

SSPC: The Society for Protective Coatings

PAINT SPECIFICATION 101

Aluminum Alkyd Paint Leafing (Type I) and Non-Leafing (Type II)

1. Scope

1.1 This specification covers two types of aluminum alkyd paint for steel. Both have good weathering in rural, industrial, and marine atmospheres. They are also excellent paints for interiors. These paints are not intended for use over bare steel.

1.2 These paints are suitable for exposures in Environmental Zones 1A (interior, normally dry) and 1B (exterior, normally dry) and are intended for brush or spray application over rust inhibitive priming paints, over themselves, or over other oleoresinous paints. Each paint is suitable as an intermediate or topcoat and is to be applied in accordance with SSPC PA 1, "Shop, Field, and Maintenance Painting of Steel."

1.3 Two types are available under this specification. Type I covers a leafing aluminum paint intended as a finish paint and Type II covers a non-leafing aluminum paint intended as an intermediate coat to provide contrast with the Type I finish coat.

2. Description

2.1 Type I aluminum alkyd paint consists of a two-component container with leafing-type aluminum paste separated from a long oil alkyd varnish vehicle. The aluminum paste is mixed with the alkyd varnish prior to use. Type II employs non-leafing aluminum, and is usually furnished in a single compartment container. As an intermediate coat it provides a contrast with the Type I finish coat without tinting. Details of the composition are given in Table 1.

2.2 This primer contains approximately 40% by volume of nonvolatile film-forming solids (pigment and binder). The theoretical spreading rate for a 1.5 mil (38 micrometers) dry film thickness is 430 square feet/U.S. gallon (10.5 square meters/liter). Actual spreading rates can be significantly lower.

3. Reference Standards

3.1 The standards referenced in this specification are listed in Sections 3.4 through 3.7 and form a part of this specification.

3.2 The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern unless otherwise specified.

3.3 If there is a conflict between the requirements of any of the cited reference standards and this specification, the requirements of this specification shall prevail.

3.4 SSPC STANDARD:

PA 1 Shop, Field, and Maintenance Painting of Steel

3.5 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS:

D 154 Guide for Testing Varnishes
D 235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)
D 480 Test Methods for Sampling and Testing of Flaked Aluminum Powders and Pastes
D 600 Specification for Liquid Paint Driers
D 962 Specification for Aluminum Powder and Paste Pigments for Paints
D 1296 Test Method for Odor of Volatile Solvents and Diluents
D 1475 Test Method for Density of Paint, Varnish, Lacquer, and Related Products
D 1542 Test Method for Qualitative Detection of Rosin in Varnishes
D 1545 Test Method for Viscosity of Transparent Liquids by Bubble Time Method
D 2369 Test Method for Volatile Content of Coatings
D 3278 Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus
D 3925 Practice for Sampling Liquid Paints and Related Pigmented Coatings

3.6 FEDERAL STANDARDS:

TT-R-266 Resin, Alkyd: Solutions
TT-T-291 (Canceled) Thinner, Paint, Mineral Spirits, Regular and Odorless (Refer to A-A-2904)

FED-STD-141 Paint, Varnish, Lacquer and Related Materials: Methods of Inspection, Sampling and Testing

Method 3011	Condition in Container
Method 3021	Skinning (Partially Filled Container)
Method 4053	Nonvolatile Vehicle Content
Method 4061	Drying Time
Method 4203	Reducibility and Dilution Stability
Method 4321	Brushing Properties
Method 4331	Spraying Properties
Method 4541	Working Properties and Appearance of Dried Film

3.7 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARD:

Z129.1	Hazardous Industrial Chemicals —Precautionary Labeling
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4. Composition

4.1 Ingredients and proportions of the mixed paint shall be as specified in Table 1.

4.2 The paint based on the specified ingredients shall be uniform, stable in storage, and free from grit and coarse particles. No rosin or rosin derivatives may be used. Beneficial additives such as anti-skinning agents, suspending agents, or wetting aids may be added.

4.3 The alkyd varnish shall conform to the composition (analysis) requirements of Table 2.

5. Properties

5.1 The alkyd varnish shall meet the requirements of Table 3 and Sections 5.2 through 5.17.

5.2 ODOR: The odor shall be normal for the materials permitted (ASTM D 1296).

5.3 COLOR: The color shall be less than “11” on the Gardner 1933 scale.

5.4 COMPATIBILITY: There shall be no evidence of incompatibility of any of the ingredients of the paint when two volumes of the mixed paint are slowly mixed with one volume of mineral spirits (FED-STD-141, Method 4203).

5.5 WORKING PROPERTIES: The paint shall be easily applied by all three methods when tested in accordance with FED-STD-141, Methods 4321, 4331, and 4541. The paint shall show no streaking, running, or sagging after drying.

5.6 CONDITION IN CONTAINER: The ready-to-mix and ready-mixed paint shall show no gas evolution, thickening, curdling, gelling, or hard caking when tested as specified in FED-STD-141, Method 3011, after storage for six months from date of delivery, in a full, tightly covered container, at a temperature of 50-110°F (10 to 43°C).

5.7 SKINNING: There shall be no skinning in a threequarters filled closed container after 48 hours when tested in the standard manner specified in FED-STD-141, Method 3021.

**TABLE 1
COMPOSITION OF MIXED PAINT**

CHARACTERISTICS	REQUIREMENTS		INGREDIENT STANDARDS	
	Min. Wt. %	Max. Wt. %	ASTM	FEDERAL
PIGMENT: (20.3 ± 0.5 wt. %) Aluminum Paste ¹	100	—	—	—
VEHICLE: (79 ± 0.5 wt. %) Alkyd Varnish Solids ²	50	—	—	TT-R-266, Type I Class A
Mineral Spirit Thinner	—	50	D 235	TT-T-291, Type I
Driers	—	—	D 600, Class B	—

¹ See Sections 5.12 through 5.17.
² See Tables 2 and 3 for analysis and properties of alkyd varnish.

**TABLE 2
 ANALYSIS OF ALKYD VARNISH**

CHARACTERISTICS	REQUIREMENTS		ASTM	FED-STD-141
	Min. Wt. %	Max. Wt. %		
Volatile	—	50	D 2369	—
Nonvolatile vehicle calculated by difference	50	—	—	4053
Rosin or rosin derivatives	—	0	D 1542	—

**TABLE 3
 PROPERTIES OF ALKYD VARNISH**

CHARACTERISTICS	REQUIREMENTS		ASTM	FED-STD-141
	Min. Wt. %	Max. Wt. %		
Viscosity ¹ , Gardner Airbubble Viscometer	C	E	D 1545	—
Weight per U.S. gallon, pounds	7.9 (914 g/L)	8.1 (974 g/L)	D 1475	—
Drying time, hours				
Set to touch	—	4	—	4061
Dry hard	—	10	D 154	4061
Flash point, degrees F	86 (30°C)	—	D 3278	—

¹Viscosity 48 hours or more after manufacture.

5.8 APPEARANCE OF DRIED FILM: A dried film of the varnish shall be clear, smooth, and glossy.

5.9 FLEXIBILITY: A dried film (thickness 1.0 ± 0.2 mils, 25 ± 5 micrometers) of the varnish shall show no cracking when bent over a 1/8" mandrel after 17 hours air dry, plus 24 hours bake at 215-225°F (102-107°C).

5.10 WATER RESISTANCE: Dried films, prepared as in Section 5.9, shall resist boiling water for ten minutes, and shall withstand immersion in distilled water for 24 hours. Upon removal after two hours drying, the film shall show no whitening, blistering, or loss of adhesion, but slight dulling is permissible.

5.11 GASOLINE RESISTANCE: After airdrying for 17 hours, plus a 24 hour bake at 220°F (104°C), the mixed paint shall show no detrimental film effects after a painted panel is immersed in gasoline for four hours.

5.12 The aluminum paste for Type I leafing paint shall comply with the requirements of ASTM D 962, Type 2, Class B, with the exception that the total retained on a 325 mesh sieve shall be within the range of 4%-6%.

5.13 Aluminum paste for Type II, non-leafing paint shall be equivalent in fineness to the standard lining grade as

defined by ASTM D 962, Type 4, Class B. In addition it shall meet the composition and properties requirements of Table 4 and Sections 5.14 through 5.17.

5.14 The aluminum pigment paste shall consist of commercially pure aluminum in the form of fine, polished flakes, and a suitable fatty lubricant or metallic soap lubricant combined with a volatile thinner. It shall contain no fillers or adulterants. There shall be no appreciable settling out of the metallic portion of the paste in the container, i.e., no free liquid shall be present.

5.15 The test methods are those given in ASTM D 480.

5.16 The aluminum paste shall be non-leafing. Two grams of the paste mixed with 25 ml of Leaf-Testing Vehicle (ASTM D 480) in a 250 cc beaker shall show no more than a trace of leafing on the surface of the vehicle. In doubtful cases, absence of leafing shall be confirmed by Section 5.17.

5.17 GENERAL APPLICABILITY AND APPEARANCE: The sample of aluminum paste to be tested may be compared with a sample mutually agreed upon by purchaser and seller.

TABLE 4
ANALYSIS OF NON-LEAFING ALUMINUM PASTE

CHARACTERISTICS	REQUIREMENTS		ASTM
	Min. Wt. %	Max. Wt. %	
Nonvolatile matter at 105-110°C	65	—	—
Easily extracted fatty and oily matter (lubricants)	—	3.0	—
Total impurities other than fatty and oily matter	—	0.7	—
Coarse particles and skins, as retained on standards 325 mesh screen	—	1.0	D 185
Leafing	—	None	—

6. Labeling

6.1 Refer to ANSI Z129.1, "Hazardous Industrial Chemicals—Precautionary Labeling." Other guidelines can be found in the National Paint and Coating Association (NPCA) "Paint Industry Labeling Guide."

6.2 MARKING OF CONTAINERS: Each container shall be legible marked with the following information:

Name: Aluminum Alkyd Paint, Type I, Leafing (or Type II, Non-Leafing)
Specification: SSPC-Paint 101, Type I (or II)
Component:
Color: Aluminum
Lot Number:
Stock Number:
Date of Manufacture:
Quantity of Paint in Container:
Information and Warnings as may be Required by Federal and State Laws:
Manufacturer's Name and Address:

6.3 DIRECTIONS FOR USE: The following directions for use shall be supplied with each container of paint:

Directions for Use of Aluminum Alkyd Paint

This paint is intended for use as an intermediate (Type II) or finish coat (Type I) over rust inhibitive primers on structural steel or over other oleoresinous paints. All oil, grease, dust, and loose or nonadherent paint shall be removed; oil and grease shall be removed to the fullest extent practical, as residues of oil and grease remaining on the surface will result in decreased paint performance. If the undercoat is damaged, the steel shall be spot-cleaned and spot-primed with rust inhibitive primer.

Mix paint thoroughly before use. If this paint is furnished in two components, add the aluminum paste to the mixing varnish in the ratio of two pounds of aluminum paste per

gallon of the varnish vehicle (1 kg per 4.2 l). To mix the paste with the varnish, add a small amount of the varnish to sufficient aluminum paste in a large container. Thoroughly mix the aluminum paste with the small portion of varnish until a smooth, thin paste is achieved. Gradually add more of the varnish while stirring. Continue adding paste and mixing until all of the varnish is incorporated with the vehicle. Examine bottom of container for unmixed paste. Screen paint before applying. Mix only enough for one day's use. If this paint is furnished in a single component and the pigment has settled, pour off most of the liquid. Thoroughly mix the pigment with the remaining liquid, taking care to scrape all the pigment off the bottom of the can. Gradually add the poured-off liquid and mix thoroughly. Mixing may be made easier by transferring contents to a larger container or by pouring the paint to and from another container. Examine bottom of container for unmixed pigment. Screen paint before applying.

Thin paint only if necessary, using only mineral spirits or turpentine. For brush application under normal conditions, no thinnings should be necessary. For spray applications add up to one pint of thinner per gallon of paint when necessary.

Apply by brush or spray to the specified film thickness or, if none is specified, to at least 1.5 mils (38 micrometers) dry or approximately 4.0 mils (102 micrometers) wet. The surface to be painted shall be dry; the surface temperature shall be at least 5°F (3°C) above the dew point, and the temperature of the air shall be over 40°F (4°C). Do not paint outdoors in rainy weather or if freezing temperatures are expected before the paint dries.

Allow paint at least a drying time of 24 hours in good weather before recoating.

NOTE: This paint is not intended to be used as a priming coat next to bare steel.

7. Inspection

7.1 All materials (coatings) supplied under this specification are subject to timely inspection by the purchaser or

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his authorized representative. The purchaser shall have the right to reject any materials supplied which are found to be defective under this specification. (See Note 9.1.) In case of dispute, unless otherwise specified, the arbitration or settlement procedure established in the procurement documents shall be followed. In no arbitration procedure is established, the procedure specified by the American Arbitration Association shall be used.

7.2 Samples of paints may be requested by the purchaser and shall be supplied upon request along with the manufacturer's name and identification for the materials. Samples may be requested at the time the purchase order is placed or may be taken from unopened containers at the job site.

7.3 Unless otherwise specified, the sampling shall be in accordance with ASTM D 3925.

8. Disclaimer

8.1 While every precaution is taken to ensure that all information furnished in SSPC standards and specifications

is as accurate, complete, and useful as possible, SSPC cannot assume responsibility nor incur any obligation resulting from the use of any materials, coatings, or methods specified herein, or of the specification or standard itself.

8.2 This specification does not attempt to address problems concerning safety associated with its use. The user of this specification, as well as the user of all products or practices described herein, is responsible for instituting appropriate health and safety practices and for insuring compliance with all governmental regulations.

9. Notes

Notes are not requirements of this specification.

9.1 The procurement documents should establish the responsibility for samples, testing, and any required affidavit certifying full compliance with the specification.