



**CHAPTER 4.**

**HELICOPTER INSTRUMENTS,  
EQUIPMENT  
AND FLIGHT DOCUMENTS**

*Note.— Specifications for the provision of helicopter communication and navigation equipment are contained in Chapter 5.*

**4.1 All helicopters on all flights**

4.1.1 General

In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the State of Registry.

4.1.2 Instruments

A helicopter shall be equipped with instruments which will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvre, and observe the operating limitations of the helicopter in the expected operating conditions.

4.1.3 Equipment

4.1.3.1 A helicopter shall be equipped with:

- a) an accessible first-aid kit;
- b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:



- 1) the pilot's compartment; and
- 2) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew;

*Note.— Refer to 4.2.2.1 for fire extinguishing agents.*

- c)
    - 1) a seat or berth for each person over an age to be determined by the State of Registry; and
    - 2) a seat belt for each seat and restraining belts for each berth;
  - d) the following manuals, charts and information:
    - 1) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the certifying authority of the State of Registry, required for the application of Chapter 3;
    - 2) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
    - 3) procedures, as prescribed in Annex 2, for pilots-in-command of intercepted aircraft; and
    - 4) a list of visual signals for use by intercepting and intercepted aircraft, as contained in Annex 2; and
  - e) if fuses are used, spare electrical fuses of appropriate ratings for replacement of those accessible in flight.
- 4.1.3.2 Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2016 shall:
- a) meet the applicable minimum performance requirements of the State of Registry; and
  - b) not be of a type listed in the 1987 *Montreal Protocol on Substances that Deplete the Ozone Layer* as it appears in the Eighth Edition of the *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer*, Annex A, Group II.

*Note.— Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.*

4.1.3.3 RESERVED

4.1.3.4 RESERVED

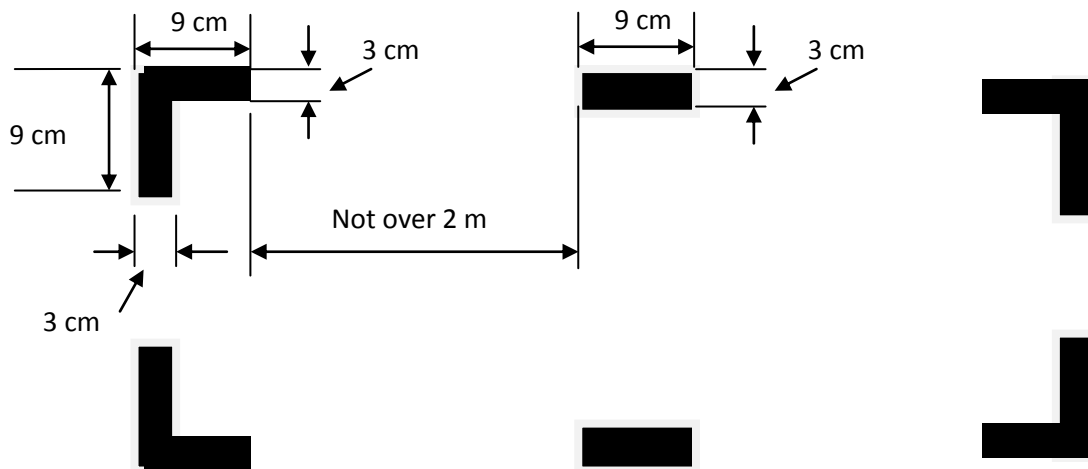
*Note.— Safety harness includes shoulder strap(s) and a seat belt which may be used independently.*

4.1.4 Marking of break-in points

4.1.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

4.1.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

*Note.— This Standard does not require any helicopter to have break-in areas.*



MARKING OF BREAK-IN POINTS (see 4.1.4)

## **4.2 Instruments and equipment for flights operated under VFR and IFR — by day and night**

*Note.— The flight instrument requirements in 4.2.1, 4.2.2 and 4.2.3 may be met by combinations of instruments or by electronic displays.*



4.2.1 All helicopters when operating in accordance with VFR by day shall be equipped with:

- a) a magnetic compass;
- b) an accurate timepiece indicating the time in hours, minutes and seconds;
- c) a sensitive pressure altimeter;
- d) an airspeed indicator; and
- e) such additional instruments or equipment as may be prescribed by the appropriate authority.

4.2.2 All helicopters when operating in accordance with VFR at night shall be equipped with:

- a) the equipment specified in 4.2.1;
- b) an attitude indicator (artificial horizon) for each required pilot;
- c) a slip indicator;
- d) a heading indicator (directional gyroscope);
- e) a rate of climb and descent indicator;
- f) such additional instruments or equipment as may be prescribed by the appropriate authority; and the following lights:
- g) the lights required by **Annex 2** for aircraft in flight or operating on the movement area of a heliport;

*Note.— The general characteristics of the lights are specified in Annex 8. Detailed specification for lights meeting the requirements of Annex 2 for aircraft in flight or operating on the movement area of a heliport are contained in the Airworthiness Manual (Doc 9760).*

- h) a landing light;
- i) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;
- j) lights in all passenger compartments; and
- k) a flashlight for each crew member station.

4.2.2.1 RESERVED

4.2.3 All helicopters, when operating in accordance with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with:

- a) a magnetic compass;
- b) an accurate timepiece indicating the time in hours, minutes and seconds;
- c) a sensitive pressure altimeter;



*Note.— Due to the long history of misreadings, the use of drum-pointer altimeters is not recommended.*

- d) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;
- e) a slip indicator;
- f) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
- g) a heading indicator (directional gyroscope);
- h) means of indicating whether the supply of power to the gyroscopic instruments is adequate;
- i) a means of indicating in the flight crew compartment the outside air temperature;
- j) a rate of climb and descent indicator;
- k) such additional instruments or equipment as may be prescribed by the appropriate authority; and
- l) if operated by night, the lights specified in 4.2.2 g) to k) and 4.2.2.1.

### **4.3 All helicopters on flights over water**

#### 4.3.1 Means of flotation

All helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when:

- a) engaged in offshore operations or other over-water operations as prescribed by the State of Registry; or
- b) flying at a distance from land specified by the appropriate State authority.

*Note.— When determining the distance from land referred to in 4.3.1, consideration should be given to environmental conditions and the availability of search and rescue facilities.*

#### 4.3.2 Emergency equipment

4.3.2.1 Helicopters operating in accordance with the provisions of 4.3.1 shall be equipped with:

- a) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat of the person for whose use it is provided;
- b) when not precluded by consideration related to the type of helicopter used, life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving



equipment including means of sustaining life as is appropriate to the flight to be undertaken; and

- c) equipment for making the pyrotechnical distress signals described in **Annex 2**.

4.3.2.2 When taking off or landing at a heliport where, in the opinion of the State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in 4.3.2.1 a) shall be carried.

4.3.2.3 Each life jacket and equivalent individual flotation device, when carried in accordance with this 4.3, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

4.3.2.4 RESERVED

4.3.2.5 RESERVED

4.3.2.6 RESERVED

#### **4.4 All helicopters on flights over designated land areas**

Helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

#### **4.5 All helicopters on high altitude flights**

4.5.1 Unpressurized helicopters

Unpressurized helicopters intended to be operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required in 2.9.1.

4.5.2 Pressurized helicopters

Pressurized helicopters intended to be operated at high altitudes should carry emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required in 2.9.2.

#### **4.6 All helicopters required to comply with the noise certification Standards in Annex 16, Volume I**

All helicopters required to comply with the noise certification Standards of Annex 16, Volume I, shall carry a document attesting noise certification. When the document, or a suitable statement attesting noise certification as contained in another document approved by the State of Registry, is issued in a language other than English, it shall include an English translation.



*Note 1.— The attestation may be contained in any document, carried on board, approved by the State of Registry in accordance with the relevant provisions of Annex 16, Volume I.*

*Note 2.— The various noise certification Standards of Annex 16, Volume I, which are applicable to helicopters are determined according to the date of application for a type certificate, or the date of acceptance of an application under an equivalent prescribed procedure by the certifying authority. Some helicopters are not required to comply with any noise certification Standard. For details see Annex 16, Volume I, Part II, Chapters 8 and 11.*

#### **4.7 Flight recorders**

*Note 1.— Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.*

*Note 2.— Combination recorders (FDR/CVR) may be used to meet the flight recorder equipment requirements in this Annex.*

*Note 3.— Detailed guidance on flight recorders is contained in Appendix 5.*

##### **4.7.1 Flight data recorders**

*Note 1.— FDR and AIR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.*

*Note 2.— Parameters to be recorded are listed in Table A5-1 of Appendix 5.*

##### **4.7.1.1 Types**

**4.7.1.1.1** A Type IV FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.

**4.7.1.1.2** A Type IVA FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, operation and configuration.

**4.7.1.1.3** A Type V FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude and engine power.



4.7.1.2 *Operation*

4.7.1.2.1 All helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with a Type IVA FDR.

4.7.1.2.2 All helicopters of a maximum certificated take-off mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type IV FDR.

4.7.1.2.3 RESERVED

4.7.1.3 *Discontinuation*

4.7.1.3.1 The use of engraving metal foil FDRs shall be discontinued.

4.7.1.3.2 The use of analogue FDRs using frequency modulation (FM) should be discontinued.

4.7.1.3.3 The use of photographic film FDRs shall be discontinued.

4.7.1.3.4 The use of analogue FDRs using frequency modulation (FM) shall be discontinued by 1 January 2012.

4.7.1.3.5 RESERVED

4.7.1.3.6 The use of magnetic tape FDRs shall be discontinued by 1 January 2016.

4.7.1.4 *Duration*

Types IV, IVA and V FDRs shall be capable of retaining the information recorded during at least the last ten hours of their operation.

4.7.2 Cockpit voice recorders

*Note.— CVR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.*

4.7.2.1 *Operation*

4.7.2.1.1 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.7.2.1.2 RESERVED





4.7.2.1.3 All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness was first issued before 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

4.7.2.2 *Discontinuation*

4.7.2.2.1 The use of magnetic tape and wire CVRs shall be discontinued by 1 January 2016.

4.7.2.2.2 RESERVED

4.7.2.3 *Duration*

4.7.2.3.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

4.7.2.3.2 From 1 January 2016, all helicopters required to be equipped with a CVR shall be equipped with a CVR capable of retaining the information recorded during the last two hours of its operation.

4.7.2.3.3 RESERVED

4.7.3 Data link recorders

*Note.— Data link recorders performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.*

4.7.3.1 *Applicability*

4.7.3.1.1 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in 5.1.2 of Appendix 5, and are required to carry a CVR, shall record on a flight recorder, the data link communications messages.

4.7.3.1.1.1 All helicopters which are modified on or after 1 January 2016, to install and utilize any of the data link communications applications listed in 5.1.2 of Appendix 5 and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

*Note 1.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped aircraft.*

*Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or*



*prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

#### 4.7.3.2 Duration

The minimum recording duration shall be equal to the duration of the CVR.

#### 4.7.3.3 Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

#### 4.7.4 Flight recorders — general

##### 4.7.4.1 Construction and installation

Flight recorders shall 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. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

*Note.— Industry crashworthiness and fire protection specifications are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.*

##### 4.7.4.2 Operation

4.7.4.2.1 Flight recorders shall not be switched off during flight time.

4.7.4.2.2 To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with Annex 13.

*Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.*

*Note 2.— The operator/owner's responsibilities regarding the retention of flight recorder records are contained in Section II, 9.6.*

##### 4.7.4.3 Continued serviceability

Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

*Note.— Procedures for the inspections of the flight recorder systems are given in Appendix 5.*



4.7.4.4 *Flight recorders electronic documentation*

The documentation requirement concerning FDR parameters provided by operator/owners to accident investigation authorities should be in electronic format and take account of industry specifications.

*Note.— Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.*

**4.8 Emergency locator transmitter (ELT)**

4.8.1 From 1 July 2008, all helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.3.1 a), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.8.2 From 1 July 2008, all helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.3.1 b), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

4.8.3 ELT equipment carried to satisfy the requirements of 4.8.1 and 4.8.2 shall operate in accordance with the relevant provisions of Annex 10, Volume III.

*Note.— The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.*

**4.9 Helicopters required to be equipped with a pressure-altitude reporting transponder**

4.9.1 From 1 January 2003, unless exempted by the appropriate authorities, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.

4.9.2 RESERVED

*Note.— The provisions in 4.9.1 and 4.9.2 are intended to support the effectiveness of ACAS as well as to improve the effectiveness of air traffic services. Effective dates for carriage requirements of ACAS are contained in Annex 6, Part I, 6.18.1 and 6.18.2. The intent is also for aircraft not equipped with pressure-altitude reporting transponders to*



*be operated so as not to share airspace used by aircraft equipped with airborne collision avoidance systems. To this end, exemptions from the carriage requirement for pressure-altitude reporting transponders could be given by designating airspace where such carriage is not required.*

#### **4.10 Microphones**

All flight crew members required to be on flight deck duty should communicate through boom or throat microphones.

#### **4.11 Helicopters equipped with head-up displays (HUD) and/or enhanced vision systems (EVS)**

Where helicopters are equipped with HUD and/or EVS, the use of such systems to gain operational benefit shall be approved by the State of Registry.

*Note.— Guidance on HUD and EVS is contained in Attachment J to Annex 6, Part I.*

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