

**PART 7 - INSTRUMENTS AND EQUIPMENT**

## 7.1.1 General

### 7.1.1.1 APPLICABILITY

- (a) Part 7 prescribes the minimum instrument and equipment requirements for all aircraft in all operations.
- (b) Part 7 requirements use the following key designators—
  - (1) AAC: all aircraft, including Commercial Air Transport and AOC Holders appropriate to the subject of the regulations, e.g., an all aircraft regulation may only refer to seaplanes, but will include CAT and AOC seaplanes;
  - (2) CAT: commercial air transport (includes AOC Holders), appropriate to the subject of the regulations, e.g., a CAT regulation may only refer to seaplanes, but will include AOC seaplanes; and
  - (3) AOC: AOC Holders. Where AOC requirements are redundant to AAC or CAT requirements, or more detailed, the AOC requirements will be followed.

### 7.1.1.2 DEFINITIONS

**Extended overwater operation.** In the case of single-engine land planes, extended overwater operation means a distance of more than 185 km (100 nm) from land suitable for making an emergency landing. In the case of multi-engine land planes, more than 370 km (200 nm) from land suitable for making an emergency landing, with the capability of continuing flight with one engine inoperative.

**ICAO Annex.** Reference to a requirement contained in a specific ICAO Annex (by Annex number, Part and chapter) means that compliance with the referenced requirement of the International Civil Aviation Organisation, as contained in the relevant 'Annex' to the Convention on Civil Aviation, is mandatory. Copies of these documents are available for reference at the SSCA

### 7.1.1.3 ACRONYMS

- (a) The following acronyms are used in Part 7:
  - (1) ADF – Automatic Direction Finder
  - (2) AOC - Air Operator Certificate
  - (3) AOCR- Air Operator Certificate Requirement
  - (4) DH – Decision Height
  - (5) DME – Distance Measuring Equipment
  - (6) ELT – Emergency Locator Transmitter
  - (7) ILS – Instrument Landing System
  - (8) IFR – Instrument Flight Rating
  - (9) IMC - Instrument Meteorological Conditions
  - (10) LRNS - Long Range Navigation Systems
  - (11) MEL – Minimum Equipment List (Part 1)
  - (12) MHz - Megahertz
  - (13) MLS – Microwave Landing System
  - (14) MNPS - Minimal Navigation Performance Specifications
  - (15) NDB – Non-Directional Beacon
  - (16) PBE - Pressure Breathing Equipment
  - (17) RVSM – Reduced Vertical Separation Minimum
  - (18) SSR – Secondary Surveillance Radar
  - (19) VFR – Visual Flight Rules (see 8.8.3.1)
  - (20) VMC - Visual Meteorological Conditions
  - (21) VOR – VHF Omnidirectional Range

(22) VSM – Vertical Separation Minimum

**7.1.1.4 GENERAL INSTRUMENT AND EQUIPMENT REQUIREMENTS**

- (a) [AAC] In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in Part 7 shall be installed or carried, as appropriate, in aircraft according to the aircraft used and to the circumstances under which the flight is to be conducted.
- (b) [AAC] All required instruments and equipment shall be approved and installed in accordance with applicable airworthiness requirements.
- (c) [AAC] Prior to operation in Cambodia of any aircraft not registered in Cambodia that uses an airworthiness inspection program approved or accepted by the State of Registry, the owner/operator shall ensure that instruments and equipment required by Cambodia but not installed in the aircraft are properly installed and inspected in accordance with the requirements of the State of Registry.
- (d) [AOC] An AOC holder shall ensure that a flight does not commence unless the required equipment—
  - (1) Meets the minimum performance standard and the operational and airworthiness requirements;
  - (2) Is installed such that the failure of any single unit required for either communication or navigation purposes, or both, will not result in the inability to communicate and/or navigate safely on the route being flown; and
  - (3) Is in operable condition for the kind of operation being conducted, except as provided in the MEL.
- (e) [AAC] If equipment is to be used by one flight crewmember at his station during flight, it shall be installed so as to be readily operable from his or her station.
- (f) [AAC] When a single item of equipment is required to be operated by more than one flight crew member, it shall be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

**7.1.2 Flight and Navigational Instruments**

**7.1.2.1 GENERAL REQUIREMENTS**

- (a) [AAC] All aircraft shall be equipped with flight and navigational instruments which will enable the flight crew to—
  - (1) Control the flight path of the aircraft;
  - (2) Carry out any required procedural manoeuvres; and
  - (3) Observe the operating limitations of the aircraft in the expected operating conditions.
- (b) [AAC] When a means is provided for transferring an instrument from its primary operating system to an alternative system, the means shall include a positive positioning control and shall be marked to indicate clearly which system is being used.
- (c) [AAC] Those instruments that are used by any one flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his station, with the minimum practicable deviation from the position and line of vision which he normally assumes when looking forward along the flight path.
- (d) [AAC] All verbal cockpit warnings generated by electronic devices shall be spoken in the English language.

**7.1.2.2 MINIMUM FLIGHT AND NAVIGATIONAL INSTRUMENTS**

- (a) [AAC] No person may operate any aircraft unless it is equipped with the following flight and navigational instruments:
  - (1) An airspeed indicating system calibrated in knots.
  - (2) A sensitive pressure altimeter calibrated in feet with a sub-scale setting calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight.

- (3) An accurate timepiece indicating the time in hours, minutes and seconds (approval not required).
- (4) A magnetic compass.

#### 7.1.2.3 INSTRUMENTS FOR OPERATIONS REQUIRING TWO PILOTS

- (a) [AAC] Whenever two pilots are required, each pilot's station shall have separate flight instruments as follows:
  - (1) An airspeed indicator calibrated in knots;
  - (2) A sensitive pressure altimeter calibrated in feet with a sub-scale setting calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;
  - (3) A vertical speed indicator;
  - (4) A turn and slip indicator, or a turn co-ordinator incorporating a slip indicator;
  - (5) An attitude indicator; and
  - (6) A stabilised direction indicator.

#### 7.1.2.4 IFR INSTRUMENTS

- (a) [AAC] All aircraft when operated in IFR, or when the aircraft cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with—
  - (1) An airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;
  - (2) A turn and slip indicator;
  - (3) An attitude indicator (artificial horizon);
  - (4) A heading indicator (directional gyroscope);
  - (5) A means of indicating whether the supply of power to the gyroscopic instruments is adequate;
  - (6) A means of indicating in the flight crew compartment the outside air temperature;
  - (7) A rate-of-climb and descent indicator; and
  - (8) Such additional instruments or equipment as may be prescribed by the SSCA.
- (b) [AOC] No person may operate an aeroplane under IFR, or under VFR over routes that cannot be navigated by reference to visual landmarks, unless the aeroplane is equipped with navigation equipment in accordance with the requirements of air traffic services in the area(s) of operation, but not less than:
  - (1) One VOR receiving system, one ADF system, one DME and one Marker Beacon receiving system;
  - (2) One ILS or MLS where ILS or MLS is required for approach navigation purposes;
  - (3) An Area Navigation System when area navigation is required for the route being a flown;
  - (4) An additional VOR receiving system on any route, or part thereof, where navigation is based only on VOR signals; and
  - (5) An additional ADF system on any route, or part thereof, where navigation is based only on NDB signals.

*Note: In areas where ADF, DME or NDB reception is unreliable a GPS receiver complying with TSO-C129, or any other standard acceptable to the SSCA, may be used as a supplementary navigation aid.*
- (c) [AAC] All aircraft intended to land in IMC or at night shall be provided with radio navigation equipment capable of receiving signals providing guidance to—
  - (1) A point from which a visual landing can be effected; or
  - (2) Each aerodrome at which it is intended to land in IMC; and
  - (3) Any designated alternate aerodromes.
- (d) [AOC] No person may conduct single pilot IFR operations unless the aeroplane is equipped with an autopilot with at least altitude hold and heading mode.

#### 7.1.2.5 STANDBY ATTITUDE INDICATOR

- (a) [AAC] No person may operate an aeroplane with a maximum certified take-off mass exceeding 5,700 kg and aircraft having a maximum approved passenger seating configuration of more than 9 seats unless it is equipped with a single standby attitude indicator (artificial horizon) that—
- (1) Operates independently of any other attitude indicating system;
  - (2) Is powered continuously during normal operation; and
  - (3) After a total failure of the normal electrical generating system, is automatically powered for a minimum of 30 minutes from a source independent of the normal electrical generating system.
- (b) [AAC] When the standby attitude indicator is being operated by emergency power, it shall be clearly evident to the flight crew.
- (c) [AAC] Where the standby attitude indicator has its own dedicated power supply there shall be an associated indication, either on the instrument or on the instrument pane when this supply is in use.

*Note: Paragraph (c) shall be complied with no later than 1 April 2000.*

- (d) [AAC] If the standby attitude instrument system is installed and usable through flight attitudes of 360° of pitch and roll, the turn and slip indicators may be replaced by slip indicators.

#### 7.1.2.6 INSTRUMENTS AND EQUIPMENT FOR CATEGORY II OPERATIONS

- (a) The instruments and equipment listed in this subsection shall be installed in each aircraft operated in a Category II operation:

*Note: This subsection does not require duplication of instruments and equipment required by 7.1.2.2 or any other provisions of Part 7.*

(1) Group I.

- (i) Two localizer and glide slope receiving systems.

*Note: Each system shall provide a basic ILS display and each side of the instrument panel must have a basic ILS display. However, a single localizer antenna and a single glide slope antenna may be used.*

- (ii) A communications system that does not affect the operation of at least one of the ILS systems.
- (iii) A marker beacon receiver that provides distinctive aural and visual indications of the outer and the middle markers.
- (iv) Two gyroscopic pitch and bank indicating systems.
- (v) Two gyroscopic direction indicating systems.
- (vi) Two airspeed indicators.
- (vii) Two sensitive altimeters adjustable for barometric pressure, having markings at 20 foot intervals and each having a placarded correction for altimeter scale error and for the wheel height of the aircraft.
- (viii) Two vertical speed indicators.
- (ix) A flight control guidance system that consists of either an automatic approach coupler or a flight director system.

*Note: A flight director system must display computed information as steering command in relation to an ILS localizer and, on the same instrument, either computed information as pitch command in relation to an ILS glide slope or basic ILS glide slope information. An automatic approach coupler must provide at least automatic steering in relation to an ILS localizer. The flight control guidance system may be operated from one of the receiving systems required by paragraph (a)(1)(i).*

- (x) For Category II operations with decision heights below 150 feet either a marker beacon receiver providing aural and visual indications of the inner marker or a radio altimeter.

(2) Group II.

- (i) Warning systems for immediate detection by the pilot of system faults in items (a)(1)(i), (a)(1)(iv), (a)(1)(iv) and (a)(1)(ix), of Group I and, if installed for use in Category III operations, the radio altimeter and autothrottle system.
- (ii) Dual controls.
- (iii) An externally vented static pressure system with an alternate static pressure source.
- (iv) A windshield wiper or equivalent means of providing adequate cockpit visibility for a safe visual transition by either pilot to touchdown and rollout.
- (v) A heat source for each airspeed system pitot tube installed or an equivalent means of preventing malfunctioning due to icing of the pitot system.

*Implementing Standard: See IS: 7.1.2.6 for Category II instrument and equipment approval and maintenance requirements.*

#### 7.1.2.7 NAVIGATION EQUIPMENT FOR OPERATIONS IN MNPS AIRSPACE

- (a) [AOC] No AOC holder may operate an aeroplane in MNPS airspace unless it is equipped with navigation equipment that-
  - (1) Continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and
  - (2) Has been authorised by the State of Registry for MNPS operations concerned.

*Note: Equipment shall comply with minimum navigation performance specifications prescribed in ICAO Doc 7030 in the form of Regional Supplementary Procedures.*
- (b) [AOC] The navigation equipment required for operations in MNPS airspace shall be visible and usable by either pilot seated at his duty station.
- (c) [AOC] For unrestricted operation in MNPS airspace an aeroplane shall be equipped with two independent Long-Range Navigation Systems (LRNS).
- (d) [AOC] For operation in MNPS airspace along notified special routes, an aeroplane shall be equipped with one LRNS, unless otherwise specified.

#### 7.1.2.8 REDUCED VERTICAL SEPARATION MINIMUM

- (a) [AAC] For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1,000 ft) is applied between FL 290 and FL 410 inclusive, an aeroplane:
  - (1) Shall be provided with equipment that is capable of:
    - (i) Indicating to the flight crew the flight level being flown;
    - (ii) Automatically maintaining a selected flight level;
    - (iii) Providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed + or – 90 m (300 ft); and
    - (iv) Automatically reporting pressure-altitude and
  - (2) Shall be authorised for operations in the airspace concerned by –
    - (i) The SSCA for AOC holders through operations specifications, or
    - (ii) for non-AOC holders through letter of authorisation.
- (b) Prior to granting an RVSM approval required by paragraph (a)(2), SSCA shall be satisfied that:
  - (1) The vertical navigation performance capability of the aeroplane satisfies the requirements specified in ICAO Annex 6, Part I, Appendix 4 (AOC) and ICAO Annex 6, Part II, Appendix 2 (General Aviation).

- (2) The operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and
- (3) The operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

*Note: An RVSM approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.*

- (c) SSCA will, if appropriate, ensure that in respect of those aeroplanes mentioned in item (a)(2) above, adequate provisions exist for:
  - (1) Receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with Annex 11, 3.3.4.1; and
  - (2) Taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operations in airspace where RVSM is applied.
- (d) SSCA will take appropriate action in respect of aircraft and operators found to be operating in RVSM airspace in Cambodia without a valid RVSM approval.

*Note: These provisions and procedures need to address both the situation where the aircraft in question is operating without approval in Cambodian airspace, and the situation where an operator for which the State has regulatory oversight responsibility is found to be operating without the required approval in the airspace of another State.*

*Note: See ICAO Doc 9574, Manual on Implementation of a 300 m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive, for guidance relating to the approval for operations in RVSM airspace.*

### 7.1.3 Communication Equipment

#### 7.1.3.1 RADIO EQUIPMENT

- (a) [AAC] No person may operate an aircraft unless it is equipped with radio equipment required for the kind of operation being conducted.
- (b) [AAC] All aircraft operated in VFR as a controlled flight or in IFR shall be provided with radio communication equipment capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by a civil aviation authority, including the aeronautic emergency frequency 121.5 MHz.

*Note: This requirement is considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.*

- (c) [AOC] No person may operate an aeroplane in IFR, or in VFR over routes that cannot be navigated by reference to visual landmarks, unless the aeroplane is equipped with communication and navigation equipment in accordance with the requirements of air traffic services in the area(s) of operation, but not less than—
  - (1) Two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route including diversions.

*Note: Each system shall have an independent antenna installation except that, where rigidly supported non-wire antennae or other antenna installations of equivalent reliability are used, only one antenna is required.*

- (2) Secondary Surveillance Radar transponder equipment fitted with a pressure altitude reporting function as required for the route being flown.

- (d) [AOC] When more than one communications equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.
- (e) [AAC] No person may operate an aeroplane under IFR unless it is equipped with an audio selector panel accessible to each required flight crewmember.
- (f) [AOC] No person may conduct single pilot IFR or night operations unless the aeroplane is equipped with a headset with boom microphone or equivalent and a transmit button on the control wheel.

#### 7.1.3.2 CREW MEMBER INTERPHONE SYSTEM

- (a) [AOC] No AOC holder may operate an aeroplane on which a flight crew of more than one is required unless it is equipped with a flight crew interphone system, including headsets and microphones, not of a handheld type, for use by all members of the flight crew.
- (b) [AOC] No AOC holder may operate an aeroplane with a maximum certified take-off mass exceeding 15,000 kg or having a maximum approved passenger seating configuration of more than 19 unless it is equipped with a crew member interphone system that—
  - (1) Operates independently of the public address system except for handsets, headsets, microphones, selector switches and signalling devices;
  - (2) Provides a means of two-way communication between the flight crew compartment and each—
    - (i) Passenger compartment;
    - (ii) Galley located other than on a passenger deck level; and
    - (iii) Remote crew compartment that is not on the passenger deck and is not easily accessible from a passenger compartment;
  - (3) Is readily accessible for use—
    - (i) From each of the required flight crew stations in the flight crew compartment; and
    - (ii) At required cabin crew member stations close to each separate or pair of floor level emergency exits;
  - (4) Has an alerting system incorporating aural or visual signals for use by flight crew members to alert the cabin crew and for use by cabin crew members to alert the flight crew;
  - (5) Has a means for the recipient of a call to determine whether it is a normal call or an emergency call; and
  - (6) Provides on the ground a means of two-way communication between ground personnel and at least two flight crew members.

#### 7.1.3.3 RADIO STATION LICENSING

- (a) **General**

This subpart lays down basic requirement and procedures for Radio Station Licensing of aircraft registered in the Kingdom of Cambodia. Radio Station Licensing is a part of Airworthiness certification.
- (b) **Mandatory requirements**
  - (1) All Radio communication of Cambodian registered aircraft shall be qualified in accordant with ICAO Annex 10 Vol. I and this part.
  - (2) No Civil Aircraft Registered in the Kingdom of Cambodia obtain a certificate of Airworthiness unless it obtained a Radio Station Licence issued by SSCA.
  - (3) This licence is no valid for any modification / alteration other than prescribed in the aircraft type certificate data sheet / equivalent document approved by SSCA, other way the holder shall inform to this Secretariat for a renewal.

- (c) **Application procedure for Radio Station Licence**
- (1) After obtaining of C of R, the owner of the aircraft shall apply in writing to SSCA, on the prescribed form AWR 07-1 obtainable from Airworthiness Section with all documents necessary and its copies if required for radio station licensing propose, no later than 60 days before the desired date of licensing.
  - (2) The owner shall notify the SSCA the location of the aircraft where it will be made available for inspection by the Airworthiness Inspector of SSCA for the purpose of licensing.
- (d) **Issue of Radio Station Licence**  
When the inspection is satisfactorily completed, Airworthiness inspector will inform to Director General of SSCA about this purpose and the Radio Station Licence shall be issued to the owner / his nominee by the Airworthiness representative of SSCA / Director General of SSCA.
- (e) **Validation**
- (1) This certificate is valid for 2 years. To confirm that the operator must maintain strictly his aircraft in accordance with applicable documents approved by SSCA.
  - (2) Non-compliance with operating condition of failure to maintain an adequate standard shall result in the revocation or suspension of the Radio Station Licence.
  - (3) Radio Station Licence, before expiry, will be renewable for next 2 years for which application with requisite fee must be submitted at least a month prior to expiry of current Radio Station Licence.

## **7.1.4 Aircraft Lights and Instrument Illumination**

### **7.1.4.1 AIRCRAFT LIGHTS AND INSTRUMENT ILLUMINATION**

- (a) [AAC] All aircraft operated at night shall be equipped with:
- (1) A landing light;
  - (2) Illumination for all flight instruments and equipment that are essential for the safe operation of the aircraft;
  - (3) Lights in all passenger compartments; and
  - (4) A flashlight for each crew member station (approval not required).
- (b) [AOC] No AOC holder may operate an aircraft by day or night unless it is equipped with:
- (1) Two landing lights
  - (2) An anti-collision light system;
  - (3) Illumination for all flight instruments and equipment that are essential for the safe operation of the aircraft;
  - (4) Lights in all passenger compartments; and
  - (5) A flashlight for each crew member station (approval not required).
- (c) [AOC] No AOC holder may operate an aircraft by night unless, in addition to the equipment specified in paragraph (a) above, it is equipped with—
- (1) Navigation/position lights;
  - (2) Two landing lights or a single light having two separately energised filaments; and
  - (3) Lights to conform to the International regulations for preventing collisions at sea if the aircraft is a seaplane or an amphibian aircraft.

## 7.1.5 Engine Instruments

### 7.1.5.1 ENGINE INSTRUMENTS

- (a) [CAT] Unless the SSCA allows or requires different instrumentation for turbine engine powered aeroplanes to provide equivalent safety, no person may conduct any commercial air transport operations in any aircraft without the following engine instruments:
- (1) A fuel pressure indicator for each engine.
  - (2) A fuel flowmeter.
  - (3) A means for indicating fuel quantity in each fuel tank to be used.
  - (4) An oil pressure indicator for each engine.
  - (5) An oil quantity indicator for each oil-tank when a transfer or separate oil reserve supply is used.
  - (6) An oil-in temperature indicator for each engine.
  - (7) A tachometer for each engine.
  - (8) An independent fuel pressure warning device for each engine or a master warning device for all engines with a means for isolating the individual warning circuits from the master warning device.
- (b) [AOC] In addition to the listed equipment requirements in paragraph (a), reciprocating engine aircraft shall have the following:
- (1) A carburettor air temperature indicator for each engine.
  - (2) A cylinder head temperature indicator for each air-cooled engine.
  - (3) A manifold pressure indicator for each engine.
  - (4) A device for each reversible propeller, to indicate to the pilot when the propeller is in reverse pitch, that complies with the following:
    - (i) The device may be actuated at any point in the reversing cycle between the normal low pitch stop position and full reverse pitch, but it may not give an indication at or above the normal low pitch stop position.
    - (ii) The source of indication shall be actuated by the propeller blade angle or be directly responsive to it.

## 7.1.6 Warning Instruments and Systems

### 7.1.6.1 MACH NUMBER INDICATOR

[AAC] All aircraft with speed limitations expressed in terms of Mach number shall be equipped with a Mach number indicator.

### 7.1.6.2 LOSS OF PRESSURISATION INDICATOR

[AAC] All pressurised aircraft intended to be operated at flight altitudes at which the atmospheric pressure is less than 376hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

### 7.1.6.3 LANDING GEAR: AURAL WARNING DEVICE

- (a) [AOC] Each aeroplane with landing gear shall have a landing gear aural warning device that functions continuously under the following conditions:
- (1) For aeroplanes with an established approach wing-flap position, whenever the wing flaps are extended beyond the maximum certified approach climb configuration position in the Aeroplane Flight Manual and the landing gear is not fully extended and locked.
  - (2) For aeroplanes without an established approach climb wingflap position, whenever the wing flaps are extended beyond the position at which landing gear extension is normally performed and the landing gear is not fully extended and locked.
- (b) [AOC] The warning system required by paragraph (a) of this section:
- (1) May not have a manual shutoff;
  - (2) Shall be in addition to the throttle-actuated device installed under the type certification airworthiness requirements; and

- (3) May utilise any part of the throttle-actuated system including the aural warning device.
- (c) [AOC] The flap position-sensing unit may be installed at any suitable place in the aeroplane.

#### 7.1.6.4 ALTITUDE ALERTING SYSTEM

- (a) [AOC] No AOC holder may operate a turbine propeller powered aeroplane with a maximum certified take-off mass in excess of 5,700 kg or having a maximum approved passenger seating configuration of more than 9 seats, or a turbojet powered aeroplane, unless it is equipped with an altitude alerting system capable of—
  - (1) Alerting the flight crew upon approaching preselected altitude in either ascent or descent; and
  - (2) Alerting the flight crew by at least an aural signal, when deviating above or below a preselected altitude.
- (b) [AAC] For operations in defined portions of airspace where, based on Regional Air Navigation Agreement, a VSM of 300 m (1,000 ft) is applied above FL 290, an aircraft shall be provided with equipment which is capable of providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert may not exceed  $\pm 90$  m (300 ft).

#### 7.1.6.5 GROUND PROXIMITY WARNING SYSTEM

- (a) [CAT] No AOC holder may operate a turbine-powered aeroplane unless it is equipped with a ground proximity warning system which has a predictive terrain hazard warning function.(EGPWS)
- (b) [AOC] Each ground proximity warning system shall automatically provide, by means of aural signals which may be supplemented by visual signals, timely and distinctive warning to the flight crew of sink rate, ground proximity, altitude loss after take-off or go around, incorrect landing configuration and downward glideslope deviation.
- (c) [AOC] A ground proximity warning system shall provide, as a minimum, warnings of the following circumstances—
  - (1) Excessive descent rate.
  - (2) Excessive terrain closure rate.
  - (3) Excessive altitude loss after take-off or go-around.
  - (4) Unsafe terrain clearance while not in landing configuration; and
  - (5) Excessive descent below the instrument glide path.

#### 7.1.6.6 WEATHER RADAR

[AOC] No person may operate an aircraft in commercial air transport in an area where potentially hazardous weather conditions may be expected unless it is equipped with weather radar. On or after 1 January 2010 all such weather radar units shall be fitted with a colour display.

### 7.1.7 *Flight and Cockpit Voice Recorders*

#### 7.1.7.1 COCKPIT VOICE RECORDERS

- (a) [AOC] No AOC holder may operate a multi-engine turbine powered aeroplane with approved passenger seating of 10 or more unless an approved cockpit voice recorder system is installed which complies with the relevant provisions of ICAO Annex 6 part 1 chapter 6.3 and attachment D.
- (b) [AOC] No AOC holder may operate a helicopter with a MTOW over 2700kg unless an approved cockpit voice recorder system is installed which complies with the relevant provisions of ICAO Annex 6 part III chapter 4.3.
- (c) [AOC] To facilitate location and identification in case of an accident, the cockpit voice recorder shall—
  - (1) Be either bright orange or bright yellow;
  - (2) Have reflective tape affixed to the external surface to facilitate its location under water; and
  - (3) Have an approved underwater locating device on or adjacent to the recorder, which is secured in such a manner that it is not likely to be separated during a crash impact

#### 7.1.7.2 FLIGHT RECORDERS

- (a) [AOC] No person may operate an aeroplane in commercial air transport that is turbine engine powered, unless it is equipped with one or more approved flight data recording systems, which comply with the relevant provisions of ICAO Annex 6 part I chapter 6.3 and attachment D.
- (b) [AOC] No person may operate a helicopter in commercial air transport, unless it is equipped with one or more approved flight data recording systems, which comply with the relevant provisions of ICAO Annex 6 part III chapter 4.3.
- (c) [AOC] Flight recorders shall—
  - (1) Be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed;
  - (2) Be maintained and calibrated as required by the SSCA; and
  - (3) Have an approved device to assist in locating that recorder under water.

*Implementing Standard: See IS: 7.1.7.2 for the maintenance requirements of flight recorders.*

#### 7.1.7.3 AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS II)

- (a) [AAC] Except on domestic routes all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II)
- (b) An airborne collision avoidance system shall operate in accordance with the relevant provisions of ICAO Annex 10, Volume IV.

### 7.1.8 Emergency, Rescue, and Survival Equipment

#### 7.1.8.1 EMERGENCY EQUIPMENT: ALL AIRCRAFT

- (a) [AAC] Each item of emergency and flotation equipment shall be—
  - (1) Readily accessible to the crew and, with regard to equipment located in the passenger compartment, to passengers without appreciable time for preparatory procedures;
  - (2) Clearly identified and clearly marked to indicate its method of operation;
  - (3) Marked as to date of last inspection; and
  - (4) Marked as to contents when carried in a compartment or container.

#### 7.1.8.2 EMERGENCY EXIT EQUIPMENT

- (a) [AOC] Each passenger-carrying land plane emergency exit (other than over-the-wing) that is more than 6 feet from the ground with the aeroplane on the ground and the landing gear extended, shall have an approved means to assist the occupants in descending to the ground.
- (b) [AOC] Each passenger emergency exit, its means of access, and its means of opening shall be conspicuously marked by a sign visible to occupants approaching along the main passenger aisle.
- (c) [AOC] Each passenger-carrying aeroplane shall have an emergency lighting system, independent of the main lighting system that—
  - (1) Illuminates each passenger exit marking and locating sign;
  - (2) Provides enough general lighting in the passenger cabin; and
  - (3) Includes floor proximity emergency escape path marking.
- (d) [AOC] Each passenger emergency exit and the means of opening that exit from the outside shall be marked on the outside of the aeroplane.
- (e) [AOC] Each passenger-carrying aeroplane shall be equipped with a slip-resistant escape route that meets the requirements under which that aeroplane was type certified.

*Implementing Standard: See IS: 7.1.8.2 for details of the emergency exit equipment requirements.*

### 7.1.8.3 VISUAL SIGNALLING DEVICES

- (a) [AAC] No person may operate an aircraft over water or across land areas which have been designated by Cambodia as areas in which search and rescue would be especially difficult, unless equipped with such signalling devices as may be appropriate to the area overflown, to include—
- (1) Visual signals for use by intercepting and intercepted aircraft; and
  - (2) At least one pyrotechnic signalling device for each life raft required for overwater operations.

### 7.1.8.4 SURVIVAL KITS

[AAC] No person may operate an aircraft across land areas which have been designated by Cambodia as areas in which search and rescue would be especially difficult, unless equipped with enough survival kits for the number of occupants of the aeroplane and is appropriately equipped for the route to be flown.

### 7.1.8.5 EMERGENCY LOCATOR TRANSMITTER

- (a) [AAC] All aircraft on all flights shall be equipped with an automatically activated ELT.
- (b) [AOC] No person may operate an aeroplane in extended overwater operations without having on the aeroplane a survival type ELT that transmits simultaneously on 121.5 and 406 MHz, and meets technical standards specified by ICAO Annex 10 Volume 3, Chapter 5 and the SSCA.
- (c) [AOC] At least one survival type ELT shall be located with each liferaft carried (See 7.1.8.17).
- (d) [AAC] Batteries used in ELT's shall be replaced (or recharged if the battery is rechargeable) when—
- (1) The transmitter has been in use for more than one cumulative hour; or
  - (2) 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge) has expired.
- (e) [AAC] The expiration date for a replacement or recharged ELT battery shall be legibly marked on the outside of the transmitter.

*Implementing Standard: See 7.1.8.5 for details of emergency locator transmitters*

*Note: The battery useful life (or useful life of charge) requirements do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.*

### 7.1.8.6 PORTABLE FIRE EXTINGUISHERS

- (a) [AOC] No person may operate an aircraft unless it is equipped with portable fire extinguishers accessible for use in crew, passenger, and cargo compartments as follows:
- (1) The type and quantity of extinguishing agent shall be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used.  
*Note: For passenger compartments, the extinguisher shall be designed to minimise the hazard of toxic gas concentrations.*
  - (2) At least one portable fire extinguisher shall be provided and conveniently located for use in each Class E cargo compartment which is accessible to crew members during flight, and at least one shall be located in each upper and lower lobe galley.
  - (3) At least one portable fire extinguisher shall be conveniently located on the flight deck for use by the flight crew.
  - (4) At least one portable fire extinguisher shall be conveniently located in the passenger compartment of aeroplanes having a passenger seating capacity of 30 or less.
  - (5) For each aeroplane having a passenger seating capacity of more than 30, there shall be at least the following number of portable fire extinguishers conveniently located and uniformly distributed throughout the compartment.

<b>Minimum Number of Hand Fire Extinguishers Passenger Seating Capacity</b>	
<b>30 through 60</b>	<b>2</b>
<b>61 through 200</b>	<b>3</b>
<b>201 through 300</b>	<b>4</b>
<b>301 through 400</b>	<b>5</b>
<b>401 through 500</b>	<b>6</b>
<b>501 through 600</b>	<b>7</b>
<b>601 or more</b>	<b>8</b>

**7.1.8.7 LAVATORY FIRE EXTINGUISHER**

- (a) [AOC] No person may operate a passenger-carrying transport category aeroplane unless each lavatory in the aeroplane is equipped with a built-in fire extinguisher for each disposal receptacle for towels, paper, or waste located within the lavatory.
- (b) [AOC] Built-in lavatory fire extinguishers shall be designed to discharge automatically into each disposal receptacle upon occurrence of a fire in the receptacle.

**7.1.8.8 LAVATORY SMOKE DETECTOR**

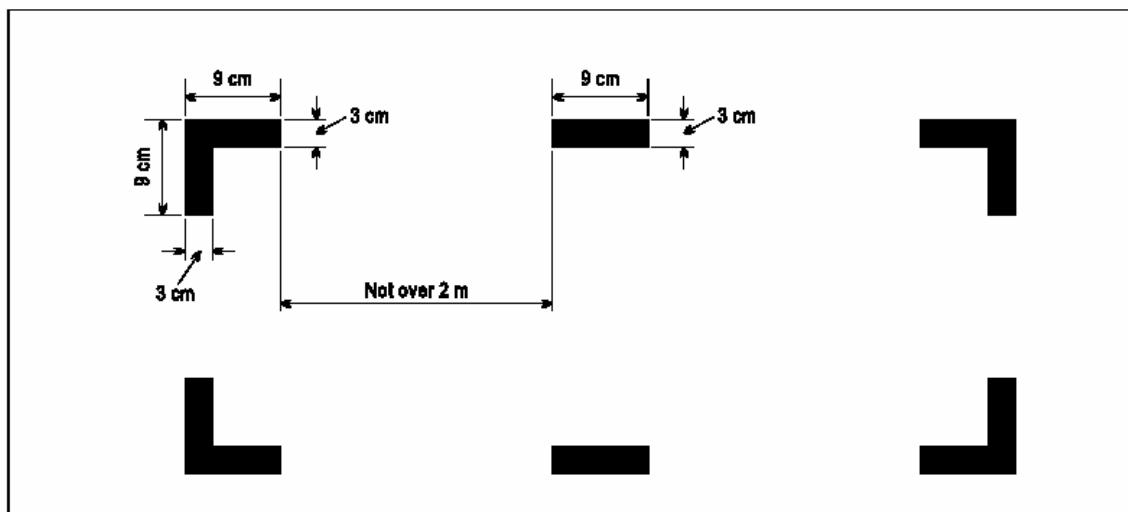
- (a) [AOC] No person may operate a passenger-carrying transport category aeroplane unless each lavatory in the aeroplane is equipped with a smoke detector system or equivalent that provides—
  - (1) A warning light in the cockpit; or
  - (2) A warning light or audio warning in the passenger cabin which would be readily detected by a flight attendant, taking into consideration the positioning of flight attendants throughout the passenger compartment during various phases of flight.

**7.1.8.9 CRASH AXE**

[AOC] No AOC holder shall operate a large aeroplane unless it is equipped with a crash axe appropriate to effective use in that type of aeroplane, stored in a place not visible to passengers on the aeroplane.

**7.1.8.10 MARKING OF BREAK-IN POINTS**

- (a) [AAC] If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, such areas shall be marked as shown below, and the colour of the markings shall be such that there is some contrast with the background.



- (b) If the corner markings are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

### 7.1.8.11 FIRST-AID AND EMERGENCY MEDICAL KIT

- (a) [AOC] No person may operate and aircraft unless it is equipped with accessible first-aid kits and, on passenger flights, an approved emergency medical kit for treatment of injuries or medical emergencies that might occur during flight time or in minor accidents.
- (b) [AOC] The number of first-aid kits to be carried shall be to the following scale:

Number of passenger seats installed	Number of first-aid kits required
0 to 99	1
100 to 199	2
200 to 299	3
300 and more	4

### 7.1.8.12 OXYGEN STORAGE AND DISPENSING APPARATUS

- (a) [AAC] All aircraft intended to be operated at altitudes requiring the use of supplemental oxygen shall be equipped with adequate oxygen storage and dispensing apparatus.
- (b) [AAC] The oxygen apparatus, the minimum rate of oxygen flow, and the supply of oxygen shall meet applicable airworthiness standards for type certification in the transport category as specified in FAR 25 or some other international standard recognised by the SCA.
- (c) [AOC] No AOC holder may operate an aeroplane at altitudes above 10,000 feet unless it is equipped with oxygen masks, located so as to be within the immediate reach of flight crew members while at their assigned duty station.
- (d) [AOC] No AOC holder may operate a pressurised aeroplane at altitudes above 25,000 feet unless:
  - (1) Flight crew member oxygen masks are of a quick donning type;
  - (2) Sufficient spare outlets and masks and/or sufficient portable oxygen units with masks are distributed evenly throughout the cabin to ensure immediate availability of oxygen to each required cabin crew member regardless of his location at the time of cabin pressurisation failure
  - (3) An oxygen-dispensing unit connected to oxygen supply terminals is installed so as to be immediately available to each occupant, wherever seated. The total number of dispensing units and outlets shall exceed the number of seats by at least 10%. The extra units are to be evenly distributed throughout the cabin.
- (e) [AOC] The amount of supplemental oxygen for sustenance required for a particular operation shall be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures established for each operation in the Operations Manual and with the routes to be flown, and with the emergency procedures specified in the Operations Manual.

*Implementing Standard: See IS: 7.1.8.12 to determine the amount of supplemental oxygen needed for non-pressurised and pressurised aircraft.*

### 7.1.8.13 PROTECTIVE BREATHING EQUIPMENT

- (a) [AOC] No AOC holder may operate an aeroplane with a maximum certified takeoff mass exceeding 5700 kg. or having a maximum approved seating configuration of more than 19 seats unless—
  - (1) It has PBE to protect the eyes, nose and mouth of each flight crew member while on flight deck duty and to provide oxygen for a period of not less than 15 minutes; and
  - (2) It has sufficient portable PBE to protect the eyes, nose and mouth of all required cabin crew members and to provide breathing gas for a period of not less than 15 minutes.
- (b) [AOC] The oxygen supply for PBE may be provided by the required supplemental oxygen system.
- (c) [AOC] The PBE intended for flight crew use shall be conveniently located on the flight deck and be easily accessible for immediate use by each required flight crew member at their assigned duty station.
- (d) [AOC] The PBE intended for cabin crew use shall be installed adjacent to each required cabin crew member duty station.

- (e) [AOC] Easily accessible portable PBE shall be provided and located at or adjacent to the required hand fire extinguishers except that, where the fire extinguisher is located inside a cargo compartment, the PBE shall be stowed outside but adjacent to the entrance to that compartment.
- (f) [AOC] The PBE while in use shall not prevent required communication.

#### 7.1.8.14 FIRST AID OXYGEN DISPENSING UNITS

- (a) [AOC] No AOC holder may conduct a passenger carrying operation in a pressurised aeroplane at altitudes above 25,000 feet, when a cabin crew member is required to be carried, unless it is equipped with—
  - (1) Undiluted first-aid oxygen for passengers who, for physiological reasons, may require oxygen following a cabin depressurisation; and
  - (2) A sufficient number of dispensing units, but in no case less than two, with a means for cabin crew to use the supply.
- (b) [AOC] The amount of first-aid oxygen required in paragraph (a) for a particular operation and route shall be determined on the basis of—
  - (1) Flight duration after cabin depressurisation at cabin altitudes of more than 8,000 feet;
  - (2) An average flow rate of at least 3 litres Standard Temperature Pressure Dry/minute/person; and
  - (3) At least 2% of the passengers carried, but in no case for less than one person.

#### 7.1.8.15 MEGAPHONES

- (a) [AOC] Each person operating a passenger-carrying aeroplane shall have a portable battery-powered megaphone or megaphones (equipment approval not required) readily accessible to the crew members assigned to direct emergency evacuation.
- (b) [AOC] The number and location of megaphones required in paragraph (a) shall be determined as follows:
  - (1) On aeroplanes with a seating capacity of more than 60 and less than 100 passengers, one megaphone shall be located at the most rearward location in the passenger cabin where it would be readily accessible to a normal flight attendant seat; and
  - (2) On aeroplanes with a seating capacity of more than 99 passengers, two megaphones in the passenger cabin on each aeroplane one installed at the forward end and the other at the most rearward location where it would be readily accessible to a normal flight attendant seat.

*Note: The SSCA may grant a deviation from the requirements of paragraph (b) if the SSCA finds that a different location would be more useful for evacuation of persons during an emergency.*

#### 7.1.8.16 INDIVIDUAL FLOTATION DEVICES

- (a) [AOC] All aircraft operated on flights over water at a distance of more than 93 km (50 NM) from land suitable for making an emergency landing shall be equipped with one life jacket or equivalent individual floatation device for each person on board.
- (b) [AOC] All life jackets or equivalent individual floatation devices shall be stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.
- (c) [AOC] For extended overwater operations, each individual floatation device shall be fitted with an approved survivor locator light.
- (d) [AOC] Upon application by an aircraft operator, the SSCA may approve the operation of an aeroplane over water without individual floatation devices, if the aircraft operator shows that the water over which the aeroplane is to be operated is not of such size and depth that individual floatation devices should be required for the survival of its occupants in the event the flight terminates in that water.

#### 7.1.8.17 LIFE RAFT

- (a) [AOC] No person may operate an aeroplane in commercial air transport in extended overwater operations without having on the aeroplane enough life rafts with rated capacities and buoyancy to accommodate the occupants of the aeroplane.

*Note: Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity of the rafts shall accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity.*

- (b) [AOC] Life rafts shall be stowed so as to facilitate their ready use in emergency.
- (c) [AOC] Life rafts shall be equipped with—
- (1) A survivor locator light;
  - (2) A survival kit;
  - (3) A pyrotechnic signalling device; and
  - (4) An ELT (See 7.1.8.5).
- (d) [AOC] Life rafts which are not deployable by remote control and which have a mass of more than 40 kg shall be equipped with some means of mechanically assisted deployment.

#### 7.1.8.18 FLOTATION DEVICE FOR HELICOPTER DITCHING

[AAC] All helicopters flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters, or flying over water beyond autorotational or safe forced landing distance from land in the case of performance Class 3 helicopters, shall be fitted with a permanent or rapidly deployable means of floatation so as to ensure a safe ditching of the helicopter.

### 7.1.9 Miscellaneous Systems and Equipment

#### 7.1.9.1 SEATS, SAFETY BELTS, AND SHOULDER HARNESSSES

- (a) [AOC] Each aircraft used in passenger operations shall be equipped with the following seats, safety belts, and shoulder harnesses that meet the airworthiness requirements for type certification of that aircraft:

- (1) A seat or berth with safety belt for each person on board over an age of 2 years

*Note: A berth designed to be occupied by two persons, such as a multiple lounge or divan seat, shall be equipped with an approved safety belt for use by two occupants during en route flight only.*

- (2) A flight deck station with a combined safety belt and shoulder harness.
- (3) A seat in the passenger compartment for each flight attendant.

#### 7.1.9.2 PASSENGER AND PILOT COMPARTMENT DOORS

- (a) [AOC] No person may conduct any passenger-carrying operation unless the aircraft has—
- (1) A door between the passenger and pilot compartments with a locking means to prevent passengers from opening it without the pilot's permission;
  - (2) A key for each door that separates a passenger compartment from another compartment that has emergency exit provisions;
- Note: The key shall be readily available for each crew member.*
- (3) A means for the crew, in an emergency, to unlock each door that leads to a compartment that is normally accessible to passengers and that can be locked by passengers; and
  - (4) A placard on each door used to access a required passenger emergency exit, indicating that such door shall be open during takeoff and landing.

### 7.1.9.3 PASSENGER INFORMATION SIGNS

- (a) [AOC] No AOC holder may operate a passenger carrying aeroplane unless it is equipped with—
- (1) At least one passenger information sign (using either letters or symbols) notifying when smoking is prohibited and one sign (using either letters or symbols) notifying when safety belts should be fastened shall, when illuminated, be legible to each person seated in the passenger cabin under all probable conditions of cabin illumination;
  - (2) Signs which notify when safety belts should be fastened and when smoking is prohibited shall be so constructed that the crew can turn them on and off;
  - (3) A sign or placard affixed to each forward bulkhead and each passenger seat back that reads "Fasten Seat Belt While Seated."

### 7.1.9.4 PUBLIC ADDRESS SYSTEM

- (a) [AOC] No AOC holder may operate a passenger carrying aeroplane with a maximum approved passenger seating configuration of more than 19 unless a public address system is installed that—
- (1) Operates independently of the interphone systems except for handsets, headsets, microphones, selector switches and signalling devices;
  - (2) For each required floor level passenger emergency exit which has an adjacent cabin crew seat, has a microphone which is readily accessible to the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communication between seated cabin crew members; and
  - (3) Is capable of operation within 10 seconds by a cabin crew member at each of those stations in the compartment from which its use is accessible; and
  - (4) Is audible and intelligible at all passenger seats, toilets, and cabin crew seats and workstations.

### 7.1.9.5 MATERIALS FOR CABIN INTERIORS

- (a) [AOC] Upon the first major overhaul of an aeroplane cabin or refurbishing of the cabin interior, all materials in each compartment used by the crew or passengers that do not meet the current airworthiness requirements pertaining to materials used in the interior of the cabin for type certification in the transport category as cited by the SSCA, shall be replaced with materials that meet the requirements specified by the SSCA.
- (b) [AOC] Seat cushions, except those on flight crew member seats, in any compartment occupied by crew or passengers shall meet requirements pertaining to fire protection as specified by the SSCA.

### 7.1.9.6 MATERIALS FOR CARGO AND BAGGAGE COMPARTMENTS

- (a) [AOC] Each Class C or D cargo compartment greater than 200 cubic feet in volume in a transport category aeroplane type certified after January 1, 1958 shall have ceiling and sidewall liner panels which are constructed of—
- (1) Glass fibre reinforced resin;
  - (2) Materials which meet the test requirements for flame resistance of cargo compartment liners as prescribed for type certification; or
  - (3) In the case of installations approved prior to March 20, 1989, aluminium.

*Note: The term "liner" includes any design feature, such as a joint or fastener, which would affect the capability of the liner to safely contain fire.*

### 7.1.9.7 POWER SUPPLY, DISTRIBUTION, AND INDICATION SYSTEM

- (a) [AOC] No AOC holder may not operate an aeroplane unless it is equipped with—
- (1) A power supply and distribution system that meets the airworthiness requirements for certification of an aeroplane in the transport category, as specified by the SSCA, or
  - (2) A power supply and distribution system that is able to produce and distribute the load for the required instruments and equipment, with use of an external power supply if any one power source or component of the power distribution system fails.

*Note: The use of common elements in the power system may be approved if the SSCA finds that they are designed to be reasonably protected against malfunctioning.*

(3) A means for indicating the adequacy of the power being supplied to required flight instruments.

(b) [AOC] Engine-driven sources of energy, when used, shall be on separate engines.

#### 7.1.9.8 PROTECTIVE CIRCUIT FUSES

[AOC] No AOC holder may operate an aeroplane in which protective fuses are installed unless there are spare fuses available for use in flight equal to at least 10% of the number of fuses of each rating or three of each rating whichever is the greater.

#### 7.1.9.9 ICING PROTECTION EQUIPMENT

(a) [AAC] Unless an aeroplane is certified under the transport category airworthiness requirements relating to ice protection, no person may operate an aeroplane in icing conditions unless it is equipped for the prevention or removal of ice on windshields, wings, empennage, propellers, and other parts of the aeroplane where ice formation will adversely affect the safety of the aeroplane.

(b) [AOC] No AOC holder may operate an aircraft in expected or actual icing conditions at night unless it is equipped with a means to illuminate or detect the formation of ice.

*Note: Any illumination that is used shall be of a type that will not cause glare or reflection that would handicap crew members in the performance of their duties.*

#### 7.1.9.10 PITOT HEAT INDICATION SYSTEMS

(a) [AOC] No AOC holder may operate a transport category aeroplane equipped with a flight instrument pitot heating system unless the aeroplane is also equipped with an operable pitot head indication system that complies with the following requirements:

(1) The indication provided shall incorporate an amber light that is in clear view of a flight crew member.

(2) The indication provided shall be designed to alert the flight crew if either the pitot heating system is switched "off," or the pitot heating system is switched "on" and any pitot tube heating element is inoperative.

#### 7.1.9.11 STATIC PRESSURE SYSTEM

[AOC] No person may operate an aircraft unless two independent static pressure systems, vented to the outside atmospheric pressure so that they will be least affected by airflow variation or moisture or other foreign matter, and installed so as to be airtight except for the vent.

#### 7.1.9.12 WINDSHIELD WIPERS

[AOC] No AOC holder may operate an aeroplane with a maximum certified take-off mass of more than 5700 kg unless it is equipped at each pilot station with a windshield wiper or equivalent means to maintain a clear portion of the windshield during precipitation.

#### 7.1.9.13 CHART HOLDER

[AOC] No AOC holder may operate an aeroplane unless a chart holder (equipment approval not required) is installed in an easily readable position which can be illuminated for night operations.

#### 7.1.9.14 COSMIC RADIATION DETECTION EQUIPMENT

[AOC] An AOC holder shall ensure that aeroplanes intended to be operated above 15000 m (49 000 ft) are equipped with an instrument to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e., the total of ionising and neutron radiation of galactic and solar origin) and the cumulative dose on each flight.

#### 7.1.9.15 MARITIME SOUND SIGNALLING DEVICE

[AAC] All seaplanes for all flights shall be equipped with equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable.

**7.1.9.16 ANCHORS**

[AAC] All seaplanes for all flights shall be equipped with one anchor, and one sea anchor (drogue), when necessary to assist in manoeuvring (approval for the anchors not required).

*Note.* - "Seaplanes" includes amphibians operated as seaplanes.

**PART 7 - IMPLEMENTING STANDARDS**

**IS: 7.1.2.6 CATEGORY II: INSTRUMENTS AND EQUIPMENT APPROVAL AND MAINTENANCE REQUIREMENTS**

- (a) *General.* The instruments and equipment required by 7.1.2.6 shall be approved as provided in this implementing standard before being used in Category II operations. Before presenting an aircraft for approval of the instruments and equipment, it must be shown that since the beginning of the 12th calendar month before the date of submission—
- (1) The ILS localizer and glide slope equipment were bench checked according to the manufacturer's instructions and found to meet those standards specified in RTCA Paper 23-63/DO-177 dated March 14, 1963, "Standards Adjustment Criteria for Airborne Localizer and Glideslope Receivers."
  - (2) The altimeters and the static pressure systems were tested and inspected; and
  - (3) All other instruments and items of equipment specified in 7.1.2.6 that are listed in the proposed maintenance program were bench checked and found to meet the manufacturer's specifications.
- (b) *Flight control guidance system.* All components of the flight control guidance system shall be approved as installed by the evaluation program specified in paragraph (e) if they have not been approved for Category III operations under applicable type or supplemental type certification procedures. In addition, subsequent changes to make, model, or design of the components must be approved under this paragraph. Related systems or devices, such as the autothrottle and computed missed approach guidance system, shall be approved in the same manner if they are to be used for Category II operations.
- (c) *Radio altimeter.* A radio altimeter must meet the performance criteria of this paragraph for original approval and after each subsequent alteration.
- (1) It shall display to the flight crew clearly and positively the wheel height of the main landing gear above the terrain.
  - (2) It shall display wheel height above the terrain to an accuracy of  $\pm 5$  feet or 5 percent, whichever is greater, under the following conditions:
    - (i) Pitch angles of zero to  $\pm 5^\circ$  about the mean approach attitude.
    - (ii) Roll angles of zero to  $20^\circ$  in either direction.
    - (iii) Forward velocities from minimum approach speed up to 200 knots.
    - (iv) Sink rates from zero to 15 feet per second at altitudes from 100 to 200 feet.
  - (3) Over level ground, it must track the actual altitude of the aircraft without significant lag or oscillation.
  - (4) With the aircraft at an altitude of 200 feet or less, any abrupt change in terrain representing no more than 10 percent of the aircraft's altitude must not cause the altimeter to unlock, and indicator response to such changes must not exceed 0.1 seconds and, in addition, if the system unlocks for greater changes, it must reacquire the signal in less than 1 second.
  - (5) Systems that contain a push to test feature must test the entire system (with or without an antenna) at a simulated altitude of less than 500 feet.
  - (6) The system must provide to the flight crew a positive failure warning display any time there is a loss of power or an absence of ground return signals within the designed range of operating altitudes.
- (d) *Other instruments and equipment.* All other instruments and items of equipment required by 7.1.2.6 shall be capable of performing as necessary for Category II operations. Approval is also required after each subsequent alteration to these instruments and items of equipment.
- (e) *Evaluation program.*
- (1) *Application.* Approval by evaluation is requested as a part of the application for approval of the Category II manual.
  - (2) *Demonstrations.* Unless otherwise authorised by the SSCA, the evaluation program for each aircraft requires the demonstrations specified in this paragraph. At least 50 ILS approaches shall be flown with at least five approaches on each of three different ILS facilities and no more than one half of the total approaches on any one ILS facility. All approaches shall be flown under simulated instrument conditions to a 100 foot decision

height and 90 percent of the total approaches made shall be successful. A successful approach is one in which—

- (i) At the 100 foot decision height, the indicated airspeed and heading are satisfactory for a normal flare and landing (speed must be  $\pm 5$  knots of programmed airspeed, but may not be less than computed threshold speed if autothrottles are used);
  - (ii) The aircraft at the 100 foot decision height, is positioned so that the cockpit is within, and tracking so as to remain within, the lateral confines of the runway extended;
  - (iii) Deviation from glide slope after leaving the outer marker does not exceed 50 percent of full-scale deflection as displayed on the ILS indicator;
  - (iv) No unusual roughness or excessive attitude changes occur after leaving the middle marker; and
  - (v) In the case of an aircraft equipped with an approach coupler, the aircraft is sufficiently in trim when the approach coupler is disconnected at the decision height to allow for the continuation of a normal approach and landing.
- (3) *Records.* During the evaluation program the following information shall be maintained by the applicant for the aircraft with respect to each approach and made available to the SSCA upon request:
- (i) Each deficiency in airborne instruments and equipment that prevented the initiation of an approach.
  - (ii) The reasons for discontinuing an approach, including the altitude above the runway at which it was discontinued.
  - (iii) Speed control at the 100 foot DH if auto throttles are used.
  - (iv) Trim condition of the aircraft upon disconnecting the auto coupler with respect to continuation to flare and landing.
  - (v) Position of the aircraft at the middle marker and at the decision height indicated both on a diagram of the basic ILS display and a diagram of the runway extended to the middle marker. Estimated touchdown point shall be indicated on the runway diagram.
  - (vi) Compatibility of flight director with the auto coupler, if applicable.
  - (vii) Quality of overall system performance.
- (4) *Evaluation.* A final evaluation of the flight control guidance system is made upon successful completion of the demonstrations. If no hazardous tendencies have been displayed or are otherwise known to exist, the system is approved as installed.
- (f) Each maintenance program for Category II instruments and equipment shall contain the following:
- (1) A list of each instrument and item of equipment specified in 7.1.2.6 that is installed in the aircraft and approved for Category II operations, including the make and model of those specified in 7.1.2.6 (a)(1).
  - (2) A schedule that provides for the performance of inspections under subparagraph (5) of this paragraph within 3 calendar months after the date of the previous inspection. The inspection shall be performed by a person authorised by Part 5, except that each alternate inspection may be replaced by a functional flight check. This functional flight check shall be performed by a pilot holding a Category II pilot authorisation for the type aircraft checked.
  - (3) A schedule that provides for the performance of bench checks for each listed instrument and item of equipment that is specified in 7.1.2.6 (a)(1) within 12 calendar months after the date of the previous bench check.
  - (4) A schedule that provides for the performance of a test and inspection of each static pressure system within 12 calendar months after the date of the previous test and inspection.
  - (5) The procedures for the performance of the periodic inspections and functional flight checks to determine the ability of each listed instrument and item of equipment specified in 7.1.2.6 (a)(1) to perform as approved for Category II operations including a procedure for recording functional flight checks.

- (6) A procedure for assuring that the pilot is informed of all defects in listed instruments and items of equipment.
  - (7) A procedure for assuring that the condition of each listed instrument and item of equipment upon which maintenance is performed is at least equal to its Category II approval condition before it is returned to service for Category II operations.
  - (8) A procedure for an entry in the maintenance records that shows the date, airport, and reasons for each discontinued Category II operation because of a malfunction of a listed instrument or item of equipment.
- (g) *Bench check.* A bench check required by this section shall comply with this paragraph.
- (1) Except as specified in paragraph (g)(2) of this subsection, it shall be performed by a certificated repair station holding one of the following ratings as appropriate to the equipment checked:
    - (i) An instrument rating.
    - (ii) An avionics rating.
  - (2) It shall be performed by a certificated air operator on aircraft identified in its approved specific operating provisions with the approved authorisations to perform maintenance and approve for return to service its own aircraft maintained under a continuous maintenance program under an equivalent system identified in **Part 9**.
  - (3) It shall consist of removal of an instrument or item of equipment and performance of the following:
    - (i) A visual inspection for cleanliness, impending failure, and the need for lubrication, repair, or replacement of parts;
    - (ii) Correction of items found by that visual inspection; and
    - (iii) Calibration to at least the manufacturer's specifications unless otherwise specified in the approved Category II manual for the aircraft in which the instrument or item of equipment is installed.
- (h) *Extensions.* After the completion of one maintenance cycle of 12 calendar months, a request to extend the period for checks, tests, and inspections is approved if it is shown that the performance of particular equipment justifies the requested extension.

#### IS: 7.1.7.2 FLIGHT RECORDER

(a) Maintenance

*Note 1: Functional check.. A functional check is a quantitative check to determine if one or more functions of an item perform within specified limits. When applied to a Digital FDR (DFDR) parameter, the functional check determines that the recorded parameter is within the limits (range, accuracy, sampling rate, and resolution) specified in the operating rule. The maintenance functional check should exercise sensor or transducer to check the range, accuracy, resolution, and sampling rate of the recorded data.*

*Note 2: Operational Check. An operational check is a task to determine that an item is fulfilling its intended purpose. An operational check is a failure-finding task and does not determine if the item is performing within specified limits. When applied to a FDR, the operational check determines that the DFDR is active and recording each parameter value within the normal operating range of the sensor. The operational check must also verify each electrical interface to the DFDRS. A check to determine the reasonableness and quality of the data being recorded is considered an operational check.*

- (1) The recommended interval for the readout of recorded data is 2,000 Hours Time in Service (TIS) or 12 months whichever occurs first.
- (2) System functional check each 8000 hours TIS or 5 years whichever occurs first. These figures are based on an ICAO recommendation and are to determine any discrepancies in the engineering conversions routines and that these are within the required tolerances.
- (3) Where the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system these should be checked as recommended by the sensor manufacturer, or at least at a period not exceeding two years.

- (4) If a parameter function can be verified through its range of operation then a data analysis will satisfy the requirement. e.g. air ground sense, gear position sense etc.
  - (5) As with other maintenance, the content of the check required and the time period at which they are carried out should consider the manufacturer's recommendations and the aircraft's existing maintenance periods.
  - (6) Whenever possible routine maintenance of the recording system should be timed to coincide with periods of maintenance of the aircraft. In this way if spare units were not available, the aircraft would not be required to operate while the recording equipment was removed.
- (b) SENSOR INPUTS
- (1) Both mandatory and non-mandatory inputs should be checked for accuracy. The checks contained within the System of Maintenance (SOM) should be sufficient to determine that any null position is accurately set and functions through the full range. Discrete inputs indicate in the correct sense, analogue inputs provide the correct range of operation. Data labels represent the correct data assigned to them
  - (2) The development of the SOM for the aircraft should consider assessment of the FDR system to ensure continued correct operation of an intended function. This means that where another system that is continuously monitored and utilises the same dedicated sensor as the FDR system, then the normal operation of that system has been satisfied, (for example an output for engine indicating that also supplied the FDR, perhaps the inertial reference unit output that supplies both the flight management system and the FDR) or where the information is transmitted to the FDAU or the FDR on a data bus that contains an integrity reporting function. In this case then the FDR download analysis may be satisfactory to meet the requirements.
  - (3) Details of these parameters are often available from the Aircraft Maintenance Manual (AMM), otherwise the aircraft manufacturer will be able to supply a technical report providing this information. The information may also be available from the Flight Data Acquisition Unit (FDAU) manufacturer.
  - (4) Mandatory parameters are listed in ICAO Annex 6.
  - (5) During maintenance, if any part of the FDR installation is interfered with there should be sufficient checks carried out to ensure the system accuracy is unimpaired. The aircraft maintenance program should reflect this requirement.
- (c) UNDERWATER LOCATOR DEVICE (ULD) MAINTENANCE
- (1) The maintenance program should specify:
    - Life limits on the battery.
    - Cleaning of the switches (contacts)
    - Periodic checking of the device in accordance with (IAW) the manufacturers requirements.

#### IS: 7.1.8.2 EMERGENCY EXIT EQUIPMENT

- (a) The assisting means for a floor level emergency exit shall meet the requirements under which the aeroplane was type certified.
- (b) The location of each passenger emergency exit shall be—
  - (1) Recognisable from a distance equal to the width of the cabin.
  - (2) Indicated by a sign visible to occupants approaching along the main passenger aisle.
- (c) There shall be an emergency exit locating sign—
  - (1) Above the aisle near each over-the-wing passenger emergency exit, or at another ceiling location if it is more practical because of low headroom;
  - (2) Next to each floor level passenger emergency exit, except that one sign may serve two such exits if they both can be seen readily from that sign; and

- (3) On each bulkhead or divider that prevents fore and aft vision along the passenger cabin, to indicate emergency exits beyond and obscured by it, except that if this is not possible, the sign may be placed at another appropriate location.
- (d) Each passenger emergency exit marking and each locating sign shall be manufactured to meet the interior emergency exit marking requirements under which the aeroplane was type certified, unless the SSCA cites different requirements for compliance with this paragraph.

*Note: No sign may continue to be used if its luminescence (brightness) decreases to below 250 microlamberts.*

- (e) Sources of general cabin illumination may be common to both the emergency and the main lighting systems if the power supply to the emergency light system is independent of the power supply to the main lighting system.
- (f) The emergency lighting system shall provide enough general lighting in the passenger cabin so that the average illumination, when measured at 40-inch intervals at seat armrest height, on the centerline of the main passenger aisle, is at least 0.05 foot-candles.
- (g) Each emergency light shall—
- (1) Be operable manually both from the flight crew station and from a point in the passenger compartment that is readily accessible to a normal flight attendant seat;
  - (2) Have a means to prevent inadvertent operation of the manual controls; and
  - (3) When armed or turned on at either station, remain lighted or become lighted upon interruption of the aeroplane's normal electric power.
  - (4) Provide the required level of illumination for at least 10 minutes at the critical ambient conditions after emergency landing.
  - (5) Have a cockpit control device that has an "on", "off", and "armed" position.
- (h) The location of each passenger emergency exit operating handle and instructions for opening the exit shall be shown in accordance with the requirements under which the aeroplane was type certified, unless the SSCA cites different requirements for compliance with this paragraph.
- (i) No operating handle or operating handle cover may continue to be used if its luminescence (brightness) decreases to below 100 microlamberts.
- (j) Access to emergency exits shall be provided as follows for each passenger carrying aeroplane:
- (1) Each passageway between individual passenger areas, or leading to a Type I or Type II emergency exit, shall be unobstructed and at least 20 inches wide.
  - (2) There shall be enough space next to each Type I or Type II emergency exit to allow a crew member to assist in the evacuation of passengers without reducing the unobstructed width of the passageway below that required in paragraph (f) 1. of this section.
  - (3) There shall be access from the main aisle to each Type III and Type IV exit. The access from the aisle to these exits shall not be obstructed by seats, berths, or other protrusions in a manner that would reduce the effectiveness of the exit. In addition, the access shall meet the emergency exit access requirements under which the aeroplane was type certificated, unless the SSCA cites different requirements for compliance with this paragraph.
  - (4) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway shall not be obstructed. However, curtains may be used if they allow free entry through the passageway.
  - (5) No door may be installed in any partition between passenger compartments.
  - (6) If it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door shall have a means to latch it in open position, and the door shall be latched open during each takeoff and landing. The latching means shall be able to withstand the loads imposed upon it when the door is subjected to the ultimate inertia forces, relative to the surrounding structure, prescribed in the airworthiness standards for type certification in the transport category as cited by the SSCA.
- (k) Each passenger emergency exit and the means of opening that exit from the outside shall be marked on the outside of the aeroplane with a 2-inch coloured band outlining the exit on the side of the fuselage.

- (l) Each passenger emergency exit marking, including the band, shall be readily distinguishable from the surrounding fuselage area by contrast in colour and shall comply with the following:
- (1) If the reflectance of the darker colour is 15 percent or less, the reflectance of the lighter colour shall be at least 45 percent.
  - (2) If the reflectance of the darker colour is greater than 15 percent, at least a 30 percent difference between its reflectance and the reflectance of the lighter colour shall be provided.
- Note: "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives.*
- (3) Exits that are not in the side of the fuselage shall have external means of opening and applicable instructions marked conspicuously in red or, if red is inconspicuous against the background colour, in bright chrome yellow and, when the opening means for such an exit is located on only one side of the fuselage, a conspicuous marking to that effect shall be provided on the other side.
- (m) Each passenger-carrying aeroplane shall be equipped with exterior lighting that meets the requirements under which that aeroplane was type certificated, unless the SSCA cites different requirement for compliance with this paragraph.
- (n) Each passenger-carrying aeroplane shall be equipped with a slip-resistant escape route that meets the requirements under which that aeroplane was type certificated, unless the SSCA cites different requirements for compliance with this paragraph.
- (o) Each floor level door or exit in the side of the fuselage (other than those leading into a cargo or baggage compartment that is not accessible from the passenger cabin) that is 44 or more inches high and 20 or more inches wide, but not wider than 46 inches, each passenger ventral exit and each tail cone exit, shall meet the requirements of this section for floor level emergency exits.
- Note: The SSCA may grant a deviation from this paragraph if he finds that circumstances make full compliance impractical and that an acceptable level of safety has been achieved.*
- (p) Approved emergency exits in the passenger compartments that are in excess of the minimum number of required emergency exits shall meet all of the applicable provisions of this subsection section and shall be readily accessible.
- (q) On each large passenger-carrying turbojet powered aeroplane each ventral exit and tail cone exit shall be—
- (1) Designed and constructed so that it cannot be opened during flight; and
  - (2) Marked with a placard readable from a distance of 30 inches and installed at a conspicuous location near the means of opening the exit, stating that the exit has been designed and constructed so that it cannot be opened during flight.

#### IS 7.1.8.5 ELT

- (a) Emergency locator transmitters (ELT) must operate on 121.5 and 406 MHz, and must have the capacity to transmit a programmed digital message on 406MHz containing information related to the ELT and the aircraft on which it is carried.
- (b) The ELT shall be uniquely complying with, and be coded in accordance with, ICAO Annex 10 Vol. 3, Chpt. 5, and be registered with the SSCA.
- (c) The ELT digital message shall contain either the transmitter serial number or one of the following information elements:
- (1) aircraft operating agency designator and a serial number from 0001 to 4096;
  - (2) 24-bit aircraft address;
  - (3) aircraft nationality and registration marks.
- (d) All ELTs shall be designed for co-operation with the COSPAS-SARSAT system and be type approved.

**IS: 7.1.8.12 OXYGEN STORAGE AND DISPENSING APPARATUS**

- (a) The supplemental oxygen supply requirements for non-pressurised aircraft are as follows:
- (1) Flight crew members. Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Table 1. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply.
  - (2) Cabin crew members, additional crew members and passengers. Cabin crew members and passengers shall be supplied with oxygen in accordance with Table 1. Cabin crew members carried in addition to the minimum number of cabin crew members required, and additional crew members, shall be considered as passengers for the purpose of oxygen supply.

**Table 1- Supplemental Oxygen for Non-Pressurised Aeroplanes**

(a)	(b)
SUPPLY FOR:	DURATION AND PRESSURE ALTITUDE
1. All occupants of flight deck seats on flight deck duty	Entire flight time at pressure altitudes above 10,000 feet
2. All required cabin crew members	Entire flight time at pressure altitudes above 13,000 ft and for any period exceeding 30 minutes at pressure altitudes above 10,000 ft but not exceeding 13,000 ft
3. 100% of passengers	Entire flight time at pressure altitudes above 13,000 ft
6. 10% of passengers	Entire flight time after 30 minutes at pressure altitudes greater than 10,000 ft but not exceeding 13,000 ft

- (b) The supplemental oxygen supply requirements for pressurised aircraft are as follows:
- (3) The amount of supplemental oxygen required shall be determined on the basis of cabin pressure altitude, flight duration and the assumption that a cabin pressurisation failure will occur at the altitude or point of flight that is most critical from the standpoint of oxygen need, and that, after the failure, the aeroplane will descend in accordance with emergency procedures specified in the Aeroplane Flight Manual to a safe altitude for the route to be flown that will allow continued safe flight and landing.
  - (4) Following a cabin pressurisation failure, the cabin pressure altitude shall be considered the same as the aeroplane altitude, unless it is demonstrated to the SSCA that no probable failure of the cabin or pressurisation system will result in a cabin pressure altitude equal to the aeroplane altitude. Under these circumstances, this lower cabin pressure altitude may be used as a basis for determination of oxygen supply.
  - (5) Flight crew members.
    - (i) Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Table 2. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply. Flight deck seat occupants, not supplied by the flight crew source, are to be considered as passengers for the purpose of oxygen supply.
  - (6) Cabin crew members, additional crew members, and passengers
    - (i) Cabin crew members and passengers shall be supplied with supplemental oxygen in accordance with Table 2. Cabin crew members carried in addition to the minimum number of cabin crew members required, and additional crew members, shall be considered as passengers for the purpose of oxygen supply.
    - (ii) The oxygen supply requirements, as specified in Table 2, for aeroplanes not certificated to fly at altitudes above 25,000 ft, may be reduced to the entire flight time between 10,000 ft and 14,000 ft cabin pressure altitudes for all required cabin crew members and for at least 10% of the passengers if, at all points along the route to be flown, the aeroplane is able to descend safely within 4 minutes to a cabin pressure altitude of 14,000 ft.

**Table 2 - Requirements for Supplemental Oxygen - Pressurised Aeroplane During and Following Emergency Descent (Note 1)**

SUPPLY FOR:	DURATION AND CABIN PRESSURE ALTITUDE
All occupants of flight deck seats on flight deck duty flight	Entire flight time when the cabin pressure altitude exceeds 13,000 and entire time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 13,000 ft after the first 30 minutes at those altitudes, but in no case less than: (i) 30 minutes for aeroplanes certificated to fly at altitudes not exceeding 25,000 ft (Note 2) (ii) 2 hours for aeroplanes certificated to fly at altitudes more than 25,000 ft (Note 3).
2. All required cabin crew members	Entire flight time when cabin pressure altitude exceeds 13,000 ft but not less than 30 minutes (Note 2), and entire flight time when cabin pressure altitude is greater than 10,000 ft but does not exceed 13,000 ft after the first 30 minutes at these altitudes.
3. 100% of passengers	10 minutes or the entire flight time when the cabin pressure altitude exceeds 15,000 ft whichever is the greater (Note 4)
6. 30% of passengers	Entire flight time when the cabin pressure altitude exceeds 14,000 ft but does not exceed 15,000 ft
5. 10% of passengers	Entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 14,000 ft after the first 30 minutes at these altitudes.

*Note 1: The supply provided shall take account of the cabin pressure altitude and descent profile for the routes concerned.*

*Note 2: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 10,000 ft in 10 minutes and followed by 20 minutes at 10,000 ft.*

*Note 3: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 10,000 ft in 10 minutes and followed by 110 minutes at 10,000 ft.*

*The oxygen required to meet the Crew Protective Breathing Equipment provisions of this Part may be included in determining the supply required.*

*Note 4: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 15,000 ft.*