

**MATERIAL AND EQUIPMENT STANDARD**

**FOR**

**CHLORINATED RUBBER INHIBITIVE PRIMER**

**ORIGINAL EDITION**

**NOV. 1993**

This standard specification is reviewed and updated by the relevant technical committee on Jan. 1999(1) and July 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 17 covers the minimum requirements for the composition, analysis, properties, storage life and packaging, inspection and labeling of chlorinated Rubber inhibitive primer.

**Note 1:**

**This standard specification is reviewed and updated by the relevant technical committee on Jan. 1999. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 61 on Jan. 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 Jul. 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 439 on Jul. 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 17-1991	"Chlorinated Rubber Inhibitive Primer"	(Discontinued)
PA GUIDE 3	"A Guide to Safety in Paint Application"	
SP 8	"Pickling"	
SP 6	"Commercial blast Cleaning"	
SP 10	"Near White Blast Cleaning"	

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

**(Specifications for Ingredients)**

D13	"Spirits of Turpentine"	
D343	"2-Ethoxyether Acetate"	(Canceled in 1982)
D364	"Industrial Grade Xylene"	
D602	"Barium Sulfate Pigment"	
D605	"Magnesium Silicate Pigments"	
D607	"Wet Ground Mica Pigment"	
D1648	"Basic Lead Silico-Chromate"	

**(Specifications for Packaging)**

D3951	"Standard Practice for Commercial Packaging"	
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**(Test Methods for Properties)**

B117	"Operating Salt Spray (Fog) Apparatus"
D185	"Coarse Particles in Pigments, Pastes and Paints"
D445	"Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)"
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 Coatings, Inks, and Related Products"
D1542	"Quantitative Test for Rosin in Varnishes"
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)**

MIL-C-429	"Chlorinated Paraffin, Technical"
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**(US Federal Test Method Standard No. 141)**

Method 2011	"Preparation of Steel Panels" (Canceled)
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 4321	"Brushing Properties"
Method 4331	"Spraying Properties"
Method 4494	"Sag Test (Multinotch Blade)"
Method 4541	"Working Properties and Appearance of Dried Film" (Canceled)
Method 6221	"Flexibility" (Canceled)

**ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)**

ANSI Z400.1/Z129.1	"Safety Data Sheet and Hazard Evaluation and Precautionary Labeling Preparation"
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**IPS (IRANIAN PETROLEUM STANDARDS)**

<a href="#">IPS-E-GN-100</a>	"Engineering Standard for Units"
<a href="#">IPS-E-TP-100</a>	"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 primer 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 primer shall contain a minimum of 32% by volume of nonvolatile film forming solids (Pigment and binder).

**TABLE 1 - COMPOSITION**

INGREDIENTS	REQUIRED		TYPICAL		INGREDIENT	
	Min. Wt. %	Max. Wt. %	COMPOSITION Wt. %	Vol. %	ASTM	FEDERAL
PIGMENT: (39 ± 10 Wt. %)						
Rust Inhibitive Pigments <sup>1</sup>	35.0	---	26.3	5.3	---	---
Tinting Pigments <sup>2</sup>	---	12.0	0.3	0.2	---	---
Extender Pigments	---	55.0	12.1	6.4	---	---
Barytes					D602	---
Magnesium					D605	---
Mica					D607	---
VEHICLE: (61 ± 10 Wt. %)						
Chlorinated Rubber <sup>3</sup>	19.0	---	12.3	10.8	---	---
Chlorinated Resins	---	---	3.3	3.0	---	MIL-C-429, Type II
Chlorinated Plasticizers	10.0	18.0	6.7	8.4	---	MIL-C-429, Type I
PLASTICIZER <sup>4</sup>	---	---	---	---	---	---
Solvents <sup>5</sup>	---	65.0	37.0	64.0	---	---
Vehicle Stabilizers <sup>6</sup>	0.6	---	0.4	0.5	---	---
Vapor Phase Stabilizers <sup>7</sup>	0.2	---	0.1	0.2	---	---
Suspending Aids <sup>8</sup>	---	3.0	1.5	1.2	---	---
TOTALS			100.0	100.0		

<sup>1</sup> The rust inhibitive pigments shall be of good quality and such that when incorporated in the vehicle portion of this specification paint, the proposed paint will perform equal to or better than the paint made from the "control formulation" at each inspection period in the tests described in Sections 6.8 through 6.12.

<sup>2</sup> Lightfast and compatible chemically resistant colored pigments shall be used to provide a tint or color when desired.

<sup>3</sup> The chlorinated rubber shall contain approximately 66% by weight chlorine. The viscosity (based on a solution of 20% by weight concentration in toluene at 20°C) shall fall in the range of 9 to 14 centipoises, when measured according to ASTM Standard 445. Up to 50% by weight of the amount of chlorinated rubber could be of the viscosity range of 17 to 25 centipoises, but spray application is more difficult.

<sup>4</sup> Alternative plasticizers can be used, provided they are compatible, high quality, and chemically resistant.

<sup>5</sup> The solvent shall consist of aromatic or a blend of aromatic and aliphatic hydrocarbons, with the aliphatic portion limited to 25% by weight and shall have a minimum kauri butanol value of 75. Up to 10% by weight of turpentine (ASTM Standard D 13) or other high boiling aromatic type solvents may be added to improve application properties.

<sup>6</sup> The vehicle stabilizer shall be a suitable chloride acceptor such as an epoxidized vegetable oil.

<sup>7</sup> A vapor phase stabilizer, such as propylene oxide, can also be used. It must be a high grade commercial material suitable for the intended purpose.

<sup>8</sup> The suspending aid shall be hydrogenated castor oil or montmorillonite mineral.

**5. ANALYSIS**

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

**TABLE 2 - ANALYSIS**

CHARACTERISTICS	REQUIREMENTS		ASTM METHOD	US FEDERAL STD. No. 141
	Min. Wt. %	Max. Wt. %		
PIGMENT	29.0	49.0	D2371	---
VOLATILES	---	46.0	D1208	---
NONVOLATILE VEHICLE	15.0	---	---	4053
UNCOMBINED WATER	---	0.25	D1208	---
COARSE PARTICLES AND SKINS AS RETAINED ON STANDARD 0.045 mm SIEVE OPENING (325 MESH SCREEN)		0.05	D185	---
ROSIN OR ROSIN DERIVATIVES	---	0	D1542	---

**6. PROPERTIES**

The primer shall meet the requirements of Table 3 and Sections 6.1 through 6.10.

**6.1 Odor**

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

**6.2 Color**

The color shall be consistent with choice of inhibitive pigment and shall be obtained by using compatible, chemically resistant tinting pigments.

**6.3 Compatibility**

There shall be no evidence of incompatibility of any of the ingredients of the primer when one volume of the primer is slowly mixed with one volume of Xylene (US Federal Standard No. 141, Method 4203).

Solvent blends shall be checked in an unpigmented film deposited on glass. The dried film must be clear and bright. The flexibility and permeability of the trial film shall also be compared with that obtained from the "control formulation" primer. See Table 4.



#### 6.4 Working Properties

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

**6.5** When subjected to the tests described in Sections 6.8 through 6.12, the performance of the primer shall be equal to or better than the "control formulation" primer given in Table 4.

#### 6.6 Film Thickness

The primer shall be capable of being applied to produce a dry film thickness of 38 microns minimum without running or sagging. Depending upon the volume solids content, this will require a wet film thickness of approximately 125 microns.

Panels prepared for the working properties test under Section 6.5 may be used for these measurements. A minimum of five measurements shall be taken to calculate the average dry film thickness.

#### 6.7 Salt Fog Test

This test shall be performed in accordance with ASTM Standard B117. Panels shall be 8 cm x 16 cm x 1/32 cm cold rolled steel, sand blasted in accordance with SSPC-SP 10, "Near-White Blast Cleaning" using 20-40 (425-850 MIC) mesh silica sand.

The primer shall be applied by spray to a 75 microns dry film thickness, approximately 225 microns (9 mils) wet film.

After one week of drying at 21-27°C the panels shall be scored as indicated in ASTM Standard B 117.

Panels shall be exposed in the cabinet at a 30 degrees angle from the vertical. Panels shall be tested in duplicate and examined at 96-hour intervals for a period of 500 hours.

#### 6.8 Flexibility Test

This test shall be run in accordance with US Federal Standard No. 141, Method 6221. Panels shall be 8 cm x 16 cm 20 gage cold-rolled steel, cleaned in accordance with US Federal Standard No. 141, Method 2011, Procedure D, followed by Procedure A.

The primer shall be applied by spray to a 75 microns dry film thickness, approximately 225 microns wet film. After one week of drying at 21-27°C, the panel shall be bent over a 4 cm mandrel and shall show no cracking or loss of adhesion.

#### 6.9 Exterior Exposure

Since exposure environments vary, exposure tests must be based on comparison with the "control formulation" paint. The proposed paint shall provide at least as much protection as the "control formulation" primer. Panels shall be 16 cm channel steel in a 30 cm long section and exposed at a 45 degree angle south exposure with the flanges horizontal.

Each panel shall have a weld bead approximately 8 cm long placed at the left end of the panel about 8 cm from the end. The primer shall be applied by spray to a 75 microns dry film thickness approximately 225 microns wet film. After one week of drying at 21-27°C the coated steel shall be scored in an "X" pattern on the right 8 cm from the end. Each stroke of the "X" must be 10 cm, long. Then the panels shall be placed on exposure. After 60 days' exposure, both the proposed and "Control" primers shall show no blistering or rusting on the face and only minor blistering or rusting at the weld and score.

**6.10 Fresh Water Immersion Test**

Panels shall be 8 cm x 16 cm x 1/3 cm cold rolled steel prepared according to SSPC-SP 10. "Near-white Blast Cleaning," using 20-40 (425-850 MIC) mesh silica sand. The primer shall be applied by spray to 75 microns dry film thickness-approximately 225 microns wet film. Half of the immersed area and half of the unimmersed area shall be coated with the selected topcoat system. After one week of drying at 21-27°C the panels shall be partially immersed (halfway) in distilled water at 38°C. Panels shall be examined every 24 hours for blistering, leaching, rusting, or loss of adhesion. Both the proposed and "control" primers, shall pass 500 hours immersion with no other defect than a slight discoloration (examine after a one hour drying period).

**TABLE 3 - PROPERTIES**

CHARACTERISTICS	REQUIREMENTS		ASTM METHOD	US FEDERAL STD. No. 141
	Min.	Max.		
PRIMER CONSISTENCY:				
VISCOSITY SHEAR				
RATE 200 rpm				
GRAMS	140	225	D562	----
KREB UNITS	70	90	D562	----
DENSITY Kg/lit	1.4	1.7	D1475	----
FINENESS OF GRIND, MICRONS				
" " HEGMAN UNITS	3			
DRYING TIME:				
SET OF TOUCH, MINUTES	15	----	----	4061
DRY HARD, HOURS	1	----	----	4061
FLASH POINT,°C	26.7	----	D3278	----

**Note:**

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

**TABLE 4 - COMPOSITION OF CONTROL PAINT**

INGREDIENTS	TYPICAL COMPOSITION		INGREDIENT STANDARDS	
	Wt. %	Vol. %	ASTM	US FEDERAL
Basic Lead Silico Chromate <sup>2</sup>	30.0	11.5	D1648	---
Barytes	13.0	4.7	D602	---
Chlorinated Rubber <sup>1</sup>	12.5	11.6	---	---
Chlorinated Resins	7.4	7.2	---	MIL-C-429, Type II
Chlorinated Plasticizer	4.1	5.5	---	MIL-C-429, Type I
Modified Hydrogenated Castor Oil	1.5	2.7	---	---
Epoxidized Soya Oil	0.9	1.2	---	---
Propylene Oxide	0.1	0.2	---	---
Xylene	23.7	44.1	D364	---
Ethylene Glycol Monoethyl Ether Acetate	6.8	11.3	D3728	---
TOTAL	100.0	100.0		

<sup>1</sup> The chlorinated rubber shall contain approximately 66% by weight chlorine. The viscosity (based on a solution of 20% by weight concentration in toluene at 20°C) shall fall in the range of 9 to 14 centipoise, when measured according to ASTM Standard D445. Up to 50% by weight of the amount of chlorinated rubber could be of the viscosity of 17 to 25 centipoises, but spray application is more difficult.

<sup>2</sup> This pigment is to be used for the reference (i.e. control) plant. A lead and chromate free pigment may be used provided it meets performance requirements. User of lead and

chromate containing paints are urged to follow all health, safety and environmental regulations in applying, handling or disposing of these materials.

**7. STORAGE LIFE AND PACKAGING**

**7.1 Condition in Container**

The primer 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 the date of delivery, in a full, tightly covered container, at a temperature of 10-43°C.

**7.2 Packaging**

The packaging shall meet the relevant requirement 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 Z129.1 "Precautionary Labeling of Hazardous Industrial Chemicals".

**9.2 Marking of Containers**

Each container shall be legibly marked with the following information:

- Name:** Chlorinated Rubber Inhibitive Primer
- Specification:** [IPS-M-TP-145](#) .....
- 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 over coating:** .....
- Kind of thinner:** .....
- Color:** .....
- Lot Number:** .....

Stock Number: .....

Date of Manufacture: .....

Quantity of Paint in Container: .....

MSDS: .....

INSPECTION DATE: .....

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

Manufacturer's Name and Address: .....

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](#)

### 9.3 Directions for Use

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

#### Directions of Use for Chlorinated Rubber Inhibitive Primer

This paint is intended for use as a primer on structural steel. Before applying, remove all moisture, oil, grease, dirt, and loose or nonadhering paint. Rust, rust scale, mill scale, etc., shall be removed by abrasive blast cleaning in accordance with SSPC-SP 6, "Commercial Blast Cleaning," or SSPC-SP 8, "Pickling". Sound old coatings that are compatible with this chlorinated rubber primer may remain, but damaged areas or areas with poor adhesion must be spot cleaned before priming. When the coating system is intended for immersion, the surface shall be cleaned in accordance with SSPC-SP10. "Near-white Blast Cleaning, "or SSPC-SP 8, "Pickling."

This primer is intended to be followed by an intermediate paint "Chlorinated Rubber Intermediate Coat Paint, and/or a finish coat conforming to "Chlorinated Rubber Top Coat Paint". The entire system is designed to provide maximum chemical resistance. In more severe environments, a second prime coat is recommended.

Mix primer thoroughly before use. If simple stirring is inadequate, 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 of 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. Generally thinners are not used for brush application. For spray application, the coating may be thinned with Xylene up to 1.5 liter per 8 liters of unthinned paint. A by volume blend of 80% minimum of Xylene and 20% maximum of an aliphatic solvent having an evaporation rate faster than that of Xylene may be used instead of straight Xylene.

Apply by brush or spray to the specified film thickness or, if none is specified, to at least 38 microns dry or approximately 125 microns wet. When application is by spraying, the equipment and operator technique should be properly adjusted to prevent dry spray and to deposit a wet film of paint on the substrate. Clean the equipment with xylene or the reducing thinner both before and after use.

The surface to be painted shall be dry and the surface temperature shall be at least 3°C above the dew point.

Do not paint outdoors if precipitation, dew, or condensation is expected before the paint dries.

At temperatures of 15-27°C and relative humidities of 40% to 60%, allow at least three hours drying time between coats. Allow at least 48 hours of drying time after the last coat is applied before placing in water immersion service. If the temperature is below 16°C or if the relative humidity is above 60%, allow 4 to 7 days before placing in water immersion service.

### 9.4 Directions for Safety

The following directions for safety shall be supplied with each container of primer:

- 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 Guide3 "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 primer with the eyes or skin.
- Clean hands thoroughly after handling primer 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 primer may not comply with some air pollution regulations because of its hydrocarbon solvent content.
- Ingredients in this primer, if so formulated, and which may pose a hazard, include lead and chromate pigments, hydrocarbon solvent, and plasticizers. Applicable regulations governing safe handling practices shall apply to the use of this primer.