

English Version

## Roller sports equipment - Inline-skates - Safety requirements and test methods

Équipement de sports à roulettes - Patins à roulettes en  
ligne - Exigences de sécurité et méthodes d'essai

Rollsportgeräte - Inline-Skates - Sicherheitstechnische  
Anforderungen und Prüfverfahren

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## Foreword

This document (EN 13843:2009) has been prepared by Technical Committee CEN/TC 136 "Sports, playground and other recreational facilities and equipment", 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of an identical text or by endorsement, at the latest by October 2009, and conflicting national standards shall be withdrawn at the latest by October 2009.

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 13843:2003.

In relation to EN 13843:2003 the following main changes have been introduced:

- a) 5.3 "Last" added;
- b) 5.4.7 "Loosening of attached starting and/or braking devices" added;
- c) attachment of the chassis to the shoe in former 5.4.1 modified;
- d) service and maintenance in former 7.2.3 b) modified.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This standard is applicable to inline-skates intended for users with a body mass of more than 20 kg and less than 100 kg.

It specifies safety requirements for inline-skates, specifications for test methods, marking and information supplied by the manufacturer to reduce the risk of injuries to both third parties and the user during their normal use.

Inline-skates for use by a rider of less than 20 kg do not belong to the scope of this European Standard. They are toys.

This Standard does not apply to roller skates according to EN 13899.

NOTE Requirements for inline-skates from the orthopedic point of view such as lateral support or similar were not included in this standard because these requirements differ from wearer and therefore cannot be covered by a standard.

## 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 22768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1:1989)*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **inline-skate**

roller sports equipment whose wheels are arranged inline and which can be attached

- a) to the users boot or shoe by means of straps;
- b) as an integrated part of a boot or shoe;
- c) as a detachable chassis of a purpose built boot or shoe

### 3.2

#### **binding element**

element for the attachment of the inline-skate to the user's foot or shoe

## 4 Requirements

### 4.1 General

General tolerances: EN 22768-v.

### 4.2 Classification of inline-skates

#### 4.2.1 Class A

Inline-skates intended for use by a user mass of more than 20 kg up to 100 kg.

#### 4.2.2 Class B

Inline-skates intended for use by a user mass of more than 20 kg up to 60 kg and a length of the foot of no more than 260 mm.

### 4.3 Safety requirements

#### 4.3.1 Protruding components and edges

All protruding components and edges on the inline-skate that can come into contact with body parts during normal use shall be deburred or constructed in such a way as to prevent injury.

The test is carried out according to 5.4.2.

#### 4.3.2 Binding elements

Binding elements shall prevent unintentional disconnection from the user's foot.

This requirement is considered to be fulfilled if the correct functioning of the inline-skate is not impeded by broken, disconnected or loosened binding elements after the tests according to Clause 5.

#### 4.3.3 Chassis

##### 4.3.3.1 General

The chassis consists of one or more supports, axles, wheels, bearings and fixings.

It shall withstand the impact loads, the constant load and the static load to which it is exposed during use. The chassis shall be attached to the shoe and/or shoe mounting in such a way as to be secured against unintentional loosening.

These requirements are considered to be fulfilled if the correct functioning of the inline-skate is not impeded by broken, disconnected or loosened binding elements after the tests according to Clause 5.

##### 4.3.3.2 Axles

The axles shall be attached and designed in such a way as to ensure that they cannot become loose, displaced or deformed during use. The wheels shall be secured on the axles against unintentional loosening. These requirements are considered to be fulfilled if the axles are not loosened, deformed or displaced to such an extent as to impair proper functioning, and the wheels have not become loose after the tests according to Clause 5.

##### 4.3.3.3 Wheels

The wheels shall be constructed from non-slip material. This requirement is considered to be fulfilled if a coefficient of adhesion  $\mu_0$  of at least 0,3 is achieved in the test according to 5.4.4.

After the tests according to Clause 5, the wheels shall not show tears. They shall further not have loosened or be deformed to the extent that a risk of their becoming blocked exists.

##### 4.3.3.4 Bearings

The bearings shall be laid out in such a way as to be functional after the tests according to Clause 5. They shall be constructed in such a way as to permit servicing according to the user information without impairment of their operational safety.

#### 4.3.4 Starting and/or braking devices

If an inline-skate is equipped with a starting and/or braking device, this device shall be unbreakable and secured against accidental loosening. It shall not cause an unintentional impediment of the inline-skates' motion.

These requirements are considered to be fulfilled if the test according to Clause 5 did not cause a noticeable loosening of the starting and/or braking device.

The clearance between the starting and/or braking device and the ground is required to prevent unintentional braking. This requirement is considered to be fulfilled, if this clearance is at least 7 mm but not more than 17 mm.

#### **4.3.5 Self-locking fixings**

Where self-locking nuts are used, the entire thread, including the locking section, shall be in contact with the bolt. Self-locking nuts and other self-locking fixings that are loosened several times for the purpose of modification or servicing, shall be suitable for this purpose. The user information shall indicate if self-locking nuts and other self-locking elements can lose their effectiveness.

## **5 Testing**

### **5.1 Test specimen**

At least two pairs of the same type shall be tested. If the type contains a starting and/or braking device, one of the test specimens shall be equipped with this device.

### **5.2 Test conditions**

Unless otherwise specified the inline-skates shall be conditioned and tested either at a temperature of  $(23 \pm 2)$  °C and a relative humidity of  $(50 \pm 5)$  % or at a temperature of  $(20 \pm 2)$  °C and a relative humidity of  $(65 \pm 5)$  %.

The tests are to be carried out according to 5.4 to 5.5.2.

### **5.3 Last**

The last used for the tests in accordance with 5.4.4 to 5.4.6, 5.5.1 and 5.5.2 shall meet the following requirements:

- a) it shall be made of non-flexible material;
- b) its size and fit shall be appropriate for the test specimen;
- c) it shall enable firm attachment to the inline-skate by the binding elements of the inline-skate.

### **5.4 Test specimen 1**

#### **5.4.1 General**

If the test specimen contains a starting and/or braking device, this specimen is to be used as test specimen 1.

#### **5.4.2 Protruding components and edges**

Test by visual and tactile examination.

#### **5.4.3 Coefficient of adhesion of wheels**

The wheel adhesion shall be tested by pulling a wheel along a steel plate with a fine brushed and degreased surface of arithmetical mean roughness  $R_a$  of 1,5  $\mu\text{m}$  to 2,0  $\mu\text{m}$  (see Figure 1).

A vertical force  $F_1$  of at least 100 N shall be applied to the wheel which is moved along the steel plate perpendicular to the inline-skate's longitudinal axis and perpendicular to the surface brush direction by a horizontal force  $F_2$ , applied at the height of the wheel's axis. The maximum force shall be recorded. The test shall be repeated ten times and the mean value of  $F_2$  shall be calculated. The test shall be carried out at a speed of  $\approx 1$  mm/s.

The coefficient of adhesion shall be calculated according to Equation (1):

$$\mu_0 = \frac{F_2}{m_E \cdot g + F_1} \quad (1)$$

where:

$\mu_0$  is the coefficient of adhesion;

$F_1$  is the load applied to wheel, in Newton;

$F_2$  is the adhesive force, in Newton;

$m_E$  is the dead weight, in kilograms;

$g$  is the standard acceleration due to gravity ( $g = 9,81 \text{ m/s}^2$ ).

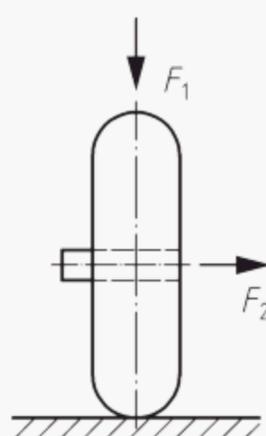
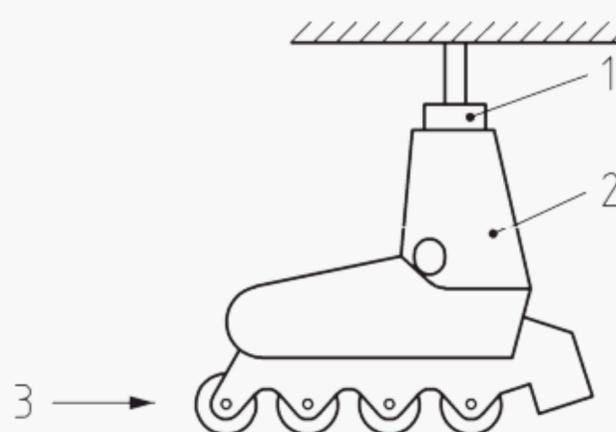


Figure 1 — Adhesion of wheels

#### 5.4.4 Horizontal frontal impact against the front wheel

An inline-skate shall be impacted in the forward direction onto the front wheel (see Figure 2) with an energy  $E_1$  of at least 135 J and an impact velocity  $v_1$  of  $(4,5 \pm 0,5) \text{ m/s}$  for class A inline-skates and an energy  $E_2$  of at least 90 J and an impact velocity  $v_2$  of  $(3,75 \pm 0,4) \text{ m/s}$  for class B inline-skates.

The type of suspension shall ensure that this energy is absorbed by the front wheel. The inline-skate shall be positioned on a last according to 5.3. It shall be tightened as close as practical.



#### Key

- 1 Last
- 2 Inline-skate
- 3 Impact direction

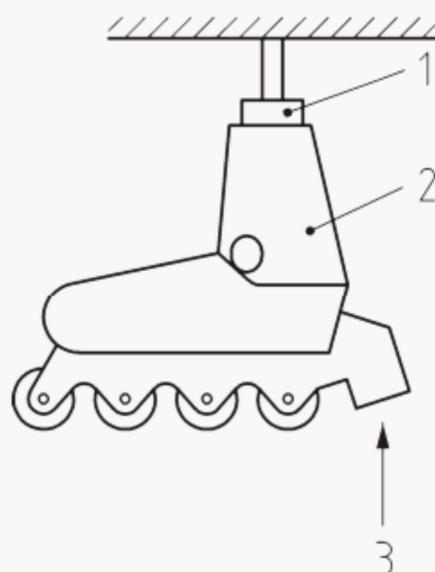
Figure 2 — Horizontal frontal impact against the front wheel

#### 5.4.5 Vertical impact against the starting and/or braking device

The starting and/or braking device (see Figure 3) shall be impacted with an energy  $E_1$  of at least 50 J and an impact velocity  $v_1$  of  $(2,5 \pm 0,3)$  m/s for class A inline-skates and an energy  $E_2$  of at least 30 J and an impact velocity  $v_2$  of  $(2,0 \pm 0,2)$  m/s for class B inline-skates.

The type of suspension shall ensure the absorption of this energy by the starting and/or braking device.

The inline-skate shall be positioned on a last according to 5.3. It shall be tightened as close as practical.



#### Key

- 1 Last
- 2 Inline-skate
- 3 Impact direction

Figure 3 — Vertical impact against the starting and/or braking device

#### 5.4.6 Continuous test

This test is carried out on a drum rotating at a circumferential speed of at least 0,5 m/s.

The drum is to be fitted with ramps. The distance between these ramps shall be such that the inline-skate passes over at least 3 ramps in 2 s.

The test apparatus is shown in Figure 4. A force  $F$  of at least 600 N is applied to the last of class A inline-skates and a force  $F$  of at least 400 N to class B inline-skates. The lower surface of the last shall cover at least 75 % of the inline-skate's sole.

The test duration is at least 3 h each for both class A and class B.

Dimensions in millimetres

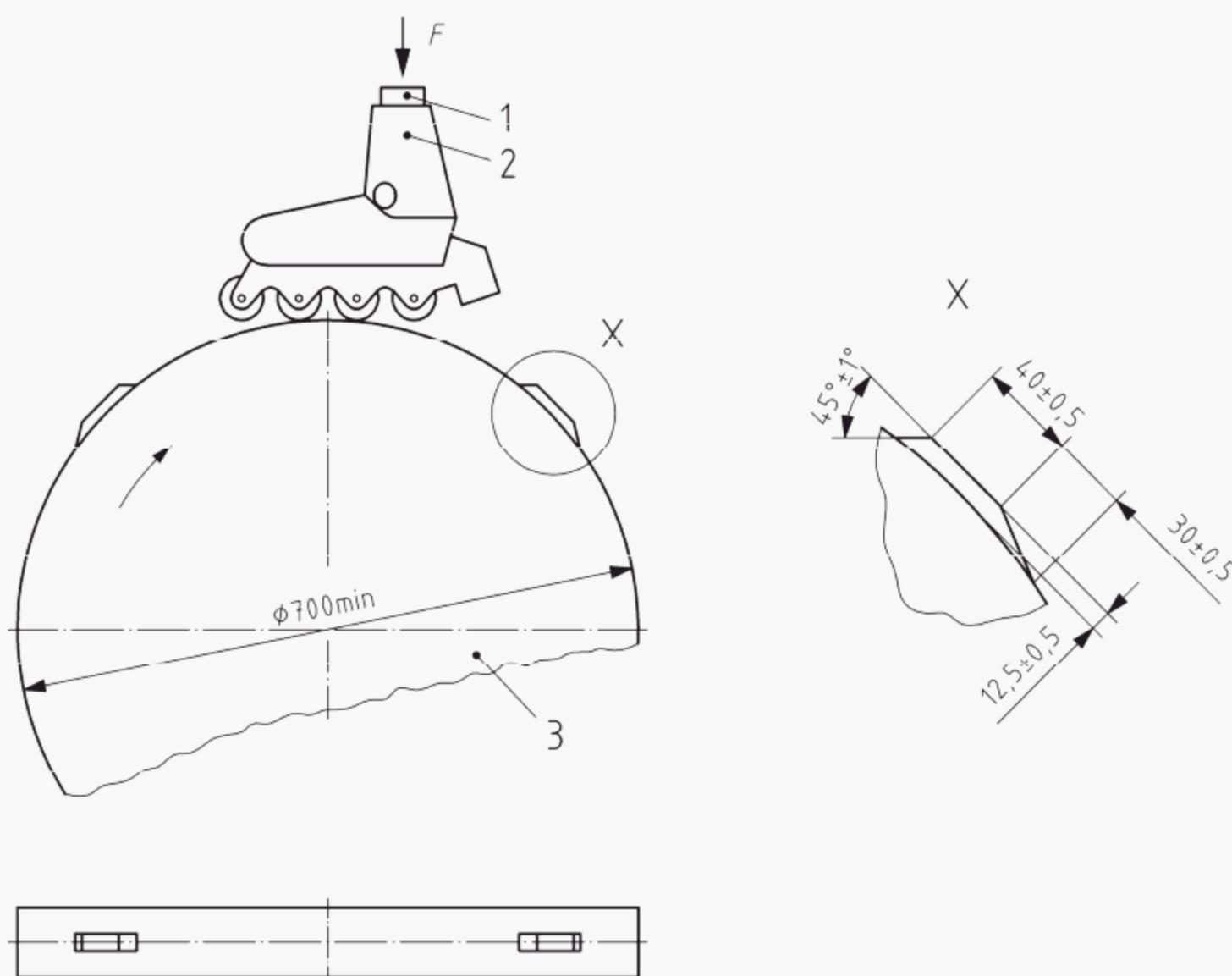


Figure 4 — Test apparatus for the continuous test

#### 5.4.7 Loosening of attached starting and/or braking devices

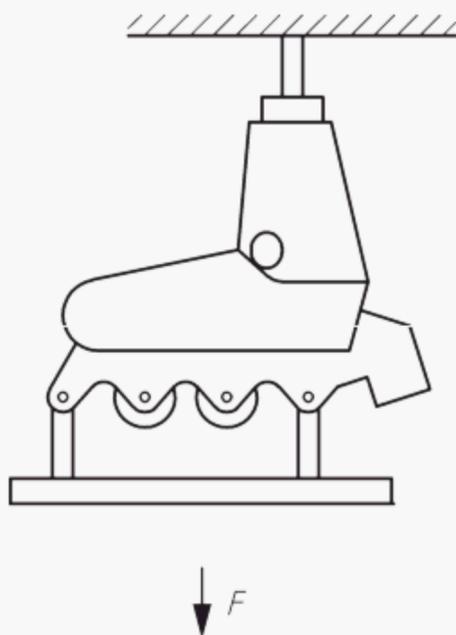
If the starting and/or braking device is attached to the chassis or parts of it are attached to this device, a tensile force of at least 40 N is to be applied to the whole starting and/or braking device respectively, the attached parts.

### 5.5 Test specimen 2

#### 5.5.1 Attachment of the chassis to the shoe

The inline-skate is mounted along the whole length of its chassis in a universal test machine, the force being applied by a last according to 5.3.

A quasi-static tensile force is applied at a speed of  $< 20$  mm/min up to a tensile force of at least  $F = 1\ 000$  N (see Figure 5).



**Key**  
 F tensile force

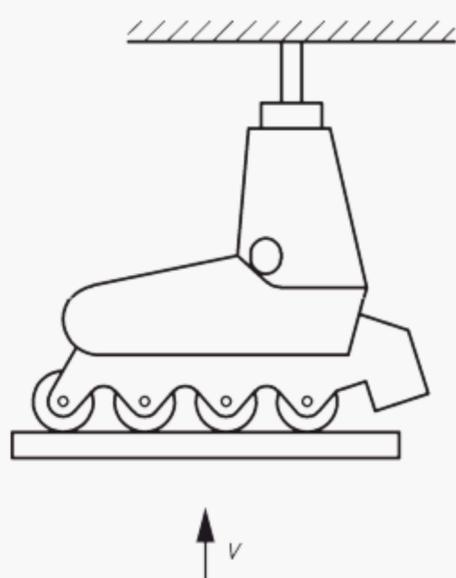
**Figure 5 — Direction of the force applied**

### 5.5.2 Vertical impact test

The inline-skate (see Figure 6) shall be impacted to a hard surface with an energy  $E_1$  of at least 135 J and an impact velocity  $v_1$  of  $(4,5 \pm 0,5)$  m/s for class A inline-skates and an energy  $E_2$  of at least 90 J and an impact velocity  $v_2$  of  $(3,75 \pm 0,4)$  m/s for class B inline-skates.

The type of suspension shall ensure that this energy is absorbed by several wheels.

The inline-skate shall be positioned on a last according to 5.3. It shall be tightened as close as practical.



**Key**  
 v impact velocity

**Figure 6 — Direction of vertical impact**

## 6 Marking

Each inline-skate shall be legibly and durably marked with the following information:

- a) the number of this European Standard;
- b) the name, trademark or other means of identification of the manufacturer or retailer;
- c) means of identification of the model;
- d) maximum weight limit or indication of the class (A or B). If the maximum weight limit is not marked this shall be given in the package.

## 7 Information supplied by the manufacturer

### 7.1 General

Easily understood information supplied by the manufacturer shall be supplied with each pair of inline-skates. This shall ensure that even a novice user will be able to use, handle and maintain the inline-skates. Text describing difficult or complicated operations are to be complemented with illustrations.

The information shall be supplied together with the recommendation that this information shall be retained by the user for future reference.

### 7.2 Contents

#### 7.2.1 General

The information supplied by the manufacturer shall contain, in text or picture form, at least the information in accordance with 7.2.2, 7.2.3, 7.2.4 and 7.2.5.

#### 7.2.2 Information about the construction of the inline-skate

This information shall contain at least:

- a) note to the effect that no modifications shall be made that can impair safety;
- b) note indicating, if applicable, that the inline-skates do not contain a starting and/or braking device;
- c) note indicating if self-locking nuts and other self-locking fixings may lose their effectiveness.

#### 7.2.3 Instructions for use

The instructions for use shall contain at least:

- a) notes concerning limitations of use according to the Road Traffic Act and recommendations regarding or descriptions of suitable surfaces (flat, clean, dry and where possible away from other road users);
- b) warning that the user should always wear protective equipment (hand/wrist protection, knee protection, head protection and elbow protection) and reflective device;
- c) instruction to check that the inline-skate's steering mechanism, if present, is correctly adjusted and that the connective components are firmly secured;
- d) description of the correct techniques for use and for braking.

#### **7.2.4 Servicing and maintenance instructions**

Clear note stating that regular maintenance enhances the safety of the equipment.

This includes:

- a) note regarding the different properties of the various bearing constructions and their maintenance;
- a) replacement of wheels, buffers and parts of the braking device (where possible or present);
- b) lubrication of the bearings;
- c) steering adjustment;
- d) note to remove any sharp edges created through use;
- e) running checks.

#### **7.2.5 Inline-skate's class**

The class including the explanation in 4.2 is to be stated.