MATERIAL STANDARD

FOR

PRIMER TO BE USED WITH COLD-APPLIED INNER LAYER

TAPE

(IPS-M-TP-310, TAPE COATING SYSTEM OF BURIED STEEL PIPE)

ORIGINAL EDITION

JULY 1995

This standard specification is reviewed and updated by the relevant technical committee on Jan. 2000(1) and Dec. 2011(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 are based on internationally acceptable standards and include 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.

Standards and Research department

No.17, Street14, North kheradmand

Karimkhan Avenue, Tehran, Iran .

Postal Code- 1585886851

Tel: 88810459-60 & 66153055

Fax: 88810462

Email: Standards@ nioc.ir

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 document.

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 covers the minimum requirements for ditch yard and repairing primer to be used with cold applied Inner-layer tape (IPS-M-TP-310) in tape coating system. The function of this primer is to provide a highly effective bonding medium between yard primer and Inner-layer tape as well as between steel surface and Inner-layer tape.

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on Jan. 2000. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 115 on Jan. 2000. 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 Dec. 2011. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 321 on Dec. 2011. 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.

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z400.1/Z129.1 (2010) "Hazard Evaluation and Safety Date Sheet and Precautionary Labeling Preparation"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

D 1200	"Standard Test Method for Viscosity by Ford Viscosity Cup"
D 1296	"Standard Test Method for Odor of Volatile Solvents and Diluents"
D 1475	"Standard Test Method for Density of Paint, Varnish Lacquer, and Related Products"
D 2369	"Standard Test Method for Volatile Content of Coatings (Total solid content)"
D 56	"Standard Test Method for Flash Point by Tag Closed Cup Tester"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	"Engineering Standard for Units"
IPS-E-TP-270	"Engineering Standard for Coatings"
IPS-M-TP-310	"Material Standard for Cold-Applied Laminated Plastic Tape as Inner-Layer Tape for Tape Coating System of Buried Steel Pipes"
IPS-C-TP-101	"Construction Standard for Surface Preparation" (Not applicable for procurement)

ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 8501	"Preparation of steel substrates before application of paints and related products Visual assessment of surface cleanliness Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings"
ISO 1523	"Determination of Flash Point-Closed Cup Equilibrium Method"
ISO 2808	"Paints and Varnishes-Determination of Film Thickness"
ISO 3251	"Paints, Varnishes and Plastics-Determination of non-Volatile-Matter Content"

SSPC (STEEL STRUCTURES PAINTING COUNCIL)

PA Guide 3 "A Guide to Safety in Paint Application"

US FEDERAL STANDARD:

Federal test method standard No. 141-paint, varnish, lacquer, and related materials; methods of inspection, sampling, and testing.

Method 3011	"Condition in Container"
Method 4061	"Drying Time"
Method 4203	"Reducibility and Dilution Stability"
Method 2011	"Preparation of Steel Panels"
Method 6221	"Flexibility"

3. DEFINITIONS AND TERMINOLOGY

In this Standard the following definitions shall apply:

DENSITY

The mass of a unit volume of the liquid at a specified temperature. The units shall be stated, such as grams per milliliter or grams per cubic centimeter.

FLASH POINT

The minimum temperature (corrected to a barometric pressure of 760 mm Hg) at which a liquid gives off a vapor in sufficient concentration to ignite under specified conditions of test.

FLAMMABLE LIQUID

Any liquid having a flash point below 37.8°C, except any liquid mixture having one or more components with a flash point at or above the upper limit which make up 99% or more of the total volume of the mixture.

INHIBITOR

A material used, normally in small proportions, to arrest or retard a chemical reaction, especially corrosion.

LOT OR BATCH

The lot or batch shall consist of an indefinite amount of materials manufactured by a single plant run through the same processing equipment with no change in ingredient materials which offered for acceptance.

NOMINAL PARAMETERS

The nominal parameters are the parameters (e.g., weight, thickness, density, etc.) specified on product labels, invoices, sales literature, and the like. The actual parameters shall not be less than 95% of nominal parameters.

RESIN

A solid or semi-solid organic compound which is thermoplastic, does not crystallize, is not a conductor of electricity, has no sharp melting point and is soluble in organic solvents but not in water. It originates, in the case of natural resins, from the secretions of certain plants or insects; or, in the case of synthetic resins, through chemical reaction of numerous substances producing complex compounds of higher molecular weight than the original materials.

BUTYL RUBBER

Butyl rubber is a designation for a series of rubber-like products made by polymerization a high percentage of a monoolefin like isobutylene, and a small amount of a di-olefin like butadiene. The resulting products have only a fraction of the unsaturation present in natural rubber, and after volcanization the product is essentially a cross-linked saturated hydrocarbon. Butyl rubber is essentially a paraffinic hydrocarbon.

SOLVENT

A volatile liquid, which is used in the manufacture of primer to dissolve or disperse the film-forming constituents, and which evaporates during drying and therefore does not become a part of the dried film. Solvents are used to control the consistency and character of the primer and to regulate application properties.

Aliphatic solvents are mild solvents derived from petroleum, such as mineral spirit.

Aromatic solvents are strong solvents derived from coal tar and certain petroleum types, such as Toluene, Xylene, and solvent naphta.

THINNERS

Volatile liquids added to primers to facilitate application and to aid penetration by lowering the viscosity.

TOTAL SOLIDS

The non-volatile matter in a coating composition, i.e., the ingredients of a coating composition which, after drying, are left behind and constitute the dry film.

STABILIZERS

Substances added, usually in small proportions, to retard undesirable chemical or physical changes.

VISCOSITY

The property of a liquid to resist shear deformation increasingly with increasing rate of deformation. Shear is the orderly movement of layers of liquid relative to parallel adjacent layers.

Dynamic viscosity is the ratio of the applied shear stress to the velocity gradient.

Kinematic viscosity is the ratio of the dynamic viscosity to the density of the liquid, both measured at the same temperature.

Note:

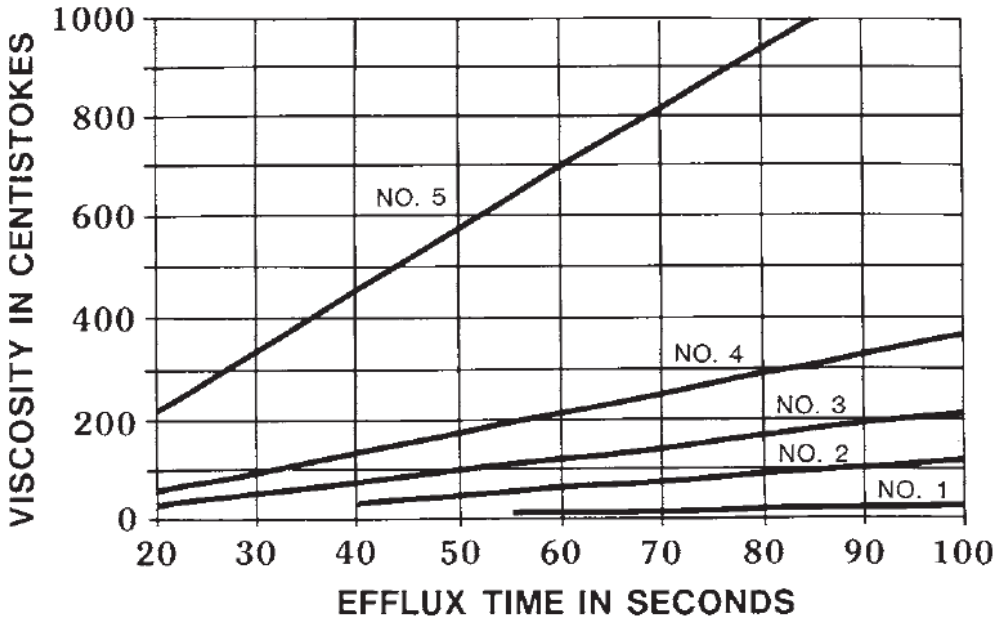
The SI unit for dynamic viscosity is the pascal second (Pa.s). The traditional unit is the centipoise (cp); 1cp=1 mili Pa.s.

The SI unit for kinematic viscosity is the square-meter per second (m^2/s). The traditional unit is the centistokes (cst); 1 cst=1 mm^2/s.

FLOW TIME

The elapsed time from the moment when the material under test starts to flow from the orifice of the filled cup to the moment when the flow stream of material first breaks close to the orifice.

The curves shows in Fig. 1 can be used to convert the flow time in seconds to kinematic viscosity in centistokes for Ford Cups No. 1 to 5.



APPROXIMATE VISCOSITY CURVES FOR FORD CUPS

Fig. 1

4. UNITS

This Standard is based on International System of Units (SI), as per IPS-E-GN-100 except where otherwise is specified.

5. COMPOSITION

The primer for cold application shall compose of a synthetic elastomers and resins, anti-corrosion inhibitors, stabilizers, etc. blended with proper-type and amount of volatile organic solvent to give a consistency suitable for spray-type, rugtype and brush-type application.

The primer shall be uniform, stable in storage, and free from grit and coarse particles. The primer shall contain additives that resists; the effect of humidity, water condensates, radiation, winds and salty environments, and also fungus and bacterial growth.

When required by the purchaser, suitable additives shall be utilized in the primer formulation in order to reduce the incidence of stress-corrosion cracking.

The primer shall be compatible with the inner-layer tape (IPS-M-TP-310) and as the same

manufacture and as the same manufacturer, the solvent percentage of the primer shall be specified by manufacturer.

6. PROPERTIES

The primer shall comply with the requirements of Table 1.

The primer shall also meet the requirements of 6.1 to 6.12 inclusive.

6.1 Odor

The odor shall be normal for the materials permitted (ASTM Standard D 1296).

6.2 Color

The color of the primer shall be black.

6.3 Compatibility

There shall be no evidence of incompatibility of any of the ingredients of the primer when one volume of the primer is slowly mixed with one volume of its own thinner (US Federal Standard No. 141, method 4203).

6.4 Application Properties

The primer shall have good application properties with a minimum tendency to produce bubbles during application. No heat shall be required to produce an effective bond between the pipe surface to be protected and the subsequently applied inner-layer tape.

Primer shall not settle in the container to form a cake or sludge that can not be mixed easily by hand or mechanical agitation.

6.5 Drying Time

The primer shall be quick-drying type (5-10 minutes) at room temperature (23 ± 2 ºC).

6.6 Covering Capacity

The covering capacity of primer for surface with roughness of 50 microns (Arithmetical average) and cleanliness of Sa 2½ shall not be less than 5 square meters per one liter of primer with regards to specified minimum dry film thickness of 30 microns (see table 1) as ISO 2808.

6.7 Flexibility

A film of the primer tested as below shall withstand bending without cracking or flaking.

This test shall be run in accordance with US Federal Standard No. 141, method 6221. Panels shall be 8 cm. × 16 cm. 20 gage cold-rolled steel, cleaned in accordance with Federal Standard No. 141, Method 2011, Procedure D, followed by Procedure A.

The primer shall be applied by spray to a 75 microns (3 mils) dry film thickness-approximately 225 microns (9 mils) wet film. After one week of drying at 21-27°C the panel shall be bent over a 4 cm mandrel and shall show no cracking or loss of adhesion.

6.8 Toxic Ingredients

The primer shall contain no benzene (benzol), chlorinated solvents, hydrolyzable chlorine derivatives or other materials of highly toxic nature.

6.9 Safety and Environmental Regulations

The solvent portion of the primer shall be certified by the manufacturer to comply with the air pollution control rules and regulations and all safety rules and regulations in effect where the coating is used.

TABLE 1

PROPERTIES

PROPERTY	UNIT	REQUIREMENT	TEST METHOD ASTM
TOTAL SOLID CONTENT (Min.)	Wt.%	20	D 2369
DENSITY AT 25 °C	g/cm^3	0.8±0.05	D 1475
VISCOSITY (FLOW TIME; FORD CUP No. 4) AT 25° C	SECOND	30-40	D 1200
TEMPERATURE RANGE OF: APPLICATION OPERATION	°C	-20 TO + 60 -20 TO + 60	
COVERING CAPACITY*	MICRON	(MIN) 30	ISO 2808
Flexibility	----	No crack	US 6221
Drying time	Min	5-10	US 4061
Flashpoint	°C	-12	D 56

*The minimum covering capacity of primer for surface with roughness of 50 microns as sa 2 ½ with minimum 30 microns DFT

7. STORAGE LIFE AND PACKAGING

7.1 Storage Life

The primer shall show no thickening, curdling, skinning, gelling, or hard caking after storage for 24 months, at normal condition, from date of delivery in a full, tightly covered container when tested in accordance with US Federal test method Standard No. 141 method 3011.

7.2 Packaging

The primer shall be packaged in containers which shall be perfectly tight in order to prevent solvent from evaporating and being polluted with dust, water and foreign materials.

The primer shall be furnished in new heavy gage steel drums with the capacities specified by the purchaser.

8. INSPECTION AND TESTING

8.1 All materials supplied under this Standard Specification shall be subject to timely inspection by the purchaser or his authorized representative. The purchaser shall have 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.

8.2 The supplier and/or manufacturer shall be responsible for the performance and costs for all laboratory test requirements as specified in this Standard.

The manufacturer shall set up and maintain such quality assurance and inspection systems as are necessary to ensure that the materials comply in all respects with the requirements of this Standard Specification.

8.3 Samples of any or all ingredients used in the manufacture of this material may be requested by the purchaser and shall be supplied upon request, along with the supplier's name and identification for the sample.

8.4 Purchaser's inspector(s) shall have free access to the supplier's work to follow up the progress of the materials covered by this Standard and to check the quality of materials. The supplier and/or manufacturer shall place free of charge at the disposal of the purchaser's inspector(s) all means necessary for carrying out their inspection: results of tests, checking of conformity of materials with this Standard requirements, checking of marking and packing and temporary acceptance of materials.

8.5 Samples of primer (and it's tape) submitted to the purchaser and/or collected by the purchaser will be tested in the purchaser's laboratory or in a responsible commercial laboratory including manufacturer's laboratory designated by the purchaser.

8.6 The supplier and/or manufacturer shall furnish the purchaser with a certified copy of results of tests made by the manufacturer covering physical (Table 1) each batch 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 furnished by the supplier and/or manufacturer shall be properly identified with each batch of product.

8.7 Prior to acceptance of the supplier's and/or manufacturer's materials, samples of material submitted by the supplier, or collected by the purchaser, will be tested by the purchaser.

If any of the samples (see 8.8) is found not to conform to this Standard, materials represented by such sample will be rejected.

If samples of the supplier's and/or manufacturer's material that have been previously accepted are found not to conform to this Standard, all such material will be rejected.

8.8 Unless otherwise specified, the number of samples for testing shall consist of 10 percent of the lot, but in no case shall be less than one or more than ten samples. The results of the tests on four specimens made from each sample shall be averaged for each test specified in clause 6 to determine conformance with the specified requirements.

9. LABELING

9.1 Labeling Standard

Refer to ANSI Standard Z400.1/Z129.1 "Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation ".

9.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name: Primer for Use with Cold Applied Laminated Plastic Tape (IPS-M-TP-310).

Specification: IPS-M-TP-321

Order No.: .....

MESC No.: .....

Type and trade name of primer: .....

Application temperature: .....

Kind of thinner: .....

Cleaning material: .....

Flash point (°C): .....

Drying time (minute); for tape application: .....

Color: Black

Batch or lot No.: .....

Stock No. : .....

Date of manufacture: .....

Shelf life: ……

Quantity of primer in container: .....

Method of application: .....

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

Manufacturer's name and address: .....

Design guide: For guidance on the usage of this primer reference shall be made to IPS-E-TP-270.

9.3 Direction for Use

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

- This material is intended for use as a ditch yard and repairing primer on primed steel pipes as well as on prepared steel surfaces. The surface of steel shall be prepared in accordance with IPS-C-TP-101 before applying the primer.

- This primer is intended to be followed by cold applied laminated plastic tape conforming to IPS-M-TP-310.

Note: the primer shall be mixed thoroughly before use.

9.4 Direction for Safety

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

- This primer 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 shall 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 primer 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 primer with the eyes or skin.

- Clean hands thoroughly after handling primer and before eating or smoking.

- Provide sufficient ventilation to ensure that vapor concentrations do not exceed the published permissible exposure limits. When necessary, supply appropriate personal protective equipment and enforce its use.