Safety Regulation Group

Civil Aviation Authority

CAP 697

CAA JAR-FCL Examinations

Flight Planning Manual

Second Edition July 2006

www.caa.co.uk

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Revision History

1st Edition **August 1999**

CAP 697, CAA JAR-FCL Flight Planning Manual, was produced to support training and examinations in JAR-FCL Subject 033 - Flight Planning and Monitoring for Aeroplanes.

2nd Edition **July 2006**

This edition has been upgraded with digitised graphics, definitions and conversions have been rationalised, and errors identified in the first edition have been corrected.

2nd Edition (corrected) **September 2006**

Since the publication of the second edition, some errors and omissions have been identified. The corrections are as follows:

Section/Aircraft	Page	Correction
2/SEP	3	Fig 2.1 Example – distance to climb; '38' corrected to '36'
3/MEP1	8	Paragraph 7.1 d) last word; 'climb' corrected to 'descent'
4/MRJT	5	Fig 4.3.1a – Landing weight and Fuel required scales; 'Kkg' corrected to 'kg'
4/MRJT	6	Fig 4.3.1b – '50 kt' values added to wind scale
4/MRJT	14	Fig 4.3.4 – Distance scale and title corrected to read from '0 to 1000 NM'
4/MRJT	16	Fig 4.3.6 – Alternate aerodrome weight grid corrected to '1000 kg'
4/MRJT	74	Fig 4.7.1b – Second line of notes; '20%' corrected to '18%'

The affected pages are identified by the word (corr.) after the page date.

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Section 1 General Notes

1 Introduction

Important Notice

1.1 The data sheets in this manual are produced to support training and examinations in JAR-FCL Subject 033 - Flight Planning and Monitoring for Aeroplanes.

1.2 The data contained within these sheets are for **training and examination purposes only**. The data must not be used for any other purpose and specifically, **are not to be used for the purpose of planning activities associated with the operation of any aeroplane in use now or in the future**.

2 Aircraft Description

2.1 The aeroplanes used in these data sheets are of generic types related to the classes of aeroplane on which the appropriate examinations are based.

2.2 Candidates must select the correct class of aeroplane for the question being attempted.

Generic Aeroplanes

Single-Engined Piston	certificated under CS 23 (Light Aeroplanes) Performance Class B	**SEP1**
Multi-Engined Piston	certificated under CS 23 (Light Aeroplanes) Performance Class B	**MEP1**
Medium-Range Jet Transport	certificated under CS 25 (Large Aeroplanes) Performance Class A	**MRJT1**

2.3 The same set of generic aeroplanes will be utilised in the following subjects:

- 031 – Mass and Balance - Aeroplanes
- 032 – Performance – Aeroplanes
- 033 – Flight Planning and Monitoring – Aeroplanes

3 Layout of Data Sheets

3.1 Each set of data sheets will consist of an introduction that will contain some pertinent information relating to the aeroplane and the subject being examined. This data will include (but is not limited to) a list of abbreviations and some conversion factors.

3.2 This will be followed by a selection of graphs and/or tables that will provide coverage suitable for the syllabus being examined. A worked example will accompany each graph/table and will demonstrate its use.

4 Definitions

Definitions given in italics are not given in ICAO, or JAA or EASA documentation but are in common use.

Basic Empty Mass (Basic Mass)	*is the mass of an aeroplane plus standard items such as: unusable fuel and other unusable fluids; lubricating oil in engine and auxiliary units; fire extinguishers; pyrotechnics; emergency oxygen equipment; supplementary electronic equipment.*
Dry Operating Mass (DOM)	is the total mass of the aeroplane ready for a specific type of operation excluding usable fuel and traffic load. The mass includes items such as: i) Crew and crew baggage. ii) Catering and removable passenger service equipment. iii) Potable water and lavatory chemicals. iv) Food and beverages.
Maximum Structural Landing Mass (MSLM)	is the maximum permissible total aeroplane mass on landing in normal circumstances.
Maximum Structural Take-Off Mass (MSTOM)	is the maximum permissible total aeroplane mass at the start of the take-off run.
Maximum Structural Taxi Mass	*is the structural limitation of the mass of the aeroplane at commencement of taxi.*
Maximum Zero Fuel Mass (MZFM)	is the maximum permissible mass of an aeroplane with no usable fuel.
Operating Mass (OM)	*is the DOM plus fuel but without traffic load.*
Performance Limited Landing Mass (PLLM)	*is the landing mass subject to the destination aerodrome limitations.*
Performance Limited Take-Off Mass (PLTOM)	*is the take-off mass subject to departure aerodrome limitations.*
Regulated Landing Mass (RLM)	*is the lowest of the 'performance limited' and 'structural limited' landing mass.*

Regulated Take-Off Mass (RTOM)	*is the lowest of the 'performance limited' and 'structural limited' TOM.*
Take-Off Mass (TOM)	is the mass of the aeroplane including everything and everyone contained within it at the start of the take-off run.
Taxi Mass	*is the mass of the aeroplane at the start of the taxi (at departure from the loading gate). Sometimes referred to a Ramp Mass.*
Traffic Load	is the total mass of passengers, baggage and cargo, including any 'non-revenue' load.
Zero Fuel Mass (ZFM)	*is DOM plus traffic load but excluding fuel.*

N.B. Within these data sheets the term 'weight' should be considered to have the same meaning as 'mass'.

5 Conversions

The following conversions, based on those in ICAO Annex 5, are satisfactory for use in JAR-FCL examinations in 030 subjects.

5.1 Mass Conversions

Pounds (lb) to Kilograms (kg)	lb × 0.454
Kilograms (kg) to Pounds (lb)	kg × 2.205

5.2 Volumes (Liquid)

Imperial Gallons to Litres (l)	Imp. Gal × 4.546
US Gallons to Litres (l)	US Gal × 3.785

5.3 Lengths

Feet (ft) to Metres (m)	Feet × 0.305

5.4 Distances

Nautical mile (NM) to Metres (m)	NM × 1852.0

Section 2 Single-Engined Piston Aeroplane (SEP1)

1 Aeroplane Details

The aeroplane is a monoplane with a single reciprocating engine and a constant speed propeller. It has a retractable undercarriage.

MTOM	3,650 lb
MLM	3,650 lb
Maximum fuel load	74 US gallons
Fuel Density	6 lb per US gallon (unless otherwise specified)

2 Fuel, Time and Distance to Climb

2.1 Calculation Method

a) Enter the graph at the ambient temperature of the aerodrome (or start of climb) and travel vertically to intersect the aerodrome (or start of climb) Pressure Altitude grid-line.

b) From this grid-line move horizontally right to intersect the aeroplane mass grid-line, interpolating if necessary.

c) From this point drop vertically to read the time taken to climb from the upper scale, fuel used on the climb from the middle scale and the air distance from the bottom scale.

d) Enter the graph at the ambient temperature at the top of climb and travel vertically to intersect the top of climb Pressure Altitude grid-line.

e) From this grid-line move horizontally right to intersect the aeroplane mass grid-line, interpolating if necessary.

f) From this point drop vertically and read the time taken to climb from the upper scale, fuel used on the climb from the middle scale and the air distance from the bottom scale.

g) Subtract the values determined at c) above from those determined at f) above to obtain the values of the time taken to climb, the fuel used to climb and the air distance travelled in the climb.

2.2 Example

Aerodrome Pressure Altitude	5,653 ft
Aerodrome Ambient Temperature	+15°C
Cruise Pressure Altitude	11,500 ft
Cruise Ambient Temperature	-5°C
Initial Climb Weight	3,650 lb

2.3 Solution

Graphical values at the aerodrome altitude = 6.5 min; 2.5 US gal; Dist. 12.5 NAM.
Graphical values at the top of climb altitude = 18.0 min; 6.0 US gal; Dist. 36.0 NAM.
Values for the climb =11.5 min; 3.5 US gal; 23.5 NAM.

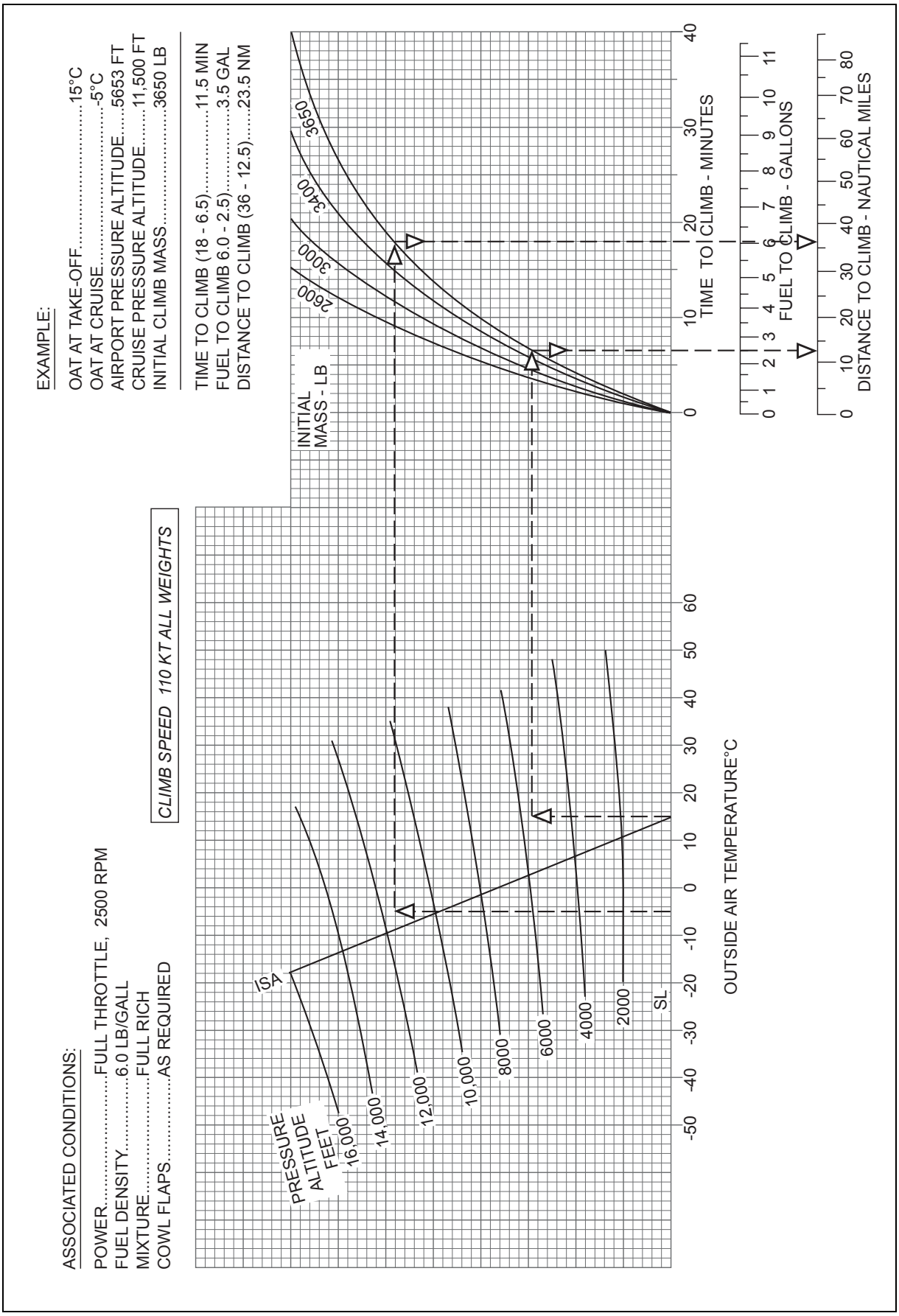

Figure 2.1 Time, Fuel and Distance to Climb

3 Recommended and Economy Cruise Power Settings

The following Tables cover cruises with 20°C lean mixture.

Table 2.2.1: 25.0 in. Hg (or full throttle); 2,500 RPM – recommended cruise power
Table 2.2.2: 25.0 in. Hg (or full throttle); 2,100 RPM – recommended cruise power
Table 2.2.3: 23.0 in. Hg (or full throttle); 2,300 RPM – recommended cruise power
Table 2.3.1: 21.0 in. Hg (or full throttle); 2,100 RPM – economy cruise power

3.1 Method of use

a) Select the correct table for the power setting.
b) Select the appropriate temperature deviation block(s).
c) Enter the block(s) at the appropriate cruising level.
d) If necessary, interpolate to extract the required data.

Table 2.2.1 **25.0 in. Hg (or full throttle) @ 2,500 rpm**
Off-peak EGT Cruise lean mixture @ cruise weight 3,400 lb

ISA Dev.	Press. Alt.	IOAT		Man. Press.	Fuel Flow		Airspeed	
°C	Feet	°C	°F	In. Hg	PPH	GPH	KIAS	KTAS
	0	-3	27	25.0	86.3	14.4	168	159
	2,000	-6	20	25.0	89.3	14.9	168	164
	4,000	-10	13	25.0	92.3	15.4	168	169
-20	6,000	-14	6	24.1	89.8	15.0	164	170
	8,000	-18	-1	22.3	82.6	13.8	157	168
	10,000	-22	-8	20.6	76.0	12.7	150	165
	12,000	-26	-15	19.1	70.2	11.7	143	162
	14,000	-30	-23	17.7	65.5	10.9	135	158
	16,000	-35	-30	16.3	60.8	10.1	126	152
	0	17	63	25.0	82.9	13.8	163	160
	2,000	14	56	25.0	85.6	14.3	163	165
	4,000	10	50	25.0	88.5	14.8	163	170
0	6,000	6	42	24.1	86.1	14.4	159	171
	8,000	2	35	22.3	79.3	13.2	152	169
	10,000	-2	28	20.6	73.3	12.2	145	166
	12,000	-6	21	19.1	67.8	11.3	137	162
	14,000	-10	13	17.7	63.5	10.6	129	157
	16,000	-15	6	16.3	59.1	9.9	120	150
	0	37	99	25.0	79.5	13.3	158	161
	2,000	34	92	25.0	82.1	13.7	158	166
	4,000	30	86	25.0	84.7	14.1	158	171
+20	6,000	26	79	24.1	82.5	13.8	154	172
	8,000	22	71	22.3	76.2	12.7	147	169
	10,000	18	64	20.6	70.5	11.8	140	165
	12,000	14	57	19.1	65.5	10.9	132	161
	14,000	10	49	17.7	61.5	10.3	123	155
	16,000	5	42	16.3	57.5	9.6	113	146

Figure 2.2 Recommended Cruise Power Settings

NOTE 1: Full-throttle manifold pressure settings are approximate.

NOTE 2: Shaded areas represent operation with full throttle.

NOTE 3: Fuel flows are to be used for flight planning. Lean using the EGT.

Table 2.2.2 **25.0 in. Hg (or full throttle) @ 2,100 rpm**
Off-peak EGT Cruise lean mixture @ cruise weight 3,400 lb

ISA Dev.	Press. Alt.	IOAT		Man. Press.	Fuel Flow		Airspeed	
°C	Feet	°C	°F	In. Hg	PPH	GPH	KIAS	KTAS
-20	0	-3	26	25.0	63.8	10.6	148	140
	2,000	-7	19	25.0	66.4	11.1	149	145
	4,000	-11	12	25.0	68.9	11.5	149	150
	6,000	-15	5	24.3	68.3	11.4	147	152
	8,000	-19	-2	22.5	63.9	10.7	139	148
	10,000	-23	-9	20.8	60.1	10.0	132	144
	12,000	-27	-17	19.3	56.7	9.5	123	139
	14,000	-31	-24	17.9	54.5	9.1	113	132
	16,000	-35	-32	16.5	52.2	8.7	95	114
0	0	17	62	25.0	61.9	10.3	143	140
	2,000	13	55	25.0	64.2	10.7	143	145
	4,000	9	48	25.0	66.6	11.1	144	150
	6,000	5	41	24.3	66.1	11.0	141	152
	8,000	1	34	22.5	61.9	10.3	134	148
	10,000	-3	27	20.8	58.5	9.8	126	143
	12,000	-7	19	19.3	55.6	9.3	116	136
	14,000	-11	12	17.9	53.5	8.9	103	125
	16,000	-	-	-	-	-	-	-
+20	0	37	98	25.0	60.1	10.0	138	140
	2,000	33	91	25.0	62.1	10.4	138	145
	4,000	29	84	25.0	64.4	10.7	139	150
	6,000	25	77	24.3	63.9	10.7	136	151
	8,000	21	70	22.5	60.2	10.0	128	147
	10,000	17	63	20.8	56.8	9.5	119	141
	12,000	13	55	19.3	54.5	9.1	108	131
	14,000	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-

Figure 2.2 Recommended Cruise Power Settings (continued)

NOTE 1: Full-throttle manifold pressure settings are approximate.

NOTE 2: Shaded areas represent operation with full throttle.

NOTE 3: Fuel flows are to be used for flight planning. Lean using the EGT.

Table 2.2.3 **23.0 in. Hg (or full throttle) @ 2,300 rpm**
Off-peak EGT Cruise lean mixture @ cruise weight 3,400 lb

ISA Dev.	Press. Alt.	IOAT		Man. Press.	Fuel Flow		Airspeed	
°C	Feet	°C	°F	In. Hg	PPH	GPH	KIAS	KTAS
-20	0	-3	26	23.0	67.6	11.3	152	144
	2,000	-7	20	23.0	69.7	11.6	152	149
	4,000	-11	13	23.0	72.1	12.0	153	154
	6,000	-15	6	23.0	74.4	12.4	153	158
	8,000	-18	-1	22.4	73.8	12.3	150	160
	10,000	-23	-9	20.7	68.4	11.4	143	157
	12,000	-27	-16	19.2	63.8	10.6	135	153
	14,000	-31	-23	17.8	60.0	10.0	127	148
	16,000	-35	-31	16.4	56.3	9.4	117	141
0	0	17	62	23.0	65.4	10.9	147	145
	2,000	13	56	23.0	67.4	11.2	147	149
	4,000	9	49	23.0	69.4	11.6	148	154
	6,000	5	42	23.0	71.7	12.0	148	159
	8,000	2	35	22.4	71.1	11.9	145	160
	10,000	-3	27	20.7	66.2	11.0	137	157
	12,000	-7	20	19.2	61.8	10.3	129	152
	14,000	-11	13	17.8	58.5	9.8	120	146
	16,000	-15	5	16.4	55.3	9.2	109	137
+20	0	37	98	23.0	63.2	10.5	142	145
	2,000	33	92	23.0	65.1	10.9	143	149
	4,000	29	85	23.0	67.1	11.2	143	154
	6,000	25	78	23.0	69.0	11.5	142	158
	8,000	22	71	22.4	68.5	11.4	140	160
	10,000	17	63	20.7	64.0	10.7	132	156
	12,000	13	56	19.2	60.0	10.0	123	151
	14,000	9	48	17.8	57.1	9.5	113	142
	16,000	-	-	-	-	-	-	-

Figure 2.2 Recommended Cruise Power Settings (continued)

NOTE 1: Full-throttle manifold pressure settings are approximate.

NOTE 2: Shaded areas represent operation with full throttle.

NOTE 3: Fuel flows are to be used for flight planning. Lean using the EGT.

Table 2.3.1 **21.0 in. Hg (or full throttle) @ 2,100 rpm**
Off-peak EGT Cruise lean mixture @ cruise weight 3,400 lb

ISA Dev.	Press. Alt.	IOAT		Man. Press.	Fuel Flow		Airspeed	
°C	Feet	°C	°F	IN. HG	PPH	GPH	KIAS	KTAS
-20	0	-4	25	21.0	52.7	8.8	126	120
	2,000	-8	18	21.0	54.0	9.0	128	125
	4,000	-11	12	21.0	55.4	9.2	130	130
	6,000	-15	5	21.0	56.9	9.5	131	136
	8,000	-19	-2	21.0	58.9	9.8	132	141
	10,000	-23	-9	20.8	60.1	10.0	132	144
	12,000	-27	-17	19.3	56.7	9.5	123	139
	14,000	-31	-24	17.9	54.5	9.1	113	132
	16,000	-35	-32	16.5	52.2	8.7	95	114
0	0	16	61	21.0	51.8	8.6	120	118
	2,000	12	54	21.0	53.1	8.9	123	124
	4,000	9	48	21.0	54.4	9.1	124	129
	6,000	5	41	21.0	55.7	9.3	125	134
	8,000	1	34	21.0	57.3	9.6	126	140
	10,000	-3	27	20.8	58.5	9.8	126	143
	12,000	-7	19	19.3	55.6	9.3	116	137
	14,000	-11	12	17.9	53.5	8.9	103	125
	16,000	-	-	-	-	-	-	-
+20	0	36	97	21.0	50.8	8.5	114	115
	2,000	32	90	21.0	52.1	8.7	116	121
	4,000	29	83	21.0	53.4	8.9	118	127
	6,000	25	77	21.0	54.7	9.1	119	132
	8,000	21	70	21.0	55.9	9.3	120	137
	10,000	17	63	20.8	56.8	9.5	119	141
	12,000	13	55	19.3	54.5	9.1	108	131
	14,000	-	-	-	-	-	-	-
	16,000	-	-	-	-	-	-	-

Figure 2.3 Economy Cruise Power Settings

NOTE 1: Full-throttle manifold pressure settings are approximate.

NOTE 2: Shaded areas represent operation with full throttle.

NOTE 3: Fuel flows are to be used for flight planning. Lean using the EGT.

4 Range Profile

The graph at Figure 2.4 provides a simple and rapid means of determining the still-air range (nautical miles) for the sample aeroplane. An example of the use of the graph is shown.

NOTE: The figures make allowance for the taxi, run-up and 45 minutes reserve fuel.

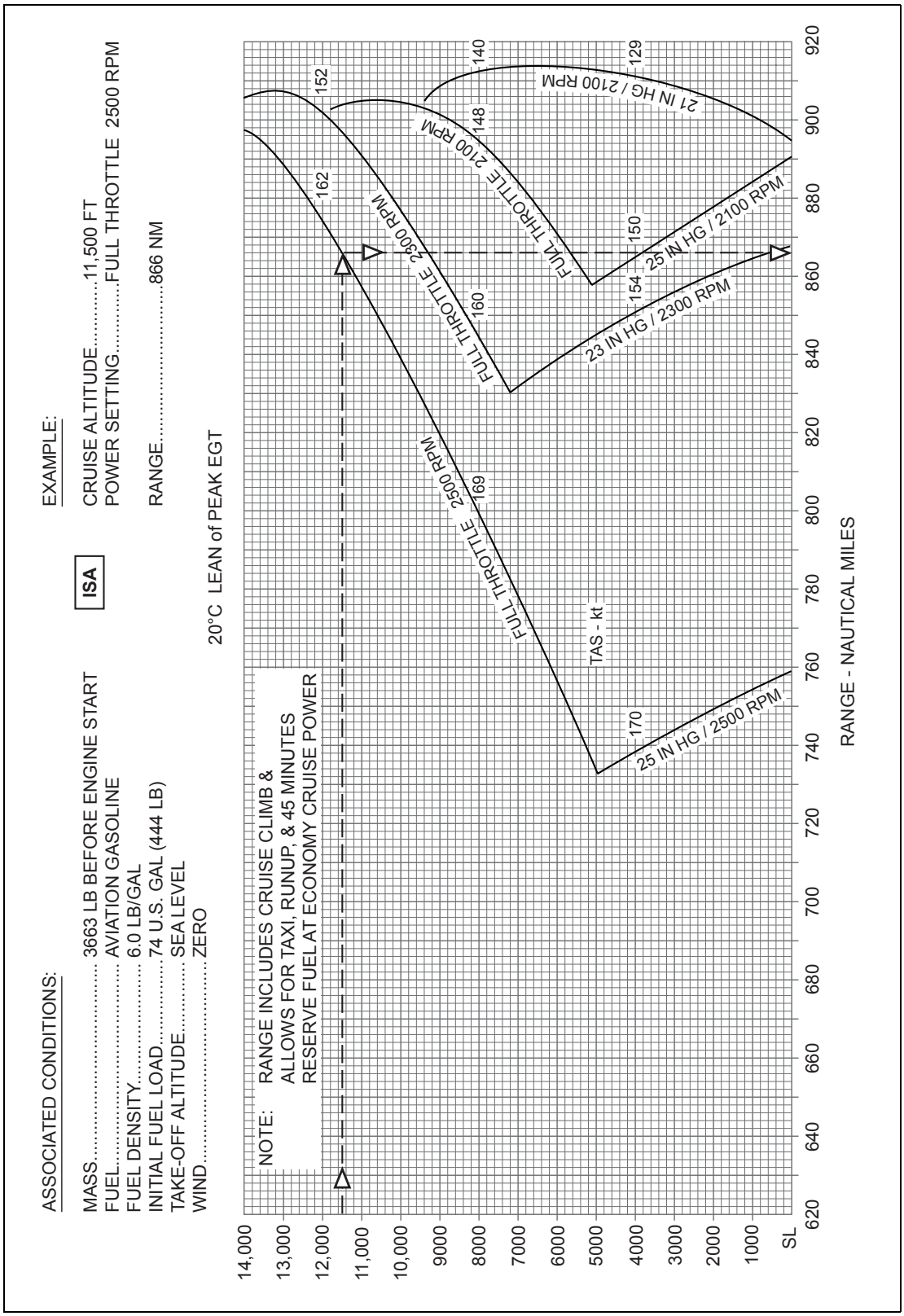

Figure 2.4 Range

5 Endurance Profile

The graph at Figure 2.5 provides a rapid method for determination of endurance for the sample aeroplane. An example is shown on the graph.

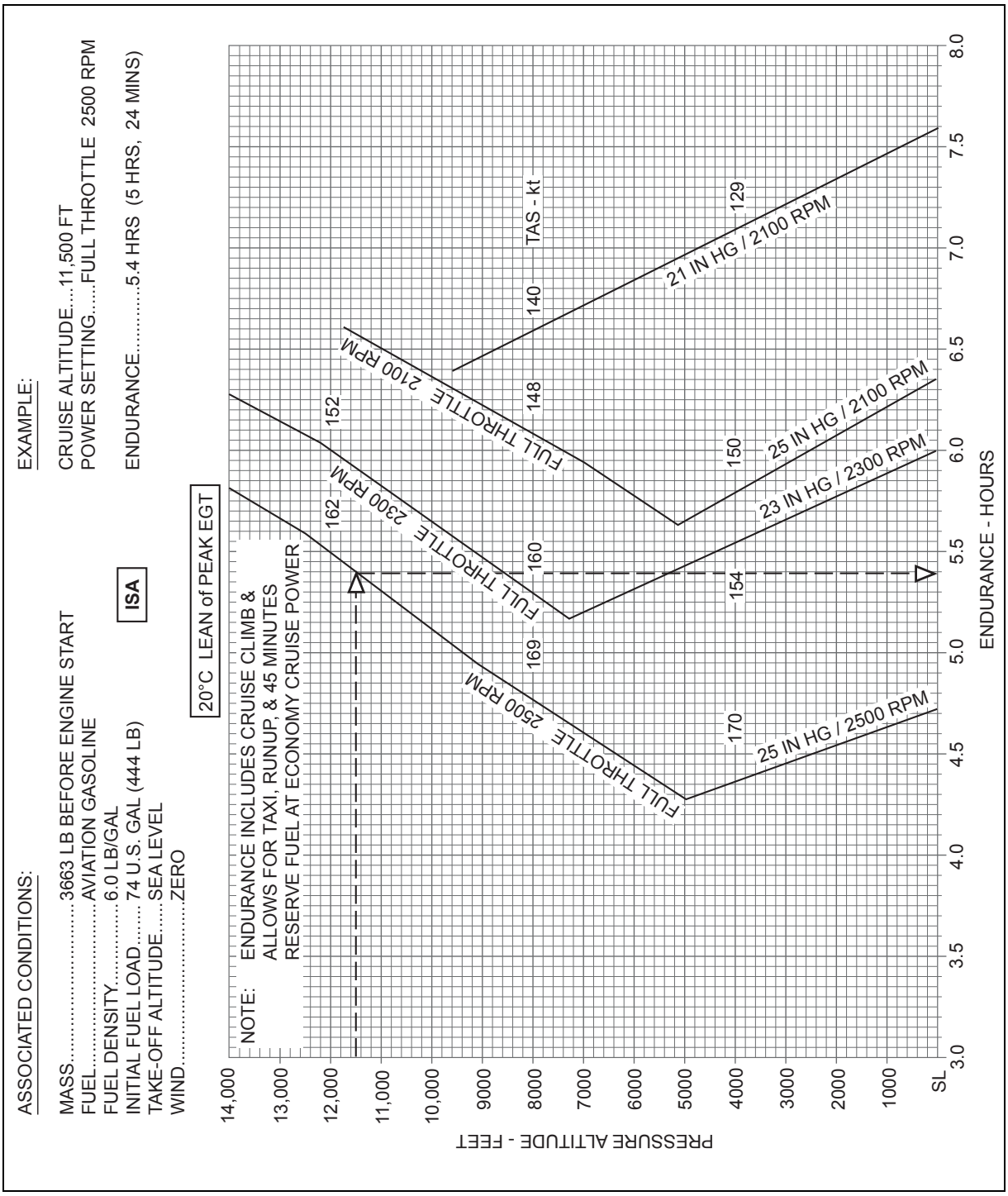

Figure 2.5 Endurance

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Section 3 Multi-Engined Piston Aeroplane (MEP1)

1 Aeroplane Details

The aeroplane is a monoplane with twin reciprocating engines and twin counter-rotating, constant speed propellers. It has a retractable undercarriage.

MTOM	4,750 lb
MZFM	4,470 lb
MLM	4,513 lb
Maximum fuel load	123 US gallons
Fuel Density	6 lb per US gallon (unless otherwise specified)

2 Fuel, Time and Distance to Climb

2.1 Calculation Method

a) Enter the graph (Figure 3.1) at the ambient temperature of the aerodrome (or start of climb) and travel vertically to intersect the aerodrome (or start of climb) Pressure Altitude grid-line.

b) From this grid-line move horizontally right to intersect the fuel, time and distance grid-lines in turn.

c) From each intersection drop vertically to read the appropriate value from the graph.

d) Enter the graph at the ambient temperature at the top of climb and travel vertically to intersect the top of climb Pressure Altitude grid-line.

e) From this grid-line move horizontally right to intersect the fuel, time and distance grid-lines in turn.

f) From each intersection drop vertically to read the appropriate value from the graph.

g) Subtract the values determined at c) above from those determined at f) above to obtain the values of the fuel used to climb, the time taken to climb, and the air distance travelled in the climb.

2.2 Example

Aerodrome Pressure Altitude	2,000 ft
Aerodrome Ambient Temperature	+21°C
Cruise Pressure Altitude	16,500 ft
Cruise Ambient Temperature	-13°C

2.3 Solution

Graphical values at the aerodrome altitude = 3.0 min; 2.0 US gal; Dist. 5.0 NAM.
Graphical values at the top of climb altitude = 27.0 min; 15.0 US gal; Dist. 50.0 NAM.
Values for the climb = 24.0 min; 13.0 US gal; 45.0 NAM.

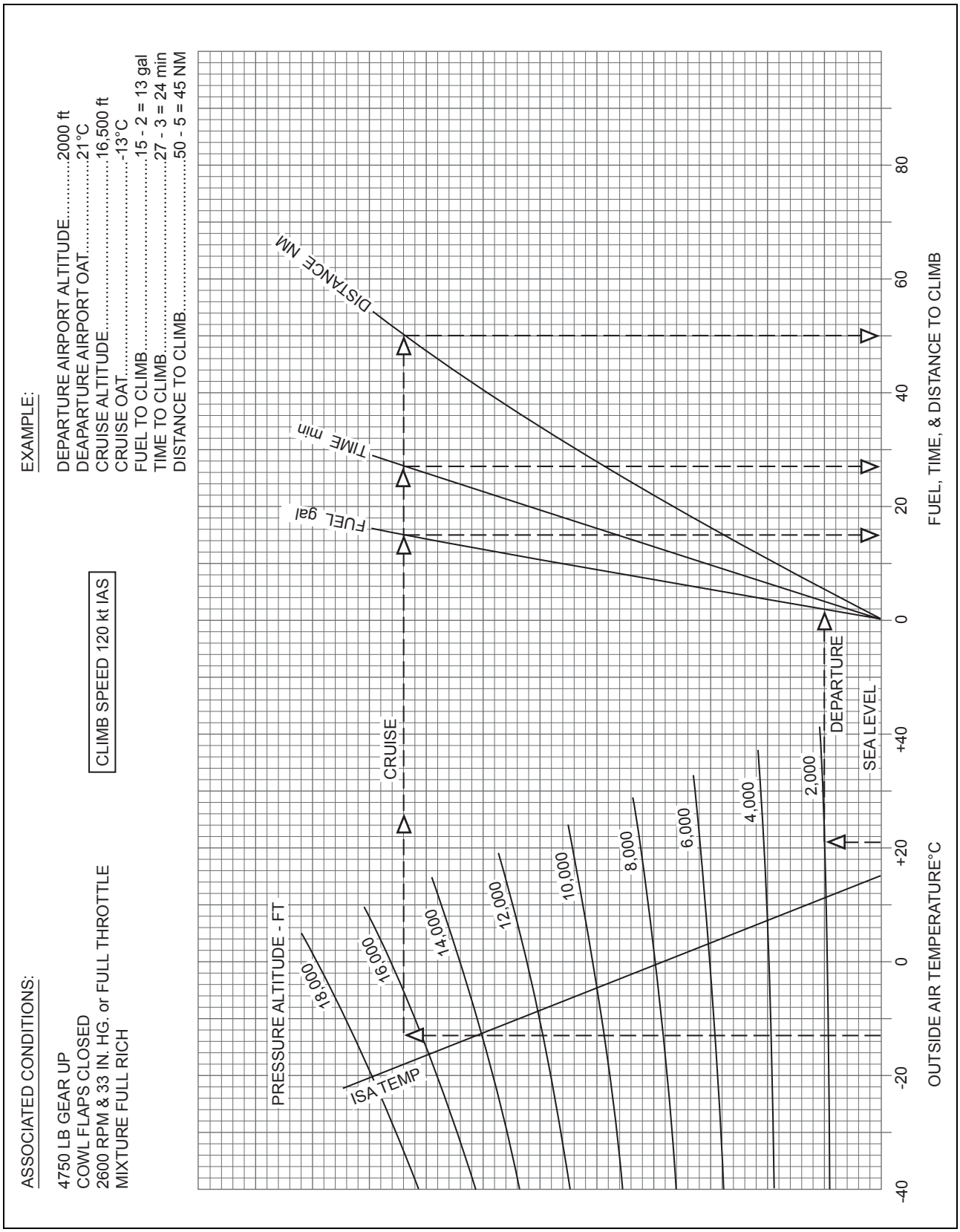

Figure 3.1 Climb

3 Range at Standard Temperatures

3.1 Calculation Method

a) Enter Figure 3.2 at the left vertical axis with the cruise Pressure Altitude.
b) Travel horizontally right to intersect the grid-line appropriate to the power setting (with or without reserve).
c) Drop vertically to read the still-air range.
d) To determine the wind effective range, multiply the still-air range by the groundspeed and divide by the TAS.
e) The TAS can be determined from Figure 3.4 using the cruise Pressure Altitude, standard temperature and the appropriate power setting.

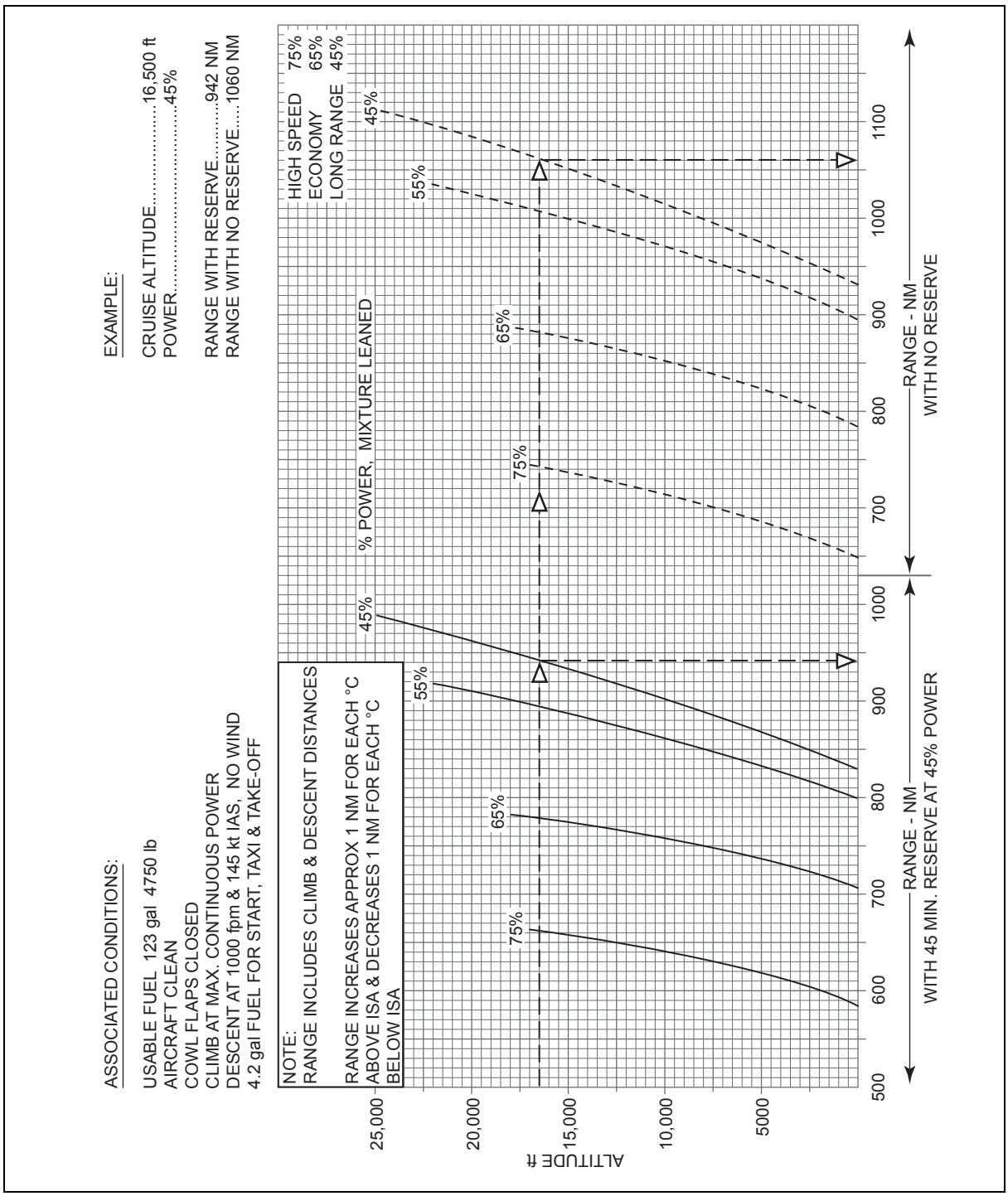

Figure 3.2 Range

4 Cruise Power Setting and Fuel Flow

4.1 Calculation Method

4.1.1 Enter the Power Setting table (Figure 3.3) at the cruise Pressure Altitude and travel horizontally right to the block appropriate to the power setting. At the top of the block read the fuel flow in US gallons per hour. In the same block select the column appropriate to the RPM and at the cruise Pressure Altitude read the manifold pressure.

4.1.2 These tables are for ISA deviation 0°C. To maintain constant power at temperature deviations other than 0° the manifold pressure must be corrected by adding 1% for each 6°C above the standard temperature or by subtracting 1% for each 6°C below the standard temperature.

The Cruise Manifold Pressure must not exceed 34 inches.

POWER		**75%**		**65%**			**55%**						**45%**					
FUEL FLOW		**29.0 GPH**		**23.3 GPH**			**18.7 GPH**						**16.0 GPH**					
RPM		**2,500**	**2,600**	**2,400**	**2,500**	**2,600**	**2,100**	**2,200**	**2,300**	**2,400**	**2,500**	**2,600**	**2,100**	**2,200**	**2,300**	**2,400**	**2,500**	**2,600**
PRESS ALT (ft)	**ISA 0°C**	**MANIFOLD ABSOLUTE PRESSURE (Hg in) (MAP)**																
0	15	34.0	33.0	33.8	32.0	31.0	31.2	30.3	29.4	28.2	27.2	26.3	27.1	26.4	25.5	24.3	23.3	22.5
2,000	11	33.8	32.7	33.2	31.7	30.7	30.5	29.7	28.8	27.8	26.8	26.0	26.4	25.8	24.6	23.7	22.8	22.1
4,000	7	33.6	32.4	32.8	31.5	30.5	30.0	29.2	28.3	27.4	26.4	25.6	25.8	25.0	24.0	23.2	22.3	21.8
6,000	3	33.4	32.2	32.5	31.2	30.3	29.7	28.8	28.0	27.0	26.2	25.3	25.3	24.5	23.5	22.8	21.9	21.5
8,000	-1	33.1	32.0	32.3	31.0	30.1	29.4	28.4	27.7	26.8	25.7	25.0	24.8	24.0	23.0	22.4	21.6	21.2
10,000	-5	33.0	31.9	32.0	30.9	30.0	-	28.3	27.5	26.5	25.5	24.7	24.4	23.7	22.8	22.0	21.4	21.0
12,000	-9	32.5	31.8	31.8	30.7	29.8	-	28.3	27.2	26.3	25.3	24.6	24.0	23.3	22.5	21.7	21.2	20.9
14,000	-13	-	31.7	-	30.5	29.7	-	-	27.1	26.1	25.2	24.4	-	23.0	22.3	21.4	21.1	20.8
16,000	-17	-	31.6	-	30.4	29.5	-	-	-	25.9	25.0	24.3	-	-	22.0	21.3	21.0	20.6
18,000	-21	-	-	-	-	29.4	-	-	-	-	25.0	24.2	-	-	-	21.2	20.9	20.5
20,000	-25	-	-	-	-	29.3	-	-	-	-	-	24.2	-	-	-	21.2	20.8	20.4
22,000	-28	-	-	-	-	-	-	-	-	-	-	24.1	-	-	-	-	-	20.4
MAX EGT		1,525°F		1,650°F														
24,000	-33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.4
25,000	-34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.4

Figure 3.3 Power Setting Table

5 True Airspeed

The graph at Figure 3.4 should be used to determine the true airspeed for the various combinations of ambient temperature, Pressure Altitude and power settings in the cruise configuration. The example on the graph illustrates the method of use.

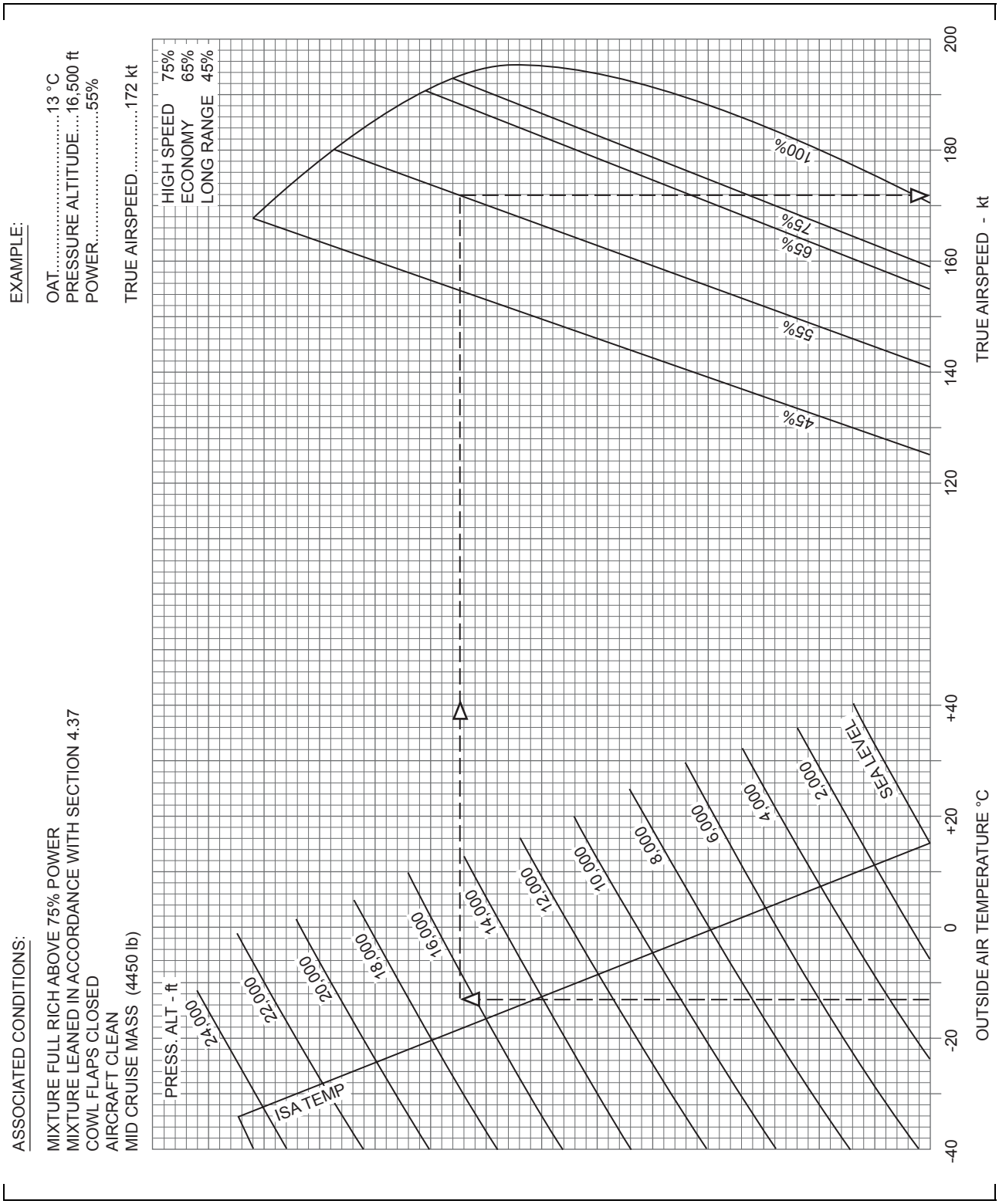

Figure 3.4 Speed v Power

6 Endurance

6.1 Method of Use

a) Enter the left vertical axis of Figure 3.5 at the cruise Pressure Altitude.

b) Move horizontally right to the appropriate power setting grid line – either the one with 45 minutes reserve (the Safe Endurance) or the one with no reserve (the Maximum Endurance).

c) From the intersection at b) travel vertically down to read the safe endurance in hours (or maximum endurance).

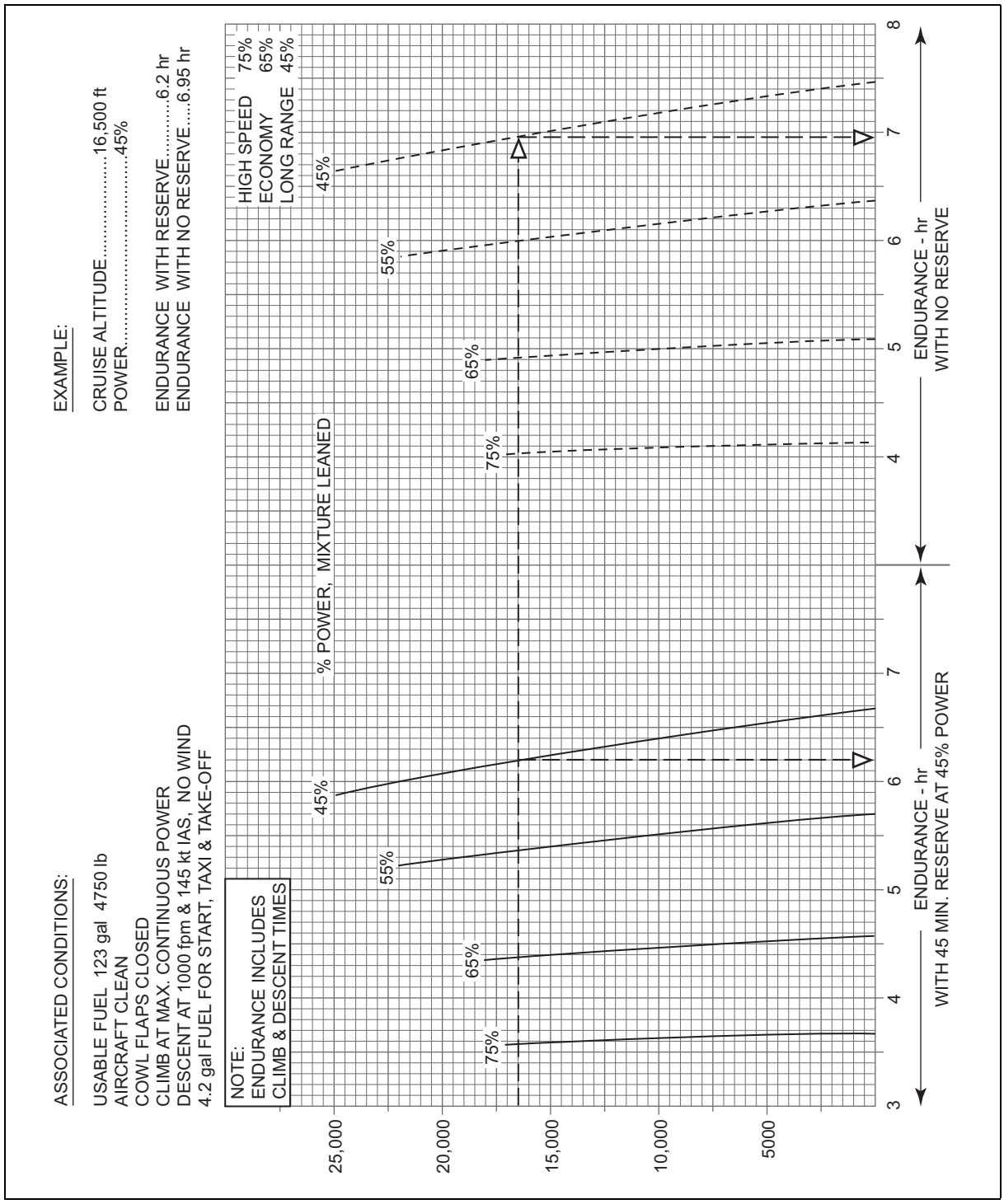

Figure 3.5 Endurance

7 Descent

7.1 Calculation Method

a) Enter Figure 3.6 with OAT at cruise altitude and move vertically to intersect the cruise Pressure Altitude.

b) From this intersection travel horizontally right to intersect the grid-lines in turn, then drop vertically to read the fuel used, time taken and air distance travelled.

c) The procedure at b) above must be done twice, once for the aerodrome (or end of descent) data and a second time for the cruising altitude data.

d) Subtract the values for the aerodrome (or end of descent) from the cruising altitude values to determine the values for the descent.

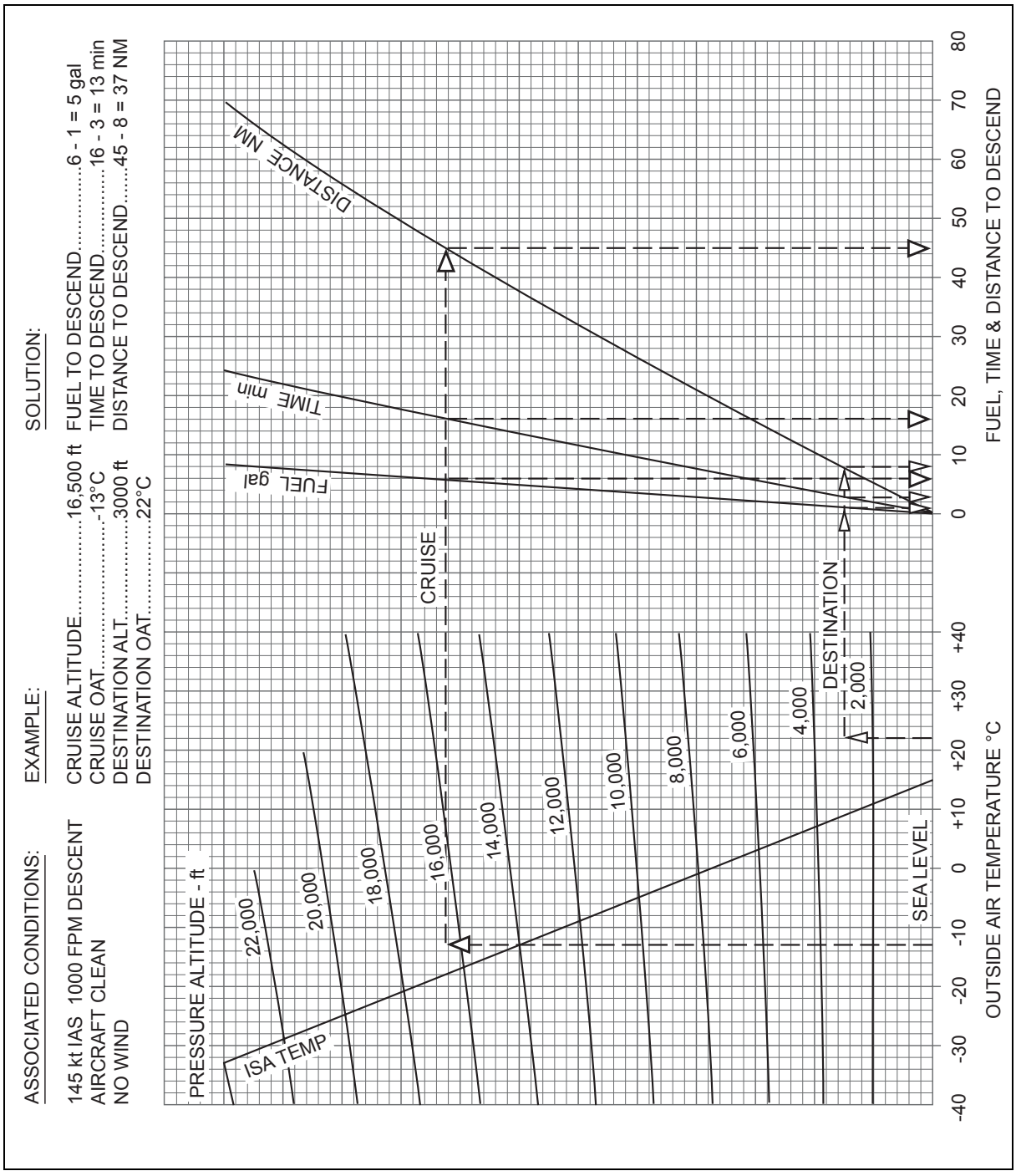

Figure 3.6 Fuel, Time and Distance to Descend

Section 4 Medium-Range Jet Transport Aeroplane (MRJT1)

1 Aeroplane Details

1.1 Aeroplane Data

- Monoplane
- Twin turbo-jet engines
- Retractable undercarriage

Structural Limits:

Maximum Taxi (Ramp) Mass	63,060 kg
Maximum Take-off Mass	62,800 kg
Maximum Landing Mass	54,900 kg
Maximum Zero Fuel Mass	51,300 kg
Maximum Fuel Load	5,311 US Gallons = 16,145 kg using 3.04 kg/gal

1.2 Constants

Fuel Density (unless otherwise specified):

3.04 kg/US gal
6.7 lb/US gal

2 Optimum Altitudes

2.1 Optimum Cruise Altitude Calculation Procedure (Figure 4.1)

a) Enter the graph with either the Brake Release Mass or the Cruise Mass on the appropriate scale. (56,800 kg Cruise Weight in the example).

b) Travel vertically to intersect the cruise profile graph line. (LRC in the example).

c) From this point move horizontally left to read the optimum cruise altitude. (33,500 ft in the example).

NOTE: Operating at 'off-optimum' altitude incurs the fuel mileage penalty listed below in the table.

Off-Optimum Condition	Fuel Mileage Penalty %	
	LRC or Mach 0.74	Mach 0.78
2,000 ft above	-1	-1
Optimum	0	0
2,000 ft below	-1	-2
4,000 ft below	-4	-4
8,000 ft below	-10	-11
12,000 ft below	-15	-20

Table 4.1 Off-Optimum Fuel Penalty

2.2 Short Distance Cruise Altitude Calculation Procedure (Figure 4.2)

a) Enter the graph with the trip distance (177 NM in the example)
b) Travel vertically to intersect the appropriate temperature deviation (ISA +20°C in the example).
c) Move horizontally right to the Brake Release Weight reference-line.
d) Parallel the grid-lines to intersect the vertical input at the Brake Release weight (52,000 kg in the example).
e) From this intersection continue horizontally right to read the cruise Pressure Altitude (28,000 ft in the example).

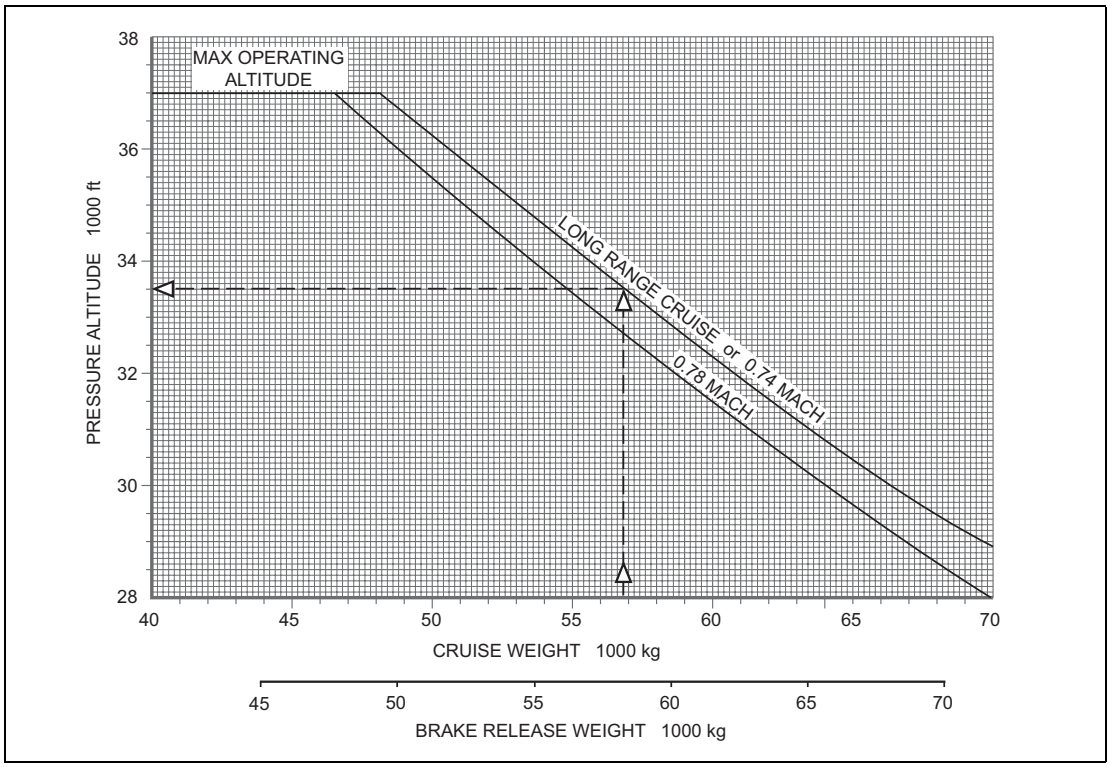

Figure 4.1 Optimum Altitude

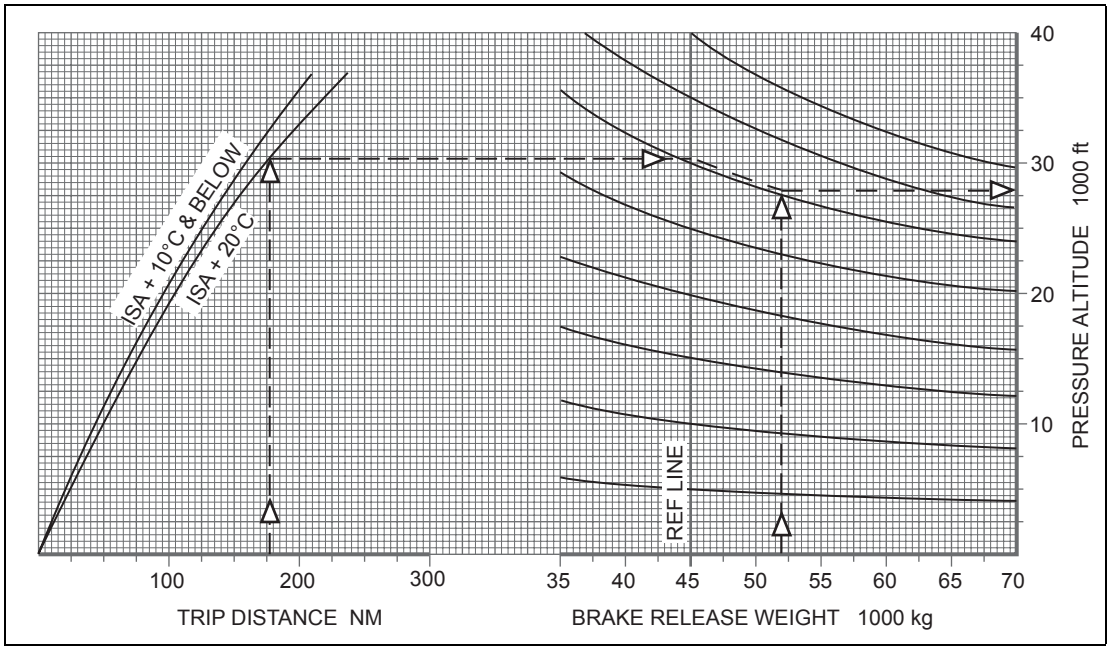

Figure 4.2 Short Distance Cruise Altitude

3 Simplified Fuel Planning

The Simplified Planning Charts permit the rapid determination the estimated trip time and the fuel required from the brakes release point. Charts are provided for the various cruise modes, as follows:

Figure 4.3.1 Long Range Cruise (LRC)

Figure 4.3.2 0.74 Mach Cruise

Figure 4.3.3 0.78 Mach Cruise

Figure 4.3.4 Low-Level 300 KIAS Cruise

Figure 4.3.5 Stepped Climb

Figure 4.3.6 Alternate Planning – LRC

These graphs are similar to each other in layout and use.

3.1 Simplified Planning Chart Corrections

a) Cost Index Adjustment

If the flight is planned to operate with the FMS in the 'ECON' mode, adjustments to the LRC trip fuel and time are necessary in order to account for the different speed profiles flown. The adjustments are given in the following table:

COST INDEX	FUEL ADJUSTMENT	TIME ADJUSTMENT %
0	-1	+4
20	+1	+1
40	+2	-1
60	+4	-2
80	+5	-3
100	+7	-4
150	+10	-5
200	+14	-7

b) Ground Operations

APU fuel flow 115 kg per hour
Taxi fuel 11 kg per minute

c) Altitude Selection

Operation 'off-optimum' altitude will result in fuel penalties (see table in paragraph 2.1, page 1).

d) Cruise

i) Increase trip fuel by 1% for operation with A.C. packs at high flow.

ii) Increase trip fuel for operation with anti-ice 'on' as follows:

Engine anti-ice only 70 kg/hour
Engine and wing anti-ice 180 kg/hour

e) Descent

Simplified Charts assume a descent at 0.74 M/250 KIAS and a straight-in approach.

i) For every additional minute of flaps down manoeuvre add 75 kg fuel.

ii) For engine anti-ice during descent add 50 kg.

f) Holding Fuel

Determine from the table at Figure 4.4.

3.2 Calculation Method

This example is shown in Figure 4.3.1a.

Given:

Trip Distance	350 NM
Cruise Altitude	29,000 ft
Estimated Landing Weight	30,000 kg
Average Wind Component	50 kt headwind
Temperature Deviation	ISA +20°C

a) Enter the graph at the trip distance (350 NM).

b) Travel vertically to the wind component reference-line.

c) Follow the grid-lines to reach the appropriate wind component (50 kt).

d) From this point continue vertically to intercept the appropriate Cruise Pressure Altitude grid line (29,000 ft).

e) From this intersection travel horizontally right to the Landing Weight grid reference-line.

f) Interpolate between the trade-lines for the appropriate Cruise Pressure Altitude and travel along this line from the reference-line to intersect the Landing Weight input (30,000 kg).

g) Continue horizontally right to the right vertical axis to read the fuel required (2,300 kg).

h) Return to the intersection at e) above and travel vertically to intersect the second Pressure Altitude grid at the Cruise Pressure Altitude.

i) Travel left from this intersection to the ISA Deviation reference-line.

j) Parallel the grid-lines to intersect the appropriate temperature deviation (ISA +20°C).

k) Continue horizontally left to read the trip time in hours from the left vertical axis (approximately 1.05 hr).

l) Apply the corrections in accordance with paragraph 3.1 as necessary.

NOTE: Additional allowances must be made if the climb, cruise or descent schedules are different from those listed.

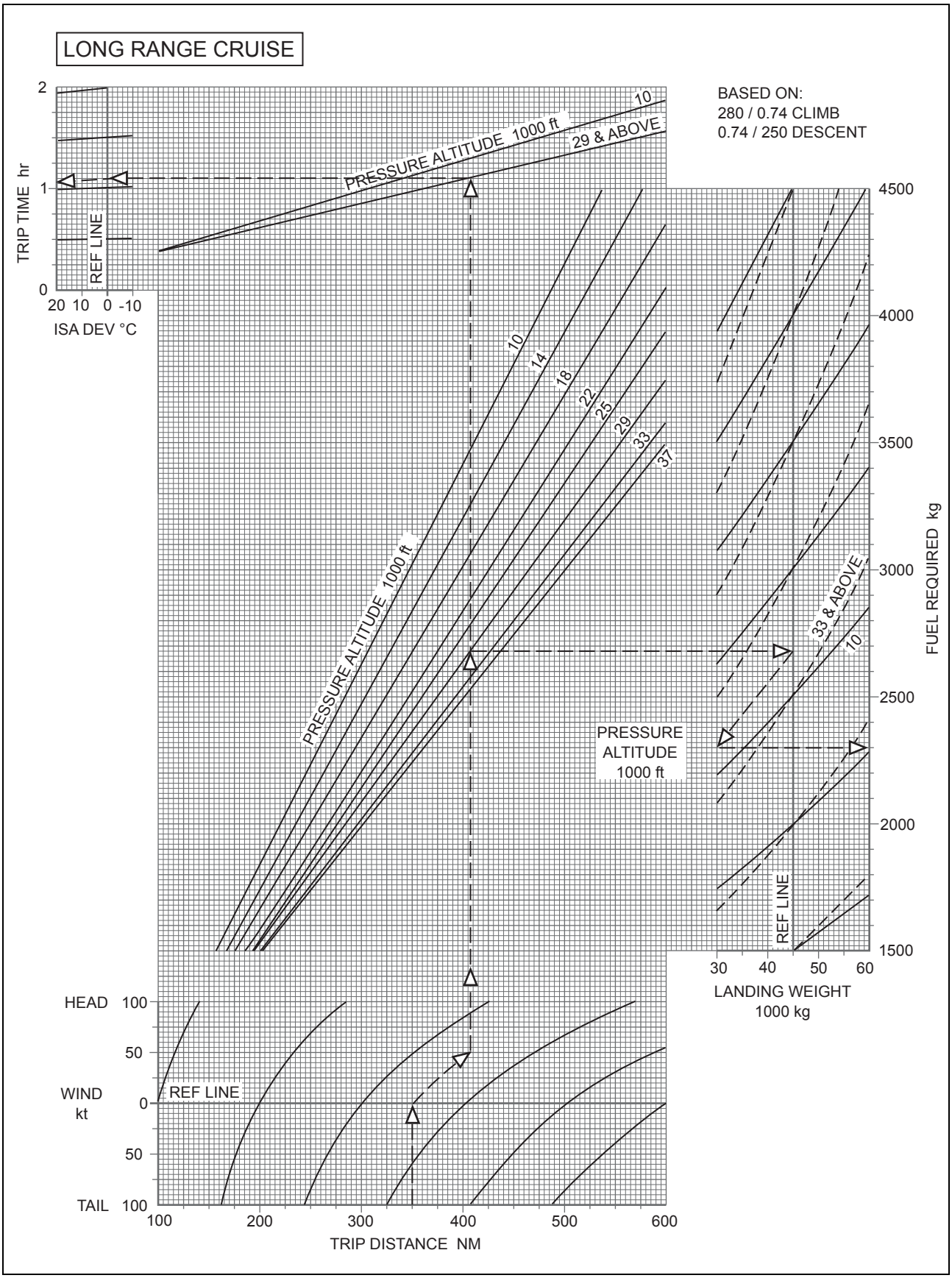

Figure 4.3.1a Simplified Flight Planning – Trip Distances 100 NM to 600 NM

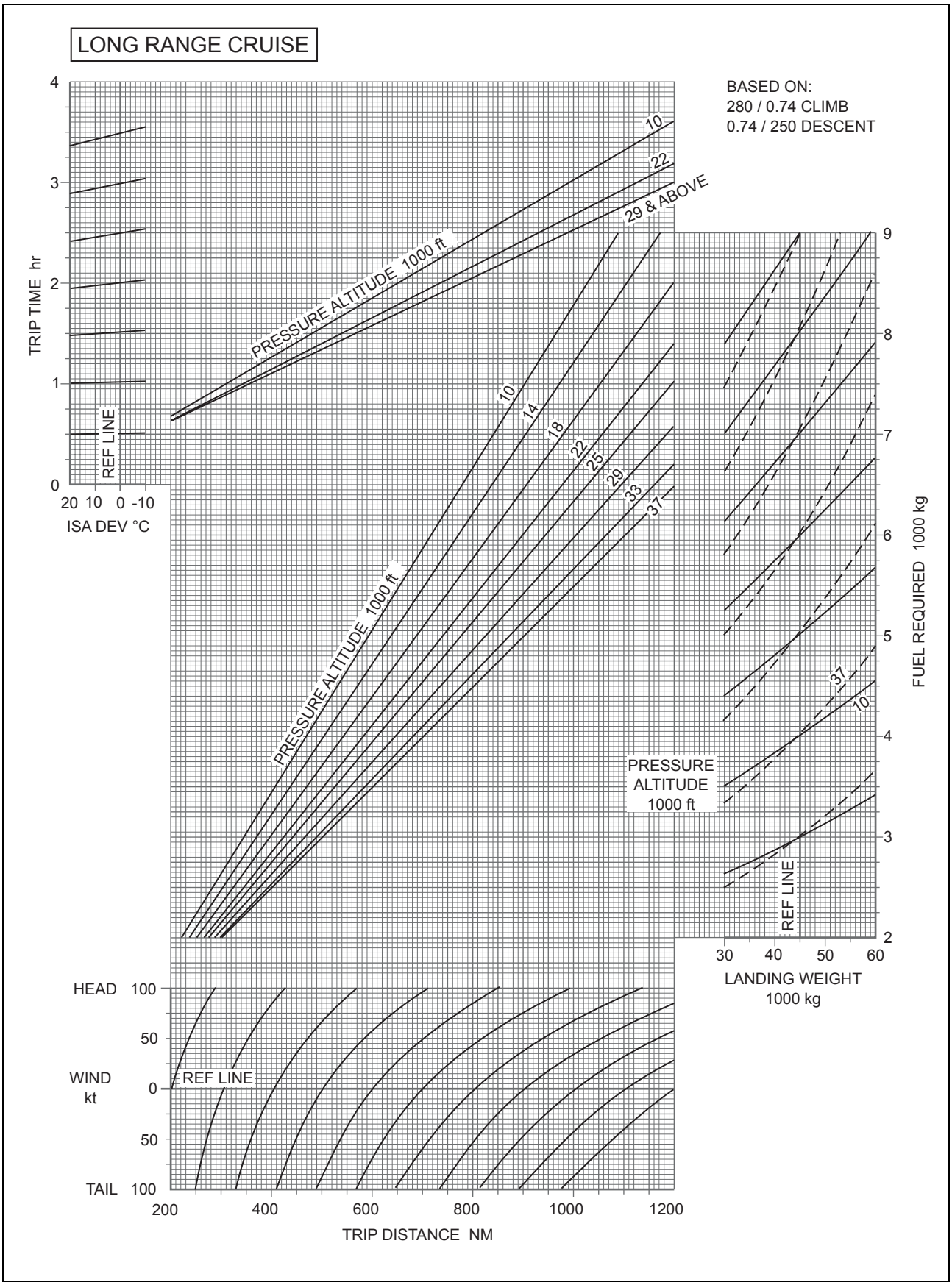

Figure 4.3.1b Simplified Flight Planning – Trip Distances 200 NM to 1,200 NM

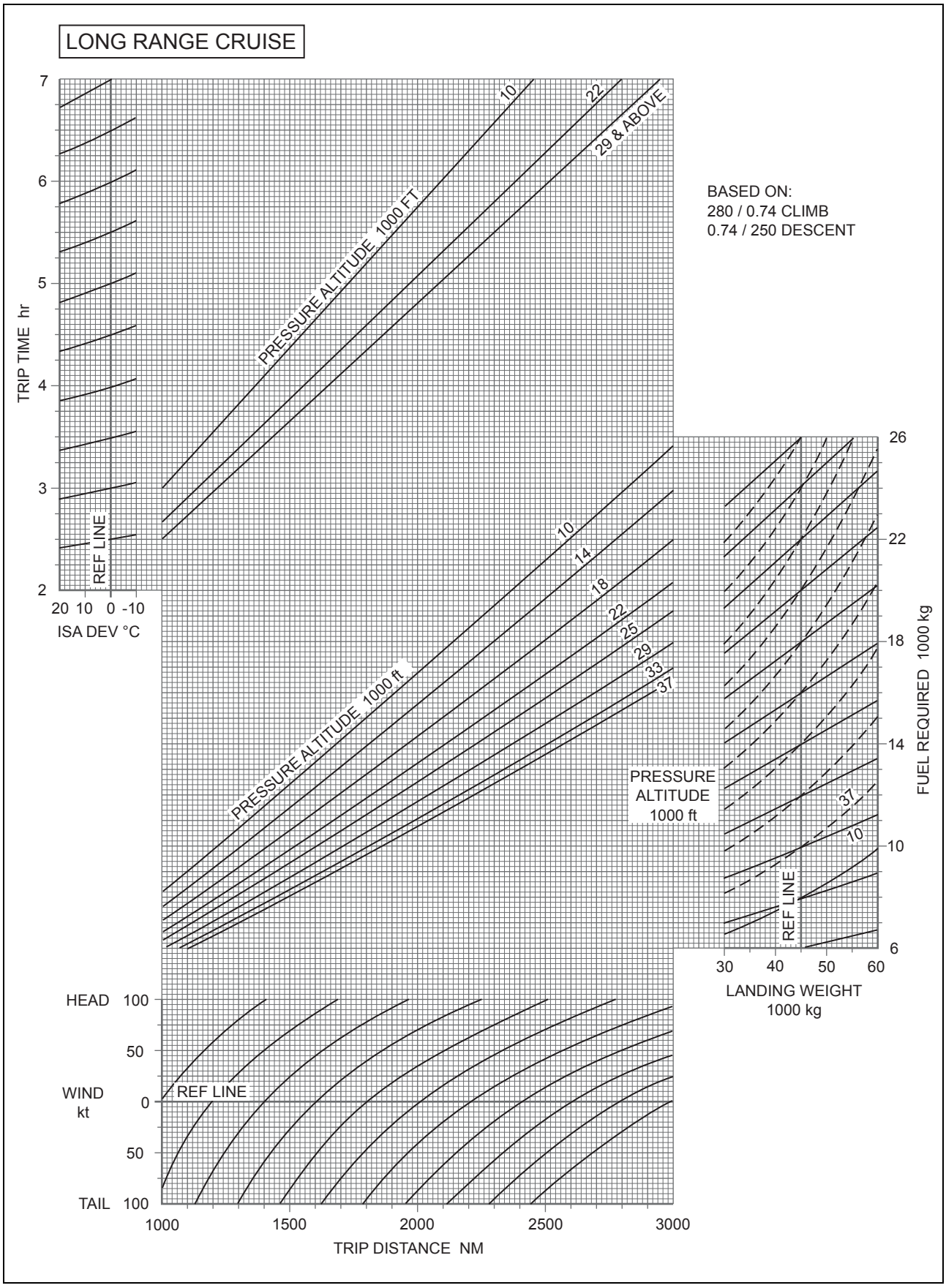

Figure 4.3.1c Simplified Flight Planning – Trip Distances 1,000 NM to 3,000 NM

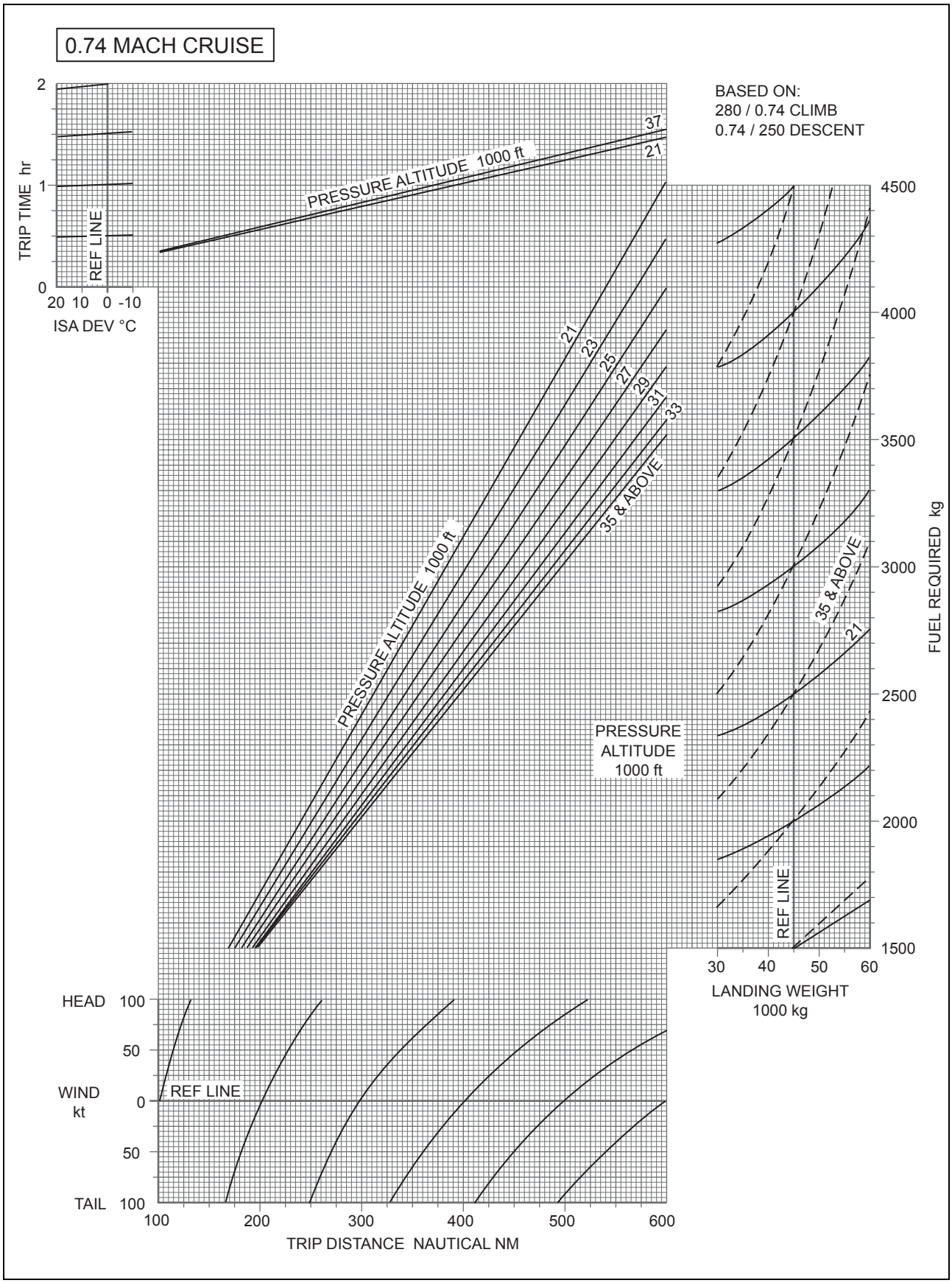

Figure 4.3.2a Simplified Flight Planning – Trip Distances 100 NM to 600 NM

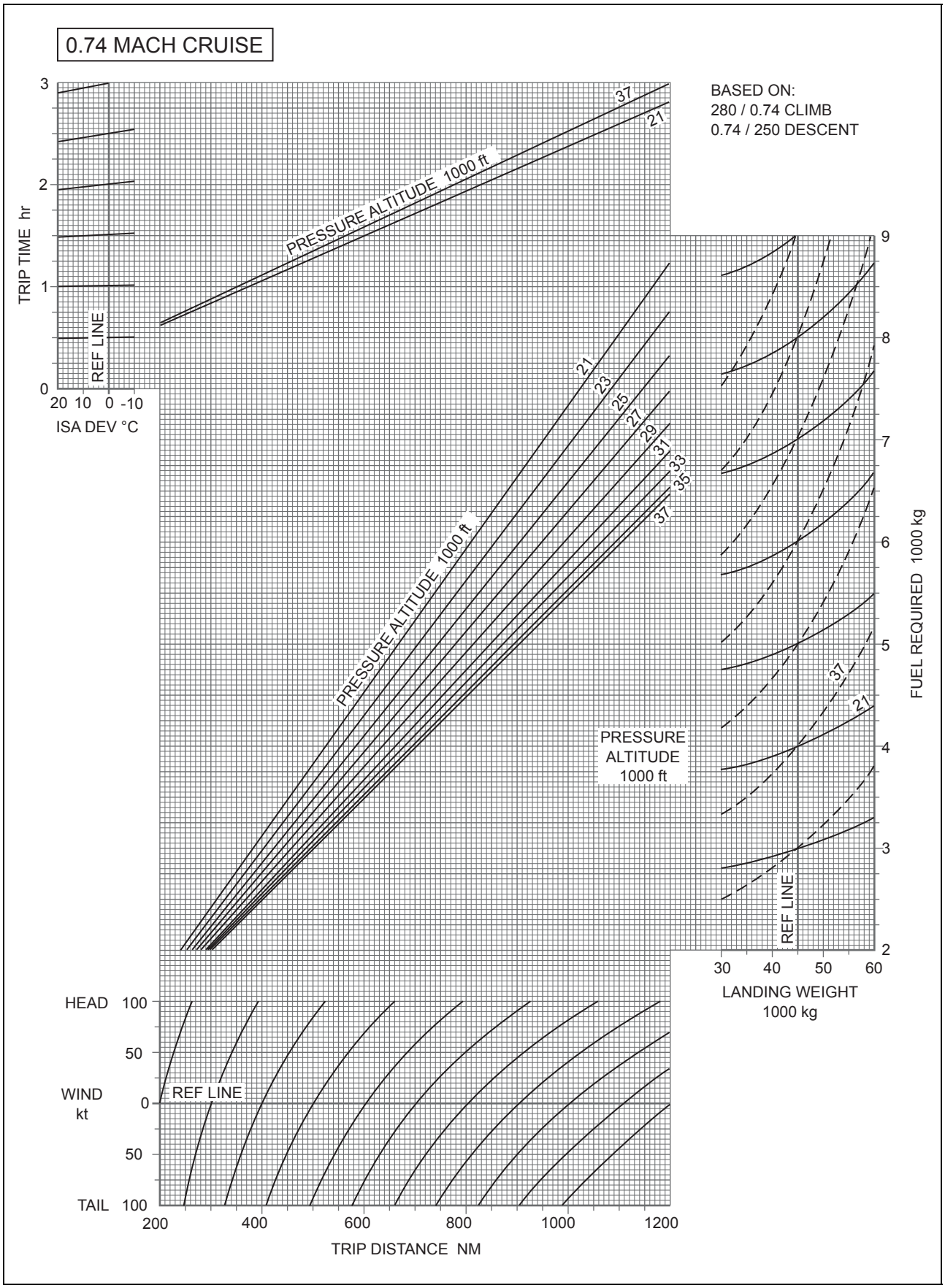

Figure 4.3.2b Simplified Flight Planning – Trip Distances 200 NM to 1,200 NM

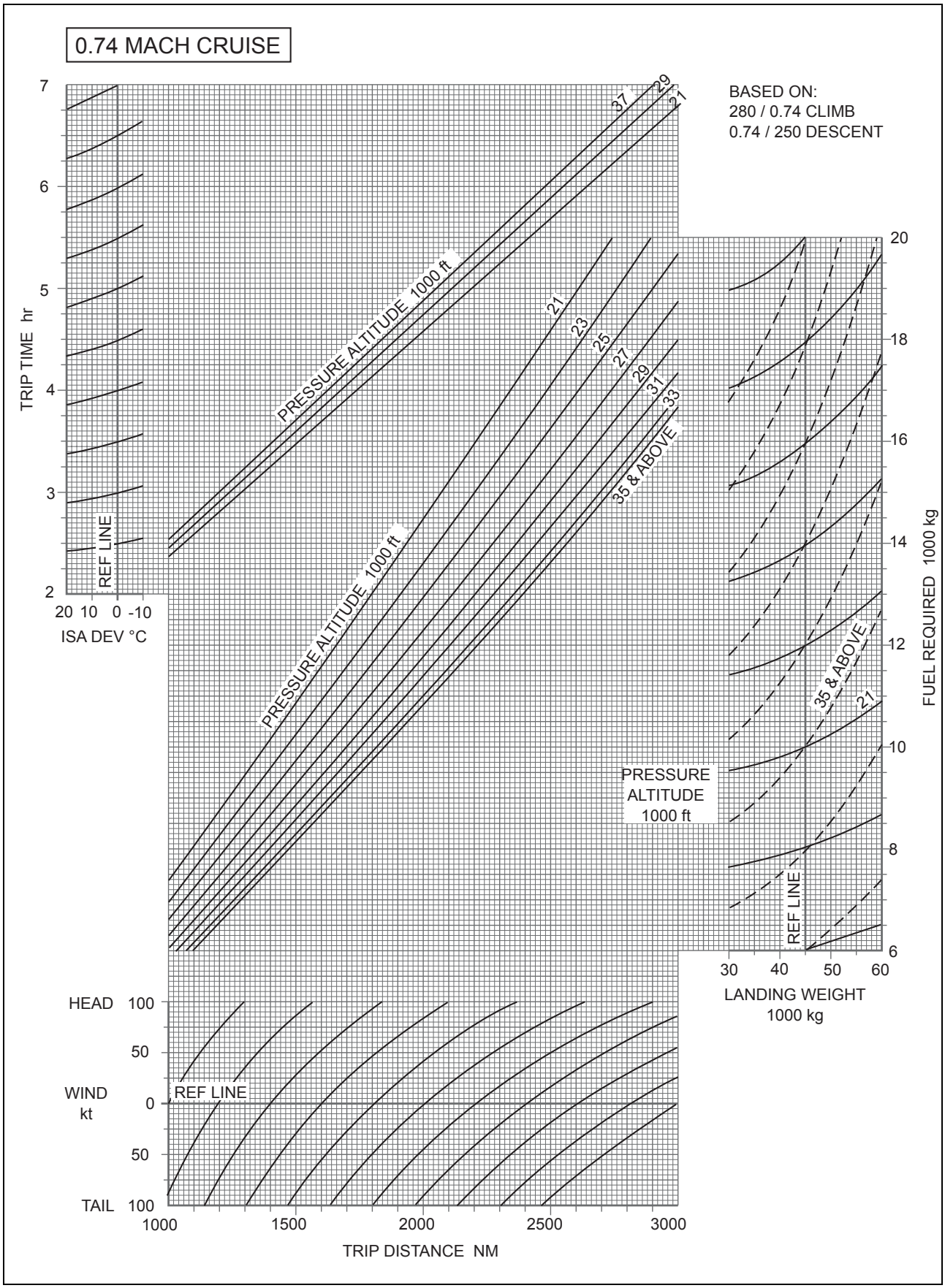

Figure 4.3.2c Simplified Flight Planning – Trip Distances 1,000 NM to 3,000 NM

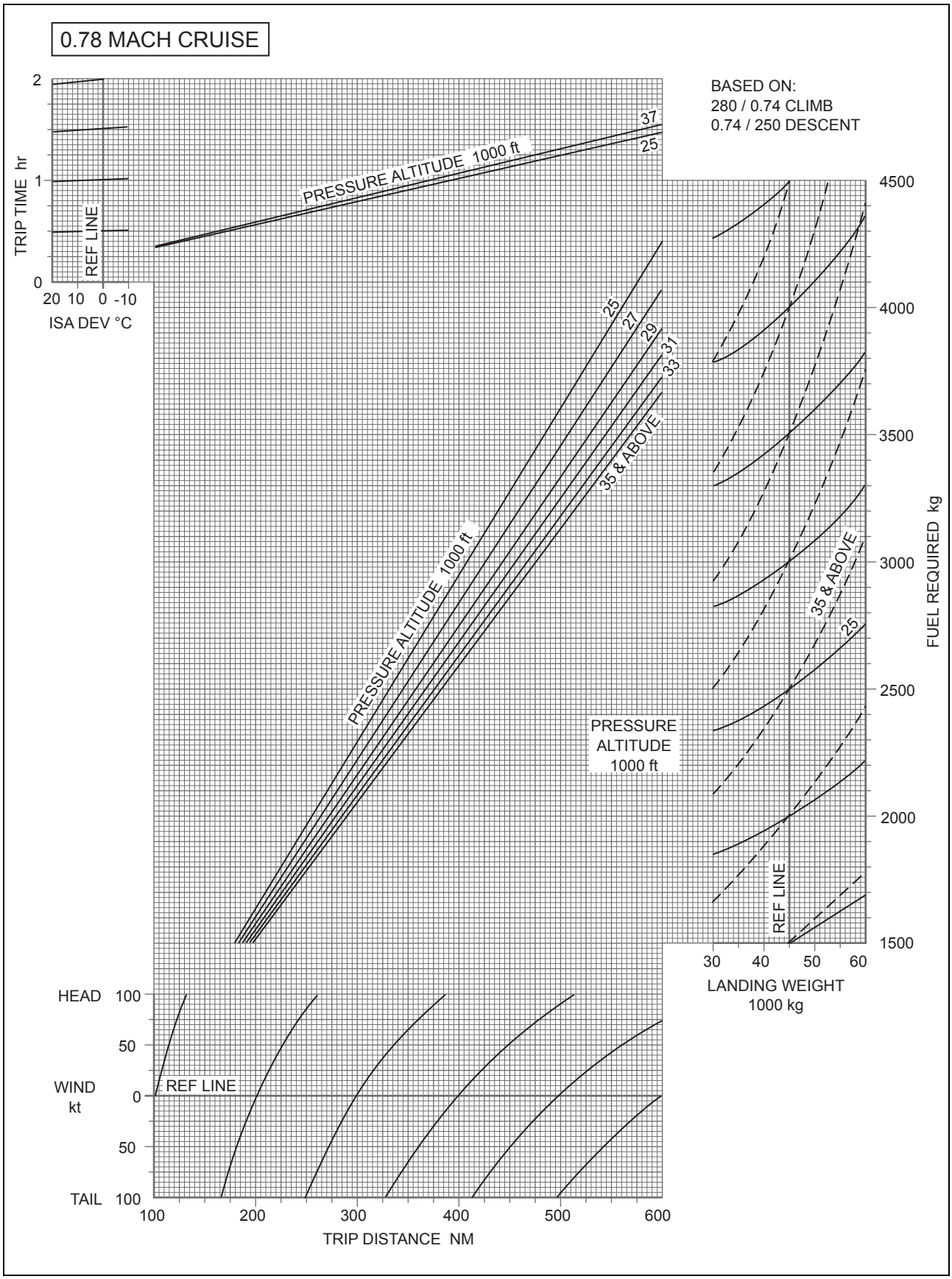

Figure 4.3.3a Simplified Flight Planning – Trip Distances 100 NM to 600 NM

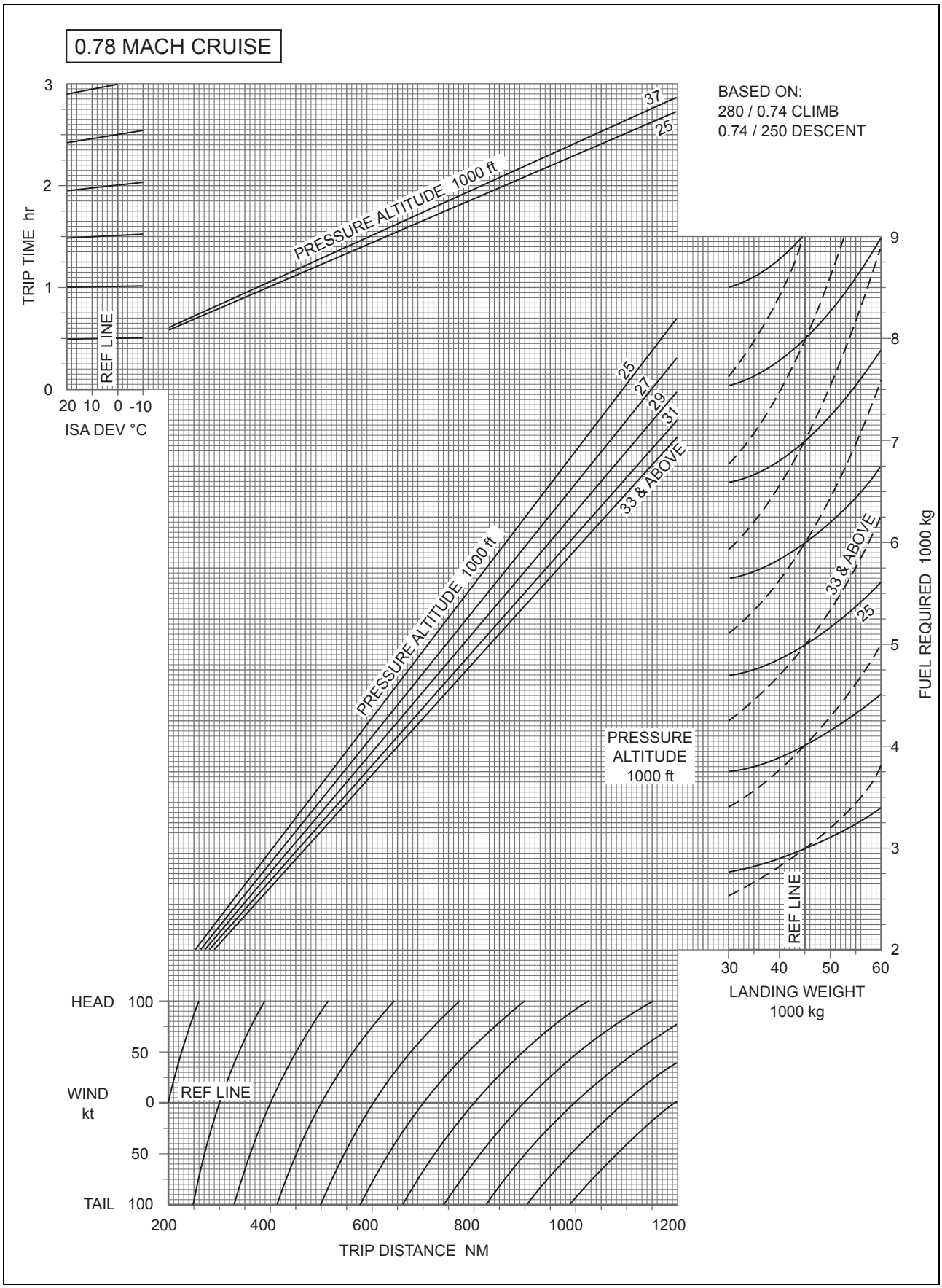

Figure 4.3.3b Simplified Flight Planning – Trip Distances 200 NM to 1,200 NM

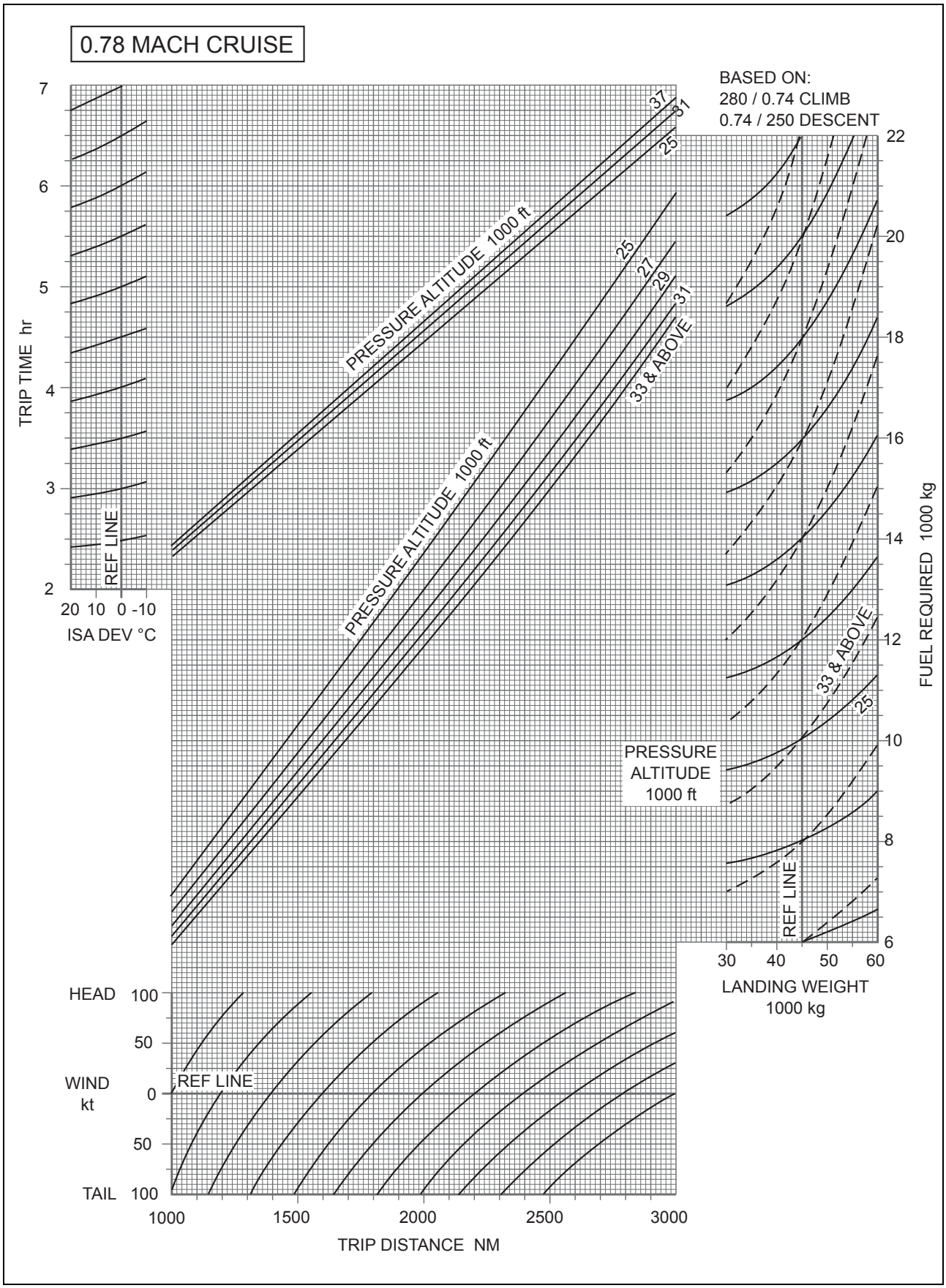

Figure 4.3.3c Simplified Flight Planning – Trip Distances 1,000 NM to 3,000 NM

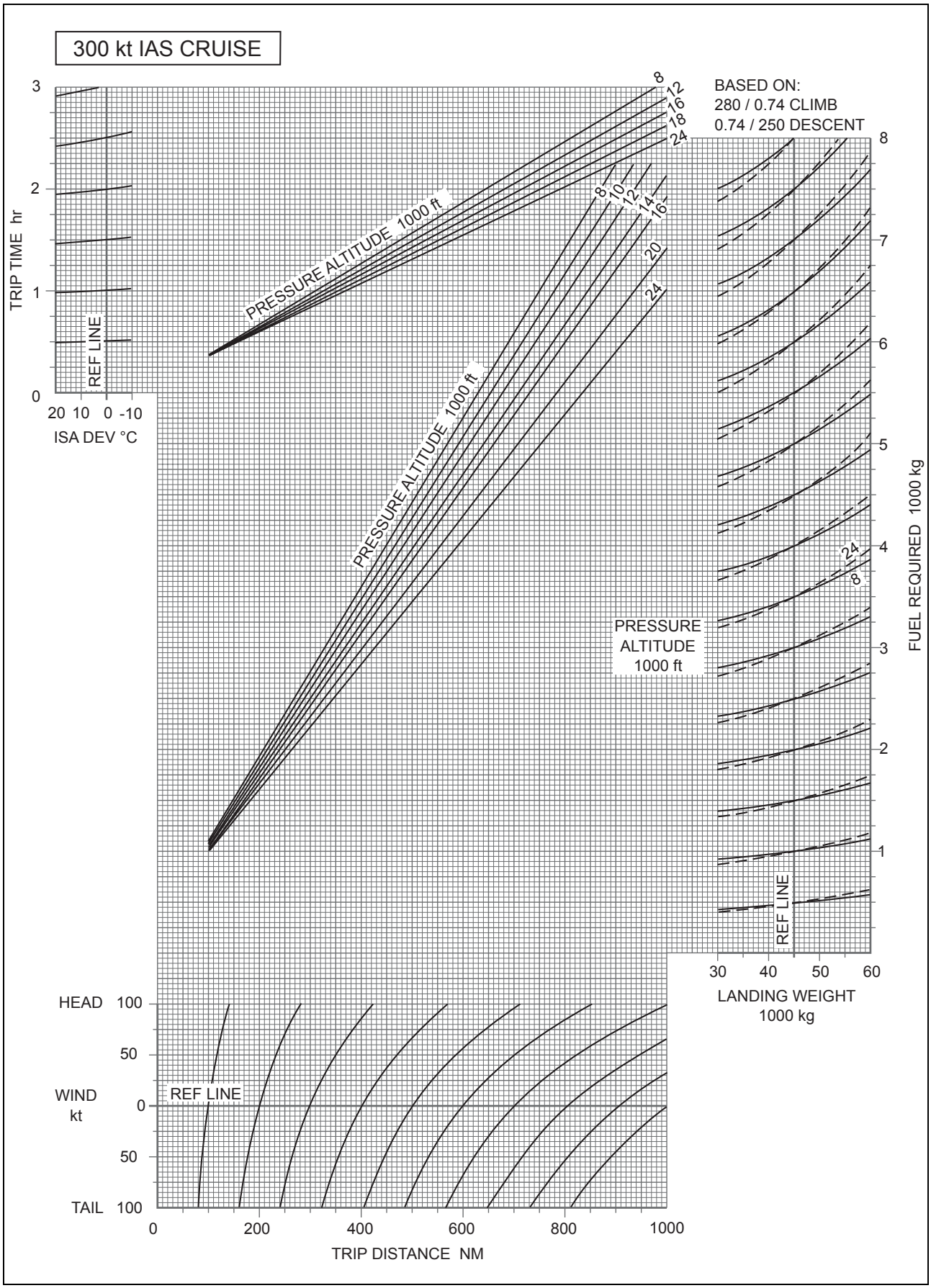

Figure 4.3.4 Simplified Flight Planning – Trip Distances 0 NM to 1,000 NM

3.3 Step Climb Simplified Fuel Planning (Figure 4.3.5)

This chart allows the planner to optimise aeroplane performance by increasing the cruise altitude in 4000 ft steps in order to allow for the increase in optimum altitude as aeroplane weight decreases.

The graph is valid for altitudes with 'Step Climb' of 4,000 ft to 2,000 ft above optimum altitude. The graph provides trip fuel and time, at LRC or 0.74 M, from brake release to touchdown. The method of use is the same as that for the constant altitude charts except that the argument of 'Brake Release Weight' is used in place of 'Cruise Pressure Altitude' - see example on chart.

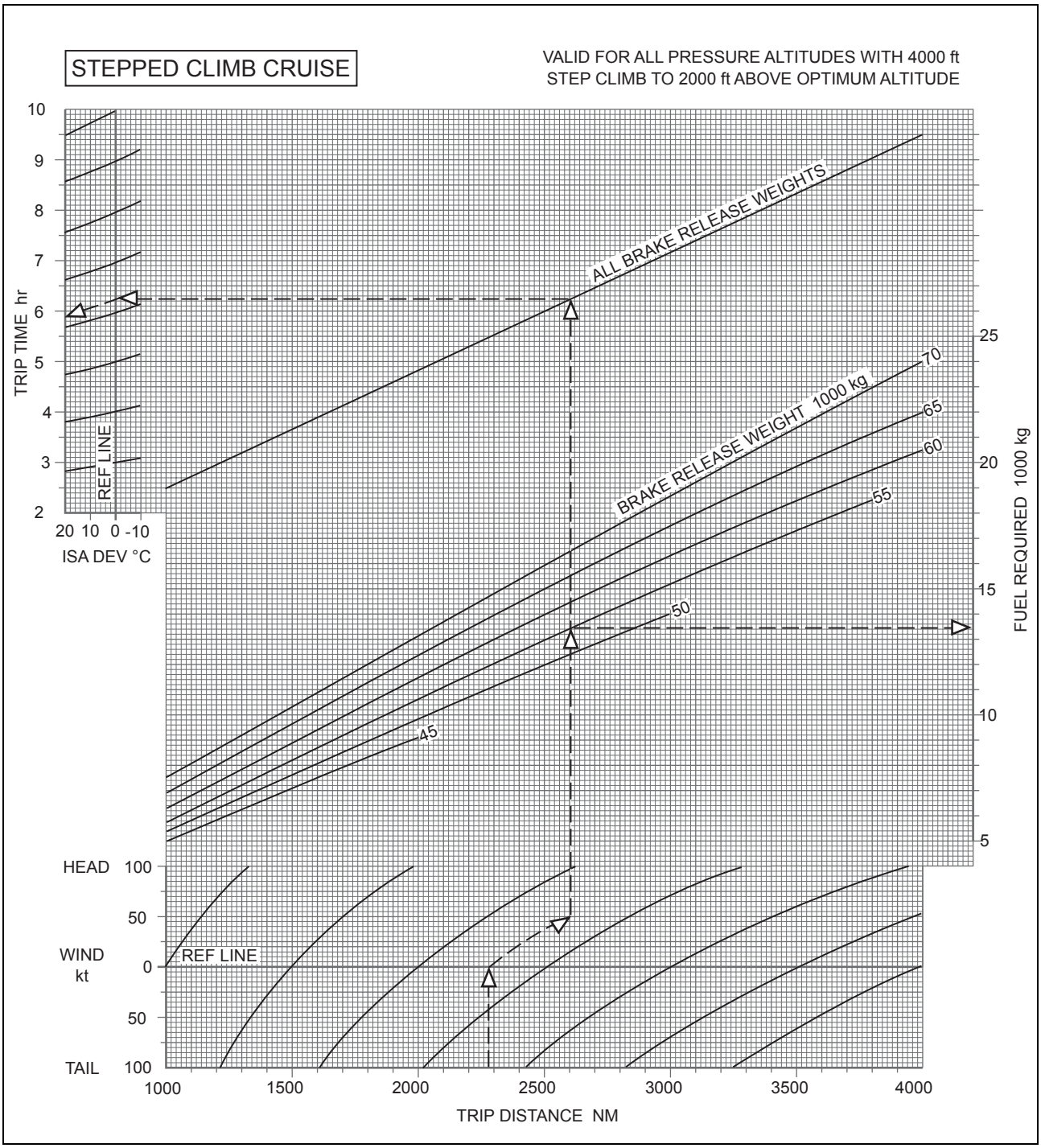

Figure 4.3.5 Simplified Flight Planning – Trip Distances 1,000 NM to 4,000 NM

3.4 Alternate Planning (Figure 4.3.6)

The fuel and time figures extracted from this chart include a missed approach, the climb to cruise altitude, a descent and straight-in approach.

Method of use is similar to previous Simplified Flight Planning graphs.

For distances greater than 500 NM use the LRC Simplified Flight Planning Charts.

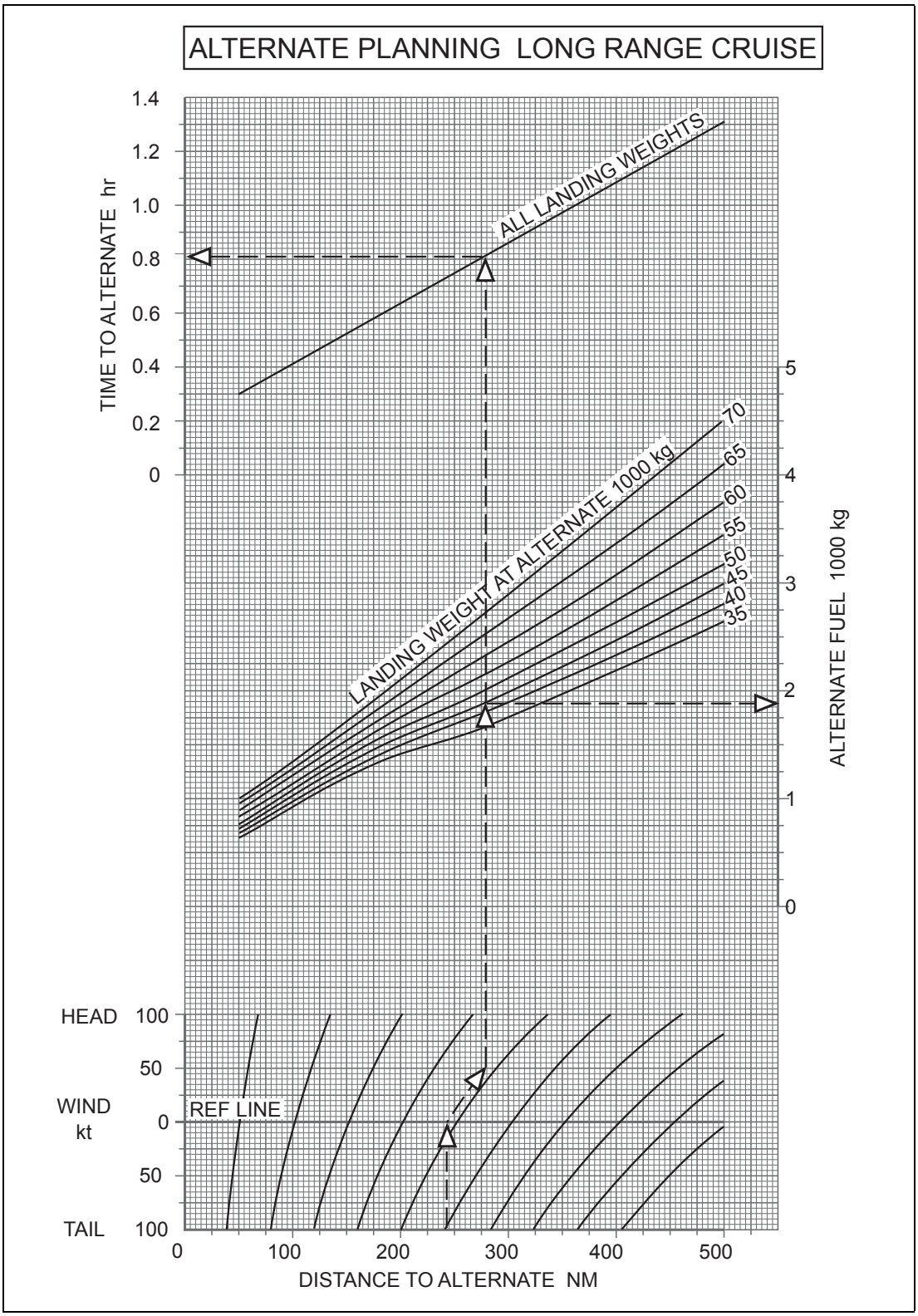

Figure 4.3.6 Simplified Flight Planning – Alternate Distances to 500 NM

4 Holding Fuel Planning

The table below provides fuel flow values for various hold entry weights and holding pressure altitudes to facilitate the calculation of the holding reserve fuel requirements for flight planning.

4.1 Calculation Procedure

a) Enter Figure 4.4 with the Pressure Altitude at which the hold is planned and the weight at the start of the hold, interpolating as required.

b) Extract the holding fuel flow in kg per hour.

c) The fuel flow is based on a racetrack pattern at the minimum drag KIAS. The minimum speed that is permitted to be flown is 210 KIAS.

d) If the hold is to be conducted in straight and level flight, reduce the fuel flow by 5%.

Press Alt. ft	Weight x 1,000 kg														
	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38
	FUEL FLOW in kg per hour														
37,000					2,740	2,540	2,400	2,260	2,160	2,080	1,980	1,900	1,800	1,740	1,680
35,000		3,020	2,820	2,660	2,520	2,420	2,320	2,220	2,140	2,060	1,960	1,880	1,800	1,720	1,660
30,000	2,840	2,740	2,660	2,560	2,480	2,400	2,300	2,220	2,140	2,060	1,960	1,880	1,800	1,740	1,680
25,000	2,840	2,760	2,660	2,580	2,500	2,420	2,320	2,240	2,160	2,080	2,000	1,920	1,840	1,780	1,720
20,000	2,840	2,760	2,680	2,580	2,500	2,420	2,340	2,260	2,180	2,100	2,020	1,940	1,860	1,800	1,760
15,000	2,880	2,800	2,700	2,620	2,540	2,460	2,380	2,300	2,220	2,140	2,060	1,980	1,920	1,860	1,800
10,000	2,920	2,820	2,740	2,660	2,580	2,500	2,420	2,340	2,260	2,180	2,100	2,020	1,980	1,920	1,880
5,000	2,960	2,860	2,780	2,700	2,620	2,540	2,460	2,380	2,300	2,220	2,140	2,080	2,020	1,960	1,920
1,500	3,000	2,900	2,820	2,740	2,660	2,580	2,520	2,440	2,360	2,280	2,220	2,140	2,080	2,020	1,980

Figure 4.4 Holding Fuel Flow – Flaps Retracted

5 Detailed Fuel Planning

5.1 En-route Climb (Figures 4.5.1)

a) Tables are provided for a range of temperature deviations from ISA -15°C to ISA +25°C.

b) The values for fuel used and time taken shown in the tables are measured from the brake release point.

c) The values for air distance quoted in the tables are measured from the point at which a height of 1,500 ft is attained above reference zero.

d) The TAS stated in the tables is the average value for the climb.

e) All of the values given in the tables are based on a climb regime of 280 KIAS/M 0.74 with all engines operating.

5.2 Calculation Procedure

a) Select the table appropriate to the ISA deviation.

b) Enter the left column at the top of climb Pressure Altitude and travel through the columns to the right to the appropriate brake release weight, extract the values for time taken, fuel used, distance travelled and TAS from the appropriate column(s), interpolating if necessary.

c) If the aerodrome has a high elevation, correct the fuel used from the sub-table at the bottom of the main table.

d) To determine the ground distance travelled in the climb, multiply the air distance by the groundspeed and divide by the TAS.

ISA -6°C TO -15°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel				30/2100	25/1800	22/1650	20/1550	17/1350	15/1200	13/1050	12/950
	Dist/TAS				184/391	148/387	130/385	117/383	98/381	85/379	73/378	64/377
36000	Time/Fuel			28/2050	24/1800	22/1650	20/1550	19/1450	16/1300	14/1150	13/1100	11/900
	Dist/TAS			166/388	142/385	127/383	115/381	106/380	91/378	79/377	69/376	60/375
35000	Time/Fuel	32/2350	27/2000	24/1850	22/1700	20/1600	19/1500	17/1400	15/1250	13/1100	12/1000	11/900
	Dist/TAS	195/390	156/385	139/383	125/381	114/380	105/378	97/377	85/376	74/375	65/374	57/373
34000	Time/Fuel	26/2000	23/1850	21/1700	20/1600	19/1500	17/1400	16/1350	14/1200	13/1100	11/950	10/850
	Dist/TAS	152/383	136/381	123/379	113/378	105/376	97/375	90/375	79/373	70/372	61/371	54/371
33000	Time/Fuel	23/1850	21/1750	20/1650	19/1550	17/1450	16/1350	15/1300	14/1150	12/1050	11/950	10/850
	Dist/TAS	133/378	121/376	112/375	104/374	97/373	90/372	84/372	74/371	66/370	58/369	51/368
32000	Time/Fuel	21/1750	20/1650	19/1550	17/1500	16/1400	16/1300	15/1250	13/1150	12/1000	11/900	9/800
	Dist/TAS	120/374	111/373	103/372	96/371	90/370	84/369	79/369	70/368	62/367	55/366	48/366
31000	Time/Fuel	20/1700	19/1600	18/1500	17/1400	16/1350	15/1300	14/1200	13/1100	11/1000	10/900	9/800
	Dist/TAS	110/370	102/369	95/368	89/367	84/367	79/366	74/366	66/365	58/364	52/364	46/363
30000	Time/Fuel	19/1600	18/1550	17/1450	16/1350	15/1300	14/1250	13/1200	12/1050	11/950	10/850	9/800
	Dist/TAS	101/366	95/365	89/1364	83/364	78/363	74/363	70/362	62/362	55/361	49/361	43/360
29000	Time/Fuel	17/1550	16/1450	16/1400	15/1300	14/1250	13/1200	13/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	92/361	87/360	81/360	77/359	72/359	68/358	64/358	57/357	51/357	46/357	41/356
28000	Time/Fuel	16/1450	15/1400	15/1300	14/1250	13/1200	13/1150	12/1100	11/1000	10/900	9/800	8/750
	Dist/TAS	84/356	79/356	75/355	70/355	67/355	63/354	59/354	53/353	48/353	42/353	38/352
27000	Time/Fuel	15/1400	14/1350	14/1250	13/1200	12/1150	12/1100	11/1050	10/950	9/850	8/800	8/700
	Dist/TAS	77/352	73/351	69/351	65/351	61/350	58/350	55/1350	49/349	44/349	39/349	35/348
26000	Time/Fuel	14/1350	14/1250	13/1200	12/1150	12/1100	11/1050	11/1000	10/900	9/850	8/750	7/700
	Dist/TAS	71/348	67/347	63/347	60/347	57/347	54/346	51/346	46/346	41/345	37/345	33/345
25000	Time/Fuel	13/1300	13/1200	12/1150	12/1100	11/1050	11/1000	10/950	9/900	8/800	8/750	7/650
	Dist/TAS	65/344	61/343	58/343	55/343	52/343	50/343	47/342	42/342	38/342	34/342	30/341
24000	Time/Fuel	13/1200	12/1150	11/1100	11/1050	10/1000	10/950	10/950	9/850	8/750	7/700	6/650
	Dist/TAS	60/340	56/340	54/340	51/339	48/339	46/339	43/339	39/339	35/338	32/338	28/338
23000	Time/Fuel	12/1150	11/1100	11/1050	10/1000	10/1000	9/950	9/900	8/800	7/750	7/700	6/600
	Dist/TAS	55/336	52/336	49/336	47/336	44/336	42/335	40/335	36/335	33/335	29/335	26/335
22000	Time/Fuel	11/1100	11/1050	10/1000	10/1000	9/950	9/900	9/850	8/800	7/700	6/650	6/600
	Dist/TAS	50/333	48/333	45/333	43/332	41/332	39/332	37/332	33/332	30/332	27/332	24/331
21000	Time/Fuel	10/1050	10/1000	10/1000	9/950	9/900	8/850	8/800	7/750	7/700	6/650	6/550
	Dist/TAS	46/330	44/329	42/329	40/329	38/329	36/329	34/329	31/329	28/328	25/328	22/328
20000	Time/Fuel	10/1000	9/950	9/950	9/900	8/850	8/800	8/800	7/700	6/650	6/600	5/550
	Dist/TAS	42/326	40/326	38/326	36/326	35/326	33/326	31/326	28/326	26/325	23/325	21/325
19000	Time/fuel	9/950	9/950	8/900	8/850	8/800	7/800	7/750	7/700	6/650	6/600	5/500
	Dist/TAS	39/323	37/323	35/323	33/323	32/323	30/323	29/323	26/323	24/322	21/322	19/322
18000	Time/Fuel	9/900	8/900	8/850	8/800	7/800	7/750	7/700	6/650	6/600	5/550	5/500
	Dist/TAS	35/320	34/320	32/320	31/320	29/320	28/320	26/320	24/320	22/320	19/319	17/319
17000	Time/Fuel	8/900	8/850	8/800	7/800	7/750	7/700	6/700	6/650	5/600	5/550	5/500
	Dist/TAS	32/317	31/317	29/317	28/317	27/317	25/317	24/317	22/317	20/317	18/317	16/317
16000	Time/Fuel	8/850	7/800	7/750	7/750	7/700	6/700	6/650	6/600	5/550	5/500	4/450
	Dist/TAS	29/314	28/314	27/314	25/314	24/314	23/314	22/314	20/314	18/314	16/314	15/314
15000	Time/Fuel	7/800	7/750	7/750	6/700	6/700	6/650	6/650	5/600	5/550	4/500	4/450
	Dist/TAS	26/312	25/312	24/312	23/311	22/311	21/311	20/311	18/311	16/311	15/311	13/311
14000	Time/Fuel	7/750	6/700	6/700	6/650	6/650	6/600	5/600	5/550	5/500	4/450	4/400
	Dist/TAS	24/309	23/309	22/309	21/309	20/309	19/309	18/309	16/309	15/309	13/309	12/309
13000	Time/Fuel	6/700	6/700	6/650	6/650	5/600	5/600	5/550	5/500	4/500	4/450	4/400
	Dist/TAS	21/306	20/306	19/306	19/306	18/306	17/306	16/306	15/306	13/306	12/306	11/306
12000	Time/Fuel	6/650	6/650	5/600	5/600	5/600	5/550	5/550	4/500	4/450	4/400	3/400
	Dist/TAS	19/304	18/304	17/304	17/304	16/304	15/304	14/304	13/304	12/304	11/304	10/304
11000	Time/Fuel	5/650	5/600	5/600	5/550	5/550	5/500	4/500	4/450	4/450	3/400	3/350
	Dist/TAS	17/301	16/301	15/301	15/301	14/301	13/301	13/301	12/301	11/301	10/301	9/301
10000	Time/Fuel	5/600	5/550	5/550	5/550	4/500	4/500	4/500	4/450	4/400	3/350	3/350
	Dist/TAS	15/299	14/299	13/299	13/299	12/299	12/299	11/299	10/299	9/299	8/299	7/299
8000	Time/Fuel	4/500	4/500	4/500	4/450	4/450	4/450	3/400	3/400	3/350	3/350	3/300
	Dist/TAS	11/294	10/294	10/294	9/294	9/294	9/294	8/294	7/294	7/294	6/294	6/294
6000	Time/Fuel	4/450	3/400	3/400	3/400	3/400	3/350	3/350	3/350	3/300	2/300	2/250
	Dist/TAS	7/290	7/290	6/290	6/290	6/290	6/290	5/290	5/290	5/290	4/290	4/290
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	2/200	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-100	-150	-250	-300	-350

Figure 4.5.1 En-route Climb 280/.74

ISA -5°C TO +5°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel				32/2250	26/1900	23/1750	21/1600	18/1400	16/1250	14/1100	12/1000
	Dist/TAS				197/400	158/396	138/393	124/392	105/389	90/388	78/386	68/385
36000	Time/Fuel			29/2150	25/1900	23/1750	21/1650	19/1550	17/1350	15/1200	13/1050	11/950
	Dist/TAS			177/397	151/393	135/391	122/390	112/388	96/386	84/385	73/384	64/383
35000	Time/Fuel	33/2450	28/2150	25/1950	22/1800	21/1650	19/1550	18/1450	16/1300	14/1150	12/1050	11/950
	Dist/TAS	209/399	169/394	148/391	133/389	121/388	112/387	104/386	90/384	78/383	69/382	601381
34000	Time/Fuel	27/2150	24/1950	22/1800	21/1700	19/1600	18/1500	17/1400	15/1250	13/1150	12/1000	11/900
	Dist/TAS	162/391	144/389	131/387	120/386	111/385	103/384	96/383	84/381	74/380	65/379	57/379
33000	Time/Fuel	24/1950	22/1850	21/1700	19/1600	18/1550	17/1450	16/1350	14/1200	13/1100	11/1000	10/900
	Dist/TAS	142/386	129/385	119/383	110/382	103/381	96/380	90/380	79/379	70/378	62/377	54/376
32000	Time/Fuel	22/1850	21/1750	19/1650	18/1550	17/1450	16/1400	15/1300	14/1200	12/1050	11/950	10/850
	Dist/TAS	128/382	118/381	110/380	102/379	96/378	90/377	84/377	74/376	66/375	58/374	51/374
31000	Time/Fuel	21/1800	19/1650	18/1600	17/1500	16/1400	15/1350	14/1300	13/1150	12/1050	10/950	9/850
	Dist/TAS	117/378	109/377	102/376	95/375	89/375	84/374	79/374	70/373	62/372	55/371	49/371
30000	Time/Fuel	19/1700	18/1600	17/1500	16/1450	15/1350	15/1300	14/1250	12/1100	11/1000	10/900	9/800
	Dist/TAS	108/374	101/373	95/372	89/372	84/371	79/371	74/370	66/369	59/369	52/368	46/368
29000	Time/Fuel	18/1600	17/1550	16/1450	15/1400	14/1300	14/1250	13/1200	12/1100	11/950	10/900	9/800
	Dist/TAS	98/369	92/368	87/367	82/367	77/367	73/366	69/366	61/365	55/365	49/364	43/364
28000	Time/Fuel	17/1550	16/1450	15/1400	14/1300	14/1250	13/1200	12/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	90/364	84/363	79/363	75/362	71/362	67/362	63/351	57/361	51/360	45/360	40/360
27000	Time/Fuel	16/1450	15/1400	14/1350	13/1250	13/1200	12/1150	12/1100	11/1000	10/900	9/800	8/750
	Dist/TAS	82/359	77/359	73/358	69/358	65/358	62/357	58/357	52/357	47/356	42/356	37/356
26000	Time/Fuel	15/1400	14/1350	13/1250	13/1200	12/1150	12/1100	11/1050	10/950	9/850	8/800	7/700
	Dist/TAS	75/355	71/355	67/354	63/354	60/354	57/353	54/353	48/353	43/352	39/352	35/352
25000	Time/Fuel	14/1350	13/1250	13/1200	12/1150	11/1100	11/1050	10/1000	9/900	9/850	8/750	7/700
	Dist/TAS	69/351	65/351	62/350	58/350	55/350	53/350	50/349	45/349	40/349	36/348	32/348
24000	Time/Fuel	13/1300	12/1200	12/1150	11/1100	11/1050	10/1000	10/950	9/900	8/800	7/750	7/650
	Dist/TAS	63/347	60/347	57/346	54/346	51/346	48/346	46/346	41/345	37/345	33/345	30/345
23000	Time/Fuel	12/1200	12/1150	11/1100	11/1050	10/1000	10/950	9/950	8/850	8/750	7/700	6/650
	Dist/TAS	58/343	55/343	52/343	50/343	47/342	45/342	42/342	38/342	34/342	31/341	28/341
22000	Time/Fuel	11/1150	11 / 1100	10/1050	10/1000	10/1000	9/950	9/900	8/800	7/750	7/700	6/600
	Dist/TAS	53/340	51/339	48/339	46/339	43/339	41/339	39/339	35/338	32/338	29/338	26/338
21000	Time/Fuel	11/1100	10/1050	10/1000	9/1000	9/950	9/900	8/850	8/800	7/700	6/650	6/600
	Dist/TAS	49/336	46/336	44/336	42/336	40/336	38/335	36/335	33/335	29/335	26/335	24/335
20000	Time/Fuel	10/1050	10/1000	9/950	9/950	9/900	8/850	8/800	7/750	7/700	6/600	5/550
	Dist/TAS	45/333	42/333	40/332	39/332	37/332	35/332	33/332	30/332	27/332	24/332	22/332
19000	Time/Fuel	10/1000	9/950	9/950	8/900	8/850	8 / 800	7/800	7/700	6/650	6/600	5/550
	Dist/TAS	41/329	39/329	37/329	35/329	34/329	32/329	30/329	28/329	25/329	22/329	20/329
18000	Time/Fuel	9/950	9/900	8/900	8/850	8/800	7/800	7/750	6/700	6/650	5/550	5/500
	Dist/TAS	37/326	36/326	34/326	32/326	31/326	29/326	28/326	25/326	23/326	21/326	18/326
17000	Time/Fuel	8/900	8/900	8/850	7/800	7/800	7/750	7/700	6/650	6/600	5/550	5/500
	Dist/TAS	34/323	32/323	31/323	29/323	26/323	27/323	26/323	23/323	21/323	19/323	17/323
16000	Time/Fuel	81/850	8/850	7/800	7/750	7/750	6/700	6/700	6/650	5/600	5/550	4/500
	Dist/TAS	31/320	29/320	28/320	27/320	26/320	24/320	23/320	21/320	19/320	17/320	15/320
15000	Time/Fuel	7/800	7/800	7/750	7/750	6/700	6/700	6/650	5/600	5/550	5/500	4/450
	Dist/TAS	28/318	27/318	25/317	24/317	23/317	22/317	21/317	19/317	17/317	16/317	14/317
14000	Time/Fuel	7/800	7/750	6/700	6/700	6/650	6/650	5/600	5/550	5/500	4/500	4/450
	Dist/TAS	25/315	24/315	23/315	22/315	21/315	20/315	19/315	17/315	16/315	14/315	13/314
13000	Time/Fuel	6/750	6/700	6/700	6/650	6/650	5/600	5/600	5/550	4/500	4/450	4/400
	Dist/TAS	22/312	21/312	21/312	20/312	19/312	18/312	17/312	16/312	14/312	13/312	11/312
12000	Time/Fuel	6/700	6/650	6/650	5/600	5/600	5/550	5/550	4/500	4/450	4/450	3/400
	Dist/TAS	20/310	19/310	18/310	17/309	17/309	16/309	15/309	14/309	13/309	11/309	10/309
11000	Time/Fuel	6/650	5/650	5/600	5/600	5/550	5/550	4/500	4/500	4/450	4/400	3/350
	Dist/TAS	18/307	17/307	16/307	15/307	15/307	14/307	13/307	12/307	11/307	10/307	9/307
10000	Time/Fuel	5/600	5/600	5/550	5/550	4/550	4/500	4/500	4/450	4/400	3/400	3/350
	Dist/TAS	15/305	15/305	14/305	13/305	13/305	12/305	12/305	11/304	10/304	9/304	8/304
8000	Time/Fuel	4/500	4/500	4/500	4/450	4/450	4/450	4/450	3/400	3/350	3/350	3/300
	Dist/TAS	11/300	11/300	10/300	10/300	9/300	9/300	9/300	8/300	7/300	6/300	6/300
6000	Time/Fuel	4/450	3/450	3/400	3/400	3/400	3/400	3/350	3/350	3/300	2/300	2/250
	Dist/TAS	7/295	7/295	7/295	7/295	6/295	6/295	6/295	5/295	5/295	4/295	4/295
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	2/200	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-100	-200	-250	-300	-350

Figure 4.5.1 En-route Climb 280/.74 (continued)

ISA +6°C TO +15°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel				33/2350	27/2000	24/1850	22/1700	18/1500	16/1300	14/1150	12/1000
	Dist/TAS				212/409	169/404	147/402	132/400	111/397	95/396	82/394	72/393
36000	Time/Fuel			30/2250	26/2000	23/1650	21/1700	20/1600	17/1400	15/1250	13/1100	12/1000
	Dist/TAS			189/405	161/402	143/400	130/398	119/397	102/395	89/393	77/392	68/391
35000	Time/Fuel	35/2600	29/2250	26/2050	23/1900	21/1750	20/1650	19/1550	16/1350	14/1200	13/1100	11/950
	Dist/TAS	224/407	180/402	157/399	141/397	129/396	119/395	110/394	95/392	83/391	73/390	64/389
34000	Time/Fuel	28/2250	25/2050	23/1900	21/1800	20/1650	19/1550	18/1500	16/1300	14/1200	12/1050	11/950
	Dist/TAS	173/400	154/397	140/395	128/394	118/393	110/392	102/391	89/389	78/388	69/387	61/386
33000	Time/Fuel	25/2100	23/1950	21/1800	20/1700	19/1600	18/1500	17/1450	15/1300	13/1150	12/1050	10/900
	Dist/TAS	151/394	138/393	127/391	118/390	109/389	102/388	95/388	84/386	74/385	65/385	58/384
32000	Time/Fuel	23/1950	21/1850	20/1750	19/1650	18/1550	17/1450	16/1400	14/1250	13/1100	11/1000	10/900
	Dist/TAS	136/390	126/389	117/388	109/387	102/386	95/385	89/384	79/383	70/383	62/382	55/381
31000	Time/Fuel	22/1850	20/1750	19/1650	18/1550	17/1500	16/1400	15/1350	13/1200	12/1100	11/1000	10/900
	Dist/TAS	125/386	116/385	108/384	101/383	95/382	89/382	84/381	74/380	66/380	59/379	52/378
30000	Time/Fuel	20/1800	19/1700	18/1600	17/1500	16/1450	15/1350	14/1300	13/1150	12/1050	10/950	9/850
	Dist/TAS	115/382	108/381	101/380	95/379	89/379	84/378	77/378	70/377	62/376	56/376	49/375
29000	Time/Fuel	19/1700	18/1600	17/1550	16/1450	15/1400	14/1300	14/1250	12/1150	11/1000	10/900	9/850
	Dist/TAS	105/376	98/376	92/375	87/374	82/374	77/374	73/373	65/373	58/372	52/372	46/371
28000	Time/Fuel	17/1600	17/1550	16/1450	15/1400	14/1300	13/1250	13/1200	12/1100	10/1000	9/900	8/800
	Dist/TAS	95/371	90/371	84/370	80/370	75/369	71/369	67/369	60/368	54/368	48/367	42/367
27000	Time/Fuel	16/1550	15/1450	15/1400	14/1350	13/1250	13/1200	12/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	87/366	82/366	77/366	73/365	69/365	66/365	62/364	56/364	50/363	44/363	39/363
26000	Time/Fuel	15/1450	15/1400	14/1350	13/1250	13/1200	12/1150	11/1100	10/1000	9/900	8/800	8/750
	Dist/TAS	80/362	75/362	71/361	67/361	64/361	60/360	57/360	51/360	46/359	41/359	37/359
25000	Time/Fuel	14/1400	14/1350	13/1250	12/1200	12/1150	11/1100	11/1050	10/950	9/850	8/800	7/700
	Dist/TAS	73/356	69/357	65/357	62/'357	59/367	56/356	53/356	47/356	43/356	38/355	34/355
24000	Time/Fuel	13/1350	13/1250	12/1200	12/1150	11/1100	11/1050	10/1000	9/900	8/850	8/750	7/700
	Dist/TAS	67/354	63/353	60/353	57/353	54/353	51/353	49/352	44/352	39/352	35/352	32/351
23000	Time/Fuel	13/1250	12/1200	11/1150	11/1100	10/1050	10/1000	10/950	9/900	8/800	7/750	7/650
	Dist/TAS	61/350	58/350	55/349	53/349	50/349	47/349	45/349	41/348	37/348	33/348	29/348
22000	Time/Fuel	12/1200	11/1150	11/1100	10/1050	10/1000	9/950	9/950	8/850	8/750	7/700	6/650
	Dist/TAS	56/346	54/346	51/346	48/346	46/345	44/345	42/345	37/345	34/345	30/345	27/344
21000	Time/Fuel	11/1150	11/1100	10/1050	10/1000	9/950	9/950	9/900	8/800	7/750	6/700	6/600
	Dist/TAS	52/343	49/342	47/342	44/342	42/342	40/342	38/342	35/342	31/341	28/341	25/341
20000	Time/Fuel	10/1100	10/1050	10/1000	9/950	9/950	8/900	8/850	7/800	7/700	6/650	6/600
	Dist/TAS	47/339	45/339	43/339	41/339	39/339	37/338	35/338	32/338	29/338	26/338	23/338
19000	Time/Fuel	10/1050	9/1000	9/950	9/950	8/900	8/850	8/800	7/750	6/700	6/600	5/550
	Dist/TAS	43/336	41/336	39/335	37/335	36/335	34/335	32/335	29/335	26/335	24/335	21/335
18000	Time/Fuel	9/1000	9/950	8/900	8/900	8/850	7/800	7/800	7/700	6/650	6/600	5/550
	Dist/TAS	39/332	38/332	36/332	34/332	33/332	31/332	30/332	27/332	24/332	22/332	19/332
17000	Time/Fuel	9/950	8/900	8/900	8/850	7/800	7/750	7/750	6/700	6/600	5/550	5/500
	Dist/TAS	36/329	34/329	33/329	31/329	30/329	28/329	27/329	24/329	22/329	20/329	18/329
16000	Time/Fuel	8/900	8/850	7/850	7/800	7/750	7/750	6/700	6/650	5/600	5/550	4/500
	Dist/TAS	33/326	31/326	30/326	28/326	27/326	26/326	25/326	22/326	20/326	18/326	16/326
15000	Time/Fuel	8/850	7/800	7/800	7/750	6/750	6/700	6/650	5/600	5/550	5/500	4/450
	Dist/TAS	29/323	28/323	27/323	26/323	24/323	23/323	22/323	20/323	18/323	16/323	15/323
14000	Time/Fuel	7/800	7/800	7/750	6/700	6/700	6/650	6/650	5/600	5/550	4/500	4/450
	Dist/TAS	26/321	25/321	24/321	23/320	22/320	21/320	20/320	18/320	17/320	15/320	13/320
13000	Time/Fuel	7/750	6/750	6/700	6/700	6/650	5/650	5/600	5/550	4/500	4/450	4/450
	Dist/TAS	24/318	23/318	22/318	21/318	20/318	19/318	18/318	16/318	15/318	13/318	12/318
12000	Time/Fuel	6/700	6/700	6/650	5/650	5/600	5/600	5/550	5/500	4/500	4/450	4/400
	Dist/TAS	21/315	20/315	19/315	18/315	18/315	17/315	16/315	15/315	13/315	12/315	11/315
11000	Time/Fuel	6/650	5/650	5/600	5/600	5/600	5/550	5/550	4/500	4/450	4/400	3/400
	Dist/TAS	19/313	18/313	17/313	16/313	16/313	15/312	14/312	13/312	12/312	11/312	9/312
10000	Time/Fuel	5/600	5/600	5/600	5/550	5/550	4/500	4/500	4/450	4/450	3/400	3/350
	Dist/TAS	16/310	16/310	15/310	14/310	14/310	13/310	12/310	11/310	10/310	9/310	8/310
8000	Time/Fuel	4/550	4/500	4/500	4/500	4/450	4/450	4/450	3/400	3/350	3/350	3/300
	Dist/TAS	12/305	11/305	11/305	10/305	10/305	10/305	9/305	8/305	8/305	7/305	6/305
6000	Time/Fuel	4/450	4/450	3/400	3/400	3/400	3/400	3/350	3/350	3/300	2/300	2/250
	Dist/TAS	8/301	8/301	7/301	7/301	7/301	6/301	6/301	6/301	5/301	5/301	4/301
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	2/200	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-100	-200	-250	-300	-400

Figure 4.5.1 En-route Climb 280/.74 (continued)

ISA +16°C TO +25°C

Press. Alt. ft	Units Min/kg. NAM/Kt	BRAKE RELEASE WEIGHT KG										
		68000	66000	64000	62000	60000	58000	56000	52000	48000	44000	40000
37000	Time/Fuel					37/2550	31/2150	27/1950	22/1650	19/1450	17/1300	15/1150
	Dist/TAS					246/417	198/413	172/410	140/407	118/405	101/403	88/402
36000	Time/Fuel				35/2450	30/2200	27/2000	24/1850	21/1600	18/1400	16/1250	14/1100
	Dist/TAS				227/414	192/411	170/408	153/406	128/404	110/402	95/400	82/399
35000	Time/Fuel		42/2950	34/2500	30/2200	27/2050	25/1900	23/1750	20/1550	17/1350	15/1200	13/1050
	Dist/TAS		281/418	220/412	190/409	169/406	153/405	140/403	119/401	103/399	90/398	78/397
34000	Time/Fuel	40/2850	34/2500	30/2250	27/2100	25/1950	23/1800	21/1700	19/1500	16/1300	14/1150	13/1050
	Dist/TAS	260/414	215/409	188/406	169/404	153/403	141/401	130/400	112/398	97/397	85/396	74/395
33000	Time/Fuel	33/2500	30/2300	27/2100	25/1950	23/1850	21/1700	20/1600	18/1450	16/1300	14/1150	12/1000
	Dist/TAS	210/407	186/404	168/402	153/400	141/399	130/398	121/397	105/395	92/394	80/393	70/392
32000	Time/Fuel	30/2350	27/2150	25/2000	23/1900	22/1750	20/1650	19/1550	17/1400	15/1250	13/1100	12/1000
	Dist/TAS	185/401	167/399	153/398	141/396	130/395	121/394	113/394	98/392	86/391	76/390	67/389
31000	Time/Fuel	27/2200	25/2050	23/1900	22/1800	20/1700	19/1600	18/1500	16/1350	14/1200	13/1100	11/950
	Dist/TAS	166/396	152/395	141/394	130/393	121/392	113/391	106/390	93/389	82/388	72/387	63/387
30000	Time/Fuel	25/2100	24/1950	22/1850	21/1750	19/1650	18/1550	17/1450	15/1300	14/1150	12/1050	11/950
	Dist/TAS	152/392	140/391	130/389	121/389	113/388	106/387	99/387	87/385	77/385	68/384	60/383
29000	Time/Fuel	23/1950	22/1850	20/1750	19/1650	18/1550	17/1450	16/1400	14/1250	13/1100	12/1000	10/900
	Dist/TAS	136/386	126/385	118/384	110/383	106/383	97/382	91/382	80/381	71/380	63/379	56/379
28000	Time/Fuel	21/1850	20/1750	19/1650	18/1550	17/1500	16/1400	15/1350	14/1200	12/1100	11/950	10/850
	Dist/TAS	123/380	114/379	107/379	100/378	94/378	89/377	83/377	74/376	66/375	58/375	52/375
27000	Time/Fuel	20/1750	19/1650	18/1550	17/1500	16/1400	15/1350	14/1250	13/1150	11/1050	10/950	9/850
	Dist/TAS	111/375	104/374	98/374	92/373	86/373	81/372	77/372	68/371	61/371	54/371	48/370
26000	Time/Fuel	18/1650	17/1550	16/1500	16/1400	15/1350	14/1300	13/1200	12/1100	11/1000	10/900	9/800
	Dist/TAS	101/370	95/370	89/369	84/369	79/368	75/368	70/368	63/367	56/367	50/366	44/366
25000	Time/Fuel	17/1550	16/1500	15/1400	15/1350	14/1300	13/1200	13/1150	11/1050	10/950	9/850	8/750
	Dist/TAS	92/365	86/365	81/365	77/364	73/364	69/364	65/363	58/363	52/363	46/362	41/362
24000	Time/Fuel	16/1500	15/1400	14/1350	14/1300	13/1200	12/1150	12/1100	11/1000	10/900	9/850	8/750
	Dist/TAS	84/361	79/361	75/360	70/360	67/360	63/360	60/359	53/359	48/359	43/358	38/358
23000	Time/Fuel	15/1400	14/1350	13/1300	13/1250	12/1150	12/1100	11/1050	10/950	9/900	8/800	7/700
	Dist/TAS	77/357	72/357	68/356	65/356	61/356	58/356	55/356	49/355	44/355	39/355	35/355
22000	Time/Fuel	14/1350	13/1300	13/1250	12/1150	11/1100	11/1050	10/1000	9/900	9/850	8/750	7/700
	Dist/TAS	70/353	66/353	63/352	59/352	56/352	53/352	50/352	45/351	41/351	36/351	32/351
21000	Time/Fuel	13/1300	12/1200	12/1150	11/1100	11/1050	10/1000	10/950	9/900	8/800	7/750	7/650
	Dist/TAS	64/349	60/349	57/349	54/349	52/348	49/348	46/348	42/348	37/348	34/348	30/347
20000	Time/Fuel	12/1200	12/1150	11/1100	11/1050	10/1000	10/950	9/950	8/850	8/750	7/700	6/650
	Dist/TAS	58/345	55/345	52/345	50/345	47/345	45/345	43/345	38/344	34/344	31/344	28/344
19000	Time/Fuel	11/1150	11/1100	10/1050	10/1000	9/950	9/900	9/900	8/800	7/750	7/650	6/600
	Dist/TAS	53/342	50/342	48/342	45/342	43/342	41/341	39/341	35/341	32/341	28/341	25/341
18000	Time/Fuel	11/1100	10/1050	10/1000	9/950	9/900	9/900	8/850	7/750	7/700	6/650	6/600
	Dist/TAS	48/339	46/339	44/338	42/338	39/338	38/338	36/338	32/338	29/338	26/338	23/338
17000	Time/Fuel	10/1050	10/1000	9/950	9/900	8/850	8/850	8/800	7/750	6/650	6/600	5/550
	Dist/TAS	44/335	42/335	40/335	38/335	36/335	34/335	33/335	29/335	27/335	24/335	21/335
16000	Time/Fuel	9/1000	9/950	9/900	8/850	8/850	7/800	7/750	7/700	6/650	5/600	5/550
	Dist/TAS	40/332	38/332	36/332	34/332	33/332	31/332	30/332	27/332	24/332	22/332	19/332
15000	Time/Fuel	9/950	8/900	8/850	8/800	7/800	7/750	7/700	6/650	6/600	5/550	5/500
	Dist/TAS	36/329	34/329	33/329	31/329	30/329	28/329	27/329	24/329	22/329	20/329	18/329
14000	Time/Fuel	8/850	8/650	7/800	7/750	7/750	7/700	6/700	6/650	5/550	5/500	4/500
	Dist/TAS	32/326	31/326	29/326	28/326	27/326	25/326	24/326	22/326	20/326	18/326	16/326
13000	Time/Fuel	7/800	7/800	7/750	7/750	6/700	6/650	6/650	5/600	5/550	5/500	4/450
	Dist/TAS	29/323	28/323	26/323	25/323	24/323	23/323	22/323	20/323	18/323	16/323	14/323
12000	Time/Fuel	7/750	7/750	6/700	6/700	6/650	6/650	5/600	5/550	5/500	4/450	4/450
	Dist/TAS	26/321	25/321	23/321	22/321	21/321	20/321	19/321	18/321	16/320	14/320	13/320
11000	Time/Fuel	6/700	6/700	6/650	6/650	5/600	5/600	5/550	5/500	4/500	4/450	4/400
	Dist/TAS	23/318	22/318	21/318	20/318	19/318	18/318	17/318	16/318	14/318	13/318	11/318
10000	Time/Fuel	6/650	6/650	5/600	5/600	5/550	5/550	5/550	4/500	4/450	4/400	3/400
	Dist/TAS	20/315	19/315	18/315	17/315	16/315	16/315	15/315	14/315	12/315	11/315	10/315
8000	Time/Fuel	5/550	5/550	5/550	4/500	4/500	4/500	4/450	4/400	3/400	3/350	3/350
	Dist/TAS	14/310	14/310	13/310	13/310	12/310	11/310	11/310	10/310	9/310	8/310	7/310
6000	Time/Fuel	4/450	4/450	4/450	4/450	3/400	3/400	3/400	3/350	3/350	3/300	2/300
	Dist/TAS	10/306	9/306	9/306	8/306	8/306	8/306	7/306	7/306	6/306	5/306	5/306
1500	Time/Fuel	2/250	2/250	2/250	2/250	2/250	2/250	2/250	2/200	2/200	2/200	1/150

Fuel Adjustment for high elevation airports	Airport Elevation	2000	4000	6000	8000	10000	12000
Effect on time and distance is negligible	Fuel Adjustment	-50	-150	-200	-300	-350	-400

Figure 4.5.1 En-route Climb 280/.74 (continued)

5.3 Wind Range Correction (Figure 4.5.2)

This graph is used for conversion of nautical ground miles to nautical air miles. (This is intended for use in conjunction with the 'integrated range' tables.)

a) Enter the graph with the average TAS. Travel horizontally left to intersect the wind component.

b) From this point travel vertically up to intersect the appropriate ground distance grid line.

c) Travel horizontally right to read the air distance.

d) For longer distances than shown on the graph, apply a factor of 10 to the tabulated values.

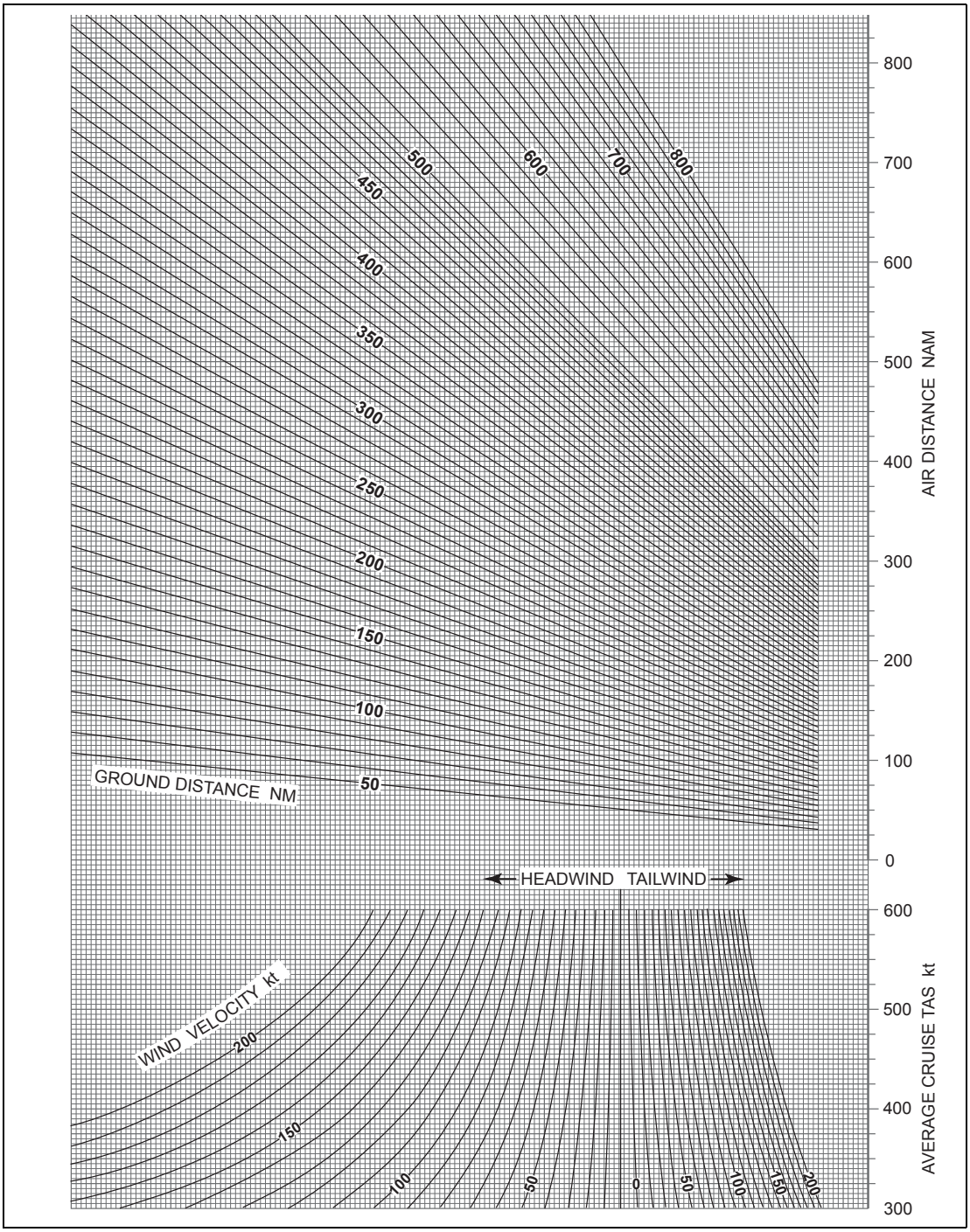

Figure 4.5.2 Wind Range Correction Graph

5.4 Integrated Range

This section allows for detailed flight planning for the cruise.

Tables are given as follows:

Figures 4.5.3.1	Long Range Cruise FL 270 to FL 370	(pages 25- 35)
Figures 4.5.3.2	0.74 Mach Cruise FL 210 to FL 370	(pages 36- 52)
Figures 4.5.3.3	0.78 Mach Cruise FL 290, 300, 310, 330, 350, 370.	(pages 53- 58)
Figures 4.5.3.4	Low level (300 KIAS) Cruise FL 140 to FL 210.	(pages 59 -66)

The tables in this section are identical in use.
The tables are based on a 'differences' principle, the difference between two gross weights representing a weight of fuel used. The corresponding difference in tabulated distance represents the still air (zero wind) distance available for that weight of fuel used.

5.4.1 Example

An aircraft commences a cruise at 0.74 Mach at FL 330 where the temperature is ISA. The following gives the relevant data for the first two sectors:

	NGM	W.C (kt)
A - B	240	-20
B - C	370	-30

Weight at beginning of first sector is 53,500 kg.

5.4.2 Method

Using the TAS given for cruise (430 kt):

Obtain NAM for each leg.	A - B	252
	B - C	398

Select table for 0.74 Mach	P. Alt. 33,000 ft.
Enter with gross weight	= 53,500 kg
Extract value for cruise equivalent air distance	= 3,796
Subtract first leg NAM	= 252
Obtain new cruise equivalent air distance value	= 3,544
Enter table to find corresponding weight	= 52,100 kg
Subtract from start weight to obtain leg fuel used	= 1,400 kg

Repeat process	
Subtract second leg NAM	398
Obtain new cruise equivalent air distance value	3,146
Enter table to find weight	50,000 kg
Subtract from start weight to obtain leg fuel used	2,100 kg

N.B. These tables are based on ISA conditions
If conditions are non-standard use the corrections given below the appropriate table.

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 27,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	371	0	20	40	61	81	102	122	142	163	183
36000	375	204	224	244	264	284	305	325	345	365	385
37000	379	405	425	445	465	485	505	525	545	565	585
38000	383	605	625	644	664	684	704	723	743	763	782
39000	387	802	822	841	861	880	900	919	939	958	978
40000	391	997	1016	1036	1055	1074	1093	1113	1132	1151	1171
41000	394	1190	1209	1228	1247	1266	1285	1304	1323	1342	1361
42000	398	1381	1399	1418	1437	1456	1475	1494	1513	1531	1550
43000	401	1569	1588	1606	1625	1644	1662	1681	1700	1718	1737
44000	405	1756	1774	1793	1811	1829	1848	1866	1885	1903	1922
45000	408	1940	1958	1977	1995	2013	2031	2050	2068	2086	2104
46000	411	2123	2141	2159	2177	2195	2213	2231	2249	2267	2285
47000	414	2303	2321	2339	2357	2375	2393	2411	2428	2446	2464
48000	417	2482	2500	2517	2535	2553	2570	2588	2606	2624	2641
49000	420	2659	2676	2694	2711	2729	2746	2764	2781	2799	2816
50000	423	2834	2851	2869	2886	2903	2921	2938	2955	2972	2990
51000	426	3007	3024	3041	3059	3076	3093	3110	3127	3144	3161
52000	428	3179	3196	3213	3229	3246	3263	3280	3297	3314	3331
53000	431	3348	3365	3382	3399	3416	3432	3449	3466	3483	3500
54000	433	3516	3533	3550	3566	3583	3600	3616	3633	3650	3666
55000	435	3683	3699	3716	3732	3749	3765	3782	3798	3815	3831
56000	437	3848	3864	3880	3897	3913	3929	3946	3962	3978	3995
57000	438	4011	4027	4043	4059	4075	4092	4108	4124	4140	4156
58000	440	4172	4188	4204	4220	4236	4252	4268	4284	4300	4316
59000	441	4332	4348	4364	4380	4396	4411	4427	4443	4459	4475
60000	442	4491	4506	4522	4538	4553	4569	4585	4600	4616	4632
61000	443	4647	4663	4678	4694	4709	4725	4740	4756	4771	4787
62000	444	4802	4818	4833	4849	4864	4879	4895	4910	4925	4941
63000	444	4956	4971	4986	5002	5017	5032	5047	5063	5078	5093
64000	444	5108	5123	5138	5153	5168	5183	5199	5214	5229	5244
65000	444	5259	5274	5289	5304	5318	5333	5348	5363	5378	5393
66000	444	5408	5423	5437	5452	5467	5482	5497	5511	5526	5541
67000	444	5556	5570	5585	5599	5614	5629	5643	5658	5673	5687

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT
A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT
B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT
C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES
A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA
B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA
C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA
D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 27,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 28,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	376	0	20	41	62	83	104	125	145	166	187
36000	380	208	229	249	270	290	311	332	352	373	393
37000	384	414	434	455	475	495	516	536	557	577	597
38000	388	618	638	658	678	698	718	738	759	779	799
39000	392	819	839	859	879	898	918	938	958	978	998
40000	396	1018	1037	1057	1077	1096	1116	1136	1155	1175	1195
41000	399	1214	1234	1253	1273	1292	1312	1331	1350	1370	1389
42000	403	1409	1428	1447	1466	1486	1505	1524	1543	1563	1582
43000	406	1601	1620	1639	1658	1677	1696	1715	1734	1753	1772
44000	409	1791	1810	1829	1848	1866	1885	1904	1923	1942	1960
45000	413	1979	1998	2016	2035	2054	2072	2091	2109	2128	2147
46000	416	2165	2184	2202	2220	2239	2257	2275	2294	2312	2331
47000	419	2349	2367	2385	2404	2422	2440	2458	2476	2495	2513
48000	422	2531	2549	2567	2585	2603	2621	2639	2657	2675	2693
49000	425	2711	2729	2747	2764	2782	2800	2818	2836	2853	2871
50000	427	2889	2907	2924	2942	2960	2977	2995	3013	3030	3048
51000	429	3065	3083	3100	3118	3135	3153	3170	3188	3205	3222
52000	432	3240	3257	3274	3292	3309	3326	3344	3361	3378	3395
53000	434	3413	3430	3447	3464	3481	3498	3515	3532	3549	3567
54000	436	3584	3601	3617	3634	3651	3668	3685	3702	3719	3736
55000	437	3753	3770	3786	3803	3820	3837	3853	3870	3887	3904
56000	439	3920	3937	3953	3970	3987	4003	4020	4036	4053	4069
57000	440	4086	4102	4119	4135	4152	4168	4184	4201	4217	4234
58000	441	4250	4266	4282	4299	4315	4331	4347	4364	4380	4396
59000	442	4412	4428	4444	4460	4476	4492	4509	4525	4541	4557
60000	442	4573	4589	4605	4620	4636	4652	4668	4684	4700	4716
61000	442	4732	4747	4763	4779	4795	4810	4826	4842	4858	4873
62000	442	4889	4905	4920	4936	4951	4967	4983	4998	5014	5029
63000	443	5045	5060	5076	5091	5106	5122	5137	5153	5168	5184
64000	443	5199	5214	5229	5245	5260	5275	5290	5306	5321	5336
65000	443	5351	5367	5382	5397	5412	5427	5442	5457	5472	5487
66000	443	5502	5517	5532	5547	5562	5577	5592	5607	5622	5637
67000	443	5652	5666	5681	5696	5711	5725	5740	5755	5770	5784

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 28,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 29,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	381	0	21	42	63	85	106	127	148	170	191
36000	385	212	233	254	275	296	317	338	359	380	401
37000	389	422	443	464	485	506	526	547	568	589	609
38000	393	630	651	671	692	712	733	753	774	794	815
39000	397	835	856	876	896	916	937	957	977	998	1018
40000	400	1038	1058	1078	1098	1118	1138	1158	1178	1198	1218
41000	404	1238	1258	1278	1298	1318	1338	1357	1377	1397	1417
42000	407	1437	1456	1476	1495	1515	1535	1554	1574	1593	1613
43000	411	1632	1652	1671	1691	1710	1729	1749	1768	1787	1807
44000	414	1826	1845	1864	1884	1903	1922	1941	1960	1979	1998
45000	417	2018	2037	2055	2074	2093	2112	2131	2150	2169	2188
46000	420	2207	2226	2244	2263	2282	2301	2319	2338	2357	2375
47000	423	2394	2413	2431	2450	2468	2487	2505	2524	2542	2561
48000	426	2579	2598	2616	2634	2653	2671	2689	2708	2726	2744
49000	428	2763	2781	2799	2817	2835	2853	2871	2890	2908	2926
50000	431	2944	2962	2980	2998	3016	3034	3052	3070	3088	3105
51000	433	3123	3141	3159	3177	3194	3212	3230	3248	3265	3283
52000	435	3301	3319	3336	3354	3371	3389	3406	3424	3441	3459
53000	436	3477	3494	3511	3529	3546	3563	3581	3598	3616	3633
54000	438	3650	3667	3685	3702	3719	3736	3753	3771	3788	3805
55000	439	3822	3839	3856	3873	3890	3907	3924	3941	3958	3975
56000	440	3992	4009	4026	4042	4059	4076	4093	4110	4126	4143
57000	440	4160	4177	4193	4210	4227	4243	4260	4277	4293	4310
58000	440	4326	4343	4359	4376	4392	4409	4425	4442	4458	4475
59000	441	4491	4507	4524	4540	4556	4572	4589	4605	4621	4638
60000	441	4654	4670	4686	4702	4718	4734	4751	4767	4783	4799
61000	441	4815	4831	4847	4863	4879	4895	4911	4927	4942	4958
62000	441	4974	4990	5006	5022	5037	5053	5069	5085	5100	5116
63000	441	5132	5147	5163	5179	5194	5210	5225	5241	5257	5272
64000	441	5288	5303	5319	5334	5349	5365	5380	5396	5411	5426
65000	441	5442	5457	5472	5487	5503	5518	5533	5548	5564	5579
66000	441	5594	5609	5624	5639	5654	5669	5684	5699	5714	5729
67000	441	5745	5759	5774	5789	5804	5819	5834	5849	5863	5878

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 29,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 30,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	386	0	21	43	65	86	108	130	151	173	195
36000	390	216	238	259	281	302	324	345	366	388	409
37000	394	431	452	473	494	515	536	558	579	600	621
38000	398	642	663	684	705	726	747	768	789	810	831
39000	402	851	872	893	913	934	955	975	996	1017	1037
40000	405	1058	1079	1099	1119	1140	1160	1181	1201	1222	1242
41000	409	1262	1283	1303	1323	1343	1363	1384	1404	1424	1444
42000	412	1464	1484	1504	1524	1544	1564	1584	1604	1624	1644
43000	416	1664	1684	1703	1723	1743	1762	1782	1802	1822	1841
44000	419	1861	1881	1900	1920	1939	1959	1978	1998	2017	2037
45000	422	2056	2075	2095	2114	2133	2152	2172	2191	2210	2230
46000	424	2249	2268	2287	2306	2325	2344	2363	2382	2401	2421
47000	427	2440	2458	2477	2496	2515	2534	2553	2572	2590	2609
48000	429	2628	2647	2666	2684	2703	2721	2740	2759	2777	2796
49000	431	2815	2833	2852	2870	2889	2907	2925	2944	2962	2981
50000	433	2999	3017	3036	3054	3072	3090	3109	3127	3145	3163
51000	435	3182	3200	3218	3236	3254	3272	3290	3308	3326	3344
52000	436	3362	3380	3398	3416	3433	3451	3469	3487	3505	3522
53000	437	3540	3558	3576	3593	3611	3628	3646	3664	3681	3699
54000	438	3717	3734	3751	3769	3786	3804	3821	3839	3856	3873
55000	438	3891	3908	3925	3943	3960	3977	3994	4012	4029	4046
56000	439	4063	4080	4097	4115	4132	4149	4166	4183	4200	4217
57000	439	4234	4251	4268	4285	4301	4318	4335	4352	4369	4386
58000	439	4403	4419	4436	4453	4469	4486	4503	4519	4536	4553
59000	439	4569	4586	4602	4619	4635	4652	4668	4685	4701	4718
60000	439	4734	4750	4767	4783	4799	4816	4832	4848	4865	4881
61000	439	4897	4913	4929	4945	4961	4978	4994	5010	5026	5042
62000	439	5058	5074	5090	5106	5122	5138	5154	5169	5185	5201
63000	439	5217	5233	5249	5264	5280	5296	5311	5327	5343	5359
64000	439	5374	5390	5405	5421	5436	5452	5467	5483	5498	5514
65000	439	5529	5545	5560	5575	5591	5606	5621	5637	5652	5667
66000	439	5683	5698	5713	5728	5743	5758	5773	5788	5804	5819
67000	439	5834	5849	5864	5879	5893	5908	5923	5938	5953	5968

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 66,600 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 30,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 31,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	391	0	22	44	66	88	110	132	154	176	199
36000	395	221	242	264	286	308	330	352	374	395	417
37000	399	439	461	482	504	525	547	569	590	612	633
38000	403	655	676	698	719	740	762	783	804	825	847
39000	406	868	889	910	931	952	973	995	1016	1037	1058
40000	410	1079	1100	1120	1141	1162	1183	1204	1225	1245	1266
41000	414	1287	1308	1328	1349	1369	1390	1410	1431	1452	1472
42000	417	1493	1513	1533	1554	1574	1594	1615	1635	1655	1676
43000	420	1696	1716	1736	1756	1776	1796	1816	1837	1857	1877
44000	423	1897	1917	1936	1956	1976	1996	2016	2036	2056	2076
.45000	425	2095	2115	2135	2154	2174	2194	2213	2233	2252	2272
46000	428	2292	2311	2331	2350	2369	2389	2408	2428	2447	2466
47000	430	2486	2505	2524	2543	2563	2582	2601	2620	2639	2658
48000	432	2678	2697	2716	2735	2754	2772	2791	2810	2829	2848
49000	433	2867	2886	2905	2924	2942	2961	2980	2998	3017	3036
50000	435	3055	3073	3092	3110	3129	3147	3166	3184	3203	3221
51000	436	3240	3258	3276	3295	3313	3331	3350	3368	3386	3405
52000	437	3423	3441	3459	3477	3495	3513	3531	3550	3568	3586
53000	437	3604	3622	3640	3657	3675	3693	3711	3729	3747	3765
54000	437	3783	3800	3818	3836	3853	3871	3889	3906	3924	3942
55000	437	3959	3977	3994	4012	4029	4047	4064	4082	4099	4117
56000	437	4134	4152	4169	4186	4203	4221	4238	4255	4272	4290
57000	437	4307	4324	4341	4358	4375	4392	4409	4426	4443	4461
58000	437	4478	4494	4511	4528	4545	4562	4579	4596	4612	4629
59000	437	4646	4663	4679	4696	4713	4729	4746	4763	4779	4796
60000	437	4813	4829	4845	4862	4878	4895	4911	4928	4944	4960
61000	437	4977	4993	5009	5025	5042	5058	5074	5090	5107	5123
62000	437	5139	5155	.5171	5187	5203	5219	5235	5251	5267	5283
63000	437	5299	5315	5331	5346	5362	5378	5394	5410	5425	5441
64000	437	5457	5473	5488	5504	5519	5535	5550	5566	5582	5597
65000	437	5613	5628	5643	5659	5674	5690	5705	5720	5736	5751
66000	437	5766	5782	5797	5812	5827	5842	5857	5873	5888	5903
67000	437	5981	5933	5948	5963	5978	5993	6008	6023	6037	6052

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 63,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 31,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 32,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	**TAS**	**CRUISE DISTANCE NAUTICAL AIR MILES**									
35000	396	0	22	45	67	90	112	135	157	180	203
36000	400	225	247	270	292	314	337	359	381	403	426
37000	404	448	470	492	514	536	558	580	602	624	646
38000	407	668	690	712	733	755	777	798	820	842	864
39000	411	885	907	928	950	971	993	1014	1036	1057	1079
40000	415	1100	1121	1142	1164	1185	1206	1227	1249	1270	1291
41000	418	1312	1333	1354	1375	1396	1417	1438	1459	1480	1501
42000	421	1522	1542	1563	1584	1604	1625	1646	1667	1687	1708
43000	423	1729	1749	1770	1790	1810	1831	1851	1872	1892	1913
44000	426	1933	1953	1974	1994	2014	2034	2054	2075	2095	2115
45000	428	2135	2155	2175	2195	2215	2235	2255	2275	2295	2315
46000	430	2335	2355	2375	2394	2414	2434	2453	2473	2493	2513
47000	432	2532	2552	2571	2591	2610	2630	2649	2669	2688	2708
48000	433	2727	2746	2766	2785	2804	2823	2843	2862	2881	2900
49000	434	2920	2939	2958	2977	2996	3015	3034	3053	3072	3091
50000	435	3110	3129	3147	3166	3185	3204	3223	3241	3260	3279
51000	435	3298	3316	3335	3353	3372	3391	3409	3428	3446	3465
52000	435	3483	3502	3520	3539	3557	3575	3594	3612	3630	3649
53000	435	3667	3685	3703	3721	3739	3758	3776	3794	3812	3830
54000	435	3848	3866	3884	3902	3920	3938	3956	3973	3991	4009
55000	435	4027	4045	4063	4080	4098	4116	4133	4151	4169	4186
56000	435	4204	4221	4239	4256	4274	4291	4309	4326	4343	4361
57000	435	4378	4396	4413	4430	4447	4464	4482	4499	4516	4533
58000	435	4550	4567	4584	4601	4618	4635	4652	4669	4686	4703
59000	435	4720	4737	4754	4771	4787	4804	4821	4838	4854	4871
60000	435	4888	4904	4921	4937	4954	4970	4987	5003	5020	5036
61000	435	5053	5069	5086	5102	5118	5134	5151	5167	5183	5200
62000	435	5216	5232	5248	5264	5280	5296	5312	5328	5344	5360
63000	435	5377	5392	5408	5424	5440	5456	5471	5487	5503	5519
64000	435	5535	5550	5566	5582	5597	5613	5628	5644	5659	5675
65000	435	5691	5706	5721	5737	5752	5767	5783	5798	5813	5829
66000	435	5844	5859	5874	5889	5904	5920	5935	5950	5965	5980
67000	435	5995	6010	6025	6040	6054	6069	6084	6099	6114	6129

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 60,700 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 32,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 33,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	400	0	23	46	69	92	115	138	161	184	207
36000	405	230	252	275	298	320	343	366	389	411	434
37000	408	457	479	502	524	547	569	591	614	636	659
38000	412	681	703	725	747	770	792	814	836	858	880
39000	415	902	924	946	968	990	1012	1034	1055	1077	1099
40000	419	1121	1143	1164	1186	1207	1229	1251	1272	1294	1315
41000	421	1337	1358	1380	1401	1422	1444	1465	1486	1508	1529
42000	424	1550	1571	1593	1614	1635	1656	1677	1698	1719	1740
43000	426	1761	1782	1803	1823	1844	1865	1886	1907	1928	1948
44000	428	1969	1990	2010	2031	2051	2072	2092	2113	2134	2154
45000	430	2175	2195	2215	2235	2256	2276	2296	2317	2337	2357
46000	432	2377	2397	2417	2437	2458	2478	2498	2518	2538	2558
47000	433	2578	2597	2617	2637	2657	2677	2696	2716	2736	2756
48000	433	2775	2795	2814	2834	2854	2873	2893	2912	2932	2951
49000	433	2971	2990	3009	3029	3048	3067	3087	3106	3125	3144
50000	433	3164	3183	3202	3221	3240	3259	3278	3297	3316	3335
51000	433	3354	3373	3392	3411	3429	3448	3467	3486	3505	3523
52000	433	3542	3561	3579	3598	3617	3635	3654	3672	3691	3709
53000	433	3728	3746	3765	3783	3801	3819	3838	3856	3874	3893
54000	433	3911	3929	3947	3965	3983	4001	4019	4038	4056	4074
55000	433	4092	4110	4127	4145	4163	4181	4199	4216	4234	4252
56000	433	4270	4287	4305	4323	4340	4358	4375	4393	4410	4428
57000	433	4445	4463	4480	4497	4515	4532	4549	4567	4584	4601
58000	433	4619	4636	4653	4670	4687	4704	4721	4738	4755	4772
59000	433	4789	4806	4823	4840	4856	4873	4890	4907	4924	4940
60000	433	4957	4974	4990	5007	5024	5040	5057	5073	5090	5106
61000	433	5123	5139	5155	5172	5188	5204	5221	5237	5253	5270
62000	433	5286	5302	5318	5334	5350	5366	5382	5398	5414	5430
63000	433	5446	5462	5478	5493	5509	5525	5541	5557	5572	5588
64000	433	5604	5619	5635	5650	5666	5681	5697	5712	5728	5743
65000	433	5759	5774	5789	5804	5820	5835	5850	5865	5880	5896
66000	433	5911	5926	5941	5956	5970	5985	6000	6015	6030	6045
67000	433	6060	6075	6089	6104	6118	6133	6148	6162	6177	6191

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 58,200 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 66,400 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 33,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 34,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	405	0	23	46	70	93	117	140	164	187	210
36000	409	234	257	280	303	326	350	373	396	419	442
37000	413	465	488	511	534	557	579	602	625	648	671
38000	416	694	716	739	761	784	806	829	851	874	896
39000	419	919	941	963	986	1008	1030	1053	1075	1097	1119
40000	422	1142	1164	1186	1207	1229	1251	1273	1295	1317	1339
41000	424	1361	1383	1405	1426	1448	1470	1492	1513	1535	1557
42000	427	1578	1600	1621	1643	1664	1685	1707	1728	1750	1771
43000	428	1792	1814	1835	1856	1877	1898	1919	1940	1961	1983
44000	430	2004	2025	2045	2066	2087	2108	2129	2150	2171	2191
45000	431	2212	2233	2253	2274	2295	2315	2336	2356	2377	2398
46000	431	2418	2438	2459	2479	2499	2520	2540	2560	2581	2601
47000	431	2621	2641	2661	2682	2702	2722	2742	2762	2782	2802
48000	431	2822	2842	2862	2881	2901	2921	2941	2960	2980	3000
49000	431	3020	3039	3059	3078	3098	3118	3137	3157	3176	3196
50000	431	3215	3234	3254	3273	3292	3311	3331	3350	3369	3389
51000	431	3408	3427	3446	3465	3484	3503	3522	3541	3560	3579
52000	431	3598	3616	3635	3654	3673	3691	3710	3729	3747	3766
53000	431	3785	3803	3822	3840	3859	3877	3896	3914	3932	3951
54000	431	3969	3987	4006	4024	4042	4060	4078	4096	4115	4133
55000	431	4151	4169	4187	4205	4223	4240	4258	4276	4294	4312
56000	431	4330	4348	4365	4383	4400	4418	4436	4453	4471	4489
57000	431	4506	4524	4541	4558	4576	4593	4610	4628	4645	4662
58000	431	4680	4697	4714	4731	4748	4765	4782	4799	4816	4833
59000	431	4851	4867	4884	4901	4918	4934	4951	4968	4985	5002
60000	431	5018	5035	5051	5068	5084	5101	5117	5134	5150	5167
61000	431	5183	5200	5216	5232	5248	5264	5281	5297	5313	5329
62000	431	5345	5361	5377	5393	5409	5425	5441	5457	5472	5488
63000	431	5504	5520	5535	5551	5566	5582	5598	5613	5629	5644
64000	431	5660	5675	5690	5706	5721	5736	5751	5766	5782	5797
65000	430	5812	5827	5842	5857	5872	5886	5901	5916	5931	5946
66000	430	5961	5975	5990	6004	6019	6033	6048	6062	6077	6091
67000	430	6106	6120	6134	6148	6162	6176	6190	6204	6219	6233

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 55,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 67,100 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 65,700 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 64,000 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 34,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 35,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	410	0	23	47	71	95	119	143	167	191	214
36000	414	238	262	285	309	333	356	380	403	427	450
37000	417	474	497	521	544	567	590	614	637	660	683
38000	420	707	730	753	776	798	821	844	867	890	913
39000	422	936	959	982	1004	1027	1050	1072	1095	1117	1140
40000	425	1163	1185	1207	1230	1252	1275	1297	1319	1342	1364
41000	426	1386	1408	1430	1452	1474	1496	1519	1541	1563	1585
42000	428	1607	1628	1650	1672	1694	1715	1737	1759	1781	1802
43000	429	1824	1845	1867	1888	1910	1931	1953	1974	1996	2017
44000	429	2039	2060	2081	2102	2123	2144	2165	2187	2208	2229
45000	429	2250	2271	2292	2313	2334	2355	2375	2396	2417	2438
46000	429	2459	2480	2500	2521	2541	2562	2582	2603	2624	2644
47000	429	2665	2685	2705	2726	2746	2766	2787	2807	2827	2848
48000	429	2868	2888	2908	2928	2948	2968	2988	3008	3028	3048
49000	429	3068	3088	3107	3127	3147	3166	3186	3206	3226	3245
50000	429	3265	3284	3304	3323	3343	3362	3381	3401	3420	3440
51000	429	3459	3478	3497	3516	3536	3555	3574	3593	3612	3631
52000	429	3650	3669	3688	3707	3726	3744	3763	3782	3801	3820
53000	429	3838	3857	3875	3894	3913	3931	3950	3968	3987	4005
54000	429	4024	4042	4060	4078	4097	4115	4133	4151	4170	4188
55000	430	4206	4224	4242	4260	4278	4296	4314	4331	4349	4367
56000	430	4385	4403	4420	4438	4456	4473	4491	4509	4526	4544
57000	430	4561	4579	4596	4613	4631	4648	4665	4682	4700	4717
58000	429	4734	4751	4768	4785	4802	4819	4836	4853	4870	4887
59000	429	4904	4921	4937	4954	4971	4987	5004	5021	5037	5054
60000	429	5070	5087	5103	5119	5136	5152	5168	5184	5201	5217
61000	429	5233	5249	5265	5281	5297	5313	5329	5345	5361	5377
62000	429	5393	5408	5424	5439	5455	5470	5486	5501	5517	5532
63000	428	5548	5563	5578	5593	5608	5623	5638	5654	5669	5684
64000	428	5699	5714	5728	5743	5758	5772	5787	5802	5817	5831
65000	427	5846	5860	5874	5889	5903	5917	5932	5946	5960	5974

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 53,000 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 64,500 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 63,100 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 61,600 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 35,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 36,000 ft LONG RANGE CRUISE

GROSS		0	100	200	300	400	500	600	700	800	900
WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	414	0	24	48	73	97	121	146	170	194	219
36000	417	243	267	291	315	339	363	387	411	435	459
37000	420	483	507	531	554	578	602	625	649	673	696
38000	422	720	743	767	790	814	837	860	884	907	930
39000	424	954	977	1000	1023	1046	1069	1092	1115	1138	1161
40000	426	1184	1207	1229	1252	1275	1297	1320	1343	1365	1388
41000	427	1411	1433	1455	1478	1500	1523	1545	1567	1590	1612
42000	427	1634	1657	1679	1701	1723	1745	1767	1789	1811	1833
43000	427	1855	1877	1899	1920	1942	1964	1986	2007	2029	2051
44000	427	2073	2094	2116	2137	2158	2180	2201	2223	2244	2266
45000	427	2287	2308	2329	2350	2372	2393	2414	2435	2456	2477
46000	427	2498	2519	2540	2561	2582	2602	2623	2644	2665	2686
47000	427	2706	2727	2747	2768	2788	2809	2829	2850	2870	2891
48000	427	2911	2931	2951	2972	2992	3012	3032	3052	3072	3093
49000	427	3113	3133	3152	3172	3192	3212	3232	3252	3271	3291
50000	427	3311	3331	3350	3370	3389	3409	3428	3448	3467	3487
51000	427	3506	3525	3545	'3564	3583	3602	3621	3641	3660	3679
52000	428	3698	3717	3736	3755	3774	3792	3811	3830	3849	3868
53000	428	3887	3905	3924	3942	3961	3979	3998	4016	4035	4054
54000	428	4072	4090	4108	4127	4145	4163	4181	4199	4217	4236
55000	428	4254	4272	4290	4307	4325	4343	4361	4379	4397	4414
56000	427	4432	4450	4467	4485	4502	4520	4537	4554	4572	4589
57000	427	4607	4624	4641	4658	4675	4692	4709	4727	4744	4761
58000	427	4778	4795	4811	4828	4845	4861	4878	4895	4911	4928
59000	427	4945	4961	4977	4994	5010	5026	5042	5059	5075	5091
60000	426	5107	5123	5139	5155	5171	5187	5202	5218	5234	5250
61000	426	5266	5281	5296	5312	5327	5342	5358	5373	5389	5404
62000	425	5419	5434	5449	5464	.5479	5494	5509	5523	5538	5553

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 50,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 61,800 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 60,500 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 59,200 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 36,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 37,000 ft LONG RANGE CRUISE

GROSS WT. kg	TAS	CRUISE DISTANCE NAUTICAL AIR MILES									
		0	100	200	300	400	500	600	700	800	900
35000	419	0	24	49	74	99	123	148	173	198	222
36000	422	247	271	296	320	345	369	393	418	442	467
37000	424	491	515	539	563	587	611	635	659	683	707
38000	426	731	755	779	803	826	850	874	897	921	945
39000	427	968	992	1015	1038	1062	1085	1108	1132	1155	1178
40000	427	1202	1225	1248	1271	1294	1317	1340	1363	1386	1409
41000	427	1432	1454	1477	1500	1522	1545	1568	1590	1613	1636
42000	427	1659	1681	1703	1725	1748	1770	1792	1815	1837	1859
43000	427	1882	1904	1926	1948	1970	1992	2014	2036	2058	2080
44000	427	2102	2123	2145	2167	2188	2210	2231	2253	2275	2296
45000	427	2318	2339	2361	2382	2403	2424	2446	2467	2488	2510
46000	427	2531	2552	2573	2594	2615	2635	2656	2677	2698	2719
47000	427	2740	2761	2781	2802	2822	2843	2864	2884	2905	2925
48000	427	2946	2966	2986	3007	3027	3047	3067	3088	3108	3128
49000	427	3148	3168	3188	3208	3228	3248	3268	3288	3307	3327
50000	427	3347	3367	3386	3406	3425	3445	3464	3484	3503	3523
51000	427	3542	3562	3581	3600	3619	3638	3657	3676	3696	3715
52000	427	3734	3753	3771	3790	3809	3828	3846	3865	3884	3903
53000	427	3922	3940	3958	3977	3995	4013	4032	4050	4069	4087
54000	427	4105	4123	4141	4159	4177	4195	4213	4231	4249	4267
55000	427	4285	4303	4320	4338	4385	4373	4390	4408	4425	4443
56000	427	4461	4479	4495	4512	4529	4546	4563	4580	4597	4614
57000	426	4631	4648	4665	4681	4698	4714	4731	4748	4764	4781
58000	426	4797	4813	4830	4845	4862	4878	4894	4910	4926	4942
59000	425	4958	4974	4990	5005	5021	5036	5052	5067	5083	5099

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 48,000 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 58,700 kgG

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 57,500 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 56,300 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.1 Long Range Cruise – Pressure Altitude 37,000 ft

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All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 21,000 ft MACH 0.74 CRUISE TAS 453 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	14	29	44	59	74	89	104	119	134
36000	149	164	179	193	208	223	238	253	268	283
37000	298	313	328	342	357	372	387	402	417	432
38000	447	461	476	491	506	521	536	550	565	580
39000	595	610	625	639	654	669	684	699	714	728
40000	743	758	773	788	802	817	832	847	861	876
41000	891	906	921	935	950	965	980	994	1009	1024
42000	1039	1053	1068	1083	1097	1112	1127	1142	1156	1171
43000	1186	1200	1215	1230	1244	1259	1274	1288	1303	1318
44000	1332	1347	1362	1376	1391	1406	1420	1435	1450	1464
45000	1479	1493	1508	1523	1537	1552	1566	1581	1596	1610
46000	1625	1639	1654	1669	1683	1698	1712	1727	1741	1756
47000	1770	1785	1799	1814	1828	1843	1857	1872	1887	1901
48000	1916	1930	1944	1959	1973	1988	2002	2017	2031	2046
49000	2060	2075	2089	2103	2118	2132	2147	2161	2175	2190
50000	2204	2219	2233	2247	2262	2276	2290	2305	2319	2333
51000	2348	2362	2376	2391	2405	2419	2434	2448	2462	2476
52000	2491	2505	2519	2534	2548	2562	2576	2590	2605	2619
53000	2633	2647	2662	2676	2690	2704	2718	2733	2747	2761
54000	2775	2789	2803	2817	2832	2846	2860	2874	2888	2902
55000	2916	2930	2944	2958	2973	2987	3001	3015	3029	3043
56000	3057	3071	3085	3099	3113	3127	3141	3155	3169	3183
57000	3197	3211	3225	3239	3253	3267	3280	3294	3308	3322
58000	3336	3350	3364	3378	3392	3405	3419	3433	3447	3461
59000	3475	3489	3502	3516	3530	3544	3558	3571	3585	3599
60000	3613	3626	3640	3654	3668	3681	3695	3709	3722	3736
61000	3750	3764	3777	3791	3804	3818	3832	3845	3859	3873
62000	3886	3900	3913	3927	3941	3954	3968	3981	3995	4008
63000	4022	4036	4049	4063	4076	4090	4103	4117	4130	4144
64000	4157	4170	4184	4197	4211	4224	4238	4251	4264	4278
65000	4291	4305	4318	4331	4345	4358	4371	4385	4398	4411
66000	4425	4438	4451	4465	4478	4491	4504	4518	4531	4544
67000	4558	4571	4584	4597	4610	4623	4637	4650	4663	4676

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 21,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 22,000 ft MACH 0.74 CRUISE TAS 451 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	15	30	46	61	77	92	108	123	139
36000	154	170	185	201	216	232	247	263	278	293
37000	309	324	340	355	371	386	401	417	432	448
38000	463	479	494	509	525	540	555	571	586	602
39000	617	632	648	663	678	694	709	725	740	755
40000	771	786	801	817	832	847	862	878	893	908
41000	924	939	954	970	985	1000	1015	1031	1046	1061
42000	1077	1092	1107	1122	1137	1153	1168	1183	1198	1214
43000	1229	1244	1259	1274	1290	1305	1320	1335	1350	1366
44000	1381	1396	1411	1426	1441	1457	1472	1487	1502	1517
45000	1532	1547	1562	1578	1593	1608	1623	1638	1653	1668
46000	1683	1698	1713	1728	1743	1758	1773	1789	1804	1819
47000	1834	1849	1864	1879	1894	1909	1924	1939	1954	1969
48000	1984	1998	2013	2028	2043	2058	2073	2088	2103	2118
49000	2133	2148	2163	2177	2192	2207	2222	2237	2252	2267
50000	2282	2296	2311	2326	2341	2356	2370	2385	2400	2415
51000	2430	2444	2459	2474	2489	2503	2518	2533	2548	2562
52000	2577	2592	2606	2621	2636	2650	2665	2680	2695	2709
53000	2724	2738	2753	2768	2782	2797	2812	2826	2841	2855
54000	2870	2885	2899	2914	2928	2943	2957	2972	2986	3001
55000	3015	3030	3044	3059	3073	3088	3102	3117	3131	3146
56000	3160	3174	3189	3203	3218	3232	3246	3261	3275	3290
57000	3304	3318	3333	3347	3361	3376	3390	3404	3418	3433
58000	3447	3461	3476	3490	3504	3518	3533	3547	3561	3575
59000	3589	3604	3618	3632	3646	3660	3674	3689	3703	3717
60000	3731	3745	3759	3773	3787	3801	3816	3830	3844	3858
61000	3872	3886	3900	3914	3928	3942	3956	3970	3984	3998
62000	4012	4026	4040	4054	4068	4081	4095	4109	4123	4137
63000	4151	4165	4179	4193	4206	4220	4234	4248	4262	4276
64000	4289	4303	4317	4331	4344	4358	4372	4386	4399	4413
65000	4427	4441	4454	4468	4482	4495	4509	4523	4536	4550
66000	4564	4577	4591	4604	4618	4632	4645	4659	4672	4686
67000	4699	4713	4726	4740	4753	4767	4780	4794	4807	4821

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 22,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 23,000 ft MACH 0.74 CRUISE TAS 449 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	16	32	48	64	80	96	112	128	144
36000	160	176	192	208	224	240	256	272	288	304
37000	320	336	352	368	384	400	416	432	448	464
38000	480	496	512	528	544	560	576	592	608	624
39000	640	656	671	687	703	719	735	751	767	783
40000	799	815	830	846	862	878	894	910	926	941
41000	957	973	989	1005	1021	1036	1052	1068	1084	1100
42000	1115	1131	1147	1163	1179	1194	1210	1226	1242	1257
43000	1273	1289	1305	1320	1336	1352	1367	1383	1399	1415
44000	1430	1446	1462	1477	1493	1509	1524	1540	1555	1571
45000	1587	1602	1618	1634	1649	1665	1680	1696	1712	1727
46000	1743	1758	1774	1789	1805	1820	1836	1851	1867	1883
47000	1898	1914	1929	1945	1960	1975	1991	2006	2022	2037
48000	2053	2068	2084	2099	2114	2130	2145	2161	2176	2191
49000	2207	2222	2237	2253	2268	2283	2299	2314	2329	2345
50000	2360	2375	2391	2406	2421	2436	2452	2467	2482	2497
51000	2513	2528	2543	2558	2574	2589	2604	2619	2634	2649
52000	2665	2680	2695	2710	2725	2740	2755	2770	2786	2801
53000	2816	2831	2846	2861	2876	2891	2906	2921	2936	2951
54000	2966	2981	2996	3011	3026	3041	3056	3071	3086	3101
55000	3116	3130	3145	3160	3175	3190	3205	3220	3234	3249
56000	3264	3279	3294	3309	3323	3338	3353	3368	3382	3397
57000	3412	3427	3441	3456	3471	3486	3500	3515	3530	3544
58000	3559	3574	3588	3603	3617	3632	3647	3661	3676	3690
59000	3705	3720	3734	3749	3763	3778	3792	3807	3821	3836
60000	3850	3865	3879	3894	3908	3923	3937	3951	3966	3980
61000	3995	4009	4023	4038	4052	4066	4081	4095	4109	4124
62000	4138	4152	4167	4181	4195	4209	4224	4238	4252	4266
63000	4281	4295	4309	4323	4337	4351	4366	4380	4394	4408
64000	4422	4436	4450	4464	4479	4493	4507	4521	4535	4549
65000	4563	4577	4591	4605	4619	4633	4647	4661	4675	4689
66000	4703	4716	4730	4744	4758	4772	4786	4800	4814	4827
67000	4841	4855	4869	4883	4896	4910	4924	4938	4952	4965

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 23,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 24,000 ft MACH 0.74 CRUISE TAS 447 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	16	33	49	66	83	99	116	133	149
36000	166	183	199	216	232	249	266	282	299	315
37000	332	349	365	382	398	415	431	448	465	481
38000	498	514	531	547	564	580	597	613	630	646
39000	663	679	696	712	729	745	762	778	795	811
40000	828	844	860	877	893	910	926	942	959	975
41000	992	1008	1024	1041	1057	1074	1090	1106	1123	1139
42000	1155	1172	1188	1204	1221	1237	1253	1269	1286	1302
43000	1318	1335	1351	1367	1383	1399	1416	1432	1448	1464
44000	1481	1497	1513	1529	1545	1561	1578	1594	1610	1626
45000	1642	1658	1675	1691	1707	1723	1739	1755	1771	1787
46000	1803	1819	1835	1851	1867	1883	1899	1915	1932	1948
47000	1964	1980	1995	2011	2027	2043	2059	2075	2091	2107
48000	2123	2139	2155	2171	2187	2202	2218	2234	2250	2266
49000	2282	2298	2313	2329	2345	2361	2377	2392	2408	2424
50000	2440	2455	2471	2487	2503	2518	2534	2550	2565	2581
51000	2597	2612	2628	2644	2659	2675	2691	2706	2722	2737
52000	2753	2769	2784	2800	2815	2831	2846	2862	2877	2893
53000	2908	2924	2939	2955	2970	2986	3001	3017	3032	3047
54000	3063	3078	3094	3109	3124	3140	3155	3170	3186	3201
55000	3216	3232	3247	3262	3277	3293	3308	3323	3338	3354
56000	3369	3384	3399	3414	3430	3445	3460	3475	3490	3506
57000	3521	3536	3551	3566	3581	3596	3611	3626	3641	3656
58000	3671	3686	3701	3716	3731	3746	3761	3776	3791	3806
59000	3821	3836	3851	3866	3881	3896	3910	3925	3940	3995
60000	3970	3985	4000	4014	4029	4044	4059	4073	4088	4103
61000	4118	4132	4147	4162	4176	4191	4206	4220	4235	4250
62000	4264	4279	4294	4308	4323	4337	4352	4366	4381	4396
63000	4410	4425	4439	4454	4468	4483	4497	4511	4526	4540
64000	4555	4569	4584	4598	4612	4627	4641	4655	4670	4684
65000	4698	4713	4727	4741	4756	4770	4784	4798	4813	4827
66000	4841	4855	4869	4884	4898	4912	4926	4940	4954	4968
67000	4983	4997	5011	5025	5039	5053	5067	5081	5095	5109

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT
A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT
B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT
C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES
A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA
B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA
C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA
D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Mach 0.74 Cruise – Pressure Altitude 24,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 25,000 ft MACH 0.74 CRUISE TAS 445 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	17	34	51	69	86	103	120	138	155
36000	172	189	206	224	241	258	275	293	310	327
37000	344	361	378	396	413	430	447	464	481	499
38000	516	533	550	567	584	601	618	635	652	670
39000	687	704	721	738	755	772	789	806	823	840
40000	857	874	891	908	925	942	959	976	993	1010
41000	1027	1044	1061	1076	1094	1111	1128	1145	1162	1179
42000	1196	1213	1230	1246	1263	1280	1297	1314	1331	1347
43000	1364	1381	1398	1414	1431	1448	1465	1482	1498	1515
44000	1532	1548	1565	1582	1599	1615	1632	1649	1665	1682
45000	1699	1715	1732	1748	1765	1782	1798	1815	1831	1848
46000	1865	1881	1898	1914	1931	1947	1964	1980	1997	2013
47000	2030	2046	2063	2079	2096	2112	2128	2145	2161	2178
48000	2194	2210	2227	2243	2259	2276	2292	2308	2325	2341
49000	2358	2374	2390	2406	2422	2439	2455	2471	2487	2504
50000	2520	2536	2552	2568	2585	2601	2617	2633	2649	2665
51000	2681	2698	2714	2730	2746	2762	2778	2794	2810	2826
52000	2842	2858	2874	2890	2906	2922	2938	2954	2970	2986
53000	3002	3017	3033	3049	3065	3081	3097	3113	3128	3144
54000	3160	3176	3192	3207	3223	3239	3255	3270	3286	3302
55000	3318	3333	3349	3365	3380	3396	3411	3427	3443	3458
56000	3474	3490	3505	3521	3536	3552	3567	3583	3598	3614
57000	3630	3645	3660	3676	3691	3707	3722	3738	3753	3768
58000	3784	3799	3815	3830	3845	3861	3876	3891	3906	3922
59000	3937	3952	3968	3983	3998	4013	4028	4044	4059	4074
60000	4089	4104	4119	4135	4150	4165	4180	4195	4210	4225
61000	4240	4255	4270	4285	4300	4315	4330	4345	4360	4375
62000	4390	4405	4420	4435	4450	4465	4479	4494	4509	4524
63000	4539	4554	4568	4583	4598	4613	4628	4642	4657	4672
64000	4687	4701	4716	4731	4745	4760	4774	4789	4804	4818
65000	4833	4848	4862	4877	4891	4906	4920	4935	4949	4964
66000	4978	4993	5007	5022	5036	5050	5065	5079	5094	5108
67000	5122	5137	5151	5165	5180	5194	5208	5222	5237	5251

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 25,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 26,000 ft MACH 0.74 CRUISE TAS 443 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	17	35	53	71	89	107	125	143	160
36000	178	196	214	232	250	267	285	303	321	339
37000	356	374	392	410	427	445	463	481	498	516
38000	534	552	569	587	605	622	640	658	675	693
39000	711	728	746	764	781	799	817	834	852	869
40000	887	905	922	940	957	975	992	1010	1027	1045
41000	1062	1080	1097	1115	1132	1150	1167	1185	1202	1219
42000	1237	1254	1272	1289	1306	1324	1341	1359	1376	1393
43000	1411	1428	1445	1463	1480	1497	1514	1532	1549	1566
44000	1584	1601	1618	1635	1652	1669	1687	1704	1721	1738
45000	1755	1773	1790	1807	1824	1841	1858	1875	1892	1909
46000	1926	1943	1960	1977	1994	2011	2028	2045	2062	2080
47000	2097	2113	2130	2147	2164	2181	2198	2215	2232	2249
48000	2266	2282	2299	2316	2333	2350	2366	2383	2400	2417
49000	2433	2450	2467	2484	2500	2517	2534	2550	2567	2584
50000	2600	2617	2634	2650	2667	2683	2700	2716	2733	2750
51000	2766	2783	2799	2816	2832	2849	2865	2882	2898	2915
52000	2931	2947	2964	2980	2996	3013	3029	3046	3062	3078
53000	3095	3111	3127	3143	3160	3176	3192	3208	3225	3241
54000	3257	3273	3289	3306	3322	3338	3354	3370	3386	3402
55000	3419	3435	3451	3467	3483	3499	3515	3531	3547	3563
56000	3579	3595	3611	3626	3642	3658	3674	3690	3706	3722
57000	3738	3754	3769	3785	3801	3817	3832	3848	3864	3880
58000	3896	3911	3927	3943	3958	3974	3990	4005	4021	4036
59000	4052	4068	4083	4099	4114	4130	4145	4161	4176	4192
60000	4207	4223	4238	4254	4269	4285	4300	4315	4331	4346
61000	4362	4377	4392	4407	4423	4438	4453	4469	4484	4499
62000	4514	4530	4545	4560	4575	4590	4605	4621	4636	4651
63000	4666	4681	4696	4711	4726	4741	4756	4771	4786	4801
64000	4816	4831	4846	4861	4876	4891	4906	4921	4936	4950
65000	4965	4980	4995	5010	5024	5039	5054	5069	5083	5098
66000	5113	5128	5142	5157	5172	5186	5201	5215	5230	5245
67000	5259	5274	5288	5303	5317	5332	5346	5361	5375	5390

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 26,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 27,000 ft MACH 0.74 CRUISE TAS 442 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	18	37	55	74	92	111	129	148	166
36000	185	203	221	240	258	277	295	314	332	351
37000	369	387	406	424	442	461	479	497	516	534
38000	553	571	589	607	626	644	662	680	699	717
39000	735	754	772	790	808	826	844	863	881	899
40000	917	935	953	972	990	1008	1026	1044	1062	1080
41000	1098	1116	1134	1152	1170	1188	1206	1224	1242	1260
42000	1278	1296	1314	1332	1350	1368	1386	1404	1422	1440
43000	1457	1475	1493	1511	1529	1546	1564	1582	1600	1618
44000	1636	1653	1671	1689	1706	1724	1742	1759	1777	1795
45000	1813	1830	1848	1865	1883	1900	1918	1936	1953	1971
46000	1988	2006	2023	2041	2058	2076	2093	2111	2128	2146
47000	2163	2181	2198	2215	2233	2250	2267	2285	2302	2320
48000	2337	2354	2371	2389	2406	2423	2440	2458	2475	2492
49000	2509	2527	2544	2561	2578	2595	2612	2629	2646	2664
50000	2681	2698	2715	2732	2749	2766	2783	2800	2817	2834
51000	2851	2868	2885	2902	2918	2935	2952	2969	2986	3003
52000	3020	3036	3053	3070	3087	3104	3120	3137	3154	3171
53000	3187	3204	3221	3237	3254	3271	3287	3304	3320	3337
54000	3354	3370	3387	3403	3420	3436	3453	3469	3486	3502
55000	3519	3535	3552	3568	3584	3601	3617	3633	3650	3666
56000	3683	3699	3715	3731	3747	3764	3780	3796	3812	3829
57000	3845	3861	3877	3893	3909	3925	3942	3958	3974	3990
58000	4006	4022	4038	4054	4070	4086	4102	4118	4134	4150
59000	4166	4182	4197	4213	4229	4245	4261	4277	4292	4308
60000	4324	4340	4356	4371	4387	4403	4418	4434	4450	4465
61000	4481	4497	4512	4528	4543	4559	4574	4590	4606	4621
62000	4637	4652	4668	4683	4698	4714	4729	4745	4760	4775
63000	4791	4806	4821	4837	4852	4867	4882	4898	4913	4928
64000	4943	4959	4974	4989	5004	5019	5034	5049	5064	5080
65000	5095	5110	5125	5140	5155	5170	5185	5200	5214	5229
66000	5244	5259	5274	5289	5304	5319	5333	5348	5363	5378
67000	5393	5407	5422	5437	5451	5466	5481	5495	5510	5525

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 27,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 28,000 ft MACH 0.74 CRUISE TAS 440 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	19	38	57	76	95	114	134	153	172
36000	191	210	229	248	267	286	305	324	343	362
37000	382	401	419	438	457	476	495	514	533	552
38000	571	590	609	628	647	666	684	703	722	741
39000	760	779	797	816	835	854	873	891	910	929
40000	948	966	985	1004	1022	1041	1060	1078	1097	1116
41000	1134	1153	1171	1190	1209	1227	1246	1264	1283	1301
42000	1320	1338	1357	1375	1394	1412	1431	1449	1467	1486
43000	1504	1523	1541	1559	1578	1596	1614	1633	1651	1669
44000	1688	1706	1724	1742	1760	1779	1797	1815	1833	1851
45000	1870	1888	1906	1924	1942	1960	1978	1996	2014	2032
46000	2050	2068	2086	2104	2122	2140	2158	2176	2194	2212
47000	2230	2248	2265	2283	2301	2319	2337	2355	2372	2390
48000	2408	2426	2443	2461	2479	2497	2514	2532	2550	2567
49000	2585	2603	2620	2638	2655	2673	2690	2708	2726	2743
50000	2761	2778	2795	2813	2830	2848	2865	2883	2900	2917
51000	2935	2952	2969	2987	3004	3021	3039	3056	3073	3090
52000	3108	3125	3142	3159	3176	3193	3211	3228	3245	3262
53000	3279	3296	3313	3330	3347	3364	3381	3398	3415	3432
54000	3449	3466	3483	3500	3517	3533	3550	3567	3584	3601
55000	3618	3634	3651	3668	3685	3701	3718	3735	3751	3768
56000	3785	3801	3818	3835	3851	3868	3884	3901	3917	3934
57000	3951	3967	3983	4000	4016	4033	4049	4065	4082	4098
58000	4115	4131	4147	4164	4180	4196	4212	4229	4245	4261
59000	4277	4293	4310	4326	4324	4358	4374	4390	4406	4422
60000	4438	4454	4470	4486	4502	4518	4534	4550	4566	4582
61000	4598	4614	4630	4645	4661	4677	4693	4709	4724	4740
62000	4756	4772	4787	4803	4818	4834	4850	4865	4881	4897
63000	4912	4928	4943	4959	4974	4990	5005	5021	5036	5052
64000	5067	5082	5098	5113	5128	5144	5159	5174	5190	5205
65000	5220	5235	5250	5266	5281	5296	5311	5326	5341	5357
66000	5372	5387	5402	5417	5432	5447	5462	5477	5492	5507
67000	5522	5536	5551	5566	5581	5596	5611	5625	5640	5655

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 28,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 29,000 ft MACH 0.74 CRUISE TAS 438 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	19	39	59	79	98	118	138	158	178
36000	197	217	237	256	276	296	315	335	355	375
37000	394	414	433	453	473	492	512	531	551	570
38000	590	609	629	648	668	687	707	726	746	765
39000	785	804	823	843	862	881	901	920	939	959
40000	978	997	1017	1036	1055	1074	1093	1113	1132	1151
41000	1170	1189	1209	1228	1247	1266	1285	1304	1323	1342
42000	1361	1380	1399	1418	1437	1456	1475	1494	1513	1532
43000	1551	1570	1589	1608	1626	1645	1664	1683	1702	1721
44000	1739	1758	1777	1795	1814	1833	1852	1870	1889	1908
45000	1926	1945	1963	1982	2001	2019	2038	2056	2075	2093
46000	2112	2130	2149	2167	2186	2204	2222	2241	2259	2278
47000	2296	2314	2333	2351	2369	2387	2406	2424	2442	2461
48000	2479	2497	2515	2533	2551	2569	2588	2606	2624	2642
49000	2660	2678	2696	2714	2732	2750	2768	2786	2804	2822
50000	2840	2858	2875	2893	2911	2929	2947	2964	2982	3000
51000	3018	3036	3053	3071	3089	3106	3124	3142	3159	3177
52000	3195	3212	3230	3247	3265	3282	3300	3317	3335	3352
53000	3370	3387	3404	3422	3439	3456	3474	3491	3508	3526
54000	3543	3560	3578	3595	3612	3629	3646	3664	3681	3698
55000	3715	3732	3749	3766	3783	3800	3817	3834	3851	3868
56000	3885	3902	3919	3936	3953	3970	3987	4003	4020	4037
57000	4054	4071	4087	4104	4121	4137	4154	4171	4187	4204
58000	4221	4237	4254	4270	4287	4303	4320	4337	4353	4370
59000	4386	4402	4419	4435	4451	4468	4484	4501	4517	4533
60000	4550	4566	4582	4598	4614	4630	4647	4663	4679	4695
61000	4711	4727	4743	4759	4775	4791	4807	4823	4839	4855
62000	4871	4887	4903	4919	4935	4950	4966	4982	4998	5014
63000	5030	5045	5061	5077	5092	5108	5123	5139	5155	5170
64000	5186	5202	5217	5233	5248	5263	5279	5294	5310	5325
65000	5341	5356	5371	5387	5402	5417	5433	5448	5463	5479
66000	5494	5509	5524	5539	5554	5569	5585	5600	5615	5630
67000	5645	5660	5675	5690	5705	5720	5735	5750	5765	5780

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 29,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 30,000 ft MACH 0.74 CRUISE TAS 436 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	20	40	61	81	102	122	143	163	183
36000	204	224	244	265	285	305	326	346	366	387
37000	407	427	447	468	488	508	528	548	568	589
38000	609	629	649	669	689	709	729	749	769	789
39000	809	829	849	869	889	909	929	949	969	989
40000	1009	1028	1048	1068	1088	1108	1127	1147	1167	1187
41000	1206	1226	1246	1265	1285	1305	1324	1344	1363	1383
42000	1403	1422	1442	1461	1481	1500	1520	1539	1559	1578
43000	1598	1617	1636	1656	1675	1694	1714	1733	1752	1772
44000	1791	1810	1829	1849	1868	1887	1906	1925	1944	1964
45000	1983	2002	2021	2040	2059	2078	2097	2116	2135	2154
46000	2173	2192	2211	2230	2249	2267	2286	2305	2324	2343
47000	2362	2380	2399	2418	2437	2455	2474	2493	2511	2530
48000	2549	2567	2586	2604	2623	2641	2660	2679	2697	2716
49000	2734	2753	2771	2789	2808	2826	2844	2863	2881	2899
50000	2918	2936	2954	2972	2991	3009	3027	3045	3063	3082
51000	3100	3118	3136	3154	3172	3190	3208	3226	3244	3262
52000	3280	3298	3316	3334	3352	3369	3387	3405	3423	3441
53000	3459	3476	3494	3512	3529	3547	3565	3582	3600	3618
54000	3635	3653	3670	3688	3705	3723	3740	3758	3775	3793
55000	3810	3828	3845	3862	3879	3897	3914	3931	3949	3966
56000	3983	4000	4018	4035	4052	4069	4086	4103	4120	4137
57000	4155	4171	4188	4205	4222	4239	4256	4273	4290	4307
58000	4324	4341	4357	4374	4391	4408	4424	4441	4458	4475
59000	4491	4508	4524	4541	4558	4574	4591	4607	4624	4640
60000	4657	4673	4690	4706	4722	4739	4755	4771	4788	4804
61000	4820	4837	4853	4869	4885	4901	4918	4934	4950	4966
62000	4982	4998	5014	5030	5046	5062	5078	5094	5110	5126
63000	5142	5158	5174	5189	5205	5221	5237	5253	5268	5284
64000	5300	5316	5331	5347	5362	5378	5393	5409	5425	5440
65000	5456	5471	5487	5502	5517	5533	5548	5564	5579	5594
66000	5610	5625	5640	5655	5671	5686	5701	5716	5731	5747
67000	5762	5777	5792	5807	5822	5837	5852	5867	5882	5897

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 66,600 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 30,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 31,000 ft MACH 0.74 CRUISE TAS 434 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	21	42	63	84	105	126	147	168	189
36000	210	231	252	273	294	315	336	357	378	399
37000	420	440	461	482	503	524	544	565	586	607
38000	628	648	669	689	710	731	751	772	793	813
39000	834	854	875	895	916	936	957	977	998	1018
40000	1039	1059	1079	1100	1120	1140	1161	1181	1201	1222
41000	1242	1262	1282	1303	1323	1343	1363	1383	1403	1423
42000	1444	1464	1484	1504	1524	1544	1564	1584	1604	1624
43000	1644	1663	1683	1703	1723	1743	1763	1782	1802	1822
44000	1842	1862	1881	1901	1921	1940	1960	1979	1999	2019
45000	2038	2058	2077	2097	2116	2136	2155	2175	2194	2214
46000	2233	2252	2272	2291	2310	2330	2349	2368	2388	2407
47000	2426	2445	2464	2483	2503	2522	2541	2560	2579	2598
48000	2617	2636	2655	2674	2693	2712	2731	2750	2769	2788
49000	2807	2825	2844	2863	2882	2900	2919	2938	2956	2975
50000	2994	3013	3031	3050	3068	3087	3105	3124	3142	3161
51000	3179	3198	3216	3235	3253	3271	3290	3308	3326	3345
52000	3363	3381	3399	3417	3436	3454	3472	3490	3508	3526
53000	3545	3563	3580	3598	3616	3634	3652	3670	3688	3706
54000	3724	3742	3760	3777	3795	3813	3831	3848	3866	3884
55000	3902	3919	3937	3954	3972	3989	4007	4024	4042	4060
56000	4077	4094	4112	4129	4146	4164	4181	4198	4216	4233
57000	4251	4268	4285	4302	4319	4336	4353	4370	4388	4405
58000	4422	4439	4456	4473	4490	4507	4523	4540	4557	4574
59000	4591	4608	4625	4641	4658	4675	4691	4708	4725	4742
60000	4758	4775	4791	4808	4824	4841	4857	4874	4890	4907
61000	4923	4940	4956	4972	4989	5005	5021	5038	5054	5070
62000	5086	5103	5119	5135	5151	5167	5183	5199	5215	5231
63000	5247	5263	5279	5295	5311	5327	5343	5358	5374	5390
64000	5406	5422	5437	5453	5469	5484	5500	5516	5531	5547
65000	5563	5578	5594	5609	5624	5640	5655	5671	5686	5702
66000	5717	5732	5748	5763	5778	5793	5809	5824	5839	5854
67000	5870	5885	5900	5915	5930	5945	5960	5975	5990	6005

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 63,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 31,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 32,000 ft MACH 0.74 CRUISE TAS 432 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	21	43	65	86	108	130	152	173	195
36000	217	238	260	281	303	324	346	368	389	411
37000	432	454	475	496	518	539	561	582	603	625
38000	646	667	689	710	731	752	773	795	816	837
39000	858	879	900	921	942	963	984	1005	1027	1048
40000	1069	1089	1110	1131	1152	1173	1194	1215	1236	1256
41000	1277	1298	1319	1339	1360	1381	1401	1422	1443	1463
42000	1484	1505	1525	1546	1566	1586	1607	1627	1648	1668
43000	1689	1709	1730	1750	1770	1790	1811	1831	1851	1872
44000	1892	1912	1932	1952	1972	1992	2012	2033	2053	2073
45000	2093	2113	2133	2153	2172	2192	2212	2232	2252	2272
46000	2292	2312	2331	2351	2371	2390	2410	2430	2450	2469
47000	2489	2508	2528	2547	2567	2586	2606	2625	2645	2664
48000	2684	2703	2722	2742	2761	2780	2800	2819	2838	2857
49000	2877	2896	2915	2934	2953	2972	2991	3010	3029	3048
50000	3068	3086	3105	3124	3143	3162	3181	3200	3218	3237
51000	3256	3275	3293	3312	3331	3349	3368	3387	3405	3424
52000	3442	3461	3479	3498	3516	3535	3553	3571	3590	3608
53000	3627	3645	3663	3681	3699	3718	3736	3754	3772	3790
54000	3809	3827	3845	3863	3881	3899	3916	3934	3952	3970
55000	3988	4006	4024	4042	4059	4077	4095	4113	4130	4148
56000	4166	4183	4201	4218	4236	4254	4271	4289	4306	4324
57000	4341	4358	4376	4393	4410	4428	4445	4462	4480	4497
58000	4514	4531	4548	4565	4582	4599	4617	4634	4651	4668
59000	4685	4702	4718	4735	4752	4769	4786	4803	4819	4836
60000	4853	4870	4886	4903	4920	4936	4953	4969	4986	5003
61000	5019	5036	5052	5068	5085	5101	5117	5134	5150	5167
62000	5183	5199	5215	5231	5248	5264	5280	5296	5312	5328
63000	5344	5360	5376	5392	5408	5424	5440	5456	5472	5488
64000	5504	5519	5535	5551	5566	5582	5598	5613	5629	5645
65000	5660	5676	5691	5707	5722	5738	5753	5769	5784	5799
66000	5815	5830	5845	5861	5876	5891	5906	5921	5937	5952
67000	5967	5982	5997	6012	6027	6042	6057	6072	6087	6101

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 60,700 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 32,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 33,000 ft MACH 0.74 CRUISE TAS 430 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	22	44	67	89	111	134	156	178	201
36000	223	245	267	289	312	334	356	378	400	422
37000	444	466	488	510	532	554	576	598	620	642
38000	664	686	708	730	751	773	795	817	838	860
39000	882	904	925	947	968	990	1011	1033	1055	1076
40000	1098	1119	1141	1162	1183	1205	1226	1247	1269	1290
41000	1312	1333	1354	1375	1396	1417	1439	1460	1481	1502
42000	1523	1544	1565	1586	1607	1628	1649	1670	1691	1712
43000	1733	1753	1774	1795	1816	1836	1857	1878	1899	1919
44000	1940	1961	1981	2002	2022	2043	2063	2084	2104	2125
45000	2145	2166	2186	2206	2227	2247	2267	2287	2308	2328
46000	2348	2368	2388	2409	2429	2449	2469	2489	2509	2529
47000	2549	2569	2589	2609	2628	2648	2668	2688	2708	2728
48000	2747	2767	2787	2806	2826	2845	2865	2885	2904	2924
49000	2943	2963	2982	3002	3021	3040	3060	3079	3098	3118
50000	3137	3156	3175	3194	3214	3233	3252	3271	3290	3309
51000	3328	3347	3366	3385	3404	3423	3442	3461	3479	3498
52000	3517	3536	3554	3573	3592	3610	3629	3648	3666	3685
53000	3704	3722	3740	3759	3777	3796	3814	3832	3851	3869
54000	3888	3906	3924	3942	3960	3978	3996	4015	4033	4051
55000	4069	4087	4105	4123	4141	4159	4176	4194	4212	4230
56000	4248	4266	4283	4301	4319	4336	4354	4372	4389	4407
57000	4425	4442	4459	4477	4494	4512	4529	4546	4564	4581
58000	4599	4616	4633	4650	4667	4684	4701	4719	4736	4753
59000	4770	4787	4804	4821	4838	4855	4871	4888	4905	4922
60000	4939	4956	4972	4989	5006	5022	5039	5056	5072	5089
61000	5106	5122	5138	5155	5171	5188	5204	5220	5237	5253
62000	5270	5286	5302	5318	5334	5350	5366	5383	5399	5415
63000	5431	5447	5463	5479	5494	5510	5526	5542	5558	5574
64000	5590	5605	5621	5636	5652	5668	5683	5699	5714	5730
65000	5746	5761	5776	5791	5807	5822	5837	5853	5868	5883
66000	5899	5914	5929	5944	5959	5974	5989	6004	6019	6034
67000	6049	6063	6078	6093	6107	6122	6137	6151	6166	6181

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 58,200 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 66,400 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 33,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 34,000 ft MACH 0.74 CRUISE TAS 428 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	22	45	68	91	114	137	160	183	206
36000	229	252	275	297	320	343	365	388	411	434
37000	456	479	502	524	547	569	592	614	637	659
38000	682	704	726	749	771	793	816	838	860	883
39000	905	927	949	971	993	1015	1037	1060	1082	1104
40000	1126	1148	1170	1191	1213	1235	1257	1279	1301	1323
41000	1344	1366	1388	1409	1431	1453	1474	1496	1517	1539
42000	1561	1582	1603	1625	1646	1668	1689	1710	1732	1753
43000	1775	1796	1817	1838	1859	1880	1902	1923	1944	1965
44000	1986	2007	2028	2049	2070	2091	2112	2132	2153	2174
45000	2195	2216	2236	2257	2278	2298	2319	2340	2360	2361
46000	2402	2422	2442	2463	2483	2504	2524	2544	2565	2585
47000	2606	2626	2646	2666	2686	2706	2726	2747	2767	2787
48000	2807	2827	2847	2867	2886	2906	2926	2946	2966	2986
49000	3006	3025	3045	3064	3084	3104	3123	3143	3163	3182
50000	3202	3221	3240	3260	3279	3298	3318	3337	3356	3376
51000	3395	3414	3433	3452	3471	3491	3510	3529	3548	3567
52000	3586	3605	3624	3642	3661	3680	3699	3718	3736	3755
53000	3774	3792	3811	3830	3848	3867	3885	3904	3922	3941
54000	3959	3978	3996	4014	4032	4051	4069	4087	4105	4124
55000	4142	4160	4178	4196	4214	4232	4250	4268	4286	4304
56000	4322	4339	4357	4375	4393	4410	4428	4446	4464	4481
57000	4499	4516	4534	4551	4569	4586	4604	4621	4639	4656
58000	4673	4691	4708	4725	4742	4759	4777	4794	4811	4828
59000	4845	4862	4879	4896	4913	4930	4947	4963	4980	4997
60000	5014	5031	5047	5064	5081	5097	5114	5130	5147	5164
61000	5180	5196	5213	5229	5245	5262	5278	5294	5311	5327
62000	5343	5359	5375	5391	5407	5423	5439	5455	5471	5487
63000	5503	5519	5534	5550	5566	5581	5597	5613	5828	5644
64000	5660	5675	5690	5705	5721	5736	5751	5767	5782	5797
65000	5812	5827	5842	5857	5872	5887	5902	5917	5932	5947
66000	5962	5976	5991	6005	6020	6034	6049	6063	6078	6093
67000	6107	6121	6135	6150	6164	6178	6192	6206	6220	6234

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 55,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 67,100 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 65,700 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 64,000 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 34,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 35,000 ft MACH 0.74 CRUISE TAS 426 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	23	47	70	94	117	141	164	188	212
36000	235	258	282	305	328	352	375	398	422	445
37000	468	491	514	537	561	584	607	630	653	676
38000	699	722	745	768	790	813	836	859	882	904
39000	927	950	972	995	1018	1040	1063	1085	1108	1131
40000	1153	1175	1198	1220	1242	1265	1287	1309	1332	1354
41000	1376	1398	1420	1443	1465	1487	1509	1531	1553	1575
42000	1597	1619	1641	1662	1684	1706	1728	1749	1771	1793
43000	1815	1836	1858	1879	1901	1922	1944	1965	1987	2009
44000	2030	2051	2073	2094	2115	2136	2157	2179	2200	2221
45000	2242	2263	2284	2305	2326	2347	2368	2389	2410	2431
46000	2452	2473	2493	2514	2535	2555	2576	2597	2617	2638
47000	2659	2679	2699	2720	2740	2761	2781	2801	2822	2842
48000	2862	2883	2903	2923	2943	2963	2983	3003	3023	3043
49000	3063	3083	3103	3123	3143	3162	3182	3202	3222	3242
50000	3261	3281	3300	3320	3339	3359	3378	3398	3417	3437
51000	3456	3476	3495	3514	3533	3552	3572	3591	3610	3629
52000	3648	3667	3686	3705	3724	3743	3762	3781	3800	3819
53000	3838	3856	3875	3893	3912	3931	3949	3968	3987	4005
54000	4024	4042	4060	4079	4097	4115	4134	4152	4170	4189
55000	4207	4225	4243	4261	4279	4297	4315	4333	4351	4369
56000	4387	4405	4423	4441	4458	4476	4494	4511	4529	4547
57000	4565	4582	4599	4617	4634	4652	4669	4686	4704	4721
58000	4739	4756	4773	4790	4807	4824	4841	4858	4875	4892
59000	4910	4926	4943	4960	4976	4993	5010	5027	5043	5060
60000	5077	5093	5110	5126	5142	5159	5175	5192	5208	5224
61000	5241	5257	5273	5289	5305	5321	5337	5353	5369	5385
62000	5401	5416	5432	5447	5463	5479	5494	5510	5525	5541
63000	5556	5572	5587	5602	5617	5632	5647	5663	5678	5693
64000	5708	5723	5738	5752	5767	5782	5796	5811	5826	5841
65000	5855	5870	5884	5898	5912	5927	5941	5955	5969	5984

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 53,000 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 64,500 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 63,100 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 61,600 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 35,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 36,000 ft MACH 0.74 CRUISE TAS 425 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	24	48	72	96	120	144	168	193	217
36000	241	265	289	312	336	360	384	408	432	456
37000	480	503	527	550	574	598	621	645	668	692
38000	716	739	762	786	809	832	855	879	902	925
39000	949	927	995	1018	1041	1064	1087	1110	1133	1156
40000	1179	1202	1225	1247	1270	1293	1316	1338	1361	1384
41000	1407	1429	1451	1474	1496	1519	1541	1564	1586	1609
42000	1631	1653	1675	1697	1720	1742	1764	1786	1808	1830
43000	1852	1874	1896	1918	1940	1962	1984	2005	2027	2049
44000	2071	2092	2114	2135	2157	2178	2200	2222	2243	2265
45000	2286	2307	2329	2350	2371	2392	2413	2435	2456	2477
46000	2498	2519	2540	2561	2582	2603	2624	2644	2665	2686
47000	2707	2728	2748	2769	2789	2810	2831	2851	2872	2892
48000	2913	2933	2953	2974	2994	3014	3034	3055	3075	3095
49000	3115	3135	3155	3175	3195	3215	3235	3255	3275	3295
50000	3315	3334	3354	3374	3393	3413	3432	3452	3472	3491
51000	3511	3530	3549	3569	3588	3607	3627	3646	3665	3684
52000	3704	3723	3742	3761	3780	3799	3818	3837	3856	3874
53000	3893	3912	3931	3949	3968	3987	4005	4024	4043	4061
54000	4080	4098	4116	4135	4153	4171	4190	4208	4226	4245
55000	4263	4281	4299	4317	4335	4353	4371	4389	4406	4424
56000	4442	4460	4478	4495	4513	4530	4548	4565	4583	4601
57000	4618	4635	4653	4670	4687	4704	4721	4738	4756	4773
58000	4790	4807	4824	4840	4857	4874	4891	4907	4924	4941
59000	4958	4974	4990	5007	5023	5039	5056	5072	5088	5105
60000	5121	5137	5153	5169	5185	5200	5216	5232	5248	5264
61000	5280	5295	5310	5326	5341	5357	5372	5387	5403	5418
62000	5434	5448	5463	5478	5493	5508	5523	5538	5553	5568

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 50,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 61,800 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 60,500 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 59,200 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 36,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 37,000 ft MACH 0.74 CRUISE TAS 424 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	24	49	73	98	123	147	172	197	221
36000	246	270	295	319	344	368	392	417	441	465
37000	490	514	538	562	586	610	634	658	682	706
38000	730	754	778	801	825	849	873	896	920	944
39000	968	991	1014	1038	1061	1085	1108	1131	1155	1178
40000	1202	1225	1248	1271	1294	1317	1340	1363	1386	1409
41000	1433	1455	1478	1501	1524	1546	1569	1592	1615	1637
42000	1660	1682	1705	1727	1750	1772	1795	1817	1839	1862
43000	1884	1906	1928	1950	1973	1995	2017	2039	2061	2083
44000	2105	2127	2148	2170	2192	2214	2235	2257	2279	2301
45000	2322	2344	2365	2386	2408	2429	2451	2472	2493	2515
46000	2536	2557	2578	2599	2620	2641	2662	2683	2704	2725
47000	2746	2767	2788	2808	2829	2850	2870	2891	2912	2932
48000	2953	2973	2994	3014	3035	3055	3075	3096	3116	3136
49000	3157	3177	3197	3217	3237	3257	3277	3297	3317	3336
50000	3356	3376	3396	3415	3435	3455	3474	3494	3514	3533
51000	3553	3572	3591	3611	3630	3649	3668	3688	3707	3726
52000	3746	3764	3783	3802	3821	3840	3859	3878	3897	3916
53000	3934	3953	3971	3990	4008	4027	4045	4064	4082	4101
54000	4119	4138	4156	4174	4192	4210	4228	4246	4264	4282
55000	4300	4318	4335	4353	4371	4388	4406	4424	4441	4459
56000	4477	4494	4511	4528	4545	4562	4579	4597	4614	4631
57000	4648	4665	4681	4698	4715	4731	4748	4765	4781	4798
58000	4815	4831	4847	4863	4879	4895	4911	4927	4944	4960
59000	4976	4991	5007	5023	5038	5054	5069	5085	5101	5116

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 48,000 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 58,700 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 57,500 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 56,300 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.2 Mach 0.74 Cruise – Pressure Altitude 37,000 ft

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All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 29,000 ft MACH 0.78 CRUISE TAS 462 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	18	37	55	74	93	111	130	149	167
36000	186	205	223	242	260	279	298	316	335	353
37000	372	390	409	427	446	464	483	501	520	538
38000	557	575	594	612	631	649	667	686	704	723
39000	741	759	778	796	814	833	851	869	888	906
40000	924	943	961	979	997	1015	1034	1052	1070	1088
41000	1106	1125	1143	1161	1179	1197	1215	1233	1251	1269
42000	1288	1308	1324	1342	1360	1378	1396	1414	1432	1450
43000	1468	1485	1503	1521	1539	1557	1575	1593	1611	1628
44000	1646	1664	1682	1700	1717	1735	1753	1771	1788	1806
45000	1824	1842	1859	1877	1894	1912	1930	1947	1965	1982
46000	2000	2018	2035	2053	2070	2087	2105	2122	2140	2157
47000	2175	2192	2210	2227	2244	2262	2279	2296	2314	2331
48000	2348	2365	2383	2400	2417	2434	2451	2469	2486	2503
49000	2520	2537	2554	2571	2588	2605	2622	2639	2656	2673
50000	2690	2707	2724	2741	2758	2775	2792	2808	2825	2842
51000	2859	2876	2892	2909	2926	2942	2959	2976	2993	3009
52000	3026	3042	3059	3075	3092	3108	3125	3141	3158	3175
53000	3191	3207	3224	3240	3256	3273	3289	3305	3322	3338
54000	3354	3371	3387	3403	3419	3435	3451	3467	3484	3500
55000	3516	3532	3548	3564	3580	3596	3612	3628	3644	3660
56000	3676	3691	3707	3723	3739	3755	3770	3786	3802	3818
57000	3834	3849	3865	3880	3896	3912	3927	3943	3958	3974
58000	3989	4005	4020	4036	4051	4066	4082	4097	4113	4128
59000	4143	4159	4174	4189	4204	4220	4235	4250	4265	4280
60000	4296	4311	4326	4341	4356	4371	4386	4401	4416	4431
61000	4446	4460	4475	4490	4505	4520	4535	4549	4564	4579
62000	4594	4608	4623	4638	4652	4667	4682	4696	4711	4726
63000	4740	4755	4769	4783	4798	4812	4827	4841	4856	4870
64000	4885	4899	4913	4927	4942	4956	4970	4984	4999	5013
65000	5027	5041	5055	5069	5083	5098	5112	5126	5140	5154
66000	5168	5182	5196	5210	5223	5237	5251	5265	5279	5293
67000	5307	5320	5334	5348	5361	5375	5389	5402	5416	5430

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 67,000 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.3 Mach 0.78 Cruise – Pressure Altitude 29,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 30,000 ft MACH 0.78 CRUISE TAS 460 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	19	38	57	77	96	115	135	154	173
36000	193	212	231	250	269	289	308	327	346	366
37000	385	404	423	442	461	480	499	519	538	557
38000	576	595	614	633	652	671	690	709	728	747
39000	766	785	804	823	842	860	879	898	917	936
40000	955	974	993	1011	1030	1049	1068	1086	1105	1124
41000	1143	1161	1180	1199	1217	1236	1255	1273	1292	1311
42000	1329	1348	1366	1385	1403	1422	1440	1459	1477	1496
43000	1514	1533	1551	1569	1588	1606	1624	1643	1661	1679
44000	1698	1716	1734	1752	1771	1789	1807	1825	1844	1862
45000	1880	1898	1916	1934	1952	1970	1988	2006	2024	2042
46000	2061	2078	2096	2114	2132	2150	2168	2186	2204	2222
47000	2239	2257	2275	2293	2310	2328	2346	2363	2381	2399
48000	2417	2434	2452	2469	2487	2504	2522	2539	2557	2574
49000	2592	2609	2627	2644	2661	2679	2696	2713	2731	2748
50000	2765	2783	2800	2817	2834	2851	2868	2886	2903	2920
51000	2937	2954	2971	2988	3005	3022	3039	3056	3073	3090
52000	3107	3123	3140	3157	3174	3191	3207	3224	3241	3258
53000	3274	3291	3308	3324	3341	3357	3374	3390	3407	3423
54000	3440	3456	3473	3489	3506	3522	3538	3555	3571	3587
55000	3604	3626	3636	3652	3668	3684	3701	3717	3733	3749
56000	3765	3781	3797	3813	3829	3845	3861	3877	3893	3909
57000	3925	3940	3956	3972	3988	4003	4019	4035	4050	4066
58000	4082	4097	4113	4128	4144	4160	4175	4191	4206	4222
59000	4237	4252	4268	4283	4298	4314	4329	4344	4360	4375
60000	4390	4405	4421	4436	4451	4466	4481	4496	4511	4526
61000	4541	4556	4571	4586	4601	4616	4631	4646	4661	4676
62000	4691	4705	4720	4735	4749	4764	4779	4794	4808	4823
63000	4838	4852	4867	4881	4896	4910	4925	4939	4954	4968
64000	4983	4997	5011	5025	5040	5054	5068	5083	5097	5111
65000	5125	5140	5154	5168	5182	5196	5210	5224	5238	5252
66000	5266	5280	5294	5308	5322	5335	5349	5363	5377	5391
67000	5405	5418	5432	5446	5459	5473	5487	5500	5514	5528

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 64,200 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.3 Mach 0.78 Cruise – Pressure Altitude 30,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 31,000 ft MACH 0.78 CRUISE TAS 458 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	19	39	59	79	99	119	139	159	179
36000	199	219	239	259	278	298	318	338	358	378
37000	398	417	437	457	476	496	516	536	555	575
38000	595	614	634	654	673	693	712	732	752	771
39000	791	810	830	849	869	888	908	927	946	966
40000	985	1005	1024	1043	1063	1082	1101	1121	1140	1159
41000	1178	1198	1217	1236	1255	1274	1293	1313	1332	1351
42000	1370	1389	1408	1427	1446	1465	1484	1503	1522	1541
43000	1560	1579	1598	1616	1635	1654	1673	1692	1711	1729
44000	1748	1767	1785	1804	1823	1841	1860	1879	1897	1916
45000	1935	1953	1971	1990	2008	2027	2045	2064	2082	2101
46000	2119	2137	2156	2174	2192	2210	2229	2247	2265	2283
47000	2302	2320	2338	2356	2374	2392	2410	2428	2446	2464
48000	2482	2500	2518	2536	2554	2571	2589	2607	2625	2643
49000	2661	2678	2696	2713	2731	2749	2766	2784	2802	2819
50000	2837	2854	2872	2889	2907	2924	2941	2959	2976	2994
51000	3011	3028	3046	3063	3080	3097	3114	3131	3149	3166
52000	3183	3200	3217	3234	3251	3268	3285	3302	3319	3336
53000	3353	3370	3386	3403	3420	3437	3453	3470	3487	3504
54000	3520	3537	3553	3570	3586	3603	3619	3636	3652	3669
55000	3685	3702	3718	3734	3751	3767	3783	3799	3816	3832
56000	3848	3864	3880	3896	3913	3929	3945	3961	3977	3993
57000	4009	4025	4041	4056	4072	4088	4104	4120	4136	4152
58000	4167	4183	4199	4214	4230	4245	4261	4277	4292	4308
59000	4324	4339	4354	4370	4385	4401	4416	4431	4447	4462
60000	4478	4493	4508	4523	4538	4553	4569	4584	4599	4614
61000	4629	4644	4659	4674	4689	4704	4719	4734	4749	4764
62000	4779	4793	4808	4823	4838	4852	4867	4882	4896	4911
63000	4926	4940	4955	4969	4984	4998	5013	5027	5042	5056
64000	5071	5085	5099	5113	5128	5142	5156	5170	5184	5199
65000	5213	5227	5241	5255	5269	5283	5297	5311	5325	5339
66000	5353	5367	5381	5394	5408	5422	5436	5449	5463	5477
67000	5491	5504	5518	5531	5545	5558	5572	5585	5599	5612

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 61,300 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 63,500 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.3 Mach 0.78 Cruise – Pressure Altitude 31,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 33,000 ft MACH 0.78 CRUISE TAS 454 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	21	42	63	84	106	127	148	169	191
36000	212	233	254	275	296	317	338	359	381	402
37000	423	444	465	485	506	527	548	569	590	611
38000	632	652	673	694	715	735	756	777	797	818
39000	839	859	880	900	921	941	962	982	1003	1023
40000	1044	1064	1084	1105	1125	1145	1166	1186	1206	1227
41000	1247	1267	1287	1307	1327	1347	1367	1387	1407	1428
42000	1448	1467	1487	1507	1527	1547	1567	1587	1606	1626
43000	1646	1666	1685	1705	1724	1744	1764	1783	1803	1822
44000	1842	1861	1881	1900	1920	1939	1958	1978	1997	2016
45000	2036	2055	2074	2093	2112	2131	2150	2169	2189	2208
46000	2227	2246	2264	2283	2302	2321	2340	2359	2378	2396
47000	2415	2434	2452	2471	2490	2508	2527	2545	2564	2582
48000	2601	2619	2638	2656	2674	2593	2711	2729	2748	2766
49000	2784	2802	2820	2838	2856	2874	2893	2911	2929	2947
50000	2965	2982	3000	3018	3036	3054	3071	3089	3107	3125
51000	3142	3160	3177	3195	3212	3230	3248	3265	3283	3300
52000	3318	3335	3352	3369	3387	3404	3421	3438	3456	3473
53000	3490	3507	3524	3541	3558	3575	3592	3609	3626	3643
54000	3660	3677	3693	3710	3727	3744	3760	3777	3794	3810
55000	3827	3844	3860	3877	3893	3909	3926	3942	3959	3975
56000	3992	4008	4024	4040	4056	4073	4089	4105	4121	4137
57000	4153	4169	4185	4201	4217	4233	4249	4265	4281	4296
58000	4312	4328	4344	4359	4375	4390	4406	4422	4437	4453
59000	4469	4484	4499	4515	4530	4545	4561	4576	4591	4607
60000	4622	4637	4652	4667	4682	4697	4712	4727	4742	4757
61000	4772	4787	4802	4817	4832	4846	4861	4876	4891	4905
62000	4920	4935	4949	4963	4978	4992	5007	5021	5036	5050
63000	5065	5079	5093	5107	5121	5136	5150	5164	5178	5192
64000	5206	5220	5234	5248	5262	5275	5289	5303	5317	5331

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 56,000 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 63,700 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 61,600 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 59,500 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.3 Mach 0.78 Cruise – Pressure Altitude 33,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 35,000 ft MACH 0.78 CRUISE TAS 449 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	22	44	67	89	112	134	156	179	201
36000	224	246	268	290	313	335	357	379	401	423
37000	446	468	490	511	533	555	577	599	621	643
38000	665	687	708	730	752	773	795	817	838	860
39000	882	903	924	946	967	988	1010	1031	1053	1074
40000	1095	1116	1137	1159	1180	1201	1222	1243	1264	1285
41000	1306	1327	1348	1368	1389	1410	1431	1452	1472	1493
42000	1514	1534	1555	1575	1596	1616	1637	1657	1678	1698
43000	1719	1739	1759	1779	1799	1820	1840	1860	1880	1900
44000	1920	1940	1960	1980	2000	2020	2040	2059	2079	2099
45000	2119	2138	2158	2178	2197	2217	2236	2256	2275	2295
46000	2314	2333	2353	2372	2391	2410	2430	2449	2468	2487
47000	2506	2525	2544	2563	2582	2601	2620	2639	2658	2677
48000	2695	2714	2733	2751	2770	2788	2807	2826	2844	2863
49000	2881	2900	2918	2936	2954	2973	2991	3009	3028	3046
50000	3064	3082	3100	3118	3136	3154	3172	3190	3208	3226
51000	3244	3261	3279	3297	3314	3332	3349	3367	3385	3402
52000	3420	3437	3454	3472	3489	3506	3524	3541	3558	3576
53000	3593	3610	3627	3644	3661	3678	3695	3712	3729	3745
54000	3762	3779	3796	3812	3829	3846	3862	3879	3895	3912
55000	3929	3945	3961	3978	3994	4010	4026	4043	4059	4075
56000	4092	4107	4123	4139	4155	4171	4187	4203	4219	4235
57000	4251	4266	4282	4297	4313	4329	4344	4360	4375	4391
58000	4406	4422	4437	4452	4467	4482	4498	4513	4528	4543
59000	4558	4573	4588	4603	4618	4632	4647	4662	4677	4692

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 51,100 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 58,800 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 57,200 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 55,500 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.3 Mach 0.78 Cruise – Pressure Altitude 35,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 37,000 ft MACH 0.78 CRUISE TAS 447 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	23	46	70	93	116	140	163	187	210
36000	233	256	279	303	326	349	372	395	418	441
37000	464	487	509	532	555	577	600	623	645	668
38000	691	713	736	758	780	803	825	847	870	892
39000	914	936	958	980	1002	1024	1046	1068	1090	1112
40000	1134	1156	1177	1199	1220	1242	1263	1285	1307	1328
41000	1350	1371	1392	1413	1435	1456	1477	1498	1519	1541
42000	1562	1583	1604	1624	1645	1666	1687	1708	1729	1750
43000	1770	1791	1811	1832	1852	1873	1893	1914	1934	1955
44000	1975	1995	2015	2035	2056	2076	2096	2116	2136	2156
45000	2176	2196	2216	2235	2255	2275	2295	2314	2334	2354
46000	2373	2393	2412	2431	2451	2470	2489	2509	2528	2547
47000	2567	2586	2605	2624	2642	2661	2680	2699	2718	2737
48000	2756	2775	2793	2812	2830	2849	2867	2886	2905	2923
49000	2942	2960	2978	2996	3014	3032	3050	3069	3087	3105
50000	3123	3141	3159	3176	3194	3212	3229	3247	3265	3283
51000	3300	3318	3335	3352	3370	3387	3404	3422	3439	3456
52000	3474	3490	3507	3524	3541	3558	3575	3592	3608	3625
53000	3642	3659	3675	3691	3708	3724	3741	3757	3774	3790
54000	3806	3822	3838	3854	3870	3886	3902	3918	3934	3950

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 46,500 kg

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 53,700 kg

B) THRUST LIMITED WEIGHT FOR ISA +15 IS 52,300 kg

C) THRUST LIMITED WEIGHT FOR ISA +20 IS 50,900 kg

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.3 Mach 0.78 Cruise – Pressure Altitude 37,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 14,000 ft LOW-LEVEL CRUISE TAS 366 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	14	28	43	57	71	86	100	114	129
36000	143	158	172	186	200	215	229	243	258	272
37000	286	301	315	329	344	358	372	386	401	415
38000	429	444	458	472	486	500	515	529	543	557
39000	572	586	600	614	628	643	657	671	685	699
40000	713	728	742	756	770	784	798	812	826	841
41000	855	869	883	897	911	925	939	953	967	981
42000	995	1009	1023	1037	1051	1065	1079	1093	1107	1121
43000	1135	1149	1163	1177	1191	1205	1219	1233	1247	1261
44000	1275	1289	1303	1317	1330	1344	1358	1372	1386	1400
45000	1414	1427	1441	1455	1469	1483	1496	1510	1524	1538
46000	1552	1565	1579	1593	1607	1620	1634	1648	1662	1675
47000	1689	1703	1716	1730	1744	1757	1771	1785	1798	1812
48000	1826	1839	1853	1866	1880	1894	1907	1921	1934	1948
49000	1962	1975	1989	2002	2016	2029	2043	2056	2070	2083
50000	2097	2110	2124	2137	2151	2164	2177	2191	2204	2218
51000	2231	2245	2258	2271	2285	2298	2311	2325	2338	2352
52000	2365	2378	2391	2405	2418	2431	2445	2458	2471	2484
53000	2498	2511	2524	2537	2551	2564	2577	2590	2603	2617
54000	2630	2643	2656	2669	2682	2695	2709	2722	2735	2748
55000	2761	2774	2787	2800	2813	2826	2839	2852	2865	2879
56000	2892	2905	2917	2930	2943	2956	2969	2982	2995	3008
57000	3021	3034	3047	3060	3073	3086	3098	3111	3124	3137
58000	3150	3163	3176	3188	3201	3214	3227	3240	3252	3265
59000	3278	3291	3303	3316	3329	3341	3354	3367	3380	3392
60000	3405	3418	3430	3443	3455	3468	3481	3493	3506	3519
61000	3531	3544	3556	3569	3581	3594	3606	3619	3631	3644
62000	3656	3669	3681	3694	3706	3719	3731	3744	3756	3768
63000	3781	3793	3806	3818	3830	3843	3855	3867	3880	3892
64000	3904	3917	3929	3941	3953	3966	3978	3990	4002	4015
65000	4027	4039	4051	4063	4076	4088	4100	4112	4124	4136
66000	4149	4161	4173	4185	4197	4209	4221	4233	4245	4257
67000	4269	4281	4293	4305	4317	4329	4341	4353	4365	4377

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 14,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 15,000 ft LOW-LEVEL CRUISE TAS 371 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	14	29	43	58	73	87	102	117	131
36000	146	161	175	190	205	219	234	248	263	278
37000	292	307	321	336	350	365	380	394	409	423
38000	438	452	467	481	496	510	525	540	554	569
39000	583	598	612	626	641	655	670	684	699	713
40000	728	742	757	771	785	800	814	829	843	857
41000	872	886	900	915	929	943	958	972	987	1001
42000	1015	1029	1044	1058	1072	1087	1101	1115	1129	1144
43000	1158	1172	1186	1201	1215	1229	1243	1257	1272	1286
44000	1300	1314	1328	1343	1357	1371	1385	1399	1413	1427
45000	1442	1456	1470	1484	1498	1512	1526	1540	1554	1568
46000	1582	1596	1610	1624	1638	1652	1666	1680	1694	1708
47000	1722	1736	1750	1764	1778	1792	1806	1820	1834	1848
48000	1862	1875	1889	1903	1917	1931	1945	1959	1972	1986
49000	2000	2014	2028	2041	2055	2069	2083	2097	2110	2124
50000	2138	2152	2165	2179	2193	2206	2220	2234	2247	2261
51000	2275	2288	2302	2316	2329	2343	2357	2370	2384	2397
52000	2411	2425	2438	2452	2465	2479	2492	2506	2519	2533
53000	2546	2560	2573	2587	2600	2614	2627	2641	2654	2668
54000	2681	2694	2708	2721	2734	2748	2761	2775	2788	2801
55000	2815	2828	2841	2855	2868	2881	2894	2908	2921	2934
56000	2948	2961	2974	2987	3000	3014	3027	3040	3053	3066
57000	3080	3093	3106	3119	3132	3145	3158	3171	3185	3198
58000	3211	3224	3237	3250	3263	3276	3289	3302	3315	3328
59000	3341	3354	3367	3380	3393	3406	3419	3432	3445	3458
60000	3470	3483	3496	3509	3522	3535	3548	3560	3573	3586
61000	3599	3612	3624	3637	3650	3663	3675	3688	3701	3714
62000	3727	3739	3752	3765	3777	3790	3803	3815	3828	3841
63000	3853	3866	3878	3891	3903	3916	3929	3941	3954	3966
64000	3979	3991	4004	4016	4029	4041	4054	4066	4079	4091
65000	4104	4116	4129	4141	4153	4166	4178	4190	4203	4215
66000	4228	4240	4252	4264	4277	4289	4301	4314	4326	4338
67000	4351	4363	4375	4387	4399	4411	4424	4436	4448	4460

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 15,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 16,000 ft LOW-LEVEL CRUISE TAS 377 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	14	29	44	59	74	89	104	119	134
36000	149	164	179	194	209	224	239	254	269	284
37000	299	313	328	343	358	373	388	403	418	433
38000	447	462	477	492	507	522	536	551	566	581
39000	596	611	625	640	655	670	684	699	714	729
40000	744	758	773	788	802	817	832	847	861	876
41000	891	905	920	935	949	964	979	993	1008	1023
42000	1037	1052	1066	1081	1096	1110	1125	1139	1154	1168
43000	1183	1198	1212	1227	1241	1256	1270	1285	1299	1314
44000	1328	1343	1357	1371	1386	1400	1415	1429	1444	1458
45000	1473	1487	1501	1516	1530	1544	1559	1573	1588	1602
46000	1616	1631	1645	1659	1673	1688	1702	1716	1731	1745
47000	1759	1773	1788	1802	1816	1830	1845	1859	1873	1887
48000	1901	1916	1930	1944	1958	1972	1986	2000	2015	2029
49000	2043	2057	2071	2085	2099	2113	2127	2141	2155	2169
50000	2183	2197	2211	2225	2239	2253	2267	2281	2295	2309
51000	2323	2337	2351	2365	2379	2393	2407	2421	2435	2448
52000	2462	2476	2490	2504	2518	2531	2545	2559	2573	2587
53000	2600	2614	2628	2642	2655	2669	2683	2697	2710	2724
54000	2738	2751	2765	2779	2792	2806	2820	2833	2847	2861
55000	2874	2888	2901	2915	2928	2942	2956	2969	2983	2996
56000	3010	3023	3037	3050	3064	3077	3091	3104	3118	3131
57000	3145	3158	3171	3185	3198	3211	3225	3238	3252	3265
58000	3278	3292	3305	3318	3331	3345	3358	3371	3385	3398
59000	3411	3424	3438	3451	3464	3477	3490	3504	3517	3530
60000	3543	3556	3569	3582	3596	3609	3622	3635	3648	3661
61000	3674	3687	3700	3713	3726	3739	3752	3765	3778	3791
62000	3804	3817	3830	3843	3856	3869	3882	3895	3908	3920
63000	3933	3946	3959	3972	3985	3997	4010	4023	4036	4049
64000	4062	4074	4087	4100	4112	4125	4138	4151	4163	4176
65000	4189	4201	4214	4227	4239	4252	4265	4277	4290	4302
66000	4315	4328	4340	4353	4365	4378	4390	4403	4415	4428
67000	4440	4453	4465	4478	4490	4503	4515	4527	4540	4552

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 16,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 17,000 ft LOW-LEVEL CRUISE TAS 382 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	15	30	45	61	76	91	107	122	137
36000	152	168	183	198	213	229	244	259	274	290
37000	305	320	335	351	366	381	396	411	427	442
38000	457	472	487	502	518	533	548	563	578	593
39000	608	624	639	654	669	684	699	714	729	744
40000	759	774	789	804	819	834	849	864	879	894
41000	910	924	939	954	969	984	999	1014	1029	1044
42000	1059	1074	1089	1104	1119	1134	1148	1163	1178	1193
43000	1208	1223	1238	1252	1267	1282	1297	1312	1326	1341
44000	1356	1371	1386	1400	1415	1430	1445	1459	1474	1489
45000	1504	1518	1533	1547	1562	1577	1591	1606	1621	1635
46000	1650	1665	1679	1694	1709	1723	1738	1752	1767	1781
47000	1796	1811	1825	1840	1854	1869	1883	1898	1912	1927
48000	1941	1956	1970	1984	1999	2013	2028	2042	2057	2071
49000	2085	2100	2114	2128	2143	2157	2172	2186	2200	2215
50000	2229	2243	2257	2272	2286	2300	2315	2329	2343	2357
51000	2372	2386	2400	2414	2428	2442	2457	2471	2485	2499
52000	2513	2527	2542	2556	2570	2584	2598	2612	2626	2640
53000	2654	2668	2682	2696	2710	2724	2738	2752	2766	2780
54000	2794	2808	2822	2836	2850	2864	2878	2892	2906	2920
55000	2933	2947	2961	2975	2989	3003	3016	3030	3044	3058
56000	3072	3085	3099	3113	3127	3140	3154	3168	3182	3195
57000	3209	3223	3236	3250	3264	3277	3291	3304	3318	3332
58000	3345	3359	3372	3386	3400	3413	3427	3440	3454	3467
59000	3481	3494	3508	3521	3535	3548	3561	3575	3588	3602
60000	3615	3629	3642	3655	3669	3682	3695	3709	3722	3735
61000	3749	3762	3775	3789	3802	3815	3828	3842	3855	3868
62000	3881	3894	3908	3921	3934	3947	3960	3973	3987	4000
63000	4013	4026	4039	4052	4065	4078	4091	4104	4117	4130
64000	4143	4156	4169	4182	4195	4208	4221	4234	4247	4260
65000	4273	4286	4299	4312	4325	4337	4350	4363	4376	4389
66000	4402	4415	4427	4440	4453	4466	4478	4491	4504	4517
67000	4529	4542	4555	4567	4580	4593	4605	4618	4631	4643

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

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B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 17,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 18,000 ft LOW-LEVEL CRUISE TAS 388 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	15	31	46	62	78	93	109	124	140
36000	156	171	187	202	218	234	249	265	280	296
37000	311	327	342	358	373	389	404	420	435	451
38000	466	482	497	513	528	544	559	575	590	606
39000	621	636	652	667	683	698	713	729	744	760
40000	775	790	806	821	836	852	867	882	898	913
41000	928	944	959	974	989	1005	1020	1035	1050	1066
42000	1081	1096	1111	1127	1142	1157	1172	1187	1202	1218
43000	1233	1248	1263	1278	1293	1308	1324	1339	1354	1369
44000	1384	1399	1414	1429	1444	1459	1474	1489	1504	1519
45000	1534	1549	1564	1579	1594	1609	1624	1639	1654	1669
46000	1684	1699	1714	1729	1743	1758	1773	1788	1803	1818
47000	1833	1848	1862	1877	1892	1907	1922	1936	1951	1966
48000	1981	1995	2010	2025	2040	2054	2069	2084	2098	2113
49000	2128	2143	2157	2172	2186	2201	2216	2230	2245	2260
50000	2274	2289	2303	2318	2332	2347	2362	2376	2391	2405
51000	2420	2434	2449	2463	2478	2492	2506	2521	2535	2550
52000	2564	2579	2593	2607	2622	2636	2650	2665	2679	2694
53000	2708	2722	2737	2751	2765	2779	2794	2808	2822	2836
54000	2851	2865	2879	2893	2907	2922	2936	2950	2964	2978
55000	2993	3007	3021	3035	3049	3063	3077	3091	3105	3119
56000	3133	3147	3161	3175	3189	3203	3217	3231	3245	3259
57000	3273	3287	3301	3315	3329	3343	3357	3371	3385	3398
58000	3412	3426	3440	3454	3468	3481	3495	3509	3523	3537
59000	3550	3564	3578	3591	3605	3619	3633	3646	3660	3674
60000	3687	3701	3715	3728	3742	3755	3769	3783	3796	3810
61000	3823	3837	3850	3864	3877	3891	3904	3918	3931	3945
62000	3958	3972	3985	3999	4012	4025	4039	4052	4066	4079
63000	4092	4106	4119	4132	4146	4159	4172	4186	4199	4212
64000	4225	4239	4252	4265	4278	4291	4305	4318	4331	4344
65000	4357	4371	4384	4397	4410	4423	4436	4449	4462	4475
66000	4488	4501	4514	4527	4540	4553	4566	4579	4592	4605
67000	4618	4631	4644	4657	4670	4683	4696	4708	4721	4734

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 18,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 19,000 ft LOW-LEVEL CRUISE TAS 394 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	15	31	47	63	79	95	111	127	143
36000	159	175	191	207	222	238	254	270	286	302
37000	318	334	349	365	381	397	413	429	444	460
38000	476	492	508	523	539	555	571	586	602	618
39000	634	649	665	681	697	712	728	744	759	775
40000	791	806	822	838	853	869	885	900	916	931
41000	947	963	978	994	1009	1025	1041	1056	1072	1087
42000	1103	1118	1134	1149	1165	1180	1196	1211	1227	1242
43000	1258	1273	1288	1304	1319	1335	1350	1366	1381	1396
44000	1412	1427	1442	1458	1473	1488	1504	1519	1534	1550
45000	1565	1580	1596	1611	1626	1641	1657	1672	1687	1702
46000	1718	1733	1748	1763	1778	1793	1809	1824	1839	1854
47000	1869	1884	1900	1915	1930	1945	1960	1975	1990	2005
48000	2020	2035	2050	2065	2080	2095	2110	2125	2140	2155
49000	2170	2185	2200	2215	2230	2245	2260	2275	2290	2305
50000	2319	2334	2349	2364	2379	2394	2408	2423	2438	2453
51000	2468	2482	2497	2512	2527	2541	2556	2571	2586	2600
52000	2615	2630	2644	2659	2674	2688	2703	2718	2732	2747
53000	2762	2776	2791	2805	2820	2834	2849	2863	2878	2892
54000	2907	2921	2936	2950	2965	2979	2994	3008	3023	3037
55000	3051	3066	3080	3095	3109	3123	3138	3152	3166	3181
56000	3195	3209	3224	3238	3252	3266	3281	3295	3309	3323
57000	3338	3352	3366	3380	3394	3408	3423	3437	3451	3465
58000	3479	3493	3507	3521	3535	3550	3564	3578	3592	3606
59000	3620	3634	3648	3662	3676	3690	3704	3718	3732	3746
60000	3759	3773	3787	3801	3815	3829	3843	3856	3870	3884
61000	3898	3912	3926	3939	3953	3967	3980	3994	4008	4022
62000	4035	4049	4063	4076	4090	4104	4117	4131	4145	4158
63000	4172	4185	4199	4212	4226	4240	4253	4267	4280	4294
64000	4307	4321	4334	4348	4361	4374	4388	4401	4415	4428
65000	4442	4455	4468	4482	4495	4508	4522	4535	4548	4562
66000	4575	4588	4601	4615	4628	4641	4654	4667	4681	4694
67000	4707	4720	4733	4746	4760	4773	4786	4799	4812	4825

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 19,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 20,000 ft LOW-LEVEL CRUISE TAS 400 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	16	32	48	65	81	97	113	130	146
36000	162	178	194	211	227	243	259	275	292	308
37000	324	340	356	372	389	405	421	437	453	469
38000	485	502	518	534	550	566	582	598	614	630
39000	646	662	678	694	710	726	742	758	774	790
40000	806	822	838	854	870	886	902	918	934	950
41000	966	982	998	1013	1029	1045	1061	1077	1093	1109
42000	1124	1140	1156	1172	1188	1203	1219	1235	1251	1267
43000	1282	1298	1314	1329	1345	1361	1377	1392	1408	1424
44000	1439	1455	1471	1486	.1502	1518	1533	1549	1564	1580
45000	1596	1611	1627	1642	1658	1673	1689	1705	1720	1736
46000	1751	1767	1782	1798	1813	1829	1844	1859	1875	1890
47000	1906	1921	1937	1952	1967	1983	1998	2013	2029	2044
48000	2060	2075	2090	2105	2121	2136	2151	2167	2182	2197
49000	2213	2228	2243	2258	2273	2289	2304	2319	2334	2349
50000	2365	2380	2395	2410	2425	2440	2455	2470	2485	2500
51000	2516	2531	2546	2561	2576	2591	2606	2621	2636	2651
52000	2666	2681	2696	2710	2725	2740	2755	2770	2785	2800
53000	2815	2830	2844	2859	2874	2889	2904	2918	2933	2948
54000	2963	2978	2992	3007	3022	3036	3051	3066	3081	3095
55000	3110	3125	3139	3154	3169	3183	3198	3212	3227	3242
56000	3256	3271	3285	3300	3314	3329	3343	3358	3372	3387
57000	3401	3416	3430	3445	3459	3474	3488	3502	3517	3531
58000	3546	3560	3574	3589	3603	3617	3632	3646	3660	3674
59000	3689	3703	3717	3731	3746	3760	3774	3788	3803	3817
60000	3831	3845	3859	3873	3887	3901	3916	3930	3944	3958
61000	3972	3986	4000	4014	4028	4042	4056	4070	4084	4098
62000	4112	4126	4140	4153	4167	4181	4195	4209	4223	4237
63000	4251	4264	4278	4292	4306	4320	4333	4347	4361	4375
64000	4389	4402	4416	4430	4443	4457	4471	4484	4498	4512
65000	4525	4539	4552	4566	4580	4593	4607	4620	4634	4647
66000	4661	4674	4688	4701	4715	4728	4742	4755	4769	4782
67000	4795	4809	4822	4835	4849	4862	4875	4889	4902	4915

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT

B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT

C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT

NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA

B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA

C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 20,000 ft

All Engines Maximum Cruise Thrust Limits A/C Auto

PRESSURE ALTITUDE 21,000 ft LOW-LEVEL CRUISE TAS 406 kt

GROSS WT. kg	0	100	200	300	400	500	600	700	800	900
	CRUISE DISTANCE NAUTICAL AIR MILES									
35000	0	16	33	49	66	82	99	115	132	148
36000	165	181	198	214	231	247	264	280	297	313
37000	330	346	363	379	396	412	429	445	461	478
38000	494	511	527	543	560	576	592	609	625	642
39000	658	674	691	707	723	739	756	772	788	805
40000	821	837	853	870	886	902	918	935	951	967
41000	983	999	1016	1032	1048	1064	1080	1096	1112	1129
42000	1145	1161	1177	1193	1209	1225	1241	1257	1273	1289
43000	1305	1321	1337	1353	1369	1385	1401	1417	1433	1449
44000	1465	1481	1497	1513	1529	1545	1561	1577	1593	1609
45000	1624	1640	1656	1672	1688	1704	1719	1735	1751	1767
46000	1783	1798	1814	1830	1846	1861	1877	1893	1909	1924
47000	1940	1956	1971	1987	2003	2018	2034	2050	2065	2081
48000	2096	2112	2128	2143	2159	2174	2190	2205	2221	2236
49000	2252	2267	2283	2298	2314	2329	2345	2360	2376	2391
50000	2407	2422	2437	2453	2468	2483	2499	2514	2530	2545
51000	2560	2576	2591	2606	2621	2637	2652	2667	2682	2698
52000	2713	2728	2743	2758	2774	2789	2804	2819	2834	2849
53000	2865	2880	2895	2910	2925	2940	2955	2970	2985	3000
54000	3015	3030	3045	3060	3075	3090	3105	3120	3135	3150
55000	3165	3180	3195	3209	3224	3239	3254	3269	3284	3299
56000	3313	3328	3343	3358	3373	3387	3402	3417	3432	3446
57000	3461	3476	3490	3505	3520	3534	3549	3564	3578	3593
58000	3608	3622	3637	3651	3666	3681	3695	3710	3724	3739
59000	3753	3768	3782	3797	3811	3826	3840	3854	3869	3883
60000	3898	3912	3926	3941	3955	3969	3984	3998	4012	4027
61000	4041	4055	4070	4084	4098	4112	4126	4141	4155	4169
62000	4183	4197	4212	4226	4240	4254	4268	4282	4296	4310
63000	4324	4338	4352	4366	4381	4395	4409	4423	4437	4451
64000	4465	4478	4492	4506	4520	4534	4548	4562	4576	4590
65000	4604	4617	4631	4645	4659	4672	4686	4700	4714	4728
66000	4741	4755	4769	4782	4796	4810	4823	4837	4851	4864
67000	4878	4892	4905	4919	4932	4946	4959	4973	4987	5000

NOTE 1: OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT

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NOTE 2: ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES

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C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA

D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA

Figure 4.5.3.4 Low-Level Cruise – Pressure Altitude 21,000 ft

5.5 Descent

The following tables in Figure 4.5.4a and Figure 4.5.4b tabulate the time taken, fuel used and air distance travelled for a 'flight idle' thrust descent. An allowance for approach and landing of 2 minutes of time and 100 kg of fuel has been included in the values listed.

0.74 M/250 KIAS (Economy) Descent

PRESS. ALT. ft	TIME min	FUEL kg	AIR DISTANCE TRAVELLED NM				
			LANDING WEIGHT kg				
			35,000	45,000	55,000	65,000	75,000
37,000	23	295	98	109	114	114	110
35,000	22	290	94	105	110	110	106
33,000	21	285	89	99	103	103	101
31,000	20	280	83	93	97	98	95
29,000	19	275	78	87	91	91	89
27,000	19	270	73	81	85	85	83
25,000	18	260	68	75	79	79	77
23,000	16	255	63	69	72	73	71
21,000	15	245	58	64	66	67	66
19,000	14	235	53	58	60	61	60
17,000	13	225	48	52	54	55	54
15,000	12	215	43	46	48	49	48
10,000	9	185	30	32	33	34	33
5,000	6	140	18	18	18	18	18
3,700	5	130	14	14	14	14	14

Figure 4.5.4a Economy Descent

0.70 M/280/250 KIAS (Turbulence Penetration) Descent

PRESS. ALT. ft	TIME min	FUEL kg	AIR DISTANCE TRAVELLED NM				
			LANDING WEIGHT kg				
			35,000	45,000	55,000	65,000	75,000
37,000	21	280	88	100	107	110	109
35,000	20	275	84	96	102	105	105
33,000	20	275	80	91	98	101	101
31,000	19	270	76	86	93	96	96
29,000	18	265	72	82	88	91	92
27,000	17	260	69	78	84	87	87
25,000	17	255	64	73	78	80	81
23,000	16	250	60	67	72	74	74
21,000	15	240	55	62	66	68	68
19,000	14	230	51	57	60	62	62
17,000	13	225	46	52	55	56	56
15,000	12	215	42	46	49	50	50
10,000	9	185	30	32	33	34	33
5,000	6	140	18	18	18	18	18
3,700	5	130	14	14	14	14	14

Figure 4.5.4b Turbulence Penetration Descent

6 Non-Normal Operation

Simplified Flight Planning
Gear Down 220 KIAS (Fig.4.6.1)

This graph is similar in use to the normal Simplified Planning Graphs in paragraph 3, giving fuel and time required for a flight with 'gear down'.
Climb and descent are included.

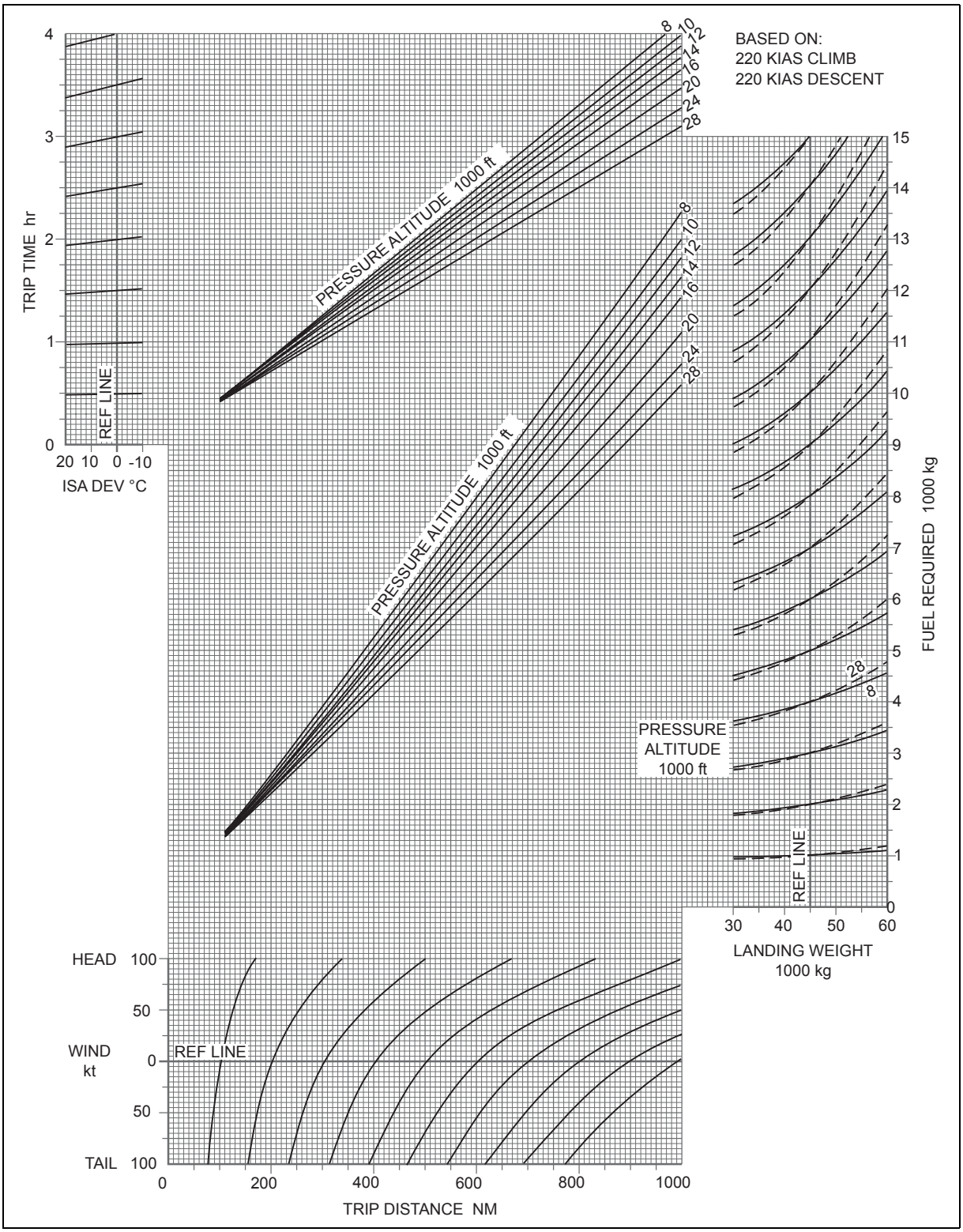

Figure 4.6.1 Non-Normal Operation – Gear Down Ferry Flight

7 Extended Range Operations (EROPS)

This paragraph provides planning information necessary for the conduct of EROPS.

7.1 Critical Fuel Reserve (Figs. 4.7.1a and 4.7.1b)

These graphs are for the determination of the minimum fuel reserve at the critical point. If this fuel reserve exceeds the predicted (planned) fuel remaining at that point, the fuel load must be adjusted accordingly. Determine the fuel required from each graph in the following manner:

a) Enter the graph at the distance from the critical point to the diversion aerodrome and travel vertically to the wind component reference line.

b) Parallel the grid-lines to apply the appropriate wind component. Then continue vertically to intercept the grid-line appropriate to the weight at the critical point.

c) From this point travel horizontally right to read the fuel required.

d) Compare the result obtained from Fig. 4.7.1a with that obtained from Fig. 4.7.1b; the higher of the two is the fuel required.

7.2 Area of Operation – Diversion Distance (Fig. 4.7.2)

The area of operation is defined as the region within which the operator is authorised to conduct extended range operations. The distance to the diversion airport from any point along the route must be covered within the approved time using the single engine cruise speed and assuming still air and ISA conditions. The maximum diversion distance used to establish the area of operation may be obtained from this chart.

a) Enter the chart for the appropriate speed with the weight at the point of diversion.

b) Select the appropriate time and read off the maximum diversion distance.

7.3 In-Flight Diversion (LRC) (Fig. 4.7.3)

Figure 4.7.3 is a simplified flight planning method of determining the fuel required and time for a flight from the point of diversion to a selected alternate.
The graph is similar in layout and use to the normal Simplified Flight Planning graphs in paragraph 3.

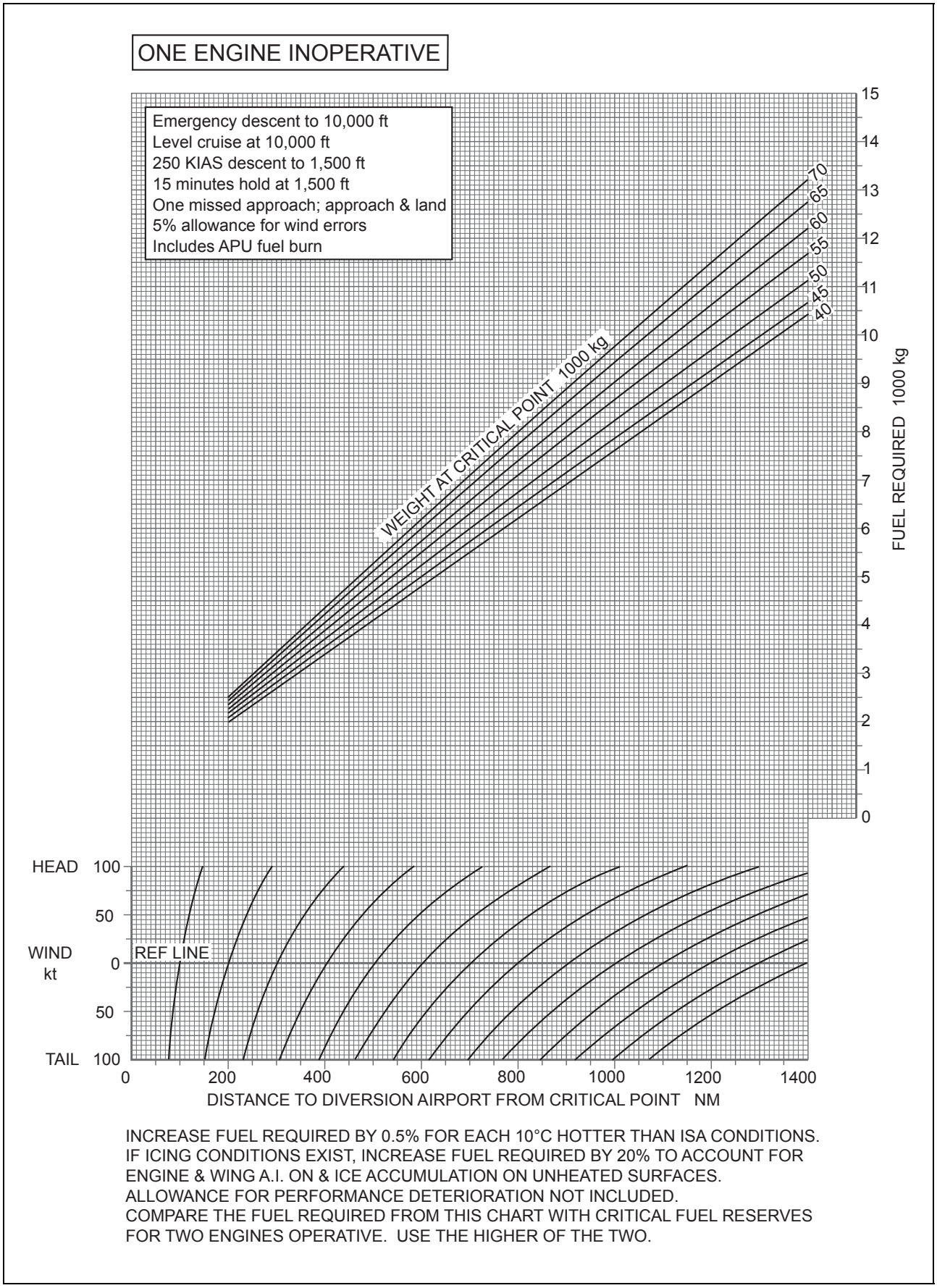

Figure 4.7.1a Critical Fuel Reserve – One Engine Inoperative

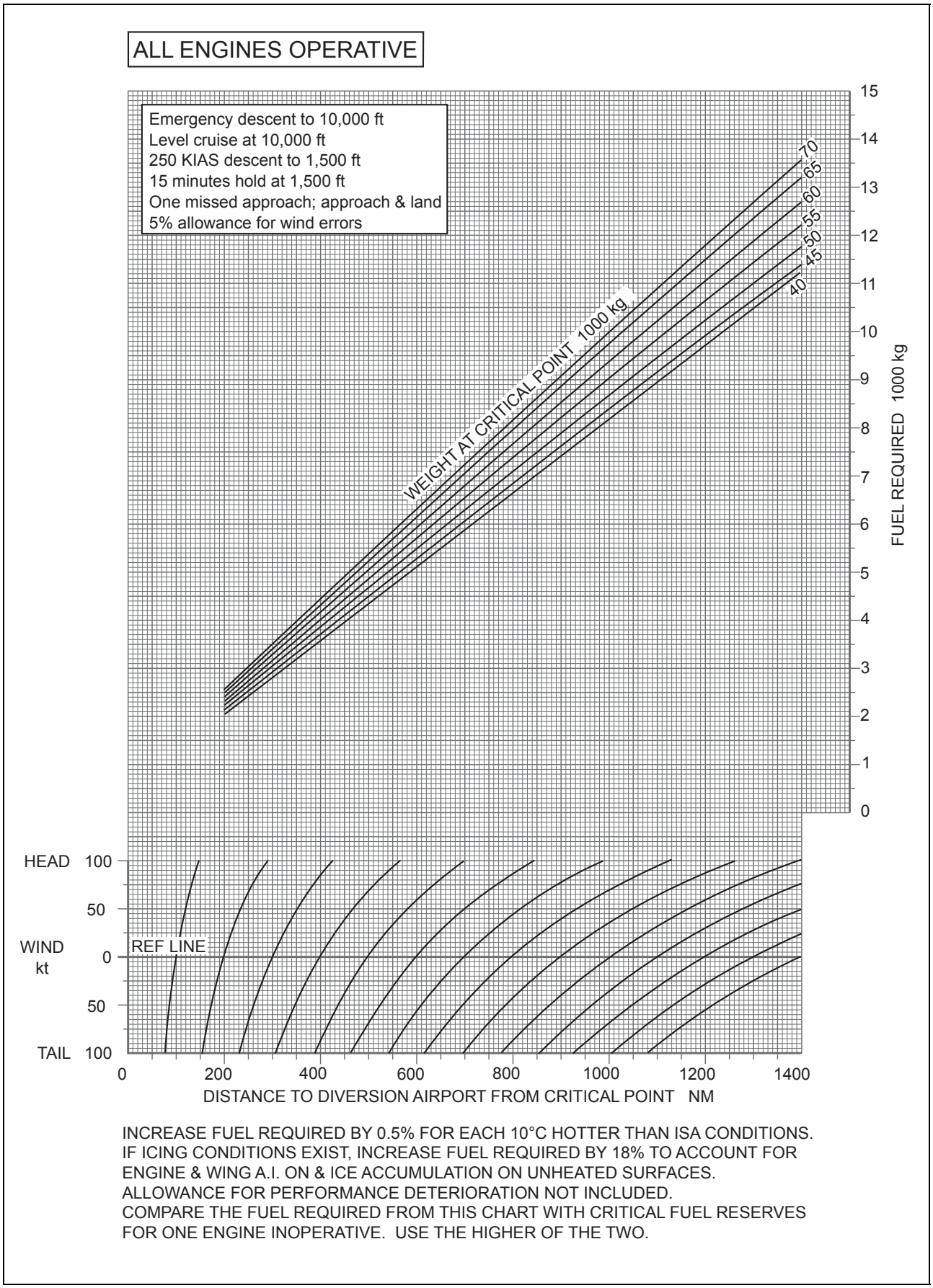

Figure 4.7.1b Critical Fuel Reserve – All Engines Operating

Speed M/KIAS	Div. Wt 1000 kg	TIME MINUTES														
		60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
.70/280	35	406	472	539	605	672	738	805	871	938	1004	1071	1137	1204	1271	1337
	40	402	467	533	598	663	729	794	860	925	990	1056	1121	1187	1252	1318
	45	397	462	526	590	654	718	782	846	910	975	1039	1103	1167	1231	1295
	50	392	454	517	580	642	705	768	830	893	956	1018	1081	1144	1207	1269
	55	385	446	507	568	630	691	752	813	875	936	997	1058	1119	1181	1242
	60	377	437	497	557	616	676	736	796	855	915	975	1035	1094	1154	1214
	65	369	427	486	544	602	660	718	776	835	893	951	1009	1067	1125	1183
	70	363	419	476	532	589	645	702	758	815	871	928	985	1041	1098	1154
.74/290	35	412	478	545	612	678	745	811	878	945	1011	1078	1145	1211	1278	1345
	40	409	474	540	606	672	737	803	869	935	1000	1066	1132	1198	1263	1329
	45	404	469	533	598	663	727	792	856	921	986	1050	1115	1180	1244	1309
	50	400	463	526	590	653	717	780	844	907	970	1034	1097	1161	1224	1288
	55	393	455	517	579	641	704	766	828	890	952	1014	1077	1139	1201	1263
	60	386	447	508	568	629	690	751	812	872	933	994	1055	1116	1176	1237
	65	378	437	497	556	615	675	734	793	853	912	971	1031	1090	1149	1209
	70	372	430	488	546	603	661	719	777	835	893	950	1008	1066	1124	1182
.74/310	35	415	482	548	615	681	748	814	881	948	1014	1081	1147	1214	1280	1347
	40	413	479	545	611	677	743	810	876	942	1008	1074	1140	1206	1272	1338
	45	410	476	541	607	672	737	803	868	933	999	1064	1130	1195	1260	1326
	50	407	472	536	601	665	730	794	859	923	988	1052	1116	1181	1245	1310
	55	402	466	529	592	656	719	783	846	908	973	1036	1100	1163	1226	1290
	60	397	459	521	583	646	708	770	833	895	957	1019	1082	1144	1206	1269
	65	391	452	513	574	635	696	757	818	879	940	1002	1063	1124	1185	1246
	70	385	445	505	565	625	685	744	804	864	924	984	1044	1103	1163	1223
.74/330	35	416	482	548	614	680	746	811	877	943	1009	1075	1141	1207	1273	1339
	40	415	481	547	613	678	744	810	875	941	1007	1072	1138	1204	1270	1335
	45	414	480	545	610	676	741	806	871	937	1002	1067	1133	1198	1263	1328
	50	412	477	542	607	671	736	801	865	930	995	1059	1124	1189	1254	1318
	55	408	472	536	600	664	728	792	856	920	984	1048	1112	1176	1240	1304
	60	404	467	530	593	656	719	783	846	909	972	1035	1098	1161	1224	1287
	65	399	461	523	586	648	710	772	834	896	958	1020	1082	1144	1207	1269
	70	395	457	518	579	640	701	762	823	884	945	1006	1067	1128	1190	1251
LRC	35	368	428	488	548	608	668	728	787	847	906	965	1024	1083	1141	1200
	40	372	433	493	554	614	674	735	794	854	914	973	1032	1092	1151	1209
	45	376	437	497	558	619	679	739	799	859	919	979	1038	1097	1157	1216
	50	379	440	501	561	622	682	742	803	862	922	982	1041	1101	1160	1219
	55	380	441	502	562	623	683	743	803	863	922	982	1041	1100	1159	1218
	60	381	442	503	563	624	684	744	804	863	923	982	1041	1100	1159	1218
	65	381	442	503	563	623	683	742	802	861	921	980	1038	1097	1156	1214
	70	383	444	504	564	623	683	742	802	860	919	978	1036	1094	1152	1210

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BASED ON DRIFTDOWN STARTING AT OR NEAR OPTIMUM ALTITUDE

Figure 4.7.2 Area of Operation – Diversion Distance One Engine Inoperative

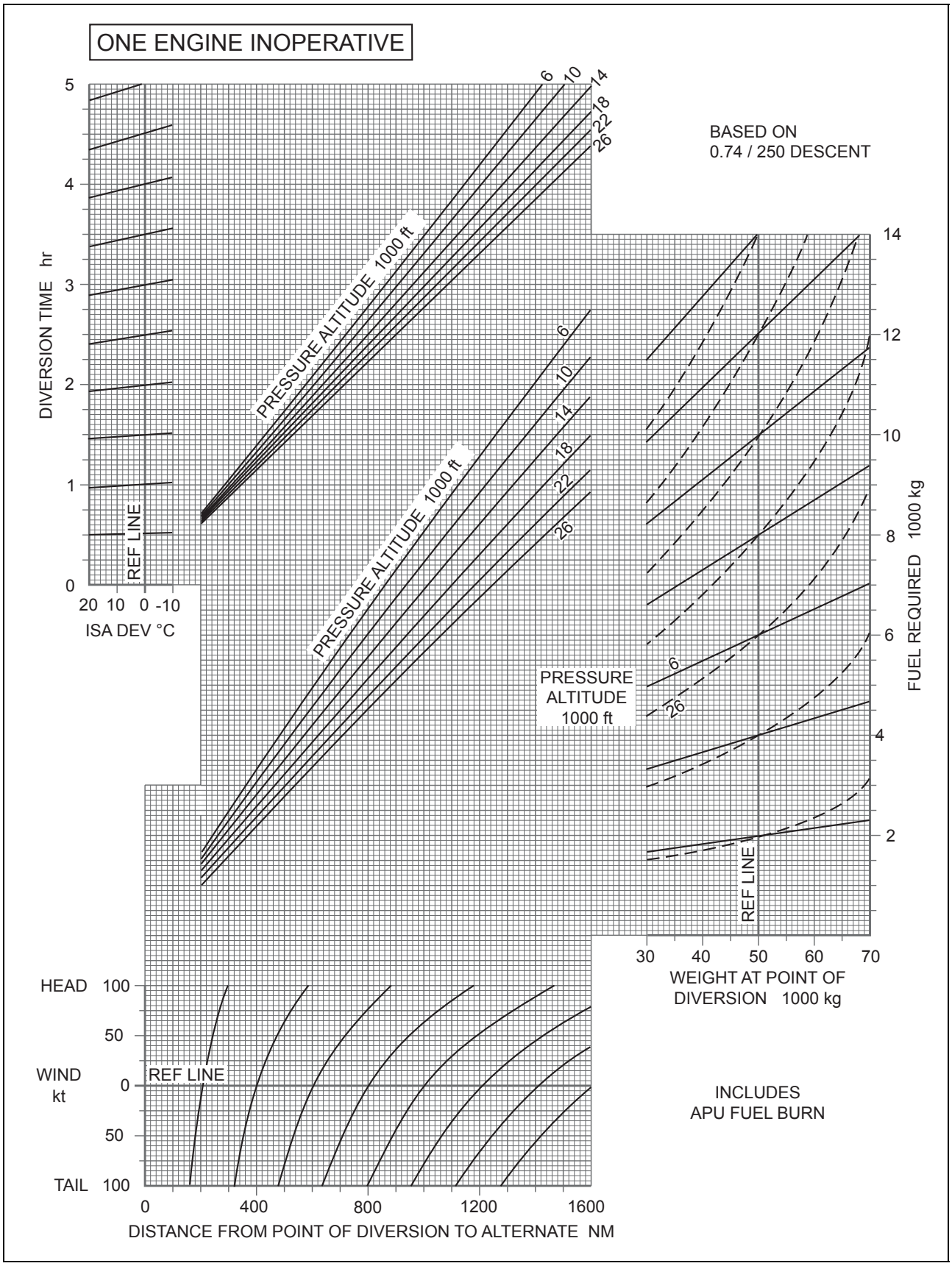

Figure 4.7.3 In-Flight Diversion (LRC) One Engine Inoperative

8 Fuel Tankering

Because of fuel cost differentials between those at departure airport and those at destination airport, economic benefit can sometimes be gained from carrying excess fuel (i.e. a fuel load greater than that required for the flight). The following graphs provide a ready means of determining whether such an action is beneficial.

- Fig. 4.8.1 – Fuel Tankering (LRC and M 0.74)

  These graphs show the surplus fuel burn required for carriage of extra fuel. In the example shown on the Long Range Cruise graph of Fig. 4.8.1, a trip has a distance of 1600 NAM and is to be conducted at FL 330.
  If excess fuel is carried, 13.2% of that excess will be consumed as a 'fuel penalty'.

- Fig. 4.8.2 – Fuel Price Differential

  Using the percentage value for the surplus fuel burn (as obtained from Fig. 4.8.1) and fuel price at the departure airport, the break-even price at the destination airport can be determined.

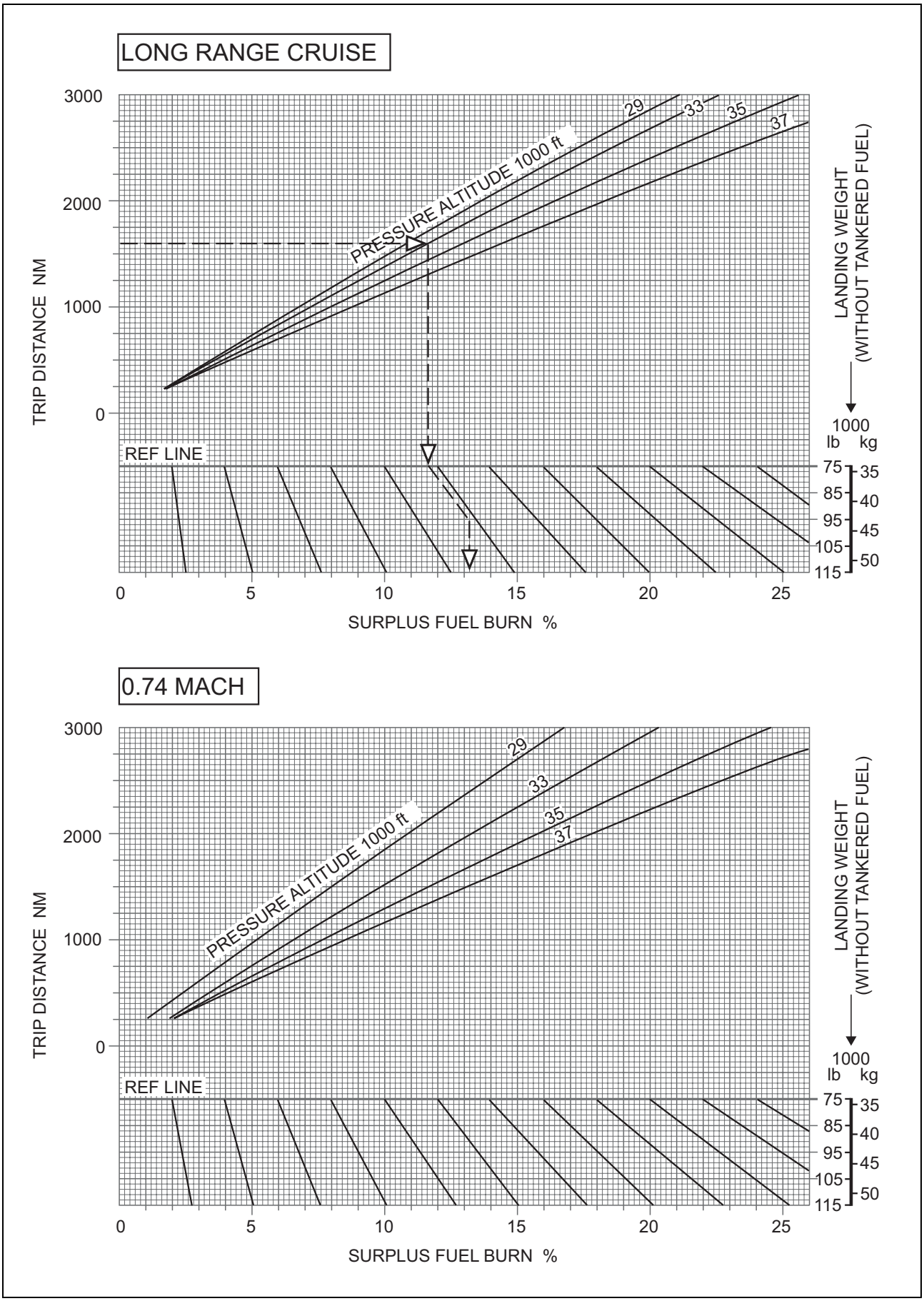

Figure 4.8.1 Fuel Tankering (LRC and 0.74 M)

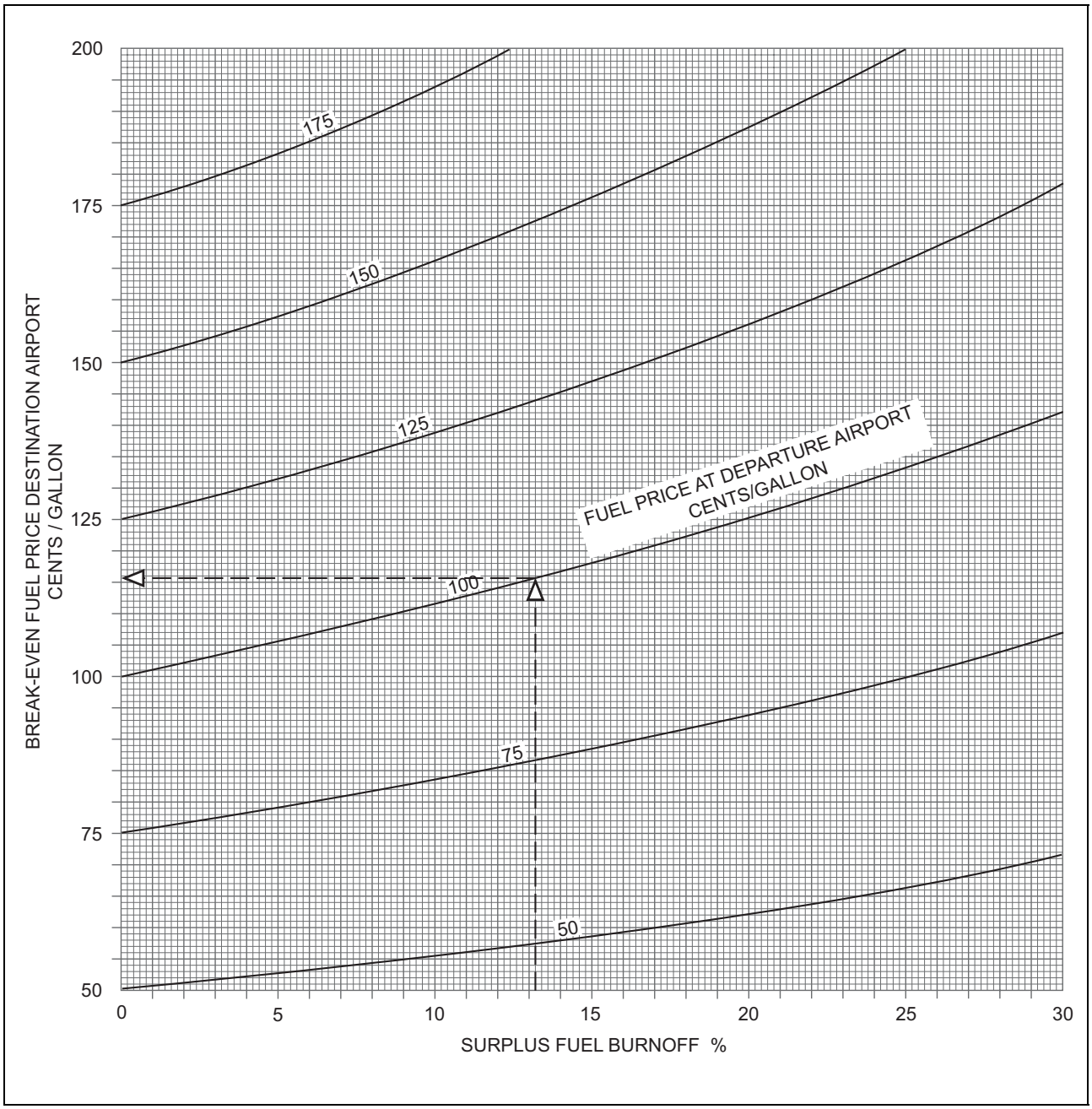

Figure 4.8.2 Fuel Price Differential

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