

INCH-POUND

A-A-59875

July 26, 2010

## COMMERCIAL ITEM DESCRIPTION

### COVERINGS FOR WATERBORNE MAIN PROPULSION SHAFTING ON U.S. NAVAL SURFACE SHIPS AND SUBMARINES

#### ANTI-CORROSION POLYSULFIDE MATERIAL SYSTEM

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 three-layer, anti-corrosion coating system which covers and protects all non-sleeve areas of waterborne propulsion shafting by preventing galvanic corrosion to the steel substrate in the marine environment and so preventing structural failure of the shafting. This CID pertains specifically to the first, second, and third layers of the four-layer shaft covering system identified in MIL-STD-2199.

2. **CLASSIFICATION.** The layers shall conform to the following types and color, as specified (see 7.2):

2.1 **Type.** Layers shall be as follows:

Type I: First layer (primer). Low-viscosity primer for polysulfides.

Type II: Second layer (elastomeric coating). Two-component, epoxy-polysulfide elastomeric coating.

Type III: Third layer (sealing/fairing compound). High-viscosity, thixotropic elastomeric coating.

2.2 **Color.** Colors for the second layer (elastomeric coating) shall be as follows:

1: Gray

2: Black

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### 3. SALIENT CHARACTERISTICS.

3.1 First layer (primer). The first layer of the shaft covering system shall consist of a low-viscosity primer for polysulfides. The primer shall contain rubber and a coupling agent in solvent (toluene) that promotes adhesion of the second layer (elastomeric coating) of the waterborne propulsion shaft covering system by delivering a monolayer of rubber to the media blasted carbon steel substrate. The primer (Thiokol 415 or equal) shall be specifically intended for use as a primer over steel for polysulfide coatings. The primer is the only shaft covering component that shall contain volatile organic compounds (VOCs). The amount of VOCs released shall be within the limit established by the Environmental Protection Agency (EPA) for shipyards in 40 CFR Part 63.

3.1.1 Adhesion of primer. Adhesion of the primer to steel and adhesion of the primer to the elastomeric coating shall be demonstrated both dry and after 1-year immersion in ASTM D1141 seawater. The primer shall be applied to flat steel test panels, 12 by 12 by ¼ inches in accordance with MIL-R-23461, that have been white metal blasted to a 3-mil average profile in accordance with SSPC-SP 5. After the primer dries, the elastomeric coating specified in 3.2 shall be applied to a 20-mil thickness in accordance with MIL-STD-2199. After the elastomeric coating cures, it shall be covered with two plies of glass reinforced plastic (GRP) in accordance with MIL-STD-2199. Primer adhesion shall be determined in accordance with ASTM D4541 using a portable adhesion tester such as the PATTI® (Pneumatic Adhesion Tensile Testing Instrument), or equivalent. The PATTI® tester or equivalent shall be applied to the GRP. Both dry and wet primer adhesive strength values shall exceed 400 pounds per square inch (psi). Adhesive failure at the primer-to-steel bond or elastomeric coating to primer bond shall constitute rejection of the primer.

3.1.2 Drying characteristics. The primer shall dry in 1 hour or less.

3.1.3 Application characteristics. The primer shall be capable of application by roller and shall have a minimum coverage of 400 square feet per gallon. Coated areas shall be identifiable from uncoated areas by a transition in gloss.

3.1.4 Corrosion protection performance. The primer shall contain a polymer, in addition to adhesion promoters, to protect the steel substrate from corrosion. The ability of the primer to protect the steel from corrosion shall be demonstrated by applying the primer within 4 hours to half of a media blasted 4-inch by 4-inch carbon steel alloy test coupon in accordance with ASTM A36/A36M. The remaining half of the test coupon shall be left uncoated. The coupon shall then be immersed in artificial seawater prepared in accordance with ASTM D1141. The test coupon shall be removed from the water weekly, photographed, and re-immersed in the ASTM D1141 seawater. The coated half of the test coupon shall remain free of corrosion after 1-month immersion in ASTM D1141 seawater.

3.2 Second layer (elastomeric coating). The second layer of the shaft covering system shall be a 100 percent solids, solvent free grade, two-component elastomeric coating system, specifically, an epoxy cured with polysulfide (Thiokol RLP 2378+ or equal). The elastomeric coating shall promote adhesion of the GRP fourth layer of the waterborne propulsion shaft covering system specified in MIL-STD-2199. The elastomeric coating shall be capable of being applied with reaction spray equipment. The cured color of the elastomeric coating system shall be in accordance with MIL-STD-2199.

3.2.1 Adhesion of GRP to elastomeric coating. Adhesion of GRP to the elastomeric coating shall be tested both dry and after 1-year immersion in ASTM D1141 seawater. Primed and elastomeric coated test panels specified in 3.1.1 shall be covered with four plies of GRP applied in accordance with MIL-STD-2199. GRP adhesion to the elastomeric coating shall be determined in accordance with ASTM D4541 using a portable adhesion tester such as the PATTI®, or equivalent. The PATTI® tester or equivalent shall be applied to the GRP. Both dry and wet GRP to elastomeric coating adhesive strength values shall exceed 400 psi, and any failure shall occur cohesively in the elastomeric coating. Adhesive failure at the GRP-to-elastomeric coating bond shall constitute rejection of the elastomeric coating.

3.2.2 Cure characteristics. The elastomeric coating shall achieve full cure at ambient room temperature. The pot life shall be a minimum of 15 minutes.

3.2.3 Curing constituents. The polysulfide components of the sealing/fairing compound shall be free of solvents and lead oxide curing agents.

3.2.4 Solvent content. The elastomeric coating shall be free of solvents and volatile organic compounds.

3.2.5 Tensile properties. Tensile elongation of the cured elastomeric coating shall exceed 400 percent at failure when tested in accordance with ATSM D638.

3.3 Third layer (sealing/fairing compound). The third layer of the shaft covering system shall be an elastomeric sealing/fairing compound, specifically, a polysulfide with a mixed viscosity of 700,000 CPS or greater (Thiokol 2282 or equal). The sealing/fairing compound shall consist of a 100 percent solids, high viscosity, thixotropic elastomeric coating for fairing the shaft to the sleeve and as a filler material for surface irregularities in the shaft. The sealing/fairing compound shall bond to the elastomeric coating and to the GRP shell specified in MIL-STD-2199.

3.3.1 Adhesion of sealing/fairing compound to elastomeric coating. Adhesion of the sealing/fairing compound to the elastomeric coating shall be tested both dry and after 1-year immersion in ASTM D1141 seawater. Adhesion shall be determined in accordance with ASTM D4541 with the PATTI® or equivalent portable tester applied to the GRP, or in accordance with MIL-R-23461A. Primed and elastomeric coated test panels specified in 3.1.1 shall be covered with a  $20 \pm 5$  mil ( $0.020 \pm 0.005$  inch) layer of sealing/fairing compound after the elastomeric coating cures. After the sealing/fairing compound cures, the test panel shall be covered with four plies of GRP applied in accordance with MIL-STD-2199. Both dry and wet sealing/fairing compound to elastomeric coating adhesive strength values shall exceed 400 psi, and any failure shall occur cohesively in either the elastomeric coating or in the sealing/fairing compound. Adhesive failure at the sealing/fairing compound-to-elastomeric coating bond shall constitute rejection of the sealing/fairing compound.

3.3.2 Adhesion of GRP to sealing/fairing compound. Adhesion of GRP to the sealing/fairing compound shall be tested both dry and after 1-year immersion in ASTM D1141 seawater. Primed and elastomeric coated test panels specified in 3.1.1 shall be covered with a  $20 \pm 5$  mil ( $0.020 \pm 0.005$  inch) layer of sealing/fairing compound after the elastomeric coating cures. After the sealing/fairing compound cures, the test panel shall be covered with four plies of GRP applied in accordance with MIL-STD-2199. GRP adhesion to the sealing/fairing compound shall be determined in accordance with ASTM D4541 using a portable adhesion tester such as the PATTI®, or equivalent. The PATTI® tester or equivalent shall be applied to the GRP. Both dry and wet GRP to sealing/fairing compound adhesive strength values shall exceed 400 psi, and any failure shall occur cohesively in the sealing/fairing compound. Adhesive failure at the GRP-to-sealing/fairing compound bond shall constitute rejection of the sealing/fairing compound.

3.3.3 Cure characteristics. The sealing/fairing compound shall achieve full cure at ambient room temperature. The pot life shall be a minimum of 30 minutes.

3.3.4 Curing constituents. The polysulfide components of the sealing/fairing compound shall be free of solvents and lead oxide curing agents.

3.3.5 Application characteristics. The sealing/fairing compound shall be capable of being applied to rotating shaft sections using a trowel or squeegee. The viscosity or thixotropy shall allow the material to fair the shaft to the sleeve end.

3.3.6 Solvent content. The sealing/fairing compound system shall be free of solvents and volatile organic compounds.

3.3.7 Tensile properties. Tensile elongation of the cured sealing/fairing compound shall exceed 400 percent at failure when tested in accordance with ATSM D638.

3.4 Toxicity. The primer, elastomeric coating, and sealing/fairing compound shall have no adverse effect on the health of personnel when used for its intended purpose, and shall not be a hazard to the environment during waste disposal.

4. REGULATORY REQUIREMENTS. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

4.1 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of FED-STD-376 and all other requirements of this CID including form, fit, and function are met. If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

4.2 Material safety data sheet (MSDS). An MSDS shall be provided with the material.

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## 5. PRODUCT CONFORMANCE 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 marketplace. The government reserves the right to require proof of such conformance.

5.2 Market acceptability. The product offered shall have been previously sold either to the government or on the commercial market and shall currently remain a standard (currently produced) offering of the manufacturer. A currently produced item is required to help ensure up-to-date technology, especially in light of probable multiple-year contract duration and rapid advancement experienced in the technology.

## 6. PACKAGING.

6.1 First layer preservation, packing, and marking. For acquisition purposes, the products shall be preserved, packed, and marked Propeller Shaft Covering System, First Layer (Primer).

6.2 Second layer preservation, packing, and marking. For acquisition purposes, the products shall be packaged as two separate kits, one kit being applicable to the first coat (Gray) of the second layer and the other kit applicable to the second coat (Black) of the second layer. Each kit shall contain two components (Part A and Part B) to be mixed. Subject kits shall be labeled as Propeller Shaft Covering System, Second Layer (Coating), First Coat (Gray) Part-A; Propeller Shaft Covering System, Second Layer (Coating), First Coat (Gray), Part-B; Propeller Shaft Covering System, Second Layer (Coating), First Coat (Black) Part-A; Propeller Shaft Covering System, Second Layer (Coating), First Coat (Black), Part-B.

6.3 Third layer preservation, packing, and marking. For acquisition purposes, the products shall be preserved, packed, and marked as Propeller Shaft Covering System, Third Layer (Sealing/Fairing Compound).

## 7. NOTES.

### 7.1 Sources of documents.

7.1.1 ASTM standards. ASTM standards may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 or online at [www.astm.org](http://www.astm.org).

7.1.2 Defense standards. Defense standards may be obtained from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094 or online at <https://assist.daps.dla.mil/quicksearch/> or <https://assist.daps.dla.mil>.

7.1.3 FAR. The Federal Acquisition Regulation may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or online at <https://www.acquisition.gov/far>.

7.1.4 SSPC standards. SSPC standards may be obtained from SSPC Publication Sales, 40 24<sup>th</sup> Street, 6<sup>th</sup> Floor, Pittsburgh, PA 15222-4656 or online at [www.sspc.org](http://www.sspc.org).

### 7.2 Ordering data. The contract or order should specify the following:

- a. CID document number and revision.
- b. Type and color (when applicable) (see 2.1 and 2.2).
- c. Product conformance provisions (see 5.1).
- d. Packaging requirements (see 6).
- e. Quantity required.

### 7.3 Key words.

Elastomer

Flexible sealants

Polysulfide coatings

Polysulfide sealant

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MILITARY INTERESTS

Custodians:

Army – MR  
Navy – SH  
Air Force – 99

Review activities:

Navy – AS, CG  
Air Force – 03, 11, 84  
DLA – IS

CIVIL AGENCY COORDINATING ACTIVITY:  
GSA – FAS

Preparing Activity:

Navy – SH  
(Project 9330-2010-005)

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