

WATER PENETRATION RATE OF WATERPROOF TAPE

Application

This procedure is used to determine the rate of water penetration through waterproof tape.

Description of Test

A vapometer containing a desiccant is covered with a sample of waterproof tape and submerged under water for a specified time. The amount of moisture absorbed through the tape during this period is calculated and reported as the water penetration rate.

Apparatus Required

Vapometer

A vapometer of the Thwing-Albert type or equivalent is required for the test (see sketch attached). The vapometer consists of a small aluminum can-shaped container with a flanged top over which the tape is placed, a rubber gasket, and finally an aluminum ring with six screws for effecting a water-tight seal.

Wax

Paraffin wax, U.S.P. grade, free from foreign material, is required for sealing the assembled apparatus. The melting point of the paraffin shall be 130 °F minimum.

Desiccator

A small desiccator which is large enough to hold the vapometer under an inch of water is needed for the test. Other equivalent apparatus may be used.

Drying Oven

The oven for drying the assembly shall be capable of maintaining a temperature of 100 +/- 2 °F.

Desiccant

Calcium chloride, anhydrous, 8-mesh, is placed in the bottom of the vapometer to absorb any water which passes through the tape specimen.

Balance

A laboratory balance is required for weighing the assembly.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Date	Action	Revisions
2000 11 10	Revised	Editorial – no technical change A. Cockman
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Procedure

1. Transfer approximately 20 g of calcium chloride to the vapometer and spread evenly over the bottom.
2. Remove three turns of tape from the sample roll and discard. Cut a 3 inch wide sample from the roll, being careful not to touch the adhesive side of the tape.
3. Place the test specimen over the top of the can with the adhesive side down and cut the sample with a razor blade so that it fits into the gasket seat of the vapometer below the rubber gasket.
4. Rub around the edges of the tape specimen with the eraser end of a pencil, using sufficient pressure to effect a tight seal.
5. Brush melted paraffin around the extreme edges of the tape specimen only. Assemble the rubber gasket and top aluminum ring, fastening down securely with the six screws.
6. Weigh the assembled apparatus and record the weight (W1).
7. Place the vapometer in a desiccator, add sufficient weight to keep the assembly submerged and add distilled water at a temperature of 100 +/- 2 °F until the surface of the tape is under 1 inch of water.
8. Cover the desiccator and place in an oven at 100 +/- 2 °F for 48 h. Throughout this exposure period, the surface of the tape shall be kept under a head of 0.9 to 1.0 inch of water.
9. At the end of the 48 h period, remove the vapometer, wipe dry, and dry in an oven at 100 +/- 2 °F for 30 minutes. Cool to 72 +/- 5 °F and reweigh (W2).
10. Report the water penetration rate as the grams of water penetrating the tape per 100 sq inch per 24 h at 100 +/- 2E F.

Calculate as follows:

$$\text{Water penetration rate} = \frac{(W2 - W1) \times 24 \times 100}{T \times A}$$

Where:

W1 = weight (in grams) before exposure period.

W2 = weight (in grams) after exposure period.

T = exposure time (in hours).

A = area of exposed surface (in square inches).

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.