

CIVIL AVIATION REGULATIONS

PART 7— INSTRUMENTS AND EQUIPMENT

FEDERATED STATES OF MICRONESIA

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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 — non-AOC Holders and AOC Holders appropriate to the subject of the regulations, e.g., an all aircraft regulation may only refer to seaplanes, but will include seaplanes operated by non-AOC Holders and AOC seaplanes.
 - (2) AOC: AOC Holders are operators engaged in commercial air transport. Where AOC requirements are more detailed, the AOC requirements will be followed.
 - (3) 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 CAT or AOC seaplanes.

7.1.1.2 DEFINITION

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.

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. DH – Decision Height.
4. DME – Distance Measuring Equipment.
5. ELT – Emergency Locator Transmitter.
6. ILS – Instrument Landing System.
7. IFR – Instrument Flight Rules.
8. IMC - Instrument Meteorological Conditions.
9. LRNS - Long Range Navigation Systems.
10. MEL – Minimum Equipment List.
11. MHz – Megahertz.

12. MLS – Microwave Landing System.
13. MNPS - Minimum Navigation Performance Specifications.
14. NDB – Nondirectional Beacon.
15. PBE - Protective Breathing Equipment.
16. RVSM – Reduced Vertical Separation Minimum.
17. SSR – Secondary Surveillance Radar.
18. VFR – Visual Flight Rules. (see 8.8.3.1)
19. VMC - Visual Meteorological Conditions.
20. VOR – VHF Omnidirectional Radiorange.
21. 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 Federated States of Microensia of any aircraft not registered in Federated States of Microensia that uses an airworthiness inspection program approved or accepted by the Federated States of Micronesia of Registry, the owner/operator shall ensure that instruments and equipment required by Federated States of Microensia but not installed in the aircraft are properly installed and inspected in accordance with the requirements of the State of Registry.
- (d) [AOC] No person shall commence a flight in commercial air transport operations unless the required equipment—
 - (1) Meets the minimum performance standard, all operational and airworthiness requirements and the relevant provisions of ICAO Annex 10, Volume IV.
 - (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.
 - (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 crew member at his or her station during flight, it shall be installed so as to be readily operable from that flight crewmember's 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.

7.2 FLIGHT AND NAVIGATIONAL INSTRUMENTS

7.2.1.1 GENERAL REQUIREMENTS

- (a) [AAC] All aircraft shall be equipped with flight instruments which will enable the flight crew to—
- (1) Control the flight path of the aircraft;
 - (2) Carry out any required procedural maneuvers; 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 pilot shall be so arranged as to permit the pilot to see the indications readily from his or her station, with the minimum practicable deviation from the position and line of vision which he normally assumes when looking forward along the flight path.

7.2.1.2 MINIMUM FLIGHT INSTRUMENTS

- (a) [AAC] No person may operate any powered aircraft unless it is equipped with the following flight instruments:
- (1) An airspeed indicating system calibrated in knots, miles per hour or kilometers per hour.
 - (2) 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.
 - (4) A magnetic compass.

Note: This applies to both VFR and IFR operation in addition to the additional requirements for IFR elsewhere in this Part.

ICAO Annex 6, Part I: 6.4.1
 ICAO Doc, 9388, 2.4, 2.5
 14 CFR: 91.205; 121.305
 JAR-OPS 1: 1.650(a-d)

7.2.1.3 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, miles per hour or kilometers per hour;

- (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-coordinator incorporating a slip indicator;
- (5) An attitude indicator;
- (6) A stabilized direction indicator

JAR-OPS 1: 1.650(K)

7.2.1.4 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 for airplanes or a slip indicator for helicopters;
 - (3) 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;
 - (8) Such additional instruments or equipment as may be prescribed by the Authority.
- (b) [AOC] No person may operate an airplane under IFR, or under VFR over routes that cannot be navigated by reference to visual landmarks, unless the airplane is equipped with navigation equipment in accordance with the requirements of air traffic services in the area(s) of operation.
 - (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 of Navigation System when an 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 NBD signals.

- (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 airplane is equipped with an autopilot with at least altitude hold and heading mode.

ICAO Annex 6: 6.9.1
ICAO Doc. 9388, 2.4.1.6, 2.4.2.6
14 CFR: 121.305
JAR-OPS 1: 1.655; 1.652(a-i), 1.865

7.2.1.5 STANDBY ATTITUDE INDICATOR

- (a) [AAC] No person may operate an airplane with a maximum certified take-off mass exceeding 5,700 kg or a performance Class 1 or 2 helicopter 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 operating and illuminated 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 panel when this supply is in use.
- (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.

ICAO Annex 6, Part I: 6.9.2.1
14 CFR: 91.205(d)(3)(i); 121.305(k), 121.313
JAR-OPS 1: 1.652(l)(m)(o)

7.2.1.6 INSTRUMENTS AND EQUIPMENT FOR CATEGORY II OPERATIONS

- (a) The instruments and equipment listed in this subsection shall be installed, approved and maintained in accordance with IS: 7. 2.1.6 for each aircraft operated in a Category II operation:

Note: This subsection does not require duplication of instruments and equipment required by § 7.2.1.2 or any other provisions of Part 7.

- (1) Group I is comprised of the following equipment and this equipment must be inspected both within three calendar months of the previous inspection and must also have a bench inspection within 12 months of the previous bench inspection using procedures contained in the approved maintenance program.

- (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) One self-monitoring radio altimeter with dual display.
- (ix) Two vertical speed indicators.
- (x) 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).

- (xi) For Category II operations with decision heights below 150 feet a radio altimeter is required.

(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)(v) and (a)(1)(ix), of Group I
- (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.

14 CFR: Part 91, Appendix A

7.2.1.7 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 authorized 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.

14 CFR: 91 Appx C
JAR-OPS 1: 1.870

7.3 COMMUNICATIONS EQUIPMENT

7.3.1.1 RADIO EQUIPMENT

- (a) [AAC] No person may operate an aircraft unless it is equipped with radio communication equipment required for the kind of operation being conducted.
- (b) [AAC] All aircraft operated in VFR as a controlled flight, in IFR, at night, extended flight over water, or over land designated by the 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 aircraft in commercial air transport operations, or as otherwise specified by the Authority, unless it is equipped with two independent radio communications systems, appropriate to the route and airspace used.

- (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) [AOC] No person may operate an aircraft in commercial air transport operations unless it is equipped with a boom or throat microphone available at each required flight crew member flight duty station.
- (f) [AOC] No person may conduct single pilot IFR or night operations unless the airplane is equipped with a headset with boom microphone or equivalent and a transmit button on the control wheel.

ICAO Annex 6. 7.1
14 CFR: 121.345-351, 135.161, 135.165
JAR-OPS 1: 1.1.850-1.865

7.3.1.2 CREW MEMBER INTERPHONE SYSTEM [RESERVED]

7.4 AIRCRAFT LIGHTS AND INSTRUMENT ILLUMINATION

7.4.1.1 AIRCRAFT LIGHTS AND INSTRUMENT ILLUMINATION

- (a) [AAC] All aircraft operated at night by, 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;
 - (5) A flashlight for each crew member station;
- (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; and
 - (2) Two landing lights or a single light having two separately energized 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.

ICAO Annex 6, 6.10
ICAO Doc. 9388: 2.4.1.6(l)
14 CFR: 91. 209, 121.303(d), 121.323, 121.549
JAR-OPS 1: 1.640(a)

7.5 ENGINE INSTRUMENTS

7.5.1.1 ENGINE INSTRUMENTS

- (a) [CAT] Unless the Authority allows or requires different instrumentation for turbine engine powered airplanes to provide equivalent safety, no person may operate any powered aircraft without the following engine instruments:
- (1) A fuel pressure indicator for each engine.
 - (2) A fuel flow meter
 - (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 temperature indicator for each engine.
 - (6) A manifold pressure indicator for each altitude 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 carburetor air temperature indicator for each piston engine.
 - (2) A cylinder head temperature indicator for each air-cooled piston 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, which complies with the following:
 1. 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.

2. The source of indication shall be actuated by the propeller blade angle or be directly responsive to it.

14 CFR Part: 91.205; 121.307

7.6 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.

ICAO Annex 6, Part I: 6.14
ICAO Annex II: 6.11
ICAO Doc. 9388: 2.4.1.6(k)
14 CFR: 91.817(b)
JAR-OPS 1: 1.650

7.1.6.2 LOSS OF PRESSURIZATION INDICATOR

[AAC] All pressurized aircraft intended to be operated at flight altitudes above 25, 000 feet shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

ICAO Annex 6; Part I: 6.7.3
ICAO Annex 6, Part II: 6.5.2; 6.5.3R
14 CFR: 25.1309 (general equipment requirement for warning devices)

7.1.6.3 LANDING GEAR: AURAL WARNING DEVICE

- (a) [AOC] Each airplane with retractable landing gear shall have an aural warning device that functions continuously under the following conditions:
 - (1) For airplanes with an established approach wing-flap position, whenever the wing flaps are extended beyond the maximum certified approach climb configuration position in the Airplane Flight Manual and the landing gear is not fully extended and locked.
 - (2) For airplanes without an established approach climb wing-flap 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 (b) 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 utilize any part of the throttle-actuated system including the aural warning device.
- (c) [AOC] The flap position-sensing unit required in paragraph (b) may be installed at any suitable place in the airplane.

14 CFR: 91.205(b);121.289

7.6.1.4 ALTITUDE ALERTING SYSTEM

- a. [AAC] No person may operate a turbine powered airplane 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 airplane, 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 ± 90 m (300 ft).

ICAO Annex 6, Part I: 7.2.4
ICAO Annex 6, Part II: 7.2.4
14 CFR: 91.219
JAR-OPS 1: 1.660

7.1.6.5 GROUND PROXIMITY WARNING SYSTEM

- (a) [CAT] No AOC holder may operate a turbine-powered airplane unless it is equipped with a ground proximity warning system.
- (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 glide slope deviation
- (c) [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 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;
5. Excessive descent below the instrument glide path.

ICAO Annex 6, Part I: 6.15.1; 6.15.2; 6.15.3; 6.15.4; 6.15.5; 6.15.6; 6.15.7; 6.15.8; 6.15.9
ICAO Annex 6, Part II: 6.9.1; 6.9.2; 6.9.3R; 6.9.4R; 6.8.5; 6.9.6; 6.9.7R
14 CFR: 91.223; 121.360, 135.153
JAR-OPS 1: 1.665

7.1.6.6 WEATHER RADAR

[AOC] No person may operate an aircraft in commercial air transport in an area where thunderstorms or other potentially hazardous weather conditions may be expected unless it is equipped with a weather radar.

*ICAO Annex 6, Part I: 6.11R
ICAO Annex 6, Part III, Section II: 4.12R
ICAO Doc. 9388: 2.4.1.8
14 CFR: 121.357, 135.173;135.175
JAR-OPS 1: 1.670*

7.7 FLIGHT AND COCKPIT VOICE RECORDERS

7.1.7.1 COCKPIT VOICE RECORDERS

- (a) [AOC] No AOC holder may operate a large multi-engine turbine powered aeroplane with approved passenger of 10 or more unless an approved cockpit voice recorder system is installed.
- (b) [AOC] To facilitate location and identification in case 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 is not likely to be separated during crash impact

*ICAO Annex 6, Part I: 6.3.7.1,6.3.7.2;6.3.8.1;6.3.8.2,6.3.9.1; 6.3.9.2R; 6.3.9.3; 6.3.11.1; 6.1.11.2; Attachment D, paragraph 2.2
ICAO Annex 6, Part II: 6.10.6.2; 6.10.6.3; 6.10.8.1; 6.10.8.2; Attachment B, paragraph 2.2
ICAO Annex 6, Part III, Section II: 4.3.5.1; 4.3.5.2; 4.3.7.1; 4.3.7.2R; 4.3.9.1; 4.3.9.2
ICAO Annex 6, Part III, Section III: 4.9.5.1; 4.9.6.1; 4.9.6.2R; 4.9.8.1; 4.9.8.2
ICAO Annex 6, Part III, Attachment B, paragraph 2.2
14 CFR: 23.1457; 25.1459; 91.609;121.359, 135.151
JAR-OPS 1: 1.700;1.705 1.710;*

7.7.1.2 FLIGHT RECORDERS

- (a) [AOC] No person may operate a large airplane in commercial air transport that is certified for operations above 25,000 feet altitude and is turbine engine powered, unless it is equipped with one or more approved flight data recording systems.
- (b) [AOC] Flight data 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 calibrated as required by the Authority; and

- (3) Have an approved device to assist in locating a recorder that may be under water and can be automatically activated.

*ICAO Annex 6 Part I: 6.3.1.3; 6.3.1.4R 6.3.1.4.1; 6.3.2; 6.3.3.1; 6.3.3.2; 6.3.3.3R; 6.3.10, ICAO Annex 6, Part II: 6.10.2; 6.10.3.1; 6.10.4; 6.10.7
ICAO Annex 6, Part III, Section II: 4.3.3.1; 4.3.4.1; 4.3.8; 4.3.1.3; 4.3.1.4; 4.3.1.4.1
ICAO Annex 6, Part III, Section III: 4.9.3.1; 4.9.4.1; 4.9.7; 4.3.1.3; 4.3.1.4; 4.3.1.4.1
14 CFR: 23.1459; 25.1459; 91.609; 121.Appendix B; 135.152,*

7.8 EMERGENCY, RESCUE, AND SURVIVAL EQUIPMENT

7.8.1.1 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.

14 CFR: 91.513; 121.309; 135.177

7.8.1.2 EMERGENCY EXIT EQUIPMENT - PASSENGERS

- (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 airplane 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 airplane 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. [AOC] 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 airplane.
- (e) [AOC] Each passenger-carrying airplane shall be equipped with a slip-resistant escape route that meets the requirements under which that airplane was type certified.

7.8.1.3 VISUAL SIGNALLING DEVICES

- (a) [AAC] No person may operate an aircraft over water or across land areas which have been designated by Federated States of Microensia as areas in which search and rescue would be especially difficult, unless equipped with such signaling devices as may be appropriate to the area over flown, to include—
- (1) At least one pyrotechnic signaling device for each life raft required for overwater operations; and
- (2) Any other requirements specified by Federated States of Microensia.

*ICAO Annex 6, Part I: 6.5.3.1 (b), 6.6
ICAO Annex 6, Part II: 6.3.3 (b)
ICAO Annex 6: Part III, Section II: 4.5.2.1 and Section II: 4.3.2.1
14 CFR: 91.509; 121.339(a)(3), 121.353
JAR-OPS 1: 1.835(a) and (c)*

7.8.1.4 SURVIVAL KITS

- (a) [AAC] No person may operate an aircraft across land areas which have been designated by Federated States of Microensia as areas in which search and rescue would be especially difficult, unless equipped with enough survival kits for the number of occupants of the airplane appropriate for the route to be flown.

*ICAO Annex 6:6
ICAO Doc. 9388: 2.4.1.10
14 CFR: 91.509(e); 121.339(c), 121.353(c)
JAR-OPS 1: 1.830(b)*

7.8.1.5 EMERGENCY LOCATOR TRANSMITTER

- (a) [AAC] All aircrafts 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 243.0 MHz, and meets technical standards specified by the Authority.
- (c) [AOC] At least one survival type ELT shall be located with each life-raft carried (See § 7.9.1.18)
- (d) [AAC] Batteries used in ELTs 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.

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.

*ICAO Annex 6, 6.17
14 CFR: 91.207; 121.339(c)
JAR-OPS 1: 1.820, 1.830(c), 1.835(b)*

7.8.1.6 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.
 - (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 if the passenger compartment is separate from the flight deck and not readily accessible to the flight crew.
 - (5) For each airplane 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.

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

ICAO Annex 6, Part I: 6.2.2
 ICAO Doc 9398: 2.4.1.7
 14 CFR: 91.513(c)(2); 121.309(c), 135.155
 JAR-OPS 1: 1.790

7.8.1.7 LAVATORY FIRE EXTINGUISHER

- (a) [AOC] No person may operate a passenger-carrying transport category airplane unless each lavatory in the airplane 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.

14 CFR: 25.854; 121.308(b)

7.8.1.8 LAVATORY SMOKE DETECTOR

- (a) [AOC] No person may operate a passenger-carrying transport category airplane unless each lavatory in the airplane 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 cabin crew member, taking into consideration the positioning of cabin crew members throughout the passenger compartment during various phases of flight.

14 CFR: 25.854;121.308(a)

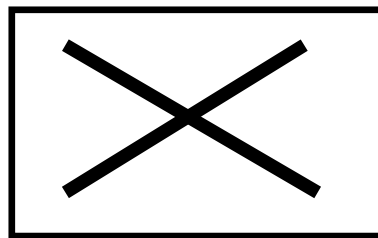
7.8.1.9 CRASH AXE

- (a) [AOC] No person shall operate an airplane certificated with a take-off mass of 5 700 kg or more unless it is equipped with a crash axe appropriate for effective use in that type of airplane, stored in a place not visible to passengers on the airplane.

14 CFR: 91.513(e); 121.309, 135.177
JAR-OPS 1: 1.795

7.8.1.10 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 airplane, such areas shall be marked as shown below, and the color of the markings shall be red or yellow and, if necessary, they shall be outlined in white to 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.

ICAO Annex 6: 6.2.4.2
14 CFR: 121.310(g)
JAR-OPS 1: 1.800

7.8.1.11 FIRST-AID AND EMERGENCY MEDICAL KIT

- (a) [AOC] No person may operate an aircraft unless it is equipped with an accessible, approved first-aid kit(s) 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
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ICAO Annex 6, Part I: 6.2.2(a), Atch B
 ICAO Doc. 9388: 2.4.1.7
 14 CFR: 121.309(d); 135.177, Apprx D
 JAR-OPS 1: 1.755, 1.745

7.8.1.12 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 by the Authority.
- (c) [AOC] No person may operate an aircraft at altitudes above 10,000 feet unless it is equipped with oxygen masks, located so as to be within the immediate reach of flightcrew members while at their assigned duty station.
- (d) [AOC] No person may operate a pressurized airplane at altitudes above 25,000 feet unless:
 - (1) Flightcrew member oxygen masks are available at the flight duty station and 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 pressurization 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. See Implementing Standard: IS: 7.9.1.13 to determine the amount of supplemental oxygen needed for non-pressurized and pressurized aircraft.

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

ICAO Annex 6: 4.3, 8.1-2, 4.4.5.2, 4.4.6.2
 ICAO Doc. 9388: 2.4.1.15, 2.4.1.16(a)
 14 CFR: 211; 121.327-329, 135.157
 JAR-OPS 1: 1.770, 1.775

7.8.1.13 PROTECTIVE BREATHING EQUIPMENT

- (a) [AOC] No AOC holder may operate an airplane 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.

14 CFR: 121.337
JAR-OPS 1: 1.780

7.8.1.14 FIRST AID OXYGEN DISPENSING UNITS

- (a) [AOC] No AOC holder may conduct a passenger carrying operation in a pressurized airplane 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 depressurization; 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 depressurization at cabin altitudes of more than 8,000 feet;
 - (2) An average flow rate of at least 3 liters Standard Temperature Pressure Dry (STPD)/minute/person; and
 - (3) At least 2% of the passengers carried, but in no case for less than one person.

14 CFR: 121.333(e)(3), 135.91
JAR-OPS 1: 1.760

7.8.1.15 MEGAPHONES [RESERVED]

7.8.1.16 INDIVIDUAL FLOTATION DEVICES

- (a) [AOC] All aircraft operated on flights over water at a distance of more than 93 km (50NM) 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 flotation 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 flotation device shall be fitted with an approved survivor locator light.
- (d) [AOC] Upon application by an aircraft operator, the authority may approve the operation of an airplane over water without individual flotation devices, if the aircraft operator shows that the water over which the airplane is to be operated is not of such size and depth that individual flotation devices should be required for the survival of its occupants in the event the flight terminates in that water.

ICAO Annex 6: Part 1: 6.5.1(a), 6.5.2.1, 6.5.2.2, 6.5.3.2
 ICAO Annex 6, Part II: 6.3.1(a)
 ICAO Annex 6, Part III, Section II: 4.5.2.1(a)
 ICAO Annex 6, Part III, Section III: 4.3.2.1(a)
 ICAO Doc. 9388: 2.4.1.12,
 14 CFR: 121.339(a), 121.340(b)
 JAR-OPS 1: 1.825, 1.830, 1.835(c)

7.8.1.17 LIFE RAFTS

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

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) Life rafts shall be stowed so as to facilitate their ready use in an emergency.
- (c) Life rafts shall be equipped with—
 - (1) A survivor locator light;
 - (2) A survival kit;
 - (3) A pyrotechnic signaling device; and
 - (4) An ELT (See § 7.9.1.5).
- (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 a means of mechanically assisted deployment.

ICAO Doc. 9388: 2.4.1.13, 2.4.1.14
 14 CFR: 121.339(a)
 JAR-OPS 1: 1.830(b)

7.8.1.18 FLOTATION DEVICE FOR HELICOPTER DITCHING [RESERVED]

7.9 MISCELLANEOUS SYSTEMS AND EQUIPMENT

7.9.1.1 SEATS, SAFETY BELTS, AND SHOULDER HARNESSSES

- (a) [AOC] Each aircraft used in passenger carrying 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.

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.

*ICAO Annex 6, Part 1: 6.2.2, 6.16.1, 6.16.2, 6.16.3
ICAO Doc. 9398: 2.4.1.7
14 CFR:91.521, 121.311, 121.333
JAR-OPS 1: 1.730*

7.9.1.2 PASSENGER AND PILOT COMPARTMENT DOORS

- (a) [AOC] No person may conduct any passenger-carrying operation unless it has--

- (1) A door between the passenger and the 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; and

*ICAO Annex 6: 13.2.1; 13.2.2, 13.2.3, 13.2.4R; 13.2.5R
14 CFR: 25.795;121.217, 121.313(f-h)
JAR-OPS 1: 1.735*

7.9.1.3 PASSENGER INFORMATION SIGNS

- (a) [AOC] No AOC holder may operate a passenger carrying airplane 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, which 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."

ICAO Annex 6, Part I: 6.2.2
 14 CFR: 23.791; 25.791; 91.517(a); 121.317
 JAR-OPS 1: 1.731
 JAR-OPS 3: 3.731

7.9.1.4 PUBLIC ADDRESS SYSTEM [RESERVED]

7.9.1.5 MATERIALS FOR CABIN INTERIORS

- (a) [AOC] Upon the first major overhaul of an airplane 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 authority, shall be replaced with materials that meet the requirements specified by the authority.
- (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 authority.

14 CFR: 121.215, 121.312, 135.170

7.9.1.6 MATERIALS FOR CARGO AND BAGGAGE COMPARTMENTS [RESERVED]

7.9.1.7 POWER SUPPLY, DISTRIBUTION, AND INDICATION SYSTEM

- (a) [AOC] No AOC holder may operate an airplane unless it is equipped with—
- (1) A power supply and distribution system that meets the airworthiness requirements for certification of an airplane in the transport category, as specified by the Authority, 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 auxiliary 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 Authority 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 redundant.

14 CFR: 121.313(c)

7.9.1.8 PROTECTIVE CIRCUIT FUSES

[AOC] No AOC holder may operate an airplane 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.

ICAO Annex 6, Part I: 6.2.2(e)
 14 CFR: 121.313(a)
 JAR-OPS 1: 1.635

7.9.1.9 ICING PROTECTION EQUIPMENT [RESERVED]

7.9.1.10 PITOT HEAT AND INDICATION SYSTEMS

- (a) [AOC] No AOC holder may operate an airplane equipped with a flight instrument pitot heating system unless the airplane is also equipped with an operable pitot heat 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. The indication provided shall be designed to alert the flight crew if either:
 - (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 system is inoperative.

ICAO Annex 6, Part I: 6.9.1(d)
ICAO Annex 6, Part II: 6.6(d)
ICAO Annex 6, Part III, Section II: 4.10.1 (d)
ICAO Annex 6, Part III, Section III: 4.6(d)
14 CFR: 25.1326; 121.342, 135.158

7.9.1.11 STATIC PRESSURE SYSTEM

[AOC] No person may operate an aircraft unless it is equipped with 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.

14 CFR: 23.1325; 25.1325; 29.1325; 121.313(e); 135.163
JAR-OPS 1: 1.652(j)

7.9.1.12 WINDSHIELD WIPERS

[AOC] No AOC holder may operate an airplane 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.

14 CFR: 121.313(b)
JAR-OPS 1: 1.645

7.9.1.13 CHART HOLDER

- (a) [AOC] No AOC holder may operate an airplane in commercial air transport operations under single pilot IFR or at night unless a chart holder is installed in an easily readable position that can be illuminated for night operations.

ICAO Annex 6, Part I: 6.22(c)
JAR-OPS 1: 1.652(n)

7.9.1.14 COSMIC RADIATION DETECTION EQUIPMENT

[AOC] No AOC holder shall ensure that airplanes intended to be operated above 15000 m (49000 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 ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight.

ICAO Annex 6. Part I: 6.12
JAR-OPS 1: 1.680

7.9.1.15 MARITIME SOUND SIGNALLING DEVICE [RESERVED]

7.9.1.16 ANCHORS [RESERVED]

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CIVIL AVIATION REGULATIONS

PART 7— IMPLEMENTING STANDARDS

FEDERATED STATES OF MICRONESIA

2001

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IS: 7.2.1.6 CATEGORY II: INSTRUMENTS AND EQUIPMENT APPROVAL AND MAINTENANCE REQUIREMENTS

- (a) *General.* The instruments and equipment required by § 7.2.1.6 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. 2.1.6 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 ± 5 feet or 5 percent, whichever is greater, under the following conditions:
 1. Pitch angles of zero to $\pm 5^\circ$ about the mean approach attitude.
 2. Roll angles of zero to 20° in either direction.
 3. Forward velocities from minimum approach speed up to 200 knots.
 4. 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 § 7.2.1.6 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 authorized by the Authority, 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 30 m (100 foot) decision height and 90 percent of the total approaches made shall be successful. A successful approach is one in which—
 - 1. At the 30 m (100 foot) decision height, the indicated airspeed and heading are satisfactory for a normal flare and landing (speed must be ± 5 knots of programmed airspeed, but may not be less than computed threshold speed if auto throttles are used);
 - 2. The aircraft at the 30 m (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;
 - 3. Deviation from glide slope after leaving the outer marker does not exceed 50 percent of full-scale deflection as displayed on the ILS indicator;
 - 4. No unusual roughness or excessive attitude changes occur after leaving the middle marker; and
 - 5. 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 Authority upon request:
 - 1. Each deficiency in airborne instruments and equipment that prevented the initiation of an approach.
 - 2. The reasons for discontinuing an approach, including the altitude above the runway at which it was discontinued.
 - 3. Speed control at the 30 m (100 foot) DH if auto throttles are used.

4. Trim condition of the aircraft upon disconnecting the auto coupler with respect to continuation to flare and landing.
 5. 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.
 6. Compatibility of flight director with the auto coupler, if applicable.
 7. 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. 2.1.6 that is installed in the aircraft and approved for Category II operations, including the make and model of those specified in § 7. 2.1.6 (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 authorized 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 authorization 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 § 7.2.1.6 (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 § 7.2.1.6 (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:
 1. An instrument rating.
 2. 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 authorizations 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:
 1. A visual inspection for cleanliness, impending failure, and the need for lubrication, repair, or replacement of parts;
 2. Correction of items found by that visual inspection; and
 3. 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.

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IS: 7.8.1.2 FLIGHT DATA RECORDERS

- (a) [AOC] Types of flight data recorders.
 - (1) Types I and IA FDRs shall record the parameters required to determine accurately:
 1. The airplane flight path.
 2. Speed.
 3. Altitude.
 4. Engine power.
 5. Configuration and operation.
 - (2) The parameters that satisfy the requirements for a Type I FDR are contained in Table A below.
 - (3) The parameters that satisfy the requirements for a Type IA FDR are listed below. The parameters without an asterisk (*) are mandatory parameters that shall be recorded. The parameters designated by an asterisk (*) shall also be recorded if an information data source for an asterisked parameter is used by airplane systems or the flight crew to operate the airplane.
 1. The following parameters satisfy the requirements for flight path and speed:

- 7.9.1.16.h.3.1.1 Pressure altitude.
- 7.9.1.16.h.3.1.2 Indicated or calibrated airspeed.
- 7.9.1.16.h.3.1.3 Air-ground status and each landing gear air-ground sensor when practicable.
- 7.9.1.16.h.3.1.4 Total or outside air temperature.
- 7.9.1.16.h.3.1.5 Heading (primary flight crew reference).
- 7.9.1.16.h.3.1.6 Normal acceleration.
- 7.9.1.16.h.3.1.7 Lateral acceleration.
- 7.9.1.16.h.3.1.8 Longitudinal acceleration (body axis).
- 7.9.1.16.h.3.1.9 Time or relative time count.
- 7.9.1.16.h.3.1.10 Navigation data*: drift angle, wind speed, wind direction, latitude/longitude.
- 7.9.1.16.h.3.1.11 Groundspeed*.
- 7.9.1.16.h.3.1.12 Radio altitude*.

2. The following parameters satisfy the requirements for altitude:

- 7.9.1.16.h.3.2.1 Pitch attitude.
- 7.9.1.16.h.3.2.2 Roll attitude.
- 7.9.1.16.h.3.2.3 Yaw or sideslip angle*.
- 7.9.1.16.h.3.2.4 Angle of attack*.

3. The following parameters satisfy the requirements for engine power:

- 7.9.1.16.h.3.3.1 Engine thrust power: propulsive thrust/power on each engine, cockpit thrust/power lever position.
- 7.9.1.16.h.3.3.2 Thrust reverse status*.
- 7.9.1.16.h.3.3.3 Engine thrust command*.
- 7.9.1.16.h.3.3.4 Engine thrust target*.
- 7.9.1.16.h.3.3.5 Engine bleed valve position*.
- 7.9.1.16.h.3.3.6 Additional engine parameters*: EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3.

4. The following parameters satisfy the requirements for configuration:

- 7.9.1.16.h.3.4.1 Pitch trim surface position.

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- 7.9.1.16.h.3.4.2 Flaps*: trailing edge flap position, cockpit control selection.
 - 7.9.1.16.h.3.4.3 Slats*: leading edge flap (slat) position, cockpit control selection.
 - 7.9.1.16.h.3.4.4 Landing Gear*: landing gear, gear selector position.
 - 7.9.1.16.h.3.4.5 Yaw trim surface position*.
 - 7.9.1.16.h.3.4.6 Roll trim surface position*.
 - 7.9.1.16.h.3.4.7 Cockpit trim control input position pitch*.
 - 7.9.1.16.h.3.4.8 Cockpit trim control input position roll*.
 - 7.9.1.16.h.3.4.9 Cockpit trim control input position yaw*.
 - 7.9.1.16.h.3.4.10 Ground spoiler and speed brake*: Ground spoiler position, ground spoiler selection, speed brake position, speed brake selection.
 - 7.9.1.16.h.3.4.11 De-icing and/or anti-icing systems selection*.
 - 7.9.1.16.h.3.4.12 Hydraulic pressure (each system)*.
 - 7.9.1.16.h.3.4.13 Fuel quantity*.
 - 7.9.1.16.h.3.4.14 AC electrical bus status*.
 - 7.9.1.16.h.3.4.15 DC electrical bus status*.
 - 7.9.1.16.h.3.4.16 APU bleed valve position*.
 - 7.9.1.16.h.3.4.17 Computed centre of gravity*.
5. The following parameters satisfy the requirements for operation:
- 7.9.1.16.h.3.5.1 Warnings.
 - 7.9.1.16.h.3.5.2 Primary flight control surface and primary flight control pilot input: pitch axis, roll axis, yaw axis.
 - 7.9.1.16.h.3.5.3 Marker beacon passage.
 - 7.9.1.16.h.3.5.4 Each navigation receiver frequency selection.
 - 7.9.1.16.h.3.5.5 Manual radio transmission keying and CVR/FDR synchronization reference.
 - 7.9.1.16.h.3.5.6 Autopilot/auto throttle/AFCS mode and engagement status*.
 - 7.9.1.16.h.3.5.7 Selected barometric setting*: pilot first officer (co-pilot).
 - 7.9.1.16.h.3.5.8 Selected altitude (all pilot selectable modes of operation)*.
 - 7.9.1.16.h.3.5.9 Selected speed (all pilot selectable modes of operation)*.

- 7.9.1.16.h.3.5.10 Selected MACH (all pilot selectable modes of operation)*.
- 7.9.1.16.h.3.5.11 Selected vertical speed (all pilot selectable modes of operation)*.
- 7.9.1.16.h.3.5.12 Selected heading (all pilot selectable modes of operation)*.
- 7.9.1.16.h.3.5.13 Selected flight path (all pilot selectable modes of operation)*; course/DSTRK, path angle.
- 7.9.1.16.h.3.5.14 Selected decision height*.
- 7.9.1.16.h.3.5.15 EFIS display format*: pilot, first officer (co-pilot).
- 7.9.1.16.h.3.5.16 Multi function/engine/alerts display format *.
- 7.9.1.16.h.3.5.17 GPWS/TAWS/GCAS status*: selection of terrain display mode including pop-up display status, terrain alerts, both cautions and warning, and advisories, on/off switch position.
- 7.9.1.16.h.3.5.18 Low pressure warning*: hydraulic pressure, pneumatic pressure.
- 7.9.1.16.h.3.5.19 Computer failure*.
- 7.9.1.16.h.3.5.20 Loss of cabin pressure*.
- 7.9.1.16.h.3.5.21 TCAS/ACAS (traffic alert and collision avoidance system/airborne collision avoidance system)*.
- 7.9.1.16.h.3.5.22 Ice detection*.
- 7.9.1.16.h.3.5.23 Engine warning each engine vibration*.
- 7.9.1.16.h.3.5.24 Engine warning each engine overtemperature*.
- 7.9.1.16.h.3.5.25 Engine warning each engine oil pressure low*.
- 7.9.1.16.h.3.5.26 Engine warning each engine overspeed*.
- 7.9.1.16.h.3.5.27 Wind shear warning*.
- 7.9.1.16.h.3.5.28 Operational stall protection, stick shaker and pusher activation*.
- 7.9.1.16.h.3.5.29 All cockpit flight control forces*: control wheel, control column, rudder pedal cockpit input forces.
- 7.9.1.16.h.3.5.30 Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path.
- 7.9.1.16.h.3.5.31 Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path.
- 7.9.1.16.h.3.5.32 DME 1 and 2 distances*
- 7.9.1.16.h.3.5.33 Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS.
- 7.9.1.16.h.3.5.34 Brakes*: left and right brake pressure, left and right brake pedal position.

- 7.9.1.16.h.3.5.35 Date*.
- 7.9.1.16.h.3.5.36 Event marker*.
- 7.9.1.16.h.3.5.37 Head up display in use*.
- 7.9.1.16.h.3.5.38 Para visual display on*.

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

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

*ICAO Annex 6, Part I: 6.3.1.1; 6.3.1.8; 6.3.1.8.1; 6.3.1.8.2; 6.3.1.8.3; 6.3.1.8.4; 6.3.1.8.5
ICAO Annex 6, Part II: 6.10.1.1; 6.10.1.7; 6.10.1.7.1; 6.10.1.7.2; 6.10.1.7.3; 6.10.1.7.4; 6.10.1.7.5*

- (4) Types II and IIA FDRs shall record the parameters specified in paragraph (a) (1) (i) through (iv) of this section, and those parameters required to accurately determine the configuration of lift and drag devices:

*ICAO Annex 6, Part I: 6.3.1.2
ICAO Annex 6, Part II: 6.10.1.2*

- (5) The parameters that satisfy the requirements for a Type II and Type IIA FDR are contained in Table A below.

Note: The differences between Type II and Type IIA parameters is the duration of the recording. Type II has a duration of 25 hours and Type IIA has a duration of 30 minutes.

ICAO Annex 6, Part I: Attachment D, Introduction and Paragraph 1.2

- (6) Type IV FDRs shall record the parameters required to determine accurately:

- 1. The helicopter flight path .
- 2. Speed.
- 3. Altitude.
- 4. Engine power and operation.

*ICAO Annex 6, Part III, Section II: 4.3.1.1
ICAO Annex 6, Part III, Section III: 4.9.1.1*

- (7) The parameters that satisfy the requirements for a Type IV FDR are contained in Table B below.

- (8) Type IVA FDRs shall record the parameters specified in paragraph (a) (6) of this section, and the parameter required to accurately determine configuration.

*ICAO Annex 6, Part III, Section II: 4.3.1.7
ICAO Annex 6, Part III, Section III: 4.9.1.7*

(9) The parameters that satisfy the requirements for a Type IVA FDR are listed below. The parameters without an asterisk (*) are mandatory parameters that shall be recorded. The parameters designated by an asterisk (*) shall also be recorded if an information data source for an asterisked parameter is used by airplane systems or the flight crew to operate the helicopter.

1. The following parameters satisfy the requirements for flight path and speed:

- 7.9.1.16.h.9.1.1 Pressure altitude.
- 7.9.1.16.h.9.1.2 Indicated airspeed.
- 7.9.1.16.h.9.1.3 Total or outside air temperature.
- 7.9.1.16.h.9.1.4 Heading (primary flight crew reference).
- 7.9.1.16.h.9.1.5 Normal acceleration.
- 7.9.1.16.h.9.1.6 Lateral acceleration.
- 7.9.1.16.h.9.1.7 Longitudinal acceleration (body axis).
- 7.9.1.16.h.9.1.8 Time or relative time count.
- 7.9.1.16.h.9.1.9 Navigation data*: drift angle, wind speed, wind direction, latitude/longitude.
- 7.9.1.16.h.9.1.10 Radio altitude*.

2. The following parameters satisfy the requirements for attitude:

- 7.9.1.16.h.9.2.1 Pitch attitude.
- 7.9.1.16.h.9.2.2 Roll attitude.
- 7.9.1.16.h.9.2.3 Yaw rate.

3. The following parameters satisfy the requirements for engine power:

- 7.9.1.16.h.9.3.1 Power on each engine: free power turbine speed (N), engine torque, engine gas generator speed (N_g), cockpit power control position.
- 7.9.1.16.h.9.3.2 Rotor: main rotor speed, rotor brake.
- 7.9.1.16.h.9.3.3 Main gearbox oil pressure*.
- 7.9.1.16.h.9.3.4 Gearbox oil temperature*, main gearbox oil temperature, tail rotor gearbox oil temperature.
- 7.9.1.16.h.9.3.5 Engine exhaust gas temperature (T_4)*.
- 7.9.1.16.h.9.3.6 Turbine inlet temperature (TIT)*.

4. The following parameters satisfy the requirements for configuration:

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- (10) Landing gear or gear selector position*.
- 7.9.1.16.h.10.1.1 Fuel quality*.
- 7.9.1.16.h.10.1.2 Ice detector liquid water content*.
- 2. The following parameters satisfy the requirements for operation:
 - 7.9.1.16.h.10.2.1 Hydraulics low pressure.
 - 7.9.1.16.h.10.2.2 Warnings.
 - 7.9.1.16.h.10.2.3 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.
 - 7.9.1.16.h.10.2.4 Marker beacon passage.
 - 7.9.1.16.h.10.2.5 Each navigation receiver frequency selection.
 - 7.9.1.16.h.10.2.6 AFCS mode and engagement status*.
 - 7.9.1.16.h.10.2.7 Stability augmentation system engagement*.
 - 7.9.1.16.h.10.2.8 Indicated sling load force*.
 - 7.9.1.16.h.10.2.9 Vertical deviation*: ILS glide path, GNSS approach path.
 - 7.9.1.16.h.10.2.10 Horizontal deviation*: ILS localizer, GNSS approach path.
 - 7.9.1.16.h.10.2.11 DME 1 and 2 distances*.
 - 7.9.1.16.h.10.2.12 Altitude rate*.
 - 7.9.1.16.h.10.2.13 Ice detector liquid water content*.
 - 7.9.1.16.h.10.2.14 Helicopter health and usage monitor system (HUMUS)*:engine data, chip detectors, track timing, exceedance discretes, broadband average engine vibration.

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

Note: The number of parameters 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.*

*ICAO Annex 6, Part III, Section II: 4.3.1.7; 4.3.1. 7.1; 4.3.1.7.2; 4.3.1.7.3; 4.3.1.7.4; 4.3.1.7.5
ICAO Annex 6, Part III, Section II: 4.9.1.7; 4.9.1.7.1; 4.9.1.7.2; 4.9.1.7.3; 4.9.1.7.4; 4.9.1.7.5*

- (11) Type V FDRs shall record the parameters specified in paragraph (a) (6) (i) through (iii) of this section, and the parameter required to accurately determine engine power.

(12) The parameters that satisfy the requirements for a Type V FDR are contained in Table B below.

**Table A — Airplanes
Parameters for Flight Data Recorders**

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
1	Time (UTC when available, otherwise elapsed time)	24 hours	4	+/-0.125% per hour
2	Pressure-altitude—	-300 m (-1 000 ft) to maximum certificated altitude of aircraft 1 500 m (5 000 ft)	1	+/-30 m to +/-200 m (+/-100 ft to +/-700 ft)
3	Indicated airspeed	95 km/h (50 kt) to max V_{So} (Note 1) V_{So} to 1.2 V_D (Note 2)	1	+/-5% +/-3%
4	Heading	360 degrees	1	+/-2%
5	Normal acceleration—	-3 g to +6 g	0.125	+/-1% of maximum range excluding datum error of +/-5%
6	Pitch attitude	+/-75 degrees	1	+/-2 degrees
7	Roll attitude	+/-180 degrees	1	+/-2 degrees
8	Radio transmission keying	On-off (one discrete)	1	
9	Power on each engine (Note 3)	Full range	1 (per engine)	+/-2%
10	Trailing edge flap or cockpit control selection	Full range or each discrete position	2	+/-5% or as pilot's indicator
11	Leading edge flap or cockpit control selection	Full range or each discrete position	2	+/-5% or as pilot's indicator
12	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	
13	Ground spoiler/speed brake selection	Full range or each discrete position	1	+/-2% unless higher accuracy uniquely required
14	Outside air temperature	Sensor range	2	+/-2 degrees C
15	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discrettes	1	
<i>Note—The preceding 15 parameters satisfy the requirements for a Type II FDR.</i>				
16	Longitudinal acceleration	+/-1 g	0.25	+/-1.5% max range excluding datum error of +/-5%

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17	Lateral acceleration	+/-1 g	0.25	+/-1.5% max range excluding datum error of +/-5%
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) (Note 4)	Full range	1	+/-2 degrees unless higher accuracy uniquely required
19	Pitch trim position	Full range	1	+/-3% unless higher accuracy uniquely required
20	Radio altitude—	-6 m to 750 m (-20 ft to 2 500 ft)	1	+/-0.6 m (+/-2 ft) or +/-3% whichever is greater below 150 m (500 ft) and +/-5% above 150 m (500 ft)
21	Glide path deviation	Signal range	1	+/-3%
22	Localizer deviation	Signal range	1	+/-3%
23	Marker beacon passage	Discrete	1	
24	Master warning	Discrete	1	
25	NAV 1 and 2 frequency selection (Note 5)	Full range	4	As installed
26	DME 1 and 2 distance (Notes 5 and 6)	0 – 370 km	4	As installed
27	Landing gear squat switch status	Discrete	1	
28	GPWS (ground proximity warning system)	Discrete	1	
29	Angle of attack	Full range	0.5	As installed
30	Hydraulics, each system (low pressure)	Discrete	2	
31	Navigation data (latitude/longitude, ground speed and drift angle) (Note 7)	As installed	1	As installed
32	Landing gear or gear selector position	Discrete	4	As installed

Note—The preceding 32 parameters satisfy the requirements for a Type I FDR.

Notes—

1. V_{S0} stalling speed or minimum steady flight speed in the landing configuration.
2. V_D design diving speed.
3. Record sufficient inputs to determine power.
4. For airplanes with conventional control systems “or” applies. For airplanes with non-mechanical control systems “and” applies. In airplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.
5. If signal available in digital form.
6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

7. If signals readily available.

If further recording capacity is available, recording of the following additional information should be considered:

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:

- 1) parameters selected by the flightcrew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;
 - 2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;
 - 3) warnings and alerts;
 - 4) the identity of displayed pages for emergency procedures and checklists;
- b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and
- c) additional engine parameters (EPR, N1, EGT, fuel flow, etc.).

*ICAO Annex I, Part I, Attachment D, Table D-1
ICAO Annex I, Part II, Attachment A, Table A-1*

Parameters for Flight Data Recorders

Serial number	Parameter	Measurement range	Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)
1	Time (UTC when available, otherwise elapsed time)	24 hours	4	+/-0.125% per hour
2	Pressure-altitude–	-300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	+/-30 m to +/-200 m (+/-100 ft to +/-700 ft)
3	Indicated airspeed	As the installed measuring system	1	+/-3%
4	Heading	360 degrees	1	+/-2 degrees
5	Normal acceleration–	-3 g to +6 g	0.125	+/-1%
6	Pitch attitude	+/-75 degrees	0.5	+/-2 degrees
7	Roll attitude	+/-180 degrees	0.5	+/-2 degrees
8	Radio transmission keying	On-off (one discrete)	1	
9	Power on each engine (Note 1)	Full range	1 (per engine)	+/-2%
10	Main rotor speed	50-130%	0.5	+/-2%
11	Pilot input and/or control surface position-primary controls (Collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal) (Note 2)	Full range	1	+/-2% unless higher accuracy uniquely required.
12	Hydraulics, each system (low pressure)	Discrete	2	
13	Outside air temperature	Sensor range	2	+/-2 degrees C
14	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discrettes	1	
15	Stability augmentation system engagement	Discrete	1	
<i>Note: The preceding 15 parameters satisfy the requirements for a Type V FDR.</i>				
16	Main gearbox oil pressure	As installed	1	As installed
17	Main gearbox oil temperature	As installed	2	As installed
18	Yaw acceleration (or yaw rate)	+/-1 g	0.25	+/-1.5% max range excluding datum error of +/-5%

19	Sling load force	0-200% of certified load	0.5	+/-3% of max range
20	Longitudinal acceleration	+/-1 g	0.25	+/-1.5% max range excluding datum error of +/-5%
21	Lateral acceleration	+/-1 g	0.25	+/-1.5% max range excluding datum error of +/-5%
22	Radio altitude—	-6 m to 750 m (-20 ft to 2 500 ft)	1	+/-0.6 m (+/-2 ft) or +/-3% whichever is greater below 150 m (500 ft) and +/-5% above 150 m (500 ft)
23	Glide path deviation	Signal range	1	+/-3%
24	Localizer deviation	Signal range	1	+/-3%
25	Marker beacon passage	Discrete	1	
26	Master warning	Discrete	1	
27	NAV 1 and 2 frequency selection (Note 3)	Full range	4	As installed
28	DME 1 and 2 distance (Notes 3 and 4)	0-370 km	4	As installed
29	Navigation data (latitude/longitude, ground speed) (Note 5)	As installed	2	As installed
30	Landing gear or gear selector position	Discrete	4	As installed

Note: The preceding 30 parameters satisfy the requirements for a Type IV FDR.

Notes—

1. Record sufficient inputs to determine power.
2. For helicopters with conventional control systems “or” applies. For helicopters with non-mechanical control systems “and” applies.
3. If signal available in digital form.
4. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
5. If signals readily available.

If further recording capacity is available, recording of the following additional information should be considered:

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:

- 1) parameters selected by the flightcrew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto flight system engagement and mode indications if not recorded from another source;

2)	display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, etc.;
3)	warnings and alerts data; and
4)	the identity of displayed pages for emergency procedures and checklists; and
b)	additional engine parameters (EPR, N1, EGT, fuel flow, etc.).

ICAO Annex I, Part III, Attachment B, Table B-1

IS: 7.9.1.2 EMERGENCY EXIT EQUIPMENT - PASSENGERS

- (a) The emergency exit equipment for airplanes in 7.9.1.2(a) shall meet the following requirements.
- (13) The assisting means for a floor level emergency exit shall meet the requirements under which the airplane was type certified.
- (14) The location of each passenger emergency exit shall be—
1. Recognizable from a distance equal to the width of the cabin.
 2. Indicated by a sign visible to occupants approaching along the main passenger aisle.
- (15) 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.
- (16) Each passenger emergency exit marking and each locating sign shall be manufactured to meet the interior emergency exit marking requirements under which the airplane was type certified, unless the Authority cites different requirements for compliance with this paragraph.
- (17) Note: No sign may continue to be used if its luminescence (brightness) decreases to below 250 micro lamberts.
- (18) 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.
- (19) 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.
- (20) 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 cabin crew member 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 airplane'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.
- (21) 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 airplane was type certified, unless the Authority cites different requirements for compliance with this paragraph.
- (22) No operating handle or operating handle cover may continue to be used if its luminescence (brightness) decreases to below 100 micro lamberts.
- (23) Access to emergency exits shall be provided as follows for each passenger carrying airplane:
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 (j)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 airplane was type certificated, unless the Authority 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 Authority.
- (24) Each passenger emergency exit and the means of opening that exit from the outside shall be marked on the outside of the airplane with a 2-inch coloured band outlining the exit on the side of the fuselage.

- (25) 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.
 3. Note: "Reflectance" is the ratio of the luminous flux reflected by a body to the luminous flux it receives.
 4. 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.
- (26) Each passenger-carrying airplane shall be equipped with exterior lighting that meets the requirements under which that airplane was type certificated, unless the Authority cites different requirement for compliance with this paragraph.
- (27) Each passenger-carrying airplane shall be equipped with a slip-resistant escape route that meets the requirements under which that airplane was type certificated, unless the Authority cites different requirements for compliance with this paragraph.
- (28) 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.
- (29) Note: The Authority 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.
- (30) 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.
- (31) On each large passenger-carrying airplane with a 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.
- (32) Portable lights. No person may operate a passenger carrying airplane unless it is equipped with flight stowage provisions accessible from each cabin crew member seat.

14 CFR: 121.310

IS: 7.9.1.11 FIRST- AID KITS

- (a) [AAC] Types. One type of first-aid kit shall be provided for carriage in all aircraft.
- (i) [AOC] Contents. The required first-aid kits shall include at least the following:
 - (1) A handbook on first aid.
 - (2) “Ground-air visual signal code for use by survivors” as contained in ICAO Annex 12.
 - (3) Materials for treating injuries.
 - (4) Ophthalmic ointment.
 - (5) A decongestant nasal spray.
 - (6) Insect repellent.
 - (7) Emollient eye drops.
 - (8) Sunburn cream.
 - (9) Water-miscible antiseptic/skin cleanser.
 - (10) Materials for treatment of extensive burns.
 - (11) Oral drugs as follows: analgesic, antispasmodic, central nervous system stimulant, circulatory stimulant, coronary vasodilator, antidiarrhoeic and motion sickness medications.
 - (12) An artificial plastic airway and splints.
- (j) [AOC] Number of first-aid kits. Each aircraft shall carry first-aid kits in accordance with the following schedule.

Number Of Passenger Seats	Number Of First-Aid Kits
0 – 50	1
51 – 150	2
151 – 250	3
More than 250	4

- (k) [AOC] Location.
 - (1) The required first-aid kits be distributed evenly throughout the aircraft, and shall be readily accessible to cabin crew members, if cabin crew members are required for the flight; and
 - (2) The first-aid kits shall be located near the aircraft exits should their use be required outside the aircraft in an emergency situation.

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IS: 7.9.1.12 EMERGENCY MEDICAL KIT - AIRPLANES

- (a) [CAT] The required medical kit shall include the following equipment:
 - (3) One pair of sterile surgical gloves.
 - (4) Sphygmomanometer.
 - (5) Stethoscope.
 - (6) Sterile scissors.
 - (7) Haemostatic forceps.
 - (8) Haemostatic bandages or tourniquet.
 - (9) Sterile equipment for suturing wounds.
 - (10) Disposable syringes and needles.
 - (11) Disposable scalpel handle and blade.
- (l) [CAT] The required medical kit shall include the following drugs:
 - (1) Coronary vasodilators.
 - (2) Analgesics.
 - (3) Diuretics.
 - (4) Anti-allergics.
 - (5) Steroids.
 - (6) Sedatives.
 - (7) Ergometrine.
 - (8) Where compatible with regulations of the appropriate authority, a narcotic drug in injectable form.
 - (9) Injectable broncho dilator.
- (m) [CAT] The medical kit shall be stored in a secure location.

ICAO Annex 6, Part I: Attachment B

IS: 7.9.1.13 OXYGEN STORAGE AND DISPENSING APPARATUS

- (a) The supplemental oxygen supply requirements for non-pressurized airplanes are as follows:

- (1) An operator shall not operate a non-pressurized airplane at pressure altitudes above 10 000 ft unless supplemental oxygen equipment, capable of storing and dispensing the oxygen supplies required, is provided.
- (2) 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.
- (3) An airplane intended to be operated above 10 000 ft pressure altitude shall be provided with equipment capable of storing and dispensing the oxygen supplies required.
- (4) Oxygen supply requirements.
 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-Pressurized Airplanes

(a) SUPPLY FOR:	(b) 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 (see note)	Entire flight time at pressure altitudes above 13,000 ft
4. 10% of passengers (see note)	Entire flight time after 30 minutes at pressure altitudes greater than 10,000 ft but not exceeding 13,000 ft

Note: For the purpose of this table "passengers" means passengers actually carried and includes infants.

- (n) The supplemental oxygen supply requirements for pressurized airplanes are as follows:
 - (1) An operator shall not operate a pressurized airplane at pressure altitudes above 10 000 ft unless supplemental oxygen equipment, capable of storing and dispensing the oxygen supplies required by this paragraph, is provided.
 - (2) The amount of supplemental oxygen required shall be determined on the basis of cabin pressure altitude, flight duration and the assumption that a cabin pressurization 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 airplane will descend in accordance with emergency procedures specified in the Airplane Flight Manual to a safe altitude for the route to be flown that will allow continued safe flight and landing.

- (3) Following a cabin pressurization failure, the cabin pressure altitude shall be considered the same as the airplane pressure altitude, unless it is demonstrated to the Authority that no probable failure of the cabin or pressurization system will result in a cabin pressure altitude equal to the airplane pressure altitude. Under these circumstances, the demonstrated maximum cabin pressure altitude may be used as a basis for determination of oxygen supply.
- (4) Oxygen equipment and supply requirements.
1. Flight crew members.
 - 7.9.1.16.n.4.1.1 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.
 - 7.9.1.16.n.4.1.2 Flight deck seat occupants, not supplied by the flight crew source, are to be considered as passengers for the purpose of oxygen supply.
 - 7.9.1.16.n.4.1.3 Oxygen masks shall be located so as to be within the immediate reach of flight crew members whilst at their assigned duty station.
 - 7.9.1.16.n.4.1.4 Oxygen masks for use by flight crew members in pressurized airplanes operating at pressure altitudes above 25 000 ft, shall be a quick donning type mask.
 2. Cabin crew members, additional crew members, and passengers.
 - 7.9.1.16.n.4.2.1 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.
 - 7.9.1.16.n.4.2.2 Airplanes intended to be operated at pressure altitudes above 25 000 ft shall be provided sufficient spare outlets and masks and/or sufficient portable oxygen units with masks for use by all required cabin crew members. The spare outlets and/or portable oxygen units are to be 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 pressurization failure.
 - 7.9.1.16.n.4.2.3 Airplanes intended to be operated at pressure altitudes above 25 000 ft shall be provided an oxygen dispensing unit connected to oxygen supply terminals immediately available to each occupant, whenever seated. The total number of dispensing units and outlets shall exceed the number of seats by at least 10 percent. The extra units shall be evenly distributed throughout the cabin.
 - 7.9.1.16.n.4.2.4 Airplanes intended to be operated at pressure altitudes above 25 000 ft or which, if operated at or below 25 000 ft, cannot descend safely within four minutes to 13 000 ft, and for which the individual certificate of airworthiness was first issued on or after 9 November 1998, shall be provided with automatically deployable oxygen equipment immediately available to each occupant, wherever seated. The total number dispensing units and outlets shall exceed the number of seats by at least 10 percent. The extra units shall be evenly distributed throughout the cabin.

7.9.1.16.n.4.2.5 The oxygen supply requirements, as specified in Table 2, for airplanes not certificated to fly at altitudes above 25,000 ft, may be reduced to the entire flight time between 10,000 ft and 13,000 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 airplane is able to descend safely within 4 minutes to a cabin pressure altitude of 13,000 ft.

Table 2 - Requirements for Supplemental Oxygen - Pressurized Airplane During and Following Emergency Descent (Note)

SUPPLY FOR:	DURATION AND CABIN PRESSURE ALTITUDE
1. 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 airplanes certificated to fly at altitudes not exceeding 25,000 ft (Note 2) (ii) 2 hours for airplanes 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 13,000 ft whichever is the greater (Note 4)
4. 10% of passengers	Entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 13,000 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 airplane'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 airplane'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 airplane's maximum certificated operating altitude to 15,000 ft.

Note 5: For the purpose of this table "passengers" means passengers actually carried and includes infants.

(o) The supplemental oxygen supply requirements for non-pressurized helicopters are as follows:

- (1) An operator shall not operate a non-pressurized helicopter at pressure altitudes above 10 000 ft unless supplemental oxygen equipment, capable of storing and dispensing the oxygen supplies required, is provided.
- (2) 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.
- (3) A helicopter intended to be operated above 10 000 ft pressure altitude shall be provided with equipment capable of storing and dispensing the oxygen supplies required.
- (4) Oxygen supply requirements:
 1. Flight crew members. Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Table 3. 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 3. 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 3- Supplemental Oxygen for Non-Pressurized Helicopters

(a) SUPPLY FOR:	(b) 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 (see note)	Entire flight time at pressure altitudes above 13,000 ft
4.. 10% of passengers (see note)	Entire flight time after 30 minutes at pressure altitudes greater than 10,000 ft but not exceeding 13,000 ft

Note: For the purpose of this table "passengers" means passengers actually carried and includes infants.

*JAR OPS 1: 1.770 and Appendix 1 to 1.770; 1.775 and Appendix 1 to 1.775
JAR OPS 3: 3.775 and Appendix 1 to 3.775*

IS: 7.10.1.13 COSMIC RADIATION DETECTION EQUIPMENT

- (a) Compliance with the sampling requirements in 7. 10.1.13 (a)(2) may be accomplished as follows:
 - (5) The sampling shall be carried out in conjunction with a Radiological Agency or similar organization acceptable to the Authority.
 - (6) Sixteen route sectors, which include flight above 15 000 m (49 000 ft), shall be sampled every quarter (three months). Where less than sixteen route sectors which include flight above 15 000 m (49 000 ft) are achieved each quarter, then all sectors above 15 000 m (49 000 ft) shall be sampled.

- (7) The cosmic radiation recorded should include both the neutron and non-neutron components of the radiation field.
- (8) The results of the sampling, including a cumulative summary quarter on quarter, should be reported to the Authority under arrangements acceptable to the Authority.

JAR OPS 1: ACJ OPS 1.680(a)(2)

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