ISLAMIC REPUBLIC OF IRAN
MINISTRY OF PETROLEUM

IPS-M-TP-168(1)

IRANIAN PETROLEUM STANDARD

MATERIAL STANDARD
FOR
ACRYLIC SILICON FINISH PAINT
FOR
TEMPERATURE APPLICATIONS UP TO 200 °C

FIRST EDITION
FEBRUARY 2001

DEPUTY MINISTER
FOR
ENGINEERING & TECHNOLOGY
RESEARCH AND STANDARDS

FOREWORD

This Standard is intended to be used within and for Iranian Ministry of Petroleum (N.I.O.C, N.I.G.C, N.P.C., N.I.O.R.D.C. and other affiliate organizations and companies) and has been prepared on the basis of the recognized standards, scientific publications, technical documents, accumulated knowledge and experiences in petroleum industries at national and international levels.

Iranian Petroleum Standards are prepared by Iranian Petroleum Standards Organization reviewed and amended by the relevant technical standard committees to incorporate acceptable comments made by oil, gas and petrochemical experts.

Standards are finally approved by the "Standards High Council" of Iranian Ministry of Petroleum.

Iranian Petroleum Standards (IPS) are subject to amendment withdrawal, if required, thus the latest edition of IPS shall be applicable.

Any comment or recommendation submitted to the "Iranian Petroleum Standards Organization" will be evaluated in the relevant technical committee and will be considered in the next revision, upon approval.

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 etc.

"PURCHASER" : Means the "Company " Where this standard is 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.

"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.

"SHOULD" : Is used where a provision is advisory only.

"SHALL" : Is used where a provision is mandatory.

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1. SCOPE

This Standard specification covers the minimum requirements for the composition, properties, storage life and packaging, inspection and labeling of acrylic silicon paint.

The paint is intended for protection of equipment (stacks, cat crackers, boilers, heat exchangers, etc.), which operate up to 200°C. In this case the steel surface shall be treated with organic or inorganic zinc rich primer.

Note: This is a revised version of the standard specification for acrylic silicon finish paint for temperature applications up to 200°c, which is issued as revision (1). Revision (0) of the said standard specification is withdrawn.

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 of Hazardous Industrial Chemicals"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

B-117	“Standard Practice for Operating Suit spray (fog) Apparatus”
D-1210	“Standard test Method for Fineness of Dispersion of Pigment Vehicle System by Hegmun-Type Gage”
D 1296	“Standard Test Method for Odor of Volatile Solvent and Diluents”
D 1475	“Standard Test Method for Density of Liquid Coating, inks, and Valuated Products”
D 2247	“Standard Practice for Testing Water Resistance of Coating in 100% Relative Humidity”
D 2485	“Standard Test Methods for Evaluating Coatings for High Temperature Service”
D-2697	"Test Method for Volume Volatile Matter in Clear or Pigment Coatings"
D 3359	“Standard Test Method for Measuring Adhesion by tape test”
D 3951	"Standard Practice for Commercial Packaging"
D 4287	“Standard Test Method High-Shear Viscosity Using a Standard Practice for Cone/Plate Viscometer”

BSI (BRITISH STANDARD INSTITUTION)

BS 381 C	"Colors for Identification Coding and Special Purposes"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-C-TP-101	"Construction Standard for Surface Preparation" (Not Applicable for Procurement)
IPS-E-TP-100	"Engineering Standard for Paints" (Table 1)

SSPC (STEEL STRUCTURES PAINTING COUNCIL)

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

US FEDERAL STANDARDS

Federal Test Method	"Paint, Varnish, Laquer, and Related Materials"
Method 595	"Color"
Method 3011.1	"Condition in Container"
Method 4321	"Brushing Properties"
Method 4331	"Spraying Properties"
Method 4401	"Odor Test"
Method 6221	"Flexibility"

3. UNITS

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

4. COMPOSITION

The paint shall consist of acrylic silicone resin, pigment and additives together with solvents needed to give consistency suitable for application by spray, brush or other approved methods. The solid content of the paint shall not be less than 40 percent by volume when kpltested by ASTM D2697.

5. PROPERTIES

The paint shall meet the requirements of sub clases 5.1 through 5.11 inclusive.

5.1 General Properties

The paint shall be suitable for temperature services up to 200°C where color is required. It shall withstand thermal shock from 200 to 230°C and temperature surges to 260°C. The paint shall exhibit excellent weathering properties thereby making it suitable for use as a topcoat in coastal and severe industrial environments. (ASTM D-2485, Method B).

5.2 Odor

The odor of the paint shall not be offensive, irritating or putrid during and after application, it shall be normal for the materials permitted as ASTM D-1296.

5.3 Color

The color shall be as specified by the purchaser with reference to Table 1 or other color.

5.4 Compatability

The paint shall be compatible with thinner. Wet dry films over intermediate shall not show any defects.

5.5 Working Properties

The paint shall be easily applied by brush and spray when tested in accordance with US Federal Standard Methods 4321, 4331. The paint shall show no streaking, running sagging craking, chipping or flaking after drying.

5.6 Condition in Container

The paint as received shall show no evidence of livering, shinning, or hard settling of pigment, the container shall not be affected. The material shall be easily dispersed in liquid portion by hand stirring to form a smooth, homogeneous paint free from persistant foam when tested in accordance with US Federal Standard Test Method 3011.1.

5.7 Fineness

Fineness of dispersed pigments in vehicle system should not be greather than 40 microns according to ASTM D-1210.

5.8 Density

When defermined in accordance with ASTM D-1475 the density of paint shall be within 5 percent of the value of the manufacturer's specification.

5.9 Viscosity

When defermined in accordance with ASTM D-4287 the density of paint shall be within 5 percent of the value of the manufacturer's specification.

5.10 Adhesion

Coating shall be applied and cured on a surface prepared carbon on carbon steel plate to Sa 2½ with 35-50 microns dry film thiclcness. Adhesion classification shall be at least 4B according to ASTM D-3359 method B. Adhesion classification of complete system applied according to manufacturer's specification or, 2C system in IPS-E-TP-100, Shall be at least 3A according to ASTM D-3359 method A.

5.11 Additional Resistance Tests

Because of diversity of potential service environments, This specification may require the paint, be further exposed and qualified by at least one additional test as follows relating to the intended exposure.

5.11.1 Weather resistance

The paint shall have a satisfactory resistance to weathering this should be clearly and adequately demonstrated by at least tow document caes histories that confirm satisfactory performance for a minimum of five year 5, at or near its recommended maximum service temperature, in a moderate or more severe environment.

5.11.2 Salt spray

For using paint in system 2C according to IPS-E-TP-100 table 1, applicable to chemical and marine atmosphere, complete system shall resist to spray test according to ASTM B-117 for 300 hours, without and blistering of coating and rusting of the coated portion.

5.11.3 Humidity

For using paint in system 2C according to IPS-E-TP-100 table 1, applicable to chemical and marine atmosphere, system shall be resist to humidity test according to ASTM D-2247 for 300 hours, without any blistering of coating and rusting of the coated portion.

TABLE 1

PAINT COLOR	COLOR No. TO BS 381 C	COLOR No. TO RALL (APPROX)
ARCTIC BLUE	112	5024
SEA GREEN	217	6017
BRILLIANT GREEN	221	6002
CANARY YELLOW	309	1018
LIGHT STRAW	384	1000
MIDDLE BROWN	411	8007
SIGNAL RED	537	3020
LIGHT ORANGE	557	2000
LIGHT GREY	631	7033
ALUMINUM	—	—

6. STORAGE LIFE AND PACKAGING

6.1 Storage Life

The product shall meet the requirements of Clause 5 after storage of at least 12 months from the date of delivery, in a full tightly coverd container at normal condition.

6.2 Packaging

The packaging shall meet the relevant requirement of ASTM D 3951 unless otherwise specified by the Purchaser.

6.3 Packing

Packing shall be accomplished in a manner which will insure acceptance by common carrier, at lowest rate, and will afford protection against physical or mechanical damage during shipment.

6.4 Marking

Shipment marking information, in addition to the labeling required (see 8.2) shall be provided on interior package and exterior shipping containers.

7. INSPECTION

7.1 All materials supplied under this Standard 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 standard specification. In case of dispute, the arbitration or settlement procedure, established in the procurement documents shall be followed.

7.2 The supplier shall be responsible for the performance and costs for all laboratory test requirements as specified in this Standard specification.

7.3 The supplier shall place free of charge at the disposal of the purchaser's inspector(s) all means necessary for carrying out their inspection, specification or test results checking of conformity of materials with this Standard specification, checking of marking and packing and temporary acceptance of materials.

7.4 Samples submitted to the purchaser will be tested in the purchaser's laboratory or in a responsible commercial laboratory designated by the Purchaser.

7.5 The supplier shall furnish the purchaser with a certified copy of results of tests made by the manufacturer covering physical and performance characteristics of each batch (see 7.8) of product to be supplied under this Standard specification. The supplier shall furnish, or allow the purchaser to collect samples of the material representative of each batch of product. Certified test reports and samples (see 7.7) furnished by the supplier or collected by the purchaser shall be properly identified with each lot (see 7.8) of product.

7.6 Prior to acceptance of the supplier's material, samples of material submitted by the supplier or collected by the purchaser will be tested by the purchaser. If any sample is found not to conform to this Standard specification, material represented by such sample will be rejected.

7.7 The number of samples for testing shall consist of 10 percent of the lot or batch (see 7.8), but in no case shall be less than one or more than 10 containers. The results of the tests on two specimens (top and bottom) shall be averaged for each test specified in this Standard specification to determine conformance with the specified requirements.

7.8 A lot or batch shall consist of an indefinite number of containers offered for acceptance and filled with a homogeneous mixture of material from one isolated container, or filled with a homogeneous mixture of material manufactured by a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

8. LABELING

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

8.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name: ACRYLIC SILICON PAINT

Specification : IPS-M-TP-168

MESC. No.: .....

Flash point °C: .....

Stock No.: .....

Date of manufacture: .....

Quantity of paint in container: .....

Type and designation of thinner: .....

Maximum temperature resistance: .....

Type of application: .....

Kind and size of spray nozzle tip: .....

Color: ……..…….....

Lot or batch number: .....

Information and warnings (if needed):.....

Manufacture's name and address: .....

Shelf life: ……

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.

8.3 Direction for Use

In addition to the manufacturer's instructions for use, the following directions shall also be supplied with each container of paint, "This paint is intended for use on primed structural steel. The surface of steel shall be prepared in accordance with IPS-C-TP-101 before applying the primer".

For use on steel surfaces subjected to high temperatures (up to 200°C). The primer used shall be organic or inorganic zinc-primer. Apply by brush or spray to the specified film thickness or, if none is specified, to at least 38 microns dry. When application is by spraying, the equipment and operator technique should be properly adjusted to prevent dry spray and to deposit a wet film of paint on the substrate. Clean the equipment with suitable thinner both before and after use. The surface to be painted shall be dry and the surface temperature shall be at least 3°C above the dew point.

8.4 Direction for Safety

In addition to the manufacturer's instructions for safety, the following directions shall also be supplied with each container of paint.

- This paint is hazardous because of its 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 paint 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 paint and before eating & smoking.

- Provide sufficient ventilation to insure that vapor concentration 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 regulation because of its hydrocarbon solvent content.

Note to Users

The IPS Standards 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 publications are based on internationally acceptable standards and include selections from the options 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 or diversity of conditions of each project or work.

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 users of IPS publications are therefore requested to send their views and comments, including any addendum prepared for particular cases to the Ministry of Petroleum, Standards and Research Organization. These comments and recommendations will be reviewed by the relevant technical committee and will be incorporated in the formal revision of the relevant IPS. The IPS publications are reviewed and revised approximately every five years.

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