



T 802 om-12

TENTATIVE STANDARD – 1944
REVISED – 1967
OFFICIAL STANDARD – 1975
OFFICIAL TEST METHOD – 1981
REVISED – 1986
REVISED – 1991
REVISED – 1999
REVISED – 2007
REVISED – 2012
© 2012 TAPPI

The information and data contained in this document were prepared by a technical committee of the Association. The committee and the Association assume no liability or responsibility in connection with the use of such information or data, including but not limited to any liability or responsibility under patent, copyright, or trade secret laws. The user is responsible for determining that this document is the most recent edition published.

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.

Drop test for fiberboard shipping containers

1. Scope

1.1 This method describes procedures for determining the ability of fiberboard containers to protect their contents and/or to withstand impact in free-fall drops. These procedures are specifically designed for controlled drop testing of solid fiber or corrugated shipping containers

1.2 They do not apply to cylindrical containers or cans made of fiber.

1.3 This test is not normally used on packages heavier than 68 kg (150 lb).

NOTE 1: Heavier packages may rarely be tested, but are unwieldy and usually undergo other tests such as incline impact or rotational edge/corner/flat drops. These tests are not defined in this method.

1.4 No single procedure is applicable to all handling, transportation and environmental conditions. Alternative test procedures are available in the literature cited in the References section.

2. Summary and significance

2.1 A container, suitably identified as to its elements, is dropped from a constant, predetermined height according to an established, prescribed sequence. At the conclusion of the series of drops, the container and its contents are examined for damage.

2.2 The main objectives of drop tests are:

Approved by the Standard Specific Interest Group for this Test Method
TAPPI

- 2.2.1 To measure the ability of the shipping container to withstand rough manual handling.
- 2.2.2 To measure the ability of the package (shipping container and interior packing materials) to protect the contents.
- 2.3 Use of these procedures permits comparing various package configurations and assists in improving design, method of packing, and blocking or bracing.
- 2.4 Package testing is complex. The choice of test procedures is critical to relevant package evaluation. Use care to insure that test procedures and performance levels do not lead to either inadequate protection or less than optimum material usage. The preferred test procedure given here is only one of many that are commonly used. It is not necessarily suitable for every situation. In these instances, the tester must choose another test sequence. Some of the more common procedures are listed under Additional Information. Sources for other test procedures are listed in the References section.

3. Safety precautions

Performing drop tests sometimes requires physical handling of heavy objects. Be sure to use proper lifting techniques when handling such objects. Use a weightlifting belt or similar bracing to support your back when lifting heavy objects and/or making multiple lifts. Packages heavier than 40 lb should be handled by two or more individuals and/or the use of a mechanical lifting device. Drop testing also requires proximity to heavy falling objects. Wear safety shoes or shoe guards when conducting drop tests.

4. Definitions

4.1 The nomenclature for the elements of the most common fiberboard shipping container, the regular slotted container (RSC), is described in 4.2 and illustrated in Fig. 1. A similar nomenclature may be developed for other styles of containers.

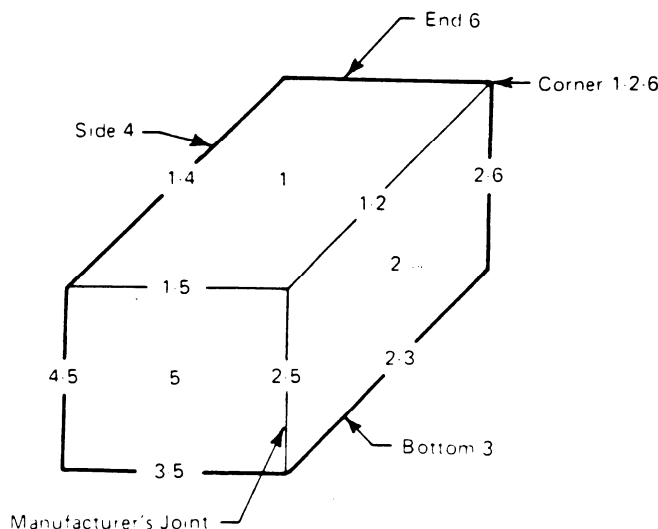


Fig. 1. Identification of faces, edges, and corners.

4.2 Make identification of the faces, edges, and corners of containers as follows (Fig. 1): Facing one end of the container with the manufacturer's joint on the observer's right, designate the top of the container as 1, the right side as 2, the bottom as 3, the left side as 4, the near end as 5, and the far end as 6. Identify the edges by the numbers of the two faces that form the edge; for example, 1-2 identifies the edge formed by the top and right side, and 2-5 the edge formed by the right side and the near end. Identify the corners by the numbers of the three faces that meet to form that corner; for example, 1-2-5 identifies the corner where the top, the right side, and the near end meet.

5. Apparatus

5.1 *Drop test equipment*, meeting the following requirements:

5.1.1 Permits the container to be placed in a position, prior to release that will ensure correct orientation, within 2° for flat-faced drops and 5° for edge and corner drops, upon impact.

5.1.2 Permits control of the drop from specified heights.

5.1.3 Utilizes lifting devices that will not damage the specimen.

5.1.4 Provides an instantaneous release mechanism that does not impart rotational or angular forces to the test package. If drop leaves are used, the apparatus shall have a spring or other mechanism so that the leaves do not interfere with a free, unobstructed fall.

5.1.5 Provides a rigid and level dropping surface (such as a concrete floor or steel plate) which is integral with a mass that shall be at least 50 times the weight of the dropping container. The dropping surface, firmly anchored to the mass, is a smooth steel plate at least 12.7 mm (approx. 0.5 in.) thick.

5.2 Two kinds of equipment meet these requirements:

5.2.1 *Dropping table*, consisting of a frame with a single or double trap door which drops vertically and folds back out of the way so that the door does not interfere with a free, unobstructed fall, the top being adjustable in height.

5.2.1.1 An alternative to the trap door dropping table is a frame with a lifting platform that rises from and falls vertically into recesses in the floor. The dropping surface is the concrete floor that surrounds the recessed area. A steel plate at least 6.3 mm (0.25 in.) may be placed on the lifting platform to support the container and act as the dropping surface.

5.2.2 *Hoist*, electrically or manually operated, provided with slings, quick release device, and hooks, which can suspend the box in the desired orientation and position (Fig. 2).

6. Sampling and test specimens

6.1 Select at least three, but preferably five, containers as nearly as possible typical of the lot, style or construction to be evaluated.

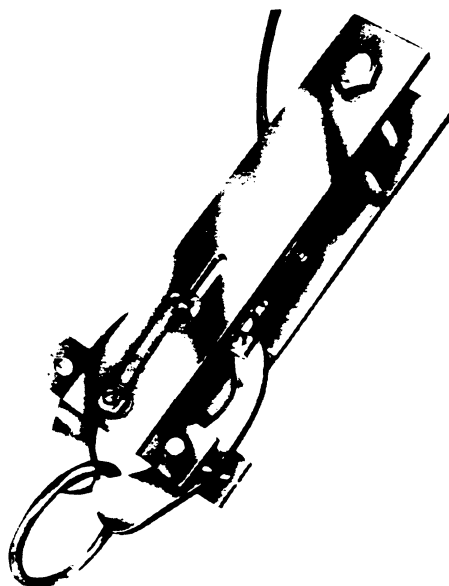


Fig. 2. Release hook.

6.2 When evaluating the protective ability of the container, pack it with specimens of the actual material(s) or items for which the container is designed.

6.3 When evaluating the ability of the container itself to withstand rough handling, a dummy load, simulating the actual contents in weight, shape, size and resilience, may be used; however, since so many factors of a product affect its ability to withstand and transmit shock loads, use of the actual product is highly recommended. Use dummy or