



# Standard Specification for Sound-Absorbing Board, Fibrous Glass, Perforated Fibrous Glass Cloth Faced<sup>1</sup>

This standard is issued under the fixed designation F2154; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers fibrous glass sound-absorbing board with a perforated fibrous glass cloth facing for sound reduction in ship spaces with high noise levels. This specification is primarily for materials used on ships. Additional requirements, testing, and certification are required for use of this material aboard U.S. Coast Guard inspected vessels in the United States.

1.2 Supplemental requirements and exceptions to the requirements discussed herein for ships of the U.S. Navy are included in Supplementary Requirements S1.

1.3 This standard measures and describes the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of materials, products, or assemblies under actual fire conditions.

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.02 on Insulation/Processes.

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## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

C423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method  
C634 Terminology Relating to Building and Environmental Acoustics

D3951 Practice for Commercial Packaging

E84 Test Method for Surface Burning Characteristics of Building Materials

2.2 *ANSI Standard:*<sup>3</sup>

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes

2.3 *Other Documents:*

46 CFR 164.012 Code of Federal Regulations—Interior Finishes for Merchant Vessels<sup>4</sup>

Navigation and Vessel Inspection Circular (NVIC) 9-97<sup>5</sup>

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, see Terminology C634.

## 4. Ordering Information

4.1 Title, number, and date of this specification.

4.2 First article sample, when required (see 7.1).

4.3 Width and length required, if other than 609.6- by 914.4-mm (24- by 36-in.) board (see 8.1).

4.4 Thickness required (see 8.2).

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

<sup>4</sup> Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, http://www.access.gpo.gov.

<sup>5</sup> Available from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

- 4.5 Density of waffle board (see 10.1).
- 4.6 Conformance inspection reports required (see 11.1).

## 5. Materials and Manufacture

5.1 See typical construction details located in Supplementary Requirements S3.

## 6. Performance Requirements

6.1 *Surface Flame Spread and Smoke Generation Properties*—The sound-absorbing board shall meet the requirements for surface flame spread and smoke generation properties for an U.S. Coast Guard Approved Interior Finish in accordance with 46 CFR 164.012 or NVIC Circular 9-97.

6.2 *Facing Separation*—When the sound-absorbing board is cut or sawed, the threads of the fibrous glass cloth facing across which the cut is made shall not be separated from the face over a distance of more than 3.0 mm (1/8 in.). In case the fibrous glass cloth facing does not cover the entire surface of the board, the uncovered portion of the board shall not extend further than 3.175 mm (1/8 in.) from any edge. The fibrous glass cloth facing shall not extend over the edge of the board.

6.3 *Sound-Absorption*—When tested as specified in 10.3, the sound-absorbing board shall have coefficients of absorption that are equal to or greater than those shown in Table 1.

## 7. Other Requirements

7.1 *First Article*—When specified (see Section 4), the contractor shall furnish sample unit(s) for first article inspection and approval (see 11.1).

## 8. Dimensions and Tolerances

8.1 *Width and Length*—Unless otherwise specified (see Section 4), the sound-absorbing board shall be furnished in a width of 609.6 mm (24 in.) and a length of 914.4 mm (36 in.) (see S6.1.3).

8.2 *Thickness*—The sound-absorbing board shall be furnished in thicknesses of 25.4 mm (1 in.) or 50.8 mm (2 in.), as specified (see Section 4 and S6.1.3).

8.3 *Tolerances*—Tolerances on length and width shall not exceed  $\pm 6.35$  mm (1/4 in.). Tolerance on thickness shall not exceed  $\pm 2.38$  mm (3/32 in.) –0 mm (0 in.).

**TABLE 1 Minimum Sound-Absorption Coefficients**

Board Thickness		Frequency, Hz					
mm	in.	125	250	500	1000	2000	4000
25.4	1	0.07	0.25	0.70	0.90	0.75	0.70
50.8	2	0.25	0.70	0.90	0.85	0.75	0.75

## 9. Sampling

9.1 *Inspection Lot*—For the purpose of sampling, a lot shall consist of all boards of the same thickness produced under essentially the same conditions, and offered for delivery at one time.

9.2 *Sampling for Visual and Dimensional Examination*—A random sample of board shall be selected from each lot offered for inspection in accordance with ANSI Z1.4 at Inspection Level II. No defects shall be allowed.

9.3 *Conformance Test Sampling*—When density and surface flame spread and smoke generation property tests are required in accordance with S5.1, the samples shall be selected in accordance with 9.3.1 and 9.3.2.

9.3.1 *Sampling for Density Test*—Sample boards shall be selected in accordance with ANSI Z1.4 at Inspection Level S-4 for the density test of 10.1. No defects shall be allowed.

9.3.2 *Sampling for Surface Flame Spread and Smoke Generation Properties*—A sufficient number of boards shall be randomly selected and joined end-to-end to form a specimen 50.8 cm (20 in.) wide by 50.8 mm (2 in.) thick by 731.5 cm (24 ft) long. The specimen shall be subject to the surface flame spread and smoke generation property test of 10.2.

## 10. Test Methods

10.1 *Density*—The density of the waffle board fibrous glass layer (see S3.1.2) shall be tested at the location of manufacture prior to fabrication into final form panels. Density is determined by dividing sample mass by sample volume. Sample mass is measured to the nearest 1.0 g and sample volume is measured to the nearest 1 cm<sup>3</sup> of water displaced by one standard board as specified (see 9.3.1).

10.2 *Surface Flame Spread and Smoke Generation Properties*—The test specimens (see 9.3.2) shall be tested in accordance with Test Method E84 (see S5).

10.3 *Sound Absorption Coefficients*—The sound-absorbing board shall be laid directly on the floor of a reverberation room and tested in accordance with Test Method C423.

## 11. Inspection

11.1 Type approvals for 46 CFR 164.012 include inspection requirements as part of the specific type approval.

## 12. Packaging

12.1 *Commercial Packaging*—Commercial packaging shall be in accordance with Practice D3951.

## 13. Keywords

13.1 fibrous glass cloth; perforated fibrous glass cloth; reverberation room method; sound absorbing; sound absorption coefficient; sound reduction; surface flame spread and smoke generation properties; waffle board