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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3607F

Issued MAY 1948
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Submitted for recognition as an American National Standard

Superseding AMS 3607E

Plastic Sheet
Cotton Fabric Reinforced Phenol-Formaldehyde

FOREWORD

Changes in this reaffirm are editorial/format only.

1. SCOPE:

1.1 Form:

This specification covers a phenol/formaldehyde-resin-impregnated, cotton fabric laminate in the form of sheet.

1.2 Application:

This sheet has been used typically for parts, such as fairleads and tubing supports, requiring good mechanical properties but where electrical properties are of secondary importance and no post-forming is required, but usage is not limited to such applications.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7154 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 256	Impact Resistance of Plastics and Electrical Insulating Materials
ASTM D 570	Water Absorption of Plastics
ASTM D 635	Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D 638	Tensile Properties of Plastics
ASTM D 638M	Tensile Properties of Plastics (Metric)
ASTM D 695	Compressive Properties of Rigid Plastics
ASTM D 695M	Compressive Properties of Rigid Plastics (Metric)
ASTM D 709	Laminated Thermosetting Materials
ASTM D 790	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D 790M	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials (Metric)

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1	DoD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication:

Sheet shall be constructed of laminations of cotton fabric which have been impregnated with a phenolic-type resin and properly cured.

3.1.1 Color: Shall be natural (tan). Supplementary coloring, when specified, shall be substantially uniform throughout the sheet. Faces of sheet shall be substantially free from streaks and stains.

3.1.2 Finish: Shall be semi-gloss.

3.2 Properties:

Sheet shall conform to the requirements shown in Table 1, 3.2.5, 3.2.6, 3.2.7, 3.2.8, and 3.2.9 in both the warp and filling directions of the base fabric; tests shall be performed on the sheet supplied and in accordance with specified test methods, insofar as practicable. Where requirements vary with standard thickness, use the value for the next lower thickness for thicknesses not specified.

TABLE 1 - Properties

Paragraph	Property	Requirement	Test Method
3.2.1	Tensile Strength, minimum	7.50 ksi (51.7 MPa)	ASTM D 638 or ASTM D 638M
3.2.2	Compressive Strength, flatwise, minimum	35.0 ksi (241 MPa)	ASTM D 695 or ASTM D 695M
3.2.3	Flexural Strength, flatwise, minimum	16.0 ksi (110 MPa)	ASTM D 790 or ASTM D 790M
3.2.4	Impact Strength, edgewise, minimum per unit of notch	2.0 foot-pounds per inch (107 J/m)	ASTM D 256

3.2.5 Afterglow (See 8.2): Shall be as shown in Table 2, determined in accordance with 4.5.1.

TABLE 2 - Maximum Afterglow

Nominal Thickness Inch	Nominal Thickness Millimeters	Afterglow Without Heating Seconds	Afterglow After Heating Seconds
Up to 1/4, incl	Up to 6.4, incl	4	15
Over 1/4 to 1/2, incl	Over 6.4 to 12.7, incl	15	25
Over 1/2 to 1, incl	Over 12.7 to 25.4, incl	35	45
Over 1	Over 25.4	45	70

3.2.6 Water Absorption: Shall be as shown in Table 3, determined in accordance with ASTM D 570 on specimens immersed for 24 hours ± 0.5 at room temperature.

TABLE 3 - Water Absorption

Nominal Thickness Inch	Nominal Thickness Millimeters	Maximum Weight Gain Percent
1/32	0.8	8.0
3/64	1.2	5.2
1/16	1.6	4.4
3/32	2.4	3.2
1/8	3.2	2.5
5/32	4.0	2.2
3/16	4.8	1.9
7/32	5.6	1.8
1/4	6.4	1.6
1/2	12.7	1.2
3/4	19.0	1.1
1 and over	25.4 and over	1.0

3.2.7 Weather Resistance: When specified, sheet shall have weather resistance acceptable to purchaser, determined by a procedure agreed upon by purchaser and vendor.

3.2.8 Corrosion: Sheet shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service. Discoloration of metals shall not be considered objectionable. Method of test and standards for acceptance shall be as agreed upon by purchaser and vendor.

3.2.9 Machinability: Sheet, at room temperature, shall not split, crack, chip, or delaminate when punched in nominal thicknesses 1/8 inch (3.2 mm) and under or when drilled, sawed, or machined in any thickness.

3.3 Quality:

Sheet, as received by purchaser, shall be uniform in quality and condition and free from blisters, wrinkles, cracks, crazing, delamination, and surface roughness, and reasonably free from other imperfections such as scratches and dents.

3.4 Sizes and Tolerances:

Shall be as follows:

3.4.1 Thickness: Standard thicknesses and tolerances shall be in accordance with Table 4.

TABLE 4A - Thicknesses and Tolerances, Inch/Pound Units

Nominal Thickness Inch	Tolerance Inch plus and minus	Nominal Thickness Inch	Tolerance Inch Plus Only	Nominal Thickness Inches	Tolerance Inch Plus only
1/32	0.0065	5/16	0.035	1	0.065
3/64	0.0075	3/8	0.040	1-1/8	0.069
1/16	0.0075	7/16	0.044	1-1/4	0.073
3/32	0.009	1/2	0.048	1-3/8	0.077
1/8	0.010	5/8	0.053	1-1/2	0.081
5/32	0.011	3/4	0.058	1-5/8	0.085
3/16	0.0125	7/8	0.062	1-3/4	0.089
7/32	0.014			2	0.097
1/4	0.030				

TABLE 4B - Thicknesses and Tolerances, SI Units

Nominal Thickness Millimeters	Tolerance Millimeters plus and minus	Nominal Thickness Millimeters	Tolerance Millimeters Plus only	Nominal Thickness Millimeters	Tolerance Millimeters Plus Only
0.8	0.165	7.9	0.89	25.4	1.65
1.2	0.190	9.5	1.02	28.6	1.75
1.6	0.190	11.1	1.12	31.8	1.85
2.4	0.23	12.7	1.22	34.9	1.96
3.2	0.25	15.9	1.35	38.1	2.06
4.0	0.28	19.0	1.47	41.3	2.16
4.8	0.318	22.2	1.57	44.4	2.26
5.6	0.36			50.8	2.46
6.4	0.76				

3.4.2 Length and Width: Shall not vary more than ±1 inch (±25 mm) from the nominal dimensions ordered.

3.4.3 Warp and Twist: Shall not exceed 1% based on a 36-inch (914-mm) length, determined in accordance with ASTM D 709.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to the requirements of this specification.

4.2 Classifications of Tests:

4.2.1 Acceptance Tests: Tests for compressive strength (3.2.2), flexural strength (3.2.3), and water absorption (3.2.6) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of sheet to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient sheet shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A lot shall be all sheet of the same nominal thickness produced from the same batches of raw materials in a single production run under the same fixed conditions and presented for vendor's inspection at one time but shall not exceed 1500 square feet (140 m^2).

4.3.1.2 When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample sheet shall be approved by purchaser before sheet for production use is supplied, unless such approval be waived by purchaser. Results of tests on production sheet shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production sheet which are essentially the same as those used on the approved sample sheet. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample sheet. Production sheet made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Afterglow: Specimens approximately 1/2 x 6 inches (12.7 x 152 mm) shall be placed in a shielded area of subdued light, such as an unlighted fume hood, and mounted horizontally as in ASTM D 635, except that the screen shall not be used. A Meker or similar large-top burner with a flame approximately 1 inch (25 mm) long shall be placed so that the tip of the flame contacts the sheet and approximately 1 inch (25 mm) of the sheet is covered by the flame. Specimens shall be heated for 15 seconds ±1 for each 1/32 inch (0.8 mm) of nominal thickness. At the end of the ignition period, the burner shall be removed, the flame on the specimen blown out, and the duration of visible glow noted.

4.5.1.1 Specimens to be tested without heating shall be conditioned for not less than four hours at 23 °C ± 1 (73 °F ± 2) and 50% ± 2 relative humidity.

4.5.1.2 Specimens to be tested after heating shall be conditioned for 168 hours ± 2 at 105 °C ± 1 (221 °F ± 2).

4.6 Reports:

The vendor of sheet shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the sheet conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3607F, vendor's material designation, size, and quantity.

4.7 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the sheet may be based on the results of testing three additional specmens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the sheet represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 A lot of sheet may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.