



GOVERNMENT OF INDIA
OFFICE OF DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE, OPP SAFDARJANG AIRPORT, NEW DELHI

CIVIL AVIATION REQUIREMENTS
SECTION 2 - AIRWORTHINESS
SERIES 'I' PART VI
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EFFECTIVE: FORTHWITH

SUBJECT: COCKPIT VOICE RECORDERS

1. PURPOSE:

Rule 57 of the Aircraft Rules, 1937 requires that every aircraft shall be fitted and equipped with instruments and equipment, including radio apparatus and special equipment as may be specified according to the use and circumstances under which the flight is to be conducted.

This part of Civil Aviation Requirement lays down the requirements for fitment of Cockpit Voice Recorder (CVR) on aircraft registered in India and aircraft leased and imported into the country.

This CAR has been issued under the provision of Rule 29C of the Aircraft Rules, 1937.

2. DEFINITION:

Cockpit Voice Recorder (CVR): An equipment installed in the aircraft for the purpose of recording the aural environment on the flight deck during flight time for the purpose of accident/ incident prevention and investigation.

3. AEROPLANES – COMMERCIAL AIR TRANSPORT

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

3.1 Operations:

3.1.1 All turbine-engined aeroplanes for which a type certificate is first issued on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR or CARS (Cockpit Audio Recording System)

3.1.2 **Recommendation**-All turbine-engined aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with either a CVR or CARS.

3.1.3 All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the individual certificate of airworthiness is first issued on or after 1 January

2003, shall be equipped with a CVR capable of retaining the information recorded during at least the last two hours of its operation.

3.1.4 All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

3.1.5 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR.

3.1.6 **Recommendation**-*All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5700kg up to and including 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should be equipped with a CVR.*

3.2 Discontinuation:

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

3.2.2 **Recommendation**-The use of magnetic tape and wire CVRs should be discontinued.

3.3. Duration:

3.3.1 All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.

3.3.2 From 1 January 2016, all CVRs shall be capable of retaining the information recorded during at least the last two hours of their operation.

3.3.3 **Recommendation**- *All aeroplanes,- for which the individual certificate of airworthiness is first issued on or after 1 January 1990,- and that are required to be equipped with a CVR, – should have a CVR capable of retaining the information recorded during at least the last two hours of their operation.*

4. AEROPLANES – GENERAL AVIATION

4.1 Operation:

4.1.1 All turbine-engined aero planes for which a type certificate is first issued on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR.

4.1.2 **Recommendation**-All turbine-engined aero planes for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with a CVR.

4.1.3 All aero planes of a maximum certificated take-off mass of over 27000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

4.1.4 **Recommendation**-*All aero planes of a maximum certificated take-off mass of over 5700kg, up to and including 27000kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1987, should be equipped with a CVR.*

4.2 Discontinuation:

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

4.2.2 **Recommendation.**— *The use of magnetic tape and wire CVRs should be discontinued.*

4.3 Duration:

4.3.1 All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.

4.3.2 From 1 January 2016, all CVRs shall be capable of retaining the information recorded during at least the last two hours of their operation.

4.3.3 **Recommendation**- *All aero planes for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of their operation.*

5. HELICOPTERS - COMMERCIAL AIR TRANSPORT & GENERAL AVIATION

5.1 Operation:

5.1.1 All helicopters of a maximum certificated take-off mass of over 7000kg 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.

5.1.2 **Recommendation**- *All helicopters of a maximum certificated take-off mass of over 3180kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on the CVR.*

5.1.3 All helicopters of a maximum certificated take-off mass of over 7000kg 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.

5.2 Discontinuation:

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

5.2.2 **Recommendation**- *The use of magnetic tape and wire CVRs should be discontinued.*

5.3 Duration:

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

5.3.2 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.

5.3.3 **Recommendation-** All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of its operation.

6. 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.

6.1 Applicability

6.1.1 All aeroplanes/helicopter 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 para 1.2 of Appendix-II and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

6.1.2 All aeroplanes which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in para 1.2 of Appendix- II and are required to carry a CVR shall record on a flight recorder the data link communications messages.

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

6.2 Duration

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

6.3 Correlation

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

7. GENERAL REQUIREMENTS

7.1 Construction and Installation

The CVR 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 for FDR, CVR and DLR are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

7.2 Operation

7.2.1 CVRs shall not be switched off during flight time.

7.2.2 To preserve cockpit voice recorder records, cockpit voice recorder shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition in accordance with instruction issued by DGCA.

Note-1- *The need for removal of the cockpit voice 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- *An operator shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related cockpit voice recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition in accordance with instruction issued by DGCA.*

7.3 Continued Serviceability

Operational checks and evaluations of recordings from the cockpit voice 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-I.*

7.4 Combination Recorders

7.4.1 Recommendation- *All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the type certificate is first issued on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, should be equipped with two combination recorders (FDR/CVR).*

7.4.2 *All aeroplanes of a maximum certificated take-off mass of over 15000 kg for which the type certificate is first issued on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.*

7.4.3 Recommendation- *All aeroplanes of a maximum certificated take-off mass over 5700kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).*

Note- *The requirement of 6.4 may be satisfied by equipping the aeroplanes with two combination recorders (one forward and one aft) or separate devices.*

7.4.4 Recommendation- *All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5700kg or less, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).*

(Charan Dass)

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COCKPIT VOICE RECORDERS

1. General Requirements:

1.1 The cockpit voice recorder systems containers shall:

- a) be painted a distinctive orange or yellow colour;
- b) carry reflective material to facilitate their location; and
- c) have securely attached an automatically activated underwater locating device.

1.2 The cockpit voice recorder systems shall be installed so that:

- a) the probability of damage to the recordings is minimized;
- b) they receive electrical power from a bus that provides the maximum reliability for operation of the cockpit voice recorder systems without jeopardizing service to essential or emergency loads;
- c) there is an aural or visual means for pre-flight checking that the cockpit voice recorder systems are operating properly; and
- d) if the cockpit voice recorder systems have a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.

1.3 The cockpit voice recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

1.4 Means shall be provided for an accurate time correlation between the flight recorder systems recordings.

1.5 The manufacturer shall provide the DGCA with the following information in respect of the flight recording systems:

- a) manufacturer's operating instructions, equipment limitations and installation procedures;
- b) parameter origin or source and equations which relate counts to units of measurement; and
- c) manufacturer's test reports.

2. Cockpit Voice Recorder (CVR)

2.1 Signals to be recorded

The CVR shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

2.1.1 The CVR shall record on four separate channels, or more, at least the following:

- a) voice communication transmitted from or received in the aircraft aero plane by radio;
- b) aural environment on the flight deck;
- c) voice communication of flight crew members on the flight deck using the aero plane's interphone system, if installed;
- d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
- e) voice communication of flight crew members using the passenger address system, if installed

2.1.2 The CVR shall be capable of recording — on at least four channels simultaneously. On a tape-based CVR, to ensure accurate time correlation between channels, the CVR is to record in an in-line format. If a bi-directional configuration is used, the in-line format and channel allocation shall be retained in both directions.

The preferred channel allocation shall be as follows:

Channel 1 — co-pilot headphones and live boom microphone

Channel 2 — pilot headphones and live boom microphone

Channel 3 — area microphone

Channel-4(Aero plane) — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.

Channel-4(Helicopters) — time reference, main rotor speed or the flight Deck vibration environment, the third and fourth crew member's headphones and live microphones, if applicable.

Note -1- Channel 1 is located closest to the base of the recording head.

Note-2- The preferred channel allocation presumes use of current conventional magnetic tape transport mechanisms, and is specified because the outer edges of the tape have a higher risk of damage than the middle. It is not intended to preclude use of alternative recording media where such constraints may not apply.

3. Inspections of Flight Recorder Systems

3.1 Prior to the first flight of the day, the built-in test features for the cockpit voice recorders and flight data acquisition unit (FDAU), when installed shall be monitored by manual and/or automatic checks.

3.2 Annual inspections shall be carried out as follows:

- a) an analysis of the recorded data from the cockpit voice recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
- b) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
- c) an annual examination of the recorded signal on the CVR shall be carried out by replay of the CVR recording. While installed in the aircraft, the CVR shall record

test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;

- | d) where practicable, during the annual examination, a sample of in-flight recordings of the CVR shall be examined for evidence that the intelligibility of the signal is acceptable; and

- | 3.3 Flight recorder systems shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

- | 3.4 A report of the annual inspection shall be made available on request to DGCA for monitoring purposes.

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APPENDIX-II

Data Link Recorder (DLR)

1. Applications to be recorded

1.1 Where the aircraft flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note— Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

1.2 Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

- Data link initiation capability
- Controller–pilot data link communications
- Data link – flight information services
- Automatic dependent surveillance – contract
- Automatic dependent surveillance – broadcast*
- Aeronautical operational control*.

Note— Descriptions of the applications are contained in Table-1.

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Table-1
DESCRIPTION OF APPLICATIONS FOR DATA LINK RECORDERS (Supplementary to Para 6.1.1)

<u>Item No.</u>	<u>Application type</u>	<u>Application description</u>	<u>Recoding content</u>
1.	<u>Data link Initiation</u>	<u>This includes any applications used to logon to or initiate data link service. In FANS-1/A and ATN, these are ATS Facilities Notification (AFN) and Context Management (CM) respectively.</u>	<u>C</u>
2.	<u>Controller/Pilot Communication</u>	<u>This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.</u>	<u>C</u>
3.	<u>Addressed Surveillance</u>	<u>This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the Automatic Dependent Surveillance (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.</u>	<u>C</u>
4.	<u>Flight Information</u>	<u>This includes any service used for delivery of flight information to specific aircraft. This includes, for example, D-METAR, DATIS, D-NOTAM and other textual data link services.</u>	<u>C</u>
5.	<u>Aircraft Broadcast Surveillance</u>	<u>This includes Elementary and Enhanced Surveillance Systems, as well as ADS-B output data. Where parametric data sent by the helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.</u>	<u>M*</u>
6.	<u>Aeronautical Operational Control Data</u>	<u>This includes any application transmitting or receiving data used for AOC purposes (per the ICAO definition of AOC).</u>	<u>M*</u>

Key:

C : Complete contents recorded.

M: Information that enables correlation to any associated records stored separately from the helicopter.

***** : Applications that are to be recorded only as far as is practicable given the architecture of the system.
