# MATERIAL AND EQUIPMENT STANDARD

# FOR

# ALKYD PAINT (ALUMINUM) LEAFING

# AS

# TOP COAT (FINISH)

# ORIGINAL EDITION

# AUG. 1993

**This standard specification is reviewed and updated by the relevant technical committee on Jan. 1998(1) and Jan. 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, packaging, inspection and labeling of alkyd paint leafing (aluminum) as topcoat (finish).

This paint consist 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 alkyds varnish prior to use.

**Note 1:**

**This standard specification is reviewed and updated by the relevant technical committee on Jan. 1998. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 62 on Jan. 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 Jan. 2012. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 325 on Jan. 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.

**SPPC (STEEL STRUCTURES PAINTING COUNCIL) VOL. 2**

| | |
|---|---|
| SSPC 101 | “Aluminum Alkyd Paint (leafing)” |
| SSPC-PA Guide 3 | “A Guide to Safety in Paint application” |

**ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)**

**(Specifications for Ingredients)**

| | |
|---|---|
| D235 | “Petroleum Spirits (Mineral Spirits)” |
| D600 | “Liquid Paint Driers” |
| D962 | “Aluminum Pigments, Powder and Paste for Paints” |

**(Specifications for Packaging)**

| | |
|---|---|
| D3951 (88) | “Standard Practice for Commercial Packaging” |

**(Test Methods for Properties)**

| | |
|---|---|
| D154 | “Varnishes” |
| D1296 | “Odors of Volatile Solvents and Diluents” |
| D1475 | “Density of Paint, Varnish, Lacquer and Related Products” |

| | |
|---|---|
| D1544 | "Color of Transparent Liquids (Gardner Color Scale)" |
| D1545 | "Viscosity of Transparent Liquids by Bubble Time Method" |
| D2369 | "Volatile Content of Paints" |
| D3278 | "Flash Point of Liquids by Small Scale Closed-Cup Apparatus" |

**UFS (FEDERAL STANDARDS)**

**(Standard Specifications for Ingredients)**

| | |
|---|---|
| TT-P-320 | "Pigment, Aluminum, Powder and Paste, for Paint" |
| 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 Data 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 mixed 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 paint contains approximately 40% by volume of nonvolatile film forming solids (Pigment and binder).

**TABLE 1 - COMPOSITION OF MIXED PAINT**

| CHARACTERISTICS | REQUIRED | | INGREDIENT ASTM | STANDARDS US FEDERAL |
|---|---|---|---|---|
| | Min. Wt%. | Max Wt% | | |
| PIGMENT (20.3 ± 0.5 Wt. %) | | | | |
| ALUMINUM PASTE[1] | 100 | --- | --- | --- |
| VEHICLE (79.7 ± 0.5 Wt. %) | | | | |
| ALKYD VARNISH SOLIDS [2] | 50 | --- | --- | TT-R-266 TYPE I CLASS A |
| MINERAL SPIRIT THINNER | --- | 50 | D235 | TT-T-291 GRADE I |
| DRIERS | --- | --- | D600 CLASS B | |

**Notes:**

**1) See Section 6.11.**

**2) See Table 2 and 3 for analysis and properties of Alkyd varnish.**

### 5. ANALYSIS

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

**TABLE 2 - ANALYSIS OF ALKYD VARNISH**

| CHARACTERISTICS | REQUIREMENTS | | ASTM METHOD | US FEDERAL STD. No. 141 |
|---|---|---|---|---|
| | Min. Wt. % | Max. Wt. % | | |
| VOLATILES | --- | 50 | D2369 | --- |
| NONVOLATILE VEHICLE CALCALATED BY DIFFERENCE | 50 | --- | --- | 4053 |

### 6. PROPERTIES

### 6.1 Requirements

The alkyd varnish shall meet the requirements of Table 3 and Sections 6.2 through 6.11.

### 6.2 Odor

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

### 6.3 Color

The color shall be less than “11” on the Gardner 1933 scale (ASTM D1544).

### 6.4 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 (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 Federal Standard No. 141, Method 3021.

### 6.6 Working Properties

The paint shall be easily applied by all three methods when tested in accordance with US Federal Standard No. 141, Method 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 (thickness 25 ± 5 microns) 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 mixed paint shall show no detrimental film effects after a painted panel is immersed in gasoline for four hours.

**6.11** The aluminum paste shall comply with the requirements of either US Federal Specification TTP- 320 Type II Class B, or ASTM Standard D962 Type 2 Class B, or either one, with the exception that the total retained on 0.045 opening (325 mesh) sieve shall be within the range of 4%-6%. However, hiding and covering capacity shall be equivalent.

**TABLE 3 - PROPERTIES**

| CHARACTERISTICS | REQUIREMENTS | | ASTM METHOD | FEDERAL STD. No. 141 |
|---|---|---|---|---|
| | Min. | Max. | | |
| VISCOSITY* GARDNER AIRBUBBLE VISCOMETER | C | E | D1545 | --- |
| DENSITY Kg/Lit | 0.91 | 0.97 | D1475 | --- |
| DRYING TIME, HOURS: | | | | |
| SET TO TOUCH | hrs | 4 | --- | 4061 |
| DRY HARD | hrs | 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 to mix and 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, in a full, tightly covered container at the temperature which will be recommended by Manufacturer.

### 7.2 Packaging

The packaging shall meet the relevant requirements of ASTM D3951 (88).

## 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 or any agreement between purchaser and manufacture. (ASTM)

## 9. LABELING

**9.1** Refer to ANSI Standard Z400.1/Z129.1 "Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation".

### 9.2 Marking of Containers

Each container shall be legibly marked with the following information:

**Name: Alkyd Paint (Aluminum) Leafing as Top coat (Finish)**

**Specification: IPS-M-TP-150 .....**

**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: Aluminum: .....**

**Lot Number: .....**

**Stock Number: .....**

**Date of Manufacture: .....**

**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.**

### 9.3 Directions for Use

The direction for use shall be supplied with each container of paint by manufacturer.

### 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 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.