MATERIAL AND EQUIPMENT STANDARD

FOR

ALKYD PAINT (ALUMINUM) NON - LEAFING

AS

INTERMEDIATE

ORIGINAL EDITION

AUG. 1993

This standard specification is reviewed and updated by the relevant technical committee on Dec. 1998(1) and April 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

This Standard specification which is mainly generated from SSPC paint 101 covers the minimum requirements for the composition analysis, properties, storage life and packaging, inspection and labeling of Alkyd Paint (Aluminum) non-leafing as intermediate.

This paint employs non-leafing aluminum, and is furnished in a single compartment container.

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on Dec. 1998. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 51 on Dec. 1998. 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 April 2012. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 343 on April 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) VOL. 2

SSPC 101	“Aluminum Alkyd Paint (Non-leafing)”
SSPC-PA Guide 3,	“A Guide to Safety in Paint Application”

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

(Specification for Ingredients)

ASTM D235	“Petroleum Spirits (Mineral Spirits)”
ASTM D480	“Standard Test Method for Sampling and Testing of Flaked Aluminum Powders and Pastes”
ASTM D600	“Liquid Paint Driers”
ASTM D962	“Standard Specification for Aluminum Powder and Paste Pigments for Paints”

(Specification for Packaging)

ASTM D3951	“Standard Practice for Commercial Packaging”

(Test Methods for Properties)

ASTM D154	“Varnishes”
ASTM D185	“Standard Test Methods for Coarse Particles in Pigments”

ASTM D1296	“Odors of Volatile Solvents and Diluents”
ASTM D1475	“Standard Test Method for Density of Liquid Coatings, Inks and Related Products”
ASTM D1542	“Quantitative Test for Rosin in Varnishes”
ASTM D1544	“Standard Test Method for Color of Transparent Liquids (Gardner Color Scale)”
ASTM D1545	“Viscosity of Transparent Liquids by Bubble Time Method”
ASTM D2369	“Standard Test Method for Volatile Content of Coatings”
ASTM D3278	“Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus”

UFS (US FEDERAL STANDARDS)

(Standard Specifications for Ingredients)

TT-R-266	“Resin, Alkyd Solutions”
TT-T-291	“Thinner, Paint, Mineral Spirits, Regular and Odorless”

(US Federal Test Method Standard No. 141)

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”

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z400.1/Z129.1	“Hazard Evaluation and Safety Date Sheet and Precautionary Labeling Preparation”

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	“Engineering Standard for Units”
IPS-E-TP-100	“Engineering Standard for Paints”

3. UNITS

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

4. COMPOSITION

4.1 Ingredients and Proportions

Ingredients and proportions of the paint 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 antiskinning agents, suspending agents, or wetting aids may be added.

4.2 Percentage

This intermediate paint contains approximately 40% by volume of nonvolatile film forming solids (pigment and binder).

TABLE 1 – COMPOSITION OF MIXED PAINT

	REQUIREMENTS		INGREDIENT STANDARDS	
CHARACTERISTICS	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	D235	TT-T-291 TYPE I
Driers	----	----	D600 Class B	----

1) See Sections 6.11 through 6.15.

2) See Tables 2 and 4 for analysis and properties of alkyd varnish.

5. ANALYSIS

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

5.2 The pigment shall conform to the composition (analysis) requirements of Table 3.

TABLE 2 - ANALYSIS OF ALKYD VARNISH

CHARACTERISTICS	REQUIREMENTS Min. Wt. %	Max. Wt. %	ASTM METHOD	US FEDERAL STD. No. 141
VOLATILES	---	50	D2369	----
NONVOLATILE VEHICLE CALCULATED BY	50	---	D2698	4053
ROSIN OR ROSIN DERIVATIVES	----	0	D1542	----

TABLE 3 - ANALYSIS OF PIGMENT (Aluminum Paste)

CHARACTERISTICS	REQUIREMENTS Min. Wt. %	Max. . Wt. %	ASTM METHOD
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 RETAINE ON STANDARD 325 MESH SCREEN	----	1.0	D185
LEAFING	----	None	----

6. PROPERTIES

6.1 Requirements

The paint shall meet the requirements of Table 4 and Sections 6.2 through 6.15.

6.2 Odor

The odor shall be normal for the materials permitted (ASTM Standard D 1296).

6.3 Color

The color shall be less than 11 on the Gardner 1933 Scale. (ASTM Standard D 1544).

6.4 Compatibility

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

6.5 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.

6.6 Working Properties

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

6.7 Appearance of Dried Film

A dried film of the varnish shall be clear, smooth, and glossy.

6.8 Flexibility

A dried film (25+5 microns thickness) of the varnish shall show no cracking when bent over 3.2 mm mandrel after 17 hours air dry, plus 24 hours bake at 102-107°C.

6.9 Water Resistance

Dried films, prepared as in Section 6.8 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.

6.10 Gasoline Resistance

After airdrying for 17 hours, plus a 24 hour bake at 104°C the paint shall show no detrimental film effects after a painted panel is immersed in Gasoline for 4 hours.

6.11 Aluminum paste for this intermediate paint shall be equivalent in fineness to the standard lining grade as defined by ASTM Standard D962, Type 4 and Class B. In addition it shall meet the composition and properties requirements of Table 3 and Sections 6.12 through 6.15.

6.12 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.

6.13 The test methods are those given in ASTM Standard D480.

6.14 The aluminum paste shall be non-leafing. Two grams of the paste mixed with 25 ml of Leaf-Testing Vehicle ASTM Standard D480 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 6.15.

6.15 General Applicability and Appearance

The sample of aluminum paste to be tested may be compared with a sample mutually agreed upon by the Purchaser and the Vendor.

TABLE 4 - PROPERTIES OF ALKYD VARNISH

CHARACTERISTICS	REQUIREMENTS Min.	REQUIREMENTS Max.	ASTM METHOD	US FEDERAL STD. No. 141
*VISCOSITY GARDNER AIRBUBBLE VISCOMETER	C	E	D1545	----
DENSITY Kg/Lit	0.91	0.97	D1475	----
DRYING TIME, HOURS				
SET TO TOUCH	----	4	----	4061
DRY HARD	----	10	D154	4061
FLASH POINT, DEGREES C	30	----	D3278	----

*** VISCOSITY 48 HOURS OR MORE AFTER MANUFACTURE**

7. STORAGE LIFE AND PACKAGING

7.1 Condition in Container

The ready mixed paint shall show no gas evolution, thickening, 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 or otherwise specified by company, in a full, tightly covered container.

7.2 Packaging

Packaging shall meet the relevant requirements of ASTM D3951.

8. INSPECTION

8.1 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.

8.2 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.

8.3 Unless otherwise specified, the methods of sampling and testing should be in accordance with US Federal Test Method Standard No. 141 or applicable methods of the "American Society for Testing and Materials" (ASTM)

9. LABELING

9.1 Refer to ANSI Standard Z400.1/Z129.1 "Hazard Evaluation and Safety Data Sheet and Per Cautionary Labeling Per parathion".

9.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name: Alkyd paint (Aluminum) Non-leafing as intermediate

Specification: IPS-M -TP-155

MESC No.: .....

No. of components: .....

Maximum temperature resistance: .....

Cleaning material: .....

Flash point °C: .....

Drying time for over coating: .....

Kind of thinner: .....

Color: Aluminum: .....

Lot Number: .....

Stock Number: .....

Date of Manufacture: .....

Temperature of Storage: .....

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 the paint for various application/environment and temperature range reference shall be made to IPS-E-TP-100.

9.3 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.

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

9.4 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 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.