

MIL-C-10382D  
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 SUPERSEDING  
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MILITARY SPECIFICATION

CORROSION PREVENTIVE, PETROLATUM, SPRAYING APPLICATION:  
 FOR FOOD HANDLING MACHINERY AND EQUIPMENT

This Specification is approved for use by the Army Materials and Mechanics Research Center, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one grade of petroleum base corrosion preventive suitable for use by spraying application on food handling machinery and equipment.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

P-D-680 - Dry Cleaning Solvent  
 PPP-C-96 - Cans, Metal, 28 Gage and Lighter  
 PPP-D-729 - Drums: Shipping and Storage, Steel, 55 Gallons  
 PPP-P-704 - Pails, Metal: (Shipping, Steel, 1 Through 12 Gallon)

STANDARDS

FEDERAL

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies)  
 Fed. Test Method Std. No. 791 - Lubricants, Liquid Fuels, and Related Products; Methods of Testing

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, US Army Materials and Mechanics Research Center, ATTN: DRXMR-SMS, Watertown, MA 02172 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

## MIL-C-10382D

## MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes  
 MIL-STD-129 - Marking for Shipment and Storage

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- A 109 - Steel, Carbon, Cold-Rolled Strip [Metric], Spec for  
 D 93 - Flash Point by Pensky-Martens Closed Tester, Tests for  
 D 127 - Drop Melting Point of Petroleum Wax, including Petrolatum, Test for  
 D 270 - Petroleum and Petroleum Products, Sampling  
 D 2500 - Cloud Point of Petroleum Oils, Test for  
 D 3951 - Standard Practice for Commercial Packaging

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

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

## 3. REQUIREMENTS

3.1 Material. The corrosion preventive covered by this specification shall be a smooth, uniform mixture of such materials that the resulting compound shall conform to the requirements of this specification. The compound shall be dispersed in the solvent for ready application by spraying at room temperature and shall produce a thin, easily removable film upon drying (see 6.2). The material shall contain no compounds or any combination of materials, which might prove hazardous under the usages recommended by the manufacturer. The residual material after evaporation shall be harmless if inadvertently ingested by personnel.

## MIL-C-10382D

3.2 Composition. The compound shall conform to the composition specified in table I.

TABLE I. Composition

Ingredients	Percent by weight
Petrolatum, white, U.S.P. Microcrystalline wax, white	31.0 $\pm$ 1.0
Lanolin, U.S.P.	10.5 $\pm$ 0.5
1-hydroxyethyl-2-heptadecenyl imidazoline	0.50 $\pm$ 0.05
2-amino-2-methyl-1-propanol	0.50 $\pm$ 0.05
Dry cleaning solvent P.D-680: Type	To make 100%

3.3 Flash point. The minimum flash point of the corrosion preventive shall be 100°F (37.8°C) when tested as specified in 4.5.1.

3.4 Non-volatile matter. The corrosion preventive shall have a minimum non-volatile matter content of 40 percent, when tested as specified in 4.5.2.

3.5 Melting point. The non-volatile fraction shall have a minimum melting point of 150°F (65.6°C) when tested as specified in 4.5.3.

3.6 Abrasives. The corrosion preventive shall contain no abrasive substances. Tests shall be made as specified in 4.5.4.

3.7 Stability. The corrosion preventive shall show no separation or settling which is not easily reincorporated by mild agitation:

- (a) After being conditioned at 0°  $\pm$  3°F (-17°  $\pm$  1.7°C) for 7 days.
- (b) After being held at room temperature for an additional 21 days. Tests shall be made as specified in 4.5.5.

3.8 Ash. The compound shall not yield more than 0.01 percent ash upon ignition, when tested as specified in 4.5.6.

3.9 Salt spray resistance. When tested for minimum of 7 days as specified in 4.5.7, there shall be no more than a trace of corrosion on any of the 3 test panels. Corrosion on the edges of the panels or on the surfaces within 1/4-inch from the edges shall be disregarded.

## MIL-C-10382D

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Lot. A lot shall consist of all corrosion preventive from the same batch or blending operation, subjected to the same processing operations and conditions and produced by one manufacturer and offered for delivery at one time.

4.3 Sampling.

4.3.1 For examination. Unless otherwise specified a random sample of filled containers shall be selected for examination in accordance with level I of MIL-STD-105.

4.3.2 For tests. Prepare a 1 quart composite sample for tests in accordance with ASTM D 270. The sample shall be representative of the lot.

4.4 Examination. Sample units selected in accordance with 4.3.1 shall be examined for visual defects in the corrosion preventive, and for defects in packaging, packing and marking for shipment. The defects and the acceptable quality levels shall be as shown in table II.

4.5 Tests.

4.5.1 Flash point. The flash point shall be determined as specified in ASTM D 93.

4.5.2 Non-volatile matter. Two samples of the corrosion preventive shall be tested with a test being made on each sample as follows: Mix the composite sample (see 4.3.2) thoroughly by shaking. By means of a medicine dropper, transfer 1 to 2 gm. of the sample directly to a tared aluminum dish, and weigh to the nearest milligram. Transfer of the material and weighing should be made as rapidly as possible. Heat the weighed dish and contents in a mechanical convection oven at 105° to 110°C (221° to 230°F) for 3 hours. Cool in a desiccator for 1/2 hour and weigh. From the weight of the residue left in the aluminum dish and the original weight of the sample taken, calculate the percent of non-volatile residue. Report the results as the average of the two tests.

4.5.3 Melting point. The melting point shall be determine as specified in ASTM D 127.

TABLE II - Classification of defects

Item	AQL percent	Classification of defects	Defect	Method of inspection
Corrosion preventive (see 4.3.1 and 3.1)	2.5	Critical	None defined	
		Major 101	Not a smooth and uniform mixture	Visual
		Major 102	Compound not dispersed in the solvent	Visual
Unit container (see 4.3.1 and 5.1)	2.5	Major 103	Improper type	Visual
		Major 104	Improper size	Visual
		Major 105	Improper fill <sup>1/</sup>	Approved scale <sup>2/</sup>
		Major 106	Leakage	Visual
		Major 107	Improper closure	Visual
Box open (see 4.3.1 and 5.2)	2.5	Major 108	Improper type <sup>3/</sup>	Visual
		Major 109	Lack of, or improper strapping	Visual
Box closed (see 4.3.1, 5.2, 5.3.1, or 5.3.3)	2.5	Major 110	Gross weight, max.	Approved scale <sup>2/</sup>
		Major 111	Improper marking	Visual
		Major 112	Improperly closed	Visual

<sup>1/</sup>The actual weight of a container filled with the minimum required quantities of corrosion preventive shall be the basis for determining the acceptable weight of subsequent containers.

<sup>2/</sup>Approved by procuring activity

<sup>3/</sup>When applicable

## MIL-C-10382D

4.5.4 Abrasives. Mix the composite sample (see 4.3.2) thoroughly by shaking. Mix approximately 75 ml. of the composite sample with 200 ml. of toluene, and stir until all of the soluble matter is in solution. Allow to stand for 1 hour at room temperature to permit any insoluble matter to settle. Carefully decant, wash the residue with 100 ml. of toluene, and again carefully decant. Repeat the procedure with successively smaller portions of toluene until the solution is practically colorless. The residue after the last decantation shall be rubbed between two pieces of flat clean glass plate. The appearance of scratches on the glass plate shall be considered evidence of the presence of abrasive material.

4.5.5 Stability.

4.5.5.1 After 0 degrees F for 7 days. A glass jar shall be filled with the composite sample (see 4.3.2) to the level required by ASTM D 2500. The closed jar shall be held in a vertical position at  $0^{\circ} + 3^{\circ}\text{F}$  for 168 hours. At the end of this period the jar and its contents shall be permitted to attain room temperature avoiding any physical disturbance of the corrosion preventive. The compound shall be considered as meeting this requirement if at the end of this period the corrosion preventive fluid regains homogeneity after mild agitation by slowly inverting the jar 4 times.

4.5.5.2 After being held at room temperature for an additional 21 days. The jar and its contents, tested in accordance with 4.5.5.1 for 168 hours, shall then be permitted to stand an additional 3 weeks (504 hours) at room temperature without physical disturbance. The compound shall be considered as having passed this test if, at the end of this period, the corrosion preventive compound regains its homogeneity after mild agitation by slowly inverting the tube 4 times.

4.5.5.3 Certification. The test procedure for stability may be waived by the procuring activity upon certification by the contractor that the lot submitted for acceptance meets the requirements of 3.7. The certificate shall be signed by a responsible agent of the certifying organization and shall be accompanied by evidence of this agent's authority to bind his principal. The Government reserves the right to check test material submitted by the contractor under certification.

4.5.6 Ash. Two samples of the corrosion preventive taken from the composite sample (see 4.3.2) shall be tested with a test being made on each sample as follows: Mix the composite sample thoroughly by shaking, and weigh 10 grams of the composite sample into a tared porcelain crucible and heat until the escaping fumes ignite. The sample shall be allowed to burn until the fire extinguishes itself, then the sample shall be further heated to drive off all volative matter, and finally ignited over an open burner until free from carbonaceous matter. At no time shall the crucible be heated above a dull red heat. The crucible shall be cooled in a desiccator, weighed, and the percentage of ash calculated. Report the results as the average of the two tests.

## MIL-C-10382D

4.5.7 Salt spray resistance.

4.5.7.1 Preparation of test panels. The test panels shall be approximately 2 by 3 by 1/4 inches, with well-rounded edges, having a 1/4 inch hole in one end for handling, and shall be prepared from open hearth low carbon steel conforming to ASTM A 109. The steel shall be cold finished and dead soft in temper. The panel test surfaces shall be prepared by use of 280-grit silicon carbide of alundum abrasive paper so as to produce a surface finish of 10-20 microinches (R.M.S.). The surface shall be free of rust and shall be thoroughly cleaned by a method which will reduce all types of superficial contamination to the practical minimum. A cleaning method which has proved satisfactory is described in 6.3.

4.5.7.2 Treatment of panels. Three panels shall be coated in a room with the ambient temperature controlled at  $77^{\circ} + 2^{\circ}\text{F}$  ( $25^{\circ}\text{C}$ ) and relative humidity below 50 percent. Agitate the corrosion preventive compound (see 4.3.2) kept at this temperature in a manner which shall insure uniformity throughout, but which shall not whip air into the material. Apply the compound to 1 face of the panel by use of a doctor blade applicator so as to obtain a uniform coating 1 mil. in thickness after drying. The coated specimen shall be permitted to dry in a horizontal position overnight. The edges of the panels shall then be protected by dipping them in molten microcrystalline wax or brushing molten microcrystalline wax on the 1/4 inch margins of the panel and cooling prior to test. Care shall be taken that the film of compound on the panel is not disturbed.

4.5.7.3 Procedure. Three test panels prepared in accordance with 4.5.7.1 shall be exposed for 7 days in accordance with method 4001.2 of Fed. Test Method Std. No. 791. The test panels shall be located with the holes downward as specified in 5.3 of method 4001.2; i.e., they shall be held at an angle of 15 degrees from the vertical and shall be parallel to the principal direction of horizontal flow of fog through the chamber. The compound shall be considered as having passed this test if, at the end of the test period, none of the panels shows more than a trace of corrosion. A trace of corrosion shall be defined as the presence of not more than 3 spots of corrosion, no one of which is larger than 1 mm. in diameter. Only that corrosion within the significant areas which includes all but a 1/4-inch margin of the panels shall be considered.

## 5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements).

5.1 Packaging. Packaging shall be level A, B, or Commercial as specified (see 6.1).

5.1.1 Level A. The corrosion preventive shall be delivered in 1-gallon cans, 5-gallon steel pails, or 55-gallon steel drums, as specified (see 6.1). One-gallon cans shall conform to type V, class 2 round of PPP-C-96. Each can shall be exterior coated in accordance with Plan B of PPP-C-96. Five-gallon steel pails shall conform to type II of PPP-P-704. Fifty-five gallon drums shall conform to type I of PPP-D-729.

## MIL-C-10382D

5.1.2 Level B. The corrosion preventive shall be packaged as specified in 5.1.1 except that the exterior coating of the 1 gallon cans shall conform to Plan A of PPP-C-96.

5.1.3 Commercial. The corrosion preventive shall be packaged in accordance with supplier's commercial practice. Protection shall be such as to prevent deterioration during shipment and ensure safe delivery at destination.

5.2 Packing. Packing shall be level A, B, or Commercial as specified (see 6.1).

5.2.1 Level A. The 1-gallon containers shall be packed in accordance with the overseas shipment requirements of the Appendix to PPP-C-96. The 5-gallon and 55-gallon containers shall require no over-packing.

5.2.2 Level B. The 1-gallon containers shall be packed in accordance with the domestic shipping requirements specified in the Appendix to PPP-C-96. The 5-gallon and 55-gallon containers shall require no overpacking.

5.2.3 Commercial. The corrosion preventative shall be packed in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Civil agencies. In addition to markings required by the contract or order, and 5.3.3 unit containers, and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to markings required by the contract or order, and 5.3.3, unit containers, and shipping containers shall be marked in accordance with MIL-STD-129.

5.3.3 Labels. In addition to the marking specified in 5.3.1 or 5.3.2 (as applicable) each unit container shall be labeled with a caution as follows:

"CAUTION:

- a. Do not use for cooking or baking.
- b. Use only for corrosion prevention during storage.
- c. Remove the preventive from food handling equipment and machinery before operating by thoroughly flushing with hot water (160°F)."



## MIL-C-10382D

## 6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Quantity desired.
- (c) Size of container required (see 5.1).
- (d) Required levels of packaging (see 5.1) and packing (see 5.2).
- (e) Special marking, if required (see 5.3.1 or 5.3.2).

6.2 Removability. This corrosion preventive is easily removed with hot water 160°F (71°C).

6.3 A method of specimen preparation for protection tests. The following procedure has been found to produce duplicable specimen surfaces of a high level of cleanliness:

- (a) After rounding the edges of the panel, reaming out the holes used for suspension, etc., wipe the surfaces as clean as possible by use of solvent-soaked rags.
- (b) Scrub the panel with a clean surgical gauze swab in hot petroleum naphtha (V.M. & P. grade).
- (c) Rinse in hot petroleum naphtha.
- (d) Rinse in hot commercial anhydrous methyl alcohol. Store in desiccator until used.
- (e) Buff the panels, ending with a new section of 280-grit carborundum or alundum abrasive paper.
- (f) Wipe off all superficial dusts from the abrasion operation, using clean cloths or absorbent tissue.
- (g) Scrub abraded face of panel thoroughly with a dry surgical gauze pad held in a blotter-type holder, until there is no dark stain on a clean section of the gauze.
- (h) Spray the panel with clean naphtha using a paint spray gun. The panel should be held in a rack at 25 degrees from the vertical. The spray should be directed vertically downward on the panel flushing the test surface progressively downward. Spray the test surface, back face, and finally the test surface again.
- (i) Rinse in hot naphtha.
- (j) Rinse in hot commercial anhydrous methyl alcohol.

MIL-C-10382D

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Preparing activity:

Army - MR

Project No. 8030-0499

Review Activities:

Army - GL, MD, SM

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