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16 October 1986
SUPERSEDING
(see 6.7)

MILITARY SPECIFICATION

# CORROSION PREVENTIVE COMPOUNDS, COLD-APPLICATION (FOR NEW AND FIELDED MOTOR VEHICLES AND TRAILERS)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers solvent dispersed corrosion preventive compounds, referred to herein as "compound," for spray, brush, or dip application on new and fielded motor vehicles and trailers (see 6.1).

1.2 Classification. The compound covered by this specificaton shall be of the types specified below. Unless otherwise specified herein, all requirements and inspections apply to both type I and type II compounds (see 6.2).

| | |
|---|---|
| Type I | - For new motor vehicles and trailers. |
| Type II | - For fielded motor vehicles and trailers. |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000, 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 8030

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

SPECIFICATIONS
FEDERAL

| | |
|---|---|
| O-M-232 | - Methanol (Methyl Alcohol). |
| TT-N-95 | - Naphtha; Aliphatic. |

STANDARDS
FEDERAL

| | |
|---|---|
| FED-STD-313 | - Material Safety Data Sheets Preparation and the Submission of. |
| FED-STD-595 | - Colors. |

FEDERAL TEST METHOD STANDARDS (FTMS)

| | |
|---|---|
| FTMS 791 | - Lubricants, Liquid Fuels, and Related Products; Methods of Testing. |

MILITARY

| | |
|---|---|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-290 | - Packaging of Petroleum and Related Products. |
| MIL-STD-45662 | - Calibration System Requirements. |

(Copies of specifications, standards, handbooks, drawings, publications, and other Government documents required by the contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM B117 | - Salt Spray (Fog) Testing. |
| ASTM D93 | - Flash Point by Pensky - Martens Closed Tester. |
| ASTM D95 | - Water in Petroleum Products and Bituminous Materials by Distillation. |
| ASTM D130 | - Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test. |
| ASTM D609 | - Preparation of Steel Panels for Testing Paint, Varnish, Lacquer, and Related Products. |
| ASTM D874 | - Sulfated Ash from Lubricating Oils and Additives. |
| ASTM D1475 | - Density of Paint, Varnish, Lacquer, and Related Products. |
| ASTM D1654 | - Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments. |
| ASTM D2247 | - Coated Metal Specimens at 100% Relative Humidity. |
| ASTM D3170 | - Chip Resistance of Coatings. |
| ASTM D3335 | - Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy. |
| ASTM D3891 | - Preparation of Glass Panels for Testing Paint, Varnish, Lacquer, and Related Products. |
| ASTM D4057 | - Manual Sampling of Petroleum and Petroleum Products. |

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which 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 specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. The compound furnished under this specification shall be products which are qualified for listing on the applicable Qualified Products List (QPL) at the time set for opening of bids (see 4.4 and 6.3).

3.2 Materials. Materials shall be as specified herein. The compound shall consist of a nonvolatile base material dispersed in a petroleum solvent. The compound shall be homogeneous, fluid, and shall meet the requirements of this specification. The compound shall have no detrimental effect on materials of construction or the performance of motor vehicles or trailers when used as intended (see 4.7.1 and 6.4).

3.2.1 Safety. The compound shall not contain any substance of a highly toxic nature. The compound shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency (see 4.7.1).

3.2.1.1 Aromatic hydrocarbons. The compound shall not contain any benzene hydrocarbons (see 4.7.1).

3.2.1.2 Halogenated hydrocarbons. The compound shall not contain any halogenated hydrocarbons (see 4.7.3).

3.3 Chemical and physical characteristics.

3.3.1 Comparative data. Data obtained in accordance with 3.3.1.1 through 3.3.1.3 shall be measured in the qualification samples. This data shall be maintained by the contractor during subsequent production as evidence of constancy of materials, formula, and manufacturing processes. The data shall be available for Government inspection upon request. Comparative data will be used by the Government in quality control evaluation of materials furnished subsequent to qualification (see 4.7.1 and 4.7.4).

3.3.1.1 Nonvolatile content.

3.3.1.1.1 Type I. The nonvolatile content, expressed as a percentage by weight, shall be established during qualification testing. The nonvolatile content of any succeeding lot shall be within ± 5 percent of the established value (see 4.7.4).

3.3.1.1.2 Type II. The nonvolatile content, expressed as a percentage by weight, shall be established during qualification testing except that the nonvolatile content shall be not less than 52 percent based on the compound as received as being 100 percent. The nonvolatile content of any succeeding lot shall be within ± 5 percent of the established value (see 4.7.4).

3.3.1.2 Weight per gallon. The weight per gallon, expressed in pounds per gallon, shall be established during qualification testing. The weight per gallon of any succeeding lot shall be within ± 5 percent of the established value (see 4.7.4).

3.3.1.3 Sulfated ash content. The sulfated ash content, expressed as a percentage by weight, shall be established during qualification testing. When the established value is 0 to 0.50 percent, the sulfated ash content of any succeeding lot shall be within ± 0.05 of the established value. When the established value is 0.51 percent or higher, the sulfated ash content of any succeeding lot shall be within ± 10 percent of the established value (see 4.7.4).

3.3.2 Water content. The amount of water present in the compound shall be not greater than 1 percent by weight (see 4.7.4).

3.3.3 Lead content. The amount of lead present in the nonvolatile portion of the compound shall be not greater than 0.015 percent by weight (see 4.7.4).

3.3.4 Flash point. The flash point of the compound shall be not less than 100 degrees Fahrenheit (°F) (see 4.7.4).

3.3.5 Condition in container. The compound shall show no settling in a freshly opened, full container. There shall be no evidence of lumps, skins, or separation of the solvent (see 4.7.4.2).

3.3.6 Color. The color requirements specified herein apply to compounds that are intended only for use on combat or tactical vehicles and trailers (see 6.2).

3.3.6.1 Type I. The compound shall be translucent or the color shall be brown conforming to color chip 30051 of FED-STD-595 or black conforming to color chip 37038 of FED-STD-595. Fluorescent pigments and dyes shall not be used (see 4.7.2).

3.3.6.2 Type II. The color shall be brown conforming to color chip 30051 of FED-STD-595 or black conforming to color chip 37038 of FED-STD-595. Fluorescent pigments and dyes shall not be used (see 4.7.2).

3.4 Performance.

3.4.1 Film characteristics.

3.4.1.1 Type I. When sprayed on a vertical surface in a single back and forth motion to the manufacturer's designated wet film thickness, the compound shall produce a coating which is continuous and uniform upon evaporation of the solvent. The dry film thickness of the coating shall be less than 6 mils and shall vary not more than 0.5 mil. The compound shall not sag at the manufacturer's designated wet film thickness (see 4.7.5).

3.4.1.2 Type II. When sprayed on a vertical surface in a single back and forth motion to the manufacturer's designated wet film thickness, the compound shall produce a coating which is continuous and uniform upon evaporation of the solvent. The dry film thickness of the coating shall be 8 ± 2 mils. The compound shall not sag at the manufacturer's designated wet film thickness (see 4.7.5).

3.4.2 Creep.

3.4.2.1 Type I. When tested in accordance with 4.7.6, the compound shall show evidence of creep of 0.25 inch or more on clean test panels (see 4.7.6).

3.4.2.2 Type II. When tested in accordance with 4.7.6, the compound shall show evidence of creep of 0.25 inch or more on mildly corroded test panels (see 4.7.6).

3.4.3 Copper corrosion. The compound shall not be corrosive to copper. When tested in accordance with 4.7.7, the copper strip classification value shall not exceed 1b (slight tarnish, dark orange) as specified in ASTM D130 (see 4.7.7).

3.4.4 Fire resistance. The compound shall produce a coating which may char, but shall not support combustion for more than 15 seconds after the flame source is removed (see 4.7.8).

3.4.5 Detergent resistance. The compound shall produce a coating which shall remain intact and continuous after immersion in a detergent solution (see 4.7.9).

3.4.6 Chip resistance. The compound shall produce a coating which shall resist chipping damage due to stones or other flying objects (see 4.7.10).

3.4.7 Solvent vapor wash resistance. The compound shall produce a coating which shall resist the washing action of the compound's solvent vapor in enclosed areas (see 4.7.11).

3.4.8 Condition to touch. The compound shall produce a coating which shall be dry to touch in 7 days (see 4.7.12).

3.4.9 Environmental.

3.4.9.1 Low temperature stability. The compound shall remain homogeneous after exposure to temperatures down to -20°F (see 4.7.13.1).

3.4.9.2 Low temperature sprayability. The compound shall be sprayable at temperatures down to 40°F (see 4.7.13.2).

3.4.9.3 Low temperature flexibility. The compound shall produce a coating which shall be flexible when exposed to temperatures down to -20°F (see 4.7.13.3).

3.4.9.4 High temperature sprayability. The compound shall be sprayable at temperatures up to 100°F (see 4.7.13.4).

3.4.9.5 High temperature flow resistance. The compound shall produce a coating which shall not sag when exposed to temperatures up to 300°F (see 4.7.13.5).

3.4.9.6 Salt fog.

3.4.9.6.1 Type I. When applied to a clean surface, the compound shall produce a coating which shall inhibit corrosion and other surface failures when exposed to a salt fog atmosphere (see 4.7.13.6.1).

3.4.9.6.2 Type II. When applied to a corroded surface, the compound shall produce a coating which shall inhibit corrosion and other surface failures when exposed to a salt fog atmosphere (see 4.7.13.6.2).

3.4.9.7 Salt water immersion. The compound shall produce a coating which shall inhibit corrosion when immersed in salt water (see 4.7.13.7).

3.4.9.8 Cyclic environmental conditions. The compound shall produce a coating which shall inhibit corrosion when exposed to cyclic environmental conditions (see 4.7.13.8).

3.5 Material Safety Data Sheets (MSDS). A MSDS shall be prepared in accordance with FED-STD-313 (see 4.7.14, 6.2, and 6.6).

3.6 Workmanship. Workmanship shall be such quality as to assure that the compound furnished under the specification is uniform in qualities and condition and free from foreign materials (see 4.7.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order (see 6.2), the responsibility for inspection shall be as specified in method 9601 of FTMS 791.

4.1.1 Responsibility for compliance. All items must 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. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Inspection equipment. Unless otherwise specified in the contract (see 6.2), the contractor is responsible for the provision and maintenance of all inspection equipment necessary to assure that supplies and services conform to contract requirements. Inspection equipment must be capable of repetitive measurements to an accuracy of 10 percent of the measurement tolerance. Calibration of inspection equipment shall be in accordance with MIL-STD-45662.

4.2 Classification of inspection:

a. Qualification inspection (see 4.4).
b. Quality conformance inspections (see 4.5).
   1. Examination (see 4.5.2).
   2. Test (see 4.5.3).
c. Control test (see 4.6).

4.3 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be conducted under the following conditions:

a. Air temperature 73 ± 18°F
b. Barometric pressure 28.5 + 2 inches mercury (Hg)
   - 3
c. Relative humidity 50 ± 30 percent

4.4 Qualification inspection. A qualification sample consisting of 5 gallons of compound shall be utilized for qualification testing. The compound shall be representative of the material proposed to be furnished under the contract. Qualification testing shall be conducted under Government surveillance by the contractor, or an authorized testing facility, at a site approved by the Government. Inspection shall consist of testing as specified in table I. Qualification inspection shall be performed at a laboratory acceptable to the Government on sample material, with equipment and procedures normally used in inspection (see 6.3).

4.4.1 Retention of qualification. Certification shall be requested every two years from each manufacturer listed on the QPL to retain listing on the QPL. This certification shall be forwarded to the preparing activity and shall be signed by a responsible official of management, attesting that the listed product still meets the requirements of the current issue of the specification, is available from the listed plant, and can be produced under the same conditions as originally qualified; that is, same process, materials, construction, design, manufacturer's part number or designation. Failure to provide certification shall be cause for removal from the QPL.

4.4.2 Failure. Failure of a qualification sample to pass any of the inspections specified herein may be cause for the Government to refuse to conduct additional inspections until the faults revealed by the inspection have been corrected.

TABLE I. Classification of inspections.

| Title | Requirement | Inspection | Qualification | Quality conformance | | Control |
|---|---|---|---|---|---|---|
| | | | | Examination | Test | |
| Materials | 3.2 thru 3.2.1.1 | 4.7.1 | X | | X | |
| Defects (see 4.5.2 and table II) | 3.3.6, 3.6, and 5.1 | 4.7.2 | X | X | | |
| Halogenated hydrocarbons | 3.2.1.2 | 4.7.3 | X | | X | |
| Comparative data | 3.3.1 | 4.7.4 | X | | X | |
| Water content | 3.3.2 | 4.7.4 | X | | X | |
| Lead content | 3.3.3 | 4.7.4 | X | | X | |
| Flash point | 3.3.4 | 4.7.4 | X | | X | |
| Condition in container | 3.3.5 | 4.7.4.2 | X | | X | |
| Film characteristics | 3.4.1 | 4.7.5 | X | | | X |
| Creep | 3.4.2 | 4.7.6 | X | | | X |
| Copper corrosion | 3.4.3 | 4.7.7 | X | | X | |
| Fire resistance | 3.4.4 | 4.7.8 | X | | | X |
| Detergent resistance | 3.4.5 | 4.7.9 | X | | | X |
| Chip resistance | 3.4.6 | 4.7.10 | X | | | X |
| Solvent vapor wash resistance | 3.4.7 | 4.7.11 | X | | X | |
| Condition to touch | 3.4.8 | 4.7.12 | X | | | X |
| Low temperature stability | 3.4.9.1 | 4.7.13.1 | X | | | X |
| Low temperature sprayability | 3.4.9.2 | 4.7.13.2 | X | | | X |
| Low temperature flexibility | 3.4.9.3 | 4.7.13.3 | X | | | X |
| High temperature sprayability | 3.4.9.4 | 4.7.13.4 | X | | | X |
| High temperature flow resistance | 3.4.9.5 | 4.7.13.5 | X | | | X |
| Salt fog | 3.4.9.6 | 4.7.13.6 | X | | | |
| Salt water immersion | 3.4.9.7 | 4.7.13.7 | X | | | |
| Cyclic environmental conditions | 3.4.9.8 | 4.7.13.8 | X | | | |
| MSDS 1/ | 3.5 | 4.7.14 | | | | |

1/ See 6.2.

4.5 Quality conformance inspection.

4.5.1 Sampling.

4.5.1.1 Lot formation. An inspection lot shall consist of all the material, of the specified type, manufactured during an identifiable production period (not exceeding 24 hours), from one manufacturer, submitted at one time for acceptance.

4.5.1.2 Sampling for examination. Samples for quality conformance examination shall be selected from a random sample of packed containers from each lot in accordance with general inspection level II of MIL-STD-105.

4.5.1.3 Sampling for tests. Samples for tests shall be selected in accordance with ASTM D4057.

4.5.2 Examination.

4.5.2.1 Acceptable quality level. Each sample selected in accordance with 4.5.1.2 shall be examined to determine conformance to the following acceptable quality levels (AQL) on the basis of percent defective:

| Classification | AQL |
|---|---|
| Major | 1.0 |
| Minor | 2.5 |

4.5.2.2 Classification of defects. For examination purposes, defects shall be classified as listed in table II.

TABLE II. Classification of defects.

| Category | Defect | Method of examination |
|---|---|---|
| Critical | None | |
| Major | AQL 1.0% Defective | |
| 101 | Identification marking, improper (see 5.1). | Visual |
| 102 | Color, not as specified (see 3.3.6). | Visual and SIE 1/ |
| Minor | AQL 2.5% Defective | |
| 201 | Packing, incorrect (see 5.1). | Visual and SIE |
| 202 | Workmanship, faulty (see 3.6). | Visual |

1/ SIE = Standard Inspection Equipment.

4.5.3 Test. Samples selected in accordance with 4.5.1.3 shall be subjected to the quality conformance tests specified in table I.

4.5.3.1 Failure. Failure of any sample to pass any of the specified quality conformance tests shall be cause for the Government to refuse acceptance of the production quantity represented, until action taken by the contractor to correct defects and prevent recurrence has been approved by the Government.

4.5.3.1.1 Disposition of rejected material. Material rejected as a result of quality conformance test failure may be reworked and resubmitted for testing.

4.6 Control tests. When specified (see 6.2), the compound shall be subjected to the control tests specified in table I. The frequency of control testing shall be determined by the Government (see 6.2).

4.6.1 Failure. Failure of any sample to pass any of the specified control tests shall be cause for the Government to refuse acceptance of the production quantity represented, until action taken by the contractor to correct defects and prevent recurrence has been approved by the Government.

4.7 Methods of inspection.

4.7.1 Materials. Conformance to 3.2 through 3.2.1.1 shall be determined by inspection of contractor records providing proof or certification that processing and materials conform to requirements. Applicable records shall include specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.7.2 Defects. Conformance to 3.3.6, 3.6, and 5.1 shall be determined by examination for the defects listed in table II. Examination shall be visual, tactile, or by measurement with standard inspection equipment.

4.7.3 Halogenated hydrocarbons. To determine conformance to 3.2.1.2, a small loop of 18 to 20 gage copper wire shall be heated in the flame of a Bunsen burner until there is no color to the flame. The loop shall be cooled and dipped into a sample of the compound being tested. The loop shall then be placed in the outer portion of the flame and after the luminous flame has disappeared, there shall be no green coloration in the flame. A green coloration in the flame indicates the presence of a halogenated compound.

4.7.4 Chemical and physical characteristics. To determine conformance to 3.3.1 through 3.3.4, the compound shall be tested in accordance with the methods specified in table III.

TABLE III. Test methods for chemical and physical characteristics.

| Characteristic | Method |
|---|---|
| Nonvolatile content | FTMS 791, method 3480 |
| Weight per gallon | ASTM D1475 |
| Sulfated ash content | ASTM D874 |
| Water content | ASTM D95 |
| Lead content | ASTM D3335 |
| Flash point | ASTM D93 |

4.7.4.1 Comparative data comparison. Comparative data obtained in quality conformance testing (see table I) shall be compared with data submitted in connection with qualification testing. Variations in excess of the tolerances (see 3.3.1.1, 3.3.1.2, and 3.3.1.3) shall be evidence of change of materials, formula, or manufacturing procedure, and shall be cause for rejection.

4.7.4.2 Condition in container. To determine conformance to 3.3.5, the compound shall be observed in the container in which the material was submitted for test and prior to any agitation. The presence of lumps or skins shall be noted and a spatula or paddle shall be lowered into the container to establish evidence of settling or separation of the solvent.

4.7.5 Film characteristics. To determine conformance to 3.4.1, three test panels shall be prepared as specified in 4.7.5.1 and coated as specified in 4.7.5.2. The wet film shall be examined for evidence of sag. The test panels shall be permitted to air-dry in a vertical position for 7 days $\pm$ 2 hours at a temperature of 77 $\pm$ 5°F. To determine if the coating is continuous, the dry test panels shall be examined under 10X magnificaton. An Elcometer gage or an equivalent gage shall be used to determine the dry film thickness of the coating.

4.7.5.1 Preparation of test panels. Test panels shall be prepared from cold rolled steel, commercial quality, conforming to type 2 of ASTM D609. The test panels shall be approximately 4 inches by 12 inches and of any convenient size thickness greater than 0.025 inch. The edges shall be well rounded. The test panels shall be cleaned in accordance with method D of ASTM D609. After cleaning, the test panels shall be stored in a desiccator and shall be used the same day they are prepared. The test panels shall be handled with forceps or other instruments at all times to avoid fingerprint corrosion.

4.7.5.2 Application of compound. The test panel shall be held in a vertical position and the compound shall be sprayed on the test panel in a single back and forth motion to the manufacturer's designated wet film thickness.

4.7.6 Creep. To determine conformance to 3.4.2, six test panels shall be prepared as specified in 4.7.6.1. The six test panels shall be divided into three sets of two test panels. Within each set of test panels, the ends of the test panels shall be fastened together with a 0.5-inch overlap by means of four 0.125-inch steel blind rivets (maximum shear strength 325 pounds) centered uniformly in the 0.5-inch overlap area. The rivets shall be mechanically expanded by a pull stem. The compound shall be applied to the top edge of the joint by means of a spatula. The test panels shall remain in a vertical position for 7 days ± 2 hours at 77 ± 5°F. The test panels shall be separated with care to avoid disturbing the compound between them. The test panels shall be examined for evidence of creep.

4.7.6.1 Preparation of test panels.

4.7.6.1.1 Type I. Six test panels, 4 inches by 12 inches and of the same thickness and composition as specified in 4.7.5.1, shall be cleaned as specified in method 5329 of FTMS 791.

4.7.6.1.2 Type II. Six test panels, prepared as specified in 4.7.5.1, shall be exposed to salt fog in accordance with ASTM B117 for 24 hours.

4.7.7 Copper corrosion. To determine conformance to 3.4.3, the compound shall be tested as specified in ASTM D130. The test duration shall be 3 hours ± 5 minutes and the test temperature shall be 212 ± 2°F. The copper strip classification value shall be as specified in 3.4.3.

4.7.8 Fire resistance. To determine conformance to 3.4.4, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. Each test panel shall be suspended vertically in a shielded hood. The test panel shall be placed in the flame of a Bunsen burner with the air shut off and the flame regulated to 2 ± 0.25 inches under the panel so that the lower end of the panel is in the flame 1 (+0.125, -0) inch. The flame shall be allowed to remain under the test panel for 20 ± 1 seconds. The flame shall then be withdrawn and the time that flaming continues shall be observed and recorded. The results for all three test panels shall be averaged. The average value shall not exceed 15 seconds.

4.7.9 Detergent resistance. To determine conformance to 3.4.5, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. A detergent solution of 2.5 grams of sodium lauryl sulfate per liter of water shall be prepared. Rinse water shall be provided at a pressure of 10 pounds per square inch using a spray nozzle (for example, Spray Systems Co., Full Jet #1/2 GG-25 or equivalent). The distance between the test panels and the spray nozzle shall be 10 inches. The temperature of the detergent solution and rinse water shall be 122 ± 2°F. After being subjected to the test cycle specified below, the test panels shall be examined under 10X magnification. There shall be no evidence of cracking, peeling, blistering, or chipping of the compound on the test panels.

a. Immerse the test panels in the detergent solution for 5 minutes.
b. Rinse the test panels for 1 minute.
c. Immerse the test panels in the detergent solution for 10 minutes.

d. Rinse the test panels for 2 minutes.
e. Repeat steps c and d.

4.7.10 Chip resistance. To determine conformance to 3.4.6, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5 and tested as specified in ASTM D3170. The test temperature shall be 32 ± 2°F. The chippage rating value shall be not less than 3A.

4.7.11 Solvent vapor wash resistance. To determine conformance to 3.4.7, the compound shall be tested as specified below.

4.7.11.1 Apparatus. The test apparatus shall include an empty cylindrical, tin-plated quart paint can, an empty cylindrical, tin-plated gallon paint can, and the cover of the tin-plated gallon paint can. The quart paint can shall be affixed to the bottom or inside face of the cover of the gallon paint can by bolting or soldering. The quart paint can shall be approximately centered with respect to the cover of the gallon paint can and the bottom or seam-closed end of the quart paint can shall be away from the gallon cover plate. Two 1-inch holes shall be drilled in the sides of the gallon paint can. One hole shall be centered 2.5 inches from the top edge of the can and the other hole shall be centered 1 inch from the bottom chime of the can, on the side opposite the upper hole. The upper half of the outer face of the gallon paint can shall be covered with fiberglass insulation, leaving an opening over the 1-inch hole. The fiberglass insulation shall have an R-value of 1.5 to 2.

4.7.11.2 Procedure. The compound shall be sprayed uniformly onto the entire outside face of the sides and bottom of the quart paint can to the manufacturer's designated wet film thickness. The coated quart paint can shall be conditioned for 2 hours at a temperature of 77 ± 5°F. At the end of this period, a 0.25-inch deep layer of the compound shall be poured into the bottom of the gallon paint can. The gallon paint can cover shall be placed tightly on the gallon paint can. Consequently, the coated quart paint can will be suspended inside the gallon paint can. The entire test unit shall be placed inside an oven stabilized at 250 ± 5°F. After 15 minutes residence time in the oven, the test unit shall be removed from the oven and allowed to cool at room temperature for 15 minutes. The cover shall then be carefully removed from the gallon paint can and the coated quart can shall be examined. There shall be no evidence of sagging, channelling, or removal of the compound from the surface of the quart paint can.

4.7.12 Condition to touch. To determine conformance to 3.4.8, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. The coating shall then be tested by applying the fingertip firmly to the compound at points not less than 0.5 inch from the edge of the test panel. The coating shall be considered dry to touch when firm pressure with the tip of the finger shows only a slight tacky condition without any adhering to the fingertip.

4.7.13 Environmental.

4.7.13.1 Low temperature stability. To determine conformance to 3.4.9.1, a pour point jar shall be filled to the mark with the compound and stoppered. The jar shall then be placed in a cold chamber maintained at -20 ± 1°F. The jar shall remain in the cold chamber for 16 hours ± 15 minutes. Care shall be taken to avoid physically disturbing the compound. The jar shall then be removed from the cold chamber and allowed to remain at 77 ± 5°F for 8 hours ± 15 minutes. This cycle shall be performed for a total of four times, ending with the expiration of the last exposure at -20 ± 1°F. The jar shall then be removed from the cold chamber and allowed to remain at 77 ± 5°F for 6 hours ± 10 minutes after which the jar shall be inverted six times and allowed to stand at 77 ± 5°F for 1 hour. The compound shall be visually examined and shall show no evidence of settling or separation of the solvent. A spatula or paddle shall be lowered into the jar to establish evidence of settling or separation of the solvent.

4.7.13.2 Low temperature sprayability. To determine conformance to 3.4.9.2, compound held in suitable sealed storage containers shall be placed in a cold chamber and held at a temperature of 40 ± 2°F for a period of 24 hours. The manufacturer's designated spraying apparatus shall be conditioned at 40 ± 2°F for at least 2 hours. A glass plate measuring at least 10 inches by 10 inches, prepared in accordance with ASTM D3891, shall be conditioned at 40 ± 2°F for at least 2 hours. The compound shall be transferred to the spraying apparatus. The glass plate shall be held in a vertical position and the compound shall be sprayed on the glass plate to the manufacturer's designated wet film thickness. The glass plate shall be held in a vertical position at 77 ± 5°F for 7 days ± 2 hours. The compound shall be considered sprayable at 40°F if the film on the sprayed glass panel is continuous and uniform. To determine if the coating is continuous, the glass plate shall be examined under 10X magnification. To determine if the coating is uniform, the dry film thickness (see 3.4.1) shall be measured as specified in 4.7.5.

4.7.13.3 Low temperature flexibility. To determine conformance to 3.4.9.3, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. The test panels shall then be conditioned at -20 ± 1°F for 2 hours. Each test panel shall be bent around a cylindrical mandrel, 3/16 inch in diameter, which has been cooled to -20 ± 1°F. Gloves shall be used in handling the test panels and no more than 5 seconds shall elapse from the time the chamber is opened and the test panel is bent. The test panels shall be examined under 10X magnification. There shall be no evidence of cracking, peeling, or chipping of the coating on the test panels.

4.7.13.4 High temperature sprayability. To determine conformance to 3.4.9.4, compound held in a suitable sealed storage container shall be placed in an oven and held at a temperature of 100 ± 2°F for a period of 24 hours. The manufacturer's designated spraying apparatus shall be conditioned at 100 ± 2°F for at least 2 hours. A glass plate, as specified in 4.7.13.2, shall be conditioned at 100 ± 2°F for at least 2 hours. The heated compound shall be sprayed on the glass plate as specified in 4.7.13.2. The compound shall be considered sprayable at 100°F if the film on the sprayed glass panel is continuous and uniform. The film shall be examined and the dry film thickness shall be determined as specified in 4.7.13.2.

4.7.13.5 High temperature flow resistance. To determine conformance to 3.4.9.5, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. Using a stiff spatula, knife, or razor blade, remove a 1-inch strip of the coating along one of the long edges of each test panel, after cutting the film parallel to the edge of the test panel and at a right angle to the surface of the test panel. A straight line shall then be drawn or scratched on each test panel, parallel to the cut edge of the film, and 0.125 inch away from it. The test panel shall then be suspended vertically, with the exposed area downward, for 2 hours in a gravity convection oven maintained at 300 ± 2°F. The test panels shall be removed from the oven and allowed to cool to 77 ± 5°F. The position of the cut edge of the coating relative to the reference line drawn or scratched on each test panel shall be examined and measured. There shall be no movement of the coating toward the reference line.

4.7.13.6 Salt fog.

4.7.13.6.1 Type I. To determine conformance to 3.4.9.6, three test panels shall be prepared, coated, and air-dried as specified as 4.7.5. Using a knife, a scribe mark shall be made lengthwise in the middle of the test surface of one of the panels. The back side and edges of all three panels shall be sealed with a suitable coating which shall be stable under the conditions of the test, such as ceresin wax. The tests panels shall be exposed to salt fog in accordance with ASTM B117. The exposure period shall be at least 1000 hours. The test panels shall be evaluated in accordance with ASTM D1654 and shall have a rating number of not less than 8 in both scribed and unscribed areas.

4.7.13.6.2 Type II. To determine conformance to 3.4.9.6, six test panels shall be prepared as specified in 4.7.5.1. Three test panels shall be exposed to salt fog in accordance with ASTM B117. The exposure period shall be 24 hours. These test panels shall be designated as mildly pre-corroded test panels. The other three test panels shall be exposed to salt fog in accordance with ASTM B117 for 120 hours. These test panels shall be designated as severely pre-corroded test panels. The six pre-corroded test panels shall be rinsed with cold, running water and air-dried, then loose corrosion deposits shall be brushed off with a soft bristle brush. The six pre-corroded test panels shall then be coated with compound as specified in 4.7.5. The back side and edges of all six panels shall be sealed as specified in 4.7.13.6.1. The test panels shall be permitted to air-dry as specified in 4.7.5. After drying, the test panels shall be exposed to salt fog in accordance with ASTM B117. The exposure period shall be at least 500 hours. The test panels shall be evaluated in accordance with ASTM D1654 for unscribed areas. The six test panels shall have an average rating number of not less than 2. Corrosion on the outer 0.25 inch of the test panels shall not be included in the rating surface area.

4.7.13.7 Salt water immersion. To determine conformance to 3.4.9.7, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. The back side and the edges of all three panels shall be sealed as specified in 4.7.13.6.1. The test panels shall be immersed vertically in separate 2000 ml tall-form beakers containing 1800 ml of salt water for 21 days ± 2 hours. The salt water shall be prepared as specified in 4.7.13.7.1.

The beaker shall be covered with a watch glass. The temperature of the salt water during immersion shall be 77 ± 5°F. Distilled water shall be added throughout the test to maintain the proper level of salt water. At the completion of the test, the test panels shall be removed from the salt water and the coatings shall be examined for evidence of corrosion. The test panels shall then be rinsed with water and methyl alcohol conforming to grade A of O-M-232. The compound shall be removed with naphtha conforming to type II of TT-N-95 and the test panels shall be evaluated in accordance with ASTM D1654 for unscribed areas and shall have a rating number of not less than 9.

4.7.13.7.1 Preparation of the salt water. The salt water shall be prepared with chemicals conforming to American Chemical Society standards for analytical reagent chemicals. The solution shall contain 27.6 grams of sodium chloride per liter of solution and 2.4 grams of calcium chloride per liter of solution. The pH of the solution shall be adjusted to a value of 7.8 to 8.2 by the addition of a 5-percent solution of sodium carbonate. If the salt water solution is kept in stock it shall be checked and its pH adjusted, if necessary, prior to each test.

4.7.13.8 Cyclic environmental conditions. To determine conformance to 3.4.9.8, three test panels shall be prepared, coated, and air-dried as specified in 4.7.5. The back side and the edges of all three test panels shall be sealed as specified in 4.7.13.6.1. The test panels shall be subjected to 30 continuous 24-hour environmental test cycles as specified below:

a. Expose the test panels to 100 percent humidity at a temperature of 100 ± 2°F in accordance with ASTM D2247 for 16 hours.
b. Remove the test panels from the humidity chamber and place the test panels in a cold chamber for 2 hours while maintaining the cold chamber at -20 ± 1°F.
c. Remove the test panels from the cold chamber and allow the test panels to remain at 77 ± 2°F for 2 hours.
d. Place the test panels in an oven for 2 hours while maintaining the oven at 158 ± 2°F.
e. Remove the test panels from the oven and expose the test panels to salt fog in accordance with ASTM B117 for 2 hours.

The test panels shall be left in the humidity chamber over the weekend. After testing, the compound shall be removed with naphtha conforming to type II of TT-N-95 and the test panels shall be rinsed in methyl alcohol conforming to grade A of O-M-232. The test panels shall be evaluated in accordance with ASTM D1654 for unscribed areas and shall have a rating number of not less than 7.

4.7.14 MSDS. To determine conformance to 3.5, verify that the MSDS has been prepared in accordance with FED-STD-313.

5. PACKAGING

5.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking shall be in accordance with MIL-STD-290. The type and size of containers and the level of packaging and packing shall be as specified by the contracting authority (see 4.7.2 and 6.2).

6. NOTES

6.1 Intended use.

6.1.1 Type I. The compound furnished under this specification is intended to protect the underbody and the boxed-in and concealed areas of new motor vehicles and trailers (see 1.1).

6.1.2 Type II. The compound furnished under this specification is intended to preserve the underbody and the boxed-in and concealed areas of fielded motor vehicles and trailers. The compound can be effectively used over previously rusted areas if the rust is tightly adhering to the metal (see 1.1).

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Type of compound (see 1.2).
c. If compound is intended for use on combat or tactical vehicles and trailers (see 3.3.6).
d. Identify activities requiring copies of completed MSDS and specify when the MSDS will be inspected (see 3.5, table I, and 6.6).
e. If responsibility for inspection shall be other than as specified (see 4.1).
f. If responsibility for inspection equipment shall be other than as specified (see 4.1.2).
g. If inspection conditions shall be other than as specified (see 4.3).
h. If control testing is required (see 4.6).
i. If control testing is required, specify the frequency of testing (see 4.6).
j. Type and size of container (see 5.1).
k. Selection of applicable levels of preservation, packaging, packing and marking (see 5.1).
l. Any special markings (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion on the applicable QPL, whether or not such products have actually been so listed by that date. The attention of contractors is called to this requirement, and manufacturers are urged 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 orders for the material covered by this specification. The activity responsible for the QPL is the Commanding General, US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000 and information pertaining to qualification of products may be obtained from that activity (see 3.1 and 4.4).

6.4 Recycled materials. The use of recycled materials which meet the requirements of the applicable material specifications without jeopardizing the intended use of the item shall be encouraged (see 3.2).

6.5 Subject term (key word) listing.

Coating, Corrosion Protective
Compound, Corrosion Preventive
Rust Preventive

6.6 MSDS. Contracting officers will identify those activities requiring copies of completed MSDS prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in appendix B of FED-STD-313 (see 3.5 and 6.2).

6.7 Supersession. This military specification supersedes MIL-C-62218(AT), dated 1 October 1974; MIL-C-0083933A(MR), dated 5 October 1970; and grade 1 of MIL-C-83933, dated 29 September 1967.

6.8 Basis of purchase. The compound shall be purchased by volume, the unit being one United States liquid gallon or 231 cubic inches at 68°F.

6.9 Changes from previous issue. Asterisks, to identify changes with respect to the previous issue, are not used in this revision due to the extensiveness of the changes.

Custodians:
Army - AT
Air Force - 99
Navy - YD

Review activities:
Army - MR, AR, ME
Air Force - 84

Preparing activity:
Army - AT

(Project 8030-0524)

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| 1. DOCUMENT NUMBER | 2. DOCUMENT TITLE |
|---|---|
| MIL-C-62718A | |

| 3a. NAME OF SUBMITTING ORGANIZATION | 4. TYPE OF ORGANIZATION *(Mark one)* |
|---|---|
| | ☐ VENDOR |
| b. ADDRESS *(Street, City, State, ZIP Code)* | ☐ USER |
| | ☐ MANUFACTURER |
| | ☐ OTHER *(Specify)*: |

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

| 7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional | b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional |
|---|---|
| c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional | 8. DATE OF SUBMISSION *(YYMMDD)* |

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