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Water absorption of corrugating medium: boat method

1. Scope and summary

1.1 The water absorptivity of corrugating medium is measured by forming a specimen into a boat shape, floating this on the surface of a vessel of water, and determining the time for the visible surface to become saturated.

1.2 This method is applicable to corrugating medium as it is commercially produced by all processes. It is generally applicable to relatively unsized (water leaf) paperboards. It has not been investigated for applicability to more highly sized boards or to grades produced in different grammage (basis weight) than those normally used in corrugating medium.

1.3 Two preferred methods which can be performed in the same general time period with equal repeatability are also described in TAPPI T 831 "Water Absorption of Corrugating Medium: Water Drop Penetration Test" and TAPPI T 835 "Water Absorption of Corrugating Medium: Water Drop Absorption Test." They do not give the same numerical results, but, in general, will rank the materials in the same order as this method. Another preferred method is TAPPI T 832 "Water Absorption of Corrugating Medium: Float Curl Method."

1.4 TAPPI T 432 "Water Absorbency of Bibulous Paper" and TAPPI T 492 "Water Absorption of Paperboard (Nonbibulous)" have been used to measure the water absorptivity of corrugating medium, but the study which led up to the development of this method indicates that they lack the repeatability of this method and most certainly take more time to conduct, especially on the more resistant samples.

2. Significance

The absorptivity of corrugating medium must be controlled to some extent so that it has the proper receptivity to the corrugating adhesive, which is an aqueous suspension of starch, for proper adhesion in the corrugating process. A test for absorptivity is necessary for control. The absorptivity may relate to the way the medium can be steamed by the showers on the singlefacers and by the preconditioner.

3. Apparatus and materials¹

3.1 *Open dish or vessel*, to contain the water and float the specimen. A 145-mL or larger evaporating dish has been found satisfactory, but any similarly sized vessel is adequate.

3.2 *Rubber stopper*, approximately 62 mm (2 ½ in.) in diameter (#13-1/2 size).

3.3 *Template*, of approximately 19 mm (¾ in.) plywood or clear plastic with 69 mm (2 ¾ in.) diameter hole cut in center. The sides of the hole are to be at the same angle (79.5°) as the sides of the rubber stopper; i.e., the hole is 69 mm (2¾ in.) in diameter at the top, 62 mm (2½ in.) in diameter at the bottom (see Fig. 1).

3.4 *Distilled water or deionized water*, pH 6.5 to 7.5.

¹Names of suppliers of testing equipment and materials for this method may be found on the Test Equipment Suppliers list in the set of TAPPI Test Methods, or may be available from the TAPPI Standards Department.

3.5 Stopwatch or timer.

4. Sampling and test specimens

4.1 Select sample according to TAPPI T 400 "Sampling and Accepting a Single Lot of Paper, Paperboard, Containerboard, or Related Product."

4.2 Condition according to TAPPI T 402 "Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets, and Related Products." Conduct test in atmosphere corresponding to TAPPI T 402.

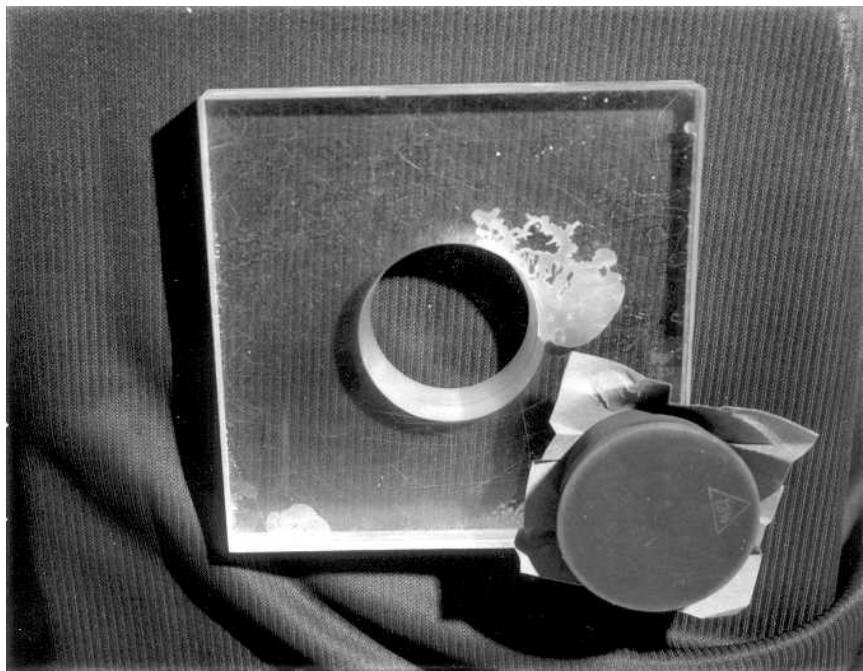


Fig. 1. Template and rubber stopper.

4.3 From each test unit of the sample, cut at least ten specimens, to approximately 100 x 100 mm (4 x 4 in.) size. Alternatively, cut ten such specimens from a single composite test unit.

4.4 Determine the felt and wire side of each specimen (see TAPPI T 455 "Identification of Wire Side of Paper). If desirable, make a small mark identifying the wire side.

5. Procedure

5.1 Make a boat of the test specimen by forming it loosely around the rubber stopper, wire side toward the stopper, pushing the combination into the hole in the template and twisting one-half turn. Remove the template and stopper prior to testing the sample. Several boats can be prepared prior to conducting the actual test.

NOTE 1: The orientation of the specimen with respect to felt and wire side is not significant, but the wire-side-up orientation is specified for use in referee instances.

5.2 Gently place the boat so formed on the surface of the distilled water in the vessel or dish and, at the same instant, start the stopwatch or timer.

5.3 Stop the watch or timer when 95% of the upper surface (of the flat portion bottom) of the boat has been penetrated and has been wet.

NOTE 2: A 95% penetration means essentially complete wetting. This degree of penetration was chosen to eliminate irregularities due to air bubbles on the bottom surface of the specimen or unusually hard sized spots in the medium caused by extraneous materials.

5.4 Record the time in seconds required for this degree of penetration.