International Standard 2248

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Packaging — Complete, filled transport packages — Vertical impact test by dropping

Emballages — Emballages d'expédition complets et pleins — Essai de choc vertical par chute libre

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2248 was prepared by Technical Committee ISO/TC 122, *Packaging*.

This second edition cancels and replaces the first edition (ISO 2248-1972), which has been technically revised as follows:

— a new clause on "Package preparation" has been added.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Packaging — Complete, filled transport packages — Vertical impact test by dropping

1 Scope and field of application

This International Standard specifies a method for carrying out a vertical impact test on a complete, filled transport package by dropping. It may be performed either as a single test to investigate the effects of vertical impact or as part of a sequence of tests designed to measure the ability of a package to withstand a distribution system that includes a vertical impact hazard.

2 References

ISO 2206, *Packaging — Complete, filled transport packages — Identification of parts when testing.*

ISO 2233, *Packaging — Complete, filled transport packages — Conditioning for testing.*

3 Principle

Raising of the test package above a rigid plane surface and releasing it to strike this surface (the "impact surface") after a free fall [1]. The atmospheric conditions, the height of drop and the attitude of the package are predetermined.

4 Apparatus

4.1 Lifting arrangement, which will not damage the test package during either lifting or release.

4.2 Means of holding the test package prior to release in its predetermined attitude. [2]

4.3 Release mechanism, to release the test package in such a way that its fall is not obstructed by any part of the apparatus before striking the impact surface (4.4).

4.4 Impact surface, horizontal and flat, massive enough to be immovable and rigid enough to be non-deformable under test conditions.

NOTE — In normal circumstances, the impact surface provided shall be

- integral with a mass at least 50 times that of the heaviest package to be tested;
- flat, such that no two points on its surface differ in level by more than 2 mm;
- rigid, such that it will not be deformed by more than 0,1 mm when an area of 100 mm^2 is loaded statically with 10 kg anywhere on the surface;
- sufficiently large to ensure that the test package falls entirely upon the surface.

In addition, the apparatus shall meet the requirements and tolerances of clause 7.

5 Package preparation

The test package shall normally be filled with its intended contents. However, simulated or dummy contents may be used, on condition that the dimensions and physical properties of such contents shall be as close as possible to those of the intended contents.

Ensure that the test package is closed normally, as if ready for distribution. If simulated or dummy contents are used, ensure that the normal method of closure is still employed.

6 Conditioning

The package shall be conditioned in accordance with one of the conditions described in ISO 2233.

1) In some circumstances, a completely free fall may not be possible; in such circumstances, the impact velocity shall be within 1 % of that which is achieved by a free fall.

2) The difference in behaviour of a sack, for example, suspended from the top or supported below in an end drop, could be significant. In such instances, the method of holding the package before dropping shall be described in the test report.

7 Procedure

Whenever possible the test shall be carried out in the same atmospheric conditions as used for conditioning, where this is critical to the materials or application of the package. In other circumstances, the test shall be carried out in atmospheric conditions which are as near as practicable to those used for conditioning.

7.1 Lift the test package and hold it in the predetermined attitude (see annex) at a height within ± 2 % of the predetermined drop height as defined by the distance between the lowest point on the package at the time of release and the nearest point on the impact surface (4.4).

7.2 Release the test package from its predetermined attitude within the following tolerances:

— for face or edge drops: 2° maximum angle between the impacting face, or edge, and the horizontal surface;

— for edge or corner drops: the angle between a prescribed surface of the package and the horizontal surface ± 5° or ± 10 % of the angle, whichever is the greater.

The velocity at impact shall be within ± 1 % of that which would be achieved by a free fall.

8 Test report

The test report shall include the following particulars:

a) reference to this International Standard;

b) number of replicate packages tested;

c) full description of the package, including dimensions, structural and material specifications of the package and its fittings, cushioning, blocking, closure or reinforcing arrangements;

d) description of contents — if simulated or dummy contents were used, full details shall be given;

e) gross mass of package and mass of contents, in kilograms;

f) relative humidity, temperature and time of conditioning, temperature and relative humidity of test area at time of test; whether these values comply with the requirements of ISO 2233;

g) the attitude in which the package was tested, stated in one of the ways given in the annex;

h) drop height, in millimetres;

j) type of apparatus;

k) any deviations from the test method described in this International Standard;

m) a record of the result, with any observations which may assist in correct interpretation;

n) date of the test;

p) signature of tester.

Annex

The predetermined attitude of the test package shall be expressed in one of the following ways, using the method of identification given in ISO 2206.

NOTE — Where bungs, enclosures or fittings are present, the attitude at impact may be related to their position.

A.1 Parallelepipedal packages

A.1.1 Impact on a face

State face 1, 2, 3, etc.

A.1.2 Impact on an edge

State edge 1-2, 2-3, 3-4, etc. and the angle between one of two surfaces forming the edge and the plane of the impact surface;

or

state the edge, and that the centre of gravity of the test package tested shall be vertically above the point of impact;

or

state the edge, and that the two parallel edges of the test package nearest to the impact edge shall lie in a horizontal plane.

A.1.3 Impact on a corner

State corner 1-2-5, 3-4-6, etc. and the angles between two of the faces forming the corner and the plane of the impact surface;

or

state the corner, and that the centre of gravity of the test package shall be vertically above the point of impact.

A.2 Cylindrical packages of circular cross-section

In all instances, the centre of gravity of the test package shall be vertically above the point, line or plane of impact with the impact surface.

A.2.1 Impact on top or bottom faces.

A.2.2 Impact at any of the points 1, 2, 3 etc., on either the edge or rim.

A.2.3 Impact on any of the lines 1-2, 3-4, etc., parallel to the axis of the cylinder.

A.3 Sacks and bags

The centre of gravity of the sack shall be vertically above the face, end or side involved in the impact.

A.3.1 Impact on a face

State face 1 or 3.

A.3.2 Impact on an end

State end 5 or 6.

A.3.3 Impact on a side

State side 2 or 4.

A.4 Miscellaneous packages

The attitude of the test package shall be based on the most appropriate attitudes given in clauses A.1, A.2 and A.3.