

## **ATTACHMENT 23 The Instruments, Equipment and Flight Documentations meets the Requirements of an Aircraft**

This attachment is established in accordance with Article 299 of this AOR proper and FAR Part 91.205 and Appendix A.

1. Visual-flight rules (day). For VFR flight during the day, the following instruments and equipment are required:
  - 1.1 Airspeed indicator.
  - 1.2 Altimeter.
  - 1.3 Magnetic compass.
  - 1.4 Tachometer for each engine.
  - 1.5 Oil pressure gauge for each engine using pressure system.
  - 1.6 Temperature gauge for each liquid-cooled engine.
  - 1.7 Oil temperature gauge for each air-cooled engine.
  - 1.8 Manifold pressure gauge for each altitude engine.
  - 1.9 Fuel gauge indicating the quantity of fuel in each tank.
  - 1.10 Landing gear position indicator, if the aircraft has a retractable landing gear.
  - 1.11 Installation of an approved aviation red or aviation white anti-collision light system. In the event of failure of any light of the anti-collision light system, operation of the aircraft may continue to a location where repairs or replacement can be made.
  - 1.12 If the aircraft is operated for hire over water and beyond power-off gliding distance from shore, approved flotation gear readily available to each occupant and at least one pyrotechnic signaling device.
  - 1.13 A certificated safety belt with a metal-to-metal latching device for each occupant 2 years of age or older.
  - 1.14 A certificated shoulder harness at a flight crewmember station or any other seat for small aircraft.
  - 1.15 An emergency locator transmitter in accordance with Article 300.
  - 1.16 A certificated shoulder harness for utility and acrobatic category aircraft with a seating configuration, excluding pilot seats, of 9 or less shall
  - 1.17 A certificated shoulder harness for each seat of a rotorcraft that meets the requirements of Article 23 paragraph 1 of AOR approved by CAA.
2. Visual flight rules (night) if applicable. For VFR flight at night, the following instruments and equipment are required:
  - 2.1 Instruments and equipment specified in Item 1.
  - 2.2 Position lights.
  - 2.3 One electric landing light.
  - 2.4 An adequate source of electrical energy for all installed electrical and radio equipment.

- 2.5 One spare set of fuses, or three spare fuses of each kind required, that are accessible to the pilot in flight.
3. Instrument flight rules. For IFR flight, the following instruments and equipment are required:
- 3.1 Instruments and equipment specified in Item 1, and, for night VFR flight (if applicable), instruments and equipment specified in Item 2.
  - 3.2 Two-way radio communication and navigation equipment suitable for the route to be flown.
  - 3.3 Gyroscopic rate-of-turn indicator, except on the following aircraft:
    - 3.3.1 Airplanes with a third attitude instrument system usable through flight attitudes of 360 degrees of pitch and roll.
    - 3.3.2 Rotorcraft with a third attitude instrument system usable through flight attitudes of  $\pm 80$  degrees of pitch and  $\pm 120$  degrees of roll.
  - 3.4 Slip-skid indicator.
  - 3.5 Sensitive altimeter adjustable for barometric pressure.
  - 3.6 A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital presentation.
  - 3.7 Generator or alternator of adequate capacity.
  - 3.8 Gyroscopic pitch and bank indicator (artificial horizon).
  - 3.9 Gyroscopic direction indicator.
4. Flight at and above 24,000 feet MSL (FL 240). If VOR navigation equipment is required under Item 3.2 of this section, no person may operate a civil aircraft within the nation at or above FL 240 unless that aircraft is equipped with certificated DME or a suitable RNAV system.
5. Category II operations. The requirements for Category II operations are the instruments and equipment specified in Item 3 and 7.
6. Category III operations. The instruments and equipment required for Category III operations are specified in Item 3.
7. Category II Operations: Manual, Instruments, Equipment, and Maintenance
- 7.1 Category II Operations Manuals
    - 7.1.1 Application for approval. An applicant for approval of a Category II manual or an amendment to an approved Category II manual shall submit the proposed manual or amendment to the CAA. If the application requests an evaluation program, it shall include the following:
      - 7.1.1.1 The location of the aircraft and the place where the demonstrations are to be conducted.
      - 7.1.1.2 The date the demonstrations are to commence (at least 10 days after filing the application).
      - 7.1.1.3 Contents. Each Category II manual shall contain:
        - 7.1.1.3.1 The registration number, make, and model of the aircraft to which it applies.

7.1.1.3.2 A maintenance program as specified in this appendix.

7.1.1.3.3 The procedures and instructions related to recognition of decision height, use of runway visual range information, approach monitoring, the decision region (the region between the middle marker and the decision height), the maximum permissible deviations of the basic ILS indicator within the decision region, a missed approach, use of airborne low approach equipment, minimum altitude for the use of the autopilot, instrument and equipment failure warning systems, instrument failure, and other procedures, instructions, and limitations that may be found necessary by the CAA.

## 7.2 Required Instruments and Equipment

The instruments and equipment listed in this section shall be installed in each aircraft operated in a Category II operation. This section does not require duplication of instruments and equipment required by Article 299 of AOR or any other provisions of this chapter.

### 7.2.1 Group I.

7.2.1.1 Two localizer and glide slope receiving systems. 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.

7.2.1.2 A communications system that does not affect the operation of at least one of the ILS systems.

7.2.1.3 A marker beacon receiver that provides distinctive aural and visual indications of the outer and the middle markers.

7.2.1.4 Two gyroscopic attitude indicator.

7.2.1.5 Two gyroscopic direction indicator.

7.2.1.6 Two airspeed indicators.

7.2.1.7 Two sensitive altimeters adjustable for barometric pressure, each having a placarded correction for altimeter scale error and for the wheel height of the aircraft. 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.

7.2.1.8 Two vertical speed indicators.

7.2.1.9 A flight control guidance system that consists of either an automatic approach coupler or a flight director system. A flight director system shall 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 shall 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 Item 7.2.1.1.

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

### 7.2.2 Group II.

7.2.2.1 Warning systems for immediate detection by the pilot of system faults in Item 2.1.1, 2.1.4, 2.1.5 and 2.1.9 of Group I and, if installed for use in Category III operations, the radio altimeter and autothrottle system.

7.2.2.2 Dual controls.

7.2.2.3 A static pressure system with an alternate static pressure source.

7.2.2.4 A windshield wiper or equivalent means of providing adequate cockpit visibility for a safe visual transition by either pilot to touchdown and rollout.

7.2.2.5 A heat source for each airspeed system pitot tube installed or an equivalent means of preventing malfunctioning due to icing of the pitot system.

### 7.3 Instruments and Equipment Approval

7.3.1 The instruments and equipment required by Item 7.2 of this attachment shall be approved as provided in this section before being used in Category II operations. Before presenting an aircraft for approval by CAA, it shall be shown that since the beginning of the 12th calendar month before the date of submission:

7.3.2 The ILS localizer and glide slope equipment were bench checked according to the manufacturer's instructions.

7.3.3 The altimeters and the static pressure systems were tested and inspected in accordance with Regulations of Airworthiness and Maintenance Management for Aviation Products, Appliances and Parts.

7.3.3.1 All other instruments and items of equipment specified in this attachment that are listed in the proposed maintenance program were bench checked and found to meet the manufacturer's specifications.

7.3.4 Flight control guidance system. All components of the flight control guidance system shall be approved as installed by the evaluation program specified in this attachment 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 shall 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.

7.3.5 Radio altimeter. A radio altimeter shall meet the performance criteria of this paragraph for original approval and after each subsequent alteration.

7.3.5.1 It shall display to the flight crew clearly and positively the wheel height of the main landing gear above the terrain.

7.3.5.2 It shall display wheel height above the terrain to an accuracy of plus or minus 5 feet or 5 percent, whichever is greater, under the following conditions:

7.3.5.2.1 Pitch angles of zero to plus or minus 5 degrees about the mean approach attitude.

7.3.5.2.2 Roll angles of zero to 20 degrees in either direction.

7.3.5.2.3 Forward velocities from minimum approach speed up to 200 knots.

7.3.5.2.4 Sink rates from zero to 15 feet per second at altitudes from 100 to 200 feet.

- 7.4 Over level ground, it shall track the actual altitude of the aircraft without significant lag or oscillation.
- 7.5 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 shall not cause the altimeter to unlock, and indicator response to such changes shall not exceed 0.1 seconds and, in addition, if the system unlocks for greater changes, it shall reacquire the signal in less than 1 second.
- 7.6 Systems that contain a push-to-test feature shall test the entire system (with or without an antenna) at a simulated altitude of less than 500 feet.
- 7.7 The system shall 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.
- 7.8 Other instruments and equipment. All other instruments and items of equipment required by this appendix 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.
- 7.9 Evaluation program
- 7.9.1 Approval by evaluation is requested as a part of the application for approval of the Category II manual.
- 7.9.2 Demonstrations. Unless otherwise authorized by the Administrator, the evaluation program for each aircraft requires the demonstrations specified in this paragraph. At least 50 ILS approaches shall be flown with at least five approaches on each of three different ILS facilities and no more than one half of the total approaches on any one ILS facility. All approaches shall be flown under simulated instrument conditions to a 100-foot decision height and 90 percent of the total approaches made shall be successful. A successful approach is one in which—
- 7.9.2.1 At the 100-foot decision height, the indicated airspeed and heading are satisfactory for a normal flare and landing (speed shall be plus or minus 5 knots of programmed airspeed, but may not be less than computed threshold speed if autothrottles are used);
- 7.9.2.2 The aircraft at the 100-foot decision height, is positioned so that the cockpit is within, and tracking so as to remain within, the lateral confines of the runway extended;
- 7.9.2.3 Deviation from glide slope after leaving the outer marker does not exceed 50 percent of full-scale deflection as displayed on the ILS indicator;
- 7.9.2.4 No unusual roughness or excessive attitude changes occur after leaving the middle marker.
- 7.9.2.5 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.
- 7.9.3 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 CAA upon request:

- 7.9.3.1 Each deficiency in airborne instruments and equipment that prevented the initiation of an approach.
- 7.9.3.2 The reasons for discontinuing an approach, including the altitude above the runway at which it was discontinued.
- 7.9.3.3 Speed control at the 100-foot decision height if auto throttles are used.
- 7.9.3.4 Trim condition of the aircraft upon disconnecting the auto coupler with respect to continuation to flare and landing.
- 7.9.3.5 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.
- 7.9.3.6 Compatibility of flight director with the auto coupler, if applicable.
- 7.9.3.7 Quality of overall system performance.
- 7.9.4 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.
- 7.10 Maintenance program
  - 7.10.1 Each maintenance program shall contain the following:
    - 7.10.1.1 A list of each instrument and item of equipment specified in Item 7.2 of this attachment that is installed in the aircraft and approved for Category II operations, including the make and model of those specified in Item 2.1.
    - 7.10.1.2 A schedule that provides for the performance of inspections under Item 7.4.1.5 within 3 calendar months after the date of the previous inspection. The inspection shall be performed by a person authorized by this chapter, 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.
    - 7.10.1.3 A schedule that provides for the performance of bench checks for each listed instrument and item of equipment that is specified in Item 7.2.1 within 12 calendar months after the date of the previous bench check.
    - 7.10.1.4 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 in accordance with Attachment 24 of AOR.
    - 7.10.1.5 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 item 2 of this attachment to perform as approved for Category II operations including a procedure for recording functional flight checks.
    - 7.10.1.6 A procedure for assuring that the pilot is informed of all defects in listed instruments and items of equipment.
    - 7.10.1.7 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 in accordance with this attachment.

7.10.1.8 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.

7.10.2 Bench check. A bench check shall comply with the following:

7.10.2.1 It shall be performed by a certificated repair station holding one of the following ratings as appropriate to the equipment checked:

7.10.2.1.1 An instrument rating.

7.10.2.1.2 A radio rating.

7.10.2.1.3 Accessories rating.

7.10.2.2 It shall consist of removal of an instrument or item of equipment and performance of the following:

7.10.2.2.1 A visual inspection for cleanliness, impending failure, and the need for lubrication, repair, or replacement of parts;

7.10.2.2.2 Correction of items found by that visual inspection.

7.10.2.2.3 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.

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.