

**MATERIAL AND EQUIPMENT STANDARD**

**FOR**

**COAL TAR MASTIC**

**(COLD APPLIED)**

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**1. SCOPE**

This Standard Specification which is generated from SSPC-PS 10.02 and mil-C-18480 B covers the minimum requirements for the composition, properties, storage life and packaging, inspection and labeling of coal tar mastic paint (cold applied).

**2. REFERENCES**

Throughout this Standard the following standards and codes are referred to. The edition 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.

**SSPC (STEEL STRUCTURES PAINTING COUNCIL) VOLUME 2**

- SSPC-PS10. 02 "Cold Applied Coal Tar Mastic Painting System"
- SSPC-PA Guide 3, "A Guide to Safety in Paint Application"

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

**(Specification For Packaging)**

- D3951 88 "Standard Practice for Commercial Packaging"

**(Test Methods For Properties)**

- D5 "Test Method for Penetration of Bituminous Materials"
- D20 "Distillation of Road Tars"
- D36 "Softening Point of Bitumen (Ring and Ball Apparatus)"
- D92 "Flash and Fire Points by Cleveland Open Cup"
- D128 "Analysis of Lubricating Grease"
- D453 "Tar Acids in Creoscote-Coal Tar Solutions"
- D1542 "Quantitative Test for Rosin Varnishes"

**ANSI (AMERICAN NATIONAL STANDARD INSTITUTE)**

- Z/129.1 "Precautionary Labeling of Hazardous Industrial Chemicals"

**UFS (US FEDERAL STANDARDS)**

**(Standard Specification For Ingredients)**

- Mil-C-15203 "Coating Compound Bituminous, Emulsic Type Coal Tar Base"
- Mil-C-18480 "Coating Compound, Bituminous, Solvent, Coal Tar Base"

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

Method 4061 "Drying Time of Coatings"

**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 shall be as specified in Table 1 and Sections 4.2 through 4.3.

**4.2 Percentage**

The coal tar mastic paint shall contain 15 to 30 percent by weight of distilled materials at 235°C, when tested by ASTM D20-83.

**4.3** The coal tar mastic shall contain only a homogeneous mixture compound of a coke oven coal tar mastic pitch, solvents, and inert non-water-absorbent mineral filler. The compound shall not contain asphalt or asbestos.

**TABLE 1 - COMPOSITION**

INGREDIENTS	TYPICAL COMPOSITION		STANDARD ASTM
	Min.	Max.	
DISTILLATION 235°C Wt%	15	30	D20 235°C
ASH CONTENT OF MASTIC Wt%	15	30	D128 routine method
TAR ACIDS OF MASTIC ml/ 100 gr	—	0.6	D453 distillation to 300°C

**5. ANALYSIS**

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

**TABLE 2 - ANALYSIS**

CHARACTERISTICS	Min.	Max.	ASTM
	Wt%	Wt%	METHOD
VOLATILE CONTENT (235°C)	15	30	D20
NONVOLATILE MATERIALS (CALCULATED BY DIFFERENCE)	85	70	—

**6. PROPERTIES**

**6.1 Requirements**

The coal tar mastic paint shall meet the requirements of Table 3 and sections 6.2 through 6.6.

**6.2 Workability**

Test the mastic, applied cold, for firm adherence to bare steel, primer (if used), and itself. At  $25 \pm 2^\circ\text{C}$  the mastic shall permit easy application by brush or spray, in two successive coats, to a minimum dry film thickness of  $760 \pm 50$  microns. At  $7 \pm 2^\circ\text{C}$ , the mastic shall permit easy brush application.

**6.3 Sag**

At  $23 \pm 1^\circ\text{C}$  and  $50 \pm 4$  percent relative humidity, apply the mastic to a clean, smooth 305 by 305 by 3 mm thick steel plate, to a uniform wet film thickness of  $760 \pm 50$  microns. Immediately after application, suspend the panel in a vertical position at application conditions for 24 hours. Then examine for evidence of sag or flow while wet. Prepare a second plate as described, except to a uniform wet film thickness of  $380 \pm 25$  mm. Immediately after application, suspend the panel in a vertical position at  $71 \pm 2^\circ\text{C}$  for 1 hour. Then examine for evidence of sag or flow while wet.

**6.4 Adhesion and Protection**

Expose the coated panel, tested at  $23^\circ\text{C}$  in 6.3, to  $60 \pm 2^\circ\text{C}$  for 16 hours. Allow the panel to cool at room temperature for 1 hour. Then expose to  $-23 \pm 2^\circ\text{C}$  for 4 hours. Examine the coating for conformance to Table 3.

**6.5 Resistance to Impact**

Apply the mastic to two wire-brushed, solvent-cleaned, mild steel plates, each 152 by 152 by 3 mm thick, to a uniform dry film thickness of  $760 \pm 50$  microns. Dry for 72 hours at room temperature, then test each plate separately, while being held firmly, coated side up, on a solid horizontal base. Drop a 900 grams steel ball from a height of 244 centimeters, so that the impact will be at the center of the plate. Examine the coating for conformance to Table 3.

**6.6 Resistance to Alkali**

Apply the mastic to a clean glass panel at a uniform dry film thickness of  $760 \pm 50$  microns. Dry the panel at  $23 \pm 1^\circ\text{C}$ , for 24 hours, then suspend vertically in 5 percent sodium hydroxide, maintained at  $23 \pm 1^\circ\text{C}$ , so that one-half of the coating is immersed. After 30 hours, lightly rub the film with a well-rounded glass rod and examine for evidence of disintegration.

TABLE 3 - PROPERTIES

CHARACTERISTICS	REQUIREMENTS		ASTM METHOD	US FEDERAL STD. NO. 141
	Min.	Max.		
FLASH POINT, °C.	35	...	D92	—
PENETRATION OF DISTILLATION RESIDUE, mm (SEE TABLE 1)	5	25	D5, 235 °C RESIDUE SAMPLE	—
SOFTENING POINT OF DISTILLATION RESIDUE, °C (SEE TABLE 1)	96	115.5	D36, 235 °C RESIDUE SAMPLE	—
WORKABILITY	SATISFACTORY WORKING AND SPREADING			—
SAG	NO SAG OR FLOW WHILE WET			—
DRYING 6 HOURS 24 HOURS	SET - TO - TOUCH DRY - TO -RECOAT			4061, DOCTOR BLADE APPLI- CATION AT 11 m <sup>2</sup> /Lt.
ADHESION AND PROTECTION	SHALL NOT LOOSEN CHECK, CRACK, PEEL, RUN, SAG, OR OTHERWISE LOSE PROTECTION VALUE			—
RESISTANCE TO IMPACT	NO VISIBLE CHIPPING CRACKING, OR DETACHMENT FROM PLATE, AND FIRM ADHESION OUTSIDE RADIUS OF 6 mm FROM CENTER OF IMPACT			—
RESISTANCE TO ALKALI	NO EVIDENCE OF DISINTEGRATION			—

## 7. STORAGE LIFE AND PACKAGING

### 7.1 Condition in Container

The mastic shall meet all the requirements specified herein after storage period of 24 months from date of delivery, in a full, tightly covered container.

### 7.2 Packaging

The packaging shall meet the relevant requirements of ASTM D 3951-88 unless otherwise specified by the purchaser.

## 8. INSPECTION

All work and materials supplied under this Specification shall be subject to timely inspection by the purchaser or his authorized representative. The contractor shall correct such work or replace such material as is found defective under this Specification. In case of dispute the arbitration or settlement procedure established in the procurement documents, shall be followed:

- Samples of paints used under this painting system should be supplied upon request along with the supplier's name and identification for the materials.
- 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).
- If an electrical inspection is required, use a holiday detector of the Tinker-Raser, Bird Dog, or other approved type having a range of 67.5 to 75 volts.

## 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: Coal Tar Mastic Paint (Cold Applied)**
- Specification: IPS-M-TP-230**
- MESC No.:** .....
- No. of component:** .....
- 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: Black** .....
- Lot Number:** .....
- Stock Number:** .....
- Date of manufacture:** .....
- Quantity of paint in container:** .....

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

**Federal and State Laws:** .....

**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: 1369(0).

**INTENDED USE**

Other than design guide. The mastic is intended for use on steel structures as necessary to substitute for hot-applied coal-tar enamel coating. The mastic is used also as a protective coating for dissimilar metals in contact, as an electrical insulating coating, and on fiberglass lagging for waterproofing.

It is appropriate for contact with alkaline soils, and may be used on underwater marine structures. Generally two coats are used, to a dried film thickness of 510 to 1020 microns. Material to be exposed to sunlight or weather should be top-coated with MIL-C-15203 coal-tar emulsion.

**9.3 Directions for Use**

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

**DIRECTIONS FOR USE OF COAL TAR MASTIC PAINT (COLD APPLIED)**

This mastic is used to protect steel from corrosion in severe surroundings. It will perform best if applied over blast cleaned or pickled steel; however, it may in special cases be used over well cleaned steel if all rust scale, loose rust, loose mill scale, and loose or nonadherent paint are removed. Oil and grease should be removed. For severe exposure, apply over a thoroughly dry rust-inhibitive primer.

Mix paint thoroughly before use. Under normal conditions, no thinning should be necessary. Thin paint only if necessary, using only mineral spirits.

Apply by spray, using high pressure spray equipment. If applied by brush, apply with a daubing action.

Apply to the specified film thickness or, if none is specified, to at least 1,600 microns, dry or approximately 3,200 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. Under normal conditions, this mastic will dry for recoating in 243 hours, but it will remain soft for long periods.

**9.4 Direction for Safety**

The following direction for safety shall be supplied with each container of coal tar mastic:

- Coal Tar mastic 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 provision of SSPC-PA Guide 3, " A Guide to Safety in Paint Application". and to the following:
- The paints specified herein may not comply with some air pollution regulations because of their hydrocarbon solvent content.
- Ingredients in this paint which may pose a hazard include hydrocarbon solvent and coal tars. This paint may contain low concentrations (less than 1% by weight) of materials that are suspected carcinogens. Applicable regulations governing safe handling practices shall apply to the use of this paint.

- Keep mastic 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 mastic and before eating or smoking.