MATERIAL AND EQUIPMENT STANDARD

FOR

VINYL PAINT (ALUMINUM) AS INTERMEDIATE

AND

TOP COAT (FINISH)

ORIGINAL EDITION

MAY 1993

This standard specification is reviewed and updated by the relevant technical committee on June 1998(1) and Apr. 2014(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 is based on internationally acceptable standards and includes 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 documents.

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 generated from SSPC-paint 8 covers the minimum requirement for composition, analysis, properties, storage life and packaging, inspection and labeling of a ready to mix vinyl paint (aluminum) to be used as Intermediate and top coat (Finish).

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on June 1998. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 33 on June 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 Apr. 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 426 on Apr. 2014. 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-paint No. 8	"Aluminum Vinyl Paint"
SSPC-PA Guide 3,	"A Guide to Safety in Paint Application"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

(Specifications for Ingredients)

D362	"Industrial Grade Toluene"
D962	"Aluminum Powder and Paste Pigments for Paints"
D1153	"Methyl Isobutyl Ketone"

(Specifications for Packaging)

D3951	"Standard Practice for Commercial Packaging"

(Test Methods for Properties)

D185	"Coarse Particles in Pigments"
D562	"Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer"
D1208	"Common Properties of Certain Pigments"

D1243	"Dilute Solution Viscosity of Vinyl Chloride Polymers"
D1296	"Odors of Volatile Solvents and Diluents"
D1475	"Density of Liquid Coatings, Inks, and Related Products Volatile Content of Coatings"
D1640	"Drying, Curing, or Film Formation of Organic Coatings at Room Temperature"
D2369	"Volatile Content of Coatings"
D2371	"Pigment Content of Solvent-Reducible Paints"

UFS (US FEDERAL STANDARDS)

(Standard Specifications for Ingredients)

MIL-P-15328	"Primer (Wash) Pretreatment"
MIL-P-15929	"Primer Coating, Shipboard, Vinyl-Red Lead (for Hot Spray)"

(Federal Test Method Standard No. 141)

Method 3011	"Condition in Container"
Method 4053	"Nonvolatile Vehicle Content"
Method 4061	"Drying Time"
Method 4081	"Water Content (Reflex Method)"
Method 4203	"Reducibility and Dilution Stability"
Method 4331	"Spraying Properties"
Method 4541 (Canceled)	"Working Properties and Appearance of Dried Film"

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z400.1/Z129.1	"Safety Data Sheet and Hazard Evaluation and Precautionary Labeling Preparation"

IPS (IRANIAN PETROLEUM STANDARDS)

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

Details of the composition, 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. Beneficial additives such as anti-skinning agents, suspending agents, or

wetting aids may be added.

The aluminum paste shall be packaged separately unless otherwise specified in the procurement documents.

4.2 Percentage

This paint shall contain approximately 14% by volume of nonvolatile film-forming solids (pigment and binder).

TABLE 1 – COMPOSITION

INGREDIENTS	REQUIRED			TYPICAL COMPOSITION		INGREDIENT STANDARDS
	Min. Wt. %	Max. Wt. %		Wt.%	Vol.%	ASTM
PIGMENT: (10 ±1%)						
Aluminum Paste		100.0	—	10.0	6.3	D 962 Type 2 Class B
VEHICLE (90 ±1%)						
Vinyl Resin A[1]		8.4	—	7.5	5.2	—
Vinyl Resin B[2]		8.4	—	7.5	5.1	—
Dioctyl Phthalate[3]		1.6	—	1.6	1.2	—
Methyl Isobutyl Ketone[4]		—	40.8	36.7	42.6	D 1153
Toluene		—	40.8	36.7	39.6	D 362
TOTALS				100.0	100.0	

1) Vinyl Resin A shall be a hydroxyl containing vinyl chloride acetate copolymer. It shall contain 89.5% to 91.5%vinyl chloride, 5.3% to 7.0% vinyl alcohol, and 2.0% to 5.5% vinyl acetate. The inherent viscosity of the resin (ASTM Standard D 1243, Method A) at 20°C shall not be less than 0.5.

2) Vinyl Resin B shall be a carboxyl containing vinyl chloride acetate copolymer. It shall contain 85% to 87% vinyl chloride, 12% to 14% vinyl acetate, and 0.5% to 1.0% maleic acid. The inherent viscosity of the resin (ASTM Standard D 1243, Method A) at 20°C shall not be less than 0.48.

3) Dioctyl phthalate di-2-ethylhexyl phthalate shall be commercial material which conforms to the following requirements:

Specific gravity at 25°C 0.980-0.9861

Refractive index at 25°C 1.4830-1.6859

4) When specified in the procurement documents, suitable high boiling vinyl solvent may be substituted for a portion of the methyl isobutyl ketone to make the paint more amenable to application in hot weather or by brush.

5. ANALYSIS

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

TABLE 2 - ANALYSIS

CHARACTERISTICS	REQUIREMENTS Min. Wt.%	Max. Wt.%	ASTM	FED-STD-141
Pigment	6.0	7.5	D 1208	4021*
Volatiles	75.0	78.5	D 2369	---
Nonvolatile vehicle				
Calculated by difference	15.5	17.5	—	4053
Uncombined water	—	0.5	D 1208	—
Coarse particles and skins, as retained on standard 325 mesh screen	—	0.25	D 185	4092

*** Using extraction mixture "C" (1:1 toluene and acetone)**

6. PROPERTIES

6.1 The paint shall meet the requirements of Table 3 and sections 6.2 through 6.6.

6.2 Odor

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

6.3 Color

The vehicle before mixing with the aluminum paste shall be clear. The color after mixing shall be typical of aluminum paint (dull aluminum luster).

6.4 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 thinner consisting of 85% toluene and 15% methyl isobutyl ketone by volume (US Federal standard No. 141, Method 4203).

6.5 Adhesion

The paint under test shall show good adhesion when tested as follows: Apply one coat 25 microns dry film thickness of the mixed paint to a clean steel panel free of rust or scale, also, to a similar panel pretreated with Wash Primer US MIL-P-15328, "Primer (Wash) Pretreatment", or SSPC paint 27, "Basic Zinc Chromate-Vinyl Butyral Wash Primer" 12.5 microns (0.5 mil) dry film thickness, and to a panel similar to the preceding one but over which has also been applied one coat of MIL-P-15929, "Primer Coating, Shipboard, Vinyl-Red Lead (for Hot Spray)" (25 microns dry film thickness) After a 24 hour dry, the film under test on each panel shall be subjected to a knife test to determine whether the paint exhibits good adhesion to the undercoats and to the steel.

6.6 Working Properties

The paint shall be easily applied when tested in accordance with US Federal Standard No. 141, Methods 4331 and 4541. The paint shall show no streaking, running, or sagging after drying.

TABLE 3 - PROPERTIES

CHARACTERISTICS	REQUIREMENTS Min.	Max.	ASTM METHOD	US FEDERAL STD. No. 141
PAINT CONSISTENCY VISCOSITY* SHEAR RATE 200 rpm				
KREB UNITS	54	60	D 562	---
GRAMS	75	97	D 562	---
DENSITY Kg/Lit	0.9	0.97	D 1475	---
DRYING TIME MINUTES:				
TACK FREE	---	15	D 1640	4061
DRY HARD	---	60	D 1640	4061

*** Viscosity 48 hours or more after manufacture.**

7. STORAGE LIFE AND PACKAGING

7.1 Condition in Container

The paint shall show no thickening, curdling, gelling, or hard caking when tested as specified in US Federal Standard No. 141, method 3011, after storage for 24 months from date of delivery (unless otherwise specified by the Company), in a full, tightly covered container.

7.2 Packaging

The 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 materials.

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 Z 129.1 "Precautionary Labeling of Hazardous Industrial Chemicals".

9.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name: Vinyl paint (Aluminum) as Intermediate and Top coat (Finish)

Specification: IPS-M-TP-110
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: .....
Quantity of Paint in Container: .....
Information and Warnings, if needed, ...
Manufacturer's Name and Address: .....
Shelf life: .....
Storage temp: .....
INSPECTION DATE: .....
MSDS: .....
Design Guide: For guidance on the usage of this paint for various application/environments and temperature range reference shall be made to IPS-E-TP-100 "Engineering Standard for Paints"

9.3 Directions for Use

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

Directions for Use of Vinyl paint (Aluminum)

This paint is intended for use over vinyl butyral wash primer or as a finish coat over vinyl chloride-acetate copolymer paint. It is supplied in two components to be mixed just before using.

Gradually add small portions of the liquid to the aluminum paste. Mix the paste thoroughly until it is smooth and free of lumps. Then gradually add the remainder of the liquid, stirring constantly. It is recommended that the paint be mixed by a mechanical mixer.

The paint shall be thinned as necessary with solvent containing not more than 85% toluene and 15% methyl isobutyl ketone or methylethyl ketone. The amount of thinning will depend upon application methods and conditions, and may be as high as 25% to 33% by volume of the paint.

When required, this paint may be tinted to a contrasting color by the addition of a stable tinting pigment dispersed in a vinyl chloride-acetate copolymer resin solution.

Apply by conventional air spray. Brushing may be used in small areas. The surface to be painted shall be dry and above 2°C, not less than 3°C above the dew point. Do not paint outdoors in rainy weather. Apply so as to obtain a minimum dry film thickness of 25 microns.

A wet film of paint shall be deposited on the surface when spraying; the spray gun should be adjusted so that proper atomization is obtained but no dry powder is deposited on the surface. The nozzle should be held about 150 mm from the surface during application.

If application is to be made by brush, apply with a brush heavily loaded with paint; apply quickly and smoothly. Avoid excessive brushing and do not go back over the surface until thoroughly dry.

At temperatures between 16 and 27°C dry at least one hour between coats and 72 hours before immersion. Varying atmospheric conditions and degrees of ventilation in confined spaces may allow shorter or require longer drying times.

Note:
This paint is not 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 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.