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**PERFECT** INTERNATIONAL INSTRUMENT  
**东莞宝大仪器有限公司**  
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**1. DEFINITION**

1.1 Dielectric breakdown is a measure of the maximum voltage stress which a single layer of tape can withstand before dielectric failure occurs, the test being carried out under prescribed conditions.

**2. SIGNIFICANCE**

2.1 The dielectric breakdown of a tape is an indication of its ability to withstand electrical stress. This value does not correspond to the dielectric strength expected in service, but is a numerical value which may be used for purchase by specification, as an indication of quality, and for comparison of different tapes or different lots of the same tape, and, to a limited degree, for design work when coupled with experience. The comparison of dielectric breakdown of different tapes after widely differing moisture conditions gives an indication of the quality of the compound used in the tape backing as a moisture-resistant dielectric.

**3. TEST SPECIMENS**

3.1 Condition the roll for at least 24 hours prior to testing in an atmosphere maintained at 23°C ± 2°C (73.4°F ± 3.6°F) and a relative humidity (RH) of 50% ± 2% at that temperature. The sample shall be placed so that the conditioning atmosphere shall have free access to all normally exposed surfaces of the sample roll.

3.2 Tapes that have backings that are not sensitive to water and/or water vapor such as vinyl, polyimide, polyethylene terephthalate, fluorocarbon polymer films, etc. shall be tested:

3.2.1 After 24 hours immersion in distilled or deionized water at 23°C ± 2°C (73.4°F ± 3.6°F). Note: Specimens shall be removed one at a time and dried by placing between layers of cotton toweling and pressing down gently over the entire surface. The sample shall then be tested immediately to prevent misleading results due to drying of the sample.

3.2.2 After 96 hours at 23°C ± 2°C (73.4°F ± 3.6°F) and 96% RH. Note: Practical methods of maintaining 96% relative humidity in small enclosures are described in the Recommended Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions (ASTM E 104). Samples shall be removed from humidity chamber one at a time and tested immediately.

3.3 Discard at least three but no more than six outer wraps of the tape from the sample roll.

3.4 One 125 mm (5")-long specimen shall be removed from the roll so that the adhesive surface contacts neither the fingers nor any foreign object. Each specimen shall consist of a single layer.

**4. EQUIPMENT**

4.1 Testing device described in ASTM Method D 295. See Figure 1

4.2 Desiccator with perforated plate (www.VWR.com, etc.)

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4.3 Ammonium Sulfate Solution (super saturated) or equivalent for maintaining 96% RH at  $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( $73.4^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$ ) in a desiccator (VWR.com or FisherScientific.com).

5.1 Cotton toweling (Type 1) in a desiccator (VWR.com or FisherScientific.com).  
5.1.1 Necessary to use a device whereby the specimen is held in place under pressure between rubber washers while voltage is applied, to prevent flashover around the edges of the specimen being tested. Such a device is described in detail in the appendix to ASTM Method D 295. The electrodes (See Figure 2) that are part of the test fixture shall be opposing cylindrical rods 6.4 mm in diameter with edges square and ends rounded to 0.8 mm radius held together with a total load of  $50 \pm 2$  gm (include the weight of electrode), applied to the upper electrode (Type 3 ASTM D 140).

5.2 Using the appropriate test equipment, and with a suitable width sample (sufficient to prevent flashover) held between the two electrodes (see Figure 3), determine the dielectric breakdown by raising the voltage uniformly at 500 volts per second until strikethrough occurs.

5.3 Reject any test where results from arcing around the surface of the tape, when a wider sample width tape may be indicated. A minimum of 5 samples from randomly selected rolls is acceptable for reporting the average result.

## 6. REPORT

6.1 Complete identification of the tape including width and nominal or measured thickness.

6.2 Conditioning method used.

6.3 Average breakdown voltage, plus the maximum and minimum, if specified.

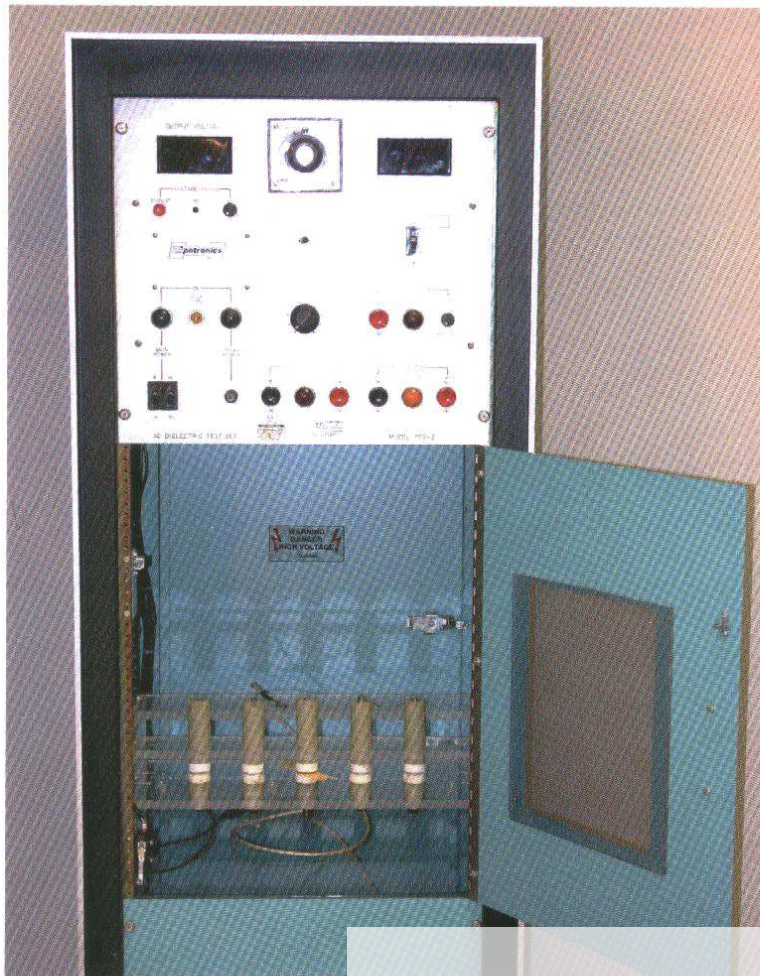


Figure 1. Dielectric test equipment.  
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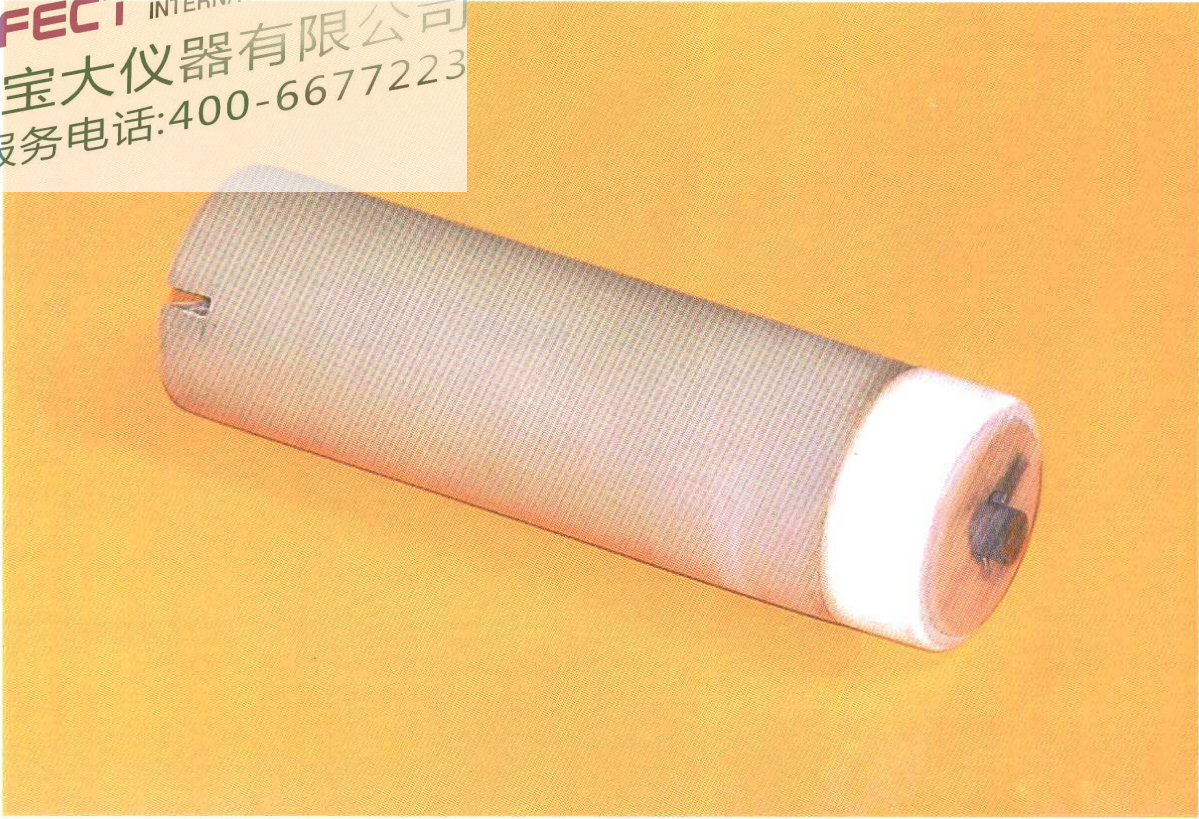


Figure 2. Dielectric electrode.

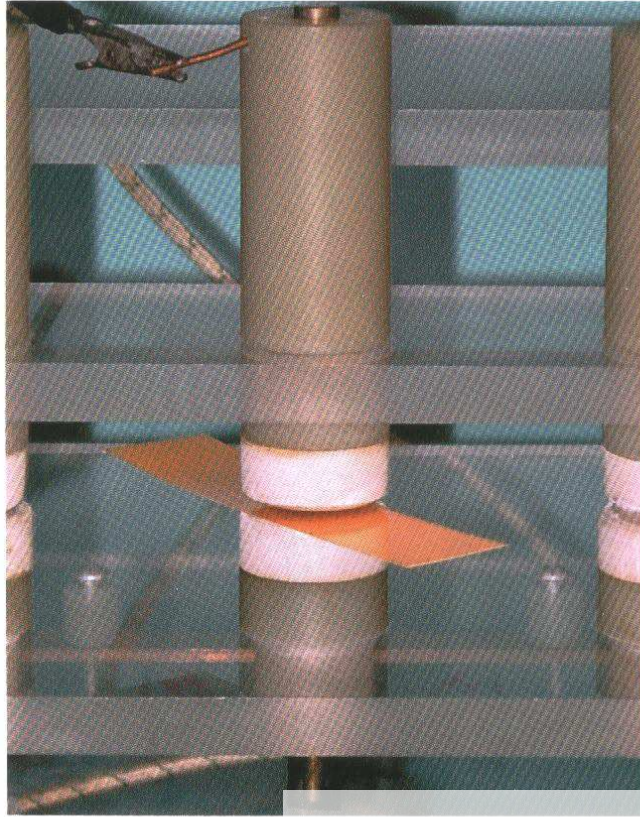


Figure 3. Dielectric sample.