NETRIC

DOD-P-24380A(SH)
21 November 1977
SUPERSEDING
MIL-P-24380(SHIPS)
24 March 1969
(see 6.6)

MILITARY SPECIFICATION

PAINT, ANCHOR CHAIN, SOLVENT TYPE, GLOSS BLACK (METRIC)

This specification is approved for use by the Naval Sea Systems Command and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers a fast-drying, solvent type, gloss black paint for dip application on steel anchor chains.

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of.

MILITARY

MIL-F-16884 - Fuel Oil, Diesel, Marine.

STANDARDS

FEDERAL

FED-STD-141 - Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.
FED-STD-313 - Material Safety Data Sheets, Preparation and the Submission of.
FED-STD-595 - Colors.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring 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. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 108 - Steel Bars, Carbon, Cold Finished, Standard Quality, Spec. for.
D 93 - Flash Point by Pensky-Martens Closed Tester, Test for.
D 1200 - Viscosity of Paints, Varnishes, and Lacquers by Ford Viscosity Cup, Test for.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Ship Engineering Center, SEC 6124, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

D 1208 - Common Properties of Certain Pigments, Tests for.
D 1475 - Density of Paint, Varnish, Lacquer, and Related Products, Test for.
D 1644 - Nonvolatile Content of Varnishes, Test for.

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

UNIFORM CLASSIFICATION COMMITTEE
Uniform Freight Classification Ratings, Rules, and Regulations.

(Application for copies should be addressed to the Tariff Publishing Officer, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

NATIONAL MOTOR FREIGHT CLASSIFICATION
National Motor Freight Traffic Association Classes and Rules.

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc., Agent, 1616 P Street, N.W., Washington, DC 20036.)

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

3. REQUIREMENTS

3.1 Toxicity. The material shall have no adverse effect on the health of personnel when used for its intended purpose (see 4.5). Questions pertinent to this effect shall be referred by the procuring activity to the appropriate service medical department which will act as advisor to the procuring activity.

3.2 Formula. The paint shall be composed of chlorinated rubber and plasticizer dissolved in suitable solvents. Solvents shall conform to requirements of 3.4.1. Carbon tetrachloride and benzene shall not be used. Test reports submitted shall include the exact formula used.

3.3 Manufacture. The component raw materials shall be mixed and ground as required to produce a product which is uniform, free from dirt and grit, and in conformance with the requirements of this specification.

3.4 Quantitative requirements. Quantitative requirements shall be as shown in table I and as herein specified.

TABLE I. Quantitative requirements.

Characteristic	Requirements	
	Minimum	Maximum
Ash content, percent by weight of paint	---	1
Viscosity, No. 4 Ford Cup at 25°C (77°F), seconds	38	42
Nonvolatile matter, percent by weight of paint	30	40
Matter insoluble in hot toluene, percent by weight of paint	---	5
Flash point, °C (°F)	37.8 (100)	---
Draining time, minutes	---	5
Drying time - set to touch, minutes	---	15
dry hard, minutes	---	60
Weight per gallon, kg (pounds)	4.55 (10)	5.0 (11)

3.4.1 Solvent. The solvent portion of the product shall conform to requirements herein specified.

(a) A combination of hydrocarbons, alcohols, aldehydes, ethers, esters, or ketones having an olefinic or cycloolefinic type of unsaturation except perchloroethylene: 5 percent maximum.

(b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene, methyl benzoate, and phenyl acetate: 8 percent maximum.

(c) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene, or toluene: 20 percent maximum.

3.5 Qualitative requirements. The paint shall conform to the qualitative requirements specified herein.

3.5.1 Dry opacity. A maximum of 7.0 milliliters(mL) per 0.948 square meter (m^2) of the paint shall be required to obtain a dry film contrast ratio of 0.92, when tested as specified (see table II).

3.5.2 Color and gloss. The color and gloss of the paint shall match the dry color chip No. 17038 of FED-STD-595 when tested as specified (see 4.3.4).

3.5.3 Appearance. The material shall appear smooth, uniform, and free from dirt, grit, clots, gel bodies, or other insoluble matter, when tested as specified (see 4.3.5).

3.5.4 Heat resistance. The dry film shall not deform, blister, crack, emit odors, or exhibit any visible evidence of deterioration and shall show no transfer of paint when tested as specified (see 4.3.7).

3.5.5 Salt spray resistance. Test specimens, prepared as described in 4.3.1, shall show a maximum of 3.0 milligrams(mg) dissolved iron when tested as specified (see 4.3.8).

3.5.6 Oil resistance. The dried paint film, prepared as described in 4.3.1, shall not soften, change in color (a slight loss of gloss shall be disregarded), or show any other visible sign of deterioration when tested as specified (see 4.3.9).

3.5.7 Adhesion. The dried paint film, prepared as described in 4.3.1, shall show no loss of adhesion when tested as specified (see 4.3.10).

3.5.8 Condition in container. The paint, as received in its filled original container, shall be readily mixable, either by paddle, shaker, or mechanical stirrer, to a smooth, uniform consistency and shall conform to all requirements as herein specified. The paint shall not curdle, liver, gel, seed, or develop any other objectionable properties for a minimum of 1 year after date of manufacture, when tested as specified (see 4.3.11).

3.5.9 Stability in partially full container. When tested as specified (see 4.3.13), the paint shall show no evidence of skinning.

3.5.10 Material Safety Data Sheet. The procuring activity shall be provided a material safety data sheet (MSDS) at the time of contract award. The MSDS is DD Form 1813 and found in and part of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection. Quality conformance inspection shall be provided in accordance with method 1031 of FED-STD-141 and as herein supplemented.

4.3 Test procedures. Tests shall be conducted in accordance with the methods specified in table II.

TABLE II. Test procedures.

Tests	Applicable method in FED-STD-141	Applicable ASTM test method
Nonvolatile matter	----	D 1644
Drying time	4061	------
Dry opacity	4121	------
Weight per gallon	----	D 1475
Color	4250	------
Gloss	----	------
Viscosity	----	D 1200
Flash point	----	D 93
Ash content	----	D 1208 Sect. 2
Salt spray resistance	6061	------
Stability in partially full container	3021	------
Condition in container	3011	------
Matter insoluble in hot toluene	5221	------

4.3.1 Test specimen preparation. Prepare 10 steel rod substrates as shown in figure 1. Suspend each rod by means of the string loop in a vertical position over the chain paint to be tested. Completely dip the rod into the paint and allow the rod to "dwell" for 15 seconds. Withdraw the rod completely from the solution using a withdrawal rate of 30.48 centimeters (cm) (12 inches) per 36 seconds, with a smooth, uniform movement, entirely free from vibration. (Determine, at this point, draining and drying time of two test specimens in accordance with 4.3.2 and 4.3.3.) After the paint has completely drained (when no more drops of paint leave the bottom tapered point), suspend the rod in a clean atmosphere at room temperature. Repeat this procedure for the remaining rods. Allow the coated rods to dry for 3 days.

4.3.2 Draining time. At the moment of complete withdrawal from the paint, start timing the drainage period with a stopwatch. Record the time it takes each of the last few drops to fall from the bottom tapered point of the rod. The end point for the draining time is determined when the last drop falls from the test rod. Run in duplicate and report the average of the draining times obtained. Note compliance with table I.

4.3.3 Drying time. Drying time shall be determined in accordance with method 4061 of FED-STD-141, except that the specified conditions of temperature and humidity shall apply only for referee tests in case of dispute. All other tests shall be conducted under prevailing laboratory conditions. Note compliance with table I.

4.3.4 Color and gloss. Prepare test panel by applying a single drawdown coat of the paint to a planar piece of opaque white glass using a doctor blade with a clearance of 0.152 millimeter (mm) (0.006 inch) [designed to give a wet film thickness of approximately 0.076 mm (0.003 inch)]. The coated panel shall be allowed to dry 24 hours under prevailing laboratory conditions before comparing with the standard color card as specified in method 4250 of FED-STD-141 (see 3.5.2).

4.3.5 Appearance. Pour a sample of thoroughly mixed paint on a clean, clear glass plate and place plate in a vertical position until the excess paint has completely drained off. Examine the film under reflected light for compliance with 3.5.3.

4.3.6 Ash content. Weigh by difference 8.0 ± 0.1 grams (g) of the thoroughly mixed paint sample into a tared, 40-mL porcelain crucible. Evaporate to dryness at 104°C (220°F) in a well-ventilated oven. Cover crucible and proceed to determine ash content in accordance with ASTM D 1951. Note compliance with table I.

4.3.7 Heat resistance. Place two coated steel rod specimens, prepared as described in 4.3.1, into an oven maintained at 71°C ± 2°C (160°F ± 5°F) for 1 hour. [If desired, specimens remaining from the drying time determination (see 4.3.3) may be used for this test]. While still in the oven, carefully examine the specimens visually. Remove from oven and wipe vigorously with a small wad of tissue paper. Determine compliance with 3.5.4.

4.3.8 Salt spray resistance. Salt spray resistance shall be determined in accordance with method 6061 of FED-STD-141. Test specimens shall consist of three coated steel rods, prepared as described in 4.3.1. The test shall be conducted using five percent sodium chloride solution at 333°C (92°F) for a period of 96 hours. The rinsed and dried samples shall then be immersed individually in sufficient 10 percent inhibited hydrochloric acid to cover the lower 15.24 cm (6 inches) of each rod. A 100-mL graduate containing approximately 30 mL of the acid has been found satisfactory for this purpose. Allow each sample to remain in the acid solution for 60 minutes at ambient temperature to dissolve any rust which may have formed. Determine the average iron content for the three solutions by any standard chemical method and note compliance with requirements of 3.5.5.

4.3.9 Oil resistance. Immerse the bottom 15.24 cm (6 inches) of two coated rods in separate containers of marine diesel fuel oil conforming to MIL-F-16884. Similarly, immerse two other coated rods in white, heavy mineral oil or "Nujol", having a Saybolt viscosity of 360 to 390 seconds at 37.8°C (100°F), and a specific gravity of 0.880 to 0.900 at 15.6°C (60°F). Allow the rods to remain in the oils at room temperature for 24 hours. Remove the samples and remove all signs of oil from the immersed portions of film with soft tissue paper or soft, clean cloths. Examine the immersed areas and compare them with the areas that were not exposed to the oil. Examine immersed areas for compliance with 3.5.6.

4.3.10 Adhesion. Using a sharp, single-edge razor blade, crosshatch 16 squares approximately 1.59 mm by 1.59 mm (1/16 by 1/16 inch) on two coated rods which were prepared as described in 4.3.1. The scratches should completely penetrate the paint film. Cover the crosshatched area with 1-inch wide pressure-sensitive tape (Scotch Brand #254 or equivalent). Using a pencil eraser, firmly rub over the taped crosshatched area in all directions to expel entrapped air and insure adhesive contact. Immediately remove the tape in one continuous, quick pull. Examine the tape and rod for removal of coating and determine compliance with 3.5.7.

4.3.11 Condition in container. Determine the condition of the paint as received in its container in accordance with method 3011 of FED-STD-141 and observe for compliance with 3.5.8. The Government, at its option and at any time not to exceed 1 year after manufacture, may test paint stored in its original containers for product condition, viscosity, and dry hard time. (Any action by the Government to disqualify paint after prior acceptance shall be based on the examination of paint stored in its original containers.)

4.3.12 Matter insoluble in hot toluene. Determine matter insoluble in hot toluene in accordance with method 5221 of FED-STD-141, using toluene as the solvent. CAUTION: The solvent is flammable and has a low flash point. Calculate as percent by weight, based on the weight of total paint sample, not on nonvolatile content. Determine compliance with requirements in table I.

4.3.13 Stability in partially full container. When tested in accordance with method 3021 of FED-STD-141 the paint shall be in compliance with 3.5.9. The duration of the test shall be 1 week (7 days).

4.4 Inspection of preparation for delivery. Inspect the packaging, packing, and marking of the material to determine compliance with the requirements of Section 5 of this specification.

4.5 Toxicity. A manufacturer of material shall disclose the formulation of his product to the Navy Bureau of Medicine and Surgery, Navy Department, Washington, DC 20372. The disclosure of proprietary information, which shall be held in confidence by the Bureau of Medicine and Surgery, shall include: the name, formula, and approximate percentage by weight and volume of each ingredient in the product; the results of any toxicological testing of the product; identification of its pyrolysis products; and any such other information as may be needed to permit an accurate appraisal of any toxicity problem associated with the handling, storage, application, use, or disposal of the material.

5. PREPARATION FOR DELIVERY

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

5.1 Packaging, packing, and marking. The paint shall be packaged, packed, and marked in accordance with PPP-P-1892. The level of packaging shall be A, B, or C and the level of packing shall be A, B, or C as specified (see 6.2). The paint shall be furnished in 1-gallon cans or 5-gallon pails as specified (see 6.2).

5.1.1 Special markings. In addition to the markings required by the contract or order (see 6.2), each container, interior and exterior, shall be marked with the following:

"The volatile content of the material in this container is not photochemically reactive as defined by Rule 102 of the South Coast Air Quality Management District." (See 6.4.)

6. NOTES

6.1 Intended use. This paint is intended for use as a dip coating for steel anchor chains. This product may be applied where air pollution regulations apply.

6.2 Ordering data. Procurement documents should specify:

(a) Title, number, and date of this specification.
(b) Size of container required (see 5.1).
(c) Level of packaging and level of packing required (see 5.1).
(d) Marking required (see 5.1.1).

6.2.1 Packaging. Level B is intended to provide economical but limited protection and should be specified only when it is determined the paint will be held in covered storage no more than one year from date of initial packaging.

6.3 Paint should be purchased under this specification by volume, the unit being one U.S. gallon (231 cubic inches) at 15.5°C (60°F).

6.4 Volatile content. Although the container marking specifically refers to the South Coast Air Quality Management District, the paint may be used anywhere else a paint complying with 3.4.1 is allowed. This includes all other air pollution control districts or similar areas controlling the emission of solvents into the atmosphere. Information regarding Los Angeles County Air Pollution Rules 102, 442, and 443 may be obtained from: South Coast Air Quality Management District, Metropolitan Zone, 434 South San Pedro Street, Los Angeles, California 90013.

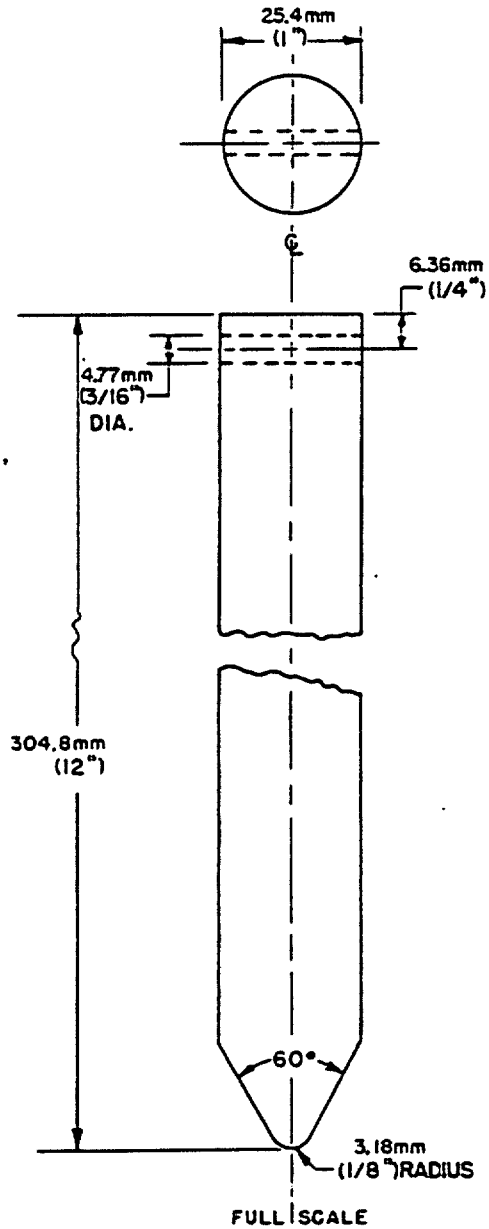
6.5 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in Section 2 do not apply when material and parts are procured by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.6 Changes from previous issue. The symbol "#" is not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Preparing activity:
Navy - SH
(Project 8010-N122)

MATERIAL
25.4 mm (1") DIA. STEEL ROD-SOLID-
ASTM A108

FINISH
CLEAN, BRIGHT, SCRATCH AND RUST FREE, WITH A SURFACE ROUGHNESS OF 10-40 MICROINCHES (RMS)



SH 9711

FIGURE 1. Steel rod test substrate.