Department of Transportation
Federal Aviation Administration
Aircraft Certification Service
Washington, DC

TSO-C53a

Date: 2/1/61

Technical Standard Order

Subject: TSO-C53a, FUEL AND ENGINE OIL SYSTEM HOSE ASSEMBLIES

Part 514 - Technical Standard Orders for Aircraft Materials, Parts, Processes, and Appliances

Part 514 contains minimum performance standards and specifications of materials, parts, processes, and appliances used in aircraft and implements the provisions of sections 3.18, 4a.31, 4b.18, 6.18 and 7.18 of the Civil Air Regulations. The regulation uses the Technical Standard Order system which, in brief, provides for FAA-industry cooperation in the development of performance standards and specifications which are adopted by the Administrator as Technical Standard Orders, and a form of self-regulation by industry in demonstrating compliance with these orders.

Part 514 consists of two subparts. Subpart A contains the general requirements applicable to all Technical Standard Orders. These provisions are summarized below for the convenient reference of the public. Subpart B contains the technical standards and specifications to which a particular product must conform, and each Technical Standard Order is set forth in the appropriate section of Subpart B. The subject Technical Standard Order is printed below. ANY TECHNICAL STANDARD ORDER MAY BE OBTAINED BY SENDING A REQUEST TO FAA, WASHINGTON 25, D.C.

SUBPART A--GENERAL

This subpart provides, in part, that a manufacturer of an aircraft material, part, process, or appliance for which standards are established in Subpart B, prior to its distribution for use on a civil aircraft of the United States, shall furnish a written statement of conformance certifying that the material, part, process, or appliance meets the applicable performance standards established in this part. The statement of conformance must be signed by a person duly authorized by the manufacturer, and furnished to the Chief, Engineering and Manufacturing Division, Bureau of Flight Standards, Federal Aviation Agency, Washington 25, D. C.

Subpart A also requires appropriate marking of materials, parts, processes, and appliances as follows:

(a) Name and address of the manufacturer responsible for compliance,

(b) Equipment name, or type or model designation,

(c) Weight to the nearest pound and fraction thereof,

(d) Serial number and/or date of manufacture, and

(e) Applicable Technical Standard Order (TSO) number.

In addition, Subpart A provides that no deviation will be granted from the performance standards established in Subpart B, and that the Administrator may take appropriate action in the event of noncompliance with Part 514.

SUBPART B

§ 514.52 Fuel and engine oil system hose assemblies (rubber or tetrafluoroethylene tube and wire braid construction) - TSO-C53a-- (a) Applicability -- (1) Minimum performance standards. Minimum performance standards are hereby established for new models of fuel and engine oil system hose assemblies [1/] of the following types manufactured on or after February 1, 1961, which are to be used on civil aircraft of the United States. Fuel and engine oil system hose assemblies of the following types approved prior to February 1, 1961, may continue to be manufactured under the provisions of their original approval.

(i) Type A. Non-fire-resistant "normal" temperature hose assemblies which are intended to be used in locations outside fire zones where the fluid and ambient air temperatures do not exceed 250°F.

(ii) Type B. Non-fire-resistant "high" temperature hose assemblies which are intended to be used in locations outside fire zones where the fluid and ambient air temperatures do not exceed 450°F.

(iii) Type C. Fire-resistant "normal" temperature hose assemblies which are intended to be used in locations within fire zones where the fluid and ambient air temperatures do not exceed 250°F.

(iv) Type D Fire-resistant "high" temperature hose assemblies which are intended to be used in locations within fire zones where the fluid and ambient air temperatures do not exceed 450°F.

(a) New models shall comply with the following minimum requirements. Three samples of each size shall be tested.

(1) Type A hose assemblies shall comply with the "3.3 Performance" section requirements of Specification MIL-H-8795A, dated July 25, 1958, [2/] except as noted in subparagraph (2) of this paragraph. The hose incorporated therein shall conform to "3.6

1/ Hose assemblies for use in propeller feathering lines are covered in TSO-C42.
2/ Copies of these specifications may be obtained by addressing a request to: Commander, USAF, Administrative Services Office, Attention EWBFE, Wright-Patterson Air Force Base, Ohio.

Performance" section of Specification MIL-H-8794A, dated July 25, 1958, [2/] except as noted in subparagraph (2) of this paragraph.

(2) Type B hose assemblies shall comply with the "3.6 Performance" section requirements of Specification MIL-H-25579 (USAF) Amendment 2, dated March 19, 1959, [2/] except as noted in subparagraph (2) of this paragraph.

(3) Type C hose assemblies shall comply with the above requirements for Type A hose assemblies and in addition shall pass the fire test described in subparagraph (3) of this paragraph.

(4) Type D hose assemblies shall comply with the above requirements for Type B hose assemblies and in addition shall pass the fire test described in subparagraph (3) of this paragraph.

(2) Exceptions. (i) Type A hose assemblies are not required to comply with sections 3.6.1.2 and 3.6.2.7 of Specification MIL-H-8794A. The operating and proof pressures referred to in Table 1 of that specification shall be those values listed in the "Fuel" column thereof. The burst pressures to be utilized shall be twice the proof pressures listed in the "Fuel" column in Table 1. The foregoing shall likewise apply in showing compliance with Specification MIL-H-8795A.

(ii) Type B hose assemblies are not required to comply with sections 3.6.5, 3.6.7 and 3.6.10 of Specification MIL-H-25579 (USAF). The burst pressures to be utilized shall be twice the proof pressures listed in Table 1 of that specification.

(3) Fire test procedure and requirements. A description of the standard fire test apparatus and its use is in FAA "Standard Fire Test Apparatus and Procedure" (Power Plant Engineering Report No. 3) [3/] . The use of a protective sleeve over the hose and/or end fittings is permitted to facilitate compliance with the fire test requirements. Sleeves or covers shall be secured to the hose assembly so that fire-resistant properties will be maintained.

(i) Oil pressure during fire test: Type C hose assemblies - the operating pressure specified in the "Fuel" column of Table 1 in Specification MIL-H-8795A. Type D hose assemblies - the operating pressure specified in Table 1 of Specification MIL-H-25579 (USAF).

(ii) Oil flow rate: $5x(\text{Hose assembly actual ID in inches})^2$. (Example: Flow rate for -16 size = $5 \times (7/8)^2 = 3.8$ GPM)

(iii) Duration: 5 minutes.

(iv) Criteria for acceptability: The hose assembly shall be considered acceptable if it complies with these test conditions without evidence of leakage.

3/ Copies of Power Plant Engineering Report No. 3, may be obtained by addressing a request to Aeronautical Reference Branch, Correspondence Inquiry Section, Federal Aviation Agency, Washington 25, D.C.

(b) Marking. The markings required are specified in Subpart A, with the following exceptions:

(1) Trademark may be used in lieu of name, and manufacturer's address is not required.

(2) In lieu of the weight specified in paragraph (c) of Subpart A, the size of the hose assembly shall be shown.

(3) The Applicable TSO number shall be followed immediately by the appropriate type designation, as TSO-C53-Type B. Where a protective sleeve is employed, the information should be legibly stamped on a steel (or other fireproof) band securely affixed to the hose assembly.

(c) Data requirements. The following information and data should be submitted with the letter of conformance.

(1) One copy of drawing showing the hose assembly constructions, materials, part numbers and the recommended maximum and minimum fluid and ambient temperatures for continuous operation. The following data should be shown for each size: Proof and burst pressure (minimum), Operating pressure (maximum), Bending radius (minimum).

(2) One copy of any installation instructions and/or other pertinent information (may be shown on drawing).

(c) Effective date. February 1, 1961.