

CORRECTION – December 2010

An editorial correction has been incorporated into this version of T 844. The reason this correction were errors in the equations in sections 7.7.1 and 7.7.2.

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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.

Determining construction (nominal basis weight) of corrugated board

1. Scope

1.1 This method describes a procedure to determine the nominal basis weight (grade) of the components of corrugated board. It is based on TIP 0308-01, now withdrawn. Test specimens of corrugated fiberboard are treated with water so that the component layers can be separated, dried, and weighed. The goal of the method is not to determine the exact basis weights of the papers comprising a corrugated specimen, but rather to identify the probable marketing grade under which the papers were likely sold.

1.2 This method is applicable to all types of corrugated fiberboard

2. Significance

2.1. Boxplants and laboratories are often called upon to determine what grades were used in the construction of a corrugated board sample for sales and marketing purposes. While this type of analysis does not provide information on combined board strength or quality, it can be used in a general manner to provide guidance to manufacturing facilities as to what combined board they might make that could potentially be “similar” in their efforts to reproduce a board specimen.

2.2. This approach can also be used as a troubleshooting tool to “deconstruct” existing corrugated board samples in order to provide assurance/confirmation that the proper nominal grades of paper were combined in the manufacturing process to meet a customer’s requirements or specifications.

3. Safety precautions

Care should be taken with cutting instruments when preparing any specimen for testing.

4. Definitions

4.1 *Layer.* A component of corrugated fiberboard. A singlewall board is composed of three layers, two flat layers (liner) on each side of a corrugated layer (medium).

4.2 *Nominal.* Measured in a general amount rather than an actual value.

Approved by the Standard Specific Interest Group for this Test Method

4.3 *Grade.* The sale unit classification of the containerboard, based on typical grades of containerboard produced as defined by the AF&PA

4.4 *Nominal basis weight or nominal grade.* The estimated grade of paper used as one of the components of the corrugated board. As distinct from (but related to) the basis weight or grammage of a paper, which is a report of the actual mass per unit area of the corrugated board, the nominal grade relates to the marketing classification under which the paper was likely sold in the marketplace.

5. Apparatus

5.1 A cutting device that can be used to produce samples of corrugated board of known dimensions. These can include but are not limited to a “four square cutter” of the type often used to prepare basis weight samples [see T 410 “Grammage of Paper and Paperboard (Weight Per Unit Area)”], circular cutters used to cut flat crush specimens [T 825 “Flat Crush Test of Corrugated Board [Rigid Support Method]”], manual or pneumatic cutters used in the preparation of pin adhesion samples [T 821 “Pin Adhesion of Corrugated Board by Selective Separation”], or even a box cutter used with the guidance of a metal template.

5.1.1 The cutting method should be capable of repeatedly cutting out test specimens whose area is known to within $\pm 0.5\%$.

5.2 A tank or sink of sufficient size to hold water that will allow for immersion of the test pieces.

5.3 A drying oven capable of holding a temperature of 105°C (221°F)

5.4 A weighting device in conformance with TAPPI T 410.

6. Sampling and test specimens

6.1 This evaluation is typically performed on a single sample due to limitations in the available material. Make sure that the test specimen is representative of the lot to be evaluated.

6.2 The surface layers of the specimen (the liners) should be free from any damage or abrasions that may lead to loss of fiber or otherwise impact the test results. They should also be free from tape or other foreign contaminants. Ideally, the sample will also be taken from a flat area of the board away from score lines.

6.3 Since the corrugated board sample is immersed in water, there is typically no need to condition specimens before testing. Conditioning takes place after drying (see 7.6). However, in some cases it is desirable to double check results by summing the measured weights of each component and comparing those weights to the initial basis weight of the combined sample. In that case, the grammage of the sample should be assessed according to TAPPI T 410 at the appropriate point in the procedure below (see Note 2).

7. Procedure

7.1 *Sample preparation.* Carefully cut the combined board specimen to a known area. Note that the sample size will depend in part on the amount of material available. The cut area shall be clean with edges perpendicular to the faces of the corrugated board.

7.1.1 Typical sizes used in the industry include 930 cm^2 (144 in.^2 , one square foot), 387 cm^2 (60 in.^2), 205 cm^2 (31.75 in.^2), 100 cm^2 (15.5 in.^2). Different sizes are used for ease of calculation, balanced against the amount of material available for testing.

NOTE 1 The ISO method (ISO 3039) specifies a 100 cm^2 area.

7.1.2 Larger specimen sizes will reduce the impact of measurement error in the weighing stages relative to the final result. However, round robin testing (9.1.2 and 9.1.3) indicates that total sources of error significantly exceed the precision of a balance, indicating that accuracy in cutting to a known size and issues associated with sample separation (7.4) likely far exceed sample size itself as contributors to variation in results.

7.2 Identify and mark the singleface and doubleback surfaces of the sample with a waterproof marker.

NOTE 2 If it is desirable to compare the final component weights with the initial sample weight, follow the procedure in TAPPI T 410 at this point.