

MIL-A-23054A(SH)
 18 August 1982
 SUPERSEDING
 MIL-A-23054(SHIPS)
 24 October 1961
 (See 6.5)

MILITARY SPECIFICATION

ACOUSTIC ABSORPTIVE BOARD, FIBROUS GLASS PERFORATED FIBROUS GLASS CLOTH FACED

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 This specification covers the requirements for fibrous glass acoustic absorptive board with a perforated fibrous glass cloth facing.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

- PPP-B-576 - Boxes, Wood, Cleated, Veneer, Paper Overlaid.
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-591 - Boxes, Fiberboard, Wood, Cleated.
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple-Wall.

MILITARY

- MIL-I-742 - Insulation Board, Thermal Fibrous Glass.
- MIL-A-3316 - Adhesives, Fire Resistant, Thermal Insulation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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- MIL-L-10547 - Liners, Case, and Sheet, Overwrap, Water Vaporproof or Waterproof. Flexible.
- MIL-C-20079 - Cloth, Glass; Tape, Textile, Glass; and Thread, Glass.

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- C 423 - Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method.
- E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials. (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT
National Motor Freight Classification

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc., ATA TRAFFIC DEPARTMENT, 1616 "P" Street, NW, Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE AGENT

Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2.1), the contractor shall furnish sample unit(s) for first article inspection and approval (see 4.2.1 and 6.3).

3.2 Material. The acoustic absorptive board shall be a laminate consisting of a perforated fibrous glass cloth facing, a high density fibrous glass layer, and a fibrous glass backing board. Asbestos fibers and components containing asbestos fibers are prohibited. A certificate of compliance shall be required that the material is asbestos free in accordance with the data ordering document specified (see 6.2.2).

3.2.1 Backing board. The backing board shall conform to type II of MIL-I-742 unfaced board with the following exception: The board shall be furnished in nominal thickness of 20 millimeters (mm) (3/4-inch) or 45 mm (1-3/4-inch) (see 3.2.2 and 3.4.2).

3.2.2 High density fibrous glass layer. The fibrous glass layer shall have a density of not less than 160 kilograms per cubic meter (kg/m^3) (10 pounds per cubic foot (lb/ft^3)) (see 4.5.1). The layer shall consist of glass fibers impregnated with a suitable binder and compressed or otherwise formed into a waffle. The nominal thickness of the high density fibrous glass layer shall be 6.0 mm (1/4-inch) (see 6.2.1). A certificate of compliance is required to establish the density of the high density layer in accordance with the data ordering document specified (see 6.2.2).

3.2.2.1 Waffle. The waffle shall be constructed having 5.0 mm (3/16-inch) deep indentations tapering from a nominal 6.0 mm (1/4-inch) diameter to a nominal 3.0 mm (1/8-inch) diameter, on the 13.0 mm (1/2-inch) centers.

3.2.3 Fibrous glass cloth facing. The cloth used for facing the high density fibrous glass layer shall conform to type I, class 2 of MIL-C-20079. The cloth facing shall be impregnated with a hardening agent. The cloth facing shall be perforated with nominal 5.0 mm (3/16-inch) diameter holes on 13.0 mm (1/2-inch) centers.

3.2.3.1 Facing adhesive. The impregnated fibrous glass cloth facing shall be compatible with adhesive conforming to type II of MIL-A-3316. The adhesive strength requirements for securing fibrous glass cloth facing to the high density fibrous glass layer shall conform to MIL-A-3316.

3.2.4 Recovered materials. Unless otherwise specified herein, all material incorporated in the acoustic absorptive board covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.3 Construction. One side of the high density fibrous glass layer shall be adhered to the backing board and the other side adhered to the fibrous glass cloth facing, using adhesive. The fibrous glass cloth facing shall be free of

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wrinkles or other irregularities. The acoustic absorptive board shall be so designed that the perforations in the fibrous glass cloth facing shall be centered over the indentations in the waffle-type high density fibrous glass layer.

3.4 Dimensions.

3.4.1 Width and length. Unless otherwise specified (see 6.2.1), the acoustic absorptive board shall be furnished in a width of 610 mm (24 inches) and a length of 915 mm (36 inches) (see 4.4).

3.4.2 Thickness. The acoustic absorptive board shall be furnished in thicknesses of 25.0 mm (1 inch) or 51.0 mm (2 inches), as specified (see 4.4 and 6.2.1).

3.4.3 Tolerances. Tolerances on length and width shall not exceed 6.0 mm (1/4 inch). Tolerance on thickness shall not exceed 2.0 mm (3/32 inch).

3.5 Fire resistance. The acoustic absorptive board shall have a flame spread index less than 30 and smoke development less than 100 when tested as specified in 4.5.2. A certificate of compliance shall be required in accordance with the data ordering document specified (see 6.2.2 and 6.3.1).

3.6 Facing separation. When the acoustic absorptive 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 inch). 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 3.0 mm (1/8 inch) from any edge. The fibrous glass cloth facing shall not extend over the edge of the board.

3.7 Sound absorption. When tested as specified in 4.5.3, the acoustic absorptive board shall have coefficients of absorption that are equal to or greater than those shown in table I.

TABLE I. Minimum sound absorption coefficients.

Board thickness		Frequency, Hz					
		125	250	500	1000	2000	4000
mm	inches						
25	1	0.07	0.25	0.70	0.90	0.75	0.70
51	2	.25	.70	.90	.85	.75	.75

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- (a) First article inspection (see 4.2.1).
- (b) Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. First article inspection shall consist of the examination and tests shown in table II.

TABLE II. First article inspection.

Inspection	Requirement paragraph	Examination and test paragraph
Visual and dimensional examination	3.4	4.4
Density	3.2.2	4.5.1
Fire resistance	3.5	4.5.2
Sound absorption	3.7	4.5.3

4.2.2 Quality conformance inspection. Quality conformance inspection shall consist of the visual and dimensional examination of 4.4. The density test of 4.5.1 and the fire resistance test of 4.5.2 are required at three year intervals except that new tests are required whenever manufacturing methods are changed. Certificates of compliance are acceptable to establish manufacturing method consistency during the interim between test periods in accordance with the data ordering document specified (see 6.2.2).

4.2.3 Test reports. Test reports shall be prepared in accordance with the data ordering documents specified (see 6.2.2).

4.3 Sampling.

4.3.1 Inspection lot. For purposes 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.

4.3.2 Sampling for visual and dimensional examination. A random sample of boards shall be selected from each lot offered for inspection in accordance with MIL-STD-105 at inspection level II. The acceptable quality level shall be 2.5 percent defective.

4.3.3 Quality conformance test sampling. When density and fire resistance tests are required in accordance with 4.2.2 the samples shall be selected according to 4.3.3.1 and 4.3.3.2.

4.3.3.1 Sampling for density test. Sample boards shall be selected in accordance with MIL-STD-105 at inspection level S-4 for the density test of 4.5.1. The acceptable quality level shall be 4 percent defective.

4.3.3.2 Sampling for fire resistance. A sufficient number of boards shall be randomly selected and joined end-to-end to form a specimen 51 centimeters (cm) (20 inches) wide by 51.0 mm (2 inches) thick by 732 cm (24 feet) long. The specimen shall be subjected to the fire resistance test of 4.5.2.

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4.4 Examination. Each of the sample boards selected in accordance with 4.3.2 shall be examined to verify compliance with the dimensional requirements of this specification. When measuring length, width, or thickness, any convenient measuring rule graduated to 1.0 mm (1/16-inch) shall be used. Any board in the sample containing one or more defects shall be rejected. If the number of defective boards in any sample exceeds the acceptance number for that sample, the entire lot represented by the sample shall be rejected. The facing separation and workmanship examinations shall be included.

4.5 Test procedures.

4.5.1 Density. The density of the waffle board fibrous glass layer (see 3.2.2) 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 gram and sample volume is measured to the nearest 1 cc of water displaced by one standard board as specified (see 4.3.3.1).

4.5.2 Fire resistance. The test specimens (see 4.3.3.2) shall be tested in accordance with ASTM E 84 (see 3.5).

4.5.3 Sound absorption coefficients. The acoustic absorptive board shall be laid directly on the floor of a reverberation room and tested in accordance with ASTM C 423.

4.6 Inspection of packaging. Sample packages and packs and inspection of the packaging, packing, and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisitions. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4).

5.1 Preservation.

5.1.1 Preservation is not required.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2.1).

5.2.1 Level A. Acoustic absorptive board of like thickness and size shall be packed in containers conforming to any one of the following specifications with container selection at the option of the contractor.

<u>Specification</u>	<u>Type or class</u>
PPP-B-576	Class 2
PPP-B-585	Class 3
PPP-B-591	Class 2, weather-resistant
PPP-B-636	Class weather-resistant
PPP-B-640	Class 2

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Unless otherwise specified (see 6.2.1), shipping containers shall have caseliners conforming to MIL-L-10547 with caseliner closure and sealing as specified in the appendix to the applicable container specification. Caseliners for PPP-B-636 and PPP-B-640 boxes may be omitted provided all center, edge seams, and the manufacturer's joint are sealed with pressure sensitive tape in accordance with the appendix to the applicable box specification. All boxes shall be closed, strapped, or banded in accordance with the applicable box specification or appendix thereto, with method V closure applicable to PPP-B-636 boxes. The gross weight of wood or wood-cleated boxes shall not exceed 200 pounds. Fiberboard boxes shall not exceed the weight limitation for the applicable box selected.

5.2.2 Level B. Acoustic absorptive board shall be packed as specified in 5.2.1, except that the domestic type or non-weather resistant class container shall apply and caseliners are not required. Method I closure shall apply for PPP-B-636 boxes.

5.2.3 Level C. Acoustic absorptive board shall be packed in containers acceptable to the common carrier which will ensure safe delivery at destination in a satisfactory condition at the lowest applicable rate. Containers, packing, or method of shipment shall comply with Uniform Freight Classification Rules or National Motor Freight Classification Rules or other carrier rules as applicable to the mode of transportation.

5.3 Marking. In addition to any special marking required (see 6.2.1), shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The acoustic absorptive board covered by this specification is intended for reduction of sound in spaces, such as machinery spaces, where there is a high level of noise.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) First article sample, when required (see 3.1).
- (c) Noncombustible or fire-retardant waffle layer (see 3.2.2).
- (d) Width and length required, if other than 24 by 36 inches board (see 3.4.1).
- (e) Thickness required (see 3.4.2).
- (f) Quality conformance inspection reports required (see 4.2.2).
- (g) Levels of packing required (see 5.2).
- (h) Special marking required (see 5.3).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of

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DAR 7-104.9 (n)(2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

<u>Paragraph no.</u>	<u>Data requirements title</u>	<u>Applicable DID no.</u>	<u>Option</u>
3.2	Certificate of compliance	DI-E-2121	10.1
3.2.2	Certificate of compliance	DI-E-2121	10.1
3.5	Certificate of compliance	DI-E-2121	10.1
4.2.2	Certificate of compliance	DI-E-2121	10.1
4.2.3	Reports, test	DI-T-2072	10.1.a

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L, Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in section 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.3.1 Guidelines for fire resistance. The following guidelines should be used to determine the necessity for requiring first article inspection for fire resistance:

- (a) If within a three year period preceding the date of invitation for bids the board has not been tested and found in compliance with this specification, or
- (b) If the material offered for delivery is not manufactured the same in all respects as that previously tested.

6.4 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material is acquired by the contractor for incorporation into the acoustic absorptive board and loses separate identity when the board is shipped.

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6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Preparing activity:

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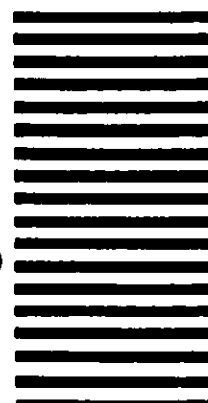
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