MATERIAL AND EQUIPMENT STANDARD

FOR

COAL TAR MASTIC

(COLD APPLIED)

ORIGINAL EDITION

AUG. 1993

This standard specification is reviewed and updated by the relevant technical committee on May 1999(1) and Nov. 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-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).

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on May 1999. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 86 on May 1999. 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 Nov. 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 435 on Nov. 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) 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	"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 Tester"
D128	"Analysis of Lubricating Grease"
D453	"Tar Acids in Creoscote-Coal Tar Solutions" (Canceled)
D1640	"Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings"

ANSI (AMERICAN NATIONAL STANDARD INSTITUTE)

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

UFS (US FEDERAL STANDARDS)

(Standard Specification for Ingredients)

MIL-C-15203 "Coating Compound Bituminous, Emulsic Type Coal Tar Base" (Canceled)

MIL-C-18480 "Coating Compound, Bituminous, Solvent, Coal Tar Base"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100 “Units”

IPS-E-TP-100 "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 and Sections 4.2 through 4.3.

4.2 Percentage

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

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. Wt%	Max. Wt%	ASTM 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 ± 2°C the mastic shall permit easy application by brush or spray, in two successive coats, to a minimum dry film thickness of 760 ± 50 microns. At 7± 2°C, the mastic shall permit easy brush application.

6.3 Sag Resistance

At 23 ±1°C and 50 ± 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 ± 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 ± 25 µm. Immediately after application, suspend the panel in a vertical position at 71 ± 2°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°C in section 6.3, to 60 ± 2°C for 16 hours. Allow the panel to cool at room temperature for 1 hour. Then expose to -23 ± 2°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 ± 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 ± 50 microns. Dry the panel at 23 ± 1°C, for 24 hours, then suspend vertically in 5 percent sodium hydroxide, maintained at 23 ± 1°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.

6.7 Color

The color shall be black or dark red.

TABLE 3 – PROPERTIES

CHARACTERISTICS	REQUIREMENTS Min.	Max.	TEST METHOD
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 SET - TO - TOUCH DRY - TO TOUCH	 6 HOURS 24 HOURS		
ADHESION AND PROTECTION	SHALL NOT LOOSEN, CHAULK, 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 12 months (minimum) from date of delivery, in a full, tightly covered container.

7.2 Packaging

The packaging shall meet the relevant requirements of ASTM D 3951 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: ……. .....

Lot Number: .....

Stock Number: .....

Date of manufacture: .....

Quantity of paint in container: .....

MSDS: ……

Inspection Date: ……..

Shelf Life: ……

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:

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 240 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.