

Cycles - Safety requirements for bicycles - Part 2:
Requirements for city and trekking, young adult,
mountain and racing bicycles (ISO 4210-2:2023)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 4210-2:2023 sisaldab Euroopa standardi EN ISO 4210-2:2023 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 4210-2:2023 consists of the English text of the European standard EN ISO 4210-2:2023.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 25.01.2023.	Date of Availability of the European standard is 25.01.2023.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 43.150

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Cycles - Safety requirements for bicycles - Part 2:
Requirements for city and trekking, young adult, mountain
and racing bicycles (ISO 4210-2:2023)**

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 (ISO 4210-2:2023)

Fahrräder - Sicherheitstechnische Anforderungen an
Fahrräder - Teil 2: Anforderungen für City- und
Trekkingfahrräder, Jugendfahrräder, Geländefahrräder
und Rennräder (ISO 4210-2:2023)

This European Standard was approved by CEN on 13 January 2023.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 24 May 2023.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 4210-2:2023) has been prepared by Technical Committee ISO/TC 149 "Cycles" in collaboration with 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 July 2023, and conflicting national standards shall be withdrawn at the latest by July 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 4210-2:2015.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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

Endorsement notice

The text of ISO 4210-2:2023 has been approved by CEN as EN ISO 4210-2:2023 without any modification.

Contents

Page

Foreword.....	v
Introduction.....	vii
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	2
4 Requirements.....	2
4.1 Toxicity.....	2
4.2 Sharp edges.....	2
4.3 Security and strength of safety-related fasteners.....	2
4.3.1 Security of screws.....	2
4.3.2 Minimum failure torque.....	2
4.3.3 Folding bicycle mechanism.....	2
4.4 Crack detection methods.....	3
4.5 Exposed protrusions.....	3
4.6 Brakes.....	3
4.6.1 Braking systems.....	3
4.6.2 Hand-operated brakes.....	3
4.6.3 Attachment of brake assembly and cable requirements.....	4
4.6.4 Brake-block and brake-pad assemblies — Security test.....	5
4.6.5 Brake adjustment.....	5
4.6.6 Hand-operated braking-system — Strength test.....	5
4.6.7 Back-pedal braking system — Strength test.....	5
4.6.8 Braking performance.....	5
4.6.9 Brakes — Heat-resistance test.....	8
4.7 Steering.....	8
4.7.1 Handlebar — Dimensions.....	8
4.7.2 Handlebar grips and plugs.....	9
4.7.3 Handlebar stem — Insertion-depth mark or positive stop.....	9
4.7.4 Handlebar stem to fork steerer — Clamping requirements.....	10
4.7.5 Steering stability.....	10
4.7.6 Steering assembly — Static strength and security tests.....	11
4.7.7 Handlebar and stem assembly — Fatigue test.....	12
4.8 Frames.....	12
4.8.1 Suspension-frames — Special requirements.....	12
4.8.2 Frame — Impact test (falling mass).....	13
4.8.3 Frame and front fork assembly — Impact test (falling frame).....	13
4.8.4 Frame — Fatigue test with pedalling forces.....	13
4.8.5 Frame — Fatigue test with horizontal forces.....	13
4.8.6 Frame — Fatigue test with a vertical force.....	13
4.8.7 Rear brake mount tests.....	14
4.9 Front fork.....	14
4.9.1 General.....	14
4.9.2 Means of location of the axle and wheel retention.....	14
4.9.3 Tyre clearance test — Suspension fork.....	14
4.9.4 Front fork — Tensile test.....	14
4.9.5 Front fork — Static bending test.....	14
4.9.6 Front fork — Rearward impact test.....	14
4.9.7 Front fork — Bending fatigue test plus rearward impact test.....	15
4.9.8 Forks intended for use with hub- or disc-brakes.....	15
4.9.9 Steerer tube — fatigue test.....	15
4.10 Wheels and tyre assembly.....	16
4.10.1 Wheels and tyre assembly — Rotational accuracy — Concentricity tolerance and lateral tolerance.....	16

4.10.2	Wheel and tyre assembly — Clearance	16
4.10.3	Wheel and tyre assembly — Static strength test	16
4.10.4	Wheels — Wheel retention	16
4.10.5	Wheels — Quick-release devices — Operating features	17
4.10.6	Wheel and tyre assembly — Greenhouse effect test for composite wheels	17
4.10.7	Wheel and tyre assembly — Heat resistance tests for composite rims used in conjunction with rim brake	18
4.10.8	Wheel and tyre assembly — Overpressure test	18
4.10.9	Wheel and tyre assembly — Information for users	19
4.11	Front mudguard	19
4.12	Pedals and pedal/crank drive system	19
4.12.1	Pedal tread	19
4.12.2	Pedal clearance	20
4.12.3	Pedal — Static strength test	21
4.12.4	Pedal — Impact test	21
4.12.5	Pedal — Dynamic durability test	21
4.12.6	Drive system — Static strength test	21
4.12.7	Crank assembly — Fatigue test	22
4.13	Drive-chain and drive belt	22
4.13.1	Drive-chain	22
4.13.2	Drive belt	22
4.14	Chain-wheel and belt-drive protective device	22
4.14.1	Requirements	22
4.14.2	Chain-wheel disc and drive pulley disc diameter	23
4.14.3	Chain and drive belt protective device	24
4.14.4	Combined front gear-change guide	25
4.15	Saddles and seat-posts	25
4.15.1	Limiting dimensions	25
4.15.2	Seat-post — Insertion-depth mark or positive stop	25
4.15.3	Saddle/seat-post — Security test	26
4.15.4	Saddle and saddle rail — Static strength test	26
4.15.5	Saddle and seat-post assembly — Fatigue test	26
4.15.6	Seat-post — Fatigue test	26
4.16	Spoke protector	27
4.17	Luggage carriers	27
4.18	Road test of a fully assembled bicycle	27
4.19	Lighting systems and reflectors	27
4.19.1	General	27
4.19.2	Wiring harness	27
4.19.3	Lighting systems	28
4.19.4	Reflectors	28
4.20	Warning device	28
5	Manufacturer's instructions	28
6	Marking	30
6.1	Requirement	30
6.2	Durability test	31
	Annex A (informative) Steering geometry	32
	Bibliography	33

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](#);

- 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.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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.

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*

ISO 14878, *Cycles — Audible warning devices — Technical specification 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.