BS EN 12674-4:2015

BSI Standards Publication

Roll containers

Part 4: Performance requirements

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National foreword

This British Standard is the UK implementation of EN 12674-4:2015. It supersedes BS EN 12674-4:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PKW/0, Packaging.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Foreword

This document (EN 12674-4:2015) has been prepared by Technical Committee CEN/TC 261 “Packaging”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12674-4:2006.

The only technical change since the latest edition concerns the following point:

— modifications in the wording of the second paragraph in 5.2.

This European Standard is part of a series of four standards for roll containers and dollies. The other parts are entitled as follows:

— *Roll containers – Part 1 – Terminology*

— *Roll containers – Part 2 – General design and safety principles*

— *Roll containers – Part 3 – Test methods*

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Roll containers and dollies are equipment intended for moving goods. They comprise apparatus fitted with fixed and/or swivel castors. For roll containers the superstructure comprises two or more frames which provide retention for items requiring transport and/or distribution.

Dollies and roll containers can be supplied in a variety of materials and additionally roll containers are supplied in four main styles. One of these styles, the Nesting style, is further sub-divided into five derived forms and the Demountable style is sub-divided into two derived forms. EN 12674-1 gives details of how these styles differ. EN 12674-2 gives methods of measuring working dimensions and aspects of design that manufacturers need to be aware of. Test methods are given in EN 12674-3 which are supported by performance levels in this Part 4, which take account of the normal static and dynamic loads applied in use.

This European Standard specifies minimum levels of performance for critical tests, in particular with reference to safety. Certain tests which are related only to longevity, quality control or need development are optional and if carried out may be subject to agreement between manufacturer and user. Tests are applied to fully assembled roll container and dolly specimens as indicated in Table 1. Dismantled or nested roll containers are not subjected to testing; however, empty dollies stacked ready for use, storage or transit need to be subjected to normative testing in order to determine a safe number of stacked units.

In order to calculate applied test loads a nominal safe working load (SWL) of 250 kg is assumed in this European Standard for every specimen. The value of 250 kg is not a normative level and may be reduced or increased by the testing body in collaboration with the specimen supplier/manufacturer. However, if different, the level used should be clearly stated in the test report.

1 Scope

This European Standard specifies appropriate tests and levels of performance for roll containers and dollies manufactured in all materials, assembled for use and stacked for storage when tested in accordance with EN 12674-3.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12674-1:1999, *Roll containers — Part 1: Terminology*

EN 12674-2:2001, *Roll containers — Part 2: General design and safety principles*

EN 12674-3:2004, *Roll containers — Part 3: Test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12674-1:1999 and the following apply.

3.1
line of tilt XX
axis in the horizontal plane about which an unstable roll container or dolly will eventually topple

Note 1 to entry: Shown as axis XX in EN 12674-3:2004, Figure 2.

3.2
angle of tilt (alpha) α
angle measured against the major horizontal axis of the length or width of the roll container and the line of tilt

Note 1 to entry: Shown in EN 12674-3:2004, Figure 2.

Note 2 to entry: Length and width are defined in EN 12674-2:2001, 4.1.

3.3
angle of inclination – (beta) ß
angle in a vertical plane, normal to the line of tilt, at which the roll container becomes unstable and topples sideways

Note 1 to entry: Shown in EN 12674-3:2004, Figure 1a and Figure 1b.

3.4
geometric centre
centre point in plan elevation generated by the intersection of two imaginary lines from the opposite internal corners of the base

3.5
vertical axis
central axis of a roll container or dolly passing through the geometric centre

3.6
ultimate load
highest load sustained during a test by a specimen before collapse or failure

3.7
safe working load (SWL)
maximum permissible load in kg to be carried by a particular design of roll container or dolly during its service life

4 Sampling of roll containers to be tested

4.1 Sequence of tests

All tests are independent of each other and may be carried out in any order. Results shall be listed in identical order to tests listed in this European Standard. A new untested or undamaged specimen or component shall be used in each test. All tests other than those referred to in 5.1.2 and 5.10.2 are prototype tests and may therefore result in destruction or damage to the specimen.

Unless otherwise stated by the roll container or dolly supplier/manufacturer and in order to calculate applied test loads a nominal safe working load (SWL) of 250 kg is assumed for every specimen. The value of 250 kg SWL is not a normative level and may be reduced or increased by the testing body in collaboration with the specimen supplier/manufacturer. However, if modified, the SWL level used shall be clearly stated in the test report.

4.2 Applicability of normative tests

The following tests shall be applied to fully assembled roll container and dolly specimens where indicated in Table 1. Some tests are conducted on empty specimens and some with load as specified. Where specific performance requirements relating to individual tests apply, they are given in Clause 5.

Stacked dollies and dismantled stacked roll container bases intended for stacking shall be subjected to normative stability testing as detailed in 5.1.3.

Dismantled or nested roll containers are not subjected to normative testing.

Table 1 — Applicability of tests

Test in EN 12674-3		**Dolly**		**Fully assembled roll container all types**	
		Dummy load	Unloaded	Dummy load	Unloaded
4.2.1	Stability	✓✓✓✓	✓ [a]	✓✓✓✓	✓✓✓✓
4.2.2	Diagonal	-	✓✓ [b]	-	✓✓ [b]
4.2.3	Side	-	-	-	✓
4.2.4	Side to base	-	-	-	-
4.2.5	Castor	-	✓✓ [c]	-	✓✓ [c]
4.2.6	Floor UDL	-	-	-	-
4.2.7	Impact	-	-	-	-
4.2.8	Hazard	-	✓✓ [d]	-	✓✓ [d e]
4.2.9	Free fall	-	-	✓	-
4.2.10	Rolling	✓✓✓✓	-	✓✓✓✓	-
4.2.11	Stacking	-	-	-	-
4.2.12	Fork lift	-	-	-	-
4.3.1	Side infill	-	-	-	-
4.3.2	Infill/infill	-	-	-	-
4.3.3	Frame infill	-	-	-	-
4.3.4	Strap	-	-		-

✓ = this represents one test

Only where tests are marked ✓ shall specimens be subjected to this test, where marked ✓✓ subjected to two tests e.g. one side, one end, etc.

[a] Test when dollies are stacked empty.

[b] Each diagonal to be tested separately using the same specimen.

[c] One test at each end, 2 tests in total.

[d] Two tests, one side and one end test.

[e] Neither A-frame nor V-frame shall be subjected to this test.

Optional tests

Tests in EN 12674-3:2004, 4.3 are optional.

Tests in EN 12674-3:2004, Annex A are optional.

5 Performance requirements – normative tests

5.1 Stability tests (4.2.1 of EN 12674-3:2004)

5.1.1 General

NOTE 1 Where this European Standard test protocol differs from EN 12674-3:2004 then this European Standard will take precedence.

NOTE 2 No recommendation is made for stability performance for the roll container known as a dairy cage.

NOTE 3 The standard dummy load in normative test 4.2.1 of EN 12674-3:2004 does not vary with roll container or dolly type, size or SWL since direct comparisons between designs would then be impossible. Additional tests may be specified by a manufacturer or user, but if specified are not part of this European Standard.

5.1.2 Dolly - dummy load

With dummy load *W* equal to 50 kg, centrally placed at *h* = 250 mm, the minimum angle of inclination *ß* of the supporting table before instability or topple shall not be less than *ß* = 28° in any of four directions R, L, F or B.

5.1.3 Dolly - stacked empty

With supporting test bed table set horizontal with *ß* = 0°, estimate the number of identical stacked units that will achieve stability. Place these in stacked position with the longest dolly dimension parallel to the test bed table hinge, setting castors on the supporting test bed table hinge-side in *toe-in* position. Incline the table slowly to *ß* = 7° and fix securely at this angle while holding stacked units secure, then add or subtract units until the stack just achieves stability. Record the number of stacked units.

NOTE If a manufacturer's moulded depressions in the dolly top deck forces an alternative castor position to *toe-in*, then these will take precedence and be used in the test.

5.1.4 Roll container (unloaded)

Without load the minimum angle of inclination *ß* before instability or topple shall not be less than *ß* = 15° in any of four directions R, L, F or B.

5.1.5 Roll container (dummy load)

With dummy load *W* equal to 50 kg, centrally placed at *h* = 250 mm, the minimum angle of inclination *ß* before instability or topple shall not be less than *ß* = 19° in any of four directions R, L, F or B.

5.2 Diagonal resistance test (4.2.2 of EN 12674-3:2004)

For empty dollies and roll containers the test load as specified in EN 12674-3 shall be applied across the specimen diagonal d_1 such that *F* equals 0,6 × SWL.

After release of load, residual distortion shall not be more than 0,3 % of the original specimen diagonal length *d*1.

Repeat the test such that each of the two diagonals are tested for compliance with 0,3 % of original specimen diagonal.

5.3 Strength and stiffness of roll container sides (4.2.3 of EN 12674-3:2004)

A roll container side may be removed or left in-situ for this test.

With test load positioning as specified in EN 12674-3, and test load *W* equal to 0,1 × SWL the maximum deflection under load d_1 shall not exceed 0,025 *L*.

Loading shall continue until inelastic distortion or fracture occurs and the result shall be recorded.

L shall be the overall height of the side frame as defined by h_3 in 4.4 of EN 12674-2:2001.

5.4 Side frame to base cantilever test (4.2.4 of EN 12674-3:2004)

Roll container sides shall be left in-situ for this test. No recommendation is made for performance.

NOTE This is primarily a test for demountable sided roll containers.

5.5 Castor lateral load resistance test (4.2.5 of EN 12674-3:2004)

With test load positioning as specified in EN 12674-3, free play in castors and wheels eliminated by means of a small preload and with test load *F* equal to 0,75 × SWL the specimen shall not distort/deflect more than 4 mm.

Residual distortion/deflection at zero load shall be less than 3 mm.

5.6 Distributed load floor test (4.2.6 of EN 12674-3:2004)

No recommendation is made for performance.

5.7 Localised edge impact loading on floor test (4.2.7 of EN 12674-3:2004)

No recommendation is made for performance.

5.8 Localised side/end base test (4.2.8 of EN 12674-3:2004)

Apply to the specimen at B a full test load *F*, equal to 0,8 × SWL concentrated at hazard point A. At that full load the overall specimen dimension measured between points A and B shall be measured. For the dairy cage style of roll container, apply at B a reduced test load *F*, equal to 0,4 × SWL concentrated at hazard point A.

Upon release of load residual distortion measured up to 5 min after loading shall be not more than 8 mm.

5.9 Free fall drop test (4.2.9 of EN 12674-3:2004)

5.9.1 Method 1 (drop)

No recommendation is made for performance.

NOTE This test would be relevant when loaded with the customers intended type of goods. A suitable protocol might be 3 cycles of drop, with inspection criteria assessed after unloading, when pass criteria would be zero damage to mounting points although pass criteria might allow castors to be destroyed.

5.9.2 Method 2 (compression version)

No recommendation is made for performance.

5.10 Starting and rolling resistance test (4.2.10 of EN 12674-3:2004)

5.10.1 Tests 1 to 4 (specimen unloaded)

No recommendation is made for performance.

5.10.2 Tests 1 to 4 (specimen loaded)

The test load shall be equal to the users SWL on a test surface identical to the users working surface with 4 tests with castors initially set as follows:

— trailing castors at 0° to direction of motion;

— castors outwards at 90° and 270° to direction of motion;

— castors inwards at 270° and 90° to direction of motion;

— reversed castors at 180° to direction of motion.

NOTE 1 Resulting pushing force will take cognizance of local/national health and safety guidelines.

NOTE 2 These tests can only usefully be conducted on the user's premises in order to create correct test surface.

5.11 Stacking test (4.2.11 of EN 12674-3:2004)

No recommendation is made for performance.

NOTE Because of the non standard and specific nature of proprietary couplings for stacked/superimposed units, it is appropriate that performance should be decided between manufacturer and user.

5.12 Mechanical lifting test (4.2.12 of EN 12674-3:2004)

No recommendation is made for performance.

6 Performance requirements – optional tests

6.1 Fatigue of welded joints - side frame to infill (4.3.1 of EN 12674-3:2004)

No recommendation is made for performance.

6.2 Strength of welded joints - infill to infill (4.3.2 of EN 12674-3:2004)

No recommendation is made for performance.

6.3 Strength and stiffness of frame infill (4.3.3 of EN 12674-3:2004)

No recommendation is made for performance.

6.4 Tensile resistance of strap/buckle (4.3.4 of EN 12674-3:2004)

No recommendation is made for performance.

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