

Filled corrugated fibreboard containers - Vertical impact test by dropping

This test is one of a series of performance tests for corrugated fibreboard containers and may be selectively applied as specified, either singly, or in combination with other tests.

1 Object

To define the apparatus and test procedure to be used to determine the ability of complete filled corrugated fibreboard containers to withstand vertical impacts (caused by drops, handling etc) and to assess the protection provided for the contents by the packaging.

2 Scope

The test is applicable to all types of corrugated containers, complete with internal fitments and the actual or dummy contents.

3 Normative references

EN 22 206 : Packaging - Complete, filled transport packages - identification of parts when testing.

EN 22 233 : Packaging - Complete, filled transport packages - Conditioning for testing.

4 Principle

A specimen container complete with actual or dummy contents is caused to fall freely, in a predetermined attitude and from a specified drop height on to a solid plane, horizontal surface⁽¹⁾. On completion of the test cycle, which may consist of a number of drops with the container in differing attitudes, the specimen and its contents are examined and reported on.

Dummy contents : where the use of the actual contents is prohibitive because of excessive cost or danger, or for other reasons, an artificial load may be used provided that it has similar dimensions, centre of gravity, moment of inertia, etc, and adequately represents the item it replaces.

Drop height : the vertical distance from the impacting surface to the lowest corner, edge, or face of the specimen, as appropriate, when positioned for dropping.

Attitudes : for the purpose of specifying the attitude in which the specimen is dropped the faces should be identified according to EN 22206 as follows :

Facing one end (with the manufacturers' joint vertical on the right side) the top of the container is numbered as 1, the right side 2, the bottom 3, the left side as 4, the near end 5, and the far end 6 (see fig. 1).

Containers not having or having more than one manufacturers' joint will be dealt with on the same principle by arbitrarily selecting one end as face 5.

Thus, the edges will be identified by the numbers of the two faces which make the edge and corners by the numbers of the three faces which meet to form the corner e.g. 2-3-5 will designate the corner at the bottom of the manufacturers' joint in fig. 1.

5 Apparatus

This shall consist of :

- 5.1.** Means of suspending or supporting the test specimen in the required attitude at the specified drop height.
- 5.2.** A release mechanism which shall not impart acceleration, rotational or side wise forces, nor interfere with the free fall of the test specimen.
- 5.3.** A horizontal⁽¹⁾, concrete or steel plane surface which shall be solid and of sufficient mass to withstand the impact energy without significant deflection or movement.

6 Conditioning

The test containers, with any internal fitments, shall be conditioned prior to filling in accordance with EN 22233. Unless otherwise specified, condition 'G' (23°C ± 2°C, 50 % rh ± 3 % rh) shall be used.

Note : For packaging tests, FEFCO recommends 23°C ± 2°C, 50 % rh ± 3 % rh, but draws the attention that ISO sets ± 2 % rh, which is quite strict for plants that cannot condition a big room.

7 Procedure

- 7.1.** A test specimen shall consist of a container, with normal or dummy contents, filled, closed and sealed in the manner intended for normal usage. The faces should be numbered for identification.
- 7.2.** The test should be carried out in the same atmosphere used for conditioning. Alternatively the test should be commenced within 5 minutes of removal of a specimen from the conditioning atmosphere.

If specified, the contents may be conditioned before filling the container which shall be retained in the conditioned atmosphere during filling, closing and testing.

7.3. Individual tests : the test container shall be suspended or supported by means of the apparatus, in the required attitude at the specified drop height and the release mechanism operated to permit free fall of the specimen on to the impact surface.

Drop testing of individual specimens shall be repeated as specified, unless there is evidence of severe damage necessitating termination of the test sequence.

7.4. Number of tests : unless otherwise specified, a minimum of three containers shall be tested.

8 Test report

The test report shall contain the following :

- a** *date and place of testing*
- b** *description, (including internal fitments and contents) identification and quantity of specimens tested.*
- c** *test climate used (if other than 23°C 50 % rh).*
- d** *description of the apparatus employed.*
- e** *description of the test sequence carried out on each specimen.*
- f** *if the drop testing is carried out as part of a series of tests, reference to that series.*
- g** *observations for each specimen indicating :*
 - 1) damage sustained by the container and fitments*
 - 2) damage to and/or loss of contents*
 - 3) whether the test sequence was completed, and if not, the point at which it was terminated.*
- h** *details of any deviation from this testing method*
- i** *any other information which may assist in the interpretation of the test results.*

(1) A plane surface inclined at 10° from the horizontal may be substituted.

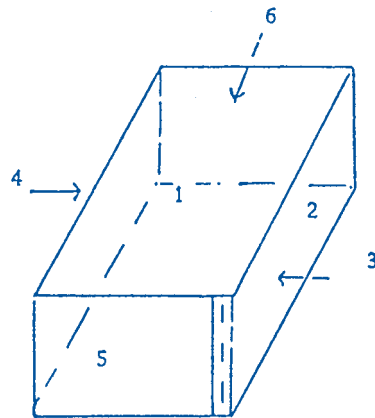


Figure 1