

**MATERIAL AND EQUIPMENT STANDARD****FOR****CHLORINATED RUBBER PAINT****FOR****TOP COAT (FINISH)****ORIGINAL EDITION****MAY 1993**

This standard specification is reviewed and updated by the relevant technical committee on Aug. 1998(1) and May 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 19 covers the minimum requirements for the composition, analysis, properties, storage life packaging, inspection and labeling of chlorinated rubber top coat (finish) paint.

**Note 1:**

**This standard specification is reviewed and updated by the relevant technical committee on Aug. 1998. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 58 on Aug. 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 May 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 422 on May 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)**

SSPC 19(discontinued 2011)"Chlorinated Rubber Top coat Paint"

**ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)****(Specifications for Ingredients)**

D13	"Spirits of Turpentine"
D364	"Industrial Grade Xylene"

**(Specifications for Packaging)**

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

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 Using the Stormer Viscometer"
D1208	"Common Properties of Certain Pigments"
D1210	"Fineness of Dispersion of Pigment Vehicle Systems"

D1296	"Odors of Volatile Solvents and Diluents"
D1475	"Density of Paint, Varnish, Lacquer and Related Products"
D1542	"Quantitative Test for Rosin in Varnishes"
D3278	"Flash Point of Liquids by Setaflash Closed Tester"

**UFS (US FEDERAL STANDARDS)****(Standard Specifications for Ingredients)**

MIL-C-429(canceled in 2001)"Chlorinated Paraffin, Technical"

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

Method 2011	"Preparation of Steel Panels"
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 4203	"Reducibility and Dilution Stability"
Method 4321	"Brushing Properties"
Method 4331	"Spraying Properties"
Method 4541	"Working Properties and Appearance of Dried Film"
Method 6221	"Flexibility"

**ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)**

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

**BSI (BRITISH STANDARDS INSTITUTION)**

BS 381C "Colors for Identification, Coding and Special purposes"

**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**

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-shinning, suspending agents, or wetting aids may be added.

**4.2 Percentage**

This paint shall contain approximately 35% by volume of nonvolatile film forming solids.

**TABLE 1 – COMPOSITION**

INGREDIENTS	REQUIRED (Sub Total)		TYPICAL COMPOSITION		INGREDIENT STANDARDS	
	Min. Wt.%	Max. Vol.%	Wt.%	Vol.%	ASTM	FEDERAL
Pigment (23 ±5 Wt.%) Colored or Tinting Pigments <sup>1</sup>	90.0	---	26.8	9.1	---	---
Extender Pigments <sup>1</sup>	---	10.0	0.3	0.2	---	---
Vehicle (77 ±5 Wt.%) Chlorinated Rubber <sup>2</sup>	20.0	32.0	23.2	19.2	---	---
Chlorinated Resin	---	---	5.6	4.8	---	MIL-C-429, Type II
Chlorinated Plasticizer	8.0	22.0	9.2	10.9	---	MIL-C-429, Type I
Plasticizer <sup>3</sup>	---	---	2.3	3.5	---	---
Solvent <sup>4</sup>	---	64.0	31.6	51.1	---	---
Vehicle Stabilizers <sup>5</sup>	0.5	---	0.7	0.8	---	---
Vapor Phase Stabilizers <sup>6</sup>	0.2	---	0.2	0.3	---	---
Suspending Aids <sup>7</sup>	0.1	---	0.1	0.1	---	---
TOTALS			100.0	100.0		

- 1) Lightfast and compatible chemically resistant colored pigments shall be used to provide a tint or color when desired. Extender pigments must be compatible and chemically resistant.

Note: when this paint is to be used in a paint system applied to the interior of potable waste vessels, the ingredients used shall not be deemed objectionable for such use by the U.S. Environmental Protection Agency or any agency that would have jurisdiction over such matters.

- 2) 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 range of 17 to 25 centipoises but spray application is more difficult.
- 3) Alternative plasticizers can be used, provided they are compatible, high quality, and chemically resistant.
- 4) 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 D13) or other high boiling aromatic type solvents may be added to improve application properties.
- 5) The vehicle stabilizer shall be a mixture of four parts of zinc oxide and one part pentaerythritol. Other suitable chloride acceptors, such as an epoxidized vegetable oil, may be used.
- 6) 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.

7) The suspending aid shall be hydrogenated castor oil or montmorillonite mineral.

**5. ANALYSIS**

The paint 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	18.0	28.0	D 1208	4021
VOLATILES	---	53.0	D 1208	---
NONVOLATILE VEHICLE	20.0	---	---	4053
UNCOMBINED WATER	---	0.25	D 1208	4081
COARSE PARTICLES AND SKINS, AS RETAINED ON 0.045 mm SIEVE OPENING (STANDARD 325 MESH SCREEN).	---	0.05	D 185	---
ROSIN OR ROSIN DERIVATIVES	---	0	D 1542	---

**6. PROPERTIES**

6.1 The paint shall meet the requirements of Table 3 and sections 6.2 through 6.5.

**6.2 Odor**

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

**6.3 Color**

The color, or contrasting shade, shall be obtained by using compatible chemically resistant tinting pigments.

**6.4 Compatibility**

There shall be no evidence of incompatibility of any of the ingredients of the paint when one volume of paint 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 "typical formulation" paint.

**6.5 Working Properties**

The paint shall be easily applied by all three methods (Brush, Spray, 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.



**TABLE 3 – PROPERTIES**

CHARACTERISTICS	REQUIREMENTS		ASTM METHOD	US FEDERAL STD. No. 141
	Min.	Max.		
PAINT CONSISTENCY				
VISCOSITY* SHEAR RATE				
200 rpm				
GRAMS	120	190		
KREB UNITS	65	80	D 562	---
DENSITY Kg/l	1.0	1.4	D 1475	---
FINENESS OF GRIND,				
MICRONS	---	25	D 1210	---
HEGMAN UNITS	6.0			
DRYING TIME:				
SET TO TOUCH, MINUTES	15	---	---	4061
DRY HARD, HOURS	1	---	---	4061
FLASH POINT °C	26.7	---	D 3278	---

\* Viscosity 48 hours or more after manufacture.

**Note:** Several arbitrary scales and modifications of the gage are used by industry. In order that readings obtained with these arbitrary scales and modifications can be reported in the preferred units, the approximate relationship of these scales to gage depth is shown in the following example:

Hegman Scale <sup>A</sup>	Depth, $\mu\text{m}$ <sup>B</sup>	Depth, mils <sup>B</sup>	PC or FSPT Scale <sup>C</sup>	NPIRI Scale <sup>D</sup>
0	100	4	0	40
1	90	3.5	1 <sup>1</sup> / <sub>4</sub>	35
2	75	3	2 <sup>1</sup> / <sub>2</sub>	30
3	65	2.5	3 <sup>3</sup> / <sub>4</sub>	25
4	50	2	5	20
5	40	1.5	6 <sup>1</sup> / <sub>4</sub>	15
6	25	1	7 <sup>1</sup> / <sub>2</sub>	10
7	15	0.5	8 <sup>3</sup> / <sub>4</sub>	5
8	0	0	10	0

A Sometimes referred to in error as the North Standard scale.

B Rounded to nearest 5  $\mu\text{m}$  or 0.5 mil.

C Federation of Societies for Paint Technology scale.

D National Printing Ink Research Institute scale, 0 to 10 on the NPIRI Production *Grindometer*, but extended on many gages to 20 or 30

**TABLE 4 – COLOR**

PAINT COLOR	COLOR No. TO BS 381 C
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
WHITE	595

## 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 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).

**8.4** Quality control procedures, documents & certificates should be presented to company for review & approval.

## 9. LABELING

### 9.1 Labeling Standard

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 Topcoat Paint

**Specification:** [IPS-M-TP-135](#) .....

**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: As specified in the purchase order with reference to BS 381C.

Lot Number: .....

Stock Number: .....

Date of Manufacture: .....

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/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 paint.

#### Directions for Use of Chlorinated Rubber Top coat Paint

This paint is intended for use as an intermediate or finish coat over rust inhibitive chlorinated rubber primer or other suitable primers on structural steel. Before applying, remove all moisture, oil, grease, dirt and loose or nonadhering paint. Sound old coatings that are compatible with this chlorinated rubber paint may remain, but damaged areas or areas of poor adhesion must be spot-cleaned and spot primed.

Preferred primers are chlorinated rubber, modified chlorinated rubber, chemically cured epoxy, zinc-rich, and others specifically recommended by the manufacturer.

Where a zinc-rich primer is used and the system is considered for water immersion service, a seal coat between the primer and this intermediate or topcoat paint may be required to eliminate blistering. Contaminated prime coats shall be cleaned by appropriate methods before application of succeeding coats.

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 degrees 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.

Mix paint 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 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 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 1-1/2 pints per gallon 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 of, if none is specified, to at least 1.5 mils (38 microns) dry or approximately 4 mils (100 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.

#### 9.4 Direction 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 followings:

- Keep paints away from heat, sparks, and open flame during storage, mixing, and application. Provide sufficient ventilation to maintain vapor concentration of 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 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 paint.