

METRIC

A-A-59877

9 September 2010

## COMMERCIAL ITEM DESCRIPTION

## INSULATING COMPOUND, ELECTRICAL, EMBEDDING

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

1. **SCOPE.** This commercial item description covers a general purpose casting and potting compound which has excellent electrical and hydrolytic stability characteristics. The purpose of the compound is to preserve the electrical properties of the equipment to which it is applied by sealing against such environmental conditions as moisture, dirt, fumes, fungus, or other deleterious substances which may be encountered in Military service.

2. **CLASSIFICATION.** Electrical embedding insulating compounds shall be classified as types in accordance with 2.1.

2.1 Type (see 7.2).

Type 1 – Single component compound.

Type 2 – Multi-component compound.

3. **SALIENT CHARACTERISTICS.**

3.1 Commercial standard. The electrical insulating compound shall be based on a bisphenol-A epoxy-based polymer with curing agent as specified herein.

3.2 Characteristics.

3.2.1 Cure. When mixed according to the manufacturer's instructions, the compound shall cure at a temperature less than 130 degrees Celsius (°C) [266 degrees Fahrenheit (°F)] and meet the properties specified herein.

3.2.2 Fillers and additives. Fillers and additives may be added to the compound but shall be uniformly dispersed throughout the compound. Fillers shall not agglomerate or irreversibly settle during storage. Fillers shall not settle during application or cure. Phase separation shall not occur with any component of the compound during working life or cure.

3.2.3 Toxicity. The components, individually or mixed, and the cured product shall not have any adverse effect on the health of personnel when used for its intended use.

3.3 Properties of individual components.

3.3.1 Color. Color additives may be used.

3.3.2 Volatile content. The components shall be free of non-reactive, volatile solvents. The total volatile matter measured in each component shall be less than 1 percent by weight.

3.4 Properties of the mixed, uncured compound.

3.4.1 Pot life. The pot life at 23 °C (73.4 °F) shall be between 30 and 45 minutes.

3.4.2 Viscosity. The viscosity shall be a maximum of 25,000 Centipoises (cps) (16.8 lbm/ft sec).

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to [CommandStandards@navy.mil](mailto:CommandStandards@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 <https://assist.daps.dla.mil>.

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3.5 Properties of the cured product. When cured as specified, the properties of the product shall be as specified in [table I.](#)

TABLE I. Quantitative requirements.

Property	Units	Value	Requirement
Volatile content, max.	%WT	1.0	ASTM D1259, Method B
Pot life, min.	Minutes	30-45	3.5.4
Viscosity, max.	CPS	25,000	ASTM D2196, Method A
Working life, min.	Minutes	30	3.5.2
Flammability, extent of burning, max.	cm (inch)	2.54 (1)	ULVN
Specific gravity		<sup>1/</sup>	ASTM D792, Method A
Mean hardness, min.	Shore D	75	ASTM D2240
Average tensile strength, min.	Bar (atm)	482.7 (476)	ASTM D638, Type I
Average elongation, min.	Percent	2.0	ASTM D638, Type I
Average water absorption, max.	Percent	0.2	ASTM D570, 24 hour immersion
Mechanical shock, min.	Grams	1360	3.5.1
Average notched Izod impact, min.	J/cm (ft-lb/in)	0.1602 (.3)	ASTM D256, Method A
Thermal shock, min.	Cycles	10	Standard industry method
Average thermal expansion coefficient, max.	cm/cm/°C (in/in/°F)	30 x 10 <sup>-5</sup> (16.7 x 10 <sup>-5</sup> )	ASTM D696
Thermal conductivity coefficient, min.	Cal-cm/sec-cm <sup>2</sup> -°C (ft-lb in/sec-ft <sup>2</sup> -°F)	2.5 x 10 <sup>-4</sup> (0.1569)	Standard industry method
Dielectric strength, min.	kV/mm (V/mil)	12.79 (325)	ASTM D149
Dielectric constant, max.			ASTM D150
At 60 Hz	---	5.0	
At 1 MHz	---	4.5	
Dissipation factor, max.			ASTM D150
At 60 Hz	---	0.04	
At 1 MHz	---	0.05	
Arc resistance, min.	Seconds	50	ASTM D495
Volume resistivity, min.	Ohm-cm (ohm-in)	10 (3.94) <sup>1/ 3/</sup>	ASTM D257
Hydrolytic stability:			
Average hardness, max.	Percent <sup>2/</sup>	10	ASTM D2240
Average volume resistivity, max.	Ohm-cm (ohm-in) <sup>3/</sup>	10 (3.94) <sup>1/ 2/</sup>	ASTM D257
Fungus resistance	---	Grade 0	MIL-STD-810, Method 508
Operating temperature	°C (°F)	-32 to 130 (25.6 to 266)	3.5.3
NOTES:			
<sup>1/</sup> Informational purposes only.			
<sup>2/</sup> Percent reduction after aging.			
<sup>3/</sup> Value after aging.			

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3.5.1 Mechanical shock. Mechanical shock shall be determined as specified in 3.5.1.1 through 3.5.1.3.

3.5.1.1 Specimen. Three specimens, each 5 cm wide by 5 cm long and 1.25 cm thick (1.97 inches wide by 1.97 inches long and 0.49 inch thick), prepared as follows shall be tested. The specimens shall be prepared by mixing the compound and pouring into molds in accordance with manufacturer's instructions. Precautions shall be taken to avoid air entrapment. Specimens shall be cured in accordance with manufacturer's instructions regarding time and temperature.

3.5.1.2 Apparatus. A set of steel balls varying in size from 2.54 to 10.2 cm (1 to 4.02 inches) in diameter shall be used. The balls shall vary in size in increments of approximately 0.159 cm (0.06 inch) up to 6.35 cm (2.5 inches). Increments shall be 0.635 cm (0.25 inch) thereafter. The steel balls shall be held and released by a rigidly supported magnetic device that shall drop the balls on the exact center of the specimen. The specimen shall be placed on a 2.54 cm (1 inch) thick steel plate of surface dimensions larger in all directions than the specimen.

3.5.1.3 Procedure. The specimen shall be placed flat on a horizontal steel plate. When dropped a vertical distance of 91 cm, the steel balls shall strike the center of the specimen. Each specimen shall be struck with steel balls starting with the smallest and proceeding towards the largest until the specimen visibly cracks. The weight of the ball which caused the crack of each specimen shall be recorded.

3.5.2 Working life. The working life, after mixing the compound thoroughly, shall be that time beyond which the insulating compound can no longer be applied satisfactorily or beyond which it no longer flows evenly and is to viscous to wet the area.

3.5.3 Operating temperature. The operating temperature of the cured insulating compound in service shall be from -32 °C to 130 °C (25.6 to 266 °F).

3.5.4 Pot life. The pot life is the time from the initial mixing of the reactants of the insulating compound to the time when solidification commences, under conditions approximating the conditions of use.

3.6 Prohibited materials. Components shall be free of asbestos, mercury and mercury compounds, polyvinyl chloride (PVC), cadmium, and any ozone depleting chemicals.

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).

## 5. PRODUCT CONFORMANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this Commercial Item Description, 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 Conformance testing. When specified (see 7.2), the electrical insulating compound submitted by the manufacturer as meeting the salient characteristics of this CID shall be tested by the government or a qualified commercial laboratory (see 7.2).

5.3 Material safety data sheet (MSDS). When specified (see 7.2), the manufacturer shall provide a material safety data sheet prepared in accordance with FED-STD-313.

6. PACKAGING. Preservation, packing, and marking shall be as specified in the contract or order.

## 7. NOTES.

7.1 Source of documents.

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

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7.1.2 Department of Defense specifications and standards. Department of Defense specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094 or online at <https://assist.daps.dla.mil/quicksearch/>.

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

- a. CID document number and revision.
- b. Type, if there is a preference (see 2.1).
- c. If proof of product conformance is required to be submitted (see 5.1).
- d. If the government is planning to test the product (see 5.2).
- e. If an MSDS is required to be submitted (see 5.3).

7.3 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.

7.4 Key words.

Hardness  
 Pot life  
 Thermal shock  
 Viscosity  
 Volatile content  
 Water absorption

7.5 Sources. The following are some known companies that warrant they have a product that meets the specified characteristics of this CID:

Emerson & Cuming  
[www.emersoncuming.com](http://www.emersoncuming.com)

Epoxies, Etc.  
[www.epoxies.com](http://www.epoxies.com)

Specialty Polymers & Services, Inc.  
[www.spolymers.com](http://www.spolymers.com)

#### MILITARY INTERESTS

##### Custodians:

Army – MI  
 Navy – SH  
 Air Force – 85

##### Review Activities:

Army – CR  
 Navy – AS, CG  
 Air Force – 03, 11, 19, 99  
 DLA – GS, GS4

#### CIVIL AGENCY COORDINATING ACTIVITY:

GSA – FAS

##### Preparing Activity:

Navy – SH  
 (Project 5970-2009-007)

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 <https://assist.daps.dla.mil>.