MATERIALS AND EQUIPMENT STANDARD

FOR

BITUMEN IMPREGNATED GLASS-FIBER MAT

FOR

OUTERWRAP

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1. SCOPE

This Standard Specification covers the minimum requirements for machine applied "Bitumen impregnated glass-fiber mat" to be used as "outerwrap" for mechanical protection of hot applied bitumen (asphalt) coating system (see also IPS-M-TP-295).

2. REFERENCES

Throughout this Standard the following standards and codes are referred to. The editions of these standards and codes that are in effect at the time of publication of this Standard shall, to the extent specified herein, form a part of this Standard. The applicability of changes in standards and codes that occur after the date of this Standard shall be mutually agreed by the Company and the Vendor.

ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 5256	"Steel Pipes and Fitting for Buried or Submerged Pipelines-External and Internal-Coating by Bitumen or Coal-tar Derived Materials".
ISO 719	"Glass-hydrolytic Resistance of Glass Grains at 98°C-Method of Test and Classification".

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

D 146	"Methods of Sampling and Testing Bitumen-saturated Felts and Woven Fabrics for Roofing and Waterproofing" (Revision A).
D 882	"Test Methods for Tensile Properties of Thin Plastic Sheeting".

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI/AWWA C 203-86	"Standard Specification for Coal-tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot-Applied".

TAPPI (TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY)

TAPPI T-411	"Test for Thickness (Caliper) of Paper and Paperboard, and Combined Board".

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-TP-270	"Coatings"
IPS-M-TP-295	"Bitumen Enamel (Hot-Applied)"

3. DEFINITIONS AND TERMINOLOGY

For this standard the following definitions shall apply:

Binder

Material(s) applied to staple fibers and to strands in order to hold them in a desired arrangement.

Borosilicate Glass

Any silicate glass having at least 5% of boron oxide ($B_2 O_3$).

Breaking Strength

The maximum resistance of material to deformation in a tensile test carried to rupture; that is, the breaking load, or force per unit cross-sectional area of the unstrained specimen.

Glass-fiber Mat

A uniform porous mat which is reinforced by strands of glass yarn to give longitudinal tensile strength; the whole being bonded with a thermosetting resin.

Hot-Applied

Of such a consistency at ambient temperature that heating is required before application.

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 (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.

Pliability

The quality or state of being flexible in bending or creasing.

Thermosetting Resin

A plastic that, after having been cured by heat or other means, is substantially infusible and insoluble.

4. UNITS

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

5. DESCRIPTION

The outerwrap shall be a non-woven, thick, glass-fiber mat uniformly impregnated and coated with bitumen (asphalt) enamel that is compatible with IPS-M-TP-295 or ISO 5256 grade P_b. The glass-fiber mat used shall be a uniformly porous mat of chemically resistant borosilicate glass hydrolytic class III (HGB 3) as a maximum, as specified by ISO 719, which is longitudinally reinforced across the full sheet width by continuous filament glass yarn to provide longitudinal reinforcement. The whole shall be bonded with a thermo-setting resin binder. The binder content shall be such that complete impregnation with the coating material is obtained during normal application. In addition the binder shall be such as to resist the action of micro-organisms. The weight of the base glass-fiber mat, before coating, shall not be less than 50 g/m^2.

The outerwrap shall have a controlled bleed through and must be provided with pin holes to ensure sufficient bleed through of enamel for escaping of gases, vapors and air and also facilitate satisfactory adhesion. It shall be rot, moisture and bacterial proof.

The outerwrap surface shall be dusted with fine mineral matter (surfacing material) before rolling to prevent sticking between layers under normal conditions of shipment and storage.

In addition at the time of unrolling at ambient temperature (0°C to 38°C) the successive layers of the outerwrap shall not stick to one another.

It shall be suitable for application by line-travel equipment or in pipe mills and coating yards on fixed head coating machine.

6. PROPERTIES

The finished material shall meet the requirements of Table 1 and 6.1 to 6.6 inclusive.

6.1 Appearance

The finished outerwrap shall have a smooth, uniform surface, freedom from visible faults such as holes, slits, folds, breaks, badly impregnated areas, delamination, uneven or frayed edges, presence of foreign bodies (oily matter, mud, etc.).

Loose or unbonded surfacing material shall be removed from the surface of the wrap by brushing or other suitable means before packaging.

The test method shall be in accordance with ASTM D146.

6.2 Breaking Strength

After test samples from inside of the roll have been aged in free air for at least 2 hours at 25°C±1°C, the average strength in the longitudinal direction shall be not less than 6000 N/m of width. The average breaking strength in the transverse direction shall be not less than 4000 N/m of width. The test method shall be in accordance with ASTM D882, modified. Cut 10 specimens of 25 mm × 150 mm with the longer dimensions along the roll and 10 specimens with the longer dimensions across the roll.

The size of the clamps of the tensile testing machine should be wider than 25 mm, and the clamps should be attached to swivels that are free to move in any direction. Grip the specimen from each end, leaving a distance of at least 76 mm between the jaws.

Initiate the breaking of the load by causing the lower clamp of the machine to travel at a uniform speed of 300 mm/min. Disregard the reading of any specimen that breaks nearer than 6.5 mm from either clamp, and test an additional specimen in its place. Report the average of the results of 10 individual tests on specimens cut along the roll as the longitudinal breaking strength and the average of the results of 10 individual tests on specimens cut across the roll as the transverse breaking strength. Readings should be to the nearest digit number.

6.3 Pliability

After test samples from inside of the roll have been aged for at least 2 hours at 25°C±1°C there shall be no cracking of the wrapper when bent at a uniform speed over a 25 mm mandrel, as determined by the following test method:

Cut five 150 mm strips with the fiber grain as shown in ASTM D146, Figure 1, D-1 to D-5, and immerse in water at 25°C for 10-15 min. Bend these strips through 180° at a uniform speed, in exactly 2 s, around the mandrel.

6.4 Thickness

The thickness shall not be less than 0.75 mm. The test method shall be in accordance with TAPPI T-411, modified. At 10 equally spaced areas selected by sampling, measure the thickness with an Ames dial reading in units of 0.25 mm (ten thousandths of an inch). Use a circular foot and anvil, both 645 mm^2 in area, exerting a pressure of 13.8 kPa. Make all measurements in an atmosphere of 50 ±2 percent relative humidity and at 23°C±1°C.

6.5 Weight Loss on Heating

The loss on heating shall be not more than 2 percent, as determined by the following test method:

Cut two samples 150 mm × 300 mm. Remove all loose surfacing material from both sides of the sample to preclude any loose particles falling off in the oven during heating and/or testing.

Weigh each strip. Suspend the strips by wire hooks for 2 hours in an oven maintained at 82°C±3°C. Care should be taken that the samples do not touch each other or the sides of the oven and that localized overheating of the samples does not take place.

Remove from the oven, cool in a dessicator, and weigh. Compute the percentage of loss in weight based on the original weight of the sample. The average of the result on the two samples shall be reported as the weight loss on heating.

6.6 Roll Sizes

The nominal roll sizes, as will specified by the purchaser, may be one of the following:

Roll length : 120 m., 240 m.

Roll width : 100 mm., 150 mm.
230 mm., 300 mm.
460 mm.

TABLE 1 - PHYSICAL CHARACTERISTICS OF BITUMEN IMPREGNATED GLASS-FIBER MAT

CHARACTERISTIC	UNIT	REQUIREMENTS	TEST METHODS
WEIGHT (Min.) (Max.)	g/m^2	535 730	ASTM D146
THICKNESS (Min.)	mm.	0.75	TAPPI T-411, MODIFIED. (SEE 6.4 OF THIS STANDARD)
BREAKING STRENGTH (AVERAGE) LONGITUDINAL (Min.) TRANSVERSAL (Min.)	 N/m WIDTH N/m WIDTH	 6000 4000	ASTM D882, MODIFIED. (SEE 6.2 OF THIS STANDARD)
PLIABILITY	—	SHALL PASS TEST	ASTM D146, MODIFIED. (SEE 6.3 OF THIS STANDARD)
WEIGHT LOSS ON HEATING (Max.)	W%	2	ASTM D146, MODIFIED (SEE 6.5 OF THIS STANDARD)

7. STORAGE LIFE AND PACKAGING

7.1 Storage Life

The product shall meet the requirements of Clause 6 after storage for 24 months from the date of delivery, in a full tightly covered container.

7.2 Packaging

The outerwrap purchased according to this Standard shall be rolled on a cardboard tubes with internal diameter of 80 mm (nominal) and packaged in suitable and approved containers so that during stocking and transport , full quality of performance is retained.

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

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 ducuments 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 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 three rolls. The results of the tests on four specimens cut from each sample roll shall be averaged for each test specified in Table 1 to determine conformance with the specified requirements.

9. LABELING

9.1 Marking of Rolls

Each roll shall be marked with the following:

a) The name or trade mark of the supplier:
b) The length of the roll (in m.);
c) The width of the roll (in mm.);
d) The weight of the roll (in kg);

9.2 Marking of Containers

Each container shall be legibly marked with the following information:

Name : Bitumen impregnated glass-fiber mat for outerwrap

Specification : IPS-M-TP-306;

Order No. : .....

MESC No. : .....

Roll sizes : Length .....m, width.....mm.

Max. temperature resistance (°C) :.....

Lot or 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.