

MATERIAL AND EQUIPMENT STANDARD**FOR****VINYL RED LEAD PRIMER****ORIGINAL EDITON****OCT. 1996**

This standard specification is reviewed and updated by the relevant technical committee on May 2000. The approved modifications are included in the present issue of IPS.

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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 Vinyl Red Lead Primer.

Note:

This standard specification is reviewed and updated by the relevant technical committee on May 2000. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 111 on May 2000. 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.

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z 129.1 "Precautionary Labeling Hazardous Industrial Chemicals"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

Specification for Packaging

D 3951 (88) "Standard Practice for Commercial Packaging"

Test Methods for Properties

D 185 "Coarse Particles in Pigments, Pasted and Paints"
D 562 "Consistency of Paints Using the Stormer Viscometer"
D 1210 "Fineness of Dispersion of Pigment-Vehicle Systems"
D 1475 "Density of Paint, Varnish, Lacquer and Related Products"
D 1640 "Drying, Curing, or Film Formation of Organic Coatings at Room Temperature"

IPS (IRANIAN PETROLEUM STANDARDS)

[IPS-E-TP-100](#) "Engineering Standards for Paints"

MIL (MILITARY STANDARD SPECIFICATION)

MIL-P-15328 "Primer, Pretreatment (Formula No. 117 for Metal)"
MIL-P-15929C "Primer Coating, Shipboard, Vinyl-Red-Lead"

SSPC (STEEL STRUCTURES PAINTING COUNCIL)

SSPC-PA-Guide 3 "A Guide to Safety in Paint Application"

USF (US FEDERAL STANDARDS)

US 595 "Federal Standard Color"
22510 "Predominantly Orange"

Standard Specifications for Ingredients

TT-M-95	"Naphtha Aliphatic"
TT-R-191	"Red Lead, Dry and Paste in Oil"
TT-M-261	"Methyl Ethyl Ketone Technical"
TT-M-268	"Methyl iso Buithyl Ketone (For use in Organic Coatings)"
TT-T-548	"Toluene, Technical"
TT-T-656	"Tricresyl Phosphate"

FEDERAL TEST METHOD "Paint, Varnish, Laquer, and Related Materials" Standard No. 141

Method 2011	
Method 2131	"Application of Sprayed Films"
Method 3011	
Method 4032	
Method 4041	"Volatile and Nonvolatile Content (Ordinary Laboratory Oven)"
Method 4061	"Drying Time"
Method 4082	"Water in Paints and Varnishes (Karl Fischer Titration Method)"
Method 4184	"Weight per Gallon"
Method 4281	"Consistency of Pigmented"
Method 4411	"Fineness of Grind"
Method 6103	
Method 6304	"Knife Test"
Method 7351	"Analysis of Vinyl Modified Alkyl Resines"
Method 7371	"Determination of Plasticizers in Laquers"

3. UNITS

This Standard is based on International system of units (SI), except where otherwise specified.

4. COMPOSITION**4.1 Ingredients and Proportion**

Ingredients and proportions shall be as specified in Subclauses 4.2 through 4.4.

4.2 Percentage

The primer shall be composed of the 43 percent by weight of total solids pigment, resin, plasticizer and solvents specified. Small amounts of wetting agents, suspension aids, and stabilizers may be used at the discretion of the manufacturer, provided all of the requirements of the specification are met.

4.3 Pigments

The pigment shall be red lead conforming to type I, grade 97 of USF TT-R-191.

4.4 Vehicle**4.4.1 Nonvolatile Vehicle**

The nonvolatile vehicle shall conform to requirements of Table 1:

TABLE 1 - VEHICLE CHARACTERISTICS

MATERIAL	PERCENT BY WEIGHT		US FED STD. SPECIFICATION
	Min.	Max.	
Vinyl resin	89	92	TT-T-656
Tricresyl phosphate	8	11	

* The resin shall be a hydroxyl containing vinyl chloride-acetate copolymer composed of 89.5 to 91.5 percent vinyl chloride, 5.3 to 7.0 percent vinyl alcohol, and 2.0 to 4.0 percent vinyl acetate. It shall have a specific gravity of 1.35 minimum, and be furnished as a powdered solid not less than 98 percent of which shall pass through a standard 0.84 mm sieve opening (No. 20 US Standard Sieve Series). An 18 percent solution of the resin in methyl isobutyl ketone shall be on darker than Gardener Color Standard No. 5. Vacuum dry a film of an acetone solution of the resin isolated as specified by the method 4032 of US Federal Standard No. 141 on a rock salt plate at 70°C, and scan the infra red spectrum from 2.5 to 15 μm. The spectrum shall match the one shown on Fig. 1, showing the 2.9, 5.75 and 14.5 microns bands in relatively the same absorbance ratio as illustrated.

4.4.2 Volatile

The volatile portion of the primer shall be composed only of the materials listed in Table 2 and shall conform to the requirements of Table 2 when tested by the methods specified.

TABLE 2 - VOLATILE (PERCENT BY WEIGHT)

MATERIAL	REQUIREMENTS				INGREDIENT STANDARD	TEST METHOD
	COMPOSITION G		COMPOSITION L ⁽⁴⁾			
	Min.	Max.	Min.	Max.		
Methyl isobutyl ketone	50	---	---	---	TT-M-268	MIL-P-15929 C Clause 4.3.4.4
Methyl n-butyl ketone ⁽²⁾	---	---	50	---	---	
Methyl ethyl ketone	7	10	17	20	TT-M-261	
Toluene	---	40	---	15	TT-T-548	
Aliphatic naphtha ⁽³⁾	---	---	---	15	TT-M-95, Type 1	

- 1) The methyl n-butyl ketone shall contain no more than 5 percent by volume of branched chain ketones.
- 2) The aliphatic naphtha shall contain no more than 11 percent by volume of aromatic hydrocarbons.
- 3) The volatile content of composition L shall also conform to the following requirements by volume when tested as specified in 4.3.4. of MIL-P-15929C.
 - a) Solvents with an olefinic or cyclo-olefinic type of unsaturation: 5 percent maximum.
 - b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethyl benzene: 3 percent maximum.
 - c) A combination of ethyl benzene, ketones having branched structures or toluene: 20 percent maximum.
 - d) Total of a + b + c: 20 percent maximum.

5. ANALYSIS

The primer shall conform to the composition (analysis) requirements of Table 3:

TABLE 3 - ANALYSIS

CHARACTERISTIC	REQUIREMENTS		US FEDERAL STD. No. 141	MIL-P-15929 C
	Min	Max		
Vinyl resin, percent by weight of non-volatile	89	92	7301	Clause 4.3.3.1
Vehicle tricresyl phosphate percent by weight of nonvolatile vehicle	8	11	7371	
Chlorine content, percent by weight of nonvolatile vehicle	45	48	---	Clause 4.3.3.3
Vinyl acetate, percent by weight of nonvolatile vehicle	2	3	---	Clause 4.3.3.4
Total solids, percent by weight of primer	43	¾	4041*	
Pigment percent by weight of primer	24	27	4042	
Red lead (pb ₃ O ₄), percent by weight of pigment	96	¾	---	Clause 4.3.5
Vehicle solids percent by weight of primer	18	21	4041	
Water, percent by weight of primer	¾	0.5	4082	

* Except substitute acetone for toluene and dry for 1 hour.

6. PROPERTIES

6.1 Requirements

The Vinyl Red Lead shall meet the requirements of Table 4 and sub clause 6.2 through 6.4.

6.2 Color

The color of the primer shall be characteristic of the pigment used and shall approximate color number 22510 predominantly orange of US Federal Standard No. 595.

6.3 Spraying Properties

The primer tested as specified bellow shall spray satisfactorily in all respects, and shall show no running, sagging, or streaking. The dried film shall show no dusting or mottling, and shall present a smooth uniform finish free from seeds. Reduce 2 parts by volume of the primer with part by volume of thinner conforming to Table 2. Spray a 13 microns dry film thickness of pretreatment coating conforming to MIL-P-15328, to a steel panel cleaned with the aliphatic naphtha, ethylene glycol monoethyl ether mixture as specified in method 2011 of US FED-STD-141. Allow the pretreatment coating to air dry 1 hour and then recoat with a 2.3 to 2.8 microns dry film of the primer. Air dry 1 hour and observe for compliance with the above allow to air dry 48 hours and apply a second coat of the primer to a 23 to 28 microns dry film thickness. Condition the panel for knife tests as specified in 5.4. For referee test, use automatic application as specified in method 2131 of US FED-STD-141.

6.4 Knife Test

A film of primer, tested as specified bellow shall be hard and tough and shall adhere tightly to and not flake or crack from the metal. The film shall ribbon or curl from the metal on cutting, and there shall be no separation between the pretreatment coating and the primer and between primer coats.

Allow the panel prepared as specified in 6.3 to air dry for 48 hours, perform the knife test as specified in method 6304 of US Federal Standard 141 for compliance with above.

TABLE 4 - PROPERTIES

CHARACTERISTICS	Min.	Max.	ASTM STANDARD	US FEDERAL STD. No. 141
Viscosity* shear rate 200 rpm	72	82	D562	4281
Kerbs units	150	200		
Grams				
Density kg/Lit	1.15	1.21	D1475	4184
Fineness of grind (micron)	40	---	D1210	4411
Hegman units	5	---	D1210	4411
Drying time, air dry, minutes				
Set to touch	---	15	D1640	4061
Dry hard	---	30	D1640	4061
85 degree specular gloss	40	---	---	6103

* Viscosity 48 hours or more after manufacture.

7. STORAGE LIFE AND PACKAGING

7.1 Storage Life

The primer shall show no thickening, curdling, felling, or hard caking when tested as specified in US Federal Standard No. 141, Method 3011, and shall meet the requirements of Clause 6 after storage of at least 12 months from the date of delivery in a full tightly covered container at normal temperature.

7.2 Packaging

The packaging shall meet the relevant requirement of ASTM D 3951 (88) unless otherwise specified by the purchaser.

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 shall 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 Red Lead Primer

Specification: [IPS-M-TP-185](#)

MESC No.

No of components: One

Type of spray

Kind and size of spray nozzle-tip

Cleaning material

Flash point °C

Self Life (month)

Drying time for overcoating

Kind of thinner

Color: No. 22510 of US Federal Standard No. 595

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 [IPS-E-TP-100](#).

reference is made to

9.3 Direction for Use

In addition to the manufacturer's instruction for use the following directions for use shall be supplied with each container of paint:

This primer is intended for use over vinyl butyral wash primer. The primer shall be thinned as necessary with solvent containing not more than 40% toluene and 50% methyl isobutyl ketone and 10% 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 primer.

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 primer 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 primer; apply quickly and smoothly. Avoid excessive brushing and do not go back over the surface until thoroughly dry.

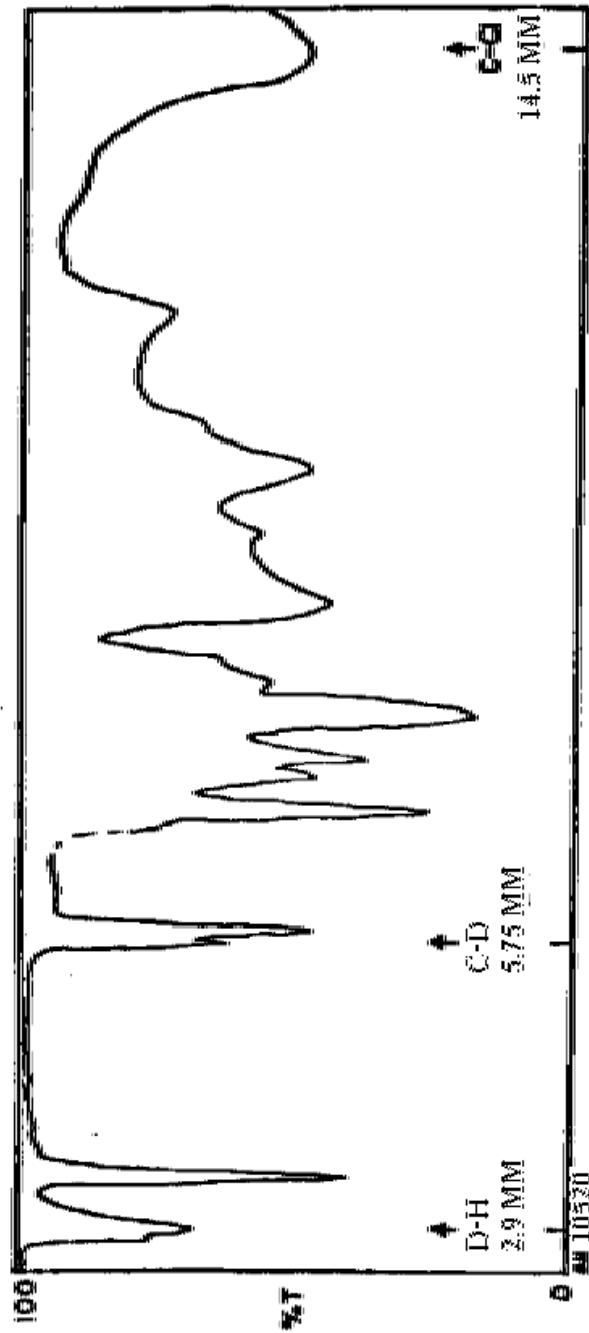
At temperature between 16 and 27°C, dry at least one hour between coats and 72 hours before immersion. Varying atmospheric conditions and degrees of ventilation in confined spaces may allow shorter or require longer drying times.

9.4 Directions for Safety

In addition to the manufacturer's instruction for use. 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 primer.



INFRARED SPECTRUM OF RESIN

Fig. 1