Government of India
Director General of Civil Aviation
Aircraft Engineering Directorate
New Delhi-110003

Effective
Date: 12-11-2018

Indian Technical Standard Order

Subject: ITSO-C140, AEROSPACE FUEL, ENGINE OIL, AND HYDRAULIC FLUID HOSE ASSEMBLIES

1. PURPOSE. This Indian Technical Standard Order (ITSO) is for manufacturers of aircraft hose assemblies, commonly used in aerospace fuel, engine oil, and hydraulic fluid systems applying for an ITSO Authorization (ITSOA).

2. APPLICABILITY. This ITSO affect applications submitted after its effective date.

3. REQUIREMENTS. The aircraft hose assemblies commonly used in aerospace fuel, engine oil, and hydraulic fluid systems, identified and manufactured under this ITSO must meet the Minimum Performance Standard (MPS) qualification set forth in Sections 1, 3, 4, and 5 of Revision E of the Society of Automotive Engineers, Inc. (SAE) Aerospace Standard Document No. 150 (AS150 REV E), 2005-08, titled "Hose Assembly, Type Classifications of, Basic Performance and Fire Resistance."

a. Functionality. This ITSO standard applies to all aerospace fuel, engine oil, and hydraulic fluid hose assemblies identified or marked with ITSO-C140 and designed for use in any area of an aircraft including areas of high temperatures or potential fire zones.

b. Failure Condition Classification. Exclusion of a function defined in AS150 REV E may create a failure condition. The applicant must develop each hose assembly to at least the design assurance level commensurate with the failure condition classification of the system in which it is installed.

c. Functional Qualification. Each hose assembly must qualify to the performance standards as specified in SAE/AS150 REV E. This must be verified through continuous sampling of hose assemblies during the manufacturing process. The required performance must be demonstrated by using the test conditions specified in SAE/AS150 REV E.

d. Environmental Qualification. A representative sample of the hose assemblies to be certified as "fire resistant" or "fireproof" under this ITSO must be subjected to the test conditions specified in Sections 4 and 5 of SAE / AS1055 REV E, "Fire Testing of Flexible Hose, Tube Assemblies, Coils, Fittings, and Similar System Components," 2017. The environmental test requirements specified in RTCA Document No. DO-160G, "Environmental Conditions and Test Procedures for Airborne Equipment," dated 03 October, 2017, have been evaluated and compliance with SAE / AS150 REV E will ensure compliance with the provisions of RTCA Document DO-160G.

e. Deviation. The DGCA has provisions for alternative or equivalent means of compliance with these MPS. Applicants seeking to invoke these provisions must apply for a deviation in accordance with DGCA CAR 21.610.

4. MARKING. Parts manufactured under this ITSO must be permanently and legibly marked in accordance with CAR 21.807. The date of manufacture of the part must be on all hose assemblies and the applicable "Type" code listed in Table 1 of SAE /AS150 REV E must be added as an extension to the ITSO number (e.g., ITSO-C140-Type IIIaB). The marking information required by this paragraph and CAR 21.807 must be applied directly on the hose assembly or on a band permanently affixed to the hose assembly.

5. APPLICATION DATA REQUIREMENTS.

a. The applicant must submit to DGCA(AED), a statement of compliance (Form CA-35 of CAR-21) along with documents required under CAR 21.605 and one copy of each of the following technical data in support of design and production capability:

(1) Operating Instructions and Equipment Limitations. Provide operating instructions and equipment limitations for each type of hose assembly. The instructions and limitations must list the minimum bend radius, maximum twist limitations, maximum operating pressure, maximum operating temperature, minimum flow rate, and fire resistance codes per Section 1.2 of SAE/AS150 REV E, as applicable.

(2) Installation procedures and limitations sufficient to ensure that the hose assembly, when installed according to the installation or operational procedures, still meets the requirements of this ITSO. Limitations must identify any unique aspects of the installation. The limitations must include a note with the following statement:

> NOTE: Satisfactory compliance with the conditions and tests required for ITSO approval indicates the hose assembly has met the minimum performance standards specified in this ITSO. It is the responsibility of those desiring to install this hose assembly on an aircraft or engine to determine that the installation will not cause the hose assembly to be subjected to conditions in excess of those for which it has been approved. The hose assembly may only be installed in a manner acceptable to, or approved by, the DGCA.

(3) Material and Process Specifications List. Provide a list of all specifications used in manufacturing and assembling each ITSO hose assembly and provide a material description for the hoses and fittings.

(4) Drawings List. Provide a list by part number of all design standard drawings of the components that make up the hose assembly.

(5) Drawings. Provide design standard drawings listed in paragraph 5. a. (4) of this ITSO.

(6) Inspection and Evaluation Instructions. Provide instructions for the periodic inspection and evaluation necessary for continued airworthiness once the hose assembly is installed, including recommended inspection intervals and service life considerations.

(7) Quality Control. Provide all functional test specifications that will be used to test each production part to ensure compliance with this ITSO, as required by CAR 21.605.

(8) Manufacturer's ITSO Qualification Test Report. Provide a copy of completed test reports.

(9) if applicable Name plate drawing may be provided

(10) Documentation. Provide any other appropriate documentation as specified in SAE / AS150 REV E.

6. MANUFACTURER DATA REQUIREMENTS

a. In addition to the data package required to be furnished directly to the DGCA, each manufacturer must have the following technical data available for review by DGCA having purview of the manufacturer's facilities:

(1) Functional Qualification Specifications. All specifications used to qualify each part's compliance with this ITSO.

(2) Equipment Calibration Procedures. All applicable procedures needed to calibrate the equipment used to manufacture components and hose assemblies under this ITSO.

(3) Production Records. Production history with applicable test/control records.

(4) Hose Assembly Drawings. All drawings required to manufacture and assemble a hose assembly under this ITSO.

7. FURNISHED DATA REQUIREMENTS

a. If furnishing one or more articles manufactured under this ITSO to one entity (such as an operator or repair station), provide one copy or on-line access to the data in paragraphs 5.a (1) through (6) of this ITSO. Add any other data needed for the proper installation, certification, use, or for continued compliance with the ITSO, of the hose assembly. The OEM is responsible for providing technical data and information to an operator or aircraft owner requesting such data or information.

8. AVAILABILITY OF REFERENCED DOCUMENTS.

a. AS150 REV E, AS1055 REV E, and other SAE documents referenced in those documents may be purchased online through website: http://www.sae.org

b. CAR 21 is available on DGCA website (www.dgca.nic.in)

c. Copies of RTCA documents may be purchased on-line through : http://www.rtca.org

d. MIL-H documents identified in SAE / AS150 REV E may be referred online.

(G. Rajasekar)
Joint Director General
For Director General of civil Aviation