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PERFECT INTERNATIONAL INSTRUMENT
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Flammability of Electrical Grade Tapes

1. DEFINITION

1.1 Flammability is the ability of a tape to self extinguish after exposure to a flame under controlled conditions.

2. SIGNIFICANCE

2.1 Flammability by this method differentiates between tapes having widely different burning characteristics but is less precise in differentiating between tapes within a narrow range of burning characteristics. The method should be used primarily for specification purposes inasmuch as the actual amount of tape used in any specific application and its configuration may alter the burning time.

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% ± 5% 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 Discard at least three but no more than six outer wraps of the tape from the sample roll.

3.3 Cut two strips of tape for each specimen 18 mm (3/4") wide by approximately 375 mm (15") long. In such a manner that fingers or any foreign object contacts the adhesive side.

4. EQUIPMENT

4.1 Clean, straight brass rods, 3 mm (1/8") in diameter and 300 mm (12") long, free from any burned material (www.VWR.com, etc.). After use may require cleaning with a fine emery cloth and/or solvent.

4.2 Winding fixture: Designed to support a brass rod by the ends and a crank or other device to rotate the rod from either end so that the strips of tape may be wound onto the brass rods. The fixture shall be attached to a rigid support in such a manner that it may be rotated to the proper angle needed to achieve the correct lap in winding the tape.

4.3 Weights: As required to provide 150 g for each 0.025 mm (0.001") nominal overall thickness of tape and means for attaching them to the end of the tape to provide winding tension.

4.4 Bunsen burner: The gas flow cylinder shall be 9 mm (3/8") inside diameter (www.VWR.com or www.FisherScientific.com).

4.5 Stop watch (www.VWR.com or www.FisherScientific.com).

4.6 Level (www.VWR.com or www.FisherScientific.com).

4.7 Stands and clamps: Arranged to support the test specimen horizontally (www.VWR.com or www.FisherScientific.com).

4.8 Enclosure: To provide a draft-free enclosure such as a hood with exhaust fan (www.VWR.com or www.FisherScientific.com).

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4.9 Gas supply: Public utility or propane gas may be used. For referee tests, commercial grade propane gas having a nominal heating value of 2521 Btu/ft³ and a specific gravity of 0.508 at 15.5°C shall be used, at a line pressure of 270 mm (11") water column.

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5.1 Place rods in the fixture while held in a horizontal position. Secure one end of a strip near one end of the rod by making a couple of wraps while keeping the rod at a 35° angle. Attach a weight as required by 4.3 to the lower end of the tape. See Figure 1. After 1 min. under tension, slowly tilt the fixture and rotate the rod so that the tape wraps on the rod with a 1/2 lap for a length of 250 mm ± 9 mm (10" ± 3/8"). Remove the weight.

5.2 Reverse the rod on the fixture and repeat the procedure above so that a second strip of tape shall be wrapped over the first strip in the opposite direction. This completes the preparation of the test specimen.

5.3 Support the specimen in a horizontal position in the draft-free enclosure using the stands and clamps. Use the level to verify that the sample is horizontal.

5.4 Ignite the Bunsen burner and adjust the flame to produce a 75 mm (5") outer cone and 37 mm (1.5") inner cone.

5.5 Apply the Bunsen burner flame vertically to the specimen so that the tip of the inner cone touches the center of the specimen. Start the stop watch at the instant the flame is applied to the specimen. Allow the flame to remain in contact with the specimen for 30 seconds.

5.6 After 30 seconds, immediately turn off the gas. Do not remove from the burner or create a new draft. When the specimen ceases to burn, stop the stop watch. Subtract 30 seconds from the total time recorded and report the time in excess of 30 seconds as the flammability of the test specimen.

6. REPORT

6.1 Complete identification of the tape.

6.2 Average burning time in seconds, plus the maximum and minimum, if specified.

6.3 Observations on the burning characteristics and condition of the burned specimens.

6.4 A minimum of three samples from three random rolls is acceptable.

Another method for measuring the flammability of electric grade tapes is ASTM D 1900.

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Figure 1. Flammability sample preparation.