

Australian Standard®

**Complete, filled transport packages—
Methods of test****Method 16: Stability testing of unit loads**

PREFACE

This Standard was prepared by Standards Australia Committee PK-012, Physical Testing of Packages and Containers, as an additional part to the AS 2582 series of test methods. It is identical with and has been reproduced from ISO 10531:1992, *Packaging—Complete, filled transport packages—Stability testing of unit loads*.

As this Standard is reproduced from an International Standard, the following modifications apply:

- (a) Its number does not appear on each page of text and its identity is shown on the cover and title page.
- (b) In the source text, 'this International Standard' should read 'this Australian Standard.'
- (c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to equivalent Australian Standards as follows:

<i>Reference to International Standard</i>		<i>Australian Standard</i>	
ISO		AS	
2234	Packaging—Complete, filled transport packages—Stacking tests using a static load	2582	Complete, filled transport packages—Methods of test
		2582.3	Method 3: Stacking tests using a static load
2244	Packaging—Complete, filled transport packages—Horizontal impact tests (horizontal or inclined plane test; pendulum test)	2582.5	Method 5: Horizontal impact tests
2247	Packaging—Complete, filled transport packages—Vibration test at fixed low frequency	2582.6	Method 6: Vibration test at fixed low frequency
2874	Packaging—Complete, filled transport packages—Stacking test using compression tester	2582.10	Method 10: Compression and stacking tests using a compression tester
8318	Packaging—Complete, filled transport packages—Vibration tests using a sinusoidal variable frequency	2582.11	Method 11: Sinusoidal vibration tests using a variable frequency

Only international references that have been adopted as Australian Standards have been listed.

1 Scope

This International Standard specifies methods of testing for the stability of unit loads. These tests are intended to assess the performance of completely formed unit loads as they are subjected to the hazards of environmental exposure, storage, handling and transportation. These tests may be performed as part of a sequence.

The considered hazards relate to a land environment. Similar hazards may be expected in a marine environment but to a substantially greater degree, and additional hazards not covered by this International Standard may occur in a marine environment. It should not be assumed that unit loads which satisfactorily pass the tests of this International Standard will be stable in a marine environment.

The unit loads covered in this International Standard are not restricted to those incorporating a pallet platform, but may include other devices such as pallet boxes or slipsheets.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2234:1985, *Packaging — Complete, filled transport packages — Stacking tests using static load*.

ISO 2244:1985, *Packaging — Complete, filled transport packages — Horizontal impact tests (horizontal or inclined plane test; pendulum test)*.

ISO 2247:1985, *Packaging — Complete, filled transport packages — Vibration test at fixed low frequency*.

ISO 2874:1985, *Packaging — Complete, filled transport packages — Stacking test using compression tester*.

ISO 3676:1983, *Packaging — Unit load sizes — Dimensions*.

ISO 4180-1:1980, *Complete, filled transport packages — General rules for the compilation of performance test schedules — Part 1: General principles*.

ISO 4180-2:1980, *Complete, filled transport packages — General rules for the compilation of performance test schedules — Part 2: Quantitative data*.

ISO 8318:1986, *Packaging — Complete, filled transport packages — Vibration tests using a sinusoidal variable frequency*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 unit load: Load consisting of items or packages held together by one or more means and shaped or fitted for handling, transporting, stacking and storing as a unit. The term is also used to describe a single item adapted for the same purpose.

3.2 clamp handling: Handling method using a special fork-lift clamping attachment for applying sufficient compression to opposite sides of unit loads such that complete loads can be stored, handled and transported.

3.3 push/pull handling: Handling method using a special fork-lift gripper attachment or other suitable means for pushing/pulling loaded slipsheets onto a

load plate such that complete loads can be stored, handled and transported.

4 General

The unit load shall be subjected to tests as specified in this International Standard. The nature of the means of handling will dictate the specific handling test required as part of the simulated distribution sequence.

The occurrence of failure at any point during the tests shall result in cessation of further testing and redesign of the unitizing technique. Any subsequent changes require retesting, recommencing with the first test method of the sequence.

Observations of failure during testing, indicating load instability, may include deformation, creep, collapse, material fatigue or shifting of packages comprising the load.

NOTE 1 The effects of temperature and humidity in the testing environment may vary greatly and thus may affect the strength of the unit load.

5 Apparatus

5.1 Equipment for compression and vibration tests shall be as specified in the appropriate International Standard listed in table 1. Equipment for the horizontal impact test shall be as specified in ISO 2244, except for the inclined plane test (see 7.2.2.1).

5.2 In making the drop test, the unit load may be handled with any convenient equipment, such as a block and tackle, a hoist, or jacks with release mechanism such that the fall of the unit load is not obstructed by any part of the apparatus before striking the impact surface.

5.3 In making the clamp lift test, use an actual lift truck equipped with the appropriate load clamping device to lift the unit load. Provision shall be made to measure the clamp force between the platens, using a load cell or other suitable device.

5.4 In making the push/pull pack test, use an actual lift truck equipped with an appropriate push/pull attachment for pulling the load onto the load plate by the slipsheet tab. Alternatively, any suitable pulling device equipped with a gripper jaw may be used.

6 Conditioning

As it is practically impossible to condition a complete unit load to such an extent that all goods and packaging materials are brought and kept in equi-

librium with the climate applied without detaching the packaging materials, conditioning of the unit load is omitted.

However, when composing the unit load for testing, the goods and the packaging materials should be subject to the same conditions as for normal transportation.

After testing, moisture determinations may be carried out on the packaging materials, in order to apply corrections if necessary.

7 Procedure

7.1 General

Tests shall be conducted under ambient conditions of temperature and humidity as specified in table 1 and in the sequence shown.

Test intensities shall be chosen according to the general principles specified in ISO 4180-1 and their values shall be as specified in ISO 4180-2.

7.2 Pallet handling tests

7.2.1 Drop test

Test the ability of the palletized load to withstand accidental drops, using the two following methods.

7.2.1.1 Drop flat on base by tilting on one edge

With one edge of the unit load supported by a hard, solid surface (e.g. concrete), raise the other end 20 cm and release to fall freely. See figure 1.

7.2.1.2 Bottom edge impact

With the unit load on a hard, solid surface (e.g. concrete), raise one end of the surface load and set upon a timber or other support 5 cm high so that the edge of the load is at most 10 cm from the corner of the support [see figure 2 a)]. Raise the other end of the load till the base of the load is 20 cm above floor level [see figure 2 b)] and release the load to fall freely. Where loads are tall or top-heavy, provision must be made to prevent the load from tipping over after the drop is made.

7.2.2 Horizontal impact test

NOTE 2 This test is optional (see table 1).

The ability of the palletized load to withstand repeated horizontal impacts against its base edges shall be evaluated using one of the tests specified in 7.2.2.1 to 7.2.2.3.