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This Test Method may include safety precautions which are believed to be appropriate at the time of publication of the method. The intent of these is to alert the user of the method to safety issues related to such use. The user is responsible for determining that the safety precautions are complete and are appropriate to their use of the method, and for ensuring that suitable safety practices have not changed since publication of the method. This method may require the use, disposal, or both, of chemicals which may present serious health hazards to humans. Procedures for the handling of such substances are set forth on Material Safety Data Sheets which must be developed by all manufacturers and importers of potentially hazardous chemicals and maintained by all distributors of potentially hazardous chemicals. Prior to the use of this method, the user must determine whether any of the chemicals to be used or disposed of are potentially hazardous and, if so, must follow strictly the procedures specified by both the manufacturer, as well as local, state, and federal authorities for safe use and disposal of these chemicals.

Water resistance of sized paper and paperboard (dry indicator method)

1. Scope

1.1 This method is based on the dry-indicator method of Carson (1-4) and modifications of it developed by Abrams (5) and Codwise (6-8).

1.2 It is designed for use with materials that require a relatively short time to test (up to about 30 s) and has been found useful in testing slack-sized papers.

1.3 For testing hard-sized paper and paperboard, see TAPPI T 441 “Water Absorptiveness of Sized (Non-bibulous) Paper and Paperboard (Cobb Test);” for testing unsized and absorbent paper, see TAPPI T 432 “Water Absorbency of Bibulous Paper.”

2. Summary

2.1 The test consists of bringing one side of the test specimen in contact with water and finding the time required for the water to pass through the specimen, as indicated by the development of color in an indicator powder consisting of a mixture of water-soluble dye, sugar, and starch. The sugar serves the two-fold purpose of masking the color of particles of dye as long as they are dry and of absorbing the transuded moisture and holding it in close proximity to the dye. The starch increases the stability of the mixture.

2.2 Five tests are made on each side of the paper and reported as two separate averages.

3. Significance

3.1 The dry indicator used in this method is so strongly hygroscopic it will change color in a moderate to high humidity atmosphere without contacting liquid water. It will also change in contact with liquid water. The test therefore measures the combined effect of vapor and liquid transmission (9). For test times up to approximately 30 s, the liquid transudation rate is dominant, and the test can be considered to measure this property. As test times exceed 30 s, the influence of vapor transmission rate increases and the test cannot be regarded as a valid measure of liquid resistance (sizing).

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- 3.2 This test is of value in cases where paper or a paper container comes into contact with water on one face.
 3.3 This method may not be applicable to materials containing large amounts of water-soluble components.

4. Apparatus

- 4.1 Any form of apparatus for applying the test may be used which fulfills the following conditions:
 4.1.1 One surface of the specimen is wetted uniformly at the moment the count of time is begun.
 4.1.2 The indicator on the opposite surface is continuously visible.
 4.1.3 No moisture reaches the indicator except that which passes through the specimen from the wetted surface.
 4.1.4 No moisture which does so reach the indicator escapes from contact with it.
 4.1.5 A float arrangement (4), as shown in Fig. 1, is one apparatus that fulfills the requirements of 4.1. It is made of a thin-walled aluminum pan about 125 mm (about 5 in.) in diameter and 25 mm (1 in.) high with a hole 50 mm (2 in.) in diameter cut in the bottom. The surface is coated with paraffin or beeswax to make it more water-repellent. The watch glass is clamped over the specimen by means of a wire-frame clamp hinged at one side and fastened under a spring at the opposite side.
 4.1.6 In the absence of the float the paper may be supported by a hollow cylinder having the upper end barely submerged under the surface of the water in a suitable vessel, while the watch glass is placed over the indicator. Such a cylinder may be found useful in supporting an occasional paper whose surface is so easily wetted that it would be difficult to float it unsupported when prepared as shown in Fig. 1.

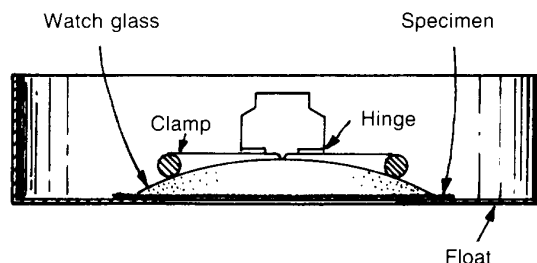


Fig. 1. Cross section of float.

4.2 *Shaker and desiccator*, assembly for the indicator, as shown in Fig. 2. The shaker is prepared from a 10-mL screw-top vial by cutting away most of the metal of the flat portion of the top, fitting a 210- μ m (No. 70) wire screen inside the top, and screwing it back in place. The desiccator is made of a small wide-mouth bottle containing anhydrous calcium chloride covered with a layer of glass wool. A hole is bored in the cork stopper just large enough to admit the shaker. The bottle remains on its side and the vial is inserted through the hole with the screened end inside. The assembly is kept in the usual type of laboratory desiccator when not in use.

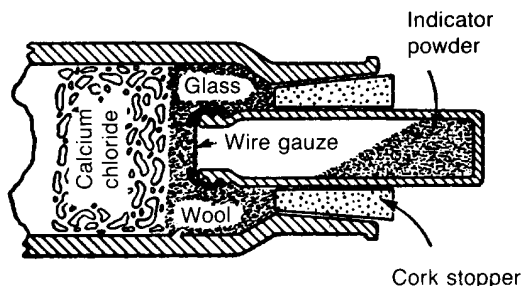


Fig. 2. Longitudinal section showing construction of desiccator and shaker.

- 4.3 Watch glasses, 50 mm (2 in.)
 4.4 Stop watch or electric timer, reading to 0.2 s.