

INCH-POUND

MIL-P-24249A(SH)

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SUPERSEDING

MIL-P-24249(SHIPS)

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MILITARY SPECIFICATION

PLASTIC MATERIAL, CELLULAR POLYURETHANE, RIGID, VOID FILLER, FOAM-IN-PLACE, LARGE SCALE AND INSTALLATION OF

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 covers a resin material and installation system which, after mixing and installation in a void, will form a rigid, foam-in-place type unicellular urethane foam.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

MILITARY

MIL-T-5624

Turbine Fuel, Aviation, Grades JP-4 and JP-5

MIL-I-45208

Inspection System Requirements

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, Attn: SEA 55Z3, 2531 National Center Bldg. 3, Washington, DC 20362-5160 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 9330

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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STANDARDS

FEDERAL

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

MILITARY

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.1.2 Other Government documents. The following other Government document forms a part of this document to the extent specified herein. Unless otherwise specified, the issue is that cited in the solicitation.

DEPARTMENT OF TRANSPORTATION (DOT)

Code of Federal Regulations (CFR) 49, Parts 171-179 – Rules and Regulations for the Transportation of Explosives and Dangerous Articles

(The Code of Federal Regulations are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

Z129.1 Hazardous Industrial Chemicals – Precautionary Labeling (DOD adopted)

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- C 273 Standard Test Method for Shear Properties in Flatwise Plane of Flat Sandwich Constructions or Sandwich Cores (DOD adopted)
- D 1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics (DOD adopted)
- D 1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics (DOD adopted)
- D 1623 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics (DOD adopted)
- D 2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging (DOD adopted)
- D 2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics
- D 2856 Standard Test Method for Open Cell Content of Rigid Cellular Plastics by the Air Pycnometer (DOD adopted)
- D 3951 Standard Practice for Commercial Packaging (DOD adopted)
- F 501 Standard Test Method for Aerospace Materials Response to Flame, with Vertical Test Specimen (for Aerospace Vehicles Standard Conditions)

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

(Non-Government standards and other publications are normally available from the organizations that prepare or 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 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 Qualification. Plastic materials 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 of award of contract (see 4.3 and 6.4).

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3.2 Materials.

3.2.1 Toxic or hazardous materials. Isocyanate fumes may be present when the foam is prepared (see 3.5). The ingredients used in this plastic material shall be free of both trimethylpropane and pentaerythritol (see 6.3).

3.2.2 Material safety data sheet (MSDS). The contracting activity shall be provided a material safety data sheet at the time of contract award. The MSDS shall be provided in accordance with the requirements of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification (see 6.7).

3.3 Physical characteristics.

3.3.1 Ingredients. When mixed in accordance with the operating instructions and automatic dispensing equipment specified by the contractor (see 6.5), the ingredients shall form a rigid unicellular urethane foam for the intended application. The foam shall air cure at ambient temperature, the minimum of which may be specified (see 6.2), and shall attain the physical properties specified in 3.4 within 7 days after mixing.

3.3.2 Foamed material.

3.3.2.1 Quantity per single pour. The automatic dispensing equipment used shall dispense foam at a rate as specified (see 6.2 and 6.5).

3.3.2.2 Uniformity per single pour. The cured material shall be essentially homogeneous (uniform physical properties) throughout, and firm in composition with small, uniform cells. There shall be no large void openings (over 1/2 inch in any direction), large accumulations of unexpanded resin, or other occlusions (see 4.6.2).

3.3.2.3 Odor. The cured material shall be free from any objectionable odor, particularly residual isocyanate fumes.

3.4 Physical property values. The foam material shall conform to the property values specified in 3.4.1 through 3.4.9.

3.4.1 Density. The foamed block shall have a maximum density of 6.4 pounds per cubic foot (see 4.6.3).

3.4.2 Compressive strength. The compressive strength of the foamed block perpendicular to foam rise shall be greater than 60 but less than 130 pounds per square inch (lb/in^2), while the compressive strength parallel to foam rise shall be a minimum of 80 lb/in^2 . Following both the humid aging test and the oil resistance test, compressive strength (perpendicular to foam rise) shall be greater than 60 but less than 130 lb/in^2 (see 4.6.4).

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3.4.3 Tensile strength. The tensile strength of the foamed block perpendicular to foam rise shall be a minimum of 80 lb/in² (see 4.6.5).

3.4.4 Shear strength. The shear strength of the foamed block (perpendicular to foam rise) shall be a minimum of 50 lb/in² (see 4.6.6).

3.4.5 Unicellularity. The percent open cell of the foam shall be a maximum of 15 percent (see 4.6.7).

3.4.6 Water absorption. The foam shall have a maximum water absorbance value of 0.10 pound per square foot of cut surface (see 4.6.8).

3.4.7 Oil resistance. The foam shall show no deterioration after being immersed in JP-5 fuel (see 4.6.9).

3.4.8 Humid aging. There shall be a maximum volume change of plus or minus 5 percent in the foam following humid aging (see 4.6.10).

3.4.9 Fire resistance. The foam shall have a maximum flame time of 15 seconds, a maximum extent of flame impingement of 8 inches, and a maximum drip flame time of 5 seconds (see 4.6.11).

3.4.10 Toxic products. The material shall have no adverse effect on the health of personnel when used for its intended purpose. Conformance shall be determined by a health hazard risk assessment (HHRA), to be conducted in accordance with 4.6.12. Products meeting this requirement will be issued a letter of approval by the Naval Sea Systems Command. Letters of approval shall apply solely to those products specifically evaluated for toxicity. Formulation changes in the product shall require a reevaluation of the product for toxicity and a new letter of approval. Approval letters will be in effect for a maximum of three years after which reissue may be requested. Manufacturers shall provide a copy of the approval letter applicable to offered products to the contracting activity before the product will be accepted (see 6.2(i)). Questions pertaining to health hazards shall be referred by the Contracting Activity to the Chief, Bureau of Medicine and Surgery, Department of the Navy, who will act as an advisor to the contracting Agency.

3.5 Precautions.

3.5.1 Ventilation. Since isocyanate fumes may be present during foam application, adequate ventilation as required by local industrial hygienist or as prescribed on MSDS is required to keep vapor concentrations below acceptable limits. If adequate ventilation cannot be provided, air masks shall be worn.

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3.5.2 Personal protective equipment. Anyone involved in foam application who may come in contact with isocyanates shall wear chemical safety glasses or face shields, rubber gloves, and coveralls to protect against splattering.

3.5.3 Fire safety. During the mixing and installation of the foam, machinery shall be calibrated frequently to ensure that system ingredients are being delivered according to the ratios and tolerances established by the contractor. Hot work, including welding, burning, and use of any open flames shall be completed before any foam installation commences. In addition, smoking, electric heaters, and so forth are prohibited from the site of installation and all surrounding areas.

3.5.4 Spills. In the event of a spill, pouring shall be immediately stopped and the ship's safety office notified. The spill shall be cleaned up in accordance with manual procedure as instructed on MSDS. This shall be done regardless of whether the spill is major or minor.

3.6 Workmanship. Workmanship shall be such as to assure a uniform product complying with this specification.

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 (examinations and tests) 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 ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall 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 (see 6.3). The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept 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).

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4.2.1 Inspection conditions. Unless otherwise specified, all inspections shall conform to the test conditions specified (see 4.6.1).

4.2.2 Inspection System. The contractor shall develop and maintain an inspection system in accordance with MIL-I-45208.

4.3 Qualification inspection. Qualification inspection shall be conducted at a laboratory satisfactory to the Naval Sea Systems Command (NAVSEA). The inspection shall consist of the tests specified in 4.6 and shall be preceded by the following three steps:

- a. Verification of the plastic material physical property values (see 4.3.1)
- b. System description and quality assurance procedure (see 4.3.2)
- c. Qualifying mock-up pour (see 4.3.3).

4.3.1 Initial qualification requirements. The contractor shall submit technical data to NAVSEA showing conformance to all physical property values in 3.4. Failure to meet the property values terminates the qualification process.

4.3.1.1 Sampling for qualification tests. Samples for testing shall be randomly selected from foam cast using a 1-cubic foot (ft³), laboratory-prepared box pour. A repeat pour shall be made using the same lot of materials, equipment, pouring procedure, and ambient conditions and the results shall be reported. Tests on the repeat pour shall be limited to density and compressive strength (perpendicular to foam rise). Samples for density and compressive strength for both pours shall be randomly selected from a minimum of five locations within the test mold and shall be representative of all four sides and the center.

4.3.2 System description and quality assurance. Before authorization can be granted for demonstration mock-up pours to complete the qualification process, the following additional information shall be furnished to NAVSEA.

- a. Description of the candidate foam system
- b. Details of the procedure to be followed during shipboard installation
- c. Full description of foam equipment, hoses and accessories to be used in the installation
- d. Quality assurance procedure to be followed by the contractor to provide assurance that installed material will meet the physical requirements of the ship's specification. This plan shall require procedures for testing foam before, during, and after shipboard installation. A description of the proposed foam installation quality control reports and time limits for reporting results to NAVSEA on site representatives shall also be included.

Non-acceptance by NAVSEA of any of the above data will terminate the qualification process.

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4.3.3 Qualifying mock-up pour. After successful completion of the previous qualifying steps (see 4.3.1 and 4.3.2), NAVSEA will authorize a qualifying mock-up pour.

4.3.3.1 Equipment. Mixing equipment, metering pumps, hoses, dispensing equipment, and accessories shall duplicate expected shipboard operating conditions.

4.3.3.2 Sampling of mock-up pour. For purposes of qualifying mock-up pour demonstrations, a simulated compartment shall be constructed in accordance with 4.5.2.1. Foam rise shall be in the 14-foot direction. After a curing time of 24 hours, 20 samples shall be randomly cut out, an equal number from each layer, to provide 40 test specimens, each 2-1/4 by 4 by 6 inches; the dimension 2-1/4 inches shall be perpendicular to the direction of foam rise (see 6.2). Tests of density and compressive strength (perpendicular to the direction to foam rise) shall be made on each specimen (see 4.6.3 and 4.6.4).

4.4 Quality conformance inspection. Quality conformance tests shall be performed by the installer at the site of installation. Tests for density (see 4.6.3) and compressive strength perpendicular to foam rise (see 4.6.4) shall be performed daily as require for large scale installations (see 4.4.2). The tests shall be made on foam from each mixing head in use during the large scale installation. Daily log and graphs relating to the density and compressive strength shall be maintained.

4.4.1 Lot. For purposes of sampling, a lot shall consist of all components of a foam system, each manufactured as one batch, but not necessarily delivered at one time.

4.4.1.1 Source inspection. From each lot (see 4.4.1) the installer shall take a quantity of foam resin material for the molds specified in 4.5.2.2. The mold samples shall be foamed, prepared, and tested as specified (see 4.6). If a sample fails in any of the tests, the foam contractor shall be notified and the tests rerun on a fresh sample with Government representatives present (see 6.6.1).

4.4.2 Quality conformance inspection preceding, during, and after installation in the large scale voids. Prior to installation, concurrent with the pouring in ship's compartments (approximately every 200 ft³ of compartment space filled), and when pouring is concluded, the installer shall perform density and compressive strength (perpendicular to the foam rise) tests, specified (see 4.6.3 and 4.6.4), using the mold specified (see 4.5.2.2). The tests shall be conducted at the installer's laboratory. Samples of the foam mix shall be poured into a 1-ft³ mold, and each mold shall provide not less than two test specimens 2-1/4 by 4 by 6 inches (6 inches in direction of foam rise). Density and compressive strength (perpendicular to the direction of foam rise). Density and compressive strength (perpendicular to the direction of foam rise) shall be determined on each sample as rapidly as possible in order to provide information and guidance for any necessary adjustment of materials or mixing equipment. In the event that the laboratory results indicate that the foam does not meet the density and compressive strength requirements of this specification, all pouring shall immediately cease. The foam that has already been poured to fill the void shall be removed, the machinery shall be recalibrated, and the void shall be repoured.

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4.4.5 Sampling.

4.5.1 Sample preparation. Foaming and handling characteristics of the material shall be determined during the preparation of the test samples as specified (see 6.2). A quantity of foam ingredients for the sample molds of 4.5.2.2 and 4.5.2.1, using the automatic equipment specified by the foam contractor (see 3.6), shall be taken as applicable and then poured.

4.5.2 Sample molds.

4.5.2.1 Mock-up section for qualification testing. The mock-up section shall be 4 by 8 by 14 feet, or as specified by the qualifying activity (see 6.5). The mold requirements shall include such information as thickness of the material (steel), size of openings, dimensions of the mold, and top or no-top configuration. The mold requirements shall also indicate when structural members, piping, or other simulated internal obstructions are required in the mock-up to obtain information about flow properties of the foam. The mock-up shall be able to be disassembled and a release agent acceptable to the foam contractor shall be used for ease of disassembly. Access to mock-up section shall simulate ship's construction.

4.5.2.2 Mock-up section for lot testing. A 1-ft³ laboratory-prepared box pour shall be used for the lot test sample. The four walls and bottom shall be solid, and shall be so constructed that the mold can be disassembled. A mold release agent acceptable to the foam contractor shall be used.

4.5.3 Preparation of test specimens.

4.5.3.1 Mock-up mold (see 4.5.2.1). Samples shall be selected in accordance with 4.3.3.2. Tests specified in 4.6 shall be conducted on each of these samples. Test specimens from these samples shall be prepared as specified (see 4.5.3.2 and 4.5.3.3).

4.5.3.2 Lot testing mold (see 4.5.2.2). After determining the density (see 4.6.3), one half of the sample block shall be cut into 1-inch or 2-1/4 inch thick layers. The thickness of these layers shall be perpendicular to the direction of foaming except for one 2-1/4 inch layer which shall be parallel. The other half shall be used to prepare tensile specimens. For the tensile specimens, the thickness shall be parallel to the rise of foam. Specimens shall be free of skin and shall be prepared in such a manner that the possibility of heating is minimized. Specimens for test shall not be heated, immersed in water, or subjected to any mechanical or chemical treatment prior to testing, except as described herein.

4.5.3.3 Size of specimens. The number and size of the specimens for each test as specified in 4.6 shall be prepared from the 1- or 2-1/4 inch thick layers. Unless otherwise specified herein, test specimens shall be selected at random from the prepared 1- and 2-1/4 inch thick layers as required. Prior to testing, each 1- by 4- by 4-inch specimen and 2-1/4 by 4- by 6-inch specimen shall be weighed to the nearest 0.1 gram, and each 1- by approximately 1.129-inch diameter specimen to the nearest 0.001 gram. The dimensions shall be measured to the nearest 0.01 inch

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and 0.001 gram and density calculated. Any specimen whose density is not within 5 percent of that of the sample block shall be subject to rejection and replaced with a new specimen. Specimens for compressive strength and change in compressive strength after humid aging and oil immersion shall be cut from the same 2-1/4 inch thick layers of foam.

4.6 Test procedures.

4.6.1 Test conditions. Unless otherwise specified (see 6.2), the atmospheric conditions surrounding the specimen prior to and during the test shall be 23 ± 2 degrees Celsius (73.4 ± 3.6 degrees Fahrenheit), and 50 ± 5 percent relative humidity. The temperature, relative humidity, and the period of time for conditioning shall be recorded for each test. Results shall be reported as the average value for the number of specimens tested, except compressive strength, for which all individual values shall be reported.

4.6.2 Uniformity in single pours. The test block molded in accordance with 4.5.2.2 shall be visually examined on all surfaces for any void openings, large accumulations of unexpanded resin, or any other occlusions. The test block shall be cut horizontally into three equal sections and the inside surfaces examined in a similar manner. Any void openings or large accumulations of unexpanded resin shall be cause for rejection (see 3.3.2.2).

4.6.3 Density. Irregular surfaces of the foam samples (such as the domed surface of the sample) shall be squared off to permit accurate measurement of dimensions. The density of the foam shall be determined in accordance with ASTM D 1622, except that one sample block shall be tested (see 3.4.1).

4.6.4 Compressive strength. Compressive strength shall be determined in accordance with procedure A of ASTM D 1621, except that the report of average values does not apply, and there shall be two test specimens of the size 2-1/4 by 4 by 6 inches. Each individual value shall be reported (see 3.4.2). Compressive strength (perpendicular to foam rise) shall be tested again following both the humid aging test and the oil resistance test, and shall meet the requirements of 3.4.2.

4.6.5 Tensile strength. Tensile strength shall be determined in accordance with ASTM D 1623, using a type A specimen, except that three specimens shall be tested (see 3.4.3).

4.6.6 Shear strength. Shear strength shall be determined in accordance with ASTM C 273, except that three specimens, 1/2 by 2 by 6 inches, shall be tested (see 3.4.4).

4.6.7 Unicellularity. The percent open cell shall be determined in accordance with procedure C of ASTM D 2856, except that three specimens, approximately 1 by 1.129 inch diameter, shall be tested (see 3.4.5).

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4.6.8 Water absorption. Water absorption shall be determined in accordance with ASTM D 2842, except that the cell chord length determination shall be omitted and five specimens, 1 by 4 by 4 inches, shall be tested (see 3.4.6).

4.6.9 Oil resistance. The specimen shall be immersed in JP-5 turbine fuel conforming to MIL-T-5624. After 70 hours, the specimen shall be removed, lightly blotted with paper toweling, and compared to an unaged specimen of similar size for evidence of softening or dissolving (see 3.4.7). Three specimens, approximately 1 by 1.129 inch in diameter, shall be tested.

4.6.10 Humid aging. Humid aging shall be determined in accordance with ASTM D 2126, except that five 2-1/4 by 4- by 6-inch specimens shall be tested (see 3.4.8).

4.6.11 Fire resistance. Flame time, maximum extent of flame impingement, and drip flame time shall be determined in accordance with ASTM F 501. Testing shall be performed on five specimens, 1/2 by 2 by 6 inches, with no lift lines included in the specimens (see 3.4.9).

4.6.12 Toxicity. The manufacturer shall provide sufficient information to permit a toxicological evaluation of his product to the Navy Environmental Health Center (NEHC), accompanied with a request to perform a health hazard risk assessment (HHRA). As a minimum, the information shall include the name, formula and approximate percentage by weight of each ingredient in the product; identification of its pyrolysis products; and any other such information as may be needed to permit an accurate appraisal of any toxicity problem associated with the handling, storage, application, use, removal, disposal, or combustion of the product. The request for a HHRA shall also include a product material safety data sheet and a copy of the product label. The manufacturer shall provide any other information requested by NEHC to perform their evaluation. Proprietary data, which is clearly marked as such, will be held in the strictest confidence by NEHC. The request for a HHRA shall be addressed to the Commanding Officer, Navy Environmental Health Center, 2510 Walmer Avenue, Norfolk, Virginia 23513-2617, Attention: Mr. J.R. Crawl, C.I.H./NEHC-34. The manufacturer shall send a copy of the letter which requests the HHRA to the Chief, Bureau of Medicine and Surgery (MED-03B4), Washington D.C. 20372-5120. Upon receipt of the HHRA performed by NEHC, the manufacturer shall send a copy to the Naval Sea Systems Command, Code 514, Washington, DC 20362, with a request for approval.

4.7 Inspection of packaging. A random sample of filled containers shall be taken from each lot in accordance with MIL-STD-105 at inspection level I and Table I to verify compliance with requirements regarding fill, closure, marking, and all other requirements not involving tests. Containers shall be examined for defects of construction of the container and closure, for evidence of leakage and for unsatisfactory markings. Each sample filled container shall also be weighed to determine the amount of contents. Any container in the sample having one or more defects, or under required fill, shall be subjected to rejection (see 6.6.2).

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TABLE I. *Sampling for inspection of packaging.*

Lot size	Sample size	Accept	Reject ^{1,2,3}
2 – 150	8	0	1
151 – 500	20	1	2
501 – 1200	32	2	3
1201 – 3200	50	3	4
3201 – 10000	80	5	6
10001 – 3500	125	5	6
35001 – 150000	200	10	11
150001 – 500000	315	14	15
500001 – OVER	500	21	22

¹All defective items must be replaced with acceptable items prior to lot acceptance.

²Inspect sample size until reject criteria is reached.

³Rejected lots may be screened and resubmitted for inspection and retest.

4.8 Lot acceptance/rejection criteria.

4.8.1 Source inspection. During source inspection retest, if the new sample fails any of the tests specified in 4.6, the lot represented by the samples (original and new) shall be rejected (see 4.4.1.1).

4.8.2 Packaging inspection. The acceptable quality level (AQL) for the packaging inspection specified in 4.7 equals 2.5 percent defective. If the number of defects in any sample (see 4.7) exceeds the acceptance number for the appropriate sampling plan as specified in MIL-STD-105, the lot represented by the sample shall be rejected.

5. PACKAGING

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

5.1 Packaging requirements. The foam material ingredients shall be packaged in accordance with ASTM D 3951.

5.2 Marking. Marking shall be in accordance with ASTM D 3951 and as follows:

- a. Density (nominal) of resultant foam (only on resin containers)
- b. Military specification number
- c. Net weight of material
- d. Date of manufacture and code number
- e. Date before which material must be used

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- f. Recommended storage procedure (if any)
- g. Recommended formulation (only on resin containers)
- h. Handling and safety precautions (if any)
- i. Foam contractor's name.

5.2.1 Special marking. Packages containing hazardous chemicals shall have warning labels securely attached to them, with the marking required by the U.S. Department of Transportation CFR Title 49, parts 171 – 179 and ANSI Z129.1.

5.3 Material safety data sheet. A copy of the material safety data sheet shall be attached to the shipping document for each destination (see 3.2.2).

6. NOTES

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

6.1 Intended use. The material is intended for shock absorption in large void filling applications.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. Handling characteristics required
- d. Minimum ambient temperature for air cure, if applicable (see 3.3.1)
- e. Where test pours are made, foam rate, depth per pour after rise, minimum time required between vertical successive pours, minimum time for test specimens to reach maximum physical properties, and quantity of foam in any single pour (see 3.3.2.1, 4.5.1, and 6.5)
- f. Area of mock-up section from which samples are to be cut (see 4.3.3.2).
- g. Atmospheric conditions, if other than specified (see 4.6.1).
- h. Total quantity of foam required.
- i. Submittal of Naval Sea Systems Command approval letter regarding toxicity.

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6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DIDs) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DIDs are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.2.1	DI-E-2121	Certificate of compliance	—
4.1.1	DI-R-4803	Inspection system program plan	—

The above DIDs were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on the DD Form 1423.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List No. 24249 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, Attn: SEA 51222, 2531 National Center Bldg. 3, Washington, DC 20362-5160 and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests must be made in accordance with "Provisions Governing Qualification SD-6" (see 6.4.1).

6.4.1 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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6.5 Contractor's instruction sheet. The foam contractor shall provide instruction sheets on the foam system for test and installation purposes. The instruction sheets shall contain the following information:

- a. Military specification number
- b. Foam supplier's code number and commercial designation
- c. Nominal density of the foamed material (free blown)
- d. Recommended storage procedure
- e. Usable storage life
- f. Handling procedures

(1) *Mixing instructions.* In addition to the recommended formulation (exact proportions in which ingredients are mixed) for automatic dispensing, instructions shall include complete mechanical and operational details of the automatic dispensing equipment to be used. Also included shall be handling qualities of the foam such as mix time, rise time, and minimum and maximum time intervals (if applicable) between successive pours.

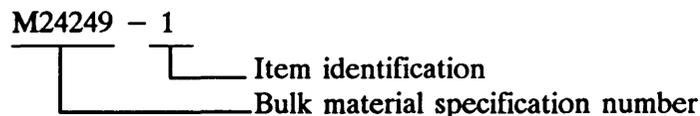
(2) *Handling precautions.*

6.6 Automatic equipment. The qualifying or contracting activity, as applicable, will provide the following information to the foam contractor so that satisfactory automatic installation equipment can be provided:

- a. Mock-up model construction (see 4.5.2.1)
- b. Foam rate and quantity per pour (see 3.3.2.1)
- c. Application procedure – at what stage in the shipbuilding program will the foam installation be done
- d. Number of test pours required from each machine during large scale installation (see 4.4.2).

6.7 Material safety data sheet (MSDS). Contracting officers must identify those activities requiring copies of MSDSs. Additional required Government information is contained in FED-STD-313. In order to obtain the MSDS, FAR clause 52.223-3 must be in the contract.

6.8 Military part number. The military part number should consist of the letter M and the basic number of this specification:

M24249 – 1

 Item identification
 Bulk material specification number

MIL-P-24249A(SH)

6.9 Subject term (key word) listing.

Cellular plastic
Expanded plastic foam
Filler

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

Preparing activity:
Navy – SH
(Project 9330-N007)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-P-24249A(SH)	2. DOCUMENT DATE (YYMMDD) 20 JULY 1992
3. DOCUMENT TITLE PLASTIC MATERIAL, CELLULAR POLYURETHANE, RIGID, VOID FILLER, FOAM-IN-PLACE, LARGE SCALE AND INSTALLATION OF		
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME <i>(Last, First, Middle Initial)</i>	b. ORGANIZATION	
c. ADDRESS <i>(Include Zip Code)</i>	d. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) AUTOVON <i>(If applicable)</i>	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME Technical Engineer: Mr. William Dunham, NAVSEA 51431	b. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (703) 602-0146	(2) AUTOVON 332-0146
c. ADDRESS <i>(Include Zip Code)</i> Commander, Naval Sea Systems Command Attn: SEA 05Q42, 2531 National Center, Bldg3 Washington, DC 20362-5160	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	