

GR No. 8 Cotton, Linen and Synthetic Fabric-Covered Aircraft

(Previously Issued as Airworthiness Notice No. 20, Issue 8, 20 March 2000.)

I Introduction

This Generic Requirement applies to the issue or renewal of Airworthiness Certificates, or, where appropriate, their associated Airworthiness Review Certificate (ARC) applicable to aircraft, excluding Microlights, that have fabric covering. Fabric coverings may be manufactured from natural materials such as linen or cotton, or other Aviation Approved fabrics produced from polyester or glass fibre.

2 Structural Damage and Deterioration

- 2.1 Removal of the fabric covering of some older types of aircraft has revealed cases of unsuspected structural damage and deterioration. It is therefore important that during routine inspections, any sign of distortion, slackness, wrinkling or discoloration of the covering material is investigated and the cause established.
- 2.2 The use of good maintenance practices, incorporation of adequate and correctly placed drain holes, regular cleaning, and storage of the aircraft in a dry hangar will retard deterioration. Damage will be reduced by using proper ground handling techniques and equipment. Planned periodic inspections of aircraft coverings, structural elements and their attachments are essential in preventing damage and deterioration from going unnoticed.
- 2.3 Following incidents such as heavy landings, high "g" loadings, ground loops and collisions, the aircraft must be inspected to detect any hidden damage or distortion.
 - 2.3.1 This may involve removal of the covering material or provision of access openings and may include inspections using NDT techniques. Experience has shown that structures can appear undamaged until manually loaded during a physical check. Wherever possible, the manufacturer's inspection recommendations should be used. In the absence of specific guidance, refer to CAA CAP 562 – Civil Aircraft Airworthiness Information and Procedures (CAAIP) and/or consult a specialist organisation.
- 2.4 Details of the incident, inspections/repairs carried out should always be entered in the aircraft log book.

3 Fabric Coverings

- 3.1 Many factors can influence the life and condition of covering fabrics, such as: age, contamination, exposure to high humidity, ultra violet light, utilisation and type of operation for which the aircraft has been employed. The type of covering material used will also need to be ascertained as natural materials are much more susceptible to adverse climatic conditions than synthetic materials. However, the improved longevity of synthetic materials often means that internal structures are inspected much less frequently and deterioration can go undetected.
- 3.2 The airworthiness of covering fabrics should be assessed using a method acceptable to the CAA, these being detailed in the Manufacturer's Airworthiness data or where appropriate CAAIP Leaflet 51-150.

NOTE: With suitable training and experience an engineer can usually assess the condition of fabric covering by its appearance, tension and reaction to thumb pressure. Failing this ability, a suitable type of fabric tester should be used. The tester and its method of operation are described in CAAIP Leaflet 51-150.

- 3.3 Cotton and linen fabrics may be replaced with synthetic materials providing they are of a type manufactured and approved for aeronautical use in their country of origin and acceptable (see 3.4 below) as an alternative covering material. Replacement materials must also be appropriate for the intended purpose having properties no less than the original fabric in terms of strength and durability. Application must be in accordance with the applicable procedures with control surfaces re-balanced to the original limits specified. Rib stringing and other materials must have a compatible life expectancy to the replacement covering.

NOTE: Care must be exercised when tautening synthetic fabric using the application of heat. Lightly built wooden structures covered with these materials can become distorted or crushed during the shrinking process. The application of non-tautening dope should be also considered in these cases.

- 3.4 The use of a replacement fabric must be covered by an approved modification, either from an appropriately approved design organisation or through the CAA or EASA as appropriate.
- 3.5 Fabric is classified as a material rather than as a part/component and, subject to the requirements of paragraph 3.4, may be used when the organisation is satisfied that the material meets the required specification and has appropriate traceability. All material must be accompanied by documentation clearly relating to the particular material and containing a conformity to specification statement plus both the manufacturing and supplier source.

4 Certification Requirements

4.1 Certificates of Airworthiness

- 4.1.1 Certificates of Airworthiness and/or associated ARC will only be issued and may only be recommended for renewal in respect of used aircraft if the requirements of paragraphs 4.1.2 and 4.1.3 have been complied with.
- 4.1.2 Certified evidence must be produced to show that an internal inspection sufficient to establish continued structural integrity has been carried out within the period specified in the applicable Maintenance Schedule. The depth of the inspection must be relative to the age of the aircraft, inspection history, known usage, storage conditions/hangarage and the elapsed time since the last full inspection. This should be determined by the certifying person using data from the organisation responsible for Type Design, a maintenance programme agreed by the CAA and the guidance material contained in CAAIP. Access holes may have to be cut to facilitate inspections and these reinforced in accordance with the manufacturers requirements (refer to covering schedule).
- 4.1.3 Certification of the inspections and work carried out must be made by an appropriately Licensed Aircraft Maintenance Engineer, persons specifically Authorised for the purpose or personnel operating under the approval granted to a Maintenance Organisation. Log book entries must be made in sufficient detail to provide an accurate record indicating the extent of the access, inspections carried out, repairs and overhauls performed, and any recovering required since the last structural inspection including reference to the applicable modification approval.

NOTE: CAP 562 Leaflet H-20 describes the certification responsibilities of UK Licensed Aircraft Maintenance Engineers in relation to Articles 25 and 26 and 28 to 31 of the Air Navigation (2009) Order (as amended) and Part 145A.50.

4.2 Permits to Fly

- 4.2.1 Permits to Fly and/or associated ARC will only be issued and may only be recommended for renewal in respect of used aircraft if the requirements of paragraph 4.2.2 have been complied with.
- 4.2.2 At initial issue or the first annual inspection (as applicable) after the 1st October 1999, all fabric covered aircraft must be internally inspected to establish and suitably record their structural integrity. The depth of the inspection must be relative to the age of the aircraft, inspection history, known usage, storage conditions/hangarage and the elapsed time since the last full inspection. This must be certified by persons specifically authorised by the CAA or an organisation approved by the CAA to issue a Flight Release Certificate in order to qualify for issue or renewal of the Permit to Fly. Thereafter, inspections must be performed at a frequency not exceeding 3 years. Access holes may have to be cut to facilitate inspections and these reinforced in accordance with the design requirements (refer to covering schedule).
- 4.2.3 Log book entries must be made in sufficient detail to provide an accurate record indicating the extent of the access, inspections carried out, repairs and overhauls performed and any re-covering required since the last structural inspection including reference to the applicable modification approval.

5 Guidance

- 5.1 Guidance material relating to fabric covered aircraft may be found in a number of publications which include:
- CAAIP Leaflet 51-150 Fabric Covering
 - CAAIP Leaflet 51-160 Doping
 - CAAIP Leaflet 51-10 Inspection of Wooden Structures
 - CAAIP Leaflet 51-50 Inspection of Metal Aircraft Structures
 - CAAIP Leaflet 51-120 Rigging checks on Aircraft
 - FAA AC 43.13 Acceptable Methods, Techniques and Practices
- 5.2 Attention is drawn to CAAIP Leaflet 51-20 which refers to deterioration in wooden structures and in glued joints in aircraft, and British Civil Airworthiness Requirements (BCAR) A3-7 Issue and Renewal of Permits to Fly.