



Standard Test Method for MODULUS OF RUPTURE OF PETROLEUM WAX¹

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This method was prepared jointly by the Technical Association of the Pulp and Paper Industry and the American Society for Testing and Materials.

1. Scope

1.1 This method covers the determination of the modulus of rupture of a petroleum wax. This procedure measures the strength of waxes by application of the simple beam formula for elastic rigid bodies and is not applicable to waxes that have more than 3-mm ($1/8$ -in.) deflection under the test conditions used.

2. Summary of Method

2.1 The specimen is cast over hot water and allowed to cool slowly in a room held at $23 \pm 1^\circ\text{C}$ ($73 \pm 2^\circ\text{F}$) and $50 \pm 5\%$ relative humidity. Small slabs of stated dimensions are suspended on two supports and then fractured by adding weight under prescribed loading conditions to a container suspended from the slab. The weight required to fracture the sample is determined and this weight, together with the specimen dimensions, is used to calculate the modulus of rupture.

3. Definition

3.1 *modulus of rupture*—the force in kilopascals (pounds-force per square inch) necessary to break a specimen of specified width and thickness, using the apparatus defined in this method.

4. Apparatus

4.1 *Modulus of Rupture Apparatus*, complete with specimen saw, jig for cutting test slabs, and casting pans. Apparatus specifications are given in Annex A1.

4.2 *Thickness Gage or Dial Comparator* capable of measuring to 1 mil. (0.025 mm).

4.3 *Cover Glass* 150 by 230 mm (6 by 9 in.) to fit casting pans.

4.4 *Metal Hood* to fit over casting pans and cover glass.

4.5 *Laboratory Oven* capable of maintaining temperature within $\pm 3^\circ\text{C}$ (5°F).

4.6 *Test Room* maintained at $23 \pm 1^\circ\text{C}$ ($73 \pm 2^\circ\text{F}$) and $50 \pm 5\%$ relative humidity.

5. Sample and Test Specimens

5.1 Weigh into a clean beaker sufficient wax (approximately 85 g) to provide a slab 3.81 ± 0.25 mm (0.150 ± 0.010 in.) thick and heat it in an oven to 11°C (20°F) above the congealing point of the sample. Boil 1 litre of distilled water for each sample to be tested. Pour the boiling water into a clean casting pan, and then slowly pour the molten wax onto a spatula partly immersed in the water to prevent splattering of the sample and to avoid entrainment of air in the wax sample. Cover the pan with a cover glass and then cover the entire assembly with a metal hood to avoid drafts. Allow the sample to cool at least 8 h at $23 \pm 1^\circ\text{C}$ ($73 \pm 2^\circ\text{F}$).

5.2 After the sample has cooled, cut around the outer edge of the wax with a thin-bladed spatula and remove the sample from the casting pan. Place the sample on a glass plate and score with a sharp knife to give a central section of the slab approximately 75 by 200 mm (3 by 8 in.). Break off the outer scored portions along the long axis of the

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