MATERIAL STANDARD

FOR

HAND-APPLIED LAMINATED TAPE

SUITABLE FOR COLD-APPLIED TAPE COATING SYSTEM

ORIGINAL EDITION

JULY 1995

This standard specification is reviewed and updated by the relevant technical committee on Nov. 1999(1) and Nov. 2012(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.

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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 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 hand-applied laminated tape to be used for coating special sections, connections, fittings, cable to pipe connections and field repairs of buried steel pipes protected with cold-applied tape coating system.

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on Nov. 1999. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 96 on Nov. 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. 2012. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 378 on Nov. 2012. 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.

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

D 257	Standard test methods for “DC Resistance or Conductance of Insulating Materials”
D 570	Standard test methods for “Water Absorption of Plastics”
D 1000	Standard test methods for “Pressure-Sensitive Adhesive Coated Tapes Used for Electrical and Electronic Applications”
E 96	Standard test methods for “Water Vapor Transmission of Materials”
G 8	Standard test methods for “Cathodic Disbonding of Pipeline Coatings”

BSI (BRITISH STANDARD INSTITUTION)

BS EN 12068	“Cathodic protection - External Organic Coatings for the Corrosion Protection of Buried or Immersed Steel Pipelines used in Conjunction with Cathodic Protection -Tapes and Shrinkable Materials”

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	“Engineering standard for Units”
IPS-E-TP-270	“Engineering Standard for Protective Coatings for Buried and Submerged Steel Structures”
IPS-M-TP-322	“Primer for Use with Hand-Applied Laminated Tape”

3. DEFINITIONS & TERMINOLOGY

For this Standard the following definitions shall apply:

ADHESION STRENGTH

The force necessary to remove the tape from a prescribed surface when measured in accordance with specific conditions of test.

CATHODIC DISBONDING

The failure of adhesion between a coating and a metalic surface that is directly attributable to cathodic protection conditions and that is often initiated by a defect in the coating system such as accidental damage, imperfect application or excessive permeability of the coating.

COATING

A coating is an electrically insulating covering applied to a metal surface, as passive protection against external corrosion.

DIELECTRIC BREAKDOWN (DIELECTRIC STRENGTH)

The dielectric breakdown is the voltage at which a single layer of tape will show electrical failure under specific conditions of test. The dielectric breakdown of a tape is an indication of its ability to withstand electrical stress.

ELONGATION

The increase in length at break when the tape is tested under specific conditions of test. Elongation of tape is important as a measurement of its uniformity and quality.

INSULATION RESISTANCE

The insulation resistance between two electrodes that are in contact with, or embedded in, a specimen, is the ratio of the direct voltage applied to the electrodes to the total current between them.

LAMINATE

A product made by bonding together two or more layers of material or materials.

LOT OR BATCH

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

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.

PRIMER

Primer as a thin film over a prepared metal surface and the adjacent pipe coating in order to ensure maximum adherence to the metal surface and the inner-layer tape.

RELEASE PAPER

A sheet, serving as a protectant or carrier, or both, for an adhesive film or mass, which is easily removed from the film or mass prior to use.

TENSILE (BREAKING) STRENGTH

The force required, per unit width, to break the tape when tested under specific conditions of test. Breaking strength of tape is of importance as a measurement of its uniformity, quality, and ability to withstand stress in application and service.

WATER VAPOR TRANSMISSION RATE

The steady water vapor flow in unit time through unit area of a body, normal to specific parallel surfaces, under specific conditions of temperature and humidity at each surface.

4. UNITS

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

5. DESCRIPTION

The hand-applied tape shall consist of a laminate comprising a stabilized polyethylene (PE) backing and an activated adhesive layer of homogeneous elastomer-base compound. The product shall provide high electrical resistivity, resistance to corrosive environments, low moisture absorption and permeability, and shall provide an effective bond to the primed steel surface. In addition the tape must be compatible with, and provide an effective bond to, a previously applied coating, if present. The tape shall also be of such a nature that it resists fungi, bacteria, plant root, excessive mechanical damage during normal application operations and be sufficiently pliable so that it conforms to the surface that is to be coated. It shall also withstand, without tearing, the tensile force necessary to obtain a tightly wrapped coating that fills the helix at the overlap and is free of voids.

The tape shall be highly conformable for easy hand wrapping even at low temperatures. The tape shall be designed for use with its own primer and both tape and primer shall be from the same manufacturer. (For standard specification of primer see IPS-M-TP-322.)

6. PROPERTIES

The finished material shall meet the requirements of Table 1 and 6.1 to 6.5 inclusive.

6.1 Appearance

The backing shall be smooth and uniform, free from visible faults such as fish eyes, slits, folds, breaks, uneven or frayed edges.

The adhesive layer shall be smooth and uniform and as free from lumps and bare spots as the best commercial practice will permit. There shall be no adhesive transfer when the tape is unwound from the roll.

6.2 Color

The color of plastic backing shall be black.

6.3 Form

The tape shall be supplied in rolls wound on hollow cores. Hollow cores shall have a nominal inside

diameter of 38 mm or as specified by purchaser. A removable interleaf (release paper) shall be incorporated against the adhesive compound preferably extend a minimum of 5 mm wider each side than the width of the tape.

6.4 Heat Aging

After test samples from inside of the roll have been aged for 30 days in an air-circulating oven at a constant temperature of 60°C, the tensile strength and the elongation shall be determined at 22°C by ASTM D 1000, an average value for tensile strength and elongation shall be not less than 80 percent of the original unaged value.

6.5 Roll Sizes

The roll sizes, as specified by the purchaser, shall be as follows:

Roll length: 10 m., 20 m.

Roll width: 50 mm, 100 mm, 150 mm, 225 mm.

TABLE 1 – PHYSICAL PROPERTIES OF TAPE

PROPERTY	UNIT	REQUIREMENT	TEST METHOD ASTM
THICKNESS: TOTAL (MIN.) BACKING (MIN.) ADHESIVE (MIN.)	mm	 0.900 0.150 0.650	D 1000
TENSILE STRENGTH (MIN.)	kg/cm WIDTH	2.5	D 1000
ELONGATION AT BREAK (MIN.)	%	150	D 1000
ADHESION TO PRIMED STEEL (MIN.)	kg/cm WIDTH	1.5	D 1000 (METHOD A)
ADHESION TO SELF (AT OVERLAPS) (MIN.)	kg/cm (WIDTH)	0.5	D 1000
DIELECTRIC STRENGTH (MIN.)	V/ μ m	40	D 1000
INSULATION RESISTANCE (MIN.)	MEGOHMS	10^6	D 257
WATER VAPOR TRANSMISSION RATE (MAX.)	g/m^2/24 HRS	3	E 96 (METHOD B)
WATER ABSORPTION (MAX.)	%WT.	0.1	D 570
CATHODIC DISBONDING (MAX.)	mm (DIAMETER)	50	G 8 (METHOD A)
HEAT AGING IN 30 DAYS AT 60°C: REDUCTION OF ELONGATION & TENSILE STRENGTH (MAX.)	%	20	SEE 6.4
TEMPERATURE RANGE: APPLICATION OPERATION	°C	 -20 TO +60 -20 TO +60	____

7. STORAGE LIFE, PACKAGING AND SAMPLING

7.1 Storage Life

The product shall meet the requirements of clause 6 after storage for 24 months from the date of delivery, in an original covered container at temperatures between -20 to +60°C.

7.2 Packaging

The tapes purchased according to this Standard Specification shall be packaged in suitable containers to ensure acceptance and safe delivery to their destination. Rolls of tape shall be packaged in quantities not to exceed the weight limitations of the container specifications. Each roll of tape shall be protected from adhering to other rolls, the container, or to the packaging material itself by the use of release paper.

7.3 Sampling

Unless otherwise specified by the purchaser, 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 10 rolls. The results of the tests on four specimens cut from each sample roll shall be averaged for each test specified in clause 6 to determine conformance with the specified requirements. The numbers and types of test specimens shall be in accordance with the ASTM test method for the specific properties to be determined.

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 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.

8.2 The supplier shall be responsible for the performance and costs for all laboratory test requirements as specified in this Standard. The supplier 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 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 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 shall furnish the purchaser with a certified copy of results of tests made by the manufacturer covering physical and performance characteristics of 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 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 sample rolls (see 7.3) 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 in this Standard specification, the methods of sampling and testing shall be in accordance with applicable methods of the International Organization for Standardization (ISO), British Standard Institution (BSI) and Deutsch Institut fur Normung (DIN).

9. LABELING

9.1 Marking of Rolls

Each roll shall be marked with the following:

a) Name and/or trade mark of the manufacturer;

b) Type and trade name of tape;

c) Length of the roll (in m);

d) Width of the roll (in mm).

9.2 Marking of Containers

Each container shall be plainly marked with the following information:

Name: Hand-Applied Laminated Tape Suitable for Cold-Applied Tape Coating System
Specification: IPS-M-TP-313
Order No.: .....
MESC No.: .....
Type and trade name of tape: .....
Roll sizes: length .....m width .....mm
Type or trade name of primer to be used with the tape: .....
Batch No.: .....
Stock No.: .....
Date of manufacture: .....
Quantity (Number of rolls): .....
Manufacturer's name and address: .....
Date of inspection: .....
Date of Exp.: .....
UPC bar code part No.: .....
Storage temperature: .....
Design guide: For guidance on the usage of this material reference shall be made to IPS-E-TP-270

9.3 Direction for Use

The manufacturer's instructions for use shall be supplied with each container of tape.