



**SLOVENSKI STANDARD**  
**SIST EN 14781:2006**  
**01-september-2006**

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**Tekmovalna kolesa – Varnostne zahteve in preskusne metode**

Racing bicycles - Safety requirements and test methods

Rennräder - Sicherheitstechnische Anforderungen und Prüfverfahren

Bicyclettes de course - Exigences de sécurité et méthodes d'essai

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**Ta slovenski standard je istoveten z: EN 14781:2005**

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ICS 43.150

English Version

## Racing bicycles - Safety requirements and test methods

Bicyclettes de course - Exigences de sécurité et méthodes  
d'essai

Rennräder - Sicherheitstechnische Anforderungen und  
Prüfverfahren

This European Standard was approved by CEN on 7 October 2005.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This European Standard (EN 14781:2005) has been prepared by Technical Committee CEN/TC 333 "Cycles", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by May 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

This European Standard is completely new and is one of a series being produced to cover all types of bicycle:

EN 14764	<i>City and trekking bicycles — Safety requirements and test methods</i>
TC 333 WI 00333002	<i>Cycles - Vocabulary — Terminology (ISO 8090: 1990 Modified)</i>
EN 14765	<i>Bicycles for young children — Safety requirements and test methods</i>
EN 14781	<i>Racing bicycles — Safety requirements and test methods</i>
prEN 15194	<i>Cycles — Electrically power assisted cycles — EPAC bicycle</i>

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.

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## Introduction

This European Standard has been developed in response to demand throughout Europe, and the aim has been to ensure that bicycles manufactured in compliance with it will be as safe as is practically possible. The tests have been designed to ensure the strength and durability of individual parts as well as of the bicycle as a whole, demanding high quality throughout and consideration of safety aspects from the design stage onwards.

The scope has been limited to safety considerations, and has specifically avoided standardisation of components.

If the bicycle is used on public roads national regulations apply.

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## 1 Scope

This European Standard specifies safety and performance requirements for the design, assembly and testing of racing bicycles and sub-assemblies, and lays down guidelines for manufacture's instructions on the use and care of such bicycles.

This European Standard applies to racing bicycles intended for high-speed amateur use on public roads, and on which the saddle can be adjusted to provide a maximum saddle height of 635 mm or more.

This European Standard does not apply to mountain bicycles and to specialised types of racing bicycle such as tandems or bicycles designed and equipped for use in sanctioned competitive events.

NOTE For bicycles with a saddle height of  $\leq 435$  mm see EN 71 and with a maximum saddle height of more than 435 mm and less than 635 mm see EN 14765.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1101, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 5775-1, *Bicycle tyres and rims — Part 1: Tyre designations and dimensions*

ISO 5775-2, *Bicycle tyres and rims — Part 2: Rims*

ISO 7636, *Bells for bicycles and mopeds — Technical specifications*

ISO 9633, *Cycle chains — Characteristics and test methods*

## 3 Terms and definitions

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

### 3.1

#### **cycle**

any vehicle that has at least two wheels and is propelled solely or mainly by the muscular energy of the person on that vehicle, in particular by means of pedals

### 3.2

#### **bicycle**

two-wheeled cycle

### 3.3

#### **tandem**

bicycle with saddles for two or more riders, one behind the other

### 3.4

#### **fully-assembled bicycle**

bicycle fitted with all components necessary for its intended use



**3.5****racing-bicycle**

bicycle having a steering assembly with multiple grip positions allowing for an aerodynamic posture, a multi-speed transmission system, tyre width not greater than 28 mm, and a maximum mass of 12 kg for the fully assembled bicycle

**3.6****maximum saddle height**

vertical distance from the ground to the top of the seat surface, measured with the seat in a horizontal position and with the seat-pillar set to the minimum insertion depth

[EN 71-1:1998]

**3.7****suspension fork**

front fork incorporating controlled, axial flexibility to reduce the transmission of road-shocks to the rider

**3.8****suspension-frame**

frame incorporating controlled, vertical flexibility to reduce the transmission of road-shocks to the rider

**3.9****braking distance**

distance travelled by a bicycle between the commencement of braking (3.10) and the point at which the bicycle comes to rest

**3.10****commencement of braking**

point on the test track or test machine at which the brake actuating device operated directly by the rider's hand or foot or by a test mechanism starts to move from its rest position, on the test track this point being determined by the first brake actuating device (front or rear) to operate

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**3.11****braking force  $F_{Br}$** 

tangential rearward force between the tyre and the ground or the tyre and the drum or belt of the test machine

**3.12****rim-brake**

brake in which brake-shoes act on the rim of the wheel

**3.13****hub-brake**

brake which acts directly on the wheel-hub

**3.14****disc-brake**

brake in which pads are used to grip the lateral face of a thin disc attached to or incorporated in the wheel-hub

**3.15****secondary brake levers**

any system that enables the rider to operate the brakes with the hands applied away from the main braking grip position

**3.16****wheel**

assembly or combination of hub, spokes or disc, and rim, but excluding the tyre

**3.17****pedal tread-surface**

surface of a pedal that is presented to the underside of the foot

**3.18**

**quick-release pedal (quick-release device)**

pedal that presents a system for attachment to the shoe that can be released by foot-movement alone

**3.19**

**crank assembly**

for fatigue testing it consists of the two cranks, the pedal-spindle adaptors, the bottom-bracket spindle, and the first component of the drive system, e.g. the chain-wheel set

**3.20**

**aerodynamic extensions**

extension (or extensions) secured to the handlebar, stem, or other part to improve the rider's aerodynamic posture

**3.21**

**visible crack**

crack which results from a test where that crack is visible to the naked eye

**3.22**

**fracture**

unintentional separation into two or more parts

**3.23**

**wheel-base**

distance between the axes of the front and the rear wheels of an un-laden bicycle

**3.24**

**public road**

any designated and adopted road, pavement, path, or track on which a bicycle is legally permitted to travel, and on most though not all of which, bicycles will share use with other forms of transport including motorised traffic

**3.25**

**toe-clip**

device attached to the pedal to grip the toe end of the rider's shoe but permitting withdrawal of the shoe

**3.26**

**highest gear**

gear ratio which gives the greatest distance travelled for one rotation of the cranks

**3.27**

**lowest gear**

gear ratio which gives the shortest distance travelled for one rotation of the cranks

## 4 Requirements and test methods

### 4.1 Brake tests and strength tests – special requirements

#### 4.1.1 Definition of brake tests

Brake tests to which accuracy requirements apply, as in 4.1.4, are those specified in 4.6.2.2.3 to 4.6.6.2 inclusive and 4.6.7.5.1.3.

#### 4.1.2 Definition of strength tests

Strength tests to which accuracy requirements apply, as in 4.1.4, are those involving static, impact or fatigue loading as specified in 4.7 to 4.13 inclusive and 14.17.2.

#### 4.1.3 Numbers and condition of specimens for the strength tests

In general, for static, impact and fatigue tests, each test shall be conducted on a new test sample, but if only one sample is available, it is permissible to conduct all of these tests on the same sample with the sequence of testing being fatigue, static and impact.

When more than one test is conducted on the same sample, the test sequence shall be clearly recorded in the test report or record of testing.

NOTE It should be noted that if more than one test is conducted on the same sample, earlier tests can influence the results of subsequent tests. Also, if a sample fails when it has been subjected to more than one test, a direct comparison with single testing is not possible.

In all strength tests, specimens shall be in the fully-finished condition.

#### 4.1.4 Accuracy tolerances of test conditions for brake tests and strength tests

Unless stated otherwise, accuracy tolerances based on the nominal values shall be as follows:

Forces and torques.....	0/+5 %
Masses and weights.....	± 1 %
Dimensions.....	± 1 mm
Angles.....	± 1°
Time duration.....	± 5 s
Temperatures.....	± 2 °C
Pressures.....	± 5 %

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## 4.2 Sharp edges

Exposed edges that could come into contact with the rider's hands, legs etc. during normal riding or normal handling and normal maintenance shall not be sharp.

## 4.3 Security and strength of safety-related fasteners

### 4.3.1 Security of screws

Any screws used in the assembly of suspension systems or screws used to attach generators, brake-mechanisms and mudguards to the frame or fork or handlebar, and the saddle to the seat-pillar shall be provided with suitable locking devices, e.g. lock-washers, lock-nuts, or stiff nuts.

NOTE Fasteners used to assemble hub and disc brakes should have heat-resistant locking devices.

### 4.3.2 Minimum failure torque

The minimum failure torque of bolted joints for the fastening of handlebars, handlebar-stems, bar-ends, seats and seat-pillars shall be at least 50 % greater than the manufacturer's recommended tightening torque.

## 4.4 Crack detection methods

Standardised methods may be used to emphasise the presence of cracks where visible cracks are specified as criteria of failure in tests specified in this European Standard. See 3.21.

NOTE For example, suitable dye-penetrant methods are specified in ISO 3452.

## 4.5 Protrusions

### 4.5.1 Requirement

#### 4.5.1.1 Exposed protrusions

Any rigid exposed protrusion longer than 8 mm (see  $L$  in Figure 1) after assembly except:

- a) the front gear-change mechanism at the chain wheel;
- b) the gear-change mechanism at the rear wheel;
- c) the rim-brake mechanism at the front and rear wheels;
- d) a lamp-bracket fitted on the head-tube;
- e) reflectors;
- f) toe-clips and toe-straps;
- g) clip-less attachment mechanism;
- h) chain wheels and rear sprockets;
- i) water bottle cage

shall terminate in a radius,  $R$  (see Figure 1), of not less than 6,3 mm. Such protrusions shall have a major end dimension,  $A$ , not less than 12,7 mm and a minor dimension,  $B$ , not less than 3,2 mm.

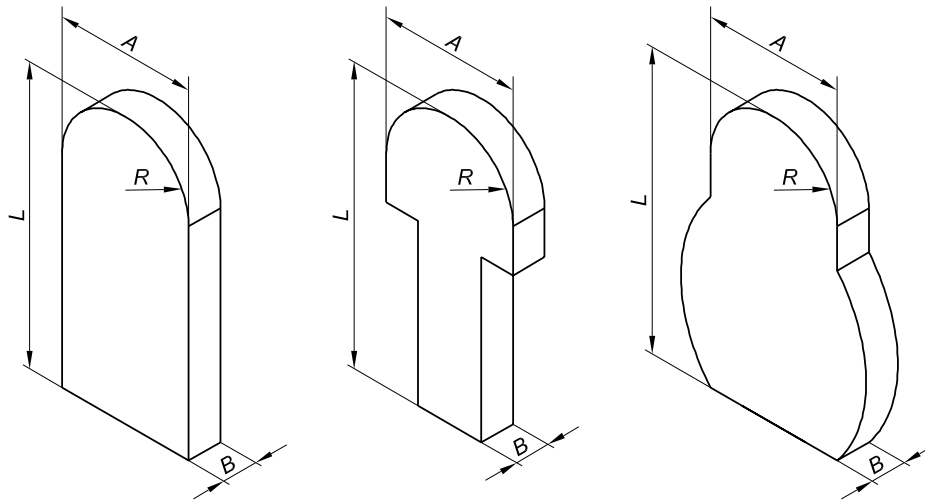
#### 4.5.1.2 Exclusion zone, protective devices and screw threads

There shall be no protrusions on the top tube of a bicycle frame between the saddle and a point 300 mm forward of the saddle, with the exception that control cables no greater than 6,4 mm in diameter and cable clamps made from material not thicker than 4,8 mm may be attached to the top tube.

Foam pads attached to the bicycle frame to act as protective cushions are permitted, provided that the bicycle meets the requirements for protrusions when the pads are removed.

A screw thread that is an exposed protrusion shall be limited to a protrusion length of one major diameter of the screw beyond the internally threaded mating part.

Dimensions in millimetres



**Key**

$R \geq 6,3$

$A \geq 12,7$

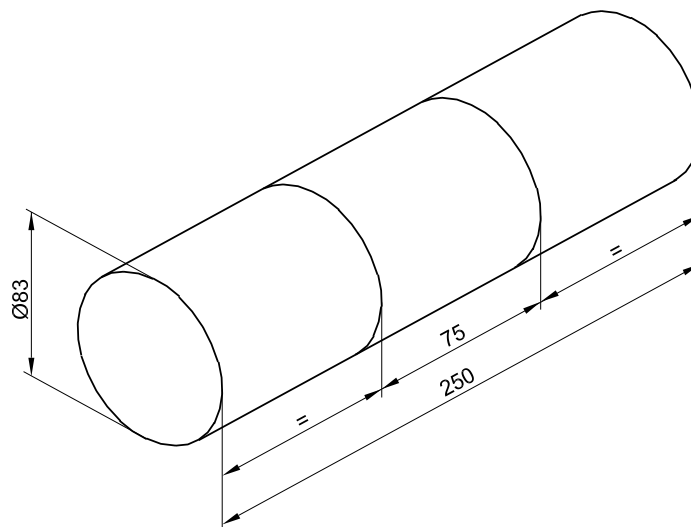
$B \geq 3,2$

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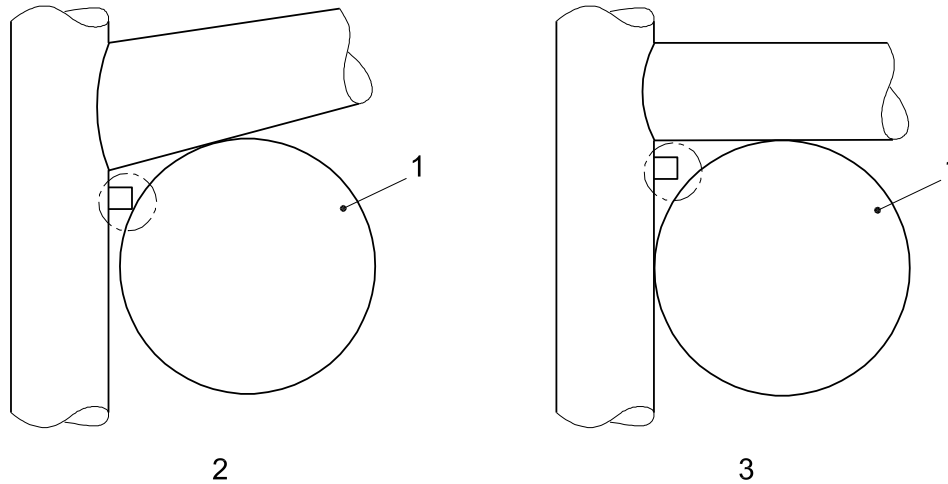
**Figure 1 — Examples of minimum dimensions of exposed protrusion  
 (these apply when  $L$  is greater than 8 mm)**

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Dimensions in millimetres



**Figure 2 — Exposed protrusion test cylinder**



**Key**

- 1 Test cylinder
- 2 Protrusion shall comply
- 3 Protrusion need not comply

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Figure 3 — Examples of protrusions

**4.5.2 Test method**

Conduct the test with a protrusion test cylinder (which simulates a limb) having the dimensions shown in Figure 2.

Manoeuvre the test cylinder in all possible attitudes towards any rigid protrusion on the bicycle. If the central 75 mm long section of the cylinder contacts the protrusion, that protrusion shall be considered to be an exposed protrusion and it shall comply with 4.5.1.1.

Examples of protrusions that need and do not need to comply with the requirements are shown in Figure 3.

**4.6 Brakes**

**4.6.1 Braking-systems**

A bicycle shall be equipped with at least two independent braking-systems. At least one shall operate on the front wheel and one on the rear wheel. The braking systems shall operate without binding and shall be capable of meeting the braking-performance requirements of 4.6.7.

Brake-blocks containing asbestos shall not be permitted.

**4.6.2 Hand-operated brakes**

**4.6.2.1 Brake-lever position**

The handbrake levers for front and rear brakes shall be positioned according to the legislation or custom and practice of the country in which the bicycle is to be sold, and the bicycle manufacturer shall state in the manufacturer's instructions manual which levers operate the front and rear brakes (see also Clause 5 b)).

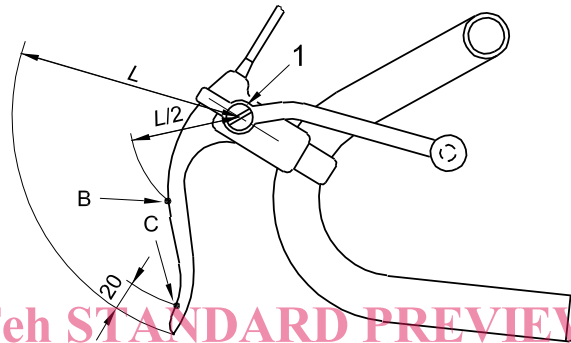
#### 4.6.2.2 Brake-lever grip dimensions

##### 4.6.2.2.1 Requirement

It shall be possible to fit the dimension gauge shown in Figure 5 over the brake-lever (or a secondary brake-lever) and the handlebar grip or any other covering in at least one position between points B and C indicated in Figure 4, without causing any movement of the brake-lever towards the handlebar.

NOTE The range of adjustment on the brake-lever should permit these dimensions to be obtained.

Dimension in millimetres



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#### Key

1 Pivot

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Figure 4 — Handbrake-lever grip dimensions