
**Cycles — Safety requirements for
bicycles —**

**Part 2:
Requirements for city and trekking,
young adult, mountain and racing
bicycles**

Cycles — Exigences de sécurité pour les bicyclettes —

*Partie 2: Exigences pour bicyclettes de ville et tout chemin (trekking),
jeunes adultes, tout-terrain et de course*

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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 of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 149, *Cycles*, Subcommittee SC 1, *Cycles and major sub-assemblies*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 333, *Cycles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 4210-2:2015), which has been technically revised.

The main changes as follows:

- improvement of [4.3.2](#) Minimum failure torque;
- change in minimum braking performance value in [Table 2](#) of [4.6.8.1.3](#);
- improvement of [4.6.9](#);
- improvement of [4.7.2](#);
- addition of a requirement for angle-adjustable handlebar stem in [4.7.6.3](#);
- addition of [4.8.7](#);
- addition of [4.9.8.3](#);
- addition of [4.9.9](#);
- re-arrangement of requirements for “Wheel and tyre assembly”, “Rims, tyres, and tubes”;
- improvement of [4.10.2](#);
- change in test force of [4.10.4.3](#);
- addition of [4.10.7](#);

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- improvement of [4.11](#);
- change in option c) of [4.14](#);
- addition of [4.15.4.2](#);
- improvement of [4.15.6](#);
- addition of icons in [Clause 6](#).

A list of all parts in the ISO 4210 series can be found on the ISO website.

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Introduction

This document has been developed in response to demand throughout the world, and the aim has been to ensure that bicycles manufactured in conformity with this document 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 standardization of components.

For the purpose of improving the safety of luggage carriers, revision work of ISO 11243, referenced in [4.17](#), is in progress. In case this revision work involves requirements for the entire bicycle, this document will incorporate those requirements in the next revision.

If the bicycle should be used on public roads, national regulations apply.

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Cycles — Safety requirements for bicycles —

Part 2:

Requirements for city and trekking, young adult, mountain and racing bicycles

1 Scope

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

This document applies to young adult bicycles with maximum saddle height of 635 mm or more and less than 750 mm, city and trekking bicycles, mountain bicycles, and racing bicycles that have a maximum saddle height of 635 mm or more including folding bicycles.

This document does not apply to specialized types of bicycle, such as delivery bicycles, recumbent bicycles, tandems, BMX bicycles, and bicycles designed and equipped for use in severe applications such as sanctioned competition events, stunting, or aerobatic manoeuvres.

NOTE For bicycles with a maximum saddle height of 435 mm or less, see national regulations for ride-on toys, and with a maximum saddle height of more than 435 mm and less than 635 mm, see ISO 8098^[8].

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 4210-1, *Cycles — Safety requirements for bicycles — Part 1: Vocabulary*

ISO 4210-3:2023, *Cycles — Safety requirements for bicycles — Part 3: Common test methods*

ISO 4210-4:2023, *Cycles — Safety requirements for bicycles — Part 4: Braking test methods*

ISO 4210-5:2023, *Cycles — Safety requirements for bicycles — Part 5: Steering test methods*

ISO 4210-6:2023, *Cycles — Safety requirements for bicycles — Part 6: Frame and fork test methods*

ISO 4210-7:2023, *Cycles — Safety requirements for bicycles — Part 7: Wheels and rims test methods*

ISO 4210-8:2023, *Cycles — Safety requirements for bicycles — Part 8: Pedal and drive system test methods*

ISO 4210-9:2023, *Cycles — Safety requirements for bicycles — Part 9: Saddles and seat-post test methods*

ISO 6742-1, *Cycles — Lighting and retro-reflective devices — Part 1: Lighting and light signalling devices*

ISO 6742-2, *Cycles — Lighting and retro-reflective devices — Part 2: Retro-reflective devices*

ISO 6742-3, *Cycles — Lighting and retro-reflective devices — Part 3: Installation and use of lighting and retro-reflective devices*

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

ISO 11243, *Cycles — Luggage carriers for bicycles — Requirements and test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4210-1 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Requirements

4.1 Toxicity

Any items which come into intimate contact with the rider (i.e. causing any hazard due to sucking or licking) shall conform with any national regulations specific to children's products.

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, e.g. deburred, broken, rolled, or processed with comparable techniques.

NOTE See ISO 13715^[9].

4.3 Security and strength of safety-related fasteners

4.3.1 Security of screws

Any screws used in the assembly of suspension systems, brackets attached to electric generators, brake mechanisms and mudguards to the frame or fork shall be provided with suitable locking devices, e.g. lock-washers, lock-nuts, thread locking compound, or stiff nuts. Fasteners used to assemble hub and disc brakes shall have heat-resistant locking devices.

NOTE For example, mechanical and physical properties of bolts are specified in ISO 898-1^[1].

4.3.2 Minimum failure torque

The minimum failure torque of bolted joints for the fastening of handle bars, handlebar stems, bar ends, saddle and seat-posts shall be at least 20 % greater than the manufacturer's maximum recommended tightening torque.

4.3.3 Folding bicycle mechanism

If folding bicycle mechanism is provided, it 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

Standardized methods should be used to emphasize the presence of cracks where visible cracks are specified as criteria of failure in tests specified in this document.

NOTE For example, suitable dye-penetrant methods are specified in ISO 3452-1[2], ISO 3452-2[3], ISO 3452-3[4], and ISO 3452-4[5]. In addition, white paint or surface treatment can be used to aid in detection for composite materials.

4.5 Exposed protrusions

This requirement is intended to address the hazards associated with the users of bicycles falling on projections or rigid components (e.g. handlebars, levers) on a bicycle, possibly causing internal injury or skin puncture.

Tubes and rigid components in the form of projections which constitute a puncture hazard to the user should be protected. The size and shape of the end protection has not been stipulated, but an adequate shape shall be given to avoid puncturing of the body. Screw threads which constitute a puncture hazard shall be limited to a protrusion length of one major diameter of the screw beyond the internally threaded mating part.

NOTE Handlebar ends are covered in [4.7.2](#).

4.6 Brakes

4.6.1 Braking systems

A bicycle shall be equipped with at least two independently actuated 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 [4.6.8](#).

Brake blocks containing asbestos shall not be permitted.

4.6.2 Hand-operated brakes

4.6.2.1 Brake lever position

The brake 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 levers operate the front and rear brakes [see also [Clause 5](#), item b)].

4.6.2.2 Brake lever grip dimensions

a) The brake lever similar to type A or type B.

The dimension, d , measured at the non-activated position of the brake lever 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 cover a distance of not less than 40 mm as shown in [Figure 1](#) a) and [Figure 1](#) b) and 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.

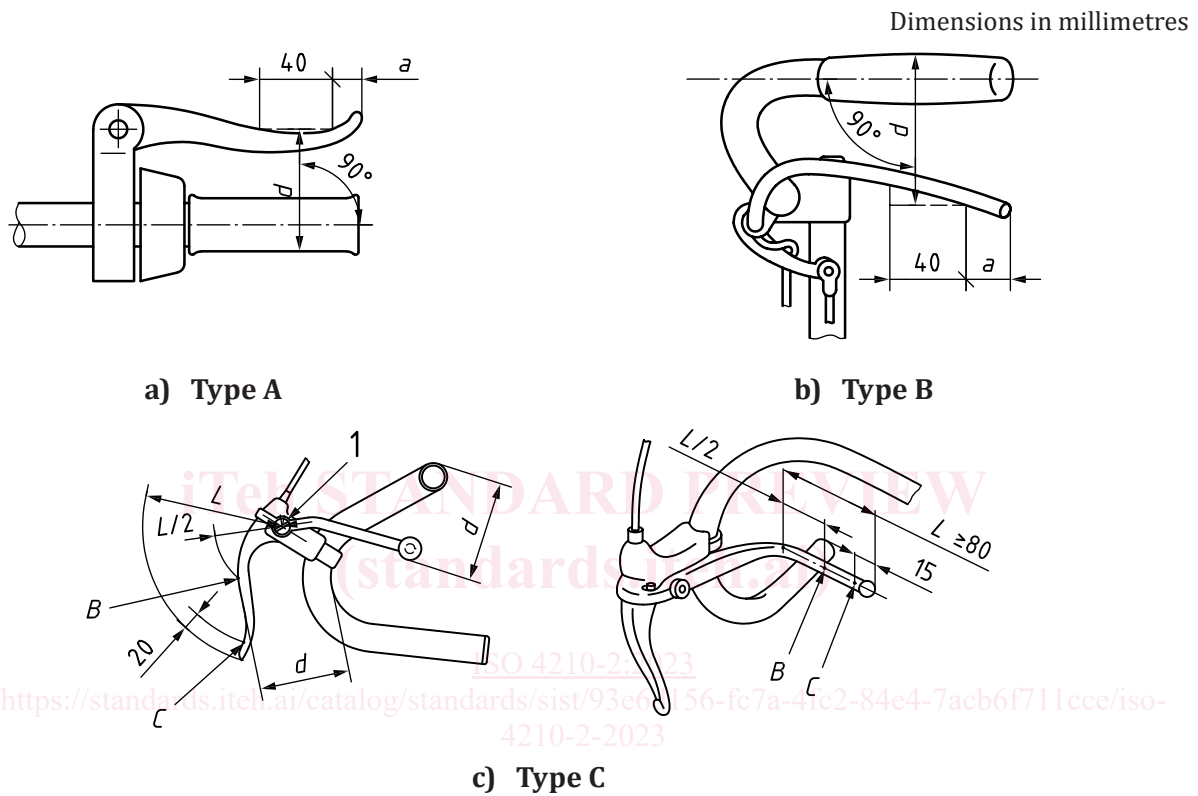
Conformity shall be established by the method detailed in ISO 4210-4:2023, 4.1.1. The range of adjustment on the brake lever should permit these dimensions to be obtained.

NOTE See [Clause 5](#), item c) in relation to the minimum intended height of the saddle.

b) The brake lever similar to type C.

It shall be possible to fit the dimension gauge shown in ISO 4210-4:2023, Figure 3 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 1 c), without causing any movement of the brake lever towards the handlebar. The dimension *d* shall not exceed 100 mm.

Conformance shall be established by the method detailed in ISO 4210-4:2023, 4.1.2. The range of adjustment on the brake lever should permit these dimensions to be obtained.



Key

- 1 pivot
- a* distance between the last part of the lever intended for contact with the rider's fingers and the end of the lever
- B* point of $L/2$
- C* point of 20 mm (in case of an extension brake lever, 15 mm) from the end of the lever
- d* brake lever grip dimension — non activated
- L* distance between the centre of the lever pivot and the lever tip end

Figure 1 — Brake lever grip dimensions

4.6.3 Attachment of brake assembly and cable requirements

Cable pinch bolts shall not sever any of the cable strands when assembled to the manufacturer's instructions. In the event of a cable failing, no part of the brake mechanism shall inadvertently inhibit the rotation of the wheel.

The cable end shall either be protected with a cap that shall withstand a removal force of not less than 20 N or be otherwise treated to prevent unravelling.

NOTE See 4.3 in relation to fasteners.

4.6.4 Brake-block and brake-pad assemblies — Security test

The friction material shall be securely attached to the holder, backing plate, or shoe and there shall be no failure of the braking system or any component thereof, and the brake shall meet the performance requirements of [4.6.8](#) when tested by the method specified in ISO 4210-4:2023, 4.3.

4.6.5 Brake adjustment

Each brake shall be equipped with an adjustment mechanism, either manual or automatic.

Each brake shall be capable of adjustment with or without the use of a tool to an efficient operating position until the friction material has worn to the point of requiring replacement as recommended in the manufacturer's instructions. Also, when correctly adjusted, the friction material shall not contact anything other than the intended braking surface.

The brake blocks of a bicycle with rod brakes shall not come into contact with the rim of the wheels when the steering angle of the handlebars is set at 60°, nor shall the rods bend, or be twisted after the handlebars are reset to the central position.

4.6.6 Hand-operated braking-system — Strength test

When tested by the method described in ISO 4210-4:2023, 4.4, there shall be no failure of the braking system or of any component thereof.

4.6.7 Back-pedal braking system — Strength test

4.6.7.1 General

If the back-pedal braking system is fitted, the brake shall be actuated by the operator's foot applying force to the pedal in a direction opposite to that of the drive force. The brake mechanism shall function regardless of any drive gear positions or adjustments. The differential between the drive and brake positions of the crank shall not exceed 60°.

The measurement shall be taken with the crank held against each position with a pedal force of at least 250 N. The force shall be maintained for 1 min in each position.

4.6.7.2 Requirement

When tested in accordance with ISO 4210-4:2023, 4.5, there shall be no failure of the brake system or any component thereof.

4.6.8 Braking performance

4.6.8.1 General

4.6.8.1.1 Test method options

Two test methods are specified to determine braking performance and experience has shown that either method is suitable and either can be used. One test method is the track test in which braking distance is measured directly with the progressive characteristics of the brakes being self-evident. The alternative test method is a machine/rig base test in which braking force is measured and, from which, braking performance values are calculated. The progressive characteristics of the brake are determined by linearity measurements. A final, simple track test checks for smooth, safe, stopping characteristics.

Whichever method is used, there shall be conformity with [4.6.8.1.2](#) or [4.6.8.1.3](#).

NOTE1 See ISO 4210-4:2023, 4.6.5.7 item i), test method — simple track test.