



AEROSPACE MATERIAL SPECIFICATION

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

AMS 3940E
Superseding AMS 3940D

Issued 7-1-47
Revised 12-15-74

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, Pennsylvania 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, Pennsylvania 19103.

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

3. TECHNICAL REQUIREMENTS:

- 3.1 Material and Fabrication: The product shall consist of wood fibers physically or chemically separated, felted, and heavily compressed to obtain the required strength, using the natural wood lignins or other suitable adhesive as the 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

- 3.1.2 Laminating: Panels 5/16 in. (7.9 mm) and under in nominal thickness shall be of one solid sheet. Panels over 5/16 in. (7.9 mm) in nominal thickness may be of one solid sheet or may 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.

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3.2 Properties: The product shall conform to the following requirements; tensile strength and moisture resistance shall be determined in accordance with ASTM D1037, Part B.

3.2.1 Tensile Strength (Dry): Shall be as follows; strength shall be approximately equal in all surface directions of the panel:

<u>Nominal Thickness</u>		<u>Tensile Strength, min</u>	
Inch	(Millimetres)	psi	(MPa)
Up to 3/16, incl	(Up to 4.8, incl)	4100	(28.3)
Over 3/16	(Over 4.8)	3100	(21.4)

3.2.2 Moisture Resistance: Shall be as follows; specimens shall not be oven dried but shall be allowed to drain for 10 min \pm 1, excess water removed by hand with blotting paper or a paper towel, and the specimens weighed immediately:

<u>Nominal Thickness</u>		<u>Dimensional Increase, %, max</u>		<u>Weight Increase</u>
Inch	(Millimetres)	Length & Width	Thickness	%, max
1/10	(2.5)	1	14	15
1/8	(3.2)	1	11	15
3/16	(4.8)	1	10	12
1/4	(6.4)	1	8	10
5/16	(7.9)	1	8	8

3.2.3 Workability: The product shall not crack, split, chip, or delaminate when drilled, sawed, or nailed perpendicularly to the surface.

3.3 Quality: Material 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.

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

3.4.1 Thickness:

3.4.1.1 Single-Ply Panels: Shall be as specified in Table I:

TABLE I

<u>Nominal Thickness</u>	<u>Actual Thickness</u>
Inch	Inch
1/10	0.090 - 0.110
1/8	0.115 - 0.145
3/16	0.170 - 0.200
1/4	0.225 - 0.260
5/16	0.295 - 0.335

TABLE I (SI)

<u>Nominal Thickness</u>	<u>Actual Thickness</u>
Millimetres	Millimetres
2.5	2.3 - 2.8
3.2	2.9 - 3.7
4.8	4.3 - 5.1
6.4	5.7 - 6.6
7.9	7.5 - 8.5

3.4.1.2 Laminated Panels: Plus and minus 0.005 in. (0.13 mm) x number of plies.

3.4.2 Length and Width: Plus and minus 0.062 in. (1.57 mm).

3.4.3 Squareness: Panels shall be square within 0.016 in. per foot (1.3 mm/m) of length or width.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples 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 perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to material and fabrication (3.1), tensile strength (3.2.1), moisture resistance (3.2.2), and tolerance (3.4) requirements are classified as acceptance or routine control tests.

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification or periodic control tests.

4.3 Sampling:

4.3.1 Acceptance Tests: Each lot shall be sampled as required by ASTM D1037; a lot shall be all panels of one size manufactured in one continuous production run and presented for inspection at one time.

4.3.2 Qualification Tests: Sampling for workability tests shall be as agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample material shall be approved by purchaser before material for production use is supplied, unless such approval be waived. Results of tests on production material 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 material which are essentially the same as those used on the approved sample material. 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 revised materials and processing and, when requested, sample revised material. No production material made by the revised procedure shall be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of the product shall furnish with each shipment three copies of a report showing the results of tests made on the product to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, material specification number and its revision letter, vendor's material designation, form, size, and quantity.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, supplier's material designation, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.