INTERNATIONAL STANDARD

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Second edition
2023-01

Cycles — Safety requirements for bicycles —

Part 4: Braking test methods

Cycles — Exigences de sécurité pour les bicyclettes —

Partie 4: Méthodes d'essai de freinage

Reference number
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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 second edition cancels and replaces the first edition (ISO 4210-4:2014), which has been technically revised.

The main changes are as follows:

— improvement of 4.1.2;

— addition of test temperature requirement in 4.6.3 and 4.6.5;

— change in the method of calculating the braking distance in 4.6.3;

— addition of rolling resistance requirement and cooling requirement in 4.6.5.7;

— change in the test method to no cooling air of 4.7;

— addition of Annex B and Annex C.

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 the demand throughout the world. The aim is to ensure that bicycles manufactured in conformity with this document will be as safe as is practically possible. The tests are 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 is limited to safety considerations and has specifically avoided standardization of components.

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

Cycles — Safety requirements for bicycles —

Part 4:
Braking test methods

1 Scope

This document specifies the braking test methods for ISO 4210-2.

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

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/

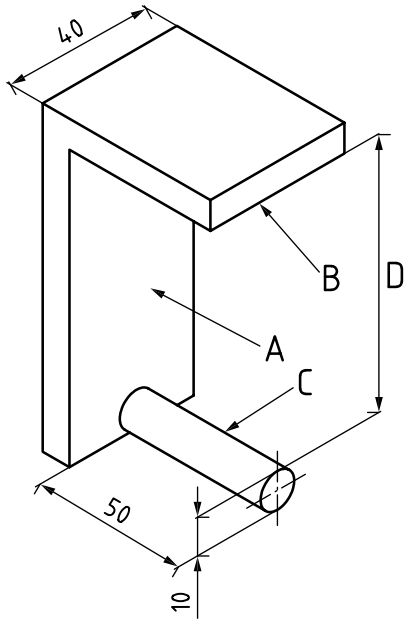
4 Test methods

4.1 Brake lever grip dimensions

4.1.1 Test method for the brake lever similar to type A or type B

Fit the gauge illustrated in Figure 1 over the handlebar grip or the handlebar (when the manufacturer does not fit a grip) and the brake lever as shown in Figure 2 so that face A is in contact with the handlebar or grip and the side of the brake lever. Ensure that face B spans an area of that part of the brake lever which 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. The measurement should be conducted only on a fully assembled bicycle.

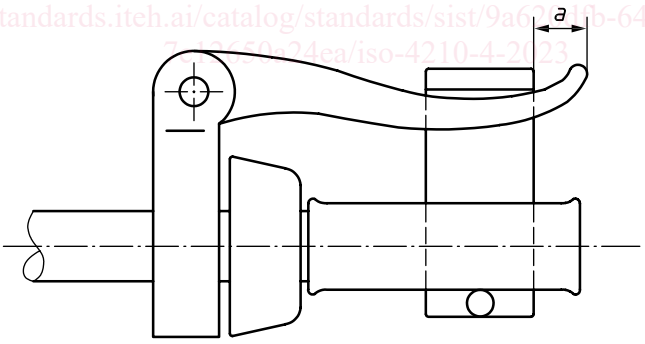
Dimensions in millimetres



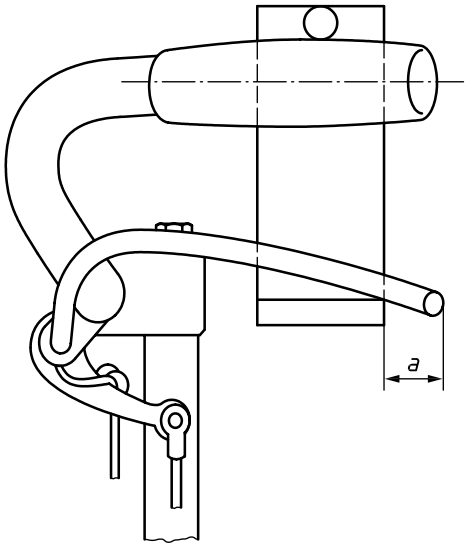
Key

A face A
B face B
C rod
D 75 mm or 90 mm

Figure 1 — Brake lever grip dimension gauge for type A and type B



a) Type A



b) Type B

Key

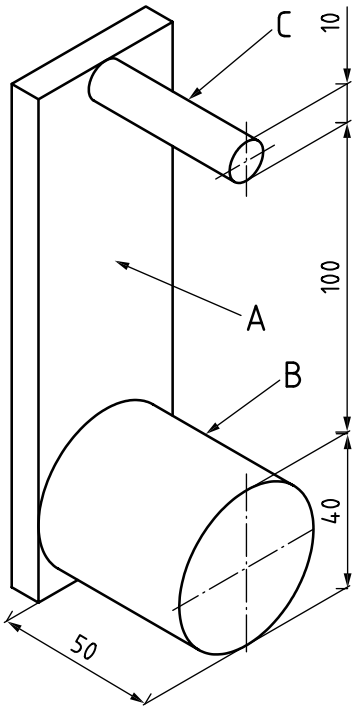
a distance between the last part of the lever intended for contact with the rider's fingers and the end of the lever

Figure 2 — Method of fitting the gauge to the brake lever and handlebar

4.1.2 Test method for the brake lever similar to type C

Fit the gauge illustrated in Figure 3 over the handlebar and brake lever as shown in Figure 4 so that face A is in contact with the handlebar or handlebar grip and the brake lever. Put the face of cylinder B in contact with the part of the grip intended for contact with the rider's hand and check if the requirements are met. In the case of brake lever with position adjustment, check if the requirements are met in a specific range of the adjustable range.

Dimensions in millimetres



Key

A face A
B face of cylinder
C rod

Figure 3 — Brake lever grip-dimension gauge for type C

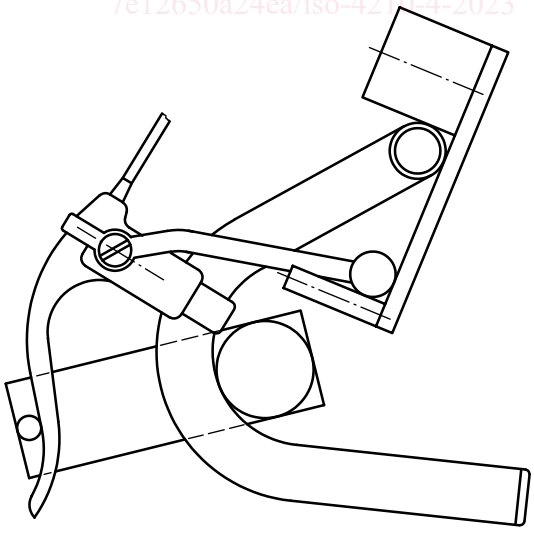


Figure 4 — Method of fitting the gauge to the brake lever and handlebar for type C

4.2 Brake levers — Position of applied force

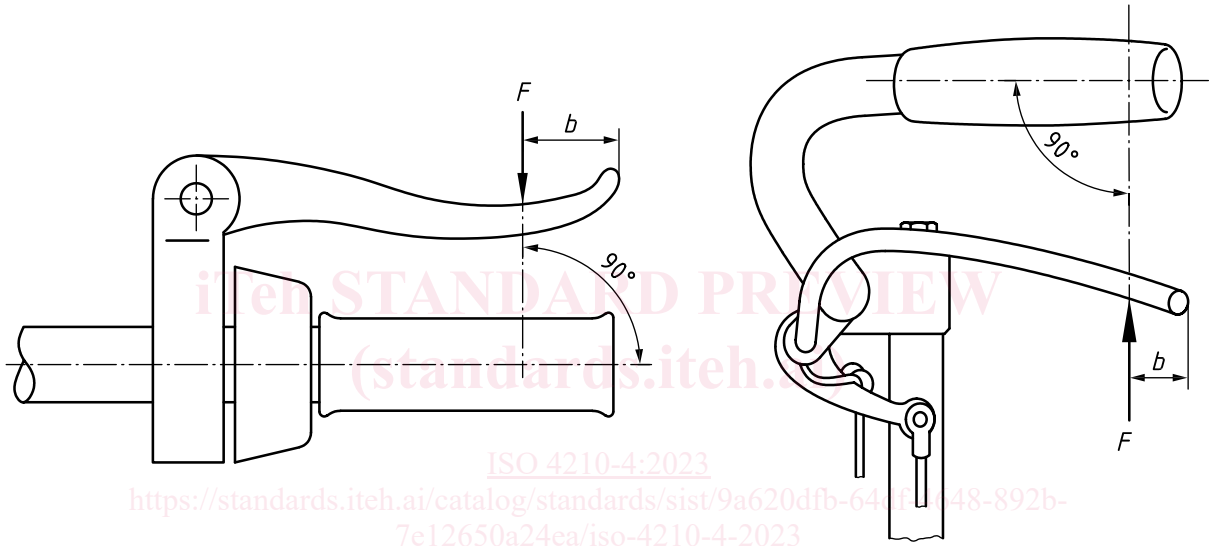
4.2.1 Type A and B brake levers

For the purposes of braking tests in this document, for brake levers similar to type A or type B, the test force shall be applied at a distance *b*, which is equal to either dimension *a* [see ISO 4210-2:2023, Figure 1 a) and b)] as determined in 4.1.1 or 25 mm from the free end of the brake lever, whichever is the greater [see Figure 5 a) and Figure 5 b)].

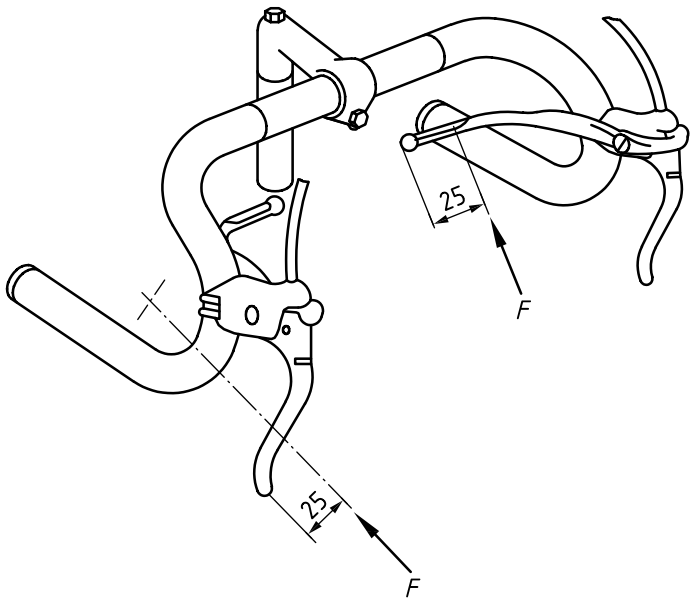
4.2.2 Type C brake levers

For the purposes of braking tests in this document, for brake levers similar to type C, the test force shall be applied at a distance of 25 mm from the free end of the brake lever [see Figure 5 c)].

Dimensions in millimetres



a) Type A **b) Type B**



c) Type C

Key

F applied force

b ≥25 mm

Figure 5 — Position of applied force on the brake lever

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

Conduct the test on a fully assembled bicycle with the brakes adjusted to a correct position with a rider or equivalent mass on the saddle. The combined mass of the bicycle and rider (or equivalent mass) shall be 100 kg.

Actuate each brake lever with a force of 180 N applied at the point specified in Figure 5 or a force sufficient to bring the brake lever into contact with the handlebar grip, whichever is lesser. Maintain this force while subjecting the bicycle to five forward and five rearward movements, each of which is not less than 75 mm distance.

Then conduct the test described in 4.4 or 4.5 as appropriate, depending on the style of brake, and then the test described in 4.6.

4.4 Hand-operated braking-system — Strength test

Conduct the test on a fully assembled bicycle. After it has been ensured that the braking system is adjusted according to the recommendations in the manufacturer's instructions, apply a force to the brake lever at the point specified in Figure 5. This force shall be 450 N, or such lesser force as is required to bring

a) a brake lever into contact with the handlebar grip or the handlebar where the manufacturer does not fit a grip,

b) a brake extension lever level with the surface of the handlebar or in contact with the handlebar, and

c) a secondary brake lever to the end of its travel.