FEDERAL SPECIFICATION

PAINT, ALUMINUM (READY-MIXED)

This specification is approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. The Material covered by this specification is a ready-mixed aluminum paint suitable for use on exterior and interior surfaces (see 6.1) exposed to atmospheric salt and brine conditions.

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

TT-C-655	Creosote, Technical Wood Preservative, (for Brush, Spray, or Open-Tank Treatment)
TT-L-1155	Linseed Oil, Alkali Refined
TT-P-320	Pigment, Aluminum, Powder and Paste for Paint
TT-T-291	Thinner, Paint, Mineral Spirit, Regular, and Odorless
TT-V-121	Varnish, Spar, Water Resisting
PPP-P-1892	Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, Marking of

Federal Standards:

Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer, and Related Materials; Methods for Sampling and Testing
Fed. Std. No. 313 - Material Safety Data Sheets, Preparation and the Submission of
Fed. Std. No. 595 - Colors

Military Specification:

MIL-R-15189 - Resin, Phenolic (Alkyl Phenol, Oil-Soluble)

(Copies of Specifications and Standards required by contractors in connection with specific procurement should be obtained from 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 a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

B 117	Salt Spray (Fog) Testing
D 12	Raw Tung Oil, Specification for
D 480	Aluminum Powder and Paste, Sampling and Testing
D 600	Liquid Paint Driers, Specification for
D 822	Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products
D 1200	Viscosity of Paints, Varnishes, and Lacquers by Ford Viscosity Cup
D 1296	Odor of Volatile Solvents and Diluents
D 1308	Effect of Household Chemicals on Clear and Pigmented Organic Finishes
D 1473	Density of Paint, Varnish, Lacquer, and Related Products
D 1642	Elasticity or toughness of Varnishes
D 1849	Package stability of Paint

American Society for Testing and Materials (ASTM) Standards: (Continued)

D 1983	Fatty Acid Composition by Gas-Liquid Chromatography of Methyl Esters
D 2245	Identification of Oils and Oil Acids in Solvent-Type Paints
D 2369	Volatile Content of Coatings
D 2800	Preparation of Methyl Esters From Oils for Determination of Fatty Acid Composition by Gas-Liquid Chromatography
D 3335	Determination of Low Concentrations of Lead in Paint by Atomic Absorption Spectroscopy
D 4206	Sustained Burning of Liquid Mixtures by the Setaflash Tester (Open Cup)
G 23	Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials

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

Air Pollution Regulations (SCAQMD)

Rules and Regulations

(Application for copy should be addressed to the South Coast Air Quality Management District, 9150 Flair Drive, El Monte, CA 91731.)

3. REQUIREMENTS

3.1 Material. The paint shall be ready-mixed and meet all requirements as specified.

3.2 Composition.

3.2.1 Pigment. The pigment shall be commercially pure aluminum in a suitable form for making paint and shall conform to the requirements of TT-P-320, Type I or Type II, Class B.

3.2.2 Vehicle. The vehicle shall be a phenolic resin varnish of 33-gallon oil length. The resin shall conform to MIL-R-15189. The oil portion of the vehicle shall consist of tung oil conforming to ASTM D 12 and alkali refined linseed oil conforming to TT-L-1155 and shall contain a minimum of 80% tung oil. The vehicle shall not contain rosin derivatives. The thinner shall be nonphotochemically reactive as defined in Rule 102 of the South Coast Air Management District Regulations.

3.3 Qualitative requirements.

3.3.1 Condition in container. The containers with paint shall show no sign of bulging due to buildup of internal pressure. A freshly opened full container of the paint tested as in 4.3.2 shall be free from grit, skins, lumps, thickening or livering and shall show no more pigment settling or caking than can be readily reincorporated to a smooth homogeneous state.

3.3.2 Odor. The odor of the paint when tested in 4.3.3 shall not be obnoxious or pungent.

3.3.3 Brushing properties. When tested as in 4.3.4, the paint shall brush to a smooth and uniform film.

3.3.4 Spraying properties. When tested as in 4.3.5 the paint shall spray satisfactorily and shall show no sagging, running, streaking or other objectionable properties.

3.3.5 Bleeding. When tested as in 4.3.6 the creosote shall not bleed through or discolor the film.

3.3.6 Luster. The paint when tested as in 4.3.7 shall show lustrous surface equal to or better than standard aluminum paint described in 4.3.7.

3.3.7 Storage stability.

3.3.7.1 Partially filled container. The paint shall show no skinning within 48 hours when tested as in 4.3.8.

3.3.7.2 Accelerated storage stability. The paint shall show no skinning, seeding, livering, curdling, or hard caking when tested as in 4.3.9. The paint shall remix readily to a smooth homogeneous state and shall have a viscosity and drying time as specified in table I. The paint container shall show no evidence of bulging and no more than 10% loss from the original leafing value.

3.3.8 Salt spray resistance. A film of paint prepared and tested as in 4.3.10 and examined immediately after removal from the test, shall show no more than a trace of rusting. Dulling or staining unaccompanied by rusting shall be permitted.

3.3.9 Water resistance. A film of paint prepared and tested as in 4.3.11 shall show no wrinkling or blistering immediately upon removal of the panel from the water. The paint shall be no more than slightly affected when examined 2 hours after removal, and after 24 hours drying at room temperature. The immersed portion shall show no more than a slight visible whitening or dulling in comparison to the nonimmersed portion.

3.4. Quantitative requirements.

3.4.1 The quantitative requirement of the ready-mixed paint shall be as specified in table I.

TABLE I Quantitative requirement

Characteristics	Requirement	
	Minimum	Maximum
Pigment, percent by weight of paint (aluminum metal)	13	--
Volatile, percent by weight of paint	--	45
Nonvolatile vehicle, percent by weight of paint	42	--
Viscosity, seconds	35	45
Flash point, °C (°F)	30(86)	--
Leafing, percent	50	--
Weight per gallon, pounds	8.0	--
Drying time:		
Set to touch, hours	1/2	2
Dry for recoating, hours	--	16
Reduction (Rosin-Pentaerythritol), percent toughness	100	--
Water (moisture) content, percent	--	0.15
Lead, percent by weight of nonvolatile	--	0.06

3.5 Special marking.

3.5.1 Direction for use. The directions for use, which shall be clearly legible, shall be shown on the reverse side of the container and shall read as follows:

DIRECTIONS FOR USE OF FEDERAL SPECIFICATION (TT-P-38)

This paint is of brushing consistency; for spraying, thin (at manufacturer's direction) with paint thinner conforming to TT-T-291, type II. Remove all dirt, grease and oil from the surface before painting. If more than one coat is applied allow at least 16 hours air dry between coats. Newly creosoted wood shall be aged at least 6 months prior to application of the aluminum paint. If knots or pitch pockets are present, scrape off excess resin and smooth the surface. Apply one coat of paint to resinous areas. When applying by brush, brush in one direction only to insure proper leafing of the aluminum.

3.5.2 Volatile organic compound (VOC) requirement. Each unit container and shipping container shall include the volatile organic compound (VOC) in grams per liter and pounds per gallon of paint, referenced to SCAQMD Rule 1113.

3.6 Material Safety Data Sheet. A material safety data sheet shall be prepared for the paint by the manufacturer in accordance with Federal Standard 313 and submitted to the Contracting Officer (see 6.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specifications where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling and inspection should be in accordance with method 1031 of Fed. Test Method Std. No. 141.

4.3 Test procedures.

4.3.1 The paint shall be tested in accordance with the applicable test methods indicated in table II and as specified herein.

TABLE II. Index

Characteristics	Requirement Reference	Test Methods F.T.M.S. 141	Test Methods ASTM	Test Para. Reference
Condition in container	3.3.1	3011	------	4.3.2
Odor	3.3.2	----	D 1296	4.3.3
Brushing property	3.3.3	4321	------	4.3.4
Spraying property	3.3.4	4331	------	4.3.5
Bleeding	3.3.5	----	G 23	4.3.6
Luster	3.3.6	----	------	4.3.7
Skinning (Partially filled Container)	3.3.7.1	3021	------	4.3.8
Accelerated Storage stability (full container)	3.3.7.2	----	D 1849	4.3.9
Water content	Table I	4081	------	----
Pigment	Table I	4021	------	----
Volatile	Table I	----	D 2369	----
Nonvolatile vehicle	Table I	4053	------	----
Viscosity	Table I	----	D 1200	----
Flash point	Table I	----	D 4206	----
Leafing	Table I	----	D 480,*Sect 6-12	
Weight per gallon	Table I	----	D 1475	----
Drying time	Table I	4061	------	----
Toughness (rosin reduction test)	Table I	----	D 1642 Method A	
Salt spray resistance	3.3.8	----	B 117	4.3.10
Water resistance	3.3.9	----	D 1308	4.3.11
Identification resin (phenolic)	3.2.2	5141	------	4.3.12
Aluminum pigment	3.2.1	----	------	4.3.13
Linseed oil, alkali refined	3.2.2	----	------	4.3.14
Tung oil	3.2.2	----	D 2800 D 2245 D 1983	4.3.15
Lead	Table I	----	D 3335	4.3.16

*Conduct a test on the aluminum paint as a "mixture" referred to in a procedure paragraph. Also change the immersion time from 3 minutes to 30 minutes.

4.3.2 Condition in container. Determine package condition on acceptance testing in accordance with method 3011 of Fed. Test Method Std. No. 141 and observe for compliance as specified in 3.3.1.

4.3.3 Odor. Test for odor in accordance with ASTM D 1296 and observe for compliance with 3.3.2.

4.3.4 Brushing properties. Determine the brushing properties of the paint in accordance with method 4321 of Fed. Test Method Std. No. 141 and observe for compliance with 3.3.3.

4.3.5 Spraying properties. Reduce the paint in accordance with manufacturer's direction. Spray on a steel panel to a dry film thickness of approximately 25 um(0.001 in) and observe the spraying properties in accordance with method 4331 of Fed. Test Method Std. No. 141 for compliance with 3.3.4.

4.3.6 Bleeding. Apply a liberal coat of creosote conforming to TT-C-655 to two douglas fir plywood panels. Expose to accelerated weathering in an enclosed carbon arc weatherometer for 24 hours. Spray 76 ± 5 um (0.003 ± 0.0002 in) wet film thickness of paint on weathered panel. Dry for 24 hours at room temperature and examine for compliance with 3.3.5.

4.3.7 Luster. Brush or spray a coat of 76 um (0.003 in) wet film thickness of the paint on tin panel prepared in accordance with method 2012 of Fed. Test Method Std. No. 141. On another tin panel brush or spray a coat of 76 um (0.003 in) wet film thickness of standard aluminum paint formulated by mixing two pounds of aluminum paste conforming to TT-P-320, type II, class B with one gallon of spar varnish conforming to TT-V-121. Allow the panels to dry at room temperature for 24 hours and examine for compliance with 3.3.6.

4.3.8 Skinning. Determine skinning of the material in accordance with method 3021 of Fed. Test Method Std. No. 141 except fill 190 ml (6 oz) of paint in a 250 ml. (8 oz) wide-mouth bottle as specified. Examine for compliance with 3.3.7.1.

4.3.9 Accelerated storage stability. Fill a pint can with paint and tighten lid. Put into a quart can with a small hole in the lid. Place in oven at 52 ± 1°C (125 ±2°F) for 2 weeks. Carefully remove and condition at room temperature for 24 hours. Open behind safety glass, and check for compliance with paragraph 3.3.7.2.

4.3.10 Salt spray resistance. Prepare two steel panels 76 x 152 x 1.6mm (3 x 6 x 1/16 inch) in accordance with method 2011 of Fed. Test Method Std. No. 141, using solvent mixture to clean as described in the method. Spray two coats of the paint on each side of the two panels to approximately 20 um (0.0008 inch) dry film thickness for each coat allowing 24 hours drying time between coats. After the last coat has dried 24 hours, brush a coat of water-resisting spar varnish conforming to TT-V-121 on edges of the panels and allow to dry for 24 hours. Expose for 240 hours both panels to a 5 percent salt spray in accordance with ASTM B 117. Remove, wash gently with running warm water, and immediately examine for compliance with 3.3.8.

4.3.11 Water resistance. Prepare a test panel as specified in 4.3.10. After 72 hours air drying immerse the coated panel in distilled water for 72 hours at 23 ± 1°C (73 ± 2°F), in accordance with ASTM D 1308. On removal, observe the panel for compliance with 3.3.9.

4.3.12 Identification of phenolic resin. Identify the phenolic resin in accordance with method 5141 of Fed. Test Method Std. No. 141.

4.3.13 Aluminum flakes. The aluminum flakes shall conform to TT-P-320, either type I or type II, class B. A certificate of compliance to this effect is necessary.

4.3.14 Linseed oil (alkali-refined). The linseed oil shall conform to TT-L-1155. A certificate of compliance to this effect is necessary.

4.3.15 Tung oil. The tung oil shall conform to ASTM D 12. Identify the tung oil utilizing the test methods specified in Table II, Index.

4.3.16 Lead Content. Determine lead in accordance with ASTM D 3335 or by the use of an x-ray fluorescence spectrometer capable of determining lead at a minimum range of 0.03 through 1.0 percent by weight of nonvolatile with an accuracy within plus or minus 5.0 percent. The x-ray method shall be used in case of dispute.

5. PREPARATION FOR DELIVERY

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 metal cans, 5-gallon steel pails as specified (see 6.2). Special marking as specified in 3.5.

6. NOTES

6.1 Intended use. The ready-mixed aluminum paint is intended for interior and exterior use such as under atmospheric salt and brine conditions or as a sealer for wood knots, also as a combined sealer and finish coat for creosote surfaces, and as a primer and finish coat for metal or wood. The paint is not intended for use on surfaces exposed to temperatures over 149°C (300°F).

6.2 Ordering data. Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Size of containers required (see 5.1).
(c) Level of packaging and packing required (see 5.1).
(d) Material Safety Data Sheet shall be provided (see 3.6).

6.3 Basis of purchase. The paint should be purchased by volume, the unit being a U.S. gallon (3.785 liters) at 15.5°C (60°F).

MILITARY INTEREST:

Coordinating Activities

Army - ME

Review Activities

Army -CE

CIVIL AGENCY COORDINATING ACTIVITIES:

VA - OSS

COM - NBS

Preparing Activity

GSA - FSS