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T _____ 831 _____

DRAFT NO. _____ 03 - SARG _____

DATE _____ May 18, 2021 _____

WORKING GROUP
CHAIRMAN _____ Ed Hughes _____

SUBJECT _____ Fiberboard Shipping
CATEGORY _____ Container Testing _____

RELATED
METHODS _____ See "Additional Information" _____

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 penetration test
(Five-year review of Official Method T 831 om-14)
(Changes approved from ballot 2 incorporated)**

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 penetrate through the sheet and wet the lower surface.

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 but 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 Alternative methods which can be performed in the same general time period with equal repeatability do not give the same numerical results, but, in general, will rank the materials in the same order as this method (see Section 9.2).

2. Significance

In the past, medium was produced with semichemical pulp, and water drop could be found to correlate with the medium to liner bondability on a corrugator. Today's mediums are also made from recycled and kraft fiber. Water drop can vary widely when using these fiber types with no detrimental effects on bondability.

3. Apparatus and materials

- 3.1 *Burette, syringe or dropper*, which will deliver 20 ± 1 drops/ml of distilled or deionized water.
- 3.2 *Rack or ring stand*, to support test specimen.
- 3.3 *Mirror*, to place under the rack to observe lower side of specimen.
- 3.4 Distilled water or deionized water, pH 6.5 to 7.5, $23.0 \pm 1.0^{\circ}\text{C}$ ($73.4 \pm 1.8^{\circ}\text{F}$).
- 3.5 *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 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 T 402.
- 4.3 From each test unit of the sample, select at least ten specimens.

5. Procedure

- 5.1 Place the specimen on a rack so that its lower side can be observed. A ring is satisfactory. The specimen should be flat and the area to be wetted should not be allowed to touch anything on the top or bottom.
 - 5.1.1 Ensure that the bottom of the specimen is visible. The test can be facilitated by placing the stand over a mirror to make observations easier.
- 5.2 Fill the burette, syringe or dropper with distilled or deionized water.

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

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

5.5 Record the time in seconds for the penetration of the drop through the sheet to the lower side of the specimen as noted by the first visual indication of wetting of the lower surface. Complete absorption of the drop as viewed from the top of the sheet is not required.

6. Report

For each test unit, report as the test result the average penetration time for ten test specimens. Also report the penetration time for each individual test specimen.

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 = 18% of average according to definitions of TAPPI T 1200 "Interlaboratory Evaluation of Test Methods to Determine TAPPI Repeatability and Reproducibility."

7.2.2 Reproducibility = 85% of average, computed from the Coefficient of Variation, as described in T 1206 "Precision Statement for Test Methods."

8. Keywords

Corrugating medium, Absorptivity, Water absorption, Water drop tests, Sizing

9. Additional information

9.1 Effective date of issue: To be assigned.

9.2 There are two official methods and one classical method which can be performed in the same general time period and provide equal repeatability. These methods are TAPPI T 832 om "Water Absorption of Corrugating Medium: Float Curl Method;" TAPPI T 835 om "Water Absorption of Corrugating Medium: Water Drop Absorption;"

and TAPPI T 819 cm “Water Absorption of Corrugating Medium: Boat Method.” The various methods do not all react similarly to artificial aging, but do typically maintain the rank-order of absorptivity among different samples.

9.3 TAPPI T 432 cm-99 “Water Absorbency of Bibulous Papers” has also been used to measure the water absorptivity of corrugating medium, but the study which led up to the development of this method indicates that it lacks the repeatability of this method and most certainly takes more time to conduct, especially on more water-resistant samples.

9.4 *Revision history.* In the 2009 revision, minor edits were made for language and clarity, information on parallel methods from one of the appendices was moved into the additional information section, and information on aging in the other appendix was reorganized. In the 2014 edition, Appendix A was eliminated, the Significance was rewritten, the requirement to identify the wire and felt side was deleted, and minor editorial changes were made.

Your comments and suggestions on this procedure are earnestly requested and should be sent to the TAPPI Standards Department. ■