IS 7028-1 (2002): Performance Tests for Complete, Filled Transport Packages, Part 1: Stacking Tests Using Static Load [TED 24: Transport Packages]

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भारतीय मानक

पूरे भरित परिवहन पैकेज का कार्यकारिता परीक्षण

भाग 1 स्थैतिक भार का प्रयोग करते हुए स्टेकिंग परीक्षण

(दूसरा पुनरीक्षण)

Indian Standard

PERFORMANCE TESTS FOR COMPLETE, FILLED TRANSPORT PACKAGES

PART 1 STACKING TESTS USING STATIC LOAD

(Second Revision)

ICS 55.180.40

BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 2

FOREWORD

This Indian Standard (Part 1) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Transport Packages and Packaging Codes Sectional Committee had been approved by the Transport Engineering Division Council.

Subsequent to the revision of ISO 2234 : 1985 'Packaging — Complete, filled transport packages and unit loads — Stacking tests using static load' in 1999, this standard has also been revised to bring it in line with the revised ISO standard. In this revision the following technical changes have been incorporated:

a) Terminology of test item had been given;
b) Procedure had been laid out in detail with specific reference to test items stored on pallets or in stacks; and
c) The unit load is also introduced.

This test may be performed as a single test to investigate the effects (deformation, creep, collapse or failure) of stacking or as part of a sequence of test designed to measure the ability of a package to withstand a distribution system that includes a stacking hazard.

The test may also be used to investigate performance under particular conditions of loading, as for example, when the bottom package in a stack rests on an open-decked pallet; or when the profile of the superimposed load is eccentric, when it is supported on the bearers of a single decked pallet which rests on a container. For such purposes, one of the three methods of carrying out the test may be more suitable than the others.

A method of carrying out a stacking test using a compression tester is given in IS 7028 (Part 9) : 1987 'Performance tests for complete, filled transport packages: Part 9 Stacking test using compression tester'.

The composition of the Committee responsible for the preparation of this standard is given in Annex A.

Indian Standard

PERFORMANCE TESTS FOR COMPLETE, FILLED TRANSPORT PACKAGES

PART 1 STACKING TESTS USING STATIC LOAD

(Second Revision)

1 SCOPE

This standard (Part 1) specifies three methods of carrying out a stacking test on a complete, filled transport package using a static load. Whichever method is employed, the test may be used to assess the performance of a package in terms of its strength or the protection that it offers to its contents when it is subjected to stacking.

2 PRINCIPLE

In simple testing, placing of the test package on a flat, horizontal surface and subjecting the test package to an evenly distributed load applied from above, using one of the three methods. The load, atmospheric conditions, period of time under load and attitude of the package for predetermined. The top-to-bottom or the side-to-side deflection of the package during the test may be measured, if appropriate.

3 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
7030 : 1988	Identification of parts for complete, filled transport packages when testing (*first revision*)
7031 : 1987	Method of conditioning for testing of complete, filled transport packages (*first revision*)

4 TERMINOLOGY

For the purpose of this standard, the following term and definition shall apply.

4.1 Test Item

A complete filled transport package or unit load.

5 APPARATUS

5.1 Horizontal Surface

Which is flat (the difference in height between the highest and lowest points not exceeding 2 mm) and rigid. A concrete floor at least 150 mm thick is suitable.

5.2 Means of Loading

Which according to the method chosen (1, 2 or 3) is as described in **5.2.1** to **5.2.3**.

5.2.1 *Method* 1

Stack of test items, each item being identical with the item under test. The number of test items is such that their total mass forms an appropriate load.

5.2.2 *Method* 2

Loading platform, free to tilt to an equilibrium position on the test item, together with an appropriate load. The loading platform, when placed centrally on top of the test item, shall be large enough to extend at least 100 mm over all sides of the top surface of the test item and rigid enough to support the load completely without deformation.

NOTE — This type of load is sometimes referred to as 'free load'.

5.2.3 *Method* 3

Loading platform, such that the lower surface of the platform is constrained to remain horizontal, together with an appropriate load. The loading platform, when placed centrally on top of the test item, shall be large enough to extend at least 100 mm over all sides of the top surface of the test item and rigid enough to support the load completely without deformation.

NOTES

1 This type of load is sometimes referred to as a 'guided load'.

2 If guides are used to ensure that the loading platform remains horizontal, they should not cause friction that could affect the test results.

5.3 Means of Measuring Deflection (if necessary), accurate to ± 1 mm and capable of indicating either an increase or a decrease in dimensions. In addition,

the apparatus shall meet the requirements and tolerances of **8**.

NOTE — Stable and safe loading during the test is dependent on the friction between the top surface of the test item and the bottom surface of the loading platform, as well as the ability of the test item to resist deformation. Means should be provided to produce a stable test assembly and to ensure that, if failure occurs, the load is restrained and does not cause danger to personnel in the vicinity.

6 TEST ITEM PREPARATION

6.1 The test item 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.

6.1.1 Ensure that the test item 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.

7 CONDITIONING

The package shall be conditioned in accordance with one of the conditions described in IS 7031.

8 PROCEDURE

8.1 Wherever possible the test shall be carried out in atmospheric conditions identical to those used for conditioning, and particularly where this is critical to the materials or application of the test item. In other circumstances, the test shall be carried out in atmospheric conditions which approximate those used for conditioning, as closely as is practicable.

8.2 Position the stack of test item (*see* **5.2.1**) or, alternatively, the loading platform (*see* **5.2.2** or **5.2.3**) centrally over the test item which has been placed on the flat, horizontal surface (*see* **5.1**).

8.2.1 If methods 2 and 3 are being used, place the masses making up the load on the loading platform without impact, ensuring that they are in full contact with the loading platform before being released. The masses shall be distributed uniformly over that portion of the surface of the loading platform in direct contact with the test item to ensure that the centre of gravity of the load is immediately above the centre of the top surface of the test item. The mass of the total load, including the mass of the loading platform, shall be within 2 percent of the predetermined value. The distance of the centre of gravity of the load above the loading platform shall not exceed 50 percent of the height of the test item.

8.2.2 In methods 2 and 3, if measurements are taken, this shall be done between the two surfaces exerting compression on the test item after the application of a pre-load sufficient to assure a good contact between the loading platform and the test item.

8.3 Apply the load for the required period of time (usually 24 h, according to the material) or until collapse.

8.4 Remove the load and examine the test item.

NOTES

1 At any time during the test it may be necessary to measure dimensions.

2 Appropriately profiled inserts to represent particular loading conditions may be placed above or below the test item or both above and below, as required.

3 In the case of test items stored on pallets or in stacks, the test should be carried out on several test items side by side or using an actual stacking pattern.

9 TEST REPORT

9.1 The test report shall include the following particulars:

a) a reference to this standard;
b) the name and address of testing laboratory and name and address of customer;
c) a unique identification of the report;
d) the date of receipt of the test items and the date(s) of performance of the test;
e) the name, title and signature of persons accepting test responsibility for the test report;
f) a statement to the effect that the test results relate only to the items tested;
g) a statement that the report shall not be reproduced except in full without the written approval of the laboratory;
h) the number of replicate test items tested;
j) a full description, including dimensions, structural and material specifications of the test item and its fittings cushioning, blocking, closure or reinforcing arrangements, gross mass of the test item and mass of the contents in kilograms;
k) a description of contents, if simulated or substituted contents were used, full details shall be given;
m) the relative humidity, temperature and the time of conditioning; temperature and relative humidity of test area at the time of test; whether these values comply with the requirements of IS 7031;
n) the attitudes in which the test item was tested, using the method of identification given in IS 7030;
p) the mass, in kilograms, of total load, including mass of loading platform, and the

period of time during which the test item was under load, the means of loading used, that is, method 1, 2 or 3, whether guides were used and if so, their design; the test item pattern under test;

q) the location of deflection measurement points on the test item and the stage of test at which deflection measurements were made;

r) the design and dimensions of any profiles used;

s) the type of apparatus used;

t) any deviations from the test methods described in this Standard; and

u) a record of the results, including observations which assist in the correct interpretation of the results.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Transport Packages and Packaging Codes Sectional Committee, TED 24

Organization	*Representative(s)*
In Personal Capacity (*Plot 1C, Sector V, Narul, Navi Mumbai* 400706)	SHRI P. V. NARAYANAN (***Chairman***)
Advance Packaging Pvt Ltd, Mumbai	SHRI DAMODAR SOMANI
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Member-Secretary
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JOINT Director (Transport Engineering), BIS

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