MATERIAL AND EQUIPMENT STANDARD

FOR

VINYL PAINT, (WHITE OR COLORED)

AS

PRIMER, INTERMEDIATE AND TOP COAT (FINISH)

ORIGINAL EDITION

AUG. 1993

This standard specification is reviewed and updated by the relevant technical committee on Feb. 1999(1) and Sep. 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 mainly generated from SSPC paint 9 (Discontinued)covers the minimum requirements for the composition, analysis, properties, storage life and packaging, inspection and labeling of vinyl paint to be used as primer, intermediate and top coat (finish). The top coat color should be specified in the procurement documents.

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. 77 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 Sep. 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 437 on Sep. 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 9 (Discontinued)	"White (or Colored) Vinyl Paint"
SSPC-PA Guide 3	"A Guide to Safety in Paint Application"
SSPC 27	“Basic Zinc Chromate Vinyl Buthyral”

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

(Specifications for Ingredients)

D362	"Industrial Grade Toluene"
D476	"Titanium Dioxide Pigments"
D1153	"Methyl Isobutyl Ketone"

(Specifications for Packaging)

D3951	"Standard Practice for Commercial Packaging"

(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"
D1210	"Fineness of Dispersion of Pigment Vehicle Systems"
D1243	"Dilute Solution Viscosity of Vinyl Chloride Polymers"
D1296	"Odors of Volatile Solvents and Diluents"
D1475	"Density of Paint, Varnish, Lacquer and Related Products"
D1640	"Drying, Curing, or Film Formation of Organic Coatings at Room Temperature"
D2369	"Volatile Content of Paints"

UFS (US FEDERAL STANDARDS)

(Standard Specifications for Ingredients)

DOD-P-15328

(Federal Test Method Standard No. 141)

Method 3011	"Condition in Container"
Method 4021	"Pigment Content (Centrifuge)"
Method 4053	"Nonvolatile Vehicle Content"
Method 4061	"Drying Time"
Method 4081	"Water Content (Reflux Method)"
Method 4092	"Coarse Particles and Skins"
Method 4203	"Reducibility and Dilution Stability"
Method 4331	"Spraying Properties"
Method 4541	"Working Properties and Appearance of Dried Film"

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z129.1	"Precautionary Labeling of Hazardous Industrial Chemicals"

BS (BRITISH STANDARD)

BS 381C	“Colors for identification, Coding and Special Purposes”

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	“Units”
IPS-E-TP-100	"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 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.

4.2 Percentage

This paint contains approximately 17% by volume of nonvolatile film forming solids (pigment and binder).

TABLE 1 – COMPOSITION

INGREDIENTS	REQUIRED Min. Wt.%	REQUIRED Max. Wt.%	TYPICAL[6] COMPOSITION Wt. %	TYPICAL[6] COMPOSITION Vol. %	INGREDIENT STANDARDS ASTM
PIGMENT (12 ±1%)					
TITANIUM DIOXIDE	95.0	---	12.0	2.9	D476, TYPE II CLASS II
TINTING PIGMENTS[1]	---	5.0	---	---	---
VEHICLE (88 ±1%)					
VINYL RESIN A[2]	9.1	---	8.0	5.9	---
VINYL RESIN B[3]	9.1	---	8.0	5.9	---
DIOCTYL PHTHALATE[4]	3.4	---	3.0	2.5	---
METHYL ISOBUTYL KETONE[5]	---	39.2	34.5	43.0	D1153
TOLUENE	---	39.2	34.5	39.8	D362
TOTALS			100.0	100.0	

1) Stable, durable tinting pigments shall be substituted for a portion of the pigment when a tint is specified in the procurement documents.

2) Vinyl Resin A shall be a hydroxyl containing vinyl chloride-acetate copolymer. It shall contain 89.5% and 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.

3) 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.

4) 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°C1. 4830-1.6859

5) When specified in the procurement documents, suitable high boiling vinyl solvent may be substituted for a portion of the methylisobutyl ketone to make the paint 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	Min. Wt. %	Max. Wt. %	ASTM METHOD
Pigment	11.0	13.0	D1208
Volatiles	67.0	71.0	D2369
Nonvolatile vehicle Calculated by Difference	18.0	20.0	---
Uncombined water	---	0.5	D1208
Coarse particles and Skins, as retained on standard (325 mesh screen	---	0.25	D185

6. PROPERTIES

6.1 Requirements

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 D1296)

6.3 Color

The color shall be white or colored as specified in the procurement documents with reference to BS 381C.

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, and also to a similar panel pretreated with wash primer DOD-P 15328 or SSPC paint 27, "Basic zinc Chromate-Vinly Butyral Wash Primer" (12.5 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.

This Note aren't requirements of this specification (this paint contains chromate pigments Users are urged to follow all health , safety , and environ mental require meant in applying handling , and disposing of these materials).

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. Wt. %	Max. Wt. %	ASTM METHOD
PAINT CONSISTENCY VISCOSITY* SHEAR RATE 200 rpm			
GRAMS	100	150	D562
KREBS	61	72	D562
DENSITY Kg/Lit	0.97	1.05	D1475
FINENESS OF GRIND, MICRONS	25	---	D1210
DRYING TIME, MINUTES			
TACK FREE	---	15	D1640
DRY HARD	---	30	D1640

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

TABLE 4 – COLOR

PAINT COLOR	COLOR No. TO BS 381C
ARCTIC BLUE	112
SEA GREEN	217
BRILLIANT GREEN	221
CANARY YELLOW	309
LIGHT STRAW	384
MIDDLE BROWN	411
SIGNAL RED	537
LIGHT ORANGE	567
LIGHT GREY	631

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 12 months from date of delivery, in a full, tightly covered container.

7.2 Packaging

The packaging shall meet the relevant requirement of ASTM D 3951(88) at a temperature 10-43 ºC.

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 ASTM D3925.

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 (white or colored) as primer, intermediate and top coat (finish)

Color: White or as specified in procurement with reference to Table 4

Lot Number: .....

Stock Number: .....

Date of Manufacture: .....

Quantity of Paint in Container: .....

Specification: IPS-M-TP-200 .....

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) .....

Shelf life .....

Drying time for overcoating .....

Kind of thinner .....

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

Directions for Use of Vinyl Paint (White or colored)

This paint is intended for use as a primer over blast cleaned steel or over Vinyl butyral wash primer. It may also be used as an intermediate or finish coat over itself as primer and over Vinyl Chloride Acetate Copolymer Paint. Mix thoroughly before use.

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

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 the specified film thickness. The minimum dry film thickness should be 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 such that dry paint (similar to overspray) is not deposited on the surface. The nozzle should be held about fifteen centimeters 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.

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 hand 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 may pose a hazard include hydrocarbon solvents. Applicable regulations governing safe handling practices shall apply to the use of this paint.