SLOVENSKI STANDARD
SIST EN 12674-3:2005

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Kontejnerji s kolesi - 3. del: Preskusne metode

Roll containers - Part 3: Test methods

Rollbehälter - Teil 3: Prüfverfahren

Conteneurs a roulettes - Partie 3: Méthodes d'essai

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ICS:

55.180.10 Veļ namenski kontejnerji General purpose containers

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Roll containers - Part 3: Test methods

Conteneurs à roulettes - Partie 3: Méthodes d'essai

Rollbehälter - Teil 3: Prüfverfahren

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document (EN 12674-3:2004) 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of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.

This draft document is part of a series of 4 documents for roll containers, other parts are titled as follows:

Roll containers - Part 1: Terminology

Roll containers - Part 2: General design and safety principles

Roll containers - Part 4: Performance requirements

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

Introduction

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

Dollies 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 2 derived forms. Part 1 of this document, Terminology, gives details of how these styles differ. Part 2 - General design and safety principles gives methods of measuring working dimensions and aspects of design that manufacturers need to be aware of. The test methods given in this Part 3 are supported by performance levels in Part 4 which take account of the normal static and dynamic loads applied in use.

This Part 3 of the document sub-divides into 3 classes of tests. Clause 4.2 contains the main safety and performance tests for complete roll containers or dollies. Clause 4.3 contains tests on component parts of roll containers and dollies and is intended for quality control purposes. Annex A (informative) covers tests requiring further industry development, which are not yet sufficiently defined to go into the normative section.

In general the earlier tests are intended to be the most stringent in order to achieve early failure in inadequate roll container or dolly designs to cut down on time of design and development. As these tests are type tests and not proof tests, untested roll containers are used for each test rather than risking accumulated damage affecting subsequent results. This will result in a better understanding of weak design features and the exact mechanical cause of each failure. There is no intention in this document to test for the effects of long-term roll container or dolly wear by using extended or cyclic repeat tests other than the tests in 4.3 on steel welds where the principal objective is to examine fatigue.

1. Scope

This document covers the load testing of roll containers and dollies for safety, fitness for purpose and the development of new designs.

All designs, styles and derived forms of roll containers and dollies intended for fitment of sides or not are subject to certain of the tests in Part 3, as stipulated in Part 4. Also included in the scope are roll containers partly made from non-metallic materials, such as plastic or plywood.

Dollies are subject to a more limited range of these tests as stipulated in Part 4.

2. Normative references

The following referenced documents are indispensable for the application of this document. 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*

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,
axis in the horizontal plane about which an unstable roll container or dolly will eventually topple (shown as xx in Figure 2)

3.2
angle of tilt α
angle measured against the major horizontal axis of the length or width (as defined in Part 2) of the roll container and the line of tilt (shown as α in Figure 2)

3.3
angle of inclination β
angle in a vertical plane, normal to the line of tilt, at which the roll container becomes unstable and topples sideways (shown as β in Figures 1a and 1b)

3.4
optimum castor start position
orientation with the castor arranged in the normal trailing (running) position

3.5
transverse 90 castor start position

orientation with the castor arranged at 90 degrees to the trailing (running) position

NOTE This will be pointing outwards on the right hand side of a roll container, inwards on the left hand side of a roll container

3.6
adverse castor start position
orientation with the castor arranged at 180 degrees to the trailing (running) position

3.7
transverse 270 castor start position
orientation with the castor arranged at 270 degrees to the trailing (running) position

NOTE This will be pointing inwards on the right hand side of a roll container, outwards on the left hand side of a roll container

3.8
castor swivel axis
vertical axis around which the castor fork rotates
[extracted from EN 12526 : 1998, *Castors and wheels - Vocabulary, recommended symbols and multilingual dictionary*]

NOTE The convention for positive angular rotation is an anti-clockwise direction when viewed from above the swivel axis.

3.9
geometric centre
centre point in plan elevation generated by an imaginary line from the opposite internal corners of the base

3.10
vertical axis
central vertical axis of a roll container or dolly passing through the geometric centre

4. Test methods

4.1 General

Each test shall be carried out on a new undamaged roll container. All tests, except where required otherwise in Part 4, shall be conducted at (20 to 25) °C. Tilting angles shall be measured to an accuracy of 0,5 degrees, test loads to an accuracy of within 3 % of maximum load applied and deflections or distortions to an accuracy of ± 0,5 mm. The tolerance on dimension of fixed stops and hazards shall be ± 2 mm and the positioning of test loads needed for testing, load applicators and spreader bars shall be to an accuracy of ± 5 mm.

Unless otherwise stated here, or in Part 4, all applied test loads are based on a roll container or dolly payload of 250 kg. Where loads are applied to specimens, the minimum deflection readings shall be taken as follows:

test commencement at zero load,

full load,

zero load immediately after the loading cycle has terminated.

4.2 Tests on roll containers - complete assembled

4.2.1 Stability test

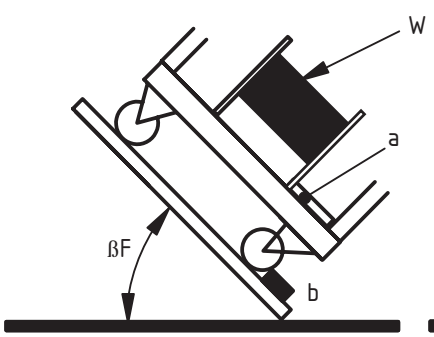

Figure 1a —Stability test – right

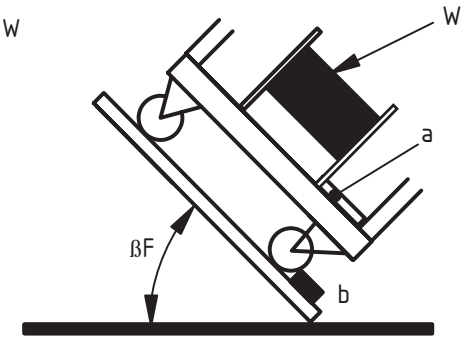

Figure 1b Stability test – forward

4.2.1.1 Purpose

To determine the maximum angle of tilt the roll container or dolly can resist without toppling, when unloaded in 4 directions then loaded in 4 directions, each using the most detrimental castor positions. These directions are - right tilt 'R', left tilt 'L', forward tilt 'F' and backward tilt 'B'

4.2.1.2 Apparatus:

A hinged, rigid, flat supporting table capable of slow inclination as shown in Figure 1 with the following:

a) anti-slide load support panel shown as a in Figure 1a;

b) restraint bar (shown as b in Figures 1a,1b) 40mm high running full length of table and parallel with the hinge;

c) inclinometer (shown as c in Figure 1a) for measurement of angle of inclination β;

d) dummy load (shown as *W* in Figures 1a,1b) with centre of gravity G on the vertical axis between 230 mm and 270 mm above the table surface.

4.2.1.3 Procedure (unloaded)

Set the table within 0,3° of level in both horizontal axes. For each of the four test modes set the castor in the maximum detrimental position (castor inwards and normal to stop b) in the direction of arrow R in Figure 2. Arrange a suitable safety restraint cord to prevent the specimen toppling to the floor. Raise the table at a rate of between 0,3 degree/sec and 1,0 degree/sec thereby forcing the roll container against the edge of restraint stop 'b' shown as XX in Figure 2 until the specimen commences to topple. Record this as angle of inclination β. Repeat the test to determine β in each of 4 directions as below.

βR Right

βL Left

βF Forward

βB Back

4.2.1.4 Procedure (loaded)

Set up the specimen as above but position a dummy load *W* equal to 0,2 x payload, centrally on the vertical axis at *h* = 250 mm. Secure the load to the specimen floor by bolts or straps. Where the roll container is designed for hanging garments, the dummy load shall be suspended from the garment hanging rail with its centre of gravity at a distance of 0,5 metre.

NOTE Although each roll container will have four stability inclination angles associated with it, the angles βL and βR may, with some designs be equal.

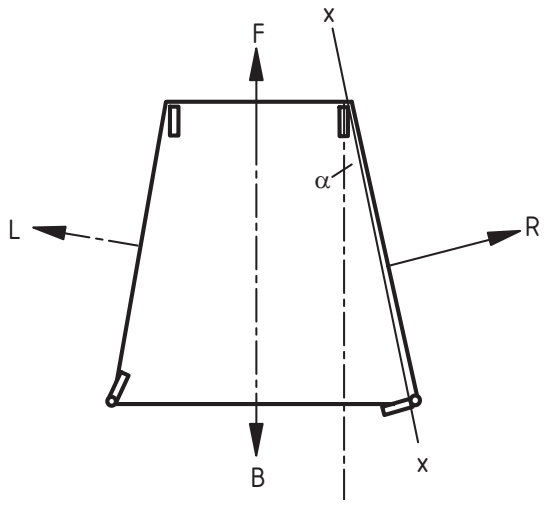

Figure 2 — Stability test - associated angles

4.2.2 Diagonal resistance test

4.2.2.1 Purpose

To simulate handling forces across corners of roll containers causing diagonal deformation. To measure the liability to local damage in sockets of demountable designs. This progressive static load test ensures a measurable result and allows determination of assembled unit stiffness and strength.

4.2.2.2 Apparatus

a) Reaction frame shown in Figure 3 mounted horizontally with load applicator at F.

b) Method to measure diagonal distance d_1

4.2.2.3 Procedure

Stand the empty roll container or dolly with castors/wheels touching the floor. Gradually apply load F over a period of (15 to 30) seconds, record the resulting local distortion and overall distortion by continuously measuring d_1 and plotting against F. Continue until d_1 equals 0,99 of original diagonal length and measure the load. Reduce the load to zero and measure the residual distortion d_R where d_R is the difference between d_1 at start and d_1 at termination.

Turn the specimen and repeat the loading cycle on the second diagonal where construction is not identical.

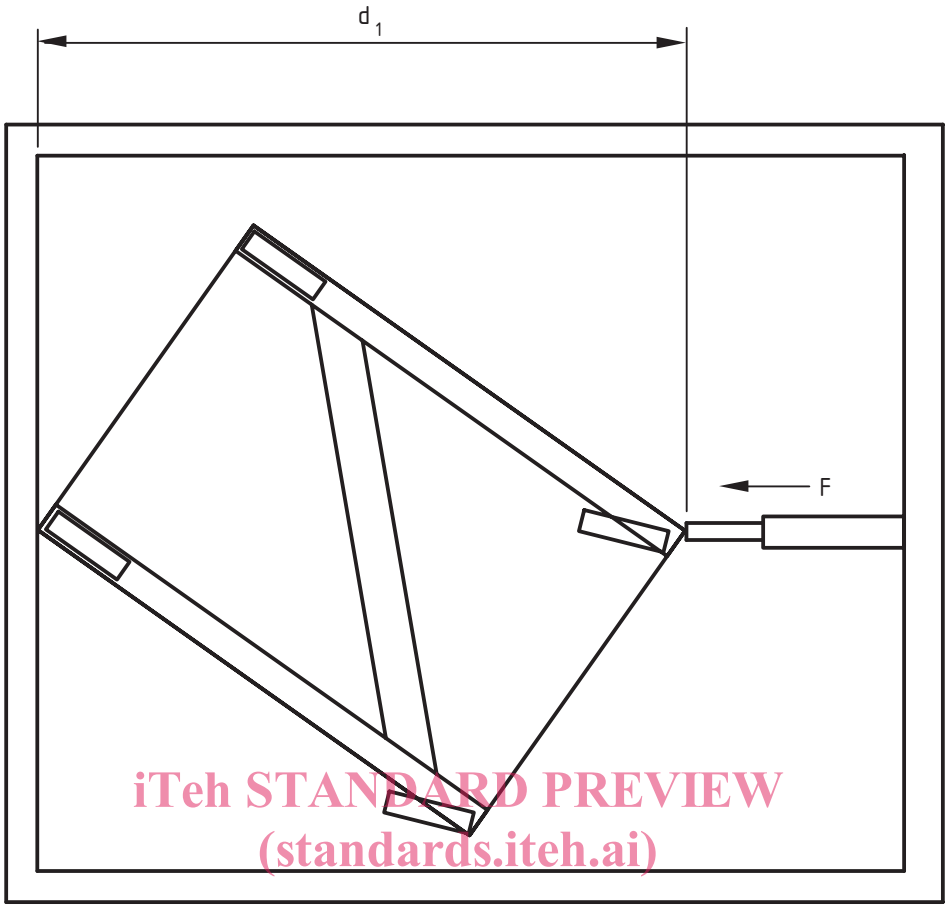

Figure 3 — Diagonal resistance test

4.2.3 Strength and stiffness of roll container sides

4.2.3.1 Purpose

To simulate outward thrust of goods and measure side frame stiffness and strength using 3-point loading whilst eliminating the effect of base mountings.

4.2.3.2 Apparatus

Rigid supports 50 mm wide at spacing 0,9*L*, where *L* = side frame length as shown in Figure 4. The length of the supports and central load bar *W* shall be sufficient to cover the full extent of the main elements of the side structure.

4.2.3.3 Procedure

Apply without shock a steadily increasing or multiple step incremental load to the centre of the side frame to make up load *W*, where *W* = 0,5 x payload. Hold for duration *t*, measure the resulting deflection d_1, reduce the load to zero and measure the residual deflection d_R.

NOTE This test is not an infill test nor intended to test the mounting point of the side frame or its strength at that point, that is the purpose of tests 4.3.3 and 4.2.4 respectively.