

SSPC: The Society for Protective Coatings

Coating Specification No. 32

Coal Tar Emulsion Coating

1. Scope

1.1 This specification covers a coal-tar emulsion coating to be used as a protective weather coat for hot- or cold-applied bituminous coatings on steel structures. It may also be used over suitable primers as a protective coating for aboveground steel structures subjected to atmospheric exposure and the deleterious effects of oxidation and ultraviolet radiation.

1.2 It is suitable for use on parts or structures exposed in SSPC Environmental Zone 1B (exterior, normally dry). It can also be used in heavy industrial environments such as Zones 3A (chemical exposure acidic), 3B (chemical exposure neutral), and 3C (chemical exposure alkaline) where color is not a prime consideration.

2. Description

2.1 The coating is a water emulsion of coal tar and may contain selected fillers. It is a thick, heavy-duty, cold-applied protective coating intended for use on steel substrates coated with hot- or cold-applied bituminous coatings or other suitable primers.

2.2 The coating contains approximately 40 percent by volume non-volatile film-forming solids. The theoretical spreading rate for a 380- μ m (15-mil) dry film thickness is 1.1 m²/L (43 ft²/gal). Actual spreading rates can be significantly lower.

3. Referenced Standards

3.1 The latest issue, revision, or amendment of the referenced documents in effect on the date of invitation to bid shall govern unless otherwise specified. Those documents marked with an asterisk (*) are referenced only in the Notes or the Appendix, which are not requirements of this specification.

3.2 If there is a conflict between the requirements of any of the cited reference documents and this specification, the requirements of this specification shall prevail.

3.3 SSPC STANDARDS:

Guide 13 Guide for the Identification and Use of Industrial Coating Material in Computerized Product Databases

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Procedure for Determining Conformance to Dry Coating Thickness Requirements

3.4 ASTM INTERNATIONAL STANDARDS:¹

D244 Standard Test Methods and Practices for Emulsified Asphalts

D1141 Standard Practice for the Preparation of Substitute Ocean Water

* **D1475** Standard Test Method for Density of Liquid Coatings, Inks, and Related Products

D1640 Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature

* **D2369** Standard Test Method for Volatile Content of Coatings

D2939 Standard Test Methods for Emulsified Bitumens Used as Protective Coatings

D3924 Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials

D4587 Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings

D6132 Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Gage

D6677 Standard Test Method for Evaluating Adhesion by Knife

D7091 Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

3.5 FEDERAL STANDARDS²

MIL-PRF-2104 Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service

¹ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. For referenced ASTM standards, visit the ASTM website, <<http://www.astm.org>> or contact ASTM Customer Service at <[http://www.service@astm.org](mailto:service@astm.org)> For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

² US Department of Defense Single Stock Point (DSSP) for military standards may be accessed online at <<http://quicksearch.dla.mil/>>

3.6 UNITED NATIONS STANDARD³

GHS Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 4th Revised Edition.

4. Composition Requirements

4.1 The manufacturer is given wide latitude in the selection of raw materials and manufacturing processes (see Notes 9.1 and 9.2).

4.2 RESIN REQUIREMENT: The coating shall be an emulsified coke-oven coal tar of such consistency as to be readily applicable either by brush or by spray. The coating may be formulated to contain mineral filler. The coal tar used in this coating is defined as a product obtained from the distillation of high-temperature crude coke oven tar, which in itself is a product obtained during the destructive distillation of coal in slot ovens operated at a temperature above 700 °C (1300 °F). The coal tar shall be composed primarily of a complex combination of condensed ring aromatic hydrocarbons of three or more members. The coating shall not contain asphalt or asbestos.

5. Requirements of Liquid Coating

5.1 RESIDUE: The percent by weight (wt %) of residue by evaporation shall be a minimum of 45 wt % when tested in accordance with ASTM D2939.

5.2 ASH CONTENT: The ash content of the residue shall be from 25 to 40 wt % when tested in accordance with ASTM D2939.

5.3 WATER CONTENT: The percent by weight of water shall not be greater than 50 wt % when tested in accordance with ASTM D244.

5.4 CONDITION IN CONTAINER: Moderate water separation, without packing hard in the container, is acceptable. Any water that separates shall be readily incorporated upon stirring.

5.5 WORKING PROPERTIES: The coating shall be designed for application by brush or spray in accordance with the Directions for Use (see Section 7.3). When applied to vertical surfaces at the manufacturer's specified thickness, the coating shall not sag (see Section 6.1).

5.6 ODOR: The coating shall not have a pronounced or unduly objectionable odor.

6. Laboratory Physical Tests of Applied Films

Unless otherwise specified herein, or in referenced test methods, properties will be tested at standard atmospheric conditions as specified in ASTM D3924

6.1 SAG: The coating shall not sag when tested as follows: Press a strip of 2.5 cm (1 inch) masking tape across the full width of a solvent-cleaned 75 x 150 mm (3 x 6 inch) cold-rolled steel panel. The tape shall be parallel to and centered on the shorter axis of the panel. Apply the material to the panel at a wet film thickness of $965 \pm 50 \mu\text{m}$ (38 ± 2 mils). The application may be made with a doctor blade according to ASTM D1640. Immediately after applying the material, carefully remove the masking tape and stand the panel in a vertical position (with the bare strip horizontal) in a draft-free $23 \pm 3^\circ\text{C}$ ($73 \pm 5^\circ\text{F}$) location. Examine the panel after 24 hours. Sagging or running of the coating into the bare area shall constitute failure of the material to pass the sag test.

6.2 ADHESION: A single coat of the material shall be applied to a dried bituminous coating such as SSPC-Paint 33 at a wet film thickness of $965 \pm 50 \mu\text{m}$ (38 ± 2 mils). Ninety-six hours after application, the adhesion shall be tested according to ASTM D6677. The adhesion value shall be 10.

6.3 WATER ABSORPTION: Determine the water absorption by the following method:

- Record tare weights of three aluminum panels, each 75 x 150 x 0.8 mm (3 x 6 x 1/32 inch)
- Apply one coat of the coating to a uniform wet film thickness of $965 \pm 50 \mu\text{m}$ (38 ± 2 mils).
- After the coating has dried for 96 hours, dip each panel momentarily in distilled water, wipe lightly with a paper towel, and weigh each panel to determine the weight of coating on the panel.
- Immerse the coated panels in distilled water at temperature of $23 \pm 3^\circ\text{C}$ ($73 \pm 4^\circ\text{F}$) per ASTM D3924 for 15 days
- Remove the panels, wipe lightly with a paper towel, and weigh again.
- Subtract the weights recorded after the initial dipping from those taken after the 15-day immersion to determine the weight of water absorbed.
- Determine the weight percent of water absorbed by the coating for each test panel.

The average of the three weight percents shall be no more than 10. In addition, the coating on each panel shall show no observable signs of softening or separation.

6.4 RESISTANCE TO OIL: Apply the coating to two wire-brushed, coal-tar naphtha solvent-cleaned mild steel panels, each 75 x 150 x 3 mm (3 x 6 x 1/8 inch) to a uniform wet film thickness of $965 \pm 50 \mu\text{m}$ (38 ± 2 mils). After the coating has dried for 96 hours, immerse the coated panels

³ United Nations Economic Commission for Europe, Transport Division, Palais des Nations, CH - 1211 Geneva 10, Switzerland. Copies of this standard may be obtained from the United Nations Publications Customer Service, National Book Network, 15200, 15200 NBN Way, Ridge Summit PA 17124 <<https://unp.un.org>>