Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3940F

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FIBERBOARD, HARD-PRESSED, STRUCTURAL

1. SCOPE:

1.1 Form: This specification covers hard-pressed fiberboard in the form of flat panels.

1.2 Application: Primarily for parts requiring moderate strength, such as panelling and sheathing of shipping containers.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D1037 - Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-W-3448 - Wallboard, Packaging of

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication: The product shall consist of wood fibers physically or chemically separated, felted, and heavily compressed to produce the properties specified in 3.2, using the natural wood lignins or other suitable adhesive as a bonding agent, in accordance with the following:

3.1.1 Wood Species: Shall be one or a combination of the following:

Spruce	Cottonwood
Fir	Willow
Poplar	Pine
Gumwood	Redwood
Aspen	Douglas Fir

Printed in U.S.A.

3.1.2 Laminating: Panels 5/16 in. (7.9 mm) and under in nominal thickness shall be one solid sheet. Panels over 5/16 in. (7.9 mm) in nominal thickness shall be laminated from thinner sheets. Panels 1/4 in. (6.4 mm) and over in nominal thickness and requiring both faces smooth may be laminated from thinner sheets. Bonding of laminated panels shall be accomplished with a thermosetting synthetic resin glue resistant to formation and growth of molds and fungi.

3.1.3 Chemical Treatment: Panels may be chemically treated to improve strength and abrasion resistance and to reduce moisture absorption.

3.2 Properties: Fiberboard shall conform to the following requirements, determined in accordance with ASTM D1037, Part B, and, except for density, shall be reported as the average of all values for each test:

3.2.1 Density: Shall be not lower than 31 lb per cu ft (497 kg/m^3).

3.2.2 Tensile Strength:

3.2.2.1 Parallel to Surface: Shall be not lower than 3500 psi (24.1 MPa); strength shall be approximately equal in all surface directions.

3.2.2.2 Perpendicular to Surface: Shall be not lower than 150 psi (1.03 MPa).

3.2.3 Modulus of Rupture: Shall be not lower than 7000 psi (48.3 MPa).

3.2.4 Water Resistance:

3.2.4.1 Water Absorption, by Weight: Shall be not greater than the following as applicable to the surface finish specified:

Nominal Thickness		Absorption, %	
Inch	(Millimetres)	Smooth One Side (S1S)	Smooth Both Sides (S2S)
1/12	2.1	30	--
1/10	2.5	20	25
1/8	3.2	15	20
3/16	4.8	12	18
1/4	6.4	10	12
5/16	7.9	8	11
3/8	9.5	8	10

3.2.4.2 Thickness Swelling: Shall be not greater than the following as applicable to the surface finish specified:

Nominal Thickness		Thickness Increase, %	
Inch	(Millimetres)	Smooth One Side (S1S)	Smooth Both Sides (S2S)
1/12	2.1	25	--
1/10	2.5	16	20
1/8	3.2	11	16
3/16	4.8	10	15
1/4	6.4	8	11
5/16	7.9	8	10
3/8	9.5	8	9

3.2.4.3 Water resistance requirements for fiberboard over 3/8 in. (9.5 mm) in nominal thickness Ø shall be as agreed upon by purchaser and vendor.

3.3 Workability: Fiberboard shall not crack, split, chip, or delaminate when drilled, sawed, or nailed perpendicularly to the surface.

3.4 Quality: Fiberboard shall be sound and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts. Panels shall be flat and shall have at least one face smooth; laminated panels shall be smooth on both surfaces.

3.5 Tolerances: Unless otherwise specified, the following dimensions and tolerances shall apply:

3.5.1 Thickness: Shall be as specified in Table I, measured in accordance with ASTM D1037:

TABLE I

Ø Nominal Thickness Inches	Actual Thickness Inches
1/12	0.070 - 0.090
1/10	0.091 - 0.100
1/8	0.115 - 0.155
3/16	0.165 - 0.205
1/4	0.210 - 0.265
5/16	0.290 - 0.335
3/8	0.350 - 0.400
7/16	0.410 - 0.460
1/2	0.475 - 0.525
5/8	0.600 - 0.650
11/16	0.660 - 0.710
3/4	0.725 - 0.775
13/16	0.785 - 0.835
7/8	0.850 - 0.900
1	0.975 - 1.025
1-1/8	1.115 - 1.155

TABLE I (SI)

Nominal Thickness Millimetres	Actual Thickness Millimetres
2.1	1.78 - 2.29
2.5	2.31 - 2.54
3.2	2.92 - 3.94
4.8	4.19 - 5.21
6.4	5.33 - 6.73
7.9	7.37 - 8.51
9.5	8.89 - 10.16
11.1	10.41 - 11.68
12.7	12.06 - 13.34
15.9	15.24 - 16.51
17.5	16.76 - 18.03
19.0	18.42 - 19.68
20.6	19.94 - 21.21
22.2	21.59 - 22.86
25.4	24.76 - 26.04
28.6	28.32 - 29.34

3.5.2 Length and Width: Nominal length shall be as ordered and nominal width shall be 4 ft (1.22 m) or 5 ft (1.52 m), as ordered. Tolerance on length and width shall be ± 1/64 in. per ft (1.3 mm/m) of linear dimension.

3.5.3 Squareness: The difference in lengths of the two face diagonals of a panel shall be not greater than 1/64 in. per ft (1.3 mm/m) of length of panel. Opposite edges of panels shall not vary more than 1/8 in. (3.2 m) in length.

3.5.4 Edge Straightness: Edges of panels shall be straight within 1/16 in. per ft (1.3 mm/m) of length or width, determined by stretching a string or wire from one corner to the adjacent corner and measuring the greatest distance between the string or wire and the panel edge being tested.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of fiberboard shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to sample and to perform such confirmatory testing as he deems necessary to ensure that the fiberboard conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for material and fabrication (3.1), tensile strength (3.2.2), water resistance (3.2.4), and tolerances (3.4) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed on the first-article shipment of fiberboard to a purchaser, when a change in material 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, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows; a lot shall be all panels of one size manufactured in one continuous production run and presented for vendor's inspection at one time:

4.3.1 Acceptance Tests: In accordance with ASTM D1037.

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

4.4 Approval:

4.4.1 Sample fiberboard shall be approved by purchaser before fiberboard for production use is supplied, unless such approval be waived. Results of tests on production fiberboard 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 fiberboard which are essentially the same as those used on the approved sample fiberboard. If any change is necessary in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material and processing and, when requested, sample fiberboard. Production fiberboard made by the revised procedure shall not be shipped prior to receipt of reapproval.