



GOVERNMENT OF INDIA  
CIVIL AVIATION DEPARTMENT  
DIRECTOR GENERAL OF CIVIL AVIATION

**AAC No. 13 of 2017**  
**Dated 14<sup>th</sup> August 2017**

## **AIRWORTHINESS ADVISORY CIRCULAR**

**Subject: Aircraft Instruments Overhaul and Periodical Inspections.**

### **1. Introduction:**

- 1.1 Aircraft instruments installed on the aircraft are required to be overhauled and inspected in accordance with the approved maintenance programme as stipulated in M.A.302 of CAR-M. The periodicity of overhaul/ inspection of the instruments are generally specified by manufacturer of an aircraft or instruments.
- 1.2 This circular provides guidance in respect of periodicity of overhaul/ inspections of such instruments where no specific recommendation is provided by the manufacturer of aircraft or instrument.
- 1.3 It is important to note that this circular is for guidance purpose only and on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

### **2. General**

- 2.1 The periodical inspection checks for ascertaining the accuracy of instruments may be made "in-situ" if possible.
- 2.2 Instruments which on test are found defective and do not conform with the maker's/ Director General of Civil Aviation's Requirements should be maintained/ inspected as per maker's requirements, by appropriately authorised persons for the purpose or should be replaced with serviceable instruments.
- 2.3 Prior to installation of instrument on the aircraft the following should be ensured:
  - (a) The instruments are approved for the type aircraft;

- (b) The range of the dial marking is adequate to reflect correct operation of the aircraft, power plant or equipment and to precisely indicate the appropriate operating limitations;
- (c) The range of any coloured sectors marked on instrument dials corresponds with the ranges specified in the aircraft flight manual or aircraft/ engine manufacturer's manuals as applicable.

2.4 At times aircraft manufacturers recommend "on-condition" maintenance programme for some of the aircraft components, including aircraft instruments. This type of maintenance means specifying intervals or inspecting/ testing the concerned units of aircraft to determine reduction in failure resistance before the failure occurs or becomes critical.

2.5 These inspections/ testing may be on the aircraft or at a maintenance facility. Before operators adopt this type of maintenance in preference to "Hard time limits", as far as periodical servicing of aircraft components is concerned, they should submit to DGCA details of programme of repetitive inspections/ tests for approval and include in aircraft maintenance programme.

2.6 The inspection/ test intervals achieved by an operator may be followed with prior concurrence of DGCA, by other operators, operating similar equipment, provided operating and environmental conditions are similar.

2.7 All maintenance (including overhaul) shall be performed and certified in accordance with the manufacturer's and/or DGCA's requirements.

### 3. **Magnetic compasses:**

3.1 Magnetic compasses should be inspected at the time of installation to ensure that

- (a) There are no signs of leakage of the fluid;
- (b) bubbles, excessive sediment and discolouration are not present in the liquid;
- (c) The pivot friction does not exceed the manufacturer's tolerances. Where such tolerances are unknown the pivot friction shall be determined by deflecting the compass needle 10 degrees and allowing it to return to the magnetic meridian. The change in indication from the original heading shall not exceed two degrees ;
- (d) The compass is swung and correction card is in place in the aircraft ;  
and
- (e) The compass mounting is satisfactory.

### 3.2 Calibration and compensation :

Following are the circumstances under which direct reading aircraft magnetic compasses, as installed in aircraft, should be calibrated and compensated:

- (a) At the time of initial installation of a compass;
- (b) At periods as specified by the manufacturer;
- (c) After major repair of the aircraft, replacement of an engine mounted in the forward fuselage, or on installation/ removal/ replacement of any magnetic material in the vicinity of the compasses;
- (d) After installation of a new electrical system or major modification of the existing electrical system in the vicinity of compass, in which case the calibration shall be made with the electrical and radio service operating in straight and level flights;
- (e) After installation of geophysical survey equipment or other equipment likely to have a strong external magnetic field;
- (f) Whenever a direct reading compass or a magnetic sensing element is changed or relocated;
- (g) Whenever the correct functioning of a compass is in doubt, or excessive deviations have been found in flight observations;
- (h) after an aircraft has passed through an electrical storm;
- (i) Whenever a physical damage, discoloration of fluid or presence of bubbles in the fluid is observed;
- (j) After an aircraft is subjected to a severe shock as in the case of a heavy landing.

*Note :- Compass compensation should be conducted in accordance with the General Rules of Compensation in vogue and whenever compasses are calibrated and/or compensated appropriate entry shall be made in the aircraft log book.*

### 4. Overhaul and periodical inspection periods:

4.1 The overhaul and periodical inspection periods specified in this circular should be calculated:

- (a) from the date of the last overhaul; or
- (b) from the date of installation in the aircraft if, prior to installation and following overhaul the instrument had been stored in accordance with accepted practices for the storage of instruments ; or
- (c) in the case of imported aircraft when neither of the dates specified in sub-paragraph (a) and (b) above is known, from the date of issue or last renewal of the aircraft's Certificate of Airworthiness.

4.2 Where the manufacturer/ vendor's recommendations are not available with regard to the overhaul and inspection periods of instruments, the periods as specified in the following table should be followed:

Instrument	Maximum overhaul Period	Periodical Inspection Period
1. Gyrohorizon indicators, Directional gyro indicators, Automatic pilots (gyro units only)	2Years/1000hrs. (whichever is earlier)	
2. Automatic pilot (except gyro units), Airspeed indicators and pitot-static system. Turn and bank indicators.  Vertical speed indicators (Rate of climb indicators), Tachometers (RPM indicators). Fuel contents gauges and fuel flow gauge. Manifold pressure gauges in piston engine and such pressure gauges of jet engines utilised for engine power output indication, Engine Oil pressure gauges, Magnetic compasses., Watches.	3years/2000hrs. (whichever is earlier)	
3. Altimeters	2 years.	
4. Thermometers, pressure and vacuum gauges (except the pressure gauges mentioned in the preceding column), Ammeter and voltmeters and position indicators.	To be decided by individual operator.	Bench Check every two years.

*Note :- Overhaul/ periodical inspection periods in respect of instruments other than those indicated above, will be notified by the Director General of Civil Aviation on specific request.*

4.3 Inspection Procedure:

4.3.1 At the periodical inspection period of the instruments specified in paragraph 4.2 of this circular:

- (a) the accuracy of instruments should be checked against an appropriate test instrument to ensure that the instrument operates correctly in accordance with the manufacturer's requirements.

*Note:-Test instruments should conform to the requirements of the manufacturer and/or Director General of Civil Aviation.*

- (b) Magnetic compasses should be inspected to ensure compliance with the requirements of Paragraph 3 of this circular.
- (c) The instruments should be overhauled/ bench checked by an approved agency and certified by an appropriately authorised persons. However, time pieces (clocks, watches) installed on aircraft having all up weight below 3000 Kgs. can be overhauled/ repaired by any of the reputed commercial watch makers/ watch repairing agencies.

#### **5. Collection of operational data:**

The operators in their own interest are advised to ask instruments overhauling agencies to furnish them with serious defects (not routine wear and tear) which come to their notice during overhauling/ servicing of time expired/ prematurely removed instruments. This data may be called for by Director General of Civil Aviation for future life development of instruments.

#### **6. Storage/ shelf life:**

- 6.1 The instruments must be stored in accordance with the accepted practices under controlled temperature (5 deg.C.-25 deg.C.) and humidity (not exceeding 70%) conditions. The storage place must be dust free. As far as possible original manufacturers/ overhauling agencies packing should be retained.
- 6.2 Normally the storage/ shelf life of instruments should be as per manufacturers/ overhauling agencies recommendations, however in the absence of any specific guidance from the manufacturers/ overhauling agency, the shelf life of instruments (other than gyro instruments) should not exceed 2 years. On completion of this period such instruments should be subjected to overhaul in accordance with the approved Overhaul Schedules.
- 6.3 Instruments which require periodic lubrication must be removed from storage and lubricated by appropriately authorised person at periods as recommended by the manufacturers and records maintained in this regard.
- 6.4 Instruments whose storage conditions are not in accordance with accepted practices, must be considered as unserviceable requiring complete overhaul.
- 6.5 The shelf life of gyro instruments must not exceed two years but at the end of first year in shelf, such instruments should be exercised as per

approved test schedules and bearing lubricated as per makers recommendations.

- 6.6 The shelf life for each type of instrument should be reflected in the operators approved maintenance programme and/ or relevant manual.
- 6.7 The shelf life should also be indicated on the CA Form-1 or equivalent document or serviceable tag, issued by the Overhauling Agency/ authorised person, accompanying the instrument/ equipment.
- 6.8 Instruments installed on aircraft which has not been operated for a continuous period of six months, should be subjected to bench check before use.

Sd/-  
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For Director General of Civil Aviation