



**UNITED KINGDOM
CIVIL AVIATION AUTHORITY**

MPD No: 1998-019 R1

Issue Date: 31 January 2002

MANDATORY PERMIT DIRECTIVE

The following action required by this Mandatory Permit Directive (MPD) is mandatory for applicable aircraft registered in the United Kingdom operating on a UK CAA Permit to Fly.

MPD : 1998-019 R1 LIGHT AIRCRAFT (INCLUDING ROTORCRAFT) BELOW 2730 KG

Subject: Flexible fuel tubing.

Applicability: Light aircraft (including rotorcraft) below 2730 kg.

Reason: A fatal accident occurred to a Montgomerie-Bensen gyroplane when the fuel tank contents sight tube became disconnected from the lower fuel tank outlet pipe and the pilot possibly distracted by the leaking fuel, lost control of the gyroplane. The sight tube, which was made from a clear PVC material with an internal reinforcement weave, had shrunk and become hard and brittle, due to prolonged exposure to gasoline fuel. MPD1998-019 was issued requiring an immediate inspection before the next flight and inspection of all fuel tube within three months. Whilst the compliance dates for this MPD have now passed there is still a need for newly constructed aircraft to be inspected and for guidance to inspectors during the annual inspection and renewal of the Permit to Fly. This MPD therefore requires continued vigilance on the part of owners and inspectors in seeking out and replacing defective and PVC fuel tubes.

Compliance: Prior to the issue or the renewal of a Permit to Fly, inspect all tubing used in fuel systems, including fuel delivery tubes, vent tubes and fuel sight gauge tubes for discoloration, shrinkage, degradation or embrittlement. Replace any tubing found to be defective or suspected of being PVC, with alternative tubing manufactured from an identifiable material suitable for use in gasoline fuel systems or where appropriate for the engine installation, two-stroke fuel/oil mixtures.

Inspections are to be carried out by an inspector suitably authorised by the CAA, PFA or BMAA and whose licence number or inspection number should be shown in the aircraft log book to record compliance with this MPD.

continued overleaf

Note 1: PVC tubing is normally transparent and flexible when supplied, but progressively discolours and hardens with age and exposure to gasoline fuels and vapour. Commercial types of PVC tubing contain a coarse-mesh nylon thread reinforcement, woven on the 45 degree bias, which is visible within the tube. However, it should be noted that some kinds of commercial tubing incorporating the 45 degree bias woven reinforcement, whilst looking externally indistinguishable from PVC tubing, are not manufactured from PVC and therefore acceptable.

Note 2: Identification of replacement materials. The following British Standards have been identified and may be referred to by owners to assist in their selection of a suitable alternative:

BS ISO 4639 : Rubber tubing and hoses for fuel circuits for internal - combustion engines.

BS EN ISO 7840 : 1 995 Small craft - Fire resistant fuel hoses.

BS 2F 67 : 1 980 Hose for aviation fuel and engine lubricating oil for aeronautical purposes.

BS 3G.100 : Part 2 : Section 3 : Subsection 3.13 : December 1973 General requirements for equipment for use in aircraft.

BS AU108 : Flexible pipes, rubber, for automobiles (now superseded).

Commercially available material manufactured from polyurethane, without plasticisers, marketed under various brand names such as "Blue Urethane" are also available. However when choosing a replacement material account should be taken of the purpose to which the tube is to be put and its location. Materials such as "Blue Urethane" should not be used in any area that could be impinged upon by a fire, unless a sight tube is essential.

Note 3: Inspectors should:

Satisfy themselves that the specification and quality of the fuel tubing, its cleanliness, the bore size of the replacement fuel tubing, and its fit onto the various end connections are suitable for the application. Suitable hose clips or equivalent must be used at the end connections, which provide adequate grip and prevent leakage of fuel or vapour.

Ensure that the routing and security of the tubing is such as to avoid engine hot spots and inverted 'U's in the pipe runs, after the tubing has been replaced.

Ensure adequate free flow and correct engine functioning at all power settings.

Note 4: Owners of aircraft with manufacturers support should seek the advice of the manufacturer when replacing fuel tubing, and comply with any additional recommendations issued in the form of service bulletins or instructions.

The original MPD became effective on 1 March 1999. Revision 1 becomes effective on 4 February 2002.