



Designation: F 2154 – 01

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

This standard is issued under the fixed designation F 2154; 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 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.

1.3 *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 and health practices and determine the applicability of regulatory requirements prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:

- C 423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method<sup>2</sup>
- C 634 Terminology Relating to Environmental Acoustics<sup>2</sup>
- D 3951 Practice for Commercial Packaging<sup>3</sup>
- E 84 Test Method for Surface Burning Characteristics of Building Materials<sup>4</sup>

### 2.2 ANSI Standard:

- ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes<sup>5</sup>

### 2.3 Other Documents:

<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.

Current edition approved November 10, 2001. Published February 2002.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.06.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 15.09.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 04.07.

<sup>5</sup> Available from American National Standards Institute, 25W. 3rd St., 4th Floor, New York, NY 10036.

46 CFR 164.012 Code of Federal Regulations—Interior  
Finishes for Merchant Vessels<sup>6</sup>  
Navigation and Vessel Inspection Circular (NVIC) 9-97<sup>7</sup>

## 3. Terminology

3.1 For definitions of terms used in this specification, see Terminology C 634.

## 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 24- by 36-in. (609.6- by 914.4-mm) board (see 8.1).
- 4.4 Thickness required (see 8.2).
- 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 Section 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 ( $\frac{1}{8}$  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 ( $\frac{1}{8}$  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,

<sup>6</sup> Available from United States Government Printing Office, Washington, DC 20593.

<sup>7</sup> Available from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

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 11.2).

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 11.2).

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

## 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 11.1.2, the samples shall be selected in accordance with 9.3.1 and 9.3.2.

**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

9.3.1 *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 E 84 (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 C 423.

## 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 D 3951.

## 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

## SUPPLEMENTARY REQUIREMENTS

### (Mandatory Information for U.S. Navy)

This specification is adapted from MIL-A-23054.

## S1. Supplemental Requirements and Exceptions to the Requirements of This Specification for Ships of the U.S. Navy

S1.1 *DoD Intended Use*—The sound-absorbing board covered by this specification is intended for reduction of sound in spaces where there is a high level of noise.

## S2. Referenced Documents

### S2.1 *Military Specifications:*

MIL-I-742 Insulation Board, Thermal, Fibrous Glass<sup>8</sup>

MIL-A-3316 Adhesives, Fire-Resistant, Thermal Insulation<sup>8</sup>

MIL-C-20079 Cloth, Glass; Tape, Textile, Glass; and Thread, Glass<sup>8</sup>

<sup>8</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.