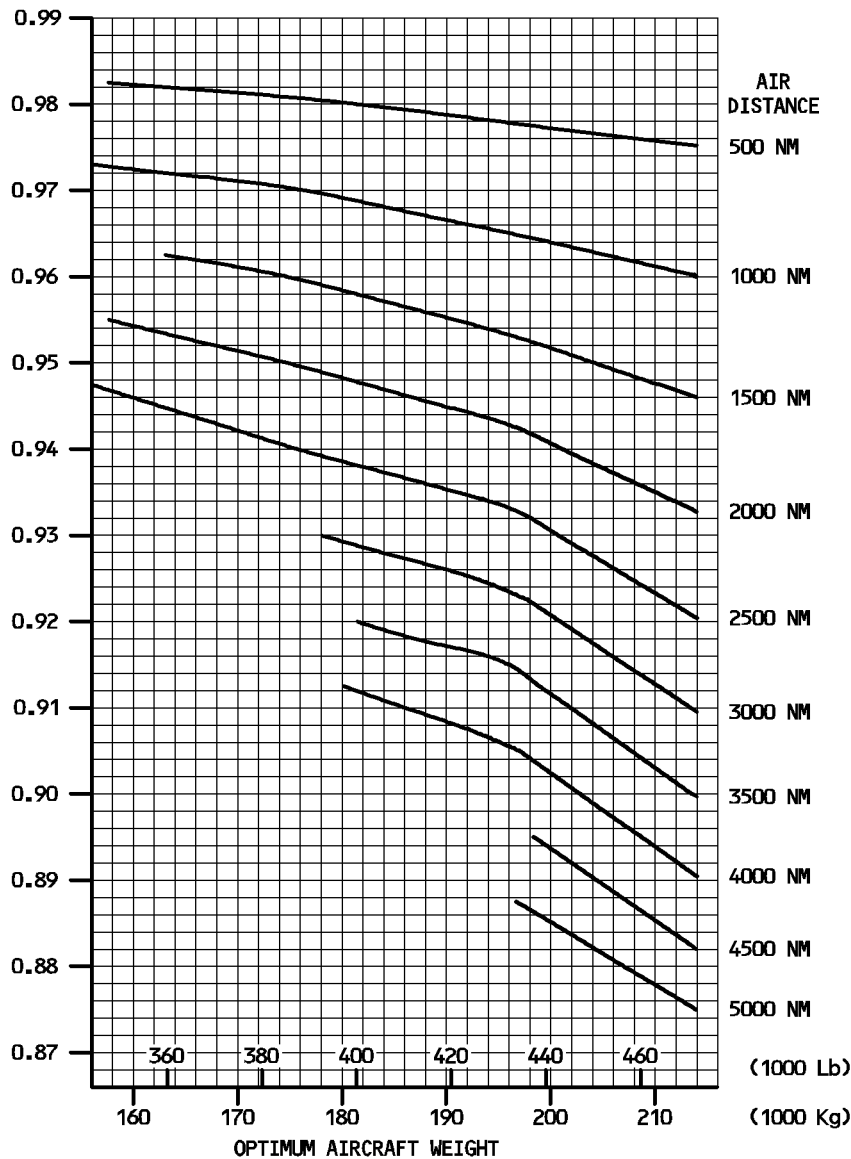
The optimum fuel tankering weight is 198 000 kg, which is 8 000 kg higher than the planned takeoff weight → optimum quantity of extra fuel is 8 000 kg.

Check :

- a) new TOW less or equal MTOW from departure airport.
- b) total fuel to be loaded less than or equal to maximum fuel capacity.
- c) MLW at destination

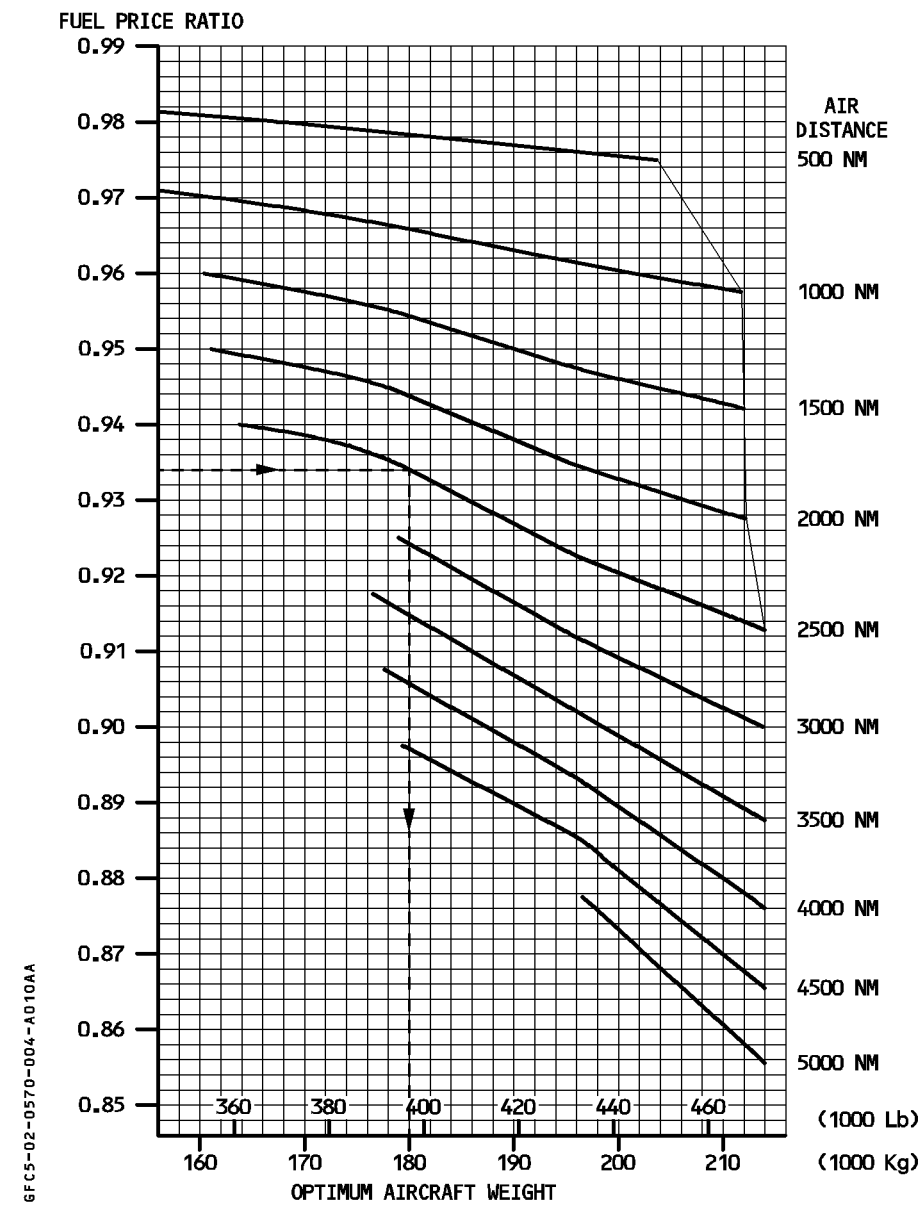
FL 290

FUEL PRICE RATIO



GFCS-02-0570-003-A010AA

FL 310



FL 330

FUEL PRICE RATIO

0.98

0.97

0.96

0.95

0.94

0.93

0.92

0.91

0.90

0.89

0.88

0.87

0.86

0.85

0.84

AIR

DISTANCE

500 NM

1000 NM

1500 NM

2000 NM

2500 NM

3000 NM

3500 NM

4000 NM

4500 NM

5000 NM

(1000 Lb)

(1000 Kg)

GFC5-02-0570-005-A010AA

OPTIMUM AIRCRAFT WEIGHT

360

380

400

420

440

460

160

170

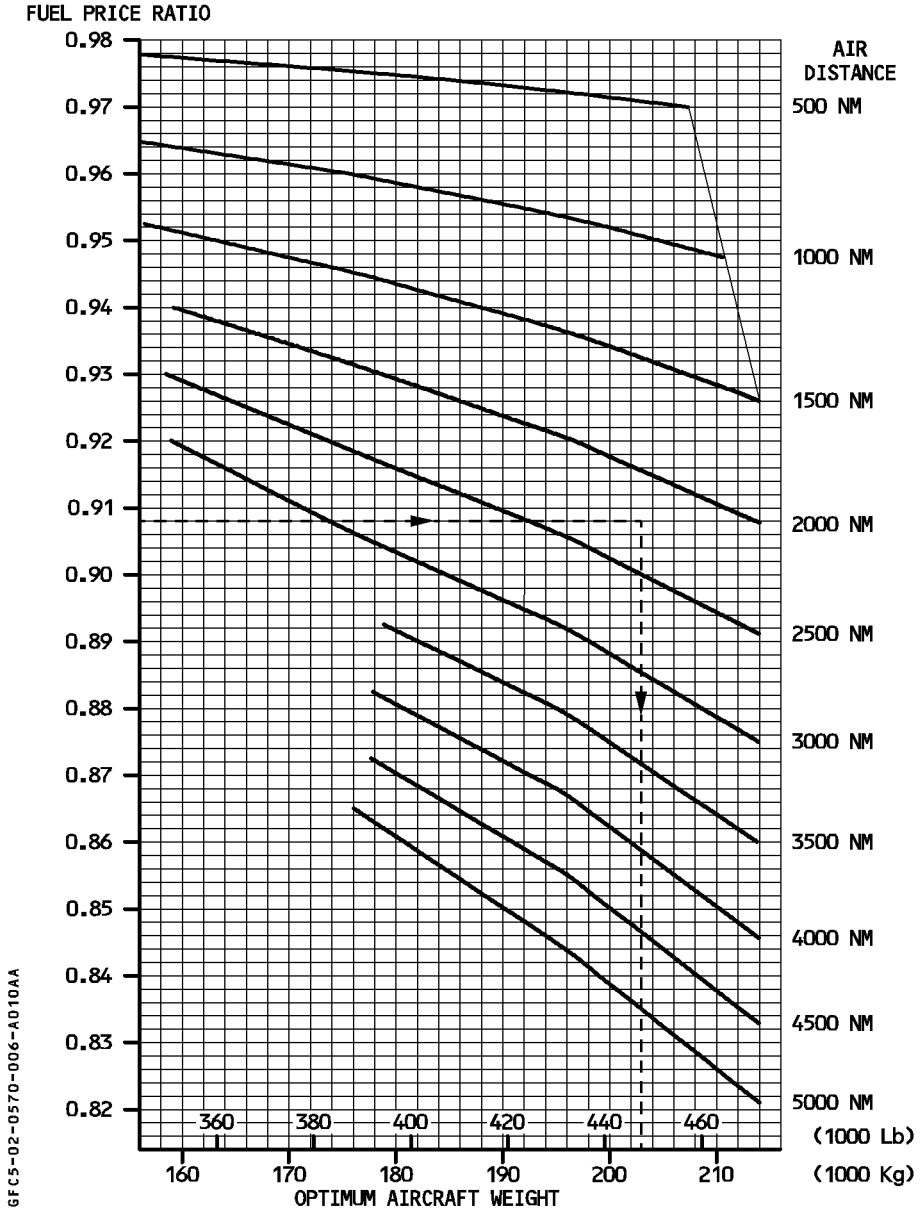
180

190

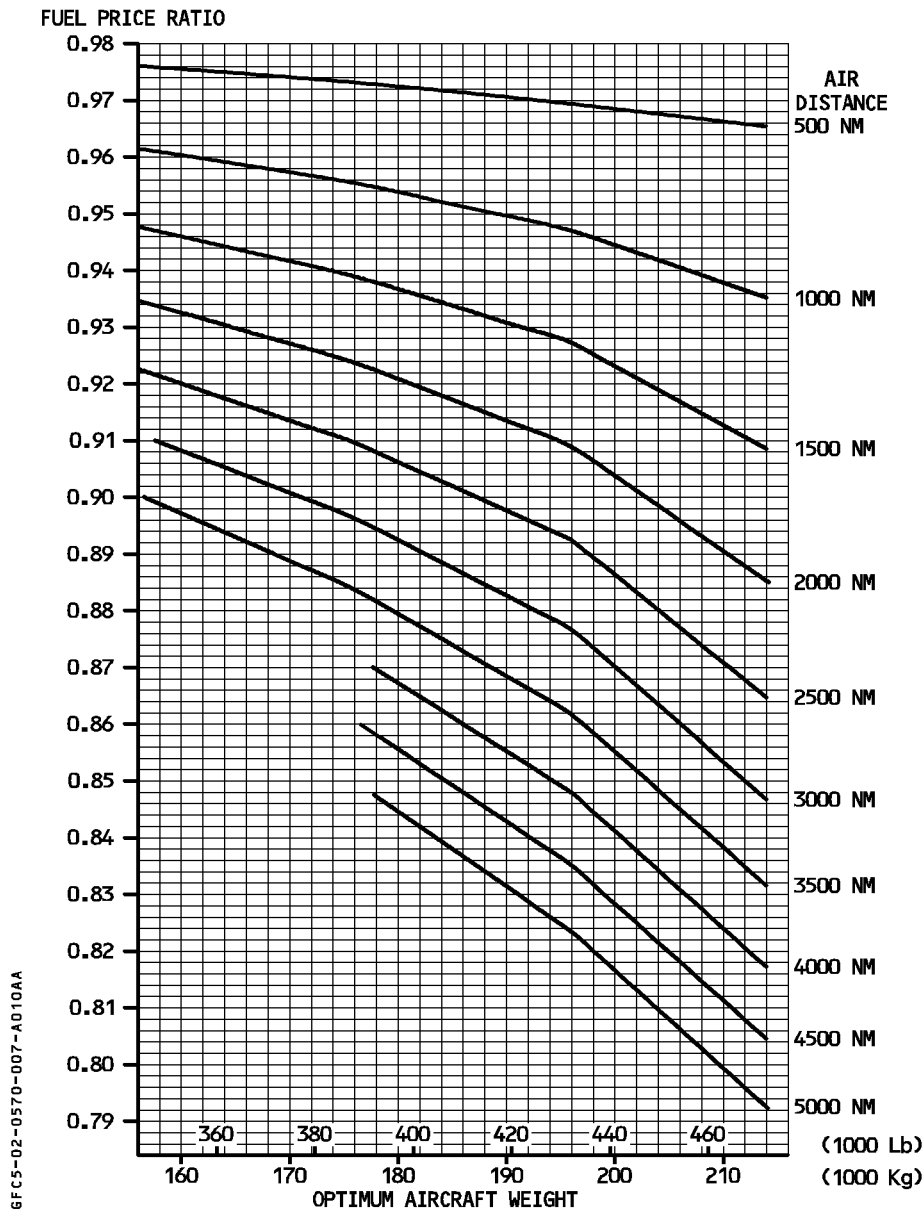
200

210

FL 350



FL 370



FL 390

