Table of Content

A .GENERAL /CHAPTER 7 - MINIMUM FLIGHT ALTITUDES ..........................................................3

7 .MINIMUM FLIGHT ALTITUDES ........................................................................................................3
  7.1 Minimum Flight Altitudes /Flight Levels VFR Flight .....................................................................3
  7.2 Minimum Flight Altitudes /Flight Levels IFR Flight ......................................................................4
  7.2.1 IFR flights non RVSM airspace .................................................................................................4
  7.3 criteria upon which minimum altitudes .........................................................................................5
  7.4 Correction Minimum Altitude Converting into FL .........................................................................5
  7.5 Mountain Wave ..............................................................................................................................6
  7.6 Temperature Correction ...............................................................................................................6
A. GENERAL / CHAPTER 7 - MINIMUM FLIGHT ALTITUDES

7. Minimum Flight Altitudes

Note: ACA understands that all minimum flight altitudes in this section of the Operations Manual are subject to the approval of the Authority.

Note: ACA wishes to use Jeppesen Charting services published “Minimum Flight Altitudes” for all ACA minimum flight altitudes for each flight. The Chief Pilot shall ensure that all Flight Crew use the most current Jeppesen “Minimum Flight Altitudes”.

Note: Minimum flight altitudes will never be less than that stated in ACA’s Operations Specifications.

7.1 Minimum Flight Altitudes / Flight Levels VFR Flight

ACA aircraft shall not conduct flight below the minimum safe altitude / flight levels, MSA depicted on the most current VFR chart for A, B, J, C, D and E Airspace Class and abide by the Airspace Class F and G airspace when conducting VFR operations. As a general rule, all ACA aircraft shall maintain an altitude where the flight path clears all obstacles or any terrain by at least 1000 ft vertically. Whenever cities or other densely populated areas are over flown, then the minimum vertical clearance shall be 2000 ft above the highest terrain/obstacle within a radius of 600 m from the aircraft.

If the minimum flight altitudes established by States to be over flown are higher than those established by ACA, or the current charts, the higher values shall apply.

VFR flights

* Magnetic track 000° - 179° = odd flight levels plus 5 (500’), FL 55, 75
* Magnetic track 180° - 359° = even flight levels plus 5 (500’), FL 65, 85
Table 1

<table>
<thead>
<tr>
<th>Airspace Class</th>
<th>B</th>
<th>C, D, E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

* When the height of the transition altitude is lower than 3050m (10000 ft) AMSL, FL 100 should be used in lieu of 10000 ft.

** When so prescribed by the appropriate ATS authority:
- Lower flight visibilities to 1500m may be permitted for flights operating:
  (1) At speeds that, in the prevailing visibility, will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; or
  (2) In circumstances in which the probability of encounters with other traffic would normally be low, e.g. in areas of low volume traffic and for aerial work at low level.
- Helicopters may be permitted to operate in less than 1500m flight visibility, if maneuvered at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.
- Except when a clearance is obtained from an air traffic control unit, VFR flights shall not take-off or land at an aerodrome within a control zone, or enter the aerodrome traffic zone or traffic pattern:
  (1) When the ceiling is less than 450m (1500 ft); or
  (2) When the ground visibility is less than 5 km (3 sm).

7.2 Minimum Flight Altitudes / Flight Levels IFR Flight

ACA shall not plan or conduct IFR / IMC flights lower than the minimum safe altitudes / flight levels depicted on the most current Jeppesen Manual and or the most current Jeppesen IFR High / Low level chart(s) for the route of flight.

If the minimum flight altitudes established by States to be over flown are higher than those established by ACA, or the current charts, the higher values shall apply.

7.2.1 IFR flights non RVSM airspace.

**Magnetic track 000° - 179° = odd flight levels**
With 2000 ft vertical separation up to and Incl. FL 290 (FL 50, 70 ... 290) With 4000 it vertical separation from FL 290 and up (FL 290, 330, 370...490, 530)

**Magnetic track 180°- 359° = even flight levels with 2000 ft vertical separation up to and Incl. FL 280 (FL 40, 60 280**

**Magnetic track 180°-359° = starting with the next usable flight level after FL 280:**
7.3 Criteria upon which minimum altitudes

The criteria upon which minimum altitudes are based will necessarily be determined to some extent by the track guidance facilities available to the pilot-in-command, and by the extent to which pilots-in-command and operators are able in particular circumstances to accept the directions of radar controllers. The minimum acceptable standards will normally be as follows:

7.3.1 For general application: 1,500 feet above the highest terrain or obstacle within 20 n.m. of the intended track, with additional provision where necessary for terrain or obstacles within 10 degrees of intended track from the last known position.

7.3.2 For flight in controlled airspace where the track is well defined by two separate aids: 1,500 feet above the highest terrain or obstacle within 10 n.m. of the intended track.

7.3.3 For radar-controlled flight within 25 n.m. of the aerodrome of departure or intended landing: 1,000 feet above the highest terrain or obstacle within 5 n.m. of the intended track. Pilots-in-command should be instructed to monitor all radar instructions by reference to other aids and be reminded that radar control does not relieve them of their responsibility to ensure adequate terrain clearance.

7.3.4 If the specified minimum altitude for a sector is related only to terrain or obstacles within less than 20 n.m. of the intended track, special attention must be drawn to the fact in manuals and prepared navigational flight plans supplied to flight crew.

7.3.5 For flights within 20 n.m. of terrain having an elevation exceeding 2,000 feet, operations manuals should provide for minimum altitude to be increased by at least the following amounts according to the wind speed at flight level:

7.3.6 Minimum altitude should be related where necessary to the ability of the aircraft to comply with the Weight and Performance requirements, i.e., all engines operating, single engine failure for 2 engine aircraft. More detail sees Pilot Operating Manual (POM) Section 4 Flight Planning Data, Sub section 6 single obstacle clearance.

7.4 Correction Minimum Altitude Converting into FL

When converting the minimum altitude into a minimum flight level, QNH and/or temperature differences (if differing from standard QNH or standard temp) shall be accounted for as follows:

Table 2

<table>
<thead>
<tr>
<th>QNH of Nearest Station</th>
<th>Correction</th>
<th>QNH of Nearest Station</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1050</td>
<td>+1,000 ft</td>
<td>1013</td>
<td>---</td>
</tr>
<tr>
<td>1045</td>
<td>+860 ft</td>
<td>1010</td>
<td>-80 ft</td>
</tr>
<tr>
<td>1040</td>
<td>+720 ft</td>
<td>1005</td>
<td>-220 ft</td>
</tr>
<tr>
<td>1035</td>
<td>+590 ft</td>
<td>1000</td>
<td>-380 ft</td>
</tr>
<tr>
<td>1030</td>
<td>+460 ft</td>
<td>995</td>
<td>-510 ft</td>
</tr>
<tr>
<td>1025</td>
<td>+320 ft</td>
<td>990</td>
<td>-630 ft</td>
</tr>
<tr>
<td>1020</td>
<td>+180 ft</td>
<td>985</td>
<td>-780 ft</td>
</tr>
<tr>
<td>1015</td>
<td>+50 ft</td>
<td>980</td>
<td>-920 ft</td>
</tr>
</tbody>
</table>
Example: Indicated or planned FL is 160 @ ISA; temp
MEA = 15000 ft local QNH; 975 = minus 1080 ft = true altitude only 13920 ft.
If MEA is 15000 ft is this particular area, the min req. obstacle clearance would not be assured - then the next higher flight level must be used.

### 7.5 Mountain Wave

The possibility of turbulence associated with strong winds or standing wave effect over mountainous regions will require a greater margin of safety. For flights within 20 NM of terrain higher than 2000 ft in elevation, the MOCA / MORA shall be increased according to Table 3:

#### Table 3

<table>
<thead>
<tr>
<th>Elevation of Terrain</th>
<th>WIND SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-30kts</td>
</tr>
<tr>
<td>2000 -8000ft</td>
<td>+500ft</td>
</tr>
<tr>
<td>Above 8000ft</td>
<td>+1000ft</td>
</tr>
</tbody>
</table>

### 7.6 Temperature Correction

ACA Flight Crews will apply cold temperature corrections to all published minimum departure, en route and approach altitudes, including MDA, DA and missed approach altitudes, according to Table 4 and advise ATC of the correction(s).

7.6.1 Subtract the elevation of the altimeter barometric reference setting source from the published minimum altitude intended to be flown to determine, height above altimeter source.

7.6.2 Enter Table 4 according to the reported temperature (at the altimeter barometric reference setting source) in the left column and read across to the nearest correction under the height above the altimeter source.

7.6.3 Add the correction to the altitude intended to be flown (published altitude) to the correction to the altitude above S000feet, use a linear extrapolation.

Note: For simplicity (e.g. to correct 10000 ft use twice the value for 5000 ft).

Note: Altitude corrections apply to QNH and QFE operations.

7.6.4 If the altitude correction results in a level-off altitude between 100 ft increments set the altitude selector at the next higher 100 ft increment.

**Notes:**

1. Altimeter cursors / MDA / DA settings (as installed) should be set at the adjusted minimum altitudes for the approach.
2. No corrections are required for reported temperatures above 0°C / 32°F.
3. Pilots should not correct altimeter barometric reference settings.
4. ATC assigned altitudes or flight levels accepted by the Flight Crew should not be adjusted for temperature.
The Flight Crew shall refuse any ATC assigned altitudes if the Flight Crew determines the terrain clearance is not adequate. The Flight Crew shall immediately advise ATC that they are unable to accept the clearance and request a higher altitude.

Table 4

<table>
<thead>
<tr>
<th>Airport Temp 0c</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
<th>1000</th>
<th>1500</th>
<th>2000</th>
<th>3000</th>
<th>4000</th>
<th>5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>170</td>
<td>230</td>
<td>290</td>
</tr>
<tr>
<td>-10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>290</td>
<td>390</td>
<td>490</td>
</tr>
<tr>
<td>-20</td>
<td>30</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>120</td>
<td>130</td>
<td>140</td>
<td>210</td>
<td>280</td>
<td>430</td>
<td>570</td>
<td>710</td>
</tr>
<tr>
<td>-30</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>130</td>
<td>150</td>
<td>170</td>
<td>190</td>
<td>280</td>
<td>380</td>
<td>570</td>
<td>760</td>
<td>950</td>
</tr>
<tr>
<td>-40</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>150</td>
<td>170</td>
<td>190</td>
<td>220</td>
<td>240</td>
<td>360</td>
<td>480</td>
<td>720</td>
<td>970</td>
<td>1210</td>
</tr>
<tr>
<td>-50</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>150</td>
<td>180</td>
<td>210</td>
<td>240</td>
<td>270</td>
<td>300</td>
<td>450</td>
<td>600</td>
<td>890</td>
<td>1120</td>
<td>1500</td>
</tr>
</tbody>
</table>

Example

1. Aerodrome elevation: 1000 feet.
2. Reported aerodrome temperature: -40°C

<table>
<thead>
<tr>
<th>Fix</th>
<th>Published Altitude (ft)</th>
<th>Height above Altimeter source (ft)</th>
<th>Correction (ft)</th>
<th>Indicated Altitude (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure Turn</td>
<td>4000</td>
<td>3000</td>
<td>720</td>
<td>4720</td>
</tr>
<tr>
<td>FAF</td>
<td>3000</td>
<td>2000</td>
<td>480</td>
<td>3480</td>
</tr>
<tr>
<td>MDA</td>
<td>1500</td>
<td>500</td>
<td>120</td>
<td>1620</td>
</tr>
</tbody>
</table>