NOTICE OF INACTIVATION FOR NEW DESIGN

INCH-POUND

MIL-P-15280J
NOTICE 1
22 April 1998

MILITARY SPECIFICATION

PLASTIC MATERIAL, UNICELLULAR (SHEETS AND TUBES)

MIL-P-15280J, dated 19 December 1988, is inactive for new design and is no longer used, except for replacement purposes.

Custodians:
Army - CR
Navy - SH
Air Force - 11

Preparing activity:
Navy - SH

Review activities:
Army - CR4, EA, MI
Navy - MC, OS, YD1
DLA - GS

AMSC N/A **FSC 5640**

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INCH-POUND

MIL-P-15280J
19 December 1988
SUPERSEDING
MIL-P-15280H
29 March 1977
(See 6.6)

MILITARY SPECIFICATION

PLASTIC MATERIAL, UNICELLULAR (SHEETS AND TUBES)

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 chemically expanded unicellular elastomeric plastic foam material for thermal insulation.

1.2 Classification. Plastic foam shall be of the following forms, as specified (see 6.2.1):

Form T - Tubular.
Form S - Sheet.

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.

SPECIFICATIONS

FEDERAL
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-F-320 - Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes.

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 20362-5101 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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MILITARY

MIL-P-116	- Preservation, Methods of.
MIL-L-19140	- Lumber and Plywood, Fire-Retardant Treated.
MIL-A-24179	- Adhesive, Flexible Unicellular-Plastic Thermal Insulation.

STANDARDS

FEDERAL

FED-STD-313	- Material Safety Data Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities.

MILITARY

MIL-STD-293	- Visual Inspection Guide for Cellular Rubber Items.
MIL-STD-414	- Sampling Procedures and Tables for Inspection by Variables for Percent Defective.
MIL-STD-1623	- Fire Performance Requirements and Approved Specifications For Interior Finish Materials and Furnishings (Naval Shipboard Use).
MIL-STD-2073-1	- DoD Materiel Procedures for Development and Application of Packaging Requirements.

2.1.2 Other Government publication. The following other Government publication forms a part of this specification to the extent specified herein. Unless otherwise specified, the issue shall be that in effect on the date of the solicitation.

DEPARTMENT OF TRANSPORTATION (DOT)

Code of Federal Regulations, Title 29, Part 1910.1200 - Hazard Communication Standard.

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

(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 non-government documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus. (DoD adopted)
C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
D 412 - Standard Test Methods for Rubber Properties in Tension. (DoD adopted)
D 471 - Standard Test Method for Rubber Property - Effect of Liquids. (DoD adopted)
D 1056 - Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber. (DoD adopted)
D 1667 - Standard Specification for Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam). (DoD adopted)
D 3951 - Standard Practice for Commercial Packaging. (DoD adopted)
E 96 - Standard Test Methods for Water Vapor Transmission of Materials. (DoD adopted)

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

(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, 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 Qualification. The plastic foam material furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

3.2 Dimension and tolerance. The dimensions of plastic foam material shall be as specified (see 6.2.1). Tubular form of material up to 5-3/4 inches inside diameter (id) shall be extruded and shall have no seams, slits or chemically bonded joints and shall not be manufactured from flat sheets. Sheet form of material shall be seamless. Unless otherwise specified (see 6.2.1), tolerances shall be as specified in table I.

TABLE I. Dimensional tolerance of sheets and tubing.

Nominal thickness (inches)		Length and width (inches)		Inside diameter (inches)	
Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance
Sheets					
Up to 1/4, inclusive	+3/32 -1/32	Up to 6, inclusive	+/-1/4	-----	-----
Over 1/4 to 1/2	+3/32 -1/32	Over 6 to 12, inclusive	+3/8	-----	-----
Over 1/2 to 1	+/-3/32	Over 12	+/-3 percent	-----	-----
Over 1	+/-1/8				
Tubular form					
Up to 3/4, inclusive	-0 to +1/8	[1]	-1 to +4	Up to 1/2, inclusive	-0 to +3/32
Over 3/4	-0 to +3/16		-1 to +4	Over 1/2 to 1, inclusive	-0 to +1/8
				Over 1 to 1-1/2, inclusive	-0 to +3/16
				Over 1-1/2 to 2-3/8, inclusive	-0 to +1/4
				Over 2-3/8	-0 to +3/8

[1] Number of sheets or length of tubing shall be as specified (see 6.2.1).

3.3 Finish. Unless otherwise specified (see 6.2.1), sheets and tubes shall have at least one surface skin. The skin surface shall be a major surface, and shall not include the edges or ends. When furnished, the material shall not contain tears and shall not have been repaired. Skin is any of various coatings or distinctive outer layers of material (for example, skin of aluminum on a plane or plating on a ship).

3.4 Color. If furnished in color other than black (see 6.2.1), each color shall be qualified separately.

3.5 Physical requirements. The material shall conform to table II (see 4.6).

TABLE II. Physical requirements.

Property	Requirement
Density, (lb/ft $^{-3}$)[1]	3.0 to 8.0
Compression resistance at 25 percent deflection, (lb/in^{-2})	2.0 to 6.0
Water absorption, (lb/in^{-2}) maximum	0.1
Compression set, (percent) maximum	24
Dimensional change, length (percent) maximum	7
Oil resistance	No softening or visible swelling.
Tensile strength, (lb/in^{-2}) minimum	30
Ultimate elongation, (percent) minimum	100
Tensile strength of cemented joints	
before aging, (lb/in^{-2}) minimum	No bond failure.
after aging, (lb/in^{-2}) minimum (form T only)	No bond failure.
Flexibility at 28 deg. F (initially)	No cracking.
After heat aging for 7 days at 180 deg. F (form T only)	No cracking.
Thermal conductivity BTU/hr sq ft (deg. F/in) at mean temp. 75 deg. F	
K factor, maximum	0.30
Water vapor permeability perm-in (maximum)	0.30

[1] Pounds per cubic foot (lb/ft^{-3}).

3.6 Odor. The material shall have no objectionable odor (see 4.6.10). (An objectionable odor shall be defined as that other than the typical odor of the material.)

3.7 Tubes. Tubes shall be furnished in straight lengths or in coil form as specified (see 1.2 and 6.2.1).

3.8 Marking. Tubes shall be printed to include the nominal pipe size (nps) accommodated, if applicable, the wall thickness, and the id. Unless otherwise specified (see 6.2.1), the applicable National stock number shall be legibly marked on one side of each sheet in at least one place and in numbers of not less than 1/2 inch height.

3.9 Toxicity. The material shall have no adverse effect on the health of personnel when used for its intended purpose as stated herein (see 4.6.16 and 6.1). Questions pertinent to this effect shall be referred by the contracting activity to the Navy Medical Command (NAVMEDCOM) who will act as an advisor to the contracting activity.

3.10 Material safety data sheet. The contracting activity shall be provided a material safety data sheet (MSDS) at the time of the contract award. The MSDS shall be provided in accordance with the requirements of FED-STD-313 and 29 CFR 1910.1200, Hazard Communication Standard. When FED-STD-313 is at variance with the CFR, 29 CFR 1910.1200 shall take precedence, modify and supplement FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification (see 6.4).

3.11 Fire performance. Materials shall not melt, drip or flow (see 4.6.17).

3.12 Workmanship. The material shall be free from the defects specified in 4.5.1 and any others that may potentially impair the use of the product.

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) Qualification inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

4.3 Qualification inspection. Qualification inspection shall be conducted at a laboratory satisfactory to the Naval Sea Systems Command (NAVSEA). Qualification inspection shall consist of the examination of 4.5 and tests specified in 4.6.

4.3.1 Retention of qualification. Periodic control inspection for the retention of qualification shall be made at 18-month intervals for materials subjected to the fire performance test specified in 4.6.17.

4.4 Quality conformance inspection.

4.4.1 Lot. For purposes of sampling, an inspection lot for examination and testing shall consist of all material of the same form and thickness produced in one plant under essentially the same conditions and offered for delivery at one time. The unit of product shall consist of one sheet of form S or of one 5- or 6-foot length of form T tubing as applicable.

4.4.1.1 Sampling for quality conformance inspection. A random sample of material shall be selected from each lot in accordance with inspection level II of MIL-STD-414. For quality conformance tests, the lot shall be as specified in 4.4.1, except that tubes of more than one id may be grouped together for the required tests.

4.4.2 Quality conformance inspection. Samples selected in accordance with 4.4.1.1 shall be subjected to the tests shown in table III. The required parameters are shown in table II. If the samples are of such size or shape that test specimens cannot be prepared from them, a substitute sample shall be provided in the form of a piece or pieces of plastic foam having dimensions appropriate for the tests required (see 6.2.2).

TABLE III. Quality conformance inspection.

Tests	Paragraph
Density	4.6.4
Compression resistance	4.6.5
Water absorption	4.6.6
Compression set	4.6.7
Dimensional change	4.6.8
Tensile strength	4.6.11
Ultimate elongation	4.6.11

4.5 Examination. An examination shall be made in accordance with the classification of defects and inspection levels as specified herein. The lot size shall be expressed in units of sheets or tubes, as specified in 4.5.1 and 4.5.2, and in units of shipping containers as specified in 4.7.

4.5.1 Examination for defects in appearance and workmanship. The sample unit for this examination shall be one sheet or tube, as applicable. The sample units shall be examined for the defects shown in table IV. Where appropriate, MIL-STD-293 may be used as a guide to determine the classification of defects.

TABLE IV. Classification of defects in appearance and workmanship.

Category	Item	Defect
Critical		
01	Sheets and tubular form	Any cut, tear, seam, slit, chemical bonded joint, or repaired section.
02		Surface skin missing or not as specified.
Major		
101	Sheets and tubular form	Presence of dirt, foreign, material embedded particles, large voids.
Minor		
201	Sheets and tubular form	Workmanship. Cell size not uniform. Color not uniform throughout material.

4.5.2 Examination for dimensional defects. The sample unit for this examination shall be one sheet or tube, as applicable. The sample unit shall be examined for the defects shown in table V.

TABLE V. Classification of dimensional defects.

Category	Item	Defect
Critical		None defined
Major		
101	Sheets and tubular form	Length and width varies by more than the applicable tolerance specified in table I.
102		Thickness varies by more than the applicable tolerance specified in table I.
103	Tubular form only	Inside diameter varies by more than the applicable tolerance specified in table I.
Minor		None defined.

4.6 Test methods.

4.6.1 Conditioning procedures. Unless otherwise specified herein, specimens shall be conditioned at an atmosphere of 73.5 +/- 2 degrees Fahrenheit (deg. F) and 50 +/- 2 percent relative humidity for at least 24 hours.

4.6.2 Dimensional measurements of test specimen.

4.6.2.1 Results. The average results of not less than three measurements shall be reported.

4.6.2.2 Tubular form. The length shall be measured with any measuring device graduated in 1/16 inch. Care shall be taken not to distort the flexible unicellular material. Thickness and id measurements shall be measured with any measuring device graduated in 1/32 inch. Three thickness measurements shall be taken, distributed around the circumference of the tube.

4.6.2.3 Sheet. The length and width shall be measured with a measuring device graduated in 1/16 inch. The flexible unicellular material shall not distort. Thickness shall be determined in accordance with ASTM D 1056 using three measurements equally spaced over the specimens.

4.6.3 Weight measurement. Test specimens shall be weighed to the nearest 0.1 gram.

4.6.4 Density. The density of the material shall be determined in accordance with ASTM D 1667.

4.6.5 Compression resistance. Compression resistance shall be determined in accordance with ASTM D 1667, except that the deflection-load rate shall be not greater than 2 inches per minute (0.85 millimeter per second).

4.6.6 Water absorption.

4.6.6.1 Specimens. Test specimens shall be 4 by 4 inches square or semi-cylindrical sections (tubular form cut in half longitudinally) 6 inches long in the thickness furnished. The specimen may have the skin on top and bottom, outer and inner surfaces, or on only one of these surfaces, as specified (see 6.2.1).

4.6.6.2 Procedure. Specimens shall be submerged in distilled water at room temperature, 70 to 80 deg. F, 2 inches below the surface of the water, and subjected to a vacuum of 25 inches of mercury for 3 minutes. The vacuum shall be released and the specimen allowed to remain submerged for 3 minutes at atmospheric pressure. The specimen shall then be removed, allowing it to stand on end to drain for 10 minutes, when it shall be blotted lightly with paper towels. Values of each of the three specimens shall be calculated and reported in terms of pounds of water gain per square foot (lb/ft2) of skinless surface.

4.6.7 Compression set.

4.6.7.1 Specimens. The specimens shall have parallel top and bottom surfaces which shall be at right angles to the side surfaces. The specimen may be cylindrical or rectangular. The dimension across the top shall be not less than equal to the thickness, and the top shall be not less than 1 square inch in area.

4.6.7.2 Procedure. The compression set of the material shall be determined in accordance with ASTM D 1667 except that the maximum dimension across the top of the specimen shall be not greater than 16 square inches in area.

4.6.8 Dimensional change.

4.6.8.1 Specimens. Test specimens shall consist of 12 by 3 inch pieces in the thickness of the sheet supplied or tubular sections 12 inches long by the thickness furnished.

4.6.8.2 Procedure. Bench marks, approximately 10 inches apart, shall be placed on the center line of the specimens about 1 inch from the ends and the distance shall be measured to the nearest 0.01 inch. The specimens shall be placed lengthwise on a piece of wooden board in an oven equipped with air circulation at 200 +/- 3 deg. F for 7 days. The specimen shall be removed from the oven, conditioned for a minimum of 2 hours at 73.5 +/- 5 deg. F, and the distance between the bench marks measured. The dimensional change shall be expressed in percent of the original length.

4.6.9 Oil resistance.

4.6.9.1 Specimens. The test specimens shall be not less than 1 by 1 inch by the thickness of the material.

4.6.9.2 Procedure. The specimen shall be immersed in no. 3 oil in accordance with ASTM D 471 for 70 hours. The specimen shall then be removed, blotted with filter paper, and compared to an untreated specimen of similar size for apparent softness and visible swelling.

4.6.10 Odor. The odor of sheets and tubular forms at room temperature shall be determined by sniffing. The odor of form T specimens that are being subjected to the aging test as specified in 4.6.13.2, shall be determined at the end of the first and seventh day by sniffing.

4.6.11 Tensile strength and ultimate elongation.

4.6.11.1 Specimens. The test specimens shall be 1/4 +/- 1/32 inch by 1/2 inch wide. Die A in accordance with ASTM D 412 shall be used.

4.6.11.2 Procedure. The tensile strength and ultimate elongation shall be determined in accordance with ASTM D 412 with the following exceptions:

(a) A 0.5-ounce weight shall be used on the presser foot for measurement of thickness.
(b) The number of test specimens and test values shall be in accordance with MIL-STD-414.
(c) All values shall be reported.
(d) Median values shall not apply.

4.6.12 Strength of cemented joints.

4.6.12.1 Before aging. As specified in 4.6.11.1, test specimens shall be cut in half at the center of the constricted portion and cemented together with an adhesive conforming to MIL-A-24179 type I. The adhesive shall be allowed to air dry for at least 24 hours. The strength of the cemented joint shall be determined as specified in 4.6.11. The number of specimens shall be as specified in 4.6.11.2.

4.6.12.2 After aging (form T only). Specimens prepared as specified in 4.6.12.1 shall be aged at 180 +/- 2 deg. F for 7 days. The strength of the cemented joints shall be determined as specified in 4.6.11, except the specimen shall be removed from the oven and permitted to rest at standard test conditions in accordance with ASTM D 412 for not less than 16 hours nor more than 70 hours before being subjected to the tests. The number of specimens shall be as specified in 4.6.11.2.

4.6.13 Flexibility.

4.6.13.1 Initial. Test specimens shall have skin on one side, both sides, or no skin. The size of the specimen shall be approximately 1 by 8 inches with a thickness of 1/4 +/- 1/16 inch. The test specimens and equipment shall be conditioned for not less than 4 hours at 28 +/- 2 deg. F and bent 180 degrees around a 1/2-inch diameter steel mandrel within 5 seconds, at the test temperature. Care shall be taken to avoid warming the test specimens, particularly at or near the bend point, in performing the test.

4.6.13.2 After heat aging (form T only). Two sets of specimens shall be prepared as specified in 4.6.13.1. One set shall be cut in half and cemented together as specified in 4.6.12.1. Both sets of specimens shall be aged for 7 days as specified in 4.6.12.2 and conditioned as specified in 4.6.13.1. The specimens shall be bent 180 degrees around a 1/2-inch diameter steel mandrel, except for the cut specimens, where the 180 degree bend shall be at the cut seam.

4.6.14 Thermal conductivity. The thermal conductivity (k factor) shall be determined at a mean temperature of 75 deg. F on flat sections of material in accordance with ASTM C 177 and ASTM C 518. Individual test values shall be reported and average values shall not apply.

4.6.15 Water vapor permeability.

4.6.15.1 Method. The water vapor permeability tests shall be performed in accordance with ASTM E 96 with the exceptions specified in 4.6.15.2 through 4.6.15.6. Only the water method shall be performed.

4.6.15.2 Specimen. Specimens shall be of 1/2 inch nominal thickness, or the thickness of the sheet, as specified (see 6.2.1), if less than 1/2 inch.

4.6.15.3 Conditioning. The specimens shall be conditioned for not less than 46 hours at 73.4 +/- 1.8 deg. F and 50 +/- 4 percent relative humidity. The test shall be conducted in this atmosphere.

4.6.15.4 Dimensions. The thickness of the specimen shall be measured as specified in 4.6.2.3. The area of the unsealed surface shall be determined within plus or minus 1 percent.

4.6.15.5 Attachment of specimen. If skin is not excluded (see 6.2.1), the specimen shall be attached to the test dish so that the skin is towards the high humidity.

4.6.15.6 Calculations. The permeability is expressed in PERM-IN. Test values shall be reported and test averages shall not apply.

4.6.16 Toxicity. To determine conformance to requirements of 3.9, the manufacturer of the material shall disclose the formulation of his product to the Naval Medical Command, MEDCOM-242, Washington, DC 20372. The disclosure of proprietary information, which shall be held in confidence by the Naval Medical Command, shall 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; identification of its pyrolysis products; and any other information which 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. Information submitted shall be clearly marked or identified to show it is being provided in connection with qualification under MIL-P-15280.

4.6.17 Fire performance. The plastic material shall be tested in accordance with MIL-STD-1623.

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation, packing and marking for shipment, stowage, and storage shall be in accordance with the requirements of section 5 and the documents specified therein. The sample unit shall be one shipping container, fully packed, selected just prior to the closing operation. Shipping containers fully prepared for delivery shall be examined for defects as specified in table VI.

TABLE VI. Classification of defects.

Category	Item	Defect
Critical		
1	Preservation	Talc or talcum not asbestos free.
Major		
101	Preservation	Not in accordance with contract.
102		Unit container not as specified.
103		Material not as specified.
104		Paper or fiberboard cores missing from tubing, unless otherwise specified.
105		Interleaving of sheets omitted or not as specified.
106	Packing	Not in accordance with contract requirements. Not level specified.
107		Container not as specified; closure not accomplished by specified methods or materials.
108		Inadequate application of components.
109	Weight	Gross weight exceeds contract requirements.
110	Markings	Interior or exterior markings (as applicable) omitted, illegible, incorrect, or not in accordance with contract requirements.
Minor		None defined.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 General.

5.1.1 Dusting material. Dusting material such as talc or talcum, shall be asbestos-free (see 6.2.2).

5.1.2 Navy fire-retardant requirements.

(a) 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 1 - general use.
Level C - Type I - non-weather resistant.
Category 1 - general use.

(b) Fiberboard. Fiberboard used in the construction of class-domestic, non-weather resistant fiberboard, and cleated fiberboard boxes shall meet the flame spread index and the specific optic density requirements of PPP-F-320 and amendments thereto.

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

5.2.1 Level A. Plastic foam, sheet, and tubular form shall be preserved (unit protected) in accordance with MIL-P-116, method III, as specified herein.

5.2.1.1 Sheets. Sheets shall be laid flat, interleaved with paper or material and unit protected by enclosing in a wrap of waterproof kraft paper or plastic film. Unless otherwise specified (see 6.2.1), the unit quantity per package shall be at the option of the contractor. Closure of the kraft paper wrap shall be accomplished by use of waterproof adhesive or waterproof pressure-sensitive tape. The plastic wrap closure shall be accomplished by heat sealing.

5.2.1.2 Tubes. Unless otherwise specified (see 6.2.1), tubular forms of material having an id greater than 2-1/8 inches shall be provided with fiberboard cores. Cores shall be inserted in and be the same length as the length of tubular form of material supplied to prevent distortion under conditions of stowage, storage, handling, and transportation. The inside of all tubing shall be uniformly powdered with talc or mica powder (see 5.1.1) for ease of application. Straight lengths and coil form shall be unit packaged in fiberboard boxes conforming to PPP-B-636, class weather resistant. Other box options shall be at the option of the contractor. Boxes containing coil form shall be provided with fiberboard inserts of the same material as the fiberboard box in accordance with the contractor's practice. Box enclosure shall be in accordance with method V of the appendix to PPP-B-636.

5.2.2 Level C. Plastic foam shall be preserved (unit protected) as specified under level A, except that the fiberboard boxes where required or used shall conform to class-domestic/fire retardant.

5.2.3 Commercial. Plastic foam shall be preserved (unit protected) in accordance with the requirements of ASTM D 3951.

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

5.3.1 General requirements for levels A, B, and C.

5.3.1.1 Containers. Containers selected (see 5.1.2) shall be of minimum weight and cube to be consistent with the protection required, of uniform size, and contain identical quantities of identical plastic material.

5.3.1.2 Levels A, B, and C containers. Plastic foam preserved as specified (see 5.2) shall be packed in shipping containers for the level specified (see 5.3), in accordance with appendix C, table VII, of MIL-STD-2073-1 and herein. Unless otherwise specified (see 6.2.1), container selection shall be at the contractor's option.

5.3.1.2.1 Caseliners, closure, and gross weight.

5.3.1.2.1.1 Caseliners. Unless otherwise specified (see 6.2.1), level A shipping container shall be provided with waterproof caseliners in accordance with MIL-STD-2073-1.

5.3.1.2.1.2 Closure. Container closure, reinforcing, or banding shall be in accordance with the applicable container specification or appendix thereto except that weather-resistant fiberboard boxes shall be closed in accordance with method V and reinforced with non-metallic or tape banding and domestic fiberboard boxes shall be closed in accordance with method I using pressure-sensitive tape.

5.3.1.2.1.3 Weight. Wood, plywood, and cleated type containers exceeding 200 pounds gross weight shall be modified by the addition of skids in accordance with MIL-STD-2073-1 and the applicable container specification or appendix thereto.

5.3.1.3 Commercial. Plastic foam preserved as specified (see 5.2) shall be packed for shipment in accordance with ASTM D 3951 and herein.

5.3.1.3.1 Container modification. Shipping containers exceeding 200 pounds gross weight shall be provided with a minimum of two, 3- by 4-inch nominal wood skids laid flat, or a skid- or sill-type base which will support the material and facilitate handling by mechanical handling equipment during shipment, storage, and stowage.

5.4 Marking.

5.4.1 Levels A, B, and C. In addition to any special markings required (see 3.8, 6.2.1, and herein), interior packs and shipping containers shall be marked, including bar coding, in accordance with MIL-STD-2073-1.

5.4.2 Commercial. In addition to any special markings required (see 3.8, 6.2.1, and herein), interior packs and shipping containers shall be marked in accordance with ASTM D 3951. In addition, bar coding shall be applied in accordance with the marking requirements of MIL-STD-2073-1.

5.4.3 Special marking. Special marking includes placing the lot or batch number on sheets and tubes and on the packing case.

6. NOTES

6.1 Intended use. The materials covered by this specification are intended for thermal insulation only and may be used in either sheet or tubular form. In tubular form, the insulating material is intended for piping systems operating at temperatures from minus 20 to 180 deg. F. This material has low thermal conductivity, is a good vapor barrier and is serviceable at operating temperatures. Material covered by this specification may vary in thermal conductivity depending upon the manufacturer. The minimum wall thickness to prevent condensation will therefore vary (see 3.2).

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Form required. When ordering form T, specify pipe size or tubing outside diameter (see 1.2 and 3.7).
(c) Dimensions as required and tolerance, if different (see 3.2 and 4.6.15.2).
(d) Number of sheets or length of tubing (see table I).
(e) If two surface skins are required (see 3.3).
(f) If color is other than black (see 3.4).
(g) Marking and special marking required (see 3.8, 5.4.1, and 5.4.2).
(h) Location of skin (see 4.6.6.1).
(i) Water vapor permeability test specimen thickness (see 4.6.15.2).
(j) If skin is not excluded (see 4.6.15.5).
(k) When fire-retardant requirements are not required (see 5.1.2).
(l) Level of preservation and packing required (see 5.2 and 5.3).
(m) Quantity of sheets for preservation required, if other than specified (see 5.2.1.1).
(n) If cores are not to be provided (see 5.2.1.2).
(o) Container selection, if other than contractor's option (see 5.3.1.2).
(p) When caseliners are not required (see 5.3.1.2.1.1).

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 27.475-1 (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
4.4.2, 5.1.1	Certificate of compliance	DI-E-2121	----

(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 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List QPL-15280 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.3.1).

6.3.1 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

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

6.5 Subject term (key word) listing.

Elastomeric
Extruded
Thermal

6.6 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.

Custodians:
Army - ER
Navy - SH
Air Force - 20

Review activities:
Army - EA, MI
DLA - GS

User activities:
Army - ME
Navy - OS, MC

Preparing activity:
Navy - SH
(Project 5640-N391)