

MATERIAL AND EQUIPMENT STANDARD**FOR****ALKYD PAINT (HIGH-BUILD THIXOTROPIC LEAFING****ALUMINUM) AS TOP COAT (FINISH)****ORIGINAL EDITION****AUG. 1993**

This standard specification is reviewed and updated by the relevant technical committee on Feb. 1999(1) and May 2012(2). The approved modifications are included in the present issue of IPS.

FOREWORD

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS are based on internationally acceptable standards and include selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein.

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

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GENERAL DEFINITIONS

Throughout this Standard the following definitions shall apply.

COMPANY :

Refers to one of the related and/or affiliated companies of the Iranian Ministry of Petroleum such as National Iranian Oil Company, National Iranian Gas Company, National Petrochemical Company and National Iranian Oil Refinery And Distribution Company.

PURCHASER :

Means the "Company" where this standard is a part of direct purchaser order by the "Company", and the "Contractor" where this Standard is a part of contract document.

VENDOR AND SUPPLIER:

Refers to firm or person who will supply and/or fabricate the equipment or material.

CONTRACTOR:

Refers to the persons, firm or company whose tender has been accepted by the company.

EXECUTOR :

Executor is the party which carries out all or part of construction and/or commissioning for the project.

INSPECTOR :

The Inspector referred to in this Standard is a person/persons or a body appointed in writing by the company for the inspection of fabrication and installation work.

SHALL:

Is used where a provision is mandatory.

SHOULD:

Is used where a provision is advisory only.

WILL:

Is normally used in connection with the action by the "Company" rather than by a contractor, supplier or vendor.

MAY:

Is used where a provision is completely discretionary.

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1. SCOPE

1.1 This Standard Specification which is mainly generated from SSPC paint 108 covers the minimum requirements for the composition, analysis, properties, storage life and packaging, inspection and labeling of alkyd paint (high build thixotropic leafing aluminum) as top coat (Finish).

1.2 This paint contains leafing aluminum pigment and a thixotropic long oil alkyd in a single package. Thixotropic paint appears to possess a high viscosity, which is altered because of a reversible gel structure when the paint is agitated. When the paint is stirred, sprayed, brushed, or rolled, the level of viscosity falls rapidly and the paint becomes liquefied. During application, the appearance is similar to other coatings. However, the liquid state will not remain for long. If undisturbed, the paint will re-gel within a short time.

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on Feb. 1999. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 78 on Feb. 1999. These modifications are included in the present issue of IPS.

Note 2:

This standard specification is reviewed and updated by the relevant technical committee on May 2012. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 345 on May 2012. These modifications are included in the present issue of IPS.

2. REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

SSPC (STEEL STRUCTURES PAINTING COUNCIL)

SSPC 108	"High-Build Thixotropic Leafing Aluminum Paint"
SSPC-PA Guide 3	"A Guide to Safety in Paint Application"
SSPC-PA1	"Shop, Field and Maintenance Paint of Steel"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

(Specification for Ingredients)

D235	"Specification for Mineral Sprits (Petroleum Sprits) (Hydrocarbon Dry Cleaning Solvent)"
D600	"Liquid Paint Driers"
D962	"Standard Specification for Aluminum Powder and Paste Pigments for Paints"
D1306	"Standard Test Method for Phthalic Anhydride Content of Alkyd Resin and Esters Containing other Dibasic Acids (Gravimetric)"

D1398	“Standard Test Method for Fatty Acid Content of Alkyd Resins and Alkyd Resin Solutions”
D1544	“Color of Transparent Liquids (Gardner Color Scale)”
D1639	“Standard Method for Acid Value of Organic Coating Materials”

(Specification for Packaging)

D3951	“Standard Practice for Commercial Packaging”
D3925	“Standard for Sampling Liquid paints and related pigmented coatings”

(Test Methods for Properties)

D185	“Coarse Particles in Pigments, Pastes and Paints”
D562	“Consistency of Paints using the Stormer Viscometer”
D1208	“Common Properties of Certain Pigments”
D1296	“Odors of Volatile Solvents and Diluents”
D1475	“Density of Paint, Varnish, Lacquer and Related Products”
D1542	“Quantitative Test for Rosin in Varnishes”
D1640	“Drying, Curing, or Film Formation of Organic Coatings at Room Temperature”
D2369	“Volatile Content of Paints”
D2801	“Leveling Characteristics of Paints by Draw-Down Method”
D3278	“Flash Point of Liquids by Setaflash Closed Tester”

(US Federal Test Method Standard No. 141)

Method 3011	“Condition in Container”
Method 3021	“Skinning (Partially Filled Container)”
Method 4021	“Pigment Content (Centrifuge)”
Method 4053	“Nonvolatile Vehicle Content”
Method 4061	“Drying Time”
Method 4203	“Reducibility and Dilution Stability”
Method 4321	“Brushing Properties”
Method 4331	“Spraying Properties”
Method 4494	“Sag Test (Multinotch Blade)”
Method 4541	“Working Properties and Appearance of Dried Film”

ANSI

(AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z400.1/Z129.1	“Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation”
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IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	“Engineering Standard for Units”
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3. UNITS

This Standard is based on International System of Units (SI), as per [IPS-E-GN-100](#) except where otherwise specified.

4. DESCRIPTION

High-build thixotropic aluminum paint contains leafing aluminum pigment and a thixotropic long oil alkyd in a single package. Thixotropic paint appears to possess a high viscosity, which is altered because of a reversible gel structure when the paint is agitated. When the paint is stirred, sprayed, brushed, or rolled, the level of viscosity falls rapidly and the paint becomes liquefied. During application, the appearance is similar to other coatings. However, the liquid state will not remain for long. If undisturbed, the paint will re-gel within a short time. Details of the composition are given in Table 1.

5. COMPOSITION

5.1 Ingredients and Proportions

Ingredients and proportions shall be as specified in Table 1.

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.

5.2 Percentage

This paint contains approximately 49% by volume of nonvolatile film-forming solids (pigment and binder). The theoretical spreading rate for a 3.0 mil (76 micrometers) dry film thickness is 260 square feet/U.S. gallon (6.4 square meters/liter). Actual spreading rates can be significantly lower.

TABLE 1 - COMPOSITION

INGREDIENT	REQUIRED		INGREDIENT STANDARDS	
	Min. Wt.%	Max. Wt.%	ASTM	FEDERAL
PIGMENT: (26.2% min.) ALUMINUM PASTE, 65% NON-VOLATILE	100	---	D962, TYPE 2 CLASS B CLASS 2	---
VEHICLE: (73.8% Max.) THIXOTROPIC ALKYD SOLIDS ¹	55.6	---	---	---
MINERAL SPIRIT THINNER	---	44.5	D235	---
DRIERS	---	---	D600, CLASS B	---
ADDITIVES	---	---	---	---

1) See Table 2 for analysis of the thixotropic alkyd resin.

6. ANALYSIS

6.1 The thixotropic alkyd resin shall conform to the composition (analysis) requirements of Table 2.

6.2 The paint shall conform to the composition (analysis) requirements of Table 3.

TABLE 2 - ANALYSIS OF THIXOTROPIC ALKYD RESIN

<u>REQUIREMENTS</u>			
CHARACTERISTICS	Min.	Max.	ASTM
NONVOLATILE RESIN, % BY WEIGHT OF SOLUTION	59	61	D1208
DRYING OIL ACIDS, % BY WEIGHT OF SOLUTION	65	---	D1398
PHTHALIC ANHYDRIDE, % BY WEIGHT OF NONVOLATILE RESIN	9	---	D1306
ACID NUMBER OF NONVOLATILE RESIN	---	8	D1639
COLOR, GARDNER COLOR STANDARDS OF 1953	---	13	D1544
POLYAMIDE RESIN, % BY WEIGHT OF NONVOLATILE RESIN ¹	2.5	---	---
ROSIN OR ROSIN DERIVATIVES	---	0	D1542

1) Polyamide Resin:

Softening Point	105 - 115°C
Amine Value	2 - 7
Acids number	10 maximum
Specific gravity	0.95 - 0.98

TABLE 3 - ANALYSIS OF PAINT

<u>REQUIREMENTS</u>				
CHARACTERISTICS	Min. Wt. %	Max. Wt. %	ASTM METHOD	STD. No. 141
PIGMENT	17	---	D1208	4021
VOLATILES	---	42	D2369	---
NONVOLATILE VEHICLE CALCULATED BY DIFFERENCE	41	---	---	4053
UNCOMBINED WATER	---	1.0	D1208	---
COARSE PARTICLES AND SKINS, AS RETAINED ON STANDARD 0.045 mm. SIEVE OPENING (325 MESH SCREEN)	---	0.5	D185	---
ROSIN OR ROSIN DERIVATIVES	---	0	D1542	

7. PROPERTIES

7.1 The paint shall meet the requirements of Table 4 and Section 6.2 through 6.7.

7.2 Odor

The odor shall be normal for the materials permitted (ASTM Standard D1296).

7.3 Color

A dried film of the paint shall show good leafing as indicated by a bright aluminum surface.

7.4 Compatibility

There shall be no evidence of incompatibility of any of the ingredients of the paint when two volumes of the paint are slowly mixed with one volume of mineral spirits (US Federal Standard No. 141, Method 4203).

7.5 Skinning

There shall be no skinning in a three quarters filled closed container after 48 hours when tested in the standard manner specified in US Federal Standard No. 141, Method 3021.

7.6 Working Properties

The paint shall be easily applied by all three methods Brush, Roller and Spray when tested in accordance with Federal Standard No. 141, Methods 4321, 4331, and 4541. The paint shall show no streaking, running, or sagging after drying.

7.7 Flexibility

Apply paint with a 4 cm brush to a 10 cm x 30 cm, 0.8 cm thick, cold rolled steel panel in the horizontal position. Apply paint quickly obtaining a wet film thickness of 175-200 microns on as much of the panel as possible. Final brush stroke shall be in the 30 cm direction; air dried for 72 hours at 21-24°C and baked five hours at 99°C. This panel shall show no cracking on the radius of the bend when bent over a 3.2 cm, mandrel. The film on the bent part shall show satisfactory adhesion.

TABLE 4 - PROPERTIES OF PAINT

CHARACTERISTICS	REQUIREMENTS			
	Min.	Max.	ASTM	FED-STD-141
VISCOSITY*				
KREB UNITS	90	95	D562	---
WEIGHT PER U.S. GALLON, POUNDS	8.4 (1.01 KG/L)	8.7 (1.05 KG/L)	D1475	---
DRYING TIME, HOURS:				
SET TO TOUCH	---	4	D1640	4061
TACK FREE	10	16	D1640	4061
FLASH POINT, DEGREES °C	105 (41 °C)	---	D3278	---
SAG RESISTANCE, mils	10 (254 micrometers)	---	D2801	4494

* Viscosity 48 hours or more after manufacture.

8. STORAGE LIFE AND PACKAGING

8.1 Condition in Container

The paint shall show no thickening, gas evolution, curdling, gelling, or hard caking when tested as specified in US Federal Standard No. 141, Method 3011, after storage for 12 months from date of delivery, in a full, tightly covered container at the temperature of 10°C - 43°C.

8.2 Packaging

The packaging shall meet the relevant requirements of ASTM D3951.

9. INSPECTION

9.1 All materials supplied under this specification shall be subject to timely inspection by the purchaser or his authorized representative. The purchaser shall have the right to reject any material(s) supplied which is (are) found to be defective under this specification. In case of dispute, the arbitration or settlement procedure established in the procurement documents shall be followed:

9.2 Samples of any or all ingredients used in the manufacture of this paint may be requested by the purchaser and shall be supplied upon request, along with the supplier's name and identification for the material.

9.3 Unless otherwise specified, the sampling shall be in accordance with ASTM D 395.

10. LABELING

10.1 Refer to ANSI Z400.1/Z 129.1 "Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation".

10.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name: Alkyd Paint (High-Build Thixotropic Leafing Aluminum) as top coat (Finish)

Specification: [IPS-M-TP-160](#)

MESC No.:

No. of Components:

Maximum Temperature Resistance:

Type of Spray:

Kind and Size of Spray Nozzle Tip:

Cleaning Material:

Flash Point °C:

Pot life (hours):

Drying Time for Overcoating:

Kind of Thinner:

Color: Bright Aluminum:

Lot Number :

Stock Number:

Date of Manufacture:

Storage Temperature:

Shelf Life:

Quantity of Paint in Container:

Information and Warnings, if needed:

Manufacturer's Name and Address:

Design Guide: For guidance on the usage of this paint for various application/environment and temperature range, reference shall be made to [IPS-E-TP-100](#) "Paints".

11. DIRECTIONS FOR USE

The following directions for use shall be supplied with each container of paint:

11.1 Directions for Use Alkyd Paint (High-Build Thixotropic Leafing Aluminum as Top Coat Finish)

- This paint is intended for use as a finish coat over rust inhibitive primers on structural steel, over itself, or over other oleoresinous paints. It is suitable for outdoor exposure in rural, industrial, and marine environments and for interior use. 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. This thixotropic paint settles only slightly and moderate hand stirring should be sufficient.

- Thin paint only if necessary, using only mineral spirits with a minimum flash point at 60°C and a boiling range of 182-215°C. Under normal conditions, no thinning should be necessary. Add up to one liter of thinner per 15 liters of paint when necessary (60ml/L of paint).

- Apply by brush or spray to the specified film thickness or, if none is specified, to at least 76 microns dry or approximately 178 microns wet. The surface to be painted shall be dry, the surface temperature shall be at least 3°C above the dew point, and the temperature of the air shall be over 4°C. The minimum Temperature shall be specified by manufacturer.

Do not paint outdoors in rainy weather or if freezing temperatures are expected before the paint dries.

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

11.2 Directions for Safety

The following directions for safety shall be supplied with each container of paint:

- Paints are hazardous because of their flammability and potential toxicity. Proper safety precautions shall be observed to protect against these recognized hazards. Safe handling practices are required and should include, but not be limited to, the provisions of SSPC-PA Guide 3, "A Guide to Safety in Paint Application" and to the following:

- Keep paints away from heat, sparks, and open flame during storage, mixing, and application. Provide sufficient ventilation to maintain vapor concentration at less than 25% of the lower explosive limit.

- Avoid prolonged or repeated breathing of vapors or spray mists, and prevent contact of the paint with the eyes or skin.
- Clean hands thoroughly after handling paints and before eating or smoking.
- Provide sufficient ventilation to insure that vapor concentrations do not exceed the published permissible exposure limits. When necessary, supply appropriate personal protective equipment and enforce its use.
- This paint may not comply with some air pollution regulations because of its hydrocarbon solvent content.
- Ingredients in this paint which may pose a hazard include hydrocarbon solvent. Applicable regulations governing safe handling practices shall apply to the use of this paint.