MATERIAL AND EQUIPMENT STANDARD

FOR

ZINC OXIDE, IRON OXIDE AND ALKYD INTERMEDIATE PAINT

ORIGINAL EDITION

MAY 1993

This standard specification is reviewed and updated by the relevant technical committee on June 1998(1), Nov. 2006(2) and Sep. 2013(3). 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.

Standards and Research department

No.17, Street14, North kheradmand

Karimkhan Avenue, Tehran, Iran.

Postal Code- 1585886851

Tel: 021-88810459-60 & 021-66153055

Fax: 021-88810462

Email: Standards@nioc.ir

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 covers the minimum requirements for the composition, analysis, properties, storage life, packaging, inspection and labeling of zinc oxide, iron oxide and alkyd intermediate paint.

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. 35 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 Nov. 2006. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No 309 on Nov. 2006. These modifications are included in the present issue of IPS.

Note 3:

This standard specification is reviewed and updated by the relevant technical committee on Sep. 2013. The approved modifications by T.C. were sent to IPS users as amendment No. 3 by circular No 405 on Sep. 2013. 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.

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

(Specifications for Ingredients)

D235	"Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)"
D600	"Liquid Paint Driers"
D605	"Magnesium Silicate Pigments (Talk)"
D3722	"Natural Red and Brown Iron Oxide Pigments"

(Specifications for Packaging)

D3951	"Standard Practice for Commercial Packaging"

(Test Methods for Properties)

D185	"Coarse Particles in Pigments"

D523	"Specular Gloss"
D562	"Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer"
D1208	"Common Properties of Certain Pigments"
D1210	"Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage"
D1296	"Odors of Volatile Solvents and Diluents"
D1475	"Density of Liquid Coating, Inks, and Related Products"
D2369	"Volatile Content of Coatings"
D2371	"Pigment Content of Solvent-Reducible Paints"
D3278	"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"

(**Federal Test Method Standard No. 141)**

Method 3011	"Condition in Container"
Method 3021	"Skinning (Partially Filled Container)"
Method 4053	"Nonvolatile Vehicle Content"
Method 4081	"Water Content (Reflux Method)"
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"
Method 6221	"Flexibility"

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z 400.1/Z 129.1	"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 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.

4.2 Percentage

This intermediate paint shall contain approximately 60% by volume of nonvolatile film forming solids (pigment and binder).

TABLE 1 – COMPOSITION

INGREDIENTS	TYPICAL COMPOSITION Wt.%	Vol.%	INGREDIENT STANDARD ASTM	US FEDERAL
Pigment: (58.4 Wt.% ±2%)				
Zinc Oxide (95% Pb_3O_4)	25.1	4.9	-	-
Red or brown oxide (85% Fe_2O_3)	13.4	5.6	D 3722*	-
Magnesium silicate	19.9	12.4	D 605	
Vehicle: (41.6 Wt.% ±2%)				
Alkyd resin solids	23.1	37.1	-	TT-R 266, GRADE II
Mineral spirit thinner	18.5	40.0	D 235	TT-T-291, GRADE I
Driers	-	-	D 600 CLASS B	-
Totals	100.0	100.0		

* Either red or brown iron oxide (natural) shall also comply with the following:

Water solubles	0.3% Max.
Coarse particles on 0.044 sieve opening (325 Mesh sieve)	0.1% Max.
Moisture and other volatile matter	0.2% Max.
Organic matter	None

5. ANALYSIS

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

TABLE 2 – ANALYSIS

CHARACTERISTICS	REQUIREMENTS Min. Wt.%	Max. Wt.%	ASTM METHOD	US FEDERAL STD. No. 141
Pigment	56	-	D 2371	4021
Volatiles	-	22	D 2369	-
Nonvolatile vehicle	19	-	-	4053
Calculated by difference uncombined water	-	1.0	D 1208	4081
Coarse particles and skins, as retained on standard 0.044 mm sieve opening (325 Mesh screen)	-	1.0	D 185	-
Rosin or rosin derivatives	-	0	-	

6. PROPERTIES

6.1 The paint shall meet the requirements of Table 3 and Sections 6.2 through 6.8.

6.2 Odor

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

6.3 Color

The color shall be typical of the specified mixture of zinc oxide and iron oxide.

*** Either red or brown iron oxide (natural) shall also comply with the following:**

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 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, spray and roller) 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 Flexibility

The film prepared as described in US Federal Standard No. 141 Method 6221, after baking 24 hours at 93°C shall show no cracking when suddenly chilled to 0°C and quickly bent sharply on itself through 180° degrees over a 3 mm (1/8 inch) mandrel. The film on the bent part of the panel shall show satisfactory adhesion.

6.8 Gloss

The gloss shall be dull (ASTM Standard D523).

TABLE 3 - PROPERTIES

CHARACTERISTICS	REQUIREMENTS		ASTM METHOD	US FEDERAL STD. No. 141
	Min.	max.		
Paint consistency:				
Viscosity* shear rate 200 rpm				
Grams	120	220	D 562	---
Kreb units	65	85	D 562	---
Density Kg/lit	1.6	---	D 1475	---
Fineness of grind, microns +	65	---	D 1210	---
Fineness of grind, hegman units	3			
Drying time, hours	---	18	---	4061
Flash point, °C	38	---	D 3278	---
Sag resistance, microns	152	---	---	4494

* Viscosity 48 hours or more after manufacture.
rpm = round per minute
+ gage depth rounded to nearest 5 mm.

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 the 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 D3951-88.

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 Standard 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 Labeling Standard

Labeling shall be in accordance with ANSI Z129.1 "Precautionary Labeling of Hazardous Industrial Chemicals".

9.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name: Zinc Oxide, Iron Oxide and Alkyd Intermediate Paint.

Specification: IPS-M-TP-120 .....

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: Zinc Oxide

Lot Number: .....

Stock Number: .....

Date of Manufacture: .....

Quantity of Paint in Container: .....

Information and Warnings, if needed: .....

Manufacturer's Name and .....

Address: .....

Date of inspection .....

Date of Exp. .....

UPC bar code part No. .....

Storage temperature .....

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 "Paint"

9.3 Directions for Use

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

Directions for Use of Zinc Oxide, Iron Oxide and Alkyd Intermediate Paint

- This paint is intended for use as an intermediate coat over rust inhibitive primers on structural steel, over itself, or over other oleoresinous paints. It may be used as a finish coat when desired. It may also be used for priming steel that has been pickled or blast cleaned. All oil, grease, dust, and loose or nonadherent paint shall be removed, as residues of oil and grease remaining on the surface will result in decreased paint performance.

- Mix paint thoroughly before use. If the pigment has settled, pour off most of the liquid into a clean container. 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 the container for unmixed pigment. Screen paint before applying.

- Thin paint only if necessary, using only mineral spirits. For brush application under normal conditions no thining should be necessary for spray application, add up to one liter of thinner per eight liter of paint when necessary.

- Apply by brush or spray to the specified film thickness or, if none is specified, to at least 38 microns dry or approximately 75 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. Do not paint outdoors in rainy weather or if freezing temperatures are expected before the paint dries.

- Allow paint at least 18 hours drying time in good weather before recoating.

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 Zinc Oxide, hydrocarbon solvent, and lead drier. Applicable regulations governing safe handling practices shall apply to the use of this paint.