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SUPERSEDING
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MILITARY SPECIFICATION

CLOTH, GLASS-FIBER

This specification is approved for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers requirements for one type of woven glass fiber cloth, to be impregnated with resin and used in plastic components.

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents, of the issue in effect on date of invitation for bids, form a part of the specification to the extent specified herein.

SPECIFICATIONS

Federal

CCC-T-191	Textile Test Methods

Military

MIL-Y-1140	Yarn, Cord Sleeving, Cloth, and Tape-Glass

FSC 8305

MIL-C-9084	Cloth, Glass, Finished for Polyester Resin Laminates
MIL-R-9299	Resin Phenolic, Low-Pressure Laminating

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

Federal

FED-STD-406	Plastics, Methods of Testing

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Preproduction sample. Unless otherwise specified (see 6.2), a preproduction sample shall meet the requirements of this specification.

3.2 Material. The glass fiber cloth shall be manufactured from continuous filament ECE glass yarn and as specified herein. The letter designation shall be in accordance with MIL-Y-1140.

3.3 Construction and physical properties. The construction and physical properties of the finished glass fiber cloth, shall conform to the requirements of Table I.

Table I

Construction and physical properties		
Property	Minimum	Maximum
Warp Yarns per Inch	40.	
Filling Yarns per Inch	28.	
Thickness, Inches	0.014	0.017
Weight, Ounces per Square Yard	13.7	16.7

3.4 Yarn number and ply. The yarn number and ply shall be 150-4/2 for the warp yarn and 450-1/8 for the filling yarn. The yarn number and ply designation shall be in accordance with MIL-Y-1140.

3.5 Width. The width and width tolerance of the fabric shall be as specified by the procuring activity. (See 6.2).

3.6 Finish. The glass fiber cloth shall be cleaned then treated with an A1100 finish.

3.7 Color. The color of the finish glass fiber cloth shall be uniform and shall be characteristic of the applied finish.

3.8 Physical properties after lamination. The finished glass fiber cloth when laminated shall conform to the requirements of Table II.

Table II

Physical properties after lamination

Property	Standard	Wet
Flexural Strength, psi	86,500	69,100
Compressive Strength, psi	49,500	35,800
Tensile Strength, psi	86,100	82,200

3.9 Roll size. Unless otherwise specified, roll length shall be as specified by the procuring activity (see 6.2) with a permissible tolerance of plus or minus 20 percent. A roll shall contain no more than 3 full-width pieces and not less than 15 yards in length, sewn together, and containing no longitudinal seams.

3.10 Workmanship. The finished glass fiber cloth shall be uniform in quality and condition, clean and free from blisters, tears, cracks, and other defects detrimental to fabrication appearance, or performance of the material.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Preproduction sample. Unless otherwise specified (see 6.2), the preproduction sample shall be prepared using the same methods proposed for the preparation of production lots of glass fiber cloth. The preproduction sample shall be subjected to all examinations and tests specified herein. Unless otherwise specified, the government will perform the examinations and tests for preproduction sample acceptance at the contractor's plant. Preproduction samples which do not meet the requirements of this specification shall be rejected and returned to the contractor. Subsequent quantities will not be considered for acceptance until approval of the preproduction samples has been obtained.

4.3 Inspection provisions.

4.3.1 Lot size. A lot shall consist of a unit quantity of the material of the same type, produced under the same conditions, and offered for inspection at one time, but shall not exceed 5,000 yards.

4.3.2 Sampling.

4.3.2.1 For visual examination. Unless otherwise specified (see 6.2), sampling for visual examination shall be in accordance with MIL-STD-105, Inspection Level II.

4.3.2.2 For inspection testing. Unless otherwise specified (see 6.2), sampling for inspection testing shall be limited to two sets of specimens, for each test specified herein, from each inspection lot.

4.3.3 Examination.

4.3.3.1 Visual examination. Visual examination of the samples specified in 4.3.2.1 shall be conducted for the purpose of determining compliance with the requirements in 3.7, 3.9 and 3.10 as well as the preservation, packaging and marking of Section 5.

4.3.3.2 Inspection testing. Inspection testing of the sample specified in 4.3.2.2 to determine compliance with the following characteristics shall be conducted in accordance with their corresponding paragraphs.

a. Warp yarns per inch, see 4.4.1.1.

b. Filling yarns per inch, see 4.4.1.1.

c. Thickness, inches, see 4.4.1.2.

d. Weight, ounces per square yard, see 4.4.1.3.

e. Flexural strength, psi, see 4.4.2.2.

f. Compressive strength, psi, see 4.4.2.3.

g. Tensile strength, psi, see 4.4.2.4.

4.3.3.3 Defects. Classification of glass fabric defects shall be in accordance with MIL-C-9084. The finished glass fiber cloth shall be free from defects except as specified herein.

4.4 Test methods and procedures.

4.4.1 Construction and physical properties.

4.4.1.1 Warp and filling yarn per inch. The yarn per inch shall be determined by Method 5050 of CCC-T-191. The average of 5 specimens, determined to the nearest 0.001 inch, shall be reported.

4.4.1.2 Thickness. The thickness shall be determined by Method 5030 of CCC-T-191. The average of 5 specimens, determined to the nearest 0.001 inch, shall be reported.

4.4.1.3 Weight. The weight shall be determined by Method 5041 of CCC-T-191. The average of 5 specimens, determined to the nearest 0.1 ounce, shall be reported.

4.4.2 Laminate.

4.4.2.1 Fabrication of laminate. The laminate shall be prepared in accordance with MIL-R-9299 except (1) the finish shall be the finish as specified in 3.6 herein. (2) the cloth shall be that specified herein, and (3) the resin shall be that resin to be used in the system for qualification end item use.

4.4.2.2 Flexural strength. The flexural strength, in the longitudinal direction of the laminate, shall be in accordance with Method 1031 of FED-STD-406. The average and range of 5 specimens, determined to the nearest 100 psi, shall be reported.

4.4.2.3 Compressive strength. The compressive strength. edgewise, in the longitudinal direction of the laminate, shall be in accordance with Method 1021 of FED-STD-406. The average of 5 specimens, determined to the nearest 100 psi, shall be reported.

4.4.2.4 Tensile strength. The tensile strength, in the longitudinal direction of the laminate, shall be in accordance with Method 1011 of FED-STD-406, Type II. The average of 5 specimens, determined to the nearest 100 psi, shall be reported.

4.5 Rejection. If a test specimen fails to meet any of the tests required by this specification, the lot represented shall be rejected.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, packing, and marking. Unless otherwise specified (see 6.2), preservation, packaging, packing and marking shall be as specified herein.

5.2 Level A and B. Not applicable.

5.3 Level C. The glass fiber cloth shall be packaged and packed in substantial containers of the type, size and kind commonly used for the purpose, so constructed as to insure acceptance and safe delivery by common or other carriers, at the lowest rate, to the point of delivery.

5.4 Marking. In addition to any special marking required by the contract or order, shipments shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The material covered by this specification in intended for use as reinforcing fibers for molded plastic components in rocket motors.

6.2 Ordering data. Procurement documents should include, but not be limited to the following:

a. Title, number, and date of this specification.

b. Whether a preproduction sample is required.

c. Applicable levels of sample and inspection methods, if other than specified.

d. Applicable levels of preservation, packaging, and packing.

e. Special marking, if applicable.

f. Length and width required.

6.3 Supersession data. This specification includes the requirements of Missile Interim Specification MIS-10042, dated 18 February 1964.

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