

**Safety Regulation Group**



**CAP 697**

**CAA JAR-FCL Examinations**

**Flight Planning Manual**

**Second Edition July 2006**

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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)<br>Performance Class B | <b>SEP1</b>  |
| Multi-Engined Piston       | certificated under CS 23 (Light Aeroplanes)<br>Performance Class B | <b>MEP1</b>  |
| Medium-Range Jet Transport | certificated under CS 25 (Large Aeroplanes)<br>Performance Class A | <b>MRJT1</b> |

- 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.

|  |   |
|--|---|
| <i>Basic Empty Mass (Basic Mass)</i>             | <i>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.</i>   |
| 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:<br>i) Crew and crew baggage.<br>ii) Catering and removable passenger service equipment.<br>iii) Potable water and lavatory chemicals.<br>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.   |
| <i>Maximum Structural Taxi Mass</i>              | <i>is the structural limitation of the mass of the aeroplane at commencement of taxi.</i>   |
| Maximum Zero Fuel Mass (MZFM)                    | is the maximum permissible mass of an aeroplane with no usable fuel.  |
| <i>Operating Mass (OM)</i>                       | <i>is the DOM plus fuel but without traffic load.</i>   |
| <i>Performance Limited Landing Mass (PLLM)</i>   | <i>is the landing mass subject to the destination aerodrome limitations.</i>  |
| <i>Performance Limited Take-Off Mass (PLTOM)</i> | <i>is the take-off mass subject to departure aerodrome limitations.</i>   |
| <i>Regulated Landing Mass (RLM)</i>              | <i>is the lowest of the 'performance limited' and 'structural limited' landing mass.</i>  |

---

|                                       |   |
|---------------------------------------|---|
| <i>Regulated Take-Off Mass (RTOM)</i> | <i>is the lowest of the 'performance limited' and 'structural limited' TOM.</i>   |
| 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.                  |
| <i>Taxi Mass</i>                      | <i>is the mass of the aeroplane at the start of the taxi (at departure from the loading gate). Sometimes referred to a Ramp Mass.</i> |
| Traffic Load                          | is the total mass of passengers, baggage and cargo, including any 'non-revenue' load.   |
| <i>Zero Fuel Mass (ZFM)</i>           | <i>is DOM plus traffic load but excluding fuel.</i>   |

**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)  $\text{lb} \times 0.454$

Kilograms (kg) to Pounds (lb)  $\text{kg} \times 2.205$

### 5.2 Volumes (Liquid)

Imperial Gallons to Litres (l)  $\text{Imp. Gal} \times 4.546$

US Gallons to Litres (l)  $\text{US Gal} \times 3.785$

### 5.3 Lengths

Feet (ft) to Metres (m)  $\text{Feet} \times 0.305$

### 5.4 Distances

Nautical mile (NM) to Metres (m)  $\text{NM} \times 1852.0$

## 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.

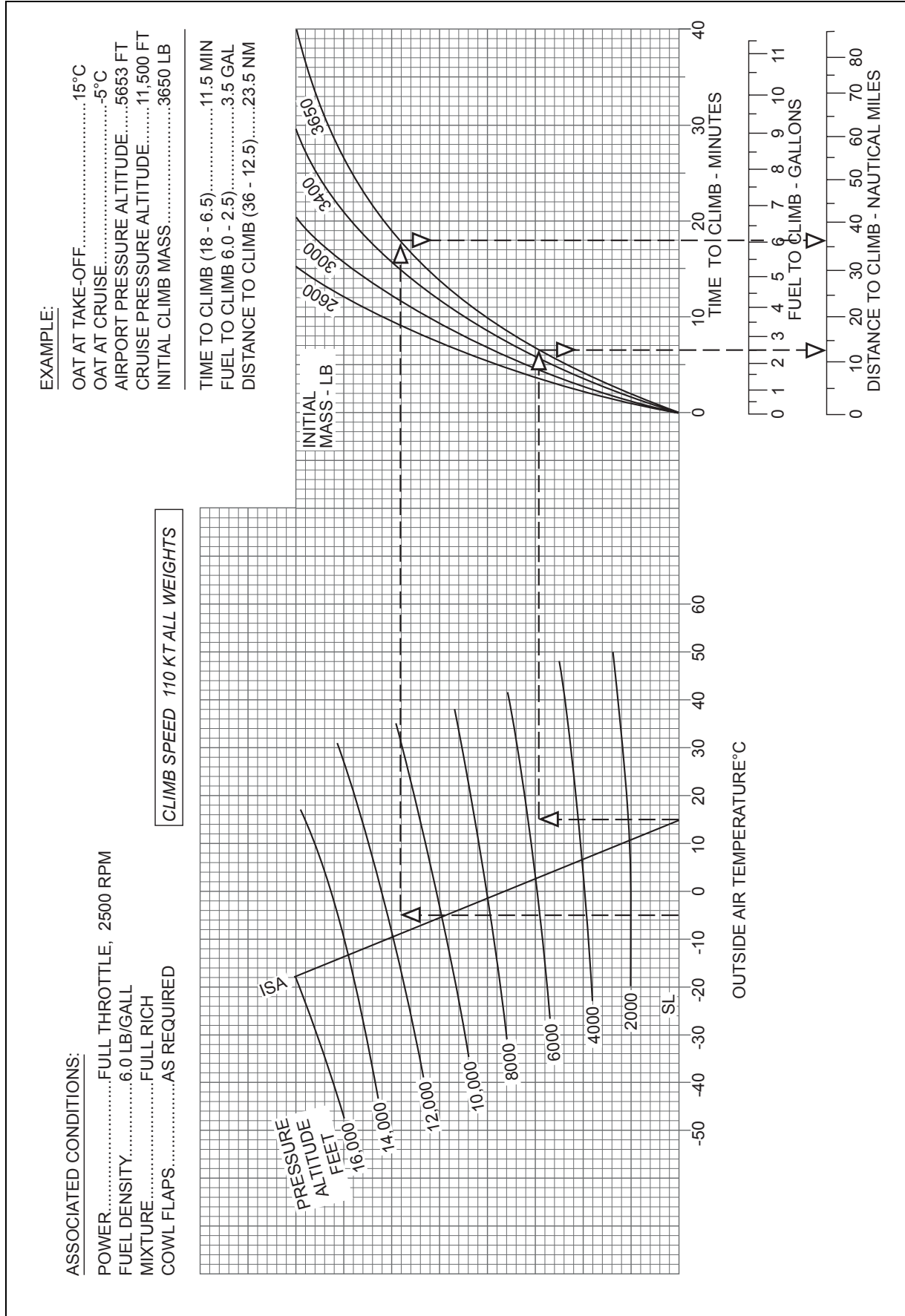
### 2.2 Example

|                               |           |
|-------------------------------|-----------|
| 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

- Select the correct table for the power setting.
- Select the appropriate temperature deviation block(s).
- Enter the block(s) at the appropriate cruising level.
- 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   | °F  |             | PPH       | GPH  | KIAS     | KTAS |
| <b>-20</b> | 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  |
|            | 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  |
| <b>0</b>   | 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  |
|            | 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  |
| <b>+20</b> | 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  |
|            | 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   | °F  |             | In. Hg    | PPH  | GPH      | KIAS |
| <b>-20</b> | 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  |
| <b>0</b>   | 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      | -    | -   | -           | -         | -    | -        | -    |
| <b>+20</b> | 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   | °F  |             | In. Hg    | PPH  | GPH      | KIAS |
| <b>-20</b> | 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  |
| <b>0</b>   | 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  |
| <b>+20</b> | 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   | °F   |             | PPH       | GPH  | KIAS     | KTAS |
| <b>-20</b> | 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      |      |
| <b>0</b>   | 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     | -           | -    | -    | -           | -         | -    | -        |      |
| <b>+20</b> | 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.

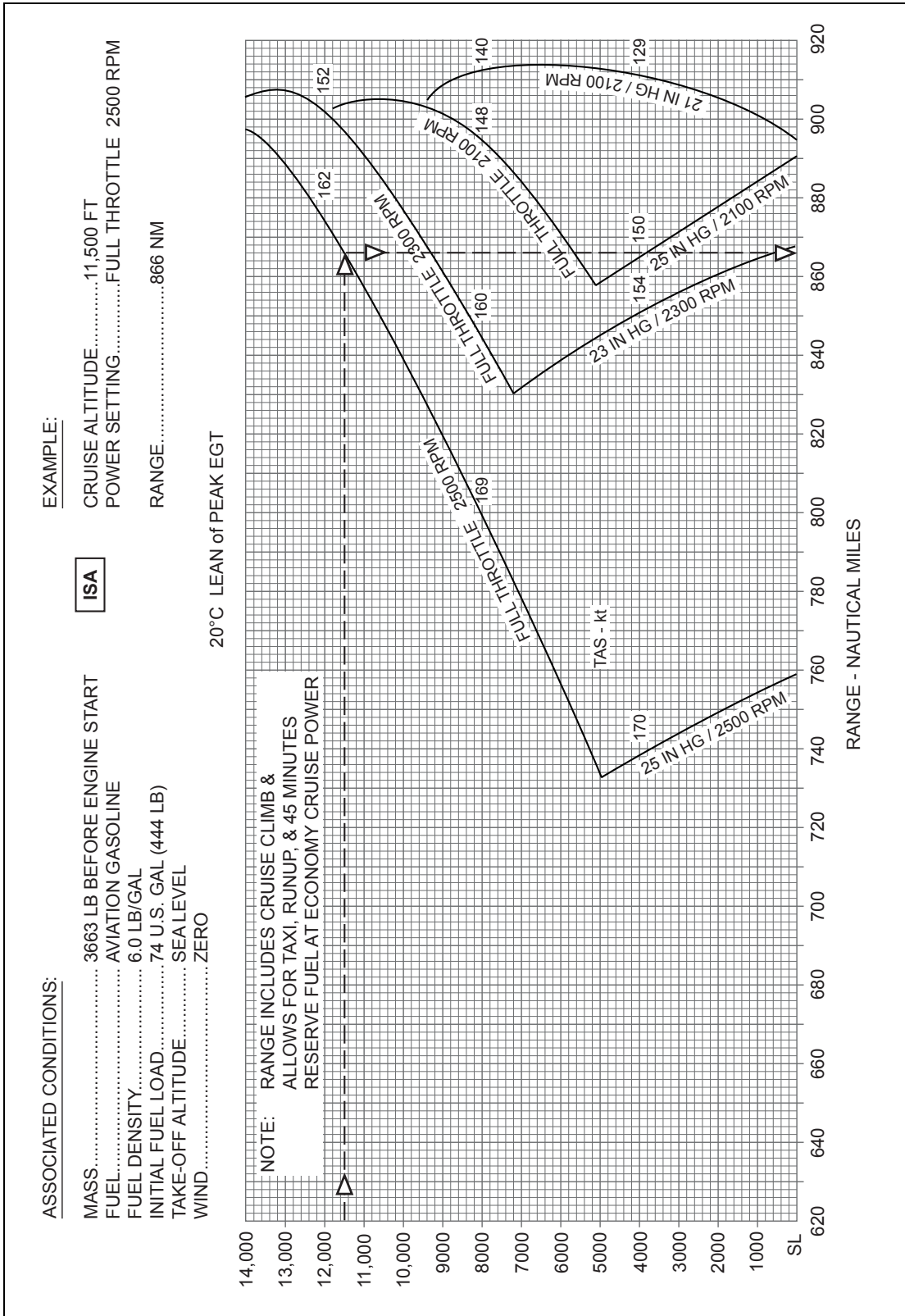
**NOTE 2:** Shaded areas represent operation with full throttle.

**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.

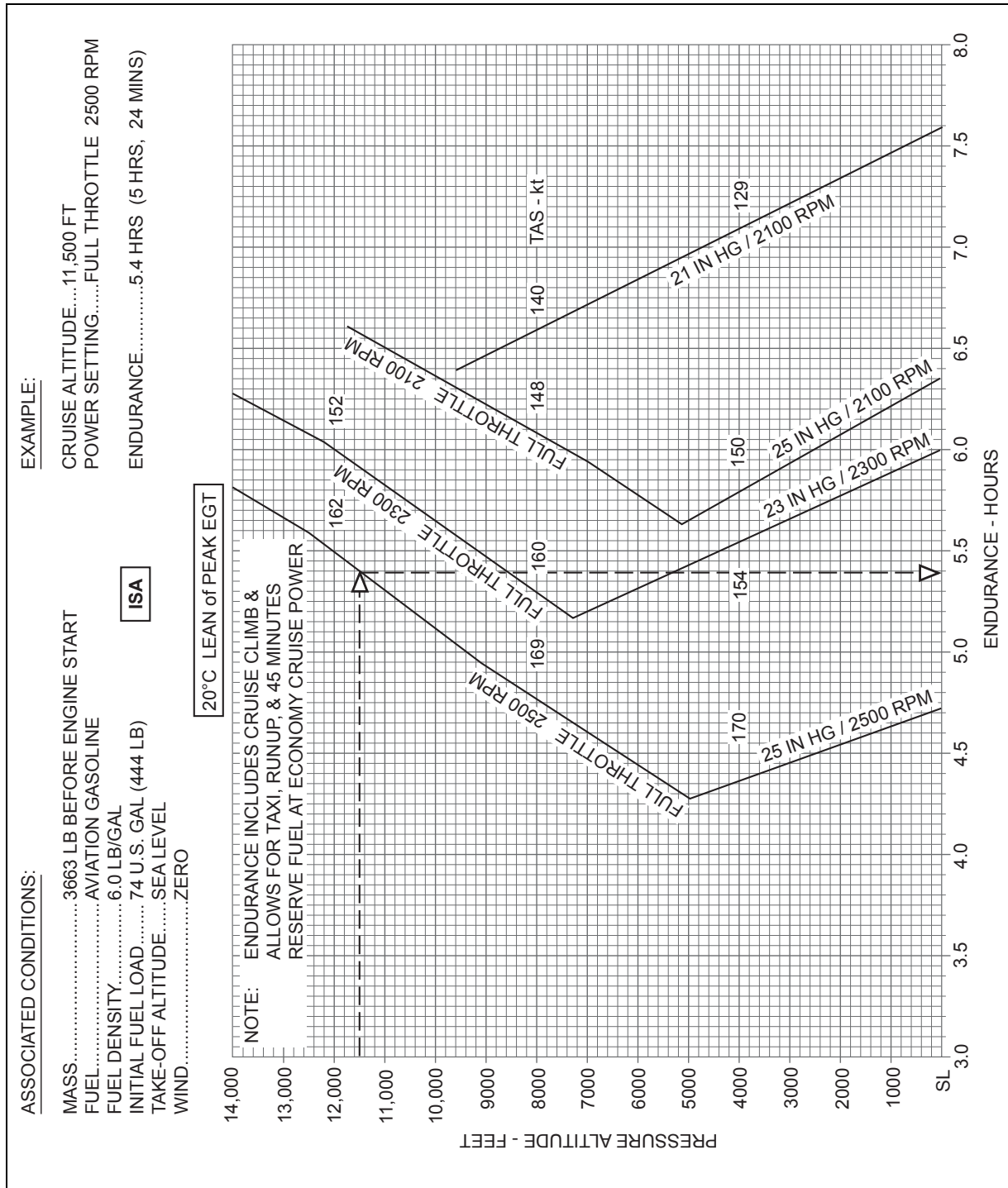
**NOTE:** The figures make allowance for the taxi, run-up and 45 minutes reserve fuel.



**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

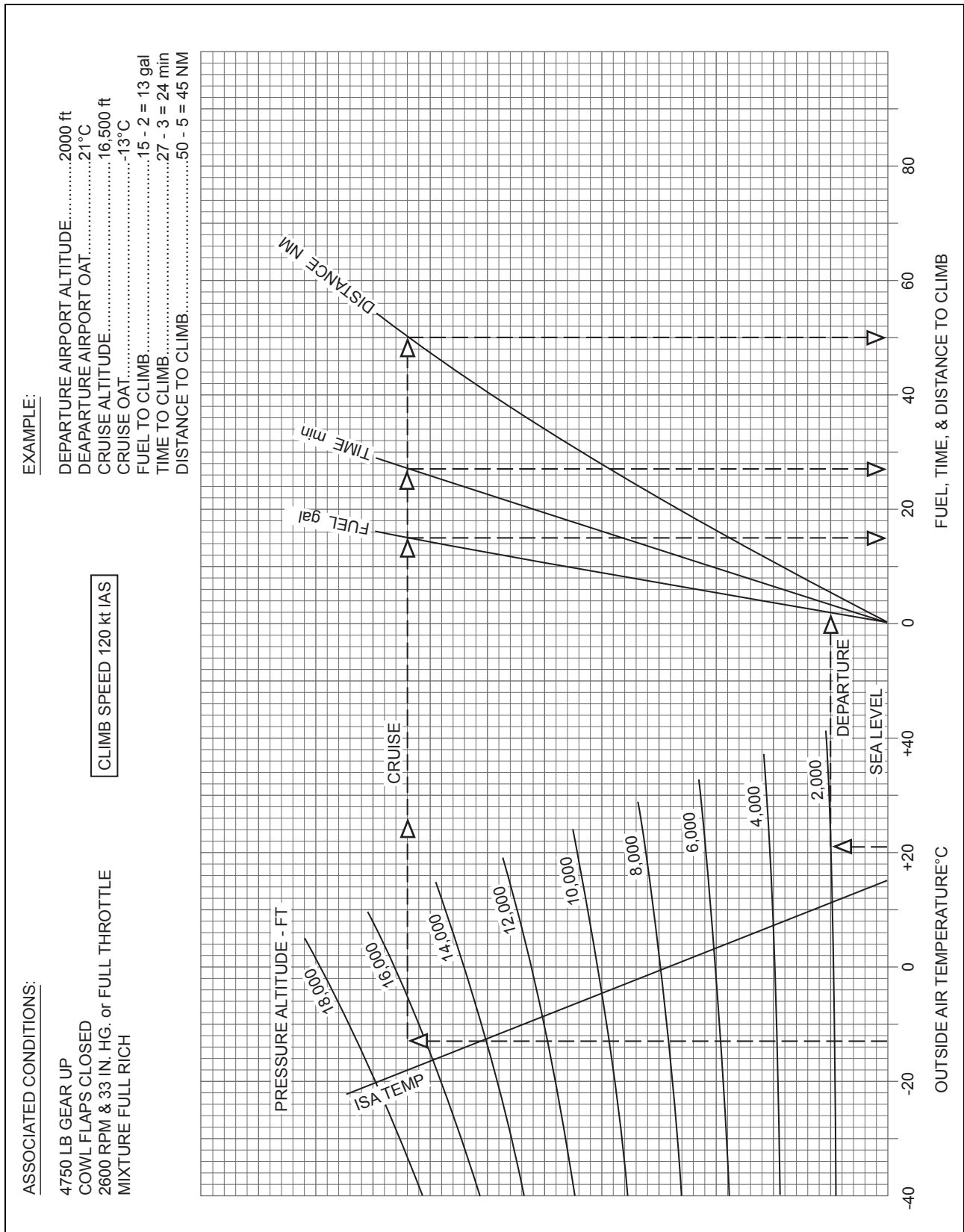
|                               |           |
|-------------------------------|-----------|
| Aerodrome Pressure Altitude   | 2,000 ft  |
| Aerodrome Ambient Temperature | +21°C     |
| Cruise Pressure Altitude      | 16,500 ft |
| Cruise Ambient Temperature    | -13°C     |

### 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.

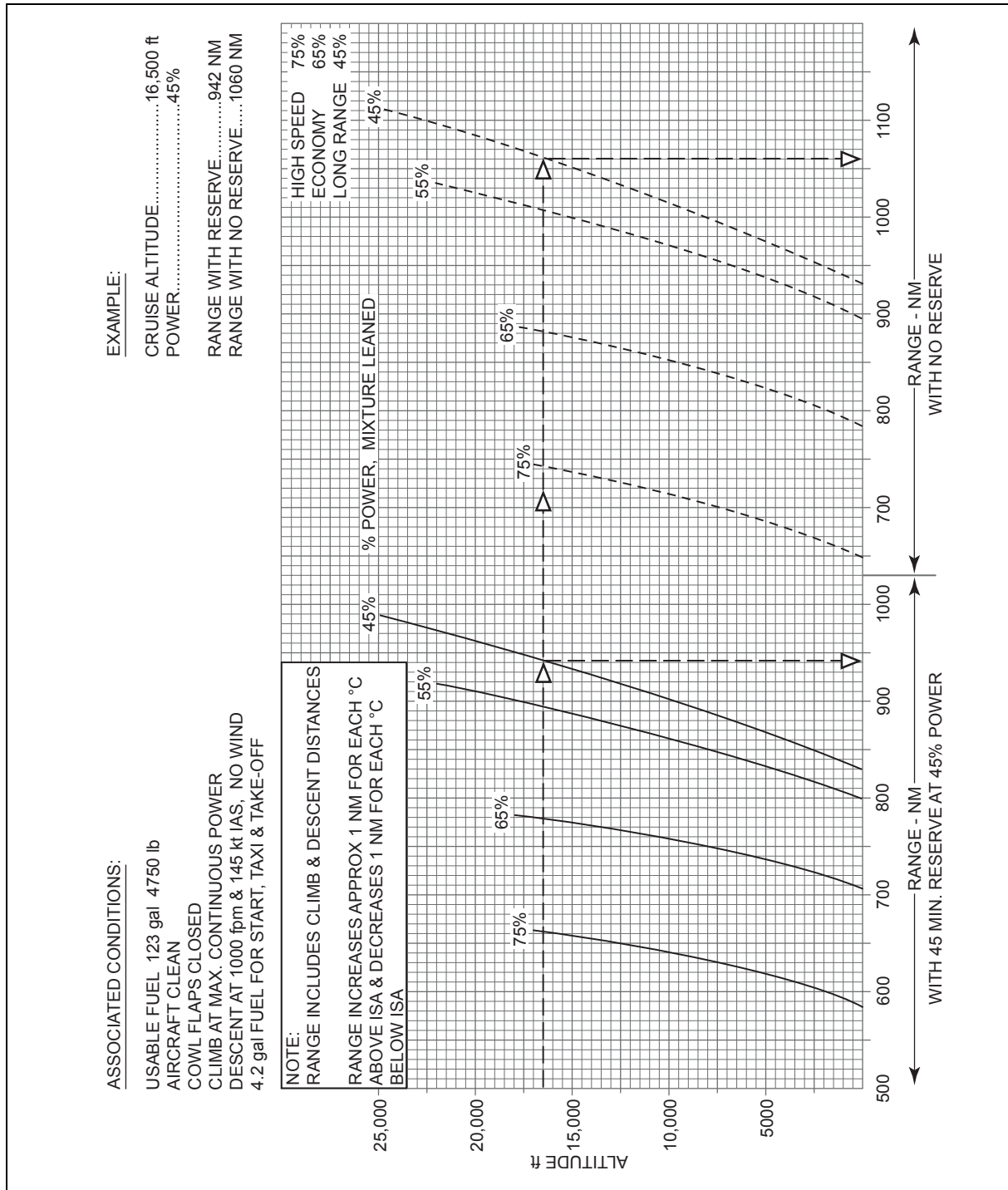


**Figure 3.1** Climb

### 3 Range at Standard Temperatures

#### 3.1 Calculation Method

- Enter Figure 3.2 at the left vertical axis with the cruise Pressure Altitude.
- Travel horizontally right to intersect the grid-line appropriate to the power setting (with or without reserve).
- Drop vertically to read the still-air range.
- To determine the wind effective range, multiply the still-air range by the groundspeed and divide by the TAS.
- 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.

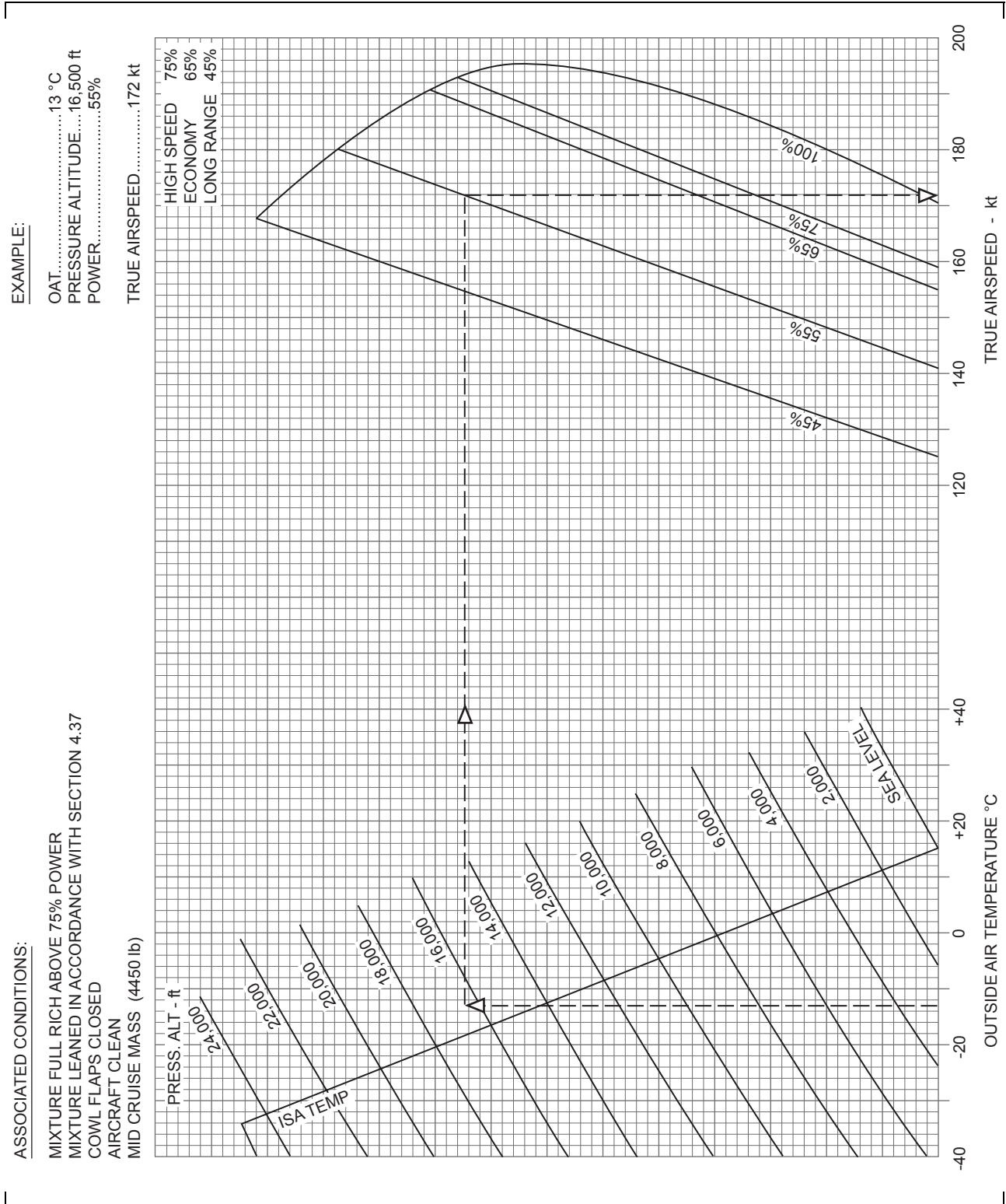
**The Cruise Manifold Pressure must not exceed 34 inches.**

| 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.

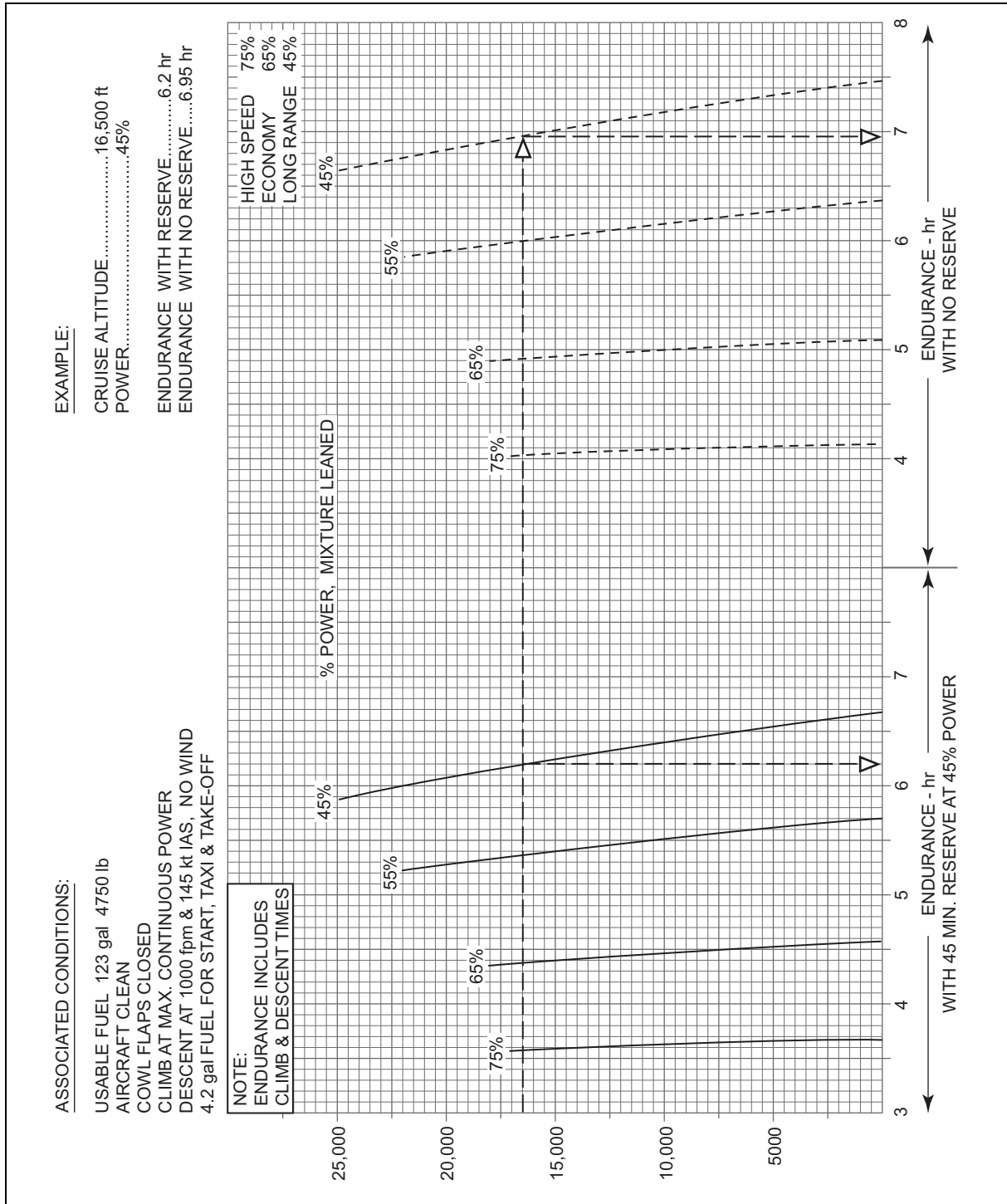


**Figure 3.4** Speed v Power

## 6 Endurance

### 6.1 Method of Use

- Enter the left vertical axis of Figure 3.5 at the cruise Pressure Altitude.
- 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).
- From the intersection at b) travel vertically down to read the safe endurance in hours (or maximum endurance).

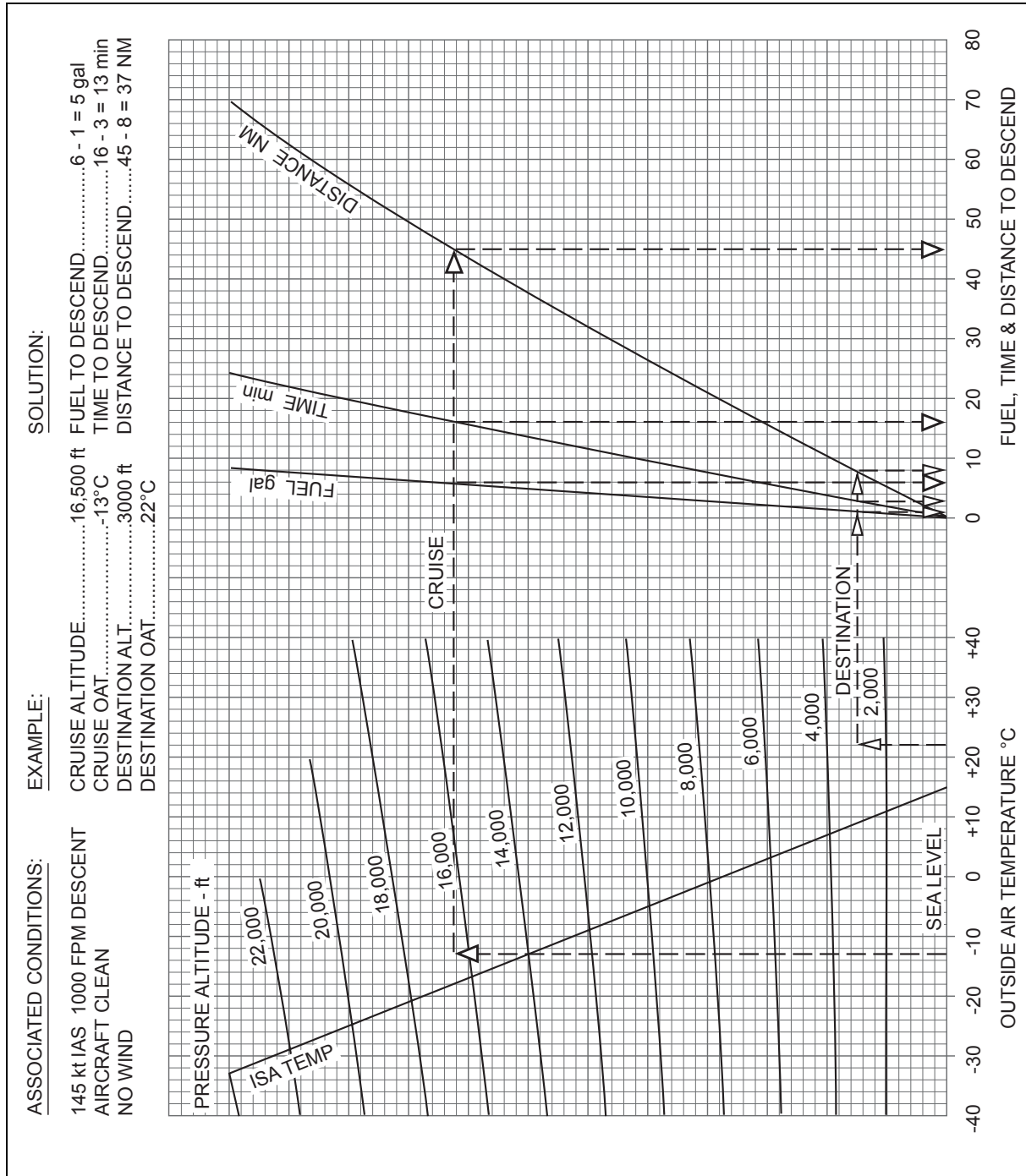


**Figure 3.5** Endurance

## 7 Descent

### 7.1 Calculation Method

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

- 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).
- Travel vertically to intersect the cruise profile graph line. (LRC in the example).
- From this point move horizontally left to read the optimum cruise altitude. (33,500 ft in the example).

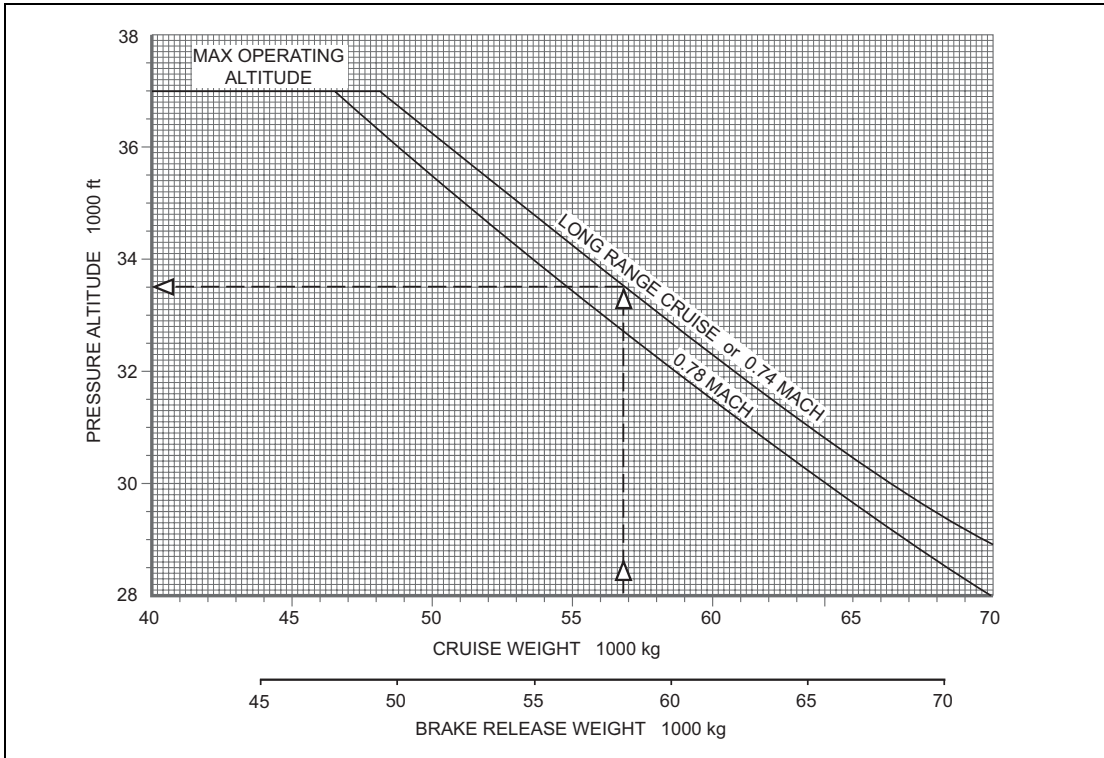
**NOTE:** Operating at 'off-optimum' altitude incurs the fuel mileage penalty listed below in the table.

| 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       |

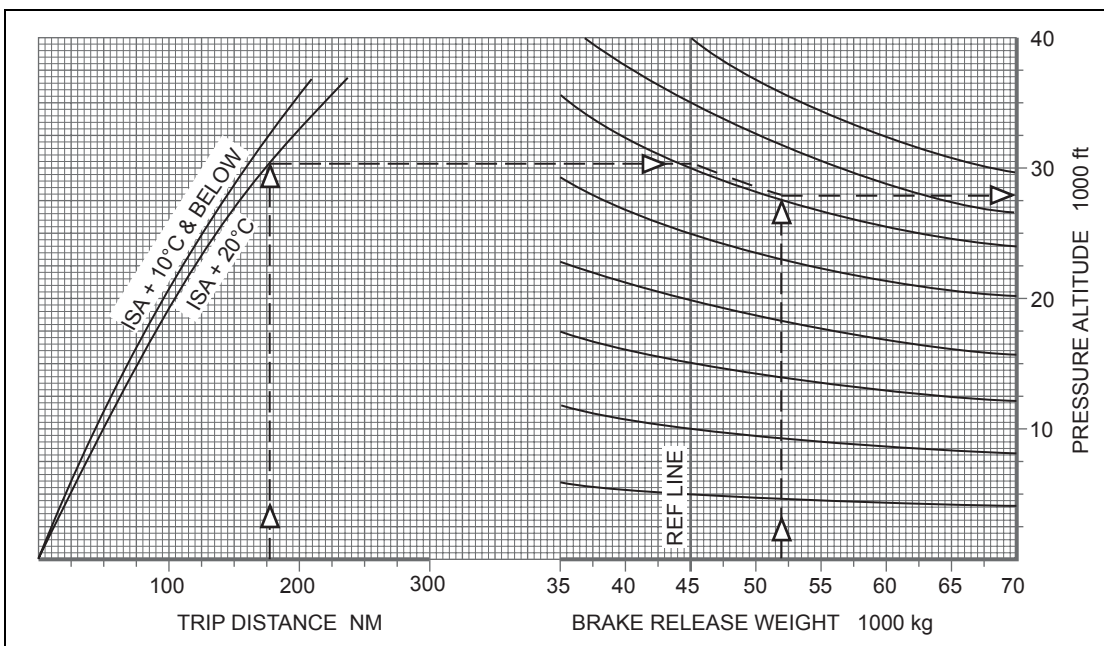
**Table 4.1** Off-Optimum Fuel Penalty

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.

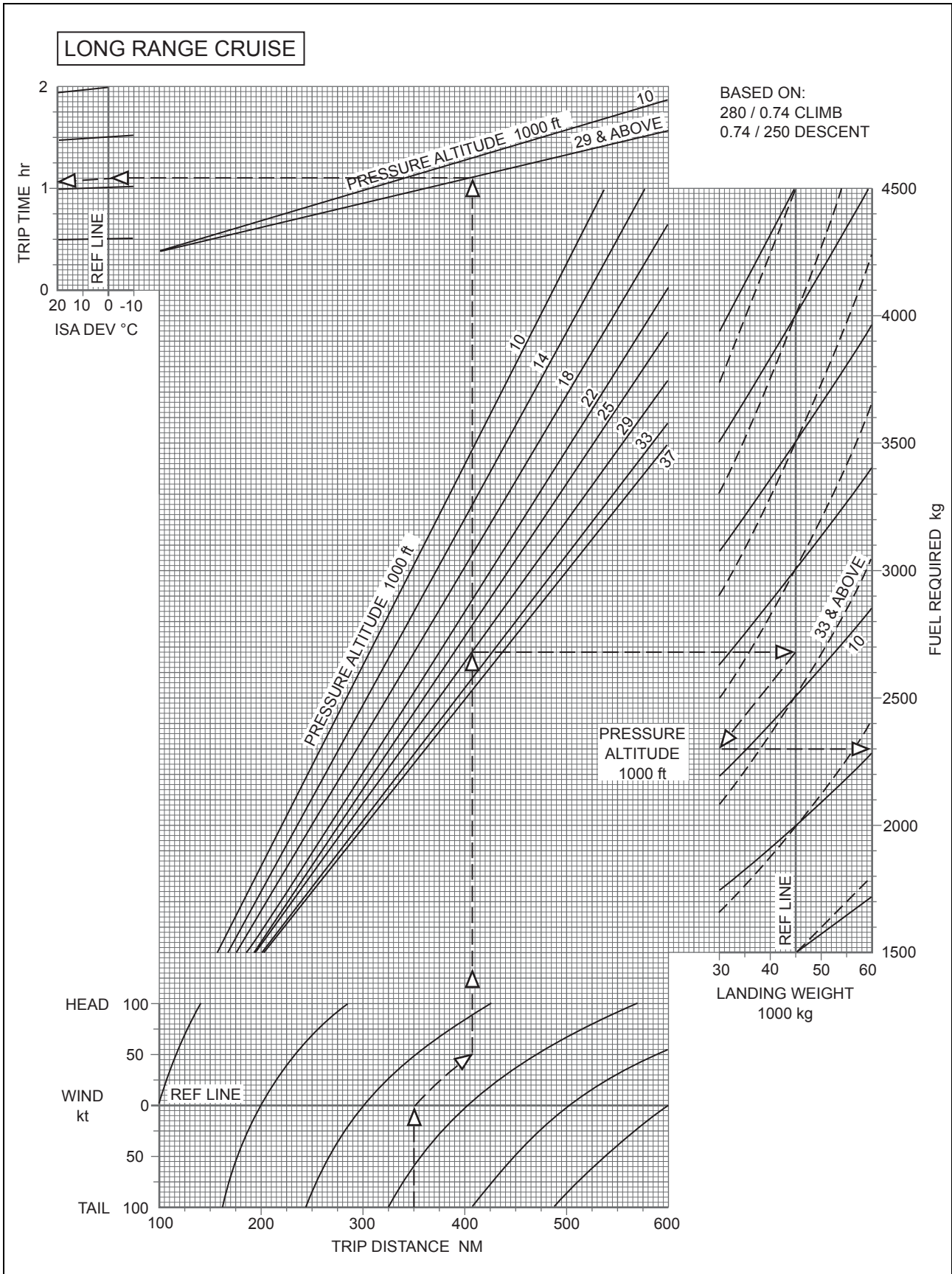
i) Travel left from this intersection to the ISA Deviation reference-line.

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

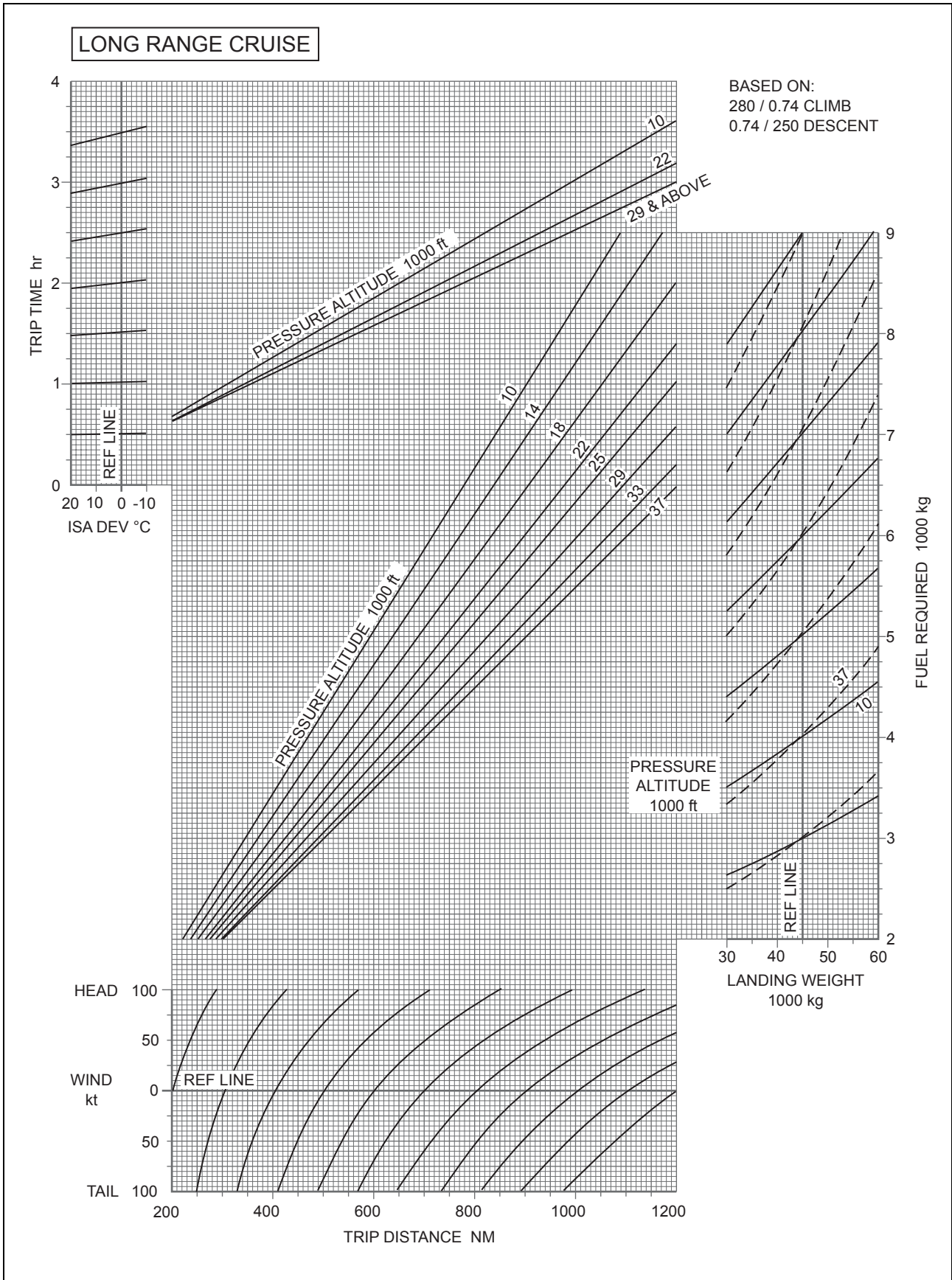
k) Continue horizontally left to read the trip time in hours from the left vertical axis (approximately 1.05 hr).

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

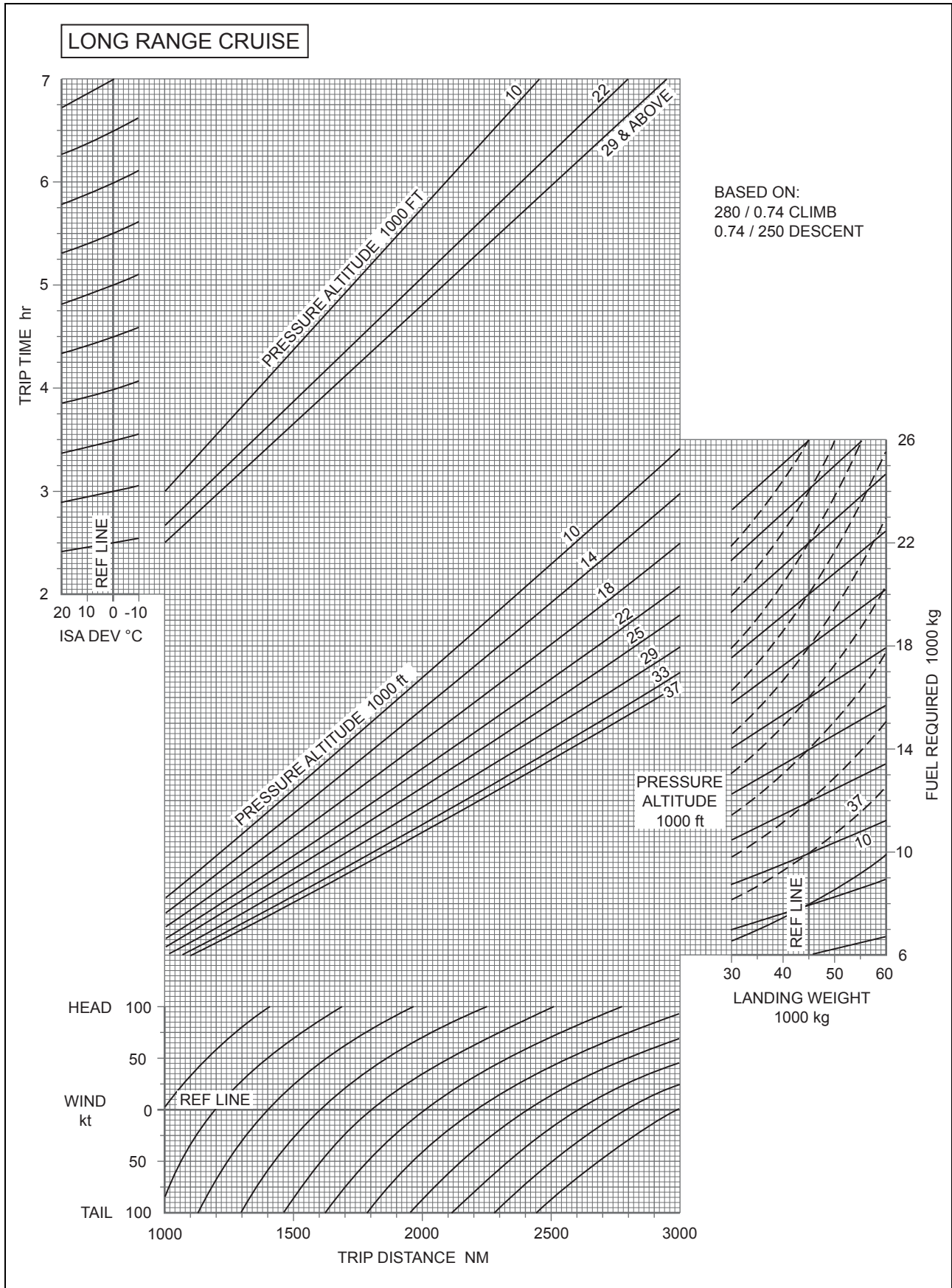
**NOTE: Additional allowances must be made if the climb, cruise or descent schedules are different from those listed.**



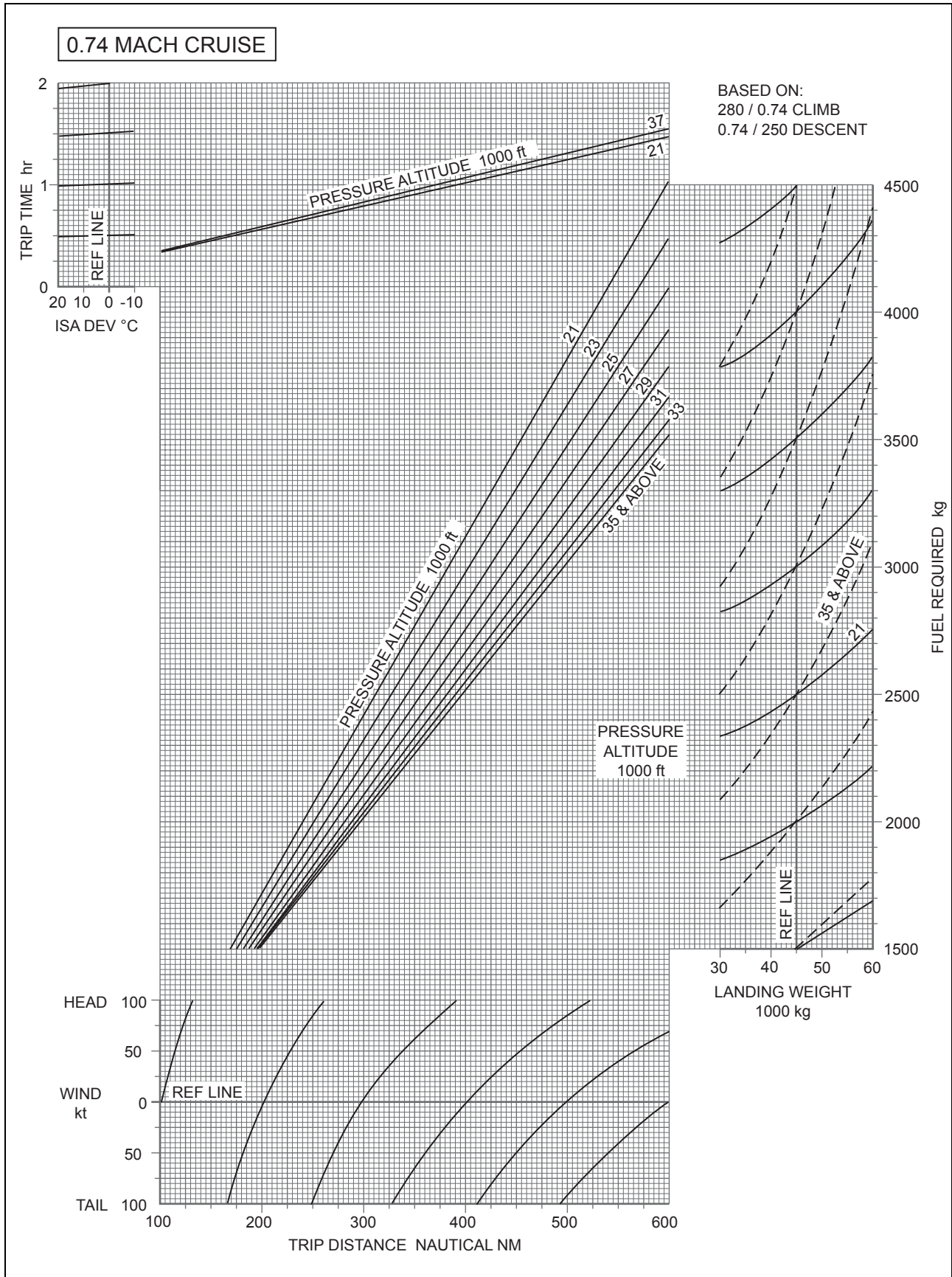
**Figure 4.3.1a** Simplified Flight Planning – Trip Distances 100 NM to 600 NM



**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





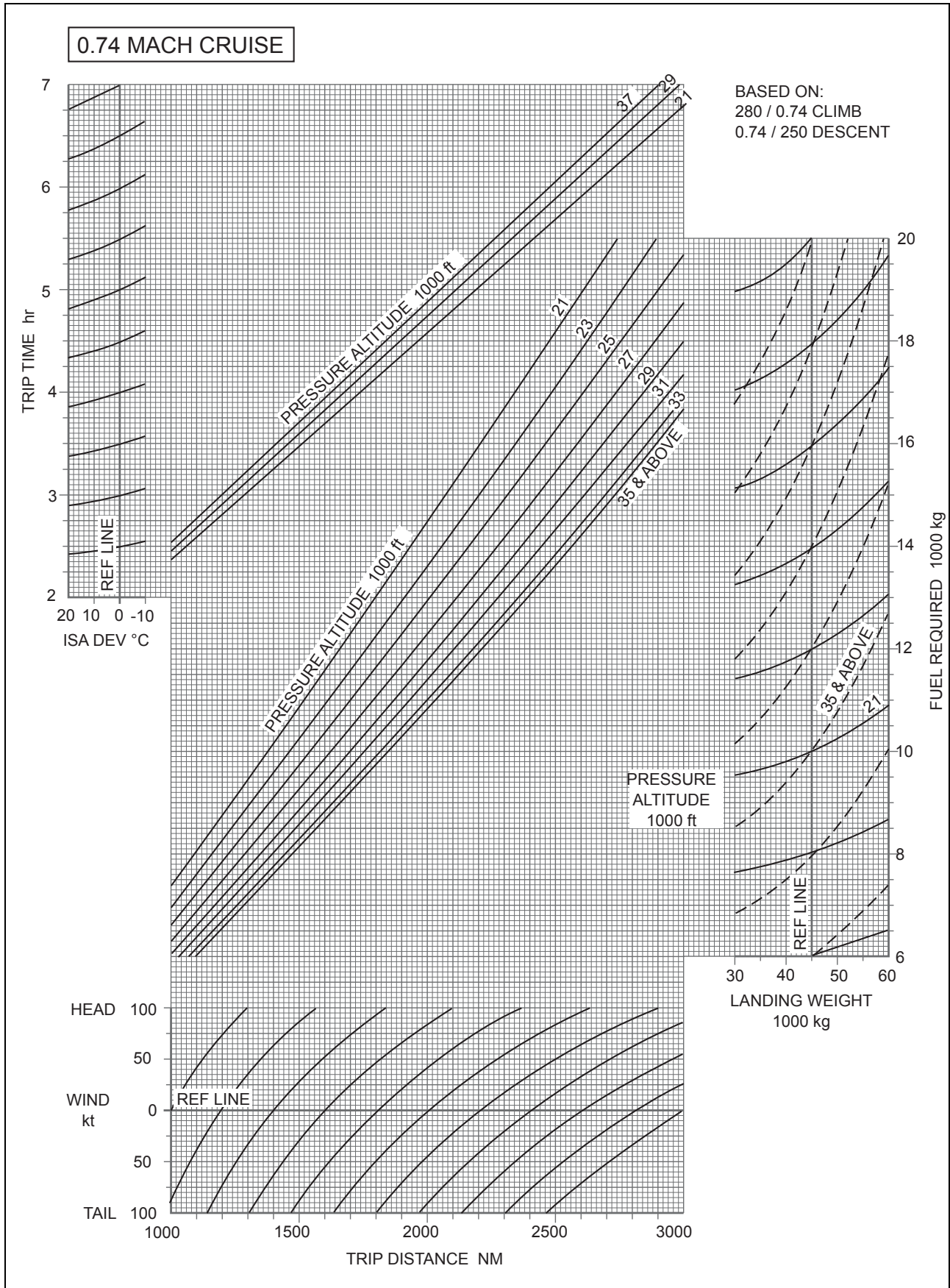
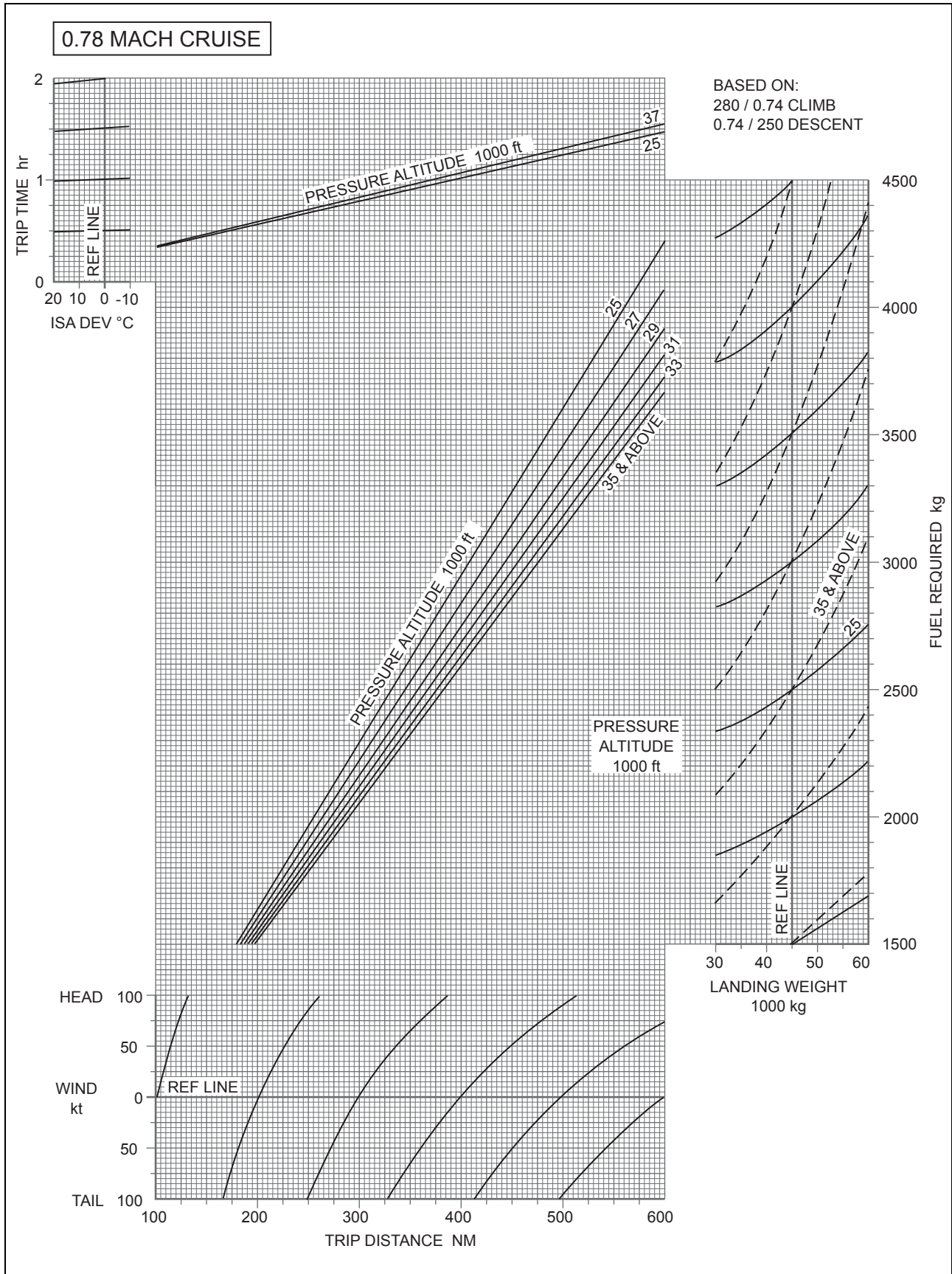
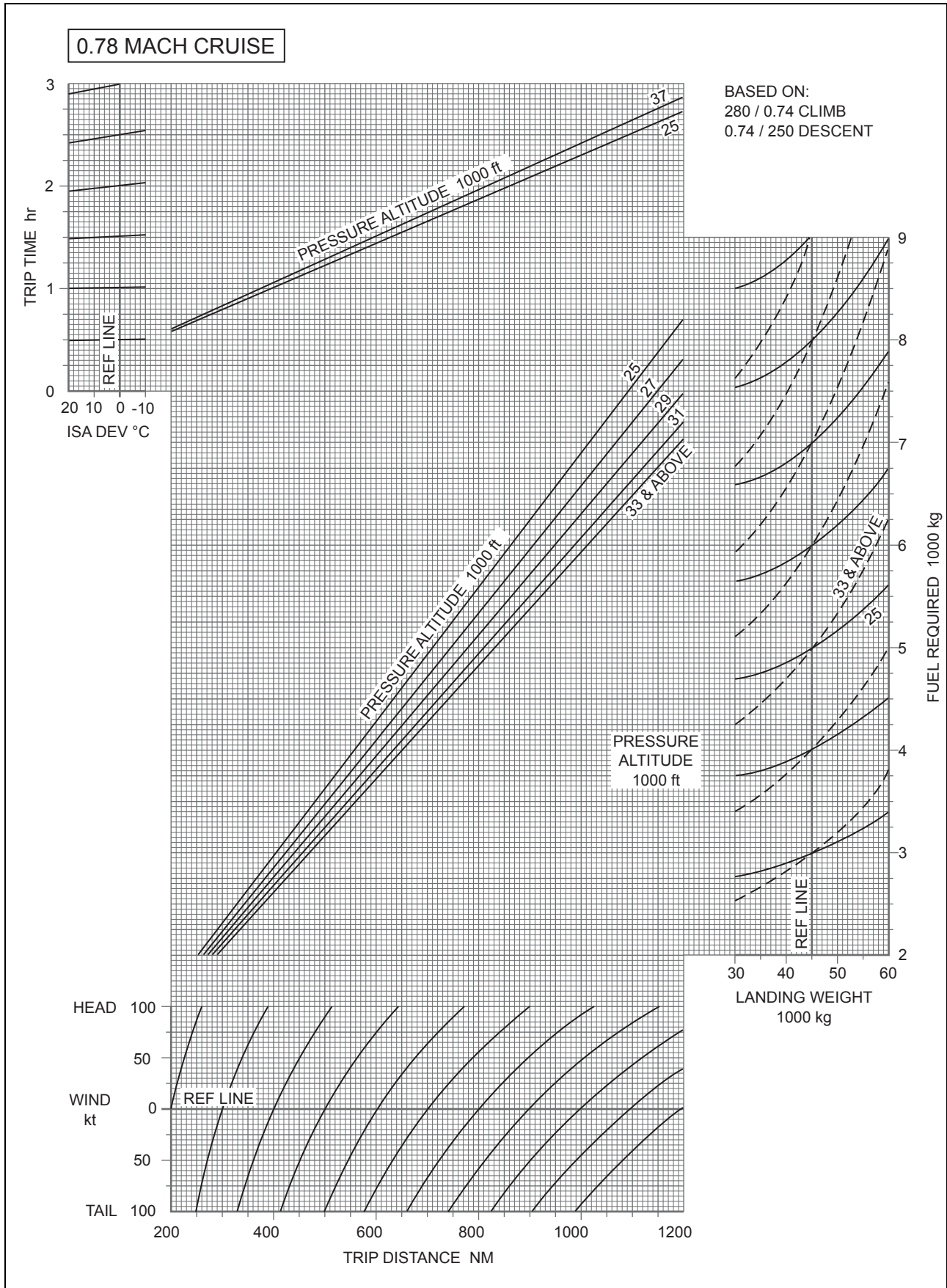


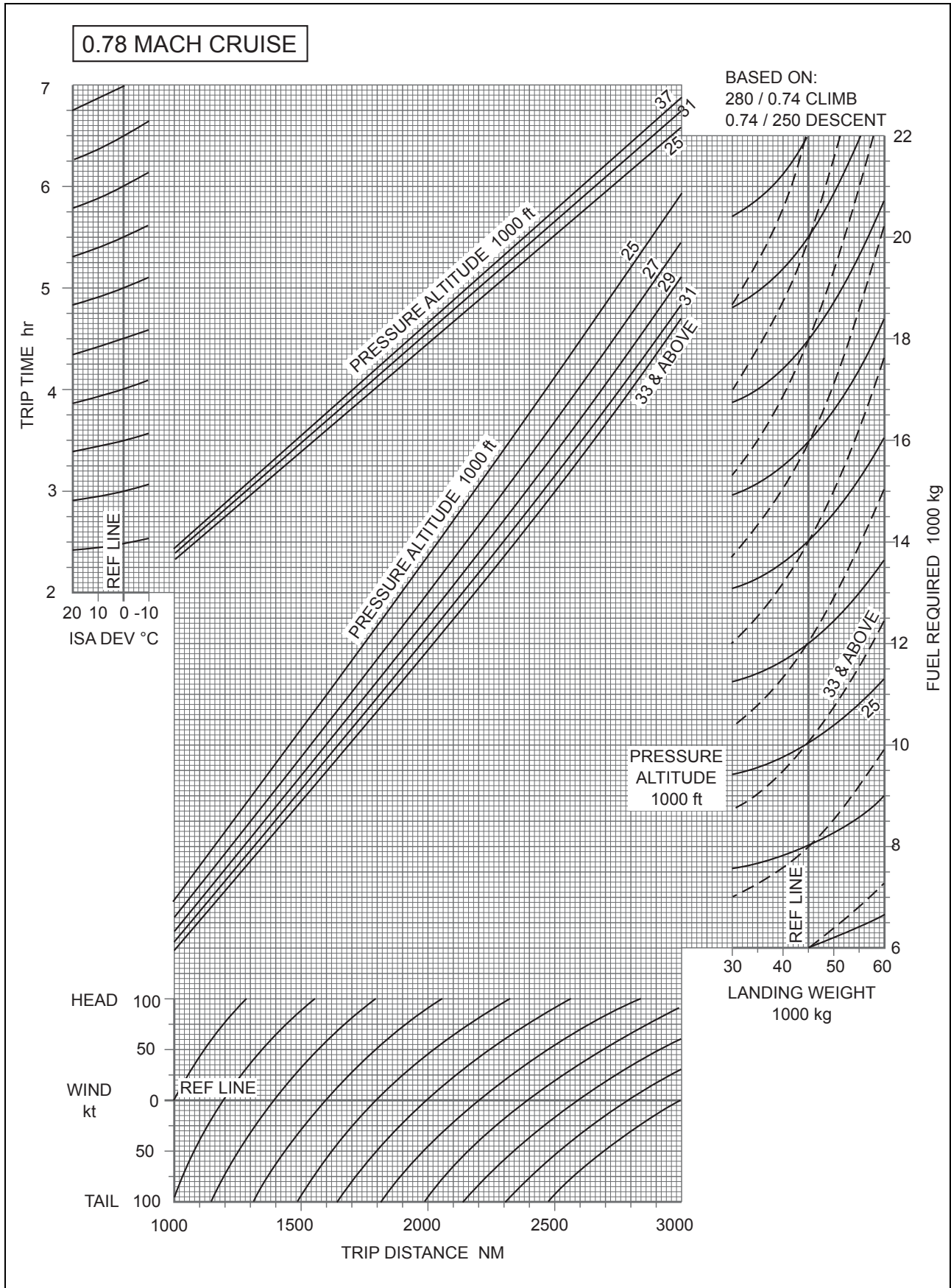
Figure 4.3.2c Simplified Flight Planning – Trip Distances 1,000 NM to 3,000 NM



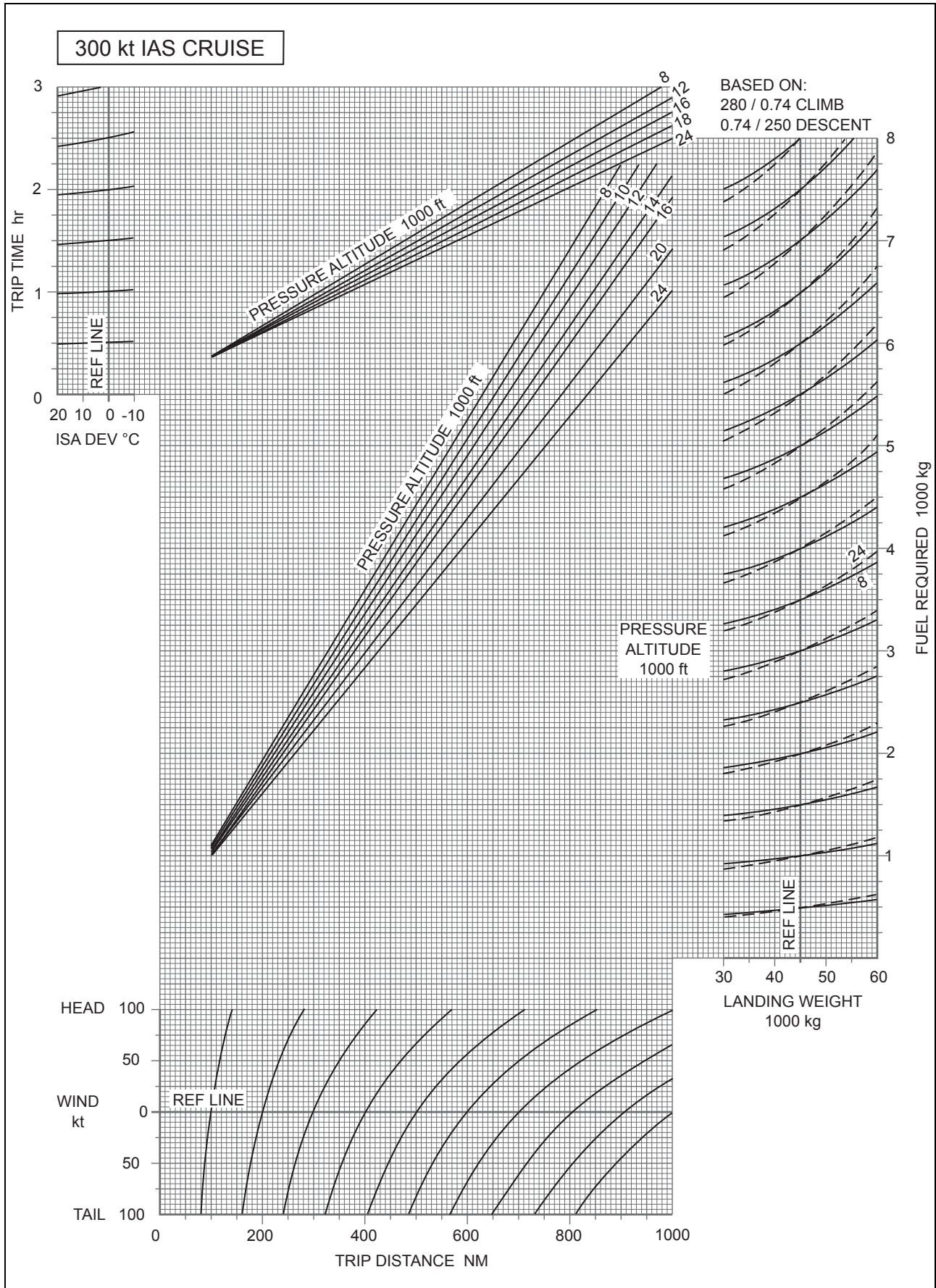
**Figure 4.3.3a** Simplified Flight Planning – Trip Distances 100 NM to 600 NM



**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

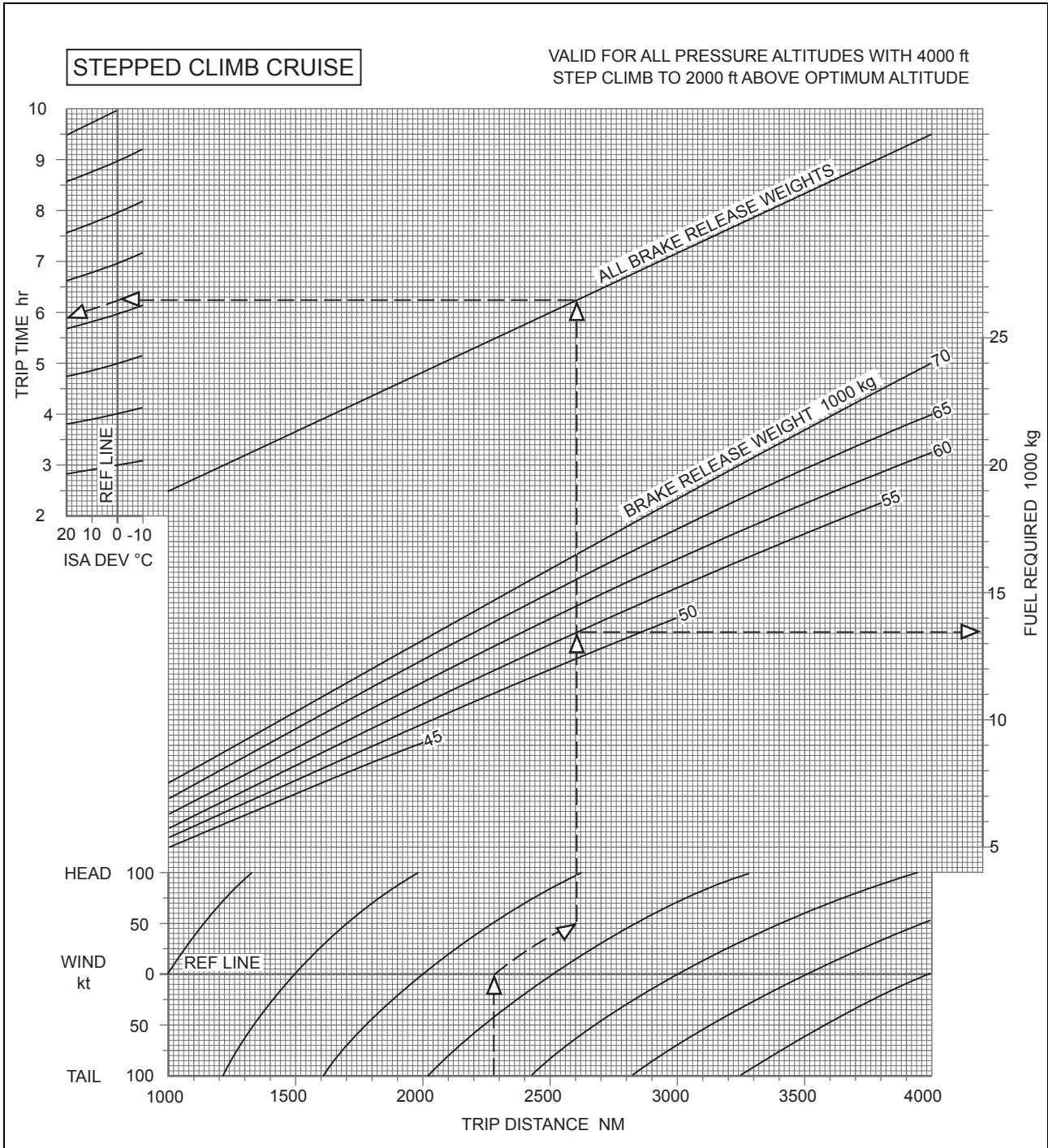


**Figure 4.3.4** Simplified Flight Planning – Trip Distances 0 NM to 1,000 NM

**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.



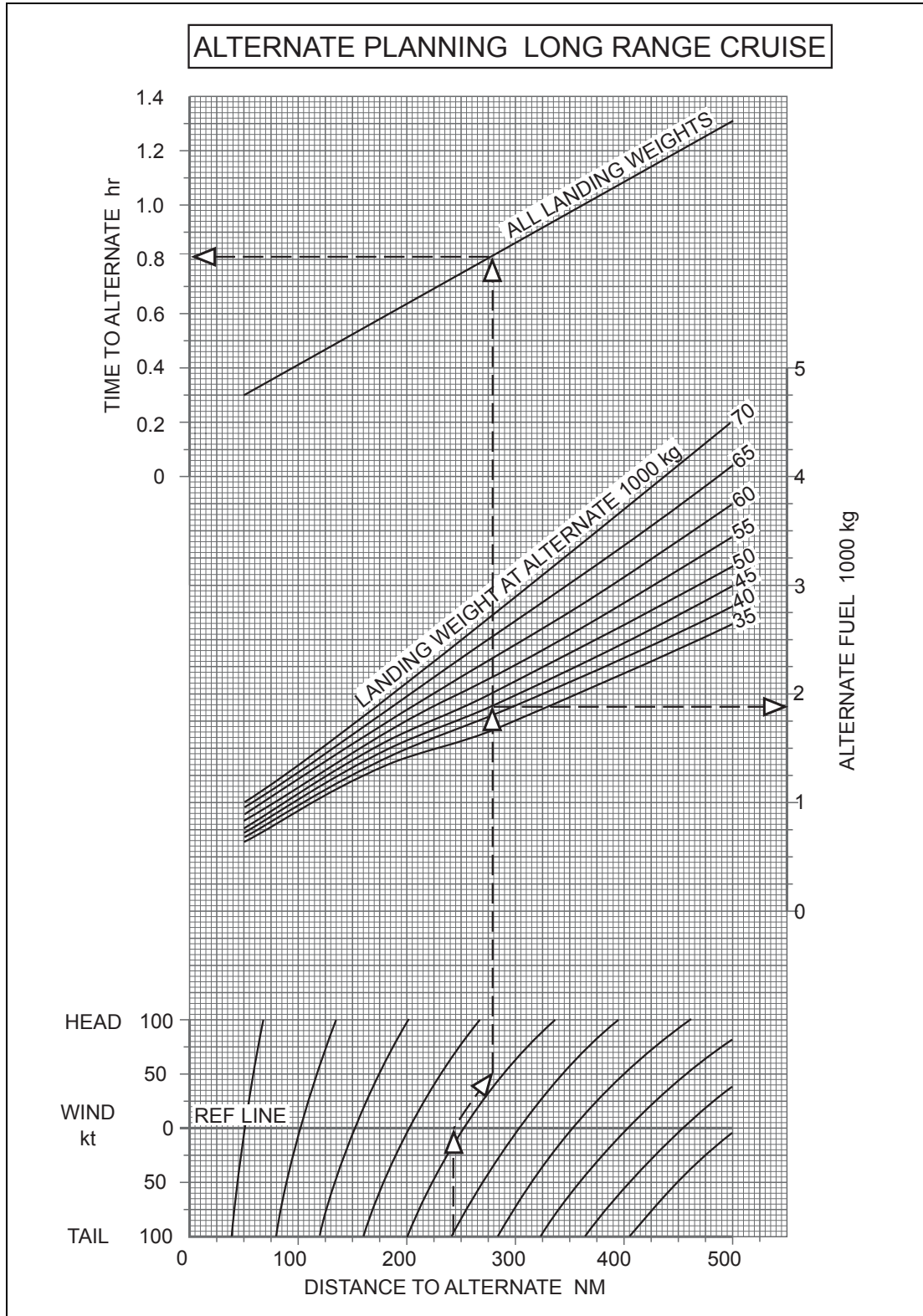
**Figure 4.3.5** Simplified Flight Planning – Trip Distances 1,000 NM to 4,000 NM

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

- 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.
- Extract the holding fuel flow in kg per hour.
- 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.
- If the hold is to be conducted in straight and level flight, reduce the fuel flow by 5%.

| Press<br>Alt.<br>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.<br>Alt.<br>ft | Units<br>Min/kg.<br>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  | 89/364  | 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  | 55/350  | 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.<br>Alt.<br>ft | Units<br>Min/kg.<br>NAM/Kt | BRAKE RELEASE WEIGHT KG |                    |                    |                    |                    |                    |                    |                    |                   |                   |                   |
|----------------------|----------------------------|-------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|
|                      |                            | 68000                   | 66000              | 64000              | 62000              | 60000              | 58000              | 56000              | 52000              | 48000             | 44000             | 40000             |
| 37000                | Time/Fuel<br>Dist/TAS      |                         |                    |                    | 32/2250<br>197/400 | 26/1900<br>158/396 | 23/1750<br>138/393 | 21/1600<br>124/392 | 18/1400<br>105/389 | 16/1250<br>90/388 | 14/1100<br>78/386 | 12/1000<br>68/385 |
| 36000                | Time/Fuel<br>Dist/TAS      |                         |                    | 29/2150<br>177/397 | 25/1900<br>151/393 | 23/1750<br>135/391 | 21/1650<br>122/390 | 19/1550<br>112/388 | 17/1350<br>96/386  | 15/1200<br>84/385 | 13/1050<br>73/384 | 11/950<br>64/383  |
| 35000                | Time/Fuel<br>Dist/TAS      | 33/2450<br>209/399      | 28/2150<br>169/394 | 25/1950<br>148/391 | 22/1800<br>133/389 | 21/1650<br>121/388 | 19/1550<br>112/387 | 18/1450<br>104/386 | 16/1300<br>90/384  | 14/1150<br>78/383 | 12/1050<br>69/382 | 11/950<br>60/381  |
| 34000                | Time/Fuel<br>Dist/TAS      | 27/2150<br>117/378      | 24/1950<br>109/377 | 22/1800<br>131/387 | 21/1700<br>120/386 | 19/1600<br>111/385 | 18/1500<br>103/384 | 17/1400<br>96/383  | 15/1250<br>84/381  | 13/1150<br>74/380 | 12/1000<br>65/379 | 11/900<br>57/379  |
| 33000                | Time/Fuel<br>Dist/TAS      | 24/1950<br>142/386      | 22/1850<br>129/385 | 21/1700<br>119/383 | 19/1600<br>110/382 | 18/1550<br>103/381 | 17/1450<br>96/380  | 16/1350<br>90/380  | 14/1200<br>79/379  | 13/1100<br>70/378 | 11/1000<br>62/377 | 10/900<br>54/376  |
| 32000                | Time/Fuel<br>Dist/TAS      | 22/1850<br>128/382      | 21/1750<br>118/381 | 19/1650<br>110/380 | 18/1550<br>102/379 | 17/1450<br>96/378  | 16/1400<br>90/377  | 15/1300<br>84/377  | 14/1200<br>74/376  | 12/1050<br>66/375 | 11/950<br>58/374  | 10/850<br>51/374  |
| 31000                | Time/Fuel<br>Dist/TAS      | 21/1800<br>117/380      | 19/1650<br>109/377 | 18/1600<br>102/376 | 17/1500<br>95/375  | 16/1400<br>89/375  | 15/1350<br>84/374  | 14/1300<br>79/374  | 13/1150<br>70/373  | 12/1050<br>62/372 | 10/950<br>55/371  | 9/850<br>49/371   |
| 30000                | Time/Fuel<br>Dist/TAS      | 19/1700<br>108/374      | 18/1600<br>101/373 | 17/1500<br>95/372  | 16/1450<br>89/372  | 15/1350<br>84/371  | 15/1300<br>79/371  | 14/1250<br>74/370  | 12/1100<br>66/369  | 11/1000<br>59/369 | 10/900<br>52/368  | 9/800<br>46/368   |
| 29000                | Time/Fuel<br>Dist/TAS      | 18/1600<br>98/369       | 17/1550<br>92/368  | 16/1450<br>87/367  | 15/1400<br>82/367  | 14/1300<br>77/367  | 14/1250<br>73/366  | 13/1200<br>69/366  | 12/1100<br>61/365  | 11/950<br>55/365  | 10/900<br>49/364  | 9/800<br>43/364   |
| 28000                | Time/Fuel<br>Dist/TAS      | 17/1550<br>90/364       | 16/1450<br>84/363  | 15/1400<br>79/363  | 14/1300<br>75/362  | 14/1250<br>71/362  | 13/1200<br>67/362  | 12/1150<br>63/351  | 11/1050<br>57/361  | 10/950<br>51/360  | 9/850<br>45/360   | 8/750<br>40/360   |
| 27000                | Time/Fuel<br>Dist/TAS      | 16/1450<br>82/359       | 15/1400<br>77/359  | 14/1350<br>73/358  | 13/1250<br>69/358  | 13/1200<br>65/358  | 12/1150<br>62/357  | 12/1100<br>58/357  | 11/1000<br>52/357  | 10/900<br>47/356  | 9/800<br>42/356   | 8/750<br>37/356   |
| 26000                | Time/Fuel<br>Dist/TAS      | 15/1400<br>75/355       | 14/1350<br>71/355  | 13/1250<br>67/354  | 13/1200<br>63/354  | 12/1150<br>60/354  | 12/1100<br>57/353  | 11/1050<br>54/353  | 10/950<br>48/353   | 9/850<br>43/352   | 8/800<br>39/352   | 7/700<br>35/352   |
| 25000                | Time/Fuel<br>Dist/TAS      | 14/1350<br>69/351       | 13/1250<br>65/351  | 13/1200<br>62/350  | 12/1150<br>58/350  | 11/1100<br>55/350  | 11/1050<br>53/350  | 10/1000<br>50/349  | 9/900<br>45/349    | 8/850<br>40/349   | 7/750<br>36/348   | 6/600<br>32/348   |
| 24000                | Time/Fuel<br>Dist/TAS      | 13/1300<br>63/347       | 12/1200<br>60/347  | 12/1150<br>57/346  | 11/1100<br>54/346  | 11/1050<br>51/346  | 10/1000<br>48/346  | 10/950<br>46/346   | 9/900<br>41/345    | 8/800<br>37/345   | 7/750<br>33/345   | 6/650<br>30/345   |
| 23000                | Time/Fuel<br>Dist/TAS      | 12/1200<br>58/343       | 12/1150<br>55/343  | 11/1100<br>52/343  | 11/1050<br>50/343  | 10/1000<br>47/342  | 10/950<br>45/342   | 9/900<br>42/342    | 8/850<br>38/342    | 8/750<br>34/342   | 7/700<br>31/341   | 6/650<br>28/341   |
| 22000                | Time/Fuel<br>Dist/TAS      | 11/1150<br>53/340       | 11/1100<br>51/339  | 10/1050<br>48/339  | 10/1000<br>46/339  | 10/1000<br>43/339  | 9/950<br>41/339    | 9/900<br>39/339    | 8/800<br>35/338    | 7/750<br>32/338   | 7/700<br>29/338   | 6/600<br>26/338   |
| 21000                | Time/Fuel<br>Dist/TAS      | 11/1100<br>49/336       | 10/1050<br>46/336  | 10/1000<br>44/336  | 9/1000<br>42/336   | 9/950<br>40/336    | 9/900<br>38/335    | 8/850<br>36/335    | 8/800<br>33/335    | 7/700<br>29/335   | 6/650<br>26/335   | 6/600<br>24/335   |
| 20000                | Time/Fuel<br>Dist/TAS      | 10/1050<br>45/333       | 10/1000<br>42/333  | 9/950<br>40/332    | 9/900<br>39/332    | 9/900<br>37/332    | 8/850<br>35/332    | 8/800<br>33/332    | 7/750<br>30/332    | 7/700<br>27/332   | 6/600<br>24/332   | 5/550<br>22/332   |
| 19000                | Time/Fuel<br>Dist/TAS      | 10/1000<br>41/329       | 9/950<br>39/329    | 9/950<br>37/329    | 8/900<br>35/329    | 8/850<br>34/329    | 8/800<br>32/329    | 7/800<br>30/329    | 7/700<br>28/329    | 6/650<br>25/329   | 6/600<br>22/329   | 5/550<br>20/329   |
| 18000                | Time/Fuel<br>Dist/TAS      | 9/950<br>37/326         | 9/900<br>36/326    | 8/900<br>34/326    | 8/850<br>32/326    | 8/800<br>31/326    | 7/800<br>29/326    | 7/750<br>28/326    | 6/700<br>25/326    | 6/650<br>23/326   | 5/550<br>21/326   | 5/500<br>18/326   |
| 17000                | Time/Fuel<br>Dist/TAS      | 8/900<br>34/323         | 8/900<br>32/323    | 8/850<br>31/323    | 7/800<br>29/323    | 7/800<br>26/323    | 7/750<br>27/323    | 7/700<br>26/323    | 6/650<br>23/323    | 6/600<br>21/323   | 5/550<br>19/323   | 5/500<br>17/323   |
| 16000                | Time/Fuel<br>Dist/TAS      | 8/850<br>31/320         | 8/850<br>29/320    | 7/800<br>28/320    | 7/750<br>27/320    | 7/750<br>26/320    | 6/700<br>24/320    | 6/700<br>23/320    | 6/650<br>21/320    | 5/600<br>19/320   | 5/550<br>17/320   | 4/500<br>15/320   |
| 15000                | Time/Fuel<br>Dist/TAS      | 7/800<br>28/318         | 7/800<br>27/318    | 7/750<br>25/317    | 7/750<br>24/317    | 6/700<br>23/317    | 6/700<br>22/317    | 6/650<br>21/317    | 5/600<br>19/317    | 5/550<br>17/317   | 5/500<br>16/317   | 4/450<br>14/317   |
| 14000                | Time/Fuel<br>Dist/TAS      | 7/800<br>25/315         | 7/750<br>24/315    | 6/700<br>23/315    | 6/700<br>22/315    | 6/650<br>21/315    | 6/650<br>20/315    | 5/600<br>19/315    | 5/550<br>17/315    | 5/500<br>16/315   | 4/500<br>14/315   | 4/450<br>13/314   |
| 13000                | Time/Fuel<br>Dist/TAS      | 6/750<br>22/312         | 6/700<br>21/312    | 6/700<br>21/312    | 6/650<br>20/312    | 6/650<br>19/312    | 5/600<br>18/312    | 5/600<br>17/312    | 5/550<br>16/312    | 4/500<br>14/312   | 4/450<br>13/312   | 4/400<br>11/312   |
| 12000                | Time/Fuel<br>Dist/TAS      | 6/700<br>20/310         | 6/650<br>19/310    | 6/650<br>18/310    | 5/600<br>17/309    | 5/600<br>17/309    | 5/550<br>16/309    | 5/550<br>15/309    | 4/500<br>14/309    | 4/450<br>13/309   | 4/400<br>11/309   | 3/350<br>10/309   |
| 11000                | Time/Fuel<br>Dist/TAS      | 6/650<br>18/307         | 5/650<br>17/307    | 5/600<br>16/307    | 5/600<br>15/307    | 5/550<br>15/307    | 5/550<br>14/307    | 4/500<br>13/307    | 4/500<br>12/307    | 4/450<br>11/307   | 4/400<br>10/307   | 3/350<br>9/307    |
| 10000                | Time/Fuel<br>Dist/TAS      | 5/600<br>15/305         | 5/600<br>15/305    | 5/550<br>14/305    | 5/550<br>13/305    | 4/550<br>13/305    | 4/500<br>12/305    | 4/500<br>12/305    | 4/450<br>11/304    | 4/400<br>10/304   | 3/400<br>9/304    | 3/350<br>8/304    |
| 8000                 | Time/Fuel<br>Dist/TAS      | 4/500<br>11/300         | 4/500<br>11/300    | 4/500<br>10/300    | 4/450<br>10/300    | 4/450<br>9/300     | 4/450<br>9/300     | 4/450<br>9/300     | 3/400<br>8/300     | 3/350<br>7/300    | 3/350<br>6/300    | 3/300<br>6/300    |
| 6000                 | Time/Fuel<br>Dist/TAS      | 4/450<br>7/295          | 3/450<br>7/295     | 3/400<br>7/295     | 3/400<br>7/295     | 3/400<br>6/295     | 3/400<br>6/295     | 3/400<br>6/295     | 3/350<br>5/295     | 3/300<br>5/295    | 2/300<br>4/295    | 2/250<br>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<br>Dist/TAS |                         |                    |                    |                    | 37/2550<br>246/417 | 31/2150<br>198/413 | 27/1950<br>172/410 | 22/1650<br>140/407 | 19/1450<br>118/405 | 17/1300<br>101/403 | 15/1150<br>88/402 |
| 36000          | Time/Fuel<br>Dist/TAS |                         |                    |                    | 35/2450<br>227/414 | 30/2200<br>192/411 | 27/2000<br>170/408 | 24/1850<br>153/406 | 21/1600<br>128/404 | 18/1400<br>110/402 | 16/1250<br>95/400  | 14/1100<br>82/399 |
| 35000          | Time/Fuel<br>Dist/TAS |                         | 42/2950<br>281/418 | 34/2500<br>220/412 | 30/2200<br>190/409 | 27/2050<br>169/406 | 25/1900<br>153/405 | 23/1750<br>140/403 | 20/1550<br>119/401 | 17/1350<br>103/399 | 15/1200<br>90/398  | 13/1050<br>78/397 |
| 34000          | Time/Fuel<br>Dist/TAS | 40/2850<br>260/414      | 34/2500<br>215/409 | 30/2250<br>188/406 | 27/2100<br>169/404 | 25/1950<br>153/403 | 23/1800<br>141/401 | 21/1700<br>130/400 | 19/1500<br>112/398 | 16/1300<br>97/397  | 14/1150<br>85/396  | 13/1050<br>74/395 |
| 33000          | Time/Fuel<br>Dist/TAS | 33/2500<br>210/407      | 30/2300<br>186/404 | 27/2100<br>168/402 | 25/1950<br>153/400 | 23/1850<br>141/399 | 21/1700<br>130/398 | 20/1600<br>121/397 | 18/1450<br>105/395 | 16/1300<br>92/394  | 14/1150<br>80/393  | 12/1000<br>70/392 |
| 32000          | Time/Fuel<br>Dist/TAS | 30/2350<br>185/401      | 27/2150<br>167/399 | 25/2000<br>153/398 | 23/1900<br>141/396 | 22/1750<br>130/395 | 20/1650<br>121/394 | 19/1550<br>113/394 | 17/1400<br>98/392  | 15/1250<br>86/391  | 13/1100<br>76/390  | 12/1000<br>67/389 |
| 31000          | Time/Fuel<br>Dist/TAS | 27/2200<br>166/396      | 25/2050<br>152/395 | 23/1900<br>141/394 | 22/1800<br>130/393 | 20/1700<br>121/392 | 19/1600<br>113/391 | 18/1500<br>106/390 | 16/1350<br>93/389  | 14/1200<br>82/388  | 13/1100<br>72/387  | 11/950<br>63/387  |
| 30000          | Time/Fuel<br>Dist/TAS | 25/2100<br>152/392      | 24/1950<br>140/391 | 22/1850<br>130/389 | 21/1750<br>121/389 | 19/1650<br>113/388 | 18/1550<br>106/387 | 17/1450<br>99/387  | 15/1300<br>87/385  | 14/1150<br>77/385  | 12/1050<br>68/384  | 11/950<br>60/383  |
| 29000          | Time/Fuel<br>Dist/TAS | 23/1950<br>136/386      | 22/1850<br>126/385 | 20/1750<br>118/384 | 19/1650<br>110/383 | 18/1550<br>106/383 | 17/1450<br>97/382  | 16/1400<br>91/382  | 14/1250<br>80/381  | 13/1100<br>71/380  | 12/1000<br>63/379  | 10/900<br>56/379  |
| 28000          | Time/Fuel<br>Dist/TAS | 21/1850<br>123/380      | 20/1750<br>114/379 | 19/1650<br>107/379 | 18/1550<br>100/378 | 17/1500<br>94/378  | 16/1400<br>89/377  | 15/1350<br>83/377  | 14/1200<br>74/376  | 12/1100<br>66/375  | 11/950<br>58/375   | 10/850<br>52/375  |
| 27000          | Time/Fuel<br>Dist/TAS | 20/1750<br>111/375      | 19/1650<br>104/374 | 18/1550<br>98/374  | 17/1500<br>92/373  | 16/1400<br>86/373  | 15/1350<br>81/372  | 14/1250<br>77/372  | 13/1150<br>68/371  | 11/1050<br>61/371  | 10/950<br>54/371   | 9/850<br>48/370   |
| 26000          | Time/Fuel<br>Dist/TAS | 18/1650<br>101/370      | 17/1550<br>95/370  | 16/1500<br>89/369  | 16/1400<br>84/369  | 15/1350<br>79/368  | 14/1300<br>75/368  | 13/1200<br>70/368  | 12/1100<br>63/367  | 11/1000<br>56/367  | 10/900<br>50/366   | 9/800<br>44/366   |
| 25000          | Time/Fuel<br>Dist/TAS | 17/1550<br>92/365       | 16/1500<br>86/365  | 15/1400<br>81/365  | 15/1350<br>77/364  | 14/1300<br>73/364  | 13/1200<br>69/364  | 13/1150<br>65/363  | 11/1050<br>58/363  | 10/950<br>52/363   | 9/850<br>46/362    | 8/750<br>41/362   |
| 24000          | Time/Fuel<br>Dist/TAS | 16/1500<br>84/361       | 15/1400<br>79/361  | 14/1350<br>75/360  | 14/1300<br>70/360  | 13/1200<br>67/360  | 12/1150<br>63/360  | 12/1100<br>60/359  | 11/1000<br>53/359  | 10/900<br>48/359   | 9/850<br>43/358    | 8/750<br>38/358   |
| 23000          | Time/Fuel<br>Dist/TAS | 15/1400<br>77/357       | 14/1350<br>72/357  | 13/1300<br>68/356  | 13/1250<br>65/356  | 12/1150<br>61/356  | 12/1100<br>58/356  | 11/1050<br>55/356  | 10/950<br>49/355   | 9/900<br>44/355    | 8/800<br>39/355    | 7/700<br>35/355   |
| 22000          | Time/Fuel<br>Dist/TAS | 14/1350<br>70/353       | 13/1300<br>66/353  | 13/1250<br>63/352  | 12/1150<br>59/352  | 11/1100<br>56/352  | 11/1050<br>53/352  | 10/1000<br>50/352  | 9/900<br>45/351    | 9/850<br>41/351    | 8/750<br>36/351    | 7/700<br>32/351   |
| 21000          | Time/Fuel<br>Dist/TAS | 13/1300<br>64/349       | 12/1200<br>60/349  | 12/1150<br>57/349  | 11/1100<br>54/349  | 11/1050<br>52/348  | 10/1000<br>49/348  | 10/950<br>46/348   | 9/900<br>42/348    | 8/800<br>37/348    | 7/750<br>34/348    | 7/650<br>30/347   |
| 20000          | Time/Fuel<br>Dist/TAS | 12/1200<br>58/345       | 12/1150<br>55/345  | 11/1100<br>52/345  | 11/1050<br>50/345  | 10/1000<br>47/345  | 10/950<br>45/345   | 9/950<br>43/345    | 8/850<br>38/344    | 8/750<br>34/344    | 7/700<br>31/344    | 6/650<br>28/344   |
| 19000          | Time/Fuel<br>Dist/TAS | 11/1150<br>53/342       | 11/1100<br>50/342  | 10/1050<br>48/342  | 10/1000<br>45/342  | 9/950<br>43/342    | 9/900<br>41/341    | 9/900<br>39/341    | 8/800<br>35/341    | 7/750<br>32/341    | 7/650<br>28/341    | 6/600<br>25/341   |
| 18000          | Time/Fuel<br>Dist/TAS | 11/1100<br>48/339       | 10/1050<br>46/339  | 10/1000<br>44/338  | 9/950<br>42/338    | 9/900<br>39/338    | 9/900<br>38/338    | 8/850<br>36/338    | 7/750<br>32/338    | 7/700<br>29/338    | 6/650<br>26/338    | 6/600<br>23/338   |
| 17000          | Time/Fuel<br>Dist/TAS | 10/1050<br>44/335       | 10/1000<br>42/335  | 9/950<br>40/335    | 9/900<br>38/335    | 8/850<br>36/335    | 8/850<br>34/335    | 8/800<br>33/335    | 7/750<br>29/335    | 6/650<br>27/335    | 6/600<br>24/335    | 5/550<br>21/335   |
| 16000          | Time/Fuel<br>Dist/TAS | 9/1000<br>40/332        | 9/950<br>38/332    | 9/900<br>36/332    | 8/850<br>34/332    | 8/850<br>33/332    | 7/800<br>31/332    | 7/750<br>30/332    | 7/700<br>27/332    | 6/650<br>24/332    | 5/600<br>22/332    | 5/550<br>19/332   |
| 15000          | Time/Fuel<br>Dist/TAS | 9/950<br>36/329         | 8/900<br>34/329    | 8/850<br>33/329    | 8/800<br>31/329    | 7/800<br>30/329    | 7/750<br>28/329    | 7/700<br>27/329    | 6/650<br>24/329    | 6/600<br>22/329    | 5/550<br>20/329    | 5/500<br>18/329   |
| 14000          | Time/Fuel<br>Dist/TAS | 8/850<br>32/326         | 8/800<br>31/326    | 7/800<br>29/326    | 7/750<br>28/326    | 7/750<br>27/326    | 7/700<br>25/326    | 6/700<br>24/326    | 6/650<br>22/326    | 5/550<br>20/326    | 5/500<br>18/326    | 4/500<br>16/326   |
| 13000          | Time/Fuel<br>Dist/TAS | 7/800<br>29/323         | 7/800<br>28/323    | 7/750<br>26/323    | 7/750<br>25/323    | 6/700<br>24/323    | 6/650<br>23/323    | 6/650<br>22/323    | 5/600<br>20/323    | 5/550<br>18/323    | 5/500<br>16/323    | 4/450<br>14/323   |
| 12000          | Time/Fuel<br>Dist/TAS | 7/750<br>26/321         | 7/750<br>25/321    | 6/700<br>23/321    | 6/700<br>22/321    | 6/650<br>21/321    | 6/650<br>20/321    | 5/600<br>19/321    | 5/550<br>18/321    | 5/500<br>16/320    | 4/450<br>14/320    | 4/400<br>13/320   |
| 11000          | Time/Fuel<br>Dist/TAS | 6/700<br>23/318         | 6/700<br>22/318    | 6/650<br>21/318    | 6/650<br>20/318    | 5/600<br>19/318    | 5/600<br>18/318    | 5/550<br>17/318    | 5/500<br>16/318    | 4/500<br>14/318    | 4/450<br>13/318    | 4/400<br>11/318   |
| 10000          | Time/Fuel<br>Dist/TAS | 6/650<br>20/315         | 6/650<br>19/315    | 5/600<br>18/315    | 5/600<br>17/315    | 5/550<br>16/315    | 5/550<br>16/315    | 5/500<br>15/315    | 4/500<br>14/315    | 4/450<br>12/315    | 4/400<br>11/315    | 3/400<br>10/315   |
| 8000           | Time/Fuel<br>Dist/TAS | 5/550<br>14/310         | 5/550<br>14/310    | 5/550<br>13/310    | 4/500<br>13/310    | 4/500<br>12/310    | 4/500<br>11/310    | 4/450<br>11/310    | 4/400<br>10/310    | 3/400<br>9/310     | 3/350<br>8/310     | 3/350<br>7/310    |
| 6000           | Time/Fuel<br>Dist/TAS | 4/450<br>10/306         | 4/450<br>9/306     | 4/450<br>9/306     | 4/450<br>8/306     | 3/400<br>8/306     | 3/400<br>8/306     | 3/400<br>7/306     | 3/350<br>7/306     | 3/350<br>6/306     | 3/300<br>5/306     | 2/300<br>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             |

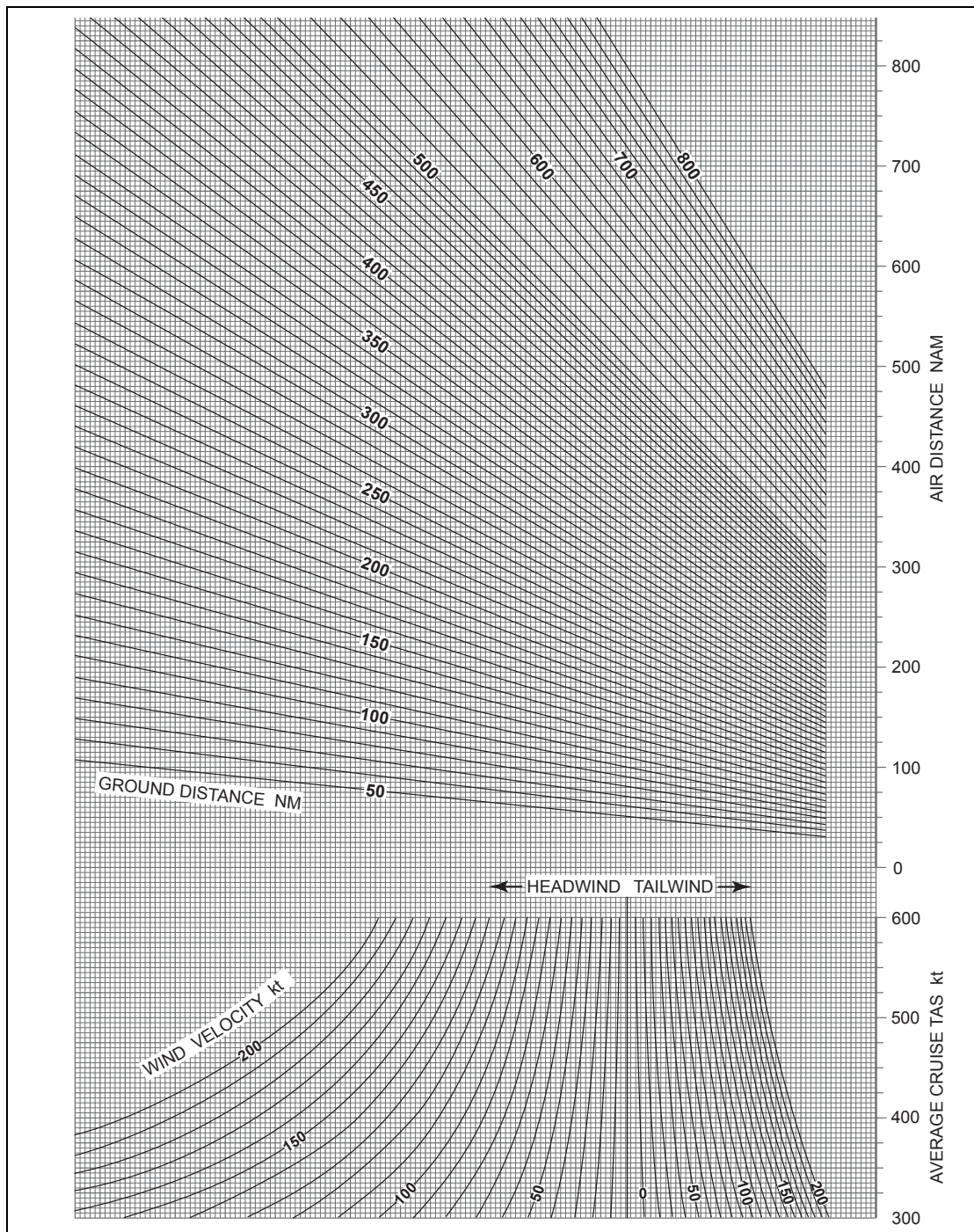
|   |                   |      |      |      |      |       |       |
|---|-------------------|------|------|------|------|-------|-------|
| Fuel Adjustment for high elevation airports | Airport Elevation | 2000 | 4000 | 6000 | 8000 | 10000 | 12000 |
| Effect on time and distance is negligible   | Fuel 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.)

- Enter the graph with the average TAS. Travel horizontally left to intersect the wind component.
- From this point travel vertically up to intersect the appropriate ground distance grid line.
- Travel horizontally right to read the air distance.
- 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<br>FL 270 to FL 370                   | (pages 25- 35) |
| Figures 4.5.3.2 | 0.74 Mach Cruise<br>FL 210 to FL 370                    | (pages 36- 52) |
| Figures 4.5.3.3 | 0.78 Mach Cruise<br>FL 290, 300, 310,<br>330, 350, 370. | (pages 53- 58) |
| Figures 4.5.3.4 | Low level (300 KIAS) Cruise<br>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                 |      |      |      |
|--------------------------|---------------------------------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |                                       | <b>27,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0 100 200 300 400 500 600 700 800 900 |   |      |      |      |      |      |                          |      |      |      |
|                          | <b>TAS</b>                            | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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                 |      |      |      |
|--------------------------|------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |            | <b>28,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS</b>             |            | 0   | 100  | 200  | 300  | 400  | 500  | 600                      | 700  | 800  | 900  |
| <b>WT. kg</b>            | <b>TAS</b> | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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<br>WT. kg   | 0 100 200 300 400 500 600 700 800 900 |                                    |      |                   |      |      |      |          |      |      |      |
|                   | 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<br>WT. kg   | 0 100 200 300 400 500 600 700 800 900 |                                    |      |      |                   |      |      |          |      |      |      |
|                   | 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                 |      |      |      |
|--------------------------|------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |            | <b>31,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS</b>             |            | 0   | 100  | 200  | 300  | 400  | 500  | 600                      | 700  | 800  | 900  |
| <b>WT. kg</b>            | <b>TAS</b> | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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                                      | 5993 | 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                 |      |      |      |
|--------------------------|---------------------------------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |                                       | <b>32,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0 100 200 300 400 500 600 700 800 900 |   |      |      |      |      |      |                          |      |      |      |
|                          | <b>TAS</b>                            | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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                 |      |      |      |
|--------------------------|---------------------------------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |                                       | <b>33,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0 100 200 300 400 500 600 700 800 900 |   |      |      |      |      |      |                          |      |      |      |
|                          | <b>TAS</b>                            | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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                 |      |      |      |
|--------------------------|---------------------------------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |                                       | <b>34,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0 100 200 300 400 500 600 700 800 900 |   |      |      |      |      |      |                          |      |      |      |
|                          | <b>TAS</b>                            | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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<br>WT. kg   | 0 100 200 300 400 500 600 700 800 900 |                                    |      |      |                   |      |      |          |      |      |      |
|                   | 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 |      |      |      |
|--------------------------|---------------------------------------|---|------|--------------------------|------|------|------|----------|------|------|------|
| <b>PRESSURE ALTITUDE</b> |                                       | <b>36,000 ft</b>                          |      | <b>LONG RANGE CRUISE</b> |      |      |      |          |      |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0 100 200 300 400 500 600 700 800 900 |   |      |                          |      |      |      |          |      |      |      |
|                          | <b>TAS</b>                            | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |                          |      |      |      |          |      |      |      |
| 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                 |      |      |      |
|---|------------|---|------|------|------|------|------|--------------------------|------|------|------|
| <b>PRESSURE ALTITUDE</b>  |            | <b>37,000 ft</b>                          |      |      |      |      |      | <b>LONG RANGE CRUISE</b> |      |      |      |
| <b>GROSS</b>  |            | 0   | 100  | 200  | 300  | 400  | 500  | 600                      | 700  | 800  | 900  |
| <b>WT. kg</b>   | <b>TAS</b> | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |      |      |      |      |      |                          |      |      |      |
| 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 | 4355 | 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 |
| <p><b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 48,000 kg</p> <p>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 58,700 kgG</p> <p>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 57,500 kg</p> <p>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 56,300 kg</p> <p><b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES</p> <p>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA</p> <p>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA</p> <p>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA</p> <p>D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA</p> |            |   |      |      |      |      |      |                          |      |      |      |

**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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 21,000 ft MACH 0.74 CRUISE TAS 453 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 22,000 ft MACH 0.74 CRUISE TAS 451 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 23,000 ft MACH 0.74 CRUISE TAS 449 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 24,000 ft MACH 0.74 CRUISE TAS 447 kt</b>               |   |                              |      |      |      |      |      |          |      |      |
| GROSS<br>WT. kg  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 | 3955 |
| 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 |
| <b>NOTE 1:</b> 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                |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> 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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 25,000 ft MACH 0.74 CRUISE TAS 445 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 26,000 ft MACH 0.74 CRUISE TAS 443 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 27,000 ft MACH 0.74 CRUISE TAS 442 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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          |      |      |      |      |      |      |      |      |
|---|---|--|------|------|------|------|------|------|------|------|
|   |   | <b>PRESSURE ALTITUDE 28,000 ft    MACH 0.74 CRUISE    TAS 440 kt</b> |      |      |      |      |      |      |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |  |      |      |      |      |      |      |      |      |
| 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 | 4342 | 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |  |      |      |      |      |      |      |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 29,000 ft MACH 0.74 CRUISE TAS 438 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 30,000 ft MACH 0.74 CRUISE TAS 436 kt</b> |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 31,000 ft MACH 0.74 CRUISE TAS 434 kt</b> |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |      |      |      |      |      |      |      |      |
|--|--|---|------|------|------|------|------|------|------|------|
| <b>PRESSURE ALTITUDE 32,000 ft    MACH 0.74 CRUISE    TAS 432 kt</b> |  |   |      |      |      |      |      |      |      |      |
| <b>GROSS</b>   | 0  | 100   | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  |
| <b>WT. kg</b>  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b>                                |   |      |      |      |      |      |      |      |      |
| 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 |
| <b>NOTE 1:</b>   | 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            |   |      |      |      |      |      |      |      |      |
| <b>NOTE 2:</b>   | 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 |      |      |
|--|--|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 33,000 ft MACH 0.74 CRUISE TAS 430 kt</b> |  |                              |      |      |      |      |      |          |      |      |
| <b>GROSS</b>   | 0  | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
| <b>WT. kg</b>  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b>                                |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b>   | 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                        |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b>   | 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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 34,000 ft MACH 0.74 CRUISE TAS 428 kt</b> |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 35,000 ft MACH 0.74 CRUISE TAS 426 kt</b>   |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <p><b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 53,000 kg</p> <p>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 64,500 kg</p> <p>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 63,100 kg</p> <p>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 61,600 kg</p> <p><b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES</p> <p>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA</p> <p>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA</p> <p>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA</p> <p>D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA</p> |   |                              |      |      |      |      |      |          |      |      |

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

| All Engines  |  | Maximum Cruise Thrust Limits |      |      |      |      |      | A/C Auto |      |      |
|--|--|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 36,000 ft MACH 0.74 CRUISE TAS 425 kt</b> |  |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0  | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b>  |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b>   | OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 50,500 kg<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 61,800 kg<br>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 60,500 kg<br>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 59,200 kg  |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b>   | ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 37,000 ft MACH 0.74 CRUISE TAS 424 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 48,000 kg<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 58,700 kg<br>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 57,500 kg<br>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 56,300 kg  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 29,000 ft MACH 0.78 CRUISE TAS 462 kt</b> |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 30,000 ft MACH 0.78 CRUISE TAS 460 kt</b> |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 31,000 ft MACH 0.78 CRUISE TAS 458 kt</b> |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 33,000 ft MACH 0.78 CRUISE TAS 454 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 56,000 kg<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 63,700 kg<br>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 61,600 kg<br>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 59,500 kg  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 35,000 ft MACH 0.78 CRUISE TAS 449 kt</b>   |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <p><b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 51,100 kg</p> <p>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 58,800 kg</p> <p>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 57,200 kg</p> <p>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 55,500 kg</p> <p><b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES</p> <p>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA</p> <p>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA</p> <p>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA</p> <p>D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA</p> |   |                              |      |      |      |      |      |          |      |      |

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

| All Engines  |   | Maximum Cruise Thrust Limits |      |      |      |      |      | A/C Auto |      |      |
|--|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 37,000 ft MACH 0.78 CRUISE TAS 447 kt</b>   |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <p><b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE IS 46,500 kg</p> <p>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER IS 53,700 kg</p> <p>B) THRUST LIMITED WEIGHT FOR ISA +15 IS 52,300 kg</p> <p>C) THRUST LIMITED WEIGHT FOR ISA +20 IS 50,900 kg</p> <p><b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES</p> <p>A) INCREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C ABOVE ISA</p> <p>B) DECREASE FUEL REQUIRED BY 0.6 PERCENT PER 10 DEGREES C BELOW ISA</p> <p>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA</p> <p>D) DECREASE TAS BY 1 KNOT PER DEGREE C BELOW ISA</p> |   |                              |      |      |      |      |      |          |      |      |

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

|   |   | All Engines |      |      |      |      | Maximum Cruise Thrust Limits |      |      |      |  | A/C Auto |  |  |  |  |
|---|---|-------------|------|------|------|------|------------------------------|------|------|------|--|----------|--|--|--|--|
| <b>PRESSURE ALTITUDE 14,000 ft LOW-LEVEL CRUISE TAS 366 kt</b>  |   |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100         | 200  | 300  | 400  | 500  | 600                          | 700  | 800  | 900  |  |          |  |  |  |  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| 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 |  |          |  |  |  |  |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |  |  |  |  |
|--|---|-------------|------|------|------|------|------------------------------|------|------|------|--|----------|--|--|--|--|
| <b>PRESSURE ALTITUDE 15,000 ft LOW-LEVEL CRUISE TAS 371 kt</b>               |   |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100         | 200  | 300  | 400  | 500  | 600                          | 700  | 800  | 900  |  |          |  |  |  |  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| 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 |  |          |  |  |  |  |
| <b>NOTE 1:</b> 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                |   |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| <b>NOTE 2:</b> 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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 16,000 ft LOW-LEVEL CRUISE TAS 377 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 17,000 ft LOW-LEVEL CRUISE TAS 382 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |      |      |
|---|---|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 18,000 ft LOW-LEVEL CRUISE TAS 388 kt</b>  |   |                              |      |      |      |      |      |          |      |      |
| <b>GROSS<br/>WT. kg</b>   | 0   | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
|   | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b> OPTIMUM WEIGHT FOR PRESSURE ALTITUDE EXCEEDS STRUCTURAL LIMIT<br>A) THRUST LIMITED WEIGHT FOR ISA +10 AND COLDER EXCEEDS STRUCTURAL LIMIT<br>B) THRUST LIMITED WEIGHT FOR ISA +15 EXCEEDS STRUCTURAL LIMIT<br>C) THRUST LIMITED WEIGHT FOR ISA +20 EXCEEDS STRUCTURAL LIMIT                                  |   |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b> ADJUSTMENTS FOR OPERATION AT NON-STANDARD TEMPERATURES<br>A) INCREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C ABOVE ISA<br>B) DECREASE FUEL REQUIRED BY 0.5 PERCENT PER 10 DEGREES C BELOW ISA<br>C) INCREASE TAS BY 1 KNOT PER DEGREE C ABOVE ISA<br>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 |  |
|--|---|-------------|------|------|------|------|------|------------------------------|------|------|----------|--|
| <b>PRESSURE ALTITUDE 19,000 ft LOW-LEVEL CRUISE TAS 394 kt</b>               |   |             |      |      |      |      |      |                              |      |      |          |  |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100         | 200  | 300  | 400  | 500  | 600  | 700                          | 800  | 900  |          |  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |             |      |      |      |      |      |                              |      |      |          |  |
| 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 |          |  |
| <b>NOTE 1:</b> 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                |   |             |      |      |      |      |      |                              |      |      |          |  |
| <b>NOTE 2:</b> 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 |      |      |
|--|--|------------------------------|------|------|------|------|------|----------|------|------|
| <b>PRESSURE ALTITUDE 20,000 ft LOW-LEVEL CRUISE TAS 400 kt</b> |  |                              |      |      |      |      |      |          |      |      |
| <b>GROSS</b>   | 0  | 100                          | 200  | 300  | 400  | 500  | 600  | 700      | 800  | 900  |
| <b>WT. kg</b>  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b>                                |                              |      |      |      |      |      |          |      |      |
| 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 |
| <b>NOTE 1:</b>   | 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            |                              |      |      |      |      |      |          |      |      |
| <b>NOTE 2:</b>   | 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 |  |  |  |  |
|--|---|-------------|------|------|------|------|------------------------------|------|------|------|--|----------|--|--|--|--|
| <b>PRESSURE ALTITUDE 21,000 ft LOW-LEVEL CRUISE TAS 406 kt</b>               |   |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| <b>GROSS<br/>WT. kg</b>  | 0   | 100         | 200  | 300  | 400  | 500  | 600                          | 700  | 800  | 900  |  |          |  |  |  |  |
|  | <b>CRUISE DISTANCE NAUTICAL AIR MILES</b> |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| 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 |  |          |  |  |  |  |
| <b>NOTE 1:</b> 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                |   |             |      |      |      |      |                              |      |      |      |  |          |  |  |  |  |
| <b>NOTE 2:</b> 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 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.<br>ALT.<br>ft | TIME<br>min | FUEL<br>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.<br>ALT.<br>ft | TIME<br>min | FUEL<br>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     |

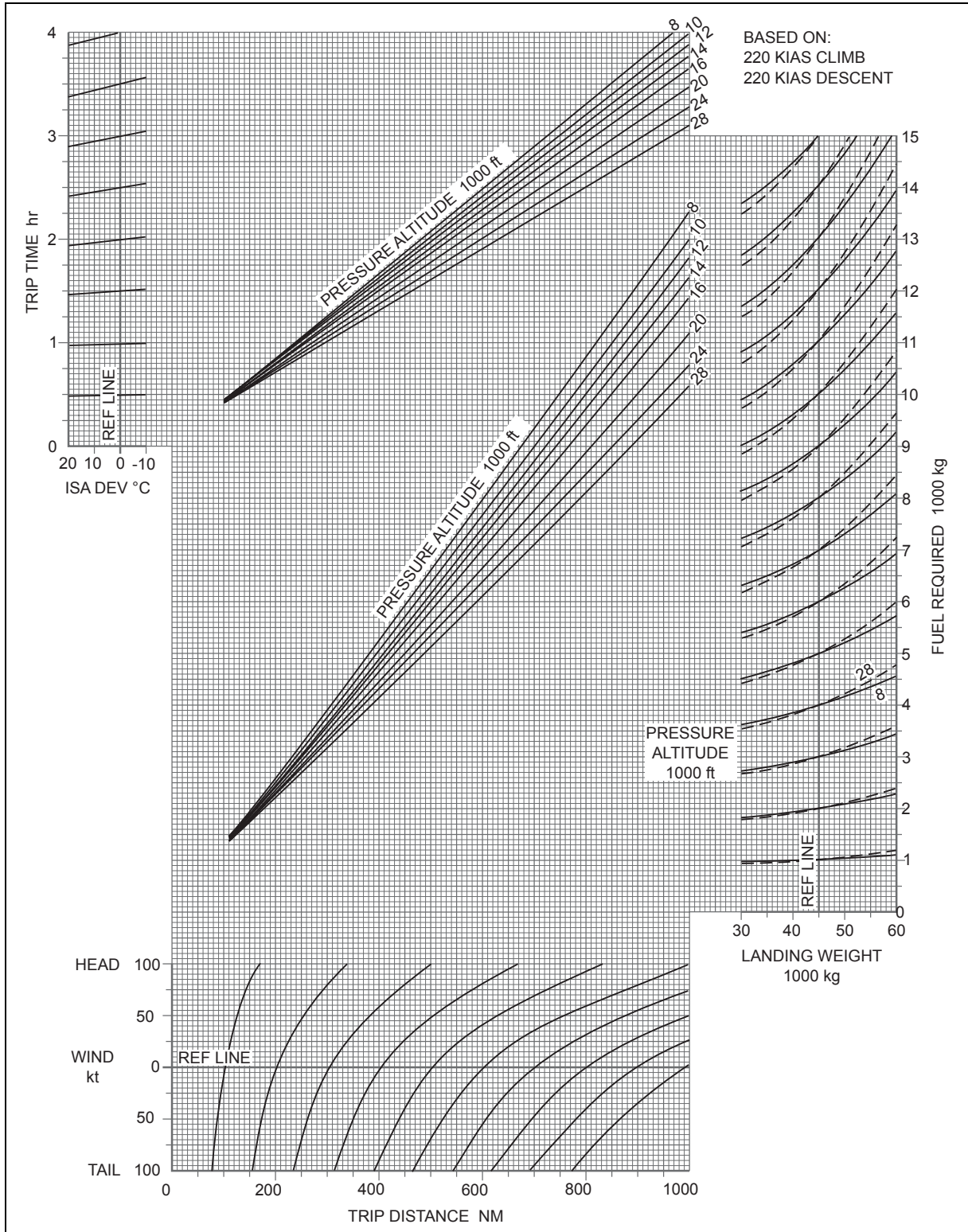
**Figure 4.5.4b** Turbulence Penetration Descent

## 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.

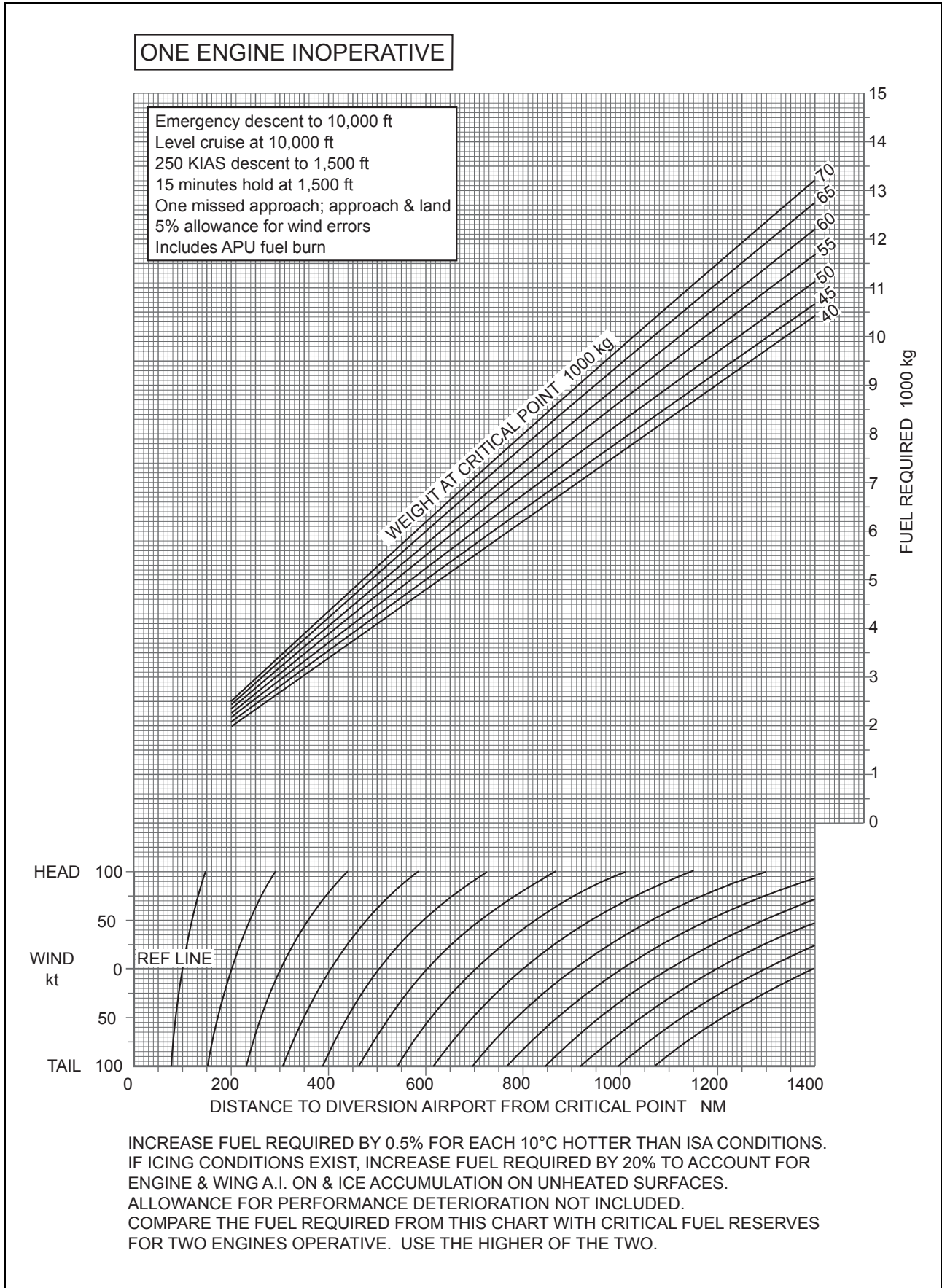
- a) Enter the chart for the appropriate speed with the weight at the point of diversion.
- b) Select the appropriate time and read off the maximum diversion distance.

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

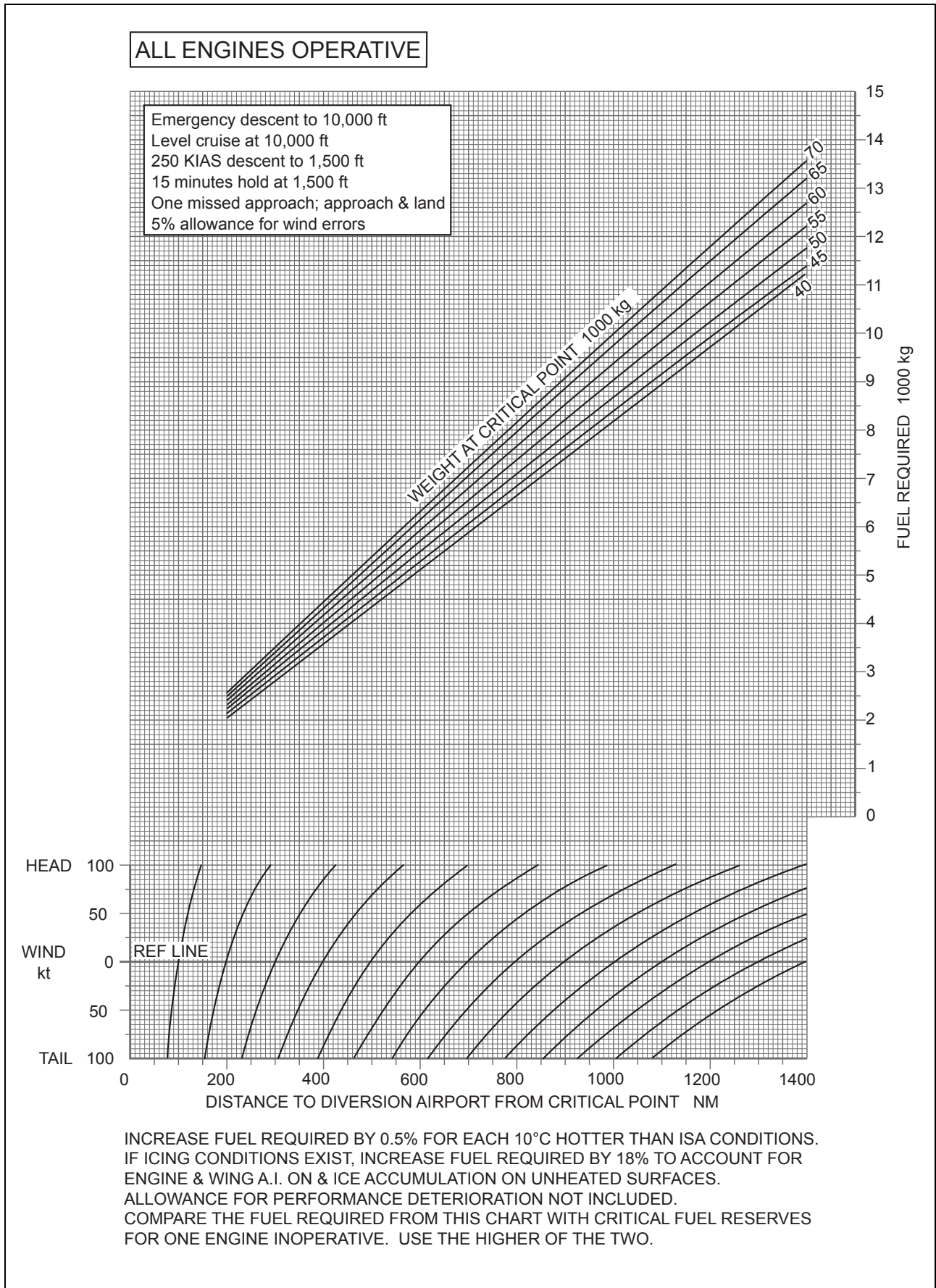
Figure 4.7.3 is a simplified flight planning method of determining the fuel required and time for a flight from the point of diversion to a selected alternate.

The graph is similar in layout and use to the normal Simplified Flight Planning graphs in paragraph 3.





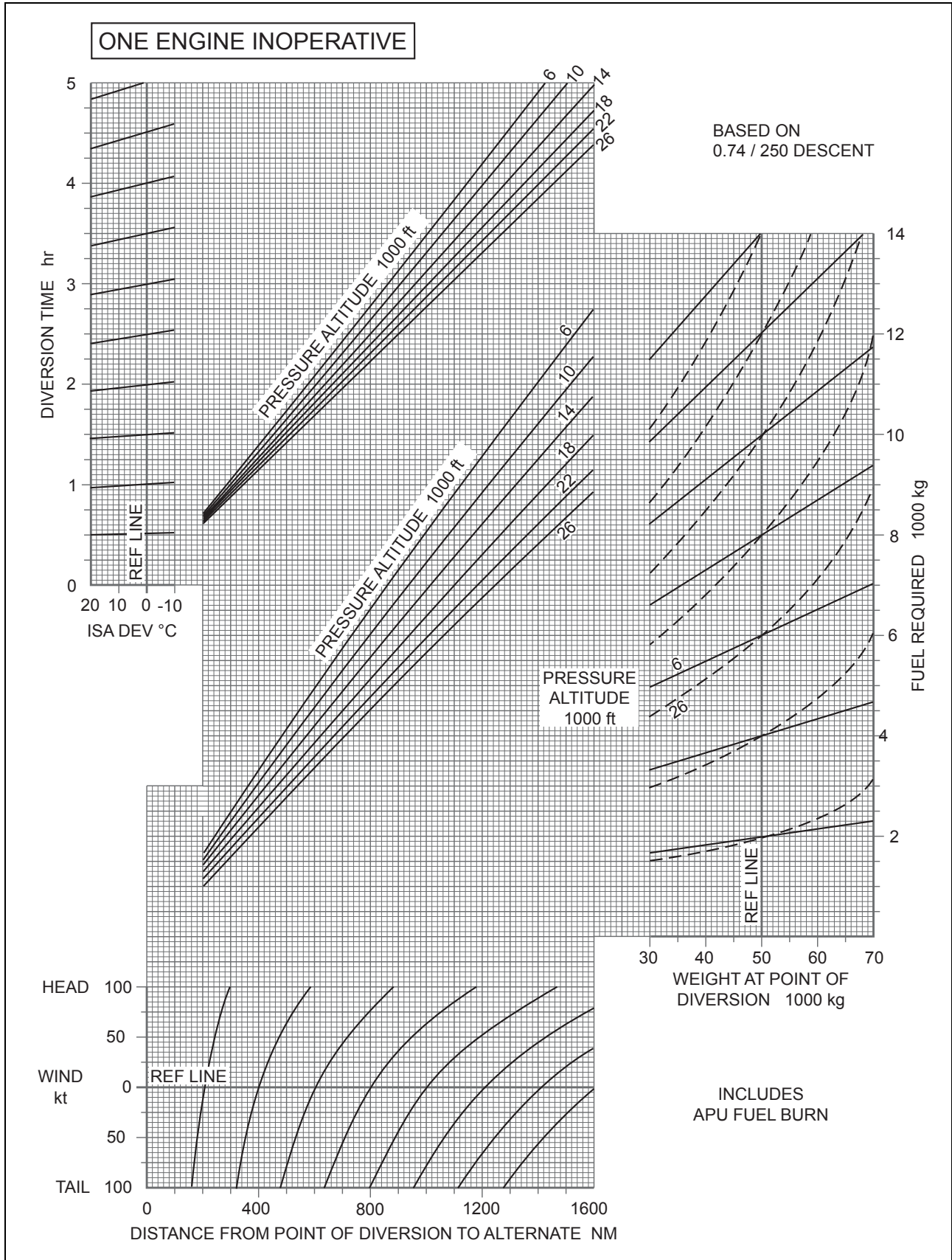
**Figure 4.7.1a** Critical Fuel Reserve – One Engine Inoperative



**Figure 4.7.1b** Critical Fuel Reserve – All Engines Operating

| Speed<br>M/KIAS   | Div. Wt<br>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 |
| <b>ISA<br/>                 BASED ON DRIFTDOWN STARTING AT OR NEAR OPTIMUM ALTITUDE</b> |                    |              |     |     |     |     |     |     |     |     |      |      |      |      |      |      |

**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.

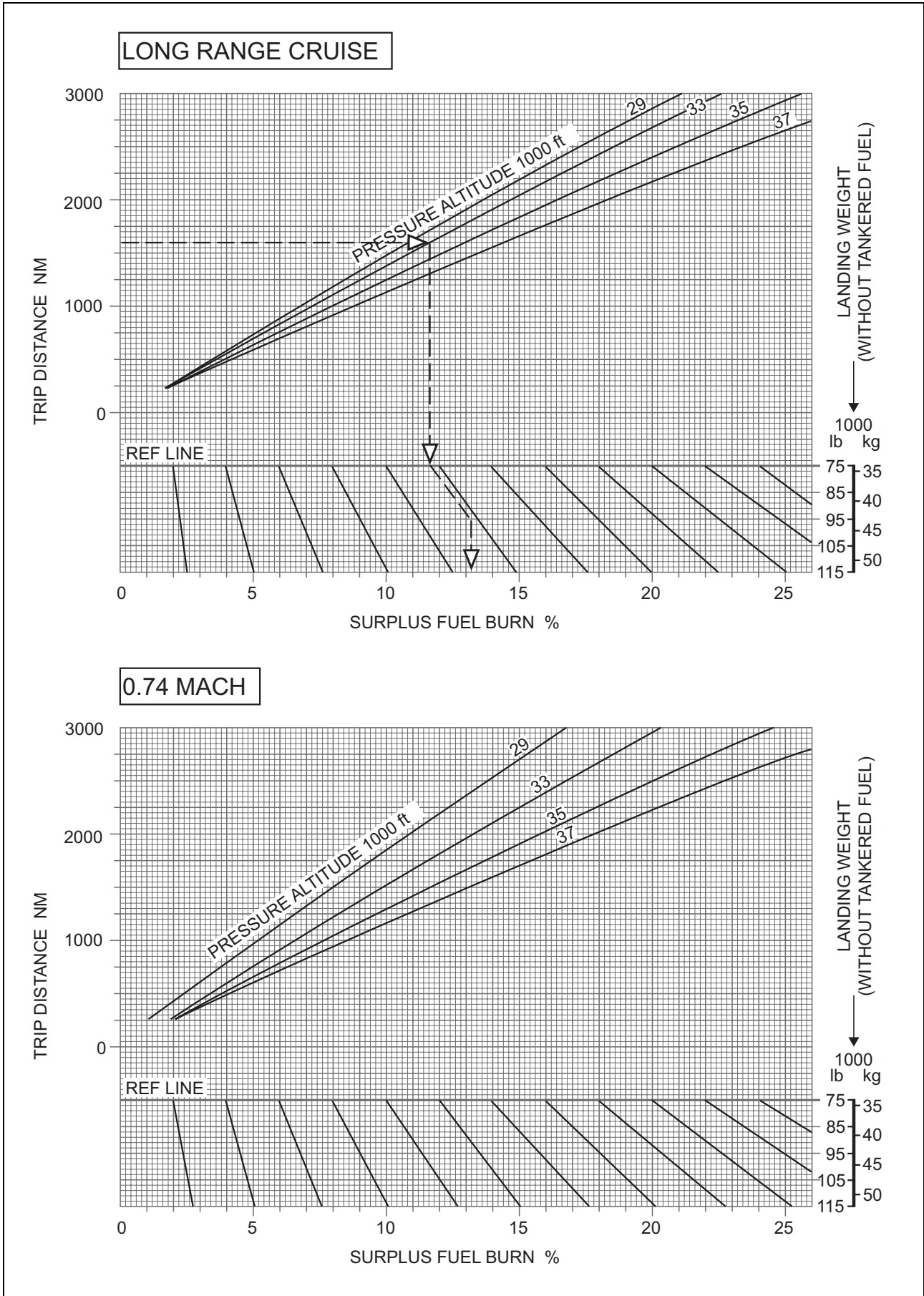
- Fig. 4.8.1 – Fuel Tankering (LRC and M 0.74)

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)

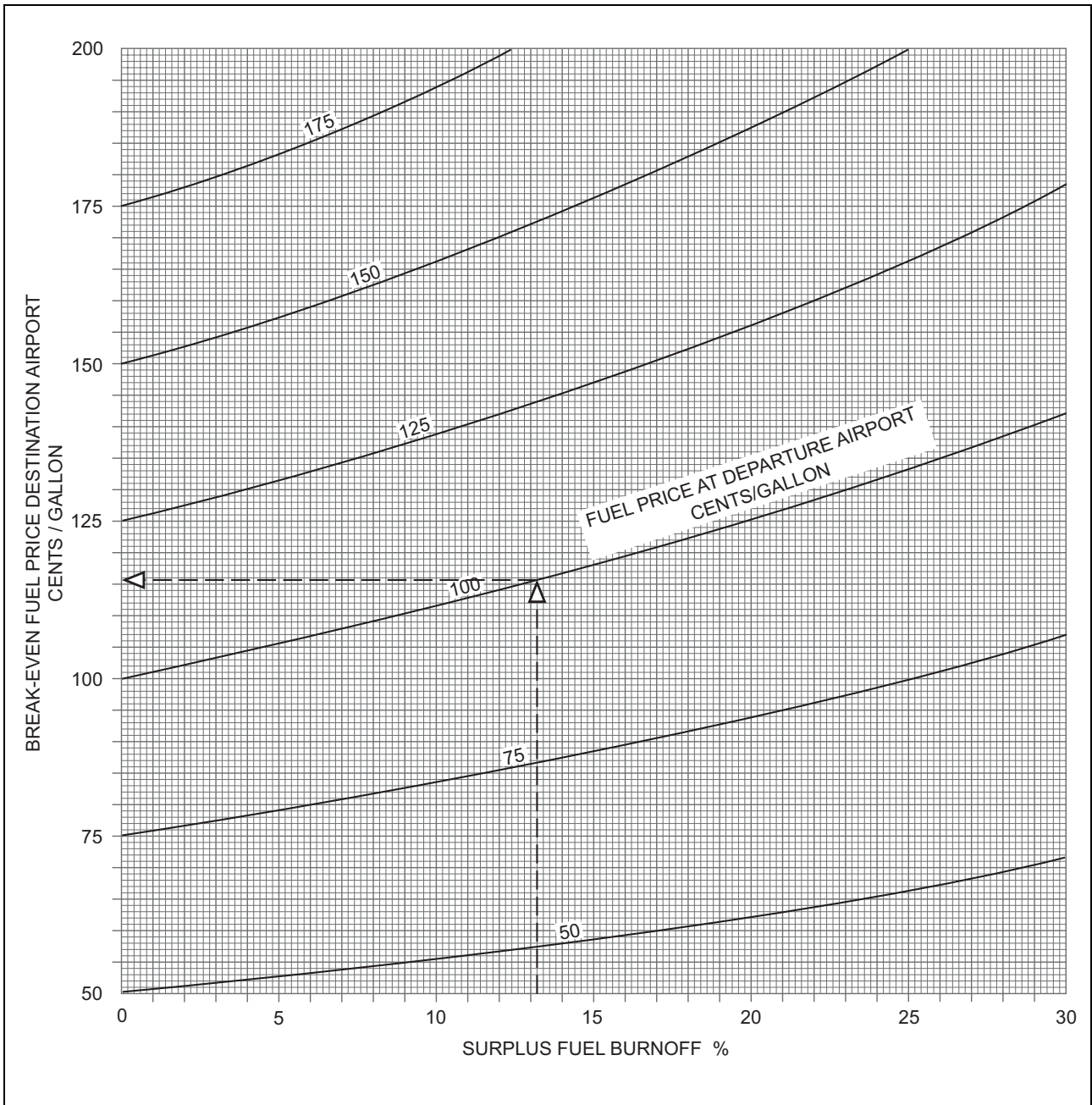


Figure 4.8.2 Fuel Price Differential

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