BRITISH STANDARD

BS EN
12528:1999

Castors and wheels — Castors for furniture — Requirements

The European Standard EN 12528:1998 has the status of a British Standard

ICS 97.140

National foreword

This British Standard is the English language version of EN 12528:1998.

The UK participation in its preparation was entrusted to Technical Committee MHE/7, Industrial trucks – Safety, which has the responsibility to:

— aid enquirers to understand the text;

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 7 and a back cover.

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EUROPEAN STANDARD
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EN 12528

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Descriptors: furniture, wheels, castors, characteristics, dimensions, product requirements, classification, tests, conformity tests, marking

English version

Castors and wheels — Castors for furniture — Requirements

Roues et roulettes — Roulettes pour meubles — Prescriptions

Räder und Rollen — Möbelrollen — Anforderungen

This European Standard was approved by CEN on 30 August 1998.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 12528:1998 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 324, Castors and wheels, the Secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by March 1999, and conflicting national standards shall be withdrawn at the latest by March 1999.

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

Contents

1 Scope

This European Standard specifies the technical requirements, the appropriate dimensions and the requirements for testing.

This European Standard applies to castors for general furniture applications, but specifically excludes those for swivel chairs and other specialized applications.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply only to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12526:1998, *Castors and wheels — Vocabulary, recommended symbols and multilingual dictionary.*

EN 12527:1998, *Castors and wheels — Test methods and apparatus.*

3 Definitions

For the purpose of this European Standard, definitions and recommended symbols of EN 12526:1998 apply.

4 Dimensions and classification

The characteristics of a castor are:

— fixing system;
— castor type;
— dimensions;
— performance level.

4.1 Fixing system

The fixing system includes top plates, stem and circlip, threaded stem and other fixing systems.

Fixings shall be chosen with reference to the application of the castor.

4.2 Castor type

Castors are classified into four types (H, W, C and S). These all apply to the castor designs illustrated in Figures 1, 2 and 3.

4.2.1 *Type H*

Castors with plain wheels are defined as type H, hard tread.

NOTE These castors are suitable for carpeted floors.

4.2.2 *Type W*

Castors with resilient tyred wheels are defined as type W, soft tread.

NOTE These castors are suitable for hard stone, wooden or tiled floors or those featuring non-textiled covering.

4.2.3 *Type C*

Castors which are electrically conductive. Type C castors may have a hard or soft tread.

NOTE These castors shall have either modified type H or type W wheels.

4.2.4 *Type S*

Inclined axle castor.

4.3 Dimensions

The Figures 1, 2 and 3 show typical castor designs; Table 1 shows the specified dimensions.

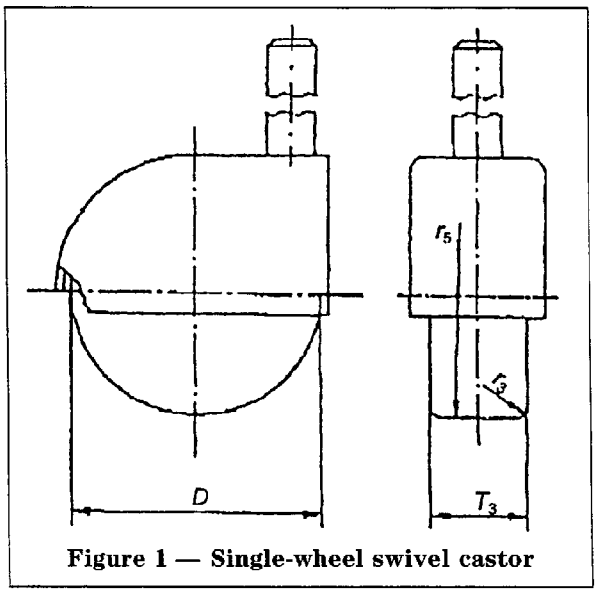

Figure 1 — Single-wheel swivel castor

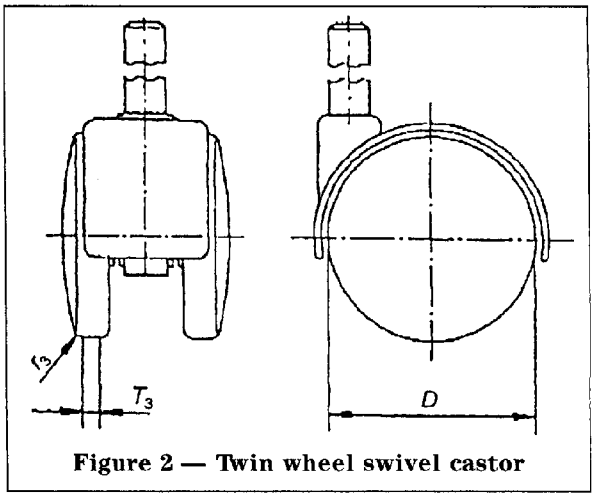

Figure 2 — Twin wheel swivel castor

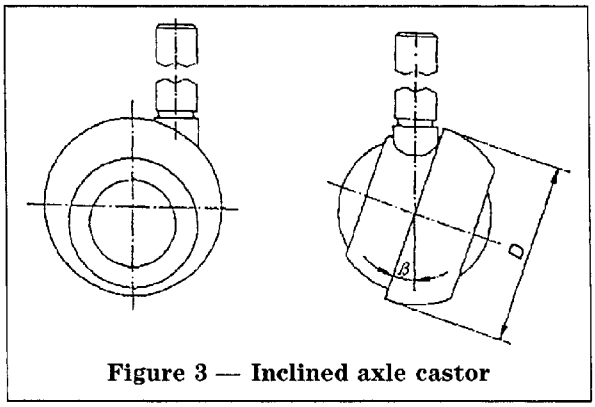

Figure 3 — Inclined axle castor

The wheel(s) of a fixed castor shall conform to the dimensions shown in Figures 1, 2 and 3 (as appropriate).

Table 1 — Specified dimensions

Dimensions in millimetres and angles in degrees

Description	Castor designs	Symbol	Dimension
Wheel diameter	All	D	min. 20
Tread width	Single wheel castors	T_3	min. 7,5
	Twin wheel castors		min. 2 × 5
External corner radius	All	r_3	min. 1,5
Tread curvature	Single wheel castors	r_5	min. 110
Angle of inclination	Inclined axle castors	β	max. 25

4.4 Performance level

The requirements for castors will vary dependent on the environment in which they are intended to be used. The levels are shown in Table 2.

Table 2 — Levels of performance

Level	Load capacity L_1 N
1	100
2	200
3	300
4	400

5 Requirements

Testing requirements for castors and wheels are listed below. Test apparatus and procedures are defined in EN 12527:1998.

5.1 Standard conditions

5.1.1 *Environmental conditions*

Tests shall be carried out at a temperature between 17 °C and 23 °C. During the 24 h prior to the test the sample(s) shall remain at the above temperature, in an environment with a relative humidity between 40 % and 70 %.

Sample(s) shall not be artificially cooled during testing.

5.1.2 *Test sequence*

A new castor shall be taken and the impact test performed.

A second new castor(s) shall be taken and the remaining tests performed in the sequence shown in Table 3.

5.2 Impact performance

5.2.1 *Test objectives, apparatus and procedures*

Detailed in **4.12** of EN 12527:1998.

Table 3 — Test sequence for castor designs and test procedure reference

Reference	Test sequence	Castors designs	Test procedure reference
5.2	Impact performance	All	**4.12**
5.3	Electrical resistance	Castors Type C	**4.4**
5.4	Manual locking device	Castors with manual locking devices	**4.6**
5.5	Dynamic	All	**4.13**
5.6	Rolling resistance	All	**4.15**
5.7	Swivel resistance	Swivel castors	**4.16**
5.9	Stem retention	All	**4.9**
5.8	Static load	All	**4.17**

5.2.2 *Test values*

Test values are listed in Table 4.

Table 4 — Impact performance

Performance level	Free falling mass L_5 kg	Drop height h_2 mm
1	2,5	150
2	5,0	150
3	5,0	200
4	5,0	300

5.2.3 *Tolerances*

The tolerances are:

Symbol	Tolerance	
	Unit	Acceptable
L_5	kg	$^{+2}_{0}$ %
h_2	mm	$^{+3}_{0}$

5.2.4 *Acceptance criteria*

No part of a castor shall become detached during the tests with the loads and drop heights specified in Table 4. On completion of the test the rolling, pivoting or braking performance shall not be impaired.

5.3 Electrical resistance test

5.3.1 *Test objectives, apparatus and procedures*

Detailed in **4.4** of EN 12527:1998

5.3.2 *Test values*

The test values are listed below.

Symbol	Value	Description
L_1	variable	load capacity
L_{17}	5 % to 10 % of L_1	test load
R	variable	measured electrical resistance

5.3.3 *Tolerances*

The tolerance is:

Symbol	Tolerance	
	Unit	Acceptable
L_1	N	$^{+2}_{0}$ %
L_{17}	N	$^{+2}_{0}$ %

5.3.4 *Acceptance criteria*

The resistance R of the sample tested shall be:

— conductive castor(s) or wheel(s): $R \leq 10^4\ \Omega$;

— antistatic castor(s) or wheel(s): $10^5 \leq R \leq 10^7\ \Omega$.

5.4 Manual locking device

5.4.1 *Test objectives, apparatus and procedures*

Detailed in **4.6** of EN 12527:1998.

5.4.2 *Test values*

The test values are listed below.

Symbol	Value	Description
L_1	variable	load capacity as test load
K_1	20 % of L_1	horizontal tractive force

5.4.3 *Tolerances*

The tolerances are:

Symbol	Tolerance	
	Unit	Acceptable
L_1	N	$^{+2}_{0}$ %
K_1	N	$^{+4}_{0}$ %

The tolerance of the time of application of load (10 s) is $^{+2}_{0}$ s.

5.4.4 *Acceptance criteria*

The wheel does not revolve around its axis when a force K_1 is applied.

5.5 Dynamic test

5.5.1 *Test objectives, apparatus and procedures*

Detailed in **4.13** of EN 12527:1998.

5.5.2 *Test values*

The test values are listed below.

Symbol	Value for type H castor	Value for type W castor	Value for type S castor	Description
L_1	variable	variable	variable	load capacity as test load
L_7	125 % of L_1	125 % of L_1	125 % of L_1	test load
h_1	2 mm	2 mm	0 mm	height of obstacles
r_2	500 cycles	1 000 cycles	1 000 cycles	number of cycles
z_1	3 min	3 min	3 min	running period
z_2	2 min	2 min	2 min	pause period
z_3	6,5 cycles per min	6,5 cycles per min	6,5 cycles per min	speed

5.5.3 *Tolerances*

The tolerances are:

Symbol	Tolerance	
	Unit	Acceptable
L_1	N	$^{+2}_{0}$ %
L_7	N	$^{+2}_{0}$ %
h_1	mm	$^{0}_{-5}$ %
r_2		$^{+1}_{0}$ %
z_1	min	±10 s
z_2	min	±10 s
z_3	cycles/min	$^{0}_{-3}$ %

The tolerances are:

— of the obstacle width (50 mm): ±2 %;

— of the angle of 90° to the running direction: ±3°;

— of the running distance of 1 m: $^{+25}_{0}$ mm.

5.5.4 *Acceptance criteria*

No castor or a part of a castor shall become detached during the tests. Each castor shall still be capable of carrying out its function at the end of the test programme. On completion of the test the rolling, pivoting or braking performance shall not be impaired.

5.6 Rolling resistance

5.6.1 *Test objectives, apparatus and procedures*

Detailed in **4.15** of EN 12527:1998.

5.6.2 *Test values*

The test values are listed below.

Symbol	Value	Description
L_1	variable	load capacity as test load
L_8	$3 \times L_1$	test load (including frame)
v_3	50 mm/s	travel speed

5.6.3 *Tolerances*

The tolerances are:

Symbol	Tolerance	
	Unit	Acceptable
L_1	N	$^{+2}_{0}$ %
L_8	N	$^{+2}_{0}$ %
v_3	mm/s	±5 %

5.6.4 *Acceptance criteria*

The horizontal force w_3 shall not exceed 15 % of L_8.

5.7 Swivel resistance

5.7.1 *Test objectives, apparatus and procedures*

Detailed in **4.16** of EN 12527:1998.

5.7.2 *Test values*

The test values are listed below.

Symbol	Value	Description
L_1	variable	load capacity as test load
L_9	L_1 per castor	applied load (dependent on the number of castors fitted in the test rig)
v_3	50 mm/s	travel speed

5.7.3 *Tolerances*

The tolerances are:

Symbol	Tolerance	
	Unit	Acceptable
L_1	N	$^{+2}_{0}$ %
v_3	mm/s	±5 %

The tolerance of the angular position of the castor to the running direction (90°) is: ±3°.

5.7.4 *Acceptance criteria*

The horizontal force w_4 shall not exceed 20 % of L_9.

5.8 Static load performance

5.8.1 *Test objectives, apparatus and procedures*

Detailed in **4.9** of EN 12527:1998.

5.8.2 *Test values*

The test values are listed below.

Symbol	Value	Description
L_1	variable	load capacity as test load
y_1	2	load factor
y_2	24 h	time of application load
y_3	24 h	elapsed time prior to inspection

5.8.3 *Tolerances*

The tolerances are:

Symbol	Tolerance	
	Unit	Acceptable
L_1	N	$^{+2}_{0}$ %
y_2	h	$^{+15}_{0}$ min
y_3	h	±1 h

5.8.4 *Acceptance criteria*

Wheel deformation measured after a time y_3 shall not exceed 3 % of the wheel diameter. On completion of the test the rolling, pivoting or braking performance shall not be impaired.

5.9 Stem retention

5.9.1 *Test objectives, apparatus and procedures*

Detailed in **4.17** of EN 12527:1998.

5.9.2 *Test values*

The test values are listed below.

Symbol	Value for circlip stems	Value for other stems	Description
L_{10}	15 N	30 N	minimum pull-out force

5.9.3 *Acceptance criteria*

The minimum force required to remove the stem from the castor shall be not less than L_{10}.

6 Conformity

The manufacturer declares on request by a certificate of conformity that the castors are in accordance with the requirements as stated in this document.

The type of testing machine shall be stated in the conformity document.

7 Marking of the product

7.1 Product marking

All the products shall be permanently marked with a name and/or trade mark of the manufacturer.

7.2 Marking of electrically conductive or antistatic castor(s)/wheel(s)

All products shall bear on their outer surface a clearly visible yellow mark, and where appropriate and possible should include the word "antistatic".

BS EN 12528:1999

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