

**INCH-POUND**

MIL-PRF-24172B (SH)

27 September 2004

SUPERSEDING

MIL-I-24172A (SH)

19 November 1986

## PERFORMANCE SPECIFICATION

### INSULATION, PLASTIC, CELLULAR FOAM, RIGID, PREFORMED AND FOAM-IN-PLACE

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 Scope. This specification establishes the requirements for a rigid cellular foam material.

1.2 Classification. Foam is of the following types and classes, as specified (see 6.2):

##### Type I - Preformed

Class 1 - 1.7 to 2.5 pounds per cubic foot density

Class 2 - 2.5 to 4.0 pounds per cubic foot density

##### Type II - Foam-in-place

Class 1 - 1.7 to 2.5 pounds per cubic foot density

Class 2 - 2.5 to 4.0 pounds per cubic foot density

#### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

Comments, suggestions, or questions on this document should be addressed to Commander, Naval Sea Systems Command, ATTN: SEA 05Q, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to [commandstandards@navsea.navy.mil](mailto:commandstandards@navsea.navy.mil), with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at [www.dodssp.daps.mil](http://www.dodssp.daps.mil)

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2.2.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-16884 - Fuel, Naval Distillate.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch> or [www.dodssp.daps.mil](http://www.dodssp.daps.mil) or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

BUREAU OF MEDICINE AND SURGERY (BUMED)

BUMED INST 6270.8 - Procedures for Obtaining Health Hazard Assessments Pertaining to Operational Use of a Hazardous Material.

(Copies of this document are available online at <https://bumed.med.navy.mil> or from Bureau of Medicine and Surgery, Department of the Navy, 2300 E Street, NW, Washington, DC 20372-5300.)

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

S9510-AB-ATM-010 Rev 2 of 30 July 1992 - Nuclear Powered Submarine Atmosphere Control Manual.

(Copies of this document are available from the Naval Sea Systems Command, Code SEA 05Z9, 1333 Isaac Hull Avenue, SE, Stop 5133, Washington Navy Yard DC 20376-5133.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attributes. (DoD adopted)

(Copies of this document are available from [www.asq.org](http://www.asq.org) or American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

ASTM INTERNATIONAL

- C 177 - Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus, Steady-State. (DoD adopted)
- C 203 - Insulation, Thermal Block Type, Breaking Load and Flexural Properties of. (DoD adopted)
- D 618 - Standard Practice for Conditioning Plastics for Testing. (DoD adopted)
- D 1621 - Plastics, Rigid Cellular, Compressive properties of. (DoD adopted)
- D 1622 - Plastics, Rigid Cellular, Apparent Density of. (DoD adopted)
- D 2842 - Water Absorption of Rigid Cellular Plastics. (DoD adopted)
- D 2856 - Plastics by the Air Pycnometer, Rigid Cellular, Open Cell Content of. (DoD adopted)

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E 84 - Surface Burning Characteristics of Building Materials. (DoD adopted)

E 96 - Water Vapor Transmission of Materials. (DoD adopted)

(Copies of these documents are available from [www.astm.org](http://www.astm.org) or ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA, 19428-2959.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Material. The basic ingredients used to formulate type I material and the components for type II material shall be such that all the requirements of this specification are fulfilled. The insulating material used in this plastic material shall be free of tolyene diisocyanate, moca, trimethylol propane and pentaerythritol.

3.2.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Color. Unless otherwise specified (see 6.2), the color of the foamed material shall be the color of the product as normally manufactured.

3.4 Uniformity. Type I material, and type II material when prepared as specified in 4.5.2.2, shall be homogeneous throughout and firm in composition. There shall be no blowholes greater than 1/2-inch in diameter or large accumulations of unexpanded resin or other large occlusions.

3.5 Property values. Types I and II materials shall conform to the property values shown in Table I when tested as specified.

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TABLE I. Type I and type II property values.

Inspection	Requirement
Density, apparent	Class 1 - 1.7 to 2.5 pounds per cubic foot Class 2 - 2.5 to 4.0 pounds per cubic foot
Compressive strength at yield point or 10 percent deflection	Class 1 - Minimum of 20 lb/in <sup>2</sup> in the direction of the rise of the foam Class 2 - Minimum of 40 lb/in <sup>2</sup> in the direction of the rise of the foam
Fire resistance, droplets before and after exposure to 4.5.10, specimen thickness 1 inch (nominal)	Flame spread 25 (max) <sup>1</sup> Smoke developed 250 (max) No melting, dripping or flaming
Unicellularity	10 percent maximum open cells
Thermal conductivity (K factor)	0.16 Btu-in/hr ft <sup>2</sup> °F maximum
Resistance to oil	No evidence of attack (softening, swelling or dissolving)
Heat aging	Maximum of 3 percent volume change
Humid aging	Maximum of 3 percent change in each linear dimension
Water absorption	0.08 pounds average per square foot of cut surface
Water vapor transmission	Maximum of 2.0 perm inches
Flexural strength	Maximum of 40 lb/in <sup>2</sup>
Low temperature aging	Maximum volume change of plus or minus (±) 4 percent No cracking

<sup>1</sup> Not to be construed as a fire hazard classification. Refers to test method only.

3.6 Dimensional form and tolerances (type I). The preformed board shall have dimensional uniformity with square corners and sides, and ends shall be parallel. The length, width and thickness of the board shall be as specified (see 6.2) with the following tolerances:

Length - Plus 1/16 minus 0 inch per linear foot.

Width - Plus 1/16 minus 0 inch per linear foot

Thickness - Up to and including 2 inches, ± 1/32 inch. Greater than 2 inches, ± 1/16 inch.

3.7 Foam-in-place (type II). Prior to production, the foam system shall be tested as specified.

3.7.1 Cure temperature. The foam shall cure at ambient temperature as specified (see 6.2 and 6.3) and attain the physical properties described herein within 48 hours after mixing.

3.7.2 Component ratio. The volume ratio between components for producing the required foam shall be a maximum of five to one.

3.8 Workmanship. The preformed foam (type I) and the component ingredients for the foam-in-place (type II) shall be processed in such a manner as to be uniform in quality and shall meet the requirements specified herein, as applicable, and shall be free from other defects that will affect life, serviceability or appearance.

3.9 Toxicity. The insulation shall have no adverse effect on the health of personnel when used for its intended purpose. The insulation shall be assessed by the Navy Environmental Health Center (NAVENVIRHLHCEN) using the administrative Health Hazard Assessment (HHA). A flowchart for this process can be found as enclosure (1) of BUMEDINST 6270.8. The HHA is a review of the insulation based on information submitted by the manufacturer, to assess health hazards associated with the handling, application, use and removal of the product. The insulation shall not cause any environmental problems during waste disposal (see 4.6 and 6.6).

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3.10 Off-gassing. The insulation shall meet the requirements in the Nuclear Powered Submarine Atmosphere Control Manual, NAVSEA Technical Manual S9510-AB-ATM-010 Rev 2, for a usage category of Limited (see 4.7 and 6.7).

## 4. VERIFICATION

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

- a. First article inspection (see 4.2)
- b. Conformance inspection (see 4.3)

4.2 First article inspection. Prior to production, first article inspection shall be conducted on a sample to determine conformance with all the requirements and tests herein. The test material shall be identical in composition and equivalent in manufacture to the material to be supplied later for conformance inspection. The first article sample shall comply with all the requirements specified herein.

4.3 Conformance tests (type II only). Conformance tests shall be conducted to determine conformance to all of the specified tests and requirements of this specification, except fire resistance (4.5.5), toxicity (4.6) and off-gassing (4.7). Sufficient quantities of foam ingredients shall be taken to produce at least six sample test blocks as specified in 4.5.2. When a temperature range for mixing and foaming the base ingredients is specified (see 4.5.2.2, 6.2 and 6.3) three test blocks of foam shall be prepared at each specified temperature. Conformance tests are not required for foam formulations previously supplied under contract which have been tested and found to conform to this specification, provided that no changes have been made in the test mold (see 4.5.2.1), materials, material production techniques, formulation, mixing instructions and handling characteristics (see 4.5.2.2, 6.2 and 6.3) in the foam formulation subsequent to these tests.

4.4 Sampling.

4.4.1 Lot. For purposes of sampling, a lot shall consist of all material from one production batch offered for delivery at one time.

4.4.2 Sampling for visual dimensional examination (type I only). A random sample of preformed boards shall be selected from each lot offered for Government inspection in accordance with ASQC Z1.4 at inspection level II. The acceptable quality level (AQL) shall be no defects. Major and minor defects shall be as specified in ASQC Z1.4.

4.4.3 Sampling for quality conformance inspection.

4.4.3.1 Type I only. From each lot (see 4.4.1) sufficient samples shall be prepared from separate boards selected at random and tested as specified in 4.5.3 through 4.5.14. If any of the samples tested is found to be not in accordance with this specification, this shall be cause for rejection of the entire lot represented by the sample.

4.4.3.2 Type II only. Two containers of resin shall be selected at random from each lot (see 4.4.1). A 2-quart sample shall be taken from each of the two containers, placed in separate clean, dry, metal or glass containers and sealed and marked. Containers from which the samples have been removed shall be re-padded with dry nitrogen and sample containers shall also be padded with dry nitrogen. In a similar manner samples of curing agent, in quantities proportional to the resin as designated by the contractor's foaming instructions, shall also be selected, packaged, and marked. Containers from which the curing agent samples have been removed shall be re-padded with dry nitrogen and sample containers shall also be padded with dry nitrogen. The selected samples shall be foamed, prepared and then tested as specified in 4.5.3 through 4.5.14.

4.5 Test methods.

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4.5.1 Test conditions. Unless otherwise specified (see 6.2), the atmospheric conditions surrounding the specimen prior to and during the test shall be  $73.4 \pm 3.6$  degrees Fahrenheit ( $^{\circ}\text{F}$ ) ( $23 \pm 1$  degrees Celsius ( $^{\circ}\text{C}$ )) and  $50 \pm 2$  percent relative humidity. The conditioning period prior to the test shall be a minimum of 24 hours.

4.5.2 Preparation of sample block (type II only).

4.5.2.1 Sample mold. Sample test molds shall be constructed in accordance with either 4.5.2.1.1, 4.5.2.1.2 or 4.5.2.1.3 as specified (see 6.2).

4.5.2.1.1 Steel. The mold shall be constructed of 1/8-inch thick steel. It shall consist of a steel box without a top and having inside dimensions of 13 inches in each direction. The bottom shall be removable and provided with devices for securing it to the sides. On the outside of each of two opposite sides a steel flange, 13 inches in length and 2 inches in width, shall be firmly attached at the midpoint of the outside surface with 13-in dimension parallel to the top and bottom surfaces of the box. The inside surfaces shall be dry and clean. A mold release agent may be used.

4.5.2.1.2 Plywood. The mold shall be constructed identical to that of 4.5.2.1.1, except that 1/2-inch thick plywood shall be used as the construction material.

4.5.2.1.3 Special test mold. When a special test mold is required for a specific application, thickness and type of material, dimensions, volume, and special configuration (if any) of the mold, construction for free rise or restraint (using top cover) and any other requirements which may be necessary for suitable mold shall be as specified (see 6.2).

4.5.2.2 Sample preparation. Foaming characteristics of the material shall be determined during the foaming of the test sample. Unless otherwise specified (see 6.2), proportions and mixing of the base ingredients and preheating of the resin, if required, shall be in accordance with the contractor's instructions. Check volume ratio between components for compliance with 3.7.2. Mechanically stir a sufficient quantity of base ingredients, and pour into the specified mold (see 4.5.2.1 and 6.2). If applicable (see 4.5.2.1.3), a top cover shall be secured. The foam shall be allowed to air cure in the mold for 48 hours prior to removal. The minimum temperature of the air and mold shall be as specified (see 6.2 and 6.3).

4.5.2.2.1 Precautions. Fumes may be present when these foams are prepared. Adequate ventilation shall be provided or air masks shall be worn. Goggles, rubber gloves, and protective clothing shall also be worn.

4.5.2.3 Removal from mold. Following the specified cure period, if necessary, a long thin spatula shall be used to cut the foam free from the mold. After the top, where applicable (see 4.5.2.1.3), and bottom covers are removed, the flanges on the sides of the mold shall be placed on blocks with the original bottom up and a 12-3/4 by 12-3/4 inch piece of 1-inch plywood shall be placed over the flat surface of the foam. Light, steady pressure shall be applied by hand to the plywood to force the foam from the mold.

4.5.2.4 Preparation of test specimens. After determining the density as specified in 4.5.3, the required specimens shall be prepared from the block free from skin in such manner that the possibility of overheating is minimized. Prior to testing, the density of each specimen shall be calculated by accurately weighing and measuring its dimensions. Any specimen whose density is not within 10 percent of that of the sample block shall be subject to rejection and replaced with a suitable new specimen.

4.5.3 Density. The density of the foamed material shall be determined in accordance with ASTM D 1622. The average density of the five specimens shall be reported.

4.5.4 Compressive strength. The compressive strength of the foamed material shall be determined in accordance with ASTM D 1621, procedure A, except that three specimens shall be used and the specimen size shall be 1 inch by 4 by 4 inches. The average value of the three specimens shall be reported.

4.5.5 Fire resistance. The fire resistance of the foamed material shall be determined in accordance with ASTM E 84 before and after exposure as specified in 4.5.10.

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4.5.6 Unicellularity. Unicellularity shall be determined in accordance with ASTM D 2856, procedure B.

4.5.7 Thermal conductivity. The thermal conductivity of the foamed material shall be determined in accordance with ASTM C 177 at a mean temperature of 75°F (23.9°C).

4.5.8 Resistance to oil. One specimen, approximating a 1-inch cube, shall be immersed in fuel oil in accordance with MIL-PRF-16884. After 70 hours the specimen shall be removed, lightly blotted with paper toweling and compared to an imaged specimen of similar size for evidence of softening, swelling, or dissolving.

4.5.9 Heat aging. The dimensions of two specimens, 1 inch by 4 by 4 inches, shall be recorded to the nearest 0.01 inch after being conditioned for 24 hours as specified in 4.5.1. The specimens shall then be placed in an oven for a 24-hour period and the oven shall be maintained at  $140 \pm 1.8^\circ\text{F}$  ( $60 \pm 1^\circ\text{C}$ ). Upon completion of the exposure period, the specimens shall again be conditioned for 24 hours as specified in 4.5.1 and the dimension re-measured to the nearest 0.01 inch. The average percent volume change for the two specimens shall be calculated and reported.

4.5.10 Humid aging. The dimensions of two specimens, 1 inch by 4 by 4 inches, shall be recorded to the nearest 0.01 inch after being conditioned for 24 hours as specified in 4.5.1. The specimens shall then be placed upon a shelf in a container with a level of water sufficient to maintain an atmosphere of 90 to 100 percent relative humidity. The container, loosely covered, shall then be placed in an oven for 7 days at a temperature of  $140 \pm 1.8^\circ\text{F}$  ( $60 \pm 1^\circ\text{C}$ ). Upon completion of the exposure period, the specimens shall again be conditioned for 24 hours as specified in 4.5.1 and their dimensions re-measured to the nearest 0.01 inch. The average percent change in each linear dimension of both specimens shall be calculated and reported.

4.5.11 Water absorption. The water absorption of the foamed material shall be determined in accordance with ASTM D 2842 and the average value for three specimens reported.

4.5.12 Water vapor transmission. The water vapor transmission shall be determined in accordance with ASTM E 96 desiccant method.

4.5.13 Flexural strength. The flexural strength shall be determined in accordance with ASTM C 203. An average value for four specimens, 12 by 3 by 1-1/2 inches thick, shall be reported.

4.5.14 Low temperature aging. The volume change due to low temperature aging shall be determined at minus 40°F in accordance with 4.5.14.1 through 4.5.14.4. Three specimens, 1 inch by 3 by 3 inches, shall be used. The average values obtained from the three specimens at the conclusion of each of the two cycles shall not exceed the maximum value change as required by 3.5. After exposure to low temperature aging, the specimens shall be examined for evidence of cracking.

4.5.14.1 Conditioning. Condition the test specimens at  $73.4 \pm 3.6^\circ\text{F}$  ( $23 \pm 2^\circ\text{C}$ ) and  $50 \pm 5\%$  relative humidity for not less than 40 hours prior to test in accordance with Procedure A of ASTM D 618.

4.5.14.2 Measurements of test specimens. The following measurements shall be made on conditioned test specimens prior to testing, after reconditioning at the end of a test procedure, and at any stage as prescribed in the test procedures:

- (a) Weight - The weight within 0.05% if the specimen weighs 100 g or less, 0.1% if the specimen exceeds 100 g in weight.
- (b) Dimensions - All dimensions to 0.001 inch (0.025 mm).

Specimens shall be brought to room temperature in an uncharged desiccator or equivalent closed container, which will require 10 to 30 minutes. The specimen shall be weighed in less than 10 minutes after exposure to room conditions. The dimensions shall be measured immediately after weighing the specimen.

4.5.14.3 Procedure. The test cycle shall be as follows:

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24 hours at 176°F (80 °C) and 70 to 75% relative humidity, followed by  
 24 hours at -40°F (-40°C).  
 24 hours at 176°F (80 °C) in the oven.  
 24 hours at -40°F (-40°C).

- (a) Condition the specimen, weigh and measure in accordance with 4.5.14.1 and 4.5.14.2.
- (b) Expose the specimen for 24 hours on the shelf of a container maintained at  $176 \pm 1.8^\circ\text{F}$  ( $80 \pm ^\circ\text{C}$ ) in the oven and containing a saturated solution of sodium chloride.
- (c) Remove the specimen from the container and wipe excess moisture from it with an absorbent cloth.
- (d) Within 30 minutes after the completion of the operation described in 4.5.14.3 (b), expose the specimen for 24 hours in a cold box maintained at  $-40 \pm 3.6^\circ\text{F}$  ( $-40 \pm 2^\circ\text{C}$ ).
- (e) Place the specimen in the uncharged desiccator and bring to room temperature in accordance with 4.5.14.3 (a).
- (f) Wipe the specimen with the absorbent cloth and then weigh, measure dimensions and examine visually in accordance with 4.5.14.2 and conduct a visual examination in accordance with 4.5.14.4.
- (g) Within 2 hours of the completion of the operation described in 4.5.14.3 (d), expose the specimen for 24 hours in the oven at  $176 \pm 1.8^\circ\text{F}$  ( $80 \pm 1^\circ\text{C}$ ).
- (h) Place the specimen in the uncharged desiccator and bring to room temperature in accordance with 4.5.14.2.
- (i) Within 30 minutes after the completion of the operation described in 4.5.14.3 (e), expose the specimen for 24 hours in a cold box maintained at  $-40 \pm 3.6^\circ\text{F}$  ( $-40 \pm 2^\circ\text{C}$ ).
- (j) Place the specimen in the uncharged desiccator and bring to room temperature in accordance with 4.5.14.2.
- (k) Wipe the specimen with the absorbent cloth and then weigh, measure dimensions and examine visually in accordance with 4.5.14.2 and conduct a visual examination in accordance with 4.5.14.4.
- (l) Recondition the specimen, weigh and measure dimensions in accordance with 4.5.14.1 and 4.5.14.2.

4.5.14.4 Visual examination. Noticeable quantitative changes in surfaces, outline and general appearance of the test specimen shall be recorded after each stage of the testing procedure. These changes include color, surface irregularities, odor and splits. Changes shall also be noted as they occur, especially those which alter the shape so that intended dimensions are no longer significant.

4.6 Toxicity. To determine conformance with the requirements of 3.9, the insulation shall be evaluated using the HHA process. Sufficient data to permit a HHA of the product shall be provided by the manufacturer/distributor to the NAVENVIRHLTHCEN. To obtain current technical information requirements specified by the NAVENVIRHLTHCEN, see 6.6.

4.7 Off-gassing. The insulation shall be tested in accordance with the Nuclear Powered Submarine Atmosphere Control Manual, NAVSEA Technical Manual S9510-AB-ATM-010 Rev 2, by a Government approved testing facility. The results shall be submitted to the Government for evaluation and approval for use (see 3.10 and 6.7).

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)



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6.1 Intended use. The material covered by this specification is intended primarily for insulation of refrigerator spaces. The materials traditionally used to meet the requirements of this specification were organic polyisocyanate and polyol resin containing a blowing agent.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type and class material required (see 1.2).
- (c) Color, if different (see 3.3).
- (d) Dimensions for type I material (see 3.6).
- (e) Ambient cure temperature conditions (see 3.7.1).
- (f) Atmospheric conditions, if different (see 4.5.1).
- (g) Sample test mold required (see 4.5.2 through 4.5.2.1.3).
- (h) Handling characteristics required for type II only (see 4.5.2.2 and 6.3).
- (j) Packaging requirements (see 5.1).
- (k) Is Material Safety Data Sheet required? (see 6.4).
- (l) Is off-gas testing required? (see 3.10 and 6.7).
- (m) If first article inspection is required (see 3.1).

6.3 Handling characteristics for type II material. For any specific application that may be necessary to specify the following characteristics:

- (a) The temperature range required for mixing and foaming the basic ingredients.
- (b) Temperature range for air and mold prior to foaming.
- (c) Mixing time.
- (d) Flow time.
- (e) Rise time.
- (f) Permissible time lapse between pourings, if multiple pours are needed to fill the cavity.

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. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

6.5 Subject term (key word) listing.

Foam material  
Insulation  
Plastic  
Polyisocyanate

6.6 Toxicity evaluation. The NAVENVIRHLTHCEN requires sufficient information to permit a HHA of the product. Any questions concerning toxicity and requests for HHA should be addressed to the Commanding Officer, Navy Environmental Health Center, ATTN: Hazardous Materials Department, Industrial Hygiene Directorate, 620 John Paul Jones Circle, Suite 1100, Portsmouth, VA 20378-2103. Upon receipt of the HHA, a copy should be provided to Commander, Naval Sea Systems Command, ATTN: SEA 05Z9, 1333 Isaac Hull Ave., SE, Stop 5133, Washington Navy Yard, DC 20376-5160.

6.7 Off-gassing. Materials to be installed in submarines are to be controlled to prevent off-gassing, which contaminates the atmosphere and results in health hazards to personnel or deleterious effects on machinery. These controls are accomplished through the Submarine Material Control Program, which is described in the Nuclear Powered Submarine Atmosphere Control Manual, NAVSEA Technical Manual S9510-AB-ATM-010 Rev 2. Under the Submarine Material Control Program, all materials considered for use on submarines require certification and assignment of a usage category. Under the certification process, candidate materials are selected

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by Navy activities or contractors, and a request for certification is submitted to Commander, Naval Sea Systems Command, ATTN: SEA 05Z9, 1333 Isaac Hull Ave., SE, Stop 5122, Washington Navy Yard DC 20376-5122. The certification request is accompanied by detailed information, including descriptions of the material. A chemical analysis is conducted, which is normally accomplished through off-gas testing. The off-gas test is required to be conducted in a Government approved laboratory designated by the preparing activity. Information pertaining to this test requirement may be obtained from Commander, Naval Sea Systems Command, ATTN: SEA 05Z9, 1333 Isaac Hull Ave., SE, Stop 5160, Washington Navy Yard, DC 20376-5160. Based on the chemical analysis results, a usage category is assigned to the material defining whether, and to what extent, the material may be used on submarines.

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Preparing activity:  
Navy - SH  
(Project 5640-0003)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at [www.dodssp.daps.mil](http://www.dodssp.daps.mil).