

**DEPARTMENT OF CIVIL AVIATION
MALAYSIA
AIRWORTHINESS NOTICE**

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FLIGHT RECORDERS - HELICOPTERS

1. Introduction

- 1.1. The ICAO Annex 6 with regards to Flight Recorders has recently been amended. Consistence with the Department's policy of adopting ICAO Standards and Recommended Practices (SARPs) the requirements of the Fifth Schedule (affecting Flight Recorders) of MCAR are amended accordingly and is reflected in this Notice.
- 1.2. The Scale of Equipment as specified in the Schedule Fifth of MCAR is to be read in conjunction with this Notice.

2. General

Note 1: Flight recorders comprise two systems, a flight data recorder (FDR) and a cockpit voice recorder (CVR).

Note 2: Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as stated in this Notice.

Note 3: Detailed guidance on flight recorders is contained in Appendix 1 which should be read in conjunction with this Notice.

3 Flight data recorders (FDR) – Types:-

- 3.1 Types IV, FDRs shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.
- 3.2 A type V FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power.
- 3.3 The use of engraving metal foil FDR shall be discontinued by 1 January 1995.
- 3.4 The use of photographic film FDRs shall be discontinued from 1 January 2003.
- 3.5 The use of analogue FDRs using frequency modulation (FM) should be discontinued by 5 November 1998.

4 All helicopters for which the individual certificate of airworthiness is first issued after 1 January 2005, which utilize data link communications and are required to carry a CVR, shall record on a flight recorder, all data link communications to and from the helicopter. The minimum recording duration shall be equal to the duration of CVR, and shall be correlated with the recorded cockpit audio.

- 4.1 Sufficient information to derive the content of the data link communications message and whenever practical, the time of the message was displayed to or generated by the crew shall be recorded.

Note 4 : Data link communications include, but are not limited to, automatic dependent surveillance (ADS), controller-pilot data link communications (CPDLC), data link-flight information services (D-FIS) and aeronautical operational control (AOC) messages.

- 5 All helicopters of maximum take off mass over 5700 kg, required to be equipped with an FDR and/ or a CVR, may alternatively be equipped with combination recorders (FDR/CVR).
6. Type IVA FDR shall record the parameters required to determine accurately the helicopter flight path, speed, altitude, engine power, configuration and operation. The parameters that satisfy the requirements for a Type IVA FDR are listed in the paragraphs below. The parameters without an asterisk (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameters is used by helicopter systems or the flight crew to operate the helicopter.
- 6.1 The following parameters satisfy be requirements for flight path and speed :
- Pressure altitude

- Indicated airspeed
- Outside air temperature
- Heading
- Normal acceleration
- Lateral acceleration
- Longitudinal acceleration (body axis)
- Time or relative time count
- Navigation data*.: drift angle, wind speed, wind direction, latitude/longitude
- Radio altitude*

6.2 The following parameters satisfy the requirements for altitude :

- Pitch attitude
- Roll attitude
- Yaw rate*

6.3 The following parameters satisfy for the requirements of engine power :

- Power on each engine: free power turbine speed (Nt), engine torque, engine gas generator speed (Ng) cockpit power control position
- Rotor : main rotor speed, rotor brake
- Main gearbox oil pressure*
- Gearbox oil temperature* main gearbox oil temperature, intermediate gearbox oil temperature, tail rotor gearbox temperature
- Engine exhaust gas temperature (T4)*
- Turbine inlet temperature (TIT)*
- Landing gear or gear selector position*
- Fuel quantity*
- Ice detector liquid water content*

6.4 The following parameters satisfy the requirements for configuration :

- Landing gear or gear selector position*
- Fuel quantity
- Ice detector liquid water content

6.5 The following parameters satisfy the requirements for operation :

- Hydraulics low pressure
- Warnings
- Primary flight controls – pilot input and/or control output position : collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal, controllable stabilator, hydraulic selection
- Marker beacon passage
- Each navigation receiver frequency selection
- AFCS mode and engagement status*
- Stability augmentation system engagement *
- Indicated sling load force*
- Vertical deviation *. ILS glide path, MLS elevation, GNSS approach path
- Horizontal deviation*. ILS localizer, MLS azimuth, GNSS approach path
- DME 1 and 2 distances
- Altitude rate*
- Ice detector liquid water content
- Helicopter health and usage monitor system (HUMS)*engine data, chip detectors, track timing, exceedance discretes, broadband average engine vibration

Note 5 :Parameter requirements, including range, sampling, accuracy and resolution, as contained in the Minimum Operational Performance Specification (MOPS) document for Flight Recorder System of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

Note 6: The number of parameter to be recorded will depend on helicopter complexity. Parameters without an () are to be recorded regardless of helicopter complexity. Those parameters designated by an (*) are to be recorded if an information source for the parameter is used by helicopter systems and/or flight crew to operate the helicopter.*

7 Flight Data Recorder- duration

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

- 7.1 Flight data recorders – helicopters for which the individual certificate of airworthiness is first issue on or after 1 January 1989
- 7.2 All helicopter of a maximum certificate take-off mass of over 7000 kg shall be equipped with a Type V FDR.
- 7.3 *All helicopters of a maximum certificated take-off mass over 27000 kg up to and including 7000 kg should be equipped with a Type V FDR.*
- 7.4 Flight data recorders – helicopter for which the individual certificate of airworthiness is first issue after 1 January 2005
- 7.5 All helicopters of a maximum certificated take-off mass of over 3180 kg shall be equipped with a Type IVA FDR with a recording duration of at least 10 hours.
- Note - A single combination CVR/FDR is acceptable.*
- 7.6 Cockpit voice recorders – helicopters for which the individual certificate of airworthiness is first issue on or after 1 January 1987
- 7.7 All helicopters of a maximum certificated take-off mass of over 7000 kg shall be equipped with a CVR the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.
- 7.8 All helicopter of a maximum certificated take-off mass of over 3180 kg up to and including 7000 kg shall be equipped with a CVR the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.
- 7.9 Cockpit voice recorders – helicopters or which the individual certificate of airworthiness was first issue before 1 January 1987
- All helicopters of a maximum certificated take-off mass of over 7000 kg shall be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on one track of the CVR.
- Note 7 :-CVR performance requirements are as contained in the Minimum Operational Performance (MOPS) document for Flight Recorder Systems of the European Organisation for Civil Aviation Equipment (EUROCAE) or equivalent documents.*
8. Cockpit voice recorders – duration
- 8.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.
- 8.2 *A CVR, installed in helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*
- 8.3 A CVR, installed in helicopters for which the individual certificate of airworthiness is first issue after 1 January 2003, shall be capable of retaining the information recorded during at least the last two hours of its operation.
9. 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 can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A.*
10. Flight recorders – operation
- 10.1 Flight recorders shall not be switched off during flight time.

- 10.2 To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident. The flight recorders shall not be re-activated before their disposition as determined in accordance with Annex 13.

Note 8 :- 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 9:- The operator's responsibilities regarding the retention of flight recorder records are contained in 9.6.

- 10.3 Flight recorders – continued serviceability

Operational checks and evolutions of recordings from the FDR and CVR systems shall be conducted to ensure the continued serviceability of the recorders.

Note 10:- Procedures for the inspections of the flight data and CVR systems are given in Appendix 1 of this notice.

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