



SLOVENSKI STANDARD
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Gorska kolesa – Varnostne zahteve in preskusne metode

Mountain-bicycles - Safety requirements and test methods

Geländefahrräder (Mountainbikes) - Sicherheitstechnische Anforderungen und Prüfverfahren

Bicyclettes tout terrain - Exigences de sécurité et méthodes d'essai

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English Version

Mountain-bicycles - Safety requirements and test methods

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d'essai

Geländefahrräder (Mountainbikes) - Sicherheitstechnische
Anforderungen und Prüfverfahren

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

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Contents

	page
Foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Requirements and test methods	9
4.1 Brake tests and strength tests – special requirements	9
4.1.1 Definition of brake tests	9
4.1.2 Definition of strength tests	9
4.1.3 Numbers and condition of specimens for the strength tests	9
4.1.4 Accuracy tolerances of test conditions for brake tests and strength tests	9
4.2 Sharp edges	9
4.3 Security and strength of safety-related fasteners	9
4.3.1 Security of screws	9
4.3.2 Minimum failure torque	10
4.3.3 Folding bicycles	10
4.4 Crack detection methods	10
4.5 Protrusions	10
4.5.1 Requirement	10
4.5.2 Test method	12
4.6 Brakes	12
4.6.1 Braking-systems	12
4.6.2 Hand-operated brakes	12
4.6.3 Attachment of brake assembly and cable requirements	15
4.6.4 Brake-block and brake-pad assemblies – Security test	15
4.6.5 Brake adjustment	16
4.6.6 Hand-operated braking-system – strength test	16
4.6.7 Braking performance	16
4.6.8 Brakes – heat-resistance test	33
4.7 Steering	34
4.7.1 Handlebar – dimensions	34
4.7.2 Handlebar grips and plugs	34
4.7.3 Handlebar-stem – insertion-depth mark or positive stop	34
4.7.4 Handlebar stem-extension to fork-stem – clamping requirements	35
4.7.5 Steering stability	35
4.7.6 Steering assembly – static strength and security tests	35
4.7.7 Handlebar and stem assembly – fatigue test	42
4.8 Frames	44
4.8.1 Suspension-frames – special requirements	44
4.8.2 Frame and front fork assembly – impact test (falling mass)	45
4.8.3 Frame and front fork assembly – impact test (falling frame)	46
4.8.4 Frame – fatigue test with pedalling forces	48
4.8.5 Frame – fatigue test with horizontal forces	50
4.8.6 Frame – fatigue test with a vertical force	51
4.9 Front fork	53
4.9.1 General	53
4.9.2 Means of location of the axle and wheel retention	53
4.9.3 Suspension-forks – special requirements	53
4.9.4 Front fork – Static bending test	54
4.9.5 Front fork – rearward impact test	55

4.9.6	Front fork – bending fatigue test	57
4.9.7	Forks intended for use with hub- or disc-brakes	58
4.10	Wheels and wheel/tyre assemblies.....	62
4.10.1	Rotational accuracy	62
4.10.2	Wheel/tyre assembly – clearance	62
4.10.3	Wheel/tyre assembly – static strength test.....	62
4.10.4	Wheel retention	63
4.10.5	Wheels – quick-release devices.....	64
4.11	Rims, tyres and tubes.....	64
4.11.1	Tyre inflation pressure	65
4.11.2	Tyre and rim compatibility.....	65
4.11.3	Rim-wear.....	65
4.12	Mudguards.....	65
4.12.1	Requirement	65
4.12.2	Stage 1: Test method – tangential obstruction.....	65
4.12.3	Stage 2: Test method – radial force.....	66
4.13	Pedals and pedal/crank drive system.....	66
4.13.1	Pedal tread.....	66
4.13.2	Pedal clearance.....	67
4.13.3	Pedal/pedal-spindle assembly – static strength test.....	68
4.13.4	Pedal-spindle – impact test	68
4.13.5	Pedal/pedal-spindle – dynamic durability test.....	69
4.13.6	Drive-system – static strength test.....	70
4.13.7	Crank assembly – fatigue tests.....	71
4.14	Saddles and seat-pillars	73
4.14.1	General	73
4.14.2	Limiting dimensions	73
4.14.3	Seat-pillar – Insertion-depth mark or positive stop	74
4.14.4	Saddle/seat pillar – security test.....	74
4.14.5	Saddle – static strength test	75
4.14.6	Saddle and seat-pillar clamp – fatigue test.....	76
4.14.7	Seat-pillar – fatigue test.....	77
4.15	Drive-chain	78
4.16	Chain-guard.....	78
4.16.1	Requirement	78
4.16.2	Chain-wheel disc diameter	79
4.16.3	Chain protective device	79
4.16.4	Combined front gear-change guide.....	79
4.17	Spoke protector	80
4.18	Lighting systems and reflectors	80
4.18.1	Lighting and reflectors	80
4.18.2	Wiring harness	80
4.19	Warning device	80
4.20	Road-test on a fully-assembled bicycle	80
4.20.1	Requirement	80
4.20.2	Test method.....	80
5	Manufacturer’s instructions	81
6	Marking	82
6.1	Requirement	82
6.2	Durability test	83
6.2.1	Requirement	83
6.2.2	Test method.....	83
Annex A (informative)	Explanation of the method of least squares for obtaining line of best fit and \pm 20 % limit lines for braking performance linearity.....	84
Annex B (informative)	Steering geometry	87
Bibliography.....		89

Foreword

This European Standard (EN 14766:2005) 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.

The basis of the European Standard is from a standard being developed for ISO and great care has been taken to ensure compatibility between the two documents.

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 14872	<i>Bicycles — Accessories for bicycles — Luggage carriers</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.

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 bicycles and sub-assemblies intended for off-road, rough-terrain use, and lays down guide lines for instructions on the use and care of such bicycles. It applies to bicycles on which the saddle can be adjusted to provide a maximum saddle height of 635 mm or more.

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

It does not apply to racing bicycles and specialised types of bicycle such as tandems or bicycles designed and equipped for use in severe applications such as sanctioned competition events, stunting, or aerobic manoeuvres.

No requirements on lighting equipment, reflectors and warning devices are specified in this European Standard, due to the existence of several different national regulations applicable in the European Countries.

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**mountain-bicycle**

bicycle designed for use off-road on rough terrain, on public roads and on public pathways. It will be equipped with a suitably strengthened frame and other components, and, typically, with wide-section tyres with coarse tread patterns and a wide range of transmission gears

3.6**off-road rough-terrain**

coarse pebble tracks, forest trails, and other general off-road tracks where tree-roots and rocks are likely to be encountered

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**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]

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3.10**braking distance**

distance travelled by a bicycle between the commencement of braking (3.11) and the point at which the bicycle comes to rest

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3.11**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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3.12**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

3.13**rim-brake**

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

3.14**hub-brake**

brake which acts directly on the wheel-hub

3.15**band-brake**

brake in which a circumferential band is wrapped around the exterior of a cylindrical drum which is attached to or incorporated in the wheel-hub

3.16**disc-brake**

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

3.17**pedal tread-surface**

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

3.18

crank assembly

for fatigue testing it consists of the two cranks, the pedal-spindles (possibly with adaptors), the bottom-bracket spindle, and the first component of the drive system, e.g. the chain-wheel cluster

3.19

bar-end

extension secured to the end of a handlebar to provide an additional hand-grip and usually with its axis perpendicular to the axis of the end of the handlebar

3.20

visible crack

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

3.21

fracture

unintentional separation into two or more parts

3.22

wheel-base

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

3.23

wheel

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

3.24

quick-release device

device to fix or release a part without a tool

3.25

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

3.26

public pathway

any designated and adopted road, path or track on which a bicycle is legally permitted to travel, and on which, use by motorised traffic is excluded

3.27

aerodynamic extension

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

3.28

maximum inflation pressure

maximum tyre pressure recommended by the tyre manufacturer for a safe and efficient performance

3.29

exposed protrusion

protrusion which through its location and rigidity could present a hazard to the rider either through heavy contact with it in normal use or should the rider fall onto it in an accident

3.30

toe-clip

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

3.31

highest gear

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

3.32**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 4.14 inclusive and 4.18.2.

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 %

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 mud-guards 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-resisting locking devices.

4.3.2 Minimum failure torque

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

4.3.3 Folding bicycles

Folding bicycles shall meet all test requirements.

Folding mechanisms shall be designed so that the bicycle can be locked for use in a simple, stable, safe way and when folded no damage shall occur to any cables. No locking mechanism shall contact the wheels or tyres during riding, and it shall be impossible to unintentionally loosen or unlock the folding mechanisms during riding.

4.4 Crack detection methods

Standardised methods should 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 3.20.

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

4.5 Protrusions

4.5.1 Requirement

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4.5.1.1 Exposed protrusions

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

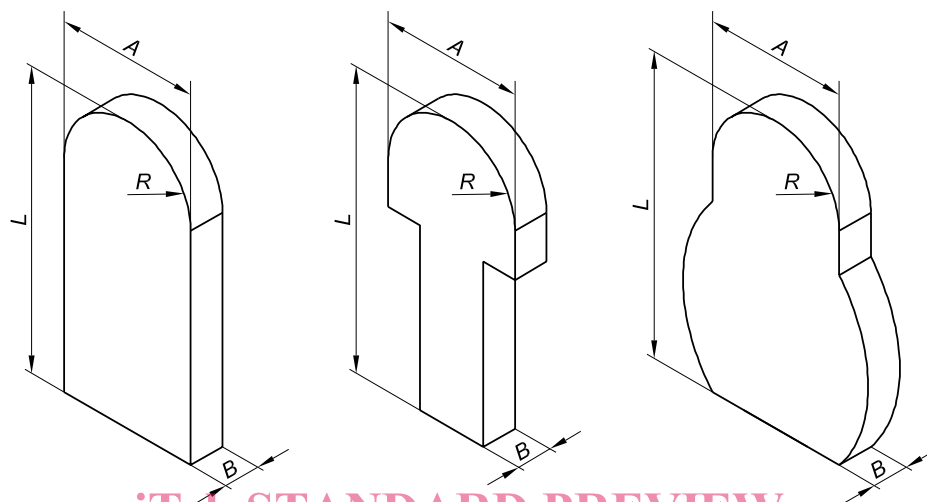
4.5.1.2 Exclusion zone, protective devices and screw threads

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 no 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



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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 protrusions (these apply when L is greater than 8 mm)

Dimensions in millimetres

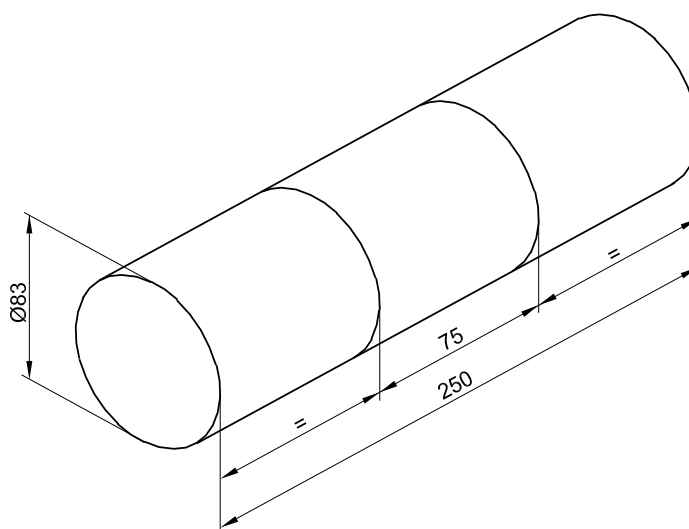


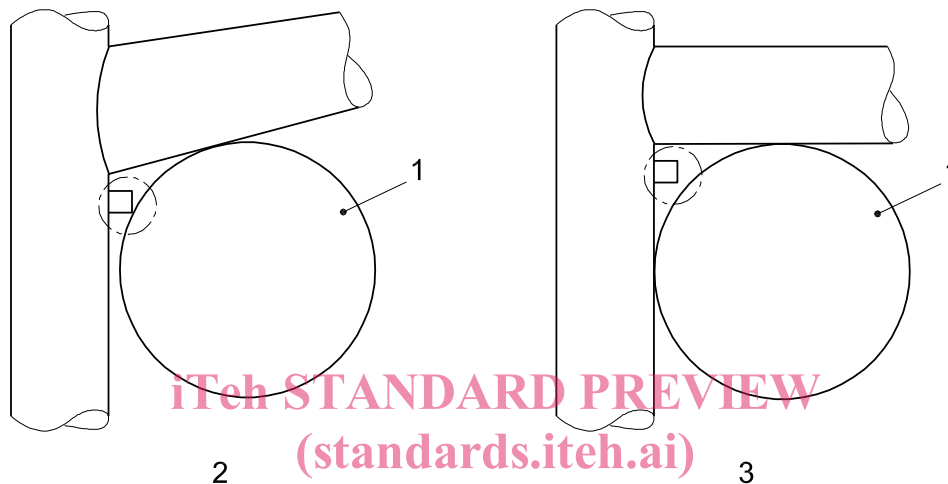
Figure 2 — Exposed protrusion test cylinder

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.



Key

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

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Figure 3 — Examples of protrusions

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 which lever operates the front brake and which lever operates the rear brake (see also Clause 5 a)).

4.6.2.2 Brake-lever grip dimensions

4.6.2.2.1 Requirement

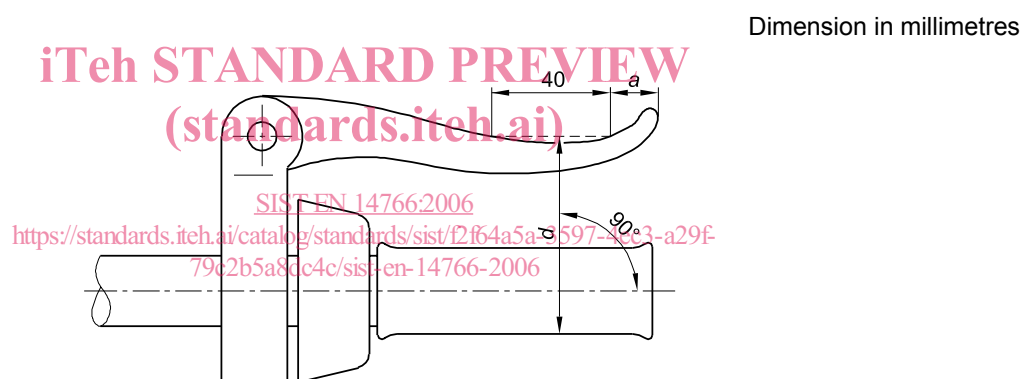
The maximum grip dimension, d , measured between the outer surfaces of the brake-lever in the region intended for contact with the rider's fingers and the handlebar or any other covering present shall over a distance of not less than 40 mm as shown in Figure 4, conform to the following:

- on bicycles on which the minimum intended height of the saddle is 635 mm or more, d shall not exceed 90 mm;
- on bicycles on which the minimum intended height of the saddle is less than 635 mm, d shall not exceed 75 mm.

Conformance shall be established by the method detailed in 4.6.2.2.2.

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

The dimension a , shown in Figure 4 which is used in 4.6.2.2.3 to establish the position for applying test loads, shall be established by the method detailed in 4.6.2.2.2.



Key

- a Distance between the last part of the lever intended for contact with the rider's fingers and the end of the lever
- d Maximum grip dimension

Figure 4 — Handbrake-lever grip dimensions

4.6.2.2.2 Test method

Fit the gauge illustrated in Figure 5 over the handlebar-grip or the handlebar (where the manufacturer does not fit a grip) and the brake-lever as shown in Figure 6 so that the face A is in contact with the handlebar or grip and the side of the brake-lever. Ensure that the face B spans an area of that part of the brake-lever that is intended for contact with the rider's fingers without the gauge causing any movement of the brake-lever towards the handlebar or grip. Measure the distance a , the distance between the last part of the lever intended for contact with the rider's fingers and the end of the lever (see 4.6.2.2.1, Figures 4 and 5, and 4.6.2.3).