TO:	**ALL HOLDERS OF MD-11 FLIGHT CREW OPERATING MANUAL**
CONCERNING:	**VOLUME IV-M – PERFORMANCE, REVISION 65, DATED: FEB 15, 2013**
HIGHLIGHTS:	**THE DATA IS COMPLETE AND NO CHANGES HAVE BEEN MADE FOR THIS REVISION.**

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MD-11

FLIGHT CREW OPERATING MANUAL

VOLUME IV-M (METRIC)

RECORD OF REVISIONS

ALL REVISIONS MUST BE INSERTED AND LOGGED IN NUMERICAL ORDER.

The transmittal sheet provided with each revision, or in lieu of a revision, identifies the revision number and date. Enter this information, **after** the revision has been inserted.

Rev. No.	Rev. Date	Inserted By

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FLIGHT CREW OPERATING MANUAL

VOLUME IV-M (METRIC)

PERFORMANCE

CF6-80C2D1F ENGINES

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CHAPTER SECTION PAGE	CODE	DATE	CHAPTER SECTION PAGE	CODE	DATE
PRE–10–26	01	Dec 1/94	PRE–20–17/18	01	May 1/92
PRE–10–27	01	Dec 1/94	PRE–20–19/20	01	May 1/92
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INFL–10–09	01	Dec 1/94	INFL–50–06	01	Dec 1/94
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INFL–20–06	01	Dec 1/94	INFL–60–19	01	Dec 15/98
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INFL–20–09	01	Dec 1/94	INFL–60–23/24	01	Dec 15/98
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INFL–20–16	01	Dec 1/94	ABN–30–03	01	Dec 15/98
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DEFL AIL–13/14	01	Mar 1/94			
DEFL AIL–15/16	01	Mar 1/94			
DEFL AIL–17/18	01	Mar 1/94			
DEFL AIL–19/20	01	Mar 1/94			
DEFL AIL–21/22	01	Mar 1/94			
DEFL AIL–23	01	Apr 15/98			
DEFL AIL–24	01	Mar 1/94			
DEFL AIL–25/26	01	Mar 1/94			

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MANUAL REVISION RECORD

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52	Aug 15/06
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54	Aug 15/07
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58	No Change
59	No Change
60	No Change
61	Feb 15/11

BOEING REVISION NUMBER	REVISION DATE

BOEING REVISION NUMBER	REVISION DATE

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Manual Effectivity

General

The airplanes listed in the table below are covered in the Flight Crew Operations Manual. The numbers are used to distinguish data peculiar to one or more, but not all of the airplanes. Where data applies to all airplanes listed, no reference is made to individual airplane numbers.

Registry number is supplied by the national regulatory agency. Airplane, serial, and tabulation numbers are supplied by Boeing.

Airplane Number	Serial Number	Tabulation Number
488	48413	1PA203
491	48414	1PA204
576	48415	1PC901
468	48426	1CA001
471	48427	1CA002
474	48428	1CA003
500	48429	1CA004
508	48430	1CA005
534	48431	1PD201
455	48449	1PB101
479	48450	1PB102
520	48502	1PC004
528	48503	1PC005
548	48504	1PC006
529	48512	1PB103
564	48513	1PB104
570	48542	1PC701
572	48543	1PC702
580	48544	1FA301
587	48545	1FA302
589	48546	1FA303
557	48555	1PC801
561	48556	1PC802
569	48557	1PC803
573	48558	1PC804
575	48559	1PC805
578	48560	1PC806
585	48561	1PC807
591	48562	1PC808
593	48563	1PC809

Airplane Number	Serial Number	Tabulation Number
612	48564	1PC810
565	48581	1PD202
567	48630	1PD203
608	48753	1PD001
613	48755	1PD002
615	48758	1PD003
600	48766	11T205
603	48769	11T207
609	48773	1FA504
616	48775	1FA505
617	48776	1FA506
618	48777	1FA507
619	48778	11T304
620	48779	11T305
624	48780	11T209
625	48781	1FA601
626	48782	1FA602
627	48783	1FA603
628	48784	1FA604
629	48785	1FA605
630	48786	11T306
631	48787	11T307
633	48789	11T401
634	48790	11T402
637	48798	11T501
639	48799	11T502
641	48800	11T503
640	48801	1FA606
642	48802	1FA607
643	48803	1FA608
644	48804	1FA609
645	48805	1FA610
646	48806	1FA611

TEMPORARY REVISION RECORD

Record the date you insert each Temporary Revision in your manual.

TR NO.	DATE INSERTED	TR NO.	DATE INSERTED	TR NO.	DATE INSERTED	TR NO.	DATE INSERTED

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TEMPORARY REVISION SUMMARY RECORD

TEMPORARY REVISION NUMBER	ISSUE DATE	REVISION DATE INCORPORATED
4M-1 thru 4M-23		Not Applicable, Canceled, or Previously Incorporated

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ERRATA RECORD

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Errata Number	Date Inserted	Errata Number	Date Inserted

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ERRATA LOG

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FCOM ADVISORY BULLETIN SUMMARY RECORD

FCOM ADVISORY BULLETIN NUMBER	ISSUE DATE	STATUS

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PERFORMANCE
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INTRODUCTION

The Performance volume of the Flight Crew Operating Manual (FCOM) can be used to analyze a complete flight plan and various other inflight performance parameters. It is divided into five chapters which are further broken down into more specific areas called sections. The following is a list of chapters and sections as they appear in the FCOM. A brief discussion follows each chapter listing and very generally describes the purpose of that chapter.

GENERAL

- Nomenclature
- Conversions and Calibrations
- Limitations

The General chapter contains various specific performance parameters and general data which are to be applied throughout the manual.

PREFLIGHT

- Flight Planning
- Takeoff
- Enroute
- Nonstandard Configurations

The Preflight chapter contains the data necessary to determine various preflight parameters, such as trip time and fuel, maximum permissible takeoff weight, takeoff speeds, thrust settings, etc. Data are presented for both standard and nonstandard operation.

INFLIGHT

- Climb
- Cruise
- Divergence
- Descent
- Holding
- Approach and Landing

The Inflight chapter contains the data necessary to determine various performance parameters during the above-mentioned phases of flight.

ABNORMAL

- Flight Controls
- Landing Gear/Brakes
- Powerplant
- Driftdown
- Miscellaneous

The Abnormal chapter presents performance which is applicable to various types of system malfunctions.

TAKEOFF DEFLECTED AILERONS

The Takeoff Deflected Ailerons chapter contains the data necessary for takeoff with deflected ailerons.

Performance charts are presented in both graphical and tabular form. Examples and "chase-arounds" accompany the various types of charts to illustrate their use. It is of the utmost importance that the charts can be read thoroughly and accurately especially in the case of the "chase-around" multi-variable charts. With this type of presentation, errors in reading can be cumulative, which will result in large final errors. If there is any doubt regarding the correct usage of any chart, refer to its example and the associated "chase-around" for proper instruction.

If at any time a discrepancy is found between the FCOM and the FAA Approved Airplane Flight Manual (AFM), the data found in the AFM should be used.

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GENERAL

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NOMENCLATURE

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NOMENCLATURE

This section contains the definitions for all the abbreviations and acronyms found in the Performance volume of the FCOM.

Abbreviation	Definition
A/C	air conditioning
AFM	Airplane Flight Manual
A/I	anti-ice protection
ALT	altitude
AMB	ambient
AND	aircraft nose down
ANU	aircraft nose up
BTMS	brake temperature monitoring system
°C	degrees Centigrade
CAS	calibrated airspeed-instrument reading corrected for instrument and position error
CG, cg	center of gravity
DEG, deg	degrees
DH	decision height
DIST	distance
dom	domestic
EAS	equivalent airspeed – calibrated airspeed corrected for compressibility
EGT	exhaust gas temperature
ENG	engine
EPR	engine pressure ratio – a ratio of engine turbine exit pressure to compressor inlet pressure
ETP	equal time point
EXT	extended
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FCOM	Flight Crew Operating Manual
FF	fuel flow
FL	flight level
FLAG	flag carrier
FLLW	field length limited weight
FPM	feet per minute
FT, ft	feet
G, g	acceleration due to gravity
GW	gross weight
HG, Hg	mercury
hg	geometric height
hp	pressure height
HR, hr	hours
IAS	Indicated airspeed – instrument reading corrected
ICAO	International Civil Aviation Organization
IN., in.	inches
IND	indicated
int	international
ISA	international standard atmosphere

NOMENCLATURE

Abbreviation	Definition
KCAS	Knots calibrated airspeed
KEAS	knots equivalent airspeed
kg	kilograms
kg/hr	kilograms per hour
KIAS	knots indicated airspeed
KTAS	knots true airspeed
KN, KT, KTS	knots airspeed
L	liters
LB, lb	pounds
LB/HR	pounds per hour
LDG	landing
M	Mach number
m	meters
M.A.C., mac	mean aerodynamic chord
MAX	maximum
mb	millibars
MCL	maximum climb thrust
MCR	maximum cruise thrust
MCT	maximum continuous thrust
MIN	minutes
M_{IND}	indicated Mach number
M_{MO}	maximum operating limit Mach number
MPH	miles per hour
MTOGW	maximum takeoff gross weight
M_{TRUE}	true Mach number
MTW	maximum taxi weight
MZFW	maximum zero fuel weight
N_1	engine low-pressure rotor speed
N_2	engine high-pressure rotor speed
N.M., N.Mi.	nautical miles
OAT	outside air temperature
OPT	optimum
PRESS, PR	pressure
PSI	pounds per square inch
QFE	ICAO altimeter code such that the altimeter reads zero at destination
RAT	ram air temperature
R/C	rate of climb
R/D	rate of descent
REF	reference
RET	retracted
RPM, rpm	revolutions per minute
RWY	runway
SAT	static air temperature
SEC	seconds
SL	sea level
SSLW	second segment limited weight

NOMENCLATURE

Abbreviation	Definition
STD, std	standard
SUPPL	supplemental carrier
T, TEMP	temperature
TAMB	ambient temperature
TAS	true airspeed – equivalent airspeed corrected for density
TAT	total air temperature
T.O.	takeoff
V	velocity
V_1	decision speed
V_{1MIN}	minimum allowable V_1
V_2	takeoff safety speed
V_{2MIN}	minimum allowable V_2
V_3	final segment climb speed
V_A	design maneuvering speed
V_{APP}	approach speed
V_{CL}	climb speed
V_{CR}	maximum cruise speed
V_{EW}	speed at equivalent weight
V_{FE}	flap placard speed
V_{LE}	landing gear extended limit speed
V_{LO}	landing gear operating limit speed
V_{MCA}	minimum control speed with one-engine inoperative, in-flight
V_{MCG}	minimum control speed with one-engine inoperative, on-ground
V_{MO}	maximum operating limit speed
V_{MU}	minimum unstick speed
V_R	takeoff rotation speed
V_{REF}	reference speed
V_{RMIN}	minimum allowable V_R
V_S, V_{stall}	stalling speed
V_{TH}	threshold speed
W_{MC}	V_{MC} limited weight
WT	weight
Δ	(delta) increment of: weight, drag, airspeed, etc.
%	percent

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CONVERSIONS AND CALIBRATIONS

TABLE OF CONTENTS

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INTRODUCTION

This section contains charts and tables which can be used to convert English units of measure or weight into the Metric equivalent or vice-versa. Other tables are included for temperature conversion, airspeed calibration, and wind component calculation to name a few. A "chase-around" or sample problem is included for each chart/table.

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TEMPERATURE CONVERSION CHART

°C ⟷ °F/°C ⟷ °F			°C ⟷ °F/°C ⟷ °F			°C ⟷ °F/°C ⟷ °F			°C ⟷ °F/°C ⟷ °F		
-56.1	-69	-92.2	-28.3	-19	-2.2	-0.6	31	87.8	27.2	81	177.8
-55.6	-68	-90.4	-27.8	-18	-0.4	0.0	32	89.6	27.8	82	179.6
-55.0	-67	-88.6	-27.2	-17	1.4	0.6	33	91.4	28.3	83	181.4
-54.4	-66	-86.8	-26.7	-16	3.2	1.1	34	93.2	28.9	84	183.2
-53.9	-65	-85.0	-26.1	-15	5.0	1.7	35	95.0	29.4	85	185.0
-53.3	-64	-83.2	-25.6	-14	6.8	2.2	36	96.8	30.0	86	186.8
-52.8	-63	-81.4	-25.0	-13	8.6	2.8	37	98.6	30.6	87	188.6
-52.2	-62	-79.6	-24.4	-12	10.4	3.3	38	100.4	31.1	88	190.4
-51.7	-61	-77.8	-23.9	-11	12.2	3.9	39	102.2	31.7	89	192.2
-51.1	-60	-76.0	-23.3	-10	14.0	4.4	40	104.0	32.2	90	194.0
-50.6	-59	-74.2	-22.8	-9	15.8	5.0	41	105.8	32.8	91	195.8
-50.0	-58	-72.4	-22.2	-8	17.6	5.6	42	107.6	33.3	92	197.6
-49.4	-57	-70.6	-21.7	-7	19.4	6.1	43	109.4	33.9	93	199.4
-48.9	-56	-68.8	-21.1	-6	21.2	6.7	44	111.2	34.4	94	201.2
-48.3	-55	-67.0	-26.6	-5	23.0	7.2	45	113.0	35.0	95	203.0
-47.8	-54	-65.2	-20.0	-4	24.8	7.8	46	114.8	35.6	96	204.8
-47.2	-53	-63.4	-19.4	-3	26.6	8.3	47	116.6	36.1	97	206.6
-46.7	-52	-61.6	-18.9	-2	28.4	8.9	48	118.4	36.7	98	208.4
-46.1	-51	-59.8	-18.3	-1	30.2	9.4	49	120.2	37.2	99	210.2
-45.6	-50	-58.0	-17.8	0	32.0	10.0	50	122.0	37.8	100	212.0
-45.0	-49	-56.2	-17.2	1	33.8	10.6	51	123.8	38.3	101	213.8
-44.4	-48	-54.4	-16.7	2	35.6	11.1	52	125.6	38.9	102	215.6
-43.9	-47	-52.6	-16.1	3	37.4	11.7	53	127.4	39.4	103	217.4
-43.3	-46	-50.8	-15.6	4	39.2	12.2	54	129.2	40.0	104	219.2
-42.8	-45	-49.0	-15.0	5	41.0	12.8	55	131.0	40.6	105	221.0
-42.2	-44	-47.2	-14.4	6	42.8	13.3	56	132.8	41.1	106	222.8
-41.7	-43	-45.4	-13.9	7	44.6	13.9	57	134.6	41.7	107	224.6
-41.1	-42	-43.6	-13.3	8	46.4	14.4	58	136.4	42.2	108	226.4
-40.6	-41	-41.8	-12.8	9	48.2	15.0	59	138.2	42.8	109	228.2
-40.0	-40	-40.0	-12.2	10	50.0	15.6	60	140.0	43.3	110	230.0
-39.4	-39	-38.2	-11.7	11	51.8	16.1	61	141.8	43.9	111	231.8
-38.9	-38	-36.4	-11.1	12	53.6	16.7	62	143.6	44.4	112	233.6
-38.3	-37	-34.6	-10.6	13	55.4	17.2	63	145.4	45.0	113	235.4
-37.8	-36	-32.8	-10.0	14	57.2	17.8	64	147.2	45.6	114	237.2
-37.2	-35	-31.0	-9.4	15	59.0	18.3	65	149.0	46.1	115	239.0
-36.7	-34	-29.2	-8.9	16	60.8	18.9	66	150.8	46.7	116	240.8
-36.1	-33	-27.4	-8.3	17	62.6	19.4	67	152.6	47.2	117	242.6
-35.6	-32	-25.6	-7.8	18	64.4	20.0	68	154.4	47.8	118	244.4
-35.0	-31	-23.8	-7.2	19	66.2	20.6	69	156.2	48.3	119	246.2
-34.4	-30	-22.0	-6.7	20	68.0	21.1	70	158.0	48.9	120	248.0
-33.9	-29	-20.2	-6.1	21	69.8	21.7	71	159.8	49.4	121	249.8
-33.3	-28	-18.4	-5.6	22	71.6	22.2	72	161.6	50.0	122	251.6
-32.8	-27	-16.6	-5.0	23	73.4	22.8	73	163.4			
-32.2	-26	-14.8	-4.4	24	75.2	23.3	74	165.2			
-31.7	-25	-13.0	-3.9	25	77.0	23.9	75	167.0			
-31.1	-24	-11.2	-3.3	26	78.8	24.4	76	168.8			
-30.6	-23	-9.4	-2.8	27	80.6	25.0	77	170.6			
-30.0	-22	-7.6	-2.2	28	82.4	25.6	78	172.4			
-29.4	-21	-5.8	-1.7	29	84.2	26.1	79	174.2			
-28.9	-20	-4.0	-1.1	30	86.0	26.7	80	176.0			

FEET TO METERS CONVERSION

Example: Convert 84,637 feet to meters.

Solution: The table cannot convert a measure larger than 59,999 ft. Therefore, 84,637 ft must be broken down into various smaller measures which are as follows:

84,637 ft = 50,000 ft + 34,000 ft + 630 ft + 7 ft

Converting each one of these measures into meters from the table yields the following:

50,000 ft	=	15,240.00 meters
34,000 ft	=	10,363.00 meters
630 ft	=	192.02 meters
7 ft	=	2.13 meters
84,637 ft	=	25,797.15 meters

Therefore, summing up:

84,637 ft = 25,797.15 meters.

FEET TO METERS CONVERSION CHART

ft	0	1	2	3	4	5	6	7	8	9
0	0	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.94
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.56	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.18
	0	10	20	30	40	50	60	70	80	90
100	30.48	33.53	36.58	39.62	42.67	45.72	48.77	51.82	54.86	57.91
200	60.96	64.01	67.06	70.10	73.15	76.20	79.25	82.30	85.34	88.39
300	91.44	94.49	97.54	100.53	103.63	106.68	109.73	112.78	115.82	118.87
400	121.92	124.97	128.02	131.06	134.11	137.16	140.21	143.26	146.30	149.35
500	152.40	155.45	158.50	161.54	164.59	167.64	170.69	173.74	176.78	179.83
600	182.88	185.93	188.98	192.02	195.07	198.12	201.17	204.22	207.26	210.31
700	213.36	216.41	219.46	222.50	225.55	228.60	231.65	234.70	237.74	240.79
800	243.84	246.89	249.94	252.98	256.03	259.08	262.13	265.18	268.22	271.27
900	274.32	277.37	280.42	283.46	286.51	289.56	292.61	295.66	298.70	301.75
	0	100	200	300	400	500	600	700	800	900
1000	304.80	335.28	365.76	396.24	426.72	457.20	487.68	518.16	548.64	579.12
2000	609.60	640.08	670.56	701.04	731.52	762.00	792.48	822.96	853.44	883.92
3000	914.40	944.88	975.36	1005.8	1036.3	1066.8	1097.3	1127.8	1158.2	1188.7
4000	1219.2	1249.7	1280.2	1310.6	1341.1	1371.6	1402.1	1432.6	1463.0	1493.5
5000	1524.0	1554.5	1585.0	1615.4	1645.9	1676.4	1706.9	1737.4	1767.8	1798.3
6000	1828.8	1859.3	1889.8	1920.2	1950.7	1981.2	2011.7	2042.2	2072.6	2103.1
7000	2133.6	2164.1	2194.6	2225.0	2255.5	2286.0	2316.5	2347.0	2377.4	2407.9
8000	2438.4	2468.9	2499.4	2529.8	2560.3	2590.8	2621.3	2651.8	2682.2	2712.7
9000	2743.2	2773.7	2804.2	2834.6	2865.1	2895.6	2926.1	2956.6	2987.0	3017.5
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
10000	3048.0	3352.8	3657.6	3962.4	4267.2	4572.0	4876.8	5181.6	5486.4	5791.2
20000	6096.0	6400.8	6705.6	7010.4	7315.2	7620.0	7924.8	8229.6	8534.4	8839.2
30000	9144.0	9448.8	9753.6	10058	10363	10668	10973	11278	11582	11887
40000	12192	12497	12802	13106	13411	13716	14021	14326	14630	14935
50000	15240	15545	15850	16154	16459	16764	17069	17374	17678	17983

METERS TO FEET CONVERSION

Example: Convert 16,353 meters to feet.

Solution: The table cannot convert a measure larger than 9,999 meters. Therefore, 16,353 meters must be broken down into various smaller measures which are as follows:

16,353 meters = 9,000 meters + 7,000 meters + 350 meters + 3 meters

Converting each one of these measures into feet from the table yields the following:

9,000	meters	=	29,527.00 ft
7,000	meters	=	22,966.00 ft
350	meters	=	1,148.30 ft
3	meters	=	9.84 ft
16,353	meters	=	53,651.14 ft

Therefore, summing up:

16,353 meters = 53,651.14 ft

METERS TO FEET CONVERSION CHART

m	0	1	2	3	4	5	6	7	8	9
0	0	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.05	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.70	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.79	141.07	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.44	183.72	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.53	219.81	223.09	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.18
80	262.46	265.74	269.03	272.31	275.59	278,87	282.15	285.43	288.71	291.99
90	295.27	298.55	301.83	305.11	308.40	311.68	314.96	318.24	321.52	324.80
	0	10	20	30	40	50	60	70	80	90
100	328.08	360.89	393.70	426.50	459.31	492.12	524.93	557.74	590.54	623.35
200	656.16	688.97	721.78	754.58	787.39	820.20	853.01	885.82	918.62	951.43
300	984.24	1017.0	1049.9	1082.7	1115.5	1148.3	1181.1	1213.9	1246.7	1279.5
400	1312.3	1345.1	1377.9	1410.7	1443.6	1476.4	1509.2	1542.0	1574.8	1607.6
500	1640.4	1673.2	1706.0	1738.8	1771.6	1804.4	1837.2	1870.1	1902.9	1935.7
600	1968.5	2001.3	2034.1	2066.9	2099.7	2132.5	2165.3	2198.1	2230.9	2263.8
700	2296.6	2329.4	2362.2	2395.0	2427.8	2460.6	2493.4	2526.2	2559.0	2591.8
800	2624.6	2657.4	2690.3	2723.1	2755.9	2788.7	2821.5	2854.3	2887.1	2919.9
900	2952.7	2985.5	3018.3	3051.1	3084.0	3116.8	3149.5	3182.4	3215.2	3248.0
	0	100	200	300	400	500	600	700	800	900
1000	3280.8	3608.9	3937.0	4265.0	4593.1	4921.2	5249.3	5577.4	5905.4	6233.5
2000	6561.6	6889.7	7217.8	7545.8	7873.9	8202.0	8530.1	8858.2	9186.2	9514.3
3000	9842.4	10170	10499	10827	11155	11483	11811	12139	12467	12795
4000	13123	13451	13779	14107	14436	14764	15092	15420	15748	16076
5000	16404	16732	17060	17388	17716	18044	18372	18701	19029	19357
6000	19685	20013	20341	20669	20997	21325	21653	21981	22309	22638
7000	22966	23294	23622	23950	24278	24606	24934	25262	25590	25918
8000	26246	26574	26903	27231	27559	27887	28215	28543	28871	29199
9000	29527	29855	30183	30511	30840	31168	31496	31824	32152	32480

INTENTIONALLY BLANK

QFE mb-in Hg-FT CONVERSION CHART

QFE mb	in. HG	PRESS. ALT. ft	QFE mb	in. HG	PRESS. ALT. ft	QFE mb	in. HG	PRESS. ALT. ft	QFE mb	in. HG	PRESS. ALT. ft
1050	31.01	–989									
1048	30.95	–936	958	28.29	1543	868	25.63	4219	778	22.97	7131
1046	30.89	–883	956	28.23	1601	866	25.57	4281	776	22.92	7199
1044	30.83	–830	954	28.17	1658	864	25.51	4343	774	22.86	7267
1042	30.77	–776	952	28.11	1715	862	25.45	4405	772	22.80	7335
1040	30.71	–723	950	28.05	1773	860	25.40	4468	770	22.74	7402
1038	30.65	–669	948	27.99	1831	858	25.34	4531	768	22.68	7470
1036	30.59	–615	946	27.94	1889	856	25.28	4593	766	22.62	7538
1034	30.53	–562	944	27.88	1947	854	25.22	4656	764	22.56	7607
1032	30.47	–508	942	27.82	2005	852	25.16	4718	762	22.50	7676
1030	30.42	–454	940	27.76	2062	850	25.10	4781	760	22.44	7745
1028	30.36	–400	938	27.70	2120	848	25.04	4844	758	22.38	7815
1026	30.30	–346	936	27.64	2178	846	24.98	4907	756	22.32	7885
1024	30.24	–292	934	27.58	2236	844	24.92	4970	754	22.27	7955
1022	30.18	–238	932	27.52	2294	842	24.86	5033	752	22.21	8025
1020	30.12	–184	930	27.46	2353	840	24.81	5097	750	22.15	8095
1018	30.06	–129	928	27.40	2412	838	24.75	5161	748	22.09	8161
1016	30.00	–74	926	27.34	2471	836	24.69	5225	746	22.03	8231
1014	29.94	–20	924	27.29	2530	834	24.63	5289	744	21.97	8301
1012	29.88	34	922	27.23	2589	832	24.57	5353	742	21.91	8371
1010	29.83	89	920	27.17	2647	830	24.51	5417	740	21.85	8442
1008	29.77	144	918	27.11	2707	828	24.45	5481	738	21.79	8512
1006	29.71	199	916	27.05	2767	826	24.39	5545	736	21.73	8583
1004	29.65	254	914	26.99	2826	824	24.33	5610	734	21.68	8654
1002	29.59	309	912	26.93	2885	822	24.27	5675	732	21.62	8725
1000	29.53	364	910	26.87	2944	820	24.21	5740	730	21.56	8796
998	29.47	419	908	26.81	3004	818	24.16	5805	728	21.50	8867
996	29.41	475	906	26.75	3064	816	24.10	5870	726	21.44	8939
994	29.35	530	904	26.70	3124	814	24.04	5935	724	21.38	9010
992	29.29	586	902	26.64	3183	812	23.98	6000	722	21.32	9082
990	29.23	641	900	26.58	3243	810	23.92	6065	720	21.26	9154
988	29.18	697	898	26.52	3303	808	23.86	6131	718	21.20	9226
986	29.12	753	896	26.46	3363	806	23.80	6197	716	21.14	9298
984	29.06	809	894	26.40	3424	804	23.74	6263	714	21.08	9371
982	29.00	865	892	26.34	3484	802	23.68	6329	712	21.03	9443
980	28.94	921	890	26.28	3545	800	23.62	6394	710	20.97	9516
978	28.88	977	888	26.22	3606	798	23.56	6461	708	20.91	9589
976	28.82	1033	886	26.16	3667	796	23.51	6528	706	20.85	9662
974	28.76	1089	884	26.10	3728	794	23.45	6595	704	20.79	9735
972	28.70	1145	882	26.05	3789	792	23.39	6661	702	20.73	9809
970	28.64	1202	880	25.99	3850	790	23.33	6727	700	20.67	9882
968	28.59	1259	878	25.93	3911	788	23.27	6794	698	20.61	9956
966	28.53	1316	876	25.87	3973	786	23.21	6861	696	20.55	10030
964	28.47	1373	874	25.81	4034	784	23.15	6928	694	20.49	10104
962	28.41	1430	872	25.75	4096	782	23.09	6995	692	20.43	10179
960	28.35	1486	870	25.69	4157	780	23.03	7063	690	20.38	10253

POUNDS TO KILOGRAMS CONVERSION

Example: Convert 156,732 LBS to kilograms.

Solution: The first step is to break 156,732 lbs into various smaller weights as follows:

156,732 lbs = 90,000 lbs + 66,000 lbs + 730 lbs + 2 lbs

The second step is to convert each one of these weights into kilograms from the table:

90,000 lbs	=	40,824 KGS
66,000 lbs	=	29,937 KGS
730 lbs	=	331.1 KGS
2 lbs	=	.91 KGS
156,732 lbs	=	71,093.01 KGS

Therefore, summing up:

156,732 lbs = 71,093.01 KGS

POUNDS TO KILOGRAMS CONVERSION CHART

LBS	0	1	2	3	4	5	6	7	8	9
0	0	0.45	0.91	1.36	1.81	2.27	2.72	3.18	3.63	4.08
10	4.5	5.0	5.4	5.9	6.4	6.8	7.3	7.7	8.2	8.6
20	9.1	9.5	10.0	10.4	10.9	11.3	11.8	12.2	12.7	13.2
30	13.6	14.1	14.5	15.0	15.4	15.9	16.3	16.8	17.2	17.7
40	18.1	18.6	19.1	19.5	20.0	20.4	20.9	21.3	21.8	22.2
50	22.7	23.1	23.6	24.0	24.5	24.9	25.4	25.9	26.3	26.8
60	27.2	27.7	28.1	28.6	29.0	29.5	29.9	30.4	30.8	31.3
70	31.8	32.2	32.7	33.1	33.6	34.0	34.5	34.9	35.4	35.8
80	36.3	36.7	37.2	37.6	38.1	38.6	39.0	39.5	39.9	40.4
90	40.8	41.3	41.7	42.2	42.6	43.1	43.5	44.0	44.5	44.9
LBS	0	10	20	30	40	50	60	70	80	90
100	45.4	49.9	54.4	59.0	63.5	68.0	72.6	77.1	81.7	86.2
200	90.7	95.3	99.8	104.3	108.9	113.4	117.9	122.5	127.0	131.5
300	136.1	140.6	145.2	149.7	154.2	158.8	163.3	167.8	172.4	176.9
400	181.4	186.0	190.5	195.1	199.6	204.1	208.7	213.2	217.7	222.3
500	226.8	231.3	235.9	240.4	244.9	249.5	254.0	258.6	263.1	267.6
600	272.2	276.7	281.2	285.8	290.3	294.8	299.4	303.9	308.5	313.0
700	317.5	322.1	326.6	331.1	335.7	340.2	344.7	349.3	353.8	358.3
800	362.9	367.4	372.0	376.5	381.0	385.6	390.1	394.6	399.2	403.7
900	408.2	412.8	417.3	421.9	426.4	430.9	435.5	440.0	444.5	449.1
LBS	0	100	200	300	400	500	600	700	800	900
1000	453.6	499.0	544.3	589.7	635.0	680.4	725.8	771.1	816.5	861.8
2000	907.2	952.6	997.9	1043	1089	1134	1179	1225	1270	1315
3000	1361	1406	1452	1497	1542	1588	1633	1678	1724	1769
4000	1814	1860	1905	1951	1996	2041	2087	2132	2177	2223
5000	2268	2313	2359	2404	2449	2495	2540	2586	2631	2676
6000	2722	2767	2812	2858	2903	2948	2994	3039	3085	3130
7000	3175	3221	3266	3311	3357	3402	3447	3493	3538	3583
8000	3629	3674	3720	3765	3810	3856	3901	3946	3992	4037
9000	4082	4128	4173	4219	4264	4309	4355	4400	4445	4491
LBS	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
10000	4536	4990	5443	5897	6350	6804	7258	7711	8165	8618
20000	9072	9526	9979	10433	10886	11340	11794	12247	12701	13154
30000	13608	14062	14515	14969	15422	15876	16329	16783	17237	17690
40000	18144	18597	19051	19505	19958	20412	20865	21319	21773	22226
50000	22680	23133	23587	24041	24494	24948	25401	25855	26309	26762
60000	27216	27669	28123	28577	29030	29484	29937	30391	30845	31298
70000	31752	32205	32659	33113	33566	34020	34473	34927	35381	35834
80000	36288	36741	37195	37649	38102	38556	39009	39463	39917	40370
90000	40824	41277	41731	42185	42638	43092	43545	43999	44453	44906
LBS	0	10000	20000	30000	40000	50000	60000	70000	80000	90000
100000	45359	49895	54431	58967	63503	68039	72575	77111	81647	86183
200000	90718	95254	99790	104326	108862	113398	117934	122470	127006	131542
300000	136077	140613	145149	149685	154221	158757	163293	167829	172365	176901
400000	181436	185972	190508	195044	199580	204116	208652	213188	217724	222260
500000	226795	231331	235867	240403	244939	249475	254011	258547	263083	267619
600000	272154	276690	281226	285762	290298	294834	299370	303906	308442	312978
700000	317513	322049	326585	331121	335657	340193	344729	349265	353801	358337
800000	362872	367408	371944	376480	381016	385552	390088	394624	399160	403696
900000	408231	412767	417303	421839	426375	430911	435447	439983	444519	449055

CAG(IGDS) DB1-4-3

KILOGRAMS TO POUNDS CONVERSION

Example: Convert 61,572 kilograms to pounds.

Solution: The first step is to break 61,572 kg into various smaller weights as follows:

61,572 kg = 61,000 kg + 570 kg + 2 kg

The second step is to convert each one of these weights into pounds from the table:

61,000 kg	=	134,481 lb
570 kg	=	1,257 lb
2 kg	=	4.4 lb
61,572 kg	=	135,742.4 lb

Therefore, summing up:

61,572 kilograms = 135,742.4 pounds

KILOGRAMS TO POUNDS CONVERSION CHART

KGS	0	1	2	3	4	5	6	7	8	9
0	0	2.2	4.4	6.6	8.8	11.0	13.2	15.4	17.6	19.8
10	22.0	24.3	26.5	28.7	30.9	33.1	35.3	37.5	39.7	41.9
20	44.1	46.3	48.5	50.7	52.9	55.1	57.3	59.5	61.7	63.9
30	66.1	68.3	70.5	72.8	75.0	77.2	79.4	81.6	83.8	86.0
40	88.2	90.4	92.6	94.8	97.0	99.2	101.4	103.6	105.8	108.0
50	110.2	112.4	114.6	116.8	119.0	121.3	123.5	125.7	127.9	130.1
60	132.3	134.5	136.7	138.9	141.1	143.3	145.5	147.7	149.9	152.1
70	154.3	156.5	158.7	160.9	163.1	165.3	167.5	169.8	172.0	174.2
80	176.4	178.6	180.8	183.0	185.2	187.4	189.6	191.8	194.0	196.2
90	198.4	200.6	202.8	205.0	207.2	209.4	211.6	213.8	216.1	218.3
KGS	0	10	20	30	40	50	60	70	80	90
100	220.5	242.5	264.6	286.6	308.6	330.7	352.7	374.8	396.8	418.9
200	440.9	463.0	485.0	507.1	529.1	551.2	573.2	595.2	617.3	639.3
300	661.4	683.4	705.5	727.5	749.6	771.6	793.7	815.7	837.7	859.8
400	881.8	903.9	925.9	948.0	970.0	992.1	1014	1036	1058	1080
500	1102	1124	1146	1168	1190	1213	1235	1257	1279	1301
600	1323	1345	1367	1389	1411	1433	1455	1477	1499	1521
700	1543	1565	1587	1609	1631	1653	1675	1698	1720	1742
800	1764	1786	1808	1830	1852	1874	1896	1918	1940	1962
900	1984	2006	2028	2050	2072	2094	2116	2138	2161	2183
KGS	0	100	200	300	400	500	600	700	800	900
1000	2205	2425	2646	2866	3086	3307	3527	3748	3968	4189
2000	4409	4630	4850	5071	5291	5512	5732	5952	6173	6393
3000	6614	6834	7055	7275	7496	7716	7937	8157	8377	8598
4000	8818	9039	9259	9480	9700	9921	10141	10362	10582	10803
5000	11023	11243	11464	11684	11905	12125	12346	12566	12787	13007
6000	13228	13448	13669	13889	14109	14330	14550	14771	14991	15212
7000	15432	15653	15873	16094	16314	16535	16755	16975	17196	17416
8000	17637	17857	18078	18298	18519	18739	18960	19180	19400	19621
9000	19841	20062	20282	20503	20723	20944	21164	21385	21605	21826
KGS	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
10000	22046	24251	26455	28660	30864	33069	35274	37478	39683	41887
20000	44092	46297	48501	50706	52910	55115	57320	59524	61729	63933
30000	66138	68343	70547	72752	74956	77161	79366	81570	83775	85979
40000	88184	90389	92593	94798	97002	99207	101412	103616	105821	108025
50000	110230	112435	114639	116844	119048	121253	123458	125662	127867	130071
60000	132276	134481	136685	138890	141094	143299	145504	147708	149913	152117
70000	154322	156527	158731	160936	163140	165345	167550	169754	171959	174163
80000	176368	178573	180777	182982	185186	187391	189596	191800	194005	196209
90000	198414	200619	202823	205028	207232	209437	211642	213846	216051	218255
KGS	0	10000	20000	30000	40000	50000	60000	70000	80000	90000
100000	220460	242506	264552	286598	308644	330690	352736	374782	396828	418874
200000	440920	462966	485012	507058	529104	551150	573196	595242	617288	639334
300000	661380	683426	705472	727518	749564	771610	793656	815702	837748	859794
400000	881840	903886	925932	947978	970024	992070	1014116	1036162	1058208	1080254

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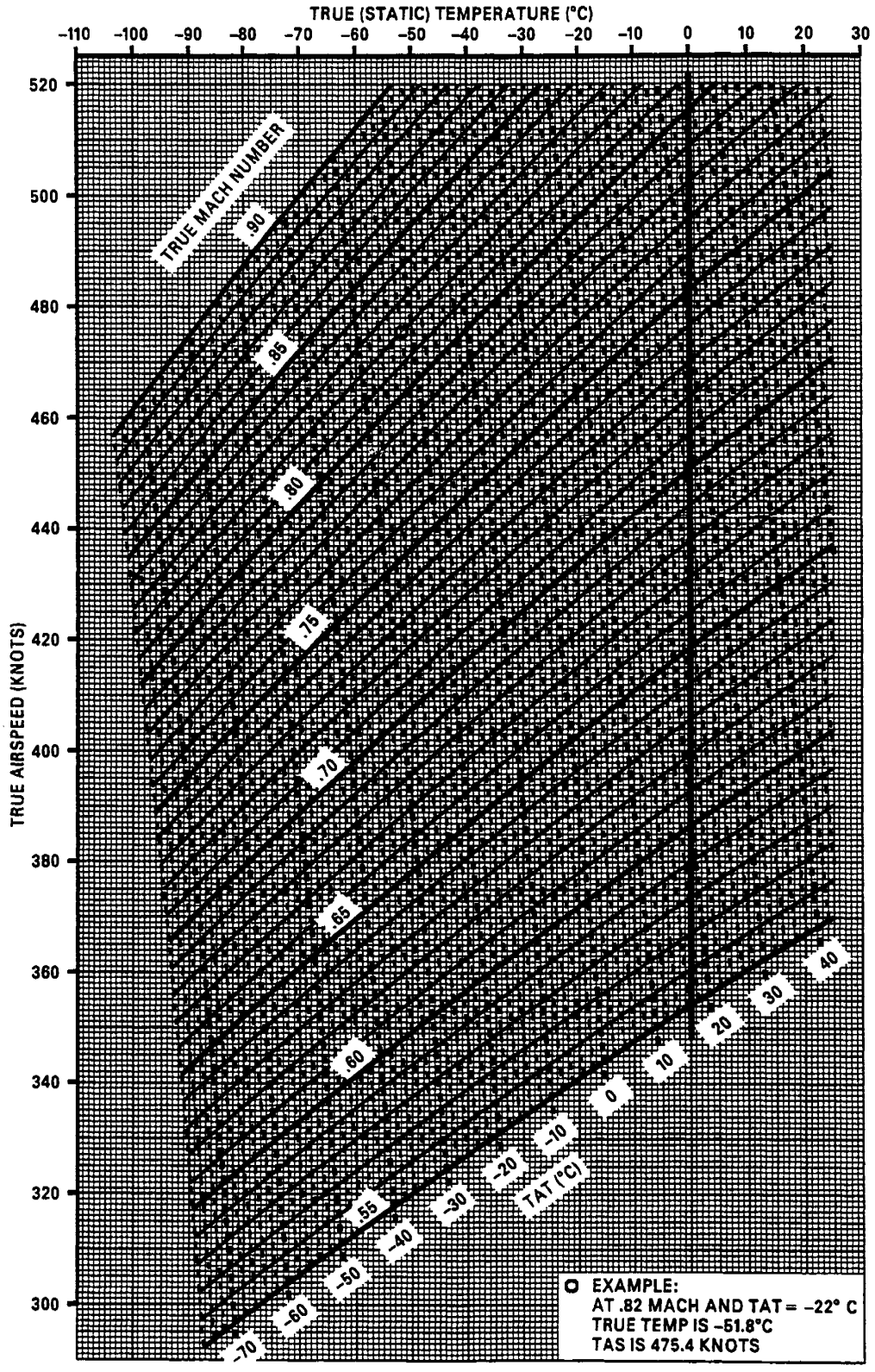
MACH AND TEMPERATURE TO TRUE AIRSPEED CONVERSION



CAG(IGDS)

DB1-4-5A

WIND COMPONENT

HEADWIND COMPONENT (KTS)

DEG *	REPORTED WIND SPEED (KTS)															
	10	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**
10	10	12	14	16	18	20	22	24	26	28	30	32	33	35	37	39
20	9	11	13	15	17	19	21	23	24	26	28	30	32	34	36	38
30	9	10	12	14	16	17	19	21	23	24	26	28	29	31	33	35
40	8	9	11	12	14	15	17	18	20	21	23	25	26	28	29	31
50	6	8	9	10	12	13	14	15	17	18	19	21	22	23	24	26
60	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
70	3	4	5	5	6	7	8	8	9	10	10	11	12	12	13	14
80	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CROSSWIND COMPONENT (KTS)

DEG *	REPORTED WIND SPEED (KTS)															
	10	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**
10	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7
20	3	4	5	5	6	7	8	8	9	10	10	11	12	12	13	14
30	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
40	6	8	9	10	12	13	14	15	17	18	19	21	22	23	24	26
50	8	9	11	12	14	15	17	18	20	21	23	25	26	28	29	31
60	9	10	12	14	16	17	19	21	23	24	26	28	29	31	33	35
70	9	11	13	15	17	19	21	23	24	26	28	30	32	34	36	38
80	10	12	14	16	18	20	22	24	26	28	30	32	33	35	37	39
90	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40

* Wind direction, in degrees, off runway heading.

Example:

Runway – 330°
Wind Direction – 020°
Wind Speed – 28 Kts

Solution:

Headwind Component = 18 Kts

Crosswind Component = 21 Kts

FUEL CONVERSION CHART

U.S. GAL ←	LB	→ L	U.S. GAL ←	LB	→ L
.15	1	.56	149	1,000	565
.30	2	1.1	299	2,000	1130
.45	3	1.7	448	3,000	1695
.60	4	2.3	597	4,000	2260
.75	5	2.8	746	5,000	2825
.90	6	3.4	896	6,000	3390
1.0	7	4.0	1045	7,000	3955
1.2	8	4.5	1194	8,000	4520
1.3	9	5.1	1343	9,000	5085
1.5	10	5.6	1493	10,000	5650
3.0	20	11.3	2985	20,000	11299
4.5	30	16.9	4478	30,000	16949
6.0	40	22.6	5970	40,000	22599
7.5	50	28.2	7463	50,000	28249
9.0	60	33.9	8955	60,000	33898
10.4	70	39.5	10448	70,000	39548
11.9	80	45.2	11940	80,000	45198
13.4	90	50.8	13433	90,000	50847
15	100	56	14926	100,000	56497
30	200	113	29851	200,000	112994
45	300	169	44776	300,000	169491
60	400	226			
75	500	282			
90	600	339			
104	700	395			
119	800	452			
134	900	508			

NOTES: 1 US GAL = 6.7 LB
1 LITER = 1.77 LB

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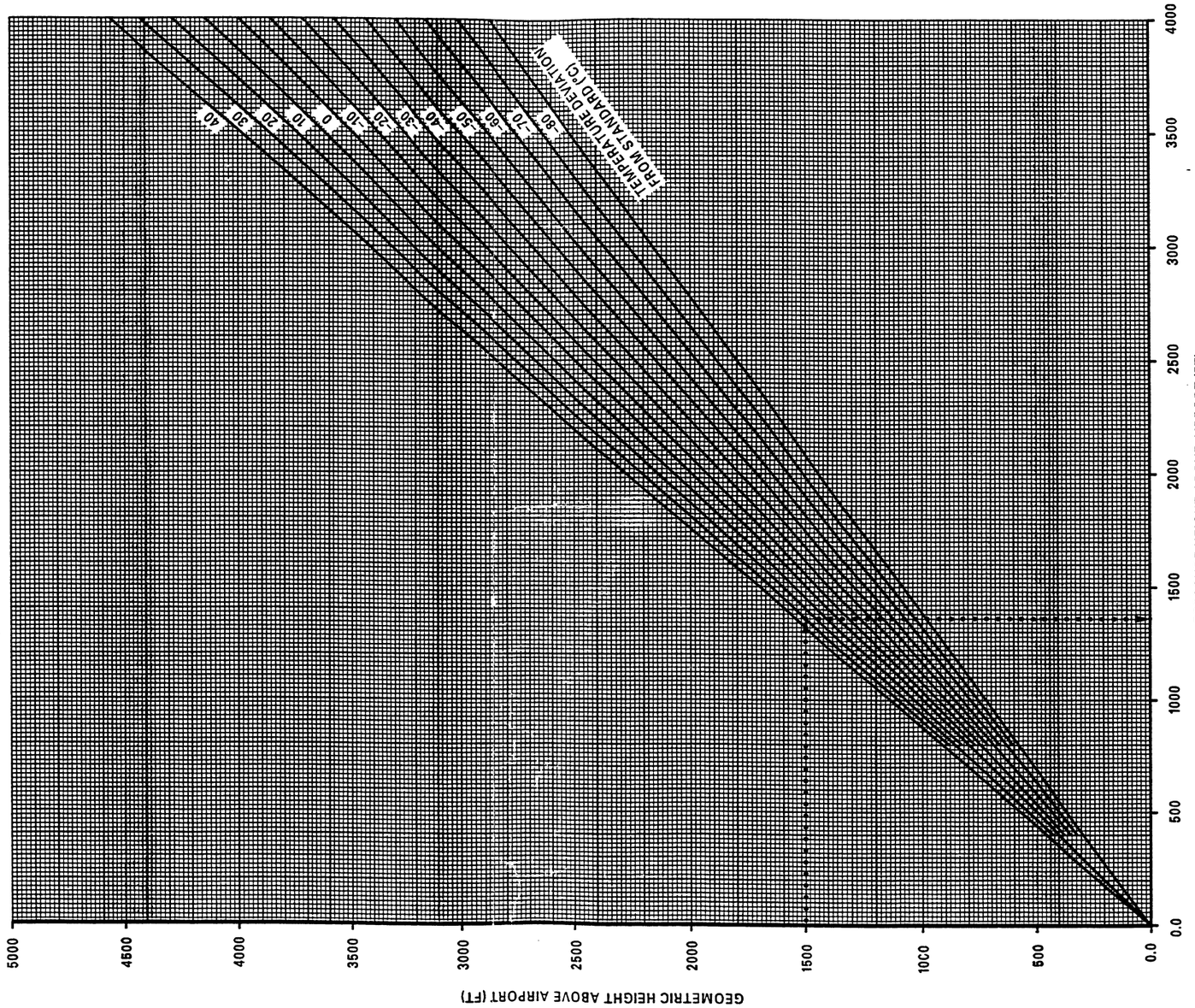
GEOMETRIC HEIGHT ABOVE AIRPORT TO PRESSURE HEIGHT ABOVE AIRPORT CONVERSION CHART



SAMPLE PROBLEM
AIRPORT PRESSURE ALTITUDE = 2000 FT
TEMP. DEVIATION FROM STD = +30°
GEOMETRIC HEIGHT ABOVE AIRPORT = 1500 FT
PRESSURE HEIGHT ABOVE AIRPORT = 1360 FT
HEIGHT OF 1500 FT ABOVE AIRPORT = 2000 + 1360 = 3360 FT

CAG(IGDS) DATA SOURCE: MDC–K0031, SECTION 4, PAGE 14–1, DATED 11–16–89

DB1–4–1003

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LIMITATIONS

TABLE OF CONTENTS

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INTRODUCTION

This section contains charts and graphs which are to be used to determine performance and operating limitations. Other graphs have been provided to determine design speeds and weight and balance limitations.

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CERTIFICATE LIMITATIONS

This airplane must be operated in compliance with the limitations contained in the Limitations section of Volume II, Page L.10.1.

ALL WEIGHT LIMITATIONS ARE LOCATED IN

THE LIMITATIONS SECTION OF VOLUME II, PAGE L.10.1.

PERFORMANCE AND OPERATING LIMITATIONS

The takeoff weight (weight at brake release or at start of takeoff roll) is limited by the most restrictive of the following:

A. Maximum takeoff weight for altitude and temperature at second segment climb from the Composite Takeoff Performance chart.

B. Takeoff Weight Limited by Fuel Dumping.

C. Takeoff field length limitation determined from the Composite Takeoff Performance charts.

D. Tire Speed Limiting Weight.

E. Enroute and landing operating requirements.

F. Obstacle clearance determined from Obstacle Clearance Takeoff Flight Path charts.

The landing weight is limited by the most restrictive of the following requirements:

A. Landing field length requirements determined from Landing Field Length and Speed charts.

B. Maximum approach and landing climb weight for altitude and temperature determined from the Approach Climb Limiting Weight charts.

Minimum ground time after landing may be determined from the applicable Maximum Permissible Quick Turn-Around Landing Weight chart.

OPERATIONAL LIMITATIONS

Runway slope ± 2%.

Limiting tailwind component is 10 knots.

Maximum demonstrated crosswind component is 35 knots.

Maximum operating altitude is 43,200 feet.

Maximum takeoff and landing altitude is 10,000 feet.*

Minimum takeoff and landing altitude is –1900 feet.**

Maximum takeoff and landing temperature is +50°C below 2525 feet; STD +40°C from 2525 to 10,000 feet.*

Minimum takeoff and landing temperature is –54°C.**

Maximum enroute temperature from Sea Level to 36,089 feet is STD +35°C; from 36,089 feet to 43,200 feet maximum temperature reduces from -21.5°C to -35.6°C.

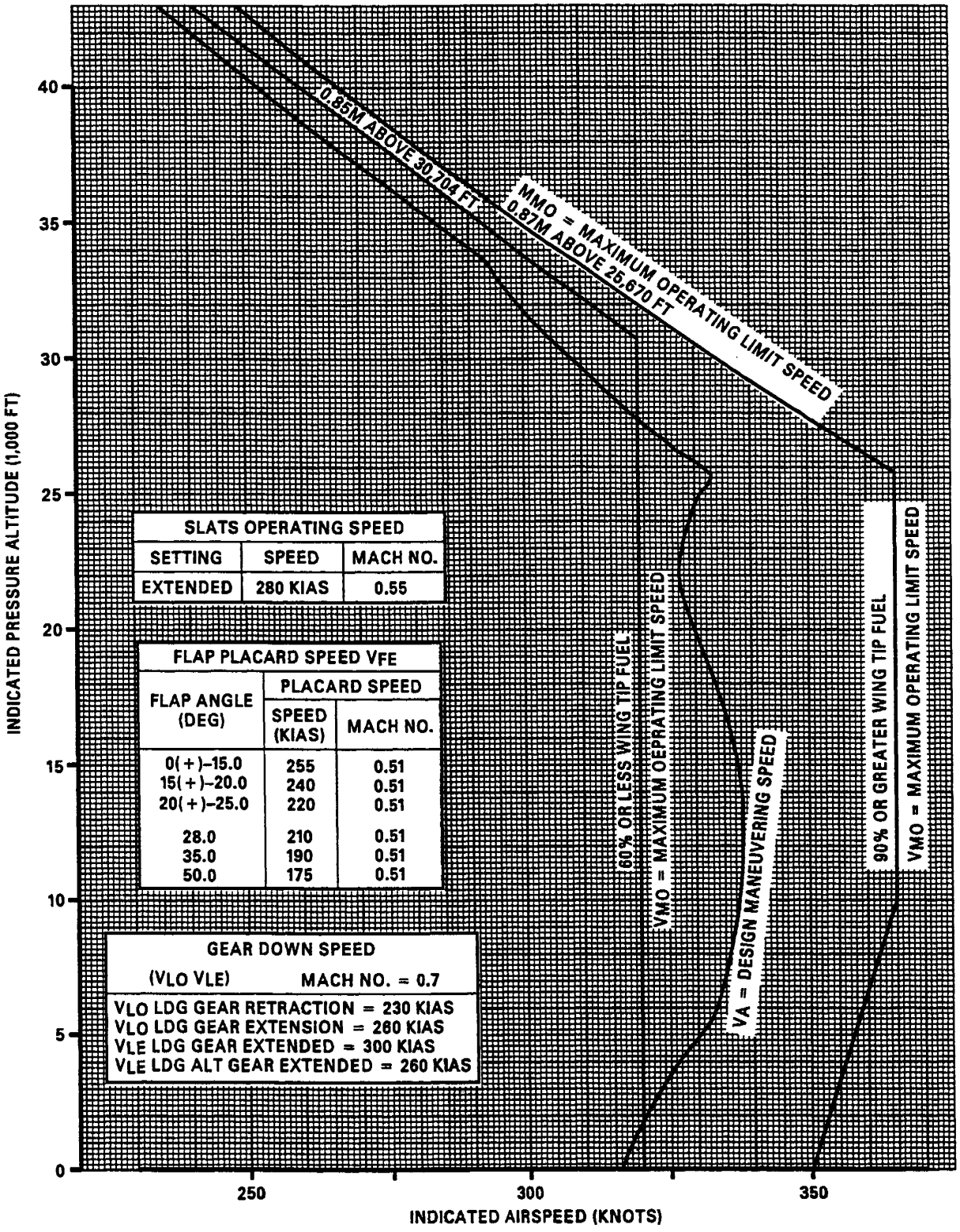
Minimum enroute temperature is –82°C.**

Maximum operating limit speed V_{MO}/M_{MO} may not be deliberately exceeded in any regime of flight (climb, cruise or descent).

* Operation is not permitted at temperatures or altitudes exceeding either those noted above or those for which performance is presented. In no case may the performance be extrapolated beyond the temperature or altitude for which performance is presented.

** For operation at temperatures and/or altitudes lower than those given on the applicable performance pages, use the performance at the lowest temperature and/or altitude shown.

MAXIMUM OPERATING SPEEDS



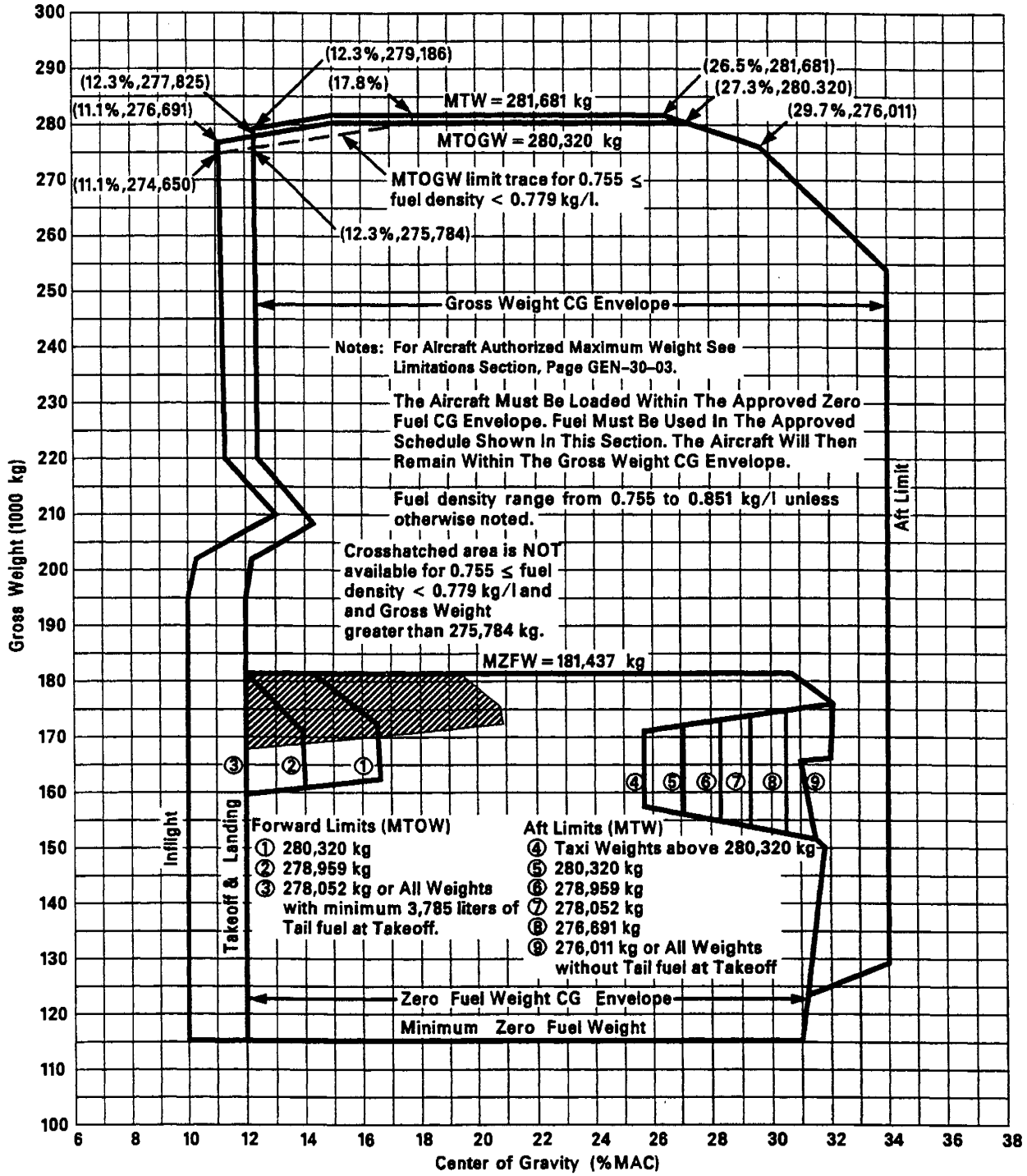
SLATS OPERATING SPEED		
SETTING	SPEED	MACH NO.
EXTENDED	280 KIAS	0.55

FLAP PLACARD SPEED V_{FE}		
FLAP ANGLE (DEG)	PLACARD SPEED	
	SPEED (KIAS)	MACH NO.
0(+)–15.0	255	0.51
15(+)–20.0	240	0.51
20(+)–25.0	220	0.51
28.0	210	0.51
35.0	190	0.51
50.0	175	0.51

GEAR DOWN SPEED	
(V_{LO} V_{LE})	MACH NO. = 0.7
V_{LO} LDG GEAR RETRACTION = 230 KIAS	
V_{LO} LDG GEAR EXTENSION = 260 KIAS	
V_{LE} LDG GEAR EXTENDED = 300 KIAS	
V_{LE} LDG ALT GEAR EXTENDED = 260 KIAS	

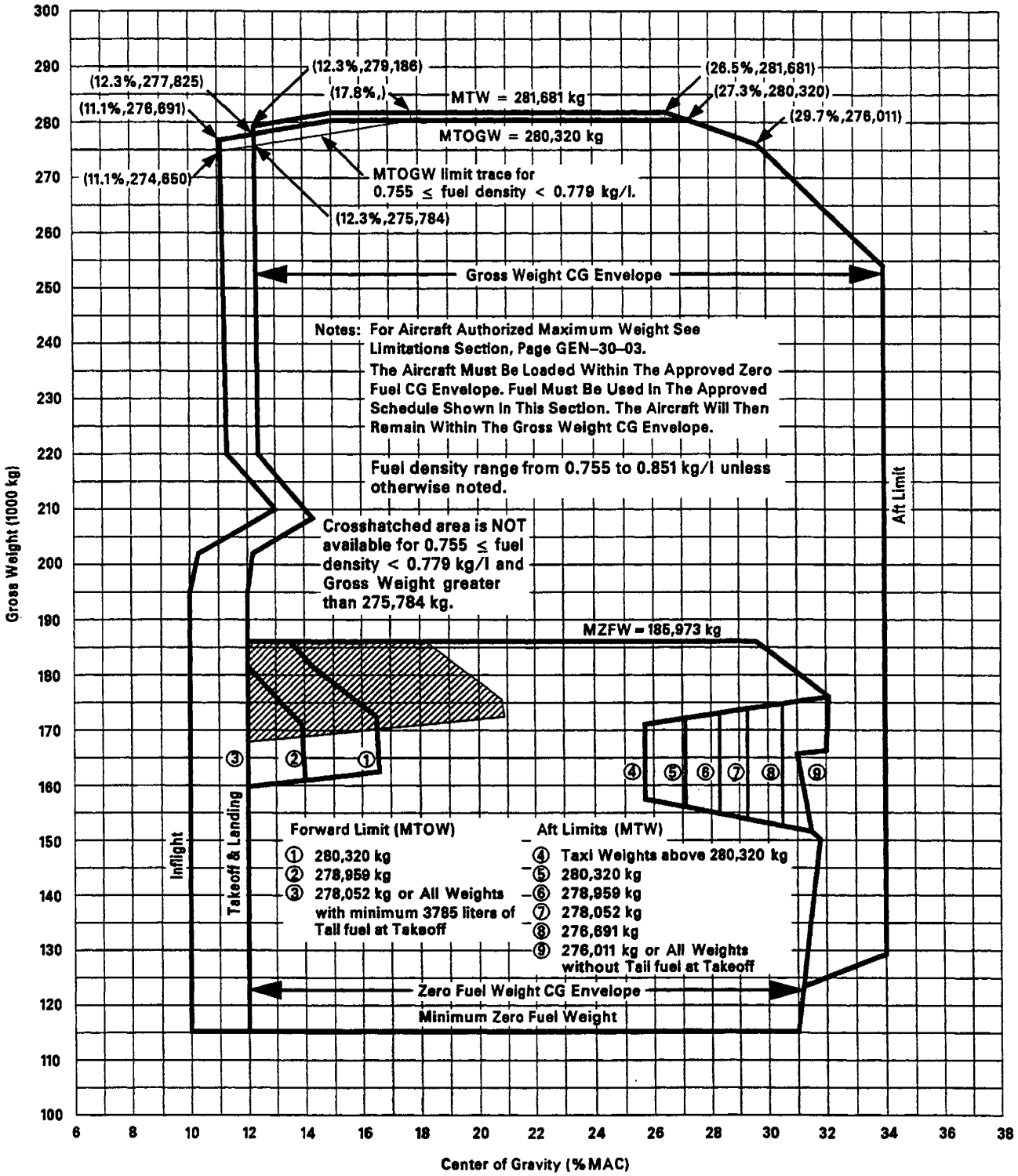
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-2, DATED 3-8-91 DB1-4-1034

Center of Gravity Envelope
MTOGW = 280,320 kg
MZFW = 181,437 kg



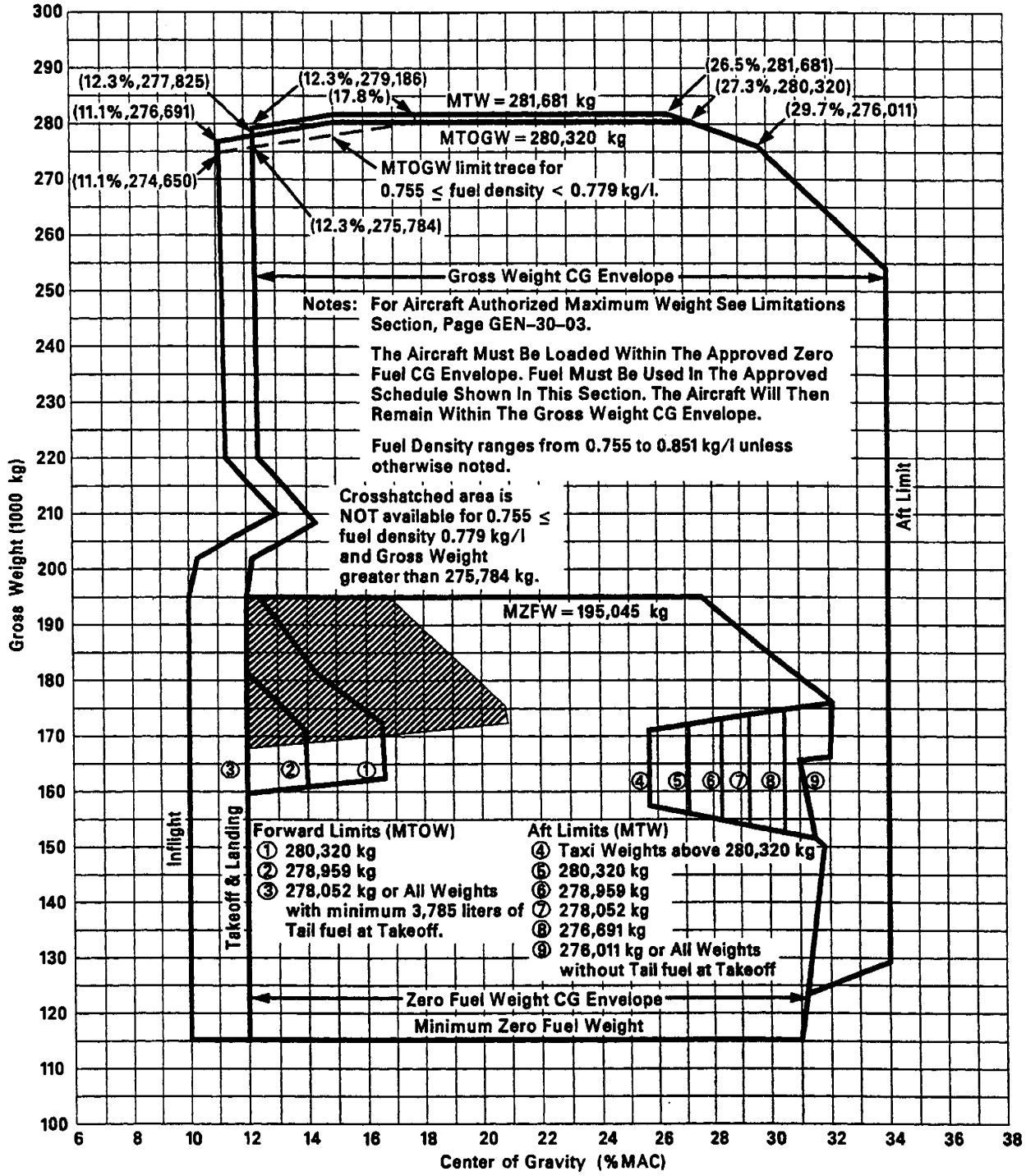
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-7, DATED 2-20-93 DB1-4-1086A

Center of Gravity Envelope
MTOGW = 280,320 kg
MZFW = 185,973 kg



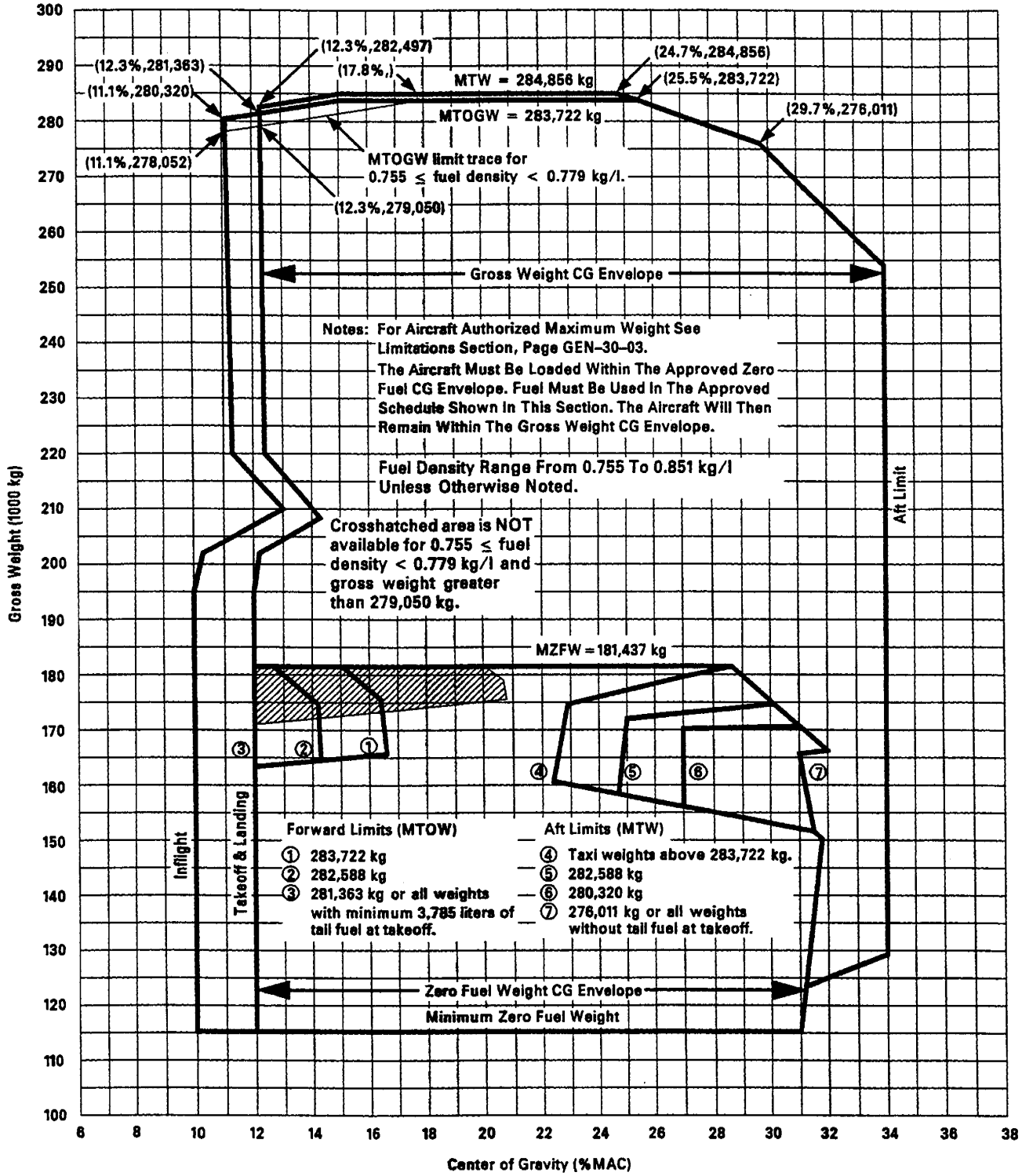
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-5, DATED 6-1-93 DB1-4-1025B

Center of Gravity Envelope
MTOGW = 280,320 kg
MZFW = 195,045 kg



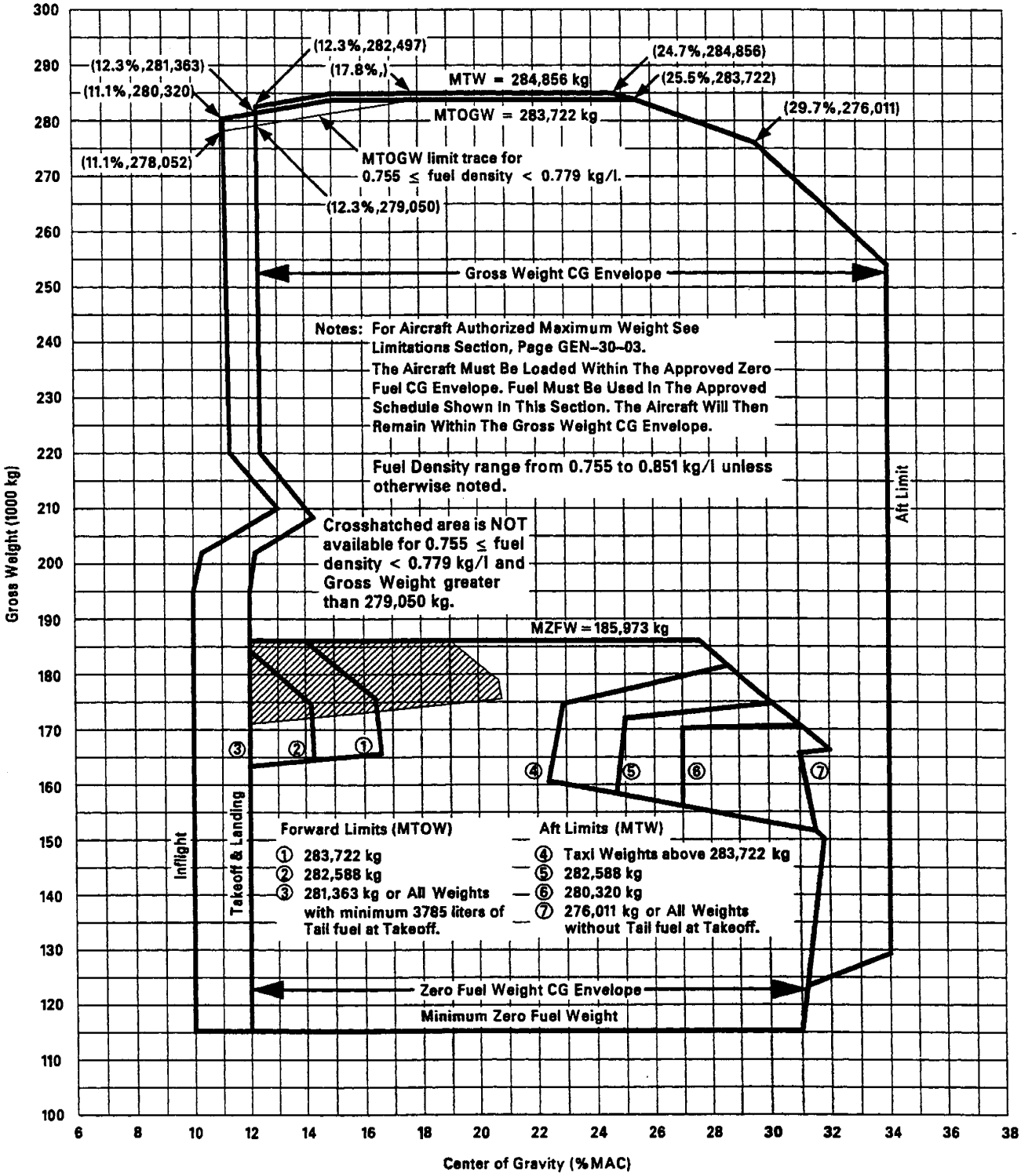
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-6, DATED 2-20-93 DB1-4-1087A

Center of Gravity Envelope
MTOGW = 283,722 kg
MZFW = 181,437 kg



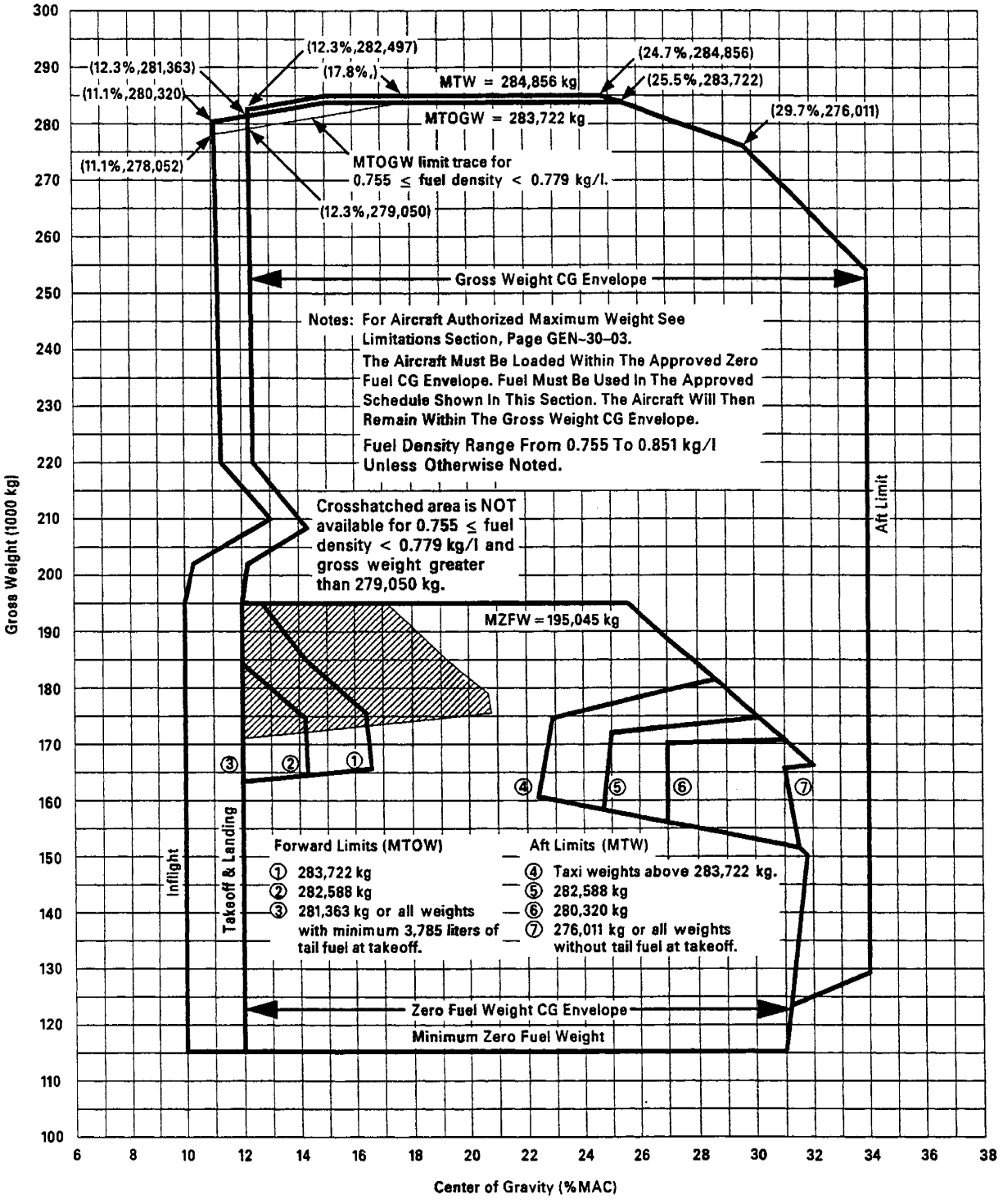
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-9, DATED 4-15-94 DB1-4-1123

Center of Gravity Envelope
MTOGW = 283,722 kg
MZFW = 185,973 kg



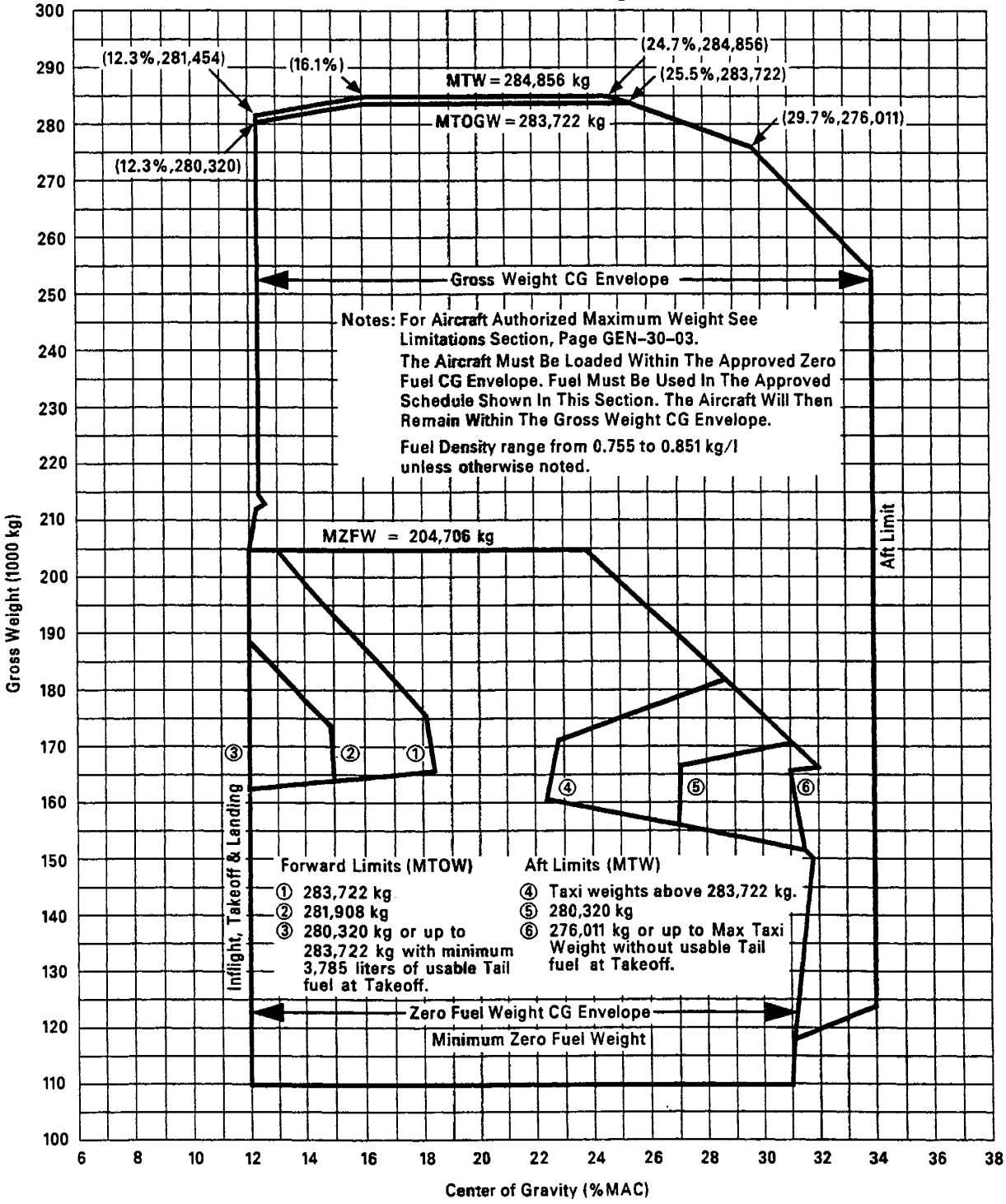
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-8, DATED 6-1-93 DB1-4-1106

Center of Gravity Envelope
MTOGW = 283,722 kg
MZFW = 195,045 kg



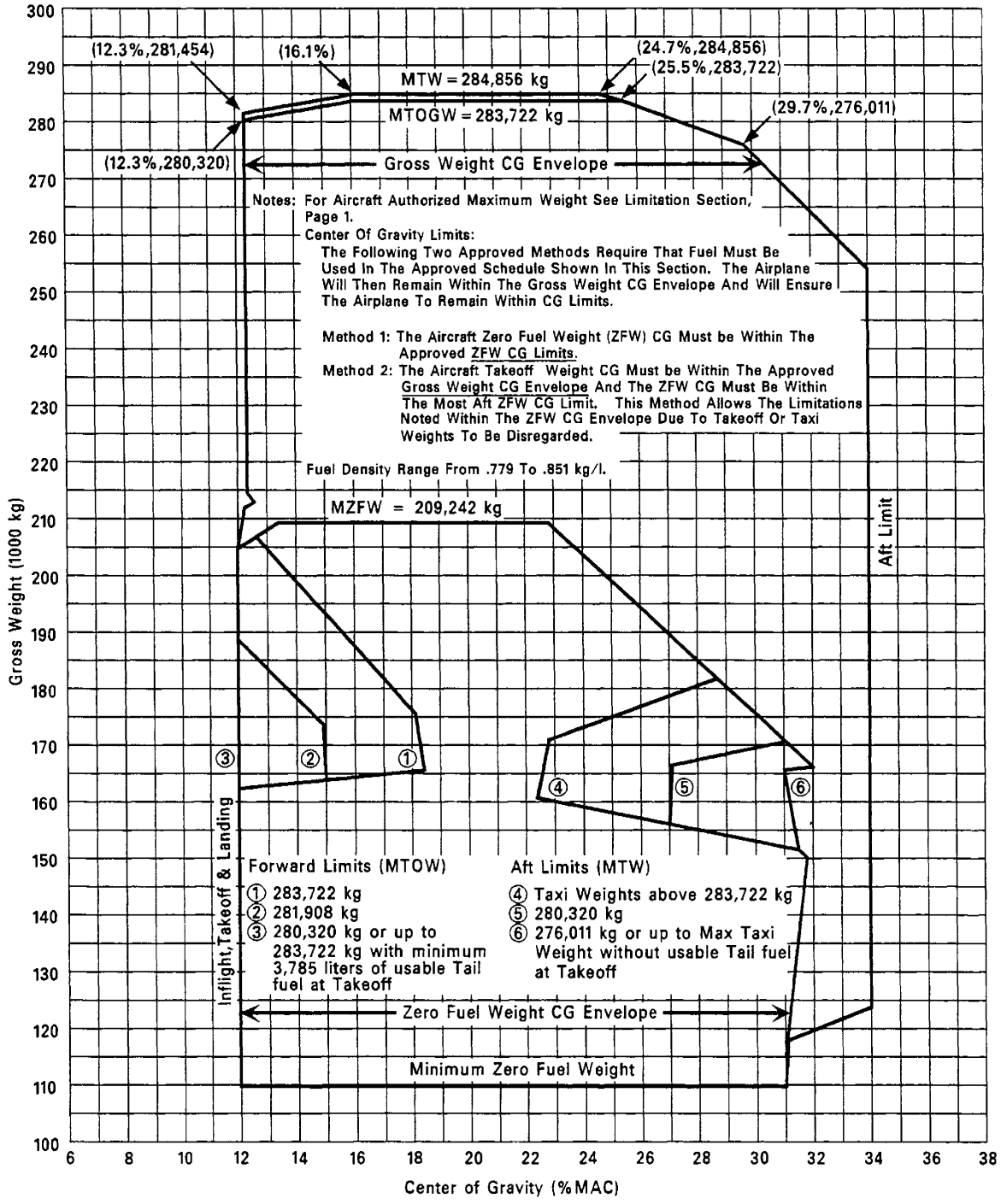
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-4, DATED 3-15-94 DB1-4-1105B

CENTER OF GRAVITY ENVELOPE
(Freighter Configuration Only)
MTOGW = 283,722 kg
MZFW = 204,706 kg



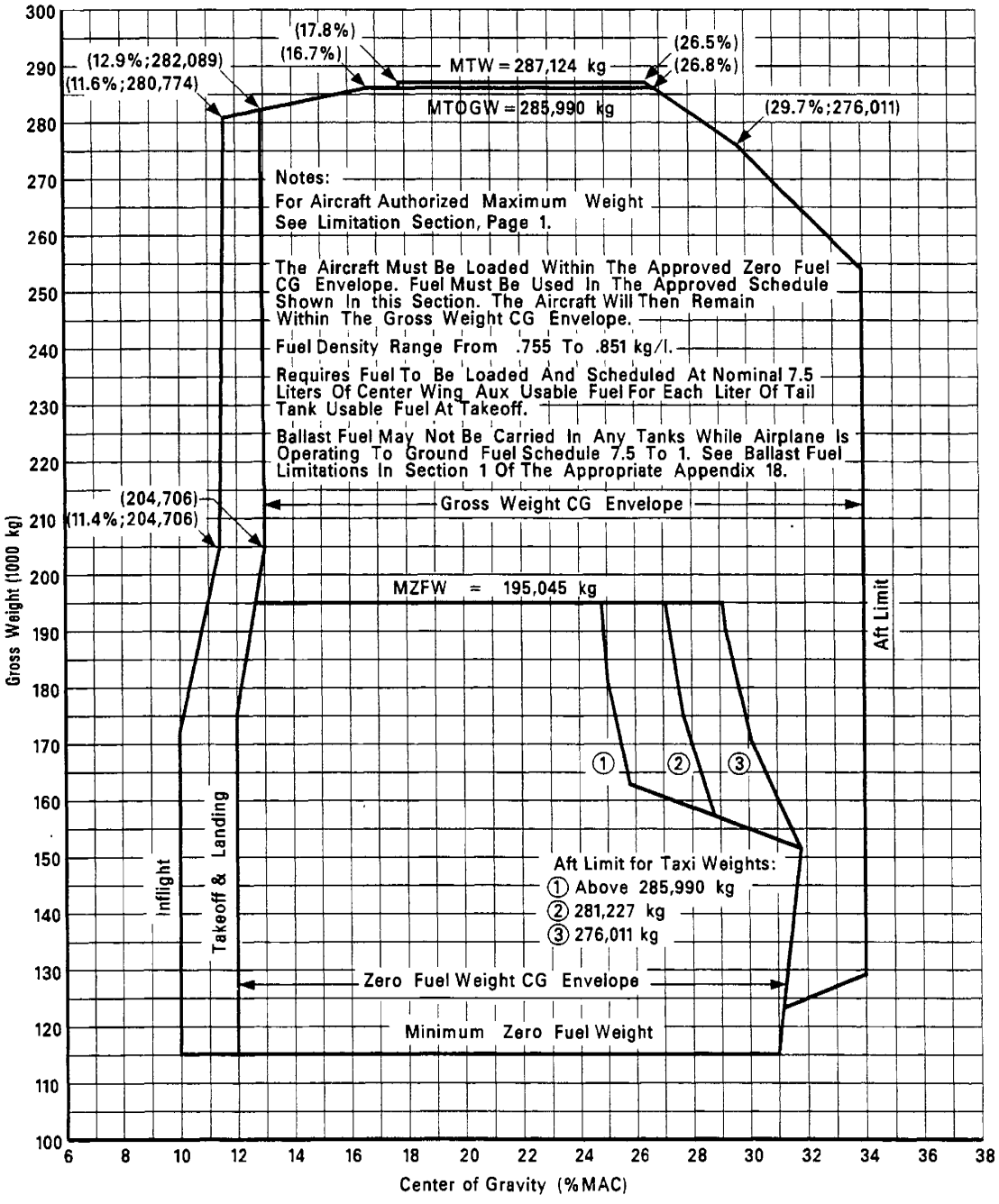
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-10, DATED 1-1-95 DB1-4-1135

Center of Gravity Envelope
MTOGW = 283,722 kg
MZFW = 209,242 kg



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-6(J), DATED 5-5-98 DB1-4-1140

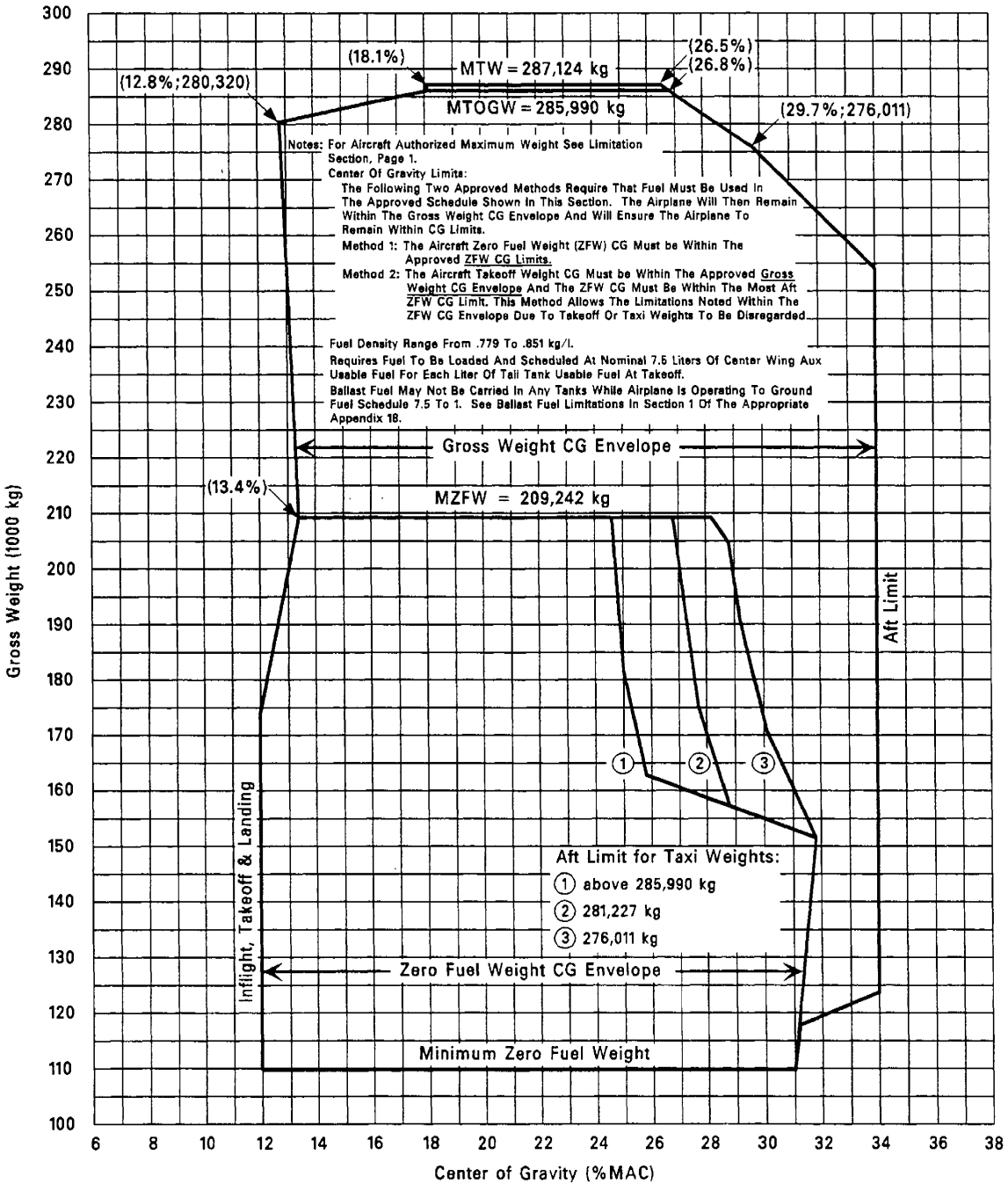
Center Of Gravity Envelope
Ground Fuel Schedule Ratio Of 7.5 To 1
MTOGW = 285,990 kg
MZFW = 195,045 kg



CAG(IGDS)

DB1-4-1141

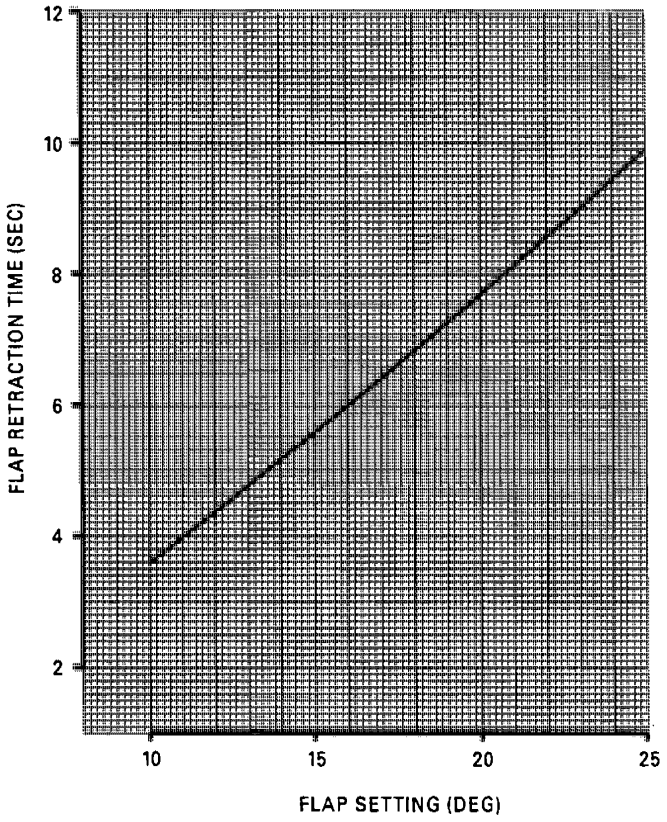
Center of Gravity Envelope
Ground Fuel Schedule Of 7.5 to 1
MTOGW = 285,990 kg
MZFW = 209,242 kg



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 2-7(J), DATED 5-5-98 DB1-4-1136A

SLAT AND FLAP RETRACTION TIMES

SLAT RETRACTION TIME = 11.5 SECONDS



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 5-1, DATED 9-11-90 DB1-4-1031

POWER SETTING LIMITATIONS

GE CF6-80C2DIF ENGINES

FUEL GRADE: Kerosene type fuels {MIL-T-5624 (JP-5), MIL-T-83133 (JP-8) and ASTM D 1655 (JET-A and A1)}

OPERATING LIMITS: MAXIMUM RPM

N_1	N_2
117.5%	112.5%

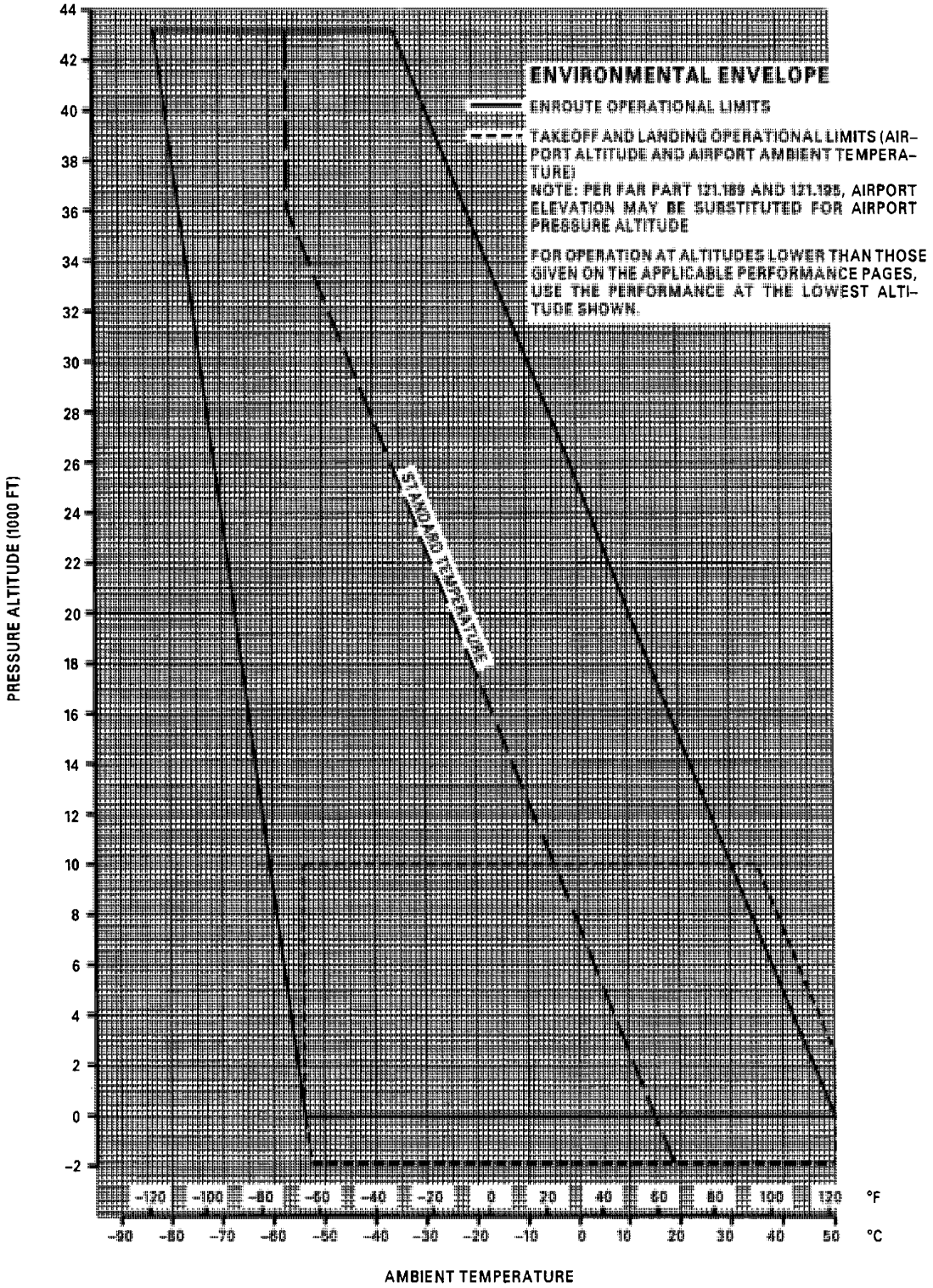
MAXIMUM EGT:

CONDITION	EGT LIMIT (°C)	TIME LIMIT
STARTING	750	NO TIME LIMIT
STARTING	870	40 SECONDS
MAXIMUM CONTINUOUS	925	CONTINUOUS
TAKEOFF	960	5 MINUTES

MAXIMUM OIL TEMPERATURE: 160°C CONTINUOUS/160–175°C (15 minutes)

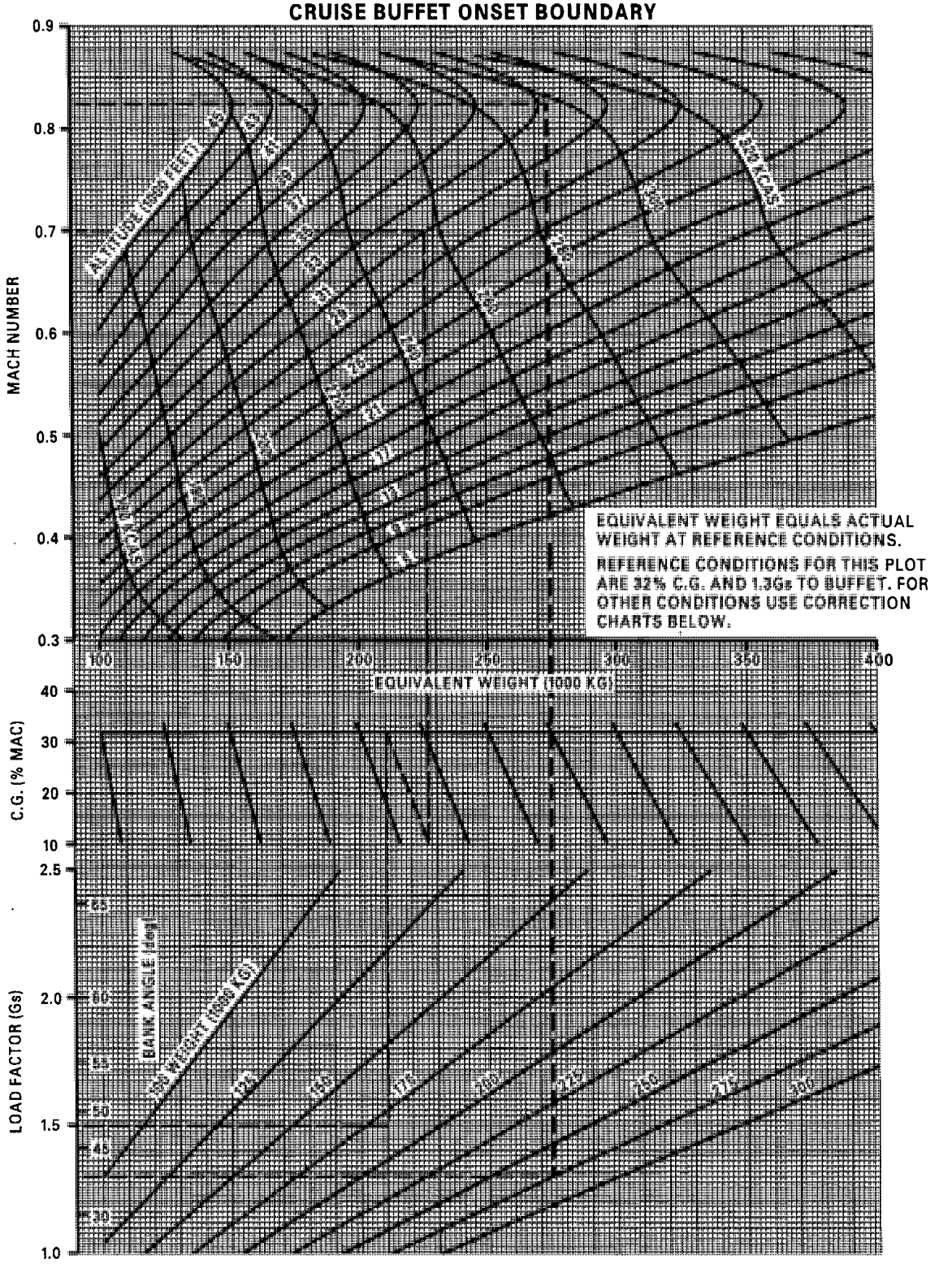
MINIMUM OIL PRESSURE: 9.5 psid

LOWER OIL PRESSURE CAUTION BAND: 10-34 psid



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 1, PAGE 3-2, DATED 9-18-90 DB1-4-1002

CRUISE BUFFET ONSET BOUNDARY



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 10-2, DATED 11-01-91 DB1-4-1026A

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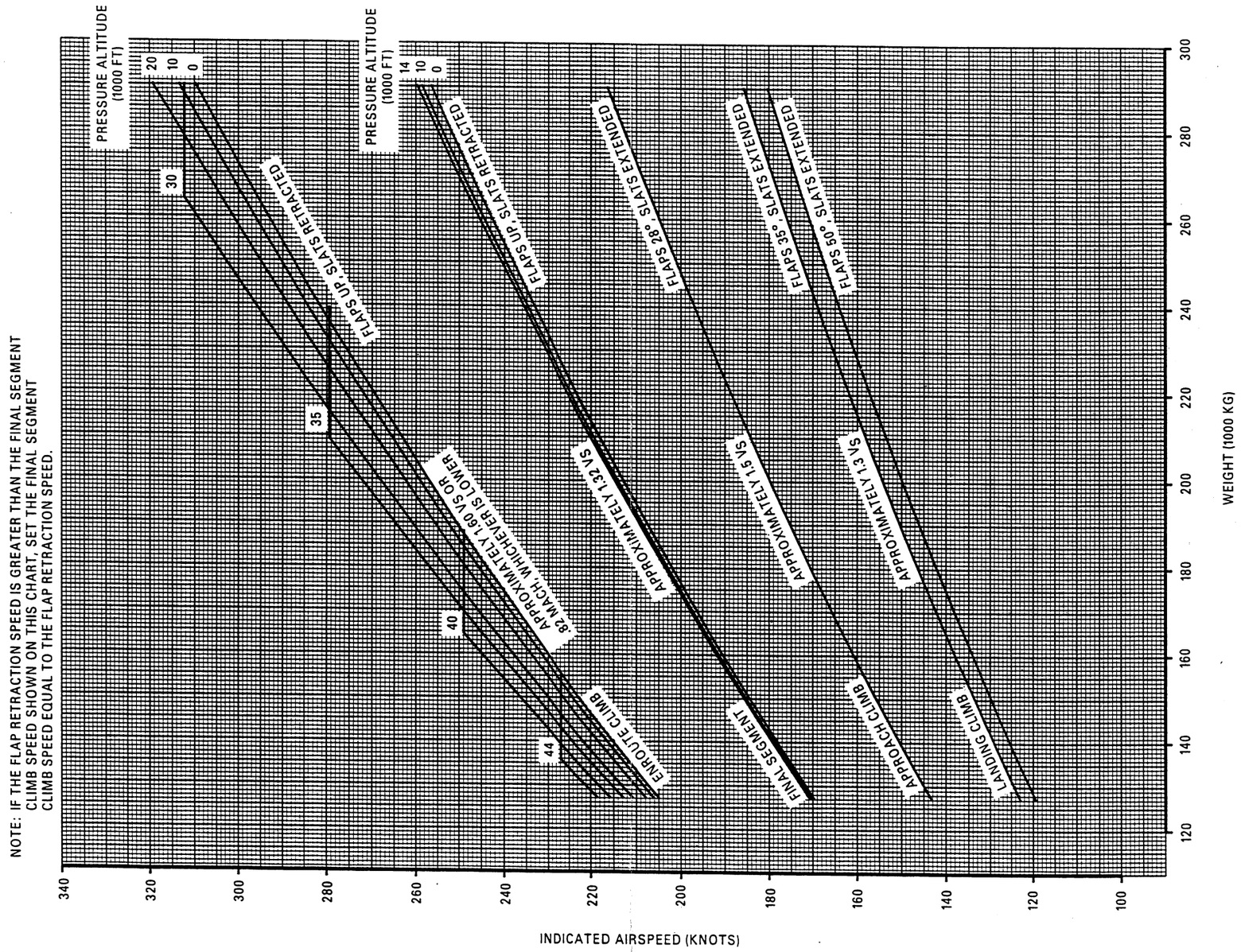
CLIMB SPEEDS



NOTE: IF THE FLAP RETRACTION SPEED IS GREATER THAN THE FINAL SEGMENT CLIMB SPEED SHOWN ON THIS CHART, SET THE FINAL SEGMENT CLIMB SPEED EQUAL TO THE FLAP RETRACTION SPEED.

CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 12-1, DATED 11-16-92

DB1-4-1005B

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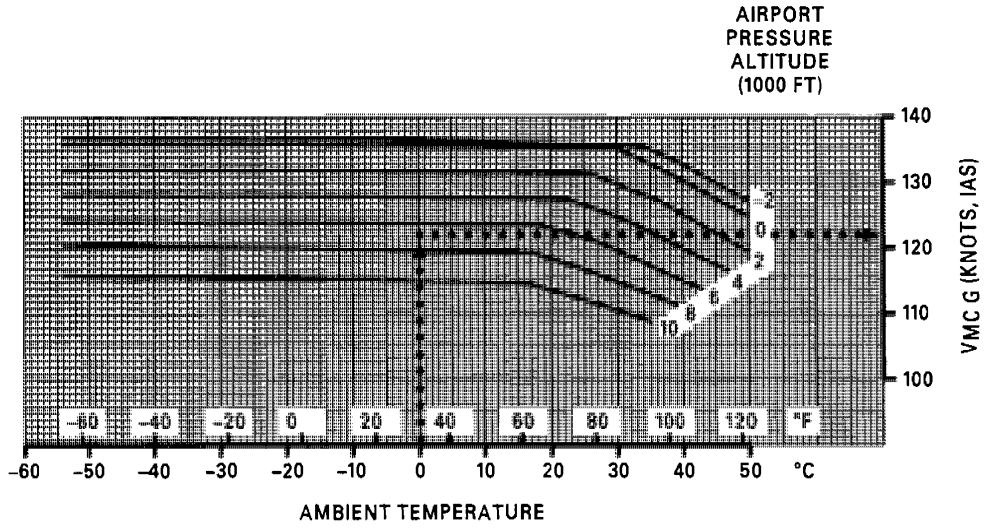
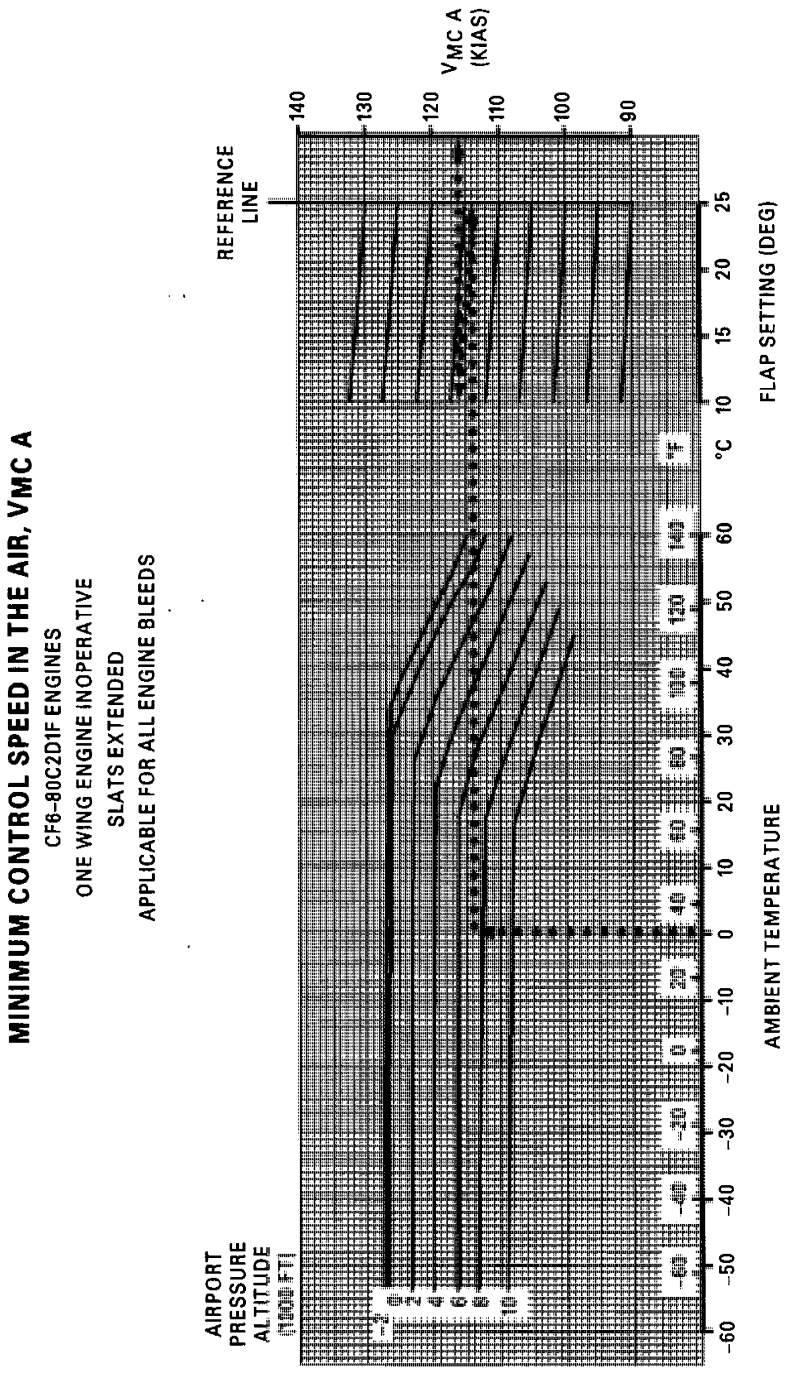
MINIMUM CONTROL SPEED ON THE GROUND, $V_{MC\ G}$

CF6-80C2DIF ENGINES
HARD SURFACE RUNWAY
ONE WING ENGINE INOPERATIVE

APPLICABLE FOR ALL CONDITIONS



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 3-2, DATED 1-8-91 DB1-4-1032



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 3-1, DATED 11-15-96 DB1-4-1065B

PREFLIGHT

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FLIGHT PLANNING

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INTRODUCTION

Careful preflight planning is necessary to effect an optimized operation. This section contains the data needed to determine fuel requirements for dispatch consistent with FAR Part 121 governing domestic or international flights, plus flexibility to accommodate company fuel reserve policy.

TIME AND FUEL TO ALTERNATE

The Time And Fuel To Alternate charts provide the time and fuel required to fly to an alternate airport. The data are valid for a landing weight at alternate of 165,000 kg or less. Corrections are provided for landing weights above 165,000 kg.

The flight to alternate begins with a missed approach at destination and ends with a straight-in approach and landing at alternate. The time and fuel values given include allowances of 360 kg of fuel and 1 minute for a missed approach and climb to 1500 ft altitude at destination. The enroute profile is based on climb from 1500 ft to altitude, cruise, and descent from altitude to 1500 ft. Also, included in the values given are variable allowances for the approach maneuver from 1500 ft and 250 KIAS to touchdown at alternate.

The climb schedule is the greater of 250 KIAS or 1.4g buffet boundary from 1500 to 10,000 ft, accelerate to 330 KIAS at 10,000 ft and climb at 330 KIAS to 31,837 ft and then climb at .82M from 31,837 ft to cruise altitude. Cruise speed is long range cruise speed. The descent schedule is .82M from cruise altitude to 38,136 ft, at 260 KIAS from 38,136 to 10,000 ft, decelerate from 260 to 250 KIAS at 10,000 ft and then at 250 KIAS from 10,000 to 1500 ft.

FLIGHT PLANNING – CONSTANT ALTITUDE

The Flight Planning – Constant Altitude charts provide time and fuel burned for various constant speeds and long-range operation at constant flight levels. The data are valid for a landing weight of 170,000 kg or less. Corrections are provided for landing weights above 170,000 kg.

The flight to destination begins with a takeoff maneuver at the departure airport and ends with a straight-in approach and landing at the destination airport. The time and fuel values given include variable allowances for the takeoff maneuver, descent, and the approach maneuver.

For all operations, the climb schedule is the greater of 250 KIAS, or 1.4g buffet boundary from 1500 to 10,000 ft, accelerate to 330 KIAS at 10,000 ft and climb at 330 KIAS to intersection of cruise mach number and then climb at cruise mach number to cruise altitude. For the long-range operation and .82M charts, the descent schedule is .82M from cruise altitude to 38,136 ft, at 260 KIAS from 38,136 to 10,000 ft, decelerate from 260 to 250 KIAS at 10,000 ft and then at 250 KIAS from 10,000 to 1500 ft. For the .83M and .84M charts, the descent schedule is .82M from cruise altitude to 31,837 ft, at 300 KIAS from 31,837 to 10,000 ft, decelerate from 300 to 250 KIAS at 10,000 ft, and then at 250 KIAS from 10,000 to 1500 ft.

FLIGHT PLANNING – STEP CLIMB MACH .82

The flight planning chart for step climb is used with a known takeoff weight to provide time and fuel burned for step climb operation.

The flight to destination begins with a takeoff maneuver at the departure airport and ends at cruise altitude overhead the destination airport. The chart has been constructed with variable allowances for the takeoff maneuver, descent, and the approach maneuver. The enroute profile is based on climb from 1500 ft to altitude and 4000-foot step cruise to overhead destination. An optimum step climb schedule is presented in tabular form that provides the weight at which to initiate climb to the given altitude. Fuel penalties are provided for flying at off-optimum flight level.

The climb schedule is the greater of 250 KIAS or 1.4g buffet boundary from 1500 to 10,000 ft, accelerate to 330 KIAS at 10,000 ft and climb at 330 KIAS from 10,000 to 27,402 ft and then climb at .82M from 27,402 ft to cruise altitude. Cruise is at .82M.

WIND AND ALTITUDE TRADE FOR CONSTANT RANGE

The Wind and Altitude Trade For Constant Range charts indicate the minimum wind velocity required to make an altitude change feasible. The wind required is the relative decrease in headwind or increase in tailwind required to compensate for flying lower than optimum altitude. Mach .80, .81, .82, .83 and .84 charts are presented.

As an example, assume the following conditions:

Cruise Mach Number	.84
Initial Flight Level	330
Wind	40 knot headwind
Gross Weight	225,000 kg
Desired Flight Level (After Descent)	310

To determine the wind required to obtain the same performance at 31,000 ft enter the Mach .84 chart with the gross weight (225,000 kg) and pressure altitude (33,000 ft) and read 5 knots as a reference point. Enter the chart again with the gross weight and desired altitude (31,000 ft) and read 18 knots. The relative difference between these two points is 13 knots. Subtracting 13 knots from the 40 knots actual the result is a 27-knot headwind at 31,000 ft that may be accepted to produce the same performance.

FUEL PLANNING SAMPLE PROBLEM AND SOLUTION

Two Fuel planning sample problems and worksheets are presented in this section of the Preflight chapter. They are entitled Sample Fuel Planning, Trip Conditions, And Worksheet. The two sample problems are for an International Scheduled Carrier (FAR 121.645) and a Domestic Scheduled Carrier (FAR 121.639). The difference is the computation of the required reserves based on FAR Part 121. The sample fuel planning worksheet displays the trip conditions and necessary fuel planning data relative to the problem. The data listed at the top of the page will be the basis for solving the problem. During the solution, the fuel figures are to be rounded up to the nearest 100 kg.

The problem is solved in reverse order, starting with a landing at the alternate and ending with a takeoff at departure. Thus, company reserve and tankered fuel (if applicable) are loaded first, followed by reserve fuel, trip fuel and contingency fuel (if applicable). Note that fuel reserves such as company, tankered, or contingency fuels are not FAR requirements.

The following steps outline the solutions in exactly the same order as they appear on the sample worksheet. We will use the Domestic Scheduled Carrier as our example, but where the reserve policies differ, an explanation and sample will be given.

OPERATING EMPTY WEIGHT

The operating empty weight is the basic empty weight (the weight of the structure, power plant, furnishings, systems, and standard items of equipment, including those fluids which are contained in a closed system) plus oil, crew, crew baggage, passenger equipment, and emergency equipment. In our example, the operating empty weight is given as 130,000 kg and is entered on Line 1.

It must be noted that there are various operating empty weights for various aircraft. The one used here was randomly chosen to complete the sample problem. When solving for actual conditions, use the appropriate operating empty weight which specifically applies to the aircraft.

ESTIMATED PAYLOAD

The payload is estimated at 37,500 kg and is entered on Line 2.

ESTIMATED ZERO FUEL WEIGHT

The estimated zero fuel weight is equal to the sum of the operating empty weight (130,000 kg) and the estimated payload (37,500 kg).

The estimated zero fuel weight is equal to 167,500 kg and is entered on Line 3. This weight must not exceed the certified maximum zero fuel weight.

COMPANY RESERVE FUEL

Company reserve fuel is a minimum reserve determined by each airline and is considered payload.

For our example, the company reserve fuel is chosen to be 2500 kg and is entered on Line 4.

This amount of fuel can now be related to endurance time which is obtained by entering the Reserve Fuel For 10% Cruise Time chart. The data are based on a landing weight of 170,000 kg or less. Enter the chart with the pressure altitude of 31,000 ft and read vertically downward to the intersection with adjusted company reserve fuel of 2500 kg (interpolating where necessary). At this intersection, read horizontally to the left to the intersection with the 10% Flight Time column and read an endurance time of 25 minutes (rounding off to the nearest minute). Enter this time on Line 4.

EXTRA FUEL - TANKERED

Tankered fuel is fuel that is transported aboard the aircraft to be used on the following trip for economic purposes. This, too, is considered payload.

This example does not consider tankered fuel. However, if tankered fuel were to be on board, the amount of tankered fuel (in kilograms) would have been entered on Line 5. Also, the endurance time is determined in the same manner as described in the Company Reserve Fuel discussion.

ESTIMATED FUEL AND LANDING WEIGHT AT ALTERNATE

The estimated fuel at alternate is the sum of the company reserve fuel (2500 kg) and the extra fuel-tankered (0 kg).

The estimated fuel at alternate is equal to 2500 kg and is entered on Line 6.

The estimated landing weight at alternate is the sum of the estimated zero fuel weight (167,500 kg), company reserve fuel (2500 kg), and extra fuel-tankered (0 kg).

The estimated landing weight at alternate is equal to 170,000 kg and is also entered on Line 6. This weight must not exceed the certified maximum structural landing weight.

HOLDING

Continued cruise or holding fuel as part of minimum reserves per FAR Part 121 must be determined.

The Holding – Flight Planning chart presents total fuel flow (kg/hr) as a function of gross weight and pressure altitude. The data are based on standard day temperature, three engines operating, air conditioning on and no ice protection. Fuel flow corrections for engine and engine and airframe ice protection are presented at the bottom of the page, as are corrections for temperature deviation from standard.

For international operation, enter the Holding – Flight Planning chart at the top with the landing weight at alternate (163,400 kg) and read vertically downward to the intersection with a pressure altitude equal to 1500 ft above the alternate airport. At this point, read a holding fuel flow of 5670 kg/hr (interpolating where necessary). The holding fuel requirement is 30 minutes, therefore, divide the fuel flow figure determined above by two which yields a 30 minute holding fuel of 2900 kg (rounding up to the nearest 100 kg). Enter the fuel (2900 kg) and time (30 minutes) figures on Line 7.

For domestic operation, which is our sample, enter the Reserve Fuel For 10% Cruise Time chart with 45 minutes in the 10% Flight Time column and read horizontally to the right to the intersection with the flight level of 31,000 ft. At this point, read the reserve fuel for 10% cruise time of 4533 kg. The chart is based on a landing weight of 170,000 kg or less. If the planned landing weight at alternate is greater than 170,000 kg, a fuel correction must be applied to the reserve fuel. To obtain the required fuel correction, continue reading horizontally to the right from the previously determined reserve fuel for 10% cruise time to the intersection with the fuel correction column. The number in the box at the intersection is the fuel correction. For each 5000 kg above 170,000 kg, the fuel to alternate must be increased by the fuel correction. Enter the fuel (4600 kg) and time (45 minutes) figures on Line 7.

TIME AND FUEL TO ALTERNATE

The time and fuel to alternate are determined by selecting the appropriate Time and Fuel to Alternate chart based on the flight level (31,000 ft). Enter the bottom left portion of the chart with the wind component (25 knot tailwind) and read vertically upward to the intersection with the ground distance (290 n mi). At this point, read horizontally to the right to the intersection with the flight level column (31,000 ft). At this point, read the time and fuel to alternate of 47 minutes and 5100 kg respectively (interpolating, if necessary).

The Time and Fuel to Alternate charts are valid for a landing weight at alternate of 165,000 kg or less. Fuel corrections must be applied at weights greater than 165,000 kg. For the example, a fuel correction of 100 kg must be added to 5100 kg.

Enter the time to alternate of 47 minutes and the fuel to alternate of 5200 kg on Line 8.

10% ENROUTE RESERVE

The 10% enroute reserve for international operation, per FAR Part 121, is the fuel required to cruise for an additional 10% of flight time. In order to determine 10% of flight time, the appropriate Flight Planning – Constant Altitude or Step Climb chart is used to find the flight time.

The 10% enroute reserve for domestic operation is not required.

For international operation select the appropriate Flight Planning – Constant Altitude chart based on cruise speed (M.84) and flight level 33,000 ft. Enter the bottom left portion of the chart with the wind component (50 knots tailwind) and read vertically upward to the intersection with the ground distance (4750 n mi.) At this point, read horizontally to the right to the intersection with the flight level column (33,000 ft) and read a flight time of 9 hours 1 minute. Enter the left side of the Reserve Fuel For 10% Cruise Time chart with the flight time which is most equal to the flight time determined above (9 hours 1 minute), which is 9 hours 0 minutes. The figure directly to the right is the 10% flight time figure which is 54 minutes. Continue reading horizontally to the right to the intersection with the flight level (33,000 ft) and read a 10% enroute reserve fuel figure of 5412 kg (interpolating, if necessary). It must be noted that the reserve fuel for 10% cruise time data are valid for a landing weight of 170,000 kg or less. If the estimated landing weight at alternate is greater than 170,000 kg a fuel correction must be applied to the 10% enroute reserve fuel. To obtain the required fuel correction, continue reading horizontally to the right from the previously determined 10% enroute reserve fuel figure (5412 kg) to the intersection with the fuel correction column and read a fuel correction of 176 kg.

For each 5000 kg above 170,000 kg the 10% enroute reserve fuel must be increased by the fuel correction figure. In our example, the estimated landing weight at alternate (163,400 kg) is not greater than 170,000 kg and therefore no fuel correction is required. Rounding up to the nearest 100 kg yields 5500 kg. Enter the 10% flight time (54 minutes) and the 10% enroute fuel (5500 kg) on Line 9.

ESTIMATED FUEL AND LANDING WEIGHT AT DESTINATION

The estimated fuel at destination is the sum of the estimated fuel at alternate (2500 kg), holding fuel (4600 kg), fuel to alternate (5200 kg) and the 10% enroute reserve fuel (0 kg). It is equal to 12,300 kg and is entered on Line 10.

The estimated landing weight at destination is the sum of the estimated landing weight at alternate (170,000 kg), holding fuel (4600 kg), fuel to alternate (5200 kg), and the 10% enroute reserve fuel (0 kg). It is equal to 179,800 kg and is entered on Line 10. This weight must not exceed the certified maximum structural landing weight.

TRIP FUEL

The trip fuel is determined by selecting the appropriate Flight Planning – Constant Altitude chart based on the cruise speed schedule (M.82) and flight level (35,000 ft). Enter the bottom left portion of the chart with the wind component (25 knots headwind) and read vertically upward to the intersection with the ground distance (2150 n mi). At this point, read horizontally to the right to the intersection with the flight level column (35,000 ft). At this point, read a flight time of 5 hours 4 minutes and a trip fuel of 32,000 kg. It must be noted that the trip fuel data are based on a landing weight of 170,000 kg or less. If the estimated landing weight at destination is greater than 170,000 kg, a fuel correction must be applied to the trip fuel. To obtain the required fuel correction, read horizontally to the right from the previously determined trip fuel figure (32,000 kg) to the intersection with the fuel correction column and read a fuel correction of 600 kg. For each 5000 kg above 170,000 kg, the trip fuel must be increased by the fuel correction figure. In our example, the estimated landing weight at destination (179,800 kg) is 9,800 kg greater than 170,000 kg and therefore adding the total fuel correction of 200 kg to the original trip fuel of 32,000 kg yields the final trip fuel of 33,200 kg. Enter the flight time (5 hours 4 minutes) and the trip fuel (33,200 kg) on Line 11.

FUEL REQUIRED FOR DISPATCH

The fuel required for dispatch is the sum of the estimated fuel at destination (12,300 kg) and the trip fuel (33,200 kg). It is equal to 45,500 kg and is entered on Line 12.

OPERATING CONTINGENCY

If delays for weather or traffic are anticipated, operational contingency fuel may be loaded. This fuel, if required, normally would be used for holding at destination at some intermediate altitude. In our example, a 20 minute delay is anticipated. The amount of fuel this time represents is determined by entering the top of the Holding – Flight Planning chart with a gross weight equal to the landing weight at destination (179,800 kg). At this point, read vertically downward to the anticipated holding altitude (10,000 ft) and read a total fuel flow of 6000 kg/hr (interpolating where necessary). Since the example is for a 20 minute contingency, the 6000 kg value from the Holding table should be divided by 3. Enter a value of 2000 kg and 20 minutes on line 13.

ESTIMATED FUEL/GROSS WEIGHT/ ENDURANCE

The total fuel is the sum of the fuel required for dispatch (45,500 kg) and the operating contingency fuel (2000 kg) which is equal to 47,500 kg and entered on Line 14.

The gross weight is the sum of the landing weight at destination (179,800 kg), trip fuel (33,200 kg), and the operating contingency fuel (2000 kg) which is equal to 215,000 kg entered on Line 14.

The endurance time is the sum of the times determined thus far which total 7 hours 21 minutes and is entered on Line 14.

TAXI FUEL

Enter taxi fuel required (approximately 2700 kg/hr); for 10 minutes, the taxi fuel is 450 kg.

ESTIMATED RAMP FUEL AND GROSS WEIGHT

The estimated ramp fuel is the sum of the estimated takeoff fuel (47,500 kg) and the taxi fuel (450 kg) which is equal to 47,950 kg entered on Line 16.

The estimated ramp gross weight is the sum of the estimated takeoff gross weight (215,000 kg) and the taxi fuel (450 kg) which is equal to 215,450 kg entered on Line 16.

WEIGHT CHECK

The weight check provides a cross-check for accuracy. Add the total fuel (47,950 kg) to the estimated zero fuel weight (Line 17, 167,500 kg). The sum is 215,450 kg and is entered on Line 18. This weight must equal the gross weight (215,450 kg, Line 16) for the fuel plan to be considered complete and accurate. As can be seen, the two are equal. This weight must not exceed the certified maximum takeoff weight.

CRUISE ALTITUDE CHECK

After completion of the fuel flight plan, the planned flight level must be checked for maximum altitude capabilities based on maximum cruise thrust, optimum performance and 1.3g buffet limitations at the initial cruise weight. The initial cruise weight is obtained by subtracting the fuel-to-climb to the planned flight level from the planned takeoff gross weight. The fuel-to-climb data are given in the Climb section of the Inflight chapter.

Select the appropriate Climb table based on temperature (ISA). The time, distance and fuel to climb data are presented for various temperatures ranging from ISA-20°C to ISA+20°C in increments of 10°C. Displayed in the data boxes as a function of takeoff gross weight and pressure altitude are time (minutes), distance (nautical miles), and fuel (kilograms) to climb to altitude. These data are based on three and two engines operating at maximum climb thrust, one air conditioning pack per engine operating and no ice protection. Presented at the bottom of the page are fuel corrections for engine or engine and airframe ice protection.

Enter the top of the chart with the planned takeoff gross weight (215,000 kg, interpolating where necessary) and read vertically downward to the intersection with the planned flight level (35,000 ft). Read the fuel-to-climb of 4,300 kg (interpolating where necessary).

Subtracting the fuel-to-climb (4,300 kg) from the planned takeoff gross weight (215,000 kg) yields the initial cruise weight of 210,700 kg.

If the takeoff is being made from an airport pressure altitude above sea level, the Climb tables are to be read in the following manner. Enter the top of the table with the planned takeoff gross weight and read vertically downward to the intersection with the planned flight level. At this point, read a reference fuel-to-climb figure. Continue reading vertically downward to a pressure altitude equal to the departure airport pressure altitude and read a second fuel-to-climb figure. Subtracting the two fuel-to-climb figures yields the fuel-to-climb to the planned flight level. The time and distance-to-climb are determined in the same manner.

To complete the cruise altitude check, select the appropriate Altitude Capability chart based on cruise speed schedule (.82M). Altitude capability data are presented for speed schedules of long range cruise, .82M, .83M and .84M. Displayed in the boxes as a function of gross weight are: maximum cruise thrust altitude capability for various temperatures; optimum performance altitude; and 1.3g buffet maximum altitude. All altitudes shown are pressure altitudes in feet. They are based on three engines operating at maximum cruise thrust with air conditioning on and no ice protection.

Altitude capability corrections for engine or engine and airframe ice protection are presented at the bottom of the page.

Enter the top of the chart with the ambient temperature (ISA+10) and read vertically downward to the intersection of the top of climb weight (210,700 kg). Read the maximum cruise altitude capability (36,000 ft), interpolating where necessary.

SAMPLE FUEL PLANNING, TRIP CONDITIONS AND WORKSHEET
DOMESTIC SCHEDULED CARRIER

Trip Conditions	Destination	Alternate
Stage Length	2150 n. mi	290 n. mi
Flight Level	350	310
Average Temperature	ISA	ISA °C
Average Wind	25 kt headwind	25 kt tailwind
Cruise at 0.82 Mach Speed Schedule		

Flight Planning Data (Given)

Operating Empty Weight	130,000 kg
Estimated Payload	37,500 kg
Company Reserves	2,500 kg
Extra Fuel (tankered)	0 lb
Operating Contingency Fuel	20 minutes
Taxi Time	10 minutes

FUEL PLANNING WORK SHEET

	Total Fuel Load (kg)	Gross Weight (kg)	Time (hr:min)
1. Operating Empty Weight (Given)		130,000	
2. Est Payload (Given)		37,500	
3. Est Zero Fuel Weight		167,500	
4. Company Reserve Fuel (Given)	2,500	2,500	0:25
5. Extra Fuel (Tankered) (Given)	0	0	:0
6. Est Fuel and Landing Weight at Alternate	2,500	170,000	
7. Holding Fuel (0:30 Int, 0:45 Dom)	4,600	4,600	0:45
8. Fuel to Alternate	5,200	5,200	0:47
9. 10% Enroute Reserve	0	0	:0
10. Est Fuel and Landing Weight at Destination	12,300	179,800	
11. Trip Fuel	33,200	33,200	5:04
12. Fuel Required for Dispatch	45,500		
13. Operating Contingency @ 10,000 FT	2,000	2,000	0:20
14. Est T.O. Fuel/Gross Wt/Endurance	47,500	215,000	7:21
15. Taxi Fuel (45 kg/min) (Given)	450	450	0:10
16. Est Ramp Fuel and Gross Weight	47,950	215,450	
17. Zero Fuel Weight	167,500		
18. Weight Check (ZFW + Total Fuel)	215,450		

Cruise Altitude Check

1. Est Takeoff Gross Weight	215,000 kg
2. Fuel to Climb to FL	4,300 kg
3. Top of Climb Weight	210,700 kg
4. Altitude Capability	36,000 ft

SAMPLE FUEL PLANNING, TRIP CONDITIONS, AND WORKSHEET
INTERNATIONAL SCHEDULED CARRIER

Trip Conditions	Destination	Alternate
Stage Length	4750 n mi.	295 n mi.
Flight Level	330	290
Average Temperature	ISA	ISA °C
Average Wind	50 kt tailwind	10 kt headwind
Cruise at 0.84 M Speed Schedule		

Flight Planning Data (Given)

Operating Empty Weight	127,000 kg
Estimated Payload	34,000 kg
Company Reserves	2,400 kg
Extra Fuel (tankered)	0 kg
Operating Contingency Fuel	20 minutes
Taxi Time	10 minutes

FUEL PLANNING WORK SHEET

	Total Fuel Load (kg)	Gross Weight (kg)	Time (hr:min)
1. Operating Empty Weight (Given)		127,000	
2. Est Payload (Given)		34,000	
3. Est Zero Fuel Weight		161,000	
4. Company Reserve Fuel (Given)	2,400	2,400	0:24
5. Extra Fuel (Tankered) (Given)	0	0	0
6. Est Fuel and Landing Weight at Alternate	2,400	163,400	
7. Holding Fuel (0:30 Int, 0:45 Dom)	2,900	2,900	0:30
8. Fuel to Alternate	5,400	5,400	0:51
9. 10% Enroute Reserve	5,500	5,500	0:54
10. Est Fuel and Landing Weight at Destination	16,200	177,200	
11. Trip Fuel	66,200	66,200	9:01
12. Fuel Required for Dispatch	82,400		
13. Operating Contingency @ 10,000 FT	2,000	2,000	0:20
14. Est T.O. Fuel/Gross Wt/Endurance	84,400	245,400	12:00
15. Taxi Fuel (45 kg/min) (Given)	450	450	0:10
16. Est Ramp Fuel and Gross Weight	84,850	245,850	
17. Zero Fuel Weight	161,000		
18. Weight Check (ZFW + Total Fuel)	245,850		

Cruise Altitude Check

1. Est Takeoff Gross Weight . . . . . 245,400 kg
2. Fuel to Climb to FL . . . . . 4,700 kg
3. Top of Climb Weight. . . . . 240,700 kg
4. Altitude Capability . . . . . 36,000 ft

FUEL PLANNING AND TRIP CONDITIONS WORKSHEET

Trip Conditions	Destination	Alternate
Stage Length		
Flight Level		
Average Temperature		
Average Wind		
Cruise at _____Speed Schedule		

Flight Planning Data (Given)

Operating Empty Weight
Estimated Payload
Company Reserves
Extra Fuel (tankered)
Operating Contingency Fuel
Taxi Time

FUEL PLANNING WORK SHEET

	Total Fuel Load (kg)	Gross Weight (kg)	Time (hr:min)
1. Operating Empty Weight (Given)			
2. Est Payload (Given)			
3. Est Zero Fuel Weight			
4. Company Reserve Fuel (Given)			
5. Extra Fuel (Tankered) (Given)			
6. Est Fuel and Landing Weight at Alternate			
7. Holding Fuel (0:30 Int, 0:45 Dom)			
8. Fuel to Alternate			
9. 10% Enroute Reserve			
10. Est Fuel and Landing Weight at Destination			
11. Trip Fuel			
12. Fuel Required for Dispatch			
13. Operating Contingency @ 10,000 FT			
14. Est T.O. Fuel/Gross Wt/Endurance			
15. Taxi Fuel (45 kg/min) (Given)			
16. Est Ramp Fuel and Gross Weight			
17. Zero Fuel Weight			
18. Weight Check (ZFW + Total Fuel)			

Cruise Altitude Check

1. Est Takeoff Gross Weight . . . . . .
2. Fuel to Climb to FL . . . . . .
3. Top of Climb Weight. . . . . .
4. Altitude Capability . . . . . .

FLIGHT PLANNING - PAYLOAD CAPABILITY

Trip Distance	3945 n. mi
Winds at Cruise Altitude	50 knot tailwind
Low Altitude Wind	15 knot headwind returning (–) 15 knot tailwind continuing (+)
Temperature	ISA
Cruise Mach and Altitude	.82 Mach, 31,000 ft.
Takeoff Gross Weight	260,000 kg
Operational Empty Weight	130,100 kg
Average Single Engine Airspeed	320 KTAS

ETP	1880 n. mi.
Distance to Continue	2065 n. mi.
Fuel to ETP	31,500 kg
Weight at Start of Driftdown	228,500 kg
Maximum Allowable Zero Fuel Weight	187,100 kg
Payload Capability	57,000 kg

The dispatch payload of the MD-11 may be governed by two engine inoperative NET performance. Along any intended track where the aircraft is more than 90 minutes from a suitable alternate, the aircraft performance must be checked with only the remaining engine operating to assure the NET performance meets FAR requirements. This section does not consider terrain clearance.

Prior to dispatch, the maximum allowable zero fuel weight must be determined based on forecast weather conditions. The maximum allowable dispatch payload is determined by accounting for a double engine failure at the Equal Time Point (ETP) using conservative aircraft performance. This computation should be taken in the following steps:

1. Compute the (ETP).

2. Determine the all-engine fuel used from takeoff to the ETP from the appropriate Flight Planning – Constant Altitude chart based on the cruise speed schedule and altitude. Subtract this fuel from the takeoff weight to determine weight at start of driftdown.

3. Determine the maximum allowable zero fuel weight using the Maximum Allowable Zero Fuel Weight chart in the Driftdown section of the Abnormal chapter. If the weight at start of driftdown is greater than the limiting start of driftdown weight for the given temperature, use the limiting start of driftdown weight in determining the Maximum Allowable Zero Fuel Weight.

4. Compute the allowable dispatch payload by subtracting the operational empty weight from the maximum allowable zero fuel weight determined in step 3.

STEP 1

The (ETP) is the point along the intended track where, in the case of a simultaneous double engine failure, a return flight to the origin or a continued flight to the destination can be made in the same time with the same amount of fuel. The following equation is used to determine the ground distance from the origin to the equal time point in nautical miles:

$$ETP = \text{Total Ground Distance} \quad \frac{GSR}{GSR + GSC}$$

Where:

Total Ground Distance = The total ground distance along the intended route from the departure airport to destination.

GSR = the average ground speed for the return flight.

GSC = the average ground speed for the continued flight.

The ground speed is the average single engine true airspeed plus the low altitude wind. The wind sign convention is: headwind (–), tailwind (+). For this computation, an average single engine true airspeed of 320 knots may be used.

$$ETP = 3945 \quad \frac{(320 - 15)}{(320\text{-}15) + (320 + 15)} = 1880 \text{ n.mi.}$$

The distance to continue from the ETP to destination is 3945 – 1880 = 2065 n.mi.

STEP 2

Determine the all engine fuel used from takeoff to the ETP.

Enter the Time And Distance To Start Of Driftdown chart in the Driftdown section of the Abnormal chapter with the 1880 n mi. trip distance to the ETP, a tailwind component of 50 knots (at 31,000 ft) and a takeoff weight of 260,000 kg. Read the weight at start of driftdown (228,500 kg) and fuel burned (31,500 kg).

STEP 3

Determine the maximum allowable zero fuel weight.

Enter the Maximum Allowable Zero Fuel Weight chart in the Driftdown section of the Abnormal chapter with the 2065 nautical mile distance to continue from the ETP to destination. Correct for the 15 knot tailwind and read vertically up to the 228,500 kg weight at start of driftdown and read the maximum allowable zero fuel weight of 187,100 kg.

STEP 4

Compute the allowable dispatch payload by subtracting the aircraft operational empty weight from the maximum allowable zero fuel weight.

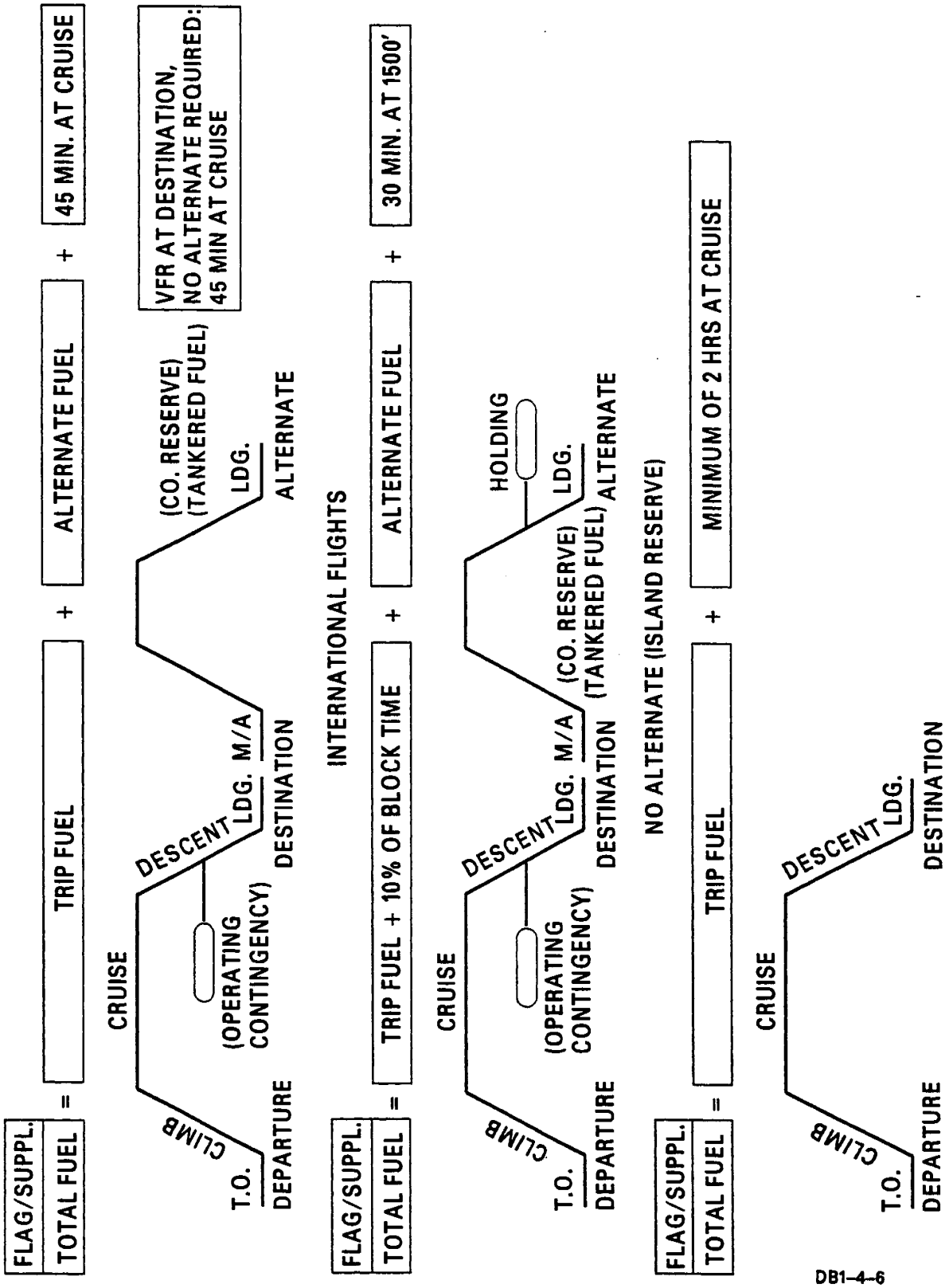
It must be noted that there are various operating empty weights for various aircraft. The one used here was randomly chosen to complete the sample problem. When solving for actual conditions, use the appropriate operating empty weight which specifically applies to the aircraft.

Allowable dispatch payload = 187,100 – 130,100 = 57,000 kg.

FLIGHT PLANNING PROFILES

F.A.R. FUEL REQUIREMENTS FOR TURBO JET AIRCRAFT

NOTE: RESERVES SHOWN INSIDE BRACKETS ARE NOT F.A.R. REQUIREMENTS



CAG(IGDS)

KEY
TOTAL FUEL FLOW
(KG/HR)

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEGREE BANK TURNS

14,000 TO 1500 FT

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA °C
TEMPERATURE

3 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
14,000	4213	4539	4873	5214	5557	5903	6254	6611	6975	7342	7717	8094	8476	8862	9264	9696
13,500	4264	4592	4929	5274	5621	5971	6325	6682	7050	7420	7796	8179	8563	8952	9356	9787
11,500	4310	4622	4953	5291	5638	5986	6338	6692	7051	7416	7788	8162	8542	8927	9324	9750
9,500	4364	4672	4985	5317	5657	6004	6355	6708	7063	7423	7784	8155	8530	8907	9300	9720
7,500	4424	4729	5040	5353	5685	6025	6372	6726	7079	7437	7796	8159	8523	8899	9286	9694
5,500	4487	4793	5100	5412	5727	6056	6396	6742	7095	7452	7809	8170	8532	8898	9272	9677
3,500	4548	4856	5165	5474	5788	6105	6430	6770	7117	7469	7827	8186	8546	8909	9279	9670
1,500	4605	4920	5231	5542	5853	6168	6488	6810	7148	7495	7847	8205	8567	8927	9296	9680

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

TFF	45	48	51	54	60	63	69	72	75	78	84	87	90	96	99	102

FOR ENGINE ICE PROTECTION ON: INCREASE FUELBURN BY 2%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUELBURN BY 4%.

RESERVE FUEL FOR 10% FLIGHT TIME
CF6-80C2D1F ENGINES
LONG RANGE CRUISE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG OR LESS
ADD THE CORRECTION AMOUNT FOR EACH ADDITIONAL
5000 KG OF LANDING WEIGHT GREATER THAN 170,000 KG

FLIGHT TIME HR:MIN	10% OF FLIGHT TIME HR:MIN	PRESSURE ALTITUDE (FT)							FUEL CORRECTION (KG)
		15,000	17,000	19,000	21,000	23,000	25,000	27,000	
		FUEL (KG)							
1:00	0:06	610	604	601	596	594	594	597	19
1:30	0:09	915	906	901	894	891	891	895	28
2:00	0:12	1,220	1,209	1,201	1,192	1,188	1,188	1,194	37
2:30	0:15	1,525	1,511	1,502	1,490	1,485	1,485	1,492	46
3:00	0:18	1,830	1,813	1,802	1,788	1,782	1,782	1,791	55
3:30	0:21	2,134	2,114	2,101	2,085	2,078	2,078	2,088	64
4:00	0:24	2,435	2,412	2,398	2,379	2,371	2,371	2,382	73
4:30	0:27	2,737	2,711	2,694	2,673	2,664	2,664	2,677	83
5:00	0:30	3,038	3,009	2,991	2,968	2,957	2,957	2,971	92
5:30	0:33	3,340	3,308	3,287	3,262	3,250	3,250	3,265	101
6:00	0:36	3,641	3,606	3,584	3,556	3,543	3,543	3,560	110
6:30	0:39	3,943	3,905	3,881	3,850	3,836	3,836	3,854	118
7:00	0:42	4,242	4,201	4,175	4,143	4,127	4,127	4,146	128
7:30	0:45	4,540	4,495	4,468	4,434	4,416	4,416	4,437	137
8:00	0:48	4,838	4,790	4,761	4,724	4,705	4,705	4,727	146
8:30	0:51	5,136	5,085	5,054	5,015	4,994	4,994	5,017	155
9:00	0:54	5,434	5,380	5,346	5,306	5,283	5,283	5,307	163
9:30	0:57	5,732	5,675	5,639	5,596	5,573	5,572	5,597	172
10:00	1:00	6,029	5,969	5,932	5,887	5,862	5,861	5,888	181
10:30	1:03	6,324	6,261	6,222	6,175	6,149	6,148	6,175	190
11:00	1:06	6,618	6,552	6,511	6,463	6,434	6,433	6,461	199
11:30	1:09	6,913	6,843	6,800	6,750	6,719	6,718	6,747	208
12:00	1:12	7,207	7,135	7,089	7,037	7,005	7,003	7,034	217
12:30	1:15	7,501	7,426	7,378	7,324	7,290	7,288	7,320	225
13:00	1:18	7,796	7,717	7,668	7,611	7,575	7,572	7,606	234
13:30	1:21	8,089	8,008	7,957	7,898	7,860	7,857	7,892	243
14:00	1:24	8,380	8,296	8,243	8,183	8,144	8,140	8,175	252
14:30	1:27	8,671	8,583	8,528	8,466	8,425	8,421	8,457	260
15:00	1:30	8,962	8,871	8,813	8,750	8,707	8,703	8,739	269
15:30	1:33	9,253	9,158	9,099	9,033	8,988	8,984	9,021	278
16:00	1:36	9,544	9,446	9,384	9,317	9,270	9,265	9,303	287
16:30	1:39	9,835	9,734	9,669	9,600	9,551	9,546	9,585	295
17:00	1:42	10,125	10,021	9,955	9,884	9,833	9,827	9,867	303

RESERVE FUEL FOR 10% FLIGHT TIME
CF6-80C2D1F ENGINES
LONG RANGE CRUISE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

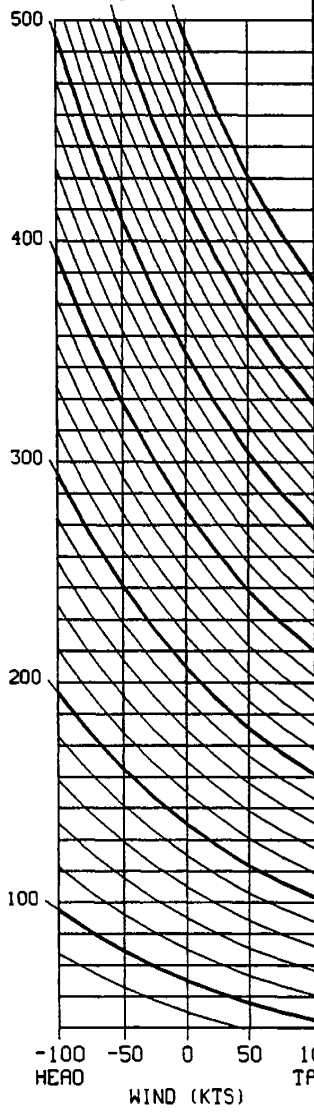
CHART VALID FOR A LANDING WEIGHT OF 170,000 KG OR LESS
ADD THE CORRECTION AMOUNT FOR EACH ADDITIONAL
5000 KG OF LANDING WEIGHT GREATER THAN 170,000 KG

FLIGHT TIME HR:MIN	10% OF FLIGHT TIME HR:MIN	PRESSURE ALTITUDE (FT)							FUEL CORRECTION (KG)
		29,000	31,000	33,000	35,000	37,000	39,000	41,000	
		FUEL (KG)							
1:00	0:06	602	610	607	591	572	562	560	20
1:30	0:09	903	915	910	886	858	843	840	29
2:00	0:12	1,203	1,220	1,214	1,182	1,144	1,123	1,120	39
2:30	0:15	1,504	1,524	1,517	1,477	1,430	1,404	1,400	49
3:00	0:18	1,805	1,829	1,821	1,772	1,716	1,685	1,680	59
3:30	0:21	2,104	2,132	2,123	2,067	2,002	1,966	1,960	68
4:00	0:24	2,401	2,434	2,423	2,360	2,286	2,244	2,237	78
4:30	0:27	2,697	2,735	2,724	2,653	2,570	2,522	2,514	88
5:00	0:30	2,994	3,036	3,024	2,946	2,854	2,800	2,790	98
5:30	0:33	3,290	3,337	3,324	3,239	3,138	3,078	3,067	108
6:00	0:36	3,587	3,638	3,625	3,531	3,422	3,356	3,343	117
6:30	0:39	3,883	3,939	3,925	3,824	3,705	3,635	3,620	127
7:00	0:42	4,177	4,236	4,223	4,116	3,989	3,913	3,897	137
7:30	0:45	4,470	4,533	4,520	4,406	4,271	4,189	4,171	147
8:00	0:48	4,762	4,830	4,818	4,697	4,553	4,464	4,445	157
8:30	0:51	5,054	5,127	5,115	4,987	4,834	4,740	4,718	167
9:00	0:54	5,346	5,423	5,412	5,277	5,116	5,015	4,992	176
9:30	0:57	5,639	5,720	5,710	5,567	5,398	5,290	5,265	186
10:00	1:00	5,931	6,017	6,007	5,858	5,680	5,566	5,539	196
10:30	1:03	6,220	6,309	6,301	6,147	5,961	5,841	5,812	206
11:00	1:06	6,508	6,601	6,595	6,434	6,241	6,115	6,084	216
11:30	1:09	6,797	6,893	6,889	6,722	6,520	6,388	6,355	225
12:00	1:12	7,085	7,186	7,183	7,010	6,800	6,661	6,625	235
12:30	1:15	7,373	7,478	7,477	7,298	7,079	6,934	6,895	245
13:00	1:18	7,661	7,770	7,771	7,586	7,358	7,206	7,165	255
13:30	1:21	7,949	8,061	8,065	7,873	7,638	7,479	7,436	265
14:00	1:24	8,234	8,349	8,355	8,160	7,917	7,752	7,706	274
14:30	1:27	8,518	8,636	8,645	8,445	8,195	8,024	7,976	284
15:00	1:30	8,802	8,924	8,935	8,730	8,472	8,294	8,244	294
15:30	1:33	9,086	9,211	9,226	9,016	8,749	8,565	8,511	304
16:00	1:36	9,370	9,499	9,516	9,301	9,026	8,835	8,778	314
16:30	1:39	9,654	9,787	9,806	9,586	9,303	9,105	9,045	324
17:00	1:42	9,938	10,073	10,095	9,871	9,580	9,375	9,312	333

TIME AND FUEL TO ALTERNATE

LANDING WEIGHT 165,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)
CRUISE ALTITUDE (FT)								
11,000		13,000		15,000		17,000		
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
2:12	14.1	2:09	13.7	2:06	13.3	2:04	12.9	200
2:08	13.8	2:06	13.3	2:03	12.9	2:00	12.5	
2:05	13.4	2:02	13.0	2:00	12.6	1:57	12.2	
2:01	13.0	1:59	12.6	1:56	12.2	1:54	11.8	
1:58	12.6	1:55	12.2	1:53	11.9	1:50	11.5	
1:54	12.2	1:52	11.8	1:49	11.5	1:47	11.2	
1:50	11.8	1:48	11.5	1:46	11.1	1:44	10.8	
1:47	11.4	1:45	11.1	1:43	10.8	1:40	10.5	
1:43	11.0	1:41	10.7	1:39	10.4	1:37	10.1	
1:40	10.7	1:38	10.3	1:36	10.1	1:34	9.8	
1:36	10.3	1:34	10.0	1:32	9.7	1:30	9.4	
1:33	9.9	1:31	9.6	1:29	9.3	1:27	9.1	
1:29	9.5	1:27	9.2	1:26	9.0	1:24	8.7	
1:25	9.1	1:24	8.9	1:22	8.6	1:20	8.4	
1:22	8.7	1:20	8.5	1:19	8.3	1:17	8.0	100
1:18	8.4	1:17	8.1	1:15	7.9	1:14	7.7	
1:15	8.0	1:13	7.8	1:12	7.6	1:10	7.4	
1:11	7.6	1:10	7.4	1:08	7.2	1:07	7.0	
1:07	7.2	1:06	7.0	1:05	6.8	1:04	6.7	
1:04	6.8	1:03	6.7	1:02	6.5	1:00	6.3	
1:00	6.5	0:59	6.3	0:58	6.1	0:57	6.0	
0:57	6.1	0:56	5.9	0:55	5.8	0:54	5.6	
0:53	5.7	0:52	5.6	0:51	5.4	0:50	5.3	
0:49	5.3	0:49	5.2	0:48	5.1	0:47	5.0	
0:46	4.9	0:45	4.8	0:44	4.7	0:44	4.6	
0:42	4.6	0:41	4.5	0:41	4.4	0:40	4.3	
0:38	4.2	0:38	4.1	0:37	4.0	0:37	3.9	
0:35	3.8	0:34	3.7	0:34	3.7	0:34	3.6	
0:31	3.4	0:31	3.4	0:30	3.3	0:30	3.3	
0:28	3.0	0:27	3.0	0:27	3.0	0:27	2.9	
0:24	2.7	0:24	2.6	0:24	2.6	0:23	2.6	
0:20	2.3	0:20	2.3	0:20	2.3	0:20	2.3	0
								FL-110
								FL-130
								FL-150
								FL-170

CHART VALID FOR A LANDING WEIGHT OF 165,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 165,000 KG LDG. WT.

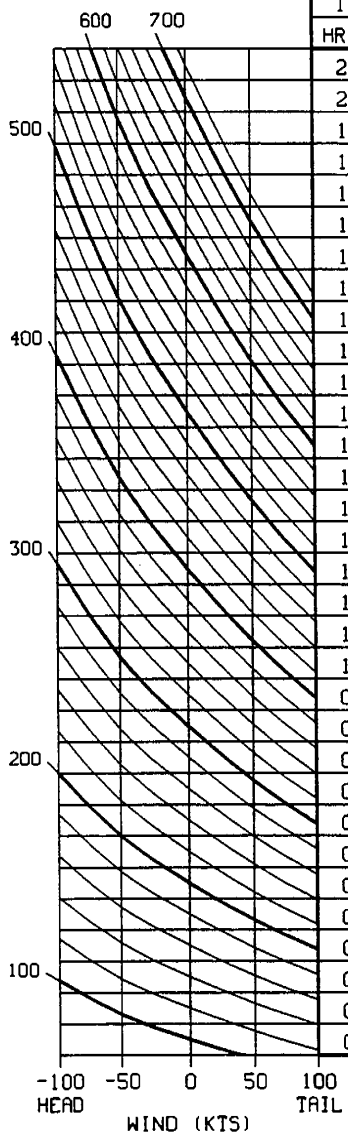
DECREASE/INCREASE TIME BY 1.0 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 33 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1056A**

TIME AND FUEL TO ALTERNATE

LANDING WEIGHT 165,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)			
CRUISE ALTITUDE (FT)											
19,000		21,000		23,000		25,000					
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
2:04	12.9	2:01	12.5	1:58	12.2	1:55	11.9	200	200	200	200
2:01	12.5	1:58	12.2	1:55	11.9	1:52	11.6				
1:57	12.2	1:55	11.8	1:52	11.5	1:49	11.2				
1:54	11.8	1:52	11.5	1:49	11.2	1:46	10.9				
1:51	11.5	1:49	11.2	1:46	10.9	1:43	10.6				
1:48	11.2	1:45	10.9	1:43	10.6	1:40	10.3				
1:45	10.8	1:42	10.5	1:40	10.3	1:37	10.0				
1:41	10.5	1:39	10.2	1:37	10.0	1:34	9.7				
1:38	10.2	1:36	9.9	1:34	9.7	1:31	9.4				
1:35	9.8	1:33	9.6	1:31	9.4	1:29	9.1				
1:32	9.5	1:30	9.3	1:28	9.0	1:26	8.8				
1:28	9.2	1:27	8.9	1:25	8.7	1:23	8.5				
1:25	8.8	1:23	8.6	1:22	8.4	1:20	8.2				
1:22	8.5	1:20	8.3	1:19	8.1	1:17	7.9				
1:19	8.2	1:17	8.0	1:15	7.8	1:14	7.6				
1:15	7.8	1:14	7.7	1:12	7.5	1:11	7.3	100	100	100	100
1:12	7.5	1:11	7.3	1:09	7.2	1:08	7.0				
1:09	7.2	1:08	7.0	1:06	6.9	1:05	6.7				
1:06	6.8	1:04	6.7	1:03	6.6	1:02	6.4				
1:02	6.5	1:01	6.4	1:00	6.3	0:59	6.1				
0:59	6.2	0:58	6.1	0:57	5.9	0:56	5.8				
0:56	5.9	0:55	5.7	0:54	5.6	0:53	5.6				
0:53	5.5	0:52	5.4	0:51	5.3	0:50	5.3				
0:49	5.2	0:49	5.1	0:48	5.0	0:47	5.0				
0:46	4.9	0:45	4.8	0:45	4.7	0:44	4.7				
0:43	4.5	0:42	4.5	0:42	4.4	0:41	4.4				
0:40	4.2	0:39	4.2	0:39	4.1	0:38	4.1				
0:36	3.9	0:36	3.8	0:35	3.8	0:35	3.8				
0:33	3.6	0:33	3.5	0:32	3.5	0:32	3.5				
0:30	3.2	0:30	3.2	0:29	3.2	0:29	3.2				
0:27	2.9	0:26	2.9	0:26	2.9					0	0
0:23	2.6	0:23	2.6								
								FL-190	FL-210	FL-230	FL-250

CHART VALID FOR A LANDING WEIGHT OF 165,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 165,000 KG LDG. WT.

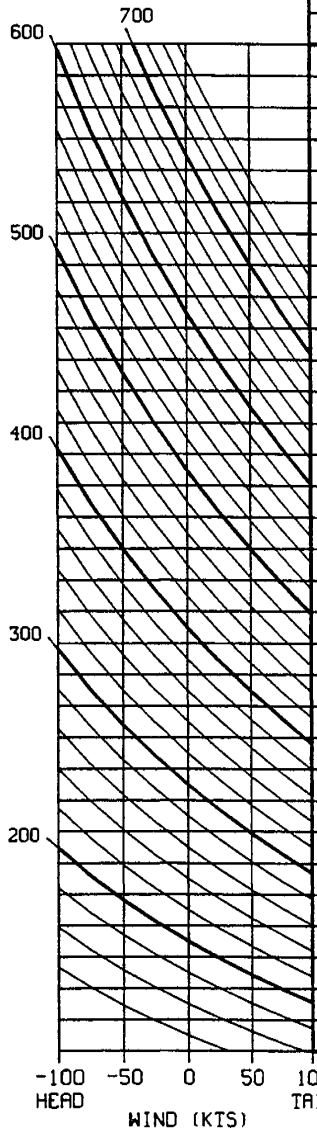
DECREASE/INCREASE TIME BY 1.0 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 38 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1057B**

TIME AND FUEL TO ALTERNATE

LANDING WEIGHT 165,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)			
CRUISE ALTITUDE (FT)											
27,000		29,000		31,000		33,000					
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
1:57	12.2	1:54	11.9	1:50	11.6	1:48	11.3	200	200	200	200
1:54	11.9	1:51	11.6	1:47	11.3	1:45	11.0				
1:52	11.6	1:48	11.3	1:45	11.0	1:43	10.8				
1:49	11.3	1:46	11.0	1:42	10.8	1:40	10.5				
1:46	11.0	1:43	10.7	1:40	10.5	1:38	10.2				
1:43	10.7	1:40	10.5	1:37	10.2	1:35	10.0				
1:40	10.4	1:38	10.2	1:34	9.9	1:33	9.7				
1:38	10.1	1:35	9.9	1:32	9.7	1:30	9.4				
1:35	9.8	1:32	9.6	1:29	9.4	1:28	9.2				
1:32	9.5	1:29	9.3	1:27	9.1	1:25	8.9				
1:29	9.2	1:27	9.0	1:24	8.8	1:23	8.7				
1:26	8.9	1:24	8.8	1:21	8.6	1:20	8.4				
1:23	8.7	1:21	8.5	1:19	8.3	1:17	8.1				
1:21	8.4	1:19	8.2	1:16	8.0	1:15	7.9				
1:18	8.1	1:16	7.9	1:14	7.8	1:12	7.6				
1:15	7.8	1:13	7.6	1:11	7.5	1:10	7.4				
1:12	7.5	1:10	7.4	1:08	7.2	1:07	7.1	100	100	100	100
1:09	7.2	1:08	7.1	1:06	7.0	1:05	6.8				
1:06	6.9	1:05	6.8	1:03	6.7	1:02	6.6				
1:03	6.6	1:02	6.5	1:01	6.4	1:00	6.3				
1:01	6.3	0:59	6.2	0:58	6.1	0:57	6.1				
0:58	6.1	0:57	6.0	0:55	5.9	0:55	5.8				
0:55	5.8	0:54	5.7	0:53	5.6	0:52	5.5				
0:52	5.5	0:51	5.4	0:50	5.3	0:50	5.3				
0:49	5.2	0:48	5.1	0:47	5.1	0:47	5.0				
0:46	4.9	0:46	4.8	0:45	4.8	0:44	4.8				
0:43	4.6	0:43	4.6	0:42	4.5	0:42	4.5				
0:40	4.3	0:40	4.3	0:40	4.3	0:39	4.2				
0:38	4.0	0:37	4.0	0:37	4.0	0:37	4.0				
0:35	3.8	0:34	3.7	0:34	3.7	0:34	3.7				
0:32	3.5	0:32	3.5	0:32	3.5						
0:29	3.2								0	0	0
								FL-270	FL-290	FL-310	FL-330

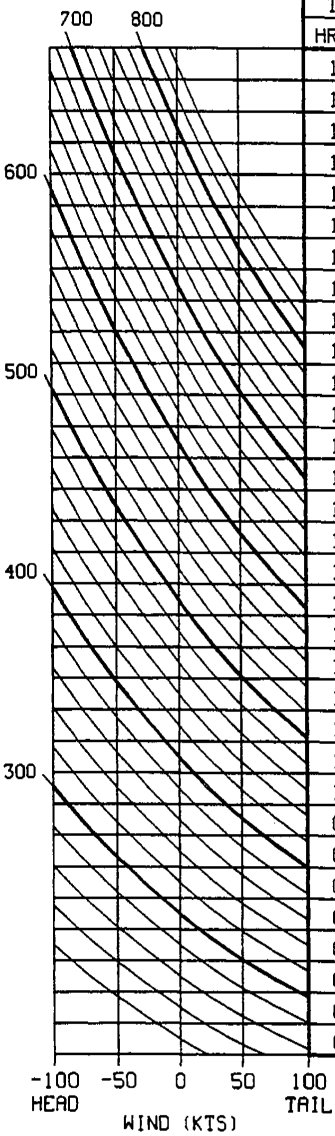
CHART VALID FOR A LANDING WEIGHT OF 165,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 165,000 KG LDG. WT.

DECREASE/INCREASE TIME BY 1.0 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 47 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1058A**

TIME AND FUEL TO ALTERNATE
LANDING WEIGHT 165,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



TOTAL FLIGHT TIME AND TRIP FUEL							
CRUISE ALTITUDE (FT)							
35,000		37,000		39,000		41,000	
TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG
1:58	12.1	1:58	11.8	1:57	11.7	1:57	11.7
1:55	11.8	1:55	11.6	1:55	11.4	1:55	11.4
1:52	11.6	1:53	11.3	1:52	11.2	1:52	11.2
1:50	11.3	1:50	11.1	1:50	11.0	1:50	10.9
1:47	11.0	1:48	10.8	1:47	10.7	1:47	10.7
1:45	10.8	1:45	10.6	1:45	10.5	1:45	10.4
1:42	10.5	1:42	10.3	1:42	10.2	1:42	10.2
1:40	10.3	1:40	10.1	1:40	10.0	1:40	10.0
1:37	10.0	1:37	9.8	1:37	9.7	1:37	9.7
1:35	9.8	1:35	9.6	1:35	9.5	1:35	9.5
1:32	9.5	1:32	9.4	1:32	9.3	1:32	9.2
1:30	9.3	1:30	9.1	1:30	9.0	1:30	9.0
1:27	9.0	1:27	8.9	1:27	8.8	1:27	8.8
1:25	8.8	1:25	8.6	1:25	8.5	1:25	8.5
1:22	8.5	1:22	8.4	1:22	8.3	1:22	8.3
1:20	8.3	1:20	8.1	1:20	8.1	1:20	8.0
1:17	8.0	1:17	7.9	1:17	7.8	1:17	7.8
1:15	7.7	1:15	7.6	1:15	7.6	1:15	7.6
1:12	7.5	1:12	7.4	1:12	7.3	1:12	7.3
1:10	7.2	1:10	7.1	1:10	7.1	1:10	7.1
1:07	7.0	1:07	6.9	1:07	6.9	1:07	6.9
1:05	6.7	1:05	6.7	1:05	6.6	1:05	6.6
1:02	6.5	1:02	6.4	1:02	6.4	1:02	6.4
1:00	6.2	1:00	6.2	1:00	6.1	1:00	6.1
0:57	6.0	0:57	5.9	0:57	5.9	0:57	5.9
0:55	5.7	0:55	5.7	0:55	5.7	0:55	5.7
0:52	5.5	0:52	5.4	0:52	5.4	0:52	5.4
0:49	5.2	0:50	5.2	0:50	5.2	0:49	5.2
0:47	5.0	0:47	5.0	0:47	5.0	0:47	5.0
0:44	4.7	0:44	4.7	0:44	4.7	0:44	4.7
0:42	4.5	0:42	4.5	0:42	4.5	0:42	4.5
0:39	4.2	0:39	4.2	0:39	4.2		

FUEL CORRECTION (KG)

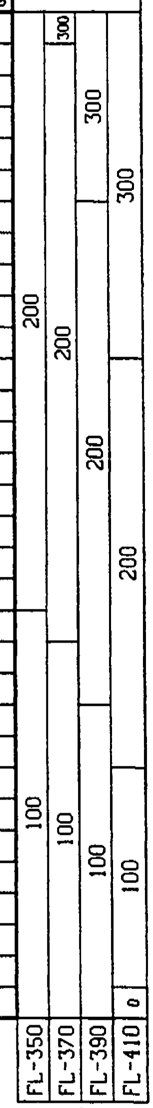


CHART VALID FOR A LANDING WEIGHT OF 165,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 165,000 KG LDG. WT.

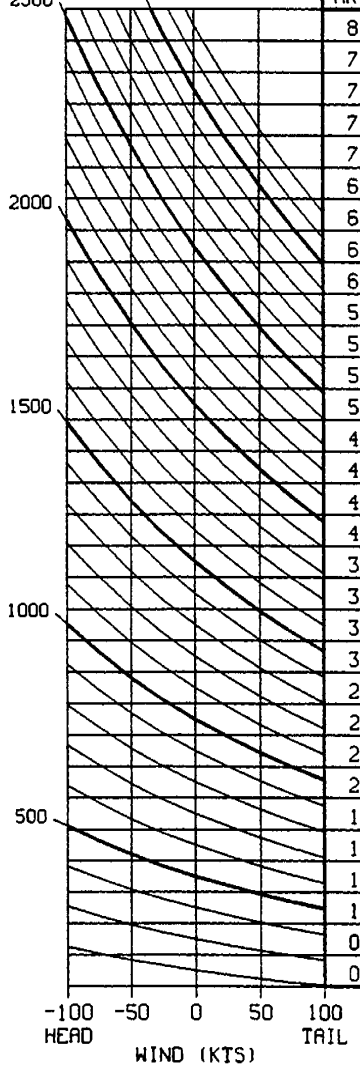
DECREASE/INCREASE TIME BY 1.0 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 60 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) DB1-4-1059A

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



TOTAL FLIGHT TIME AND TRIP FUEL								
CRUISE ALTITUDE (FT)								
21,000		23,000		25,000		27,000		
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
8:02	57.1	7:47	55.2	7:31	53.3	7:15	51.4	
7:48	55.2	7:34	53.4	7:18	51.5	7:02	49.8	
7:34	53.3	7:20	51.5	7:05	49.8	6:50	48.1	
7:20	51.4	7:07	49.7	6:52	48.0	6:37	46.4	
7:06	49.5	6:53	47.9	6:39	46.3	6:25	44.8	
6:52	47.7	6:39	46.1	6:26	44.6	6:12	43.1	
6:38	45.8	6:26	44.4	6:13	42.9	6:00	41.5	
6:24	44.0	6:12	42.6	6:00	41.2	5:47	39.8	
6:09	42.1	5:58	40.8	5:47	39.5	5:34	38.2	
5:55	40.3	5:44	39.1	5:33	37.8	5:21	36.6	
5:41	38.5	5:31	37.3	5:20	36.1	5:08	35.0	
5:26	36.7	5:17	35.6	5:06	34.4	4:55	33.3	
5:12	34.9	5:03	33.8	4:53	32.8	4:43	31.7	
4:57	33.1	4:48	32.1	4:39	31.1	4:29	30.2	
4:42	31.4	4:34	30.4	4:26	29.5	4:16	28.6	
4:28	29.6	4:20	28.7	4:12	27.8	4:03	27.0	
4:13	27.8	4:06	27.0	3:58	26.2	3:50	25.4	
3:58	26.1	3:51	25.3	3:44	24.6	3:37	23.9	
3:43	24.4	3:37	23.7	3:30	23.0	3:23	22.3	
3:28	22.7	3:22	22.0	3:16	21.4	3:10	20.8	
3:13	20.9	3:08	20.3	3:02	19.8	2:56	19.2	
2:58	19.2	2:53	18.7	2:48	18.2	2:43	17.7	
2:43	17.5	2:39	17.1	2:34	16.6	2:29	16.2	
2:28	15.9	2:24	15.4	2:20	15.0	2:15	14.6	
2:12	14.2	2:09	13.8	2:05	13.5	2:02	13.1	
1:57	12.5	1:54	12.2	1:51	11.9	1:48	11.6	
1:42	10.9	1:39	10.6	1:37	10.4	1:34	10.1	
1:26	9.2	1:24	9.0	1:22	8.8	1:20	8.7	
1:10	7.6	1:09	7.4	1:07	7.3	1:06	7.2	
0:55	6.0	0:54	5.9	0:53	5.8	0:52	5.7	
0:39	4.4	0:39	4.3	0:38	4.3	0:38	4.2	

FUEL CORRECTION (KG)

FL-210	FL-230	FL-250	FL-270
1000	1000	900	900
900	900	800	800
800	800	700	700
700	700	600	600
600	600	500	500
500	500	400	400
400	400	300	300
300	300	200	200
200	200	100	100
100	100		

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LOG. WT.

DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 41 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1066A

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
LONG RANGE CRUISE SPEED
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)
	21,000		23,000		25,000		27,000		
	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	
5500 6000							13:45	109.6	
					13:51	111.9	13:33	107.7	1800
					13:39	109.9	13:21	105.7	1700
			13:50	112.3	13:27	107.9	13:09	103.8	
			13:38	110.2	13:15	105.8	12:57	101.8	1800
5000	13:51	112.2	13:26	108.1	13:03	103.9	12:45	99.9	1700
	13:39	110.1	13:14	106.0	12:51	101.9	12:32	98.0	
	13:26	107.9	13:01	104.0	12:39	99.9	12:20	96.1	1700
	13:14	105.8	12:49	101.9	12:27	97.9	12:08	94.2	
4500	13:02	103.6	12:37	99.8	12:15	95.9	11:56	92.3	1600
	12:49	101.5	12:25	97.8	12:03	94.0	11:44	90.5	
	12:37	99.4	12:13	95.8	11:50	92.1	11:32	88.6	1600
	12:24	97.2	12:01	93.8	11:38	90.1	11:20	86.8	1500
4000	12:12	95.1	11:48	91.7	11:26	88.2	11:07	84.9	
	12:00	93.0	11:36	89.7	11:14	86.3	10:55	83.1	1500
	11:47	91.0	11:24	87.7	11:02	84.4	10:43	81.3	1400
	11:34	88.9	11:11	85.8	10:50	82.5	10:31	79.5	
	11:21	86.8	10:59	83.8	10:37	80.6	10:19	77.6	1400
	11:08	84.8	10:47	81.8	10:25	78.7	10:07	75.8	1300
3500	10:55	82.7	10:34	79.8	10:13	76.8	9:54	74.0	
	10:42	80.7	10:22	77.9	10:01	75.0	9:42	72.3	1300
	10:29	78.7	10:09	76.0	9:48	73.2	9:30	70.5	1200
	10:16	76.7	9:56	74.0	9:36	71.3	9:18	68.7	
	10:03	74.7	9:44	72.1	9:24	69.5	9:05	66.9	1200
	9:50	72.6	9:31	70.2	9:11	67.6	8:53	65.2	1100
	9:36	70.7	9:18	68.3	8:59	65.8	8:41	63.5	
	9:23	68.7	9:05	66.4	8:46	64.0	8:29	61.7	1100
	9:09	66.8	8:52	64.5	8:34	62.2	8:16	60.0	1000
	8:56	64.8	8:39	62.6	8:21	60.4	8:04	58.3	
	8:43	62.8	8:26	60.8	8:09	58.6	7:52	56.5	1000
	8:29	60.9	8:13	58.9	7:56	56.8	7:39	54.8	900
	8:15	59.0	8:00	57.1	7:43	55.1	7:27	53.2	
									FL-210
									FL-230
									FL-250
									FL-270

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 48 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) DB1-4-1127

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)			
	29,000		31,000		33,000		35,000					
	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG				
3000	7:01	49.7	6:53	47.9	6:52	46.4	6:54	45.1			900	
	6:49	48.1	6:41	46.4	6:40	44.9	6:41	43.7	800	800	800	900
	6:36	46.4	6:29	44.8	6:27	43.4	6:29	42.2				
	6:24	44.8	6:16	43.3	6:15	41.9	6:16	40.8				
	6:12	43.2	6:04	41.8	6:02	40.5	6:04	39.3				800
	5:59	41.7	5:52	40.2	5:50	39.0	5:51	37.9	700	700	700	
2500	5:47	40.1	5:39	38.7	5:37	37.5	5:39	36.4				
	5:34	38.5	5:27	37.2	5:25	36.1	5:26	35.0				700
	5:22	36.9	5:14	35.7	5:12	34.6	5:13	33.6				
	5:10	35.4	5:02	34.2	5:00	33.2	5:01	32.2	600	600	600	600
	4:57	33.8	4:50	32.7	4:47	31.7	4:48	30.8				
	4:44	32.3	4:37	31.2	4:35	30.3	4:36	29.4				
	4:32	30.7	4:25	29.7	4:23	28.8	4:23	28.0				
2000	4:19	29.2	4:12	28.2	4:10	27.4	4:11	26.7	500	500	500	500
	4:07	27.7	4:00	26.8	3:58	26.0	3:58	25.3				
	3:54	26.2	3:47	25.3	3:45	24.6	3:46	23.9				
	3:41	24.7	3:35	23.9	3:33	23.2	3:33	22.6				
	3:29	23.2	3:22	22.4	3:20	21.8	3:21	21.2	400	400	400	400
	3:16	21.7	3:10	21.0	3:08	20.4	3:08	19.9				
1500	3:03	20.2	2:57	19.6	2:55	19.0	2:55	18.5				
	2:50	18.7	2:45	18.1	2:43	17.6	2:43	17.2				
	2:37	17.2	2:32	16.7	2:30	16.3	2:30	15.9	300	300	300	300
	2:24	15.7	2:19	15.3	2:18	14.9	2:18	14.5				
	2:11	14.3	2:07	13.9	2:05	13.5	2:05	13.2				
	1:58	12.8	1:54	12.5	1:53	12.2	1:53	11.9				
1000	1:44	11.4	1:41	11.1	1:40	10.8	1:40	10.6	200	200	200	200
	1:31	9.9	1:29	9.7	1:27	9.5	1:27	9.3				
	1:18	8.5	1:16	8.3	1:15	8.2	1:15	8.0				
	1:04	7.1	1:03	6.9	1:02	6.8	1:02	6.7				
500	0:51	5.6	0:50	5.6	0:50	5.5	0:50	5.5	100	100	100	100
	0:37	4.2	0:37	4.2	0:37	4.2	0:37	4.2				
									FL-290	FL-310	FL-330	FL-350

-100 HEAD -50 0 50 100 TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LOG. WT.

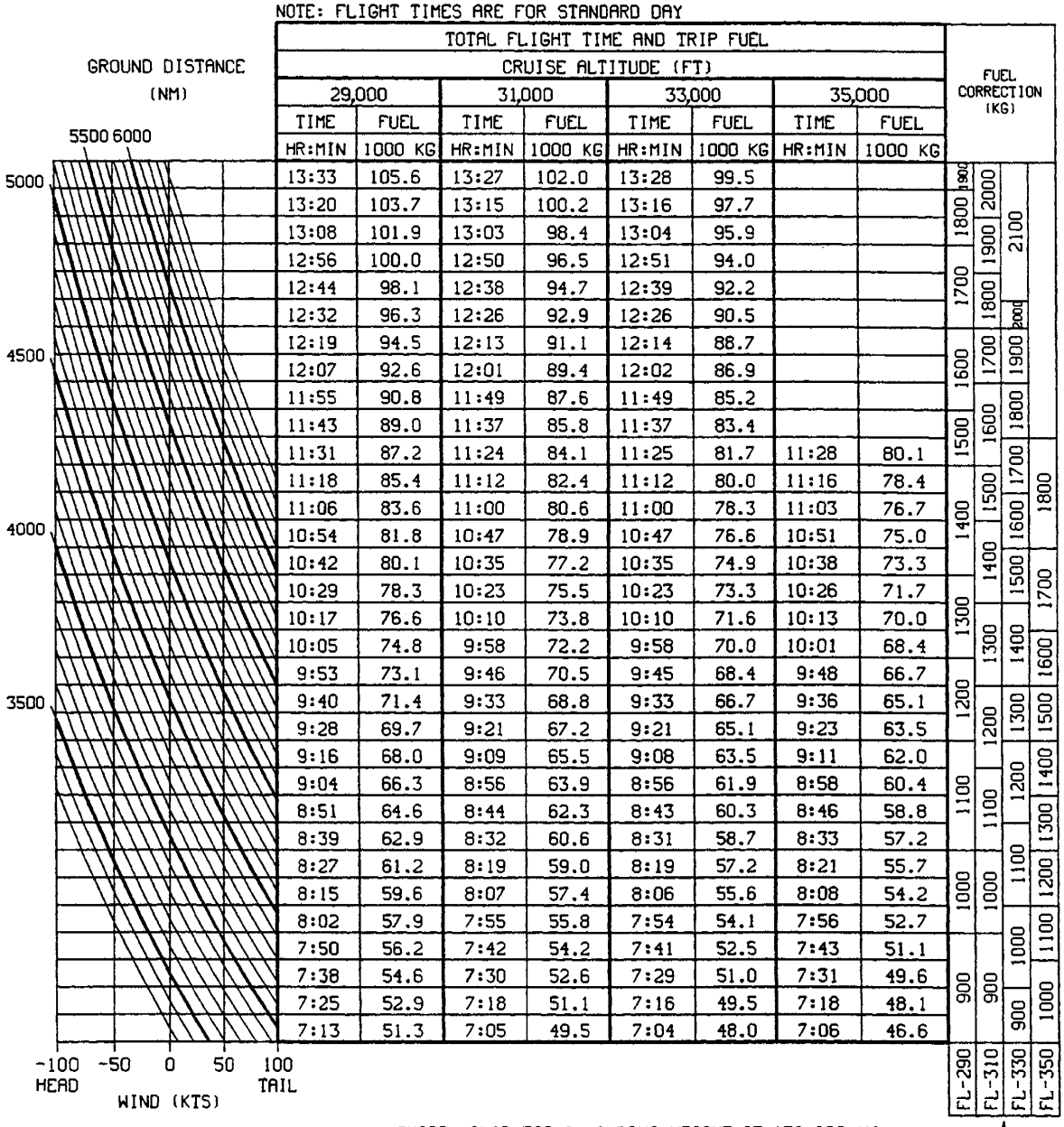
DECREASE/INCREASE TIME BY 1.2 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 42 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1067A**

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
LONG RANGE CRUISE SPEED
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT) 29,000 TIME HR:MIN	29,000 FUEL 1000 KG	31,000 TIME HR:MIN	31,000 FUEL 1000 KG	33,000 TIME HR:MIN	33,000 FUEL 1000 KG	35,000 TIME HR:MIN	35,000 FUEL 1000 KG
5500 6000	13:33	105.6	13:27	102.0	13:28	99.5		
	13:20	103.7	13:15	100.2	13:16	97.7		
	13:08	101.9	13:03	98.4	13:04	95.9		
	12:56	100.0	12:50	96.5	12:51	94.0		
	12:44	98.1	12:38	94.7	12:39	92.2		
	12:32	96.3	12:26	92.9	12:26	90.5		
	12:19	94.5	12:13	91.1	12:14	88.7		
	12:07	92.6	12:01	89.4	12:02	86.9		
	11:55	90.8	11:49	87.6	11:49	85.2		
	11:43	89.0	11:37	85.8	11:37	83.4		
	11:31	87.2	11:24	84.1	11:25	81.7	11:28	80.1
	11:18	85.4	11:12	82.4	11:12	80.0	11:16	78.4
	11:06	83.6	11:00	80.6	11:00	78.3	11:03	76.7
	10:54	81.8	10:47	78.9	10:47	76.6	10:51	75.0
	10:42	80.1	10:35	77.2	10:35	74.9	10:38	73.3
	10:29	78.3	10:23	75.5	10:23	73.3	10:26	71.7
	10:17	76.6	10:10	73.8	10:10	71.6	10:13	70.0
	10:05	74.8	9:58	72.2	9:58	70.0	10:01	68.4
	9:53	73.1	9:46	70.5	9:45	68.4	9:48	66.7
	9:40	71.4	9:33	68.8	9:33	66.7	9:36	65.1
	9:28	69.7	9:21	67.2	9:21	65.1	9:23	63.5
	9:16	68.0	9:09	65.5	9:08	63.5	9:11	62.0
	9:04	66.3	8:56	63.9	8:56	61.9	8:58	60.4
	8:51	64.6	8:44	62.3	8:43	60.3	8:46	58.8
	8:39	62.9	8:32	60.6	8:31	58.7	8:33	57.2
	8:27	61.2	8:19	59.0	8:19	57.2	8:21	55.7
	8:15	59.6	8:07	57.4	8:06	55.6	8:08	54.2
	8:02	57.9	7:55	55.8	7:54	54.1	7:56	52.7
	7:50	56.2	7:42	54.2	7:41	52.5	7:43	51.1
	7:38	54.6	7:30	52.6	7:29	51.0	7:31	49.6
	7:25	52.9	7:18	51.1	7:16	49.5	7:18	48.1
	7:13	51.3	7:05	49.5	7:04	48.0	7:06	46.6

FUEL CORRECTION (KG)

FL-290	FL-310	FL-330	FL-350
900	900	900	1000
1000	1000	1000	1100
1100	1100	1100	1200
1200	1200	1200	1300
1300	1300	1300	1400
1400	1400	1400	1500
1500	1500	1500	1600
1600	1600	1600	1700
1700	1700	1700	1800
1800	1800	1800	1900
1900	1900	1900	2000
2000	2000	2000	2100

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 44 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1128

FLIGHT PLANNING – CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL – CRUISE ALTITUDE (FT)						FUEL CORRECTION (KG)
	37,000		39,000		41,000		
	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	
3000	6:55	44.4					1100
	6:42	42.9					1000
	6:29	41.5					900
	6:17	40.0					800
	6:04	38.6					700
	5:52	37.2					600
2500	5:39	35.7	5:38	35.6			500
	5:27	34.3	5:26	34.2			400
	5:14	32.9	5:13	32.8			300
	5:02	31.6	5:01	31.4			200
	4:49	30.2	4:48	30.0			100
2000	4:36	28.8	4:36	28.6			
	4:24	27.4	4:23	27.3			
	4:11	26.1	4:11	25.9			
	3:59	24.8	3:58	24.6			
	3:46	23.4	3:46	23.2			
	3:34	22.1	3:33	21.9			
1500	3:21	20.8	3:21	20.6			
	3:08	19.4	3:08	19.3			
	2:56	18.1	2:55	18.0	2:55	18.1	
	2:43	16.8	2:43	16.7	2:43	16.8	
	2:31	15.5	2:30	15.4	2:30	15.5	
	2:18	14.3	2:18	14.1	2:18	14.2	
	2:05	13.0	2:05	12.9	2:05	12.9	
1000	1:53	11.7	1:53	11.6	1:52	11.6	
	1:40	10.4	1:40	10.4	1:40	10.4	
	1:28	9.2	1:27	9.1	1:27	9.1	
	1:15	7.9	1:15	7.9	1:15	7.9	
	1:02	6.7	1:02	6.6	1:02	6.7	
500	0:50	5.4	0:50	5.4	0:50	5.5	

-100 HEAD -50 0 50 100 TAIL

WIND (KTS)

FL-370 FL-390 FL-410

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

DECREASE/INCREASE TIME BY 1.2 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 45 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1068A**

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.82 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)			
	CRUISE ALTITUDE (FT)											
	21,000		23,000		25,000		27,000					
	502 KTS		498 KTS		494 KTS		489 KTS					
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
3000	6:35	63.2	6:38	59.4	6:42	55.8	6:45	52.8	500	500	600	600
	6:23	61.2	6:26	57.5	6:29	54.0	6:33	51.1				
	6:11	59.2	6:14	55.6	6:17	52.2	6:20	49.4	400		500	
	5:59	57.1	6:02	53.7	6:05	50.5	6:08	47.7				500
	5:47	55.1	5:50	51.8	5:53	48.7	5:56	46.0		400		
	5:35	53.1	5:38	49.9	5:41	46.9	5:43	44.4			400	
2500	5:23	51.1	5:26	48.0	5:29	45.2	5:31	42.7				400
	5:11	49.1	5:14	46.2	5:16	43.4	5:19	41.0				
	4:59	47.1	5:02	44.3	5:04	41.7	5:07	39.4				
	4:47	45.2	4:50	42.4	4:52	39.9	4:54	37.7	300			
	4:35	43.2	4:37	40.6	4:40	38.2	4:42	36.1		300		
	4:23	41.2	4:25	38.7	4:28	36.4	4:30	34.5			300	
	4:11	39.2	4:13	36.9	4:15	34.7	4:18	32.8				300
2000	3:59	37.3	4:01	35.1	4:03	33.0	4:05	31.2				
	3:47	35.3	3:49	33.2	3:51	31.3	3:53	29.6				
	3:35	33.4	3:37	31.4	3:39	29.5	3:41	28.0				
	3:23	31.4	3:25	29.6	3:27	27.8	3:28	26.3	200			
	3:11	29.5	3:13	27.7	3:15	26.1	3:16	24.7		200		
	2:59	27.5	3:01	25.9	3:02	24.4	3:04	23.1			200	
	2:47	25.6	2:49	24.1	2:50	22.7	2:52	21.5				200
1500	2:35	23.7	2:37	22.3	2:38	21.0	2:39	20.0				
	2:23	21.8	2:25	20.5	2:26	19.4	2:27	18.4				
	2:11	19.8	2:12	18.7	2:14	17.7	2:15	16.8				
	1:59	17.9	2:00	16.9	2:01	16.0	2:02	15.2				
	1:47	16.0	1:48	15.1	1:49	14.3	1:50	13.6	100			
	1:35	14.1	1:36	13.3	1:37	12.7	1:38	12.1		100		
1000	1:23	12.2	1:24	11.6	1:25	11.0	1:26	10.5			100	
	1:11	10.3	1:12	9.8	1:13	9.3	1:13	9.0				100
	1:00	8.4	1:00	8.0	1:01	7.7	1:01	7.4				
	0:47	6.5	0:48	6.3	0:48	6.0	0:49	5.8				
500	0:35	4.6	0:36	4.5	0:36	4.4	0:36	4.3				
									FL-210	FL-230	FL-250	FL-270

-100 HEAD -50 0 50 100 TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 54 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1069A**

FLIGHT PLANNING – CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.82 MACH CRUISE
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL – CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)				
	21,000		23,000		25,000		27,000						
	502 KTS		498 KTS		494 KTS		489 KTS						
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL					
5500 6000	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG					
5000							13:05	108.9					
					12:47	112.8	12:53	106.9				1200	1400
					12:34	110.8	12:41	105.0					
					12:22	108.8	12:28	103.1					
			12:04	113.4	12:10	106.8	12:16	101.2					1300
			11:52	111.3	11:58	104.8	12:04	99.3					
4500			11:40	109.2	11:46	102.8	11:52	97.4					
			11:28	107.1	11:34	100.9	11:39	95.6			1000	1100	1200
	11:10	111.6	11:16	105.1	11:21	98.9	11:27	93.7					
	10:58	109.4	11:04	103.0	11:09	97.0	11:15	91.8	900				
	10:46	107.3	10:52	100.9	10:57	95.0	11:02	89.9					1100
	10:34	105.1	10:40	98.9	10:45	93.1	10:50	88.1				1000	
4000	10:22	103.0	10:27	96.8	10:33	91.1	10:38	86.3					
	10:10	100.8	10:15	94.8	10:20	89.2	10:26	84.5	800		900		1000
	9:58	98.6	10:03	92.8	10:08	87.3	10:13	82.6				900	
	9:46	96.5	9:51	90.7	9:56	85.4	10:01	80.8					
	9:34	94.4	9:39	88.7	9:44	83.5	9:49	79.0					
	9:22	92.3	9:27	86.7	9:32	81.6	9:36	77.2					900
	9:10	90.1	9:15	84.8	9:20	79.7	9:24	75.4	700		800	800	
3500	8:58	88.0	9:03	82.8	9:07	77.8	9:12	73.6					
	8:46	85.9	8:51	80.8	8:55	76.0	9:00	71.9					
	8:35	83.8	8:39	78.8	8:43	74.1	8:47	70.1					
	8:23	81.7	8:27	76.8	8:31	72.3	8:35	68.3					800
	8:11	79.7	8:15	74.9	8:19	70.4	8:23	66.6				700	
	7:59	77.6	8:03	72.9	8:07	68.6	8:11	64.8	600		700		
	7:47	75.5	7:50	70.9	7:54	66.7	7:58	63.1					
	7:35	73.4	7:38	69.0	7:42	64.9	7:46	61.4					700
	7:23	71.4	7:26	67.1	7:30	63.1	7:34	59.6				600	
	7:11	69.3	7:14	65.2	7:18	61.3	7:21	57.9					
	6:59	67.3	7:02	63.2	7:06	59.5	7:09	56.2	500		600		600
	6:47	65.2	6:50	61.3	6:53	57.6	6:57	54.5				500	
												500	
									FL-210	FL-230	FL-250		FL-270

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 60 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) DB1-4-1129

FLIGHT PLANNING – CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.82 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)			
	29,000		31,000		33,000		35,000					
	485 KTS		481 KTS		477 KTS		473 KTS					
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
3000	6:48	50.2	6:52	47.9	6:55	46.2	6:58	44.8	700			
	6:36	48.6	6:39	46.4	6:42	44.7	6:46	43.3		700	800	900
	6:23	47.0	6:27	44.8	6:30	43.2	6:33	41.9				
	6:11	45.4	6:14	43.3	6:17	41.7	6:20	40.4	600		700	800
	5:59	43.8	6:02	41.8	6:05	40.2	6:08	39.0		600		
	5:46	42.2	5:49	40.3	5:52	38.8	5:55	37.6				
2500	5:34	40.6	5:37	38.8	5:39	37.3	5:42	36.2				
	5:22	39.0	5:24	37.3	5:27	35.9	5:29	34.8	500		600	700
	5:09	37.4	5:12	35.8	5:14	34.4	5:17	33.3		500		
	4:57	35.9	4:59	34.3	5:02	33.0	5:04	32.0				
	4:44	34.3	4:47	32.8	4:49	31.6	4:51	30.6	400		500	600
	4:32	32.8	4:34	31.3	4:36	30.1	4:39	29.2		400		
	4:20	31.2	4:22	29.8	4:24	28.7	4:26	27.8				
2000	4:07	29.7	4:09	28.4	4:11	27.3	4:13	26.5				
	3:55	28.1	3:57	26.9	3:59	25.9	4:00	25.1				
	3:42	26.6	3:44	25.4	3:46	24.5	3:48	23.8	300		400	500
	3:30	25.1	3:32	24.0	3:33	23.1	3:35	22.4		300		
	3:18	23.6	3:19	22.5	3:21	21.7	3:22	21.1				
	3:05	22.0	3:07	21.1	3:08	20.3	3:10	19.7				
1500	2:53	20.5	2:54	19.7	2:56	19.0	2:57	18.4				
	2:41	19.0	2:42	18.2	2:43	17.6	2:44	17.1				
	2:28	17.5	2:29	16.8	2:30	16.2	2:32	15.8				
	2:16	16.0	2:17	15.4	2:18	14.9	2:19	14.5	200		300	400
	2:03	14.5	2:04	14.0	2:05	13.5	2:06	13.2		200		
	1:51	13.1	1:52	12.6	1:53	12.2	1:53	11.9				
1000	1:39	11.6	1:39	11.2	1:40	10.8	1:41	10.6				
	1:26	10.1	1:27	9.8	1:27	9.5	1:28	9.3				
	1:14	8.6	1:14	8.4	1:15	8.2	1:15	8.0				
	1:01	7.2	1:02	7.0	1:02	6.8	1:03	6.7	100	100	100	100
	0:49	5.7	0:49	5.6	0:50	5.5	0:50	5.5				
500	0:37	4.2	0:37	4.2	0:37	4.2	0:37	4.2				
									FL-290	FL-310	FL-330	FL-350

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 44 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1070A**

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.82 MACH CRUISE
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)
	CRUISE ALTITUDE (FT)								
	29,000		31,000		33,000		35,000		
	485 KTS		481 KTS		477 KTS		473 KTS		
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
5000	13:12	103.8	13:18	99.6	13:25	96.8			1600 1800 2100
	12:59	102.0	13:06	97.9	13:13	95.0			1500 1700 2000
	12:47	100.1	12:53	96.1	13:00	93.2			
	12:35	98.3	12:41	94.3	12:47	91.4			
	12:22	96.5	12:28	92.5	12:35	89.7			1400 1600 1900
4500	12:10	94.6	12:16	90.7	12:22	87.9			
	11:57	92.8	12:03	89.0	12:10	86.2			1600 1500 1800
	11:45	91.0	11:51	87.2	11:57	84.5	12:03	82.7	1300 1700 1900
	11:33	89.2	11:38	85.5	11:44	82.8	11:50	81.0	1400 1600
	11:20	87.5	11:26	83.8	11:32	81.0	11:38	79.3	
	11:08	85.7	11:13	82.0	11:19	79.3	11:25	77.6	1200 1300 1500 1800
4000	10:56	83.9	11:01	80.3	11:07	77.7	11:12	75.9	
	10:43	82.2	10:49	78.6	10:54	76.0	11:00	74.3	
	10:31	80.4	10:36	76.9	10:41	74.4	10:47	72.6	1100 1200 1400 1700
	10:18	78.7	10:24	75.3	10:29	72.7	10:34	71.0	
	10:06	76.9	10:11	73.6	10:16	71.1	10:21	69.3	
	9:54	75.2	9:59	71.9	10:04	69.5	10:09	67.7	1000 1100 1300 1600
	9:41	73.5	9:46	70.3	9:51	67.9	9:56	66.1	
3500	9:29	71.8	9:34	68.6	9:38	66.3	9:43	64.5	
	9:16	70.1	9:21	67.0	9:26	64.6	9:31	62.9	900 1000 1200 1500 1400
	9:04	68.4	9:09	65.3	9:13	63.0	9:18	61.3	
	8:52	66.7	8:56	63.7	9:01	61.5	9:05	59.8	
	8:39	65.0	8:44	62.1	8:48	59.9	8:52	58.3	800 900 1100 1300
	8:27	63.3	8:31	60.5	8:35	58.4	8:40	56.7	
	8:15	61.7	8:19	58.9	8:23	56.8	8:27	55.2	
	8:02	60.0	8:06	57.3	8:10	55.2	8:14	53.7	700 800 1000 1200
	7:50	58.4	7:54	55.7	7:58	53.7	8:02	52.2	
	7:37	56.7	7:41	54.2	7:45	52.2	7:49	50.7	
	7:25	55.1	7:29	52.6	7:32	50.7	7:36	49.2	600 700 900 1100
	7:13	53.4	7:16	51.0	7:20	49.2	7:24	47.7	
	7:00	51.8	7:04	49.5	7:07	47.7	7:11	46.2	600 800 1000
									FL-290 FL-310 FL-330 FL-350

-100 HEAD -50 0 50 100 TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

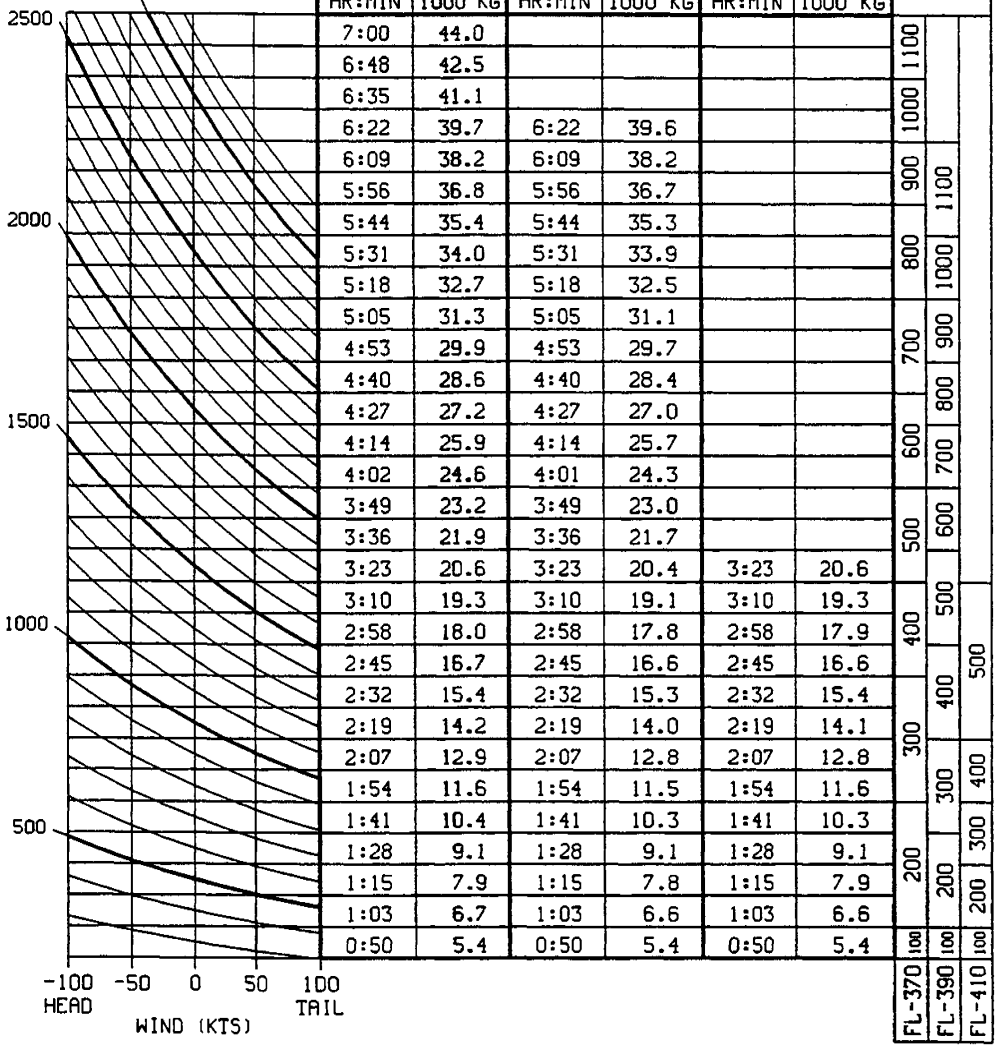
INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 46 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1130**

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.82 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



TOTAL FLIGHT TIME AND TRIP FUEL						FUEL CORRECTION (KG)
CRUISE ALTITUDE (FT)						
37,000		39,000		41,000		
470 KTS		470 KTS		470 KTS		
TIME	FUEL	TIME	FUEL	TIME	FUEL	
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
7:00	44.0					1100
6:48	42.5					
6:35	41.1					1000
6:22	39.7	6:22	39.6			
6:09	38.2	6:09	38.2			900
5:56	36.8	5:56	36.7			
5:44	35.4	5:44	35.3			800
5:31	34.0	5:31	33.9			
5:18	32.7	5:18	32.5			700
5:05	31.3	5:05	31.1			
4:53	29.9	4:53	29.7			600
4:40	28.6	4:40	28.4			
4:27	27.2	4:27	27.0			500
4:14	25.9	4:14	25.7			
4:02	24.6	4:01	24.3			400
3:49	23.2	3:49	23.0			
3:36	21.9	3:36	21.7			300
3:23	20.6	3:23	20.4	3:23	20.6	
3:10	19.3	3:10	19.1	3:10	19.3	200
2:58	18.0	2:58	17.8	2:58	17.9	
2:45	16.7	2:45	16.6	2:45	16.6	100
2:32	15.4	2:32	15.3	2:32	15.4	
2:19	14.2	2:19	14.0	2:19	14.1	FL-370
2:07	12.9	2:07	12.8	2:07	12.8	
1:54	11.6	1:54	11.5	1:54	11.6	FL-390
1:41	10.4	1:41	10.3	1:41	10.3	
1:28	9.1	1:28	9.1	1:28	9.1	FL-410
1:15	7.9	1:15	7.8	1:15	7.9	
1:03	6.7	1:03	6.6	1:03	6.6	
0:50	5.4	0:50	5.4	0:50	5.4	

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 46 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1071B

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.83 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL							
	CRUISE ALTITUDE (FT)							
	21,000		23,000		25,000		27,000	
	508 KTS		504 KTS		500 KTS		495 KTS	
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG
3000	6:31	64.1	6:34	60.2	6:37	56.6	6:40	53.4
	6:19	62.0	6:22	58.3	6:25	54.7	6:28	51.7
	6:07	60.0	6:10	56.3	6:13	52.9	6:16	50.0
	5:55	58.0	5:58	54.4	6:01	51.1	6:04	48.3
	5:43	55.9	5:46	52.5	5:49	49.3	5:52	46.6
2500	5:31	53.9	5:34	50.6	5:37	47.5	5:40	44.9
	5:20	51.9	5:22	48.7	5:25	45.7	5:28	43.2
	5:08	49.8	5:10	46.8	5:13	44.0	5:15	41.5
	4:56	47.8	4:58	44.9	5:01	42.2	5:03	39.9
	4:44	45.8	4:46	43.0	4:49	40.4	4:51	38.2
2000	4:32	43.8	4:34	41.1	4:37	38.6	4:39	36.5
	4:20	41.8	4:23	39.3	4:25	36.9	4:27	34.9
	4:08	39.8	4:11	37.4	4:13	35.1	4:15	33.2
	3:57	37.8	3:59	35.5	4:01	33.4	4:03	31.6
	3:45	35.8	3:47	33.7	3:49	31.6	3:51	29.9
1500	3:33	33.8	3:35	31.8	3:37	29.9	3:38	28.3
	3:21	31.9	3:23	29.9	3:25	28.2	3:26	26.6
	3:09	29.9	3:11	28.1	3:13	26.4	3:14	25.0
	2:57	27.9	2:59	26.3	3:00	24.7	3:02	23.4
	2:46	26.0	2:47	24.4	2:48	23.0	2:50	21.8
1000	2:34	24.0	2:35	22.6	2:36	21.3	2:38	20.2
	2:22	22.0	2:23	20.8	2:24	19.6	2:26	18.6
	2:10	20.1	2:11	18.9	2:12	17.9	2:13	17.0
	1:58	18.1	1:59	17.1	2:00	16.2	2:01	15.4
	1:46	16.2	1:47	15.3	1:48	14.5	1:49	13.8
500	1:35	14.3	1:35	13.5	1:36	12.8	1:37	12.2
	1:23	12.3	1:23	11.7	1:24	11.1	1:25	10.6
	1:11	10.4	1:12	9.9	1:12	9.4	1:13	9.0
	0:59	8.5	1:00	8.1	1:00	7.7	1:01	7.5
	0:47	6.6	0:48	6.3	0:48	6.1	0:49	5.9
	0:35	4.7	0:36	4.5	0:36	4.4	0:36	4.3

FUEL CORRECTION (KG)

FL-210	FL-230	FL-250	FL-270
500	500	500	600
400	400	400	500
300	300	300	400
200	200	200	300
100	100	100	200
			100

-100 HEAD -50 0 50 100 TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 55 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1072A

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.83 MACH CRUISE
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)			
	CRUISE ALTITUDE (FT)											
	21,000		23,000		25,000		27,000					
	508 KTS		504 KTS		500 KTS		495 KTS					
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
5500 6000	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
5000							12:56	110.2				1400
							12:44	108.3			1200	1300
					12:26	112.3	12:32	106.3				
					12:14	110.2	12:20	104.4				
					12:02	108.2	12:08	102.4				
			11:44	112.8	11:50	106.2	11:56	100.5				
4500			11:32	110.7	11:38	104.2	11:43	98.6			1100	1200
			11:20	108.6	11:26	102.2	11:31	96.7		1000		
	11:03	113.2	11:08	106.5	11:14	100.2	11:19	94.8	900			
	10:51	111.0	10:56	104.4	11:02	98.2	11:07	92.9			1000	1100
	10:39	108.8	10:44	102.3	10:50	96.2	10:55	91.1				
	10:27	106.6	10:32	100.2	10:37	94.3	10:43	89.2		900		
4000	10:15	104.4	10:20	98.2	10:25	92.3	10:31	87.4	800			1000
	10:03	102.2	10:08	96.1	10:13	90.4	10:18	85.5			900	
	9:52	100.1	9:56	94.1	10:01	88.5	10:06	83.7		800		
	9:40	97.9	9:45	92.0	9:49	86.5	9:54	81.8			800	900
	9:28	95.7	9:33	90.0	9:37	84.6	9:42	80.0				
	9:16	93.6	9:21	87.9	9:25	82.7	9:30	78.2	700			
	9:04	91.4	9:09	85.9	9:13	80.8	9:18	76.4		700		
3500	8:52	89.3	8:57	83.9	9:01	78.9	9:06	74.6			700	800
	8:41	87.1	8:45	81.9	8:49	77.0	8:54	72.7				
	8:29	85.0	8:33	79.9	8:37	75.1	8:41	71.0		600		
	8:17	82.9	8:21	77.9	8:25	73.2	8:29	69.2	600		600	700
	8:05	80.8	8:09	75.9	8:13	71.3	8:17	67.4				
	7:53	78.7	7:57	73.9	8:01	69.5	8:05	65.6		500		
	7:41	76.6	7:45	71.9	7:49	67.6	7:53	63.9			500	600
	7:29	74.5	7:33	70.0	7:37	65.7	7:41	62.1				
	7:18	72.4	7:21	68.0	7:25	63.9	7:29	60.4	500			
	7:06	70.3	7:09	66.1	7:13	62.1	7:17	58.6		500	500	600
	6:54	68.2	6:57	64.1	7:01	60.2	7:04	56.9				
	6:42	66.2	6:45	62.1	6:49	58.4	6:52	55.2	400			
									FL-210	FL-230	FL-250	FL-270

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 61 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1131

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.83 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)			
	CRUISE ALTITUDE (FT)											
	29,000		31,000		33,000		35,000					
	491 KTS		487 KTS		483 KTS		478 KTS					
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
3000	6:44	50.8	6:47	48.4	6:50	46.6	6:54	45.1	700			
	6:31	49.1	6:35	46.9	6:38	45.1	6:41	43.7	600	700	800	900
	6:19	47.5	6:22	45.3	6:26	43.6	6:29	42.2				
	6:07	45.9	6:10	43.8	6:13	42.1	6:16	40.7	500	600	700	800
	5:55	44.3	5:58	42.2	6:01	40.6	6:04	39.3				
	5:43	42.7	5:45	40.7	5:48	39.1	5:51	37.9				
2500	5:30	41.1	5:33	39.2	5:36	37.7	5:39	36.4	400	500	600	700
	5:18	39.5	5:21	37.6	5:23	36.2	5:26	35.0				
	5:06	37.9	5:08	36.1	5:11	34.7	5:13	33.6				
	4:54	36.3	4:56	34.6	4:58	33.3	5:01	32.2				
	4:41	34.7	4:44	33.1	4:46	31.9	4:48	30.8	300	400	500	600
	4:29	33.1	4:31	31.6	4:33	30.4	4:36	29.4				
	4:17	31.6	4:19	30.1	4:21	29.0	4:23	28.0				
2000	4:05	30.0	4:07	28.6	4:09	27.6	4:11	26.7	200	300	400	500
	3:52	28.4	3:54	27.2	3:56	26.1	3:58	25.3				
	3:40	26.9	3:42	25.7	3:44	24.7	3:45	23.9				
	3:28	25.4	3:30	24.2	3:31	23.3	3:33	22.6				
	3:16	23.8	3:17	22.8	3:19	21.9	3:20	21.2	100	200	300	400
	3:03	22.3	3:05	21.3	3:06	20.5	3:08	19.9				
	2:51	20.8	2:53	19.9	2:54	19.1	2:55	18.5				
1500	2:39	19.2	2:40	18.4	2:41	17.8	2:43	17.2				
	2:27	17.7	2:28	17.0	2:29	16.4	2:30	15.9				
	2:15	16.2	2:16	15.5	2:17	15.0	2:18	14.6				
	2:02	14.7	2:03	14.1	2:04	13.6	2:05	13.2				
	1:50	13.2	1:51	12.7	1:52	12.3	1:52	11.9				
1000	1:38	11.7	1:39	11.3	1:39	10.9	1:40	10.6				
	1:26	10.2	1:26	9.8	1:27	9.6	1:27	9.3				
	1:13	8.7	1:14	8.4	1:14	8.2	1:15	8.0				
	1:01	7.2	1:02	7.0	1:02	6.9	1:02	6.8				
	0:49	5.7	0:49	5.6	0:49	5.5	0:50	5.5				
500	0:37	4.3	0:37	4.2	0:37	4.2	0:37	4.2				
									FL-290	FL-310	FL-330	FL-350

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 44 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1073A**

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.83 MACH CRUISE
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)
	29,000		31,000		33,000		35,000		
	491 KTS		487 KTS		483 KTS		478 KTS		
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
5000	13:03	105.0	13:09	100.6	13:16	97.6			1600
	12:50	103.1	12:57	98.8	13:04	95.8			1800
	12:38	101.3	12:45	97.0	12:51	94.0			2000 2100
	12:26	99.4	12:32	95.2	12:39	92.3			1500 1700 1900
	12:14	97.6	12:20	93.4	12:26	90.5			1400 1600 1800
4500	12:02	95.7	12:08	91.6	12:14	88.7			
	11:49	93.9	11:55	89.9	12:01	86.9			1300 1500 1700
	11:37	92.1	11:43	88.1	11:49	85.2			
	11:25	90.3	11:31	86.4	11:36	83.5	11:42	81.6	1400 1600 1900
	11:13	88.5	11:18	84.6	11:24	81.8	11:30	79.9	1200
	11:00	86.6	11:06	82.9	11:11	80.0	11:17	78.2	1300 1500 1800
4000	10:48	84.9	10:54	81.1	10:59	78.4	11:05	76.5	
	10:36	83.1	10:41	79.4	10:47	76.7	10:52	74.8	1100
	10:24	81.3	10:29	77.7	10:34	75.0	10:40	73.2	1200 1400 1700
	10:11	79.6	10:16	76.0	10:22	73.4	10:27	71.5	
	9:59	77.8	10:04	74.3	10:09	71.7	10:14	69.8	1000 1300 1600
	9:47	76.1	9:52	72.7	9:57	70.1	10:02	68.2	
	9:35	74.3	9:39	71.0	9:44	68.5	9:49	66.6	1100 1200 1500
3500	9:22	72.6	9:27	69.3	9:32	66.9	9:37	65.0	
	9:10	70.9	9:15	67.7	9:19	65.2	9:24	63.4	900 1000 1400
	8:58	69.2	9:02	66.0	9:07	63.6	9:12	61.8	
	8:46	67.5	8:50	64.4	8:55	62.0	8:59	60.3	1100 1300
	8:34	65.8	8:38	62.8	8:42	60.5	8:47	58.7	
	8:21	64.1	8:25	61.2	8:30	58.9	8:34	57.2	800 900 1000 1200
	8:09	62.4	8:13	59.5	8:17	57.3	8:21	55.6	
	7:57	60.7	8:01	57.9	8:05	55.8	8:09	54.1	
	7:45	59.0	7:48	56.3	7:52	54.2	7:56	52.6	700 800 900 1100
	7:32	57.4	7:36	54.7	7:40	52.7	7:44	51.1	
	7:20	55.7	7:24	53.2	7:27	51.2	7:31	49.6	
	7:08	54.1	7:11	51.6	7:15	49.6	7:19	48.1	600 700 800 1000
	6:56	52.4	6:59	50.0	7:03	48.1	7:06	46.6	900
									FL-290 FL-310 FL-330 FL-350

5500 6000

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 46 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1132

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.83 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL						FUEL CORRECTION (KG)
	CRUISE ALTITUDE (FT)						
	37,000		39,000		41,000		
	476 KTS		476 KTS		476 KTS		
	TIME	FUEL	TIME	FUEL	TIME	FUEL	
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
3000	6:56	44.3					1100
	6:43	42.8					1000
	6:31	41.3					
	6:18	39.9					
	6:05	38.5	6:05	38.3			900
2500	5:53	37.1	5:53	36.9			
	5:40	35.7	5:40	35.5			800
	5:27	34.3	5:27	34.1			
	5:15	32.9	5:15	32.6			
2000	5:02	31.5	5:02	31.3			700
	4:50	30.1	4:50	29.9			
	4:37	28.8	4:37	28.5			
	4:24	27.4	4:24	27.1			600
	4:12	26.1	4:12	25.8			
1500	3:59	24.7	3:59	24.5			
	3:46	23.4	3:46	23.1			500
	3:34	22.1	3:34	21.8			
	3:21	20.7	3:21	20.5			
	3:09	19.4	3:09	19.2	3:09	19.3	
1000	2:56	18.1	2:56	17.9	2:56	18.0	400
	2:43	16.8	2:43	16.6	2:43	16.7	
	2:31	15.5	2:31	15.4	2:31	15.4	
	2:18	14.2	2:18	14.1	2:18	14.1	300
	2:05	13.0	2:06	12.8	2:06	12.9	
	1:53	11.7	1:53	11.6	1:53	11.6	
500	1:40	10.4	1:40	10.3	1:40	10.3	200
	1:28	9.2	1:28	9.1	1:28	9.1	
	1:15	7.9	1:15	7.9	1:15	7.9	
	1:02	6.7	1:02	6.6	1:02	6.7	100
	0:50	5.4	0:50	5.4	0:50	5.4	
							FL-370
							FL-390
							FL-410

-100 HEAD -50 0 50 100 TAIL
WIND (KTS)

FUEL CORRECTION (KG)	
1100	
1000	
900	1000
800	
700	900
600	800
500	700
400	600
300	500
200	400
100	300
	200
	100

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 44 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1124

FLIGHT PLANNING – CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.84 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)			
	21,000		23,000		25,000		27,000					
	514 KTS		510 KTS		506 KTS		501 KTS					
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL				
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG				
3000	6:26	65.2	6:30	61.2	6:33	57.5	6:36	54.3	500	500	600	600
	6:15	63.1	6:18	59.2	6:21	55.6	6:24	52.6				
	6:03	61.0	6:06	57.3	6:09	53.8	6:12	50.8	400		500	
	5:51	58.9	5:54	55.3	5:57	52.0	6:00	49.1		500		
	5:39	56.8	5:42	53.4	5:45	50.1	5:48	47.3				
	5:28	54.8	5:31	51.4	5:33	48.3	5:36	45.6				500
2500	5:16	52.7	5:19	49.5	5:21	46.5	5:24	43.9		400	400	
	5:04	50.7	5:07	47.6	5:10	44.7	5:12	42.2				
	4:53	48.6	4:55	45.6	4:58	42.9	5:00	40.5	300			
	4:41	46.6	4:43	43.7	4:46	41.1	4:48	38.8		300	400	
	4:29	44.5	4:32	41.8	4:34	39.3	4:36	37.1				
	4:18	42.5	4:20	39.9	4:22	37.5	4:24	35.4				400
2000	4:06	40.4	4:08	38.0	4:10	35.7	4:12	33.7		300	300	
	3:54	38.4	3:56	36.1	3:58	33.9	4:00	32.0				
	3:42	36.4	3:44	34.2	3:46	32.1	3:48	30.4				
	3:31	34.4	3:33	32.3	3:34	30.4	3:36	28.7				300
	3:19	32.4	3:21	30.4	3:22	28.6	3:24	27.0	200			
	3:07	30.4	3:09	28.5	3:11	26.8	3:12	25.4		200	200	
	2:56	28.4	2:57	26.7	2:59	25.1	3:00	23.7				
1500	2:44	26.4	2:45	24.8	2:47	23.3	2:48	22.1				200
	2:32	24.4	2:34	22.9	2:35	21.6	2:36	20.5				
	2:20	22.4	2:22	21.1	2:23	19.9	2:24	18.8				
	2:09	20.4	2:10	19.2	2:11	18.1	2:12	17.2				
	1:57	18.4	1:58	17.4	1:59	16.4	2:00	15.6				
	1:45	16.4	1:46	15.5	1:47	14.7	1:48	13.9	100			
	1:34	14.5	1:35	13.7	1:35	13.0	1:36	12.3		100	100	
1000	1:22	12.5	1:23	11.8	1:24	11.2	1:24	10.7				100
	1:10	10.5	1:11	10.0	1:12	9.5	1:12	9.1				
	0:59	8.6	0:59	8.2	1:00	7.8	1:00	7.5				
	0:47	6.6	0:47	6.4	0:48	6.1	0:48	5.9				
500	0:35	4.7	0:36	4.5	0:36	4.4	0:36	4.3	FL-210	FL-230	FL-250	FL-270

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 55 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1074B

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.84 MACH CRUISE
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)			
	21,000		23,000		25,000		27,000					
	514 KTS		510 KTS		506 KTS		501 KTS					
5500 6000	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG	TIME HR:MIN	FUEL 1000 KG				
5000							12:47	112.1				
							12:35	110.1				
							12:23	108.1				
					12:05	112.2	12:11	106.2			1200	1300
					11:54	110.1	12:00	104.2				
					11:42	108.0	11:47	102.2				
4500			11:24	112.7	11:30	106.0	11:35	100.3		1000	1100	1200
			11:12	110.5	11:18	104.0	11:24	98.4				
			11:01	108.4	11:06	101.9	11:12	96.4				
	10:43	113.0	10:49	106.2	10:54	99.9	11:00	94.5	900			
	10:32	110.7	10:37	104.1	10:42	97.9	10:48	92.6		900	1000	1100
	10:20	108.5	10:25	102.0	10:30	95.9	10:36	90.7				
4000	10:08	106.3	10:13	99.9	10:18	93.9	10:24	88.8	800			
	9:57	104.0	10:02	97.8	10:07	91.9	10:12	86.9		800	900	1000
	9:45	101.8	9:50	95.7	9:55	90.0	10:00	85.1				
	9:33	99.6	9:38	93.6	9:43	88.0	9:48	83.2				
	9:21	97.4	9:26	91.5	9:31	86.0	9:36	81.3				
	9:10	95.2	9:14	89.5	9:19	84.1	9:24	79.5	700			
	8:58	93.0	9:03	87.4	9:07	82.1	9:12	77.6		700	800	900
3500	8:46	90.8	8:51	85.3	8:55	80.2	9:00	75.8				
	8:35	88.6	8:39	83.3	8:43	78.3	8:48	74.0				
	8:23	86.5	8:27	81.3	8:31	76.3	8:36	72.1	600			
	8:11	84.3	8:15	79.2	8:19	74.4	8:24	70.3		600	700	800
	8:00	82.2	8:04	77.2	8:08	72.5	8:12	68.5				
	7:48	80.0	7:52	75.2	7:56	70.6	8:00	66.7				
	7:36	77.9	7:40	73.1	7:44	68.7	7:48	64.9	500			
	7:24	75.8	7:28	71.2	7:32	66.8	7:36	63.1		500	600	700
	7:13	73.6	7:16	69.2	7:20	65.0	7:24	61.4				
	7:01	71.5	7:05	67.2	7:08	63.1	7:12	59.6				
	6:49	69.4	6:53	65.2	6:56	61.2	7:00	57.8			500	600
	6:38	67.3	6:41	63.2	6:44	59.3	6:48	56.1				
									FL-210	FL-230	FL-250	FL-270

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 61 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1133

FLIGHT PLANNING – CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.84 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL — CRUISE ALTITUDE (FT)								FUEL CORRECTION (KG)
	29,000		31,000		33,000		35,000		
	497 KTS		493 KTS		489 KTS		484 KTS		
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
3000	6:39	51.6	6:43	49.2	6:46	47.3	6:49	45.8	700
	6:27	49.9	6:30	47.6	6:34	45.7	6:37	44.3	600 700 800 900
	6:15	48.2	6:18	46.0	6:21	44.2	6:25	42.8	
	6:03	46.6	6:06	44.4	6:09	42.7	6:12	41.3	500 600 700 800
	5:51	45.0	5:54	42.9	5:57	41.2	6:00	39.8	
2500	5:39	43.3	5:42	41.3	5:44	39.7	5:47	38.4	
	5:27	41.7	5:29	39.7	5:32	38.2	5:35	36.9	400 500 600 700
	5:15	40.1	5:17	38.2	5:20	36.7	5:23	35.5	
	5:03	38.4	5:05	36.7	5:08	35.2	5:10	34.1	
	4:50	36.8	4:53	35.1	4:55	33.8	4:58	32.6	300 400 500 600
2000	4:38	35.2	4:41	33.6	4:43	32.3	4:45	31.2	
	4:26	33.6	4:28	32.1	4:31	30.8	4:33	29.8	
	4:14	32.0	4:16	30.6	4:18	29.4	4:20	28.4	200 300 400 500
	4:02	30.5	4:04	29.1	4:06	27.9	4:08	27.0	
	3:50	28.9	3:52	27.6	3:54	26.5	3:56	25.6	
1500	3:38	27.3	3:40	26.1	3:41	25.1	3:43	24.2	
	3:26	25.7	3:27	24.6	3:29	23.6	3:31	22.8	100 200 300 400
	3:14	24.2	3:15	23.1	3:17	22.2	3:18	21.5	
	3:02	22.6	3:03	21.6	3:05	20.8	3:06	20.1	
	2:50	21.0	2:51	20.1	2:52	19.4	2:54	18.8	FL-290 FL-310 FL-330 FL-350
	2:37	19.5	2:39	18.6	2:40	18.0	2:41	17.4	
1000	2:25	17.9	2:27	17.2	2:28	16.6	2:29	16.1	
	2:13	16.4	2:14	15.7	2:15	15.2	2:16	14.7	
	2:01	14.9	2:02	14.3	2:03	13.8	2:04	13.4	
	1:49	13.3	1:50	12.8	1:51	12.4	1:52	12.1	
	1:37	11.8	1:38	11.4	1:38	11.0	1:39	10.7	
500	1:25	10.3	1:26	9.9	1:26	9.6	1:27	9.4	
	1:13	8.8	1:13	8.5	1:14	8.3	1:14	8.1	
	1:01	7.3	1:01	7.1	1:02	6.9	1:02	6.8	
	0:49	5.8	0:49	5.6	0:49	5.6	0:49	5.5	
	0:37	4.3	0:37	4.2	0:37	4.2	0:37	4.2	

-100 HEAD -50 0 50 100 TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.1 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 45 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

DB1-4-1075A

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.84 MACH CRUISE
CF6-80C2D1F ENGINES
LONG DISTANCE

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL								FUEL CORRECTION (KG)
	CRUISE ALTITUDE (FT)								
	29,000		31,000		33,000		35,000		
	497 KTS		493 KTS		489 KTS		484 KTS		
5500 6000	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL	
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
5000	12:54	106.8	13:00	102.3	13:07	99.2			600 1800
	12:42	104.9	12:48	100.5	12:55	97.4			1500 1700 1900
	12:30	103.0	12:36	98.7	12:42	95.6			
	12:18	101.1	12:24	96.8	12:30	93.8			
	12:05	99.2	12:12	95.0	12:18	91.9			1400 1600
	11:53	97.3	11:59	93.1	12:06	90.1			1800
4500	11:41	95.4	11:47	91.3	11:53	88.4			1500
	11:29	93.6	11:35	89.6	11:41	86.6			1300 1700
	11:17	91.8	11:23	87.8	11:29	84.8			
	11:05	89.9	11:11	86.0	11:16	83.1			1400
	10:53	88.1	10:58	84.2	11:04	81.3	11:10	79.4	1200 1600
	10:41	86.3	10:46	82.5	10:52	79.6	10:57	77.7	1300 1500 1700
4000	10:29	84.5	10:34	80.7	10:39	77.9	10:45	76.0	
	10:17	82.7	10:22	79.0	10:27	76.2	10:32	74.3	1100 1200 1400
	10:05	80.9	10:10	77.2	10:15	74.5	10:20	72.6	1600
	9:52	79.1	9:57	75.5	10:02	72.8	10:08	70.9	
	9:40	77.3	9:45	73.8	9:50	71.2	9:55	69.3	1000 1300
	9:28	75.5	9:33	72.1	9:38	69.5	9:43	67.6	1100
	9:16	73.8	9:21	70.4	9:26	67.9	9:30	66.0	1500
3500	9:04	72.0	9:09	68.7	9:13	66.2	9:18	64.4	1200 1400
	8:52	70.3	8:56	67.1	9:01	64.6	9:06	62.7	900 1000 1100 1300
	8:40	68.5	8:44	65.4	8:49	63.0	8:53	61.2	
	8:28	66.8	8:32	63.8	8:36	61.4	8:41	59.6	
	8:16	65.1	8:20	62.1	8:24	59.8	8:28	58.0	800 900 1000 1200
	8:04	63.4	8:08	60.5	8:12	58.2	8:16	56.4	
	7:52	61.7	7:55	58.8	8:00	56.6	8:04	54.9	
	7:39	60.0	7:43	57.2	7:47	55.0	7:51	53.4	700 800 900 1100
	7:27	58.3	7:31	55.6	7:35	53.5	7:39	51.8	
	7:15	56.6	7:19	54.0	7:23	51.9	7:26	50.3	1000
	7:03	54.9	7:07	52.4	7:10	50.4	7:14	48.8	600 700 800 900
	6:51	53.2	6:55	50.8	6:58	48.8	7:02	47.3	
									FL-290 FL-310 FL-330 FL-350

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 47 KG/HR FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1134**

FLIGHT PLANNING - CONSTANT ALTITUDE

LANDING WEIGHT 170,000 KG
.84 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL						FUEL CORRECTION (KG)		
	CRUISE ALTITUDE (FT)								
	37,000		39,000		41,000				
	482 KTS		482 KTS		482 KTS				
	TIME	FUEL	TIME	FUEL	TIME	FUEL			
3000	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG			
2500	6:51	44.9					1100		
	6:39	43.4							
	6:26	41.9					1000		
	6:14	40.5							
	6:01	39.0					900		
	5:49	37.6							
	5:36	36.1							
2000	5:24	34.7	5:24	34.5			800	900	
	5:12	33.3	5:12	33.1					
	4:59	31.9	4:59	31.7			700		
	4:47	30.5	4:47	30.3				800	
	4:34	29.1	4:34	28.9					
	4:22	27.7	4:22	27.5					
1500	4:09	26.4	4:09	26.1			600	700	
	3:57	25.0	3:57	24.8					
	3:44	23.7	3:44	23.4					
	3:32	22.3	3:32	22.1			500	600	
	3:19	21.0	3:19	20.7					
	3:07	19.7	3:07	19.4					
	2:54	18.3	2:54	18.1			400	500	
1000	2:42	17.0	2:42	16.8					
	2:29	15.7	2:29	15.5	2:29	15.6		400	400
	2:17	14.4	2:17	14.2	2:17	14.3	300		
	2:04	13.1	2:04	13.0	2:05	13.0		300	
	1:52	11.8	1:52	11.7	1:52	11.7			300
500	1:40	10.5	1:40	10.4	1:40	10.4			
	1:27	9.3	1:27	9.2	1:27	9.2	200	200	
	1:15	8.0	1:15	7.9	1:15	7.9			200
	1:02	6.7	1:02	6.7	1:02	6.7			
	0:50	5.5	0:50	5.4	0:50	5.5	100	100	100
							FL-370	FL-390	FL-410

-100 -50 0 50 100
HEAD TAIL
WIND (KTS)

CHART VALID FOR A LANDING WEIGHT OF 170,000 KG
ADD/SUBTRACT FUEL CORRECTION FOR EACH 5000 KG
ABOVE/BELOW 170,000 KG LDG. WT.

INCREASE/DECREASE TAS BY 10 KNOTS PER 10 DEG C ABOVE/BELOW STANDARD DAY
DECREASE/INCREASE TIME BY 1.2 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 47 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS) **DB1-4-1125**

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

3 ENGINES OPERATING
ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

	PRESSURE ALTITUDE (FEET)										
	MAX CRUISE THRUST – TEMPERATURE DEVIATION °C									STD DAY	
WEIGHT 1000 KG	ISA -20	ISA -15	ISA -10	ISA -5	ISA	ISA +5	ISA +10	ISA +15	ISA +20	OPTIMUM ALTITUDE	1.3 G BUFFET
290	32,000	32,000	32,000	32,000	32,000	32,000	32,000	31,000	30,000	29,000	30,000
280	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	31,000	30,000	31,000
270	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	33,000	31,000	32,000
260	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	34,000	32,000	33,000
250	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	35,000	33,000	34,000
240	37,000	37,000	37,000	37,000	37,000	37,000	37,000	36,000	36,000	33,000	35,000
230	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	36,000	34,000	36,000
220	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	37,000	35,000	37,000
210	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	38,000	36,000	38,000
200	41,000	41,000	41,000	41,000	40,000	40,000	40,000	40,000	39,000	37,000	39,000
190	42,000	42,000	42,000	42,000	42,000	42,000	42,000	41,000	40,000	38,000	40,000
180	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	42,000	39,000	41,000
170	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	41,000	42,000
160	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	43,000
150	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000
140	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

MACH = .82

3 ENGINES OPERATING
ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

	PRESSURE ALTITUDE (FEET)										
	MAX CRUISE THRUST – TEMPERATURE DEVIATION °C									STD DAY	
WEIGHT 1000 KG	ISA -20	ISA -15	ISA -10	ISA -5	ISA	ISA +5	ISA +10	ISA +15	ISA +20	OPTIMUM ALTITUDE	1.3 G BUFFET
290	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	31,000	29,000	31,000
280	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	32,000	30,000	31,000
270	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	33,000	31,000	33,000
260	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	34,000	32,000	33,000
250	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	35,000	33,000	34,000
240	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	36,000	33,000	35,000
230	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	37,000	34,000	36,000
220	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	38,000	35,000	37,000
210	40,000	40,000	40,000	40,000	40,000	40,000	40,000	39,000	39,000	36,000	38,000
200	41,000	41,000	41,000	41,000	41,000	41,000	41,000	40,000	40,000	37,000	39,000
190	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	41,000	38,000	40,000
180	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	39,000	41,000
170	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	41,000	42,000
160	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	43,000
150	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000
140	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

MACH = .83

3 ENGINES OPERATING
ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

	PRESSURE ALTITUDE (FEET)										
	MAX CRUISE THRUST – TEMPERATURE DEVIATION °C									STD DAY	
WEIGHT 1000 KG	ISA −20	ISA −15	ISA −10	ISA −5	ISA	ISA +5	ISA +10	ISA +15	ISA +20	OPTIMUM ALTITUDE	1.3 G BUFFET
290	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	31,000	29,000	30,000
280	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	32,000	30,000	31,000
270	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	33,000	31,000	32,000
260	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	34,000	32,000	33,000
250	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	35,000	33,000	34,000
240	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	36,000	34,000	35,000
230	38,000	38,000	38,000	38,000	38,000	38,000	38,000	37,000	37,000	35,000	36,000
220	39,000	39,000	39,000	39,000	39,000	39,000	38,000	38,000	38,000	35,000	37,000
210	40,000	40,000	40,000	40,000	40,000	40,000	40,000	39,000	39,000	36,000	38,000
200	41,000	41,000	41,000	41,000	41,000	41,000	41,000	40,000	40,000	37,000	39,000
190	42,000	42,000	42,000	42,000	42,000	42,000	42,000	41,000	41,000	38,000	40,000
180	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	40,000	41,000
170	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	41,000	42,000
160	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	43,000
150	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000
140	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

MACH = .84

3 ENGINES OPERATING
ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

	PRESSURE ALTITUDE (FEET)										
	MAX CRUISE THRUST – TEMPERATURE DEVIATION °C									STD DAY	
WEIGHT 1000 KG	ISA -20	ISA -15	ISA -10	ISA -5	ISA	ISA +5	ISA +10	ISA +15	ISA +20	OPTIMUM ALTITUDE	1.3 G BUFFET
290	32,000	32,000	32,000	32,000	32,000	32,000	32,000	31,000	30,000	29,000	30,000
280	33,000	33,000	33,000	33,000	33,000	33,000	33,000	32,000	31,000	30,000	31,000
270	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	33,000	31,000	32,000
260	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	34,000	32,000	33,000
250	36,000	36,000	36,000	36,000	36,000	36,000	36,000	35,000	34,000	33,000	34,000
240	37,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	35,000	34,000	35,000
230	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	36,000	34,000	36,000
220	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	37,000	35,000	36,000
210	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	38,000	36,000	37,000
200	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	39,000	37,000	38,000
190	42,000	42,000	42,000	42,000	42,000	42,000	42,000	41,000	40,000	38,000	40,000
180	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	41,000	39,000	41,000
170	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	41,000	42,000
160	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	42,000	43,000
150	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000
140	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000	43,000

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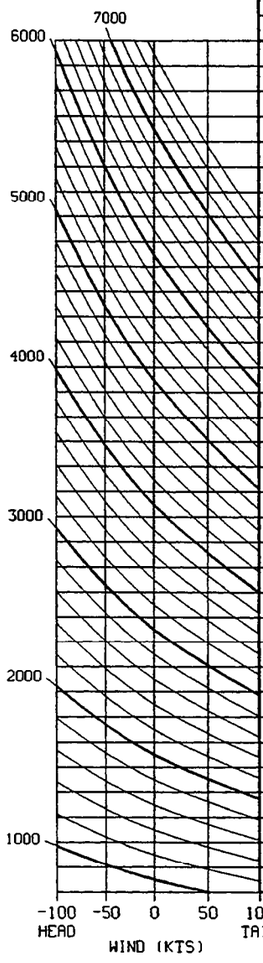
FLIGHT PLANNING – STEP CLIMB

FL 310 / 350 / 390 / 430
.82 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



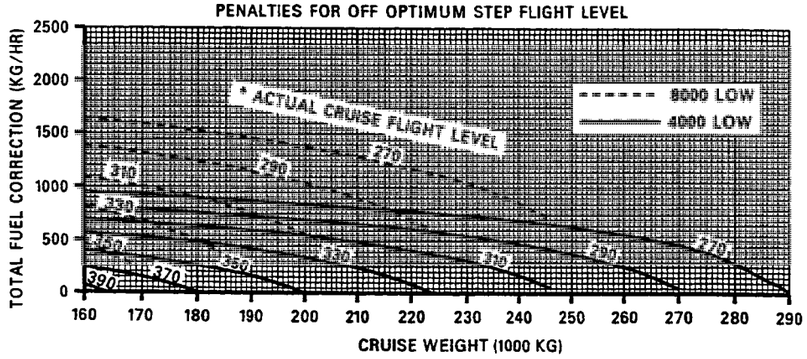
TOTAL FLIGHT TIME AND TRIP FUEL							
TAKEOFF WEIGHT (KG)							
180,000		190,000		200,000		210,000	
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG
16:20	76.6	16:20	80.1	16:21	83.7	16:21	87.4
15:55	75.0	15:55	78.4	15:55	81.9	15:55	85.6
15:29	73.3	15:29	76.7	15:30	80.2	15:30	83.8
15:04	71.7	15:04	75.0	15:04	78.4	15:04	82.0
14:38	70.0	14:38	73.2	14:39	76.6	14:39	80.2
14:13	68.3	14:13	71.5	14:13	74.8	14:13	78.3
13:47	66.6	13:47	69.8	13:48	73.0	13:48	76.4
13:22	64.9	13:22	68.0	13:22	71.2	13:22	74.5
12:56	63.2	12:57	66.2	12:57	69.4	12:57	72.6
12:31	61.4	12:31	64.4	12:31	67.5	12:31	70.7
12:05	59.7	12:06	62.6	12:06	65.6	12:06	68.7
11:40	57.9	11:40	60.7	11:40	63.7	11:40	66.7
11:14	56.1	11:15	58.9	11:15	61.8	11:15	64.7
10:49	54.3	10:49	57.0	10:49	59.8	10:49	62.7
10:23	52.5	10:24	55.1	10:24	57.8	10:24	60.6
9:58	50.7	9:58	53.2	9:58	55.9	9:58	58.6
9:32	48.8	9:33	51.3	9:33	53.8	9:33	56.5
9:07	46.9	9:07	49.3	9:07	51.8	9:07	54.3
8:42	45.1	8:42	47.4	8:42	49.8	8:42	52.2
8:16	43.1	8:16	45.4	8:17	47.6	8:16	49.9
7:51	41.2	7:51	43.4	7:51	45.5	7:51	47.7
7:25	39.3	7:25	41.3	7:26	43.4	7:25	45.4
7:00	37.3	7:00	39.2	7:00	41.2	7:00	43.1
6:34	35.3	6:34	37.1	6:35	39.0	6:34	40.8
6:09	33.3	6:09	35.0	6:09	36.7	6:09	38.4
5:43	31.2	5:43	32.8	5:44	34.4	5:43	36.0
5:18	29.2	5:18	30.7	5:18	32.1	5:18	33.6
4:52	27.0	4:52	28.4	4:53	29.7	4:52	31.2
4:27	24.9	4:27	26.2	4:27	27.4	4:27	28.8
4:01	22.8	4:01	23.9	4:02	25.0	4:02	26.2
3:36	20.6	3:36	21.5	3:36	22.6	3:36	23.7
3:10	18.3	3:10	19.2	3:11	20.1	3:11	21.1
2:45	16.1	2:45	16.8	2:45	17.6	2:45	18.5
2:19	13.8	2:19	14.4	2:20	15.1	2:20	15.9

DECREASE/INCREASE TIME BY 1.3 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 31 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

OPTIMUM STEP CLIMB SCHEDULE		
CLIMB TO	2000 FT STEP	4000 FT STEP
(FL)	GROSS WEIGHT (KG)	
310	278,600	285,000
330	255,800	266,200
350	233,400	242,000
370	211,000	219,800
390	191,200	198,900
410	174,200	180,800
430	158,300	164,600

PENALTIES FOR OFF OPTIMUM STEP FLIGHT LEVEL



* ACTUAL CRUISE FLIGHT LEVEL EITHER 4000 FT
OR 8000 FT LOWER THAN THE OPTIMUM STEP ALTITUDE

DB1-4-1126

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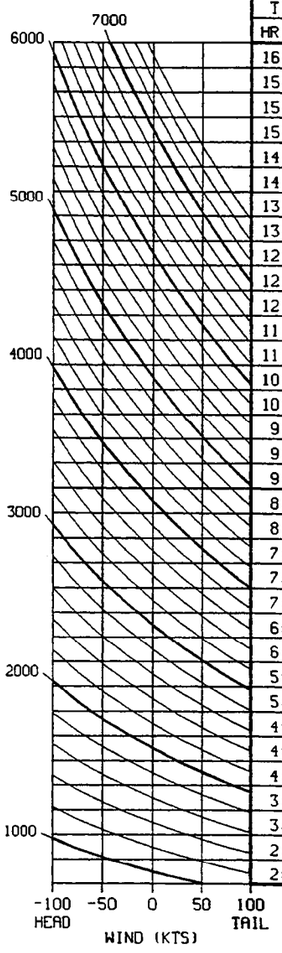
FLIGHT PLANNING – STEP CLIMB

FL 310 / 350 / 390 / 430
.82 MACH CRUISE
CF6–80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY

GROUND DISTANCE (NM)	TOTAL FLIGHT TIME AND TRIP FUEL							
	TAKEOFF WEIGHT (KG)							
	220,000		230,000		240,000		250,000	
	TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL
	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG
7000	16:20	91.2	16:20	95.1	16:20	99.0	16:19	103.0
	15:55	89.4	15:55	93.2	15:54	97.0	15:54	100.9
	15:29	87.5	15:29	91.2	15:29	95.0	15:28	98.8
	15:04	85.6	15:04	89.3	15:04	93.0	15:03	96.8
	14:38	83.7	14:38	87.3	14:38	90.9	14:37	94.6
	14:13	81.8	14:13	85.3	14:13	88.9	14:12	92.4
	13:48	79.8	13:47	83.3	13:47	86.8	13:46	90.2
	13:22	77.9	13:22	81.2	13:22	84.6	13:21	88.0
	12:57	75.9	12:56	79.2	12:56	82.5	12:55	85.7
	12:31	73.9	12:31	77.1	12:31	80.3	12:30	83.4
	12:06	71.8	12:05	74.9	12:05	78.0	12:04	81.1
	11:40	69.8	11:40	72.8	11:40	75.8	11:39	78.7
	11:15	67.7	11:14	70.6	11:14	73.4	11:13	76.4
	10:49	65.6	10:49	68.4	10:49	71.1	10:48	74.0
	10:24	63.4	10:23	66.1	10:23	68.8	10:23	71.5
	9:58	61.2	9:58	63.8	9:58	66.4	9:57	69.1
	9:33	59.0	9:32	61.4	9:32	64.0	9:32	66.6
	9:07	56.7	9:07	59.1	9:07	61.5	9:06	64.0
	8:42	54.4	8:41	56.7	8:41	59.1	8:41	61.5
	8:16	52.1	8:16	54.3	8:16	56.6	8:15	58.9
	7:51	49.8	7:50	51.9	7:50	54.1	7:50	56.3
	7:25	47.4	7:25	49.4	7:25	51.5	7:24	53.6
	7:00	45.0	7:00	46.9	6:59	48.9	6:59	50.8
	6:34	42.6	6:34	44.4	6:34	46.3	6:33	48.1
	6:09	40.2	6:08	41.9	6:08	43.6	6:08	45.3
	5:43	37.7	5:43	39.3	5:43	40.9	5:42	42.5
	5:18	35.2	5:17	36.6	5:17	38.1	5:17	39.7
	4:52	32.6	4:52	34.0	4:52	35.3	4:52	36.8
	4:27	30.1	4:26	31.3	4:27	32.5	4:26	33.9
	4:01	27.4	4:01	28.5	4:01	29.7	4:01	30.9
	3:36	24.8	3:36	25.7	3:36	26.8	3:35	27.9
	3:10	22.1	3:10	22.9	3:10	23.9	3:10	24.9
	2:45	19.3	2:45	20.1	2:45	20.9	2:45	21.8
	2:19	16.6	2:20	17.2	2:20	17.9	2:19	18.7

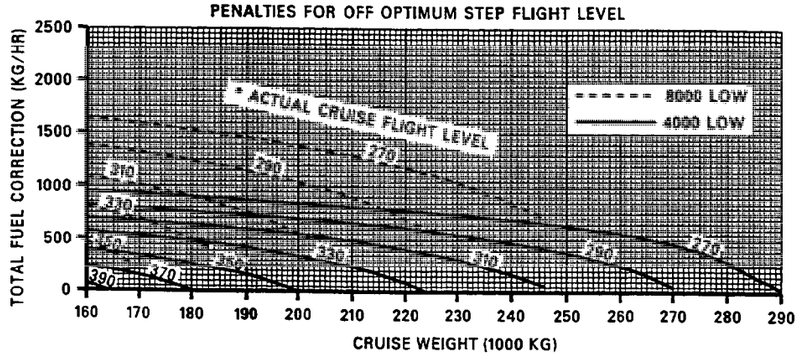


DECREASE/INCREASE TIME BY 1.3 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 36 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

OPTIMUM STEP CLIMB SCHEDULE		
CLIMB TO (FL)	2000 FT STEP	4000 FT STEP
	GROSS WEIGHT (KG)	
310	278,600	285,000
330	255,800	266,200
350	233,400	242,000
370	211,000	219,800
390	191,200	198,900
410	174,200	180,800
430	158,300	164,600

PENALTIES FOR OFF OPTIMUM STEP FLIGHT LEVEL



* ACTUAL CRUISE FLIGHT LEVEL EITHER 4000 FT
OR 8000 FT LOWER THAN THE OPTIMUM STEP ALTITUDE

DB1–4–1081C

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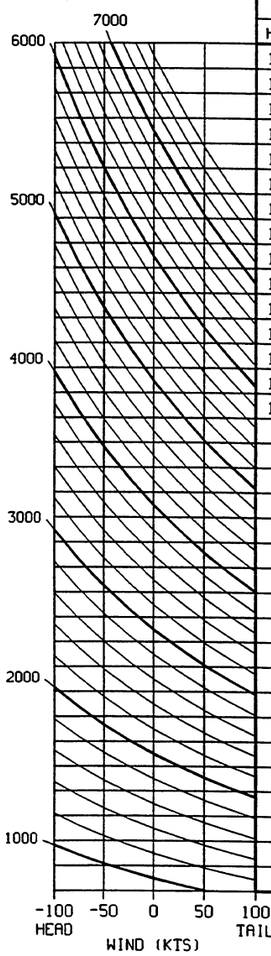
FLIGHT PLANNING - STEP CLIMB

FL 310 / 350 / 390 / 430
.82 MACH CRUISE
CF6-80C2D1F ENGINES

NOTE: FLIGHT TIMES ARE FOR STANDARD DAY



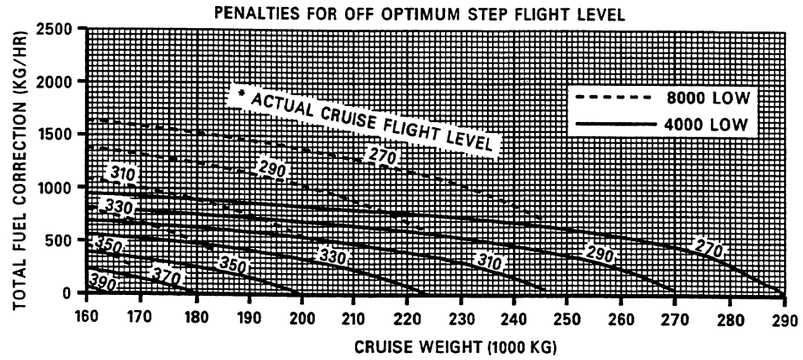
TOTAL FLIGHT TIME AND TRIP FUEL							
TAKEOFF WEIGHT (KG)							
260,000		270,000		280,000		290,000	
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG
16:18	107.0	16:16	111.0	16:15	114.9	16:14	118.9
15:52	104.8	15:51	108.7	15:50	112.5	15:48	116.5
15:27	102.7	15:25	106.4	15:24	110.2	15:23	114.1
15:01	100.5	15:00	104.1	14:59	107.9	14:57	111.7
14:36	98.2	14:35	101.8	14:33	105.5	14:32	109.2
14:10	96.0	14:09	99.5	14:08	103.1	14:06	106.8
13:45	93.7	13:44	97.1	13:42	100.6	13:41	104.2
13:19	91.4	13:18	94.7	13:17	98.1	13:15	101.7
12:54	89.0	12:53	92.3	12:51	95.6	12:50	99.1
12:28	86.6	12:27	89.8	12:26	93.1	12:24	96.4
12:03	84.3	12:02	87.4	12:00	90.5	11:59	93.8
11:37	81.8	11:36	84.8	11:35	87.9	11:33	91.0
11:12	79.3	11:11	82.3	11:09	85.2	11:08	88.3
10:47	76.9	10:45	79.7	10:44	82.6	10:43	85.5
10:21	74.3	10:20	77.1	10:18	79.8	10:17	82.7
9:56	71.8	9:54	74.4	9:53	77.1	9:52	79.9
9:30	69.2	9:29	71.7	9:27	74.3	9:26	76.9
9:05	66.5	9:03	69.0	9:02	71.4	9:01	74.0
8:39	63.9	8:38	66.2	8:37	68.6	8:36	71.1
8:14	61.1	8:12	63.4	8:11	65.7	8:10	68.1
7:48	58.4	7:47	60.6	7:46	62.8	7:45	65.1
7:23	55.6	7:22	57.7	7:21	59.8	7:19	62.0
6:57	52.8	6:56	54.8	6:55	56.8	6:54	58.9
6:32	50.0	6:31	51.8	6:30	53.7	6:29	55.8
6:07	47.1	6:05	48.9	6:04	50.6	6:03	52.5
5:41	44.2	5:40	45.9	5:39	47.5	5:38	49.3
5:16	41.2	5:15	42.8	5:14	44.3	5:13	46.0
4:50	38.3	4:49	39.7	4:48	41.1	4:48	42.7
4:25	35.2	4:24	36.6	4:23	37.8	4:23	39.3
4:00	32.2	3:59	33.3	3:58	34.5	3:58	35.8
3:34	29.1	3:33	30.1	3:33	31.2	3:33	32.4
3:09	25.9	3:08	26.8	3:08	27.8	3:08	28.9
2:43	22.7	2:43	23.5	2:43	24.3	2:43	25.4
2:18	19.5	2:18	20.1	2:18	20.9	2:18	21.8

DECREASE/INCREASE TIME BY 1.2 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 39 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

CAG(IGDS)

OPTIMUM STEP CLIMB SCHEDULE		
CLIMB TO	2000 FT STEP	4000 FT STEP
(FL)	GROSS WEIGHT (KG)	
310	278,600	285,000
330	255,800	266,200
350	233,400	242,000
370	211,000	219,800
390	191,200	198,900
410	174,200	180,800
430	158,300	164,600

PENALTIES FOR OFF OPTIMUM STEP FLIGHT LEVEL



* ACTUAL CRUISE FLIGHT LEVEL EITHER 4000 FT
OR 8000 FT LOWER THAN THE OPTIMUM STEP ALTITUDE

DB1-4-1082C

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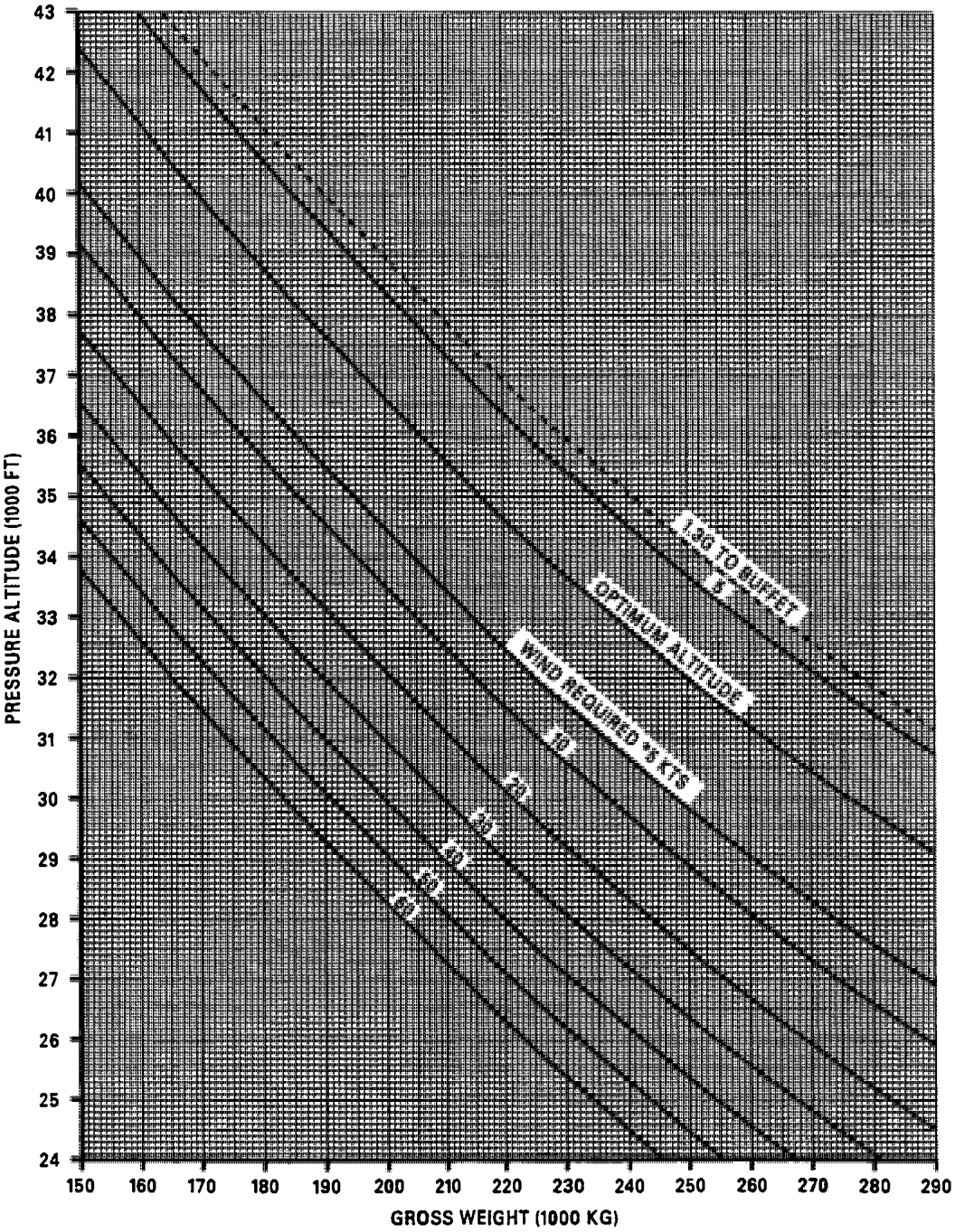
WIND AND ALTITUDE TRADE FOR CONSTANT RANGE

STANDARD DAY
CF6-80C2D1F ENGINES

MACH .80

* THE WIND REQUIRED IS THE RELATIVE DECREASE IN HEADWIND OR INCREASE IN TAILWIND REQUIRED TO COMPENSATE FOR FLYING ABOVE AND BELOW OPTIMUM ALTITUDE



CAG(IGDS)

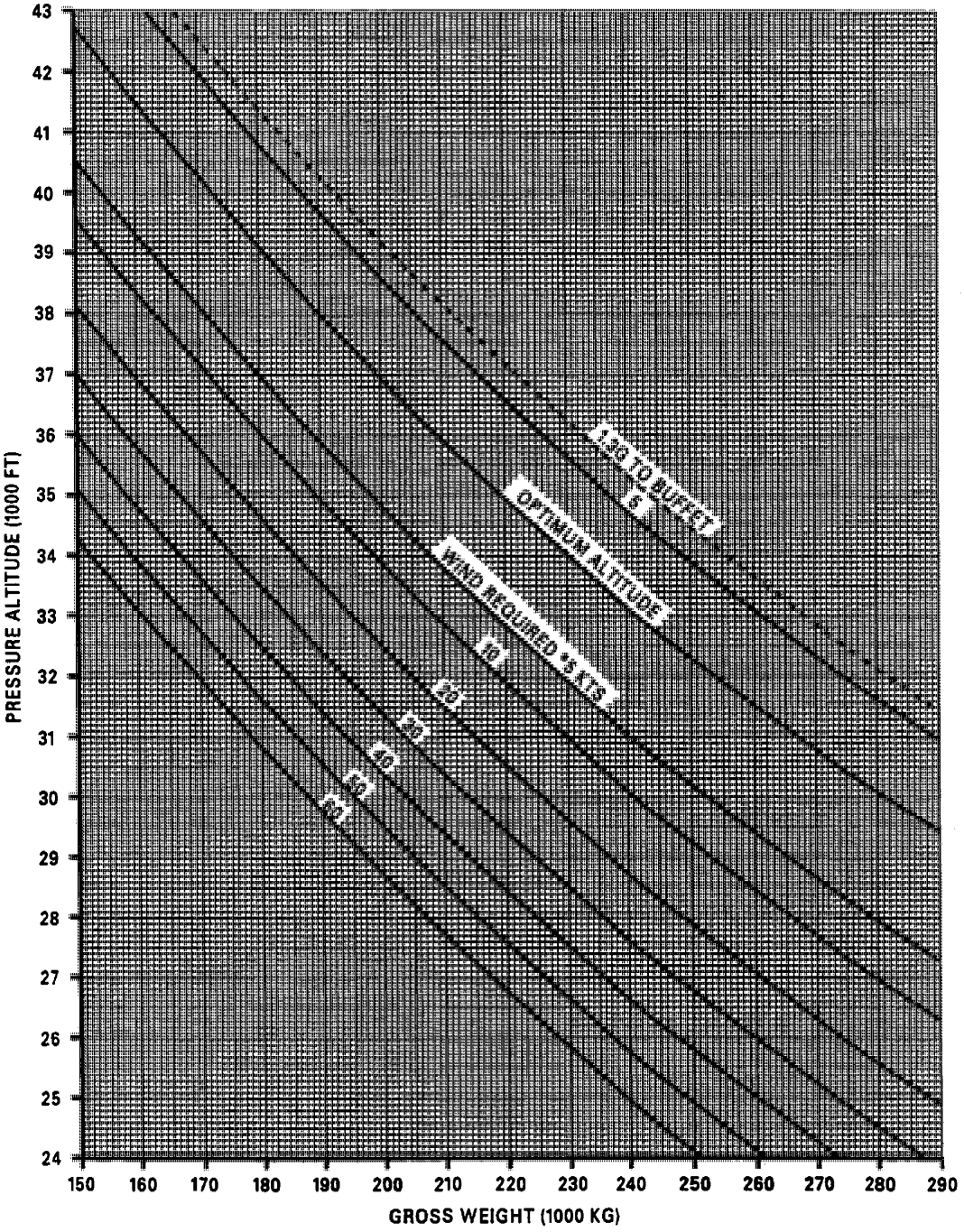
DB1-4-1050A

WIND AND ALTITUDE TRADE FOR CONSTANT RANGE

STANDARD DAY
CF6-80C2D1F ENGINES

MACH .81

* THE WIND REQUIRED IS THE RELATIVE DECREASE IN HEADWIND OR INCREASE IN TAILWIND REQUIRED TO COMPENSATE FOR FLYING ABOVE AND BELOW OPTIMUM ALTITUDE



CAG(IGDS)

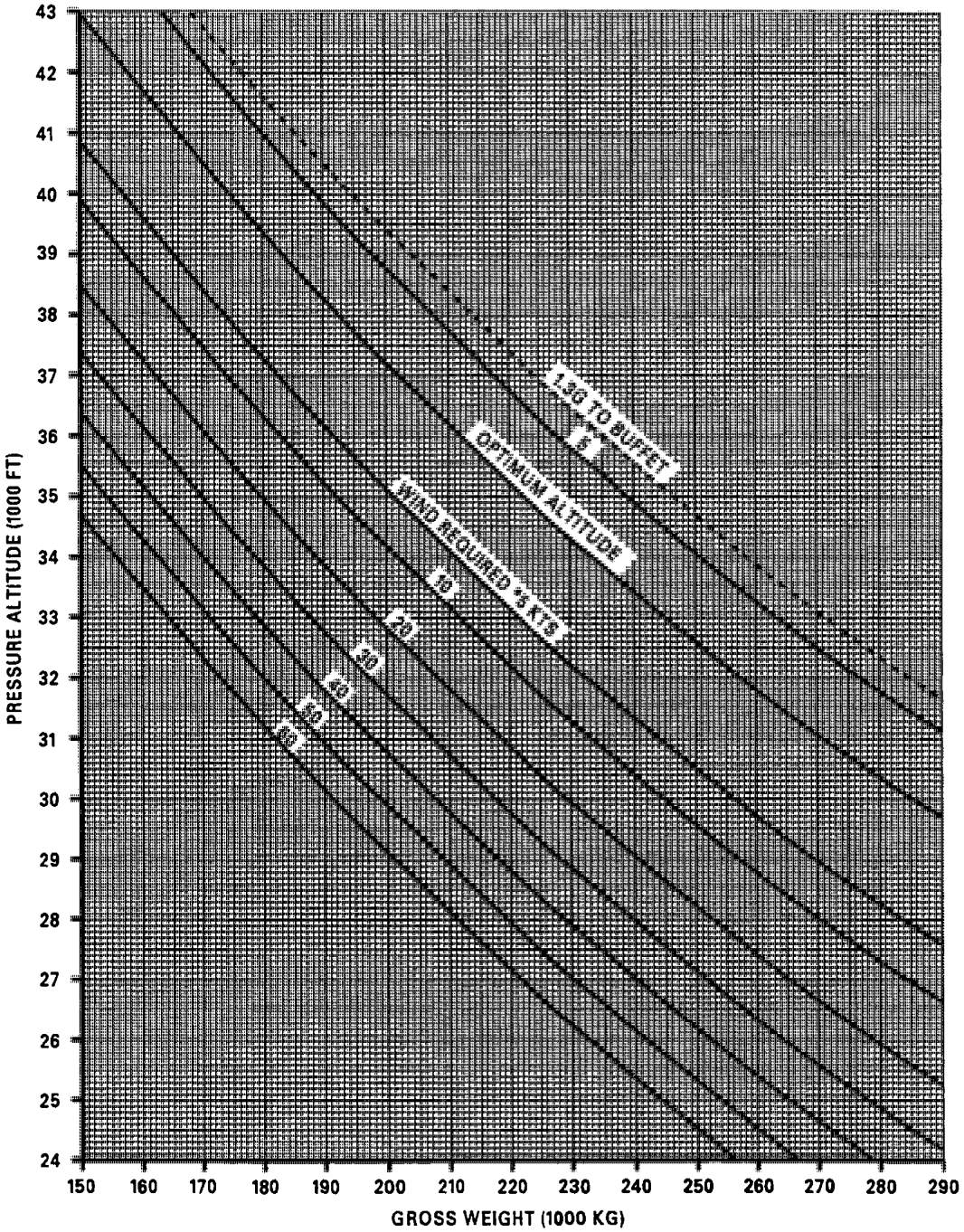
DB1-4-1051A

WIND AND ALTITUDE TRADE FOR CONSTANT RANGE

STANDARD DAY
CF6-80C2D1F ENGINES

MACH .82

* THE WIND REQUIRED IS THE RELATIVE DECREASE IN HEADWIND OR INCREASE IN TAILWIND REQUIRED TO COMPENSATE FOR FLYING ABOVE AND BELOW OPTIMUM ALTITUDE



CAG(IGDS)

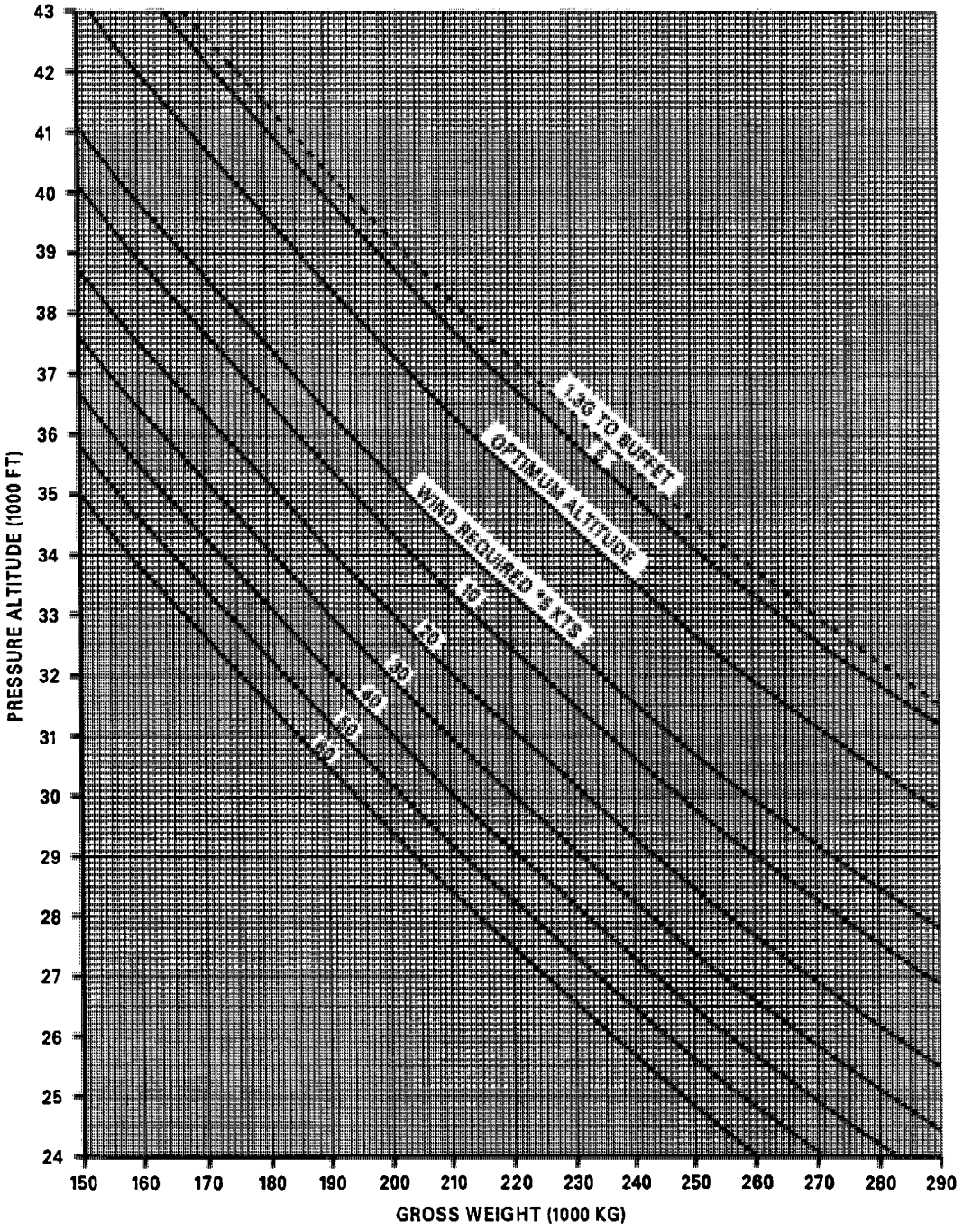
DB1-4-1052A

WIND AND ALTITUDE TRADE FOR CONSTANT RANGE

STANDARD DAY
CF6-80C2D1F ENGINES

MACH .83

* THE WIND REQUIRED IS THE RELATIVE DECREASE IN HEADWIND OR INCREASE IN TAILWIND REQUIRED TO COMPENSATE FOR FLYING ABOVE AND BELOW OPTIMUM ALTITUDE



CAG(IGDS)

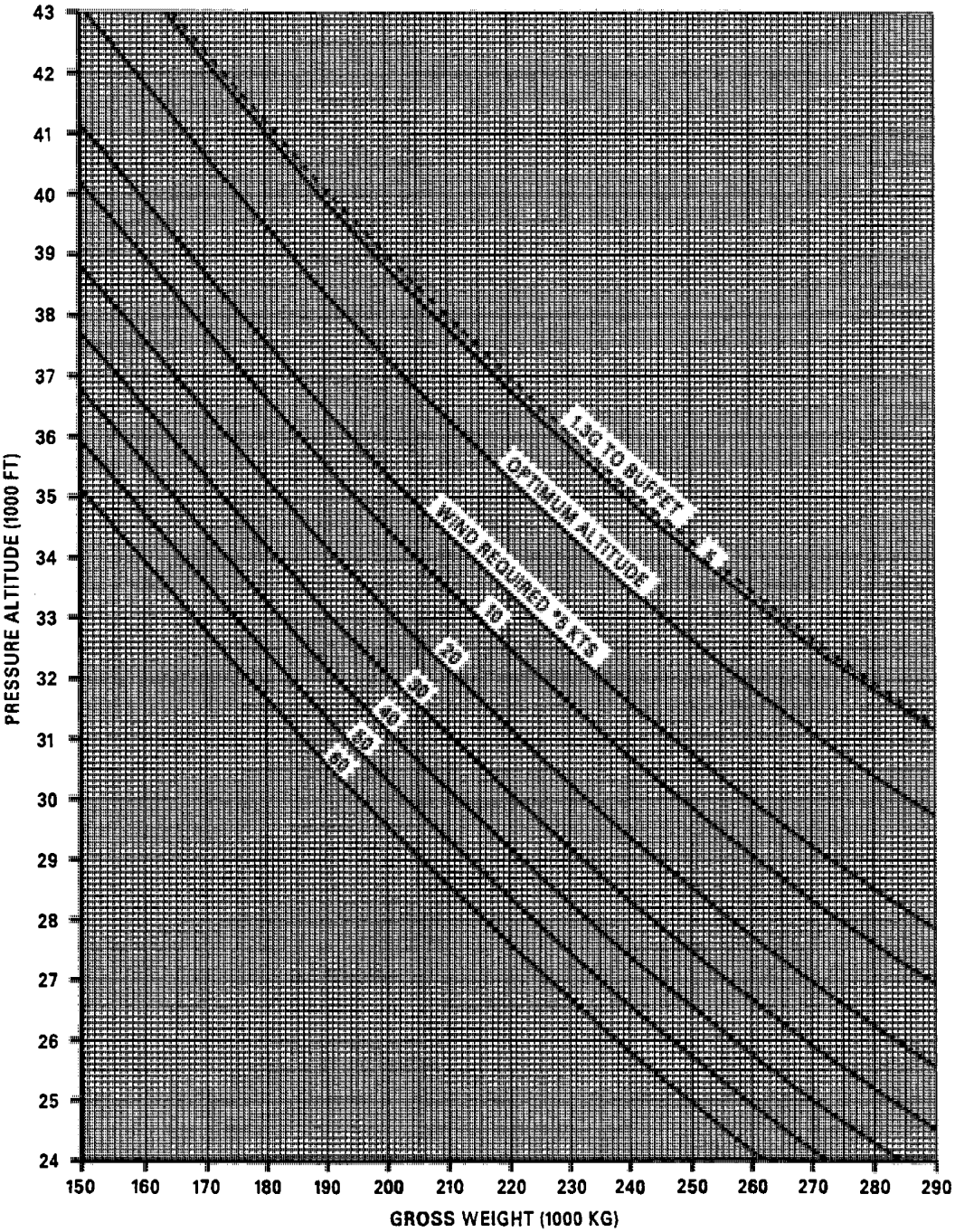
DB1-4-1053A

WIND AND ALTITUDE TRADE FOR CONSTANT RANGE

STANDARD DAY
CF6-80C2D1F ENGINES

MACH .84

* THE WIND REQUIRED IS THE RELATIVE DECREASE IN HEADWIND OR INCREASE IN TAILWIND REQUIRED TO COMPENSATE FOR FLYING ABOVE AND BELOW OPTIMUM ALTITUDE.



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TAKEOFF

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INTRODUCTION

The Takeoff section presents data to determine aircraft performance during takeoff and flight path. The data and information are used to determine; takeoff field length, second segment climb, tire speed, brake energy, and obstacle clearance requirements based on takeoff limitations. Takeoff and transition speeds are provided to confirm information contained on the Flight Management System (FMS) Data Entry page. Power settings are provided in a tabular format for both ground and inflight takeoff and also for maximum continuous power.

The data presented here are derived from the FAA Approved Airplane Flight Manual (AFM) and their use will provide either equivalent or slightly more conservative answers than can be determined from the AFM.

Additional takeoff data may be found in the Takeoff Deflected Ailerons chapter.

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SAMPLE TAKEOFF PROBLEM AND WORKSHEET

Determine the takeoff performance parameters based on the following conditions:

Airport Pressure Altitude	2000 ft
Airport Ambient Temperature	30°C
Runway Length	3430 m
Runway Condition	dry
Reported Wind At A 10-Meter Height	20 kt headwind
Runway Slope	1% downhill
A/C Bleed Condition	off
Anti-Ice Bleed	off
Takeoff Gross Weight	240,000 kg
Center Of Gravity	20% MAC
Obstacle Information	
1. Distance From Liftoff End Of Runway	500 m
Height Above Liftoff End Of Runway	20 ft
2. Distance from Liftoff End Of Runway	6200 m
Height Above Liftoff End Of Runway	485 ft

Flap Setting	23°
Runway Length Limiting Weight	278,500 kg
Second Segment Limiting Weight	278,500 kg
V_1	144 KIAS
V_R	161 KIAS
V_2	170 KIAS
Flap Retract Speed	180 KIAS
Slat Retract/V_3 Speed	233 KIAS
V_1 Max Brake Energy	183 KIAS
Equivalent Runway Length	N/A
Maximum Tire Speed Limiting Weight	not limiting
Obstacle Limited Weight	260,000 kg
Performance Limited Weight	260,000 kg
(Lowest of runway length, second segment, maximum tire speed and obstacle clearance limiting weights)	
Pressure Height For Acceleration With Obstacle Clearance	1300 ft
Stabilizer Setting	7.9°
Takeoff N_1	111.7%

COMPOSITE TAKEOFF PERFORMANCE

The Composite Takeoff Performance charts present data to determine optimum flap setting, takeoff field length and second segment limiting weight. Separate charts are provided for pressure altitudes from -2000 to 2000 ft, 2001 to 6000 ft, and 6001 to 10,000 ft. There are also different charts to be used depending on whether the ambient temperature is (1) at or below the break temperature or (2) above the break temperature.

Procedure:

1. Select the appropriate chart based on the airport pressure altitude and ambient temperature. Enter top right portion of the chart with the balanced field length, correct for given slope and wind conditions and read the corrected field length.

2. Enter top left portion of the chart with the ambient temperature and airport pressure altitude, read down to corrected field length then across to the reference line (25° flap line). Hold this point on the runway length reference line.

3. Enter the lower right portion of the chart with the ambient temperature and airport pressure altitude and read across to the reference line (25° flap line). Hold this point on the second segment reference line.

4. Follow the field length limited weight (FLLW) solid guidelines at the point from step 2 towards 10° flap and follow the second segment limiting weight (SSLW) dashed guidelines at the point from step 3 toward 10° flap to the point where they intersect.

5. At the intersection, read the maximum takeoff weight and the optimum flap setting.

Discussion:

When no intersection occurs, one of two things will happen.

1. When following the FLLW guideline to 10° flap, the 25° flap field length limited weight is less than the 25° flap second segment limited weight. In this case, the best flap will be 25° and the maximum takeoff weight will be based on the field length limit.

2. When following the SSLW guideline to 10° flap, the second segment limiting weight at 10° flap is less than the 10° flap field length limited weight. In this case, the best flap will be 10° and the maximum takeoff weight will be based on the second segment limit.

Takeoff Sample Problem:

For the takeoff sample problem the corrected field length based on the given balanced field length, slope and wind conditions is 3900 m. From the intersection of the field length limiting weight and second segment limiting weight guidelines the optimum flap setting is 23° and the maximum takeoff weight is 278,500 kg.

TAKEOFF AND TRANSITION SPEEDS

The Takeoff And Transition Speed tables present V_1, V_R, V_2, flap retract, slat retract and final segment speed data. The V_1 speed obtained from the data is defined as the takeoff decision speed for a balanced field length. With a recognized engine failure by the V_1 decision speed the aircraft may either be brought to a complete stop within the available field length, or accelerated with the remaining two engines operating and the takeoff continued to a 35-ft height in the same available field length.

Procedure:

Enter the Basic Takeoff Speeds V_1, V_R, V_2 table (1) with the flap setting and takeoff weight. At the intersection read V_1, V_R and V_2 speeds. A minimum speed check will be required if the V-speeds are to the left of the heavy line.

Proceed to the V_1 altitude/temperature and weight/altitude-temperature correction charts (2A). Enter the charts with the airport pressure altitude, weight and reported temperature (for reduced thrust takeoffs use the assumed temperature). Read the additive corrections and apply to the V_1 speed. Proceed to charts 2B and 2C and make similar corrections to V_R and V_2, respectively.

Proceed to chart 2D. Read the V_1 slope correction and apply it to V_1. Then read the wind correction from chart 2E and apply it to V_1.

The slope and wind corrections to be applied to the V_R and V_2 speeds can be read from table 2F. From table 2F also read the air conditioning and ice protection bleed corrections to be applied to V_1 and V_R.

Proceed to the Minimum Speeds table 3. This table is used when the V-speeds determined in table 1 are to the left of the heavy line. Enter the table with the reported temperature (for a reduced thrust takeoff use actual reported temperatures, NOT assumed temperature). At the intersection with the airport pressure altitude read the V_{1MIN} and V_{RMIN} speeds, compare with the respective corrected takeoff speeds and use the higher of each speed. The equation for V_{2MIN} is shown below table 3. Compare this value with the corrected V_{2MIN} speed and use the higher of the two. Enter table 4 with the takeoff weight and read the V_3 speed. The equations for flap retract and slat retract speeds are shown to the left of table 4.

Takeoff Sample Problem:

For the takeoff sample problem the basic takeoff speeds V_1, V_R and V_2 read from table 1 for 23° flap setting and 240,000 kg (the planned takeoff weight) are 142, 159 and 169 KIAS, respectively. After applying an altitude/temperature correction (+4) and a weight/altitude-temperature correction (0) from table 2A, a slope correction (–3) from table 2D, and a wind correction (+1) from table 2E the value of V_1 is 144 KIAS. Similarly applying corrections to V_R and V_2 charts 2B, 2C and table 2F values of 161 and 170 KIAS, respectively, are obtained. None of these are lower than the minimum speeds in table 3. Flap retract speed is 180 KIAS, slat retract/V_3 speed is 233 KIAS.

TAKEOFF DECISION SPEED WHEN LIMITED BY MAXIMUM BRAKE ENERGY

The Takeoff Decision Speed When Limited By Maximum Brake Energy chart shows the highest speed at which the brakes can stop the aircraft in the event of a rejected takeoff.

Procedure:

Enter the Takeoff Decision Speed When Limited By Maximum Brake Energy chart with the takeoff weight and correct for given runway slope, wind conditions, airport pressure altitude and ambient temperature to read V_1 MAX BRAKE ENERGY.

If V_1 is greater than V_1 MAX BRAKE ENERGY the maximum allowable takeoff weight at which the Takeoff Decision Speed V_1 is less than or equal to the V_1 MAX BRAKE ENERGY must be determined.

Takeoff Sample Problem:

For the takeoff sample problem, the V_1 MAX BRAKE ENERGY obtained from the chart is 183 KIAS. The value of V_1 obtained from the Takeoff Speed tables for the given conditions is 144 KIAS and thus does not exceed the brake energy limited value.

TAKEOFF FIELD LENGTH LIMITED BY MAXIMUM BRAKE ENERGY

The Takeoff Field Length Limited By Maximum Brake Energy chart shows the relationship between takeoff field length with a balanced V_1, and the resulting field length when the V_1 has been reduced to V_1 MAX BRAKE ENERGY.

Procedure:

If the balanced V_1 for the actual takeoff weight exceeds V_1 MAX BRAKE ENERGY this chart is used to determine a new takeoff weight at which the V_1 does not exceed the brake energy limited value of V_1. This is done by entering on the scale labeled Runway Length When Limited By Maximum Brake Energy with the actual takeoff field length available and reading the equivalent runway length. This value of Equivalent Runway Length is then used on the Composite Takeoff Performance chart to obtain the new takeoff weight.

Takeoff Sample Problem:

Since the takeoff sample problem was not Max Brake Energy limited, this chart was not used.

MAXIMUM TIRE SPEED LIMITING WEIGHT

The maximum tire speed limiting weight is the takeoff weight for which the highest ground speed attained during the ground roll (at lift-off with all engines operating) is equal to the tire rating. In this case the tire is rated up to a speed of 204.2 knots (235 MPH).

Procedure:

To determine the maximum takeoff weight at which the tire speed rating will not be exceeded, enter the chart at the ambient temperature and airport pressure altitude. Correct for flap setting and wind conditions to obtain the maximum tire speed limiting weight.

Takeoff Sample Problem:

For the takeoff sample problem the weight obtained from this chart would be greater than 290,000 kg. Thus tire speed is not limiting for this problem.

SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

The Second Segment Climb Gradient At Gear Up Height charts show the relationship between gross weight and second segment climb gradient used on the Obstacle Clearance Takeoff Flight Path charts. They are used in conjunction with the Obstacle Clearance Takeoff Flight Path charts to determine if obstacle clearance requirements are satisfied at the takeoff weight.

Procedure:

To determine the weight corresponding to a known gradient, enter the chart at the lower right at the gradient required to clear obstacles. Correct for flap setting and draw a vertical line upward. Enter the left side of the chart at the ambient temperature and airport pressure altitude and draw a horizontal line to the right. The intersection of these is the takeoff weight that would yield the desired second segment climb gradient.

Takeoff Sample Problem:

To obtain a 3.6% gradient necessary to clear the 485-ft obstacle, the maximum takeoff weight would be 260,000 kg. Since this obstacle limiting weight is lower than the runway length limiting weight, second segment limiting weight and maximum tire speed limiting weight, it is the performance limiting weight.

OBSTACLE CLEARANCE TAKEOFF FLIGHT PATH

The Obstacle Clearance Takeoff Flight Path charts allow for determination of whether or not existing obstacles can be cleared at a known takeoff weight. Separate charts are provided for obstacles up to 280 ft in height at distances up to 2200 m from the end of the runway, and for obstacles up to 1255 ft in height and up to 4200 m from the end of the runway. The obstacle heights which must be used with these charts are measured with respect to the end of the runway. In order to determine maximum takeoff gross weight, the Second Segment Climb Gradient At Gear Up Height chart is used in conjunction with the gradient values that identify the individual takeoff paths.

Procedure:

To determine the gradient required to clear existing obstacles for known airport and operational conditions, enter the chart at the bottom at the obstacle distance. After correcting for wind and flap setting, draw a vertical line to intersect a horizontal line at the obstacle height. This intersection is the gradient required.

Sample Takeoff Problem:

A second segment climb gradient of less than 2.4% would be required to clear the 20-ft obstacle, and a 3.6% climb gradient would be required to clear the 485-ft obstacle. Since the Composite Takeoff Performance chart assures us of at least a 2.7% one-engine inoperative second segment climb gradient, the 20-ft obstacle can be cleared but the 485-ft obstacle cannot.

PRESSURE HEIGHT FOR ACCELERATION WITH OBSTACLE CLEARANCE

The Pressure Height For Acceleration With Obstacle Clearance chart allows for determination of the pressure altitude above the airport at which the level flight acceleration and cleanup phase of the takeoff must occur following an engine failure in order to ensure that the aircraft will follow a takeoff flight path no lower than those shown on the Obstacle Clearance Takeoff Flight Path chart. The second segment gradient used to read the pressure height above acceleration is identical to that used to label the various takeoff paths shown on the Obstacle Clearance Takeoff Flight Path chart.

Procedure:

To determine the pressure height for acceleration above the airport for level flight acceleration, enter the chart at the top with the airport pressure altitude, intersect the ambient temperature line, then read down to the second segment climb gradient and left to obtain the pressure height.

Takeoff Sample Problem:

For the airport pressure and ambient temperature of the sample problem, a pressure height for acceleration of 1300 ft is read for a 3.6% second segment gross climb gradient.

STABILIZER SETTING FOR TAKEOFF

The Stabilizer Setting For Takeoff chart allows for determination of the optimum stabilizer setting for the aircraft center of gravity location and the flap setting to be used for takeoff.

Takeoff Sample Problem:

For the takeoff sample problem a stabilizer angle of 7.9° is obtained from this chart for a 20% MAC CG location and 23° takeoff flap setting.

N_1 SETTING - TAKEOFF THRUST - SET BETWEEN 40 AND 80 KNOTS

The N_1 Setting – Takeoff Thrust table allows for the determination of the N_1 setting for takeoff thrust.

Procedure:

Determine the N_1 setting for takeoff as a function of airport pressure altitude and ambient temperature, then correct for air conditioning and/or ice protection bleed requirements.

Takeoff Sample Problem:

Entering the table for 2000-ft pressure altitude and 30°C ambient temperature an N_1 value of 111.7 is obtained. Assuming 80 KIAS there will be no Mach correction. There are no corrections to N_1 for bleeds.

MAXIMUM CONTINUOUS THRUST N_1 SETTING

The N_1 Setting – Maximum Continuous Thrust table is used to determine the inflight N_1 setting for maximum continuous thrust. The N_1 setting is presented as a function of pressure altitude and ambient temperature (TAMB), with corrections to be applied where applicable.

W_{MC}

The W_{MC} chart is provided to determine the maximum weight at which minimum control speeds affect takeoff speeds and takeoff field lengths.

Procedure:

Enter the bottom left portion of the chart with the airport ambient temperature and read vertically upward to the intersection with airport pressure altitude. From this point read horizontally to the right and correct for flap setting, runway slope and wind before reading a value of W_{MC}.

REDUCED THRUST TAKEOFF N_1 SETTING

Tables are provided to determine performance data for reduced thrust takeoff using the assumed temperature method when the actual takeoff weight is less than the maximum allowable takeoff weight. Tables are provided for pressure altitudes from –1000 to 6000 ft.

To obtain the flex N_1 setting for the known takeoff weight and wind condition, the assumed temperature is obtained from the appropriate Airport Analysis page for the departure airport. Using the Reduced Thrust Takeoff N_1 Settings page, the flex power setting is found by reading the N_1 at the intersection of the assumed and actual ambient temperature.

For bleeds on conditions, notes are provided on the appropriate page.

Reduced thrust takeoff is not permitted:

1. When runway is contaminated by water, ice, slush or snow.
2. When anti-skid is inoperative.
3. With anti-ice "ON" at airport pressure altitudes above 6000 ft.

TAKEOFF BRAKE TEMPERATURE

The Takeoff Brake Temperature chart is provided to ensure that the brakes at all times have sufficient capacity to stop the aircraft should a rejected takeoff be initiated. This chart should be utilized when the peak brake temperature exceeds 300°C. The chart provides maximum allowable brake temperature for a given takeoff weight and V_1 speed. The estimated cooling time is provided for information only.

Procedure:

Enter the bottom left portion of the chart with the appropriate V_1 speed and read vertically to the reference line and correct for wind. Continue upward to the intersection of actual takeoff weight. Read horizontally to the right to the reference line. From the bottom of the middle area, read vertically upward from the intersection of the pressure altitude and ambient temperature. From the reference line, parallel the curved lines until the vertical line is intersected. Continue horizontally to the right to the 0 minute estimated cooling time line and read the allowable brake temperature. If the current brake temperature is cooler than the allowable temperature, no cooling time is required. However, if the current temperature is greater, the allowable temperature line is extended straight out until intersected by the current temperature, which is paralleled to the curved temperature lines. From this point, read vertically downward to get the estimated cooling time.

ENGINE AND AIRCRAFT ICE PROTECTION TAKEOFF WEIGHT CORRECTIONS

The takeoff weight corrections provided are to be applied to the maximum allowable takeoff weight determined by the method shown in this section, if that computation was based on takeoff with engine and aircraft ice protection off.

SAMPLE CONTAMINATED RUNWAY PROBLEM AND WORKSHEET

Determine the contaminated runway weight and V_1 reductions based on the following conditions:

Airport Pressure Altitude	sea level
Airport Ambient Temperature	0°C
Runway Length	9500 ft
Runway Slope	0
Water or Slush Depth	1/4 inch
A/C Bleed Condition	off
Engine and Airframe Ice Protection Bleed	on
Allowable Takeoff Weight (dry runway, 25 degree flaps)	608,000 lb
V_1	159 KIAS
V_{MCG}	136 KIAS

Weight Reduction – at sea level	53,500 lb
– slope correction	0
– temperature correction	+1750 lb
– altitude correction	0
Total Weight Reduction	55,250 lb
Allowable Takeoff Weight	552,750 lb
V_1 Reduction – at sea level	25.5 KIAS
– slope correction	0
– altitude correction	0
– temperature correction	0
Total V_1 Reduction	25.5 KIAS
Reduced V_1	133.5 KIAS
Allowable Takeoff Weight Based on Accelerate-Stop Distance	485,000 lb
Allowable Takeoff Weight Based on Accelerate-Go Distance	541,000 lb
Field Length Limited Weight for $V_1 = V_{MCG}$	485,000 lb

NOTE: Please convert to kilograms and meters. Metric data will be supplied when available.

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EFFECT OF SLUSH AND WATER ON BALANCED TAKEOFF PERFORMANCE

The Effect Of Slush And Water On Balanced Takeoff Performance tables provide weight and V_1 reductions to correct dry runway takeoff performance for the effects of water or slush on the runway. These corrections are applicable for airport pressure altitudes up to 2000 ft, ambient temperatures from STD -35°C to STD +35°C, runway slopes of -2% to +2% and field lengths of 6000 to 13,000 ft. The corrections are presented for a takeoff flap setting of 25°, air conditioning off, and engine and airframe ice protection on. Separate tables are provided for contaminant depths of 1/4 in. and 1/2 in.

Procedure:

Before determining the weight and V_1 reductions for a contaminated runway the allowable takeoff weight and V_1 based on dry runway performance with 25° takeoff flap setting must be determined, as illustrated in the Sample Takeoff problem in this section. Enter the weight reduction table (A) with the given field length and read the weight correction at sea level. Then obtain the corrections for slope, ambient temperature and altitude, all as a function of field length. Apply the corrections to the dry runway allowable takeoff weight. Similarly, to obtain the V_1 reduction enter table B with the given field length and read a correction to V_{1BASIC} at sea level. Then read the additional corrections for slope and altitude for the desired field length. Enter the plot at the given field length and ambient temperature to determine the effect of temperature on V_{1BASIC}. Apply the reductions to the dry runway V_1 and compare this value to V_{MCG}. The latter can be read from the Minimum Control Speed On The Ground chart in the Limitations section of the General chapter. If the reduced V_1 is less than V_{MCG} it must be increased to be equal to V_{MCG}. A new contaminated runway allowable takeoff weight must then be obtained from the Takeoff Performance In Slush/Water charts in this section.

Sample Problem:

For the contaminated runway sample problem enter Table A with the given 9500 ft field length and read a weight correction at sea level of 53,500 lb and a temperature correction of +1750 lb. There are no corrections to be made for slope or altitude. The total weight correction is the sum of all these corrections, in this case 55,250 lb. The allowable takeoff gross weight (552,750 lb) is the dry runway allowable takeoff weight with 25° takeoff flap setting (608,000 lb) reduced by the total weight correction (55,250 lb). From Table B for a field length of 9500 ft the V_{1BASIC} reduction at sea level is 25.5 KIAS, with no additional corrections to be made for slope, altitude or temperature. Reducing the dry runway V_1 of 159 KIAS by 25.5 KIAS the allowable V_1 on a contaminated runway is 133.5 KIAS. Since V_1 must be at least equal to V_{MCG} it must be increased to V_{MCG} before using the graphs of accelerate-stop and accelerate-go distances to determine a new allowable takeoff weight.

TAKEOFF PERFORMANCE IN SLUSH/WATER

Takeoff Performance In 1/4 Inch and 1/2 Inch Slush/Water charts are provided to determine the field length limited weight for V_1 equal to V_{MCG}. These plots illustrate the distance to accelerate and stop as well as the distance to accelerate and go for a 25° flap setting with air conditioning off and engine and airframe ice protection on. These plots are applicable for airport pressure altitudes up to 2000 ft., ambient temperatures from STD −35°C to STD +35°C, runway slopes of −2% to +2% and field lengths of 6000 to 13,000 feet.

Procedure:

To determine accelerate-stop distance enter the scale on the left with the ambient temperature, draw a vertical line upward to the appropriate pressure altitude line and draw a horizontal line to the right. Enter the right side of the chart with the takeoff field length, correct for runway slope, and draw a vertical line upward. At the intersection of these read the allowable takeoff gross weight based on accelerate-stop distance. Repeat these steps on the accelerate-go charts to obtain the allowable takeoff gross weight based on accelerate-go distance. Due to the inherent conservatism of the data contained in the tables, higher takeoff weights may be realized from the graphs of distance to accelerate/go and accelerate/stop. If this should occur, the lower of the two takeoff weights should be used.

Sample Problem:

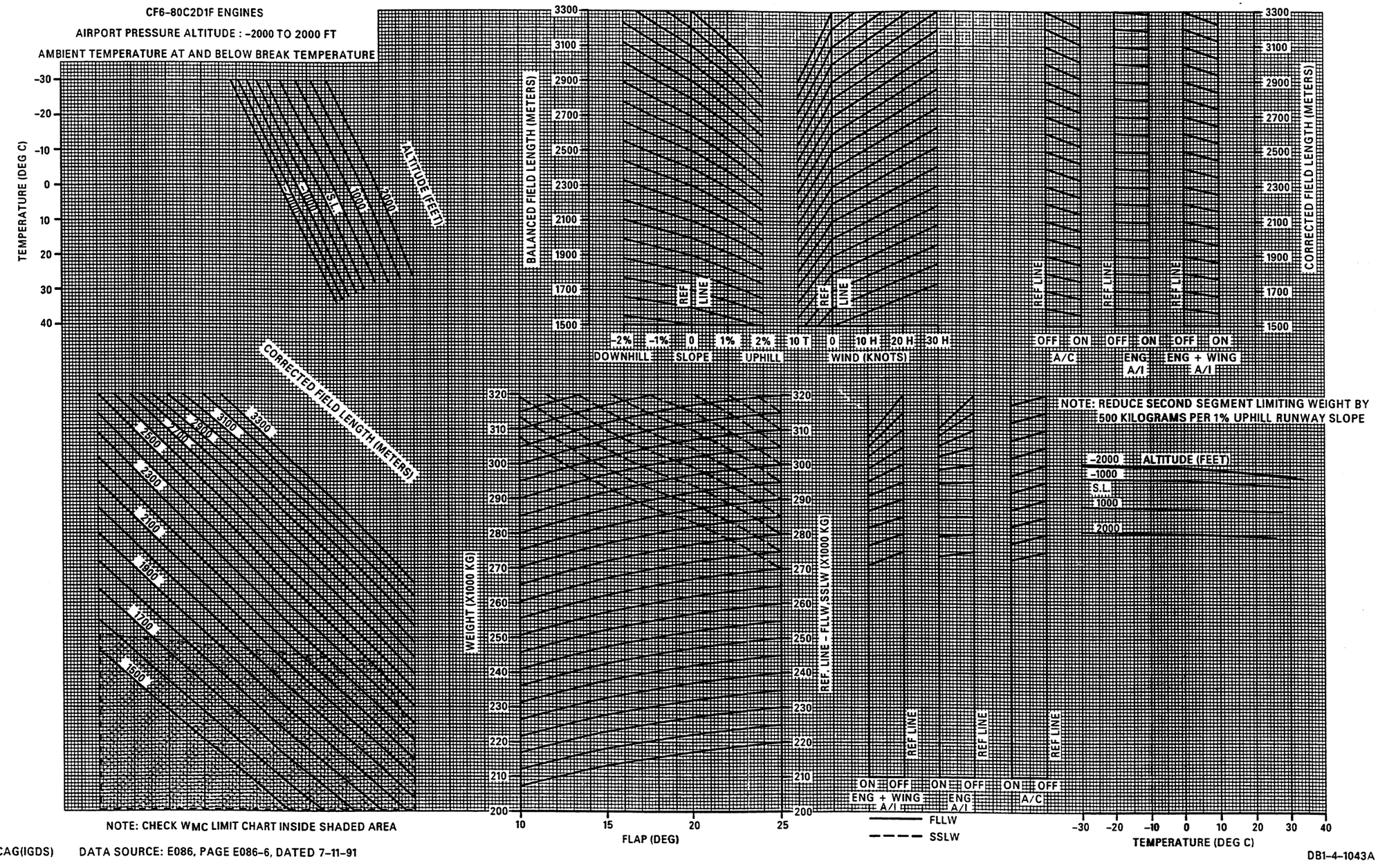
For the sample problem with 1/4 inch slush or water, 0°C ambient temperature at sea level, a 9500 ft. takeoff field length and no slope, the allowable takeoff gross weight based on accelerate-stop distance is 485,000 lb. The allowable takeoff gross weight based on accelerate-go distance is 541,000 lb. So the new field length limited weight for V_1 equal to V_{MCG} is 485,000 lb. Note that the weights obtained from these graphs are both lower than the takeoff weight obtained from the Effect Of Slush And Water On Balanced Takeoff Performance tables.

COMPOSITE TAKEOFF PERFORMANCE

CF6-80C2D1F ENGINES

AIRPORT PRESSURE ALTITUDE : -2000 TO 2000 FT

AMBIENT TEMPERATURE AT AND BELOW BREAK TEMPERATURE



NOTE: CHECK W_{MC} LIMIT CHART INSIDE SHADED AREA

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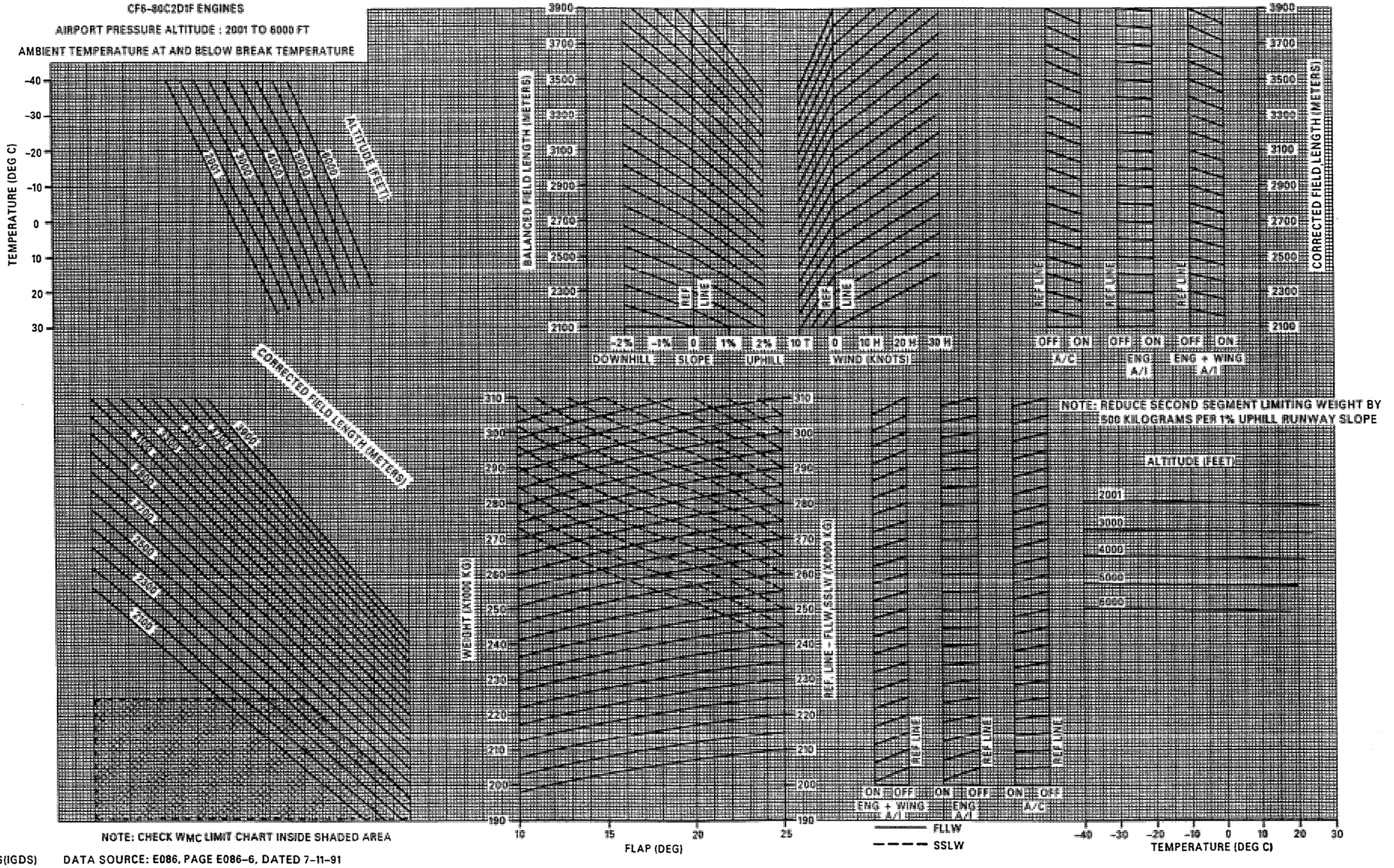
COMPOSITE TAKEOFF PERFORMANCE

CF6-80C2D1F ENGINES

AIRPORT PRESSURE ALTITUDE : 2001 TO 6000 FT

AMBIENT TEMPERATURE AT AND BELOW BREAK TEMPERATURE



NOTE: CHECK WMC LIMIT CHART INSIDE SHADED AREA

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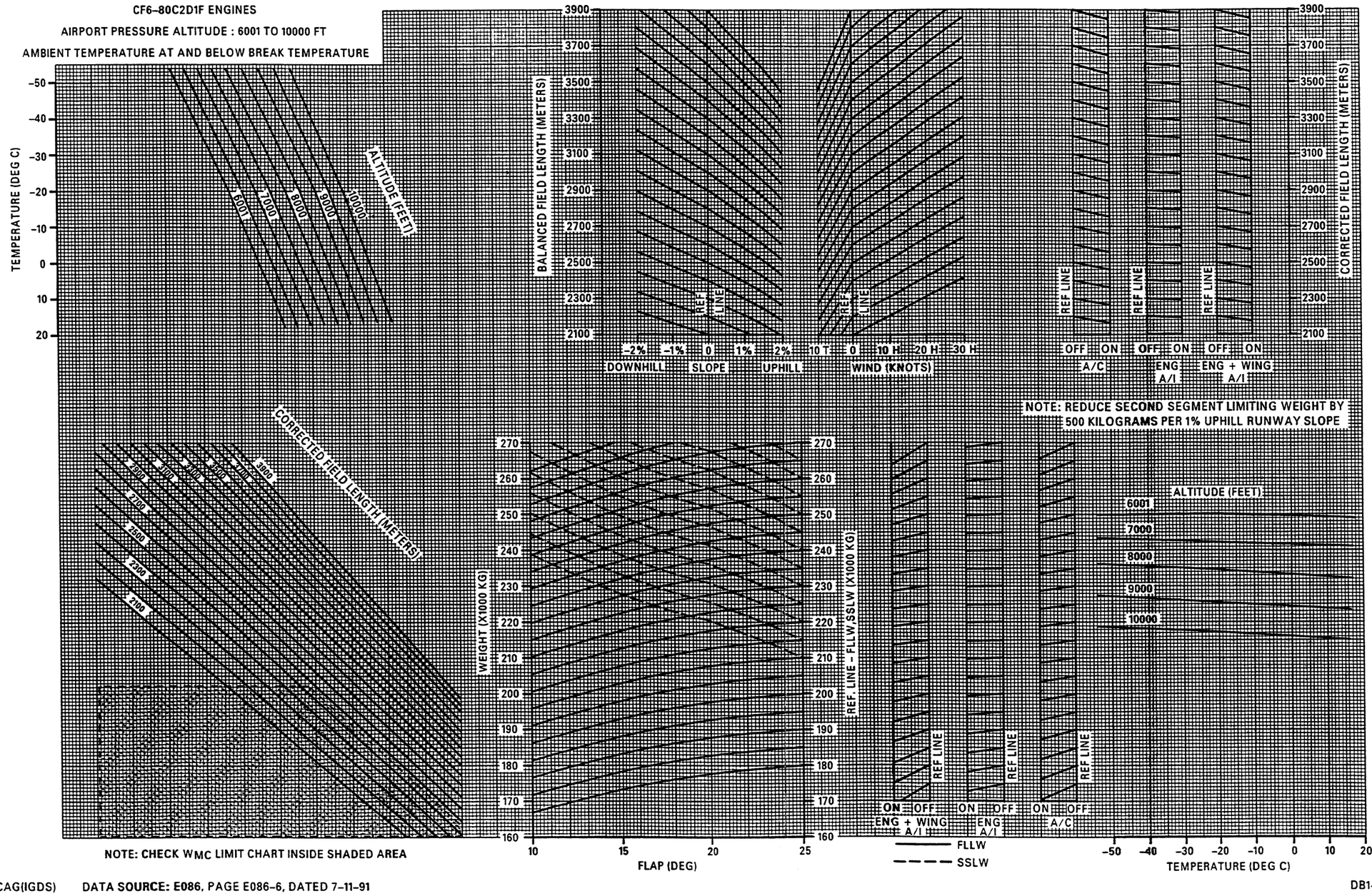
COMPOSITE TAKEOFF PERFORMANCE

CF6-80C2D1F ENGINES

AIRPORT PRESSURE ALTITUDE : 6001 TO 10000 FT

AMBIENT TEMPERATURE AT AND BELOW BREAK TEMPERATURE



NOTE: REDUCE SECOND SEGMENT LIMITING WEIGHT BY 500 KILOGRAMS PER 1% UPHILL RUNWAY SLOPE

NOTE: CHECK W_{MC} LIMIT CHART INSIDE SHADED AREA

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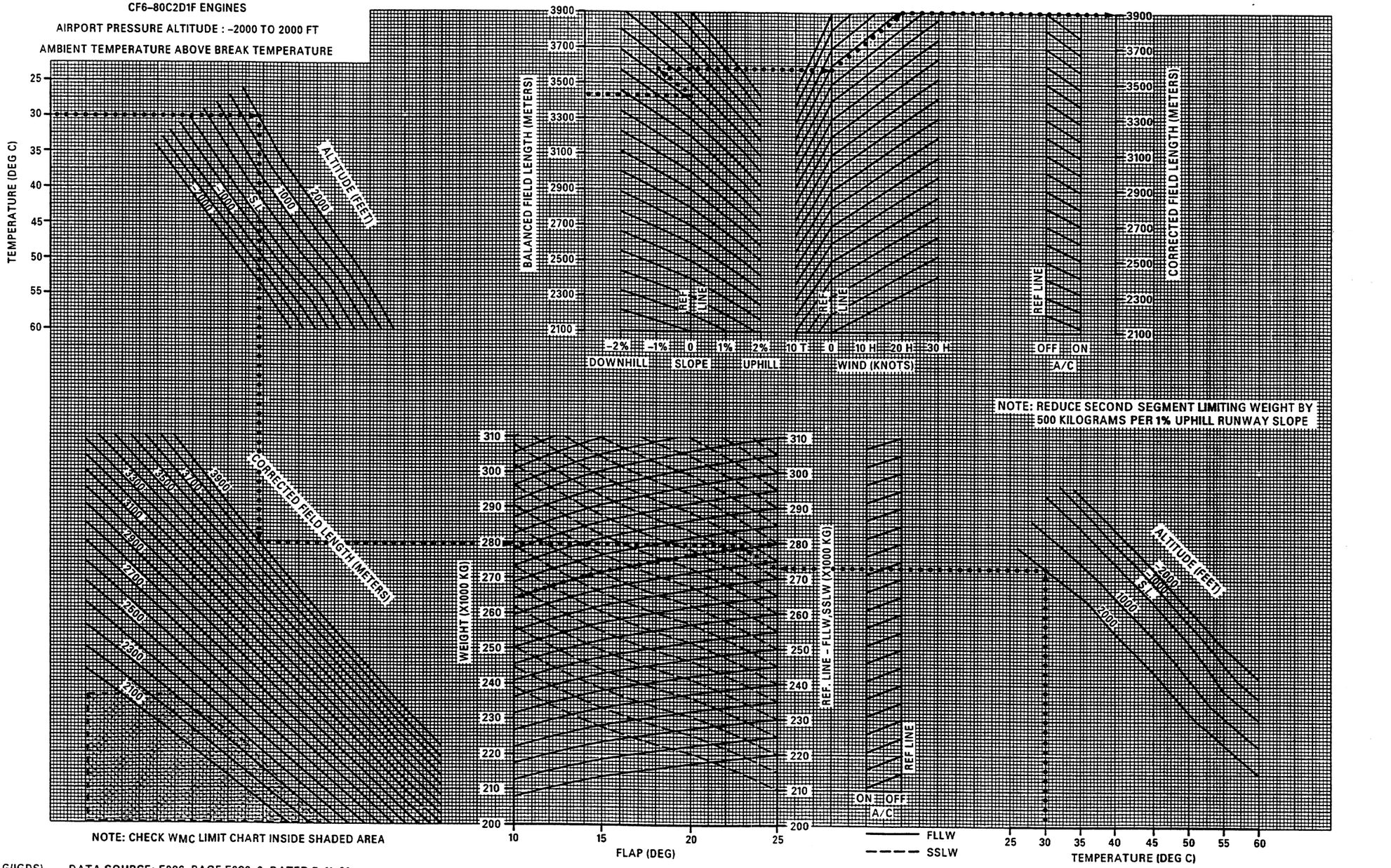
COMPOSITE TAKEOFF PERFORMANCE

CF6-80C2D1F ENGINES

AIRPORT PRESSURE ALTITUDE : -2000 TO 2000 FT

AMBIENT TEMPERATURE ABOVE BREAK TEMPERATURE



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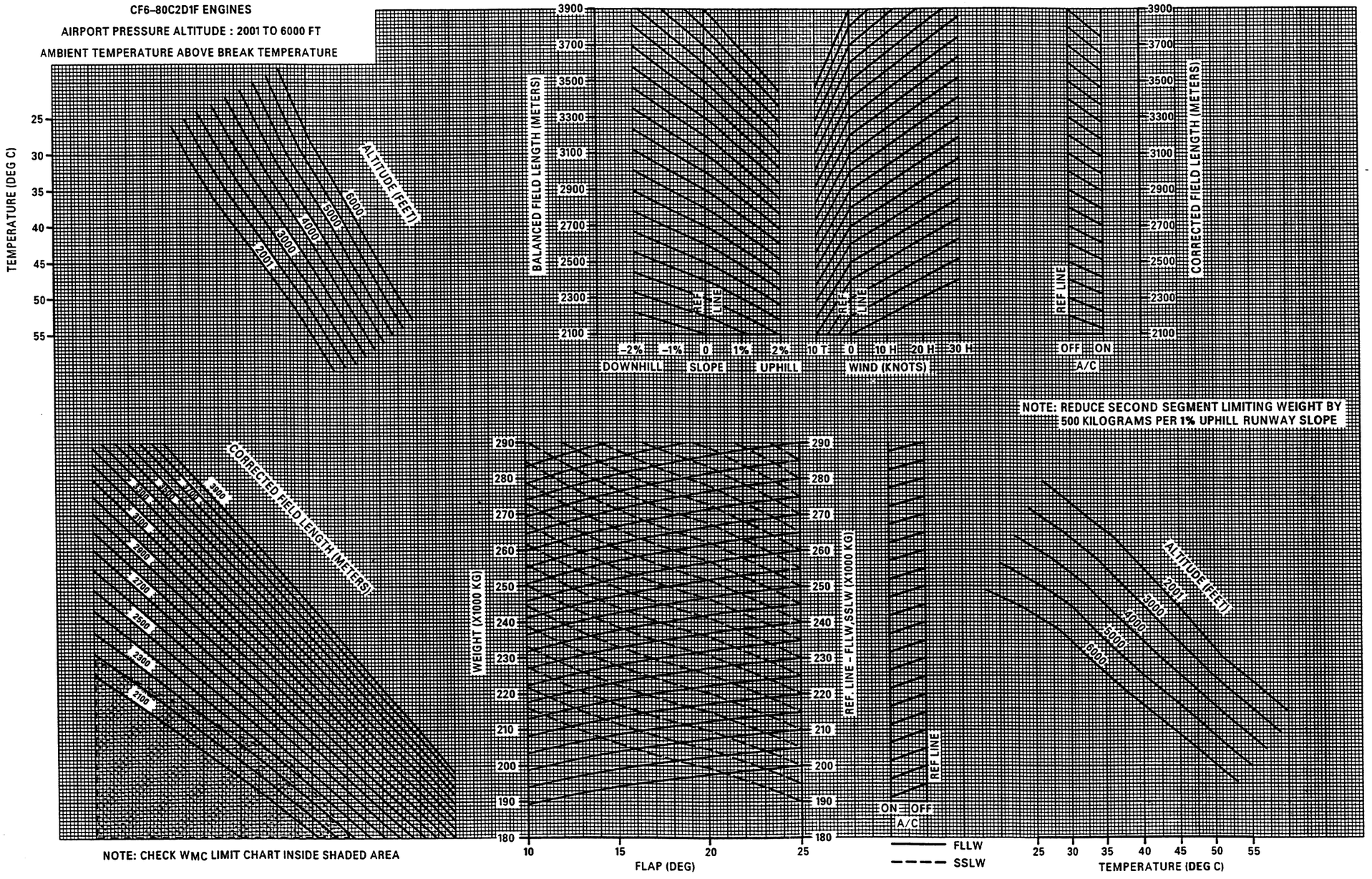
COMPOSITE TAKEOFF PERFORMANCE

CF6-80C2D1F ENGINES

AIRPORT PRESSURE ALTITUDE : 2001 TO 6000 FT

AMBIENT TEMPERATURE ABOVE BREAK TEMPERATURE



NOTE: CHECK WMC LIMIT CHART INSIDE SHADED AREA

CAG(IGDS) DATA SOURCE: E086, PAGE E086-6, DATED 7-11-91

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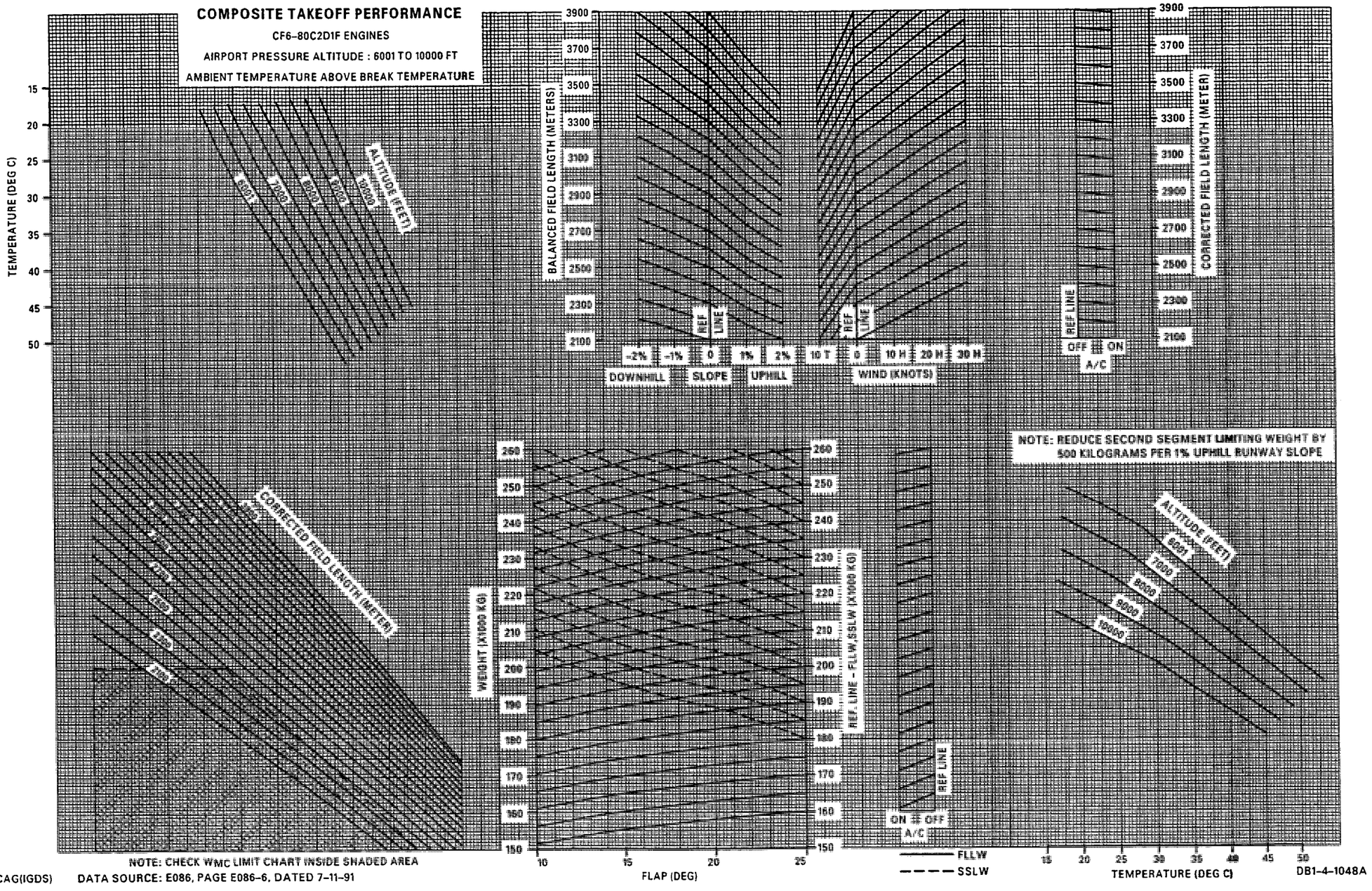
COMPOSITE TAKEOFF PERFORMANCE

CF6-80C2D1F ENGINES

AIRPORT PRESSURE ALTITUDE : 6001 TO 10000 FT

AMBIENT TEMPERATURE ABOVE BREAK TEMPERATURE



NOTE: CHECK WMC LIMIT CHART INSIDE SHADED AREA

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TAKEOFF AND TRANSITION SPEEDS (SHEET 1)
CF6-80C2D1F ENGINES

PROCEDURE:

1. DETERMINE BASIC TAKEOFF SPEEDS V_1, V_R, V_2 FOR TAKEOFF WEIGHT AND FLAP SETTING. (NOTE: IF BASIC TAKEOFF SPEEDS FALL LEFT OF HEAVY LINE ON TABLE **1**, A MINIMUM SPEED CHECK WILL BE REQUIRED AFTER DETERMINING THE CORRECTED TAKEOFF SPEEDS.)
2. DETERMINE CORRECTED TAKEOFF SPEEDS BY ADDING ΔV VALUES FROM CORRECTION TABLES **2A, B, C, D, E,** AND **F** (SUBTRACT WHEN SHOWN WITH NEGATIVE SIGN).
3. WHEN BASIC TAKEOFF SPEEDS OBTAINED IN STEP 1 ARE LEFT OF THE HEAVY LINE, USE THE HIGHER OF THE CORRECTED TAKEOFF SPEEDS OBTAINED IN STEP 2, OR THE MINIMUM SPEEDS FROM TABLE **3**.
4. THE TRANSITION SPEEDS (FLAP RETRACTION, SLAT RETRACTION AND V_3 SPEEDS) ARE DETERMINED BY ENTERING TABLE **4**.

1

BASIC TAKEOFF SPEEDS V_1, V_R, V_2 (KIAS)																		
FLAP	TAKEOFF WEIGHT (1000 KG)																	
(DEG)		130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
10	V_1	78	85	93	100	107	114	121	127	134	139	145	150	156	161	166	171	175
	V_R	104	112	119	126	133	139	144	150	155	159	164	168	173	177	181	186	190
	V_2	141	145	148	152	156	160	163	166	170	173	176	180	183	186	190	193	196
11	V_1	77	85	92	99	107	113	120	126	133	138	144	149	155	160	165	170	174
	V_R	103	111	119	125	132	138	143	149	154	158	163	167	172	176	180	185	189
	V_2	140	144	147	151	155	159	162	165	169	172	175	179	182	185	189	192	195
12	V_1	77	84	92	99	106	113	119	126	132	138	143	148	154	159	164	169	173
	V_R	102	110	118	125	131	137	142	148	153	157	162	166	171	175	179	184	188
	V_2	139	143	146	150	154	158	161	164	168	171	174	178	181	184	187	191	194
13	V_1	76	84	91	98	105	112	119	125	131	137	142	148	153	158	163	168	172
	V_R	102	110	117	124	130	136	142	147	152	156	161	165	170	174	178	183	187
	V_2	138	142	146	149	153	157	160	163	167	170	173	177	180	183	186	190	193
14	V_1	76	83	90	98	105	111	118	124	130	136	141	147	152	157	162	167	171
	V_R	101	109	116	123	129	135	141	146	151	156	160	165	169	173	177	182	186
	V_2	137	141	145	149	152	156	159	162	166	169	172	176	179	182	185	189	192
15	V_1	75	83	90	97	104	111	117	124	130	135	141	146	151	156	161	166	171
	V_R	100	108	116	122	129	134	140	145	150	155	159	164	168	172	176	181	185
	V_2	137	140	144	148	151	155	158	161	165	168	171	175	178	181	184	188	191
16	V_1	75	82	90	97	104	110	117	123	129	135	140	145	151	156	161	165	170
	V_R	100	108	115	122	128	134	139	144	149	154	158	163	167	171	176	180	184
	V_2	136	140	143	147	151	154	157	161	164	167	171	174	177	180	183	187	190
17	V_1	74	82	89	96	103	110	116	123	129	134	139	145	150	155	160	165	169
	V_R	99	107	115	121	127	133	139	144	149	153	158	162	166	171	175	179	183
	V_2	135	139	143	146	150	154	157	160	163	167	170	173	176	179	183	186	189
18	V_1	74	81	89	96	103	109	116	122	128	134	139	144	149	155	159	164	169
	V_R	99	107	114	121	127	133	138	143	148	153	157	161	166	170	174	178	182
	V_2	135	139	142	146	149	153	156	159	163	166	169	172	175	179	182	185	188
19	V_1	74	81	88	95	102	109	115	122	128	133	138	144	149	154	159	164	168
	V_R	98	106	113	120	126	132	137	143	147	152	156	161	165	169	173	177	181
	V_2	134	138	142	145	149	152	155	159	162	165	168	171	175	178	181	184	187
20	V_1	73	81	88	95	102	109	115	121	127	133	138	143	148	154	158	163	167
	V_R	98	106	113	120	126	132	137	142	147	151	156	160	164	169	173	177	181
	V_2	134	137	141	145	148	152	155	158	161	164	168	171	174	177	180	183	186
21	V_1	73	80	88	95	102	108	115	121	127	132	138	143	148	153	158	163	167
	V_R	98	105	113	119	125	131	136	142	146	151	155	160	164	168	172	176	180
	V_2	133	137	141	144	148	151	154	157	161	164	167	170	173	176	179	183	186
22	V_1	73	80	87	94	101	108	114	121	127	132	137	143	148	153	158	162	166
	V_R	97	105	112	119	125	131	136	141	146	150	155	159	163	168	172	176	179
	V_2	133	136	140	144	147	151	154	157	160	163	166	170	173	176	179	182	185
23	V_1	72	80	87	94	101	108	114	120	126	132	137	142	147	152	157	162	166
	V_R	97	105	112	118	125	130	136	141	146	150	154	159	163	167	171	175	179
	V_2	132	136	140	143	147	150	153	156	159	163	166	169	172	175	178	181	184
24	V_1	72	80	87	94	101	108	114	120	126	132	137	142	147	152	157	161	166
	V_R	97	104	112	118	124	130	135	140	145	150	154	158	163	167	171	175	178
	V_2	132	135	139	143	146	150	153	156	159	162	165	168	172	175	178	181	184
25	V_1	72	79	87	94	101	108	114	120	126	131	137	142	147	152	157	161	165
	V_R	96	104	111	118	124	130	135	140	145	149	154	158	162	166	170	174	178
	V_2	131	135	139	142	146	150	152	155	159	162	165	168	171	174	177	180	183

CHECK FOR MINIMUM SPEEDS LEFT OF HEAVY LINE

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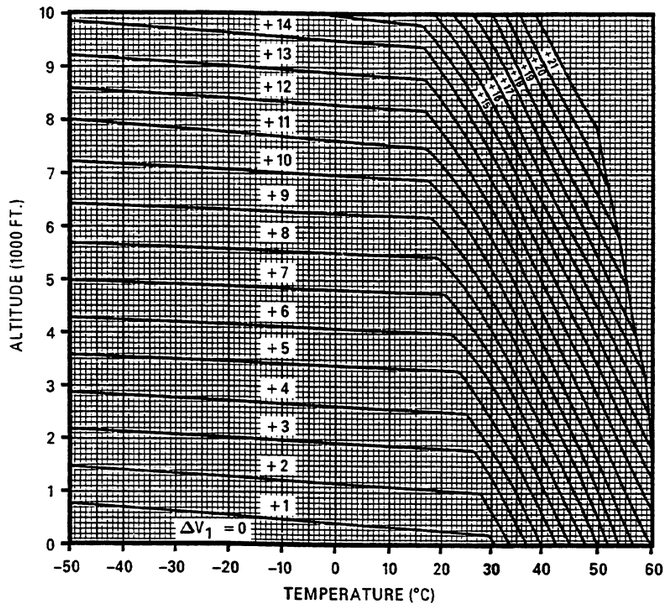
TAKEOFF AND TRANSITION SPEEDS (SHEET 2)

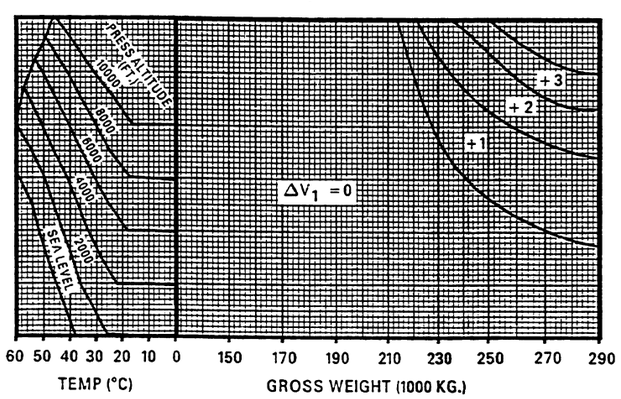
CF6-80C2D1F ENGINES

2A

V_1 ALTITUDE/TEMPERATURE CORRECTION (KIAS)

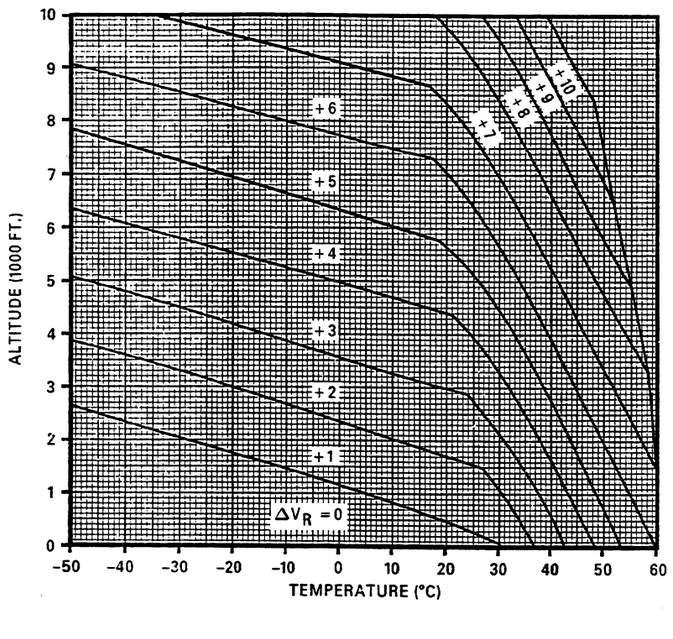


V_1 WEIGHT/ALT-TEMP CORRECTION (KIAS)

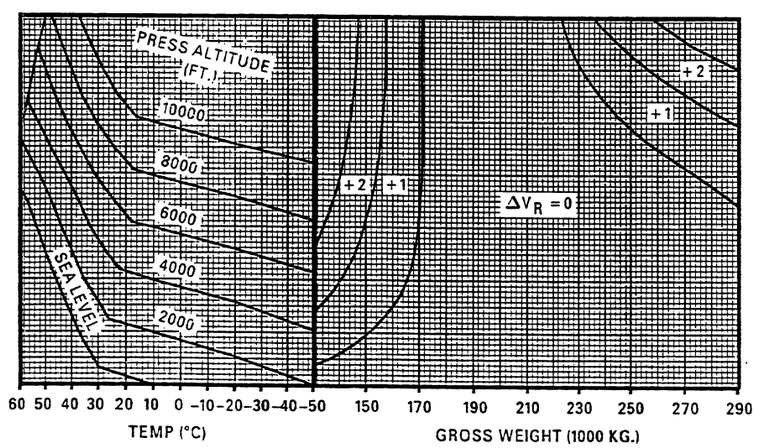


2B

V_R ALTITUDE/TEMPERATURE CORRECTION (KIAS)



V_R WEIGHT/ALT-TEMP CORRECTION (KIAS)



CAG(IGDS)

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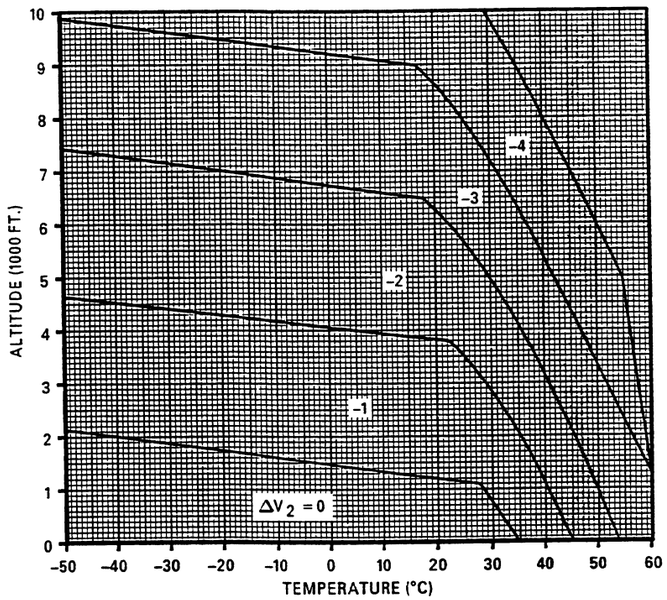
TAKEOFF AND TRANSITION SPEEDS (SHEET 3)

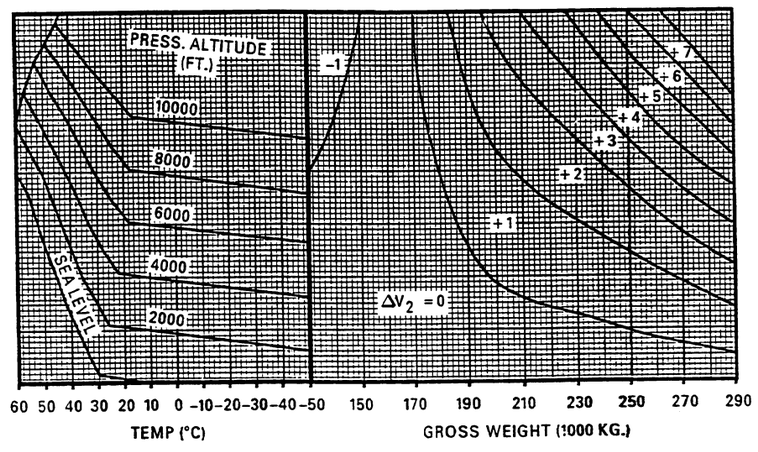
CF6-80C2D1F ENGINES

2C

V_2 ALTITUDE/TEMPERATURE CORRECTION (KIAS)



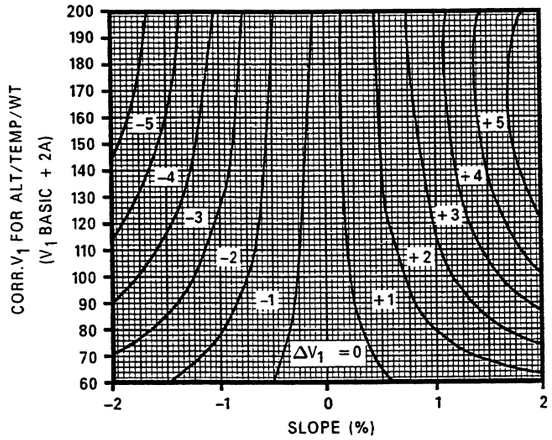
V_2 WEIGHT/ALT-TEMP CORRECTION (KIAS)



CAG(IGDS)

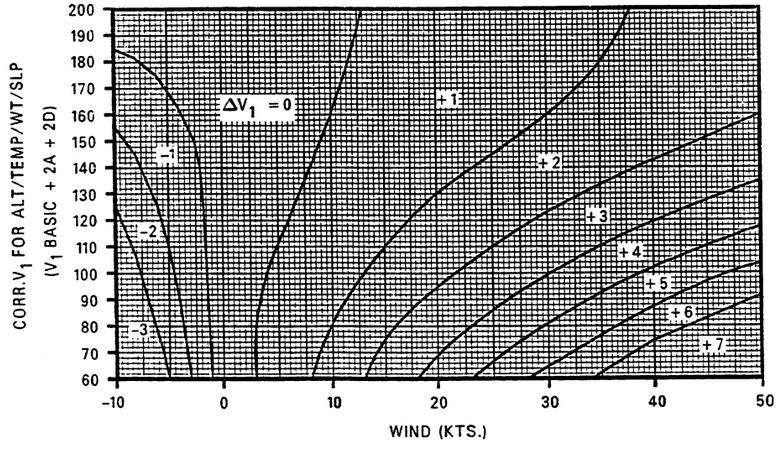
2D

SLOPE CORRECTION



2E

WIND CORRECTION



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TAKEOFF AND TRANSITION SPEEDS (SHEET 4)

CF6-80C2D1F ENGINES

2F

MISCELLANEOUS CORRECTIONS (KIAS)

ENGINE ICE PROTECTION ON	ΔV_1 ΔV_R	0 0
ENGINE AND AIRFRAME ICE PROTECTION ON	ΔV_1 ΔV_R	0 0
AIR CONDITIONING ON	ΔV_1 ΔV_R	+0.5 0

WIND PER 10 KNOTS	HEADWIND	ΔV_R	0
	TAILWIND	ΔV_R	0

SLOPE PER 1%	UPHILL	ΔV_R ΔV_2	+0.5 -0.5
	DOWNHILL	ΔV_R ΔV_2	-1 +0.5

3

MINIMUM SPEEDS (KIAS)

V_1 & V_R MINIMUM SPEEDS

ALTITUDE (FT)	TEMPERATURE (°C)				
	-20 TO 15	20	30	40	50
SEA LEVEL	136	136	135	130	125
1000	134	134	133	128	122
2000	132	132	130	125	120
3000	130	130	127	123	118
4000	128	128	125	120	115
5000	126	126	122	118	113
6000	124	123	120	115	111
7000	122	121	118	113	109
8000	120	119	115	111	107

V_2 MIN = V_R MIN + (CORRECTED V_2 - CORRECTED V_R)

NOTE:

CHECK MINIMUM SPEEDS WHEN LEFT OF HEAVY LINE ON TABLE 1 AND USE THE HIGHER OF THE MINIMUM SPEED OR THE CORRECTED TAKEOFF SPEED.

FOR REDUCED THRUST TAKEOFFS READ MINIMUM SPEEDS AT ACTUAL TEMPERATURE (°C).

FLAP RETRACT = V_2 + 10 (KIAS)

SLAT RETRACT = V_3

4

TRANSITION SPEEDS

TAKEOFF WEIGHT (1000 KG)	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
V_3 (KIAS)	172	178	184	190	196	202	207	213	218	223	228	233	238	243	247	252	256

CAG(IGDS)

DB1-4-1039A

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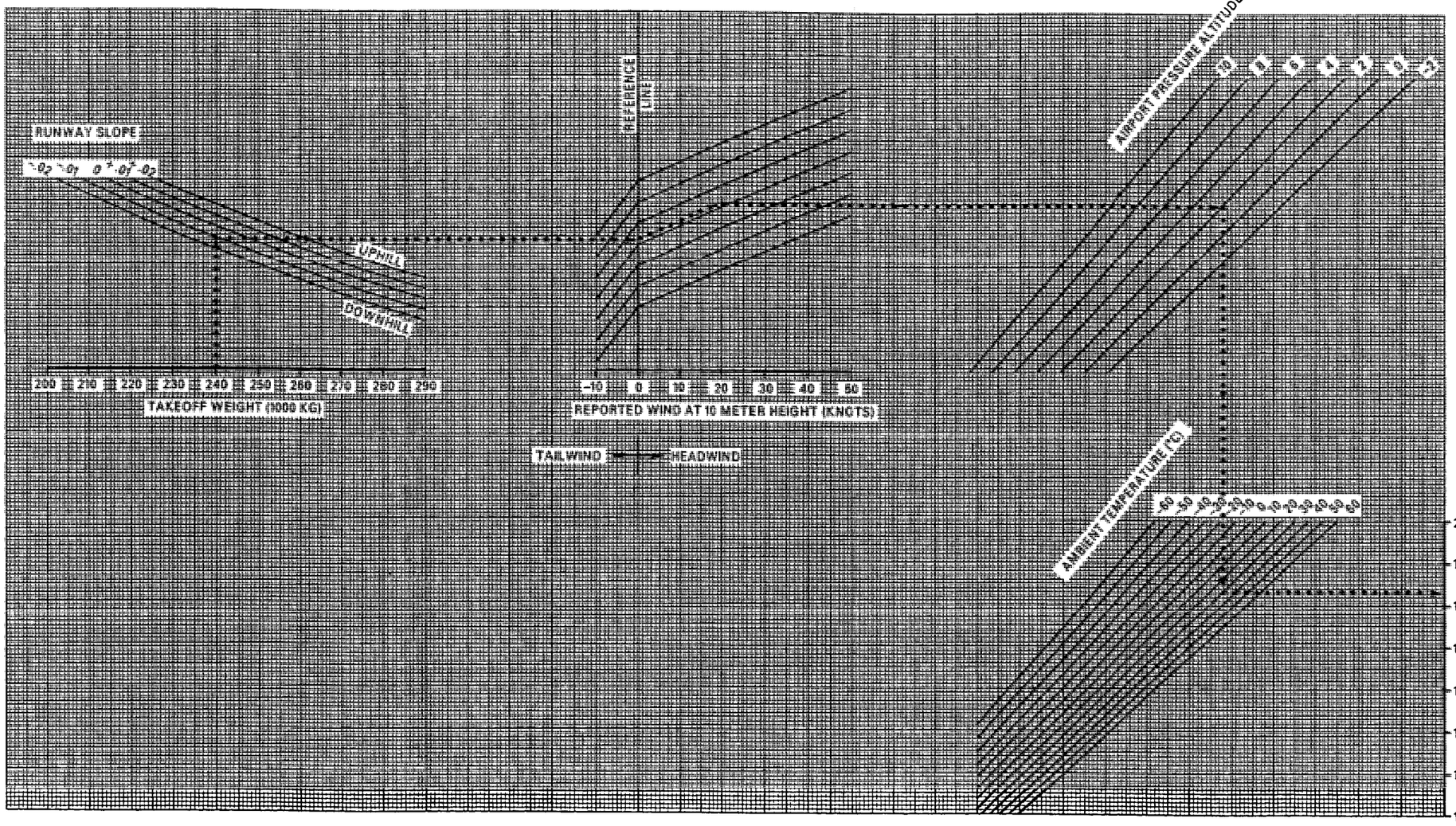
TAKEOFF DECISION SPEED WHEN LIMITED BY MAXIMUM BRAKE ENERGY, V1 MAX BRAKE ENERGY



CAG(IGDS) DATA SOURCE: MDC = K0031, SECTION 4A, PAGE 10-6, DATED 10-1-90

DB1-4-1004A

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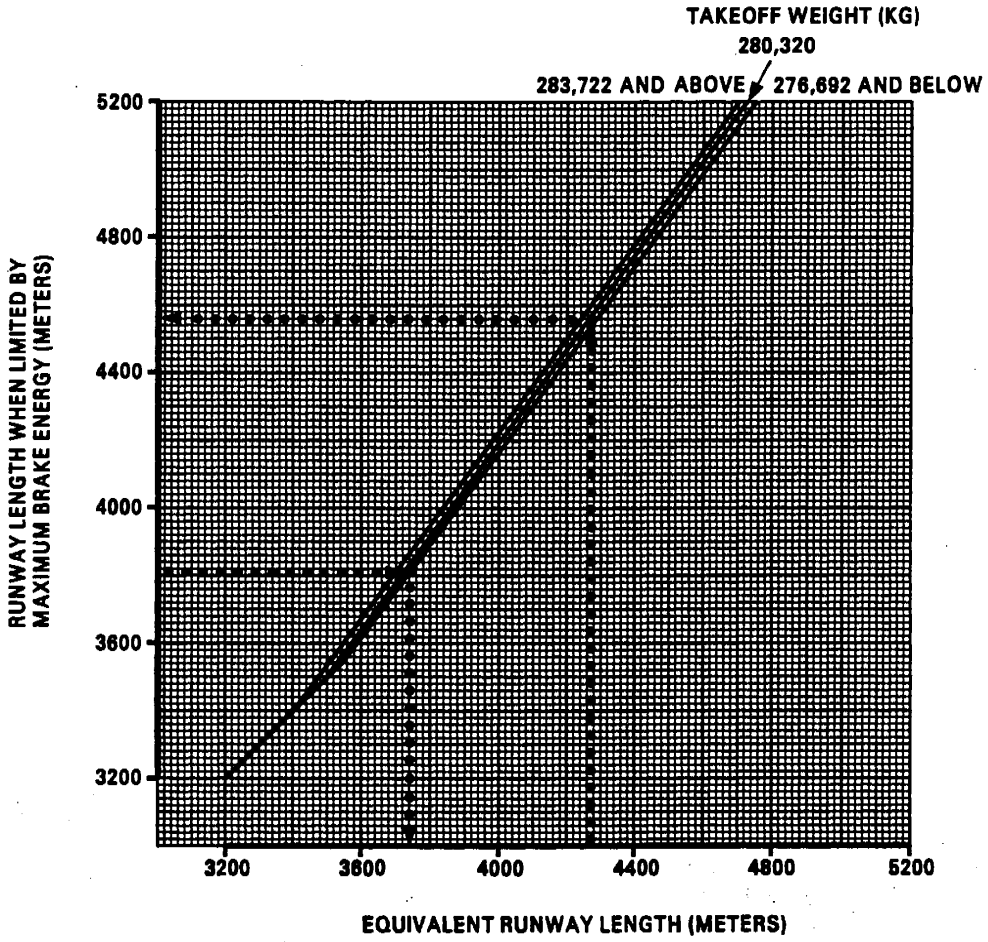
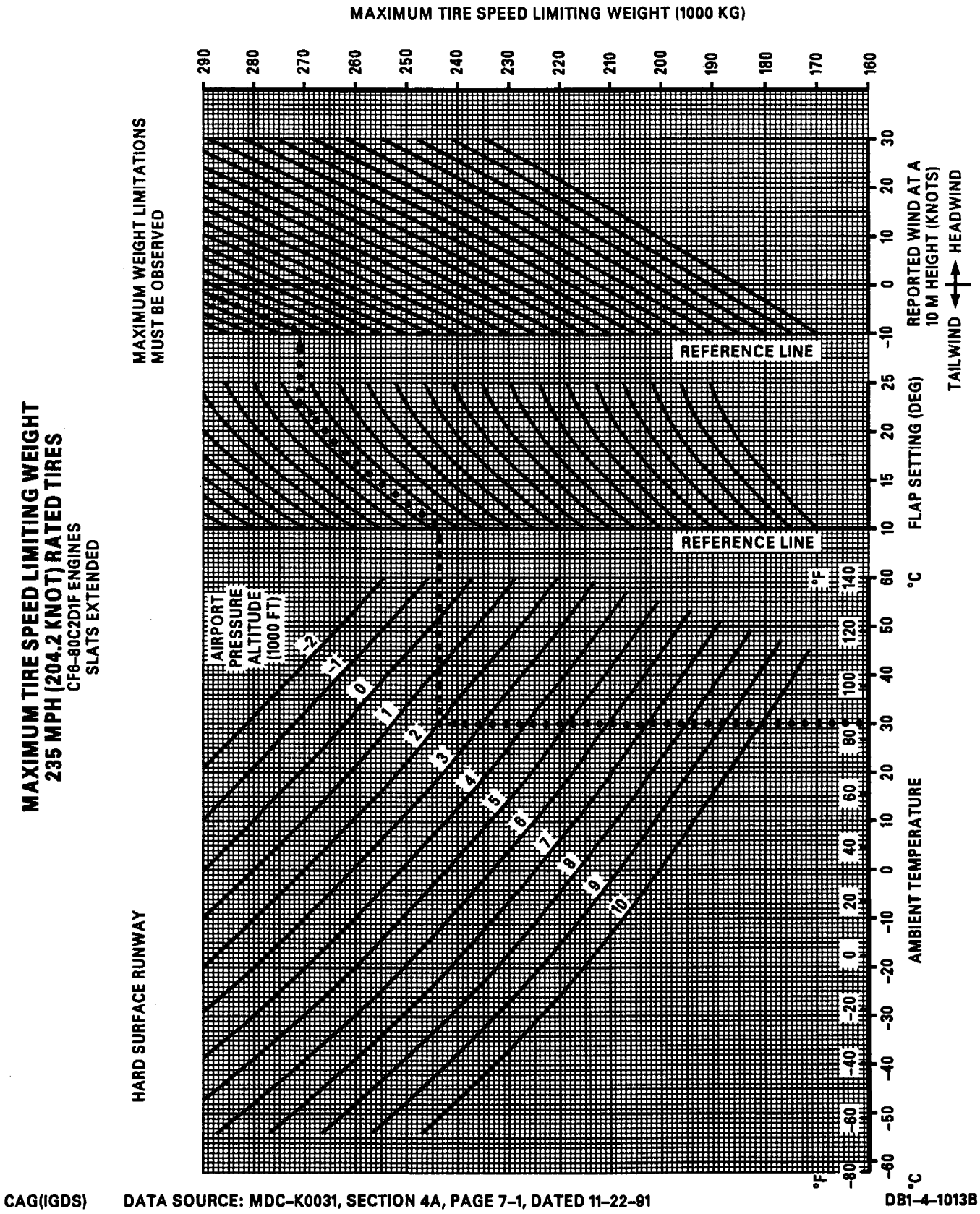
TAKEOFF FIELD LENGTH WHEN LIMITED BY MAXIMUM BRAKE ENERGY

CF6-80C2D1F ENGINES

NOT FOR USE WITH UNBALANCED DATA



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 9-4, DATED 12-6-95 DB1-4-1012B



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 7-1, DATED 11-22-91 DB1-4-1013B

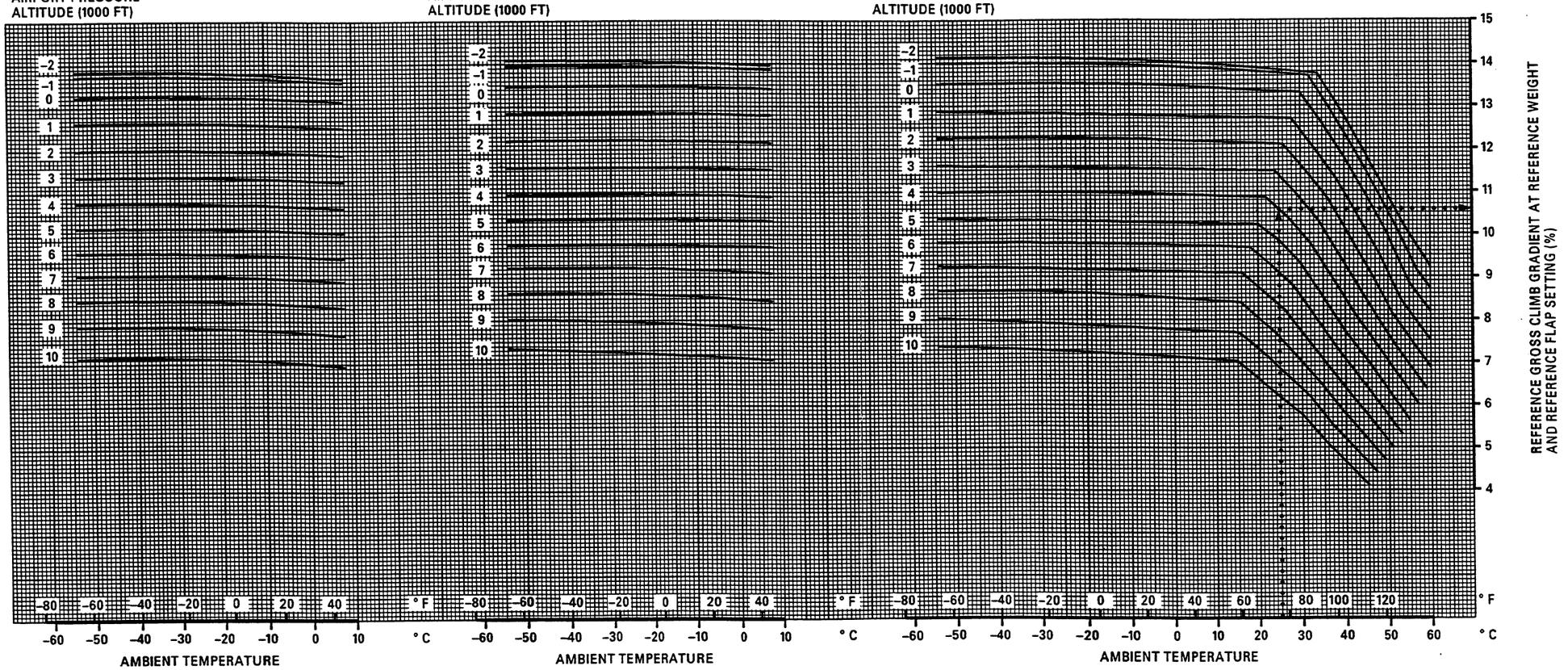
SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

TWO ENGINES OPERATING CF6-80C2D1F ENGINES
TAKEOFF THRUST
GEAR UP $V_{CL} = V_2$
SLATS EXTENDED
ENGINE AIRBLEED FOR AIR CONDITIONING ON

ENGINE AND AIRFRAME ICE PROTECTION ON

ENGINE ICE PROTECTION ON

ICE PROTECTION OFF



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 13-1, DATED 12-13-90

DB1-4-1014

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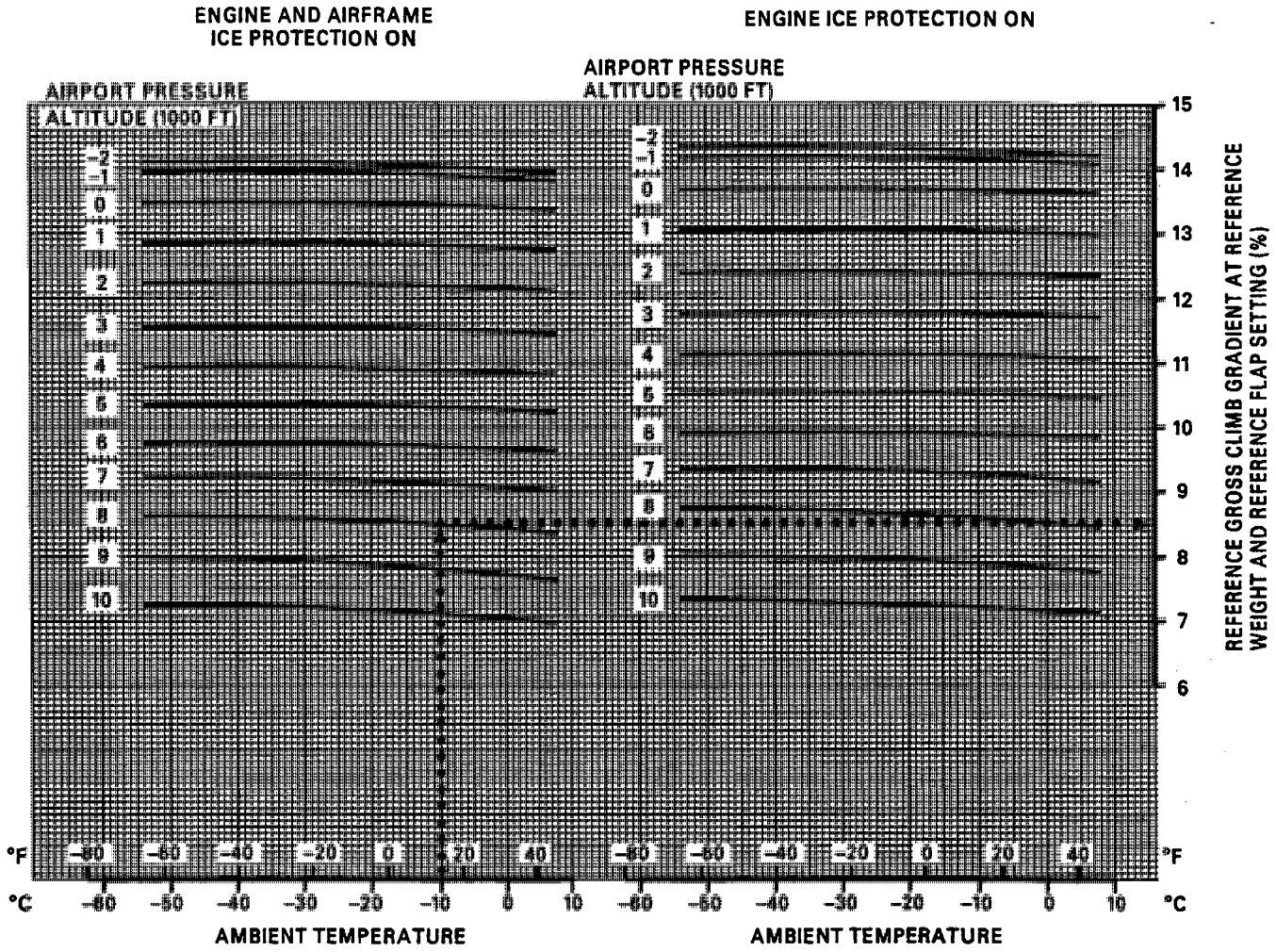
SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

TWO ENGINES OPERATING CF6-80C2DIF ENGINES
TAKEOFF THRUST
GEAR UP $V_{CL} = V_2$
SLATS EXTENDED
ENGINE AIRBLEED FOR AIR CONDITIONING OFF



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 13-2, DATED 12-18-90 DB1-4-1015

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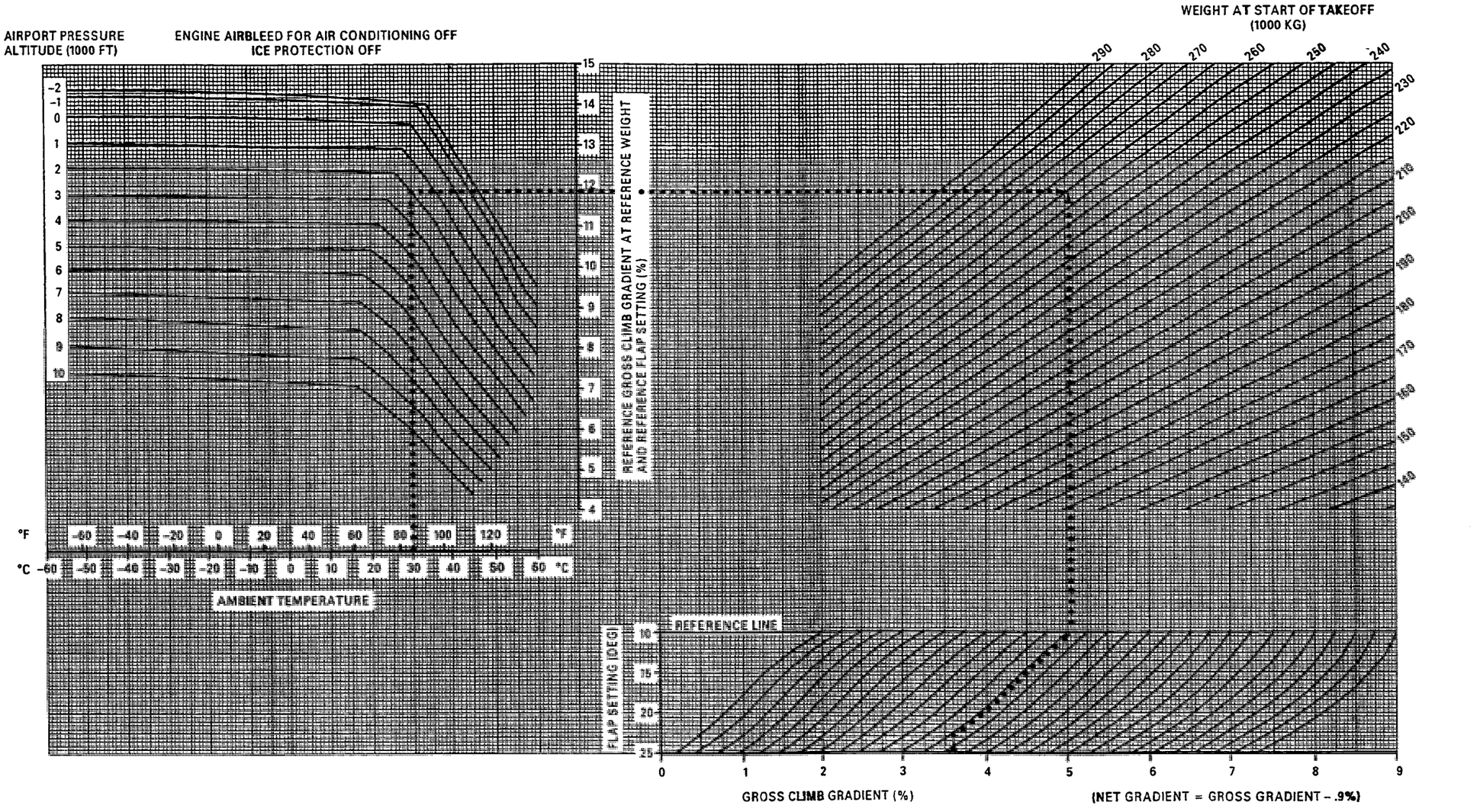
SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

TWO ENGINES OPERATING CF6-80C2D1F ENGINES
TAKEOFF THRUST
GEAR UP $V_{CL} = V_2$
SLATS EXTENDED

NOTE:

REDUCE THE CLIMB GRADIENT OBTAINED FROM THIS CHART BY .03 % PER .01 UPHILL RUNWAY SLOPE.
WHEN ENTERING THE CHART WITH A GRADIENT TO OBTAIN A WEIGHT, INCREASE THE GRADIENT BY .03% PER .01 UPHILL RUNWAY SLOPE BEFORE ENTERING THE CHART.
NO CORRECTION IS NEEDED FOR DOWNHILL RUNWAY SLOPE.



CAG(IGDS) DATA SOURCE: MDC-K0031. SECTION 4A. PAGE 13-3. DATED 1-9-90

DB1-4-1016A

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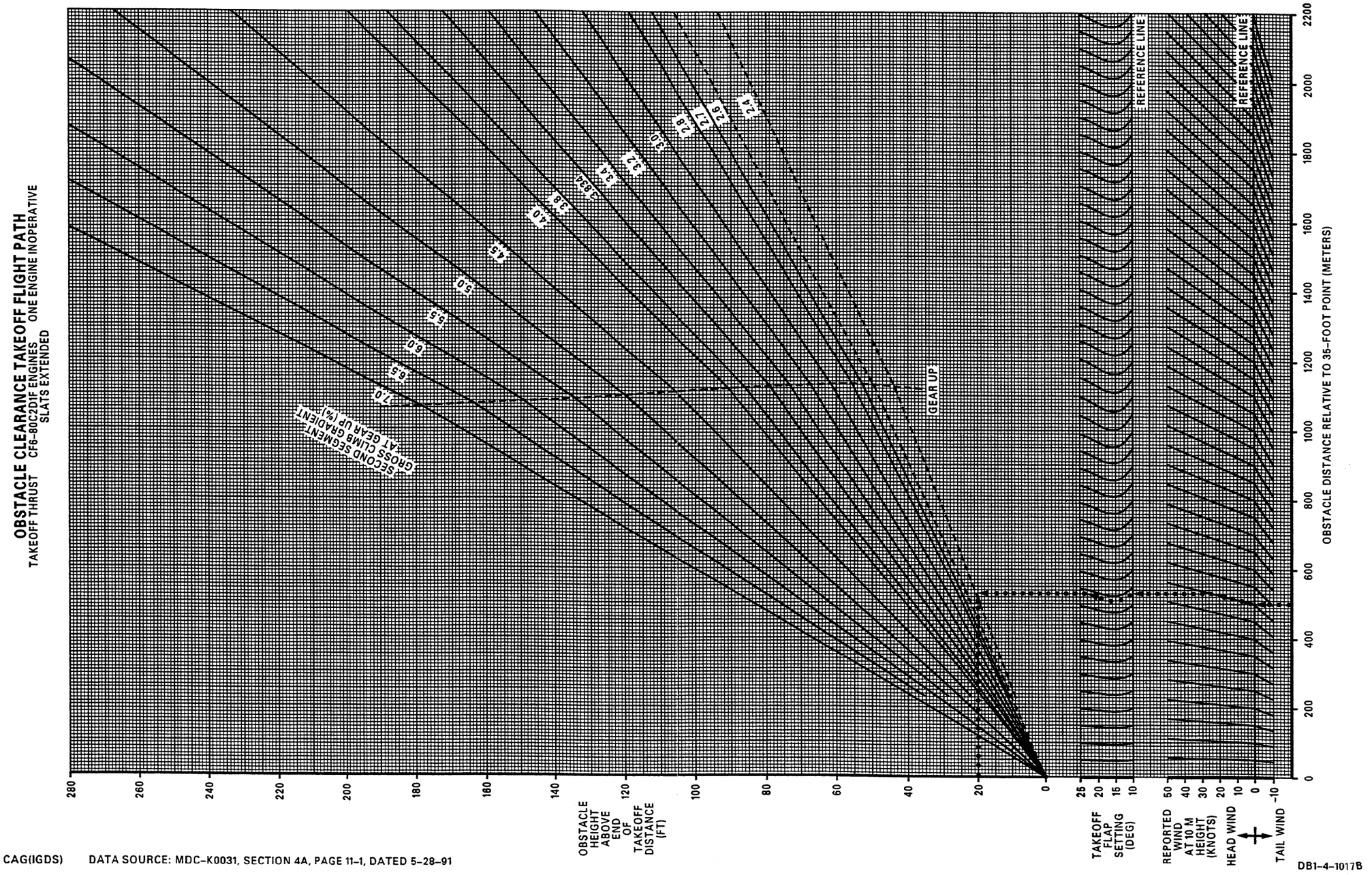

CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 11-1, DATED 5-28-91

DB1-4-1017B

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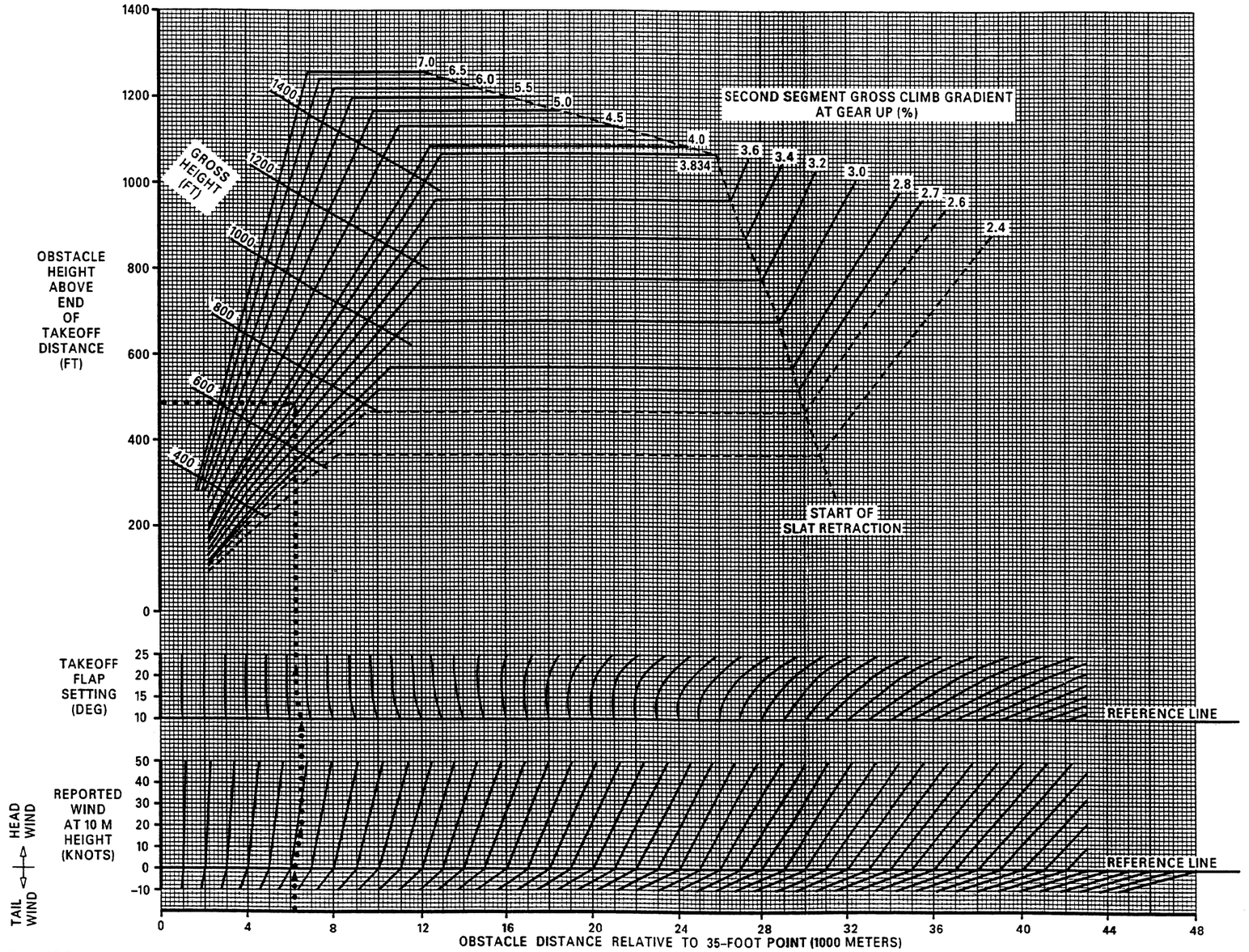
OBSTACLE CLEARANCE TAKEOFF FLIGHT PATH

CF6-80C2DIF ENGINES
TAKEOFF AND MAXIMUM CONTINUOUS THRUST
ONE ENGINE INOPERATIVE



NOTE:
1. BASED ON 5 MINUTES OF TAKEOFF THRUST FOLLOWED BY MAXIMUM CONTINUOUS THRUST.
2. DASHED LINES ARE TO BE USED FOR INTERPOLATION ONLY.

CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 11-2, DATED 5-28-91

DB1-4-1018B

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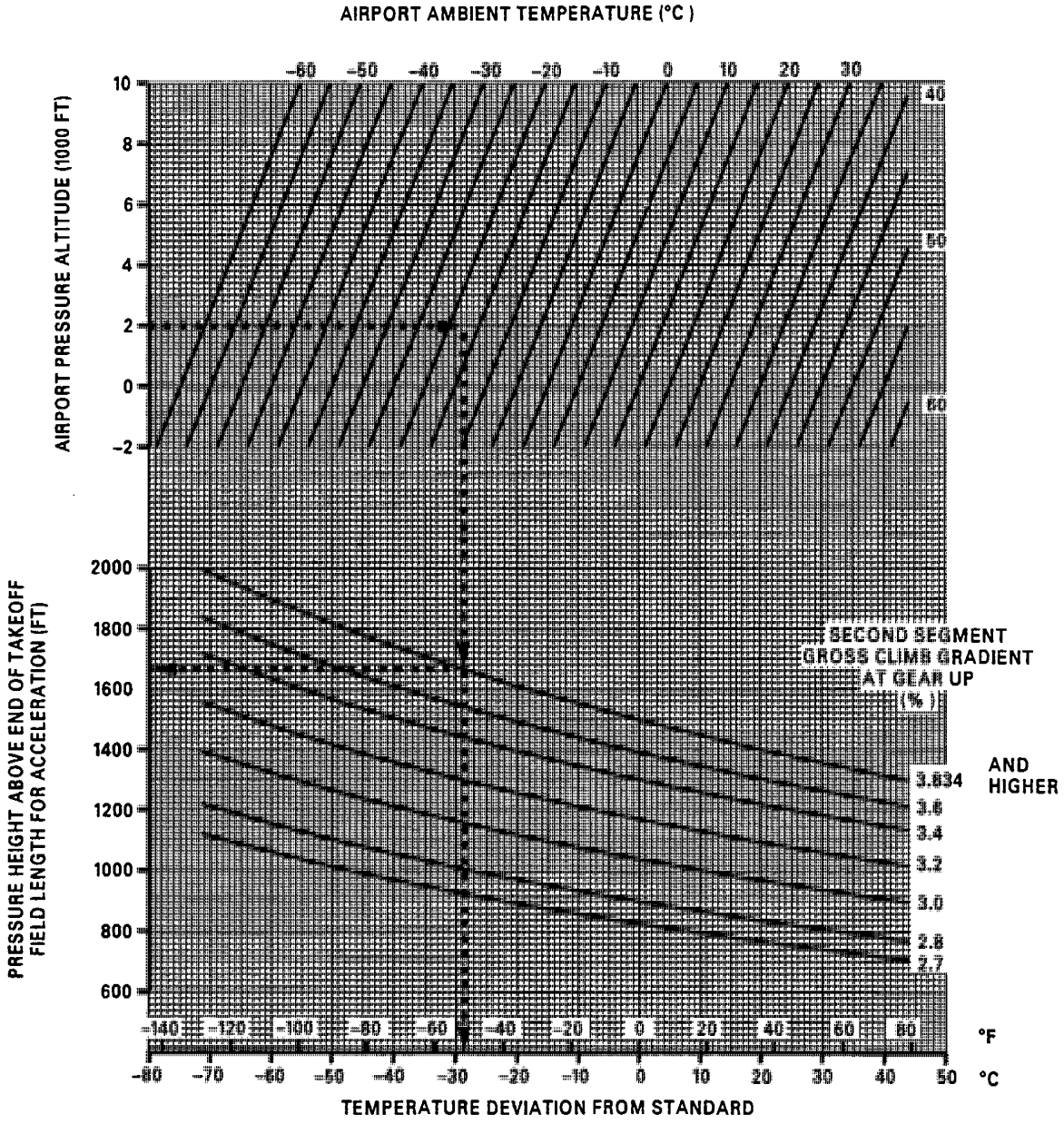
PRESSURE HEIGHT FOR ACCELERATION WITH OBSTACLE CLEARANCE

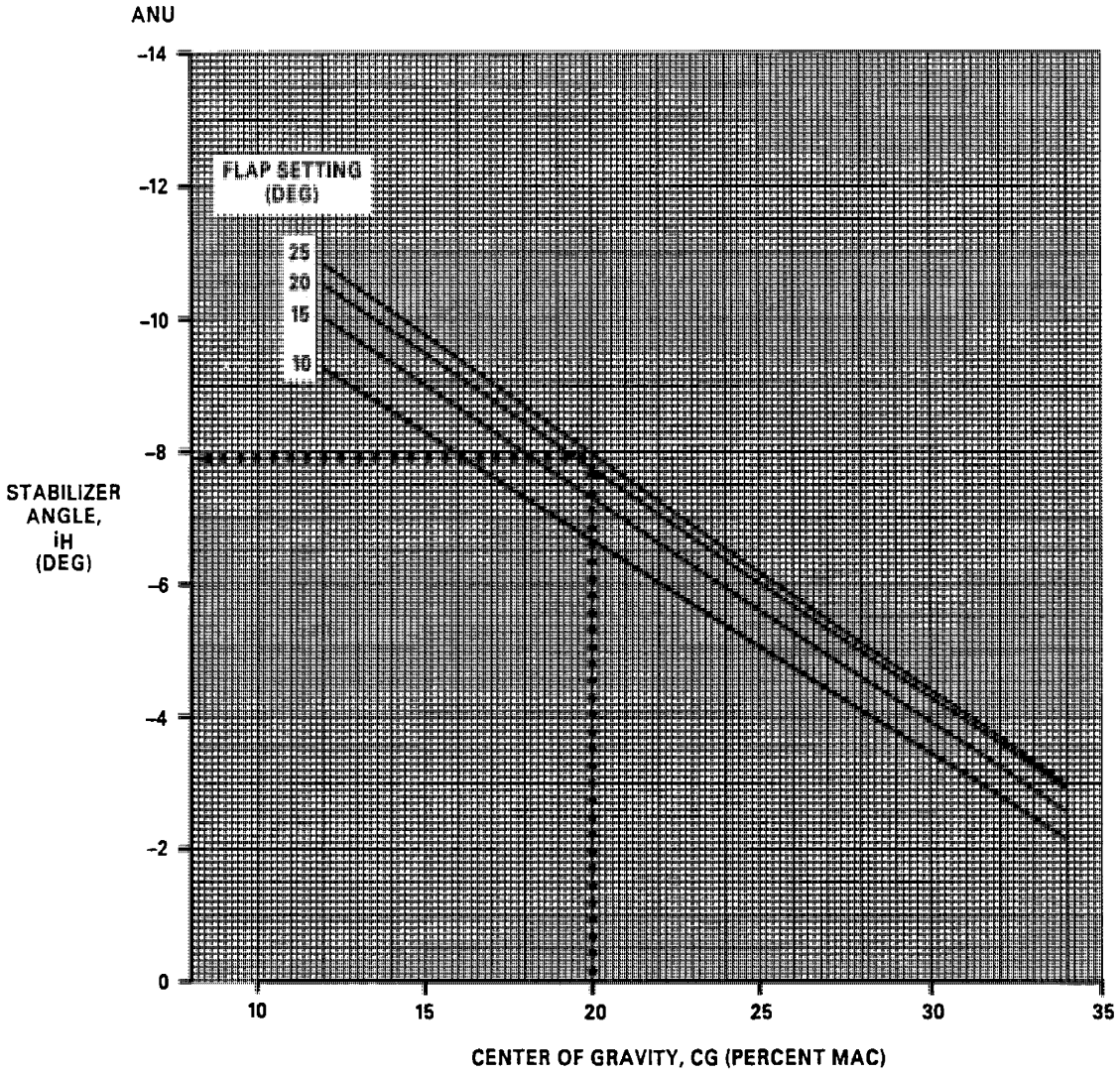
TAKEOFF THRUST SLATS EXTENDED FLAPS 10° TO 25°
CF6-80C2D1F ENGINES

SIMPLIFIED PROCEDURE
AT MINIMUM PRESSURE HEIGHT
FOR ACCELERATION OF 741 FT
AN OBSTACLE HEIGHT OF 336 FT
CAN ALWAYS BE CLEARED



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 12-1, DATED 11-25-96 DB1-4-1022D

STABILIZER SETTING FOR TAKEOFF



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 13-2, DATED 10-22-90 DB1-4-1027A

GROUND AND INFLIGHT TAKEOFF THRUST

% N_1 SETTING
CF6-80C2D1F ENGINES
WITH AC PACKS OFF

VALID FOR AIRSPEEDS < = 300 KCAS

TAMB (°C)	BASE N_1 PRESSURE ALTITUDE (1000 FT)															LIMIT N1
	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
-60	91.67	93.29	94.87	95.62	96.35	97.13	97.88	98.71	99.32	100.11	100.88	101.36	101.82	102.55	103.25	103.73	104.20	100.26
-50	93.64	95.29	96.89	97.65	98.38	99.16	99.91	100.72	101.33	102.16	102.96	103.45	103.92	104.66	105.38	105.87	106.35	102.26
-40	95.58	97.23	98.85	99.62	100.38	101.13	101.87	102.67	103.28	104.14	104.98	105.48	105.95	106.71	107.45	107.95	108.44	104.13
-30	97.44	99.14	100.79	101.56	102.30	103.06	103.80	104.58	105.19	106.09	106.97	107.47	107.95	108.73	109.48	109.99	110.49	106.00
-20	99.28	101.00	102.67	103.45	104.20	104.95	105.68	106.44	107.05	107.98	108.90	109.41	109.90	110.69	111.46	111.98	112.49	107.84
-10	101.07	102.82	104.51	105.29	106.04	106.78	107.50	108.25	108.85	109.82	110.77	111.29	111.79	112.60	113.38	113.90	114.39	109.60
0	102.84	104.61	106.32	107.10	107.85	108.59	109.29	110.02	110.62	111.63	112.61	113.12	113.61	114.41	115.18	115.69	116.18	111.34
10	104.57	106.36	108.09	108.87	109.63	110.36	111.07	111.80	112.41	113.41	114.35	114.86	115.34	115.45	115.40	115.19	115.03	113.03
20	106.28	108.11	109.89	110.69	111.45	112.19	112.90	113.58	113.60	113.68	113.53	113.39	113.20	113.11	112.97	112.98	112.97	114.69
30	108.10	109.94	111.72	111.73	111.69	111.72	111.66	111.63	111.58	111.39	111.21	111.19	111.19	111.09	111.13	111.20	111.27	116.34
40	108.07	108.98	109.83	109.87	109.82	109.64	109.43	109.18	109.19	109.23	109.26	109.42	109.55	109.79	110.00	110.10	110.18	117.50
50	106.51	107.31	107.98	107.80	107.69	107.74	107.85	107.90	107.86	107.96	108.04	108.20	108.34					117.50
60	105.18	105.67	106.15	106.27	106.35	106.47	106.55	106.56	106.53	107.04								117.50

BLEED CORRECTIONS

1 PACK AND/OR AIRFOIL PER ENGINE

BLEED CONFIG.	PRESSURE ALTITUDE (1000 FT)																	
	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
AC LOW	-0.26	-0.28	-0.31	-0.33	-0.36	-0.36	-0.36	-0.36	-0.33	-0.35	-0.37	-0.39	-0.41	-0.42	-0.42	-0.43	-0.43	-0.43
AC HIGH	-0.43	-0.47	-0.51	-0.55	-0.59	-0.60	-0.60	-0.60	-0.55	-0.58	-0.62	-0.65	-0.68	-0.69	-0.70	-0.71	-0.71	-0.72
ENGINE A/I ONLY	-0.60	-0.65	-0.70	-0.75	-0.79	-0.78	-0.76	-0.74	-0.72	-0.74	-0.76	-0.77	-0.79	-0.80	-0.80	-0.80	-0.81	-0.82
ENGINE AND AIRFOIL A/I	-0.96	-1.05	-1.13	-1.22	-1.30	-1.29	-1.27	-1.25	-1.16	-1.22	-1.27	-1.32	-1.37	-1.37	-1.37	-1.37	-1.38	-1.38

DIRECTIONS:

1) Determine base N1 for the given pressure altitude and ambient temperature.
2) Add appropriate bleed corrections for AC and/or anti-ice for the given pressure altitude.
NOTE: An EAI "free bleed region" exists for ground takeoff power settings:
No ΔN1 correction for EAI at or below 10,000 ft. altitude with ambient temperature less than 7.8° C.
3) Compare resulting N1 versus the Limit N1 for the given ambient temperature. Select the lesser N1.

CAG(IGDS)

DB1-4-1137B

MAXIMUM CONTINUOUS THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

MACH NO.	TAT (°C)	BASE N_1 PRESSURE ALTITUDE (1000 FT) 0	5	10	15	20	25	31	35	39	43	LIMIT N_1
	-60	88.91	92.59	97.64	100.58							100.26
	-50	90.86	94.59	99.66	102.59							102.26
	-40	92.78	96.54	101.62	104.52							104.13
	-30	94.67	98.45	103.54	106.40							106.00
	-20	96.52	100.32	105.41	108.23							107.84
	-10	98.34	102.15	107.24	110.01							109.60
.30	0	100.12	103.94	109.02	111.82							111.34
	10	101.88	105.70	110.91	110.03							113.03
	20	103.60	107.55	108.99	108.19							114.69
	30	105.45	105.91	107.23	106.59							116.34
	40	104.17	104.44	105.44	108.02							117.50
	50	102.89	103.35	106.77	109.61							117.50
	60	101.90	104.63	108.28	111.17							117.50
	-60	88.29	91.75	96.50	101.06	102.80						100.26
	-50	90.21	93.76	98.53	103.06	104.91						102.26
	-40	92.12	95.69	100.48	104.99	106.93						104.13
	-30	94.00	97.58	102.38	106.85	108.90						106.00
	-20	95.84	99.45	104.24	108.68	110.83						107.84
	-10	97.65	101.26	106.06	110.46	112.75						109.60
.40	0	99.41	103.04	107.83	112.22	112.27						111.34
	10	101.16	104.79	109.66	111.76	111.11						113.03
	20	102.87	106.58	109.02	110.02	109.31						114.69
	30	104.64	106.31	107.57	108.13	108.69						116.34
	40	104.69	104.74	105.45	108.41	110.32						117.50
	50	103.34	103.46	105.57	109.99	111.92						117.50
	60	102.19	103.73	107.07	111.54							117.50
	-60	87.51	90.83	95.50	98.76	100.02	101.85					100.26
	-50	89.41	92.82	97.52	100.75	102.11	103.90					102.26
	-40	91.29	94.74	99.46	102.67	104.12	105.87					104.13
	-30	93.14	96.62	101.34	104.52	106.08	107.78					106.00
	-20	94.97	98.46	103.19	106.34	107.99	109.67					107.84
	-10	96.76	100.27	105.00	108.11	109.88	110.62					109.60
.50	0	98.51	102.03	106.75	109.83	111.10	108.90					111.34
	10	100.24	103.76	108.50	111.11	109.70	107.70					113.03
	20	101.93	105.48	109.95	109.36	108.27	106.85					114.69
	30	103.61	107.09	108.09	107.55	106.17	108.45					116.34
	40	105.37	105.41	106.34	106.05	107.73	110.02					117.50
	50	104.02	104.00	104.64	107.56	109.27	111.57					117.50
	60	102.78	102.94	105.96	109.10	110.78	113.10					117.50

AC ON (1 PACK PER ENGINE, LOW FLOW)

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N_1 PRESSURE ALTITUDE (1000 FT) 0	5	10	15	20	25	31	35	39	43
ENGINE A/I ONLY	-0.63	-0.67	-0.70	-0.73	-0.78	-0.85	-0.77	-0.73	-0.78	-0.86
ENGINE & AIRFOIL A/I	-0.99	-1.08	-1.16	-1.23	-1.37	-1.52	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1. DETERMINE BASE N_1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2. ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.
3. COMPARE RESULTING N_1 VERSUS THE LIMIT N_1 FOR THE GIVEN TAT. SELECT THE LESSER N_1.

MAXIMUM CONTINUOUS THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

MACH NO.	TAT (°C)	BASE N_1 PRESSURE ALTITUDE (1000 FT)										LIMIT N_1
		0	5	10	15	20	25	31	35	39	43	
	-60		89.50	93.74	96.91	99.08	99.47					100.26
	-50		91.45	95.72	98.87	101.13	101.48					102.26
	-40		93.36	97.65	100.79	103.14	103.45					104.13
	-30		95.22	99.53	102.64	105.08	105.35					106.00
	-20		97.04	101.35	104.43	106.97	107.20					107.84
	-10		98.83	103.15	106.19	108.83	109.04					109.60
.60	0		100.58	104.90	107.90	110.68	108.19					111.34
	10		102.29	106.60	109.60	110.29	106.84					113.03
	20		103.99	108.36	109.39	109.23	105.77					114.69
	30		105.69	108.13	107.74	107.59	105.98					116.34
	40		105.97	106.71	105.91	106.38	107.53					117.50
	50		104.42	104.76	105.55	107.95	109.06					117.50
	60		103.13	104.07	107.08	109.50	110.57					117.50
	-60				94.16	96.72	96.77	101.58	101.07	100.95	101.84	100.26
	-50				96.08	98.73	98.73	103.54	103.05	102.92	103.79	102.26
	-40				97.99	100.73	100.69	105.49	105.01	104.88	105.73	104.13
	-30				99.82	102.66	102.57	107.35	106.89	106.73	107.57	106.00
	-20				101.60	104.53	104.40	109.19	108.55	108.30	107.91	107.84
	-10				103.34	106.36	106.21	109.74	107.38	106.21	105.61	109.60
.70	0				105.04	108.16	107.92	107.85	104.99	103.88	103.49	111.34
	10				106.69	109.97	106.06	105.98	103.28	102.98	102.65	113.03
	20				108.36	108.66	104.84	104.79	104.65	104.62	104.29	114.69
	30				107.18	107.47	103.83	106.41	106.26	106.23	105.90	116.34
	40				105.51	105.58	104.69	107.99	107.84	107.82	107.49	117.50
	50				103.77	105.44	106.21	109.55	109.40	109.37	109.04	117.50
	60				104.12	106.97	107.70					117.50
	-60					94.10	93.53	98.32	97.84	97.68	98.47	100.26
	-50					96.09	95.48	100.27	99.80	99.64	100.41	102.26
	-40					98.04	97.38	102.17	101.72	101.55	102.31	104.13
	-30					99.97	99.27	104.04	103.61	103.44	104.17	106.00
	-20					101.83	101.09	105.84	105.40	105.20	105.93	107.84
	-10					103.64	102.86	107.64	106.82	105.90	105.07	109.60
.80	0					105.41	104.61	107.05	104.61	103.41	102.73	111.34
	10					107.17	105.26	105.28	102.34	101.19	100.75	113.03
	20					108.37	103.68	103.45	101.30	101.23	100.79	114.69
	30					107.02	102.55	103.00	102.89	102.82	102.38	116.34
	40					105.75	101.59	104.56	104.45	104.39	103.95	117.50
	50					103.70	102.81	106.10	105.99	105.92	105.48	117.50
	60					104.17	104.29	107.61	107.50	107.43	106.99	117.50

AC ON (1 PACK PER ENGINE, LOW FLOW)

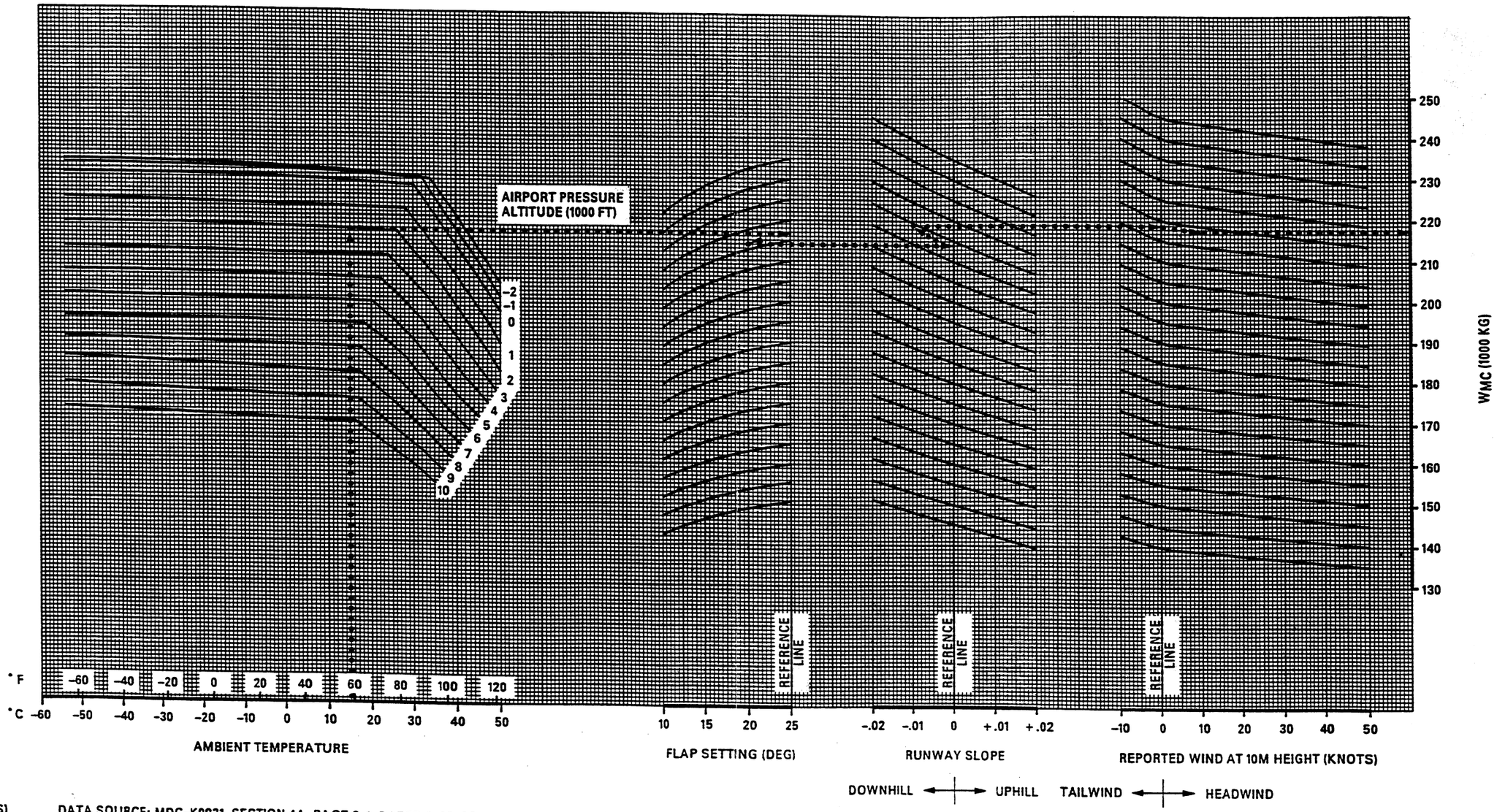
ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N_1 PRESSURE ALTITUDE (1000 FT)									
	0	5	10	15	20	25	31	35	39	43
ENGINE A/I ONLY	-0.63	-0.67	-0.70	-0.73	-0.78	-0.85	-0.77	-0.73	-0.78	-0.86
ENGINE & AIRFOIL A/I	-0.99	-1.08	-1.16	-1.23	-1.37	-1.52	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1. DETERMINE BASE N_1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2. ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.
3. COMPARE RESULTING N_1 VERSUS THE LIMIT N_1 FOR THE GIVEN TAT. SELECT THE LESSER N_1.

INTENTIONALLY BLANK

W_{MC}
MAXIMUM WEIGHT AT WHICH MINIMUM CONTROL SPEEDS AFFECT TAKEOFF SPEEDS AND TAKEOFF FIELD LENGTHS
CF6–80C2D1F ENGINES
APPLICABLE FOR ALL ENGINE BLEEDS
SLATS EXTENDED



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 8-1, DATED 2-22-92

DB1-4-1023B

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(Back of 11 x 16 Page)

REDUCED THRUST TAKEOFF N_1 SETTINGS
-1000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	91.2	93.0	94.7	96.4	98.1	98.5	98.8	99.1	99.4	99.8	100.1	100.4	100.7	101.1	101.4
	58	91.7	93.5	95.3	97.0	98.7	99.0	99.3	99.6	100.0	100.3	100.6	100.9	101.3	101.6	101.9
	56	92.3	94.1	95.9	97.6	99.2	99.6	99.9	100.2	100.6	100.9	101.2	101.5	101.9	102.2	102.5
15%	54	92.9	94.7	96.5	98.2	99.9	100.2	100.6	100.9	101.2	101.6	101.9	102.2	102.5	102.9	103.2
	52	93.6	95.4	97.1	98.9	100.6	100.9	101.2	101.6	101.9	102.2	102.5	102.9	103.2	103.5	103.8
	50	94.2	96.0	97.8	99.5	101.2	101.5	101.9	102.2	102.5	102.9	103.2	103.5	103.8	104.2	104.5
10%	48	94.8	96.6	98.4	100.1	101.8	102.2	102.5	102.8	103.2	103.5	103.8	104.2	104.5	104.8	105.1
	46	95.4	97.2	99.0	100.8	102.5	102.8	103.1	103.5	103.8	104.1	104.5	104.8	105.1	105.4	105.8
	44	96.0	97.9	99.6	101.4	103.1	103.4	103.8	104.1	104.4	104.8	105.1	105.4	105.8	106.1	106.4
5%	42	96.7	98.5	100.3	102.0	103.7	104.1	104.4	104.7	105.1	105.4	105.7	106.1	106.4	106.7	107.1
	40	97.3	99.2	100.9	102.7	104.4	104.7	105.1	105.4	105.7	106.1	106.4	106.7	107.1	107.4	107.7
	38	98.0	99.8	101.6	103.3	105.1	105.4	105.7	106.1	106.4	106.7	107.1	107.4	107.7	108.1	108.4
	36	98.6	100.5	102.3	104.0	105.7	106.1	106.4	106.7	107.1	107.4	107.7	108.1	108.4	108.7	109.1
	34	99.1	101.0	102.8	104.6	106.4	106.7	107.0	107.4	107.7	108.1	108.4	108.7	109.0	109.4	109.7
0%	32	99.1	101.0	102.8	104.6	106.4	106.7	107.0	107.4	107.7	108.1	108.5	108.8	109.2	109.6	109.9

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	101.7	102.0	102.3	102.6	103.0	103.3	103.6	103.9	104.2	104.5	104.8	105.1	105.4	105.7	105.7
	58	102.2	102.6	102.9	103.2	103.5	103.8	104.1	104.4	104.8	105.1	105.4	105.7	106.0	105.9	
	56	102.8	103.2	103.5	103.8	104.1	104.4	104.7	105.1	105.4	105.7	106.0	106.3	106.2		
15%	54	103.5	103.8	104.1	104.5	104.8	105.1	105.4	105.7	106.0	106.4	106.7	106.6			
	52	104.2	104.5	104.8	105.1	105.4	105.8	106.1	106.4	106.7	107.0	107.0				
	50	104.8	105.1	105.5	105.8	106.1	106.4	106.7	107.1	107.4	107.3					
10%	48	105.5	105.8	106.1	106.4	106.7	107.1	107.4	107.7	107.6						
	46	106.1	106.4	106.7	107.1	107.4	107.7	108.0	108.0							
	44	106.7	107.1	107.4	107.7	108.0	108.4	108.3								
5%	42	107.4	107.7	108.0	108.4	108.7	108.6									
	40	108.1	108.4	108.7	109.0	109.0										
	38	108.7	109.1	109.4	109.3											
	36	109.4	109.7	109.7												
	34	110.0	110.0													
0%	32	110.3														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.2%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.5%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-187

REDUCED THRUST TAKEOFF N_1 SETTINGS

0 FOOT PRESSURE ALTITUDE

-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	91.8	93.6	95.3	97.0	98.7	99.1	99.4	99.7	100.0	100.4	100.7	101.0	101.3	101.7	102.0
	58	92.3	94.1	95.9	97.6	99.2	99.6	99.9	100.2	100.6	100.9	101.2	101.5	101.9	102.2	102.5
	56	92.8	94.6	96.4	98.1	99.8	100.1	100.4	100.8	101.1	101.4	101.8	102.1	102.4	102.7	103.1
15%	54	93.5	95.3	97.0	98.7	100.4	100.8	101.1	101.4	101.8	102.1	102.4	102.7	103.1	103.4	103.7
	52	94.2	96.0	97.8	99.5	101.2	101.5	101.9	102.2	102.5	102.9	103.2	103.5	103.9	104.2	104.5
	50	95.0	96.8	98.6	100.3	102.0	102.3	102.7	103.0	103.3	103.7	104.0	104.3	104.6	105.0	105.3
10%	48	95.6	97.5	99.2	101.0	102.7	103.0	103.3	103.7	104.0	104.3	104.7	105.0	105.3	105.7	106.0
	46	96.3	98.1	99.9	101.6	103.3	103.7	104.0	104.4	104.7	105.0	105.4	105.7	106.0	106.3	106.7
	44	97.0	98.8	100.6	102.3	104.0	104.4	104.7	105.0	105.4	105.7	106.0	106.4	106.7	107.0	107.4
	42	97.6	99.5	101.2	103.0	104.7	105.0	105.4	105.7	106.1	106.4	106.7	107.1	107.4	107.7	108.0
5%	40	98.3	100.1	101.8	103.7	105.4	105.7	106.1	106.4	106.7	107.1	107.4	107.7	108.1	108.4	108.7
	38	99.0	100.8	102.6	104.3	106.1	106.4	106.7	107.1	107.4	107.7	108.1	108.4	108.7	109.1	109.4
	36	99.6	101.5	103.3	105.0	106.7	107.1	107.4	107.7	108.1	108.4	108.7	109.1	109.4	109.7	110.1
	34	100.3	102.2	104.0	105.7	107.4	107.8	108.1	108.5	108.8	109.1	109.5	109.8	110.1	110.4	110.8
	32	100.8	102.7	104.5	106.3	108.1	108.4	108.8	109.1	109.5	109.9	110.2	110.5	110.9	111.2	111.5
0%	30	100.8	102.7	104.5	106.3	108.1	108.4	108.8	109.1	109.5	109.9	110.3	110.6	111.0	111.4	111.7

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	102.3	102.6	102.9	103.3	103.6	103.9	104.2	104.5	104.8	105.1	105.4	105.7	106.1	106.4	106.1
	58	102.8	103.2	103.5	103.8	104.1	104.4	104.7	105.1	105.4	105.7	106.0	106.3	106.6	106.4	
15%	56	103.4	103.7	104.0	104.3	104.6	105.0	105.3	105.6	105.9	106.2	106.5	106.8	106.6		
	54	104.0	104.4	104.7	105.0	105.3	105.6	105.9	106.3	106.6	106.9	107.2	107.0			
	52	104.8	105.2	105.5	105.8	106.1	106.4	106.8	107.1	107.4	107.7	107.5				
10%	50	105.6	105.9	106.3	106.6	106.9	107.2	107.5	107.9	108.2	108.0					
	48	106.3	106.6	107.0	107.3	107.6	107.9	108.2	108.6	108.4						
	46	107.0	107.3	107.6	108.0	108.3	108.6	108.9	108.7							
	44	107.7	108.0	108.3	108.7	109.0	109.3	109.1								
5%	42	108.4	108.7	109.0	109.3	109.7	109.5									
	40	109.0	109.4	109.7	110.0	109.8										
	38	109.7	110.1	110.4	110.2											
	36	110.4	110.7	110.5												
	34	111.1	110.9													
0%	32	111.3														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.2%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.5%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-188

REDUCED THRUST TAKEOFF N_1 SETTINGS
1000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	91.9	93.7	95.5	97.2	98.8	99.2	99.5	99.8	100.2	100.5	100.8	101.1	101.5	101.8	102.1
	58	92.5	94.2	96.0	97.7	99.4	99.7	100.0	100.4	100.7	101.0	101.4	101.7	102.0	102.3	102.7
	56	93.0	94.8	96.5	98.2	99.9	100.2	100.6	100.9	101.2	101.6	101.9	102.2	102.5	102.9	103.2
	54	93.5	95.3	97.0	98.8	100.4	100.8	101.1	101.4	101.8	102.1	102.4	102.8	103.1	103.4	103.7
15%	52	94.1	95.9	97.7	99.4	101.1	101.4	101.8	102.1	102.4	102.8	103.1	103.4	103.7	104.1	104.4
	50	94.8	96.6	98.4	100.1	101.8	102.2	102.5	102.8	103.2	103.5	103.8	104.2	104.5	104.8	105.1
	48	95.5	97.4	99.1	100.9	102.6	102.9	103.2	103.6	103.9	104.2	104.6	104.9	105.2	105.6	105.9
10%	46	96.2	98.1	99.8	101.6	103.3	103.6	104.0	104.3	104.6	105.0	105.3	105.6	106.0	106.3	106.6
	44	96.9	98.8	100.5	102.3	104.0	104.3	104.7	105.0	105.4	105.7	106.0	106.3	106.7	107.0	107.3
	42	97.7	99.5	101.3	103.0	104.7	105.1	105.4	105.7	106.1	106.4	106.7	107.1	107.4	107.7	108.1
5%	40	98.4	100.2	102.0	103.7	105.4	105.8	106.1	106.5	106.8	107.1	107.5	107.8	108.1	108.4	108.8
	38	99.1	100.9	102.7	104.4	106.2	106.5	106.8	107.2	107.5	107.8	108.2	108.5	108.8	109.2	109.5
	36	99.7	101.6	103.3	105.1	106.8	107.2	107.5	107.8	108.2	108.5	108.8	109.2	109.5	109.8	110.2
	34	100.4	102.2	104.0	105.8	107.5	107.8	108.2	108.5	108.8	109.2	109.5	109.8	110.2	110.5	110.8
	32	101.1	102.9	104.7	106.5	108.2	108.5	108.9	109.2	109.5	109.9	110.2	110.5	110.9	111.2	111.5
	30	101.6	103.4	105.3	107.1	108.9	109.2	109.6	109.9	110.3	110.6	110.9	111.3	111.6	111.9	111.7
0%	28	101.6	103.4	105.3	107.1	108.9	109.2	109.6	109.9	110.3	110.7	111.1	111.4	111.8	112.1	

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	102.4	102.7	103.1	103.4	103.7	104.0	104.3	104.6	104.9	105.3	105.6	105.9	106.2	106.5	106.3
	58	103.0	103.3	103.6	103.9	104.2	104.6	104.9	105.2	105.5	105.8	106.1	106.4	106.7	106.5	
15%	56	103.5	103.8	104.2	104.5	104.8	105.1	105.4	105.7	106.1	106.4	106.7	107.0	106.8		
	54	104.1	104.4	104.7	105.0	105.3	105.7	106.0	106.3	106.6	106.9	107.2	107.0			
	52	104.7	105.0	105.4	105.7	106.0	106.3	106.6	106.9	107.3	107.6	107.4				
	50	105.5	105.8	106.1	106.4	106.7	107.1	107.4	107.7	108.0	107.8					
10%	48	106.2	106.5	106.9	107.2	107.5	107.8	108.1	108.5	108.2						
	46	106.9	107.3	107.6	107.9	108.2	108.5	108.9	108.7							
	44	107.7	108.0	108.3	108.6	109.0	109.3	109.1								
5%	42	108.4	108.7	109.0	109.4	109.7	109.5									
	40	109.1	109.4	109.8	110.1	109.9										
	38	109.8	110.1	110.5	110.3											
	36	110.5	110.8	110.6												
	34	111.1	110.9													
0%	32	111.3														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.2%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.5%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-189

REDUCED THRUST TAKEOFF N_1 SETTINGS
2000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	92.0	93.8	95.6	97.3	98.9	99.3	99.6	99.9	100.3	100.6	100.9	101.2	101.6	101.9	102.2
	58	92.5	94.3	96.1	97.8	99.5	99.8	100.1	100.5	100.8	101.1	101.5	101.8	102.1	102.4	102.8
	56	93.1	94.9	96.6	98.3	100.0	100.4	100.7	101.0	101.3	101.7	102.0	102.3	102.7	103.0	103.3
	54	93.6	95.4	97.1	98.9	100.6	100.9	101.2	101.6	101.9	102.2	102.5	102.9	103.2	103.5	103.9
15%	52	94.1	95.9	97.7	99.4	101.1	101.4	101.8	102.1	102.4	102.8	103.1	103.4	103.8	104.1	104.4
	50	94.7	96.5	98.3	100.0	101.7	102.1	102.4	102.7	103.1	103.4	103.7	104.1	104.4	104.7	105.0
	48	95.4	97.2	99.0	100.7	102.4	102.8	103.1	103.4	103.8	104.1	104.4	104.8	105.1	105.4	105.7
	46	96.1	97.9	99.7	101.4	103.1	103.5	103.8	104.1	104.5	104.8	105.1	105.5	105.8	106.1	106.5
10%	44	96.8	98.7	100.4	102.2	103.9	104.2	104.6	104.9	105.2	105.6	105.9	106.2	106.6	106.9	107.2
	42	97.6	99.4	101.2	102.9	104.6	105.0	105.3	105.7	106.0	106.3	106.7	107.0	107.3	107.6	108.0
	40	98.3	100.1	101.9	103.7	105.4	105.7	106.1	106.4	106.7	107.1	107.4	107.7	108.1	108.4	108.7
5%	38	99.1	100.9	102.7	104.4	106.1	106.5	106.8	107.2	107.5	107.8	108.2	108.5	108.8	109.2	109.5
	36	99.8	101.6	103.4	105.2	106.9	107.2	107.6	107.9	108.2	108.6	108.9	109.2	109.6	109.9	110.2
	34	100.5	102.3	104.1	105.8	107.5	107.9	108.2	108.6	108.9	109.2	109.6	109.9	110.2	110.6	110.9
	32	101.1	102.9	104.7	106.5	108.2	108.5	108.9	109.2	109.5	109.9	110.2	110.5	110.9	111.2	111.5
	30	101.8	103.6	105.4	107.2	108.9	109.2	109.6	109.9	110.3	110.6	110.9	111.3	111.6	111.9	111.7
	28	102.3	104.2	106.0	107.9	109.6	110.0	110.3	110.7	111.0	111.3	111.7	112.0	112.3	112.1	
0%	26	102.3	104.2	106.0	107.9	109.6	110.0	110.4	110.7	111.1	111.5	111.8	112.2	112.5		

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	102.5	102.8	103.2	103.5	103.8	104.1	104.4	104.7	105.0	105.4	105.7	106.0	106.3	106.6	106.4
	58	103.1	103.4	103.7	104.0	104.3	104.7	105.0	105.3	105.6	105.9	106.2	106.5	106.8	106.6	
15%	56	103.6	103.9	104.3	104.6	104.9	105.2	105.5	105.8	106.2	106.5	106.8	107.1	106.8		
	54	104.2	104.5	104.8	105.1	105.5	105.8	106.1	106.4	106.7	107.0	107.3	107.1			
	52	104.7	105.0	105.4	105.7	106.0	106.3	106.6	107.0	107.3	107.6	107.4				
	50	105.4	105.7	106.0	106.3	106.6	107.0	107.3	107.6	107.9	107.7					
10%	48	106.1	106.4	106.7	107.0	107.4	107.7	108.0	108.3	108.1						
	46	106.8	107.1	107.4	107.8	108.1	108.4	108.7	108.5							
	44	107.5	107.9	108.2	108.5	108.8	109.2	108.9								
5%	42	108.3	108.6	109.0	109.3	109.6	109.4									
	40	109.1	109.4	109.7	110.0	109.8										
	38	109.8	110.1	110.5	110.2											
	36	110.6	110.9	110.7												
	34	111.2	111.6													
0%	32	111.3														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.3%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.6%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-190

REDUCED THRUST TAKEOFF N_1 SETTINGS
3000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	92.2	94.0	95.8	97.5	99.1	99.5	99.8	100.1	100.5	100.8	101.1	101.4	101.8	102.1	102.4
	58	92.8	94.5	96.3	98.0	99.7	100.0	100.4	100.7	101.0	101.3	101.7	102.0	102.3	102.6	103.0
	56	93.3	95.1	96.8	98.6	100.2	100.6	100.9	101.2	101.6	101.9	102.2	102.6	102.9	103.2	103.5
	54	93.8	95.6	97.4	99.1	100.8	101.1	101.5	101.8	102.1	102.5	102.8	103.1	103.4	103.8	104.1
	52	94.3	96.1	97.9	99.6	101.3	101.7	102.0	102.3	102.7	103.0	103.3	103.7	104.0	104.3	104.6
15%	50	94.9	96.7	98.5	100.2	101.9	102.2	102.6	102.9	103.2	103.6	103.9	104.2	104.5	104.9	105.2
	48	95.5	97.3	99.0	100.8	102.5	102.8	103.2	103.5	103.8	104.2	104.5	104.8	105.1	105.5	105.8
	46	96.1	97.9	99.7	101.4	103.1	103.5	103.8	104.1	104.5	104.8	105.1	105.5	105.8	106.1	106.5
10%	44	96.7	98.6	100.3	102.1	103.8	104.1	104.5	104.8	105.1	105.5	105.8	106.1	106.5	106.8	107.1
	42	97.5	99.3	101.1	102.9	104.6	104.9	105.2	105.6	105.9	106.2	106.6	106.9	107.2	107.6	107.9
	40	98.3	100.1	101.9	103.6	105.3	105.7	106.0	106.3	106.7	107.0	107.3	107.7	108.0	108.3	108.7
	38	99.0	100.8	102.6	104.4	106.1	106.4	106.8	107.1	107.4	107.8	108.1	108.4	108.8	109.1	109.4
5%	36	99.8	101.6	103.4	105.1	106.9	107.2	107.5	107.9	108.2	108.5	108.9	109.2	109.5	109.9	110.2
	34	100.5	102.3	104.1	105.9	107.6	107.9	108.3	108.6	109.0	109.3	109.6	110.0	110.3	110.6	110.9
	32	101.2	103.1	104.9	106.6	108.3	108.7	109.0	109.3	109.7	110.0	110.3	110.7	111.0	111.3	111.7
	30	101.9	103.8	105.6	107.3	109.0	109.4	109.7	110.0	110.4	110.7	111.0	111.4	111.7	112.0	112.4
	28	102.7	104.5	106.3	108.0	109.8	110.1	110.4	110.8	111.1	111.4	111.8	112.1	112.4	112.1	
	26	103.1	105.0	106.8	108.6	110.4	110.7	111.1	111.5	111.8	112.2	112.5	112.8	112.5		
0%	24	103.1	105.0	106.8	108.6	110.4	110.7	111.1	111.5	111.8	112.2	112.6	112.9			

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	102.7	103.1	103.4	103.7	104.0	104.3	104.6	104.9	105.3	105.6	105.9	106.2	106.5	106.7	106.5
	58	103.3	103.6	103.9	104.3	104.6	104.8	105.2	105.5	105.8	106.1	106.4	106.8	107.0	106.7	
15%	56	103.8	104.2	104.5	104.8	105.1	105.4	105.8	106.1	106.4	106.7	107.0	107.2	107.0		
	54	104.4	104.7	105.0	105.4	105.7	106.0	106.3	106.6	106.9	107.3	107.5	107.2			
	52	105.0	105.3	105.6	105.9	106.2	106.6	106.9	107.2	107.5	107.7	107.5				
	50	105.5	105.8	106.2	106.5	106.8	107.1	107.4	107.8	108.0	107.7					
10%	48	106.1	106.4	106.8	107.1	107.4	107.7	108.1	108.4	108.0						
	46	106.8	107.1	107.4	107.8	108.1	108.4	108.7	108.4							
	44	107.4	107.8	108.1	108.4	108.7	109.1	108.7								
5%	42	108.2	108.5	108.9	109.2	109.5	109.2									
	40	109.0	109.3	109.6	110.0	109.6										
	38	109.8	110.1	110.4	110.1											
	36	110.5	110.8	110.5												
	34	111.3	110.9													
0%	32	111.3														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.3%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.6%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-191

REDUCED THRUST TAKEOFF N_1 SETTINGS
4000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	92.4	94.2	95.9	97.7	99.3	99.7	100.0	100.3	100.7	101.0	101.3	101.6	102.0	102.3	102.6
	58	92.9	94.7	96.5	98.2	99.9	100.2	100.5	100.9	101.2	101.5	101.9	102.2	102.5	102.8	103.2
	56	93.5	95.3	97.0	98.7	100.4	100.8	101.1	101.4	101.8	102.1	102.4	102.7	103.1	103.4	103.7
	54	94.0	95.8	97.6	99.3	101.0	101.3	101.7	102.0	102.3	102.7	103.0	103.3	103.6	104.0	104.3
	52	94.6	96.4	98.1	99.8	101.5	101.9	102.2	102.5	102.9	103.2	103.5	103.8	104.2	104.5	104.8
15%	50	95.1	96.9	98.7	100.4	102.1	102.4	102.8	103.1	103.4	103.8	104.1	104.4	104.8	105.1	105.4
	48	95.6	97.4	99.2	100.9	102.6	103.0	103.3	103.7	104.0	104.3	104.6	105.0	105.3	105.6	106.0
	46	96.2	98.0	99.8	101.5	103.2	103.6	103.9	104.2	104.6	104.9	105.2	105.6	105.9	106.2	106.5
	44	96.8	98.6	100.4	102.1	103.8	104.2	104.5	104.8	105.2	105.5	105.8	106.2	106.5	106.8	107.2
10%	42	97.4	99.2	101.0	102.7	104.4	104.8	105.1	105.5	105.8	106.1	106.5	106.8	107.1	107.4	107.8
	40	98.2	100.0	101.8	103.5	105.2	105.6	105.9	106.2	106.6	106.9	107.2	107.6	107.9	108.2	108.6
	38	98.9	100.7	102.5	104.3	106.0	106.3	106.7	107.0	107.3	107.7	108.0	108.3	108.7	109.0	109.3
	36	99.7	101.5	103.3	105.0	106.8	107.1	107.4	107.8	108.1	108.5	108.8	109.1	109.4	109.8	110.1
5%	34	100.4	102.3	104.1	105.8	107.5	107.9	108.2	108.6	108.9	109.2	109.6	109.9	110.2	110.5	110.9
	32	101.2	103.0	104.8	106.6	108.3	108.6	109.0	109.3	109.7	110.0	110.3	110.7	111.0	111.3	111.6
	30	102.0	103.8	105.6	107.4	109.1	109.4	109.8	110.1	110.4	110.8	111.1	111.4	111.8	112.1	111.1
	28	102.8	104.6	106.4	108.1	109.8	110.2	110.5	110.9	111.2	111.5	111.9	112.2	112.5	112.1	
	26	103.5	105.3	107.1	108.9	110.6	110.9	111.3	111.6	111.9	112.3	112.6	112.9	112.5		
	24	103.8	105.7	107.5	109.3	111.1	111.4	111.8	112.2	112.5	112.9	113.3	112.8			
0%	22	103.8	105.7	107.5	109.3	111.1	111.4	111.8	112.2	112.5	112.9	113.3				

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	102.9	103.2	103.6	103.9	104.2	104.5	104.8	105.1	105.4	105.8	106.1	106.4	106.7	106.8	106.5
15%	58	103.5	103.8	104.1	104.4	104.8	105.1	105.4	105.7	106.0	106.3	106.6	106.9	107.1	106.8	
	56	104.0	104.4	104.7	105.0	105.3	105.6	106.0	106.3	106.6	106.9	107.2	107.3	107.1		
	54	104.6	104.9	105.3	105.6	105.9	106.2	106.5	106.8	107.2	107.5	107.6	107.3			
	52	105.2	105.5	105.8	106.1	106.5	106.8	107.1	107.4	107.7	107.9	107.6				
10%	50	105.7	106.1	106.4	106.7	107.0	107.3	107.6	108.0	108.1	107.8					
	48	106.3	106.6	106.9	107.3	107.6	107.9	108.2	108.4	108.1						
	46	106.9	107.2	107.5	107.8	108.2	108.5	108.7	108.4							
	44	107.5	107.8	108.1	108.5	108.8	109.0	108.7								
5%	42	108.1	108.4	108.8	109.1	109.4	109.0									
	40	108.9	109.2	109.5	109.9	109.4										
	38	109.7	110.1	110.3	109.9											
	36	110.4	110.8	110.3												
	34	111.2	110.8													
0%	32	111.2														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.3%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.6%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-192A

REDUCED THRUST TAKEOFF N_1 SETTINGS
5000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	92.6	94.4	96.1	97.8	99.5	99.8	100.2	100.5	100.8	101.1	101.5	101.8	102.1	102.4	102.8
	58	93.1	94.9	96.7	98.4	100.1	100.4	100.7	101.0	101.4	101.7	102.0	102.4	102.7	103.0	103.3
	56	93.6	95.4	97.2	98.9	100.6	100.9	101.3	101.6	101.9	102.3	102.6	102.9	103.2	103.6	103.9
	54	94.2	96.0	97.8	99.5	101.2	101.5	101.8	102.2	102.5	102.8	103.2	103.5	103.8	104.1	104.5
	52	94.7	96.5	98.3	100.0	101.7	102.1	102.4	102.7	103.1	103.4	103.7	104.1	104.4	104.7	105.0
15%	50	95.3	97.1	98.9	100.6	102.3	102.6	103.0	103.3	103.6	104.0	104.3	104.6	104.9	105.3	105.6
	48	95.8	97.6	99.4	101.1	102.8	103.2	103.5	103.8	104.2	104.5	104.8	105.2	105.5	105.8	106.2
	46	96.4	98.2	99.9	101.7	103.4	103.7	104.1	104.4	104.7	105.1	105.4	105.7	106.1	106.4	106.7
	44	96.9	98.7	100.5	102.3	104.0	104.3	104.6	105.0	105.3	105.6	106.0	106.3	106.6	107.0	107.3
	42	97.5	99.3	101.1	102.8	104.5	104.9	105.2	105.5	105.9	106.2	106.5	106.9	107.2	107.5	107.9
10%	40	98.1	99.9	101.7	103.4	105.1	105.5	105.8	106.1	106.5	106.8	107.1	107.5	107.8	108.1	108.5
	38	98.9	100.7	102.5	104.2	105.9	106.3	106.6	107.0	107.3	107.6	108.0	108.3	108.6	108.9	109.3
	36	99.7	101.5	103.3	105.0	106.8	107.1	107.4	107.8	108.1	108.4	108.8	109.1	109.4	109.8	110.1
	34	100.5	102.3	104.1	105.9	107.6	107.9	108.3	108.6	108.9	109.3	109.6	109.9	110.3	110.6	110.9
5%	32	101.3	103.1	104.9	106.7	108.4	108.7	109.1	109.4	109.7	110.1	110.4	110.7	111.1	111.4	111.6
	30	102.1	103.9	105.7	107.5	109.2	109.5	109.9	110.2	110.5	110.9	111.2	111.5	111.9	112.1	111.6
	28	102.9	104.7	106.5	108.3	110.0	110.3	110.7	111.0	111.3	111.7	112.0	112.3	112.5	112.1	
	26	103.7	105.5	107.3	109.1	110.8	111.1	111.4	111.8	112.1	112.4	112.8	112.9	112.5		
	24	104.4	106.2	108.0	109.8	111.5	111.8	112.2	112.5	112.8	113.2	113.3	112.9			
	22	104.6	106.4	108.2	110.0	111.8	112.2	112.5	112.9	113.2	113.6	113.3				
0%	20	104.6	106.4	108.2	110.0	111.8	112.2	112.5	112.9	113.2	113.6					

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
	60	103.1	103.4	103.7	104.0	104.4	104.7	105.0	105.3	105.6	105.9	106.2	106.5	106.8	106.8	106.6
15%	58	103.6	104.0	104.3	104.6	104.9	105.2	105.6	105.9	106.2	106.5	106.8	107.1	107.1	106.8	
	56	104.2	104.5	104.9	105.2	105.5	105.8	106.1	106.4	106.8	107.1	107.4	107.4	107.1		
	54	104.8	105.1	105.4	105.7	106.1	106.4	106.7	107.0	107.3	107.6	107.6	107.4			
	52	105.4	105.7	106.0	106.3	106.6	107.0	107.3	107.6	107.9	107.9	107.6				
10%	50	105.9	106.2	106.6	106.9	107.2	107.5	107.8	108.2	108.1	107.9					
	48	106.5	106.8	107.1	107.4	107.8	108.1	108.4	108.4	108.1						
	46	107.0	107.4	107.7	108.0	108.3	108.7	108.7	108.4							
	44	107.6	107.9	108.3	108.6	108.9	108.9	108.7								
5%	42	108.2	108.5	108.8	109.2	109.2	108.9									
	40	108.8	109.1	109.4	109.7	109.2										
	38	109.6	109.9	110.2	109.7											
	36	110.4	110.7	110.2												
	34	111.2	110.7													
0%	32	111.2														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.3%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.6%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

DB1-4-193

REDUCED THRUST TAKEOFF N_1 SETTINGS
6000 FOOT PRESSURE ALTITUDE
-30 TO 30° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		-30	-20	-10	0	10	12	14	16	18	20	22	24	26	28	30
	60	92.7	94.5	96.2	97.9	99.6	99.9	100.3	100.6	100.6	101.3	101.6	101.9	102.2	102.5	102.9
	58	93.2	95.0	96.8	98.5	100.2	100.5	100.8	101.2	101.5	101.8	102.1	102.5	102.8	103.1	103.4
	56	93.8	95.6	97.3	99.0	100.7	101.1	101.4	101.7	102.0	102.4	102.7	103.0	103.4	103.7	104.0
	54	94.3	96.1	97.9	99.6	101.3	101.6	101.9	102.3	102.6	102.9	103.3	103.6	103.9	104.2	104.6
	52	94.8	96.6	98.4	100.1	101.8	102.2	102.5	102.8	103.2	103.5	103.8	104.2	104.5	104.8	105.1
15%	50	95.4	97.2	99.0	100.7	102.4	102.7	103.1	103.4	103.7	104.1	104.4	104.7	105.1	105.4	105.7
	48	95.9	97.7	99.5	101.2	103.0	103.3	103.6	104.0	104.3	104.6	105.0	105.3	105.6	105.9	106.3
	46	96.5	98.3	100.1	101.8	103.5	103.8	104.2	104.5	104.8	105.2	105.5	105.8	106.2	106.5	106.8
	44	97.0	98.8	100.6	102.4	104.1	104.4	104.7	105.1	105.4	105.7	106.1	106.4	106.7	107.1	107.4
	42	97.6	99.4	101.2	102.9	104.7	105.0	105.3	105.7	106.0	106.3	106.7	107.0	107.3	107.7	108.0
10%	40	98.2	100.0	101.8	103.6	105.3	105.6	105.9	106.3	106.6	107.0	107.3	107.6	107.9	108.3	108.6
	38	98.8	100.6	102.4	104.2	105.9	106.2	106.6	106.9	107.3	107.6	107.9	108.2	108.6	108.9	109.2
	36	99.7	101.5	103.3	105.0	106.8	107.1	107.4	107.8	108.1	108.4	108.8	109.1	109.4	109.8	110.1
	34	100.5	102.3	104.1	105.9	107.6	107.9	108.3	108.6	109.0	109.3	109.6	109.9	110.3	110.6	110.9
5%	32	101.4	103.2	105.0	106.7	108.4	108.8	109.1	109.5	109.8	110.1	110.5	110.8	111.1	111.5	111.6
	30	102.2	104.0	105.8	107.6	109.3	109.6	110.0	110.3	110.6	111.0	111.3	111.6	112.0	112.1	111.6
	28	103.0	104.9	106.6	108.4	110.1	110.5	110.8	111.1	111.5	111.8	112.1	112.5	112.5	112.1	
	26	103.8	105.6	107.4	109.2	110.9	111.2	111.6	111.9	112.2	112.6	112.9	112.9	112.5		
	24	104.6	106.4	108.2	109.9	111.6	112.0	112.3	112.7	113.0	113.3	113.3	112.9			
	22	105.2	107.0	108.8	110.6	112.3	112.7	113.0	113.3	113.7	113.6	113.3				
	20	105.2	107.0	108.8	110.6	112.4	112.8	113.1	113.5	113.8	113.6					
0%	18	105.2	107.0	108.8	110.6	112.4	112.8	113.1	113.5	113.8						

32 TO 60° C

DERATION	ASSUMED TEMP DEG C	AMBIENT TEMPERATURE - DEGREES C														
		32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
15%	60	103.2	103.5	103.8	104.1	104.5	104.8	105.1	105.4	105.7	106.0	106.3	106.6	107.0	106.8	106.5
	58	103.8	104.1	104.4	104.7	105.0	105.4	105.7	106.0	106.3	106.6	106.9	107.2	107.1	106.8	
	56	104.3	104.6	105.0	105.3	105.6	105.9	106.2	106.6	106.9	107.2	107.5	107.3	107.1		
	54	104.9	105.2	105.5	105.9	106.2	106.5	106.8	107.1	107.4	107.8	107.6	107.3			
10%	52	105.5	105.8	106.1	106.4	106.7	107.1	107.4	107.7	108.0	107.9	107.6				
	50	106.0	106.4	106.7	107.0	107.3	107.6	108.0	108.3	108.1	107.9					
	48	106.6	106.9	107.2	107.6	107.9	108.2	108.5	108.4	108.1						
	46	107.2	107.5	107.8	108.1	108.4	108.8	108.6	108.4							
	44	107.7	108.0	108.4	108.7	109.0	108.9	108.6								
5%	42	108.3	108.6	109.0	109.3	109.2	108.9									
	40	108.9	109.3	109.6	109.5	109.2										
	38	109.6	109.9	110.0	109.5											
	36	110.4	110.5	110.0												
	34	111.1	110.5													
0%	32	111.1														

NOTES

1. N_1 IS INCREASED FOR THE FOLLOWING:
   ENGINE A/I "ON" 0.2%
   AIRFOIL A/I "ON" 0.3%
2. A/C PACKS "ON" AND MISCELLANEOUS BLEEDS "ON" DECREASE N_1 BY 0.5%.
3. ANTI-ICE "ON" ABOVE 8 (DEG C) IS NOT ALLOWED.

CAG(IGDS)

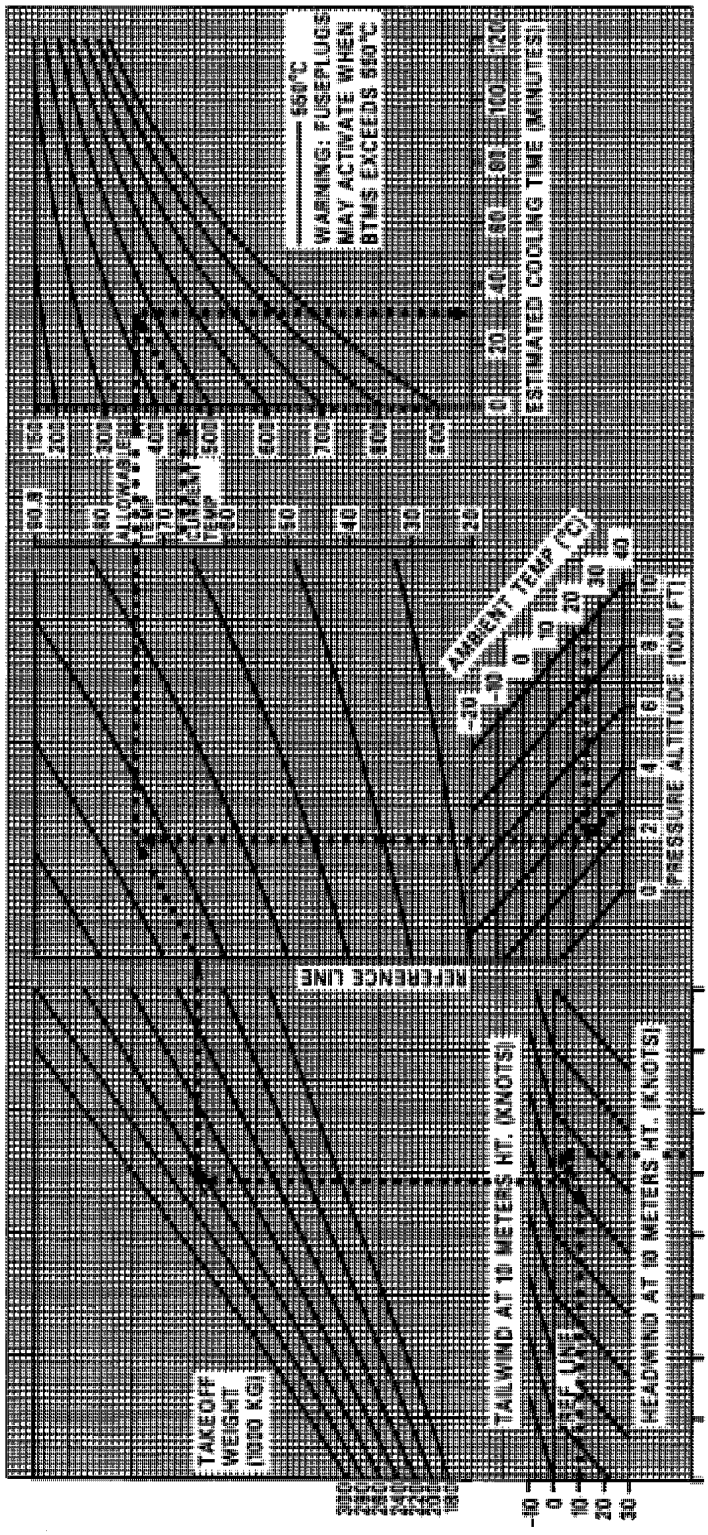
DB1-4-194A

TAKEOFF BRAKE TEMPERATURE CHART

ALS BRAKE P/N 2609472-2, -3 & -4

NOTES:
- CHART BASED ON FULLY WORN BRAKES.
- ASSUMES USE OF MAXIMUM REVERSE THRUST IF TAKEOFF IS ABORTED.
- READ "CURRENT TEMP." ONLY AFTER BRAKE TEMPERATURES HAVE PEAKED.

EXAMPLE:
TAKEOFF WEIGHT = 265,000 KG
V_1 SPEED = 163 KIAS
AMBIENT CONDITIONS = 3000 FT, 25°C, 10 KT HEADWIND
ALLOWABLE BTMS TEMP. = 360°C
CURRENT BTMS TEMP. = 450°C
ESTIMATED COOLING TIME = 30 MINUTES



CAG(IGDS)

DB1-4-1122

ENGINE & AIRCRAFT ICE PROTECTION
TAKEOFF WEIGHT CORRECTIONS (KGS)

CF6-80C2D1F ENGINES
RUNWAY SLOPES FROM -1% TO +1%
WINDS -10 TO 30 KNOTS

AIRPORT PRESSURE ALTITUDE (FEET)	OUTSIDE AIR TEMPERATURE (°C)						
	-50	-40	-30	-20	-10	0	7.7
FLAPS 10°							
SEA LEVEL	4200	4150	4100	4150	4300	4400	4500
2000	4050	4000	3950	4050	4200	4350	4400
4000	3550	3500	3500	3600	3750	3900	4050
6000	3100	3100	3200	3350	3450	3500	3500
FLAPS 15°							
SEA LEVEL	3900	3900	3850	3900	3950	4100	4200
2000	3750	3700	3700	3800	3900	4000	4150
4000	3350	3300	3300	3400	3450	3600	3750
6000	2900	2950	2950	3100	3250	3300	3350
FLAPS 20°							
SEA LEVEL	3750	3700	3650	3700	3800	3900	4000
2000	3550	3500	3500	3600	3700	3850	3900
4000	3150	3100	3100	3200	3300	3400	3500
6000	2750	2800	2850	2950	3050	3100	3200
FLAPS 25°							
SEA LEVEL	3450	3450	3400	3450	3550	3700	3800
2000	3350	3300	3300	3400	3450	3550	3700
4000	2950	2900	2900	2950	3100	3200	3350
6000	2550	2600	2700	2800	2900	2900	2950

GE CF6-80C2D1F ENGINES
EFFECT OF SLUSH AND WATER ON BALANCED TAKEOFF PERFORMANCE
1/4 INCH SLUSH OR WATER DEPTH
REVERSERS OPERATIVE FLAPS 25°

PRELIMINARY DATA

A.) WEIGHT REDUCTION (LB) – VALID UP TO 2000 FT. PRESSURE ALTITUDE

FIELD LENGTH (FEET)	6000	7000	8000	9000	10000	11000	12000	13000
Δ WEIGHT AT SEA LEVEL (1000 LB)	34.0	40.5	46.5	51.5	55.5	57.5	36.5	15.0

TABLE CORRECTIONS:

SLOPE	-2%	+2000 ←			+3000 →			
	-1%	+1000 ←			+1500 →			
	+1%	-500 ←			-1000 →			
	+2%	-1000 ←			-2000 →			
PER 1°C OAT	BELOW 10°C	+80	+110	+135	+175	+175	+175	+175	+175
	ABOVE 10°C	-55	-75	-120	-135	-135	-135	-135	-135
PER 1000 FT ABOVE SEA LEVEL		-650	-950	-1250	-1400	-1450	-1300	-1300	-1300

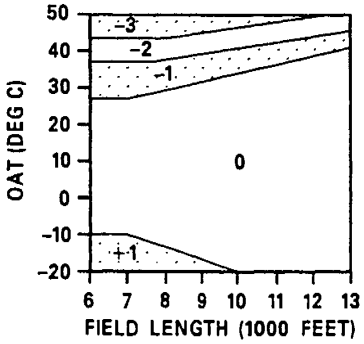
B.) V1 REDUCTION (KIAS) – VALID UP TO 2000 FT. PRESSURE ALTITUDE

FIELD LENGTH (FEET)	6000	7000	8000	9000	10000	11000	12000	13000
Δ V1 BASIC (KTS) AT SEA LEVEL	22.0	23.0	24.0	25.0	26.0	26.5	26.5	24.5

TABLE CORRECTIONS:

SLOPE	-2%	+7.5	+7.0	+7.0	+7.5	+7.5	+8.0	+8.0	+8.0
	-1%	+3.5	+3.5	+3.5	+3.5	+3.5	+3.5	+3.5	+3.5
	+1%	-3.0	-3.0	-3.0	-3.0	-2.5	-2.5	-2.5	-2.5
	+2%	-5.5	-5.5	-5.5	-5.5	-5.0	-4.5	-4.5	-4.5
PER 1000 FT ABOVE SEA LEVEL		←			-0.50				→

EFFECT OF OAT ON Δ V1 BASIC (KIAS)



CAG(IGDS) DATA SOURCE: E060, PAGE E060-6.54, DATED 3-28-91 DB1-4-126A

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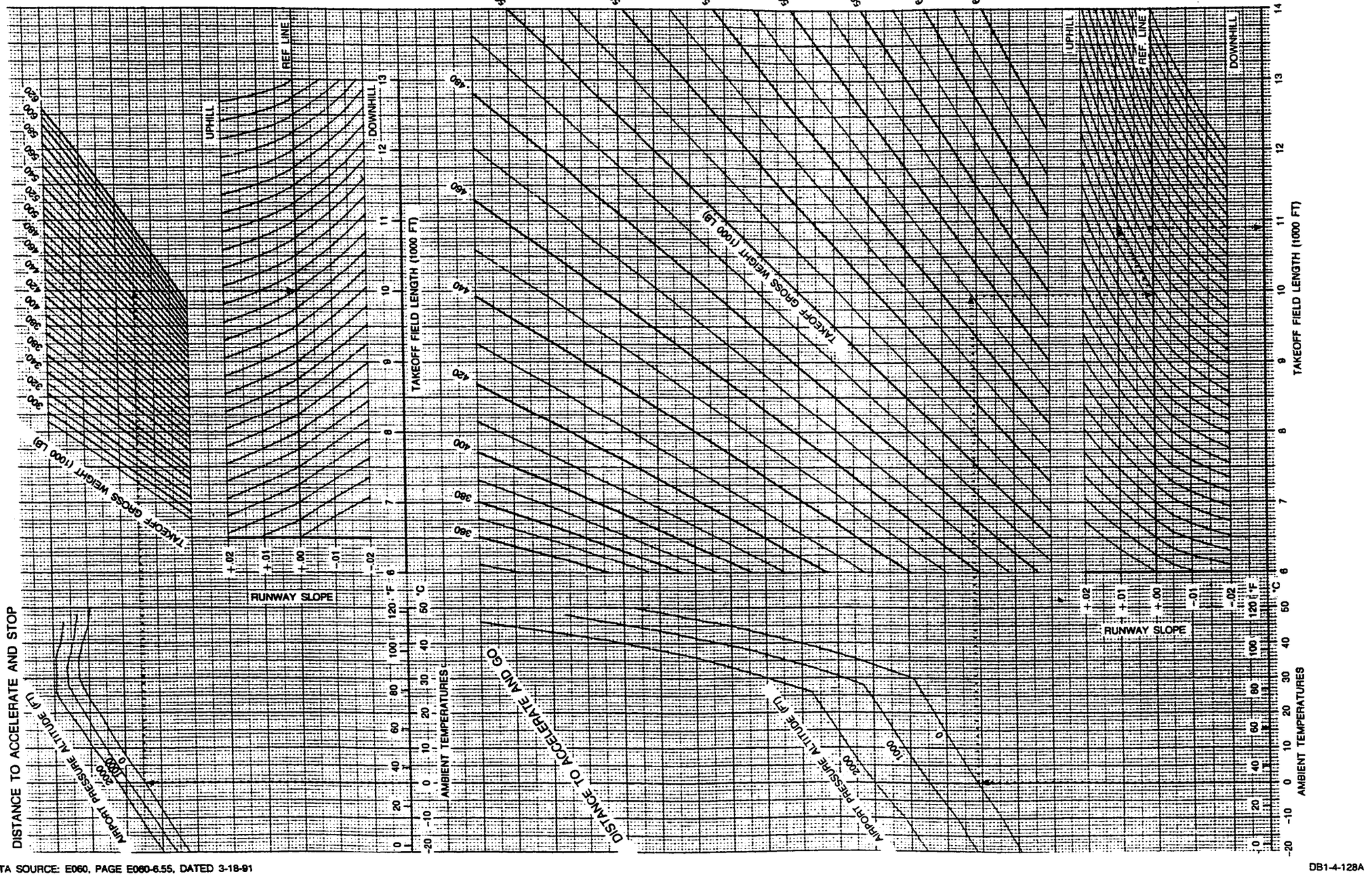
REVISION A

TAKEOFF PERFORMANCE IN 1/4 INCH SLUSH/WATER
CF6-80C2D1F ENGINES REVERSER OPERATIVE
FLAP 25° $V_1 = V_{MC_G}$

PRELIMINARY DATA



DATA SOURCE: E060, PAGE E060-6.55, DATED 3-18-91

DB1-4-128A

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GE CF6-80C2D1F ENGINES
EFFECT OF SLUSH AND WATER ON BALANCED TAKEOFF PERFORMANCE
1/2 INCH SLUSH OR WATER DEPTH
REVERSERS OPERATIVE FLAPS 25°

PRELIMINARY DATA

A.) WEIGHT REDUCTION (LB) - VALID UP TO 2000 FT. PRESSURE ALTITUDE

FIELD LENGTH (FEET)	6000	7000	8000	9000	10000	11000	12000	13000
Δ WEIGHT AT SEA LEVEL (1000 LB)	50.5	59.0	67.0	73.5	78.5	81.5	60.5	37.5

TABLE CORRECTIONS:

SLOPE	-2%	+3000 ←			→ +4000			
	-1%	+1500 ←			→ +2000			
	+1%	-1000 ←			→ -1500			
	+2%	-2000 ←			→ -3000			
PER 1°C OAT	BELOW 10°C	+100	+150	+150	+200	+250	+250	+250	+250
	ABOVE 10°C	-100	-100	-150	-150	-150	-150	-150	-150
PER 1000 FT ABOVE SEA LEVEL		-750	-1050	-1400	-1650	-1850	-1850	-1850	-1850

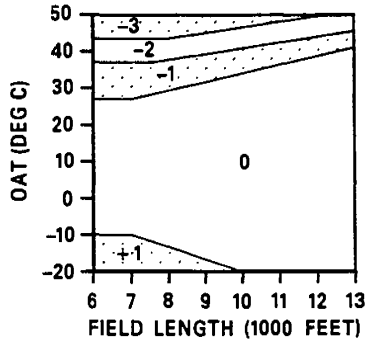
B.) V1 REDUCTION (KIAS) - VALID UP TO 2000 FT. PRESSURE ALTITUDE

FIELD LENGTH (FEET)	6000	7000	8000	9000	10000	11000	12000	13000
Δ V1 BASIC (KTS) AT SEA LEVEL	18.5	19.5	20.5	21.5	22.5	23.0	23.0	21.5

TABLE CORRECTIONS:

SLOPE	-2%	+7.0	+7.0	+6.5	+6.5	+6.5	+6.0	+6.0	+6.0
	-1%	+3.0	+3.0	+3.0	+3.0	+3.0	+2.0	+2.0	+2.0
	+1%	-3.0	-3.0	-2.5	-2.5	-2.5	-2.0	-2.0	-2.0
	+2%	-5.0	-5.0	-5.0	-4.5	-4.5	-3.5	-3.5	-3.5
PER 1000 FT ABOVE SEA LEVEL		← -0.50 →							

EFFECT OF OAT ON Δ V1 BASIC (KIAS)



CAG(IGDS) DATA SOURCE: E060, PAGE E060-6.56, DATED 3-28-91 DB1-4-127A

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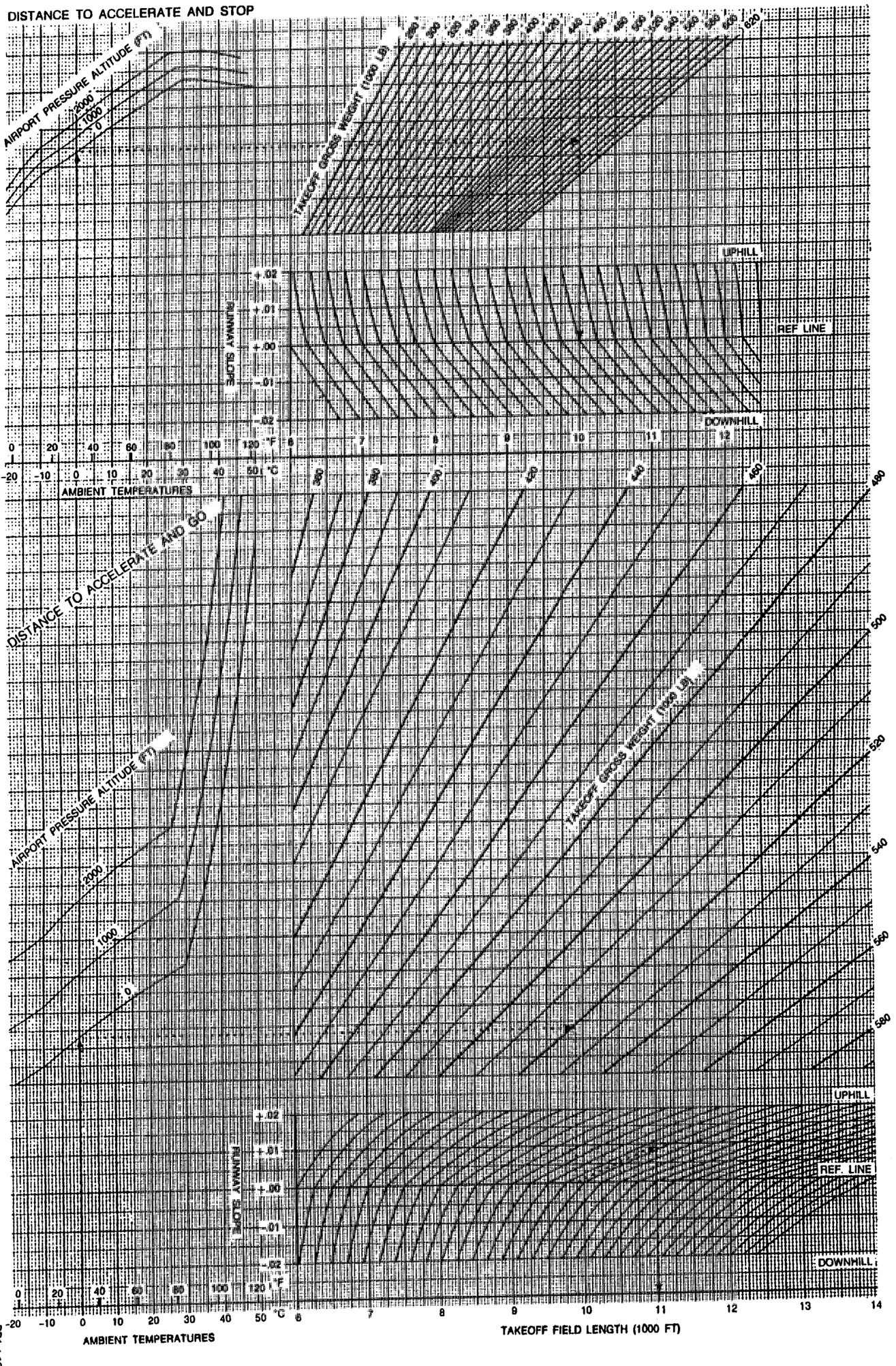
PRELIMINARY DATA

TAKEOFF PERFORMANCE IN 1/2 INCH SLUSH/WATER

CF6-80C2D1F ENGINES REVERSER OPERATIVE
FLAP 25° $V_1 = V_{MC_G}$

DATA SOURCE: EB60, PAGE EB60-6.57, DATED 3-18-91



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ENROUTE

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INTRODUCTION

The Enroute Climb Weights For Net Gradient = 0% charts are useful when determining terrain clearance for a given route. The charts can be used to determine altitude capability when one or two engines become inoperative in flight and the remaining engine/engines are operated at maximum continuous thrust. These data are based on the "net" altitude capability and are intended to be used for flight planning purposes. The actual "gross" altitude capability will be higher than the data indicated.

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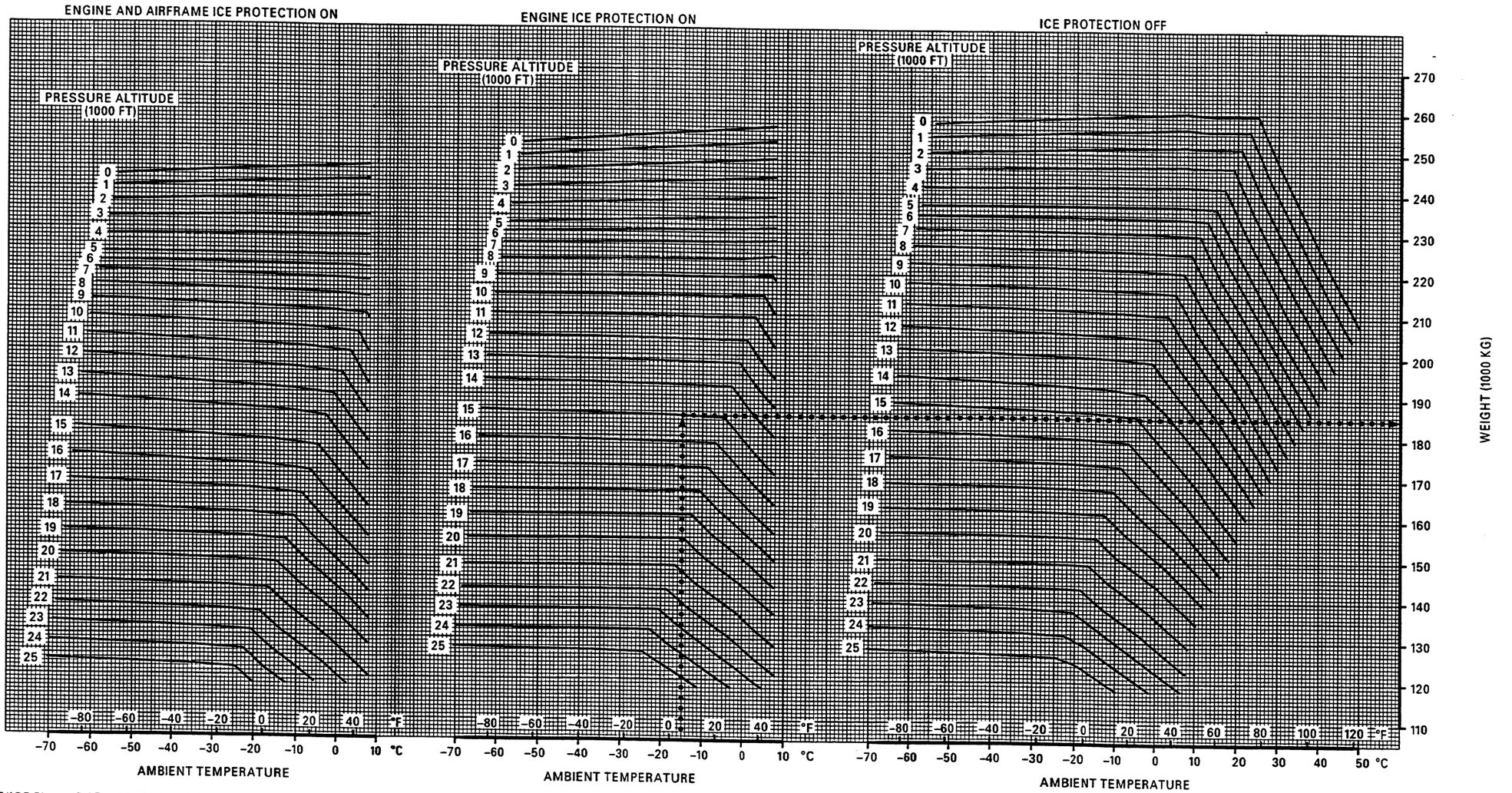
ONE ENGINE ENROUTE CLIMB WEIGHT FOR NET GRADIENT = 0%

CF6-80C2D1F ENGINES
FLAPS UP SLATS RETRACTED GEAR UP
TWO ENGINES INOPERATIVE
MAXIMUM CONTINUOUS THRUST
V_{CL} = 1.6 V_S (APPROXIMATELY) OR
.82 MACH, WHICHEVER IS LOWER
GROSS GRADIENT = 0.3%
ENGINE AIRBLEED FOR AIR CONDITIONING ON



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 17-1, DATED 8-23-91

DB1-4-1020A

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TWO ENGINE ENROUTE CLIMB WEIGHT FOR NET GRADIENT = 0%

CF6-80C2D1F ENGINES
ONE ENGINE INOPERATIVE
MAXIMUM CONTINUOUS THRUST
V_{CL} = 1.6 V_S (APPROXIMATELY) OR
.82 MACH, WHICHEVER IS LOWER
GROSS GRADIENT = 1.4%
FLAPS UP SLATS RETRACTED GEAR UP
ENGINE AIRBLEED FOR AIR CONDITIONING ON

ENGINE AND AIRFRAME ICE PROTECTION

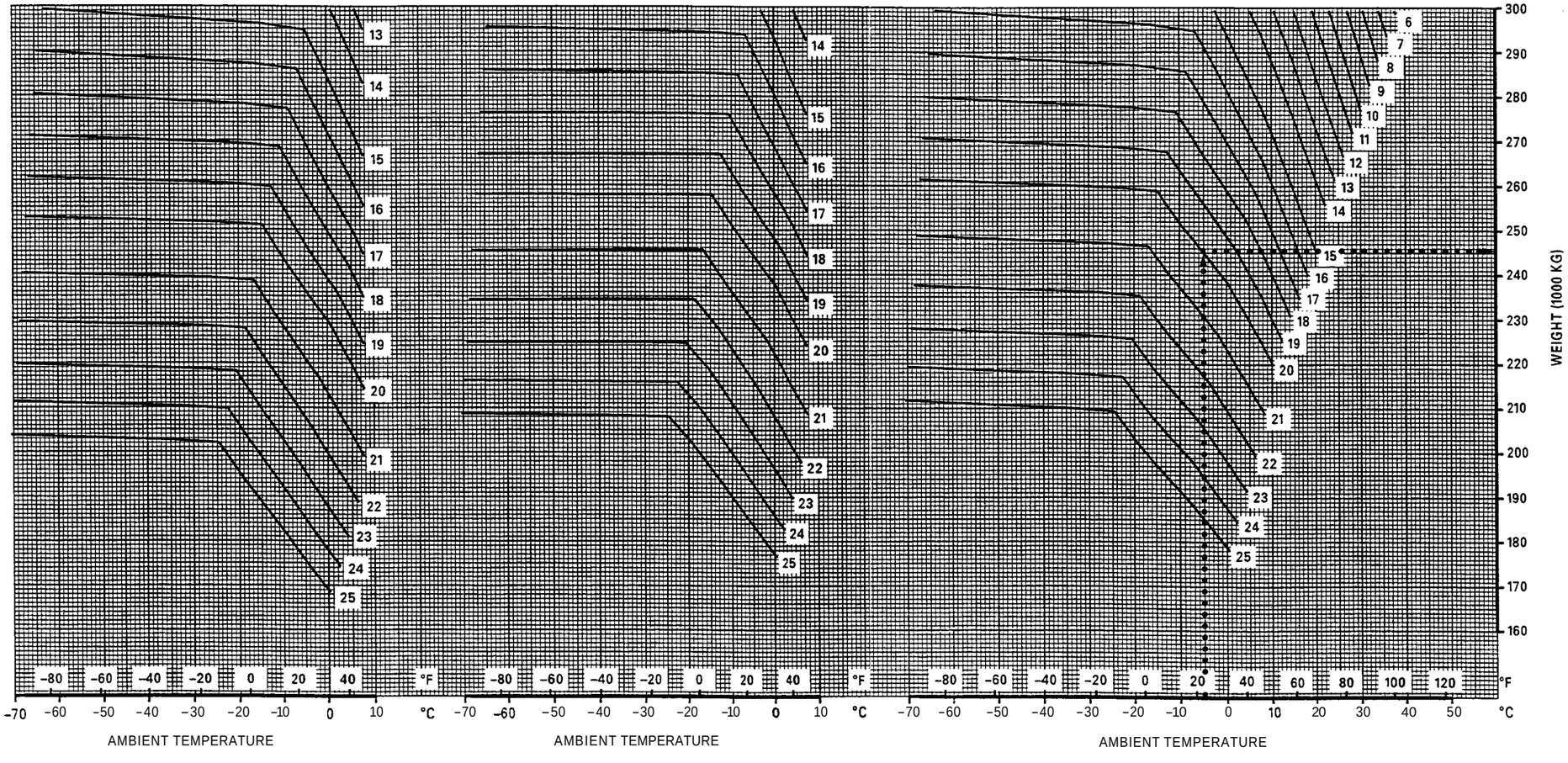
PRESSURE ALTITUDE (1000 FT)

ENGINE ICE PROTECTION ON

PRESSURE ALTITUDE (1000 FT)

ICE PROTECTION OFF

PRESSURE ALTITUDE (1000 FT)



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4A, PAGE 16-1, DATED 8-23-91

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NONSTANDARD CONFIGURATIONS

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INTRODUCTION

The takeoff weight corrections provided are to be applied to the maximum allowable takeoff weight determined by the method shown in the Takeoff section of the Preflight chapter. These corrections also can be applied to the maximum allowable takeoff weights contained in the computerized takeoff weight analysis program.

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TAKEOFF WEIGHT CORRECTIONS

Conditions	Weight Correction (kg)	
Air Conditioning Packs ON	–3,850	
Engine Ice Protection ON	–550	
Engine And Airframe Ice Protection ON	–3,700	
Engine Idle Control System Inoperative	–8,900	
Engine Cowl Anti-Ice Shutoff Valve Inoperative	–550 –8,150	(< 7.0° C) (≥ 7.0° C)
Airfoil Anti-Ice Shutoff Valve Inoperative	–3,700 –15,900	(< 7.0° C) (≥ 7.0° C)
Automatic Ground Spoiler System Inoperative	–1,200	
FADEC Normal Mode Inoperative	–2,050	
APU Operating:	–1.150	
APU Exhaust Door Inoperative And Secured Open	–1,150	(Inlet door open or closed)
APU Inlet Door Inoperative And Secured Open	–150	(Exhaust door closed)
APU Inlet Door Inoperative And Secured Open	–180	(Exhaust door removed)

One Wheel Brake Assembly Inoperative Takeoff Weight Corrections (kg)

Applicable for all temperatures, flap settings, and wind –10 kts to 10 kts.

	–2%	0%	2%
Sea Level	–24,100	–20,900	–18,200
2000 ft PA	–23,600	–20,400	–18,200
4000 ft PA	–22,700	–18,600	–16,400
6000 ft PA	–21,400	–17,700	–15,500
8000 ft PA	–19,100	–15,900	–13,600

Procedure:

1. Determine the one wheel brake inoperative maximum takeoff weight by applying the applicable weight correction to the all wheel brakes operative maximum takeoff weight.
2. Determine the V_1 for the actual takeoff weight.
3. If the V_1 for the actual takeoff weight is greater than V_{MCG}, determine V_R and V_2 using normal procedures for the actual takeoff weight.
4. If the V_1 determined in Step 2 is less than V_{MCG}, determine the V_1 at the one wheel brake inoperative maximum takeoff weight found in Step 1.
5. If the V_1 determined in Step 4 is greater than V_{MCG}, set $V_1 = V_{MCG}$ and determine the V_R and V_2 using normal procedures for the actual takeoff weight.
6. If the V_1 determined in Step 4 is less than V_{MCG}, no takeoff is permitted for the given conditions of flap, wind, and temperature.

INFLIGHT

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CLIMB

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INTRODUCTION

The Climb section of the Inflight chapter contains data to determine the time, distance, and fuel-to-climb information based on the optimum center of gravity location (32% MAC). For long-range and high-speed climb operations, a 3 engine climb speed schedule of 250 KCAS or 1.4g buffet boundary whichever is greater is used below 10,000 ft and 330 KCAS to Mach .82 is used above 10,000 ft. The 2 engine climb speed schedule is the same below 10,000 ft and 290 KCAS to Mach .74 is used above 10,000 ft. The 2 engine climb speed schedule is for long-range. Maximum climb thrust settings are presented along with center of gravity corrections for % increases to the Climb tables, for a CG location other than the optimum.

MAXIMUM CLIMB THRUST N_1 SETTING

The N_1 Setting – Maximum Climb Thrust tables are used to determine the inflight N_1 setting for maximum climb thrust. The N_1 setting is presented as a function of pressure altitude, Mach number, and total air temperature (TAT) with corrections to be applied where applicable.

CLIMB TABLES

Select the appropriate Climb table based on temperature. The climb data are presented for three and two engines operating at various temperatures ranging from ISA-20°C to ISA+20°C in increments of 10°C. Displayed in the data boxes as a function of takeoff gross weight and pressure altitude are time (minutes), distance (nautical miles), and fuel (kilograms) to climb to altitude. The three engine data are based on three engines operating at maximum climb thrust, one air conditioning pack per operating engine and no ice protection. The two engine data are based on two engines operating at maximum continuous thrust, one air conditioning pack per operating engine and no ice protection. Fuel values include a variable takeoff allowance. Presented at the bottom of the page are fuel and distance corrections for engine or engine and airframe ice protection. No data is presented that is less than 1.3G buffet onset margin.

As an example let's determine the climb parameters for the following conditions:

Takeoff Gross Weight = 250,000 kg
Pressure Altitude = 33,000 ft
Temperature = ISA + 10°C
Three Engines Operating
No Ice Protection

Select the appropriate Climb table based on number of engines operating and temperature. Enter the top of the table with the gross weight (interpolating where necessary) and read vertically downward to the intersection with the pressure altitude (33,000 ft). At this point read the following:

Time = 16.4 min
Distance = 110 n mi.
Fuel = 5250 kg

Enter the top of the table with the planned takeoff gross weight (interpolating where necessary) and read vertically downward to the intersection with the planned flight level. Read the time, distance, and fuel to climb (interpolating where necessary).

If the takeoff is being made from an airport pressure altitude above sea level, the Climb tables are to be read in the following manner. Enter the top of the table with the planned takeoff gross weight and read vertically downward to the intersection with the planned flight level. At this point read a reference fuel-to-climb figure. Continue reading vertically downward to a pressure altitude equal to the departure airport pressure altitude and read a second fuel-to-climb figure. Subtracting the two fuel-to-climb figures yields the fuel-to-climb to the planned flight level. The time and distance-to-climb are determined in the same manner.

CENTER OF GRAVITY CORRECTIONS

The Center Of Gravity Correction charts are used to correct the time, fuel and distance figures found in the Climb tables, which are based on the optimum center of gravity location (32% MAC). The CG Correction charts allow for adjusting these figures for CG locations at 22% as well as at 12% MAC.

Enter the bottom of the 22% (or 12%) chart with the planned flight level and read vertically upward to the intersection with the gross weight. From this point read horizontally to the right and correct for temperature if necessary. This correction is then applied to the 32% time, fuel and distance data read from the Climb tables to obtain the time, fuel and distance for a CG location of 22% (or 12%).

For a CG location between 32% and 22% the time, fuel and distance are determined by interpolating between the 32% and the 22% data. Similarly for a CG location between 22% and 12% the time, fuel and distance data is determined by interpolating between the 22% and 12% values.

MAXIMUM CLIMB THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

MACH NO.	TAT °C	PRESSURE ALTITUDE - 1000 FT									
		5	8	10	14	20	25	31	35	39	43
.40	60	88.01	90.63	93.02	96.26						
	-50	89.97	92.62	94.98	98.28						
	-40	91.87	94.54	96.88	100.22						
	-30	93.73	96.42	98.73	102.13						
	-20	95.56	98.26	100.55	104.00						
	-10	97.36	100.07	102.33	105.82						
	0	99.11	101.83	104.06	107.63						
	10	100.85	103.60	105.88	108.06						
	20	102.65	104.80	105.88	106.75						
	30	102.64	103.30	104.63	105.45						
	40	101.21	102.01	103.31	105.05						
	50	99.94	101.14	103.59	106.56						
	60	100.05	102.58	105.04	108.04						
.60	-60	85.69	87.72	89.58	91.92	96.66	99.47				
	-50	87.56	89.66	91.50	93.89	98.65	101.48				
	-40	89.44	91.56	93.38	95.82	100.60	103.45				
	-30	91.27	93.40	95.20	97.69	102.49	105.35				
	-20	93.06	95.21	96.98	99.52	104.33	107.20				
	-10	94.82	96.98	98.73	101.32	106.14	109.04				
	0	96.55	98.72	100.44	103.08	107.93	108.19				
	10	98.24	100.42	102.11	104.82	107.64	106.84				
	20	99.91	102.11	103.86	105.50	106.20	105.77				
	30	101.63	103.69	104.19	104.21	105.15	105.98				
	40	102.11	102.23	102.99	102.97	105.13	107.53				
	50	100.74	100.94	101.73	102.03	106.65	109.06				
	60	99.48	99.86	101.38	103.48	108.15	110.57				
.80	-60					91.58	93.53	98.32	97.84	97.68	98.47
	-50					93.51	95.48	100.27	99.80	99.64	100.41
	-40					95.40	97.38	102.17	101.72	101.55	102.31
	-30					97.27	99.27	104.04	103.61	103.44	104.17
	-20					99.07	101.09	105.84	105.40	105.20	105.93
	-10					100.83	102.86	107.64	106.82	105.90	105.07
	0					102.56	104.61	107.05	104.61	103.41	102.73
	10					104.26	105.26	105.28	102.34	101.19	100.75
	20					105.46	103.68	103.45	101.30	101.23	100.79
	30					104.00	102.55	103.00	102.89	102.82	102.38
	40					102.80	101.59	104.56	104.45	104.39	103.95
	50					101.82	102.81	106.10	105.99	105.92	105.48
	60					102.72	104.29	107.61	107.50	107.43	106.99

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N1 PRESSURE ALTITUDE (1000 ft.)									
	5	8	10	14	20	25	31	35	39	43
EAI ONLY	-0.67	-0.69	-0.70	-0.72	-0.78	-0.85	-0.77	-0.73	-0.78	-0.86
EAI + WAI	-1.08	-1.13	-1.16	-1.21	-1.37	-1.52	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1) DETERMINE BASE N1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2) ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.

MAXIMUM CLIMB THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

MACH NO.	TAT °C	BASE N1 PRESSURE ALTITUDE - 1000 FT									
		5	8	10	14	20	25	31	35	39	43
.82	-60						93.24	97.53	96.99	96.82	97.80
	-50						95.18	99.47	98.95	98.77	99.73
	-40						97.08	101.36	100.86	100.67	101.62
	-30						98.96	103.23	102.75	102.56	103.48
	-20						100.78	105.03	104.54	104.33	105.25
	-10						102.54	106.81	106.05	105.63	104.98
	0						104.28	106.81	104.39	103.16	102.65
	10						105.57	105.02	102.10	100.93	100.65
	20						103.84	103.21	100.54	100.34	100.09
	30						102.67	102.17	102.00	101.92	101.67
	40						101.69	103.73	103.57	103.48	103.24
	50						102.49	105.26	105.10	105.02	104.77
	60						103.96	106.77	106.60	106.52	106.27
.83	-60						93.00	97.20	96.66	96.49	97.47
	-50						94.94	99.14	98.62	98.44	99.40
	-40						96.83	101.03	100.52	100.34	101.28
	-30						98.72	102.90	102.41	102.23	103.15
	-20						100.53	104.70	104.21	104.00	104.91
	-10						102.29	106.47	105.76	105.46	104.91
	0						104.03	106.77	104.38	103.16	102.63
	10						105.64	104.96	102.08	100.91	100.60
	20						103.83	103.16	100.41	100.00	99.75
	30						102.64	101.90	101.66	101.58	101.33
	40						101.65	103.39	103.22	103.14	102.89
	50						102.23	104.92	104.75	104.67	104.42
	60						103.70	106.42	106.26	106.18	105.92
.85	-60						92.52	96.54	96.00	95.84	96.80
	-50						94.46	98.48	97.96	97.79	98.74
	-40						96.34	100.36	99.85	99.68	100.61
	-30						98.22	102.23	101.74	101.56	102.47
	-20						100.03	104.02	103.54	103.33	104.24
	-10						101.79	105.78	105.18	104.86	104.74
	0						103.51	106.70	104.35	103.16	102.59
	10						105.23	104.85	102.04	100.88	100.52
	20						103.82	103.07	100.16	99.46	99.19
	30						102.58	101.62	100.97	100.90	100.63
	40						101.57	102.69	102.53	102.46	102.19
	50						101.72	104.22	104.05	103.98	103.71
	60						103.18	105.72	105.55	105.48	105.21

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	PRESSURE ALTITUDE (1000 ft.)									
	5	8	10	14	20	25	31	35	39	43
EAI ONLY	-0.67	-0.69	-0.70	-0.72	-0.78	-0.85	-0.77	-0.73	-0.78	-0.86
EAI + WAI	-1.08	-1.13	-1.16	-1.21	-1.37	-1.52	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1) DETERMINE BASE N1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2) ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 330 KIAS TO 27,402 FT
THEN CLIMB AT .82 MACH IND.

3 ENGINES OPERATING
ISA - 20 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA - 20 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000	11.1 73 2774	12.3 81 3028	13.6 90 3307	15.2 101 3621	17.3 116 4008											
41,000	10.0 64 2637	11.0 71 2867	12.0 78 3111	13.2 86 3375	14.5 95 3672	16.1 106 4012	18.3 122 4427									
39,000	9.0 57 2513	9.9 63 2724	10.7 68 2946	11.7 75 3180	12.7 82 3436	13.8 89 3715	15.1 98 4017	16.7 109 4366	18.8 124 4794							
37,000	8.2 51 2398	9.0 56 2594	9.7 61 2798	10.5 66 3012	11.3 71 3243	12.3 78 3488	13.2 84 3747	14.3 91 4028	15.6 100 4336	17.0 110 4676	18.8 123 5080					
35,000	7.6 46 2292	8.2 50 2476	8.9 54 2667	9.5 59 2865	10.3 64 3078	11.1 69 3302	11.9 74 3538	12.8 80 3787	13.7 86 4051	14.8 93 4329	15.9 101 4628	17.2 110 4966	18.7 121 5358	20.8 136 5843		
33,000	7.0 42 2198	7.6 46 2372	8.2 49 2552	8.8 53 2737	9.5 57 2937	10.2 62 3146	10.9 67 3364	11.7 71 3593	12.5 77 3833	13.3 82 4081	14.2 88 4341	15.2 95 4625	16.3 103 4936	17.5 111 5277	19.0 122 5678	21.3 139 6245
31,000	6.6 38 2107	7.1 42 2272	7.6 45 2442	8.2 49 2617	8.8 52 2805	9.4 56 3002	10.1 60 3206	10.8 65 3419	11.5 69 3642	12.2 74 3869	13.0 79 4105	13.8 85 4361	14.7 91 4636	15.7 98 4930	16.8 105 5255	18.2 115 5645
29,000	6.1 35 2018	6.6 38 2175	7.1 41 2335	7.7 44 2501	8.2 48 2679	8.8 51 2864	9.4 55 3057	10.0 59 3257	10.7 63 3466	11.3 67 3677	12.0 72 3895	12.7 76 4130	13.5 82 4382	14.4 87 4647	15.3 94 4935	16.4 101 5264
27,000	5.7 32 1922	6.2 35 2070	6.6 37 2222	7.1 40 2378	7.6 43 2545	8.1 46 2720	8.7 50 2900	9.3 53 3088	9.9 56 3283	10.5 60 3479	11.1 64 3681	11.7 69 3898	12.4 73 4130	13.2 78 4372	14.0 83 4632	14.9 89 4921
25,000	5.2 28 1800	5.6 30 1936	6.0 33 2076	6.4 35 2220	6.9 38 2375	7.4 40 2537	7.9 43 2703	8.4 46 2875	8.9 49 3054	9.4 52 3233	10.0 56 3416	10.5 59 3612	11.1 63 3822	11.8 67 4040	12.4 72 4270	13.2 77 4521
23,000	4.7 25 1681	5.1 27 1808	5.5 29 1937	5.9 31 2070	6.3 33 2213	6.7 35 2362	7.1 38 2515	7.6 40 2674	8.0 43 2838	8.5 46 3001	9.0 48 3167	9.5 52 3345	10.0 55 3535	10.5 58 3732	11.1 62 3938	11.7 66 4159
21,000	4.3 21 1567	4.6 23 1683	5.0 25 1803	5.3 27 1925	5.7 29 2057	6.1 31 2194	6.4 33 2336	6.9 35 -2482	7.3 37 2632	7.7 40 2781	8.1 42 2932	8.5 45 3094	9.0 48 3267	9.5 50 3445	10.0 54 3630	10.5 57 3827
19,000	3.9 19 1455	4.2 20 1562	4.5 22 1672	4.8 23 1784	5.1 25 1906	5.5 27 2033	5.8 29 2163	6.2 30 2297	6.6 32 2435	6.9 34 2570	7.3 37 2708	7.7 39 2855	8.1 41 3012	8.5 44 3173	8.9 46 3340	9.4 49 3515
17,000	3.5 16 1346	3.8 17 1444	4.1 19 1545	4.3 20 1647	4.6 22 1759	4.9 23 1876	5.3 25 1995	5.6 26 2118	5.9 28 2244	6.2 30 2368	6.6 32 2492	6.9 34 2626	7.2 36 2769	7.6 38 2914	8.0 40 3064	8.4 42 3221
15,000	3.2 14 1239	3.4 15 1329	3.7 16 1420	3.9 17 1514	4.2 19 1616	4.5 20 1723	4.7 21 1832	5.0 23 1944	5.3 24 2059	5.6 26 2171	5.9 27 2284	6.2 29 2405	6.5 31 2535	6.8 32 2666	7.1 34 2801	7.5 36 2941
10,000	2.4 9 978	2.6 10 1047	2.8 11 1117	2.9 11 1188	3.1 12 1267	3.3 13 1351	3.5 14 1436	3.8 15 1523	4.0 16 1612	4.2 17 1698	4.4 18 1782	4.6 19 1874	4.8 20 1974	5.0 21 2073	5.3 23 2174	5.5 24 2277
10,000	2.1 7 859	2.2 8 918	2.4 8 978	2.5 9 1040	2.7 10 1109	2.8 10 1181	3.0 11 1255	3.2 12 1331	3.4 12 1408	3.6 14 1495	3.8 15 1584	4.0 16 1681	4.3 17 1788	4.5 18 1896	4.8 20 2008	5.1 21 2124
5,000	1.3 4 604	1.4 4 642	1.5 5 681	1.6 5 720	1.7 5 766	1.8 6 814	1.9 6 864	2.0 6 913	2.1 7 964	2.3 7 1027	2.4 8 1090	2.6 9 1162	2.7 10 1242	2.9 10 1322	3.1 11 1403	3.3 12 1486
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 3.0%/2.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 330 KIAS TO 27,402 FT
THEN CLIMB AT .82 MACH IND.

3 ENGINES OPERATING
ISA – 10 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA – 10 °C
TEMPERATURE

PR ALT	TAKEOFF GROSS WEIGHT (1000 KG)															
FEET	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000	11.4 77 2901	12.6 85 3169	14.0 95 3462	15.7 107 3794	17.8 123 4204											
41,000	10.3 68 2756	11.3 74 2997	12.3 82 3254	13.5 90 3531	14.9 100 3844	16.6 112 4202	18.9 129 4643									
39,000	9.3 60 2624	10.1 66 2845	11.0 72 3078	12.0 79 3324	13.1 86 3593	14.2 94 3886	15.6 103 4204	17.2 115 4572	19.4 131 5026							
37,000	8.5 54 2502	9.2 59 2708	10.0 64 2922	10.8 69 3145	11.6 75 3387	12.6 82 3645	13.6 88 3916	14.7 96 4211	16.0 105 4535	17.5 116 4893	19.3 129 5319					
35,000	7.8 48 2390	8.4 53 2583	9.1 57 2782	9.8 62 2989	10.6 67 3212	11.4 72 3447	12.2 78 3694	13.1 84 3955	14.1 91 4232	15.1 98 4523	16.3 106 4837	17.6 116 5191	19.2 127 5604	21.4 143 6116		
33,000	7.2 44 2291	7.8 48 2472	8.4 52 2660	9.0 56 2855	9.7 60 3063	10.4 65 3282	11.2 70 3510	12.0 75 3749	12.8 81 4001	13.7 86 4260	14.6 93 4532	15.6 100 4829	16.7 108 5155	18.0 117 5512	19.5 128 5934	21.9 146 6529
31,000	6.7 40 2194	7.3 44 2367	7.8 47 2544	8.4 51 2727	9.0 55 2924	9.7 59 3129	10.3 63 3343	11.0 68 3565	11.8 73 3799	12.5 78 4036	13.3 83 4282	14.2 89 4549	15.1 95 4837	16.1 102 5143	17.2 111 5484	18.7 121 5893
29,000	6.3 37 2100	6.8 40 2264	7.3 43 2432	7.8 47 2605	8.4 50 2790	9.0 54 2984	9.6 58 3185	10.3 62 3394	10.9 66 3612	11.6 70 3832	12.3 75 4059	13.1 80 4305	13.9 86 4567	14.7 92 4844	15.7 98 5145	16.8 106 5488
27,000	5.8 33 1999	6.3 36 2153	6.8 39 2311	7.3 42 2474	7.8 45 2649	8.3 48 2831	8.9 52 3019	9.5 55 3215	10.1 59 3418	10.7 63 3622	11.3 67 3833	12.0 72 4059	12.7 77 4300	13.5 82 4553	14.3 87 4823	15.2 94 5125
25,000	5.3 29 1869	5.7 32 2011	6.2 34 2157	6.6 37 2308	7.1 39 2469	7.5 42 2637	8.0 45 2810	8.6 48 2990	9.1 51 3176	9.6 55 3362	10.2 58 3552	10.8 62 3756	11.4 66 3973	12.0 70 4199	12.7 75 4439	13.5 80 4701
23,000	4.8 26 1743	5.2 28 1875	5.6 30 2010	6.0 32 2148	6.4 34 2297	6.8 37 2452	7.3 39 2611	7.7 42 2776	8.2 45 2947	8.7 48 3116	9.2 51 3288	9.7 54 3473	10.2 57 3670	10.8 61 3873	11.4 65 4087	12.0 69 4317
21,000	4.4 22 1622	4.7 24 1744	5.1 26 1868	5.4 28 1995	5.8 30 2132	6.2 32 2275	6.6 34 2422	7.0 37 2573	7.4 39 2729	7.8 41 2884	8.3 44 3040	8.7 47 3208	9.2 50 3386	9.7 53 3570	10.2 56 3761	10.7 59 3965
19,000	4.0 19 1505	4.3 21 1616	4.6 23 1730	4.9 24 1847	5.2 26 1973	5.6 28 2104	5.9 30 2239	6.3 32 2378	6.7 34 2521	7.1 36 2661	7.4 38 2803	7.8 40 2955	8.2 43 3117	8.7 45 3283	9.1 48 3455	9.6 51 3636
17,000	3.6 17 1390	3.9 18 1492	4.1 20 1596	4.4 21 1702	4.7 23 1818	5.0 24 1938	5.4 26 2062	5.7 27 2189	6.0 29 2320	6.4 31 2447	6.7 33 2575	7.0 35 2713	7.4 37 2860	7.8 39 3010	8.1 42 3165	8.5 44 3326
15,000	3.2 14 1278	3.5 16 1370	3.7 17 1465	4.0 18 1562	4.3 19 1667	4.5 21 1778	4.8 22 1890	5.1 24 2006	5.4 25 2126	5.7 27 2241	6.0 28 2356	6.3 30 2481	6.6 32 2614	6.9 34 2749	7.3 36 2888	7.6 38 3031
10,000	2.4 9 1003	2.6 10 1074	2.8 11 1146	3.0 12 1220	3.2 12 1301	3.4 13 1387	3.6 14 1474	3.8 15 1564	4.0 16 1656	4.2 17 1743	4.4 18 1829	4.7 19 1923	4.9 21 2025	5.1 22 2126	5.3 23 2229	5.6 25 2334
10,000	2.1 7 879	2.2 8 940	2.4 9 1002	2.5 9 1065	2.7 10 1135	2.9 11 1210	3.1 11 1285	3.2 12 1363	3.4 13 1443	3.6 14 1532	3.9 15 1622	4.1 16 1722	4.3 18 1830	4.6 19 1941	4.8 20 2055	5.1 22 2173
5,000	1.3 4 612	1.4 4 651	1.5 5 690	1.6 5 730	1.7 5 777	1.8 6 826	1.9 6 876	2.0 7 926	2.1 7 978	2.3 8 1041	2.4 8 1105	2.6 9 1178	2.7 10 1258	2.9 11 1340	3.1 11 1422	3.3 12 1506
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 3.0%/1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 330 KIAS TO 27,402 FT
THEN CLIMB AT .82 MACH IND.

3 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT	TAKEOFF GROSS WEIGHT (1000 KG)															
FEET	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000	11.8 80 3031	13.0 90 3313	14.4 100 3621	16.1 112 3971	18.4 129 4405											
41,000	10.5 71 2877	11.6 78 3130	12.7 86 3400	13.9 95 3692	15.3 106 4020	17.1 118 4398	19.4 136 4864									
39,000	9.5 63 2738	10.4 69 2970	11.3 76 3213	12.3 83 3471	13.4 90 3754	14.6 99 4060	16.0 109 4395	17.7 121 4783	19.9 138 5263							
37,000	8.7 56 2608	9.4 61 2823	10.2 67 3048	11.0 73 3282	12.0 79 3535	12.9 86 3805	14.0 93 4089	15.1 101 4399	16.4 110 4739	18.0 122 5116	19.9 136 5566					
35,000	8.0 51 2490	8.6 55 2691	9.3 60 2900	10.0 65 3117	10.8 70 3350	11.7 76 3596	12.5 82 3854	13.5 88 4127	14.5 95 4418	15.6 103 4722	16.7 112 5051	18.1 122 5424	19.8 134 5859	22.0 151 6399		
33,000	7.4 46 2385	8.0 50 2575	8.6 54 2771	9.3 59 2974	10.0 63 3192	10.7 68 3421	11.5 73 3659	12.3 79 3909	13.1 84 4173	14.0 91 4443	15.0 98 4727	16.0 105 5038	17.2 113 5379	18.5 123 5753	20.1 135 6197	22.5 153 6825
31,000	6.9 42 2283	7.4 46 2463	8.0 50 2648	8.6 53 2840	9.2 58 3045	9.9 62 3259	10.6 66 3482	11.3 71 3715	12.1 76 3958	12.9 81 4205	13.7 87 4463	14.6 93 4741	15.5 100 5042	16.5 107 5362	17.7 116 5718	19.2 127 6147
29,000	6.4 39 2184	6.9 42 2354	7.5 45 2530	8.0 49 2710	8.6 52 2904	9.2 56 3106	9.8 60 3315	10.5 64 3533	11.2 69 3761	11.9 74 3990	12.6 79 4228	13.4 84 4483	14.2 90 4757	15.1 96 5045	16.1 103 5359	17.2 111 5718
27,000	6.0 35 2077	6.5 38 2238	6.9 41 2403	7.4 44 2573	8.0 47 2754	8.5 51 2944	9.1 54 3141	9.7 58 3344	10.3 62 3556	11.0 66 3769	11.6 70 3988	12.3 75 4223	13.0 80 4474	13.8 85 4737	14.6 91 5019	15.6 98 5334
25,000	5.4 31 1940	5.9 33 2088	6.3 36 2240	6.7 38 2396	7.2 41 2564	7.7 44 2739	8.2 47 2919	8.8 50 3106	9.3 54 3300	9.9 57 3493	10.4 61 3691	11.0 65 3903	11.6 69 4128	12.3 73 4363	13.0 78 4612	13.8 84 4884
23,000	4.9 27 1807	5.3 29 1944	5.7 31 2084	6.1 33 2228	6.5 36 2382	7.0 38 2543	7.4 41 2709	7.9 44 2881	8.4 47 3058	8.9 50 3233	9.4 53 3412	9.9 56 3604	10.4 60 3807	11.0 63 4018	11.6 67 4240	12.3 72 4478
21,000	4.5 23 1680	4.8 25 1806	5.2 27 1934	5.5 29 2067	5.9 31 2209	6.3 33 2357	6.7 36 2509	7.1 38 2666	7.6 40 2829	8.0 43 2988	8.4 46 3150	8.9 49 3324	9.4 52 3508	9.8 55 3698	10.4 58 3896	10.9 62 4107
19,000	4.1 20 1556	4.4 22 1671	4.7 24 1789	5.0 25 1910	5.3 27 2041	5.7 29 2177	6.1 31 2317	6.4 33 2461	6.8 35 2609	7.2 37 2754	7.6 40 2900	8.0 42 3057	8.4 45 3224	8.8 47 3395	9.3 50 3573	9.8 53 3760
17,000	3.7 17 1435	3.9 19 1540	4.2 20 1648	4.5 22 1759	4.8 23 1878	5.1 25 2003	5.5 27 2131	5.8 28 2262	6.1 30 2398	6.5 32 2529	6.8 34 2661	7.1 36 2803	7.5 38 2954	7.9 41 3108	8.3 43 3267	8.7 46 3434
15,000	3.3 15 1317	3.5 16 1413	3.8 17 1511	4.1 19 1611	4.3 20 1720	4.6 21 1834	4.9 23 1950	5.2 24 2070	5.5 26 2193	5.8 28 2312	6.1 29 2431	6.4 31 2559	6.7 33 2695	7.1 35 2833	7.4 37 2976	7.7 39 3124
10,000	2.5 10 1029	2.7 10 1102	2.8 11 1176	3.0 12 1252	3.2 13 1336	3.4 14 1424	3.7 15 1514	3.9 16 1606	4.1 17 1701	4.3 18 1790	4.5 19 1877	4.7 20 1973	4.9 21 2076	5.2 23 2179	5.4 24 2284	5.6 25 2391
10,000	2.1 8 899	2.3 8 962	2.4 9 1025	2.6 10 1090	2.7 10 1162	2.9 11 1238	3.1 12 1316	3.3 12 1396	3.5 13 1478	3.7 14 1569	3.9 15 1661	4.1 17 1763	4.4 18 1873	4.6 19 1986	4.9 21 2103	5.2 23 2224
5,000	1.4 4 620	1.4 5 660	1.5 5 700	1.6 5 740	1.7 6 787	1.8 6 837	1.9 6 888	2.0 7 939	2.2 7 992	2.3 8 1056	2.4 8 1121	2.6 9 1194	2.8 10 1276	2.9 11 1358	3.1 12 1441	3.3 12 1526
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 3.0%/1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 330 KIAS TO 27,402 FT
THEN CLIMB AT .82 MACH IND.

3 ENGINES OPERATING
ISA + 10 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA + 10 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000	12.1 85 3165	13.4 94 3460	14.8 105 3785	16.6 119 4155	19.0 137 4615											
41,000	10.8 74 3001	11.9 82 3267	13.0 91 3550	14.3 100 3856	15.8 111 4202	17.6 125 4601	20.0 143 5096									
39,000	9.8 66 2854	10.7 72 3096	11.6 79 3352	12.6 87 3622	13.8 95 3918	15.0 104 4240	16.4 114 4592	18.2 128 5001	20.6 145 5511							
37,000	8.9 59 2717	9.6 64 2942	10.5 70 3176	11.3 76 3421	12.2 83 3686	13.2 90 3969	14.3 97 4266	15.5 106 4591	16.9 116 4948	18.4 128 5345	20.5 143 5821					
35,000	8.1 53 2592	8.8 58 2802	9.5 63 3020	10.3 68 3247	11.1 73 3490	11.9 79 3746	12.8 85 4016	13.8 92 4302	14.8 100 4606	15.9 108 4924	17.2 117 5269	18.6 128 5660	20.3 141 6117	22.6 159 6690		
33,000	7.5 48 2481	8.2 52 2679	8.8 57 2884	9.5 61 3096	10.2 66 3323	10.9 71 3561	11.7 77 3810	12.6 82 4071	13.4 88 4346	14.4 95 4628	15.3 102 4925	16.4 110 5250	17.6 119 5606	18.9 129 5997	20.6 141 6462	23.1 161 7123
31,000	7.0 44 2374	7.6 48 2561	8.2 52 2754	8.8 56 2954	9.4 60 3167	10.1 65 3391	10.8 69 3623	11.6 74 3866	12.4 79 4120	13.1 85 4377	14.0 91 4646	14.9 98 4936	15.9 105 5249	16.9 112 5582	18.1 121 5954	19.6 133 6404
29,000	6.6 40 2269	7.1 44 2447	7.6 47 2629	8.2 51 2818	8.8 55 3019	9.4 59 3230	10.1 63 3448	10.7 67 3675	11.4 72 3912	12.1 77 4150	12.9 82 4397	13.7 88 4663	14.5 94 4948	15.4 100 5248	16.4 107 5574	17.6 116 5950
27,000	6.1 36 2157	6.6 39 2324	7.1 43 2496	7.6 46 2673	8.1 49 2862	8.7 53 3059	9.3 57 3263	9.9 60 3476	10.6 65 3696	11.2 69 3917	11.8 73 4145	12.5 78 4389	13.3 84 4650	14.1 89 4923	15.0 95 5216	15.9 102 5544
25,000	5.5 32 2011	6.0 34 2165	6.4 37 2324	6.9 40 2486	7.4 43 2660	7.9 46 2842	8.4 49 3030	8.9 52 3224	9.5 56 3425	10.0 60 3625	10.6 63 3830	11.2 68 4050	11.9 72 4284	12.5 76 4526	13.3 81 4785	14.1 87 5068
23,000	5.0 28 1872	5.4 30 2014	5.8 32 2159	6.2 35 2309	6.6 37 2469	7.1 40 2636	7.6 43 2808	8.0 46 2986	8.5 48 3170	9.0 52 3351	9.5 55 3536	10.1 58 3734	10.6 62 3945	11.2 66 4162	11.8 70 4391	12.5 74 4639
21,000	4.5 24 1737	4.9 26 1868	5.3 28 2001	5.6 30 2139	6.0 32 2286	6.4 35 2439	6.8 37 2597	7.3 39 2760	7.7 42 2928	8.1 45 3093	8.6 47 3260	9.0 50 3439	9.5 54 3629	10.0 57 3825	10.5 60 4029	11.1 64 4248
19,000	4.1 21 1607	4.4 23 1726	4.7 24 1849	5.1 26 1974	5.4 28 2109	5.8 30 2250	6.2 32 2394	6.5 34 2543	6.9 36 2697	7.3 39 2846	7.7 41 2997	8.1 43 3159	8.5 46 3331	9.0 49 3506	9.4 52 3689	9.9 55 3882
17,000	3.7 18 1480	4.0 20 1589	4.3 21 1701	4.6 23 1815	4.9 24 1938	5.2 26 2067	5.5 28 2199	5.9 29 2335	6.2 31 2475	6.6 33 2610	6.9 35 2746	7.2 37 2892	7.6 40 3047	8.0 42 3205	8.4 44 3368	8.8 47 3539
15,000	3.3 15 1356	3.6 17 1455	3.8 18 1556	4.1 19 1660	4.4 21 1772	4.7 22 1889	5.0 24 2010	5.3 25 2133	5.6 27 2260	5.9 28 2382	6.2 30 2504	6.5 32 2635	6.8 34 2775	7.1 36 2916	7.5 38 3062	7.8 40 3214
10,000	2.5 10 1055	2.7 11 1129	2.9 12 1206	3.1 12 1284	3.3 13 1370	3.5 14 1460	3.7 15 1553	3.9 16 1647	4.1 17 1745	4.3 18 1835	4.5 19 1925	4.8 21 2022	5.0 22 2127	5.2 23 2232	5.5 25 2338	5.7 26 2447
10,000	2.1 8 919	2.3 8 983	2.4 9 1049	2.6 10 1115	2.8 10 1189	2.9 11 1267	3.1 12 1347	3.3 13 1429	3.5 14 1512	3.7 15 1605	3.9 16 1699	4.2 17 1803	4.4 18 1916	4.7 20 2030	4.9 21 2149	5.2 23 2272
5,000	1.4 4 629	1.5 5 669	1.5 5 709	1.6 5 750	1.7 6 798	1.8 6 849	1.9 6 900	2.1 7 952	2.2 7 1005	2.3 8 1070	2.4 9 1136	2.6 9 1210	2.8 10 1292	3.0 11 1375	3.1 12 1459	3.3 13 1545
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 3.0%/1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 330 KIAS TO 27,402 FT
THEN CLIMB AT .82 MACH IND.

3 ENGINES OPERATING
ISA + 20 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA + 20 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000	14.1 102 3420	15.7 114 3757	17.6 129 4136	20.0 148 4588												
41,000	12.5 89 3230	13.8 98 3526	15.2 109 3846	16.8 121 4198	18.7 136 4604	21.1 155 5088										
39,000	11.3 79 3064	12.3 86 3333	13.5 95 3618	14.7 104 3923	16.1 115 4260	17.7 126 4627	19.5 140 5047	21.9 159 5548								
37,000	10.2 70 2914	11.2 77 3162	12.1 84 3422	13.2 92 3697	14.3 100 3995	15.5 109 4311	16.9 119 4657	18.4 130 5037	20.2 143 5464	22.3 160 5955						
35,000	9.4 63 2777	10.2 69 3009	11.1 75 3250	12.0 82 3503	13.0 89 3775	14.0 96 4064	15.1 104 4371	16.3 113 4700	17.7 123 5056	19.1 134 5434	20.7 146 5853	22.7 161 6342	25.2 181 6942			
33,000	8.7 58 2656	9.5 63 2874	10.2 68 3100	11.1 74 3336	11.9 80 3590	12.8 86 3857	13.8 93 4139	14.8 101 4437	16.0 109 4755	17.1 117 5086	18.4 127 5440	19.8 138 5833	21.5 150 6274	23.3 165 6771	25.8 185 7400	
31,000	8.1 53 2539	8.8 57 2745	9.5 62 2958	10.2 67 3179	11.0 73 3416	11.9 78 3666	12.7 84 3928	13.6 91 4204	14.6 97 4495	15.6 105 4795	16.7 113 5110	17.9 122 5456	19.2 131 5834	20.6 142 6244	22.3 155 6717	24.6 173 7317
29,000	7.6 48 2424	8.2 52 2618	8.8 57 2819	9.5 61 3028	10.2 66 3251	11.0 71 3485	11.8 76 3730	12.6 82 3986	13.5 88 4256	14.4 94 4532	15.3 101 4819	16.3 109 5132	17.5 117 5471	18.7 126 5834	20.0 136 6238	21.7 149 6719
27,000	7.0 43 2299	7.6 47 2482	8.2 51 2670	8.8 55 2865	9.4 59 3073	10.1 64 3292	10.8 68 3520	11.6 73 3758	12.4 78 4007	13.2 84 4260	14.0 90 4523	14.9 96 4807	15.9 103 5114	16.9 111 5438	18.0 119 5794	19.4 129 6204
25,000	6.3 38 2137	6.8 41 2304	7.4 44 2477	7.9 48 2655	8.5 51 2845	9.1 55 3045	9.7 59 3252	10.3 63 3468	11.0 67 3694	11.7 72 3920	12.4 77 4154	13.2 82 4406	14.0 88 4676	14.9 94 4960	15.8 100 5266	16.9 108 5610
23,000	5.7 33 1982	6.1 35 2135	6.6 38 2293	7.1 41 2456	7.6 44 2630	8.1 47 2813	8.7 51 3002	9.3 54 3198	9.9 58 3402	10.4 62 3606	11.1 66 3814	11.7 70 4039	12.4 75 4279	13.1 80 4530	13.9 85 4797	14.8 91 5091
21,000	5.1 28 1834	5.5 31 1975	6.0 33 2119	6.4 36 2268	6.8 38 2427	7.3 41 2594	7.8 44 2766	8.3 47 2945	8.8 50 3131	9.3 53 3314	9.9 57 3501	10.4 60 3702	11.0 64 3917	11.6 68 4140	12.3 73 4375	13.0 78 4631
19,000	4.6 24 1692	5.0 26 1820	5.4 29 1951	5.7 31 2087	6.1 33 2232	6.6 35 2385	7.0 38 2542	7.4 40 2704	7.9 43 2873	8.4 46 3038	8.8 49 3205	9.3 52 3386	9.8 55 3578	10.3 58 3776	10.9 62 3985	11.5 66 4208
17,000	4.2 21 1553	4.5 23 1670	4.8 24 1789	5.1 26 1912	5.5 28 2045	5.9 30 2183	6.3 32 2326	6.7 34 2474	7.1 37 2627	7.5 39 2775	7.8 41 2925	8.3 44 3087	8.7 47 3260	9.2 50 3436	9.7 53 3621	10.2 56 3817
15,000	3.7 18 1419	4.0 19 1524	4.3 21 1632	4.6 22 1743	4.9 24 1863	5.2 26 1989	5.6 27 2118	5.9 29 2252	6.3 31 2390	6.6 33 2523	7.0 35 2657	7.3 38 2801	7.7 40 2956	8.1 42 3113	8.5 45 3276	9.0 48 3449
10,000	2.7 11 1091	2.9 12 1170	3.1 13 1250	3.3 14 1332	3.6 15 1424	3.8 16 1519	4.1 17 1617	4.3 18 1718	4.6 20 1822	4.8 21 1919	5.0 22 2016	5.3 24 2122	5.6 25 2235	5.8 27 2349	6.1 28 2466	6.4 30 2587
10,000	2.3 9 947	2.5 9 1014	2.6 10 1082	2.8 11 1152	3.0 12 1230	3.2 13 1312	3.4 13 1396	3.6 14 1483	3.9 15 1572	4.1 17 1671	4.3 18 1772	4.6 19 1883	4.9 21 2005	5.2 23 2129	5.5 25 2258	5.8 27 2394
5,000	1.4 5 640	1.5 5 682	1.6 5 723	1.7 6 766	1.8 6 815	1.9 7 868	2.1 7 921	2.2 7 975	2.3 8 1030	2.5 9 1098	2.6 9 1166	2.8 10 1243	3.0 11 1329	3.2 12 1415	3.3 13 1503	3.5 14 1594
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 3.0%/1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 290 KIAS TO 28,228 FT
THEN CLIMB AT .74 MACH IND.

WINDMILLING JET

2 ENGINES OPERATING
ISA - 20 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA - 20 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
39,000	20.9 129 3546															
37,000	17.4 106 3225	19.9 122 3609	23.0 142 4073													
35,000	15.1 90 2986	16.9 102 3305	19.0 115 3665	21.6 132 4086	24.9 153 4609											
33,000	13.4 79 2792	14.8 88 3071	16.5 98 3378	18.4 110 3722	20.6 124 4122	23.4 141 4594										
31,000	12.0 69 2619	13.2 77 2870	14.6 85 3142	16.2 94 3440	17.9 105 3778	19.9 118 4161	22.3 133 4603	25.2 152 5129								
29,000	10.8 61 2458	11.9 67 2686	13.1 74 2930	14.4 82 3195	15.8 91 3491	17.4 101 3821	19.3 112 4191	21.5 126 4614	24.1 142 5109							
27,000	9.6 52 2272	10.5 57 2475	11.5 63 2692	12.5 69 2924	13.7 76 3181	15.0 84 3462	16.5 92 3771	18.1 102 4116	20.0 113 4505	22.2 127 4941	24.8 144 5455					
25,000	8.3 44 2083	9.1 48 2264	9.9 53 2454	10.8 58 2656	11.8 63 2879	12.8 69 3120	13.9 75 3380	15.2 82 3664	16.6 90 3977	18.1 99 4313	19.8 110 4691	21.9 123 5132				
23,000	7.3 37 1910	7.9 40 2070	8.6 44 2239	9.3 48 2417	10.1 52 2612	11.0 57 2821	11.9 62 3044	12.9 67 3285	13.9 73 3545	15.0 79 3815	16.3 87 4109	17.7 95 4441	19.3 105 4820	21.2 116 5255		
21,000	6.4 31 1751	6.9 34 1894	7.5 37 2044	8.1 40 2202	8.8 44 2374	9.5 47 2558	10.2 51 2753	11.0 55 2961	11.9 60 3183	12.8 65 3409	13.7 70 3650	14.7 76 3917	15.8 83 4214	17.1 90 4542	18.7 100 4926	20.8 112 5432
19,000	5.6 26 1602	6.1 29 1731	6.6 31 1865	7.1 34 2005	7.7 37 2159	8.3 40 2322	8.9 43 2494	9.6 46 2676	10.3 50 2870	11.0 54 3064	11.7 58 3267	12.5 62 3491	13.4 68 3736	14.3 73 4002	15.5 80 4303	16.9 88 4675
17,000	4.9 22 1460	5.3 24 1576	5.8 26 1696	6.2 29 1821	6.7 31 1957	7.2 33 2103	7.7 36 2255	8.3 39 2416	8.9 42 2586	9.5 45 2753	10.1 48 2927	10.7 52 3117	11.4 56 3324	12.1 60 3544	13.0 65 3788	14.0 71 4077
15,000	4.3 19 1325	4.7 20 1428	5.0 22 1535	5.4 24 1645	5.8 26 1767	6.3 28 1896	6.7 30 2031	7.2 32 2173	7.7 35 2323	8.2 37 2467	8.7 40 2616	9.2 43 2777	9.7 46 2953	10.3 49 3138	10.9 53 3338	11.7 57 3569
10,000	3.0 12 1005	3.2 13 1079	3.5 14 1156	3.7 15 1236	4.0 16 1324	4.3 17 1418	4.6 18 1516	4.9 20 1618	5.3 21 1725	5.5 23 1823	5.8 24 1922	6.1 26 2029	6.4 27 2145	6.7 29 2264	7.0 31 2387	7.4 33 2523
10,000	2.7 10 936	3.0 11 1005	3.2 12 1075	3.4 13 1148	3.6 14 1230	3.9 15 1316	4.2 16 1406	4.5 17 1500	4.8 19 1598	5.1 20 1705	5.4 22 1816	5.7 24 1939	6.1 26 2074	6.5 28 2214	6.9 31 2363	7.4 33 2523
5,000	1.6 5 633	1.7 6 675	1.8 6 717	1.9 6 760	2.1 7 811	2.2 7 865	2.3 8 920	2.5 8 976	2.6 9 1034	2.8 10 1104	3.0 11 1175	3.2 12 1256	3.4 13 1345	3.6 14 1437	3.9 15 1531	4.1 16 1629
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUELBY 3.0%/1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT.
CLIMB AT 290 KIAS TO 28,228 FT.
THEN CLIMB AT .74 MACH IND.

WINDMILLING JET

2 ENGINES OPERATING
ISA - 10 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA - 10 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
39,000	21.6 137 3731															
37,000	18.0 112 3386	20.6 129 3793	23.9 151 4288													
35,000	15.6 95 3130	17.5 107 3466	19.7 122 3849	22.4 140 4296	25.9 163 4854											
33,000	13.8 83 2923	15.3 93 3217	17.0 103 3542	19.0 116 3906	21.3 131 4330	24.2 150 4832										
31,000	12.4 73 2740	13.7 81 3003	15.1 90 3290	16.7 100 3605	18.5 111 3962	20.6 125 4368	23.1 141 4837	26.2 161 5398								
29,000	11.2 64 2569	12.3 71 2808	13.5 78 3065	14.8 87 3344	16.3 96 3656	18.0 106 4004	19.9 118 4395	22.2 133 4844	25.0 151 5372							
27,000	9.8 55 2371	10.8 60 2584	11.8 66 2811	12.9 73 3055	14.1 80 3325	15.5 88 3621	17.0 97 3946	18.7 108 4310	20.6 120 4722	22.9 134 5184	25.6 152 5732					
25,000	8.6 46 2170	9.4 51 2358	10.2 55 2558	11.1 60 2770	12.1 66 3003	13.1 72 3256	14.3 79 3529	15.6 86 3828	17.1 95 4157	18.6 105 4511	20.4 116 4909	22.6 130 5377				
23,000	7.5 39 1986	8.1 42 2154	8.8 46 2330	9.6 50 2516	10.4 55 2720	11.2 59 2938	12.2 65 3172	13.2 70 3423	14.3 76 3696	15.5 83 3980	16.7 91 4289	18.2 100 4638	19.8 110 5036	21.8 122 5495		
21,000	6.5 33 1817	7.1 36 1967	7.7 39 2124	8.3 42 2288	9.0 46 2468	9.7 49 2660	10.5 53 2863	11.3 58 3080	12.2 63 3313	13.1 68 3549	14.0 73 3801	15.1 80 4080	16.3 87 4391	17.6 95 4735	19.2 104 5138	21.4 118 5672
19,000	5.7 28 1660	6.2 30 1794	6.7 33 1934	7.3 35 2080	7.8 38 2240	8.5 41 2410	9.1 45 2589	9.8 48 2780	10.5 52 2982	11.2 56 3183	12.0 61 3396	12.8 65 3629	13.7 71 3885	14.7 77 4162	15.9 83 4477	17.3 92 4868
17,000	5.0 23 1511	5.5 25 1631	5.9 28 1756	6.4 30 1886	6.9 32 2028	7.4 35 2179	7.9 38 2338	8.5 40 2505	9.1 44 2682	9.7 47 2856	10.3 50 3036	11.0 54 3234	11.7 58 3449	12.4 63 3678	13.3 68 3933	14.4 74 4235
15,000	4.4 20 1369	4.8 21 1475	5.1 23 1586	5.5 25 1701	6.0 27 1827	6.4 29 1961	6.9 31 2101	7.4 34 2249	7.9 36 2404	8.4 39 2554	8.9 42 2708	9.4 45 2876	9.9 48 3058	10.5 51 3249	11.2 55 3457	12.0 60 3698
10,000	3.1 12 1032	3.3 13 1109	3.5 14 1188	3.8 15 1270	4.1 16 1362	4.4 18 1459	4.7 19 1560	5.0 20 1665	5.4 22 1775	5.6 23 1876	5.9 25 1978	6.2 27 2088	6.5 28 2207	6.8 30 2328	7.2 32 2455	7.5 35 2595
10,000	2.8 11 960	3.0 11 1031	3.2 12 1103	3.5 13 1178	3.7 14 1263	4.0 16 1352	4.3 17 1445	4.6 18 1541	4.9 19 1642	5.2 21 1753	5.5 23 1867	5.8 25 1993	6.2 27 2132	6.6 29 2276	7.1 32 2430	7.5 35 2595
5,000	1.6 5 643	1.7 6 685	1.8 6 729	1.9 7 773	2.1 7 824	2.2 8 879	2.4 8 935	2.5 9 992	2.7 9 1051	2.8 10 1122	3.0 11 1195	3.2 12 1277	3.4 13 1368	3.7 14 1461	3.9 15 1557	4.2 17 1656
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUELBY 2.0%/1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 290 KIAS TO 28,228 FT
THEN CLIMB AT .74 MACH IND.

WINDMILLING JET

2 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
39,000	22.4 146 3924															
37,000	18.6 119 3553	21.3 137 3986	24.8 160 4514													
35,000	16.1 101 3280	18.0 114 3636	20.3 129 4041	23.2 148 4518	26.9 173 5115											
33,000	14.2 87 3060	15.8 98 3370	17.6 109 3713	19.6 123 4098	22.1 139 4548	25.1 159 5083										
31,000	12.7 77 2864	14.1 85 3142	15.6 95 3444	17.2 105 3776	19.1 117 4154	21.3 132 4584	23.9 149 5083	27.1 171 5681								
29,000	11.5 68 2683	12.6 75 2934	13.9 83 3204	15.3 91 3498	16.8 101 3828	18.6 112 4195	20.6 125 4609	23.0 141 5085	25.9 159 5647							
27,000	10.1 58 2473	11.1 63 2696	12.1 70 2934	13.3 77 3190	14.5 84 3474	15.9 93 3785	17.5 102 4129	19.3 113 4512	21.3 126 4948	23.7 142 5438	26.5 161 6021					
25,000	8.8 48 2259	9.6 53 2457	10.5 58 2665	11.4 63 2888	12.4 69 3132	13.5 76 3397	14.7 83 3684	16.1 91 3997	17.6 100 4344	19.2 110 4717	21.1 122 5138	23.3 137 5632				
23,000	7.7 41 2065	8.3 44 2240	9.1 48 2424	9.8 53 2618	10.7 57 2831	11.5 62 3060	12.5 68 3304	13.6 74 3568	14.7 80 3855	15.9 88 4152	17.2 96 4476	18.7 105 4843	20.4 116 5263	22.5 129 5747		
21,000	6.7 34 1886	7.3 37 2042	7.9 41 2206	8.5 44 2378	9.2 48 2565	10.0 52 2765	10.8 56 2978	11.6 61 3205	12.5 66 3448	13.4 71 3695	14.4 77 3959	15.5 84 4251	16.7 91 4577	18.1 100 4938	19.8 110 5363	22.0 124 5927
19,000	5.9 29 1720	6.4 31 1860	6.9 34 2006	7.5 37 2159	8.0 40 2325	8.7 43 2502	9.3 47 2689	10.0 51 2887	10.8 55 3098	11.5 59 3309	12.3 63 3530	13.2 68 3773	14.1 74 4041	15.1 80 4331	16.3 88 4661	17.8 97 5074
17,000	5.2 24 1564	5.6 27 1688	6.0 29 1818	6.5 31 1953	7.0 34 2101	7.5 36 2258	8.1 39 2423	8.7 42 2597	9.4 45 2782	9.9 49 2962	10.6 52 3150	11.2 56 3356	12.0 61 3580	12.8 66 3819	13.7 71 4084	14.7 78 4402
15,000	4.5 20 1413	4.9 22 1524	5.3 24 1639	5.7 26 1759	6.1 28 1890	6.5 30 2029	7.0 33 2174	7.5 35 2327	8.1 38 2489	8.6 40 2644	9.1 43 2804	9.6 46 2978	10.2 50 3167	10.8 53 3365	11.5 58 3582	12.3 62 3833
10,000	3.1 12 1060	3.4 13 1139	3.6 15 1221	3.9 16 1306	4.2 17 1400	4.5 18 1500	4.8 20 1605	5.1 21 1713	5.5 23 1828	5.7 24 1931	6.0 26 2035	6.3 28 2148	6.6 29 2271	7.0 31 2395	7.3 33 2525	7.7 36 2669
10,000	2.8 11 985	3.1 12 1058	3.3 13 1133	3.5 14 1210	3.8 15 1297	4.0 16 1389	4.3 17 1484	4.6 19 1584	4.9 20 1688	5.3 22 1802	5.6 24 1919	6.0 26 2049	6.3 28 2192	6.8 30 2340	7.2 33 2499	7.7 36 2669
5,000	1.6 5 653	1.7 6 696	1.9 6 740	2.0 7 785	2.1 7 838	2.2 8 893	2.4 8 950	2.5 9 1009	2.7 9 1069	2.9 10 1141	3.1 11 1215	3.3 12 1298	3.5 13 1391	3.7 14 1486	3.9 16 1583	4.2 17 1685
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 2.0%/1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINES

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 290 KIAS TO 28,228 FT
THEN CLIMB AT .74 MACH IND.

WINDMILLING JET

2 ENGINES OPERATING
ISA + 10 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA + 10 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
39,000	23.3 155 4132															
37,000	19.3 126 3730	22.1 145 4191	25.7 170 4757													
35,000	16.6 106 3437	18.6 120 3813	21.0 136 4243	24.0 157 4751	27.9 184 5392											
33,000	14.6 92 3202	16.3 103 3529	18.1 115 3891	20.3 130 4300	22.8 147 4777	26.0 168 5347										
31,000	13.1 81 2995	14.5 90 3287	16.0 100 3605	17.7 111 3956	19.7 124 4355	22.0 139 4811	24.7 158 5341	28.1 181 5980								
29,000	11.8 71 2803	13.0 79 3066	14.3 87 3351	15.7 96 3661	17.3 106 4008	19.2 118 4396	21.3 132 4834	23.8 148 5339	26.8 169 5939							
27,000	10.4 60 2579	11.4 67 2813	12.5 73 3063	13.6 81 3332	14.9 89 3631	16.4 98 3958	18.0 108 4320	19.8 119 4725	22.0 133 5186	24.4 150 5707						
25,000	9.0 51 2353	9.9 56 2559	10.7 61 2778	11.7 66 3011	12.7 73 3267	13.9 79 3544	15.1 87 3846	16.5 95 4175	18.1 105 4541	19.8 116 4934	21.7 129 5378	24.1 144 5902				
23,000	7.8 42 2147	8.5 46 2330	9.3 51 2522	10.1 55 2726	10.9 60 2948	11.8 65 3187	12.8 71 3443	13.9 77 3719	15.1 84 4020	16.3 92 4331	17.7 100 4672	19.2 110 5058	21.0 122 5501	23.1 135 6012		
21,000	6.9 36 1959	7.4 39 2121	8.1 42 2292	8.7 46 2471	9.4 50 2667	10.2 54 2876	11.0 59 3098	11.9 63 3334	12.8 69 3589	13.8 74 3847	14.8 81 4123	15.9 88 4429	17.2 95 4771	18.6 104 5149	20.3 115 5597	22.7 130 6193
19,000	6.0 30 1784	6.5 33 1929	7.1 36 2081	7.6 39 2240	8.2 42 2413	8.9 45 2597	9.5 49 2792	10.3 53 2999	11.1 57 3220	11.8 61 3439	12.6 66 3670	13.5 72 3924	14.4 77 4203	15.5 84 4506	16.7 92 4852	18.3 102 5287
17,000	5.3 25 1618	5.7 28 1748	6.2 30 1883	6.6 32 2023	7.2 35 2177	7.7 38 2340	8.3 41 2512	8.9 44 2693	9.6 47 2886	10.2 51 3073	10.8 55 3269	11.5 59 3482	12.2 63 3715	13.1 68 3964	14.0 74 4242	15.1 81 4575
15,000	4.6 21 1460	5.0 23 1575	5.4 25 1695	5.8 27 1819	6.2 29 1955	6.7 31 2099	7.2 34 2250	7.7 36 2409	8.2 39 2577	8.7 42 2737	9.2 45 2903	9.8 48 3083	10.4 52 3279	11.0 56 3485	11.7 60 3710	12.5 65 3972
10,000	3.2 13 1089	3.4 14 1171	3.7 15 1255	3.9 16 1343	4.2 18 1440	4.5 19 1543	4.9 20 1651	5.2 22 1763	5.6 23 1881	5.8 25 1987	6.1 27 2095	6.4 28 2211	6.7 30 2336	7.1 32 2463	7.4 35 2597	7.8 37 2746
10,000	2.9 11 1010	3.1 12 1085	3.3 13 1163	3.6 14 1243	3.8 15 1332	4.1 17 1427	4.4 18 1525	4.7 19 1628	5.0 21 1735	5.3 22 1852	5.7 24 1973	6.0 26 2107	6.4 29 2253	6.9 31 2406	7.3 34 2569	7.8 37 2746
5,000	1.6 6 663	1.8 6 707	1.9 6 752	2.0 7 798	2.1 7 851	2.3 8 908	2.4 9 966	2.6 9 1026	2.7 10 1087	2.9 11 1161	3.1 11 1236	3.3 12 1320	3.5 14 1414	3.7 15 1510	4.0 16 1609	4.2 17 1713
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 2.0%/1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

KEY
TIME (MIN)
DIST (NM)
FUEL (KG)

CLIMB TABLE
CF6-80C2D1F ENGINE

CLIMB AT 250 KIAS OR 1.4G BUFFET BOUNDARY TO 10,000 FT
CLIMB AT 290 KIAS TO 28,228 FT
THEN CLIMB AT .74 MACH IND.

WINDMILLING JET

2 ENGINES OPERATING
ISA + 20 °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA + 20 °C
TEMPERATURE

PR ALT FEET	TAKEOFF GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
37,000	23.3 156 4150	27.2 184 4734														
35,000	19.9 131 3792	22.6 150 4250	26.0 174 4794	30.4 206 5478												
33,000	17.4 113 3512	19.6 128 3902	22.1 145 4346	25.1 166 4867	29.0 193 5507											
31,000	15.5 98 3266	17.3 110 3608	19.3 124 3988	21.6 140 4420	24.4 159 4927	27.8 183 5536	32.3 214 6297									
29,000	13.8 86 3037	15.3 96 3341	17.0 107 3674	18.9 119 4045	21.1 134 4470	23.6 151 4961	26.8 173 5543									
27,000	12.0 72 2771	13.2 80 3035	14.6 88 3321	16.1 98 3633	17.7 109 3984	19.7 121 4378	21.9 135 4827	24.5 153 5349	27.8 175 5974							
25,000	10.3 59 2506	11.3 66 2735	12.4 72 2979	13.5 79 3243	14.8 87 3534	16.3 96 3855	17.9 106 4209	19.7 117 4606	21.8 131 5058	24.2 147 5567						
23,000	8.9 49 2271	9.7 54 2471	10.6 59 2682	11.5 65 2908	12.5 71 3155	13.6 77 3424	14.9 84 3715	16.2 92 4033	17.7 101 4385	19.3 112 4760	21.1 123 5181	23.3 137 5671	25.9 155 6253			
21,000	7.7 41 2062	8.4 45 2238	9.1 49 2424	9.9 53 2620	10.7 58 2835	11.6 63 3066	12.6 69 3314	13.7 75 3581	14.8 81 3871	16.0 89 4172	17.3 97 4498	18.8 106 4866	20.5 117 5284	22.4 129 5760	24.8 145 6343	
19,000	6.7 35 1872	7.3 38 2029	7.9 41 2193	8.6 45 2366	9.3 49 2555	10.1 53 2757	10.9 57 2973	11.7 62 3203	12.7 67 3452	13.6 73 3703	14.6 79 3973	15.8 86 4271	17.0 94 4605	18.4 102 4975	20.1 113 5409	22.4 128 5979
17,000	5.9 29 1694	6.4 32 1833	6.9 35 1978	7.5 37 2130	8.1 41 2297	8.7 44 2475	9.4 48 2664	10.1 51 2864	10.9 56 3079	11.7 60 3293	12.5 65 3518	13.3 70 3767	14.3 76 4041	15.4 83 4340	16.6 90 4680	18.2 100 5105
15,000	5.1 24 1524	5.5 26 1647	6.0 29 1775	6.5 31 1908	7.0 34 2055	7.5 36 2211	8.1 39 2376	8.7 42 2551	9.4 46 2737	10.0 49 2919	10.6 53 3108	11.3 57 3316	12.1 62 3543	12.9 67 3788	13.8 73 4060	14.9 80 4387
10,000	3.5 15 1127	3.8 16 1213	4.1 17 1303	4.4 19 1396	4.7 20 1500	5.0 22 1611	5.4 23 1726	5.8 25 1848	6.2 27 1977	6.6 29 2095	6.9 31 2216	7.3 33 2348	7.7 36 2490	8.1 39 2639	8.6 41 2798	9.1 45 2979
10,000	3.2 13 1044	3.4 14 1123	3.7 15 1204	3.9 16 1289	4.2 18 1385	4.6 19 1486	4.9 20 1591	5.2 22 1702	5.6 24 1819	6.0 26 1949	6.4 28 2084	6.9 31 2234	7.4 34 2399	7.9 37 2575	8.5 41 2767	9.1 45 2979
5,000	1.8 6 677	1.9 7 723	2.0 7 770	2.1 8 818	2.3 8 874	2.4 9 933	2.6 10 994	2.8 10 1057	3.0 11 1122	3.2 12 1200	3.4 13 1281	3.6 14 1372	3.9 16 1473	4.1 17 1577	4.4 19 1687	4.7 20 1802
1,500	0.8 2 423	0.9 2 447	0.9 2 470	1.0 2 493	1.0 3 523	1.1 3 555	1.2 3 587	1.2 3 619	1.3 3 651	1.4 4 697	1.5 4 744	1.6 4 798	1.7 5 860	1.8 5 922	1.9 6 983	2.1 6 1045

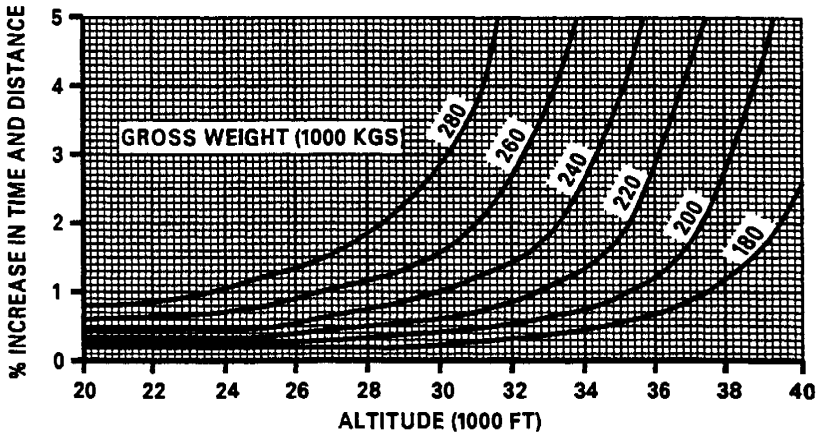
FOR ENGINE ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 2.0%/1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE DISTANCE/FUEL BY 6.0%/3.0%.

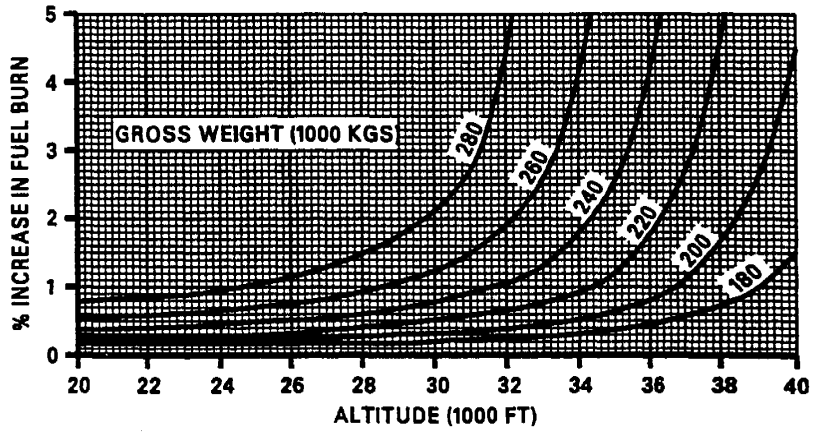
CG CORRECTIONS FOR TIME, DISTANCE, AND FUEL BURN TO CLIMB 32% CG TO 22% CG

NOTE: CG CORRECTIONS ARE VALID FOR ISA TO ISA + 20 DEG C

TIME AND DISTANCE 32% CG TO 22% CG



FUEL BURN 32% CG TO 22% CG

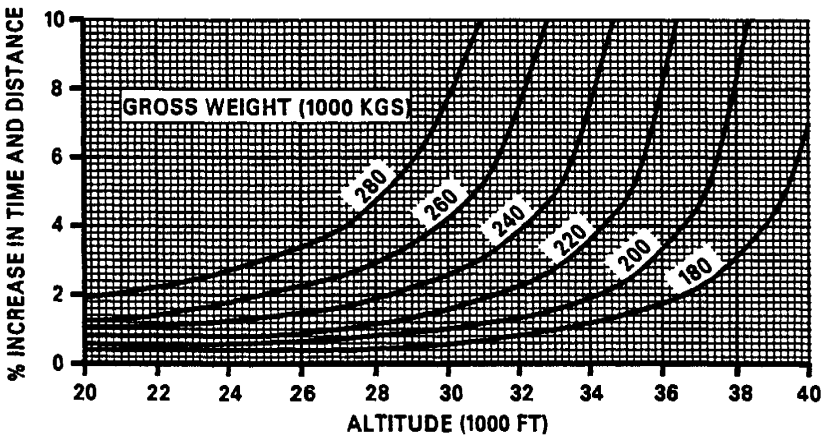


CAG(IGDS) DATA SOURCE: E086, PAGE E086-2.3, DATED 9-18-91 DB1-4-1084A

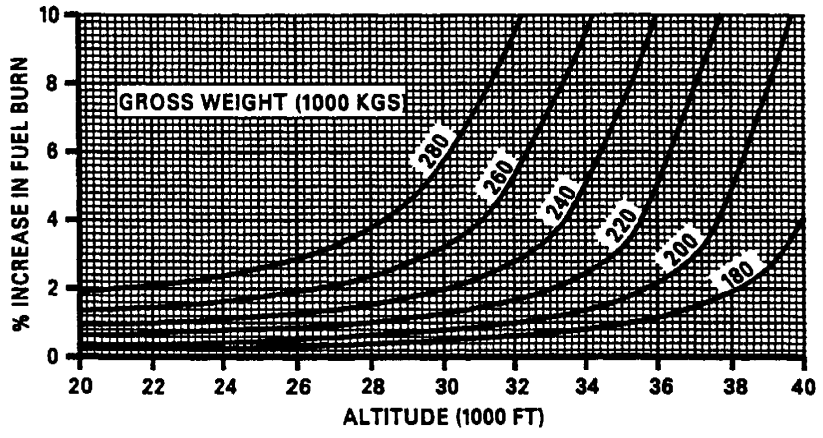
CG CORRECTIONS FOR TIME, DISTANCE, AND FUEL BURN TO CLIMB 32% CG TO 12% CG

NOTE: CG CORRECTIONS ARE VALID FOR ISA TO ISA + 20 DEG C

TIME AND DISTANCE 32% CG TO 12% CG



FUEL BURN 32% CG TO 12% CG



CAG(IGDS) DATA SOURCE: E086, PAGE E086-2.3, DATED 9-18-91 DB1-4-1085A

CRUISE

TABLE OF CONTENTS

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INTRODUCTION

The Cruise section provides data for determining the N_1 setting, for either maximum cruise thrust or for the required cruise speed. The Cruise tables provide speeds and fuel flows as a check on aircraft operation. All of the data in the Cruise tables are based on the optimum center of gravity location (32% MAC). Also provided are center of gravity corrections to determine the % increase to fuel burned for a CG location other than the optimum.

MAXIMUM CRUISE THRUST N_1 SETTING

The Maximum Cruise Thrust N_1 Setting tables are used to determine the inflight N_1 for maximum cruise thrust. The N_1 setting is presented as a function of pressure altitude, Mach number and total air temperature (TAT), with corrections to be applied where applicable.

CRUISE TABLES - 3 ENGINE

Cruise tables are provided for long range cruise and for cruise at constant Mach of .82, .83 and .84.

The tables present the indicated Mach number, indicated airspeed, N_1 setting, total air temperature and fuel flow as a function of weight and altitude, all for a standard day. Separate tables are provided for each flight level from 11,000 to 43,000 ft for long range cruise (99% maximum nautical miles per lb), from 25,000 to 43,000 ft for cruise at Mach .82, .83 and .84. At the bottom of each page are fuel flow corrections for temperature deviation from standard, engine or engine and airframe ice protection.

CRUISE TABLES - 2 ENGINE

Cruise tables are provided for long range cruise with two engines operating.

The tables present the indicated Mach number, indicated airspeed, N_1 setting, total air temperature and fuel flow as a function of weight and altitude, all for a standard day. Separate tables are provided for each flight level from 1000 to 41,000 ft. At the bottom of each page are fuel flow corrections for temperature deviation from standard, engine or engine and airframe ice protection.

CRUISE TABLES - 1 ENGINE

Cruise tables are provided for long range cruise with one engine operating.

The tables present the indicated Mach number, indicated airspeed, N_1 setting, total air temperature and fuel flow as a function of weight and altitude, all for a standard day. Separate tables are provided for each flight level from 1000 to 23,000 ft. At the bottom of each page are fuel flow corrections for temperature deviation from standard, engine or engine and airframe ice protection.

As an example, let's determine the cruise parameters for the following conditions:

Cruise Mach Number	= .83
Gross Weight	= 220,000 kg
Pressure Altitude	= 33,000 ft
Static Air Temperature	= - 40.4°C
Three Engines Operating	
No Ice Protection	

Select the appropriate Cruise table based on indicated cruise Mach number (.83). Enter the top of the table with the gross weight (interpolating where necessary) and read vertically downward to the intersection with pressure altitude (33,000). At this point read the following:

Required $\%N_1$	= 90.5
EGT (°C)	= 605°
$\%N_2$	= 95.7
ISA Fuel Flow	= 2443 kg/hr/engine
Indicated Airspeed	= 296 KIAS
TAT (°C)	= -20°C

Directly under the pressure altitude figure read the following:

Standard SAT	= -50.4°C
True Airspeed	= 483 KTAS

Since the actual temperature is 10° greater than the standard day temperature, we must refer to the temperature correction at the bottom of the page and calculate a fuel flow correction of 90 kg/hr/engine.

If no data appears in the data box at the intersection of the gross weight and pressure altitude, operation at those conditions is not authorized because the maximum cruise thrust limits are exceeded.

CENTER OF GRAVITY CORRECTIONS

The Percent Increase In Cruise Fuel Flow For Off Optimum C.G. table is used to correct fuel flow figures found in the Cruise tables, which are based on the optimum center of gravity location (32% MAC).

Enter the bottom of the appropriate chart with the cruise altitude and read vertically upward to the intersection with the gross weight to obtain the correction for a CG location of 22%. For a CG location of 12% the 22% correction must be multiplied by a factor as shown.

The 22% correction must be applied to the 32% fuel flow data obtained from the Cruise tables to obtain the fuel flow for a 22% CG location. Similarly the 12% correction is applied to the 32% value to obtain the fuel flow at a CG location of 12%.

For a CG location between 32% and 22% the fuel flow is determined by interpolating between the 32% and the 22% values. Similarly for a CG location between 22% and 12% the fuel flow is determined by interpolating between the fuel flow value at 22% and at 12%.

MAXIMUM CRUISE THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

MACH NO.	TAT °C	BASE N1 PRESSURE ALTITUDE - (1000 FT)									
		5	10	14	20	25	30	31	35	39	43
.40	-60	82.82	86.89	90.50	95.59						
	-50	84.69	88.81	92.46	97.59						
	-40	86.52	90.68	94.36	99.52						
	-30	88.30	92.51	96.22	101.41						
	-20	90.06	94.31	98.05	103.27						
	-10	91.79	96.08	99.84	105.09						
	0	93.48	97.81	101.60	104.40						
	10	95.16	99.58	102.00	103.17						
	20	96.85	99.60	100.81	102.08						
	30	96.83	98.32	99.62	102.48						
	40	95.49	97.15	99.32	103.95						
	50	94.29	97.35	100.73	105.40						
	60	94.29	98.70	102.12	106.82						
.60	-60	80.53	83.80	86.30	91.02	95.03	99.07				
	-50	82.29	85.67	88.20	92.97	97.01	101.08				
	-40	84.08	87.51	90.08	94.88	98.96	103.06				
	-30	85.83	89.30	91.90	96.73	100.85	104.97				
	-20	87.55	91.06	93.69	98.55	102.69	106.84				
	-10	89.24	92.79	95.45	100.34	104.53	105.76				
	0	90.91	94.49	97.18	102.10	103.39	103.65				
	10	92.54	96.16	98.87	101.51	101.85	102.00				
	20	94.15	97.86	99.52	100.31	100.61	102.06				
	30	95.78	98.21	98.33	99.25	100.64	103.60				
	40	96.21	96.98	97.19	99.27	102.11	105.11				
	50	94.92	95.85	96.40	100.68	103.56	106.59				
	60	93.74	95.47	97.76	102.08	104.98	108.06				
.80	-60				85.89	88.91	92.87	93.57	93.30	93.40	94.48
	-50				87.77	90.83	94.82	95.52	95.24	95.33	96.40
	-40				89.62	92.71	96.73	97.44	97.13	97.22	98.28
	-30				91.45	94.57	98.62	99.34	99.00	99.09	100.13
	-20				93.22	96.38	100.45	101.17	100.86	100.96	102.04
	-10				94.95	98.14	102.24	102.95	102.39	101.67	101.51
	0				96.66	99.89	102.50	102.42	99.86	98.88	98.77
	10				98.34	100.41	100.45	100.26	97.61	96.76	96.91
	20				99.42	98.56	98.73	98.60	96.28	96.36	96.52
	30				97.88	97.26	97.23	97.74	97.79	97.88	98.04
	40				96.80	96.11	98.71	99.23	99.28	99.37	99.54
	50				95.85	97.23	100.16	100.69	100.74	100.83	101.01
	60				96.71	98.62	101.59	102.13	102.18	102.28	102.46

AC ON (1 PACK PER ENGINE, LOW FLOW)

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N1 PRESSURE ALTITUDE (1000 ft.)									
	5	10	14	20	25	30	31	35	39	43
EAI ONLY	-0.67	-0.70	-0.72	-0.78	-0.85	-0.78	-0.77	-0.73	-0.78	-0.86
EAI + WAI	-1.08	-1.16	-1.21	-1.37	-1.52	-1.53	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1) DETERMINE BASE N1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2) ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.

MAXIMUM CRUISE THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

MACH NO.	TAT °C	BASE N1 PRESSURE ALTITUDE - (1000 FT)									
		5	10	14	20	25	30	31	35	39	43
.82	-60					88.50	92.20	92.85	92.69	92.77	93.87
	-50					90.41	94.15	94.81	94.62	94.70	95.79
	-40					92.29	96.05	96.71	96.51	96.58	97.65
	-30					94.15	97.94	98.61	98.38	98.45	99.50
	-20					95.95	99.77	100.44	100.22	100.30	101.39
	-10					97.70	101.54	102.22	101.83	101.69	101.53
	0					99.44	102.40	102.26	99.93	98.89	98.78
	10					100.68	100.36	100.15	97.58	96.72	96.84
	20					98.64	98.57	98.40	95.79	95.71	95.89
	30					97.29	97.05	97.01	97.16	97.23	97.40
	40					96.13	98.02	98.49	98.64	98.72	98.90
	50					96.80	99.47	99.95	100.10	100.18	100.37
	60					98.19	100.90	101.38	101.54	101.61	101.81
.83	-60					88.24	91.89	92.53	92.34	92.43	93.55
	-50					90.15	93.84	94.48	94.28	94.35	95.46
	-40					92.02	95.73	96.39	96.15	96.23	97.32
	-30					93.88	97.63	98.28	98.03	98.09	99.18
	-20					95.68	99.45	100.11	99.86	99.94	101.05
	-10					97.43	101.22	101.88	101.51	101.50	101.46
	0					99.16	102.38	102.22	99.92	98.89	98.80
	10					100.77	100.34	100.13	97.53	96.67	96.79
	20					98.62	98.51	98.35	95.69	95.36	95.55
	30					97.25	96.98	96.78	96.80	96.87	97.07
	40					96.09	97.70	98.16	98.29	98.36	98.56
	50					96.53	99.15	99.62	99.74	99.81	100.03
	60					97.92	100.57	101.05	101.17	101.25	101.47
.85	-60					87.72	91.27	91.89	91.65	91.73	92.90
	-50					89.63	93.21	93.84	93.58	93.65	94.81
	-40					91.49	95.10	95.73	95.45	95.52	96.66
	-30					93.34	96.98	97.62	97.32	97.38	98.51
	-20					95.13	98.80	99.44	99.13	99.21	100.35
	-10					96.88	100.57	101.22	100.88	100.84	101.20
	0					98.60	102.31	102.15	99.92	98.89	98.84
	10					100.33	100.30	100.10	97.44	96.57	96.70
	20					98.60	98.40	98.23	95.49	94.82	95.06
	30					97.18	96.86	96.66	96.09	96.15	96.40
	40					96.01	97.06	97.50	97.57	97.63	97.89
	50					95.99	98.50	98.95	99.02	99.09	99.35
	60					97.37	99.92	100.37	100.45	100.52	100.78

AC ON (1 PACK PER ENGINE, LOW FLOW)

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N1 PRESSURE ALTITUDE (1000 ft.)									
	5	10	14	20	25	30	31	35	39	43
EAI ONLY	-0.67	-0.70	-0.72	-0.78	-0.85	-0.78	-0.77	-0.73	-0.78	-0.86
EAI + WAI	-1.08	-1.16	-1.21	-1.37	-1.52	-1.53	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1) DETERMINE BASE N1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2) ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
TAT (DEG C)

CRUISE TABLE
CF6-80C2D1F ENGINES

.82 MACH CRUISE

3 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT TAS	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000 -56.5 470	89.4 582 94.4 1526 232 -27	90.8 599 95.1 1620 232 -27	92.5 617 95.8 1732 232 -27	94.7 639 96.8 1878 232 -27	97.9 670 98.2 2080 232 -27											
41,000 -56.5 470	87.7 564 93.6 1561 243 -27	88.9 577 94.1 1638 243 -27	90.2 591 94.7 1726 243 -27	91.5 607 95.4 1826 243 -27	93.2 625 96.2 1950 243 -27	95.4 647 97.2 2109 243 -27	98.6 677 98.4 2329 243 -27									
39,000 -56.5 470	86.3 548 93.0 1615 255 -27	87.3 559 93.4 1681 255 -27	88.4 571 93.9 1754 255 -27	89.5 584 94.4 1836 255 -27	90.7 597 95.0 1928 255 -27	92.0 612 95.6 2034 255 -27	93.5 628 96.3 2164 255 -27	95.6 649 97.3 2328 255 -27	98.6 677 98.4 2550 255 -27							
37,000 -56.5 470	85.1 535 92.5 1682 267 -27	86.0 545 92.8 1742 267 -27	86.9 555 93.2 1806 267 -27	87.8 565 93.6 1875 267 -27	88.8 576 94.0 1952 267 -27	89.8 587 94.5 2036 267 -27	90.9 600 95.1 2131 267 -27	92.1 613 95.7 2238 267 -27	93.5 628 96.3 2369 267 -27	95.4 647 97.2 2530 267 -27	97.9 671 98.2 2739 267 -27					
35,000 -54.3 473	84.5 531 92.5 1774 279 -25	85.2 539 92.8 1828 279 -25	86.0 548 93.1 1886 279 -25	86.8 557 93.5 1949 279 -25	87.6 566 93.8 2015 279 -25	88.5 576 94.2 2086 279 -25	89.4 586 94.6 2165 279 -25	90.3 597 95.1 2251 279 -25	91.3 608 95.5 2346 279 -25	92.4 620 96.1 2452 279 -25	93.6 634 96.7 2580 279 -25	95.3 650 97.4 2734 279 -25	97.3 670 98.3 2924 279 -25			
33,000 -50.4 477	84.3 536 91.2 1892 292 -20	85.0 542 93.2 1941 292 -20	85.6 550 93.5 1994 292 -20	86.3 557 93.8 2051 292 -20	87.0 565 94.1 2111 292 -20	87.8 574 94.4 2176 292 -20	88.5 582 94.7 2243 292 -20	89.4 592 95.1 2317 292 -20	90.2 601 95.5 2397 292 -20	91.0 611 95.9 2483 292 -20	91.9 621 96.3 2578 292 -20	92.9 632 96.8 2683 292 -20	94.0 644 97.3 2805 292 -20	95.5 660 98.0 2965 292 -20	97.8 683 99.0 3203 292 -20	
31,000 -46.4 481	84.3 543 91.7 2026 306 -16	84.8 548 91.9 2070 306 -16	85.4 553 94.0 2118 306 -16	86.0 559 94.2 2170 306 -16	86.6 566 94.5 2225 306 -16	87.3 574 94.7 2283 306 -16	87.9 581 95.0 2346 306 -16	88.6 589 95.3 2411 306 -16	89.3 597 95.6 2480 306 -16	90.1 606 95.9 2554 306 -16	90.8 614 96.3 2635 306 -16	91.6 623 96.7 2721 306 -16	92.4 633 97.1 2814 306 -16	93.4 644 97.5 2926 306 -16	94.6 658 98.1 3079 306 -16	96.3 675 98.9 3268 306 -16

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
FF/ENG	27	27	28	29	30	31	32	33	34	35	36	37	38	40	42	45
TAS	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
TAT (DEG C)

CRUISE TABLE
CF6-80C2D1F ENGINES

.82 MACH CRUISE

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT TAS	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
29,000	84.3	84.8	85.3	85.9	86.4	86.9	87.5	88.1	88.7	89.4	90.0	90.7	91.4	92.2	93.1	94.1
	551	555	559	564	569	575	582	589	596	603	611	619	626	635	646	658
-42.5	92.2	92.4	92.7	92.9	94.9	95.1	95.4	95.6	95.9	96.1	96.4	96.7	97.0	97.4	97.9	98.4
485	2182	2223	2267	2313	2363	2417	2474	2534	2598	2664	2734	2808	2887	2979	3096	3227
	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319
	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
27,000	84.5	84.9	85.3	85.8	86.3	86.8	87.3	87.8	88.3	88.9	89.4	90.0	90.6	91.3	92.0	92.9
	560	563	567	571	575	579	584	590	597	603	610	616	623	631	640	649
-38.5	92.8	93.0	93.1	93.4	93.6	95.0	95.2	95.4	95.6	95.9	96.1	96.3	96.6	96.9	97.2	97.6
489	2354	2392	2433	2476	2522	2570	2623	2678	2736	2797	2862	2928	2998	3077	3173	3280
	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333	333
	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
25,000	84.7	85.0	85.4	85.8	86.2	86.7	87.1	87.6	88.1	88.5	89.0	89.5	90.1	90.6	91.3	92.0
	569	572	575	579	582	585	589	594	599	604	610	616	622	629	636	644
-34.5	93.4	93.5	93.7	93.9	94.0	94.2	94.4	94.6	94.8	95.0	95.2	95.5	95.7	95.9	96.2	96.5
494	2549	2585	2623	2663	2705	2750	2797	2847	2900	2956	3015	3077	3142	3212	3294	3385
	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347	347
	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
FF/ENG	27	27	28	29	30	31	32	33	34	35	36	37	38	40	42	45
TAS	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
TAT (DEG C)

CRUISE TABLE
CF6-80C2D1F ENGINES

.83 MACH CRUISE

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT TAS	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000 -56.5 476	89.7 587 94.6 1555 235 -27	91.1 603 95.3 1648 235 -27	92.7 620 96.0 1760 235 -27	94.9 643 97.0 1905 235 -27	98.0 673 98.3 2104 235 -27											
41,000 -56.5 476	88.0 569 93.8 1593 247 -27	89.2 582 94.3 1670 247 -27	90.4 595 94.9 1757 247 -27	91.8 611 95.6 1857 247 -27	93.4 628 96.3 1981 247 -27	95.6 650 97.3 2139 247 -27	98.7 679 98.5 2356 247 -27									
39,000 -56.5 476	86.7 553 93.2 1650 258 -27	87.6 564 93.6 1716 258 -27	88.7 576 94.1 1789 258 -27	89.8 588 94.6 1871 258 -27	90.9 601 95.2 1963 258 -27	92.2 615 95.8 2068 258 -27	93.7 632 96.5 2198 258 -27	95.8 652 97.4 2360 258 -27	98.7 679 98.5 2579 258 -27							
37,000 -56.5 476	85.5 541 92.7 1721 271 -27	86.3 550 93.1 1781 271 -27	87.2 560 93.4 1844 271 -27	88.1 570 93.8 1914 271 -27	89.1 580 94.3 1990 271 -27	90.1 592 94.8 2074 271 -27	91.1 604 95.3 2168 271 -27	92.3 617 95.8 2275 271 -27	93.7 632 96.5 2406 271 -27	95.6 650 97.3 2565 271 -27	98.0 673 98.3 2771 271 -27					
35,000 -54.3 478	84.9 537 92.8 1817 283 -24	85.6 545 93.1 1871 283 -24	86.4 553 93.4 1930 283 -24	87.1 562 93.7 1992 283 -24	88.0 571 94.0 2057 283 -24	88.8 581 94.4 2129 283 -24	89.7 591 94.8 2207 283 -24	90.6 601 95.3 2293 283 -24	91.6 612 95.8 2387 283 -24	92.6 624 96.3 2493 283 -24	93.8 637 96.8 2621 283 -24	95.5 653 97.6 2773 283 -24	97.5 673 98.4 2961 283 -24			
33,000 -50.4 483	84.8 541 93.2 1939 296 -20	85.4 548 93.5 1989 296 -20	86.0 555 93.8 2042 296 -20	86.7 563 94.1 2099 296 -20	87.4 571 94.4 2159 296 -20	88.1 579 94.7 2223 296 -20	88.9 587 95.0 2291 296 -20	89.7 596 95.3 2364 296 -20	90.5 605 95.7 2443 296 -20	91.3 615 96.1 2530 296 -20	92.2 625 96.5 2624 296 -20	93.2 636 97.0 2728 296 -20	94.2 648 97.5 2850 296 -20	95.7 663 98.2 3010 296 -20	98.0 686 99.2 3250 296 -20	
31,000 -46.4 487	84.8 548 92.0 2079 310 -15	85.3 553 92.2 2122 310 -15	85.9 559 94.2 2171 310 -15	86.5 565 94.5 2223 310 -15	87.1 572 94.7 2278 310 -15	87.7 579 95.0 2336 310 -15	88.3 587 95.3 2399 310 -15	89.0 594 95.6 2463 310 -15	89.7 602 95.8 2533 310 -15	90.4 610 96.2 2606 310 -15	91.1 619 96.5 2686 310 -15	91.9 628 96.9 2772 310 -15	92.7 637 97.3 2865 310 -15	93.7 648 97.7 2977 310 -15	94.9 662 98.3 3134 310 -15	96.5 679 99.1 3326 310 -15

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
FF/ENG	28	28	29	30	31	32	33	33	34	35	36	38	39	41	43	46
TAS	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
TAT (DEG C)

CRUISE TABLE
CF6-80C2D1F ENGINES

.83 MACH CRUISE

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT TAS	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
29,000 -42.5 491	84.8 557 92.5 2240 323 -11	85.3 560 92.7 2281 323 -11	85.8 564 92.9 2325 323 -11	86.3 569 94.9 2371 323 -11	86.8 575 95.2 2422 323 -11	87.4 581 95.4 2476 323 -11	87.9 588 95.6 2533 323 -11	88.5 595 95.9 2593 323 -11	89.1 601 96.1 2656 323 -11	89.7 609 96.4 2722 323 -11	90.4 616 96.7 2791 323 -11	91.0 623 96.9 2865 323 -11	91.7 631 97.3 2945 323 -11	92.5 640 97.6 3037 323 -11	93.4 651 98.1 3156 323 -11	94.4 663 98.6 3291 323 -11
27,000 -38.5 495	85.0 566 93.1 2418 337 6	85.4 569 93.3 2457 337 6	85.8 572 93.4 2497 337 6	86.3 576 93.6 2541 337 6	86.8 580 93.9 2586 337 6	87.2 585 95.2 2635 337 6	87.7 591 95.5 2688 337 6	88.2 596 95.7 2743 337 6	88.7 603 95.9 2801 337 6	89.3 609 96.1 2862 337 6	89.8 615 96.4 2926 337 6	90.4 622 96.6 2992 337 6	91.0 628 96.8 3062 337 6	91.6 636 97.1 3141 337 6	92.4 645 97.5 3240 337 6	93.2 654 97.9 3350 337 6
25,000 -34.5 500	85.2 575 93.7 2621 351 -2	85.6 578 93.8 2656 351 2	86.0 581 94.0 2694 351 2	86.3 584 94.2 2734 351 2	86.7 587 94.3 2776 351 2	87.2 591 94.5 2821 351 2	87.6 595 94.7 2867 351 2	88.0 600 94.9 2918 351 2	88.5 605 95.1 2972 351 2	89.0 611 95.3 3028 351 2	89.4 616 95.5 3087 351 2	89.9 622 95.7 3148 351 2	90.4 628 95.9 3213 351 2	91.0 634 96.2 3283 351 2	91.6 642 96.4 3368 351 2	92.3 650 96.7 3460 351 2

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
FF/ENG	28	28	29	30	31	32	33	33	34	35	36	38	39	41	43	46
TAS	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
TAT (DEG C)

CRUISE TABLE
CF6-80C2D1F ENGINES

.84 MACH CRUISE

3 ENGINES OPERATING **ISA °C** TEMPERATURE	ONE A/C PACK PER OPERATING ENGINE ICE PROTECTION OFF	3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT TAS	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000 -56.5 482	90.1 593 94.9 1596 239 -26	91.5 609 95.6 1691 239 -26	93.1 627 96.3 1806 239 -26	95.4 649 97.3 1956 239 -26	98.6 680 98.6 2161 239 -26											
41,000 -56.5 482	88.5 575 94.1 1635 250 -26	89.7 588 94.6 1714 250 -26	90.9 602 95.2 1803 250 -26	92.2 617 95.9 1906 250 -26	93.9 634 96.7 2033 250 -26	96.2 657 97.7 2195 250 -26										
39,000 -56.5 482	87.2 560 93.5 1694 262 -26	88.1 571 93.9 1762 262 -26	89.1 582 94.4 1837 262 -26	90.2 594 94.9 1920 262 -26	91.4 607 95.5 2014 262 -26	92.6 621 96.1 2122 262 -26	94.2 638 96.8 2256 262 -26	96.4 659 97.8 2422 262 -26								
37,000 -56.5 482	86.0 547 93.0 1769 274 -26	86.8 556 93.4 1829 274 -26	87.7 566 93.7 1894 274 -26	88.6 576 94.1 1965 274 -26	89.5 587 94.6 2043 274 -26	90.5 598 95.1 2129 274 -26	91.6 610 95.6 2224 274 -26	92.7 623 96.1 2335 274 -26	94.2 638 96.8 2469 274 -26	96.1 657 97.7 2633 274 -26						
35,000 -54.3 484	85.4 544 93.1 1869 287 -23	86.1 552 93.4 1924 287 -23	86.9 560 93.7 1983 287 -23	87.6 569 94.0 2045 287 -23	88.4 578 94.3 2113 287 -23	89.3 587 94.7 2186 287 -23	90.1 597 95.1 2265 287 -23	91.0 607 95.6 2353 287 -23	92.0 618 96.1 2449 287 -23	93.1 630 96.6 2559 287 -23	94.4 644 97.2 2691 287 -23	96.0 660 97.9 2847 287 -23	98.1 680 98.8 3041 287 -23			
33,000 -50.4 489	85.3 548 93.5 1995 300 -19	85.9 555 93.8 2046 300 -19	86.6 562 94.1 2099 300 -19	87.2 570 94.4 2157 300 -19	87.9 578 94.6 2218 300 -19	88.6 586 95.0 2283 300 -19	89.4 594 95.3 2352 300 -19	90.1 603 95.6 2427 300 -19	90.9 612 96.0 2508 300 -19	91.8 621 96.4 2596 300 -19	92.7 632 96.9 2693 300 -19	93.6 642 97.3 2800 300 -19	94.7 654 97.8 2926 300 -19	96.3 670 98.5 3091 300 -19	98.7 694 99.6 3342 300 -19	
31,000 -46.4 493	85.3 554 92.3 2138 314 -14	85.9 559 94.3 2184 314 -14	86.4 566 94.5 2233 314 -14	87.0 572 94.8 2286 314 -14	87.6 579 95.0 2342 314 -14	88.2 586 95.3 2402 314 -14	88.8 594 95.6 2464 314 -14	89.5 601 95.8 2530 314 -14	90.2 609 96.1 2601 314 -14	90.9 617 96.5 2677 314 -14	91.6 626 96.8 2758 314 -14	92.4 634 97.2 2846 314 -14	93.2 643 97.6 2941 314 -14	94.1 654 98.1 3056 314 -14	95.4 669 98.7 3222 314 -14	97.2 687 99.4 3423 314 -14

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
FF/ENG	29	29	30	31	32	33	33	34	35	36	37	39	40	42	44	47
TAS	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
TAT (DEG C)

CRUISE TABLE
CF6-80C2D1F ENGINES

.84 MACH CRUISE

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT TAS	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
	85.4	85.9	86.4	86.9	87.4	87.9	88.5	89.0	89.6	90.2	90.9	91.5	92.2	92.9	93.9	94.9
29,000	563	566	571	576	582	589	595	602	608	615	623	630	638	647	658	670
-42.5	92.8	93.1	95.0	95.2	95.5	95.7	95.9	96.2	96.4	96.7	97.0	97.3	97.6	97.9	98.4	98.9
497	2306	2347	2392	2440	2492	2546	2604	2665	2729	2795	2867	2942	3024	3118	3244	3385
	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328
	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
	85.6	86.0	86.4	86.9	87.3	87.8	88.3	88.8	89.3	89.8	90.3	90.9	91.5	92.1	92.9	93.7
27,000	572	575	578	582	587	592	598	604	610	616	622	629	635	643	652	662
-38.5	93.4	93.6	93.8	94.0	95.4	95.6	95.8	96.0	96.2	96.4	96.7	96.9	97.1	97.4	97.8	98.2
501	2491	2529	2570	2614	2661	2711	2765	2821	2880	2942	3006	3073	3145	3226	3331	3447
	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
	85.8	86.2	86.6	86.9	87.3	87.7	88.2	88.6	89.0	89.5	90.0	90.5	91.0	91.5	92.2	92.9
25,000	581	584	587	590	594	597	602	607	612	618	623	629	635	642	649	657
-34.5	94.0	94.2	94.3	94.5	94.7	94.8	95.0	95.2	95.4	95.6	95.8	96.0	96.2	96.5	96.7	97.1
506	2700	2736	2774	2814	2857	2902	2951	3003	3057	3114	3174	3237	3301	3373	3463	3560
	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356
	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
FF/ENG	29	29	30	31	32	33	33	34	35	36	37	39	40	42	44	47
TAS	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%

KEY
REQUIRED %N_1
EGT (DEG C)
% N_2
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG) 140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
43,000 -56.5	89.8 588 94.6 1563 .832 236	91.2 605 95.4 1664 .834 237	92.9 623 96.2 1781 .835 237	95.2 647 97.2 1935 .837 238	98.4 677 98.5 2142 .837 238											
41,000 -56.5	88.1 569 93.8 1593 .830 247	89.3 582 94.4 1676 .832 247	90.6 597 95.0 1771 .833 248	92.0 613 95.7 1877 .835 248	93.6 631 96.5 2007 .836 249	95.9 654 97.5 2173 .837 249	99.1 684 98.7 2400 .838 249									
39,000 -56.5	86.5 552 93.1 1638 .827 257	87.6 564 93.6 1716 .830 258	88.7 576 94.1 1792 .831 259	89.8 589 94.7 1881 .832 259	91.1 603 95.3 1981 .834 260	92.4 618 95.9 2091 .835 260	94.0 635 96.7 2229 .836 260	96.1 657 97.6 2399 .837 261								
37,000 -56.5	84.9 532 92.3 1665 .814 265	86.1 547 92.9 1758 .824 269	87.2 559 93.4 1839 .829 270	88.1 570 93.8 1914 .830 271	89.1 581 94.3 1996 .831 271	90.2 593 94.8 2088 .833 272	91.3 606 95.4 2189 .834 272	92.5 619 96.0 2301 .835 272	94.0 635 96.7 2439 .836 273	95.9 654 97.5 2606 .837 273	98.4 678 98.5 2822 .837 273					
35,000 -54.3	83.2 515 89.9 1665 .782 265	84.8 534 92.6 1791 .809 275	86.0 549 93.2 1894 .822 280	87.0 560 93.6 1978 .827 282	87.9 571 94.0 2056 .830 283	88.8 581 94.4 2130 .830 283	89.7 591 94.9 2215 .832 284	90.7 602 95.4 2308 .833 284	91.7 614 95.9 2410 .834 285	92.8 626 96.4 2521 .835 285	94.1 640 97.0 2656 .836 285	95.8 657 97.7 2817 .837 286	97.8 678 98.7 3012 .837 286			
33,000 -50.4	81.4 505 89.3 1638 .737 260	83.3 523 90.4 1788 .771 273	84.9 539 93.0 1921 .798 284	86.1 555 93.7 2033 .815 290	87.2 567 94.2 2128 .824 294	88.0 578 94.6 2211 .828 295	88.9 587 95.0 2290 .830 296	89.7 596 95.3 2365 .830 296	90.5 606 95.8 2453 .832 297	91.4 617 96.2 2546 .833 297	92.4 627 96.7 2648 .834 298	93.3 639 97.1 2758 .835 298	94.4 651 97.7 2885 .835 298	96.0 667 98.4 3056 .836 299	98.4 691 99.4 3306 .837 299	
31,000 -46.4	79.8 496 88.9 1621 .700 257	81.5 512 89.8 1756 .727 268	83.2 528 90.7 1902 .757 280	84.8 544 91.7 2045 .785 291	86.2 560 94.2 2177 .808 300	87.3 573 94.7 2281 .819 305	88.1 584 95.1 2370 .825 308	88.9 593 95.5 2453 .828 309	89.7 602 95.8 2532 .830 310	90.4 611 96.2 2608 .830 310	91.2 620 96.6 2696 .831 310	92.0 629 97.0 2789 .833 311	92.8 639 97.4 2890 .834 311	93.8 651 97.9 3009 .835 312	95.1 665 98.5 3172 .835 312	96.8 683 99.3 3376 .836 312
29,000 -42.5	78.2 487 88.6 1609 .668 255	79.9 503 89.4 1744 .692 265	81.5 518 90.2 1880 .716 275	83.1 533 91.1 2021 .742 286	84.7 549 92.0 2174 .770 298	86.0 563 94.5 2310 .793 308	87.2 577 95.2 2433 .811 315	88.2 590 95.7 2542 .821 320	88.9 599 96.0 2627 .825 321	89.7 607 96.3 2710 .828 323	90.4 616 96.7 2791 .830 323	91.0 624 96.9 2867 .830 323	91.8 632 97.3 2953 .831 324	92.6 641 97.7 3053 .832 324	93.5 653 98.2 3181 .833 325	94.6 666 98.7 3325 .834 325

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

%N_1	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
FF/ENG	20	21	23	25	27	29	31	33	35	37	38	40	41	42	44	45

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

3 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
27,000 -38.5	76.7 477 88.3 1603 .639 254	78.3 494 89.1 1732 .661 264	79.9 510 89.8 1866 .683 273	81.5 524 90.6 2003 .705 283	82.9 538 91.4 2142 .727 292	84.4 552 92.2 2289 .752 303	85.8 566 93.0 2442 .778 314	87.0 580 94.9 2577 .798 323	88.0 592 95.4 2697 .812 329	88.9 604 95.9 2806 .821 333	89.6 612 96.2 2893 .825 335	90.3 620 96.5 2977 .828 336	91.0 628 96.8 3060 .830 337	91.6 636 97.1 3142 .830 337	92.4 645 97.5 3246 .831 338	93.3 656 97.9 3365 .832 338
25,000 -34.5	75.2 469 88.1 1610 .615 255	76.8 484 88.9 1731 .633 263	78.4 500 89.6 1860 .653 272	79.9 515 90.3 1994 .674 281	81.3 529 91.0 2131 .694 290	82.7 542 91.7 2270 .714 299	84.0 555 92.4 2409 .734 308	85.4 568 93.2 2563 .758 319	86.7 581 93.9 2714 .781 329	87.8 594 94.6 2851 .799 337	88.7 606 95.0 2971 .812 343	89.6 616 95.5 3081 .821 347	90.2 625 95.8 3171 .824 349	90.9 633 96.1 3262 .827 350	91.6 641 96.4 3360 .829 351	92.3 650 96.7 3460 .830 351
23,000 -30.6	73.7 461 87.9 1623 .592 255	75.4 476 88.7 1743 .610 263	77.0 491 89.4 1864 .627 271	78.4 506 90.0 1993 .645 280	79.8 520 90.7 2125 .663 288	81.2 534 91.3 2263 .682 297	82.5 547 92.0 2403 .701 305	83.7 559 92.7 2543 .719 314	85.0 571 93.3 2687 .739 323	86.2 583 94.0 2843 .761 333	87.4 595 94.7 2995 .781 343	88.5 607 95.3 3133 .798 351	89.4 619 95.8 3258 .810 356	90.1 629 96.2 3371 .819 360	90.9 638 96.5 3480 .823 363	91.6 646 96.9 3584 .826 364
21,000 -26.6	72.1 454 87.7 1634 .570 256	73.8 468 88.4 1756 .587 264	75.5 483 89.2 1878 .605 272	77.0 497 89.9 1999 .620 279	78.4 511 90.5 2124 .637 287	79.7 524 91.1 2256 .653 295	81.0 537 91.7 2392 .670 303	82.2 550 92.3 2532 .688 311	83.4 562 92.9 2673 .705 320	84.5 573 93.5 2814 .722 328	85.7 584 94.1 2960 .740 336	86.9 596 94.8 3118 .760 346	88.0 607 95.4 3273 .779 355	89.0 618 96.0 3413 .794 363	89.6 626 96.3 3501 .798 365	90.1 632 96.5 3572 .798 365
19,000 -22.6	70.6 448 87.5 1651 .550 256	72.3 461 88.2 1769 .566 264	74.0 475 88.9 1890 .582 272	75.5 489 89.6 2015 .599 280	76.9 502 90.3 2135 .613 287	78.2 515 90.9 2259 .628 294	79.5 528 91.4 2389 .643 302	80.7 541 92.0 2523 .659 310	81.9 553 92.6 2661 .674 317	83.0 564 93.1 2803 .690 325	84.1 575 93.7 2944 .706 333	85.2 585 94.2 3087 .722 341	86.2 596 94.8 3233 .738 349	87.3 607 95.4 3393 .756 358	88.3 616 96.0 3530 .770 365	88.8 620 96.2 3596 .770 365
17,000 -18.7	69.2 442 87.3 1675 .532 258	70.8 456 88.0 1788 .547 265	72.4 469 88.7 1905 .561 273	74.0 482 89.4 2027 .577 280	75.4 494 90.1 2151 .592 288	76.8 507 90.7 2275 .606 295	78.1 519 91.3 2397 .619 302	79.3 531 91.8 2523 .633 309	80.4 543 92.3 2657 .647 316	81.5 555 92.8 2792 .661 323	82.6 566 93.3 2932 .676 331	83.7 577 93.8 3074 .690 338	84.7 587 94.4 3217 .705 346	85.7 597 94.9 3362 .719 353	86.7 606 95.5 3511 .734 361	87.5 614 95.9 3625 .742 365
15,000 -14.7	67.8 438 87.2 1705 .515 260	69.4 450 87.8 1814 .529 267	70.9 463 88.5 1928 .543 274	72.5 475 89.2 2045 .557 281	73.9 487 89.8 2166 .571 288	75.3 499 90.5 2290 .585 296	76.6 511 91.1 2417 .599 303	77.8 522 91.6 2539 .611 309	79.0 534 92.1 2664 .623 316	80.1 545 92.6 2793 .636 322	81.2 556 93.1 2927 .649 329	82.2 567 93.6 3064 .662 336	83.2 578 94.1 3205 .675 343	84.2 588 94.5 3349 .689 351	85.2 598 95.0 3498 .702 358	86.1 607 95.5 3647 .716 365
13,000 -10.8	66.5 435 87.1 1736 .501 262	68.1 446 87.7 1842 .513 269	69.6 458 88.4 1952 .526 275	71.0 469 89.0 2066 .539 282	72.4 481 89.6 2182 .551 289	73.8 492 90.2 2302 .564 296	75.1 504 90.8 2426 .577 303	76.4 515 91.4 2552 .590 310	77.6 526 91.9 2679 .602 317	78.7 537 92.4 2802 .614 323	79.8 547 92.9 2928 .625 329	80.8 558 93.4 3059 .637 335	81.8 568 93.8 3195 .649 342	82.7 578 94.3 3334 .661 349	83.7 589 94.7 3479 .673 355	84.7 599 95.2 3628 .686 362
11,000 -6.8	65.1 433 87.1 1762 .485 263	66.8 444 87.7 1875 .499 271	68.2 454 88.3 1982 .511 278	69.7 465 88.8 2092 .522 284	71.0 476 89.4 2205 .534 291	72.3 486 90.0 2321 .546 297	73.6 497 90.6 2440 .557 304	74.9 508 91.2 2563 .569 310	76.1 518 91.7 2689 .581 317	77.3 529 92.2 2817 .593 324	78.4 539 92.7 2943 .605 330	79.4 549 93.2 3068 .615 336	80.4 559 93.6 3195 .625 342	81.3 569 94.1 3328 .636 348	82.3 579 94.5 3469 .647 354	83.2 589 94.9 3612 .659 360

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
FF/ENG	20	21	23	25	27	29	31	33	35	37	38	40	41	42	44	45

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

CRUISE TABLE
CF6-80C2D1F ENGINES

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

LONG RANGE CRUISE SPEED

2 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

WINDMILLING JET

2 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
41,000 -56.5	103 717 99.6 2591 .814 241															
39,000 -56.5	98.3 675 98.0 2508 .794 246	101.5 704 99.1 2746 .810 251														
37,000 -56.5	95.1 641 96.5 2444 .767 248	97.3 665 97.6 2657 .787 255	100.0 690 98.5 2883 .803 261													
35,000 -54.3	92.9 619 95.6 2419 .741 250	94.7 640 96.5 2607 .758 256	96.8 663 97.6 2821 .778 264	98.9 685 98.5 3039 .795 270	101.6 709 99.4 3280 .809 275											
33,000 -50.4	91.5 607 95.2 2420 .715 251	93.1 627 96.1 2607 .735 259	94.7 646 97.0 2791 .750 265	96.5 666 97.9 2997 .768 272	98.4 687 98.9 3213 .785 278	100.5 708 99.7 3440 .799 284	103.0 731 100.5 3694 .810 289									
31,000 -46.4	89.9 591 94.6 2392 .682 250	91.7 614 95.7 2599 .706 260	93.2 633 96.6 2791 .726 268	94.7 651 97.4 2980 .743 274	96.2 669 98.2 3172 .757 280	98.0 689 99.1 3390 .774 287	99.7 708 100.0 3615 .788 292	101.7 727 100.7 3848 .800 298	104.0 749 101.5 4101 .811 302							
29.000 -42.5	88.4 579 94.3 2410 .660 252	90.1 599 95.1 2584 .676 259	91.8 619 96.1 2782 .697 267	93.3 639 97.0 2985 .718 276	94.7 656 97.8 3178 .734 283	96.0 672 98.5 3366 .748 288	97.5 689 99.3 3574 .761 294	99.1 708 100.2 3800 .777 301	100.7 725 100.9 4021 .789 306	102.6 743 101.6 4258 .800 311	104.7 764 102.3 4516 .810 315					
27,000 -38.5	86.8 568 93.4 2414 .635 253	88.6 587 94.3 2601 .654 261	90.2 605 95.1 2779 .670 268	91.8 624 95.9 2965 .687 275	93.3 643 96.8 3177 .707 283	94.6 660 97.6 3373 .724 291	95.8 676 98.3 3577 .738 297	97.1 691 99.0 3767 .750 302	98.5 707 99.7 3977 .763 308	100.0 724 100.5 4206 .777 314	101.5 740 101.2 4430 .788 319	103.2 757 101.8 4669 .799 323				

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
FF/ENG	31	33	36	38	41	43	46	48	51	53	56	59	62	65	69	73

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

2 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

WINDMILLING JET
2 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
25,000 -34.5	85.3 559 92.0 2427 .612 253	87.1 576 92.8 2608 .630 261	88.7 594 93.6 2796 .647 269	90.3 611 94.4 2980 .663 276	91.7 628 95.1 3159 .677 282	93.1 646 95.9 3363 .695 290	94.5 663 96.7 3585 .713 298	95.6 678 97.4 3778 .727 305	96.8 693 98.0 3977 .740 310	98.0 707 98.7 4171 .751 315	99.3 722 99.3 4384 .763 321	100.6 738 100.1 4618 .776 327	102.0 753 100.7 4845 .786 331	103.6 769 101.3 5088 .796 336		
23,000 -30.6	83.8 552 91.8 2441 .588 253	85.6 568 92.6 2630 .607 262	87.2 584 93.4 2810 .624 270	88.8 601 94.1 2998 .640 277	90.3 617 94.8 3189 .656 285	91.7 633 95.5 3369 .669 291	93.0 648 96.2 3561 .682 297	94.3 665 96.9 3778 .700 305	95.5 681 97.7 3992 .716 312	96.6 695 98.3 4189 .729 318	97.7 709 98.9 4392 .740 323	98.8 722 99.5 4589 .750 328	100.0 736 100.1 4805 .761 333	101.2 752 100.8 5046 .773 339	102.7 767 101.5 5300 .783 344	104.2 783 102.0 5560 .792 348
21,000 -26.6	82.1 542 91.4 2420 .560 251	84.0 560 92.3 2630 .582 262	85.8 576 93.2 2831 .602 271	87.3 591 93.9 3010 .617 278	88.8 606 94.5 3195 .632 285	90.2 621 95.2 3386 .647 292	91.6 636 95.9 3582 .661 299	92.8 651 96.5 3764 .673 304	94.0 666 97.1 3959 .686 311	95.2 682 97.8 4179 .702 318	96.3 696 98.5 4392 .716 325	97.3 709 99.0 4591 .728 331	98.3 722 99.6 4797 .739 336	99.3 735 100.2 4998 .748 341	100.5 748 100.8 5223 .758 345	101.8 764 101.5 5477 .768 350
19,000 -22.6	80.6 534 91.2 2431 .539 251	82.3 550 91.9 2609 .555 259	84.1 567 92.8 2820 .576 269	85.9 583 93.6 3035 .597 279	87.3 596 94.3 3212 .611 286	88.7 611 94.9 3396 .624 293	90.0 625 95.6 3593 .638 300	91.3 640 96.2 3786 .652 306	92.6 653 96.8 3973 .664 312	93.7 667 97.3 4158 .675 318	94.8 681 98.0 4358 .687 324	95.9 696 98.6 4579 .702 331	97.0 710 99.2 4796 .715 338	97.9 722 99.8 4999 .726 343	98.9 735 100.3 5220 .737 349	99.9 747 100.9 5431 .745 353
17,000 -18.7	79.2 528 91.1 2461 .523 253	80.8 543 91.8 2629 .536 260	82.4 558 92.4 2801 .550 267	84.1 574 93.2 3008 .569 276	85.8 589 94.0 3223 .588 286	87.3 602 94.7 3427 .604 294	88.5 615 95.3 3608 .616 300	89.8 629 95.9 3796 .629 307	91.1 642 96.5 3988 .642 313	92.3 656 97.1 4183 .654 320	93.4 668 97.6 4369 .665 325	94.4 681 98.1 4556 .675 330	95.4 694 98.7 4756 .686 336	96.5 708 99.3 4981 .700 343	97.5 722 99.9 5214 .713 350	98.4 734 100.4 5424 .723 355
15,000 -14.7	77.6 519 90.9 2473 .503 253	79.5 536 91.7 2663 .520 262	81.0 551 92.3 2831 .533 269	82.5 565 93.0 3004 .546 275	84.1 579 93.6 3197 .561 283	85.6 594 94.4 3420 .579 292	87.2 608 95.1 3639 .596 302	88.4 619 95.7 3819 .608 308	89.6 632 96.2 4004 .620 314	90.7 644 96.8 4194 .632 320	91.9 657 97.3 4388 .643 326	93.0 670 97.9 4584 .655 333	94.0 681 98.3 4771 .665 338	95.0 693 98.8 4961 .674 343	96.0 706 99.4 5165 .684 348	97.0 719 100.0 5398 .696 354
13,000 -10.8	76.0 512 90.7 2486 .485 254	77.9 528 91.5 2667 .501 262	79.7 544 92.2 2860 .517 271	81.2 558 92.9 3033 .529 277	82.6 571 93.4 3205 .541 284	83.9 584 94.0 3383 .553 290	85.4 598 94.7 3607 .569 299	86.9 612 95.4 3824 .585 308	88.2 624 96.0 4034 .600 316	89.3 635 96.6 4215 .611 321	90.4 647 97.1 4403 .622 327	91.5 658 97.6 4595 .633 333	92.6 670 98.1 4791 .643 339	93.6 682 98.6 4991 .654 345	94.6 693 99.0 5187 .663 350	95.6 705 99.5 5384 .672 355
11,000 -6.8	74.4 505 90.6 2501 .468 254	76.2 520 91.3 2681 .483 262	78.1 536 92.0 2864 .497 270	79.8 551 92.7 3055 .512 278	81.2 565 93.3 3237 .525 285	82.6 577 93.9 3419 .536 292	83.8 589 94.4 3595 .547 298	85.2 602 95.0 3792 .560 305	86.5 615 95.6 4010 .575 313	87.9 628 96.3 4231 .590 322	89.1 639 96.9 4432 .602 329	90.1 649 97.3 4616 .612 334	91.1 660 97.8 4806 .622 340	92.1 671 98.3 5001 .632 345	93.1 682 98.8 5205 .642 351	94.2 694 99.2 5411 .652 357

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
FF/ENG	31	33	36	38	41	43	46	48	51	53	56	59	62	65	69	73

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

WINDMILLING JET

2 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
9,000 2.8	72.8	74.7	76.5	78.1	79.8	81.3	82.5	83.7	84.9	86.2	87.4	88.7	89.8	90.7	91.7	92.7
	498	513	528	542	557	571	582	594	605	618	630	642	652	661	672	683
	90.4	91.2	91.9	92.5	93.2	93.8	94.3	94.8	95.3	95.9	96.5	97.1	97.6	98.1	98.5	99.0
	2519	2698	2879	3063	3251	3456	3628	3803	3982	4193	4414	4637	4836	5023	5220	5421
	.451	.466	.480	.493	.507	.520	.530	.540	.550	.564	.578	.592	.603	.612	.621	.630
	254	262	270	278	286	294	299	305	311	319	327	335	341	346	352	357
7,000 1.1	71.3	73.1	74.9	76.6	78.1	79.7	81.1	82.4	83.6	84.7	85.8	87.0	88.2	89.3	90.4	91.3
	493	507	521	535	549	562	576	588	598	609	620	632	643	654	664	673
	90.2	91.0	91.7	92.4	93.0	93.6	94.2	94.7	95.2	95.7	96.1	96.7	97.3	97.8	98.3	98.7
	2541	2717	2896	3079	3263	3460	3657	3840	4015	4193	4377	4596	4818	5045	5250	5443
	.437	.450	.463	.476	.489	.502	.514	.525	.534	.544	.553	.566	.579	.592	.602	.611
	255	263	271	279	286	293	301	307	313	318	324	332	339	347	353	358
5,000 5.1	69.9	71.7	73.4	75.0	76.6	78.1	79.6	80.9	82.3	83.4	84.4	85.5	86.5	87.7	88.8	89.8
	488	502	515	528	542	555	567	580	592	603	613	623	633	644	655	665
	90.1	90.8	91.5	92.2	92.9	93.4	94.0	94.6	95.1	95.6	96.0	96.5	96.9	97.4	98.0	98.4
	2571	2739	2916	3096	3280	3475	3661	3855	4056	4229	4406	4586	4777	4998	5227	5437
	.423	.435	.448	.460	.472	.484	.496	.508	.519	.528	.537	.545	.555	.567	.578	.589
	256	264	271	279	286	294	301	308	315	320	326	331	337	344	351	357
3,000 9.1	68.6	70.3	71.9	73.5	75.0	76.5	78.0	79.3	80.7	82.0	83.1	84.2	85.2	86.1	87.1	88.1
	486	497	510	523	535	548	560	572	584	596	607	616	626	636	645	655
	90.0	90.7	91.4	92.0	92.7	93.3	93.9	94.4	94.9	95.5	95.9	96.4	96.8	97.2	97.6	98.1
	2614	2774	2941	3117	3297	3491	3676	3862	4051	4248	4441	4616	4794	4975	5170	5376
	.412	.423	.434	.445	.456	.468	.479	.490	.501	.512	.522	.530	.538	.546	.555	.564
	259	265	272	279	287	294	301	308	315	322	328	333	338	343	349	354
1,000 13.0	67.5	69.0	70.6	72.1	73.6	75.0	76.4	77.8	79.1	80.4	81.7	82.8	83.9	84.8	85.8	86.4
	484	495	506	517	529	541	553	565	576	587	598	610	620	629	638	644
	90.1	90.6	91.2	91.9	92.5	93.1	93.7	94.3	94.8	95.3	95.8	96.3	96.7	97.1	97.5	97.7
	2664	2820	2981	3147	3322	3513	3695	3881	4065	4253	4444	4644	4831	5008	5190	5315
	.402	.412	.421	.431	.442	.453	.463	.474	.484	.494	.504	.514	.523	.531	.538	.540
	261	268	274	280	287	294	301	308	315	321	328	334	340	345	350	351

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
FF/ENG	31	33	36	38	41	43	46	48	51	53	56	59	62	65	69	73

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

WINDMILLING JET

1 ENGINE OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

1 ENGINE OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260			
23,000 -30.6	105 744 100 4753 .540 232															
21,000 -26.6	102 729 99.7 .530 237	105 752 100.9 .538 241	108 784 102.3 .547 245													
19,000 -22.6	99.7 719 99.1 4741 .518 241	102.1 740 100.2 5111 .529 246	104.7 760 101.3 5488 .536 250	107.7 787 102.6 5929 .544 254												
17,000 -18.7	98.0 707 98.5 4769 .505 245	100.1 728 99.6 5117 .516 250	102.2 749 100.8 5489 .526 255	104.5 767 101.7 5859 .534 259	107.2 789 102.9 6270 .540 262											
15,000 -14.7	96.1 694 97.9 4770 .489 246	98.4 717 99.1 5151 .503 253	100.3 737 100.1 5497 .513 258	102.2 758 101.2 5865 .523 264	104.3 775 102.1 6236 .531 268	106.7 793 103.1 6635 .537 271										
13,000 -10.8	94.4 682 97.6 4778 .472 247	96.5 704 98.5 5146 .486 254	98.6 726 99.6 5531 .500 262	100.4 745 100.6 5886 .510 267	102.2 764 101.6 6252 .519 272	104.2 782 102.5 6642 .528 277	106.2 798 103.4 7024 .534 280	108.5 817 104.3 7444 .540 283								
11,000 -6.8	92.6 670 97.3 4780 .456 247	94.7 692 98.2 5155 .470 255	96.7 713 99.1 5525 .483 262	98.7 733 100.0 5907 .496 270	100.5 752 101.0 6283 .507 275	102.2 770 101.9 6643 .515 280	103.8 788 102.8 7026 .523 285	105.7 803 103.6 7424 .530 289	107.7 819 104.5 7830 .536 292							
9,000 -2.8	90.9 658 97.1 4772 .439 247	93.0 680 97.9 5153 .454 256	95.0 701 98.8 5536 .468 264	96.9 720 99.6 5906 .480 270	98.7 740 100.4 6286 .492 277	100.5 759 101.3 6685 .503 284	102.1 776 102.2 7043 .511 288	103.6 792 103.1 7417 .519 293	105.3 808 103.9 7825 .526 297	107.0 822 104.6 8227 .532 300						

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9			
FF/ENG	53	57	61	66	71	76	80	85	90	97	104	111	118			

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 5.0%.

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%\ N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

WINDMILLING JET

1 ENGINE OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

1 ENGINE OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260			
7,000 1.1	89.3 648 96.9 4771 .424 248	91.3 669 97.7 5144 .438 256	93.3 689 98.5 5528 .451 264	95.2 709 99.3 5919 .465 272	96.9 727 100.1 6290 .476 278	98.7 746 100.8 6668 .487 285	100.4 764 101.6 7066 .498 291	101.9 781 102.5 7451 .507 297	103.4 796 103.3 7817 .514 301	104.8 812 104.1 8206 .521 305	106.5 826 104.9 8633 .528 309					
5,000 5.1	87.7 639 96.8 4780 .410 248	89.7 658 97.5 5142 .423 256	91.6 678 98.3 5516 .436 264	93.5 697 99.0 5901 .448 272	95.3 716 99.7 6295 .461 279	96.9 733 100.5 6674 .472 286	98.6 751 101.2 7053 .482 292	100.2 768 101.9 7442 .492 298	101.8 785 102.8 7862 .503 305	103.1 800 103.5 8227 .509 309	104.5 814 104.3 8606 .516 313					
3,000 9.1	86.3 632 96.6 4786 .397 249	88.2 650 97.4 5139 .409 257	90.1 668 98.1 5500 .421 264	91.8 686 98.8 5873 .433 272	93.6 704 99.5 6260 .445 279	95.3 722 100.2 6653 .456 286	96.9 739 100.9 7046 .467 293	98.4 755 101.6 7424 .477 299	99.9 772 102.2 7810 .486 305	101.4 788 102.9 8210 .496 311	102.8 803 103.7 8625 .504 317	104.1 817 104.4 9001 .511 321				
1,000 13.0	84.8 625 96.5 4808 .385 250	86.7 642 97.3 5147 .396 258	88.5 659 98.0 5500 .408 265	90.3 676 98.7 5859 .419 272	92.0 693 99.3 6231 .430 279	93.6 710 100.0 6616 .441 286	95.2 727 100.6 7011 .451 294	96.8 744 101.3 7415 .462 301	98.2 759 101.9 7796 .471 307	99.7 775 102.5 8181 .480 312	101.1 790 103.2 8573 .489 318	102.5 805 103.8 8991 .498 324	103.8 820 104.6 9401 .505 329			

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9			
FF/ENG	53	57	61	66	71	76	80	85	90	97	104	111	118			

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 5.0%.

CENTER OF GRAVITY CORRECTIONS

PERCENT INCREASE IN CRUISE FUEL FLOW FOR OFF OPTIMUM C.G.

C.G. % MAC	% INCREASE FF
32	0
30	.5
28	1.0
26	1.5
24	2.0
22	2.6
20	3.3
18	3.9
16	4.5

DATA SOURCE: MD-11 FUEL CONSERVATION MANUAL, PAGE 30

DIVERGENCE

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INTRODUCTION

The divergence section contains data for planning a divergence to an alternate airport or prolonged holding if required. Charts and tables are provided to determine time and fuel from start of divergence and speeds and fuel flow during holding.

TIME AND FUEL FROM START OF DIVERGENCE AND RECLEARANCE

This chart provides the time and fuel for a reclearance and divergence. The divergence to an alternate airport begins at 31,000 ft cruise altitude at the time of reclearance. The enroute profile is based on a step climb to 35,000 ft and ends at cruise altitude overhead (39,000 ft) at the alternate airport. The optimum step climb schedule is presented in table form and provides the weight at which to initiate climb to the specified altitude. Penalties are provided for flying at off-optimum flight level. Corrections for, time and fuel are presented for temperature deviation from standard day.

As an example determine the time and fuel for divergence and reclearance for the following conditions:

Gross Weight At Time Of Reclearance	250,000 kg
Ground Distance To Alternate Airport	2500 n mi
Average Cruise Wind	50-knot tailwind
Temperature	ISA °C

Select the correct table for the divergence weight (250,000 kg). Enter the bottom left portion of the chart with the wind component (50-knot tailwind) and read vertically upward to the intersection with the ground distance (2500 n mi). At this point read horizontally to the right to the intersection with the gross weight (250,000 kg) column. At this point read the time and fuel for a standard day of 4 hr 56 min and 38,500 kg.

Determine the long range optimum performance cruise altitude from the Altitude Capability table based on long range cruise speed. This table is found in the Flight Planning section of the Preflight chapter. For 250,000 kg the long range optimum cruise altitude is 33,000 ft. The optimum altitude is higher than 31,000 ft and a fuel correction penalty from the Penalties For Off Optimum Flight Level chart needs to be applied. Enter the chart at 250,000 kg and find the penalty for 4000 ft, 340 kg. Since the example is 2000 ft above, the penalty needs to be divided in half (170 kg).

Assuming the step climb will occur in 4000-ft steps the Optimum Step Climb Schedule shows a weight of 241,600 kg at which the climb from 31,000 ft to 35,000 ft should be initiated. Similarly the climb from 35,000 to 39,000 ft should be initiated at 198,500 kg. Also shown in the table are gross weights at which to initiate step climbs in 2000-ft increments.

The total time and fuel for divergence and reclearance include all of the above corrections. For this example the total time is 4 hr 56 min and the total fuel is 35,970 kg.

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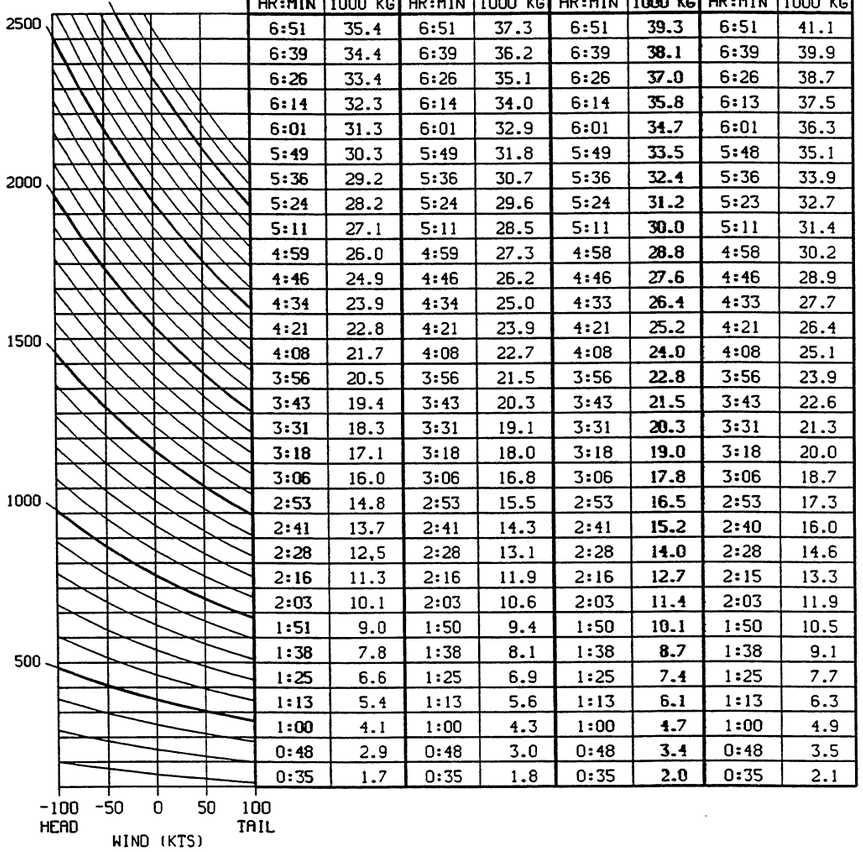
TIME AND FUEL FROM START OF DIVERGENCE AND RECLEARANCE

FL 310 / 350 / 390 / 430
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: DIVERGENCE TIMES ARE FOR STANDARD DAY

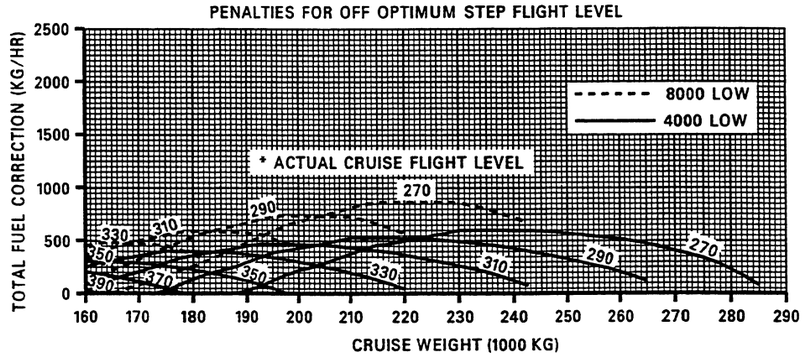


TOTAL DIVERGENCE TIME AND FUEL								
DIVERGENCE WEIGHT (KG)								
180,000		190,000		200,000		210,000	
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG
6:51	35.4	6:51	37.3	6:51	39.3	6:51	41.1
6:39	34.4	6:39	36.2	6:39	38.1	6:39	39.9
6:26	33.4	6:26	35.1	6:26	37.0	6:26	38.7
6:14	32.3	6:14	34.0	6:14	35.8	6:13	37.5
6:01	31.3	6:01	32.9	6:01	34.7	6:01	36.3
5:49	30.3	5:49	31.8	5:49	33.5	5:48	35.1
5:36	29.2	5:36	30.7	5:36	32.4	5:36	33.9
5:24	28.2	5:24	29.6	5:24	31.2	5:23	32.7
5:11	27.1	5:11	28.5	5:11	30.0	5:11	31.4
4:59	26.0	4:59	27.3	4:58	28.8	4:58	30.2
4:46	24.9	4:46	26.2	4:46	27.6	4:46	28.9
4:34	23.9	4:34	25.0	4:33	26.4	4:33	27.7
4:21	22.8	4:21	23.9	4:21	25.2	4:21	26.4
4:08	21.7	4:08	22.7	4:08	24.0	4:08	25.1
3:56	20.5	3:56	21.5	3:56	22.8	3:56	23.9
3:43	19.4	3:43	20.3	3:43	21.5	3:43	22.6
3:31	18.3	3:31	19.1	3:31	20.3	3:31	21.3
3:18	17.1	3:18	18.0	3:18	19.0	3:18	20.0
3:06	16.0	3:06	16.8	3:06	17.8	3:06	18.7
2:53	14.8	2:53	15.5	2:53	16.5	2:53	17.3
2:41	13.7	2:41	14.3	2:41	15.2	2:40	16.0
2:28	12,5	2:28	13.1	2:28	14.0	2:28	14.6
2:16	11.3	2:16	11.9	2:16	12.7	2:15	13.3
2:03	10.1	2:03	10.6	2:03	11.4	2:03	11.9
1:51	9.0	1:50	9.4	1:50	10.1	1:50	10.5
1:38	7.8	1:38	8.1	1:38	8.7	1:38	9.1
1:25	6.6	1:25	6.9	1:25	7.4	1:25	7.7
1:13	5.4	1:13	5.6	1:13	6.1	1:13	6.3
1:00	4.1	1:00	4.3	1:00	4.7	1:00	4.9
0:48	2.9	0:48	3.0	0:48	3.4	0:48	3.5
0:35	1.7	0:35	1.8	0:35	2.0	0:35	2.1

DECREASE/INCREASE TIME BY 1.3 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 45 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

OPTIMUM STEP CLIMB SCHEDULE		
CLIMB TO	2000 FT STEP	4000 FT STEP
(FL)	GROSS WEIGHT (KG)	
310	278,300	284,400
330	255,700	265,900
350	233,400	241,600
370	210,800	219,400
390	191,000	198,500
410	174,200	180,400
430	158,200	164,200

PENALTIES FOR OFF OPTIMUM STEP FLIGHT LEVEL



* ACTUAL CRUISE FLIGHT LEVEL EITHER 4000 FT
OR 8000 FT LOWER THAN THE OPTIMUM STEP ALTITUDE

CAG(IGDS)

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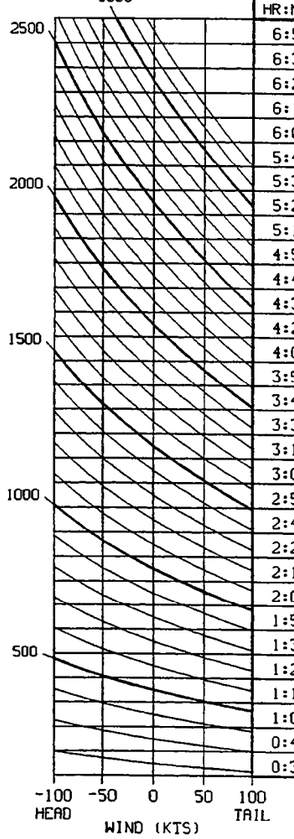
TIME AND FUEL FROM START OF DIVERGENCE AND RECLEARANCE

FL 310 / 350 / 390 / 430
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: DIVERGENCE TIMES ARE FOR STANDARD DAY

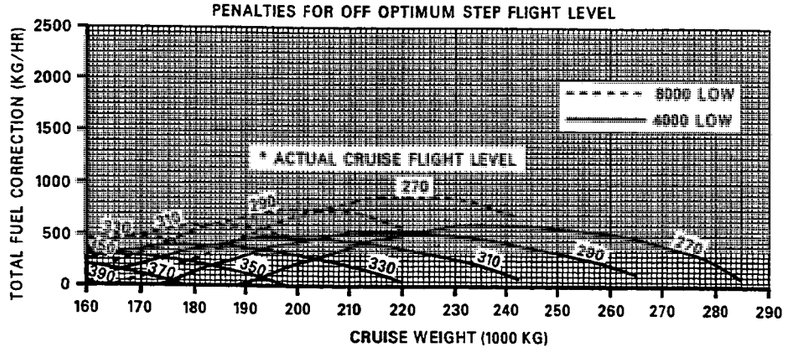


TOTAL DIVERGENCE TIME AND FUEL							
DIVERGENCE WEIGHT (KG)							
220,000		230,000		240,000		250,000	
TIME	FUEL	TIME	FUEL	TIME	FUEL	TIME	FUEL
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG
6:51	42.9	6:50	44.8	6:50	46.7	6:49	48.7
6:38	41.7	6:38	43.5	6:37	45.3	6:36	47.3
6:26	40.5	6:25	42.2	6:25	43.9	6:24	45.9
6:13	39.2	6:13	40.9	6:12	42.6	6:11	44.5
6:01	38.0	6:00	39.6	6:00	41.2	5:59	43.0
5:48	36.7	5:48	38.3	5:47	39.8	5:46	41.6
5:36	35.4	5:35	36.9	5:35	38.4	5:34	40.2
5:23	34.1	5:23	35.6	5:22	37.0	5:21	38.7
5:10	32.8	5:10	34.2	5:10	35.6	5:09	37.3
4:58	31.6	4:58	32.9	4:57	34.2	4:56	35.8
4:45	30.2	4:45	31.5	4:45	32.8	4:44	34.3
4:33	28.9	4:33	30.1	4:32	31.4	4:31	32.8
4:20	27.6	4:20	28.7	4:20	29.9	4:19	31.4
4:08	26.3	4:08	27.3	4:07	28.5	4:06	29.9
3:55	24.9	3:55	25.9	3:55	27.0	3:54	28.3
3:43	23.6	3:43	24.5	3:42	25.6	3:41	26.8
3:30	22.2	3:30	23.1	3:30	24.1	3:29	25.3
3:18	20.8	3:18	21.7	3:17	22.6	3:16	23.8
3:05	19.4	3:05	20.2	3:05	21.1	3:04	22.2
2:53	18.0	2:53	18.8	2:52	19.6	2:51	20.6
2:40	16.6	2:40	17.3	2:40	18.1	2:39	19.1
2:28	15.2	2:28	15.9	2:28	16.6	2:27	17.5
2:15	13.8	2:15	14.4	2:15	15.0	2:14	15.9
2:03	12.4	2:03	12.9	2:03	13.5	2:02	14.3
1:50	11.0	1:50	11.4	1:50	11.9	1:49	12.6
1:38	9.5	1:38	9.9	1:38	10.4	1:37	11.0
1:25	8.1	1:25	8.4	1:25	8.8	1:24	9.4
1:13	6.6	1:13	6.9	1:13	7.2	1:12	7.7
1:00	5.1	1:00	5.3	1:00	5.6	1:00	6.0
0:48	3.6	0:48	3.8	0:48	4.0	0:47	4.4
0:35	2.2	0:35	2.3	0:35	2.4	0:35	2.7

DECREASE/INCREASE TIME BY 1.3 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 45 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

OPTIMUM STEP CLIMB SCHEDULE		
CLIMB TO (FL)	2000 FT STEP	4000 FT STEP
	GROSS WEIGHT (KG)	
310	278,300	284,400
330	255,700	265,900
350	233,400	241,600
370	210,800	219,400
390	191,000	198,500
410	174,200	180,400
430	158,200	164,200

PENALTIES FOR OFF OPTIMUM STEP FLIGHT LEVEL



* ACTUAL CRUISE FLIGHT LEVEL EITHER 4000 FT
OR 8000 FT LOWER THAN THE OPTIMUM STEP ALTITUDE

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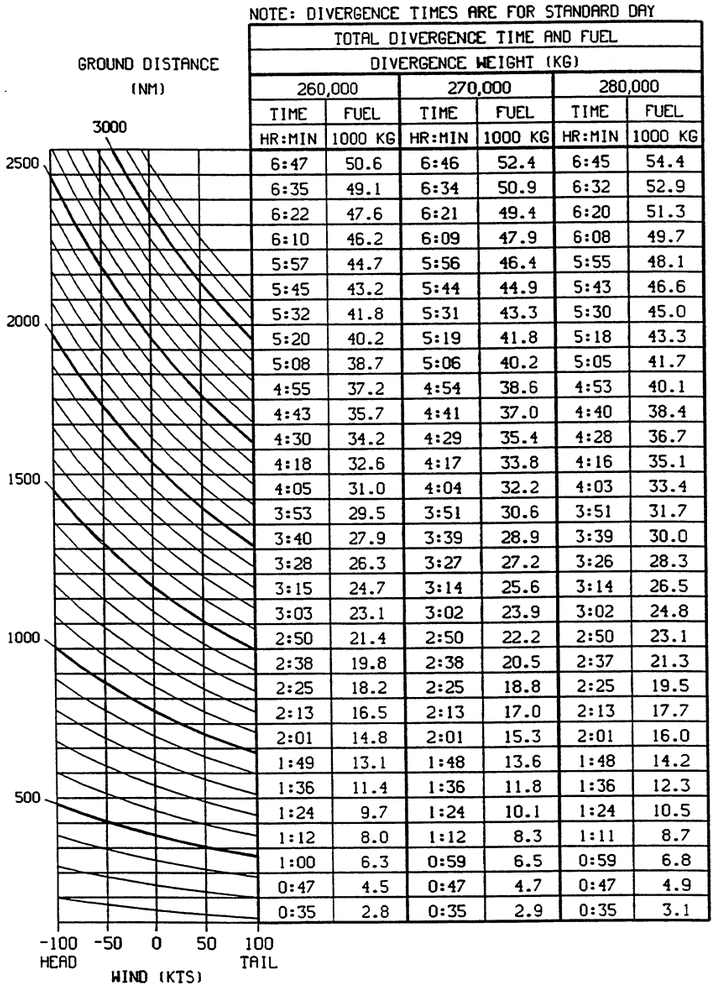
TIME AND FUEL FROM START OF DIVERGENCE AND RECLEARANCE

FL 310 / 350 / 390 / 430
LONG RANGE CRUISE
CF6-80C2D1F ENGINES

NOTE: DIVERGENCE TIMES ARE FOR STANDARD DAY

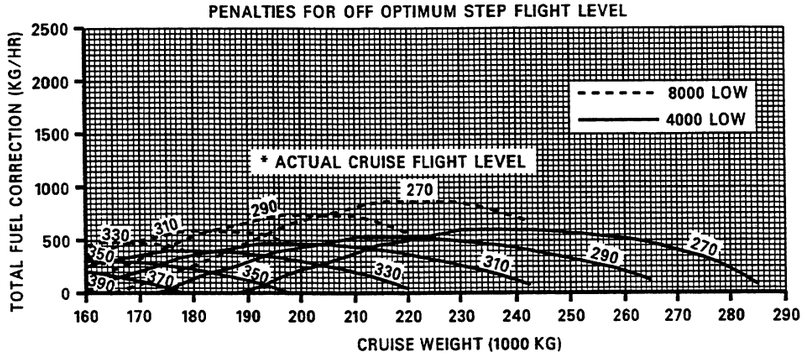


TOTAL DIVERGENCE TIME AND FUEL						
DIVERGENCE WEIGHT (KG)						
260,000		270,000		280,000		
TIME	FUEL	TIME	FUEL	TIME	FUEL	
HR:MIN	1000 KG	HR:MIN	1000 KG	HR:MIN	1000 KG	
6:47	50.6	6:46	52.4	6:45	54.4	
6:35	49.1	6:34	50.9	6:32	52.9	
6:22	47.6	6:21	49.4	6:20	51.3	
6:10	46.2	6:09	47.9	6:08	49.7	
5:57	44.7	5:56	46.4	5:55	48.1	
5:45	43.2	5:44	44.9	5:43	46.6	
5:32	41.8	5:31	43.3	5:30	45.0	
5:20	40.2	5:19	41.8	5:18	43.3	
5:08	38.7	5:06	40.2	5:05	41.7	
4:55	37.2	4:54	38.6	4:53	40.1	
4:43	35.7	4:41	37.0	4:40	38.4	
4:30	34.2	4:29	35.4	4:28	36.7	
4:18	32.6	4:17	33.8	4:16	35.1	
4:05	31.0	4:04	32.2	4:03	33.4	
3:53	29.5	3:51	30.6	3:51	31.7	
3:40	27.9	3:39	28.9	3:39	30.0	
3:28	26.3	3:27	27.2	3:26	28.3	
3:15	24.7	3:14	25.6	3:14	26.5	
3:03	23.1	3:02	23.9	3:02	24.8	
2:50	21.4	2:50	22.2	2:50	23.1	
2:38	19.8	2:38	20.5	2:37	21.3	
2:25	18.2	2:25	18.8	2:25	19.5	
2:13	16.5	2:13	17.0	2:13	17.7	
2:01	14.8	2:01	15.3	2:01	16.0	
1:49	13.1	1:48	13.6	1:48	14.2	
1:36	11.4	1:36	11.8	1:36	12.3	
1:24	9.7	1:24	10.1	1:24	10.5	
1:12	8.0	1:12	8.3	1:11	8.7	
1:00	6.3	0:59	6.5	0:59	6.8	
0:47	4.5	0:47	4.7	0:47	4.9	
0:35	2.8	0:35	2.9	0:35	3.1	

DECREASE/INCREASE TIME BY 1.3 MIN/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY
INCREASE/DECREASE FUEL BY 45 KG/HR OF FLIGHT TIME PER 10 DEG C ABOVE/BELOW STANDARD DAY

OPTIMUM STEP CLIMB SCHEDULE		
CLIMB TO	2000 FT STEP	4000 FT STEP
(FL)	GROSS WEIGHT (KG)	
310	278,300	284,400
330	255,700	265,900
350	233,400	241,600
370	210,800	219,400
390	191,000	198,500
410	174,200	180,400
430	158,200	164,200

PENALTIES FOR OFF OPTIMUM STEP FLIGHT LEVEL



* ACTUAL CRUISE FLIGHT LEVEL EITHER 4000 FT
OR 8000 FT LOWER THAN THE OPTIMUM STEP ALTITUDE

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DB1-4-1080C

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DESCENT

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INTRODUCTION

The Descent section of the Inflight chapter contains data to determine the time, distance and fuel-to-descend information for both long-range and high speed descent operations based on the optimum CG location (32% MAC).

DESCENT TABLES

The Descent tables present data that are based on a standard day temperature and an aircraft gross weight of 170,000 kgs. Time, distance, and fuel figures are presented as a function of altitude. The distance is further presented as a function of average descent wind. Also included in the values given are 4 minutes for approach maneuver from 1500 ft and 250 KIAS to touchdown.

To illustrate the use of the tables, determine the time, distance and fuel to descend for the following conditions:

descent speed schedule	= long range
top of descent pressure altitude	= 35,000 ft
bottom of descent pressure altitude	= sea level
aircraft gross weight	= 160,000 kg
temperature	= ISA °C
average wind during descent	= 50 kt headwind

Select the appropriate Descent table based on the descent speed schedule (long range). Enter the left side of the table with the top of descent pressure altitude (35,000 ft) and read horizontally to the right to the intersection with the forecast average wind during descent column (50 knots headwind, interpolating where necessary) and read a descent distance of 96 n mi. Continue reading horizontally to the right to the intersection with the time column and read a descent time of 24.2 minutes. Immediately to the right is the fuel column which is 756 kg. These data are based on descending from 35,000 ft to sea level.

If a descent is made to a pressure altitude other than sea level, the table is to be read in the following manner: Enter the table at the top of descent pressure altitude and read the time, distance and fuel to descend figures. Re-enter the table with the bottom of descent pressure altitude and read the time, distance and fuel to descend figures. Subtracting the two sets of figures results with the time, distance and fuel to descend to the given bottom of descent altitude.

There are no corrections for nonstandard temperatures or weights other than 170,000 kg. The effect of temperature is relatively insignificant on descent data and is not presented for this reason. Weight will affect descent data but for simplicity, 170,000 kg was chosen as a representative weight. Even though the data will vary slightly with temperature and weight, the data serve as a guide as to where to start the descent.

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DESCENT TABLES
CF6-80C2D1F ENGINES

LONG RANGE DESCENT
DESCEND AT .82 MACH IND. TO 38,136 FT
THEN 260 KIAS
THEN 250 KIAS BELOW 10,000 FT

3 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA °C
TEMPERATURE

	DISTANCE (N MI)						
	FORECAST AVERAGE WIND DURING DESCENT						
PRESSURE ALTITUDE FEET	HEADWIND 100 KT N MI	HEADWIND 50 KT N MI	WIND ZERO N MI	TAILWIND 50 KT N MI	TAILWIND 100 KT N MI	TIME MIN	FUEL KG
41,000	96	115	134	153	172	2.9	794
39,000	91	109	128	146	165	26.1	783
38,136	89	107	125	143	162	25.8	779
37,000	85	103	121	138	156	25.2	771
35,000	79	96	113	130	146	24.2	756
33,000	73	89	105	121	137	23.1	741
31,000	68	83	98	113	128	22.1	726
29,000	62	77	91	105	119	21.0	710
27,000	57	70	84	97	110	20.0	693
25,000	52	64	77	89	101	18.9	676
23,000	47	58	70	81	93	17.8	658
21,000	42	53	63	74	84	16.7	640
19,000	37	47	57	66	76	15.5	621
17,000	33	41	50	59	67	14.4	601
15,000	28	36	44	51	59	13.2	580
13,000	24	31	37	44	51	12.0	557
11,000	20	25	31	37	42	10.8	532
10,000	18	23	28	33	38	10.1	518
10,000	17	22	27	32	37	10.0	514
9,000	15	19	24	28	33	9.3	499
8,000	13	17	21	24	28	8.6	483
7,000	11	14	17	21	24	7.9	467
6,000	9	11	14	17	20	7.2	450
5,000	7	9	11	13	15	6.5	433
4,000	5	6	8	9	11	5.8	415
3,000	3	4	5	6	7	5.1	396
2,000	1	1	2	2	2	4.4	377
1,500	0	0	0	0	0	4.0	367

DESCENT DATA ARE FOR AN AIRCRAFT LANDING WEIGHT OF 170,000 KG

DESCENT TABLES
CF6-80C2D1F ENGINES

HIGH SPEED DESCENT
DESCEND AT .82 MACH IND. TO 31,837 FT
THEN 300 KIAS
THEN 250 KIAS BELOW 10,000 FT

3 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING
ISA °C
TEMPERATURE

	DISTANCE (N MI)						
	FORECAST AVERAGE WIND DURING DESCENT						
PRESSURE ALTITUDE FEET	HEADWIND 100 KT N MI	HEADWIND 50 KT N MI	WIND ZERO N MI	TAILWIND 50 KT N MI	TAILWIND 100 KT N MI	TIME MIN	FUEL KG
41,000	88	105	121	137	154	23.5	734
39,000	84	99	115	131	146	22.8	724
37,000	79	94	109	124	139	22.0	714
35,000	75	89	104	118	133	21.3	704
33,000	71	85	99	113	127	20.7	696
31,837	69	83	96	110	123	20.4	691
31,000	67	80	93	107	120	20.0	687
29,000	62	74	87	100	112	19.2	675
27,000	57	69	81	93	104	18.3	663
25,000	52	63	74	86	97	17.5	650
23,000	47	58	68	79	89	16.6	636
21,000	43	52	62	72	82	15.8	622
19,000	38	47	56	56	75	14.9	608
17,000	34	42	51	59	67	14.0	593
15,000	30	37	45	53	60	13.1	577
13,000	26	33	39	46	53	12.2	560
11,000	22	28	34	40	46	11.2	542
10,000	20	26	31	37	42	10.8	532
10,000	17	22	27	32	37	10.0	514
9,000	15	19	24	28	33	9.3	499
8,000	13	17	21	24	28	8.6	483
7,000	11	14	17	21	24	7.9	467
6,000	9	11	14	17	20	7.2	450
5,000	7	9	11	13	15	6.5	433
4,000	5	6	8	9	11	5.8	415
3,000	3	4	5	6	7	5.1	396
2,000	1	1	2	2	2	4.4	377
1,500	0	0	0	0	0	4.0	367

DESCENT DATA ARE FOR AN AIRCRAFT LANDING WEIGHT OF 170,000 KG

HOLDING

TABLE OF CONTENTS

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INTRODUCTION

The Holding section of the Inflight chapter contains tables for holding performance.

HOLDING

Holding data are presented for both low and high altitudes in tabular form as a function of gross weight and pressure altitude based on standard day temperature, air conditioning on and no ice protection. Corrections for nonstandard temperatures and engine or engine and airframe ice protection are given at the bottom of the page. Airspeeds are based on the faster of approximately 1.67 V_{stall} or minimum fuel.

To illustrate the use of the table, determine the holding parameters based on the following conditions:

Gross Weight	= 170,000 kg
Pressure Altitude	= 15,000 ft
Temperature	= standard day
Air Conditioning On	
No Ice Protection	

Enter the appropriate Holding table (11,000 to 21,000 ft) at the top with the gross weight (170,000 kg, interpolating where necessary) and read vertically downward to the intersection with the pressure altitude (15,000 ft, interpolating where necessary) and read the following:

Required N_1	= 68.6%
EGT	= 445°C
$\%N_2$	= 87.4%
Fuel Flow/Engine	= 1850 kg/hr
Indicated Mach Number	= .476
Indicated Airspeed	= 240 KIAS

The corrections at the bottom of the page are not applicable since the conditions are for standard day temperature and no ice protection.

If no data appears in the data box at the intersection of the gross weight and pressure altitude, operation at those conditions is not authorized because the maximum cruise limits would be exceeded.

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KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
INDICATED MACH NUMBER

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEG BANK TURNS

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
10,000 -4.8	57.5	59.4	61.1	62.8	64.5	66.0	67.5	68.9	70.3	71.6	72.8	74.0	75.2	76.3	77.4	78.6
	389	400	411	421	432	443	453	463	473	483	494	503	513	523	532	543
	84.2	84.9	85.6	86.3	86.9	87.5	88.1	88.6	89.2	89.8	90.3	90.9	91.3	91.8	92.3	92.8
	1450	1553	1659	1770	1884	2000	2117	2235	2353	2473	2594	2719	2844	2970	3102	3242
	208	216	224	231	238	245	252	259	265	272	278	284	290	296	302	309
	.377	.392	.405	.419	.431	.444	.456	.468	.480	.491	.502	.513	.524	.534	.545	.558
8,000 -0.8	56.1	57.9	59.6	61.2	62.8	64.4	65.9	67.3	68.6	69.9	71.2	72.4	73.5	74.7	75.8	76.9
	387	398	408	418	428	438	448	458	467	477	487	496	505	515	524	534
	84.0	84.8	85.4	86.1	86.7	87.3	87.9	88.5	89.0	89.5	90.0	90.6	91.1	91.6	92.0	92.5
	1470	1571	1675	1781	1892	2006	2123	2240	2358	2478	2598	2719	2842	2967	3096	3233
	208	216	223	231	238	245	252	258	265	271	277	283	289	295	301	308
	.363	.377	.390	.403	.415	.427	.439	.450	.462	.472	.483	.494	.504	.514	.524	.536
6,000 3.1	54.7	56.4	58.1	59.7	61.3	62.8	64.2	65.7	67.0	68.3	69.6	70.8	71.9	73.0	74.1	75.3
	386	396	406	416	425	435	444	453	462	471	480	489	498	507	516	526
	83.9	84.6	85.3	86.0	86.6	87.2	87.7	88.3	88.8	89.3	89.8	90.3	90.8	91.3	91.8	92.3
	1490	1592	1695	1799	1904	2016	2130	2246	2364	2483	2602	2722	2843	2965	3092	3227
	208	216	223	230	238	245	251	258	264	271	277	283	289	295	301	307
	.350	.363	.376	.388	.400	.411	.423	.433	.444	.455	.465	.475	.485	.495	.505	.516
4,000 7.1	53.3	55.0	56.7	58.3	59.8	61.2	62.7	64.0	65.4	66.7	67.9	69.1	70.3	71.4	72.5	73.6
	385	394	404	413	423	432	440	449	457	467	475	484	492	501	509	519
	83.7	84.5	85.2	85.8	86.4	87.0	87.6	88.1	88.6	89.1	89.6	90.1	90.5	91.0	91.5	92.0
	1511	1614	1716	1819	1924	2030	2140	2254	2370	2488	2608	2727	2847	2968	3092	3223
	208	216	223	230	237	244	251	257	264	270	276	282	288	294	300	306
	.337	.350	.362	.374	.385	.396	.407	.418	.428	.438	.448	.458	.467	.476	.486	.496
2,000 11.0	52.0	53.7	55.3	56.9	58.4	59.8	61.1	62.5	63.8	65.1	66.3	67.5	68.7	69.8	70.9	72.0
	384	393	403	411	420	429	438	446	454	462	470	479	487	495	503	512
	83.5	84.3	85.0	85.7	86.3	86.9	87.4	88.0	88.5	89.0	89.5	89.9	90.4	90.8	91.2	91.7
	1530	1635	1738	1842	1945	2051	2157	2266	2380	2496	2614	2733	2854	2974	3097	3225
	208	215	223	230	237	244	251	257	263	270	276	282	288	293	299	306
	.325	.337	.349	.360	.371	.382	.392	.402	.412	.422	.432	.441	.450	.459	.468	.478
1,500 12.0	51.6	53.3	55.0	56.5	58.0	59.4	60.8	62.1	63.4	64.7	65.9	67.1	68.3	69.4	70.5	71.6
	384	393	402	411	420	429	437	445	453	461	469	478	486	494	502	510
	83.5	84.2	85.0	85.6	86.3	86.8	87.4	87.9	88.4	88.9	89.4	89.9	90.3	90.8	91.2	91.7
	1535	1640	1744	1847	1951	2056	2163	2270	2383	2498	2616	2735	2856	2976	3099	3227
	208	215	223	230	237	244	251	257	263	270	276	282	287	293	299	305
	.322	.334	.346	.357	.368	.379	.389	.399	.409	.418	.428	.437	.446	.455	.464	.474

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
FF/ENG	15	16	17	18	20	21	22	23	24	26	27	28	30	31	32	34

FOR ENGINE ICE PROTECTION ON: INCREASE FUELBURN BY 2.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUELBURN BY 4%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
INDICATED MACH NUMBER

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEG BANK TURNS

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
21,000 -26.6	66.5 410 85.1 1369 210 .472	68.5 425 85.9 1482 218 .489	70.4 439 86.7 1597 226 .507	72.1 453 87.5 1715 234 .524	73.8 467 88.2 1835 242 .540	75.4 481 88.9 1957 249 .556	76.9 493 89.5 2082 256 .571	78.2 506 90.1 2208 263 .586	79.5 519 90.7 2335 270 .601	80.7 531 91.2 2464 277 .616	81.9 543 91.7 2594 284 .630	83.0 553 92.3 2725 291 .644	84.0 563 92.8 2857 297 .658	85.1 573 93.3 2992 304 .672	86.1 582 93.9 3134 311 .686	87.3 593 94.5 3289 319 .703
19,000 -22.6	64.8 405 84.9 1377 210 .452	66.8 418 85.7 1489 218 .469	68.7 432 86.5 1603 226 .486	70.4 446 87.2 1718 233 .502	72.1 459 87.9 1836 241 .518	73.6 472 88.6 1957 248 .533	75.1 485 89.2 2079 255 .547	76.6 497 89.9 2203 262 .562	77.9 509 90.4 2329 269 .576	79.1 521 91.0 2457 276 .590	80.3 532 91.5 2585 283 .603	81.4 544 92.0 2715 289 .617	82.5 555 92.5 2846 295 .630	83.5 565 93.0 2978 302 .643	84.6 574 93.5 3115 309 .657	85.7 585 94.1 3266 316 .672
17,000 -18.7	63.1 400 84.7 1387 209 .434	65.1 413 85.5 1498 217 .450	66.9 426 86.2 1611 225 .466	68.7 439 86.9 1725 233 .481	70.3 452 87.6 1840 240 .496	71.9 464 88.3 1959 247 .511	73.4 476 89.0 2079 255 .525	74.8 488 89.6 2201 261 .539	76.2 500 90.1 2326 268 .552	77.5 511 90.7 2451 275 .566	78.7 523 91.3 2578 281 .578	79.9 534 91.7 2707 288 .591	80.9 544 92.2 2836 294 .604	82.0 555 92.7 2967 300 .616	83.0 566 93.1 3104 307 .629	84.1 577 93.7 3251 314 .644
15,000 -14.7	61.4 396 84.5 1,400 209 .416	63.4 408 85.3 1509 217 .432	65.2 421 86.0 1622 225 .447	67.0 433 86.7 1735 232 .462	68.6 445 87.4 1850 240 .476	70.2 457 88.0 1966 247 .490	71.7 469 88.7 2083 254 .504	73.1 480 89.3 2204 261 .517	74.5 492 89.9 2326 267 .530	75.8 503 90.4 2450 274 .543	77.1 514 91.0 2575 280 .555	78.2 524 91.5 2702 287 .567	79.4 535 92.0 2830 293 .579	80.4 545 92.4 2959 299 .591	81.5 556 92.9 3094 305 .603	82.6 567 93.4 3239 313 .617
13,000 -10.8	59.8 393 84.4 1424 209 .400	61.7 405 85.1 1533 217 .415	63.6 416 85.8 1645 224 .430	65.3 428 86.5 1759 232 .444	67.0 439 87.2 1875 239 .458	68.5 450 87.8 1991 246 .471	70.0 462 88.4 2109 253 .484	71.4 473 89.0 2228 260 .497	72.8 484 89.6 2350 266 .509	74.1 495 90.2 2473 273 .521	75.4 505 90.7 2598 279 .533	76.5 515 91.2 2724 286 .545	77.7 526 91.7 2852 292 .556	78.8 535 92.2 2982 298 .567	79.9 546 92.7 3116 304 .579	81.0 557 93.2 3259 311 .592
11,000 -6.8	58.3 391 84.2 1441 208 .385	60.1 402 85.0 1544 216 .399	61.9 413 85.7 1653 224 .413	63.6 423 86.3 1766 231 .427	65.3 434 87.0 1881 239 .440	66.9 445 87.6 1997 246 .453	68.3 455 88.2 2114 252 .465	69.8 466 88.8 2232 259 .477	71.1 477 89.3 2351 266 .489	72.4 487 89.9 2471 272 .501	73.7 497 90.5 2595 278 .512	74.9 507 91.0 2720 285 .523	76.0 517 91.5 2846 291 .534	77.1 527 91.9 2974 297 .545	78.3 537 92.4 3106 303 .556	79.4 547 92.9 3247 310 .569

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8
FF/ENG	15	16	18	19	21	22	24	25	26	28	29	31	32	33	35	37

FOR ENGINE ICE PROTECTION ON: INCREASE FUELBURN BY 2.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUELBURN BY 4%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
INDICATED MACH NUMBER

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEG BANK TURNS

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
33,000 -50.4	77.0	78.8	80.6	82.2	83.7	85.1	86.5	87.7	88.9	89.9	90.9	92.0	93.0			
	460	477	492	507	521	537	553	568	582	596	609	621	634			
	86.7	87.6	88.4	89.3	91.8	92.6	93.3	93.9	94.6	95.2	95.8	96.4	96.9			
	1383	1507	1632	1761	1893	2025	2157	2291	2424	2559	2707	2878	3079			
	215	224	233	242	250	258	266	273	280	285	290	293	295			
	.618	.642	.666	.689	.711	.732	.753	.771	.788	.802	.813	.821	.826			
31,000 -46.4	75.3	77.2	78.9	80.5	82.1	83.5	84.9	86.2	87.4	88.5	89.6	90.5	91.5	92.4	93.5	
	450	467	484	499	512	525	540	554	569	583	596	608	621	632	645	
	86.5	87.3	88.1	88.9	89.7	90.4	92.9	93.6	94.2	94.8	95.4	96.0	96.5	97.0	97.6	
	1371	1493	1617	1743	1871	2003	2135	2269	2402	2538	2672	2808	2954	3120	3318	
	214	223	231	240	248	256	264	272	279	286	292	298	302	305	307	
	.589	.612	.634	.656	.677	.698	.718	.737	.756	.772	.788	.801	.811	.819	.824	
29,000 -42.5	73.6	75.5	77.3	78.9	80.5	81.9	83.3	84.6	85.8	87.0	88.1	89.2	90.2	91.0	92.0	93.0
	440	457	474	490	504	517	530	542	556	569	583	595	608	620	632	645
	86.2	87.0	87.8	88.5	89.3	90.0	90.7	91.4	93.8	94.4	95.0	95.6	96.1	96.7	97.2	97.8
	1364	1484	1607	1732	1858	1986	2117	2251	2385	2520	2655	2792	2928	3064	3211	3386
	213	222	230	238	246	254	262	270	277	285	292	298	304	309	314	318
	.563	.584	.605	.626	.646	.665	.684	.703	.721	.739	.755	.771	.785	.797	.808	.817
27,000 -38.5	71.8	73.8	75.6	77.3	78.8	80.3	81.7	83.0	84.2	85.4	86.6	87.7	88.7	89.7	90.6	91.6
	432	448	464	480	495	509	522	534	545	556	569	582	594	607	619	632
	85.9	86.8	87.6	88.3	89.0	89.6	90.3	91.0	91.6	92.7	94.0	94.6	95.2	95.7	96.3	96.8
	1357	1476	1598	1721	1846	1973	2101	2231	2365	2500	2636	2772	2910	3047	3190	3338
	212	221	229	237	245	253	260	268	275	283	290	297	303	310	316	322
	.538	.558	.578	.597	.616	.635	.653	.671	.688	.705	.722	.738	.753	.768	.782	.796
25,000 -34.5	70.0	72.0	73.9	75.6	77.2	78.7	80.1	81.4	82.6	83.8	85.0	86.1	87.2	88.2	89.2	90.3
	424	440	455	470	485	499	513	525	537	548	559	569	581	593	605	619
	85.7	86.5	87.3	88.1	88.7	89.4	90.0	90.6	91.2	91.9	92.5	93.0	93.6	94.1	94.7	95.3
	1358	1475	1595	1716	1840	1965	2092	2220	2349	2482	2617	2754	2891	3029	3173	3327
	211	220	228	236	244	251	259	266	273	281	288	295	301	308	315	323
	.514	.534	.553	.571	.589	.607	.624	.641	.657	.673	.689	.705	.720	.735	.750	.767
23,000 -30.6	68.3	70.3	72.1	73.9	75.5	77.1	78.5	79.8	81.1	82.3	83.4	84.5	85.6	86.7	87.7	88.8
	417	432	447	461	476	490	503	516	529	540	551	561	571	581	593	606
	85.3	86.2	87.0	87.7	88.5	89.1	89.8	90.3	90.9	91.5	92.1	92.6	93.2	93.8	94.3	94.9
	1362	1477	1594	1715	1837	1961	2087	2215	2344	2474	2605	2739	2875	3013	3157	3313
	211	219	227	235	243	250	257	265	272	279	286	293	299	306	313	321
	.492	.511	.529	.547	.564	.580	.597	.612	.628	.643	.659	.673	.688	.703	.718	.735

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9
FF/ENG	16	17	19	20	22	23	25	27	28	30	32	34	35	37	39	41

FOR ENGINE ICE PROTECTION ON: INCREASE FUELBURN BY 2.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUELBURN BY 4%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED AIRSPEED (KT)
INDICATED MACH NUMBER

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEG BANK TURNS

3 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

3 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
43,000 -56.5	87.6 558 93.2 1508 222 .788	89.2 579 94.2 1646 229 .809	90.9 599 95.1 1813 233 .822													
41,000 -56.5	85.3 531 92.0 1479 221 .754	87.1 553 92.9 1613 230 .780	88.6 572 93.8 1746 237 .802	90.1 590 94.7 1897 242 .817	91.7 609 95.5 2085 245 .825											
39,000 -56.5	83.0 505 90.7 1449 220 .718	84.8 525 91.7 1581 229 .746	86.5 545 92.6 1713 238 .771	88.0 564 93.4 1845 245 .793	89.3 581 94.2 1983 251 .810	90.7 597 95.0 2147 255 .821	92.1 614 95.7 2351 257 .826									
37,000 -56.5	80.6 483 87.8 1417 218 .682	82.5 499 90.5 1547 228 .710	84.2 518 91.4 1677 237 .735	85.8 537 92.2 1808 245 .760	87.2 554 93.0 1941 253 .781	88.5 570 93.7 2072 259 .799	89.7 585 94.4 2216 264 .813	90.9 600 95.1 2386 268 .822	92.2 615 95.8 2596 269 .826							
35,000 -54.3	78.6 469 87.0 1395 216 .649	80.5 485 88.0 1521 226 .675	82.2 500 88.9 1650 235 .700	83.8 517 91.4 1780 244 .724	85.3 534 92.2 1911 252 .746	86.7 551 93.0 2043 260 .768	88.0 566 93.7 2176 267 .786	89.1 581 94.3 2309 273 .802	90.2 595 95.0 2456 277 .814	91.4 609 95.6 2628 280 .822	92.5 622 96.2 2836 282 .826					

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0					
FF/ENG	18	19	21	23	24	26	28	30	31	33	35					

FOR ENGINE ICE PROTECTION ON: INCREASE FUELBURN BY 2.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUELBURN BY 4%.

APPROACH AND LANDING

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INTRODUCTION

The Approach And Landing section provides data to determine permissible landing performance levels. When determining these levels, various performance parameters must be analyzed. A sample problem is presented to illustrate the procedure that is used and the parameters that must be analyzed. Care must be exercised when selecting the appropriate chart for the correct flap setting.

SAMPLE LANDING PROBLEM AND WORKSHEET

Determine the maximum landing gross weight based on the following conditions:

	Destination
Airport Pressure Altitude	4000 ft
Airport Ambient Temperature	20°C
Runway Length	2350 m
Approach Flap Setting	28°
Landing Flap Setting	50°
Reported Wind At A 10-Meter Height	20-knot headwind
Runway Slope	1% uphill
Bleed Condition	air conditioning "ON" no ice protection
Runway Condition	wet
Landing Weight	184,000 kg

		Destination
1.	Maximum Structural Landing Weight	195,045 kg
2.	Approach Climb Limiting Weight	261,900 kg
3.	Landing Field Length Limiting Weight	190,000 kg
4.	Maximum Permissible Quick Turn-Around Landing Weight	192,500 kg
5.	Maximum Landing Gross Weight (Lowest Of Weights Determined In Steps 1 Thru 4)	190,000 kg
6.	Landing Speed	144 KIAS

MAXIMUM STRUCTURAL LANDING WEIGHT

The maximum structural landing weight is the maximum permissible normal landing weight based on structural limitations, which in our example is 195,045 kg.

It must be noted that there are various maximum structural landing weights that apply to the MD-11. The one used here is a typical maximum structural landing weight which was chosen to complete the sample problem. However, when solving for actual conditions use the actual maximum structural landing weight which is presented in the Limitations section of the General chapter.

N_1 SETTING

The Go-Around Takeoff Thrust tables allow for the determination of the N_1 setting for go-around inflight takeoff thrust. The base N_1 value is presented as a function of airport pressure altitude and ambient temperature, with corrections for air conditioning and/or ice protection bleed requirements.

APPROACH CLIMB LIMITING WEIGHT

The Approach Climb Limiting Weight chart is used to determine the maximum weight for which the available gross climb gradient is 2.4% in the approach climb configuration (one engine inoperative, takeoff thrust, flaps set at 28°, slats extended and gear retracted). The speed for which this chart is valid is 1.5 V_S.

This chart is for a FAR limiting weight and in no way represents the normal go-around procedure.

Procedure:

The approach climb weights are presented as a function of ambient temperature and pressure altitude for different ice protection bleed requirements and with engine air bleed for air conditioning on. Enter the appropriate altitude/temperature data grid based on icing engine air bleed at the bottom with the ambient temperature and read vertically upward to the intersection with the pressure altitude. At this point, read horizontally to the right to obtain the approach climb limiting weight.

Sample Landing Problem

Entering the altitude/temperature data grid labeled Ice Protection Off with 20°C ambient temperature and 4000-ft pressure altitude, an approach climb limiting weight of 261,900 kg is obtained.

LANDING SPEED

The Landing Speed charts allow for determination of landing speed as a function of airport pressure altitude. Separate charts are provided for 35° and 50° flap configurations with slats extended.

Procedure:

Select the appropriate Landing Speed chart based on landing flap setting. Enter the lower portion of the chart with the landing weight and read vertically upward to the intersection with the airport pressure altitude line. Read horizontally left to obtain the landing speed.

Sample Landing Problem:

For the sample landing problem using 50° flaps and a landing weight of 184,000 kg, a landing speed of 144 KIAS is obtained.

LANDING FIELD LENGTH

The Landing Field Length charts are provided to determine the maximum permissible landing weight based on the available runway length. Separate charts are provided for 35° and 50° flap configurations with anti-skid operative. All charts are based on operation with slats extended.

Procedure:

Select the appropriate Landing Field Length chart based on landing flap setting. Enter the lower right portion of the chart with the runway length. For a dry runway, enter the chart with the dry runway length and continue vertically upward to the dry runway (reference line) scale. For a wet runway, enter the wet runway landing field length scale with the wet runway length and read diagonally upward following the guidelines to the dry runway (reference line) scale. From this point, read vertically upward to the intersection with the wind, then horizontally left to the intersection with the airport pressure altitude. From this point, read vertically upward to obtain the field length limiting weight.

Sample Landing Problem

For the sample landing problem the Landing Field Length chart for 50° flap setting must be used. Enter the chart with the 2350-m wet runway length

and follow the guidelines diagonally upward to the dry runway (reference line) scale. Read vertically upward to the 20-knot headwind line, left to the intersection with the 4000-ft pressure altitude line, then vertically upward to obtain a landing field length limiting weight of 190,000 kg.

MAXIMUM PERMISSIBLE QUICK TURN-AROUND LANDING WEIGHT

The Maximum Permissible Quick Turn-Around Landing Weight charts are provided to determine the maximum landing weight for which there is no waiting time required prior to the next takeoff for landing at either 35° or 50° flaps. When a landing is made at the weight determined from this chart, or at a lesser weight, the wheel thermal fuse plugs will not release pressure during a rejected takeoff.

If a landing is made at a weight greater than the weight determined from the chart, a waiting period (ramp time) of 45 minutes is required before takeoff is permitted.

Procedure:

Enter the bottom left portion of the chart with the airport ambient temperature and read vertically upward to the intersection with airport pressure altitude. From this point read horizontally to the right, correcting for wind and runway slope and read a maximum permissible quick turn-around landing weight.

Sample Landing Problem:

For the sample landing problem entering the chart with 20°C ambient temperature, 4000-ft pressure altitude, and correcting for a 20-knot headwind and 1% uphill slope a maximum quick turn-around landing weight of 192,500 kg is read.

NORMAL CONFIGURATION REFERENCE SPEEDS

The Normal Configuration Reference Speeds table provides the 2 and 3 engine reference speeds as a function of weight for both 35°/EXT and 50°/EXT configuration.

THRESHOLD SPEED INCREMENT FOR LANDING WITH AN INOPERATIVE STABILIZER

The threshold speed increment for landing with an inoperative stabilizer is shown as a function of center of gravity location and stabilizer angle for 35°/EXT configuration.

STOPPING DISTANCE WITH AUTOBRAKE SYSTEM

The Stopping Distance With Autobrake System charts illustrate the actual unfactored landing ground roll distance from main gear touchdown to a full stop, assuming normal speed loss from the threshold to the touchdown point.

Procedure:

Determine the landing speed at a 50-ft height using the charts in this section of the FCOM. Enter the Stopping Distance With Autobrake System chart at the bottom with the landing speed. After correcting for airport pressure altitude and wind, draw a line vertically upward to the intersection with the appropriate line based on flap setting, runway condition, and deceleration level. From this point, read horizontally to the right and make a correction for nonstandard temperature to determine the actual stopping distance. At the bottom of the page are slope corrections to be applied to the stopping distance.

GO-AROUND TAKEOFF THRUST
% N1 SETTING
CF6-80C2D1F ENGINES

ONE A/C PACK PER OPERATING ENGINE
LOW FLOW

VALID FOR AIRSPEEDS < = 300 KCAS

TAMB (°C)	BASE N_1 PRESSURE ALTITUDE (1000 FT)															LIMIT N1
	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
-60	91.42	93.01	94.56	95.29	95.99	96.77	97.52	98.35	98.99	99.76	100.51	100.97	101.41	102.13	102.83	103.30	103.77	100.26
-50	93.38	95.01	96.58	97.32	98.02	98.80	99.55	100.36	101.00	101.81	102.59	103.06	103.51	104.25	104.96	105.45	105.92	102.26
-40	95.30	96.95	98.55	99.29	100.00	100.77	101.51	102.31	102.95	103.79	104.61	105.09	105.54	106.30	107.03	107.52	108.00	104.13
-30	97.18	98.86	100.48	101.22	101.94	102.71	103.44	104.22	104.86	105.74	106.60	107.08	107.54	108.31	109.06	109.56	110.05	106.00
-20	99.02	100.72	102.37	103.12	103.84	104.59	105.32	106.08	106.72	107.63	108.53	109.02	109.49	110.28	111.04	111.55	112.05	107.84
-10	100.81	102.53	104.20	104.95	105.68	106.42	107.14	107.88	108.52	109.47	110.40	110.90	111.38	112.18	112.96	113.47	113.95	109.60
0	102.58	104.32	106.01	106.77	107.50	108.23	108.93	109.66	110.29	111.28	112.24	112.73	113.20	113.99	114.75	115.26	115.74	111.34
10	104.31	106.07	107.78	108.54	109.27	110.00	110.72	111.43	112.08	113.06	113.98	114.47	114.93	115.04	114.98	114.76	114.60	113.03
20	106.02	107.83	109.68	110.35	111.10	111.83	112.54	113.22	113.27	113.33	113.16	113.00	112.79	112.69	112.55	112.55	112.54	114.69
30	107.84	109.66	111.41	111.40	111.34	111.36	111.30	111.27	111.25	111.04	110.84	110.80	110.79	110.68	110.71	110.77	110.84	116.34
40	107.81	108.69	109.52	109.54	109.46	109.29	109.07	108.82	108.86	108.88	108.89	109.03	109.14	109.38	109.58	109.68	109.76	117.50
50	106.25	107.03	107.67	107.47	107.33	107.39	107.49	107.54	107.53	107.61	107.67	107.81	107.93					117.50
60	104.93	105.39	105.84	105.94	106.00	106.11	106.19	106.20	106.28	107.04	107.77							117.50

BLEED CORRECTIONS

ANTI-ICE (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	PRESSURE ALTITUDE (1000 FT)																	
	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
EAI	-0.60	-0.65	-0.70	-0.75	-0.79	-0.78	-0.76	-0.74	-0.72	-0.74	-0.76	-0.77	-0.79	-0.80	-0.80	-0.81	-0.81	-0.82
WAI + EAI	-0.96	-1.05	-1.13	-1.22	-1.30	-1.29	-1.27	-1.25	-1.16	-1.22	-1.27	-1.32	-1.37	-1.37	-1.37	-1.38	-1.38	-1.38

DIRECTIONS:

1) Determine base N1 for the given pressure altitude and ambient temperature.
2) Add appropriate bleed corrections for anti-ice for the given pressure altitude.
3) Compare resulting N1 versus the Limit N1 for the given ambient temperature. Select the lesser N1.

CAG(IGDS)

DB1-4-1139

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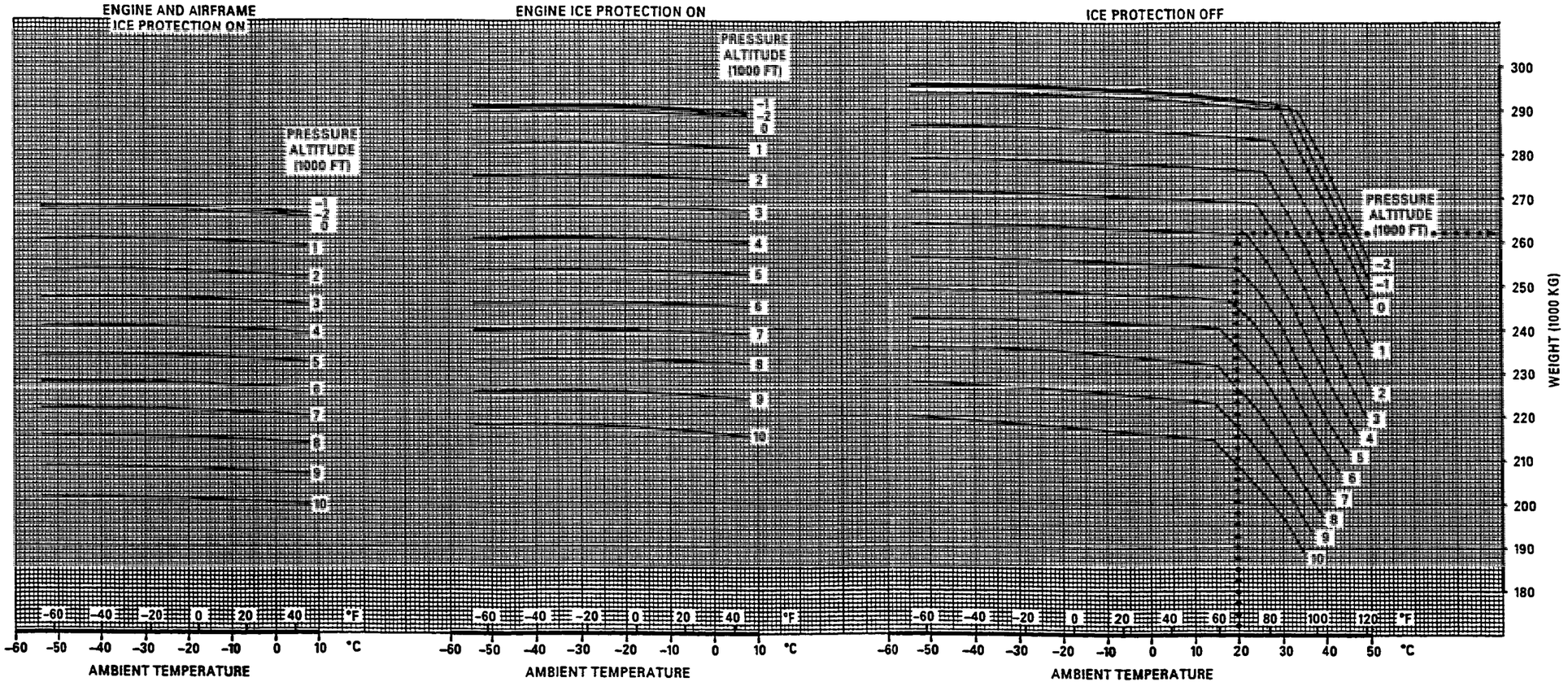
APPROACH CLIMB LIMITING WEIGHT

CF6–80C2D1F ENGINES
FLAPS 28° GEAR UP SLATS EXTENDED
ONE ENGINE INOPERATIVE TAKEOFF THRUST
V_{CL} = 1.5 V_S(APPROXIMATELY) GROSS GRADIENT = 2.4%
ENGINE AIRBLEED FOR AIR CONDITIONING ON

WHEN ICING CONDITIONS ARE PREDICTED DURING TAKEOFF AND/OR ENROUTE AND THE PREDICTED LANDING TEMPERATURE IS BELOW 20°C, REDUCE THE LIMITING WEIGHT OBTAINED FROM THE CHART BELOW ENTITLED EITHER 'ICE PROTECTION OFF' OR 'ENGINE ICE PROTECTION ON' BY 2.4%. THIS REDUCTION IS REQUIRED TO ACCOUNT FOR THE ICE REMAINING ON THE NON–HEATED STRUCTURE.

MAXIMUM WEIGHT LIMITATIONS MUST BE OBSERVED



CAG(IGDS) DATA SOURCE: MDC–K0031 SECTION 4A, PAGE 18–1, DATED12–5–90

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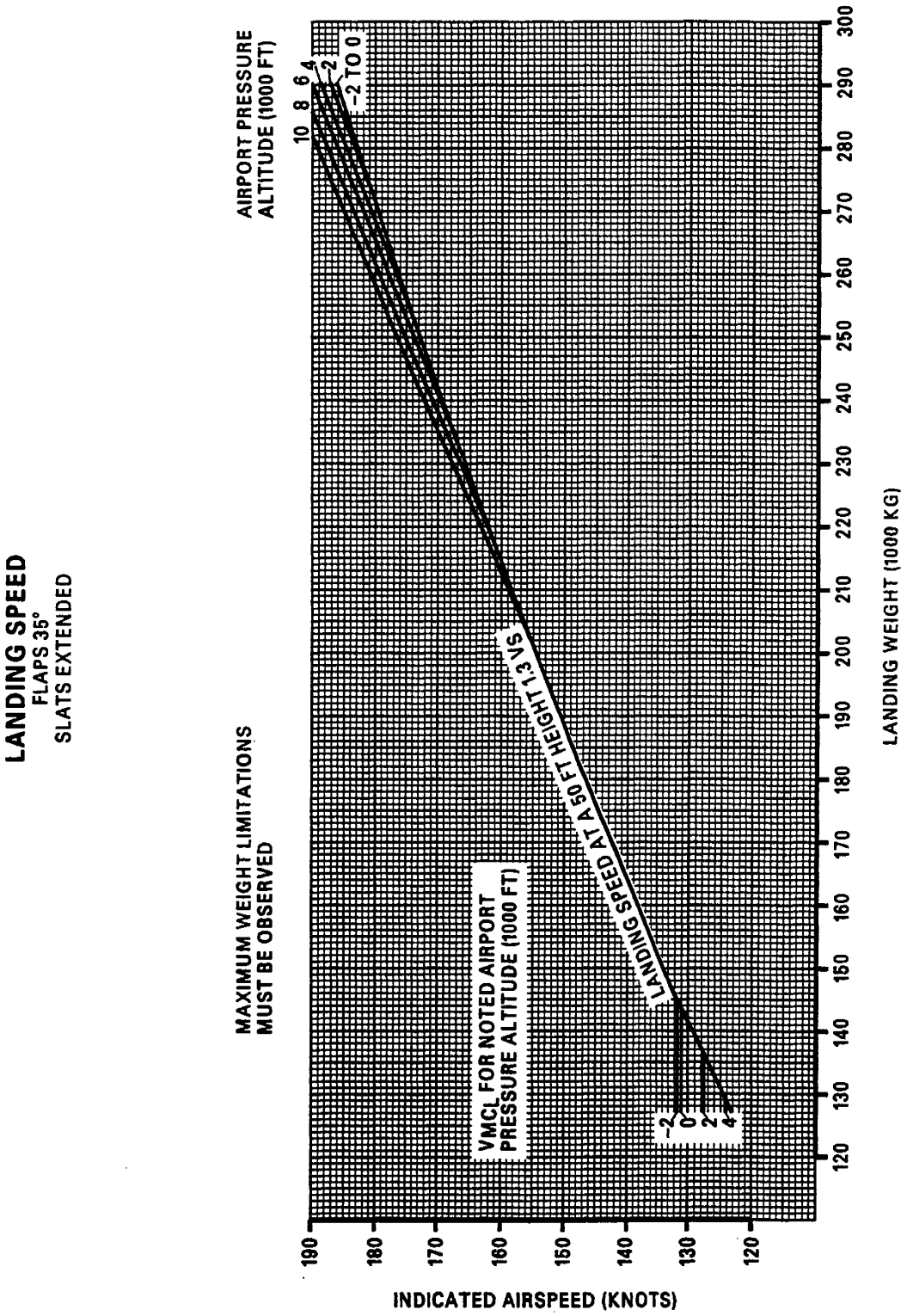

CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 19-1, DATED 7-11-91 DB1-4-1008A

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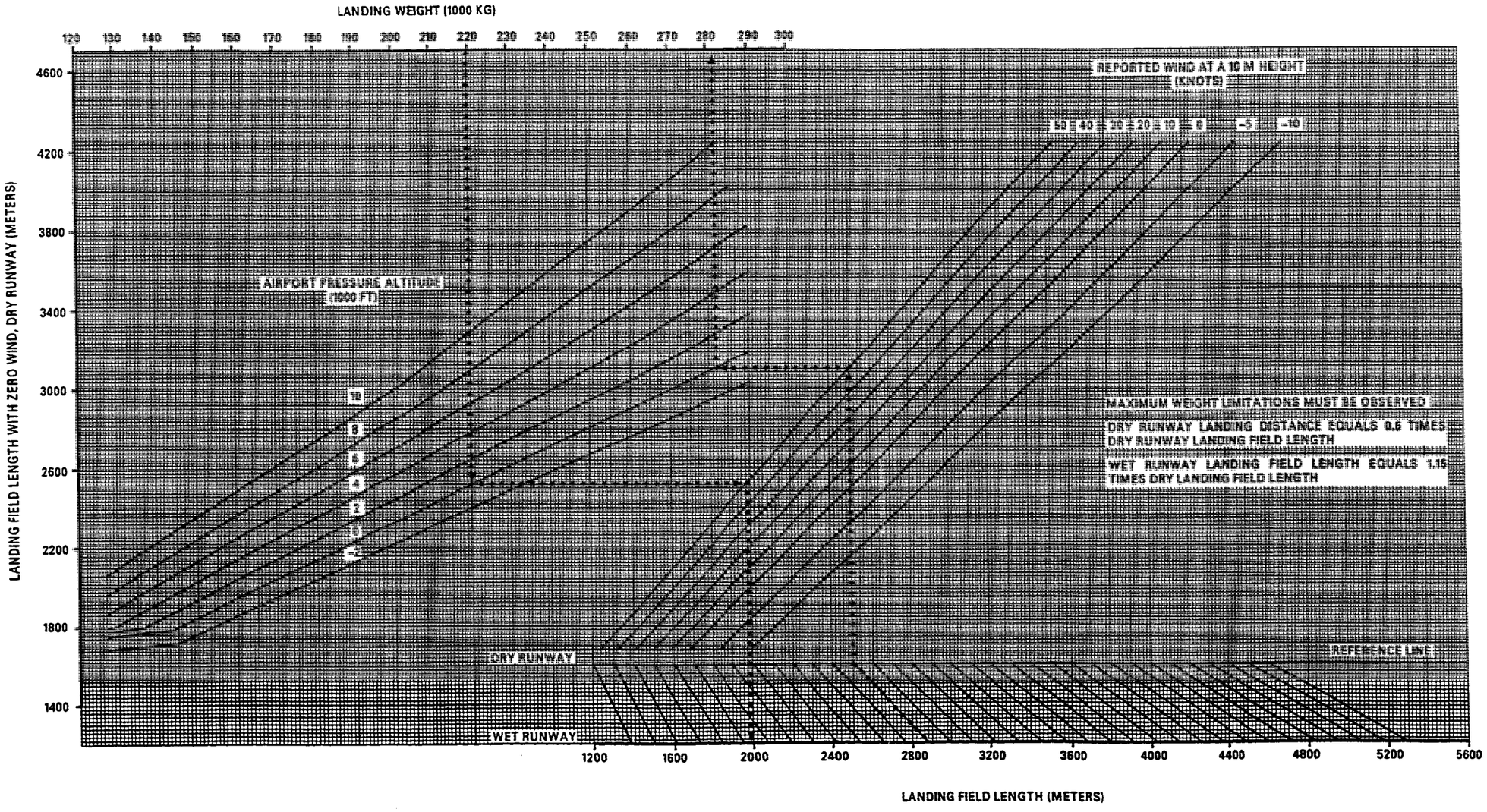
MAXIMUM LANDING WEIGHT – FIELD LENGTH LIMITS
ANTI-SKID OPERATIVE
HARD SURFACE RUNWAY
FLAPS 35°
SLATS EXTENDED



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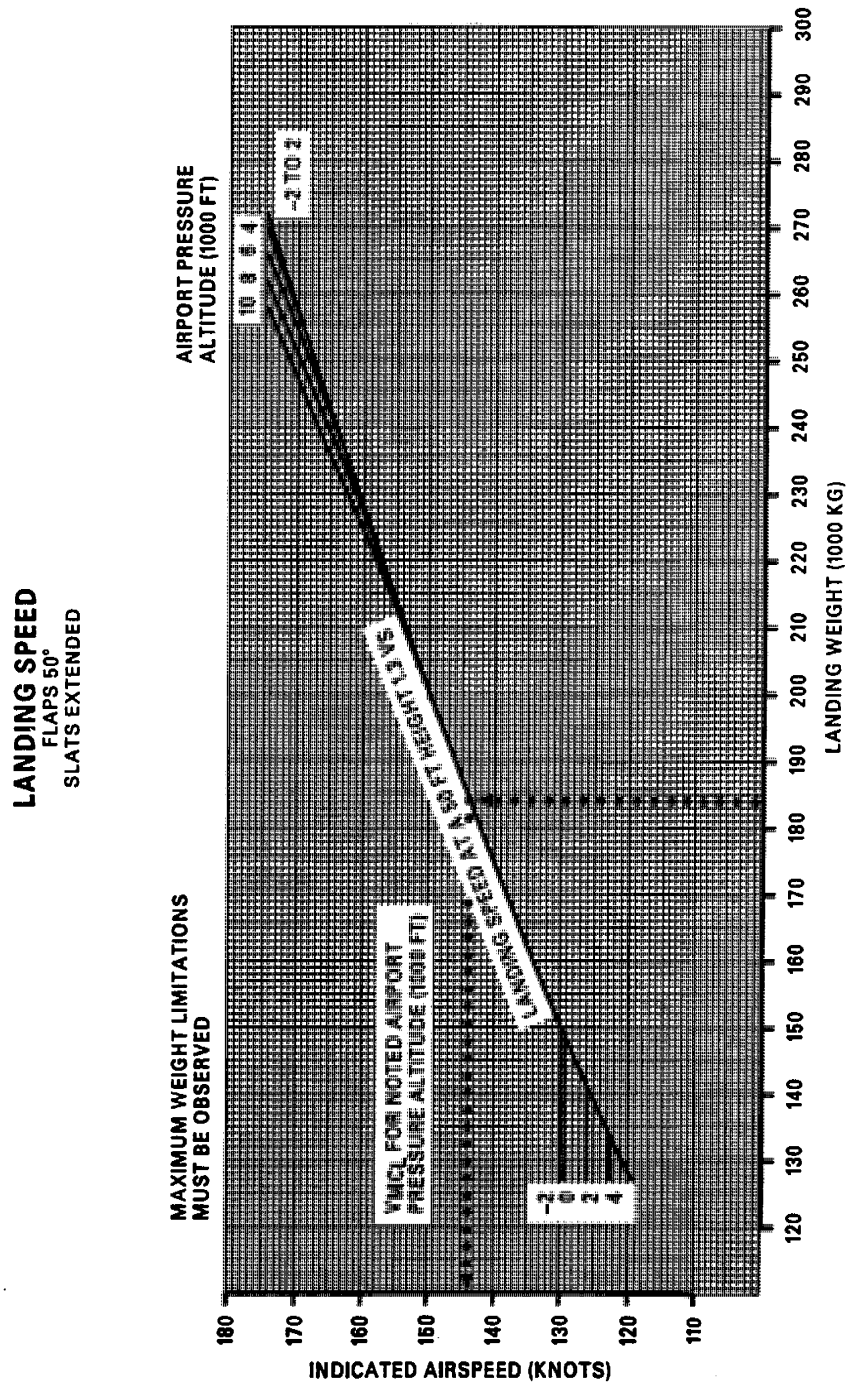

CAG(IGDS) DATA SOURCE: MDC-K0031 SECTION 4, PAGE 19-2, DATED 11-1-90 DB1-4-1009A

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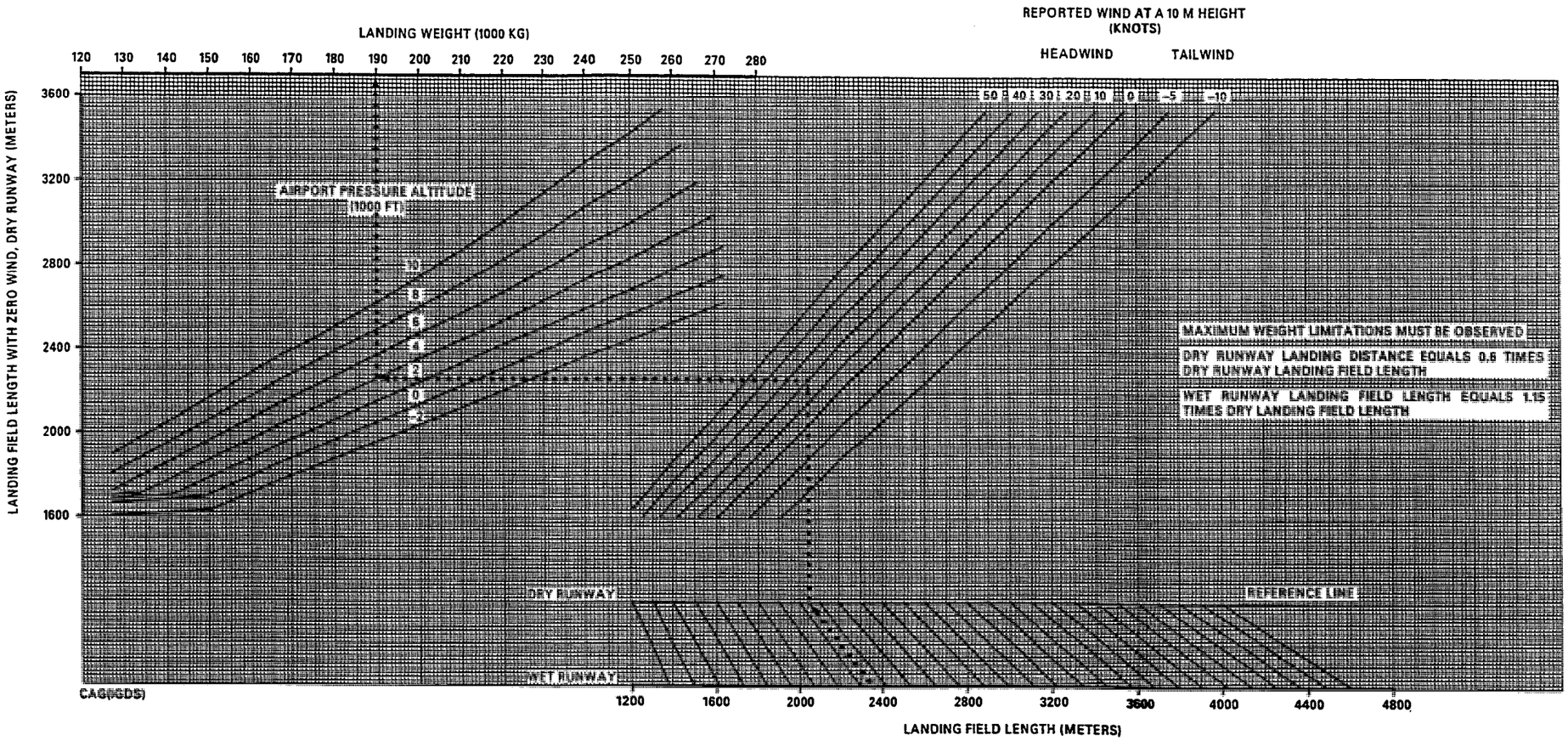
MAXIMUM LANDING WEIGHT – FIELD LENGTH LIMITS
ANTI-SKID OPERATIVE
HARD SURFACE RUNWAY
FLAPS 50°
SLATS EXTENDED



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 20-2, DATED 11-5-90

DB1-4-10078

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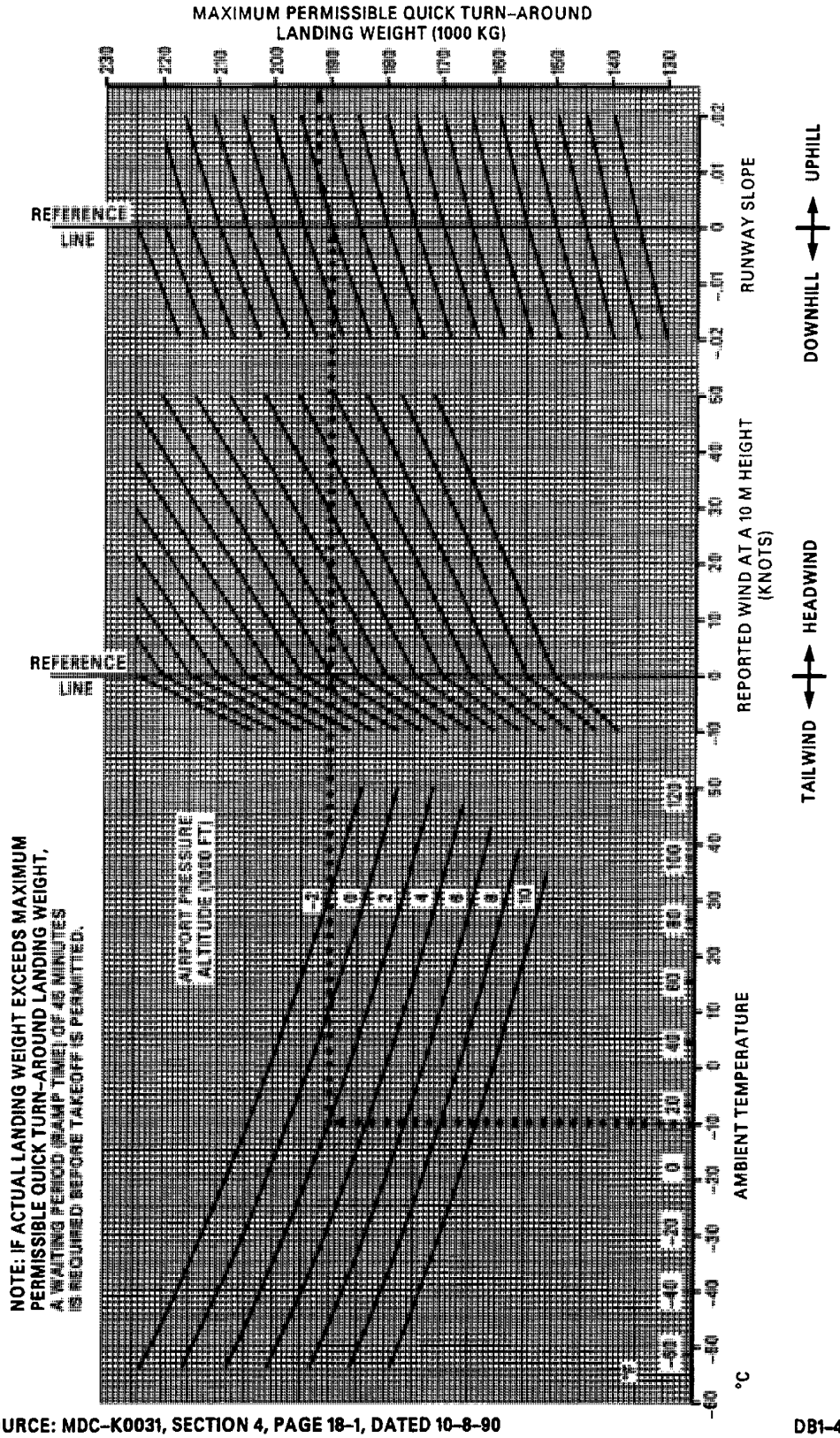
MAXIMUM PERMISSIBLE QUICK TURN-AROUND LANDING WEIGHT

FLAPS 35° SLATS EXTENDED
LANDING SPEED AT A 50 FT HEIGHT = 1.3 VS

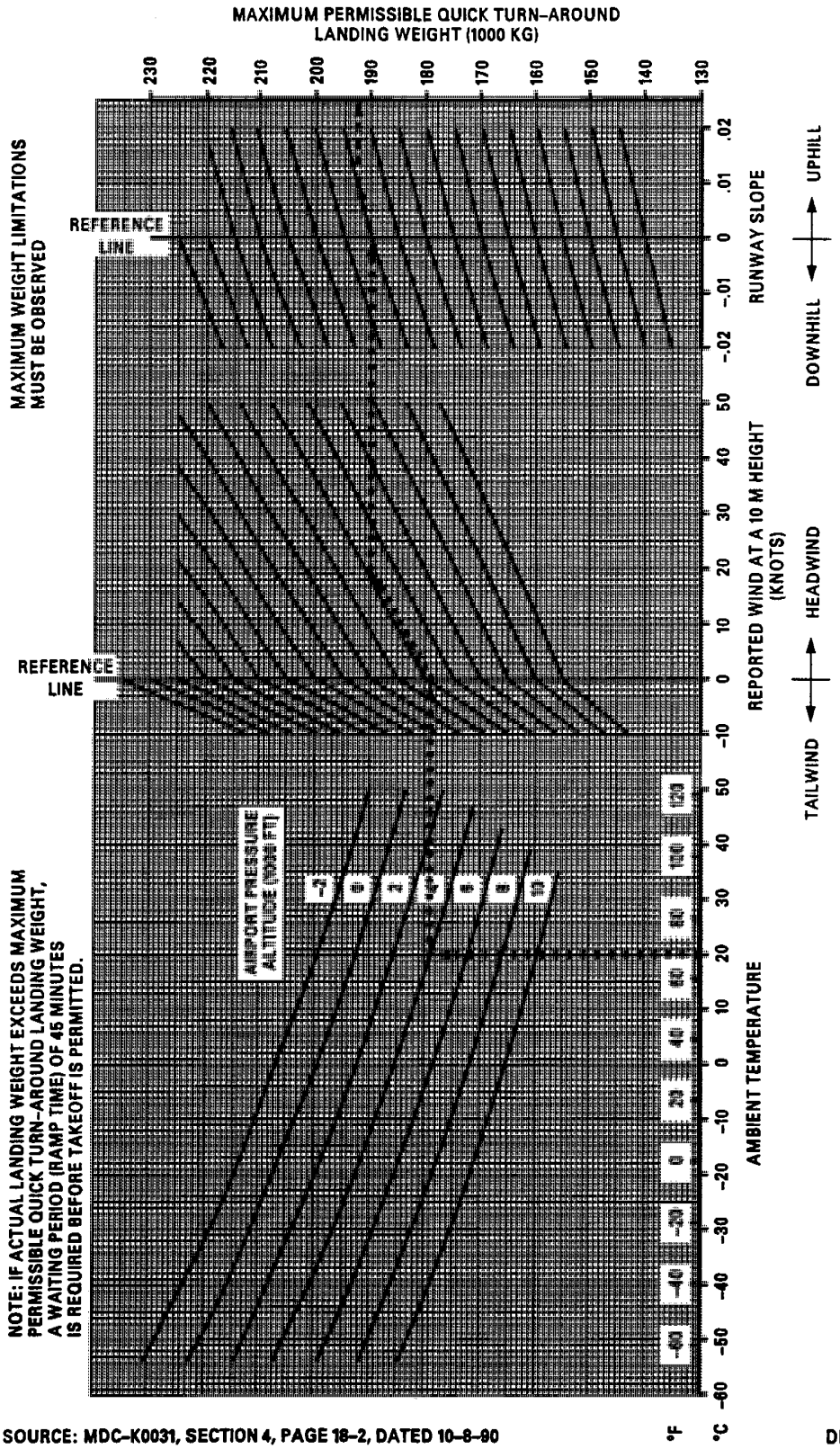


CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 18-1, DATED 10-8-90

DB1-4-1010

MAXIMUM PERMISSIBLE QUICK TURN-AROUND LANDING WEIGHT

FLAPS 50° SLATS EXTENDED
LANDING SPEED AT A 50 FT HEIGHT = 1.3 VS



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 4, PAGE 18-2, DATED 10-8-90 DB1-4-1011A

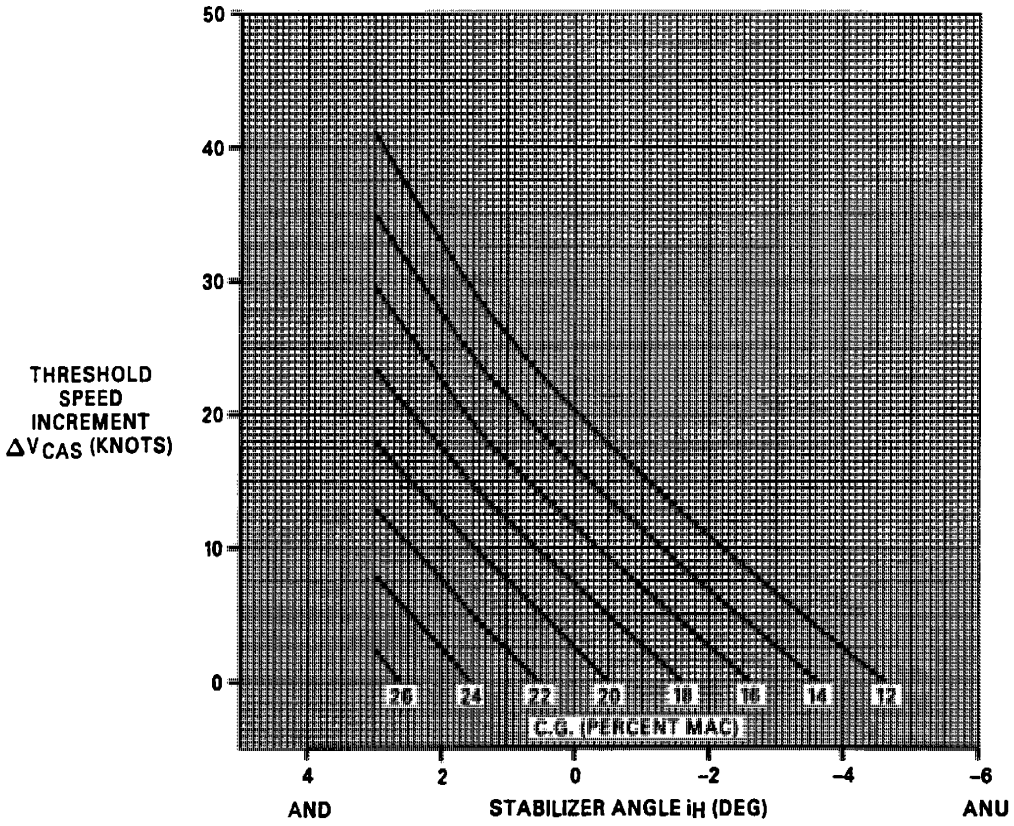
NORMAL CONFIGURATION REFERENCE SPEEDS (1.3 V_{STALL}) KIAS

MD-11 2 AND 3 ENGINES																		
LANDING WEIGHT (X1000 KGS)																		
FLAP/ SLAT	(NOTES)	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
35/ EXT	(1, 2)	131	131	134	138	142	147	151	155	159	162	165	169	173	176	179	183	186
50/ EXT	(1)	129	129	132	135	139	143	146	150	153	156	160	163	166	169	172	175	178

NOTES: (1) V_{APP} is the greater of V_{REF} + 5 or V_{REF} + wind additive (see note 3).
(2) If HYD 2 & 3 failure, V_{APP} is the greater of V_{REF} + 8, V_{MC_A} or V_{REF} + wind additive (see note 3).
(3) Wind additive is 1/2 of the steady state wind greater than 20 knots or full gust, whichever is greater (max 20 knots).

THRESHOLD SPEED INCREMENT FOR LANDING WITH AN INOPERATIVE STABILIZER

FLAPS 35°
SLATS EXTENDED



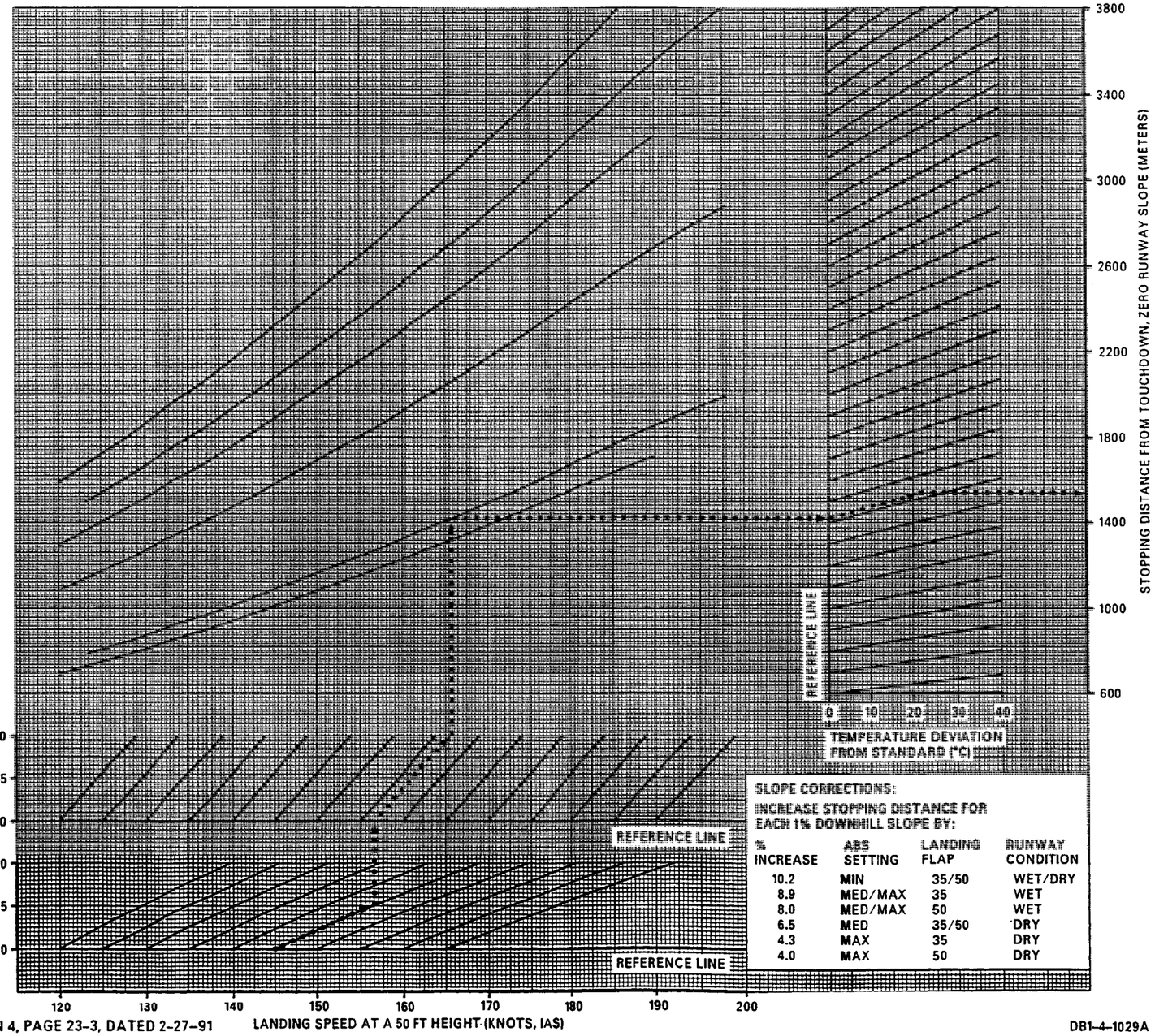
CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 3, PAGE 11-3, DATED 10-22-90 DB1-4-1028

STOPPING DISTANCE WITH AUTOBRAKE SYSTEM

GUIDANCE INFORMATION ONLY
APPLICABLE FOR 35° AND 50° FLAPS AS NOTED
HARD SURFACE RUNWAY

STANDARD DECELERATION CONFIGURATION

LANDING FLAP	RUNWAY CONDITION	ABS SETTING
35/50	WET/DRY	MIN
35	WET	MED/MAX
50	WET	MED/MAX
35/50	DRY	MED
35	DRY	MAX
50	DRY	MAX



SLOPE CORRECTIONS:

INCREASE STOPPING DISTANCE FOR EACH 1% DOWNHILL SLOPE BY:

% INCREASE	ABS SETTING	LANDING FLAP	RUNWAY CONDITION
10.2	MIN	35/50	WET/DRY
8.9	MED/MAX	35	WET
8.0	MED/MAX	50	WET
6.5	MED	35/50	DRY
4.3	MAX	35	DRY
4.0	MAX	50	DRY

CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 9, SECTION 4, PAGE 23-3, DATED 2-27-91 DB1-4-1029A

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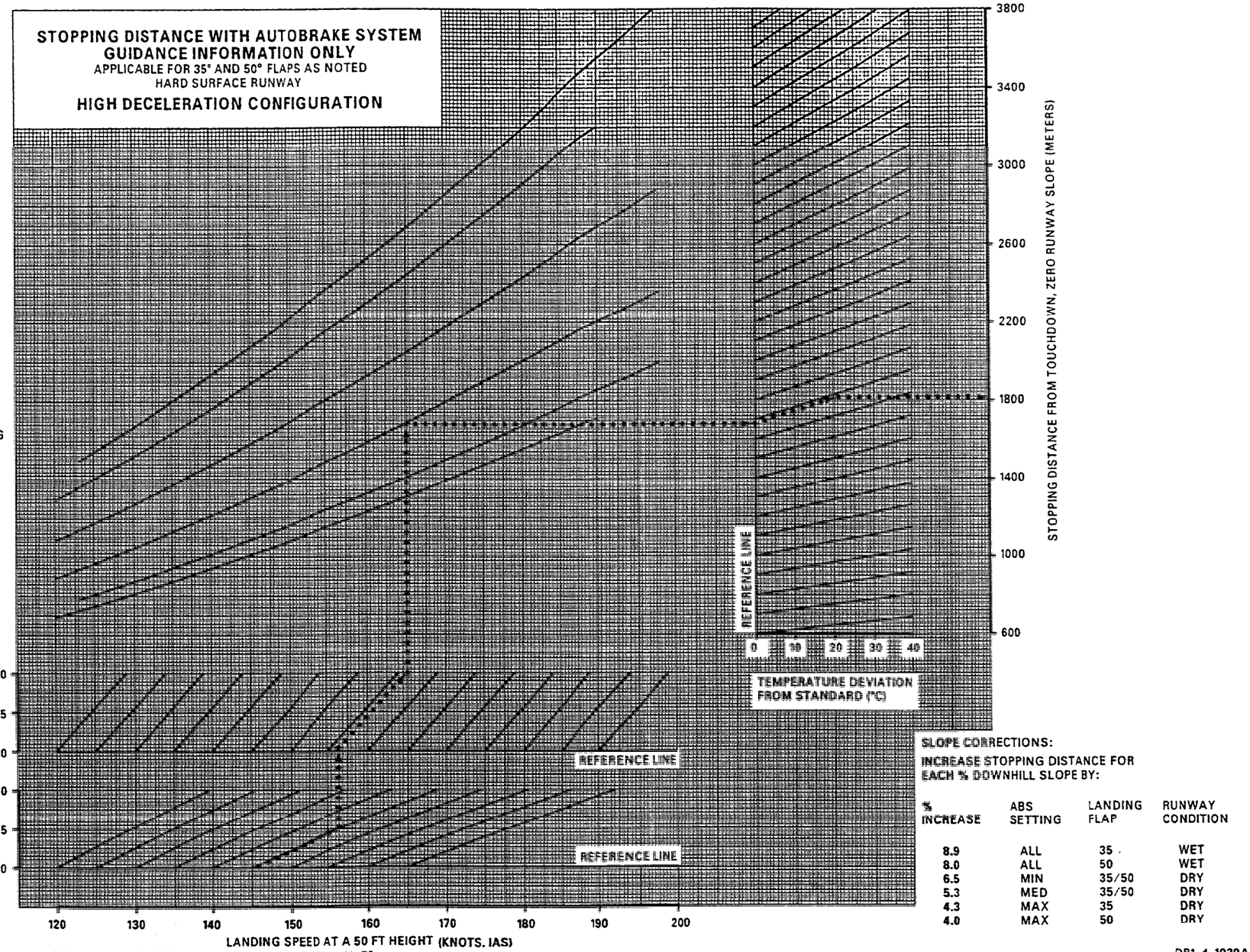

SLOPE CORRECTIONS:

INCREASE STOPPING DISTANCE FOR EACH % DOWNHILL SLOPE BY:

% INCREASE	ABS SETTING	LANDING FLAP	RUNWAY CONDITION
8.9	ALL	35	WET
8.0	ALL	50	WET
6.5	MIN	35/50	DRY
5.3	MED	35/50	DRY
4.3	MAX	35	DRY
4.0	MAX	50	DRY

DB1-4-1030A

CAG(IGDS) DATA SOURCE: MDC-K0031. APPENDIX 9, SECTION 4, PAGE 23-4, DATED 3-11-91

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ABNORMAL

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LANDING GEAR/BRAKES

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INTRODUCTION

The Landing Gear/Brakes section of the Abnormal chapter presents data which are to be used in the event of various system malfunctions related to the landing gear or brakes.

MAXIMUM LANDING WEIGHT – ANTI-SKID INOPERATIVE

If the anti-skid system is inoperative, landing with 50° flaps must be scheduled.

To determine the maximum permissible landing weight with the anti-skid system inoperative, enter the lower right portion of the chart with the runway length. For a dry runway, enter the chart with the dry runway length and continue vertically upward to the dry runway (reference line) scale. For a wet runway, enter the wet runway landing field length scale with the wet runway length and read diagonally upward following the guidelines to the dry runway (reference line) scale. From this point, read vertically upward to the intersection with the wind, then horizontally left to the intersection with the airport pressure altitude. From this point, read vertically upward to obtain the maximum permissible landing weight with the anti-skid system inoperative.

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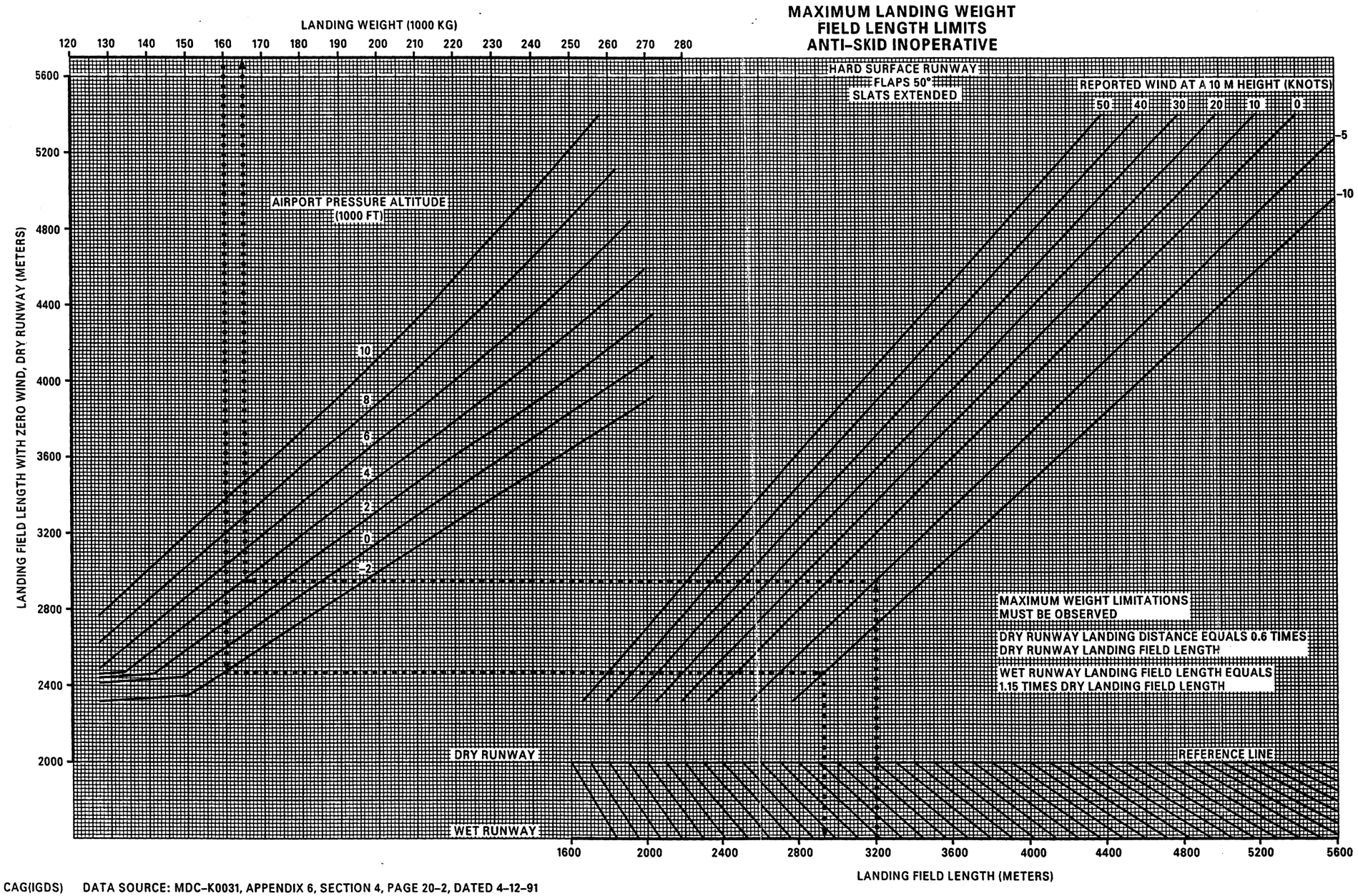
MAXIMUM LANDING WEIGHT
FIELD LENGTH LIMITS
ANTI-SKID INOPERATIVE



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DB1-4-1040

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POWERPLANT

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INTRODUCTION

The Powerplant section of the Abnormal chapter contains cruise and altitude capability data in the event of an engine failure and also the maximum continuous thrust N_1 settings.

MAXIMUM CONTINUOUS THRUST N_1 SETTING

The N_1 Setting – Maximum Continuous Thrust tables are used to determine the inflight N_1 setting for maximum continuous thrust. The N_1 setting is presented as a function of pressure altitude and ambient temperature (TAMB), with corrections to be applied where applicable.

ALTITUDE CAPABILITY

In the event of one or two engines failing, a maximum cruise altitude can be readily obtained from the charts entitled Altitude Capability. The charts present maximum altitude capabilities based on maximum continuous thrust limitations for temperatures of ISA-20°C to ISA+20°C by 5°C increments.

Also presented is the altitude capability with engine or engine and airframe ice protection on.

CRUISE TABLES

Cruise data is presented for both one or two engines operating at maximum continuous thrust. The long-range cruise speed schedule is the only one shown. These data are read in the same manner as for the three engine cruise data (Cruise section of the Inflight chapter). The maximum TAT (°C) at which maximum continuous thrust N_1 can be set is presented in the data box instead of the maximum TAT (°C) at which maximum cruise N_1 can be set as shown in the three engine cruise data.

MAXIMUM WEIGHT FOR TWO ENGINES INOPERATIVE MISSED APPROACH

The Maximum Weight For Two Engines Inoperative Missed Approach chart is provided to show the maximum weight at which to attempt a single engine missed approach as a function of ambient temperature and airport pressure altitude.

Procedure:

Enter the bottom of the chart with the ambient temperature and read vertically upward to the intersection of airport pressure altitude. From this point, read horizontally to the right to read the maximum weight for two engines inoperative missed approach.

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MAXIMUM CONTINUOUS THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

MACH NO.	TAT (°C)	BASE N_1 PRESSURE ALTITUDE (1000 FT)										LIMIT N_1
		0	5	10	15	20	25	31	35	39	43	
	-60	88.91	92.59	97.64	100.58							100.26
	-50	90.86	94.59	99.66	102.59							102.26
	-40	92.78	96.54	101.62	104.52							104.13
	-30	94.67	98.45	103.54	106.40							106.00
	-20	96.52	100.32	105.41	108.23							107.84
	-10	98.34	102.15	107.24	110.01							109.60
.30	0	100.12	103.94	109.02	111.82							111.34
	10	101.88	105.70	110.91	110.03							113.03
	20	103.60	107.55	108.99	108.19							114.69
	30	105.45	105.91	107.23	106.59							116.34
	40	104.17	104.44	105.44	108.02							117.50
	50	102.89	103.35	106.77	109.61							117.50
	60	101.90	104.63	108.28	111.17							117.50
	-60	88.29	91.75	96.50	101.06	102.80						100.26
	-50	90.21	93.76	98.53	103.06	104.91						102.26
	-40	92.12	95.69	100.48	104.99	106.93						104.13
	-30	94.00	97.58	102.38	106.85	108.90						106.00
	-20	95.84	99.45	104.24	108.68	110.83						107.84
	-10	97.65	101.26	106.06	110.46	112.75						109.60
.40	0	99.41	103.04	107.83	112.22	112.27						111.34
	10	101.16	104.79	109.66	111.76	111.11						113.03
	20	102.87	106.58	109.02	110.02	109.31						114.69
	30	104.64	106.31	107.57	108.13	108.69						116.34
	40	104.69	104.74	105.45	108.41	110.32						117.50
	50	103.34	103.46	105.57	109.99	111.92						117.50
	60	102.19	103.73	107.07	111.54							117.50
	-60	87.51	90.83	95.50	98.76	100.02	101.85					100.26
	-50	89.41	92.82	97.52	100.75	102.11	103.90					102.26
	-40	91.29	94.74	99.46	102.67	104.12	105.87					104.13
	-30	93.14	96.62	101.34	104.52	106.08	107.78					106.00
	-20	94.97	98.46	103.19	106.34	107.99	109.67					107.84
	-10	96.76	100.27	105.00	108.11	109.88	110.62					109.60
.50	0	98.51	102.03	106.75	109.83	111.10	108.90					111.34
	10	100.24	103.76	108.50	111.11	109.70	107.70					113.03
	20	101.93	105.48	109.95	109.36	108.27	106.85					114.69
	30	103.61	107.09	108.09	107.55	106.17	108.45					116.34
	40	105.37	105.41	106.34	106.05	107.73	110.02					117.50
	50	104.02	104.00	104.64	107.56	109.27	111.57					117.50
	60	102.78	102.94	105.96	109.10	110.78	113.10					117.50

AC ON (1 PACK PER ENGINE, LOW FLOW)

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N_1 PRESSURE ALTITUDE (1000 FT)									
	0	5	10	15	20	25	31	35	39	43
ENGINE A/I ONLY	-0.63	-0.67	-0.70	-0.73	-0.78	-0.85	-0.77	-0.73	-0.78	-0.86
ENGINE & AIRFOIL A/I	-0.99	-1.08	-1.16	-1.23	-1.37	-1.52	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1. DETERMINE BASE N_1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2. ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.
3. COMPARE RESULTING N_1 VERSUS THE LIMIT N_1 FOR THE GIVEN TAT. SELECT THE LESSER N_1.

MAXIMUM CONTINUOUS THRUST
% N_1 SETTING
CF6-80C2D1F ENGINES

MACH NO.	TAT (°C)	BASE N_1 PRESSURE ALTITUDE (1000 FT)									LIMIT N_1
		0	5	10	15	20	25	31	35	39	43	
.60	-60		89.50	93.74	96.91	99.08	99.47					100.26
	-50		91.45	95.72	98.87	101.13	101.48					102.26
	-40		93.36	97.65	100.79	103.14	103.45					104.13
	-30		95.22	99.53	102.64	105.08	105.35					106.00
	-20		97.04	101.35	104.43	106.97	107.20					107.84
	-10		98.83	103.15	106.19	108.83	109.04					109.60
	0		100.58	104.90	107.90	110.68	108.19					111.34
	10		102.29	106.60	109.60	110.29	106.84					113.03
	20		103.99	108.36	109.39	109.23	105.77					114.69
	30		105.69	108.13	107.74	107.59	105.98					116.34
	40		105.97	106.71	105.91	106.38	107.53					117.50
	50		104.42	104.76	105.55	107.95	109.06					117.50
	60		103.13	104.07	107.08	109.50	110.57					117.50
.70	-60				94.16	96.72	96.77	101.58	101.07	100.95	101.84	100.26
	-50				96.08	98.73	98.73	103.54	103.05	102.92	103.79	102.26
	-40				97.99	100.73	100.69	105.49	105.01	104.88	105.73	104.13
	-30				99.82	102.66	102.57	107.35	106.89	106.73	107.57	106.00
	-20				101.60	104.53	104.40	109.19	108.55	108.30	107.91	107.84
	-10				103.34	106.36	106.21	109.74	107.38	106.21	105.61	109.60
	0				105.04	108.16	107.92	107.85	104.99	103.88	103.49	111.34
	10				106.69	109.97	106.06	105.98	103.28	102.98	102.65	113.03
	20				108.36	108.66	104.84	104.79	104.65	104.62	104.29	114.69
	30				107.18	107.47	103.83	106.41	106.26	106.23	105.90	116.34
	40				105.51	105.58	104.69	107.99	107.84	107.82	107.49	117.50
	50				103.77	105.44	106.21	109.55	109.40	109.37	109.04	117.50
	60				104.12	106.97	107.70					117.50
.80	-60					94.10	93.53	98.32	97.84	97.68	98.47	100.26
	-50					96.09	95.48	100.27	99.80	99.64	100.41	102.26
	-40					98.04	97.38	102.17	101.72	101.55	102.31	104.13
	-30					99.97	99.27	104.04	103.61	103.44	104.17	106.00
	-20					101.83	101.09	105.84	105.40	105.20	105.93	107.84
	-10					103.64	102.86	107.64	106.82	105.90	105.07	109.60
	0					105.41	104.61	107.05	104.61	103.41	102.73	111.34
	10					107.17	105.26	105.28	102.34	101.19	100.75	113.03
	20					108.37	103.68	103.45	101.30	101.23	100.79	114.69
	30					107.02	102.55	103.00	102.89	102.82	102.38	116.34
	40					105.75	101.59	104.56	104.45	104.39	103.95	117.50
	50					103.70	102.81	106.10	105.99	105.92	105.48	117.50
	60					104.17	104.29	107.61	107.50	107.43	106.99	117.50

AC ON (1 PACK PER ENGINE, LOW FLOW)

ANTI-ICE BLEED CORRECTIONS (WAI IS 1 AIRFOIL PER ENGINE)

ANTI-ICE CONFIG.	BASE N_1 PRESSURE ALTITUDE (1000 FT)									
	0	5	10	15	20	25	31	35	39	43
ENGINE A/I ONLY	-0.63	-0.67	-0.70	-0.73	-0.78	-0.85	-0.77	-0.73	-0.78	-0.86
ENGINE & AIRFOIL A/I	-0.99	-1.08	-1.16	-1.23	-1.37	-1.52	-1.54	-1.54	-1.79	-2.04

DIRECTIONS:
1. DETERMINE BASE N_1 FOR THE GIVEN MACH NUMBER, PRESSURE ALTITUDE AND TAT.
2. ADD APPROPRIATE ANTI-ICE BLEED CORRECTIONS FOR THE GIVEN PRESSURE ALTITUDE.
3. COMPARE RESULTING N_1 VERSUS THE LIMIT N_1 FOR THE GIVEN TAT. SELECT THE LESSER N_1.

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

RATE OF CLIMB = 100. FT/MIN AT

LONG RANGE CRUISE **WINDMILLING JET**

ONE ENGINE OPERATING
ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

	PRESSURE ALTITUDE (FEET)										
	MAX CONTINUOUS THRUST – TEMPERATURE DEVIATION °C									STD DAY	
WEIGHT 1000 KG	ISA −20	ISA −15	ISA −10	ISA −5	ISA	ISA +5	ISA +10	ISA +15	ISA +20	OPTIMUM ALTITUDE	1.3 G BUFFET
240	3,000	3,000	3,000	3,000	3,000	3,000	3,000	0	0	3,000	N
230	6,000	6,000	6,000	6,000	6,000	6,000	6,000	2,000	0	6,000	O
220	9,000	9,000	9,000	8,000	8,000	8,000	8,000	4,000	2,000	9,000	T
210	11,000	11,000	11,000	11,000	11,000	11,000	10,000	8,000	4,000	11,000	L
200	13,000	13,000	13,000	13,000	13,000	12,000	12,000	11,000	8,000	13,000	I
190	14,000	14,000	14,000	14,000	14,000	14,000	14,000	13,000	11,000	14,000	M
180	16,000	16,000	16,000	16,000	16,000	16,000	16,000	14,000	13,000	16,000	I
170	18,000	18,000	18,000	18,000	18,000	17,000	17,000	16,000	15,000	18,000	T
160	20,000	19,000	19,000	19,000	19,000	19,000	19,000	18,000	17,000	19,000	I
150	21,000	21,000	21,000	21,000	21,000	21,000	21,000	20,000	19,000	21,000	N
140	23,000	23,000	23,000	23,000	22,000	22,000	22,000	21,000	21,000	22,000	G

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

RATE OF CLIMB = 100. FT/MIN AT

LONG RANGE CRUISE **WINDMILLING JET**

TWO ENGINES OPERATING
ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

	PRESSURE ALTITUDE (FEET)										
	MAX CONTINUOUS THRUST – TEMPERATURE DEVIATION °C									STD DAY	
WEIGHT 1000 KG	ISA −20	ISA −15	ISA −10	ISA −5	ISA	ISA +5	ISA +10	ISA +15	ISA +20	OPTIMUM ALTITUDE	1.3 G BUFFET
290	22,000	22,000	22,000	22,000	22,000	22,000	22,000	21,000	20,000	22,000	
280	23,000	23,000	23,000	23,000	23,000	23,000	23,000	22,000	21,000	23,000	
270	24,000	24,000	24,000	24,000	24,000	24,000	23,000	22,000	22,000	24,000	N
260	25,000	25,000	25,000	25,000	25,000	25,000	24,000	23,000	22,000	25,000	O
250	26,000	26,000	26,000	26,000	26,000	26,000	26,000	24,000	23,000	26,000	T
240	28,000	28,000	28,000	27,000	27,000	27,000	27,000	26,000	24,000	27,000	
230	29,000	29,000	29,000	29,000	29,000	29,000	29,000	27,000	26,000	29,000	L
220	30,000	30,000	30,000	30,000	30,000	30,000	30,000	29,000	28,000	30,000	I
210	31,000	31,000	31,000	31,000	31,000	31,000	31,000	30,000	29,000	31,000	M
200	32,000	32,000	32,000	32,000	32,000	32,000	32,000	31,000	31,000	32,000	I
190	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	32,000	33,000	T
180	35,000	35,000	35,000	34,000	34,000	34,000	34,000	34,000	33,000	34,000	I
170	36,000	36,000	36,000	36,000	36,000	36,000	35,000	35,000	34,000	35,000	N
160	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	36,000	36,000	G
150	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	37,000	38,000	
140	40,000	40,000	40,000	40,000	40,000	40,000	40,000	39,000	38,000	39,000	

KEY
REQUIRED $\%N_1$
TAT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

WINDMILLING JET

1 ENGINE OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

1 ENGINE OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260			
23,000 -30.6	105 744 100 4753 .540 232															
21,000 -26.6	102 729 99.7 4735 .530 237	105 752 100.9 5117 .538 241	108 784 102.3 5595 .547 245													
19,000 -22.6	99.7 719 99.1 4741 .518 241	102.1 740 100.2 5111 .529 246	104.7 760 101.3 5488 .536 250	107.7 787 102.6 5929 .544 254												
17,000 -18.7	98.0 707 98.5 4769 .505 245	100.1 728 99.6 5117 .516 250	102.2 749 100.8 5489 .526 255	104.5 767 101.7 5859 .534 259	107.2 789 102.9 6270 .540 262											
15,000 -14.7	96.1 694 97.9 4770 .489 246	98.4 717 99.1 5151 .503 253	100.3 737 100.1 5497 .513 258	102.2 758 101.2 5865 .523 264	104.3 775 102.1 6236 .531 268	106.7 793 103.1 6635 .537 271										
13,000 -10.8	94.4 682 97.6 4778 .472 247	96.5 704 98.5 5146 .486 254	98.6 726 99.6 5531 .500 262	100.4 745 100.6 5886 .510 267	102.2 764 101.6 6252 .519 272	104.2 782 102.5 6642 .528 277	106.2 798 103.4 7024 .534 280	108.5 817 104.3 7444 .540 283								
11,000 -6.8	92.6 670 97.3 4780 .456 247	94.7 692 98.2 5155 .470 255	96.7 713 99.1 5525 .483 262	98.7 733 100.0 5907 .496 270	100.5 752 101.0 6283 .507 275	102.2 770 101.9 6643 .515 280	103.8 788 102.8 7026 .523 285	105.7 803 103.6 7424 .530 289	107.7 819 104.5 7830 .536 292							
9,000 -2.8	90.9 658 97.1 4772 .439 247	93.0 680 97.9 5153 .454 256	95.0 701 98.8 5536 .468 264	96.9 720 99.6 5906 .480 270	98.7 740 100.4 6286 .492 277	100.5 759 101.3 6685 .503 284	102.1 776 102.2 7043 .511 288	103.6 792 103.1 7417 .519 293	105.3 808 103.9 7825 .526 297	107.0 822 104.6 8227 .532 300						

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9			
FF/ENG	53	57	61	66	71	76	80	85	90	97	104	111	118			

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 5.0%.

KEY
REQUIRED $\%N_1$
TAT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

WINDMILLING JET

1 ENGINE OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

1 ENGINE OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260			
7,000 1.1	89.3 648 96.9 4771 .424 248	91.3 669 97.7 5144 .438 256	93.3 689 98.5 5528 .451 264	95.2 709 99.3 5919 .465 272	96.9 727 100.1 6290 .476 278	98.7 746 100.8 6668 .487 285	100.4 764 101.6 7066 .498 291	101.9 781 102.5 7451 .507 297	103.4 796 103.3 7817 .514 301	104.8 812 104.1 8206 .521 305	106.5 826 104.9 8633 .528 309					
5,000 5.1	87.7 639 96.8 4780 .410 248	89.7 658 97.5 5142 .423 256	91.6 678 98.3 5516 .436 264	93.5 697 99.0 5901 .448 272	95.3 716 99.7 6295 .461 279	96.9 733 100.5 6674 .472 286	98.6 751 101.2 7053 .482 292	100.2 768 101.9 7442 .492 298	101.8 785 102.8 7862 .503 305	103.1 800 103.5 8227 .509 309	104.5 814 104.3 8606 .516 313					
3,000 9.1	86.3 632 96.6 4786 .397 249	88.2 650 97.4 5139 .409 257	90.1 668 98.1 5500 .421 264	91.8 686 98.8 5873 .433 272	93.6 704 99.5 6260 .445 279	95.3 722 100.2 6653 .456 286	96.9 739 100.9 7046 .467 293	98.4 755 101.6 7424 .477 299	99.9 772 102.2 7810 .486 305	101.4 788 102.9 8210 .496 311	102.8 803 103.7 8625 .504 317	104.1 817 104.4 9001 .511 321				
1,000 13.0	84.8 625 96.5 4808 .385 250	86.7 642 97.3 5147 .396 258	88.5 659 98.0 5500 .408 265	90.3 676 98.7 5859 .419 272	92.0 693 99.3 6231 .430 279	93.6 710 100.0 6616 .441 286	95.2 727 100.6 7011 .451 294	96.8 744 101.3 7415 .462 301	98.2 759 101.9 7796 .471 307	99.7 775 102.5 8181 .480 312	101.1 790 103.2 8573 .489 318	102.5 805 103.8 8991 .498 324	103.8 820 104.6 9401 .505 329			

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9			
FF/ENG	53	57	61	66	71	76	80	85	90	97	104	111	118			

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 5.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

WINDMILLING JET

2 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260			
41,000 -56.5	103 717 99.6 2591 .814 241															
39,000 -56.5	98.3 675 98.0 2508 .794 246	101.5 704 99.1 2746 .810 251														
37,000 -56.5	95.1 641 96.5 2444 .767 248	97.3 665 97.6 2657 .787 255	100.0 690 98.5 2883 .803 261													
35,000 -54.3	92.9 619 95.6 2419 .741 250	94.7 640 96.5 2607 .758 256	96.8 663 97.6 2821 .778 264	98.9 685 98.5 3039 .795 270	101.6 709 99.4 3280 .809 275											
33,000 -50.4	91.5 607 95.2 2420 .715 251	93.1 627 96.1 2607 .735 259	94.7 646 97.0 2791 .750 265	96.5 666 97.9 2997 .768 272	98.4 687 98.9 3213 .785 278	100.5 708 99.7 3440 .799 284	103.0 731 100.5 3694 .810 289									
31,000 -46.4	89.9 591 94.6 2392 .682 250	91.7 614 95.7 2599 .706 260	93.2 633 96.6 2791 .726 268	94.7 651 97.4 2980 .743 274	96.2 669 98.2 3172 .757 280	98.0 689 99.1 3390 .774 287	99.7 708 100.0 3615 .788 292	101.7 727 100.7 3848 .800 298	104.0 749 101.5 4101 .811 302							
29,000 -42.5	88.4 579 94.3 2410 .660 252	90.1 599 95.1 2584 .676 259	91.8 619 96.1 2782 .697 267	93.3 639 97.0 2985 .718 276	94.7 656 97.8 3178 .734 283	96.0 672 98.5 3366 .748 288	97.5 689 99.3 3574 .761 294	99.1 708 100.2 3800 .777 301	100.7 725 100.9 4021 .789 306	102.6 743 101.6 4258 .800 311	104.7 764 102.3 4516 .810 315					
27,000 -38.5	86.8 568 93.4 2414 .635 253	88.6 587 94.3 2601 .654 261	90.2 605 95.1 2779 .670 268	91.8 624 95.9 2965 .687 275	93.3 643 96.8 3177 .707 283	94.6 660 97.6 3373 .724 291	95.8 676 98.3 3577 .738 297	97.1 691 99.0 3767 .750 302	98.5 707 99.7 3977 .763 308	100.0 724 100.5 4206 .777 314	101.5 740 101.2 4430 .788 319	103.2 757 101.8 4669 .799 323				

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
FF/ENG	31	33	36	38	41	43	46	48	51	53	56	59	62	65	69	73

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES
LONG RANGE CRUISE SPEED

WINDMILLING JET

2 ENGINES OPERATING
ISA °C
TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
25,000 -34.5	85.3 559 92.0 2427 .612 253	87.1 576 92.8 2608 .630 261	88.7 594 93.6 2796 .647 269	90.3 611 94.4 2980 .663 276	91.7 628 95.1 3159 .677 282	93.1 646 95.9 3363 .695 290	94.5 663 96.7 3585 .713 298	95.6 678 97.4 3778 .727 305	96.8 693 98.0 3977 .740 310	98.0 707 98.7 4171 .751 315	99.3 722 99.3 4384 .763 321	100.6 738 100.1 4618 .776 327	102.0 753 100.7 4845 .786 331	103.6 769 101.3 5088 .796 336		
23,000 -30.6	83.8 552 91.8 2441 .588 253	85.6 568 92.6 2630 .607 262	87.2 584 93.4 2810 .624 270	88.8 601 94.1 2998 .640 277	90.3 617 94.8 3189 .656 285	91.7 633 95.5 3369 .669 291	93.0 648 96.2 3561 .682 297	94.3 665 96.9 3778 .700 305	95.5 681 97.7 3992 .716 312	96.6 695 98.3 4189 .729 318	97.7 709 98.9 4392 .740 323	98.8 722 99.5 4589 .750 328	100.0 736 100.1 4805 .761 333	101.2 752 100.8 5046 .773 339	102.7 767 101.5 5300 .783 344	104.2 783 102.0 5560 .792 348
21,000 -26.6	82.1 542 91.4 2420 .560 251	84.0 560 92.3 2630 .582 262	85.8 576 93.2 2831 .602 271	87.3 591 93.9 3010 .617 278	88.8 606 94.5 3195 .632 285	90.2 621 95.2 3386 .647 292	91.6 636 95.9 3582 .661 299	92.8 651 96.5 3764 .673 304	94.0 666 97.1 3959 .686 311	95.2 682 97.8 4179 .702 318	96.3 696 98.5 4392 .716 325	97.3 709 99.0 4591 .728 331	98.3 722 99.6 4797 .739 336	99.3 735 100.2 4998 .748 341	100.5 748 100.8 5223 .758 345	101.8 764 101.5 5477 .768 350
19,000 -22.6	80.6 534 91.2 2431 .539 251	82.3 550 91.9 2609 .555 259	84.1 567 92.8 2820 .576 269	85.9 583 93.6 3035 .597 279	87.3 596 94.3 3212 .611 286	88.7 611 94.9 3396 .624 293	90.0 625 95.6 3593 .638 300	91.3 640 96.2 3786 .652 306	92.6 653 96.8 3973 .664 312	93.7 667 97.3 4158 .675 318	94.8 681 98.0 4358 .687 324	95.9 696 98.6 4579 .702 331	97.0 710 99.2 4796 .715 338	97.9 722 99.8 4999 .726 343	98.9 735 100.3 5220 .737 349	99.9 747 100.9 5431 .745 353
17,000 -18.7	79.2 528 91.1 2461 .523 253	80.8 543 91.8 2629 .536 260	82.4 558 92.4 2801 .550 267	84.1 574 93.2 3008 .569 276	85.8 589 94.0 3223 .588 286	87.3 602 94.7 3427 .604 294	88.5 615 95.3 3608 .616 300	89.8 629 95.9 3796 .629 307	91.1 642 96.5 3988 .642 313	92.3 656 97.1 4183 .654 320	93.4 668 97.6 4369 .665 325	94.4 681 98.1 4556 .675 330	95.4 694 98.7 4756 .686 336	96.5 708 99.3 4981 .700 343	97.5 722 99.9 5214 .713 350	98.4 734 100.4 5424 .723 355
15,000 -14.7	77.6 519 90.9 2473 .503 253	79.5 536 91.7 2663 .520 262	81.0 551 92.3 2831 .533 269	82.5 565 93.0 3004 .546 275	84.1 579 93.6 3197 .561 283	85.6 594 94.4 3420 .579 292	87.2 608 95.1 3639 .596 302	88.4 619 95.7 3819 .608 308	89.6 632 96.2 4004 .620 314	90.7 644 96.8 4194 .632 320	91.9 657 97.3 4388 .643 326	93.0 670 97.9 4584 .655 333	94.0 681 98.3 4771 .665 338	95.0 693 98.8 4961 .674 343	96.0 706 99.4 5165 .684 348	97.0 719 100.0 5398 .696 354
13,000 -10.8	76.0 512 90.7 2486 .485 254	77.9 528 91.5 2667 .501 262	79.7 544 92.2 2860 .517 271	81.2 558 92.9 3033 .529 277	82.6 571 93.4 3205 .541 284	83.9 584 94.0 3383 .553 290	85.4 598 94.7 3607 .569 299	86.9 612 95.4 3824 .585 308	88.2 624 96.0 4034 .600 316	89.3 635 96.6 4215 .611 321	90.4 647 97.1 4403 .622 327	91.5 658 97.6 4595 .633 333	92.6 670 98.1 4791 .643 339	93.6 682 98.6 4991 .654 345	94.6 693 99.0 5187 .663 350	95.6 705 99.5 5384 .672 355
11,000 -6.8	74.4 505 90.6 2501 .468 254	76.2 520 91.3 2681 .483 262	78.1 536 92.0 2864 .497 270	79.8 551 92.7 3055 .512 278	81.2 565 93.3 3237 .525 285	82.6 577 93.9 3419 .536 292	83.8 589 94.4 3595 .547 298	85.2 602 95.0 3792 .560 305	86.5 615 95.6 4010 .575 313	87.9 628 96.3 4231 .590 322	89.1 639 96.9 4432 .602 329	90.1 649 97.3 4616 .612 334	91.1 660 97.8 4806 .622 340	92.1 671 98.3 5001 .632 345	93.1 682 98.8 5205 .642 351	94.2 694 99.2 5411 .652 357

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

$\%N_1$	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
FF/ENG	31	33	36	38	41	43	46	48	51	53	56	59	62	65	69	73

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
REQUIRED $\%N_1$
EGT (DEG C)
$\%N_2$
FUEL FLOW/ENGINE (KG/HR)
INDICATED MACH NUMBER
INDICATED AIRSPEED (KT)

CRUISE TABLE
CF6-80C2D1F ENGINES

LONG RANGE CRUISE SPEED

WINDMILLING JET

2 ENGINES OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

2 ENGINES OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
9000 -2.8	72.8 498 90.4 2519 .451 254	74.7 513 91.2 2698 .466 262	76.5 528 91.9 2879 .480 270	78.1 542 92.5 3063 .493 278	79.8 557 93.2 3251 .507 286	81.3 571 93.8 3456 .520 294	82.5 582 94.3 3628 .530 299	83.7 594 94.8 3803 .540 305	84.9 605 95.3 3982 .550 311	86.2 618 95.9 4193 .564 319	87.4 630 96.5 4414 .578 327	88.7 642 97.1 4637 .592 335	89.8 652 97.6 4836 .603 341	90.7 661 98.1 5023 .612 346	91.7 672 98.5 5220 .621 352	92.7 683 99.0 5421 .630 357
7000 1.1	71.3 493 90.2 2541 .437 255	73.1 507 91.0 2717 .450 263	74.9 521 91.7 2896 .463 271	76.6 535 92.4 3079 .476 279	78.1 549 93.0 3263 .489 286	79.7 562 93.6 3460 .502 293	81.1 576 94.2 3657 .514 301	82.4 588 94.7 3840 .525 307	83.6 598 95.2 4015 .534 313	84.7 609 95.7 4193 .544 318	85.8 620 96.1 4377 .553 324	87.0 632 96.7 4596 .566 332	88.2 643 97.3 4818 .579 339	89.3 654 97.8 5045 .592 347	90.4 664 98.3 5250 .602 353	91.3 673 98.7 5443 .611 358
5000 5.1	69.9 488 90.1 2571 .423 256	71.7 502 90.8 2739 .435 264	73.4 515 91.5 2916 .448 271	75.0 528 92.2 3096 .460 279	76.6 542 92.9 3280 .472 286	78.1 555 93.4 3475 .484 294	79.6 567 94.0 3661 .496 301	80.9 580 94.6 3855 .508 308	82.3 592 95.1 4056 .519 315	83.4 603 95.6 4229 .528 320	84.4 613 96.0 4406 .537 326	85.5 623 96.5 4586 .545 331	86.5 633 96.9 4777 .555 337	87.7 644 97.4 4998 .567 344	88.8 655 98.0 5227 .578 351	89.8 665 98.4 5437 .589 357
3000 9.1	68.6 486 90.0 2614 .412 259	70.3 497 90.7 2774 .423 265	71.9 510 91.4 2941 .434 272	73.5 523 92.0 3117 .445 279	75.0 535 92.7 3297 .456 287	76.5 548 93.3 3491 .468 294	78.0 560 93.9 3676 .479 301	79.3 572 94.4 3862 .490 308	80.7 584 94.9 4051 .501 315	82.0 596 95.5 4248 .512 322	83.1 607 95.9 4441 .522 328	84.2 616 96.4 4616 .530 333	85.2 626 96.8 4794 .538 338	86.1 636 97.2 4975 .546 343	87.1 645 97.6 5170 .555 349	88.1 655 98.1 5376 .564 354
1000 13.0	67.5 484 90.1 2664 .402 261	69.0 495 90.6 2820 .412 268	70.6 506 91.2 2981 .421 274	72.1 517 91.9 3147 .431 280	73.6 529 92.5 3322 .442 287	75.0 541 93.1 3513 .453 294	76.4 553 93.7 3695 .463 301	77.8 565 94.3 3881 .474 308	79.1 576 94.8 4065 .484 315	80.4 587 95.3 4253 .494 321	81.7 598 95.8 4444 .504 328	82.8 610 96.3 4644 .514 334	83.9 620 96.7 4831 .523 340	84.8 629 97.1 5008 .531 345	85.8 638 97.5 5190 .538 350	86.4 644 97.7 5315 .540 351

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

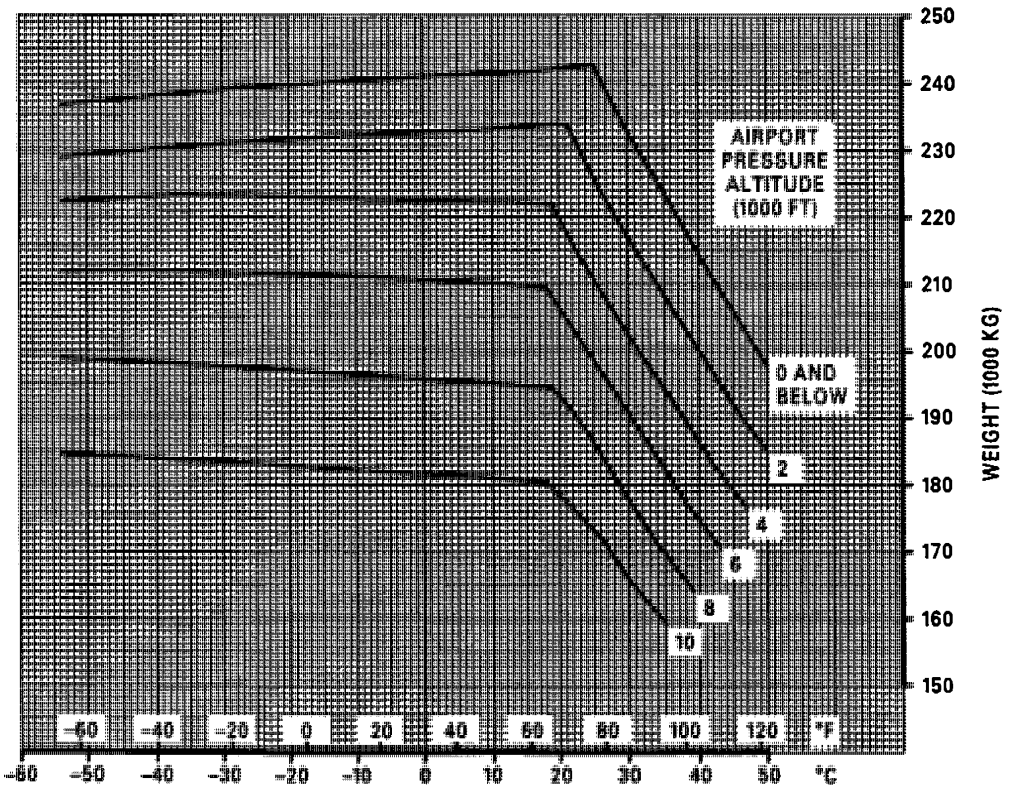
$\%N_1$	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
FF/ENG	31	33	36	38	41	43	46	48	51	53	56	59	62	65	69	73

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 1.0%.
FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

MAXIMUM WEIGHT FOR TWO ENGINES INOPERATIVE MISSED APPROACH

CF6-80C2D1F ENGINES

ENGINE AIRBLEED FOR AIR CONDITIONING OFF
ICE PROTECTION OFF



CAG(IGDS) DATA SOURCE: MDC-K0031, SECTION 2, PAGE 5-3, DATED 9-17-90 DB1-4-1033

DRIFTDOWN

TABLE OF CONTENTS

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INTRODUCTION

The following data provide range information and flight planning procedures for the purpose of analyzing the simultaneous failure of two engines during overwater operation in order to show compliance with the Federal Aviation Regulations (FAR).

DRIFTDOWN SAMPLE PROBLEM AND WORKSHEET

TWO ENGINES INOPERATIVE OVERWATER DRIFTDOWN

Distance to Continue From ETP to Destination		1800 n.mi.
Low Altitude Wind		20 knot tailwind
Low Altitude Temperature		ISA - 5°C
Cruise Altitude		31,000 ft
Weight at Engine Failure		250,000 kg
Time and Fuel to Destination	Time	4 hr 50 min
	Fuel	40,000 kg
Gross Weight at Destination		210,000 kg
Approximate Time, Fuel and Distance to Driftdown	Time	1 hr 18 min
	Fuel	9,900 kg
	Distance	470 n.mi.
Weight at Bottom of Driftdown		240,100 kg
Altitude Capability at Bottom of Driftdown		9600 ft
Altitude Capability at Destination		14,000 ft
Start of Driftdown Speed		304 KIAS
Speed at Bottom of Driftdown		285 KIAS

RANGE CAPABILITY FROM START OF DRIFTDOWN

The Range Capability From Start Of Driftdown chart presents data to determine time and fuel burned to destination. If the weight at start of driftdown is greater than the limiting start of driftdown weight for the given low altitude temperature, use the limiting start of driftdown weight in determining fuel burned. This chart is based on an altitude of 31,000 ft at start of driftdown. Corrections must be made as indicated for any other initial altitude.

Procedure:

Enter the chart at the bottom with distance from start of driftdown, correct for wind, then continue vertically upward to initial weight at start of driftdown. At that point, read the time and fuel to destination. As noted, for a hot day (above ISA + 10°C) corrections must be made to the range and time.

Sample Problem:

For the sample problem the initial weight from start of driftdown is 250,000 kg. Using a distance from start of driftdown of 1800 n.mi. and correcting for wind a time of 4 hours 50 minutes is obtained. The fuel burned from the ETP to destination is 40,000 kg. The gross weight at destination is 250,000 – 40,000 = 210,000 kg.

TIME, DISTANCE AND FUEL BURNED FOR DRIFTDOWN

The Approximate Time, Distance and Fuel Burned For Driftdown table presents time, distance and fuel data to driftdown. The table is based on an altitude of 31,000 ft. This table provides approximate data only, actual conditions may vary from the bleed, temperature and speed assumptions made for this chart.

Procedure:

Enter the table with the initial gross weight and temperature, and read the distance, time, and fuel to driftdown.

Sample Problem:

To obtain the distance to driftdown, enter the table at 250,000 kg and read a value of 470 miles at ISA + 10°C. Continuing across and read the time, 1 hour 18 minutes, and the fuel burned value of 9,900 kg. The gross weight at bottom of driftdown is 250,000 – 9,900 = 240,100 kg.

DRIFTDOWN ALTITUDE CAPABILITY

Driftdown altitude capability is presented as a function of weight and temperature at both driftdown speed and a cruise-climb speed of 290 KIAS.

Procedure:

Enter the table at the instantaneous weight and read the altitude capability at the desired speed and temperature.

Sample Problem:

To determine altitude capability at bottom of driftdown enter the "At Driftdown Speed" portion of the table with 240,100 kg (weight at bottom of driftdown) and interpolate for ISA + 10°C low altitude temperature. The altitude capability at bottom of driftdown is 9600 ft. Similarly entering the "At Cruise-Climb of 290 KIAS" portion of the table with 210,000 kg (weight at destination) and interpolating for ISA + 10°C the altitude capability at destination is 14,000 ft.

DRIFTDOWN SPEEDS

The Driftdown Speeds table presents driftdown speed as a function of altitude and gross weight. A correction to driftdown speed for bank angle should be made as required.

Procedure:

Enter the Driftdown Speeds table with gross weight and altitude to read driftdown speed. To correct driftdown speed for bank angle enter the chart at the lower right with the bank angle, continue vertically upward to intersect the curve, then vertically left to the reference line. Follow the guidelines to the gross weight.

Sample Problem:

To obtain the speed at start of driftdown, enter the table at 250,000 kg and interpolate to obtain a speed of 304 KIAS at 31,000 ft. The speed at bottom of driftdown, at 8500 ft altitude and 240,000 kg gross weight, is 285 KIAS.

TIME AND DISTANCE TO START OF DRIFTDOWN

The Time And Distance To Start Of Driftdown charts are provided to determine the time and distance to start of driftdown for a known takeoff weight and ground distance or flight time. Enter the chart at the bottom with the ground distance or flight time to start of driftdown. Make a correction for wind at cruise altitude then read vertically upward to the intersection with the takeoff weight. From this point read the weight at start of driftdown and fuel burned (including takeoff fuel allowance). The climb distance can be read from the intersection of the takeoff weight and the approximate distance to climb data line.

INTEGRATED TIME AND RANGE

The Integrated Time And Range charts are provided to calculate the range and time required to destination from the initial cruise-climb segment of flight after driftdown. These charts are based on maximum continuous thrust at a speed of 290 KIAS. Since this speed is faster than the driftdown speed, the charts include an acceleration segment. Both net and gross flight path charts are included for FAR fuel planning requirements and actual range and time values.

Procedure:

Enter the bottom of the chart with the bottom of driftdown weight and read vertically upward to the solid delta ambient temperature line. Read horizontally to the left and read the range. Continue up the vertical line to the dashed temperature line and read horizontally to the right to get the time.

HOLDING - ONE ENGINE OPERATING

The two engines inoperative holding speed and fuel flow may be determined using the Holding – One Engine Operating table. Enter the table at the left with a gross weight and read across to the intersection with the holding altitude. At this point read the holding speed and fuel flow. These data are based on standard day operation with no air conditioning and no ice protection. Presented at the bottom of the page are temperature corrections and bleed corrections for air conditioning, engine, and engine and airframe ice protection on.

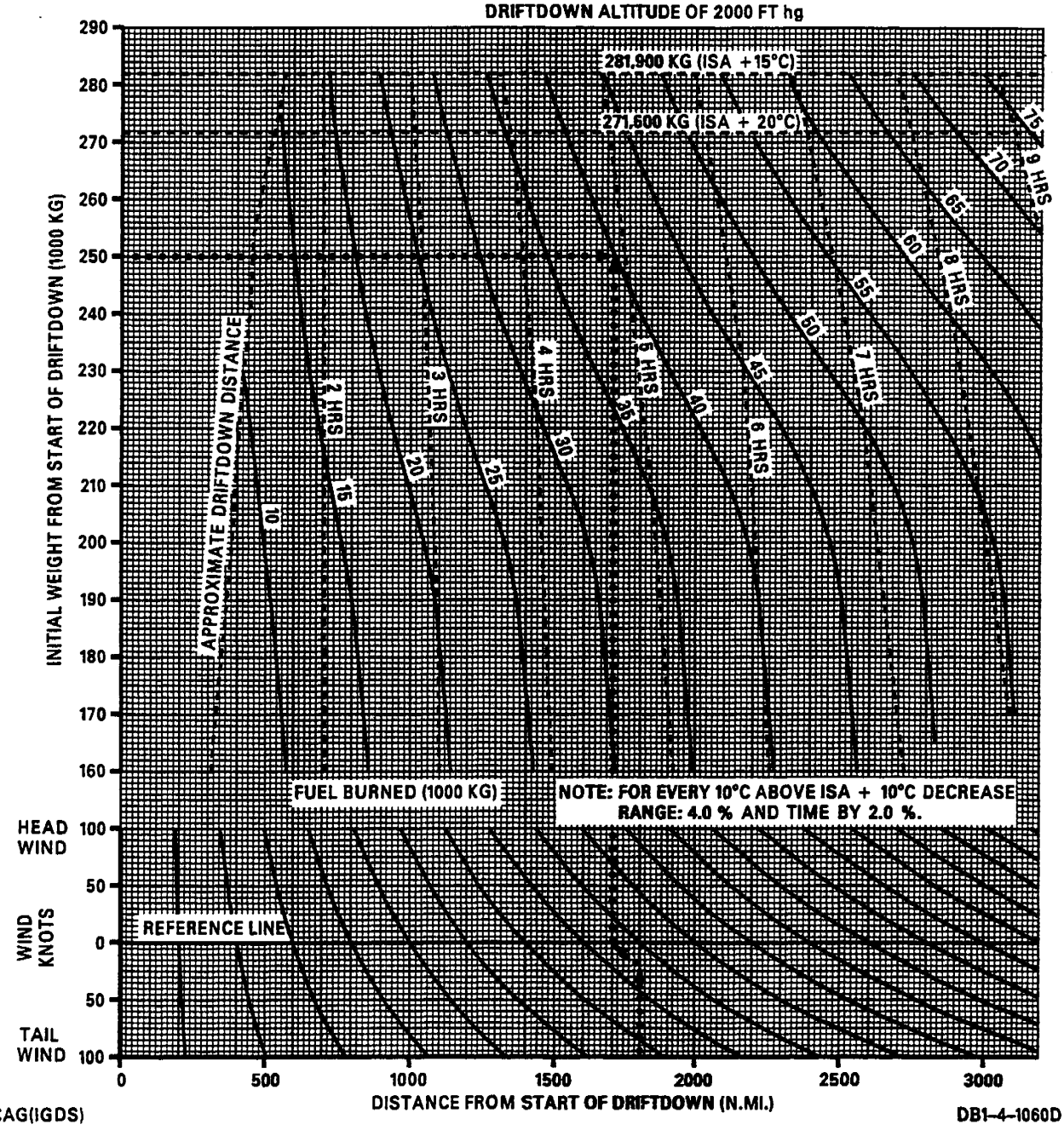
RANGE CAPABILITY FROM START OF DRIFTDOWN

ONE ENGINE OPERATING CF6-80C2D1F ENGINES
MAXIMUM CONTINUOUS THRUST ICE PROTECTION OFF
ONE A/C PACK ON ABOVE 10,000 FT OFF BELOW
ISA +10°C AND BELOW

DATA BASED ON:
1. GROSS FLIGHT PATH DRIFTDOWN PERFORMANCE FROM 31,000 FT hp
   BELOW 31,000 FT SUBTRACT 70 KG/1000 FT FROM FUEL BURNED
   ABOVE 31,000 FT ADD 90 KG/1000 FT TO FUEL BURNED.
2. GROSS FLIGHT PATH CRUISE-CLIMB PERFORMANCE.
3. ALLOWANCES: DESCENT, 4 MIN APPROACH AND 15 MIN HOLDING FUEL.

GROSS FLIGHT PATH

LIMITING START OF DRIFTDOWN WEIGHT TO ENSURE A GROSS DRIFTDOWN ALTITUDE OF 2000 FT hg



CAG(IGDS) DB1-4-1060D

APPROXIMATE TIME, DISTANCE, AND FUEL BURNED FOR DRIFTDOWN

ONE ENGINE OPERATING, MAXIMUM CONTINUOUS THRUST,
CRUISE CONFIGURATION, GROSS FLIGHT PATH

APPLICABLE TO ALL BLEED CONDITIONS

DRIFTDOWN WEIGHT (1000 KG)	ISA + 10°C			ISA + 20°C		
	DISTANCE (N.MI.)	TIME (MIN)	FUEL (KG)	DISTANCE (N.MI.)	TIME (MIN)	FUEL (KG)
160	315	55	5,300	335	59	6,000
170	328	57	5,500	347	60	6,000
180	341	58	5,700	362	62	6,100
190	356	61	6,100	381	64	6,300
200	372	63	6,500	403	68	6,800
210	389	65	7,000	428	72	7,500
220	407	68	7,600	456	78	8,500
230	427	71	8,300	488	84	9,600
240	448	75	9,100	524	91	10,900
250	470	78	9,900	562	99	12,500
260	493	82	10,900	604	108	14,200
270	518	87	11,900	649	117	16,200
280	543	91	13,000	698	128	18,400

DRIFTDOWN

ALTITUDE CAPABILITY
CF6-80C2D1F ENGINES

ONE ENGINE OPERATING, MAXIMUM CONTINUOUS THRUST, ICE PROTECTION OFF, CRUISE CONFIGURATION, GROSS FLIGHT PATH, A/C PACKS OFF BELOW 10,000 FT

INSTANTANEOUS WEIGHT (1000 KG)	AT DRIFTDOWN SPEED			AT CRUISE-CLIMB OF 290 KIAS		
	TO ISA+10°C	ISA+15°C	ISA+20°C	TO ISA+10°C	ISA+15°C	ISA+20°C
	ALTITUDE (FT)			ALTITUDE (FT)		
140	24,600	23,900	23,200	25,000	22,600	21,800
150	22,800	22,100	21,400	22,200	21,400	20,800
160	21,200	20,500	20,000	21,000	20,400	19,700
170	19,800	19,000	18,200	20,000	19,000	18,100
180	18,200	17,400	16,500	18,500	17,500	16,300
190	16,700	15,800	14,900	16,900	15,800	14,600
200	15,100	14,400	13,500	15,300	14,300	13,200
210	13,700	12,800	11,600	14,000	12,700	11,500
220	12,300	11,000	10,000	12,400	11,100	10,000
230	10,700	9,800	8,200	10,800	9,900	8,300
240	9,600	7,900	5,600	9,700	8,000	5,700
250	7,800	5,400	3,500	7,800	5,500	3,500
260	5,700	3,500	1,600	5,500	3,400	1,500
270	3,800	1,600	–	3,500	1,400	–
280	2,000	–	–	1,500	–	–

BLEED CORRECTIONS

A/C Packs on below 10,000 ft.	–600	–700	–800	–600	–700	–800
ICE Protection Turned on	–1300	–1400	–1500	–1300	–1400	–1500

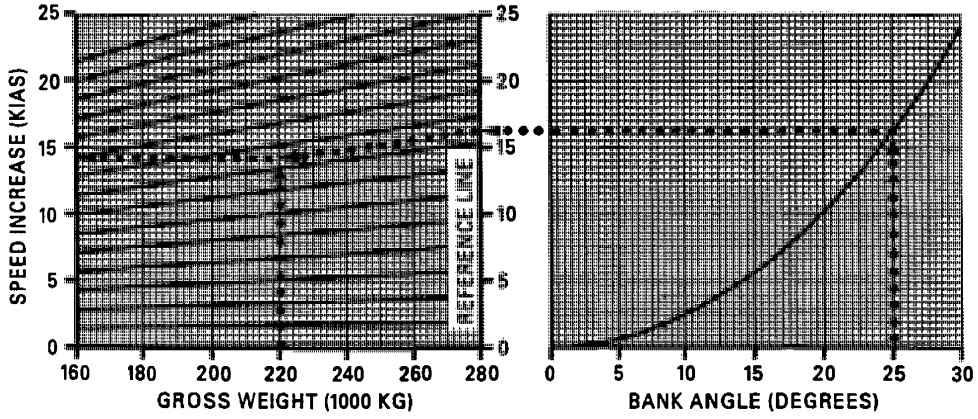
DRIFTDOWN SPEEDS

GROSS WEIGHT (1000 KG)	ALTITUDE (1000 FT)								
	S.L.	5	10	15	20	25	30	35	40
	DRIFTDOWN SPEED (KIAS)								
130	207	208	209	209	210	212	213	216	218
140	215	216	216	217	218	220	222	224	228
150	223	223	224	225	226	228	230	233	236
160	230	231	232	233	234	236	238	241	245
170	237	238	239	240	242	243	246	249	254*
180	244	245	246	247	249	251	254	257	262*
190	251	252	253	254	256	258	261	265	270*
200	257	259	259	261	263	265	268	273	278*
210	264	265	266	267	269	272	276	280*	
220	270	271	272	274	276	279	283	287*	
230	276	277	278	280	283	286	290	295*	
240	282	283	285	286	289	292	296	302*	
250	286	289	291	293	295	299	303	309*	
260	293	295	296	299	301	305	310	316*	
270	299	300	302	304	307	311	316*		
280	304	306	308	310	313	317	323*		

NOTES: *DRIFTDOWN SPEED IS THE LOWER OF TABULATED DATA OR MACH 0.82

[·:·] – DRIFTDOWN NOT REQUIRED – CHECK ALTITUDE CAPABILITY TABLE

DRIFTDOWN SPEED CORRECTION FOR BANK



CAG(IGDS) DATA SOURCE: E086, PAGE E086-9.4, DATED 7-19-91 DB1-4-1055B

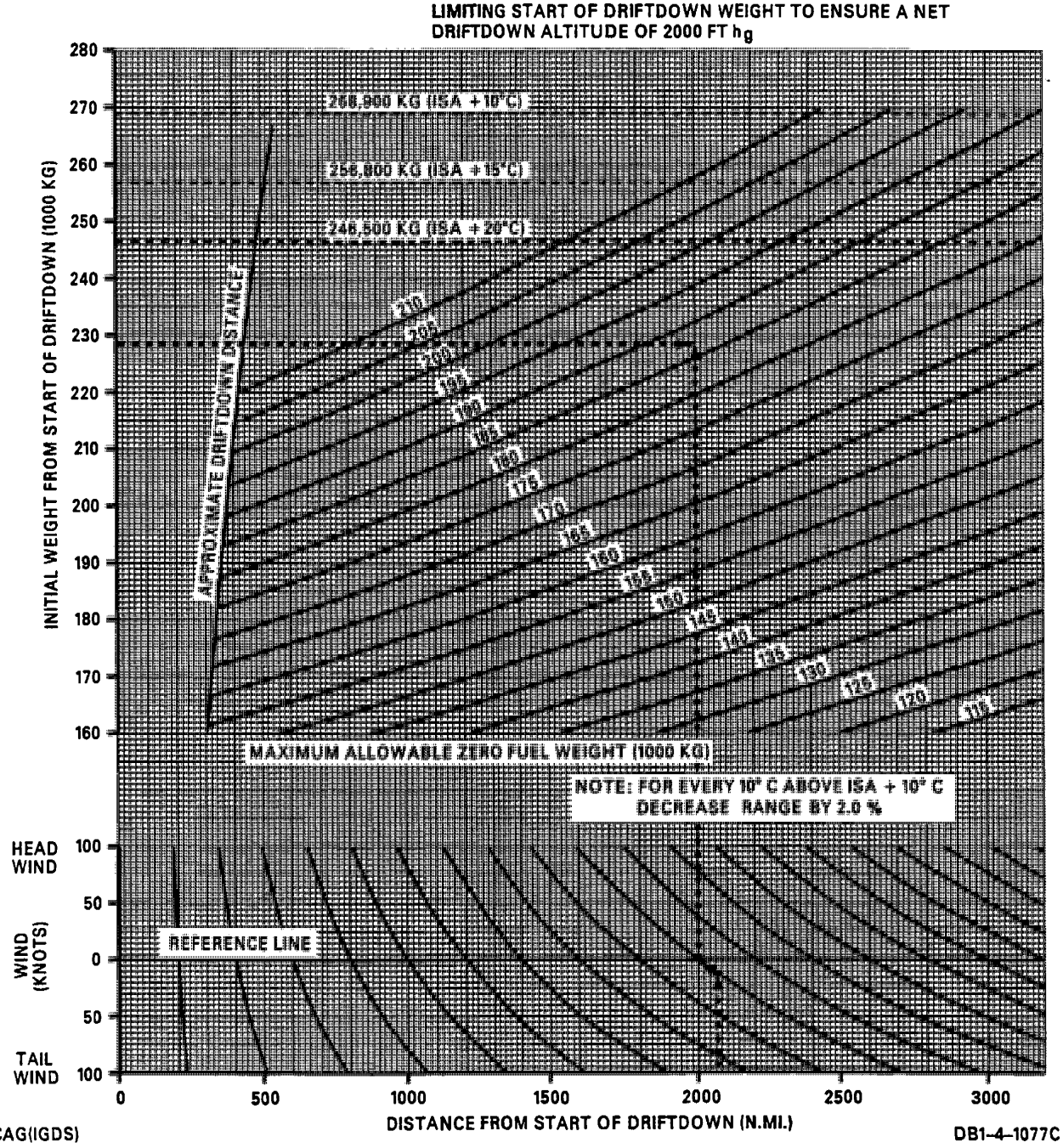
MAXIMUM ALLOWABLE ZERO FUEL WEIGHT

CF6-80C2D1F ENGINES ONE ENGINE OPERATING
MAXIMUM CONTINUOUS THRUST ICE PROTECTION OFF
ONE A/C PACK ON ABOVE 10,000 FT OFF BELOW
ISA + 10°C AND BELOW

NET FLIGHT PATH

DATA BASED ON:

1. NET FLIGHT PATH DRIFTDOWN PERFORMANCE FROM 31,000 FT h_p
   BELOW 31,000 FT SUBTRACT 70 KG/1000 FT FROM MAXIMUM ALLOWABLE ZERO FUEL WEIGHT
   ABOVE 31,000 FT ADD 90 KG/1000 FT TO MAXIMUM ALLOWABLE ZERO FUEL WEIGHT
2. NET FLIGHT PATH CRUISE-CLIMB PERFORMANCE
3. ALLOWANCES = DESCENT .4 MIN APPROACH AND 15 MIN HOLDING FUEL

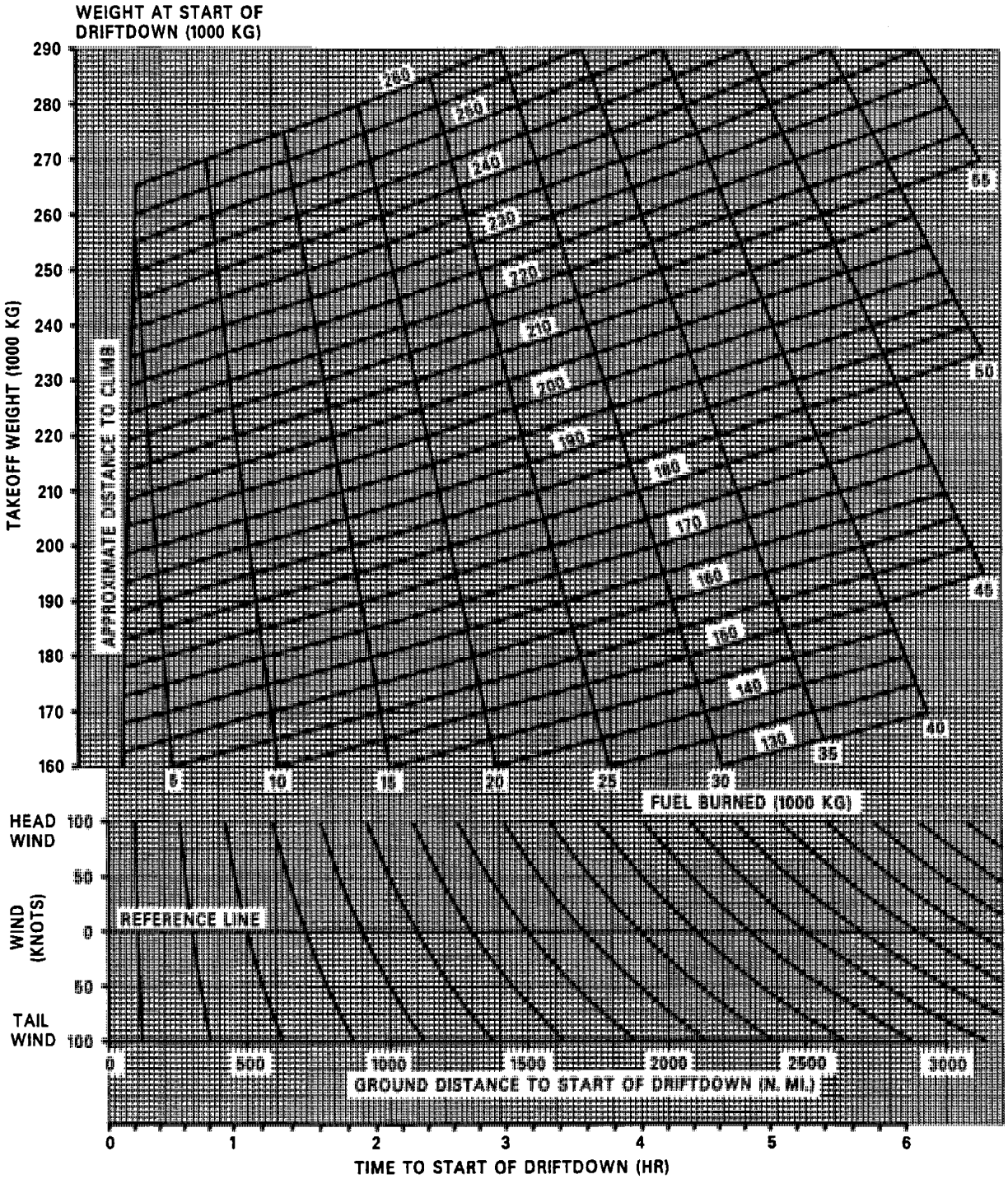


CAG(IGDS)

DB1-4-1077C

TIME AND DISTANCE TO START OF DRIFTDOWN

CF6-80C2D1F ENGINES
THREE ENGINES OPERATING
MACH .82 31,000 FT
STANDARD DAY

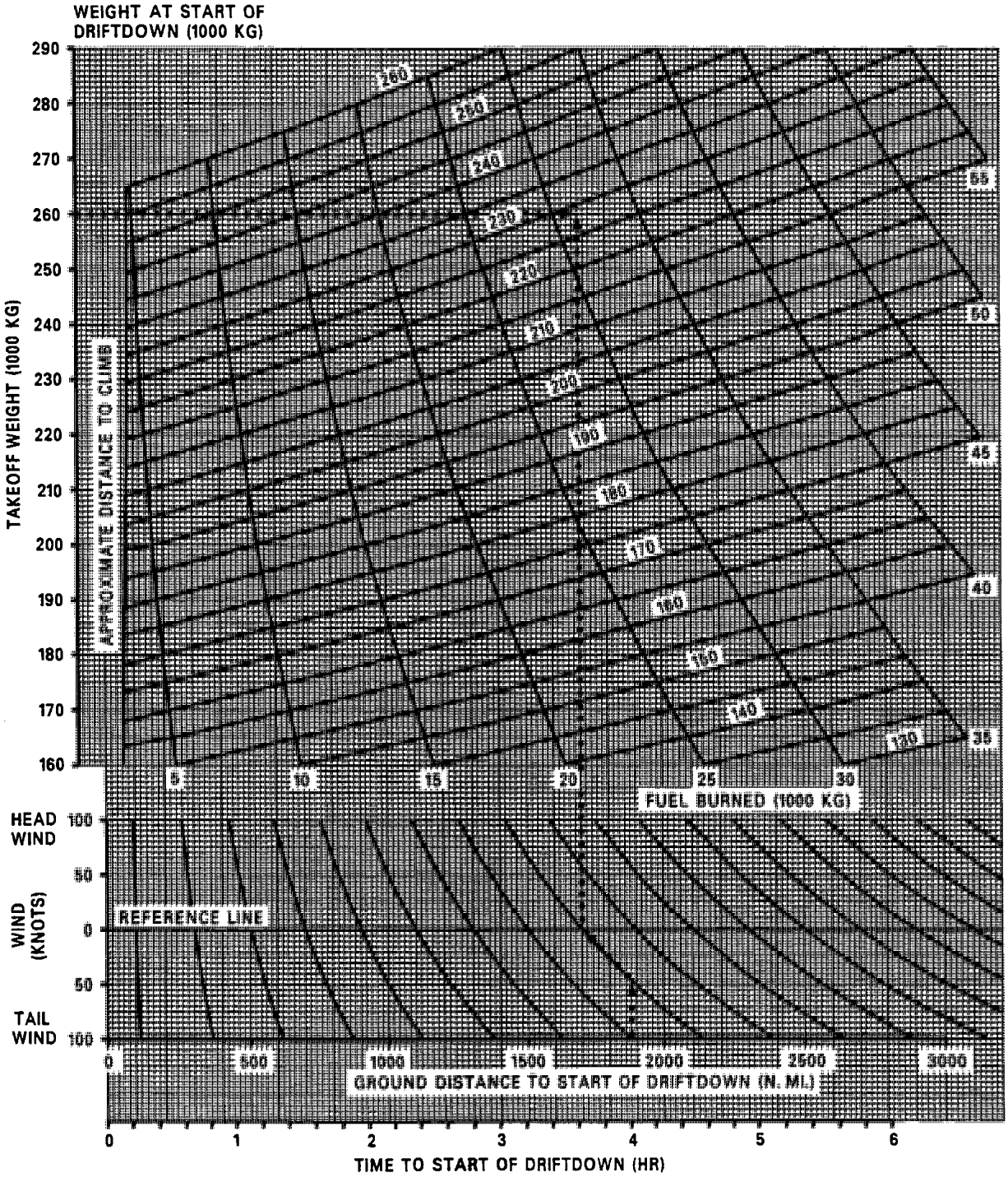


CAG(IGDS)

DB1-4-1041C

TIME AND DISTANCE TO START OF DRIFTDOWN

CF6-80C2D1F ENGINES
THREE ENGINES OPERATING
MACH .82 31,000/35,000/39,000 FT
STANDARD DAY



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DB1-4-1042B

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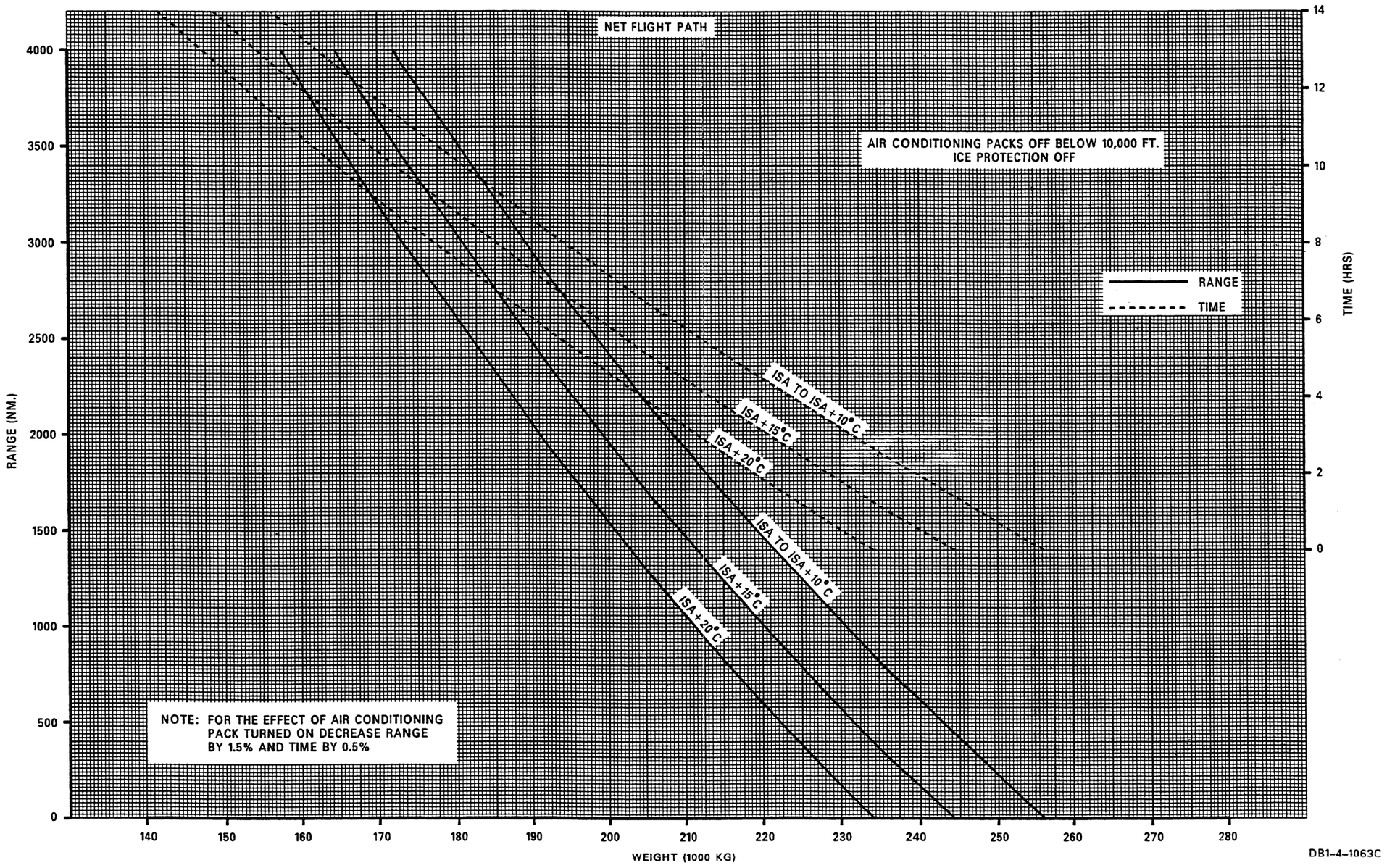
INTEGRATED TIME AND RANGE

CF6-80C2D1F ENGINES
ONE ENGINE OPERATING MAXIMUM CONTINUOUS THRUST
CRUISE CONFIGURATION
CRUISE-CLIMB SPEED = 290 KIAS



CAG(IGDS)

DB1-4-1063C

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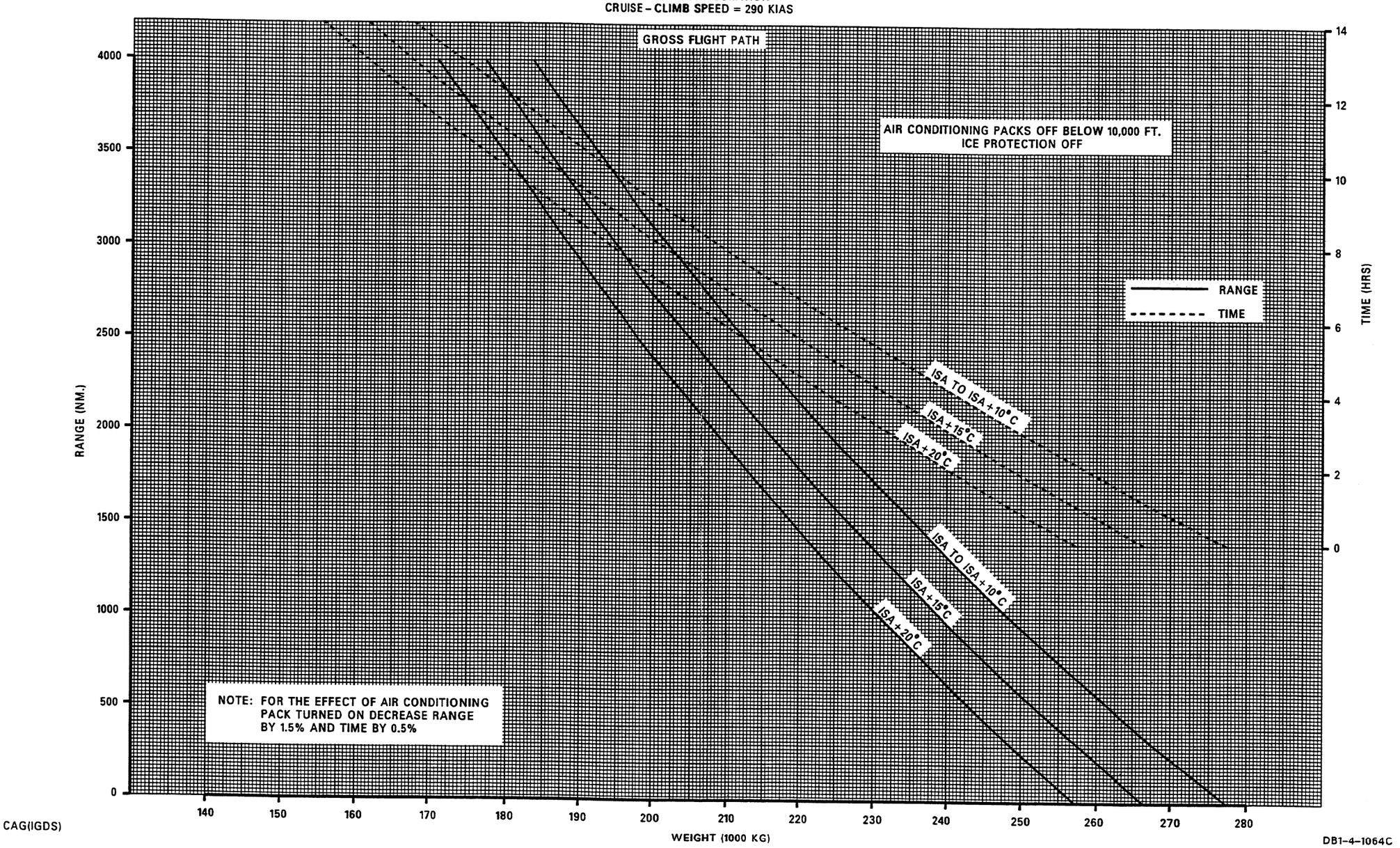
INTEGRATED TIME AND RANGE

CF6-80C2D1F ENGINES
ONE ENGINE OPERATING MAXIMUM CONTINUOUS THRUST
CRUISE CONFIGURATION
CRUISE - CLIMB SPEED = 290 KIAS



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KEY
INDICATED AIRSPEED (KT)
TOTAL FUEL FLOW (KG/HR)

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEG BANK TURNS

WINDMILLING JET

1 ENGINE OPERATING **ISA °C** TEMPERATURE

ONE A/C PACK PER OPERATING ENGINE
ICE PROTECTION OFF

1 ENGINE OPERATING **ISA °C** TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250			
10,000 -4.8	208 4090	216 4453	224 4827	231 5211	238 5606	245 6017	252 6445	259 6901	265 7402							
8000 -0.8	208 4076	216 4434	223 4801	231 5175	238 5561	245 5955	252 6365	258 6790	265 7235	271 7722						
6000 3.1	208 4064	216 4417	223 4778	230 5146	238 5521	245 5909	251 6302	258 6709	264 7134	271 7572	277 8037					
4000 7.1	208 4053	216 4399	223 4753	230 5114	237 5484	244 5860	251 6247	257 6641	264 7044	270 7465	276 7900	282 8351				
2000 11.0	208 4046	215 4383	223 4730	230 5083	237 5444	244 5814	251 6189	257 6574	263 6970	270 7371	276 7784	282 8216	288 8661			
1500 12.0	208 4045	215 4381	223 4726	230 5077	237 5435	244 5803	251 6177	257 6559	263 6952	270 7352	276 7760	282 8185	287 8627			

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

TFF	42	46	49	53	57	61	65	69	74	79	83	88	93			

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

KEY
INDICATED AIRSPEED (KT)
TOTAL FUEL FLOW (KG/HR)

CRUISE TABLE
CF6-80C2D1F ENGINES

HOLDING PATTERN WITH 30 DEG BANK TURNS

WINDMILLING JET

1 ENGINE OPERATING
ISA °C
TEMPERATURE

A/C PACKS INOPERATIVE
ICE PROTECTION OFF

1 ENGINE OPERATING
ISA °C
TEMPERATURE

PR ALT STD SAT	GROSS WEIGHT (1000 KG)															
	130	140	150	160	170	180	190	200	210	220	230	240	250			
10,000 -4.8	208 4026	216 4384	224 4753	231 5132	238 5520	245 5923	252 6342	259 6782	265 7262							
8000 -0.8	208 4013	216 4367	223 4729	231 5098	238 5479	245 5867	252 6269	258 6685	265 7117	271 7583						
6000 3.1	208 4003	216 4351	223 4707	230 5071	238 5441	245 5823	251 6211	258 6609	264 7025	271 7452	277 7901					
4000 7.1	208 3994	216 4335	223 4684	230 5041	237 5406	244 5776	251 6158	257 6546	264 6942	270 7352	276 7778	282 8216				
2000 11.0	208 3988	215 4321	223 4663	230 5012	237 5367	244 5732	251 6103	257 6482	263 6872	270 7266	276 7670	282 8091	288 8524			
1500 12.0	208 3988	215 4319	223 4659	230 5006	237 5359	244 5722	251 6091	257 6467	263 6854	270 7247	276 7647	282 8061	287 8492			

ISA DEV. CORRECTION: INCREASE/DECREASE PER 5°C ABOVE/BELOW STD SAT

TFF	39	43	46	49	53	56	60	63	67	71	74	77	82			

FOR ENGINE ICE PROTECTION ON: INCREASE FUEL FLOW BY 2.0%.

FOR ENGINE AND AIRFRAME ICE PROTECTION ON: INCREASE FUEL FLOW BY 4.0%.

TAKEOFF DEFLECTED AILERONS

TABLE OF CONTENTS

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INTRODUCTION

This chapter contains Takeoff Deflected Ailerons performance charts and graphs which are applicable to and should be used with the Limitations and Takeoff sections of this manual. For procedures or sample problems, see corresponding sections.

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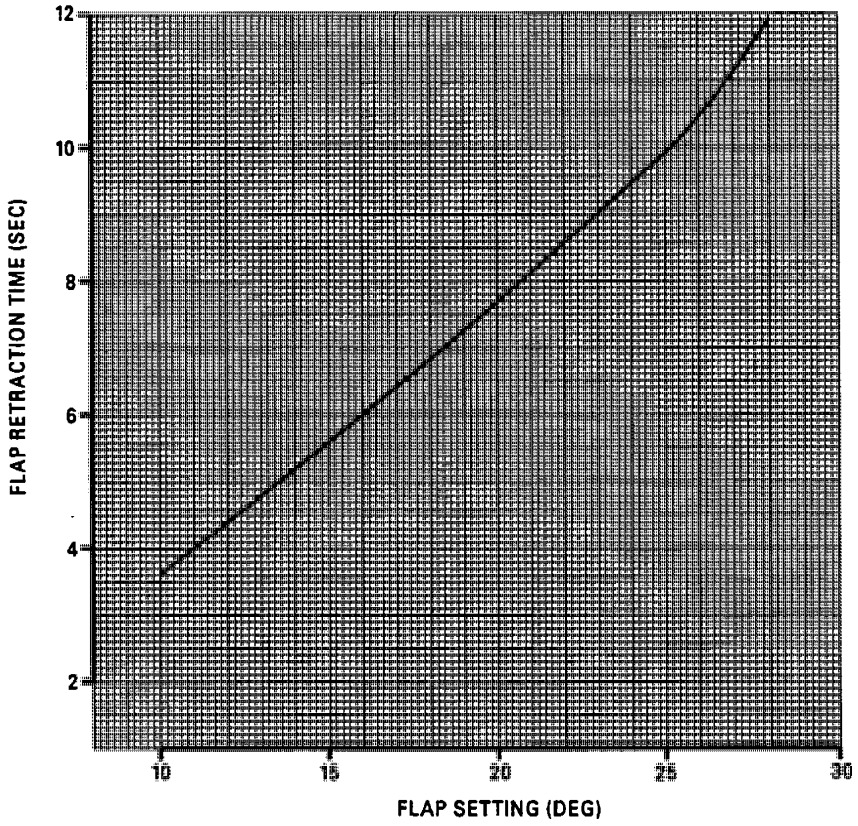
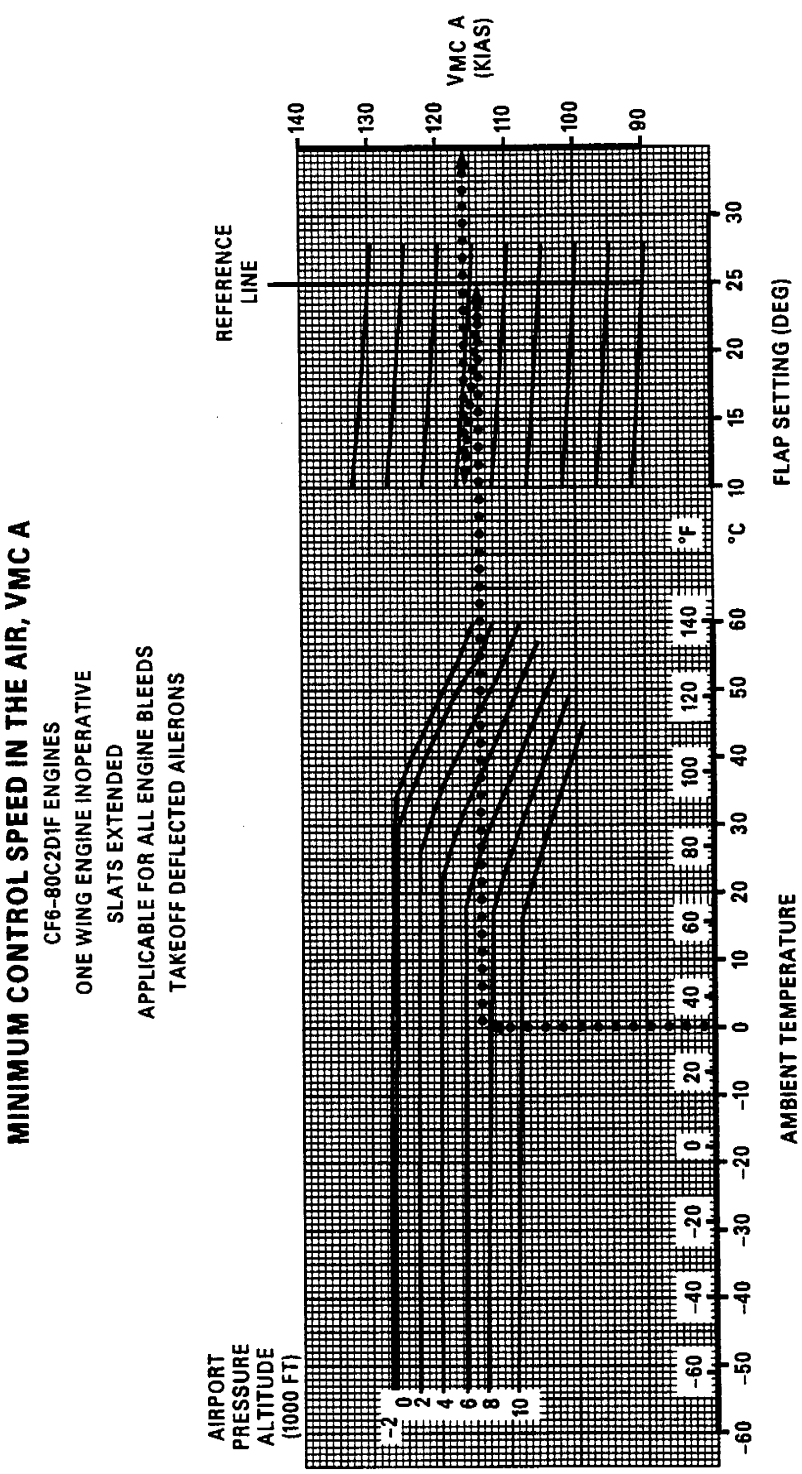
SLAT AND FLAP RETRACTION TIMES
TAKEOFF DEFLECTED AILERONS

SLAT RETRACTION TIME = 11.5 SECONDS



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4, PAGE 5-1, DATED 3-4-93 DB1-4-1107

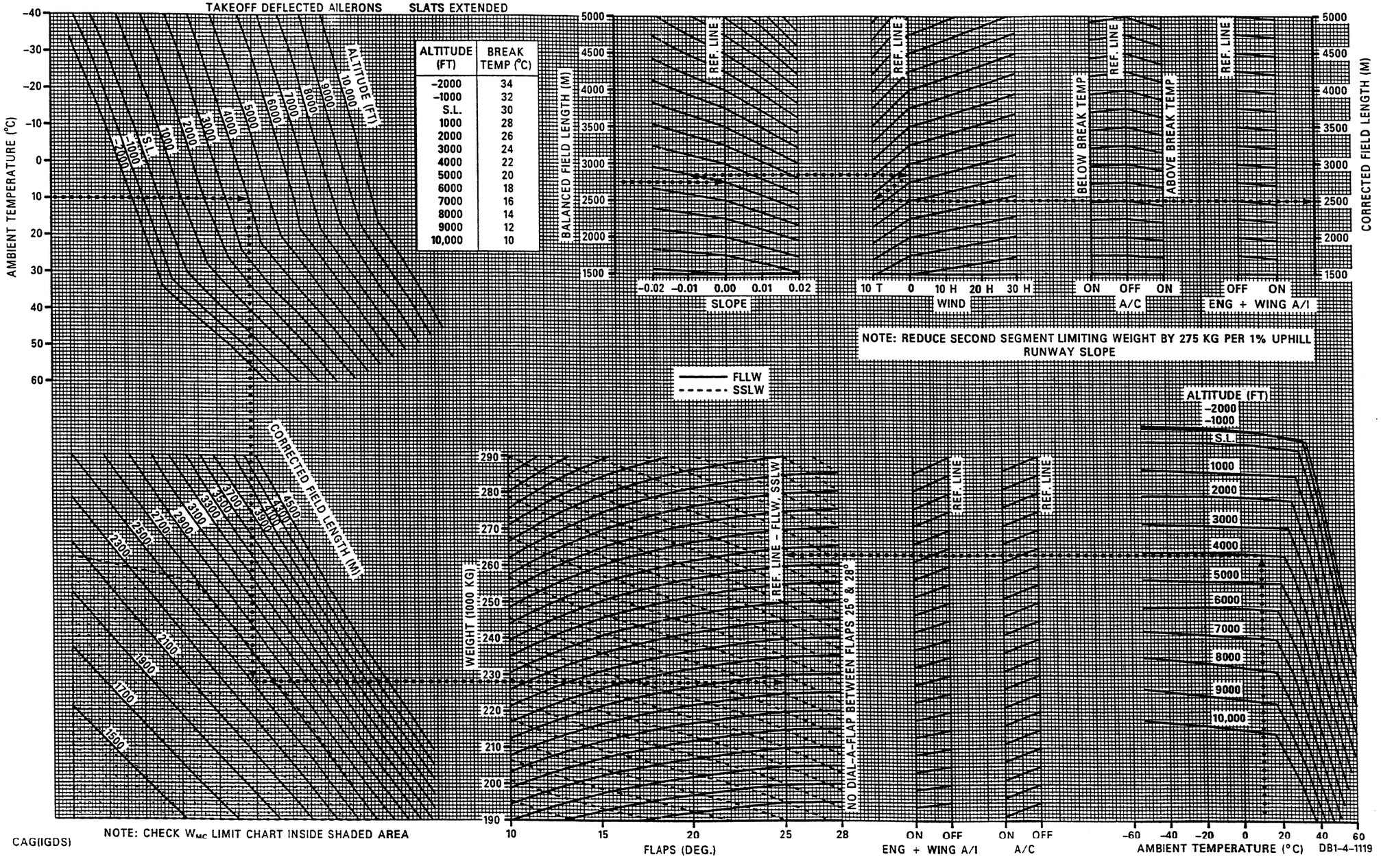


CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 3-1, DATED 11-15-96 DB1-4-1108B

COMPOSITE TAKEOFF PERFORMANCE

GE CF6-80C2D1F ENGINES

TAKEOFF DEFLECTED AILERONS SLATS EXTENDED



ALTITUDE (FT)	BREAK TEMP (°C)
-2000	34
-1000	32
S.L.	30
1000	28
2000	26
3000	24
4000	22
5000	20
6000	18
7000	16
8000	14
9000	12
10,000	10

NOTE: REDUCE SECOND SEGMENT LIMITING WEIGHT BY 275 KG PER 1% UPHILL RUNWAY SLOPE

——— FLLW
------ SSLW

ALTITUDE (FT)
-2000
-1000
S.L.
1000
2000
3000
4000
5000
6000
7000
8000
9000
10,000

NOTE: CHECK W_{MC} LIMIT CHART INSIDE SHADED AREA

CAG(IGDS)

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TAKEOFF AND TRANSITION SPEEDS (SHEET 1)
CF6-80C2D1F ENGINES
TAKEOFF DEFLECTED AILERONS

PROCEDURE:

1. DETERMINE BASIC TAKEOFF SPEEDS V_1, V_R, V_2 FOR TAKEOFF WEIGHT AND FLAP SETTING. (NOTE: IF BASIC TAKEOFF SPEEDS FALL LEFT OF HEAVY LINE ON TABLE **1**, A MINIMUM SPEED CHECK WILL BE REQUIRED AFTER DETERMINING THE CORRECTED TAKEOFF SPEEDS.)
2. DETERMINE CORRECTED TAKEOFF SPEEDS BY ADDING ΔV VALUES FROM CORRECTION TABLES **2A, B,** AND **C** (SUBTRACT WHEN SHOWN WITH NEGATIVE SIGN).
3. WHEN BASIC TAKEOFF SPEEDS OBTAINED IN STEP 1 ARE LEFT OF THE HEAVY LINE, USE THE HIGHER OF THE CORRECTED TAKEOFF SPEEDS OBTAINED IN STEP 2, OR THE MINIMUM SPEEDS FROM TABLE **3**.
4. THE TRANSITION SPEEDS (FLAP RETRACTION, SLAT RETRACTION AND V_3 SPEEDS) ARE DETERMINED BY ENTERING TABLE **4**.

1

BASIC TAKEOFF SPEEDS V_1, V_R, V_2 (KIAS)

FLAP (DEG)		TAKEOFF WEIGHT (1000 KG)																
		130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
10	V_1	76.5	84.0	91.0	98.0	105.0	111.5	118.0	124.0	129.5	135.5	141.0	146.5	151.5	156.5	161.5	167.0	170.5
	V_R	103.5	111.0	118.0	124.5	131.0	136.5	142.0	147.0	152.0	156.5	161.0	165.5	170.0	174.0	178.0	182.0	185.5
	V_2	137.0	141.0	145.0	148.5	152.5	156.0	159.5	163.0	166.5	169.5	173.0	176.0	179.5	183.0	186.0	189.5	192.5
11	V_1	75.5	83.0	90.5	97.5	104.5	111.0	117.0	123.0	129.0	134.5	140.0	145.5	150.5	155.5	161.0	166.0	169.5
	V_R	103.0	110.5	117.5	124.0	130.0	135.5	141.0	146.0	151.0	155.5	160.0	164.5	168.5	173.0	177.0	181.0	184.0
	V_2	136.5	140.0	144.0	147.5	151.5	155.0	158.5	162.0	165.5	168.5	172.0	175.0	178.5	182.0	185.0	188.0	191.0
12	V_1	75.0	82.5	90.0	97.0	103.5	110.0	116.5	122.0	128.0	133.5	139.0	144.5	149.5	155.0	160.0	165.0	168.5
	V_R	102.0	109.5	116.5	123.0	129.0	134.5	140.0	145.0	150.0	154.5	159.0	163.5	167.5	172.0	176.0	180.0	183.0
	V_2	135.5	139.5	143.0	147.0	150.5	154.0	157.5	161.0	164.5	167.5	171.0	174.0	177.5	181.0	184.0	187.0	190.0
13	V_1	74.5	82.0	89.5	96.0	103.0	109.5	115.5	121.5	127.5	133.0	138.5	144.0	149.0	154.0	159.0	164.0	168.0
	V_R	101.5	109.0	116.0	122.0	128.0	134.0	139.0	144.0	149.0	153.5	158.0	162.5	166.5	171.0	175.0	179.0	182.0
	V_2	135.0	138.5	142.5	146.0	149.5	153.0	156.5	160.0	163.5	166.5	170.0	173.0	176.5	180.0	183.0	186.0	189.0
14	V_1	74.0	81.5	88.5	95.5	102.5	109.0	115.0	121.0	126.5	132.0	137.5	143.0	148.0	153.0	158.0	163.0	167.0
	V_R	100.5	108.0	115.0	121.5	127.5	133.0	138.5	143.5	148.5	153.0	157.5	161.5	166.0	170.0	174.0	178.0	181.0
	V_2	134.0	138.0	141.5	145.5	149.0	152.5	156.0	159.5	162.5	166.0	169.0	172.5	175.5	179.0	182.0	185.0	188.0
15	V_1	73.5	81.0	88.5	95.0	102.0	108.5	114.5	120.5	126.0	131.5	137.0	142.5	147.5	152.5	157.5	162.5	166.0
	V_R	100.0	107.5	114.5	121.0	127.0	132.5	137.5	142.5	147.5	152.0	156.5	161.0	165.0	169.0	173.0	177.0	180.0
	V_2	133.5	137.0	141.0	144.5	148.0	151.5	155.0	158.5	162.0	165.0	168.0	171.5	175.0	178.0	181.0	184.0	187.0
16	V_1	73.5	80.5	88.0	94.5	101.5	108.0	114.0	119.5	125.5	131.0	136.5	142.0	147.0	152.0	157.0	162.0	165.5
	V_R	99.5	107.0	114.0	120.0	126.0	131.5	137.0	142.0	147.0	151.5	156.0	160.0	164.0	168.5	172.5	176.0	179.5
	V_2	133.0	136.5	140.0	144.0	147.5	151.0	154.5	158.0	161.0	164.0	167.5	170.5	174.0	177.0	180.0	183.5	186.0
17	V_1	73.0	80.5	87.5	94.5	101.0	107.5	113.5	119.5	125.0	130.5	136.0	141.5	146.5	151.5	156.5	161.0	165.0
	V_R	99.0	106.5	113.5	119.5	125.5	131.0	136.5	141.5	146.0	150.5	155.0	159.5	163.5	167.5	171.5	175.5	178.5
	V_2	132.0	136.0	139.5	143.0	147.0	150.0	153.5	157.0	160.5	163.5	166.5	170.0	173.0	176.5	179.5	182.5	185.5
18	V_1	72.5	80.0	87.0	94.0	100.5	107.0	113.0	119.0	124.5	130.0	135.5	141.0	146.0	151.0	155.5	160.5	164.5
	V_R	98.5	106.0	113.0	119.0	125.0	130.5	136.0	141.0	145.5	150.0	154.5	158.5	163.0	167.0	171.0	174.5	177.5
	V_2	131.5	135.5	139.0	142.5	146.0	149.5	153.0	156.5	159.5	162.5	166.0	169.0	172.5	175.5	178.5	181.5	184.5
19	V_1	72.5	80.0	87.0	93.5	100.5	106.5	112.5	118.5	124.0	129.5	135.0	140.5	145.5	150.5	155.5	160.0	164.0
	V_R	98.0	105.5	112.5	118.5	124.5	130.0	135.5	140.5	145.0	149.5	154.0	158.0	162.0	166.0	170.0	174.0	177.0
	V_2	131.0	135.0	138.5	142.0	145.5	149.0	152.5	156.0	159.0	162.0	165.0	168.5	171.5	175.0	178.0	181.0	183.5
20	V_1	72.5	79.5	86.5	93.5	100.0	106.5	112.5	118.0	124.0	129.5	135.0	140.0	145.0	150.0	155.0	160.0	163.5
	V_R	97.5	105.0	112.0	118.5	124.0	129.5	135.0	140.0	144.5	149.0	153.5	157.5	161.5	165.5	169.5	173.5	176.5
	V_2	130.5	134.5	138.0	141.5	145.0	148.5	152.0	155.0	158.5	161.5	164.5	167.5	171.0	174.0	177.0	180.0	183.0
21	V_1	72.0	79.5	86.5	93.0	100.0	106.0	112.0	118.0	123.5	129.0	134.5	139.5	144.5	149.5	154.5	159.5	163.0
	V_R	97.5	104.5	111.5	118.0	124.0	129.5	134.5	139.5	144.0	148.5	153.0	157.0	161.0	165.0	169.0	172.5	176.0
	V_2	130.0	134.0	137.5	141.0	144.5	148.0	151.0	154.5	158.0	161.0	164.0	167.0	170.5	173.5	176.5	179.5	182.5
22	V_1	72.0	79.0	86.0	93.0	99.5	106.0	112.0	117.5	123.5	129.0	134.0	139.5	144.5	149.5	154.5	159.0	163.0
	V_R	97.0	104.5	111.0	117.5	123.5	129.0	134.0	139.0	143.5	148.0	152.5	156.5	160.5	164.5	168.5	172.0	175.5
	V_2	129.5	133.5	137.0	140.5	144.0	147.5	150.5	154.0	157.5	160.5	163.5	166.5	170.0	173.0	176.0	179.0	182.0
23	V_1	71.5	79.0	86.0	92.5	99.0	105.5	111.5	117.5	123.0	128.5	134.0	139.0	144.0	149.0	154.0	159.0	162.5
	V_R	96.5	104.0	111.0	117.0	123.0	128.5	133.5	138.5	143.0	147.5	152.0	156.0	160.0	164.0	168.0	171.5	175.0
	V_2	129.0	133.0	136.5	140.0	143.5	147.0	150.5	153.5	157.0	160.0	163.0	166.0	169.5	172.5	175.5	178.5	181.5
24	V_1	71.5	78.5	85.5	92.5	99.0	105.5	111.5	117.0	123.0	128.5	133.5	139.0	144.0	149.0	154.0	159.0	162.5
	V_R	96.0	103.5	110.5	117.0	122.5	128.0	133.5	138.0	143.0	147.5	151.5	155.5	160.0	163.5	167.5	171.5	174.5
	V_2	129.0	132.5	136.0	139.5	143.0	146.5	150.0	153.0	156.5	159.5	162.5	165.5	169.0	172.0	175.0	178.0	181.0
25	V_1	71.0	78.5	85.5	92.0	99.0	105.0	111.0	117.0	122.5	128.0	133.5	139.0	144.0	149.0	154.0	158.5	162.5
	V_R	96.0	103.5	110.0	116.5	122.5	128.0	133.0	138.0	142.5	147.0	151.0	155.5	159.5	163.5	167.0	171.0	174.0
	V_2	128.5	132.0	135.5	139.5	143.0	146.0	149.5	153.0	156.0	159.0	162.0	165.5	168.5	171.5	174.5	177.5	180.5
28	V_1	70.0	77.5	84.5	91.0	97.5	104.0	110.0	115.5	121.5	127.0	132.0	137.5	142.5	147.5	152.5	157.5	161.0
	V_R	94.5	102.0	108.5	115.0	120.5	126.0	131.0	136.0	140.5	145.0	149.0	153.0	157.0	161.0	165.0	168.5	171.5
	V_2	126.5	130.0	133.5	137.0	140.5	143.6	147.0	150.5	153.5	156.5	159.5	162.5	165.5	169.0	172.0	174.5	177.5

CHECK FOR MINIMUM SPEEDS BELOW HEAVY LINE

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TAKEOFF AND TRANSITION SPEEDS (SHEET 2)
CF6-80C2D1F ENGINES
TAKEOFF DEFLECTED AILERONS

2A
ALTITUDE/TEMPERATURE CORRECTIONS (KIAS)

ALTITUDE (FT)		TEMPERATURE (DEG C)												
		-30 TO -21	-20 TO -11	-10 TO -1	0 TO 9	10 TO 19	20 TO 24	25 TO 29	30 TO 34	35 TO 39	40 TO 44	45 TO 49	50 TO 54	55 TO 60
SEA LEVEL	ΔV1	0	0	0	0	0	0	0	2	3	5	7	9	11
	ΔVR	0	0	0	0	0	0	0	1	2	3	4	5	5
	ΔV2	0	0	0	0	0	0	0	0	-1	-1	-2	-2	-3
1000	ΔV1	1	1	1	1	1	2	2	3	5	7	9	11	13
	ΔVR	0	0	0	1	1	1	1	2	3	4	4	5	6
	ΔV2	0	0	0	0	0	0	0	-1	-1	-2	-2	-3	-3
2000	ΔV1	2	2	3	3	3	3	4	5	7	9	11	13	15
	ΔVR	1	1	1	1	2	2	2	3	4	4	5	6	7
	ΔV2	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-3	-3	-3
3000	ΔV1	4	4	4	4	4	4	5	7	9	11	13	15	16
	ΔVR	1	2	2	2	2	3	3	4	5	5	6	7	7
	ΔV2	-1	-1	-1	-1	-1	-1	-1	-2	-2	-3	-3	-3	-3
4000	ΔV1	5	5	5	5	6	6	7	9	11	13	14	16	18
	ΔVR	2	2	3	3	3	3	4	5	5	6	7	7	8
	ΔV2	-1	-1	-1	-1	-1	-2	-2	-2	-2	-3	-3	-3	-3
5000	ΔV1	7	7	7	7	7	8	9	11	13	14	16	18	20
	ΔVR	3	3	3	4	4	4	5	5	6	7	7	8	9
	ΔV2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3
6000	ΔV1	8	8	8	8	9	9	11	13	14	16	18	20	
	ΔVR	4	4	4	4	5	5	6	6	7	7	8	9	
	ΔV2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	
7000	ΔV1	9	10	10	10	10	11	13	14	16	18	20		
	ΔVR	4	5	5	5	5	6	6	7	7	8	9		
	ΔV2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3		
8000	ΔV1	11	11	11	11	12	13	15	16	18	20			
	ΔVR	5	5	6	6	6	6	7	7	8	9			
	ΔV2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3			
9000	ΔV1	13	13	13	13	14	15	16	18	20	21			
	ΔVR	6	6	6	6	7	7	8	8	9	10			
	ΔV2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3			
10,000	ΔV1	14	14	15	15	15	17	18	20	21				
	ΔVR	7	7	7	7	7	8	8	9	10				
	ΔV2	-3	-3	-3	-3	-3	-3	-3	-3	-3				

2B
ALTITUDE/WEIGHT CORRECTIONS (KIAS)

ALTITUDE (FT)		TAKEOFF WEIGHT (1000 KG)								
		UP TO 129	130 TO 149	150 TO 169	170 TO 189	190 TO 209	210 TO 229	230 TO 249	250 TO 269	270 TO 290
UP TO 2000	ΔV1	0	0	0	0	0	0	0	0	1
	ΔVR	1	1	0	0	0	0	0	0	0
	ΔV2	0	0	0	0	0	0	0	1	1
3000	ΔV1	0	0	0	0	0	0	0	0	1
	ΔVR	1	1	0	0	0	-1	0	0	0
	ΔV2	0	0	0	0	0	0	1	1	2
4000	ΔV1	0	0	0	0	0	0	0	1	1
	ΔVR	2	1	0	0	-1	-1	-1	0	0
	ΔV2	0	0	0	0	0	0	1	2	2
5000	ΔV1	0	0	0	0	0	0	1	1	2
	ΔVR	2	1	0	0	-1	-1	-1	0	0
	ΔV2	-1	0	0	0	0	1	1	2	3
6000	ΔV1	0	0	0	0	0	0	1	2	3
	ΔVR	2	1	0	0	-1	-1	0	0	0
	ΔV2	-1	0	0	0	0	1	2	3	4
7000	ΔV1	0	0	0	0	0	0	1	2	4
	ΔVR	3	1	0	0	-1	-1	0	0	1
	ΔV2	-1	0	0	0	1	1	2	4	5
8000	ΔV1	0	0	0	0	0	1	2	3	5
	ΔVR	3	2	1	0	-1	-1	0	0	1
	ΔV2	-1	-1	0	0	1	2	3	5	6
9000	ΔV1	0	0	0	0	0	1	2	4	6
	ΔVR	3	2	1	0	-1	0	0	1	1
	ΔV2	-1	-1	0	0	1	2	4	6	7
10,000	ΔV1	0	0	0	0	1	2	3	5	7
	ΔVR	4	2	1	0	-1	0	0	1	2
	ΔV2	-1	-1	0	0	2	3	4	6	7

NOTE:

CHECK MINIMUM SPEEDS WHEN LEFT OF HEAVY LINE ON TABLE 1 AND USE THE HIGHER OF THE MINIMUM SPEED OR THE CORRECTED TAKEOFF SPEED.

FOR REDUCED THRUST TAKEOFFS READ MINIMUM SPEEDS AT ACTUAL TEMPERATURE (°C).

2C
MISCELLANEOUS CORRECTIONS (KIAS)

ENGINE ICE PROTECTION ON	ΔV1 ΔVR	0 0
ENGINE AND AIRFRAME ICE PROTECTION ON	ΔV1 ΔVR	+0.5 0
AIR CONDITIONING ON	ΔV1 ΔVR	+1.0 +0.5
WIND PER 10 KNOTS — HEADWIND	ΔV1 ΔVR	+1.0 0
WIND PER 10 KNOTS — TAILWIND	ΔV1 ΔVR	-2.0 0
SLOPE PER 1% — UPHILL	ΔV1 ΔVR ΔV2	+2.5 +1.0 -0.5
SLOPE PER 1% — DOWNHILL	ΔV1 ΔVR ΔV2	-2.5 -1.0 +1.0

3
MINIMUM SPEEDS (KIAS)

V_1 & V_R MINIMUM SPEEDS

ALTITUDE (FT)	TEMPERATURE (°C)				
	-20 TO 15	20	30	40	50
SEA LEVEL	136	136	135	130	125
1000	134	134	133	128	122
2000	132	132	130	125	120
3000	130	130	127	123	118
4000	128	128	125	120	115
5000	126	126	122	118	113
6000	124	123	120	115	111
7000	122	121	118	113	109
8000	120	119	115	111	107

V_2 MIN = V_R MIN + (CORRECTED V_2 - CORRECTED V_R)

4
TRANSITION SPEEDS

FLAP RETRACT = V_2 + 10 (KIAS)

SLAT RETRACT = V_3

TAKEOFF WEIGHT (1000 KG)	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
V_3 (KIAS)	172	178	184	190	196	202	207	213	218	223	228	233	238	243	247	252	256

CAG(IGDS)

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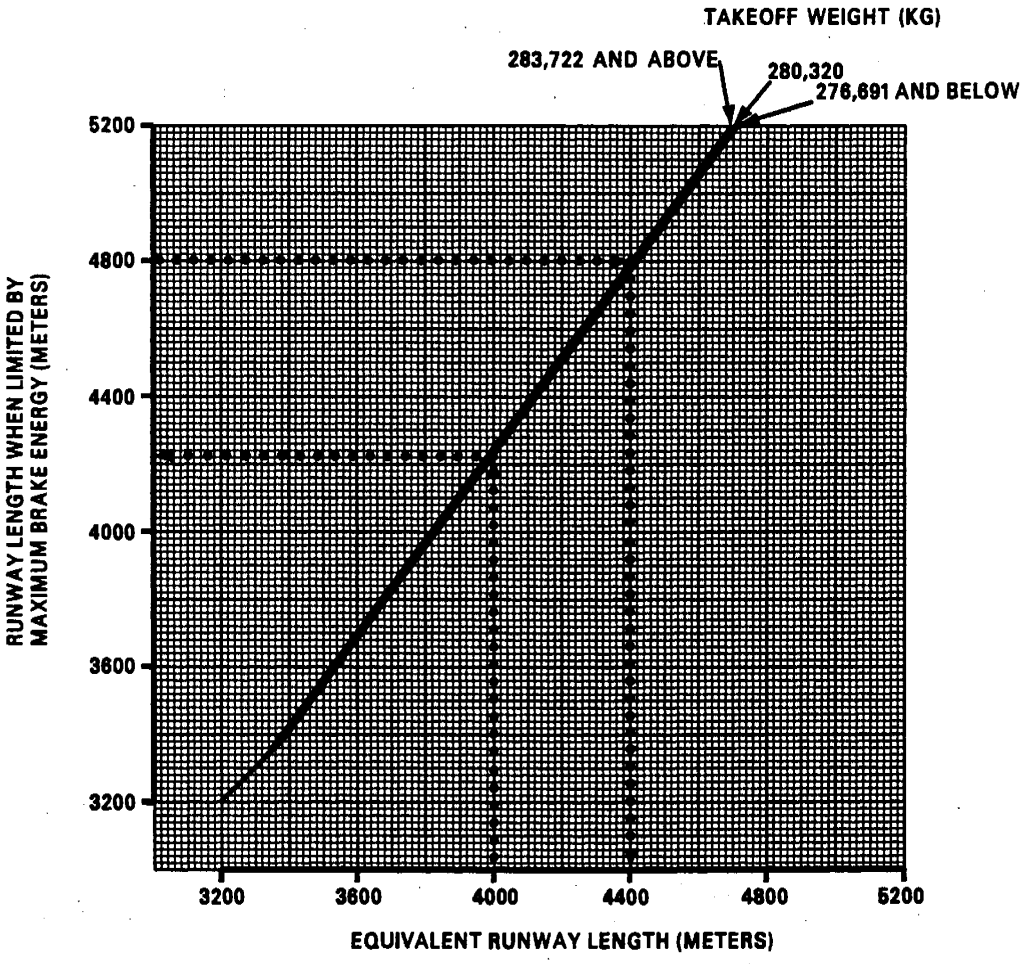
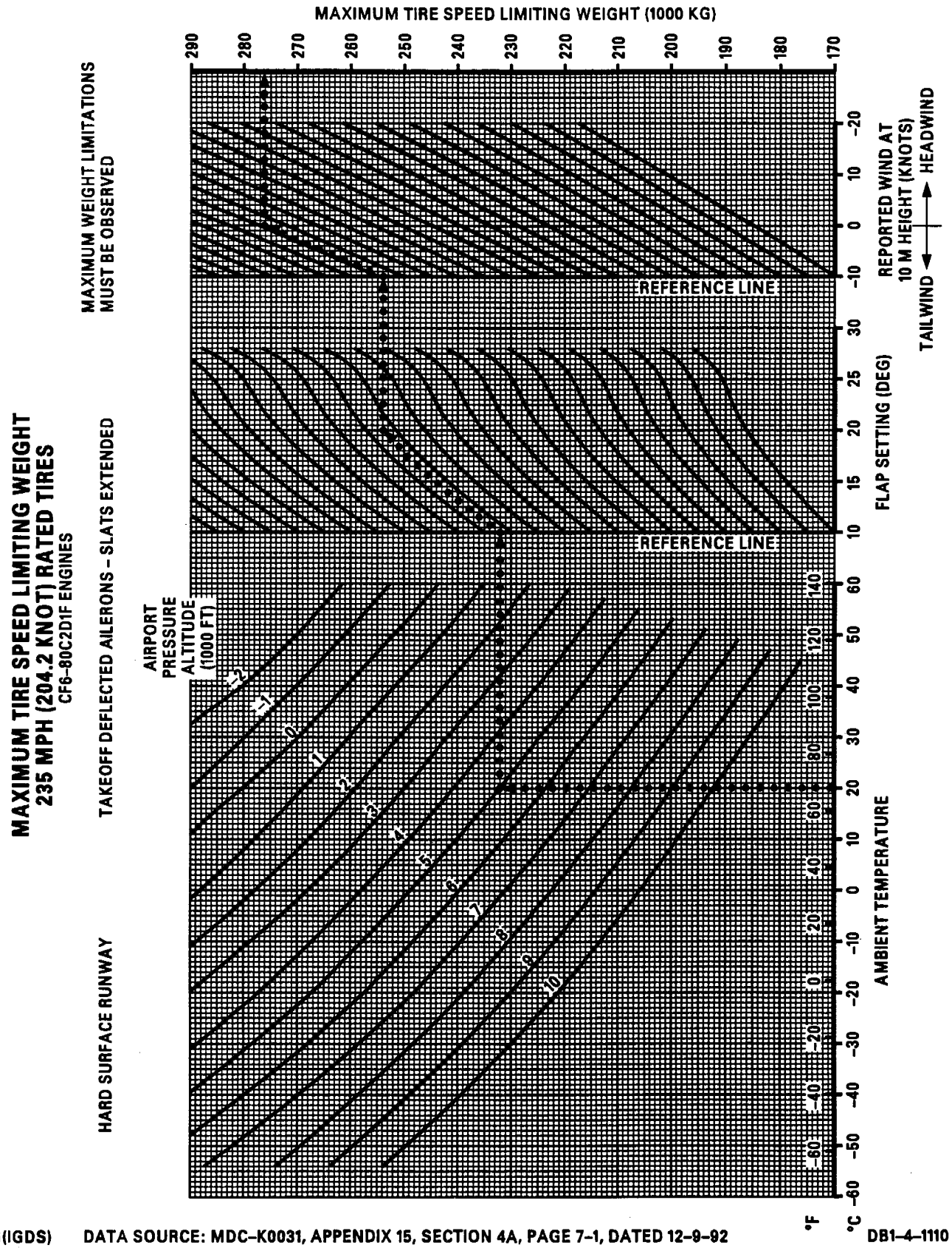
TAKEOFF FIELD LENGTH WHEN LIMITED BY MAXIMUM BRAKE ENERGY

CF6-60C2D1F ENGINES SLATS EXTENDED
TAKEOFF DEFLECTED AILERONS

APPLICABLE FOR ALL TAKEOFF CONDITIONS
NOT APPLICABLE FOR USE WITH UNBALANCED DATA



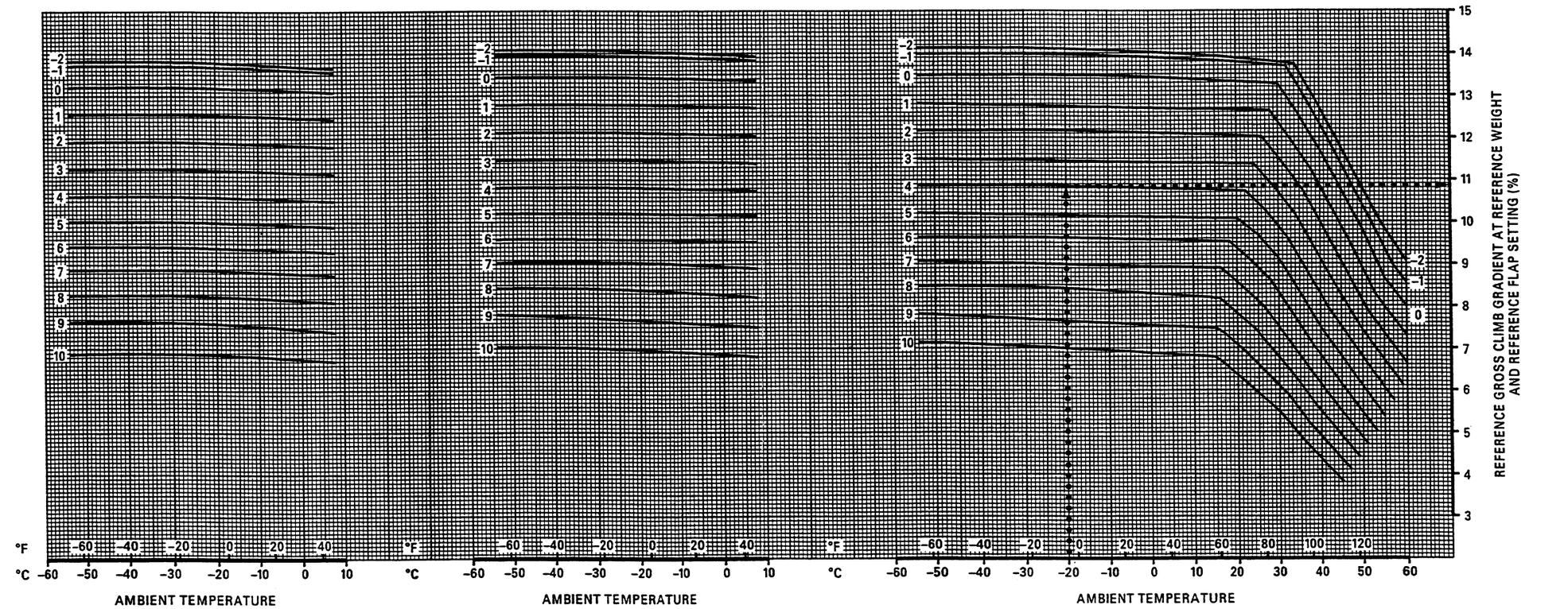
CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 9-4, DATED 12-6-95 DB1-4-1109A



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 7-1, DATED 12-9-92 DB1-4-1110

SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

TWO ENGINES OPERATING CF6-80C2D1F ENGINES
TAKEOFF THRUST
GEAR UP $V_{CL} = V_2$
TAKEOFF DEFLECTED AILERONS
SLATS EXTENDED
ENGINE AIRBLEED FOR AIR CONDITIONING ON



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 13-1, DATED 1-13-93

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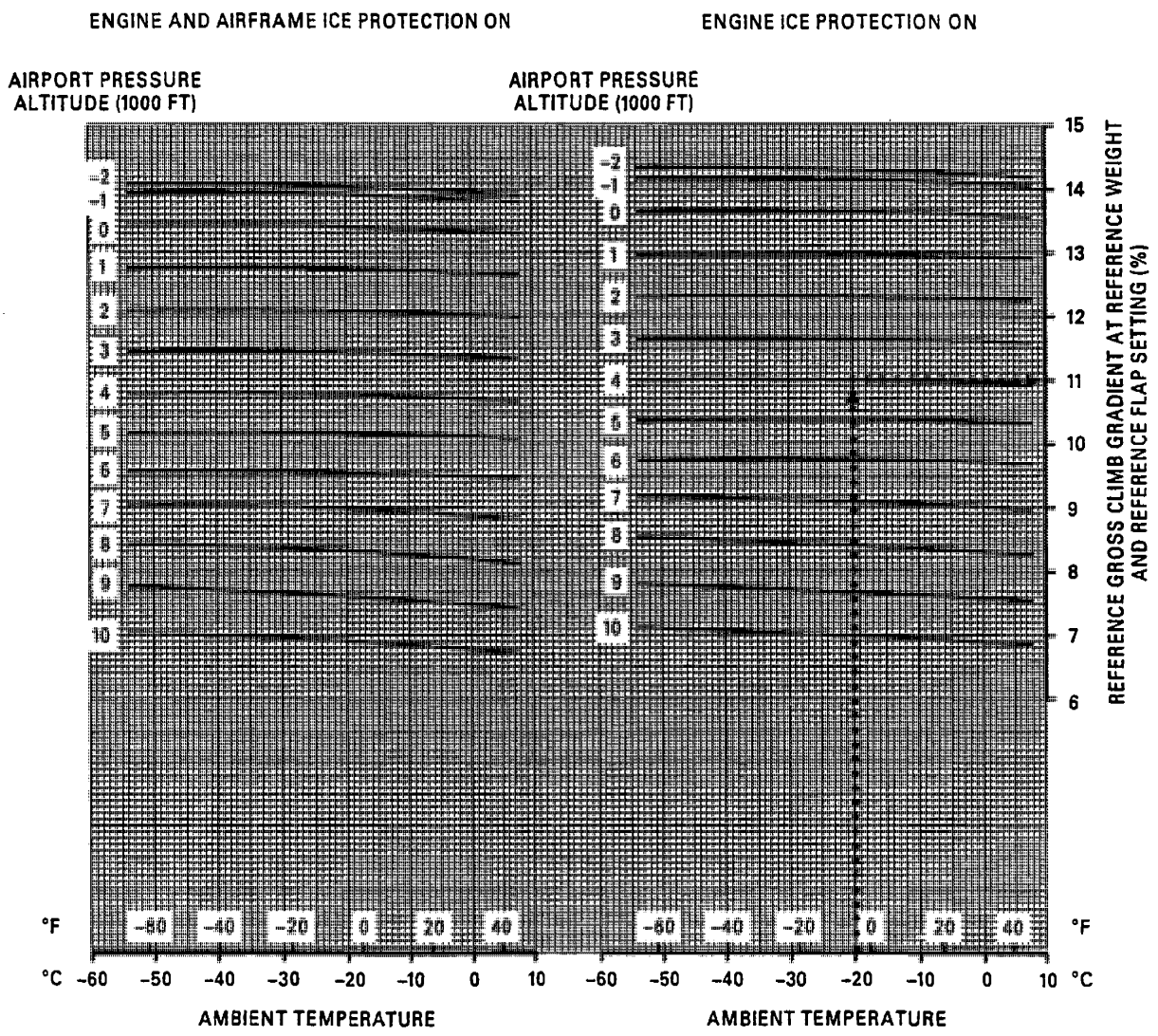
SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

TWO ENGINES OPERATING CF6-80C2D1F ENGINES
TAKEOFF THRUST
GEAR UP $V_{CL} = V_2$
TAKEOFF DEFLECTED AILERONS
SLATS EXTENDED
ENGINE AIRBLEED FOR AIR CONDITIONING OFF



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 13-2, DATED 1-13-93 DB1-4-1112

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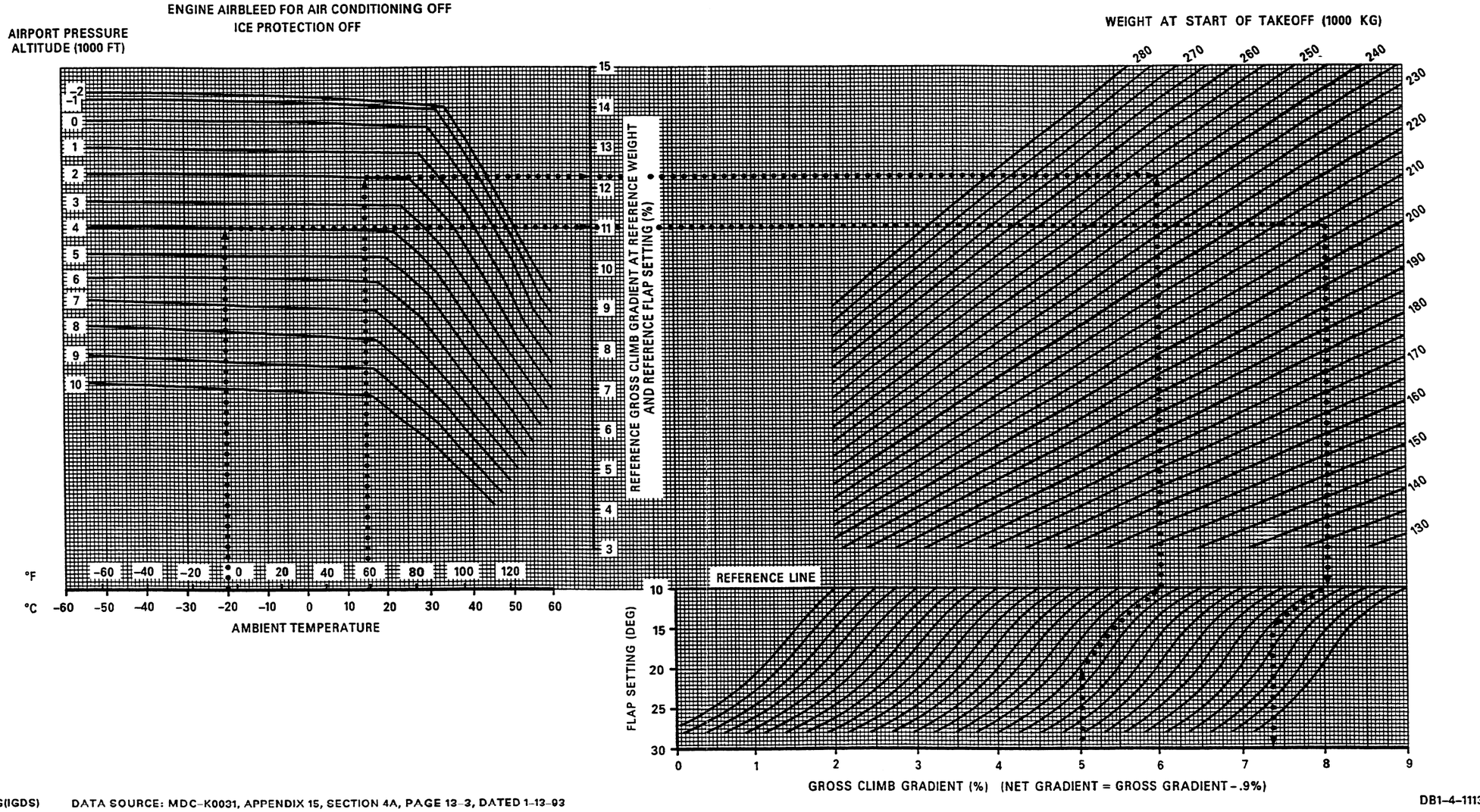
SECOND SEGMENT CLIMB GRADIENTS AT GEAR UP HEIGHT

TWO ENGINES OPERATING CF6-80C2D1F ENGINES
TAKEOFF THRUST
GEAR UP $V_{CL} = V_2$
TAKEOFF DEFLECTED AILERONS
SLATS EXTENDED

NOTE: REDUCE THE CLIMB GRADIENT OBTAINED FROM THIS CHART BY .03% PER .01 UPHILL RUNWAY SLOPE.
WHEN ENTERING THE CHART WITH A GRADIENT TO OBTAIN A WEIGHT, INCREASE THE GRADIENT BY .03% PER .01 UPHILL RUNWAY SLOPE BEFORE ENTERING THE CHART.
NO CORRECTION IS NEEDED FOR DOWNHILL RUNWAY SLOPE.

ENGINE AIRBLEED FOR AIR CONDITIONING OFF
ICE PROTECTION OFF



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 13-3, DATED 1-13-93

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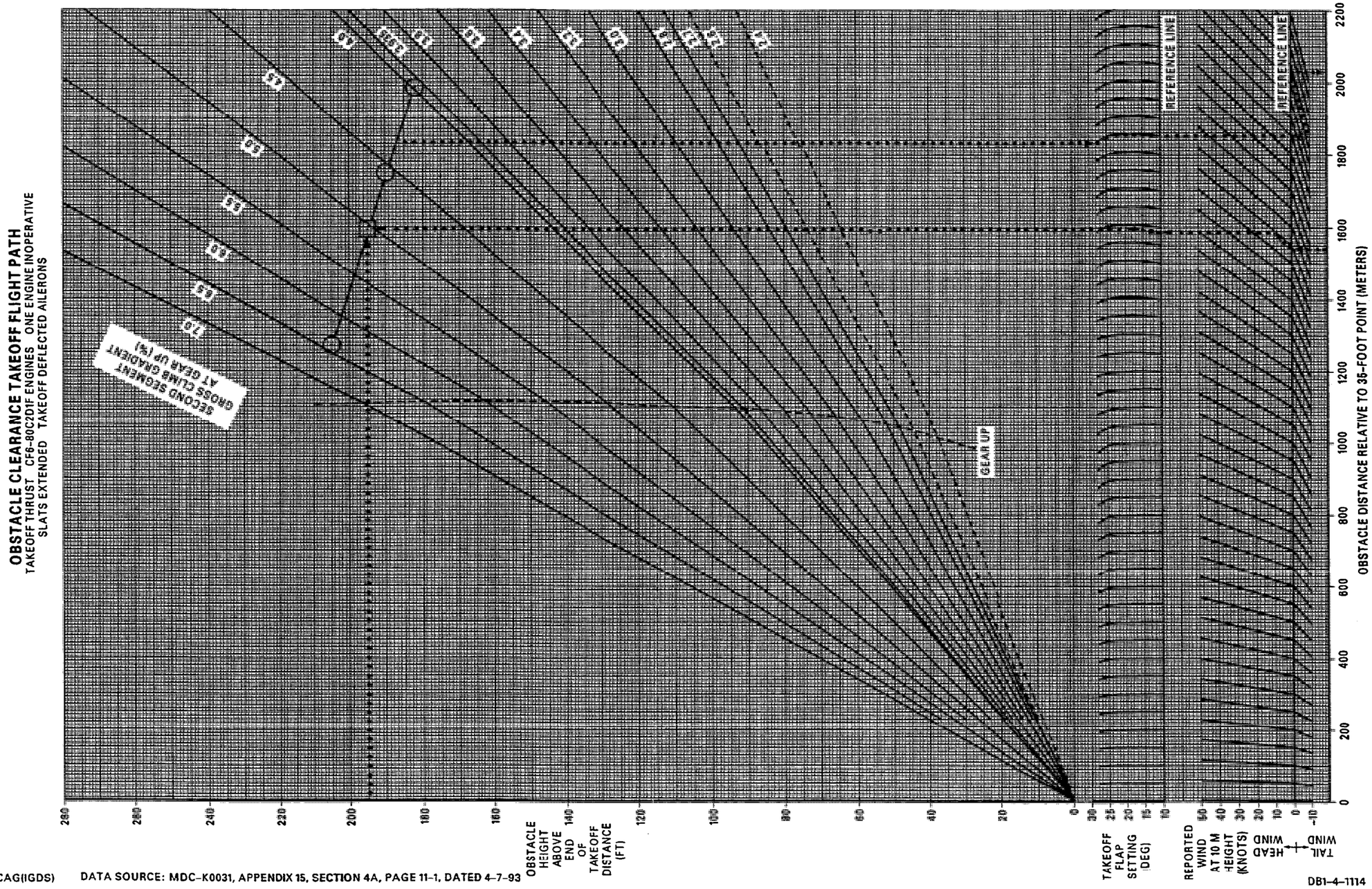

CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 11-1, DATED 4-7-93

DB1-4-1114

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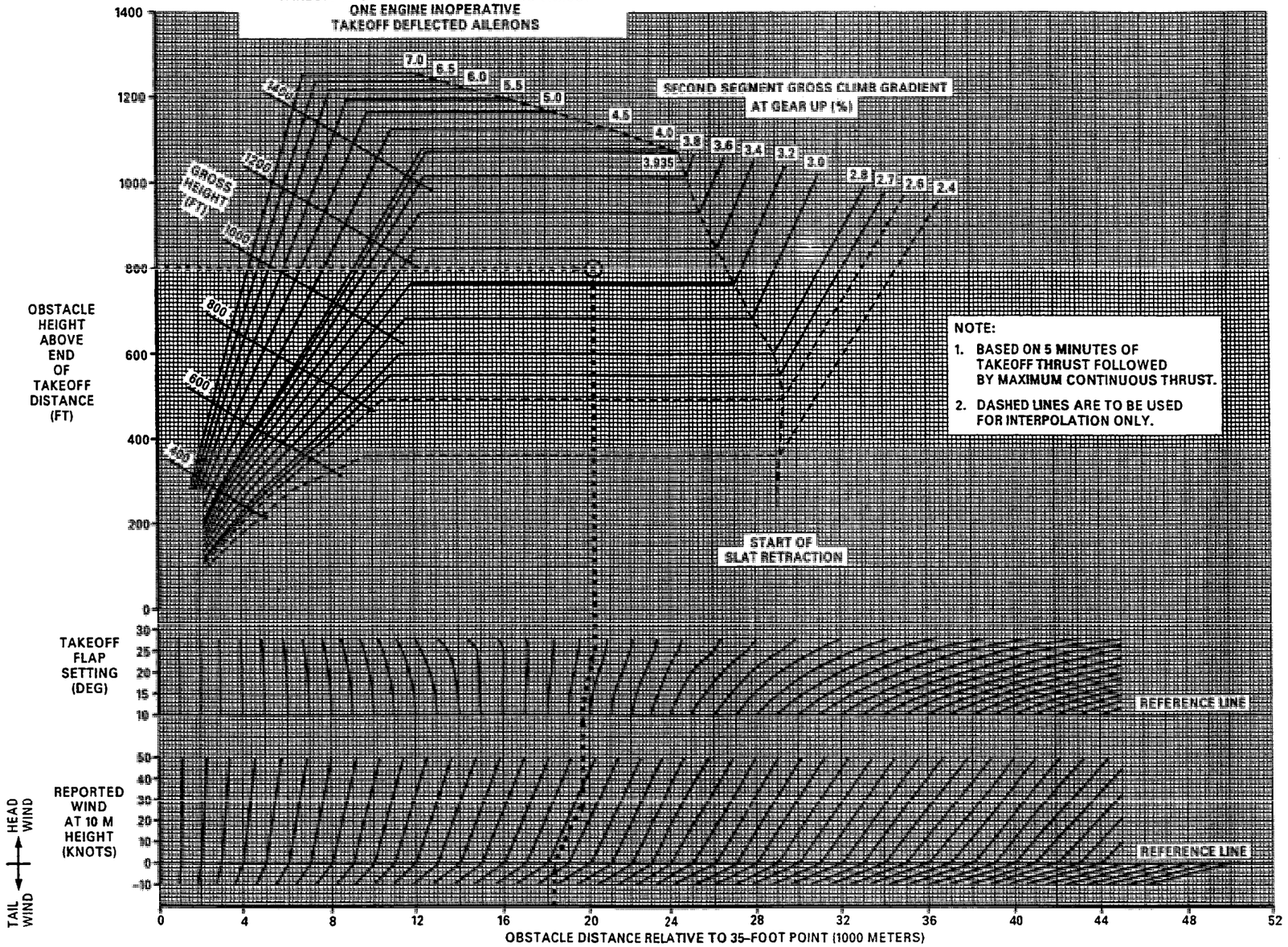
OBSTACLE CLEARANCE TAKEOFF FLIGHT PATH

CF6–80C2D1F ENGINES
TAKEOFF AND MAXIMUM CONTINUOUS THRUST
ONE ENGINE INOPERATIVE
TAKEOFF DEFLECTED AILERONS



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 11-2, DATED 5-3-93

DB1-4-1115

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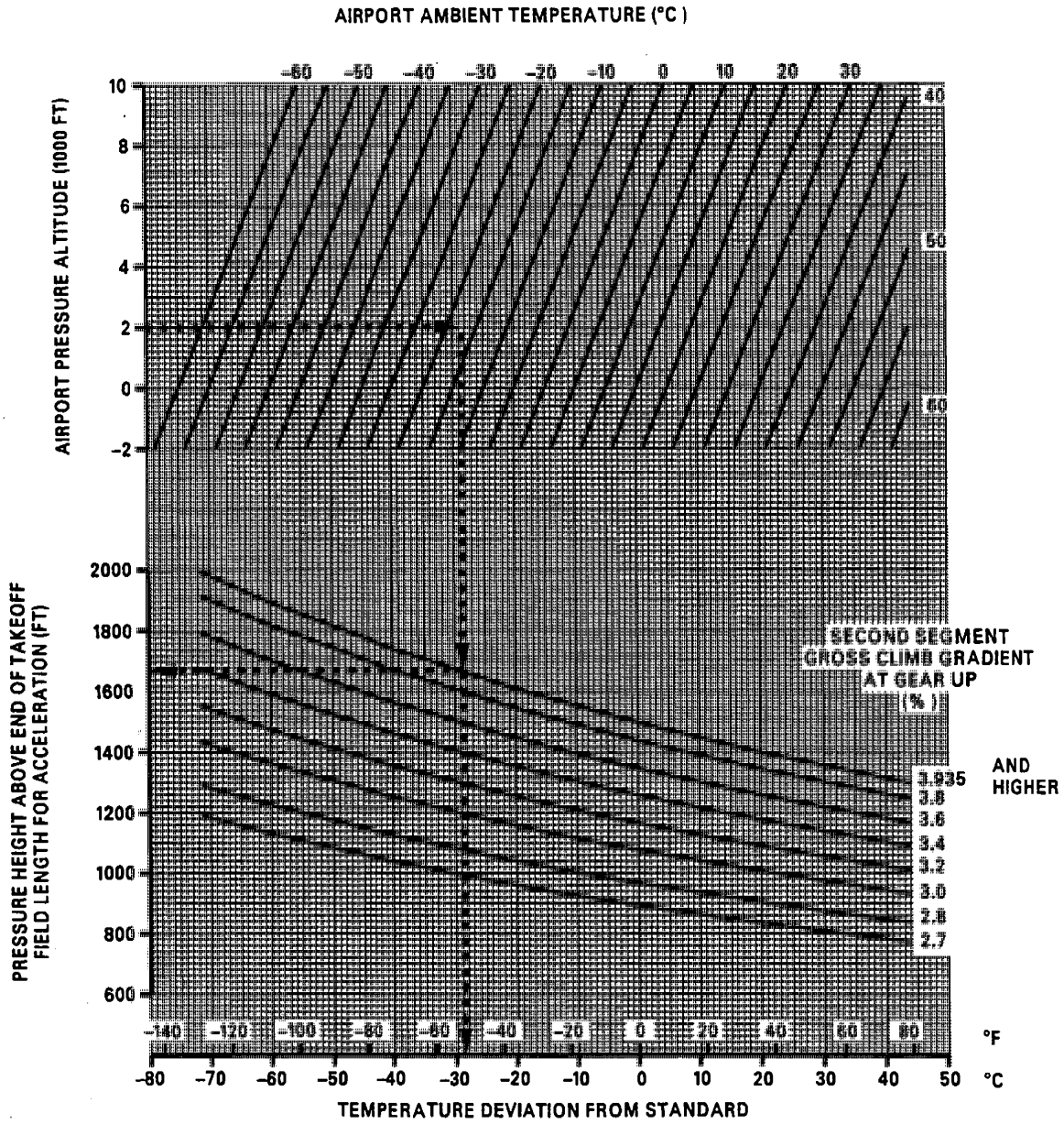
PRESSURE HEIGHT FOR ACCELERATION WITH OBSTACLE CLEARANCE

TAKEOFF THRUST SLATS EXTENDED FLAPS 10° TO 28°
CF6-80C2D1F ENGINES
TAKEOFF DEFLECTED AILERONS

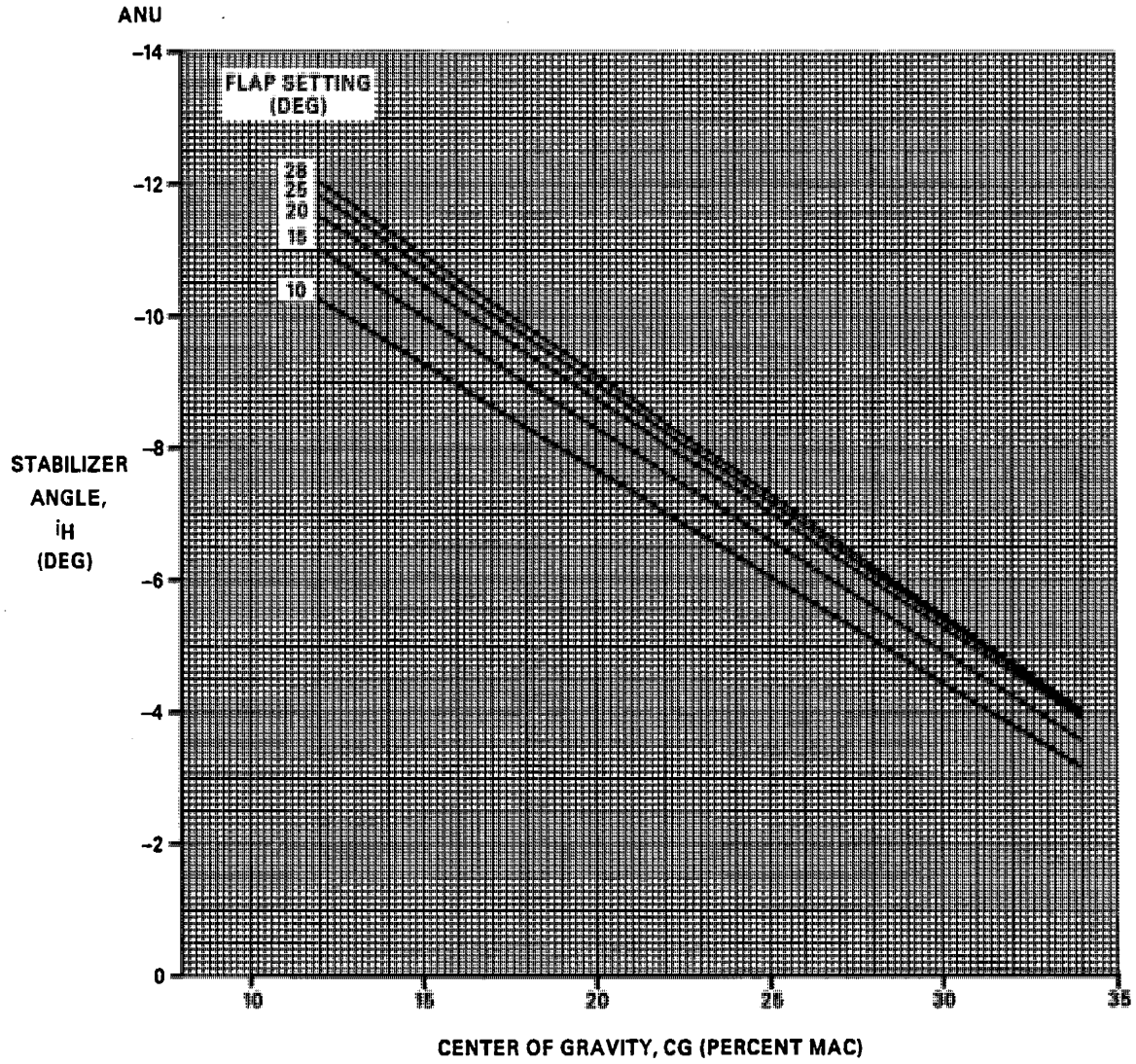
SIMPLIFIED PROCEDURE
AT MINIMUM PRESSURE HEIGHT
FOR ACCELERATION OF 786 FT
AN OBSTACLE HEIGHT OF 356 FT
CAN ALWAYS BE CLEARED



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 12-1, DATED 12-2-96 DB1-4-1116A

STABILIZER SETTING FOR TAKEOFF

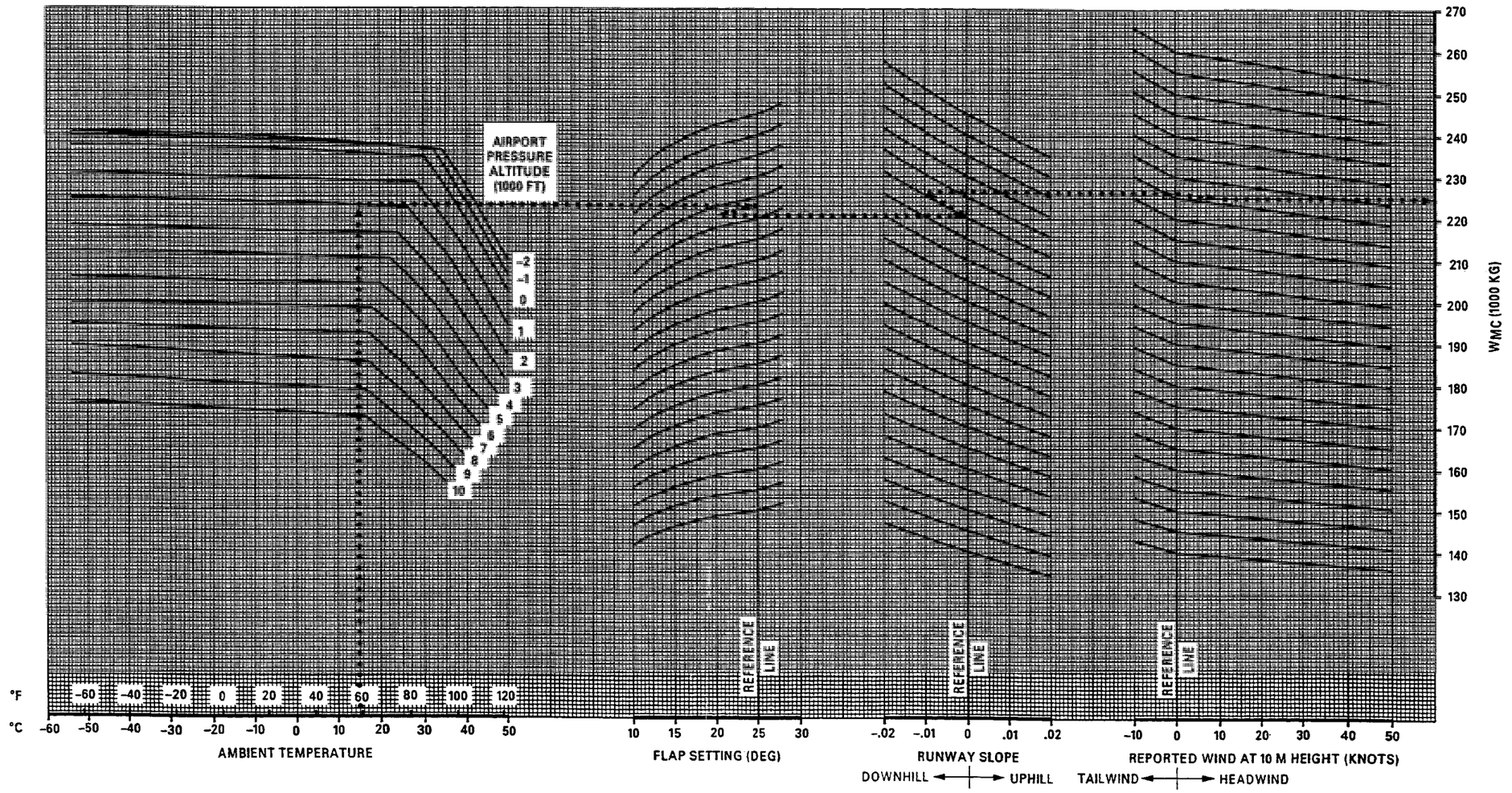
TAKEOFF DEFLECTED AILERONS



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4, PAGE 13-2, DATED 4-14-92 DB1-4-1117

WMC
MAXIMUM WEIGHT AT WHICH MINIMUM CONTROL SPEEDS AFFECT TAKEOFF SPEEDS AND TAKEOFF FIELD LENGTHS

CF6-80C2D1F ENGINES
APPLICABLE FOR ALL ENGINE BLEEDS
SLATS EXTENDED
TAKEOFF DEFLECTED AILERONS



CAG(IGDS) DATA SOURCE: MDC-K0031, APPENDIX 15, SECTION 4A, PAGE 8-1, DATED 11-19-92

DB1-4-1118

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