AD/DC3/15 Engine Nacelle Fire Protection - Modifications 4/84 Amdt 2

Applicability: All models.

Requirement: 1. Install a fire detection system for each engine nacelle as follows:-

Fire Detectors:

(a) Install a continuous type detector or a minimum of six (6) unit detectors in the accessory compartment. Mount unit detectors or portion of the continuous type detector at suitable locations on or near the forward face of the firewall and dispose as evenly as possible about the nacelle axis. In installations where the airstream from the oil cooler is discharged into the accessory compartment, mount at least one unit detector or portion of a continuous detector in the path of the airstream.

(b) All detectors used shall be of an approved type.

Detector Circuits:

(a) Provide separate independent detector circuits for each nacelle.

(b) Provide a test switch in the cockpit in each detector circuit and arrange the circuit so that the operation of the test switch checks the circuit protection, the indicator lamps, and the continuity of the detector wiring.

Indicators:

(a) Provide separate indicators in the cockpit for each nacelle; each indicator shall consist of two red lamps connected in parallel.

(b) Ensure that the indicating lights are in the field of vision of the pilot and co-pilot and are separated sufficiently to prevent confusion as to the source of the fire.

(c) In addition to indicating lights, install an audible warning device, which is capable of being silenced and common to all detector circuits, in the cockpit. Ensure that the noise emitted by such device is distinctive from that emitted by any other audible warning device in the cockpit.

Fire Extinguisher System:

Modify the existing fire extinguisher installation to comply with the following requirements:-

(a) Ensure that two separate charges of extinguishant are available to each nacelle. Each extinguishant charge shall consist of at least seven (7) pounds of carbon dioxode or six (6) pounds of methyl bromide.

(b) Plumb the extinguishant to an accessory compartment spray ring. Where the airstream from the oil cooler discharges into the accessory compartment, arrange the extinguisher spray line so that an adequate amount of extinguishant is discharged into the oil cooler honeycomb.

Note: Existing installations, where portion of the extinguishant is discharged into the carburettor air intake, may be retained if not more than 25 per cent of the extinguishant, by weight, enters the intake.

(c) Ensure that extinguisher lines and spray rings forward of the firewall are of fireproof construction, except that short flexible lengths may consist of fire-resistant coupled hose assemblies.

(d) Where the extinguisher bottles are electrically operated, arrange the firing circuit so that the failure of the wiring to any one bottle will not affect the operation of the remaining bottles.

Fluid Shut-off Valves:

Install shut-off valves in the fuel, oil and hydraulic fluid systems, as follows:-

(a) Mount valves immediately to the rear of each nacelle firewall and insert in the lines conveying fluid to the appropriate engine-driven pump.

(b) Install valves so that they are capable of being operated rapidly while the aeroplane is in flight.

Ventilation of Electrical Accessories:

(a) Modify the ventilation systems for the generator and magnetos so that the source of their air intake is not within the accessory compartment or adjacent to the exhaust stack.

(b) Replace with appropriate fire-proof components, ventilating tubes and ducts in cases where their burning through or collapse could permit the spread of fire from the engine compartment to the accessory compartment.

Fluid Lines:

(a) Replace, with approved flexible fire-resistant hose assemblies, all lines which carry flammable fluids or gases within the accessory compartment. Alternatively, fire-proof rigid lines may be used, connected to fire-resistant coupled flexible hose assemblies.

(b) Replace, with a fire-proof line, the line from the oil tank to the propeller feathering pump and the oil tank drain line where these lines lie forward of the firewall.

Note: For the purpose of this Directive a fire-resistant hose assembly wrapped in asbestos lagging enclosed in a synthetic rubber or P.V.C. sheath may be regarded as fireproof.

Electric cables:

(a) Ensure that wiring forward of the firewall is P.V.C. insulated glass braided cable to Specification AN-J-C-48a or other cable approved as fire-resistant Class II for the following circuits:-

(I) Fire detectors

(II) Propeller feathering

(III) Those portions of the starter circuit in which a fault could adversely affect the propeller feathering.

(b) Protect cables with glass outer braiding from abrasion by wrapping with P.V.C. tape, shrouding with P.V.C. tubing, or by other approved means.

(c) Sleeve cables in electrically unprotected circuits either individually, in P.V.C. tubing, or enclose in metal conduit. Before enclosing in metal conduit protect glass outer braided cables from abrasion in accordance with subparagraph (b) above.

(d) Install cables and cable runs forward of the firewall in the cooler parts of the engine nacelle. Arrange cable runs so that they are not exposed to mechanical damage during normal engine operation or during maintenance. Cables and cable conduits shall not be directly clipped to the engine diaphragm.

<u>Sealing of Firewall Diaphragm:</u>

Rework the firewall and diaphragm to ensure that they will provide a complete seal against the passage of flame and hot gas from one nacelle compartment to another. In particular, the following modifications are required:-

(a) Seal all gaps and holes in firewall and diaphragm with fire-proof material.

(b) Replace with fire-proof components, all existing light alloy fittings, connections, disconnect plates, etc., on firewall and diaphragm. Alternatively, shroud existing light alloy parts with adequate fire-proof shields so that, in event of an engine nacelle fire, they will not be subjected to flame or their failure will not allow flame to penetrate the firewall.

(c) Replace a sufficient number of the existing light alloy rivets on the firewall with steel rivets or bolts to ensure that, in the event of an accessory compartment fire hot enough to melt light alloy, the firewall will remain intact and impervious to flame.

Compliance: Unless already accomplished, within 100 hours time in service after 31 March 1984.

Background: This Directive is raised in issue to remove the prohibition imposed on the use of free hose and clamps assemblies in Amdt. 1 of this directive. The prohibition is unnecessary for these large diameter low pressure applications considering their long satisfactory history.