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MILITARY SPECIFICATION

INSULATION PANEL, THERMAL AND ACOUSTIC ABSORPTIVE, OPEN-CELL POLYIMIDE FOAM

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes the requirements for fire resistant thermal and acoustic absorptive open-cell polyimide foam insulation panels for use in shipboard applications (see 6.1).

1.2 Classification. Flexible polyimide foam shall be furnished in the following types and classes as specified (see 6.2.1).

Type I - Unfaced (thermal and acoustical absorptive)
Type II - Faced

Class 1 - Fibrous glass cloth faced (thermal)
Class 2 - Slotted base board faced with perforated fibrous glass cloth (acoustical)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

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 55Z3, Department of the Navy, Washington, DC 20362-5101 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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SPECIFICATIONS

FEDERAL

PPP-B-576 - Boxes, Wood, Cleated, Veneer Paper Overlaid.
PPP-B-585 - Boxes, Wood, Wirebound.
PPP-B-591 - Boxes, Shipping, Fiberboard, Wood-Cleated.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple-Wall.

MILITARY

MIL-A-3316 - Adhesives, Fire-Resistant, Thermal Insulation.
MIL-L-19140 - Lumber and Plywood, Fire-Retardant Treated.
MIL-C-20079 - Cloth, Glass; Tape, Textile Glass; and Thread, Glass.
DOD-E-24607 - Enamel, Interior, Nonflaming (Dry), Chlorinated Alkyd Resin, Semigloss (Metric).

STANDARDS

FEDERAL

FED-STD-313 - Material Safety Data Sheets, Preparation and the Submission of.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-147 - Palletized Unit Loads.
MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods.

(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 activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C 167 - Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations.

C 177 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate. (DoD adopted)

C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method. (DoD adopted)

C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter.

D 3574 - Methods of Testing Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams. (DoD adopted)

D 3951 - Standard Practice for Commercial Packaging. (DoD adopted)

E 662 - Standard Method for Specific Optical Density of Smoke Generated by Solid Materials.

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

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY

T 803 - Puncture and Stiffness Test of Container Board.

(Application for copies should be addressed to the Technical Association of the Pulp and Paper Industry, 1 Douwoody Park, Atlanta, GA 30338.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 Materials. Materials shall be as specified in 3.2.1 through 3.2.2.2.3.

3.2.1 Type I (unfaced panel). The basic material shall be flexible, open cell polyimide foam.

3.2.2 Type II (faced panel). Type II material shall be as specified in 3.2.2.1.

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3.2.2.1 Facing. Fibrous glass cloth facing shall conform to the requirements of type I, class 2 of MIL-C-20079, and shall be free of wrinkles and other irregularities. Facing for class 2 of this specification shall be perforated with nominal 3/16-inch diameter holes on 1/2-inch centers.

3.2.2.2 Construction. Construction shall be in accordance with 3.2.2.2.1 through 3.2.2.2.3.

3.2.2.2.1 Class 1. The panel shall consist of a backing conforming to type I unfaced foam, laminated with non-perforated fibrous glass cloth facing.

3.2.2.2.2 Class 2. The panel shall consist of a backing conforming to type I unfaced foam. One face of the foam shall be slotted, 3/16 inch wide by 3/16 inch deep, on 1/2-inch centers, in one direction only. The perforated glass cloth facing shall be bonded to the slotted side of the foam, installed so that the perforations in the cloth facing are centered over the slots in the foam (see figure 1).

3.2.2.2.3 Adhesive. Adhesive for bonding the fibrous glass cloth shall conform to class 1, grade B of MIL-A-3316. Testing shall be as specified in 4.5.1.

3.3 Dimensions and tolerances. Unless otherwise specified (see 6.2.1), insulation panels shall be furnished in the lengths, width and tolerances as specified in table I. Dimensions and tolerances shall be determined in accordance with 4.5.2.

TABLE I. Panel dimensions and tolerances.

Length (inches)	Width (inches)	Thickness (inches)	Tolerances (inch)		
			Length	Width	Thickness
36	24	1/2, 1 or 2	± 1/4	± 1/4	+ 1/8 - 0
48	24	1/2, 1 or 2	± 1/4	± 1/4	+ 1/8 - 0

3.4 Weights and tolerances. Panel weight shall be as specified in table II with a tolerance of plus or minus 10 percent of any given lot and plus or minus 10 percent of any given panel. Weights and tolerances shall be determined in accordance with 4.5.3.

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TABLE II. Weight (areal density).

Type and class	Weight (lb/ft^2)	
	1 inch	2 inches
Type I	0.07	0.13
Type II		
Class 1	0.16	0.22
Class 2	.14	.21

3.5 Facing alignment.

3.5.1 Type II, class 1. If the facing material does not cover the entire surface of the panel, the uncovered portion of the panel shall not be longer than 1/8 inch from any edge. The facing shall not extend over the edge of the panel by more than 1/8 inch. Facing alignment shall be determined in accordance with 4.5.4.

3.5.2 Type II, class 2. Misalignment of the facing material over the slotted panel shall be not greater than 3/64 inch when tested in accordance with 4.5.4.

3.6 Painting. Type I panels shall be furnished unpainted. Unless otherwise specified (see 6.2.1), type II panels shall be furnished unpainted. Painting when required shall conform to DOD-E-24607 with color as specified (see 6.2.1).

3.6.1 Paintability (type II, class 1 only). The faced panel, as furnished, shall be compatible with and shall hold one coat of paint conforming to DOD-E-24607 when applied to the panel facing. Paintability determination shall be in accordance with 4.5.5.

3.7 Cutability. When the panel is cut or sawed, the threads of the cloth facing across which the cut is made shall not be separated from the face over a distance of more than 1/8 inch. Determination shall be in accordance with 4.5.6.

3.8 Puncture resistance (type II only). The puncture resistance of the faced board shall be not less than 800 ounce-inches per inch of tear when tested in accordance with 4.5.7.

3.9 Compressibility. Compressibility shall be a minimum value of 1.2 pounds per square inch (lb/in^2) at 50 percent deflection when tested in accordance with 4.5.8.

3.10 Sound absorption. When tested as specified in 4.5.9, the acoustic absorptive board shall have coefficients of absorption that are equal to or greater than those shown in table III.

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TABLE III. Minimum sound absorption coefficients.

Type, class	Board thickness (inches)	Frequency, Hz					
		125	250	500	1000	2000	4000
I	1/2	0.04	0.10	0.20	0.40	0.55	0.55
I	1	.06	.20	.45	.65	.65	.65
I	2	.15	.40	.75	.75	.75	.70
II, 2	1	.07	.25	.70	.90	.75	.70
II, 2	2	.25	.70	.90	.85	.75	.75
II, 2	1/2	.05	.15	.35	.50	.60	.60

3.11 Thermal conductivity (type I and type II, class 1 only). The thermal conductivity of type I and type II, class 1 material shall not exceed 0.29 British thermal units inches per hour square feet at an average mean temperature of 75 degrees Fahrenheit when tested in accordance with 4.5.10.

3.12 Fire resistance. Unless otherwise specified (see 6.2.1), fire tests shall be performed in accordance with 4.5.11. When specified in the contract or order, a certificate of compliance shall be prepared (see 6.2.2).

3.12.1 Flame resistance. Both type I and II shall be tested in accordance with 4.5.11.1. Flashover time shall be greater than 10 minutes.

3.12.2 Optical smoke density (type I). Optical smoke density for type I shall be not greater than 5 when tested in accordance with 4.5.11.2.

3.13 Steam aging (hydrolytic stability), type I. The material shall be exposed in a steam autoclave. Exposed material shall conform to the following requirement when tested as specified in 4.5.12.

3.14 Identification markings. Unless otherwise specified (see 6.2.1), each panel on the backside shall be marked with the information as follows:

(a) "Noncombustible Polyimide Foam"
(b) "Asbestos Free"
(c) Specification number, type and class
(d) Manufacturer's name
(e) Manufacturer's product identification

Markings shall be legible, permanent, and not less than 3/8 inch in height. A minimum of two complete markings shall be required per panel. Inspection shall be in accordance with 4.5.13.

3.15 Material safety data sheet. The contracting activity shall be provided a material safety data sheet (MSDS) at the time of contract award. The MSDS is form OSHA-20, found in and part of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification (see 6.4).

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3.16 Recovered materials. Unless otherwise specified herein, all material incorporated in the products covered by this specification shall be new and may 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.

3.17 Toxicity. The material shall have no adverse effect on the health of personnel when used for its intended purpose (see 4.6).

3.18 Workmanship. Material shall be uniform in quality and condition. Material shall be clean and free from foreign materials, contaminants, and defects that will impair material use and serviceability.

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.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

(a) First article inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

4.2.1 Inspection conditions. Unless otherwise specified (see 6.2.1), all inspections shall be performed in accordance with the test conditions specified herein.

4.3 First article inspection. First article inspection shall consist of the tests specified in table IV as outlined in 4.5 (see 6.3).

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TABLE IV. First article inspection.

Inspection	Requirement	Test
Adhesive	3.2.2.2.3	4.5.1
Dimensions and tolerances	3.3	4.5.2
Weights and tolerances	3.4	4.5.3
Facing alignment	3.5	4.5.4
Paintability	3.6.1	4.5.5
Cutability	3.7	4.5.6
Puncture resistance	3.8	4.5.7
Compressibility	3.9	4.5.8
Sound absorption	3.10	4.5.9
Thermal conductivity	3.11	4.5.10
Flame resistance	3.12.1	4.5.11.1
Smoke density	3.12.2	4.5.11.2
Steam aging	3.13	4.5.12
Identification markings	3.14	4.5.13
Toxicity	3.17	4.6

4.3.1 First article test report. When specified in the contract or order, a first article test report shall be prepared (see 6.2.2).

4.4 Quality conformance inspection. Quality conformance inspection shall be as specified in table V and 4.4.1 through 4.4.2. When specified in the contract or order, a test report shall be prepared (see 6.2.2).

TABLE V. Quality conformance inspection.

Inspection	Requirement	Test
Group A		
Dimensions and tolerances	3.3	4.5.2
Weights and tolerances	3.4	4.5.3
Identification markings	3.14	4.5.13
Group B		
Adhesive	3.2.2.3.3	4.5.1
Facing alignment	3.5	4.5.4
Paintability	3.6.1	4.5.5
Sound absorption	3.10	4.5.9
Thermal conductivity	3.11	4.5.10

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TABLE V. Quality conformance inspection. - Continued

Inspection	Requirement	Test
Group C		
Cutability	3.7	4.5.6
Puncture resistance	3.8	4.5.7
Compressibility	3.9	4.5.8
Steam aging	3.13	4.5.12
Group D		
Flame resistance	3.12.1	4.5.11.1
Smoke density	3.12.2	4.5.11.2

4.4.1 Examination of end item for defects in appearance and dimensions. The sample unit for the examination of table VI shall be one insulation panel. The inspection level for determining the sample size shall be level I, with an acceptable quality level (AQL) of 6.5 percent defective in accordance with MIL-STD-105. Not more than five panels shall be selected from a single carton.

TABLE VI. Examination for visual and dimensional defects.

Examination	Defect
Appearance (type I)	Surface not sufficiently smooth to permit facing.
Appearance (type II)	Facing wrinkles or facing not adhered over entire surface of backing. Excessive surface waviness which results in increase of thickness of 1/4-inch or greater. Facing not aligned as specified.
Paintability (type II only)	Not as specified in 3.6.1.
Classification	Type not as specified (see 1.2).
Dimensions	Not within limits or tolerances specified in 3.3 or by contract requirements.
Weight	Not as specified in 3.4 and table II.

4.4.2 Testing of the end item. The end item shall be tested in accordance with 4.4.2.1 through 4.4.2.3.

4.4.2.1 Lot. A lot shall consist of all panels of the same type, size, and thickness produced under similar conditions and ready for inspection or shipment at one time. Unless otherwise specified (see 6.2.1), the lot size shall be expressed in the number of panels.

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4.4.2.2 Sampling. The sample unit shall be one panel. The sample size shall be in accordance with inspection level S-1 of MIL-STD-105. The AQL for the end item test shall be 4.0.

4.4.2.3 Noncompliance. If a sample fails to pass group B, C, or D inspections of table V, the contractor shall notify the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the inspection activity, has been taken. After the corrective action has been taken, group B, C, and D inspections shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed, at the option of the inspection activity). Group A inspections may be reinstituted; however, final acceptance and shipment shall be withheld until group B, C and D inspections have shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity.

4.4.3 Certificate of compliance. When specified in the contract or order, a certificate of compliance shall be prepared (see 6.2.2).

4.4.3.1 Testing. The tests specified in 4.5.9, 4.5.10, and 4.5.11 shall only be conducted for one of the following reasons:

(a) If within 3 years preceding the date of invitation for bids, the material has not been tested and found in compliance with 3.10, 3.11, and 3.12, or
(b) If the material offered for delivery is not manufactured the same in all respects as that previously tested.

Any changes in basic ingredients or process shall be promptly reported to both the contracting activity and Commander, Naval Sea Systems Command (NAVSEA). The Government at its sole discretion reserves the right to require that all tests described in this specification be conducted on all lots before shipment is made.

4.5 Test procedures. Testing shall be conducted in accordance with 4.5.1 through 4.5.13.

4.5.1 Adhesive. Adhesive testing shall be in accordance with MIL-A-3316 except that the testing shall be conducted with type II, class 2 insulation material (see 3.2.2.2.3).

4.5.2 Dimensions and tolerances. Length, width, thickness, and tolerances shall be determined by the method specified in ASTM C 167 (see 3.3).

4.5.3 Weight and tolerances. Weight and tolerances shall be determined by the method specified in ASTM C 167 (see 3.4).

4.5.4 Facing alignment. Face alignment shall be tested by direct measurement using a steel rule with 1/16-inch graduations (see 3.5).

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4.5.5 Paintability (type II, class 1 only). One coat of latex emulsion flat primer (see 6.5) and one coat of fire retardant paint conforming to DOD-E-24607 shall be applied to the cloth surface of the type II panel. The paint shall dry to a uniform smooth coat which shall have a flat to semigloss appearance and exhibit no shiners or flashes when viewed under ordinary conditions of illumination (see 3.6.1).

4.5.6 Cutability. Panels shall be examined after cutting or sawing to determine conformance to 3.7. Thermal separation shall be determined by direct measurement using a rigid rule with 1/16-inch graduations.

4.5.7 Puncture resistance (type II, class 1 only). Puncture resistance shall be determined in accordance with the method specified in TAPPI T 803, except as follows: The 24 by 18 inch test specimen shall be placed with the cloth faced down between the clamping plates. The loose sleeve shall be placed against the base of the puncture point and the pointer shall be set about 1 inch above the expected reading. The pendulum shall be raised to the horizontal position. The pendulum shall be released by pushing the latch handle to the left. The reading on the proper scale shall be noted after the pendulum has completed its swing. Two determinations shall be made in the warp direction and two in the filling direction of the cloth on each specimen (see 3.8).

4.5.8 Compressibility. Compressibility shall be tested in accordance with ASTM D 3574, test method C (see 3.9).

4.5.9 Sound absorption. Sound absorption coefficients shall be determined in accordance with ASTM C 423 using type A mounting (see 3.10).

4.5.10 Thermal conductivity. Thermal conductivity shall be determined in accordance with ASTM C 177 or ASTM C 518 (see 3.11).

4.5.11 Fire resistance tests. Fire resistance tests shall be performed in accordance with 4.5.11.1 and 4.5.11.2.

4.5.11.1 Flame resistance. Flame resistance shall be tested in accordance with the appendix (see 3.12.1).

4.5.11.2 Optical smoke density. Optical smoke density shall be determined in accordance with ASTM E 662 (see 3.12.2).

4.5.12 Steam aging. Steam aging shall be tested in accordance with ASTM D 3574 using procedure J_1. A random batch sample shall be selected that is large enough to cut into two equal sizes to fit into the autoclave. One sample shall be tested in accordance with ASTM D 3574 and the other shall be used to make visual, dimensional, weight, and tear strength comparisons after the sample is dry. Any significant changes shall be cause for rejection (see 3.13).

4.5.13 Identification markings. Panels shall be visually examined to determine conformance to 3.14.

4.6 Toxicity. A manufacturer of material shall disclose the formulation of his product to the Naval Medical Command (MED COM 422), Navy Department, Washington, DC 20372 for approval (see 3.17). The disclosure of proprietary information, which will be held in confidence by the Naval Medical Command,

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should include the name, formula, and approximate percentage by weight and volume of each ingredient in the product; the results of any toxicological testing of the product; and such other information as may be needed to permit an accurate appraisal of any toxicity problem associated with the handling, storage, application, use, disposal, or combustion of the material.

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-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 packaging requirements specified herein apply only for direct Government acquisition.)

5.1 Preservation. Preservation shall be level A, C, or commercial as specified (see 6.2.1).

5.1.1 General. Unless otherwise specified (see 6.2.1), unit quantities per unit pack shall be as follows:

(a) Fifteen panels of 1-inch thickness (36-inch or 48-inch lengths).
(b) Eight panels of 2-inch thickness (36-inch or 48-inch lengths).

5.1.2 Level A. Panels of one class, size and thickness shall be unit packed into a fiberboard box in accordance with PPP-B-636, class weather-resistant. Unless otherwise specified (see 6.2.1), other box options such as type, variety, grade, and style shall be at the contractor's option. Box closure shall be in accordance with method V of the appendix to PPP-B-636. Box reinforcing shall be accomplished by use of nonmetallic strapping or reinforced, pressure-sensitive adhesive tape.

5.1.3 Level C. Unit packs shall be as specified under level A except boxes shall be of the class domestic and closure shall be in accordance with method I of the appendix to PPP-B-636 using pressure-sensitive adhesive tape.

5.1.4 Commercial. Except for the unit pack quantity, commercial packaging shall be in accordance with ASTM D 3951.

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

5.2.1 General requirements for levels A, B and C. Level A, B, and C packing shall be as specified in 5.2.1.1 through 5.2.1.5.

5.2.1.1 Containers. Containers selected shall be of minimum weight and cube consistent with the protection required, of uniform size, and contain identical quantities of identical gasket material.

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5.2.1.1.1 Navy, fire-retardent treated lumber and plywood. Unless otherwise specified (see 6.2.1), all lumber and plywood including laminated veneer material used in shipping container and pallet construction, members, blocking, bracing and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Level A and B - Type II - weather-resistant.
Category I - General use.
Level C - Type I - non-weather-resistant.
Category I - General use.

5.2.1.2 Levels A, B and C. Unless otherwise specified (see 6.2.1), material preserved as specified (see 5.1), shall be packed in containers specified in table VII at the contractor's option for the required level of packing.

TABLE VII. Container selection.

Specification	Container	Packing application (Type, style, grade, class)			Use criteria: Gross weight maximum (pounds)			
		Level A	Level B	Level C	Under 100	100-200	200-1000	Over 1000
PPP-B-636	Fiberboard	Not applicable	Weather-resistant 4/	Domestic	1/	1/	No	No
PPP-B-640	Fiberboard, corrugated, triple wall	Not applicable	Weather-resistant	Non-weather-resistant	Yes	Yes	2/	No
PPP-B-576	Wood, cleated veneer, paper overlaid	Not applicable	3/ Class 2	3/ Class 1	Yes	Yes	1/	
PPP-B-585	Wood, wirebound	Class 3	3/ Class 2	3/ Class 1	Yes	Yes	1/	No
PPP-B-591	Wood, cleated fiberboard	Not applicable	3/ Class 2	3/ Class 1	Yes	1/	1/	No
PPP-B-601	Wood, cleated plywood	Overseas type	Overseas type 3/	Domestic type 3/	Yes	Yes	1/	No
PPP-B-621	Wood, nailed and lock-corner	Class 2 overseas	Class 2 overseas 3/	Class 1 domestic 3/	Yes	Yes	1/	No

See footnotes at top of next page.

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1/ Maximum gross weight, container plus contents, shall not exceed the applicable weight requirements for type, style, grade or class container selected for the applied degree of packing.
2/ See 5.2.1.3.3.
3/ For gross weights under 100 pounds, use of lighter weight, minimum cube less expensive fiberboard containers should be considered.
4/ Level A unit packs (see 5.1.2) shall not be overpacked.

5.2.1.3 Caseliners, closure and gross weight. Caseliners, closure, and weight shall be as specified in 5.2.1.3.1, 5.2.1.3.2, and 5.2.1.3.3.

5.2.1.3.1 Caseliners. Unless otherwise specified (see 6.2.1), level A shipping containers shall be provided with waterproof caseliners in accordance with MIL-STD-1186, when contents (unit packs, see 5.1.1) are other than class weather-resistant.

5.2.1.3.2 Closure. Shipping containers, except as otherwise specified herein, shall be closed, reinforced or bonded in accordance with the applicable container specification or appendix thereto. Fiberboard boxes in accordance with PPP-B-636, class weather-resistant, shall be closed in accordance with method V as specified in PPP-B-636 and reinforced with nonmetallic or tape bonding; class domestic shall be closed in accordance with method I as specified in PPP-B-636 using pressure-sensitive tape in accordance with the appendix of PPP-B-636.

5.2.1.3.3 Weight. Unless otherwise specified (see 6.2.1), the gross weight of wood, plywood and cleated boxes shall not exceed 200 pounds. Boxes exceeding 200 pounds gross weight shall be modified by the addition of skids in accordance with the applicable container specification (see table VII).

5.2.1.4 Commercial. Material preserved as specified (see 5.1) shall be packed for shipment in accordance with ASTM D 3951.

5.2.1.4.1 Container modification. Shipping containers exceeding 200 pounds gross weight shall have a minimum of two 3- by 4-inch nominal wood skids laid flat which will support the material and facilitate handling by mechanical handling equipment during transportation, storage and stowage.

5.2.1.5 Palletized unit loads. When specified (see 6.2.1), shipping containers shall be palletized in accordance with MIL-STD-147 (see 5.2.1.1.1).

5.3 Marking. Marking shall be as specified in 5.3.1 through 5.3.3.

5.3.1 Levels A, B and C. In addition to any special markings required (see 6.2.1, 3.14, or herein), unit packs, shipping containers and palletized unit loads shall be marked for shipment, storage, and stowage in accordance with MIL-STD-129. Additional marking shall be in accordance with the intended use as specified in 6.1.

5.3.2 Commercial. In addition to any special marking required (see 6.2.1, 3.14, or herein), unit packs, shipping containers and unitized loads shall be marked in accordance with ASTM D 3951.

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5.3.3 Bar coding. Unless otherwise specified (see 6.2.1), bar code markings shall be applied on unit packs, shipping containers, palletized unit and unitized loads in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Insulation panels as specified herein are intended for the following applications.

6.1.1 Type I. Type I material is a general purpose insulation for thermal and acoustical applications designed to be used as a direct substitute for fibrous glass insulation on an inch for inch thickness basis. It is intended as an alternative for MIL-I-742, type II and MIL-I-22023, type I and type II (all classes).

6.1.2 Type II, class 1. Type II, class 1 material is intended for use as a thermal insulation substitute for MIL-I-742, type I. Type II, class 1 is not intended for use as an acoustic material.

6.1.3 Type II, class 2. Type II, class 2 is designated for use as a lightweight acoustical absorption material for overheads (exclusive of suspended ceiling system panels) and bulkheads in dry, clean shipboard spaces where moisture and water vapor barriers are not required. This material should not be used in areas such as main or auxiliary machinery rooms, galleys, or showers where moisture, petroleum products, or noxious contaminants may be absorbed by the insulation.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type and class required (see 1.2).
(c) When a first article inspection is required (see 3.1).
(d) Length, width, and thickness required, if other than as specified (see 3.3).
(e) When painting is required and color desired (see 3.6).
(f) Fire resistance tests on panels other than specified (see 3.12).
(g) Panel identification markings, if other than as specified (see 3.14).
(h) Inspection conditions, if other than specified (see 4.2.1).
(i) Lot size, if other than specified (see 4.4.2.1).
(j) Level of preservation (see 5.1) and level of packing (see 5.2) required.
(k) Unit quantities, if other than as specified (see 5.1.1).
(l) Box options (see 5.1.2) and container selection (see 5.2.1.2), if other than contractor's.
(m) If fire-retardant lumber is to be other than as specified (see 5.2.1.1.1).
(n) Caseliner, if required (see 5.2.1.3.1).
(o) Container weight, if other than specified (see 5.2.1.3.3).
(p) Palletization, when required (see 5.2.1.5).
(q) Special markings required (see 5.3.1 and 5.3.2).
(r) Bar coding, if other than as specified (see 5.3.3).

Review activity

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6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, 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 Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) 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 are cited in the following paragraphs.

Paragraph no.	Data requirement title	Applicable DID no.	Option
3.12, 4.4.3	Certificate of compliance	DI-E-2121	----
4.3.1	First article inspection report	DI-T-4902	----
4.4	Inspection and test reports	DI-T-5329	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., 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 sections 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. When a first article inspection is required, the items should be a first article sample. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection 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.

6.4 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent government mailing address for submission of data are listed in appendix B of FED-STD-313. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

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6.5 Latex emulsion flat primer. A flat primer suitable for the paintability test (see 4.5.5) may be Ocean Chemicals, Inc., No. 634 or equal.

6.6 Subject term (key word) listing.

Acoustic
Insulation
Polyimide
Thermal

Custodians:
Army - ME
Navy - SH
Air Force - 99

Review activities:
Army - CE
Navy - YD
Air Force - 84

User activities:
Army - MR, MI
Navy - CG

Preparing activity:
Navy - SH
(Project 5640-0112)

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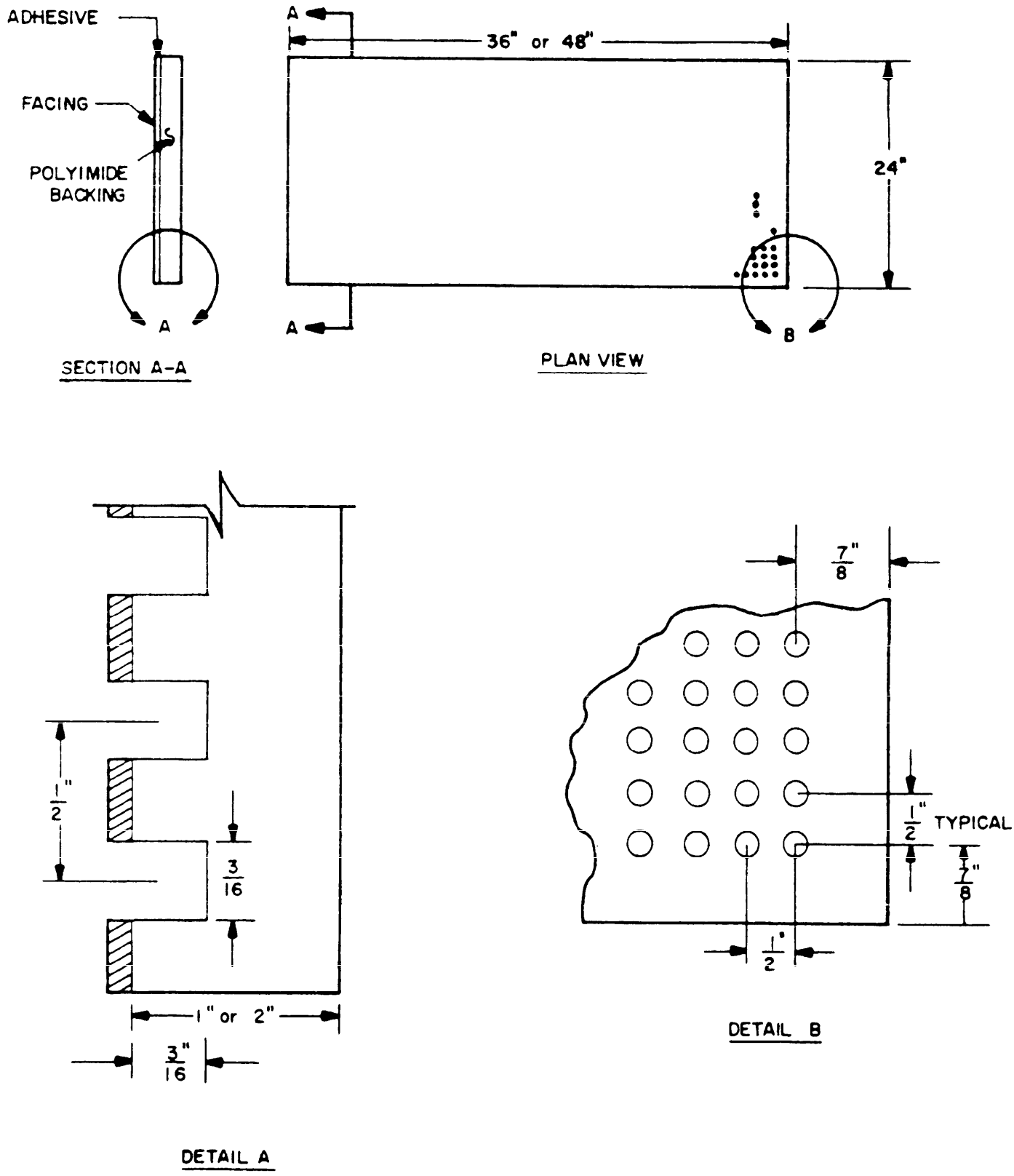

SH 1320153

FIGURE 1. Type II, class 2 construction.

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APPENDIX

DETERMINATION OF THE FLASHOVER POTENTIAL OF A LINING MATERIAL USING A QUARTER-SCALE ROOM FIRE TEST

10. SCOPE

10.1 Scope. This method describes a procedure to determine the flashover potential of materials in a room when subjected to a fire exposure. The method described will yield a time from the introduction of the fire exposure until the moment of flashover. This appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

10.2 JUSTIFICATION

10.2.1 In the interest of reducing both the set-up time and cost associated with fire testing in a full size room (defined as a 10-foot long by 10-foot wide by 8-foot high room having a 30-inch wide by 80-inch high doorway), a one-quarter scale room fire test was devised to predict flashover potential of lining materials exposed to fire.

20. APPLICABLE DOCUMENTS

(This section is not applicable to this appendix.)

30. EQUIPMENT

30.1 The quarter-scale room shall be constructed from a suitable ceramic insulation board and shall form an airtight box having a ceiling and four sides. The box shall sit on a floor fabricated with the same material. The interior dimensions of the fully lined quarter-scale room shall be 30 inches long by 30 inches wide by 24 inches high. The doorway is located at the center of one wall and shall be 19.5 inches wide and 17 inches high to secure the proper ventilation and fire development. The height between the finished ceiling and the top of the doorway shall be 7 inches. The floor of the model room shall extend at least 12 inches outside the doorway. The box shall be removable to allow for application of ceiling and wall covering. The entire base of the box in contact with the floor shall be made airtight.

30.2 A porous plate diffusion flame burner shall be used as the fire source. The burner shall be 3.5 inches long by 3.5 inches wide by 3 inches high, consisting of a horizontal porous plate area of 3 by 3 inches with a 0.25 inch wide steel plate perimeter and steel plate sides and bottom.

30.3 Four 10 mil chromel-alumel thermocouples shall be used, 1 inch and 3 inches below the center of the overhead and 1 inch and 2 inches below the top of the doorway.

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40. PROCEDURE

40.1 The test material shall fully line the walls and ceiling.

40.2 Prior to testing, the fully lined test room shall be conditioned for at least 24 hours at a relative humidity between 20 and 60 percent, and a temperature of 23 $\pm$ 5 degrees Celsius (°C).

40.3 The fire source shall be positioned on the floor snugly against one rear corner of the test room. A flow rate of 0.32 cubic feet per minute (ft^3/min) methane shall be used to produce a constant heat input of approximately 320 Btu for the duration of the test.

40.4 The test data from the four thermocouples shall be recorded as a continuous function of time.

40.5 The primary data generated by this test will be the time to flashover, if it occurs, and the maximum temperature if flashover is not reached. Flashover is characterized by thermal flux levels equal to or greater than 2 watts per square centimeter at the floor level. This corresponds to interior temperatures of 600°C and higher, and doorway temperatures of 500°C and higher. For this test purpose, flashover is defined as the fire condition when one of the interior thermocouple measurements reaches 600°C or one of the doorway measurements reaches 500°C, whichever occurs first. Flashover shall not occur within 10 minutes.

40.6 Color slides of the test material shall be taken before the test, at the point of maximum involvement, and after the fire has been extinguished.

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NOTE. This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document*(s)* or to amend contractual requirements.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
DOD-1-24688	Insualtion Panel, Thermal and Acoustic Absorptive Open-Cell

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426

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