METRIC

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SUPERSEDING
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(see 6.7)

MILITARY SPECIFICATION

PAINT, FORMULA NO. 34 (BINDER FOR ANTI-SWEAT COATINGS) (METRIC)

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

1. SCOPE

1.1 Scope. This specification covers paint, Formula No. 34, for use with expanded vermiculite or ground cork, to provide anti-sweat protection on piping and bulkheads.

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

TT-P-325 - Pigment, Antimony Oxide, Dry.
TT-R-266 - Resin, Alkyd; Solutions.
TT-T-291 - Thinner-Paint, Volatile Spirits, Petroleum Spirits.
PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of.

MILITARY

MIL-C-15198 - Calcium Carbonate, Precipitated (Pigment).

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.

(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.

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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
D 34 - White Pigments, Chemical Analysis of.
D 93 - Flash Point by Pensky-Martens Closed Tester, Test for.
D 562 - Consistency of Paints Using the Stormer Viscosimeter, Test for.
D 563 - Phthalic Anhydride Content of Alkyd Resins and Resin Solutions, Test for.
D 600 - Liquid Paint Driers, Spec. for.
D 1210 - Fineness of Dispersion of Pigment-Vehicle Systems, Test for.
D 1296 - Odor of Volatile Solvents and Diluents, Test for.
D 1306 - Phthalic Anhydride Content of Alkyd Resins and Esters Containing other Dibasic Acids (Gravimetric), Test for.
D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes, Test for.
D 1475 - Density of Paint, Varnish, Lacquer, and Related Products, Test for.
D 1542 - Rosin in Varnishes, Qualitative Tests for.
D 2350 - Antimony Oxide in White Pigment Separated From Solvent-Type Paints, Test for.
D 2369 - Volatile Content of Paints, Test for.

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

(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 4.6). 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 fire-retardant paint, Formula No. 34, shall consist of ingredients conforming to the applicable specifications and mixed in the proportions specified (see table I).

TABLE I. Navy Standard Formula No. 34.

Ingredients	Kg[1/]	(Pounds)[1/]
Calcium carbonate, precipitated (MIL-C-15198)	372.0	(820.0)
Antimony oxide (TT-P-325)	47.7	(105.0)
Resin alkyd solution (type I, class A, TT-R-266)[2/3/]	145.5	(320.0)
Paint thinner (type II, grade A, TT-T-291)	65.8	(145.0)
Lead naphthenic drier (ASTM D 600, class B)	1.27	(2.8)
Cobalt naphthenic drier (ASTM D 600, class B)	0.50	(1.1)

[1/] The formula is given slightly in excess of 100 gallons to allow for normal manufacturing losses.

[2/] The solvent shall consist of mineral spirits conforming to type II, grade A of TT-T-291.

[3/] Type I, class B resin, alkyd solution of TT-R-266 may be substituted (see 6.6).

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

3.4 Quantitative requirements. The paint shall conform to the quantitative requirements shown in table II and as herein specified.

TABLE II. Quantitative requirements.

Characteristic	Requirements	
	Minimum	Maximum
Pigment, percent by weight of paint	65	--
Volatiles, percent by weight of paint	--	18
Nonvolatile vehicle, percent by weight of paint (calculated by difference)	15	--
Phthalic anhydride, percent by weight of nonvolatile vehicle	23	--
Water, percent by weight of paint	--	0.5
Coarse particles and skins (as residue retained on standard No. 325 sieve), percent by weight of paint	--	0.5
Viscosity, Krebs units	90	100
Weight per gallon, Kg (pounds)	6.13(13.5)	6.40(14.1)
Drying time - set to touch, hours	0.5	2
dry hard, hours	--	8
Fineness of grind	4	--
Flash point, °C (°F)	38(100)	--
Antimony oxide, percent by weight of pigment	10.5	12.5
Calcium carbonate, percent by weight of pigment	83	--

3.4.1 Solvent. The solvent portion of the formulation 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.

A certificate of compliance from the contractor to this effect is necessary.

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

3.5.1 Odor: The odor shall be characteristic of the volatiles permitted when tested as specified (see 4.4).

3.5.2 Rosin and rosin derivatives: Rosin and rosin derivatives shall be absent when tested as specified (see 4.4.6).

3.5.3 Resistance to water immersion: After 24 hours of recovery, there shall be no whitening, blistering, softening, or loss of adhesion, when tested as specified (see 4.4.4).

3.5.4 Compatibility with thinner: There shall be no evidence of incompatibility of any of the ingredients of the paint as received when tested as specified (see 4.4.7).

3.5.5 Flexibility. The paint shall show no evidence of cracking when tested as specified (see 4.4.5).

3.5.6 Condition in container. The product shall be readily broken up with a paddle to a smooth, uniform consistency and shall not liver, thicken, curdle, gel, or show any other objectionable properties for at least 1 year after date of manufacture, when tested as specified (see 4.4.9).

3.5.7 Skinning. The paint shall not skin within 48 hours in a three-quarters filled container when tested as specified (see 4.4.8).

3.5.8 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 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 Additional inspection.

4.3.1 Ingredient materials. When requested by the testing laboratory or other controlling authority, 1 pint of each ingredient in the formula specified in table I shall be supplied for test purposes.

4.4 Test procedures. Tests shall be conducted in accordance with the methods specified in table III.

TABLE III. Test procedures.

Test	Applicable method in FED-STD-141	Applicable ASTM test method
Pigment content	4021	------
Volatiles	----	D 2369
Nonvolatile vehicle (by difference)	4053	------
Phthalic anhydride	----	D 563
Drying time	4061	------
Water	4081	------
Coarse particles and skins	4092	------
Weight per gallon	----	D 1475
Compatibility with thinner	4203	------
Viscosity, Kreb-Stormer	----	D 562
Flash point	----	D 93
Odor	----	D 1296
Fineness of grind	----	D 1210
Rosin and rosin derivatives	----	D 1542
Water immersion	----	D 1308 Sec 5
Flexibility	6221	------
Condition in container	3011	------
Skinning	3021	------
Antimony oxide	----	D 2350
Calcium carbonate	----	D 34

4.4.1 Pigment analysis.

4.4.1.1 Pigment content. Extract the pigment from a weighed sample of paint, as in method 4021 of FED-STD-141, using extraction mixture A. Dry and weigh extracted pigment. Calculate percent pigment in the paint.

4.4.1.2 Calcium carbonate. Determine calcium carbonate as a percent of the pigment by ASTM D 34.

4.4.1.3 Antimony oxide. Determine antimony oxide as a percent of pigment on a 1.000-gram(g) sample of the extracted pigment in accordance with ASTM D 2350.

4.4.2 Phthalic anhydride. Determine phthalic anhydride as a percent of nonvolatile vehicle in accordance with ASTM D 563. If dibasic acids other than phthalic are present, ASTM D 1306 shall be used.

4.4.3 Drying time. Determine drying time by 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.

4.4.4 Water immersion test. Determine water immersion properties of the paint by section 5 of ASTM D 1308. Apply the paint coating to a wet film thickness of 0.0075 centimeter (cm) ± 0.0012 cm (0.003 ± 0.0005 inch). Allow 48 hours for the coating to air dry, then immerse it in distilled water at 25°C ± 5°C (77°F ± 9°F) for 24 hours. After removal from the water, allow a 24-hour recovery period before examination for compliance with 3.5.3.

4.4.5 Flexibility. Determine flexibility in accordance with method 6221 of FED-STD-141. Draw down a 5.08-cm (two-inch) wide film of the paint, with a suitable film applicator, that will give a dry film thickness of 0.0035 cm ± 0.00075 cm (0.0014 ± 0.0003 inch) on a flat tin panel prepared in accordance with method 2012 of FED-STD-141, using the aliphatic naphtha-ethylene glycol monoethyl ether mixture. Dry the test specimen horizontally for two hours in an air-circulating oven at 100°C to 105°C (212°F to 221°F). At the end of the baking period, condition the panel for 30 minutes at 25°C ± 5°C (77°F ± 9°F) and bend over a 0.32-cm (1/8-inch) mandrel. The coated surface of the panel shall be uppermost during the bending, which shall be accomplished at a uniform rate over approximately 2 seconds. The panel shall be examined at the bend using a seven-power lens and any cracking shall be noted.

4.4.6 Rosin and rosin derivatives. Conduct test for rosin and rosin derivatives in accordance with ASTM D 1542. A portion of the separated, nonvolatile vehicle shall be used for the test.

4.4.7 Compatibility with thinner. Determine compatibility with thinner in accordance with method 4203 of FED-STD-141. Fifty milliliters (mL) of paint shall be mixed with 50 mL of mineral spirits (conforming to type II, grade A of TT-T-291). Observations shall be made immediately after mixing and repeated in 30 minutes.

4.4.8 Skinning. Determine skinning characteristics of the material in a partially filled container in accordance with 3021 of FED-STD-141.

4.4.9 Condition in container. Determine the condition of the paint as received in its container in accordance with method 3011 of FED-STD-141.

4.5 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.

4.6 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 the 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 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), interior containers shall be marked in accordance with FED-STD-313. Also, 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. Formula No. 34 paint is intended for use in conjunction with expanded vermiculite or ground cork to provide anti-sweat protection on piping and bulkheads subject to intermittent condensation. This product may be applied where air pollution regulations apply.

6.2 Ordering data. Procurement documents should specify the following:

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

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 Composition by volume. For information only and with the understanding that weight-volume relationships of ingredients may vary slightly, the following approximation of composition by volume is included.

TABLE IV. Composition by volume.

Ingredients	Gallons
Calcium carbonate	36.15
Antimony oxide	2.18
Resin, alkyd solution	40.10
Paint thinner	21.14
Lead naphthenate	0.29
Cobalt naphthenate	0.14
Total volume	100.0

6.6 If it is desired to use an alkyd resin solution conforming to the requirements for type I, class B of TT-R-266, the weight of the alkyd resin solution as specified in table I of this specification should be multiplied by 1.17 and the weight of paint thinner (petroleum spirits) reduced by 0.17 times the specified weight of alkyd resin solution. The resin solution used in any case should contain as solvent, paint thinner conforming to type II, grade A of TT-T-291.

6.7 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.

Custodians:
Army - MR
Navy - SH
Review activities:
Navy - MS

Preparing activity:
Navy - SH
(Project No. 8010-0764)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

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