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INCH-POUND
A-A-59488
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COMMERCIAL ITEM DESCRIPTION

DECKING, SYNTHETIC

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. SCOPE. This Commercial Item Description (CID) describes the requirements of synthetic decking made from Ultra High Molecular Weight Polyethylene (UHMWPE). Synthetic decking is intended for use in the well decks of U.S. Navy amphibious ships that carry boats, landing craft, and other equipment. Adverse sea conditions and the ability to control boats and landing craft within the well area, when open to the sea, require that a durable and abrasion-resistant deck covering be used to provide some form of protection to both the ship and the service craft.

2. CLASSIFICATION.

2.1 Size. Unless otherwise specified, synthetic decking shall be provided in either 2.5 inch (63.5 mm) or 3.5 inch (88.9 mm) thickness and shall duplicate the plank widths as indicated on the applicable ship installation drawing. Panel widths wider than the wood plank sizes may be used as long as the weight per unit area requirements are met by the larger width panel and the decking is installed with the “M”-shaped cross-section running in the fore to aft directions (see 3.2.1). Thinner, wider, or solid sheets (not having the “M”-shaped cross-section) may be necessary to suit dimensional requirements or special conditions on the installation drawing.

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 03Q, 2531 Jefferson Davis Highway, Arlington, VA 22242-5160.

AMSC N/A FSC 2040

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3. SALIENT CHARACTERISTICS.

3.1 Material. Synthetic decking shall be made using UHMWPE formulation. The UHMWPE material shall use a base virgin resin made in accordance with ASTM D 4020 and have a nominal molecular weight of 3.1×10^6 or greater. The use of additives and/or fillers with the virgin resin material may be used to achieve the synthetic decking properties specified herein as long as the additives and/or fillers are evenly distributed throughout the panel to provide a 100-percent uniform mix and homogeneous-type formulation throughout the cross-section.

3.1.1 Material properties. The synthetic decking material shall meet all of the following requirements specified over a normal operating temperature range of –20° to +125°F (–28.9° to +51.7°C). Unless otherwise specified within the documented test methods, all testing shall be conducted at +75°F (+23.9°C). A temperature variation of plus or minus 9°F (5°C) shall be allowed for test purposes. The material property requirements are summarized in Table I.

3.1.1.1 Flame spread. The test specimens shall be prepared and tested in accordance with ASTM E 162 and shall not exceed a 25 IS (flame spread index) value. The test specimens shall be placed in the test fixture so that the high traction surface faces the flame source. The test specimens shall exhibit no dripping, puddling, or exfoliation during the test and shall not exhibit any burning or smoldering after the flame source has been removed. Surface coatings shall not be used to retard burning of the synthetic decking.

3.1.1.2 Smoke density. The test specimen shall be evaluated to determine the relative amount of smoke produced by burning or decomposition in accordance with ASTM E 662. The test specimens shall be placed in the test fixture so that the high traction surface faces the flame source. The smoke generated during the flaming and nonflaming modes shall not exceed 450 Dm (maximum specific optional density).

3.1.1.3 Impact resistance. A test specimen shall be prepared and tested as described in ASTM D 256, Method A (except that the Izod specimens shall be unnotched). The high traction surface is not to be included as part of the test specimens. These unnotched test specimens shall be capable of absorbing an Izod impact condition of 45 inch-pounds/inch (202.5 Joules/meter). No breakage or cracking of the test specimen is permitted.

3.1.1.4 Coefficient of friction. The high traction top surface of the synthetic decking (see 3.2.2) shall be manufactured so that the coefficient of friction value does not fall below 0.75 when tested in either the dry, wet, or oily surface conditions as determined from the WCM procedure specified in UL 410.

3.1.1.5 Water absorption. The synthetic decking material shall not absorb more than 1.0 percent of its original weight when immersed in water as defined in the procedure of ASTM D 570.

3.1.1.6 Chemical resistance. The synthetic decking material shall not exhibit a weight increase of greater than 0.50 percent or a dimensional change of 0.10 percent when immersed in the following fluids and tested in accordance with ASTM D 543. The synthetic decking shall not

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experience any degradation or loss of material properties so that it fails to meet any of the other requirements specified within this document.

- Aqueous film-forming foam (AFFF) firefighting fluid made from six parts of foam concentrate and 94 parts of seawater in accordance with MIL-F-24385. Synthetically formulated seawater is acceptable for this test if natural seawater is not available.
- Hydraulic fluid in accordance with MIL-H-19457.
- JP-5 aviation fuel in accordance with MIL-DTE-5624.
- Lubricating oil in accordance with MIL-PRF-7808.
- Gasoline in accordance with ASTM D 4814.

3.1.1.7 Corrosion. The synthetic decking shall not have a corrosive effect on steel, galvanized iron, stainless steel, or aluminum when exposed to salt water or fresh water wash down conditions normally encountered in well deck service or when in contact with the chemical reagents specified in 3.1.1.6.

Table I. Summary of synthetic decking material property requirements

Properties	Units	Requirements	Test method
Operating temperature	°F (°C)	-20 to 125 (-28.9 to 51.7)	N/A
Flame spread	Is	25	ASTM E 162
Smoke density	Dm	450	ASTM E 662
Impact resistance	inch-pound/inch (J/m)	45 (202.5)	ASTM D 256
Coefficient of friction			
Dry condition	Dimensionless units	0.75	UL 410
Wetted with water condition		0.75	UL 410
Wetted with oil condition		0.75	UL 410
Water absorption	Percent increase	1.0	ASTM D 570
Chemical resistance			
Firefighting fluid	Percent increase in weight and dimensions	0.50 wt/0.10 dim.	ASTM D 543
Hydraulic fluid		0.50 wt/0.10 dim.	ASTM D 543
Aviation fuel		0.50 wt/0.10 dim.	ASTM D 543
Lubricating oil		0.50 wt/0.10 dim.	ASTM D 543
Gasoline		0.50 wt/0.10 dim.	ASTM D 543
Compression	Percent	10.0	ASTM D 621
Color	N/A	Black	Visual
Paintability	N/A	Pass	TT-E-489

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3.1.1.8 Compression set. The synthetic decking shall not incur a permanent compression set of more than 10.0 percent when tested in accordance with ASTM D 621 Method B, except that a 500 lb/in^2 (3.5 N/mm^2) load shall be used for the test.

3.1.1.9 Color. Unless otherwise specified, the color of the synthetic decking shall be black.

3.1.1.10 Paintability. The high traction surface of the synthetic decking shall be capable of being painted for marking and coding. White paint, color number 17875, or yellow paint, color number 13538, specified in TT-E-489 shall be used to ensure compliance.

3.2 Construction. The formulated synthetic resin material shall be manufactured into sizes capable of replacing wood planking on the applicable ship class installation drawings unless otherwise specified (see 2.1). The synthetic decking shall incorporate a weight-reducing "M"-shaped pattern on its back face (see 3.2.1) and a high traction surface on its top face (see 3.2.2).

3.2.1 Weight. The maximum weight for a 12 inch x 12 inch (304.8 mm x 304.8 mm) or 1.0 square foot area of synthetic decking shall be 11.2 lbs. (5.1 kg) for the 2.5 inch (63.5 mm) thick material
and 15.5 lbs. (7.0 kg) for the 3.5 inch (88.9 mm) thick material. Unless otherwise specified, the synthetic decking shall incorporate a weight-reducing pattern within its back face surface, such as the "M"-shaped cross-section configuration shown in Figure I. The total amount of full-thickness panel in contact with the steel deck surface shall not be less than 50 percent of the synthetic decking top-surface area. In no case shall the weight reduction pattern decrease the remaining panel thickness to less than 1.25 inches (31.8 mm).

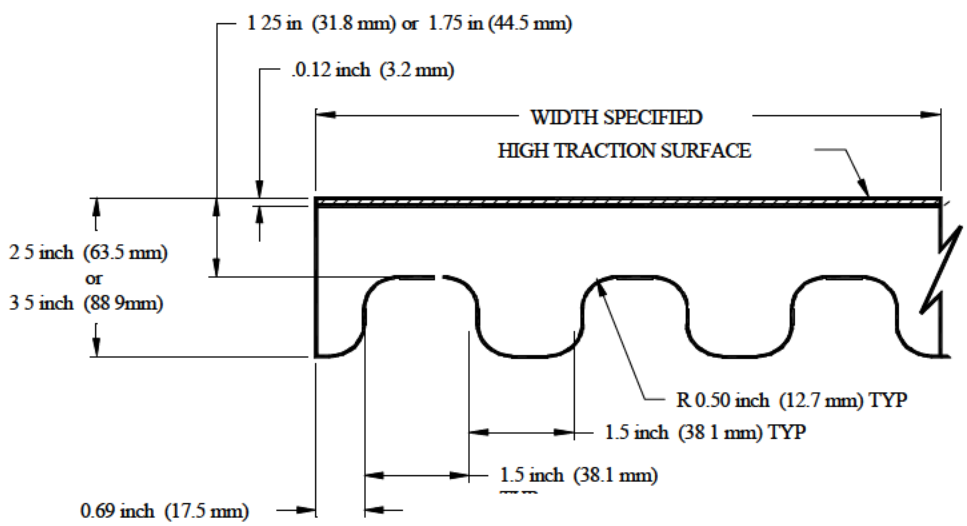

FIGURE 1 Typical Synthetic Decking Cross Section (Dimensions Are Nominal)

3.2.2 High traction surface. A high traction surface shall be embedded to a minimum thickness of 0.12 inch (3.2 mm) into the top surface of the synthetic decking as shown in Figure I. The

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method used to create the high traction surface is at the discretion of the manufacturer, as long as the coefficient of friction requirements are met and maintained throughout the full 0.12 inch (3.2 mm) thickness of the high traction surface.

3.2.3 Structural integrity. The synthetic decking, including the high traction surface, shall not delaminate, crack, splinter, peel, or spall when subjected to the testing included in this specification. Minor surface scuffing that may occur during testing is acceptable, as long as it does not cause a loss of structural integrity of the synthetic decking nor any degradation of its high traction surface.

3.2.4 Production tolerances. The maximum production tolerances for the overall thickness and width of the synthetic decking shall not be greater than plus or minus 0.12 inch (3.2 mm) of the dimensions specified on the applicable ship class installation drawing. The production length tolerance shall not be greater than plus or minus 0.50 inch (12.7 mm) of the length specified on the applicable ship class installation drawing.

3.2.5 Thermal expansion. The synthetic decking formulation shall take into account the thermal expansion and contraction that may occur over the normal operating temperature range specified (see 3.1.1). The thermal effects on the overall thickness, length, and width of the synthetic decking shall not be greater than plus or minus 0.005 inch/inch (0.005 mm/mm) when tested in accordance with ASTM D 696.

3.2.6 Attachment tolerances. When specified, synthetic decking shall be provided with fastener mounting holes arranged in the hole patterns as shown on the applicable ship class installation drawing. Fastener mounting hole tolerances shall take into account the thermal expansion or contraction of the synthetic decking over the normal operating temperature range specified to ensure that decking buckling or binding problems do not occur.

3.2.7 Flatness, waviness, and straightness tolerances. The flatness variation of the as-received panel shall not exceed 0.50 inch (12.7 mm) for every 12 inch (304.8 mm) of panel surface distance across the width or the length of the panel. The waviness variations shall not exceed 0.50 inch (12.7 mm) at any point along the length of the synthetic decking. Flatness and waviness denote the maximum deviation of the top surface of the synthetic decking when resting on a flat horizontal surface. The straightness tolerance along the total length of the synthetic decking shall not exceed 0.50 inch (12.7 mm) at the maximum curvature point when measured against a flat vertical surface.

3.2.8 Joining of synthetic decking pieces. When shorter pieces of synthetic decking are joined together to make longer lengths, the joint must be strong enough that the synthetic decking material can be lifted at both ends without incurring any visible damage to the joint integrity. The joint connection must achieve complete attachment across the full “M”-shaped cross-section of the two joined pieces and must not require any cross-section alteration of either of the joined pieces so that the standard “M”-shaped configuration is maintained across the joint. The joining process must ensure that the dimensional, flatness, waviness, and straightness requirements as specified in this specification are maintained.

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3.3 Installation requirements. The synthetic decking shall be capable of being cut or machined from its original length and width dimensions to any smaller dimension or shape, and shall be capable of being drilled. The synthetic decking manufacturer shall provide detailed recommendations on the cutting tools, cutting speeds, safety procedures, and all other fabrication-related concerns that should be considered during the installation of the decking.

3.4 Maintenance. When subjected to the operational environment normally encountered in well deck operations, the synthetic decking shall be capable of being cleaned using a washdown procedure that includes brushing with a mild cleaning solution followed by a steam water rinse.

3.5 System repairability. Damaged synthetic decking shall be capable of being replaced without requiring the use of specialized training or specialized equipment.

4. REGULATORY REQUIREMENTS.

4.1 Toxic products and formulations. The synthetic decking shall have no adverse effect on the health of personnel when used for its intended purpose. Pertinent questions shall be referred by the contracting activity to the appropriate departmental medical service, which will act as an advisor to the contracting activity. Regardless of any other requirements, materials and parts containing asbestos, mercury, lead, cadmium, chlorofluorocarbons (CFCs), vinyl chlorides, antimony trioxide, red phosphorous, and halogenated compounds (materials that contain iodine, bromine, chlorine, and fluorine) shall not be used. The contractor shall have toxicological product formulations and associated information of the UHMWPE available for review by the contracting activity to evaluate the safety of the material for the proposed use.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this CID; conform to the producer's own drawings, specifications, standards, and quality assurance practices; and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

6. PACKAGING.

6.1 Packaging. Commercial preservation, packing, and marking practices shall be acceptable for the synthetic decking unless otherwise specified in the contract or order.

7. NOTES.

7.1 Ordering information. Procurement documents should specify the following:

(a) Title, number, and date of this CID.
(b) Thickness of synthetic decking required. (see 2.1)
(c) Color, if other than black. (see 3.1.1.9)

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(d) If weight-reducing pattern is not required. (see 2.1 and 3.2.3)
(e) Certification of product compliance. (see 5.1)
(f) If special packaging is required. (see 6.1)
(g) If predrilled mounting holes are required. (see 3.2.6)

7.2 Applicable documents. The documents referenced in this CID are the issues in effect on the date of the invitation for bids or request for proposal unless otherwise specified. These documents form a part of this CID to the extent specified in the event that there is a conflict between this CID and a document referenced herein, in which case this CID shall take precedence.

7.2.1 Government documents.

FEDERAL SPECIFICATIONS

TT-E-489 - Enamel, Alkyd, Gloss, Low VOC Content

DEPARTMENT OF DEFENSE

MIL-DTL-5624 - Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP-8 ST
MIL-PRF-7808 - Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-H-19457 - Hydraulic Fluid, Fire-Resistant, Non-Neurotoxic
MIL-F-24385 - Fire Extinguishing Agent, Aqueous Film Foaming Foam (AFFF) Liquid Concentrate for Fresh and Seawater

A copy of these government documents is available from the Standardization Documents Order Desk, Building 4D,700 Robbins Avenue, Philadelphia, PA 19111.

7.2.3 Commercial documents.

AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

D 256 - Standard Test Methods for impact Resistance of Plastics and Electrical Insulating Materials
D 543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
D 570 - Standard Test Method for Water Absorption of Plastics
D 621 - Standard Test Methods for Deformation of Plastics Under Load
D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between –30°C and 30°C
D 4020 - Standard Specification for Ultra-High-Molecular-Weight-Polyethylene Molding and Extrusion Materials
D 4814 - Standard Specification for Automotive Spark-Ignition Engine Fuel
E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

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

Application for copies of ASTM specifications should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

UNDERWRITERS LABORATORIES

UL 410 - Slip Resistance of Floor Surface Materials

Application for copies of UL specifications should be addressed to Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

Preparing Activity
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