

INCH-POUND

A-A-59800A (AT)

August 30, 2011

SUPERSEDING

A-A-59800 (AT)

September 11, 2007

COMMERCIAL ITEM DESCRIPTION

SOLIDS ALIPHATIC POLYUREA COATING

The General Services Administration has authorized the use of this Commercial Item Description for all federal agencies.

1. SCOPE. This commercial item description (CID) covers a range of 100% solids, two-component aliphatic polyurea coatings intended for use on cleaned, pretreated and primed (when required) substrates which include: steel, galvanized steel, aluminum, plastic, composites, wood, fabric and concrete. These UV-durable polyurea coatings are intended to provide extremely tough durable coatings that are impact resistant, stone and gravel chip resistant, abrasion resistant, chemical resistant, corrosion resistant and sound and vibration damping over a wide temperature range. These aliphatic polyurea coatings contain no hazardous diphenyl methane diisocyanate (MDI) or toluene diisocyanate (TDI) species and no volatile organic compounds.

These coatings can be applied using a variety of application equipment including high-pressure heated spray via plural component spray equipment and low-pressure heated spray via static mix cartridges. The coatings can be repaired using small volume repair kits. The Type II coating can also be applied at room temperature using unheated low-pressure static mix cartridges, at material temperatures as low as 60°F.

Comments, suggestions, or questions on this document should be addressed to U.S. Army RDECOM, Tank Automotive Research, Development and Engineering Center, ATTN: RDTA-EN/STND/TRANS MS #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000 or emailed to DAMI_STANDARDIZATION@conus.army.mil. 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>.

AMSC N/A

FSC 8010

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

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2. CLASSIFICATION. The Corrosion Prevention Compounds (CPCs) shall conform to the following types:

2.1 Type

- Type I - Improved General Purpose Coating.
- Type II - Coating Optimized for Blast Resistance.
- Type III - Coating Optimized for Fire Resistance.

2.1.1 Type I: Improved General Purpose Coating. Type I coating has outstanding abrasion, impact, scratch & mar, and chip resistance properties and provides for the improved protection of metal and other substrates from use and abuse that would easily damage or remove typical paint systems and therefore has outstanding corrosion resistance.

The appropriate film thickness of the Type I coating depends on the particular application needs. A general guideline is to use approximately 50 - 80 mils of coating thickness in high use or chip prone areas, like wheel wells, undercarriages, and other similar areas. Use lower film thickness, approximately 20 mils, in less demanding application areas, like vehicle interiors.

2.1.2 Type II: Coating Optimized for Blast Resistance. Type II coating is formulated to reduce the disintegration and fragmentation of building walls and the formation of projectiles during blast events. This coating provides for a flexible polymer system that has been demonstrated to provide improved blast-resistance via static capacity and dynamic large-scale blast tests.

Type II coating can be applied at room temperature using unheated low-pressure static mix cartridges, at material temperatures as low as 60°F.

The appropriate film thickness of Type II coating depends on the particular application needs and should be prescribed by an appropriately qualified blast engineer if being used or specified for blast resistance.

2.1.3 Type III: Coating Optimized for Fire Resistance. Type III coating is formulated to provide for a polyurea that meets the Underwriters Laboratory UL94 test with a V-0 rating, vertical burn test requirements.

The appropriate film thickness of Type III coating depends on the particular application needs. A general guideline is to use approximately 50 - 80 mils of coating thickness in high use or chip prone areas, like wheel wells, undercarriages, and other similar areas. Use lower film thickness, approximately 20 mils, in less demanding application areas, like vehicle interiors.

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3. SALIENT CHARACTERISTICS

3.1 Materials. The materials shall be used in accordance with the manufacturer's material specifications for sprayable polyurea coatings. The use of recovered material made in compliance with regulatory requirements is acceptable provided all requirements of this CID are met (see 4).

3.1.1 Materials deterioration, prevention and control. The material shall be a sprayable polyurea consisting of two liquid components, both of which are 100% solids and combine to form a 100% solids barrier coating.

3.1.2 Polyurea. The two liquid components cure through an exothermic reaction to form an elastomeric polyurea coating which shall meet the zero volatile organic compound requirement and be compatible with the chemical agent resistant coating (CARC) primers and topcoats per TACOM Drawing 12369000 , or Table 1 of MIL-DTL-53072.

3.1.2.1 Resin component. The material shall be a polyamine based resin blend.

3.1.2.1.1 Characteristics of the resin component. The characteristics of the aliphatic polyamine based resin component shall be established by the following:

- a. 100% solid, liquid resin.
- b. Weight per gallon (will vary based on the resin component color) (see Table I).
- c. Brookfield Viscosity (#4 Spindle @ 20 RPM) in cps at 25°C (will vary based on the resin component color) (see Table II).
- d. An aliphatic polyamine based resin.

TABLE I. Weight of Resin

	Color: Black
Type	Weight (lbs/gal)
I	8.10 - 8.40
II	8.15 - 8.35
III	8.35 - 8.55

TABLE II. Viscosity of Resin

	Color: Black
Type	Viscosity (cps)
I	1000 - 2000
II	1000 - 2000
III	1000 - 2000

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3.1.2.2 Isocyanate Component. The material shall be an aliphatic polyisocyanate that does not contain hazardous diphenyl methane diisocyanate (MDI) or toluene diisocyanate (TDI) species.

3.1.2.2.1 Characteristics of the isocyanate component. The characteristics of the aliphatic isocyanate component shall be established by the following:

- a. 100% solids, liquid resin.
- b. Weight per gallon (see Table III).
- c. Brookfield Viscosity (#4 Spindle @ 20 RPM) in cps at 25°C (See Table IV).
- d. An aliphatic polyisocyanate.

TABLE III. Weight of Isocyanate

Type	Weight (lbs/gal)
I	9.10 - 9.30
II	9.20 - 9.40
III	9.35 - 9.55

TABLE IV. Viscosity of isocyanate

Type	Viscosity (cps)
I	1800 - 2900
II	300 - 600
III	2300 - 3300

3.1.2.3 Characteristics of the mixed components. Characteristics of the mixed components of 3.1.2.1 and 3.1.2.2 and tolerance ranges shall be established by Table V.

3.1.2.4 Optional additives. The polyurea coating shall allow for the addition of materials such as sand, garnet, quartz, slag, rubber, polymer particles or other aggregates for increasing non-skid performance uniformly throughout the coating or the top surface.

3.1.2.5 Color. The polyurea coating shall be pigmented to any color as defined by FED-STD-595. All properties listed in this CID are represented in black.

3.1.2.6 Flame resistance. For Type I and II, the sprayed and cured polyurea coating shall be in accordance with 49CFR571.302. For Type III, the sprayed and cured polyurea shall be in accordance with UL94 test with a V-0 rating, vertical burn test requirements.

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TABLE V. Characteristics of mixed components

Property	Type I	Type II	Type III	Reference
Hardness, Shore D	57 - 67	42 - 52	55 - 65	ASTM D2240
Tensile Strength, MPa	13 - 26	11 - 20	10 - 20	ASTM D412 or ASTM D882
Elongation, %	180 - 320	180 - 320	100 - 250	ASTM D412 or ASTM D882
Young's Modulus, MPa	130 - 400	20 - 120	200 - 600	ASTM D412 or ASTM D882
Tabor Abrasion, mg loss after 1000 cycles CS10 wheel/500g load	Less than 30	Less than 30	Less than 30	ASTM D4060
Tear Resistance, kN/m	40 - 80	25 - 55	40 - 80	ASTM D624 Die C
Water Absorption, %	Less than 1.2	Less than 1.2	Less than 1.2	ASTM D570
Maximum tack-free time, seconds	60	180	60	
Minimum dry film thickness, mils	20	20	20	
Maximum dry film thickness, mils	Application Dependent	Application Dependent	Application Dependent	
Mixed cured components classified as inert, no danger to the environment	Inert	Inert	Inert	

3.2 Configuration. The polyurea coating composition shall be applied by spraying and be compatible with CARC primers and topcoats per Army Drawing 12369000, or Table 1 of MIL- DTL-53072.

3.3 Performance. Performance will vary depending on substrate, pretreatment and coating system. Unless otherwise specified (see 7.3), the performance of the spray applied polyurea coating shall be verified on zinc phosphate pretreated cold rolled steel with CARC primer (MIL-DTL-53022, MIL-DTL-53030, MIL-DTL-53084, MIL-PRF-32348) by the following.

3.3.1 Adhesion. The minimum pull off adhesion should be 500 psi per ASTM D4541 (see 7.1.3).

3.3.2 UV Durability. No chalking, fading, cracking and minimal (< 15% of initial) gloss loss after 2 years of Ft. Lauderdale, Florida exposure and/or 3000 KJ Xenon Weather-O-Meter.

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3.3.3 GM14872 Accelerated Corrosion Testing. Testing shall be conducted for a period of more than 40 cycles, with 8 cycles approximating the equivalent of one year of “real world” exposure in this environment. After 40 cycles, the polyurea coating shall exhibit no scribe creep.

3.3.4 Appearance. The cured coating shall have a uniform surface texture, free of sags, pits, blisters or visual defects.

3.3.5 Operational temperature range. The operational temperature range shall be from -40 to 150°F for continual exposure without material degradation and an operational range of -55 to 220°F for short, intermittent time intervals of 60 seconds without material degradation.

3.3.6 Chip resistance. No hits to substrate and only slight surface scuffing using the SAE J400 Gravel-O-Meter test method using 5 cups of number 8 road gravel with panel temperatures at -20°F.

3.3.7 Impact resistance. No cracking with 50 inch-pounds direct and 25 inch-pounds reverse impact at 25°C per ASTM D2794.

3.3.8 Chemical resistance. Using a film sprayed and cured as specified in 3.3, place a 3 to 5 ml spot of a chemical listed below on the surface of the coating. Cover with an appropriate size watch glass and allow to stand for 4 hours at room temperature. Rinse thoroughly with water, allow to dry and examine for blistering or softening. The polyurea coating Type I, II, III and IV will meet the following:

a. Acid (10% sulfuric)	no blistering
b. Bases (1% NaOH)	no blistering
c. Solvents (MEK)	no softening
d. Oils (Motor Oil)	no softening
e. Oxidizers (3% hydrogen peroxide)	no softening

3.3.9 Toxicity. The sprayed and cured polyurea coating shall contain no volatile organic compounds, or solvents of any type. The sprayed on polyurea coating shall have no adverse effects on the health of personnel when used as directed for the intended purpose.

3.4 Identification marking. Identification markings shall be in the form of a label affixed to the unit container and shall be legible and shall include the manufacturer’s name, address, lot number, part number, contents verification and safety warning.

3.5 Unit container sizes. The two components of the polyurea coating shall be available in the following unit container sizes:

- a. 300 and/or 600 ml cartridges
- b. 5 gallon (20 liter) containers
- c. 55 gallon (208 liter) drums
- d. 200, 300 and 400 gallon totes

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e. 5000 gallon tank wagons

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 Responsibility for inspection. The contractor is responsible for the performance of all inspections (examinations and tests).

5.2 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 market. The government reserves the right to require proof of such conformance (See 3.3 and 7.3).

6. PACKAGING. Preservation, packing and marking shall be specified in the contract or order (See 7.3).

7. NOTES

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

7.1 Addressed for obtaining copies of referenced documents.

7.1.1 Government Documents.

7.1.1.1 Federal and DoD Standards/ Specifications. Copies of Federal and DoD Standards/ Specifications are available from <https://assist.daps.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.

7.1.1.2 Code of Federal Regulations. Copies of CFR documents are available from www.gpoaccess.gov/cfr/index.html or U.S. Government Printing Office, P.O. Box 979050, St. Louis, MO 63197-9000.

7.1.1.3 TACOM Drawings. Copies of TACOM drawings are available from DAMI_STANDARDIZATION@conus.army.mil or U.S. Army RDECOM, Tank Automotive Research, Development and Engineering Center, ATTN: RDTA-EN/STND/TRANS MS #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000.

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7.1.2 Non-Government Documents.

7.1.2.1 ASTM Documents. Copies of ASTM documents are available from www.astm.org or ASTM International, P.O. Box C700, West Conshohocken, PA 19428-2959.

7.1.2.2 SAE Documents. Copies of SAE documents are available from <http://www.sae.org> or SAE Customer Service, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

7.1.2.3 GM Documents. Copies of GM document are available from General Motors North America, c/o Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112 or www.ih.com or as directed by the contracting officer.

7.1.2.4 UL Documents. Copies of these documents are available from <http://www.ul.com> or Underwriters Laboratories, 2600 N.W. Lake Rd., Camas, WA 98607-8542.

7.2 Toxicity. If a Material Safety Data Sheet (MSDS) is required by law, it is to be shipped with the container (see 3.3.9). Contracting officers will identify those activities requiring copies of completed MSDS's prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in FED-STD-313; and 29CFR1910.1200 requires that the MSDS for each hazardous chemical used in an operation must be readily available to personnel using the material. Contracting officers will identify the activities requiring copies of the MSDS.

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

- a. CID document number and revision.
- b. Product conformance provisions.
- c. Packing requirements

7.4 Key words.

Abrasion protection
Corrosion protection
Corrosion resistance
Impact protection
Chip resistant
Sound damping
Vibration damping
UV durable
Tough
Spall resistance
Flame resistance
Damage protection

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Custodian:
Army - AT

Preparing Activity:
Army – AT

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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>.