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# INTERNATIONAL STANDARD



# 2248

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Packaging — Complete, filled transport packages Part IV : Vertical impact test by dropping

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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.

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

It was approved in July 1971 by the Member Bodies of the following countries :

|                     |                       |                |
|---------------------|-----------------------|----------------|
| Australia           | Ireland               | Spain          |
| Austria             | Israel                | Sweden         |
| Belgium             | Italy                 | Switzerland    |
| Czechoslovakia      | Japan                 | Thailand       |
| Egypt, Arab Rep. of | Netherlands           | Turkey         |
| France              | New Zealand           | United Kingdom |
| Germany             | Norway                | U.S.A.         |
| Hungary             | Romania               | U.S.S.R.       |
| India               | South Africa, Rep. of | Yugoslavia     |

No Member Body expressed disapproval of the document.

# Packaging — Complete, filled transport packages

## Part IV : Vertical impact test by dropping

### 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method of making 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 — Part I : Identification of parts when testing.*

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

### 3 PRINCIPLE

The package is raised above a rigid plane surface and released to strike this surface (the "impact surface") after a free fall<sup>1)</sup>. 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 package during either lifting or release.

**4.2 Means of holding the package** prior to release in its predetermined attitude<sup>2)</sup>.

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

1) In some circumstances a completely free fall may not be possible and 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.

**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<sup>2</sup> is loaded statically with 10 kg anywhere on the surface;
- sufficiently large to ensure that the test package falls entirely upon the surface.

Additionally the apparatus shall meet the requirements and tolerances of section 6.

### 5 CONDITIONING

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

### 6 PROCEDURE

The test shall be carried out if possible in the same atmospheric conditions as used for conditioning, or if not the test must commence within 5 min of removing the package from those atmospheric conditions.

**6.1** Lift the package and hold it in the predetermined attitude (see Appendix) at a height within  $\pm 2\%$  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.

**6.2** Release the package from its predetermined attitude within the following tolerances;

- for face or edge drops :  $2^\circ$  maximum 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  $\pm 5^\circ$  or  $\pm 10\%$  of the angle, whichever is the greater.

NOTE — The velocity at impact shall be within  $\pm 1\%$  of that which would be achieved by a free fall.

## 7 TEST REPORT

The test report shall include the following particulars :

- a) the number of replicate packages tested;
- b) full description, including dimensions, structural and material specifications of the container and its fittings, cushioning, blocking, closure or reinforcing arrangements;
- c) description of contents;
- d) gross mass of package and net mass of contents in kilograms;
- e) 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;

- f) the attitude in which the package was tested, stated in one of the ways given in the Appendix;
- g) drop height, in millimetres;
- h) type of apparatus used;
- j) any deviations from the test method described in this International Standard;
- k) a record of the result, with any observations which may assist in correct interpretation;
- l) date;
- m) signature of tester.

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## APPENDIX

The predetermined attitude of the 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.

## **Z.1 PARALLELEPIPEDAL PACKAGES** (see 2.1 of ISO 2206)

### **Z.1.1 Impact on a face**

State face 1, 2, 3, etc.

### **Z.1.2 Impact on an edge**

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

or

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

or

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

### **Z.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 pack shall be vertically above the point of impact.

## **Z.2 CYLINDRICAL PACKAGES OF CIRCULAR CROSS SECTION** (see 2.2 of ISO 2206)

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

### **Z.2.1 Impact on top or bottom faces.**

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

### **Z.2.3 Impact on any of the lines 12, 34, etc.,** parallel to the axis of the cylinder.

## **Z.3 SACKS AND BAGS** (see 2.3 of ISO 2206)

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

### **Z.3.1 Impact on a face**

State face 1 or 3.

### **Z.3.2 Impact on an end**

State end 5 or 6.

### **Z.3.3 Impact on a side**

State side 2 or 4.

## **Z.4 MISCELLANEOUS PACKAGES** (see 2.4 of ISO 2206)

The attitude of the package shall be based on the most appropriate of the attitudes given in sections Z.1, Z.2 and Z.3 of this Appendix.

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