

MATERIAL AND EQUIPMENT STANDARD

FOR

EPOXY POLYAMIDE INTERMEDIATE PAINT

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1. SCOPE

This Standard Specification which is derived from "SSPC-paint 22" covers the minimum requirements for the composition analysis, properties, storage life and packaging, inspection and labeling of epoxy polyamide intermediate paint.

2. REFERENCES

Throughout this Standard the following standards and codes are referred to. The editions of these standards and codes that are in effect at the time of publication of this Standard shall, to the extent specified herein, form a part of this Standard. The applicability of changes in standards and codes that occur after the date of this Standard shall be mutually agreed upon by the Company and the Vendor/Consultant.

STEEL STRUCTURES PAINTING COUNCIL (SSPC) VOLUME 2

SSPC 22 (Epoxy-Polyamid Paints, Primer, Intermediate and Topcoat)

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

"Specification for Ingredients"

- D331 2-Ethoxy Ethanol
- D364 Industrial Grade Xylene
- D605 Magnesium Silicate Pigments
- D607 Wet Ground Mica Pigment
- D1153 Methyl Isobutyl Ketone
- D1648 Basic Lead Silico-Chromate
- D3722 Natural Red and Brown Iron Oxides

"Specification for Packaging "

- D3951 Standard Practice for commercial packaging

"Test Methods for Properties"

- B117 Salt Spray (Fog)Testing
- D522 Elongation of Attached Organic Coating with Conical Mandrel Apparatus
- D562 Consistency of Paints Using the Stormer Viscometer
- D610 Evaluating Degree of Rusting on Painting Steel Surfaces
- D714 Evaluating Degree of Blistering of paints
- D1210 Fineness of Dispersion of Pigment Vehicle Systems
- D1310 Flash Point of Liquids by Tag Open Cup Apparatus
- D1475 Density of Paint, Varnish, Lacquer, and Related Products
- D1544 Color of Transparent Liquids (Gardner Color Scale)
- D1640 Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
- D1652 Epoxy Content of epoxy Resins
- D1654 Evaluating Painted or Coated Specimens Subjected to Corrosive Environments
- D2369 Volatile Content of Paints

USF (US FEDERAL STANDARDS)

- MIL-P-24441 "Paint, Epoxy Polyamide, General Specification for"

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

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

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-TP-100 "Paints"

3. UNITS

International System of Units (SI) in accordance with IPS-E-GN-100 shall be used.

4. COMPOSITION**4.1 Ingredients and Proportions**

Ingredients and proportions of the reference formulations shall be as specified in Table 1.

4.2 Percentage

The intermediate contains approximately 65% by volume of nonvolatile film forming solids (pigment and binder).

4.3 The curing agent component of each coating shall contain a liquid type polyamide resin and volatile solvent. The polyamide resin shall be a condensation product of dimerized fatty acids and polyamines.

TABLE 1 - COMPOSITION OF REFERENCE FORMULATIONS

INGREDIENTS	INTERMEDIATE		STANDARD ASTM
	Kg	Lit.	
BASE COMPONENT :			
BASIC LEAD SILICO CHROMATE	134.2	32.9	D1648
RED IRON OXIDE	30.8	6.9	D3722
MAGNESIUM SILICATE	30.8	10.8	D605
MICA	10.5	3.7	D607
ORGANO MONTMORILLONITE	3.6	2.1	-
95/5 METHANOL / WATER	1.4	1.5	-
EPOXY RESIN	91	76.8	-
LEVELING AGENT	4.6	4.5	-
METHYL ISOBUTYL KETONE	20	25	D1153
XYLENE	68	78	D364
2-ETHOXY ETHANOL	29.5	31.8	D331
TOTAL (BASE COMPONENT)	424.4	274	
CURING AGENT COMPONENT :			
POLYAMIDE RESIN	81.6	50.5	-
XYLENE	49.4	56.9	-
TOTALS (CURING AGENT COMPONENT)	131	107.4	-
TOTALS (FORMULATION)	555.4	381.4	-

5. ANALYSIS

Each coating shall conform to the composition (analysis) requirements of Table 2.

TABLE 2 - ANALYSIS

CHARACTERISTICS	REQUIREMENTS		STANDARD ASTM
	Min.	Max.	
NONVOLATILES, % BY WEIGHT	60	-	D2369

TABLE 3 - EPOXY RESIN ANALYSIS

CHARACTERISTICS	REQUIREMENTS		ASTM METHOD
	Min.	Max.	
EPOXIDE EQUIVALENT	450	550	D1652
COLOR, GARDNER (40% in BUTYL CARBITOL	-	4	D1544

TABLE 4 - POLYAMIDE RESIN ANALYSIS

CHARACTERISTICS	REQUIREMENTS		ASTM
	Min.	Max.	
AMINE VALUE ¹	230	250	-
COLOR, GARDNER	-	8	D1544
SPECIFIC GRAVITY	0.96	0.98	D1475
VISCOSITY, BROOKFIELD, at 75°C, POISES	31	37	-
1 PERCHLORIC ACID TITRATION			

6. PROPERTIES

6.1 The epoxy resin shall meet the requirements clauses 6.2 through 6.9.

6.2 The undiluted polyamide resin shall meet the requirements of Table 4.

6.3 Coatings supplied under this specification shall be comparable in performance to the reference formulations of Table 1. They need not be composed of the quantities and types of ingredients given in Table 1. However, if substitutions of other ingredients are made, the coatings shall meet the performance requirements of this specification

6.4 After combining the base and curing agent components, the primer, intermediate, and topcoat shall conform to the requirements of Table 5.

6.5 Each component of these paints based on the specified ingredients shall be uniform, stable in storage, and free from grit and coarse particles.

6.6 Solvent Resistance

The development of solvent (Methyl Ethyl Ketone) resistance is required as an indication of satisfactory cure and subsequent chemical resistance. Apply the individual coating (primer, intermediate, topcoat) by spray or brush to a clean test panel so that a dry film thickness of 50-70 microns per coat is obtained. Air dry the panel for five days at 25±2°C and relative humidity of 40% -50%. Following the curing period, saturate a small cotton ball with methyl ethyl ketone and place on the test panel under a watch glass for 30 minutes.

After a ten minute recovery period, determine the pencil hardness of the coating. The minimum allowable rating is "7B".

Determine pencil hardness as follows: using a series of drawing leads (either wood clinched or secured in a mechanical holder), expose approximately 6 mm, of lead. With a rotary motion square the point of the lead against No. 400 grit paper. Hold the lead at approximately 45° and push forward against the film using a pressure just short of breaking the lead. If penetration is not made repeat using the next harder lead until penetration is made. Rate the film by indicating the hardest lead that does not penetrate.

6.7 Test Panels

Test panels shall be carbon steel minimum size 10 cm × 20 cm × 0.3 cm unless otherwise specified. They shall be blast cleaned in accordance with SSPC-SP10. Air drying and test conditions shall be at 25±2°C and 40%-50% relative humidity.

6.8 Elcometer Adhesion Test

Prepare test panels as in Section 6.7 using 6 mm thick steel plate.

Apply coatings at 50-75 microns dry film thickness per coat in accordance with the following schedule.

COATING	SUBSTRATE	DRYING TIMES
Primer	Steel	5 days
Intermediate	Primer	72 hours for primer
		72 hours for intermediate
Topcoat	Primer and Intermediate	72 hours for primer
		72 hours for intermediate
		5 days for topcoat

The adhesion of the prime coat to the substrate, intercoat adhesion, or cohesion of any coat of the painting system shall be determined by the adhesion tester 156 kg. Prepare test panels as described above. Lightly sand the coating surface and aluminum dolly and apply a quick set adhesive containing Alpha Cyanoacrylate. Allow the adhesive to cure overnight. Scribe the coating and adhesive around the dolly prior to testing. Make a minimum of three trials and report the average. An average of 28 kg/square centimeter is considered acceptable.

6.9 Pot Life

Determine pot life of the individual coatings as follows: Thoroughly mix half a kilogram sample of the finished coating and let stand at 25±2°C for eight hours. At the end of this time there shall be no evidence of gelation. The coatings shall be in a free flowing condition and brushable without thinning.

TABLE 5 - PROPERTIES

CHARACTERISTICS	INTERMEDIATE		STANDARD ASTM
	Min.	Max.	
PAINT CONSISTENCY VISCOSITY SHEAR RATE 200 rpm			
GRAMS	95	190	
KREB UNIT	60	89	D562
DENSITY kg/Lit	1.3	1.4	D1475
FINENESS OF GRIND, MICRON	65	-	D1210
" " HEGMAN UNITS	3		
DRYING TIME (24°C, 45% R.H.)			
TACK FREE, HOURS	-	2	
DRY HEAD, HOURS	-	5	
DRY THROUGH, HOURS	-	8	
FLASH POINT, °C	27.2	-	D1310

7. STORAGE LIFE AND PACKAGING

7.1 Packaging

The packaging shall meet relevant requirement of ASTM D 3951-88.

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 materials(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.

9. LABELING

9.1 Refer to ANSI Standard Z 129.1 "Precautionary Labeling of Hazardous Industrial Chemicals.

9.2 Marking of Containers

Each container of each component shall be legibly marked with the following information:

Name: Epoxy-Polyamide, Intermediate

Specification: IPS-M-TP-220

MESC No. :

No of components

Maximum temperature resistance

Type of spray

Kind and size of spray nozzletip

Cleaning material

Flash point °C

Pot life (hours)

Drying time for overcoating

Kind of thinner

Color:

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/environment and temperature range, reference shall be made to IPS-E-TP-100

9.3 Directions for Use

The manufacturer shall supply complete instructions covering uses, surface preparation, mixing, thinning, application method application conditions, pot life, wet and dry film thicknesses, temperature and humidity limitations, drying time, etc., with each container of paint.

The followings are guidelines for the instructions required:

- Mixing and Thinning

Each coating component should be stirred to a smooth homogeneous mixture. Then the proper amount of base and curing agent components, as recommended by the manufacturer, should be added together and mixed thoroughly. After allowing to stand for 30 minutes at 25±2°C the coating may be thinned up to 12% by volume of the total coating for spraying. The coating should be applied within the manufacturer's pot life limitations.

- Coating Thickness

The coatings are usually applied by spray to a dry film thickness of 50-75 microns per coat, total dry thickness 175-225 microns (seven to nine mils).

- Cure Time Between Coats

Under normal conditions, each coat should be air dried a minimum of four hours, but no more than 72 hours between application coats. In very hot weather with surfaces exposed to direct sunlight, it may be necessary to limit the intercoat drying period to 24 hours or less. Long drying time between coats may cause poor intercoat adhesion. These coatings shall not be applied at temperatures below 10°C

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 lead and chromate-containing pigments, hydrocarbon solvents, and plasticizers. Applicable regulations governing safe handling practices shall apply to the use of this paint.

During surface preparation that involves the removal of an old film of this paint, care shall be taken to minimize dusting, to protect workers from the dust, and to properly dispose of coating residues.