MATERIAL STANDARD

FOR

HAND-APPLIED PETROLATUM TAPE AND PRIMER

ORIGINAL EDITION

JAN. 1996

This standard specification is reviewed and updated by the relevant technical committee on Oct. 2003. The approved modifications are included in the present issue of IPS.

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1. SCOPE

This Standard specification sets out minimum requirements for hand-applied petrolatum tape and it's primer to be used for the corrosion protection of underground and underwater valves and irregular shape fittings.

The Standard consists of two parts as follows:

Part 1 : Petrolatum Tape

Part 2 : Petrolatum Primer (Priming Solution)

The Petrolatum anti-corrosive materials shall neither be used for parts which contact an organic solvent directly, or for external coating of buried pipelines carrying these materials including crude oil and petroleum products, nor for substances which is buried in soil or water containing crude oil or petroleum products because there will be danger of petrolatum being dissolved by such organic materials.

Note:

This standard specification is reviewed and updated by the relevant technical committee on Oct. 2003. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 208 on Oct. 2003. 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)

Z 129.1	"Precautionary Labeling of Hazardous Industrial Chemicals"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIAL)

D 70	Standard Test Method for "Specific Gravity and Density of Semi-Solid Bituminous Materials"
D 94	Standard Test Method for "Saponification Number of Petroleum Products"
D 570	Standard Test Method for "Water Absorption of Plastics"
D 1000	Standard Test Method for "Pressure-Sensitive Adhesive Coated Tapes Used for Electrical and Electronic Applications"
D 1200	Standard Test Method for "Viscosity by Ford Viscosity Cup"

D 1296	Standard Test Method for "Odor of Volatile Solvents and Diluents"
E 70	Standard Test Method for "pH of Aqueous Solutions with the Glass Electrode"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-C-TP-101	"Construction Standard for Surface Preparation" (Not Applicable for Procurement)
IPS-E-TP-270	"Coatings" (Not Applicable for Procurement)

SSPC (STEEL STRUCTURES PAINTING COUNCIL)

SSPC	PA3	"Safety Precaution in Painting"

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 4203	"Reducibility and Dilution Stability"
Method 4321	"Brushing Properties"

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.

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.

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.

Petrolatum

Petrolatum is Petroleum jelly used for impregnation.

Petroleum Jelly

Petroleum jelly is a purified mixture of semi-solid hydrocarbons obtained from petroleum.

Saponification Number

The number of milligrams of potassium hydroxide that is consumed by 1g of oil under the conditions of the test.

Tensile (Breaking) Strength

The force required, Per unit width, to break the tape when tested under Specific conditions of test.

4. UNITS

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

5. PART ONE

5.1 Scope

Part one of this standard specification covers the minimum requirements for composition, properties, storage life, packaging, sampling, inspection and testing, and labeling of Petrolatum tape for corrosion Protection.

5.2 Composition

The tape shall consist of thin, flexible fabric of synthetic fiber cloth uniformly impregnated and coated on both side with a mixture of petroleum jelly and natural mineral filler plus suitable additives.

The base material shall be as uniform in composition and size and as free of contamination as can be achieved by good manufacturing practice.

The tape shall be designed for use with its own primer and both tape and primer shall be from the same manufacturer.

5.3 Classification

The tape shall be Type 1 or Type 2, as will be specified by the purchaser, with reference to it's thermal resistance (see Table 5.1).

TABLE 5.1 - CLASSIFICATION

TYPE	THERMAL RESISTANCE °C
TYPE 1	٤٠
TYPE 2	٦٠

5.4 Properties

The tape shall provide high insulation properties, corrosion preventing properties, low moisture absorption and permeability, non cracking and non hardening properties. It shall be resistant to salts, mineral acids, and alkaline substances. The tape shall be simply unrolled in situ on to the primed steel surface.

The finished material shall meet the requirements of Table 5.2 and subclasses 5.4.1 to 5.4.6 inclusive.

5.4.1 Appearance

The tape shall be wound uniformly and shall have a smooth and uniform surface free from remarkable deformation, folds, cuts, badly impregnated areas, uneven or frayed edges, presence of foreign bodies, and other defects to practical use.

The appearance of tapes shall be observed visually.

5.4.2 Cold workability

The tape shall be highly conformable for easy hand wrapping even at low temperatures (-5 to 0°C) with no occurrence of breakage nor cracking, and no loss of visco consistency.

The test method shall be in accordance with Appendix C.

5.4.3 Saponification number

The saponification number of the petrolatum tape should not be greater than 10 mg KOH/g weight of sample. The test method shall be in accordance with ASTM D94.

5.4.4 Form

The tape shall be supplied in rolls densely wound on hollow cores, having a typical inside diameter of 38 mm, and preferably covered on one side with a plastic foil.

5.4.5 Color

Unless otherwise specified, the material shall be of neutral color.

5.4.6 Dimensions (roll sizes)

The nominal roll sizes (see 3), as will specified by the purchaser, shall be as follows:

Roll length: 5-10 m

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

TABLE 5.2 - PHYSICAL PROPERTIES OF TAPE

PROPERTY	UNIT	REQUIREMENT	TEST METHOD
Thickness (average)	mm	١,١ (permissible deviation from average = 0.2)	ASTM D1000
Weight (min.)	kg/m^2	١,٣	Appendix F
Tensile strength (min.)	kg/cm width	٣,٥	ASTM D1000
Dielectric strength (min.) (double layer)	Kv	١٦	ASTM D 149
Water Absorption (max.)	%	١	ASTM D570
Thermal resistance, 24h Type 1 Type 2		 No dripping at 40±2°C No dripping at 60±2°C	Appendix B
Tacky adhesion strength (min.)	kg/cm width	٠,٥	Appendix E
Change in Ph		±١,٠	Appendix D

5.5 Storage Life, Packaging, and Sampling

5.5.1 Storage life

The product shall meet the requirements of Clause 5.4 after storage for 24 months from the date of delivery, in an original covered container at normal conditions.

5.5.2 Packaging

The tapes purchased according to this standard specification shall be packaged in suitable containers to ensure acceptance and safe delivery to their destination.

Each roll shall be individually packaged with a moisture proof material and rolls of tape shall be securely packed in parcels or boxes in such a way as to protect them from damage.

Packing shall be weather-proof and strapped on pallets suitable for long distance shipment.

5.5.3 Sampling

Unless otherwise specified, the number of samples for testing shall consist of 10 percent of the lot (see 3), 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 5.4 to determine conformance with the specified requirement.

5.6 Inspection and Testing

5.6.1 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.

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

The supplier and/or 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.

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

5.6.4 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.

5.6.5 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.

5.6.6 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.

5.6.7 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 materials (Tape and/or primer) is (are) found not to conform to this Standard, materials represented by such sample will be rejected.

5.6.8 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 (BS) and Deutsch Institute fur Normung (DIN) last edition.

5.7 Labeling

5.7.1 Marking of rolls

Each roll shall be marked with the following information:

a) name 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.);

e) weight of the roll (in kg).

5.7.2 Marking of containers

Each container shall be plainly marked with the following information:

Name	**: Petrolatum Tape**
Specification	**: IPS-M-TP-317 (Part One)**
Order No.	**: .....**
MESC No.	**: .....**
Type and trade name of tape	**: .....**
Roll sizes	**: Length .....m, width …….. mm.**
Type and trade name of primer to be used with the tape	**: .....**
Max. temperature resistance (°C)	**: .....**
Batch No.	**: .....**
Stock No.	**: .....**
Date of manufacture	**: .....**
Quantity (Number of rolls)	**: .....**
Manufacturer's name and address	**: .....**
Design guide	**: For guidance on the usage of this Material reference shall be made to IPS-E-TP-270**

5.7.3 Direction for use

The manufacturer's instruction for use shall be supplied with each container of tapes.

6. PART TWO

6.1 Scope

This Part of standard specification covers the minimum requirements for petrolatum primer (priming solution) to be used in conjunction with petrolatum tape (Part One) for corrosion protection.

6.2 Composition

The primer shall be based on petroleum-jelly compound and of constituents compatible with the brand of petrolatum tape material blended with proper type and amount of volatile organic solvent to produce a liquid coating which can be applied cold by brushing or spraying.

The base material shall be as uniform in composition and size and as free of contamination as can be achieved by good manufacturing practice.

The product shall be capable of producing a satisfactory bond between the metal surface and the petrolatum tape.

It shall be homogeneous, water-free, stable in storage, free from grit and coarse particles and resistant to salts, mineral acids and alkaline substances.

The primer shall contain additives, which inhibit corrosion, and microbiological attack The primer shall be designed for use with the particular tape and both tape and primer shall be from the same manufacturer.

6.3 Properties

The primer shall comply with the requirements of Table 6.1 and 6.3.1 to 6.3.8 inclusive.

6.3.1 Odor

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

6.3.2 Color

Unless otherwise specified, the material shall be of neutral color.

6.3.3 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).

The thinner shall be defined by the manufacturer.

6.3.4 Application properties

The primer shall have satisfactory brushing properties with a minimum tendency to produce bubbles during application (US Federal Standard No. 141, Method 4321).

No heat shall be required to produce an effective bond between the surface to be protected and the subsequently applied tape.

6.3.5 Condition in container

The primer shall not settle in the container forming a cake or sludge that can not be mixed easily by hand stirring (US Federal Standard No. 141, Method 3011).

6.3.6 Covering capacity

The covering capacity of primer for surface which is clean and free from rust, mill scale, weld spatter, water, grease, dirt and other loose or deleterious matter shall not be less than 8 Sq.meter per one liter of primer with regards to specified adhesion strength of coating system.

6.3.7 Toxic ingredients

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

6.3.8 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 6.1 - REQUIREMENTS FOR PRIMER

PROPERTY	UNIT	REQUIREMENT	TEST METHOD ASTM
Specific gravity at 25°C	---	١±٠,١	D70
Viscosity (flow time; ford cup no. 4) at 25°C	S	٥٠ to 70	D1200
Saponification number (max.)	mg	١٠	D94
Temperature range of: Application Operation	°C	 - 5 to + 40 - 5 to + 60	

6.4 Storage Life, Packaging and Sampling

6.4.1 Storage life

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

6.4.2 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. All containers shall be of a suitable shape, with a sufficiently large aperture to allow adequate stirring and mixing.

The primer shall be furnished in 1 liter steel cans, in 3.8 liters (1-US gal.) steel cans, or other suitable containers as specified by the purchaser.

6.4.3 Sampling

Unless otherwise specified, the number of samples for testing shall consist of 10 percent of the lot (see 3), but in no case shall be less than one or more than ten samples. The results of the tests on at least two specimens made from each sample shall be averaged for each test specified in Clause 6.3 to determine conformance with the specified requirements.

6.5 Inspection and Testing

See Part 1, paragraph 5.6.

6.6 Labeling

6.6.1 Labeling standard

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

6.6.2 Marking of containers

Each container shall be legibly marked with the following information:

Name	**: Petrolatum Primer (Priming Solution)**
Specification	**: IPS-M-TP-317 (Part Two)**
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	**: .....**
Type and trade name of tape to be	
used with the primer	**: .....**
Lot or batch No.	**: .....**
Stock No.	**: .....**
Date of manufacture	**: .....**
Quantity of primer in container	
(net weight)	**: .....**
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**

6.7 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 primer is intended for use as a prime coat on prepared steel surfaces. The surface of steel shall be prepared to ST 3 in accordance with IPS-C-TP-101 before applying primer.

- This primer is intended to be followed by prefabricated hand-applied petrolatum tape conforming to IPS-M-TP- 317 (Part One).

6.8 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 (if working in closed area) to insure that the vapor concentrations do not exceed the published permissible exposure limits. When necessary, supply appropriate personal protective equipment and enforce its use.

APPENDICES

APPENDIX A

GENERAL CONDITION OF TESTING

A.1 Standard Atmospheric Conditions of Testing Site

Unless otherwise specified, tapes (and it's primer) shall be tested on a testing site under the standard atmospheric conditions. However, the standard atmospheric conditions mean the conditions at a temperature of 23±5°C and a relative humidity of 65±10%.

A.2 Pretreatment of Sample

The sample rolls of tape (and it's primer) shall preliminarily be left standing on a testing site under the standard atmospheric conditions for 2 hours or longer before removing for test.

A.3 Test Specimen Preparation

Place the rolls of tape to be tested on a freely revolving mandrel. Discard the first three layers of tape from the roll.

Remove the required length of Specimen along the lengthwise direction.

Place the specimen on a smooth clean surface or suspend it from one end in free air for the conditioning period, unless otherwise specified.

The test specimens shall then be prepared as provided for in the individual test methods.

APPENDIX B

DETERMINATION OF THERMAL RESISTANCE

B.1 Apparatus

B.1.1 Thermostatic Bath-A hot wind circulating type bath capable of adjusting the temperature at 40 ±2°C for Type 1 tapes, and at 60 ±2°C for Type 2 tapes, constructed to allow the test body to be installed as shown in Fig. B.1.

B.1.2 Steel pipe-The steel pipe of nominal diameter 50 mm and 300 mm in length, free from scale and other extraneous matters and finished to expose the steel pipe surface, shall be used.

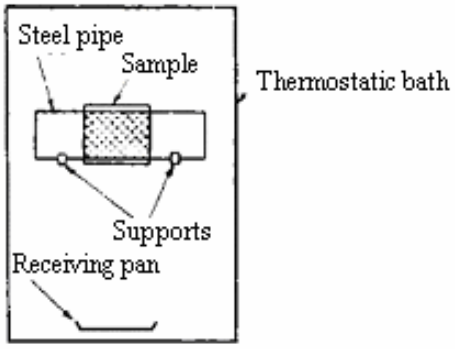
B.2 Procedure

B.2.1 Cut the sample into a piece of 50 mm in width and about 500 mm in length, stick one of its ends on the upper half circumference of the steel pipe and suspend a weight of 3 kg at the other end, and wind the sample in two layers around the steel pipe by rotating the pipe (refer to Fig. B.2).

B.2.2 Then remove the load, cut off the portion of the sample remaining unwound, and smooth the surface by hand toward the winding direction to obtain a smoothness test body with no appreciable difference in level.

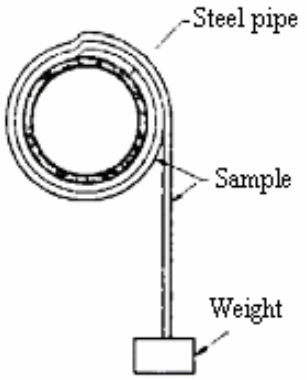
B.2.3 After leaving the test body standing for 30 minutes to one hour, place it in the thermostatic bath adjusted at 40 ±2°C, for Type 1 sample, and at 60 ±2°C for Type 2 sample, and keep the test body horizontal (refer to Fig. B.1).

B.2.4 After 24 h, observe whether or not the petrolatum drips.



MOUNTING METHOD OF TEST BODY

Fig. B.1



WINDING OF SAMPLE

Fig. B.2

APPENDIX C

DETERMINATION OF COLD WORKABILITY

C.1 Apparatus

C.1.1 Thermostatic Bath - One capable of adjusting the temperature at -5 to 0°C.

C.2 Procedure

Leave the sample of 50 mm in width standing in a thermostatic bath at -5 to 0°C for 2 hours or longer, and after immediately removing the outer three layers of the tape under the standard atmospheric conditions, quietly unwind a length of about 1 m in about 3 to 5 seconds, and examine for the occurrence of breakage, cracking, and a change in viscosity consistency by the feel of hand.

APPENDIX D

DETERMINATION OF CHANGE IN pH

D.1 Apparatus

D.1.1 pH Meter-The pH meter as specified in ASTM E70.

D.1.2 Beaker-The beaker of hard quality with nominal capacity of 500 ml.

D.2 Procedure

D.2.1 Introduce 5 ml water (purified by ion exchange) or distilled water into the beaker and completely immerse a test piece of 25 mm in width and 110 mm in length in the water.

D.2.2 After 24 hours have elapsed at room temperature, measure the pH according to ASTM E70 as appropriate to obtain the pH value for this test.

D.2.3 Measure pH of water without the test piece immersed to obtain the pH value for the blank test.

D.2.4 Take the value obtained by subtracting the pH value for the main test from that of the blank test as the change in pH.

APPENDIX E

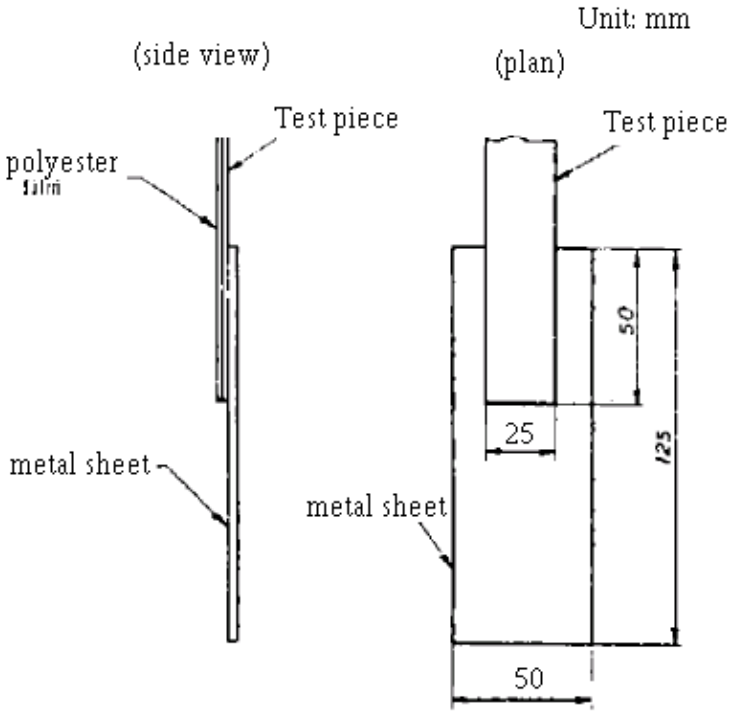
DETERMINATION OF TACKY ADHESION STRENGTH

After test samples from inside of the roll have been aged for at least 2 hours under the standard atmospheric conditions as described in Appendix A, the average adhesion strength shall not be less than 0.5 kg/cm of width. The test method shall be in accordance with ASTM D 1000 (Method A), with the following exception:

E.1 The test specimen shall be 150 mm in length and 25 mm in width.

E.2 Stick the test specimen on one end of the steel plate so as to make the contact surface area 25 mm × 50 mm (refer to Fig. E.1).

E.3 Stick a polyester film of 25 m in thickness and 25 mm × 150 mm in size on the test specimen and pressure-bond it by reciprocating one time the roller of the pressure bonding apparatus at a speed of about 50 mm/S.



METHOD OF LAMINATING TEST PIECE

Fig. E.1

E.4 After 30 minutes since pressure bonding, grip the test piece laminated with the polyester film by the upper chuck of the tensile testing machine and the metal sheet by the lower chuck, and pull at a speed of 300 ±30 mm/min. Thus, read the indicated load value when the test piece is peeled off and take it as the tacky adhesion strength of the tape.

APPENDIX F

DETERMINATION OF DIMENSIONS OF ROLLS

F.1 Apparatus

F.1.1 Balance-One capable of weighing to the nearest 1 g.

F.1.2 Steel Ruler-A steel ruler capable of measuring to the nearest 1 mm.

F.2 Procedure

F.2.1 The test specimen shall consist of a single thickness of tape approximately 1000 mm long removed from a full roll of tape.

The specimen shall be conditioned for not less than 2 hours as described in Appendix A.

F.2.2 Remove the core from the roll and weight the tape to the nearest 10 g (see Note).

Note:

If it is desired to run additional tests on the tape in the roll, it is permissible to weigh the roll with the core in place first and then subtract the weight of the core after all test specimens have been removed.

F.2.3 Remove a test specimen of tape approximately 1000 mm long from the roll in accordance with the procedure described in Appendix A. After conditioning, measure the relaxed length of the specimen to the nearest 10 mm and its width to the nearest 1 mm.

F.2.4 From the net mass (F.2.2) and the dimension (F.2.3), calculate the average net mass per unit area for the rolls in the representative sample and record it as the average for the lot.