SLOVENSKI STANDARD
SIST EN 12527:2000

01-december-2000

Castors and wheels - Test methods and apparatus

Castors and wheels - Test methods and apparatus

Räder und Rollen - Prüfverfahren und -geräte

Roues et roulettes - Méthodes et appareillage d'essai

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Ta slovenski standard je istoveten z: **EN 12527:1998**

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ICS:

01.075	Simboli za znake	Character symbols
21.180	Ohišja, okrovi, drugi strojni deli	Housings, enclosures, other machine parts
53.060	Industrijski tovornjaki	Industrial trucks

SIST EN 12527:2000 **en**

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12527

September 1998

ICS 01.075; 21.180; 53.060

Descriptors: general product, furniture, handling equipment, wheels, castors, chatacteristics, equipment specification, dimensions, classification, tests, conformity tests, marking

English version

Castors and wheels - Test methods and apparatus

Roues et roulettes - Méthodes et appareillage d'essai

Räder und Rollen - Prüfverfahren und -geräte

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

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Content

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of an identical text or by endorsement, at the latest by March 1999, and conflicting national standards shall be withdrawn at the latest by March 1999.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

Introduction

Castors and wheels are used in many applications and environments.

For many of these specific requirements are needed. Thus the need for a standard on testing of castors and wheels suitable for users, original equipment manufacturers and testing houses.

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1 Scope

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This standard specifies the test methods and apparatus to be used to check the performance of the castors and wheels.

The test to be used and the acceptance criteria, values and applicability relevant to each type of castor and wheel are covered by the specific standards.

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
ISO 2878	Rubber vulcanized - Antistatic and conductive products - Determination of electrical resistance limits

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3 Definitions and symbols

For the purpose of this European Standard, definitions given in EN 12526 apply and the meaning of the symbols are listed in table 1 and in the individual tests.

Table 1: Symbols and meaning of the symbols

Symbol	Unit	Meaning of the symbols
A	mm	dimensions of top plate
a	mm	bolt hole spacing
B	mm	dimensions of top plate
b	mm	bolt hole spacing
c	m	distance between obstacles
D	mm	wheel diameter
d	mm	bore diameters
E_1	-	number of locking actions
E_2	cycles per minute	frequency of locking actions
e	mm	wheel spacing
F	mm	offset
f	mm	fork width
G	mm	fixing bolt diameter
g	mm	minimum distance of slotted hole centres
H	mm	overall height
h_1	mm	height of obstacles
h_2	mm	drop height
K_1	N	horizontal tractive force
K_2	N	horizontal tractive force
L_1	N	load capacity
L_2	N	test load
L_3	N	test load
L_4	N	test load
L_5	kg	free falling mass
L_6	N	test load
L_7	N	test load
L_8	N	test load
L_9	N	test load
L_{10}	N	pull-out force
L_{17}	N	test load
M	mm	hub diameter
m	mm	swept radius
n	-	number of obstacles
P	mm	stem diameter
Q	mm	stem length
R	Ω	electrical resistance
r_1	-	number of wheel revolutions
r_2	-	number of cycles
r_3	mm	external corner radius
r_4	mm	internal corner radius

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Table 1 (continued)

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Table 1 (concluded)

Symbol	Unit	Meaning of the symbols
r_5	mm	tread curvature
S_1	mm	maximum initial swivel play
S_2	mm	maximum swivel wear play
s	mm	bearing seat dimensions
T	mm	wheel width
T_1	mm	hub width
T_2	mm	tyre width
T_3	mm	tread width
t	mm	bearing seat dimensions
v_1	m/s	average speed of running period
v_2	m/s	speed at impact with obstacles
v_3	mm/s	travel speed
W_1	mm	maximum initial wheel play
W_2	mm	maximum wheel wear play
w_1	N	minimum rolling resistance (type H)
w_2	N	minimum rolling resistance (type W)
w_3	N	horizontal tractive force
w_4	N	swivel resistance
y_1	value	load factor
y_2	h	time of application of the load
y_3	h	elapsed time prior to inspection elapsed time prior to inspection (for furniture and swivel chair castors only)
z_1	min	running period
z_2	min	pause
z_3	-	speed (cycles per min)
ß	degrees	angle of inclination

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4 Test methods

4.1 General requirements

4.1.1 Test sequence

Tests shall be carried out in a pre-defined sequence to allow repeatability of testing conditions.

4.1.2 Test sample

All tests within the sequence shall be made with the same castor(s) or wheel(s), unless otherwise specified in the appropriate standard. Castors and wheels shall not be artificially cooled during testing.

4.1.3 Application of test load

The test load shall always be applied directly so that its centre of gravity lies central to the mounting plane of the castor(s), or the centre of the test frame - where required - on which the sample(s) under test are mounted (see figures 3 and 7). Unless otherwise specified the test load shall be a real weight.

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4.1.4 Test report

Actual readings and test results of each test and indication if the test is passed or failed shall be clearly given in the test report, including the following information:

- reference to the relevant European Standard;
- type of the test machine which was used;
- details of any deviation to this European Standard;
- main features of the test sample;
- name and address of location where the test was carried out;
- date of the test.

4.2 Wheel play test

4.2.1 Objectives

This test is to determine the initial wheel play - at the commencement of the test sequence - and the final wheel play - at the end of the test sequence.

4.2.2 Symbols

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The following symbols are to be used:

Symbol	Meaning of the symbol
W_1	maximum initial wheel play
W_2	maximum wheel wear play

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4.2.3 Apparatus

The test apparatus is a device to clamp the fork with the fitted wheel under test.

4.2.4 Procedure

The measurements shall be taken with the wheel and axle bush assembled as during test (original product). The fork of the castor is rigidly clamped in a vertical position ensuring that the fork width is maintained and the movement of the wheel is not impaired. The wheel play shall not include any side movement of the wheel on the axle. Wheel play shall be in mm and measured as in figure 1. To determine the wear play subtract the initial wheel play from the final wheel play.

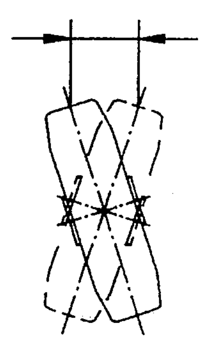

Figure 1: Wheel play

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4.3 Swivel play test

4.3.1 Objectives

This test is to determine the initial swivel play - at the commencement of the test sequence- and the final swivel play - at the end of the test sequence.

4.3.2 Symbols

The following symbols are to be used:

Symbol	Meaning of the symbol
S_1	maximum initial swivel play
S_2	maximum swivel wear play

4.3.3 Apparatus

The test apparatus is a lever of at least 200 mm in length suitable to be rigidly fixed to the mounting plane of the castor under test as in figure 2.

4.3.4 Procedure

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The measurements shall be taken with the wheel and axle bush assembled as during test (original product). The fork of the castor is rigidly clamped in a vertical position ensuring that the fork width is maintained and the movement of the swivel is not impaired. A mark shall be made on the fixed and swivelling parts of the castor. The swivel play shall be measured at 200 mm from the swivel axis of the castor when:

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- the marks are aligned;
- the mounting plane is rotated through 90^0.

Swivel play shall be in mm and measured as in figure 2. The larger of these two values shall be taken. To determine the swivel play subtract the initial swivel play from the final swivel play

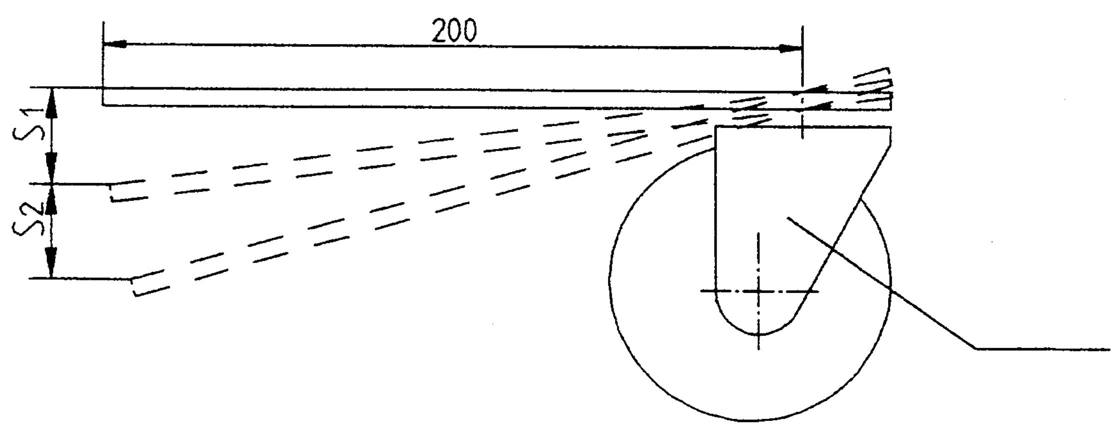

Figure 2: Swivel play

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4.4 Electrical resistance test

4.4.1 Objectives

This test is to measure the electrical resistivity of the sample (according to ISO 2878). The wheel(s) shall be perfectly cleaned and dry.

4.4.2 Symbols

The following symbols are to be used:

Symbol	Meaning of the symbol
L_{17}	test load
R	measured resistance

4.4.3 Apparatus

The test apparatus is an instrument having a nominal open circuit voltage of 500 V d.c., preferably an insulation tester (ohm meter), or with any suitable instrument known to give comparable results.

The instrument shall be sufficiently accurate to determine the resistance within 10 % and shall not dissipate more than 3 W in the product.

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The resistance values obtained will vary with the applied voltage, and errors may occur when low test voltages are involved. In case of dispute, the voltage applied to the product shall be not less than 40 V, except where this conflicts with the requirement not to dissipate more than 3 W in the test piece.

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4.4.4 Procedure

Place the castor and/or wheel on a metal plate that is insulated from the floor. Between the metal plate and the castor a piece of wet blotting paper of the size of the contact area can be added if furniture castors or swivel chair castors are tested. Keep the tread in contact with the metal plate by applying with a load of 5 to 10 % of the nominal load on the castor or wheel as given in 4.1.3. Using the insulation tester measure the resistance between the mounting plane of the castor or axle of the wheel and the metal plate. It is necessary to take three readings each with a different part of the tread in contact with the metal plate.

4.5 Fatigue test for braking and/or locking device

4.5.1 Objectives

This test is to determine if there is any wear and/or permanent deformation, that would adversely affect the performance of the braking and/or locking device. This test is not applicable to braking and/or locking devices based on a threaded mechanism.

4.5.2 Symbols

The following symbols are to be used:

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Symbol	Meaning of the symbol
E_1	number of locking actions
E_2	frequency of locking actions in cycles per minute
L_3	load

4.5.3 Apparatus

The test apparatus shall simulate as effectively as possible what happens when the braking and/or locking device is operated and released with the castor stationary.

4.5.4 Procedure

The castor loaded with L_3 is placed in the apparatus and the braking/locking actions are carried out in accordance with E_1 and E_2.

4.6 Efficiency check of wheel braking and/or locking device

4.6.1 Objectives

This test is to determine the performance of the wheel braking and/or locking device. It is recommended that this test should follow test in 4.5, where applicable.

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4.6.2 Symbols

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The following symbols are to be used:

Symbol	Meaning of the symbol
L_1	load capacity
K_1	horizontal tractive force

4.6.3 Apparatus

The test apparatus is:

- a low friction device that allows either a:
  a) linear movement,
  b) circular movement,
- a force measuring device,
- a pulling device to pull force equal to K_1,
- a time measuring instrument.

4.6.4 Procedure

The castor is placed on a horizontal smooth steel surface, clean from visible dirt. The braking and/or locking device is engaged. Apply to the mounting plane of the castor a load L_1. Then gradually apply a horizontal tractive force (K_1) in line with the running direction of the wheel. The force K_1 shall be applied for 10 s then released. Gradually apply the force K_1 once more for 10 s and monitor if the wheel revolves around its axle. Repeat the above procedure applying the force in the opposite direction. If during the application of the force K_1 the wheel skids on the floor, change the surface material to a higher grip and repeat the test.