MS - 158

FEDERAL AVIATION AGENCY

FLIGHT STANDARDS SERVICE

(14 CFR 514)

[Regulatory Docket No. 1693; Notice No. 63-14)

TECHNICAL STANDARD ORDERS FOR AIRCRAFT MATERIALS PARTS AND APPLIANCES

NOTICE OF PROPOSED RULE MAKING

Pursuant to the authority delegated to me by the Administrator (§11.45, 27 F.R. 9585) notice is hereby given that the Federal Aviation Agency has under consideration a proposal to amend Part 514 of the Regulations of the Administrator by adopting a new Technical Standard Order. This Technical Standard Order establishes minimum performance standards for aircraft fabric of a synthetic type for use as an external covering on civil aircraft of the United States. There is an increasing interest in the use of synthetic fabric for aircraft covering and there is an increasing number of makers of synthetic fabric for such use. Therefore in order to provide an adequate and uniform basis for approval of the synthetic fabric, design and testing requirements are needed. This order sets forth these requirements.

Interested persons may participate in the making of the proposed rule by submitting such written data, views or arguments as they may desire. Communications should be submitted in duplicate to the Docket Section of the Federal Aviation Agency, Room A-103, 1711 New York Avenue, N.W., Washington 25, D. C. All communications received on or before May 31, 1963, will be considered by the Administrator before taking action on the proposed rule. The proposals contained in this notice may be changed in light of comments received. All comments submitted will be available in the Docket Section for examination by interested persons at any time.

This amendment is proposed under the authority of Sections 313(a) and 601 of the Federal Aviation Act of 1958 (72 Stat. 752, 775; 49 U.S.C. 1354(a), 1421).

In consideration of the foregoing it is proposed to amend Part 514 as follows:

By adding the following Section 514.89:

§ 514.89 Aircraft fabric, synthetic - TSO-C83.

(a) Applicability. Minimum performance standards are hereby established for aircraft fabric of a synthetic type for use as an external covering on civil aircraft of the United States. Fabric manufactured on or after the effective date of this section shall meet the standards set forth in the Federal Aviation Agency Standard, "Aircraft Fabric, Synthetic", dated November 15, 1962.[1/]

(b) Marking. In lieu of the marking requirements of § 514.3(d), the TSO number, and the manufacturer's name and address shall be marked continuously along the selvage edge of the fabric.

(c) Data requirements. In accordance with the provisions of § 514.2, the manufacturer shall furnish to the Chief, Engineering and Manufacturing Branch, Flight Standards Division, Federal Aviation Agency, in the region in which the manufacturer is located, the following technical data:

(1) Six copies of the specifications describing the fabric;

1/Copies may be obtained upon request addressed to Publishing and Graphics Branch, Inquiry Section, MS-158, Federal Aviation Agency, Washington 25, D. C.

(2) Six copies of applicable installation instructions; and

(3) One copy of the manufacturer's test report.

Director
Flight Standards Service

Issued in Washington, D. C., on APR 8 1963, 19 .

November 15, 1962

Federal Aviation Agency Standard
For
Aircraft Fabric, Synthetic

1.0 Purpose. To establish minimum requirements for approval of aircraft fabric composed of synthetic fibers for use on civil aircraft of the United States.

1.1 Scope. This standard concerns fabrics whose principal application is the covering of aircraft surfaces such as wings, fuselage, tail surfaces and control surfaces.

2.0 Technical Requirements.

2.1 General. The synthetic fibers or yarns shall be of a diameter and grade to produce a cloth meeting the physical requirements of this standard. In this regard commercially designated Type E continuous filament glass fiber yarns as listed in Table II of Specification MIL-Y-1140C are considered acceptable. Glass cloths conforming to Military Specifications MIL-C-9084, MIL-Y-1140C and to MIL-G-1140 in the untreated condition, and meeting Item 2.2 requirements will be found acceptable under the terms of this standard.

2.1.1 Weave. The weave shall be plain (one up and one down).

2.1.2 Processing or Finishing. The processed or finished fabric shall be shown by test or service experience to be compatible with standard aircraft grades of nitrate or acetate butyrate dope, conforming to the military specifications listed in Note (d) (1), or to an equal or higher standard. Also, the finished fabric shall be shown to be compatible with epoxy, polyurethane and polyester type resins conforming to those specifications listed in Note (d) (2). Compatibility can be demonstrated by appropriate examination of the fabric area after wetting by the impregnating agent. After finishing, the fabric shall be reasonably free of oil spots, grease and other contamination, creases, wrinkles, other forms of permanent distortion, and shall not be brittle or fused. The treated fabric shall be uniform in color and shall have drape characteristics not substantially different from the untreated fabric.

2.2 Properties. Cloth shall conform to the following requirements and tests shall be performed on the product supplied in accordance with listed ASTM methods, insofar as practicable.

	Property	Value	Test Method
2.2.1	Weight, oz. per sq. yd., max.	4.0	ASTM D39-61
2.2.2	Thread count, ends per in., min. Warp or Fill	36 x 34	ASTM D39-61
2.2.3	Breaking Strength, either direction, lb. per in., min.	80	ASTM D39-49 or D579-49 (Raveled strip method)
2.2.4	Elongation, when under 70 lb. tension, percent, max. Nominal Width:		ASTM D39-49 (Raveled strip method) (Note (a))
	38 in.	13	
	44 in.	13	
	50 in.	13.5	
	60 in.	14	
	69 in.	15	
	90 in.	16	
2.2.5	Burst Strength, Mullen, Points, min.	170	(Note (b))
2.2.6	Sizing, Finishing, and Other Nonfibrous Materials, percent max.	3.5	D579-49, Section 12 (Note (c))

Notes (a) Elongation at 70 pounds shall be measured from a base line on the chart to a point at which the curve intersects 70 pounds load ordinate with the base line passing through the point where the curve leaves the zero ordinate.

(b) Bursting strength shall be determined with a hydraulic type machine in which the cloth is firmly clamped against a rubber diaphragm, through which the pressure is applied to a circular area of approximately 1 square inch. The pressure required to burst the cloth is registered on an accurate Bourdon tube-type gage, calibrated in pounds per square inch, the readings of which are designated as points. See Federal Specification CCC-T-191b, Method 5122 for details of test.

(c) A desizing operation may be performed, if necessary, to reduce the sizing content to the maximum specified.

(d) (1) The following military specifications apply to aircraft dope, as described, and are listed for information only:

MIL-D-5549A-1;	Clear Dope, Cellulose-Acetate, Butyrate

MIL-D-7850;	Fungicidal Dope, First Coat, Cellulose-Acetate, Butyrate
MIL-D-5550A-1;	Pigmented Dope, Cellulose-Acetate, Butyrate
MIL-D-5551A-2;	Pigmented Dope, Glass, Cellulose-Acetate, Butyrate
MIL-D-5553A-2;	Clear Dope, Cellulose Nitrate
MIL-D-5552A-1;	Clear Dope, Glass, Cellulose Nitrate
MIL-D-5554A-1;	Glass Dope, Cellulose Nitrate
MIL-D-5555-1;	Pigmented Dope, Cellulose Nitrate

(2) The following military specifications apply to epoxy and polyester resins:

MIL-R-9300A;	Resin, Epoxy, low pressure laminating
MIL-R-25042A;	Resin, Polyester, low pressure laminating
MIL-R-7575B;	Resin, Polyester, low pressure laminating

3.0 Quality. The synthetic fibers shall be evenly spun into yarns of proper and uniform yarn count, twist, and diameter to produce the texture and weight required. The yarn shall be reasonably free from nap breaks, broken ends, uneven threads and knots. Yarns shall be closely woven into fabric, uniform in body and appearance, and which shall be reasonably free from striations due to variable weaving operations.

4.0 Tolerances. The following tolerances will be permitted on synthetic fiber cloth:

4.1 Average count (ends and picks): Plus or minus 2

4.2 Average ounces per square yard: Plus or minus 10 percent

4.3 Nominal net width: Plus or minus ½ inch per yard of width

4.4 Length of Roll: The cloth shall be furnished on rolls containing a minimum of 250 yards in length, plus or minus 25 yards

4.5 Length of Cut: The length of a single cut shall be not less than 40 yards except that 20 percent of the total yardage of one width may be in short lengths less than 40 yards. However, short lengths shall be rolled together and the roll properly labeled to indicate that it is composed of short lengths.

5.0 Reports.

5.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product meets the requirements of this specification. This report shall include the purchase order number, material specification number, vendor's number, width and quantity.

6.0 Identification. The cloth shall incorporate a continuous marking to show the TSO number. This marking may be stamped along the selvage or affixed thereto in a manner that will preclude its loss or removal prior to fabric use.

7.0 Flammability. Flammability of the cloth shall be determined in accordance with Commercial Standard for Flammability of Clothing Textiles, No. CS 191-53 of January 30, 1953.