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Water absorbency of nonbibulous paperboard

Scope

This method is used to determine the rate of water absorption of an unsized or slack-sized paperboard. It is generally suitable for sheets of paperboard 0.2 mm (0.008 in.) thick or thicker.

For testing absorbent paper or materials such as blotting, toweling, tissues, or beer mat stock, use TAPPI T 432 "Water Absorbency of Bibulous Papers."

For testing harder sized sheets, TAPPI T 441 "Water Absorptiveness of Sized (Non-bibulous) Paper, Paperboard, and Corrugated Fiberboard (Cobb Test)."

Safety precautions

There are no particular safety precautions associated with this method.

Apparatus

1. *Buret*, preferably of 25-mL capacity or less. Adjust the tip of the buret to provide individual drops of approximately 0.05 mL. A buret delivering 5.0 mL of water as 100 +/- 4 drops of distilled water at 23°C (73°F) meets this requirement.

NOTE 1:

The water may be dyed, for ease of observation, by heating nearly to boiling and adding 0.5% by weight Crocein Scarlet N (Acid Red 73) dye to give a deep red color when completely dissolved. Cool to 23°C and filter if not clear. If dyed water is used, the buret must be calibrated with the same dyed water, or perhaps more easily, a second buret calibrated for use with the dyed water.

Approved by a Working Group of TAPPI in accordance with the Useful Method Guidelines

NOTE 2: Depending upon the sizing level of the product, the addition of dye may affect the surface tension enough to influence test results.

2. *Stopwatch* or timer.
3. *Specimen support*, a piece of metal or other nonabsorbent material about 100 × 100 mm having a central hole of approximately 40 mm.

Test specimens

From each test unit obtained in accordance with TAPPI T 400 “Sampling and Accepting a Single Lot of Paper, Paperboard, Containerboard or Related Product,” select five test specimens each about 100 × 100 mm (4 × 4 inches square for each side to be tested. Mark the wire or felt sides of the specimens and condition and test them in an atmosphere in accordance with TAPPI T 402 “Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets and Related Products.”

Procedure

Fill the buret with distilled water (or dyed distilled water if used) at a temperature of 23°C. In turn, place each specimen, with the side to be tested uppermost, on the specimen support situated 10 mm ($\frac{3}{8}$ in.) or other specified distance beneath the tip of the buret. The buret tip shall be centrally located over the hole in the specimen support piece so that lower surface of the specimen, in the area to be tested, does not contact any other surface.

Allow a single drop of water to fall upon the paperboard and record the time in seconds required for the drop to be completely absorbed, as indicated by the wet spot losing its gloss. Where absorption time is expected to be 2 min or greater, cover the drop with a watch glass immediately to reduce the effect of evaporation.

NOTE 3: If an auxiliary lamp is used as an aid in viewing, it should be situated far enough from the specimen to prevent heating the sheet or the testing solution.

Report

For each test unit report as water absorbency the average time of five tests in seconds, to the nearest second, required for a 0.05-mL drop of water to be absorbed by the specified side of the paperboard.

State if the water was dyed.

State distance from the buret tip to the specimen, if other than 10 mm.

Precision

The following estimates of precision are based on a round robin test (ten replications by six laboratories testing eight types of paperboard):

Repeatability (within a laboratory) = 14%

Reproducibility (between laboratories) = 72%.

Keywords

Paperboard, Water absorbance, Absorptivity