BS ISO 22879:2016

BSI Standards Publication

Castors and wheels — Requirements for castors for furniture

National foreword

This British Standard is the UK implementation of ISO 22879:2016.

The UK participation in its preparation was entrusted to Technical Committee MHE/7/-/1, Castors and wheels.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2016

ISBN 978 0 580 92964 9

ICS 97.140

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2016.

Amendments/corrigenda issued since publication

Date	Text affected

BS ISO 22879:2016

INTERNATIONAL STANDARD

ISO 22879

Second edition
2016-12-01

Castors and wheels — Requirements for castors for furniture

Roues et roulettes — Exigences pour roulettes pour meubles

Reference number
ISO 22879:2016(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 110, *Industrial trucks*.

This second edition results from the reinstatement of ISO 22879:2004, which was withdrawn in 2014 and with which it is technically identical.

Introduction

The industry stakeholders have expressed the need for this important International Standard. Therefore, the interested parties agreed to republish the withdrawn International Standard as a new edition.

In order to ensure that the International Standard will be actively used in the ISO member countries, worldwide, procedures may be necessary to replace the existing national standards and technical regulations by the International Standard.

Only by these actions will there be the guarantee that products in accordance with International Standards can be shipped worldwide freely without any technical barriers.

Castors and wheels — Requirements for castors for furniture

1 Scope

This document specifies the technical requirements, the appropriate dimensions and the requirements for the testing of castors for furniture.

It is applicable to castors for general furniture applications, but specifically excludes those for swivel chairs and other specialized applications.

NOTE Castors for swivel chairs are specified in ISO 22880.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 22878:2004, *Castors and wheels — Test methods and apparatus*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22877 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

NOTE Symbols are given in ISO 22878:2004, Annex A.

4 Dimensions and classification

4.1 Characteristics

The characteristics of a castor are

— fixing system,

— castor type,

— dimensions, and

— performance level.

4.2 Fixing system

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

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

4.3 Castor type

4.3.1 General

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

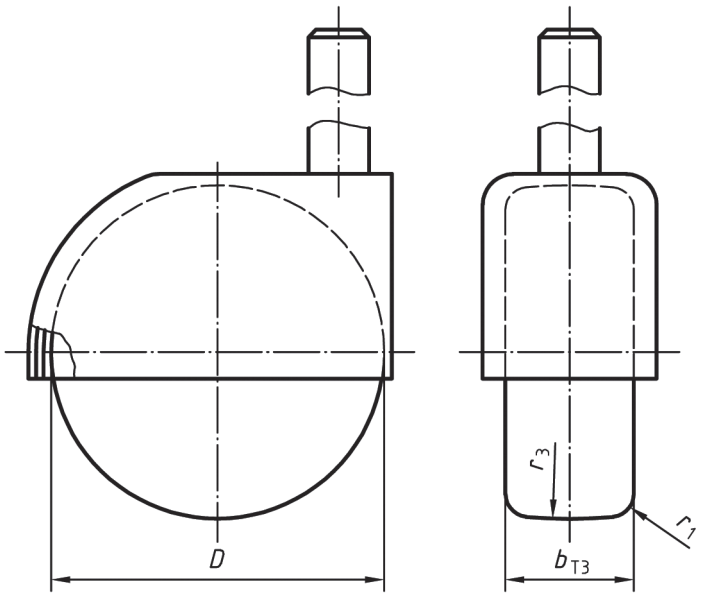

Figure 1 — Single-wheel swivel castor

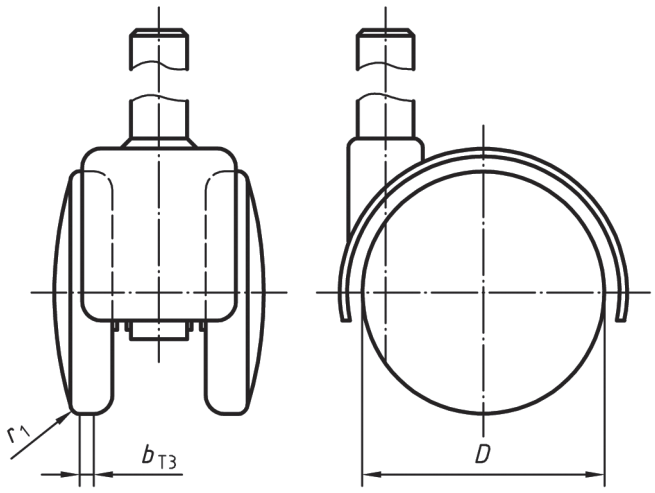

Figure 2 — Twin-wheel swivel castor

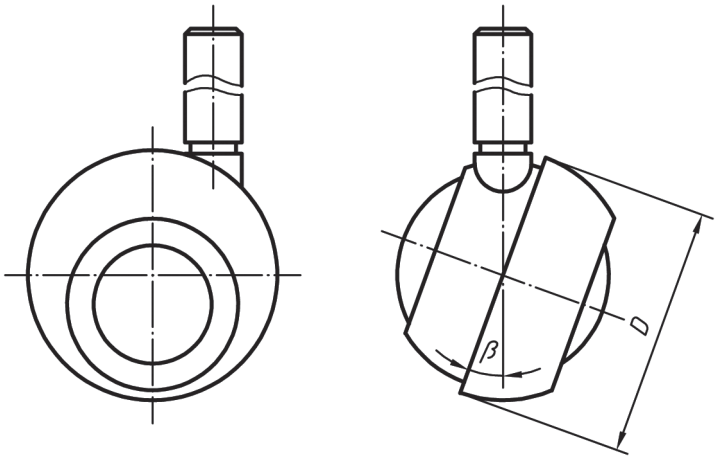

Figure 3 — Inclined axle castor

4.3.2 Type H

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

These castors are suitable for carpeted floors.

4.3.3 Type W

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

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

4.3.4 Type C

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

These castors should have either modified Type H or Type W wheels.

4.3.5 Type S

These are inclined axle castors.

4.4 Dimensions

Figure 1 to Figure 3 show typical castor designs. Table 1 shows the specified dimensions and the corresponding symbols.

Table 1

Dimensions in millimetres and angles in degrees

Description	Castor designs	Symbol	Dimension
Wheel diameter	All	D	min. 20
Tread width	Single-wheel castors	b_{T3}	min. 7,5
	Twin-wheel castors		min. 2 × 5
External corner radius	All	r_1	min. 1,5
Tread curvature	Single-wheel castors	r_3	min. 110
Angle of inclination	Inclined axle castors	β	max. 25

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

4.5 Performance level

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

Table 2

Level	Load capacity F_{max} (N)
1	100
2	200
3	300
4	400

5 Requirements for testing

5.1 General

Test apparatus and procedures shall be as specified in ISO 22878.

5.2 Standard conditions

5.2.1 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 samples shall remain at the specified temperature, in an environment with a relative humidity between 40 % and 70 %.

Samples shall not be artificially cooled during testing.

5.2.2 Test sequence

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

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

Table 3

Reference in this document	Test sequence	Castor designs	Test procedure given in ISO 22878:2004
5.3	Impact performance	All	4.12
5.4	Electrical resistance	Type C castors	4.4
5.5	Manual locking device	Castors with manual locking devices	4.6
5.6	Dynamic	All	4.13
5.7	Rolling resistance	All	4.15
5.8	Swivel resistance	Swivel castors	4.16
5.9	Static load	All	4.9
5.10	Stem retention	All	4.17

5.3 Impact performance

5.3.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.12.

5.3.2 Test values

Test values shall be as listed in Table 4.

Table 4

Performance level	Mass of free-falling weight m kg	Drop height h_2 mm
1	2,5	150
2	5,0	150
3	5,0	200
4	5,0	300

5.3.3 Tolerances

The tolerances shall be as shown in Table 5.

Table 5

Symbol	Unit	Tolerance	
		Acceptable	Unit
m	kg	+2 % 0	kg
h_2	mm	+3 0	mm

5.3.4 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.

5.4 Electrical resistance test

5.4.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.4.

5.4.2 Test values

The test values shall be as listed in Table 6.

Table 6

Symbol	Value	Description
F_{max}	Variable	Load capacity
F_{17}	5 % to 10 % of F_{max}	Test load
R	Variable	Electrical resistance

5.4.3 Tolerances

The tolerance shall be as shown in Table 7.

Table 7

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_{17}	N	+2 % 0	N

5.4.4 Acceptance criteria

The resistance, R, of the sample tested shall be

— $R \leq 10^5\ \Omega$ for conductive castors or wheels, and

— $10^5\ \Omega \leq R \leq 10^7\ \Omega$ for antistatic castors or wheels.

5.5 Manual locking device

5.5.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.6.

5.5.2 Test values

The test values shall be as listed in Table 8.

Table 8

Symbol	Value	Description
F_{max}	Variable	Load capacity
F_{11}	Equal to F_{max}	Test load
F_{K1}	20 % of F_{max}	Horizontal tractive force

5.5.3 Tolerances

The tolerances shall be as shown in Table 9.

Table 9

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_{11}	N	+2 % 0	N
F_{K1}	N	+4 % 0	N

5.5.4 Acceptance criteria

The wheel shall not revolve around its axis when a force, F_{K1}, is applied.

5.6 Dynamic test

5.6.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.13.

5.6.2 Test values

The test values shall be as listed in Table 10.

Table 10

Symbol	Value for Type H castor	Value for Type W castor	Value for Type S castor	Description
F_{max}	Variable	Variable	Variable	Load capacity
F_7	125 % of F_{max}	125 % of F_{max}	125 % of F_{max}	Test load
h_1	2 mm	2 mm	0 mm	Height of obstacles
n_{r2}	500 cycles	1 000 cycles	1 000 cycles	Number of cycles
t_{z1}	3 min	3 min	3 min	Running period
t_{z2}	2 min	2 min	2 min	Pause
f_z	6,5 cycles/min	6,5 cycles/min	6,5 cycles/min	Frequency

5.6.3 Tolerances

The tolerances shall be as shown in Table 11.

Table 11

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_7	N	+2 % 0	N
h_1	mm	0 –5 %	mm
n_{r2}	—	+1 % 0	—
t_{z1}	min	±10	s
t_{z2}	min	±10	s
f_z	cycles/min	0 –3 %	cycles/min

5.6.4 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.

5.7 Rolling resistance

5.7.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.15.

5.7.2 Test values

The test values shall be as listed in Table 12.

Table 12

Symbol	Value	Description
F_{11}	Variable	Test load
F_8	$3 \times F_{11}$	Test load (including frame)
v_3	50 mm/s	Travel speed

5.7.3 Tolerances

The tolerances shall be as shown in Table 13.

Table 13

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_1	N	+2 % 0	N
v_3	mm/s	±5 %	mm/s

5.7.4 Acceptance criteria

The horizontal force, F_{w3}, shall not exceed 15 % of F_8.

5.8 Swivel resistance

5.8.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.16.

5.8.2 Test values

The test values shall be as listed in Table 14.

Table 14

Symbol	Value	Description
F_{max}	Variable	Load capacity
F_9	F_{max} per castor	Test load (applied load, dependent on the number of castors fitted in the test rig)
v_3	50 mm/s	Travel speed

5.8.3 Tolerances

The tolerances shall be as shown in Table 15.

Table 15

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_9	N	+2 % 0	N
v_3	mm/s	0 −5 %	mm/s

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

5.8.4 Acceptance criteria

The horizontal tractive force, F_{w3}, shall not exceed 20 % of F_9.

5.9 Static load performance

5.9.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.9.

5.9.2 Test values

The test values shall be as listed in Table 16.

Table 16

Symbol	Value	Description
F_{max}	Variable	Load capacity
y_1	2	Load factor
F_6	$F_{max} \times y_1$	Test load
t_{y1}	24 h	Time of application of the load
t_{y2}	24 h	Elapsed time prior to inspection

5.9.3 Tolerances

The tolerances shall be as shown in Table 17.

Table 17

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_6	N	+2 % 0	N
t_{y1}	h	+15 % 0	min
t_{y2}	h	±1	h

5.10 Stem retention

5.10.1 Test objectives, apparatus and procedures

These shall be as specified in ISO 22878:2004, 4.17.

5.10.2 Test values

The test values shall be as listed in Table 18.

Table 18

Symbol	Value for circlip stems	Value for other stems	Description
F_{min}	15 N	30 N	Minimum pull-out force

5.10.3 Acceptance criteria

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

6 Conformity

On request, the manufacturer shall declare 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

7.1 Product marking

All the products shall be permanently marked with the name and/or trademark of the manufacturer

7.2 Marking of electrically conductive or antistatic castors/wheels

All products shall bear, on their outer surface, a clearly visible mark as follows:

— antistatic: a white mark and, where appropriate and possible, the word “antistatic”;

— conductive: a yellow mark and, where appropriate and possible, the word “conductive”.

Bibliography

[1] ISO 22877, *Castors and wheels — Vocabulary, symbols and multilingual terminology*

[2] ISO 22880, *Castors and wheels — Castors for furniture — Requirements for castors for swivel chairs*

[3] ISO 22881, *Castors and wheels — Requirements for use on manually propelled equipment for institutional applications*

[4] ISO 22882, *Castors and wheels — Requirements for castors for hospital beds*

[5] ISO 22883, *Castors and wheels — Requirements for applications up to 1,1 m/s (4 km/h)*

[6] ISO 22884, *Castors and wheels — Requirements for applications over 1,1 m/s (4 km/h) and up to 4,4 m/s (16 km/h)*

ICS 97.140
Price based on 12 pages

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email subscriptions@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services
Tel: +44 345 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 345 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

bsi.