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## Water repellence of paper and boards

### Scope

This method describes a procedure for measuring water repellence of paper, paperboard, or combined board which has been treated to produce water repellence. The method can be used for a wide range of products, from sheets having only slight water repellence to sheets with wax sizings or coatings that have a high degree of water repellence. This method is useful for sheets treated with such materials as a stearic chrome complex, polyvinylidene chloride, polyvinyl compounds, commercial varnishes, paraffin wax impregnations, and paraffin wax coatings. The sheets may be produced directly on the paper machine or subsequently coated. The method is not practical for plastic extrusion coatings, heavily wax-coated, nor certain curtain-coated grades which have a hard wax/resin type of coating, for which the test period becomes prohibitively lengthy.

### Safety precautions

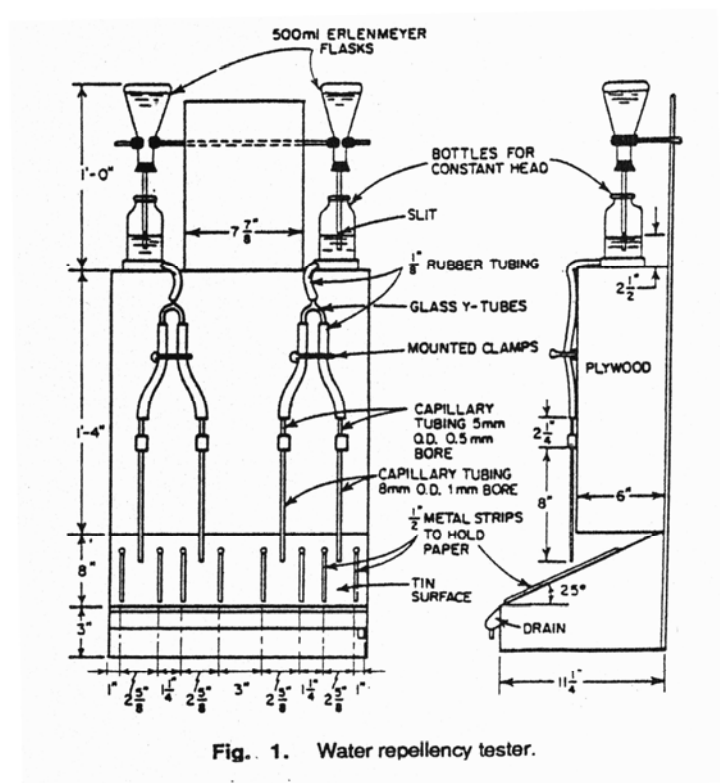
There are no additional safety precautions associated with this method.

### Apparatus

1. *Water repellence tester* (Fig. 1), consisting of the following components:
  - (a) *Water reservoir*, one or more inverted Erlenmeyer flasks, 500 mL or larger.
  - (b) *Constant head bottle*, adjusted by positioning a slit in the delivery tube from the water reservoir to maintain a constant water level of about 6.5 cm (2.5 in.).
  - (c) *Delivery tubes*, glass capillary tubes, to deliver  $8.0 \pm 0.5$  mL (about  $9.5 \pm 5$  drops) distilled water per minute in free-falling drops at 23°C (73°F), each pair of tubes connected to the constant head bottle by means of a Y-tube and rubber tubing.

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- (d) *Pinch clamp*, for starting and stopping the flow of water.
- (e) *Support block and specimen holders*, with top surface of the block at an angle of  $25 \pm 1^\circ$ , and holders made of spring steel or bronze so as to hold the specimens firmly in position.
2. *Timer*, stop watch or electric timer reading in seconds.



## Materials

*Distilled water*, stored in stoppered containers at  $23 \pm 2^\circ\text{C}$  ( $73 \pm 3.5^\circ\text{F}$ ).

## Calibration

Check and if necessary adjust the length or diameter of each capillary tube so that it delivers the specified flow.

**NOTE 1:** This adjustment is critical for accurate results.

Remove any air bubbles from the tubing of the apparatus before using by holding the constant head bottle directly over the Y-tube so that the rubber tubing is vertical. With the pinch clamp closed, work the air bubbles out of the vertical tube by squeezing it with the fingers.

Position the tips of the delivery tubes so that a drop contacts the test specimen at the same time that the next drop is released from the tube (the drops are not free flowing).

Check the flow rate of each tube before use.