

**CAUTION:**

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 absorption of corrugating medium: water drop absorption test

1. Scope and summary

1.1 The water absorptivity of corrugating medium is measured by dropping a drop of water on the surface of a specimen and determining the time in seconds for the drop to be completely absorbed as evidenced by the loss of sheen.

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) containerboards. It may not be applicable to more highly sized boards or to grades produced in different grammage (basis weight) than those normally used in corrugating medium.

1.3 The precision and repeatability of test results are dependant on the grade and manufacturing process. Use caution when making comparisons between samples that differ significantly in basis weights or manufacturing process.

1.4 Aging effects on the absorptivity of corrugating medium made of recycled fibers have been shown to be negligible. However, this is not true for medium with virgin fibers. See Appendix A.

1.5 Due in part to the uniqueness of medium, various alternate methods are available for evaluating water absorption. These alternate methods are cited in Section 9 Additional Information.

2. Significance

Some producers test absorptivity of corrugating medium to know that it has the proper receptivity to the corrugating adhesive, which is an aqueous suspension of starch, for proper adhesion in the corrugating process. The absorptivity may also relate to the way the medium can be steamed by the showers on the singlefacer and by the preconditioner.

3. Apparatus and materials

3.1 *Burette, syringe or dropper*, which will deliver 20 ± 1 drops/cm³ of distilled or deionized water.

3.2 *Rack or ring stand*, to support test specimen.

3.3 *Distilled water or deionized water*, pH 6.5 to 7.5, $23.0 \pm 1.0^{\circ}\text{C}$ ($73.4 \pm 1.8^{\circ}\text{F}$).

3.4 *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 Precondition and 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.

4.3 From each test unit of the sample, select at least four specimens. Cut test specimens into a square large enough to perform 5 replicates per specimen without absorbed drops touching when they are applied on each corner and in the center of the specimen. This may require some trial drops to determine the size of the absorbed drop.

4.4 Determine the felt and wire side of each specimen. If desirable, make a small mark identifying the wire side.

5. Procedure

5.1 Place the flat specimen on a rack or ring, wire side down, so that its testing area is not in contact with a solid surface.

5.2 Position the burette or dropper 25 mm (approximately 1 inch.) above the top surface of the specimen.

5.3 Check the pH of the water to be used, especially if it has been in an unsealed container or not properly nitrogen-capped. If the pH does not fall in the appropriate range; add a buffer to correct it.

5.4 Fill the burette, syringe or dropper with distilled or deionized water.

5.5 Drop a drop of water on the upper surface in the center of the specimen and immediately start the stopwatch or timer.

5.6 Record the time in seconds for the drop to be absorbed into the specimen as noted by the visual observation of the gloss disappearing from the surface. Repeat on another specimen with felt side up. Repeat on the remaining two specimens with the wire side up.

5.7 Repeat the test on each corner of the specimen. Repeat with the felt side up on the second specimen. Repeat on the two remaining specimens with the wire sides up.

5.8 When making multiple tests, check the pH of the water periodically to assure it does not drift outside the acceptable range.

6. Report

For each test unit, report as the test result the average time for complete absorption of the drop into the surface for the ten felt-side tests and for the ten wire-side tests.

7. Precision

7.1 The precision of this method was determined in 1991 by a round-robin evaluation of this and several other methods by eight laboratories on samples of corrugating medium from eight different mills made by a variety of processes with a wide range of absorptivity levels. Tests were made both before and after aging.

7.2 The following estimates of precision are based on these results.

7.2.1 Repeatability = 13% of average according to definitions of TAPPI T 1200 "Interlaboratory Evaluation of Test Methods to Determine TAPPI Repeatability and Reproducibility."

7.2.2 Reproducibility = 75% of average, computed from the Coefficient of Variation, as described in TAPPI T 1200 "Interlaboratory Evaluation of Test Methods to Determine TAPPI Repeatability and Reproducibility."

8. Keywords

Corrugating medium, Absorptivity, Water absorption, Water drop tests