

WI _____ 070308.03 _____

T _____ 812 _____

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TAPPI

WORKING GROUP
CHAIRMAN _____ Dave Carlson _____

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.



Ply separation of solid and corrugated fiberboard (wet) (Reaffirmation of T 812 om-03) (no changes from Draft 1)

1. Scope



This method describes a laboratory test for evaluating the resistance to ply separation of solid or corrugated fiberboard after exposure to water. It is intended primarily to distinguish between boards fabricated with weather-resistant adhesives and those with nonweather-resistant adhesives.

2. Significance



The ability of a fiberboard shipping container to meet certain wet weather-resistance requirements is influenced by the resistance of the plies of the solid or corrugated fiberboard to separation after exposure to water. An appraisal of the strength of the combining adhesive after a period of immersion in water is therefore one of the criteria for weather-resistant fiberboard shipping containers.

3. Apparatus



3.1 *Corrosion-resisting tank*, for holding water and test specimens, of suitable size so that water has free access to all surfaces of each specimen.

NOTE 1: The tank must be kept clean.

3.2 *Rack*, or other means for supporting the specimens vertically and keeping them separated from each other and from the sidewalls of the tank in such a manner that ply separation is not restricted.

3.3 *pH meter and thermometer*, to record pH and temperature. To be routinely calibrated using manufacturers' procedures and recommendations.

4. Materials



Water, use tap or potable water maintained at a temperature of $23 \pm 3^\circ\text{C}$ ($73 \pm 5^\circ\text{F}$) with a pH between 6.5 and 7.5, drawn fresh for each batch of specimens.

5. Conditioning



5.1 *Preliminary conditioning*. After manufacture allow the solid or corrugated fiberboard to condition or "cure" in accordance with TAPPI T 402 "Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets and related products" for a period of at least 24 h from the time of manufacture to the time of cutting specimens.

5.1.1 When testing to determine compliance with other specifications, this time interval may be increased up to two weeks.

NOTE 2: For control purposes only, a quick test of the board at the time of manufacture may be made by placing it in an oven for 10-20 min at a temperature of 105°C (221°F) to accelerate the cure of the adhesive prior to cutting and submerging the test specimens.

6. Sampling and test specimens



6.1 From each test unit obtained in accordance with TAPPI T 400 "Sampling and Accepting a Single Lot of Paper, Paperboard, Containerboard, or Related Product," depending on lot size, cut 3-5 specimens, 150 x 250 mm (6 x 10 in.) in size, from undamaged, unscored, unprinted portions of the board.

6.1.1 Cut corrugated fiberboard specimens so that the flute openings are along the 250-mm (10-in.) dimension.

6.1.2 If finished containers do not permit specimens of this size, use smaller size specimens. Some printing or

a score near the middle of the specimen (not near an edge) is acceptable if unavoidable.

7. Procedure



7.1 Submerge the specimens vertically with the 250-mm (10-in.) edges horizontal and the top edge 25 mm (1 in.) below the surface of the water. Support the specimens so that the water has free access to all surfaces and ply separation, if it occurs, is not restricted.

7.2 Allow the specimens to remain submerged for 24 ± 1 h.

NOTE 3: For reduced levels of (wet) weather or moisture resistant adhesives, reduced immersion times may be selected and so reported.

7.3 Remove the specimens from the water and continue to support them in a vertical position, allowing them to drain until their surfaces no longer glisten, and in the case of corrugated fiberboard allow any excess water to drain from the flutes.

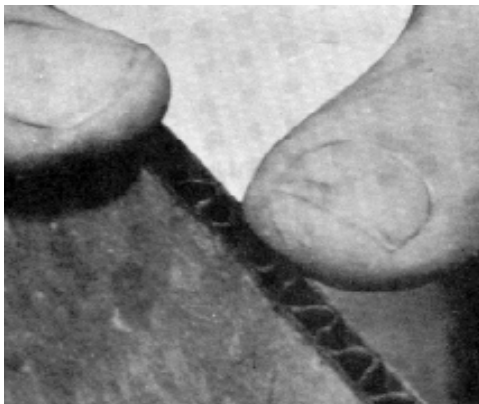


Fig. 1. Procedure for overcoming surface tension.

7.4 Immediately following drainage, check the specimens for adhesion between components.



NOTE 4: Separation of components may occur spontaneously and freely during soaking; however, surface tension may often cause the wet components of fiberboard to cling together even though not bonded by adhesive. To overcome the surface tension, brush lightly with the ball of the thumb across the cut edges of the specimen at several points on both faces of each of the four edges, particularly the 250-mm (10-in.) or machine direction edges.

8. Report



8.1 Report whether the specimen exhibited separation of the edges, and if so, the extent of separation expressed in millimeters (inches) of delamination measured inward from the edge of the specimen.

8.2 Report also the following:

- 8.2.1 Number of specimens tested.
- 8.2.2 Dimensions of the specimens, if not of standard size.
- 8.2.3 The temperature and pH of the water.
- 8.2.4 Any additional relevant information.

9. Precision

A precision statement is not applicable to this qualitative method.

10. Keywords

Corrugated boards, Fiberboards, Ply separation, Bonding strength

11. Additional information

- 11.1 Effective date of issue: to be assigned.
- 11.2 Significant changes included in this revision: The conditioning atmosphere has been narrowed to TAPPI standards and the length of conditioning time has been reduced prior to cutting and submersion of specimens.

Reference

ASTM D4727 – “Standard Specifications for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes.” Glue bond separation of weather-resistant and water and water-vapor resistant classes. (American Society for Testing and Materials)

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

