



GOVERNMENT OF INDIA
OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE, OPP. SAFDARJUNG AIRPORT, NEW DELHI-110 003

CIVIL AVIATION REQUIREMENTS
SECTION 2 – AIRWORTHINESS
SERIES 'I' PART I

ISSUE II, 15TH MARCH, 1976

EFFECTIVE: FORTHWITH

Subject: Aircraft Instruments Overhaul and Periodical Inspections.

1. GENERAL :

- 1.1 Aircraft instruments shall be overhauled and inspected in accordance with the requirements of this part of CAR Section 2 Series 'I' except where different requirements have been specified by makers of an aircraft or in an operator's approved Maintenance System Manual or in other documents approved or issued by the Director General.
- 1.2 The periodical inspection checks for ascertaining the accuracy of instruments may be made "in-situ" if possible.
- 1.3 Instruments which on test are found defective and do not conform with the maker's/Director General of Civil Aviation's requirements shall be required to be maintained/inspected as per maker's Director General of Civil Aviation's requirements by persons approved for the purpose or shall be replaced with serviceable instruments.
- 1.4 Instruments shall be inspected prior to installation to ensure that
 - (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.

1.5 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.

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 shall submit to DGCA details of programme of repetitive inspections/tests for approval and include in Quality Control cum Maintenance System Manual.

However 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.

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

2. MAGNETIC COMPASSES :

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

- (a) there are no signs of leakage of the liquid;
- (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.

2.1 Calibration and compensation :

Following are the circumstances under which direct reading aircraft magnetic compasses, as installed in aircraft, shall 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 serve shock as in the case of a heavy landing.

Note :- Compass compensation shall 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.

3. OVERHAUL AND PERIODICAL INSPECTION PERIODS :

3.1 The overhaul and periodical inspection periods specified in this part of the CAR Series shall 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

3.2 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 shall be followed:

Instrument	Maximum overhaul Period	Periodical Inspection Period
1. Gyrohorizon indicators, Directional gyro indicators, Automatic pilots (gyro units only)	2 years/1000 hrs. (whichever is earlier.)	
2. Automatic pilot (except gyro units) Airspeed indicators and pitot static system. Turn & bank indicators.	3 years/2000 hrs. (which ever is earlier).	
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.	3 years/2000 hrs. (which ever 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	Bench Check every two years. operator.
---	-----------------------------	---

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.

3.3 Inspection Procedure :

3.3.1 At the periodical inspection period of the instruments specified in paragraph 3.2 of this series :-

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

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

- (b) Magnetic compasses shall be inspected to ensure compliance with the requirements of Paragraph 2 of this series.
- (c) The instruments shall be overhauled/bench checked by an approved agency and certified by an appropriately licensed Aircraft Maintenance Engineer or persons approved for the purpose. However, time pieces (clocks, watches) installed on aircraft having all up weight below 3000 Kgs. can be overhauled/repared by any of the reputed commercial watch makers/watch repairing agencies.

4. COLLECTION OF OPERATIONAL DATA :

In their own interest operators are advised to ask instruments overhauling agencies to furnish them with serious defects (not routine wear and tear) with 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.

5. STORAGE/SHELF LIFE :

5.1 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.

5.2 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 shall be subjected to overhaul in accordance with the approved Overhaul Schedules.
- 5.3 Instruments which require periodic lubrication must be removed from storage and lubricated by appropriately licenced/ approved personnel at periods as recommended by manufacturers and records maintained in this regard.
- 5.4 Instruments whose storage conditions are not in accordance with accepted practices, must be considered as unserviceable requiring complete overhaul.
- 5.5 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.
- 5.6 The shelf life for each type of instrument must be reflected in the operators approved Quality Control Manual/Maintenance System Manual.
- 5.7 The shelf life must be also be indicated on the serviceable tag, issued by the Overhauling Agency, accompanying the instrument/equipment.
- 5.8 Instruments installed on aircraft which has not been operated for a continuous period of six months, shall be subjected to bench check before use.

This supersedes all previous instructions on the subject by DGCA.

Sd/-
(V. N. Kapur)
Director of Airworthiness
for Director General of Civil Aviation