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**Cycles — Safety requirements for  
bicycles —**

**Part 8:  
Pedal and drive system test methods**

*Cycles — Exigences de sécurité pour les bicyclettes —*

*Partie 8: Méthodes d'essai des pédales et du système de transmission*

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# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Test methods</b> .....	<b>1</b>
4.1 Pedal — Static strength test.....	1
4.2 Pedal — Impact test.....	2
4.3 Pedal — Dynamic durability test.....	3
4.4 Drive system — Static strength test.....	4
4.4.1 Test method for drive system with chain.....	4
4.4.2 Test method for drive system with belt.....	5
4.5 Drive belt — Tensile strength test.....	5
4.6 Crank assembly — Fatigue test.....	5
4.6.1 General.....	5
4.6.2 Test method with the cranks at 45° to the horizontal.....	6
4.6.3 Test method with the cranks at 30° to the horizontal for mountain bicycles.....	7
<b>Bibliography</b> .....	<b>9</b>

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[ISO 4210-8:2023](https://standards.iteh.ai/catalog/standards/sist/69eaff19-c81f-4320-842d-bed7895986ae/iso-4210-8-2023)

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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](http://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](http://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](http://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 4210-8:2014), which has been technically revised.

The main changes are as follows:

- improvement of [4.1](#);
- improvement of [4.2](#);
- improvement of [4.5](#);
- improvement of [4.6.2](#).

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](http://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.

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

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# Cycles — Safety requirements for bicycles —

## Part 8: Pedal and drive system test methods

### 1 Scope

This document specifies pedal and drive system 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 4210-3:2023, *Cycles — Safety requirements for bicycles — Part 3: Common test methods*

IEC 60529:2001, *Degrees of protection provided by enclosures (IP Code)*

### 3 Terms and definitions

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

ISO and IEC maintain terminology 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 Pedal — Static strength test

Screw the pedal spindle securely into a suitable rigid fixture with its axis horizontal, as shown in [Figure 1](#). Place a steel U-shaped loading block, dimensioned as shown in [Figure 1](#), so that its edge is located at 40 mm from the end of the pedal. The width of the U-shaped block shall be such that its edges are aligned with the edges of the pedal. The loading block shall be free to rotate as shown in [Figure 1](#) to ensure a constant contact with the pedal.

For pedals with binding systems, the force may instead be applied to a cleat fitted onto the pedal.

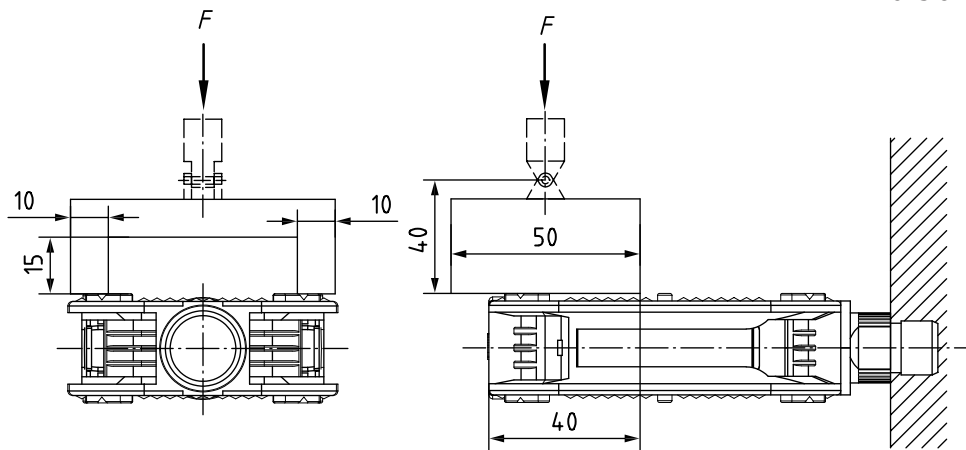
Apply a vertically downward force of 1 500 N for 5 min to the centre of the U-shaped loading block, as shown in [Figure 1](#). Release the force and examine the pedal assembly and the spindle.

For folding pedals, check for any changes to the setting of the folding mechanism.

If the folding pedal has two different riding sides, the test shall be applied on each side.

For pedals with a single riding side, the test shall be applied only on the riding side.

Dimensions in millimetres



**Key**

$F$  vertically downward force, 1 500 N

**Figure 1 — Pedal/pedal-spindle assembly — Static strength test**

**4.2 Pedal — Impact test**

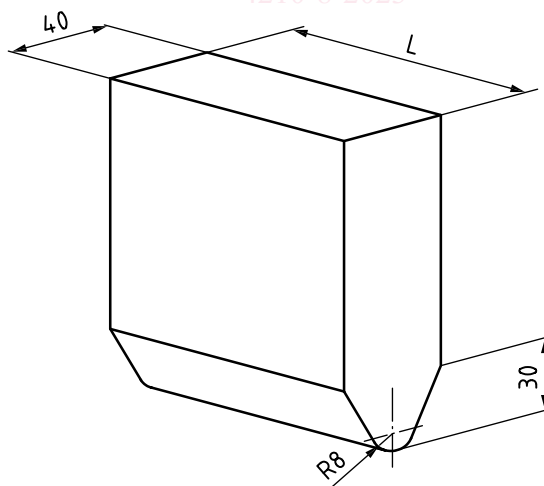
Screw the pedal-spindle securely into a suitable rigid fixture with its axis horizontal as shown in [Figure 3](#) and release a striker of the design shown in [Figure 2](#) and mass of 15 kg from a height of 400 mm to strike the pedal at the centre of the pedal. The length of the striker shall be equal to or wider than the length of the tread surface. For pedals with binding systems, the cleat shall be attached and the cleat length shall be used instead of the tread surface length.

NOTE See ISO 4210-3:2023, Annex B.

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Dimensions in millimetres



**Key**

$L$  length of the striker

**Figure 2 — Striker dimensions**



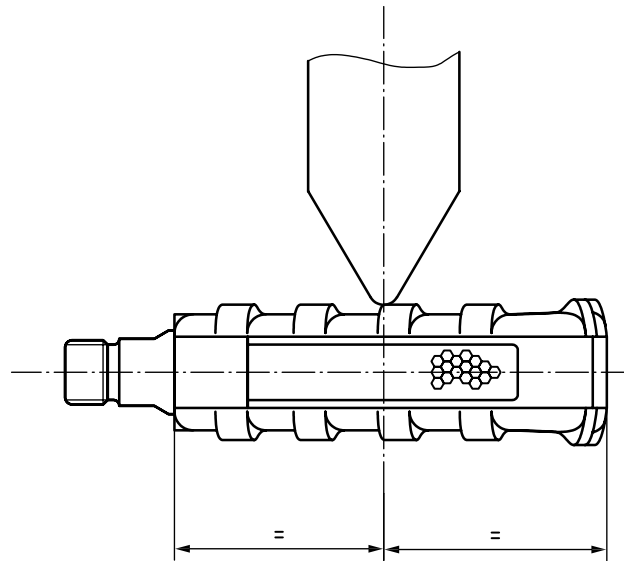


Figure 3 — Position of impact

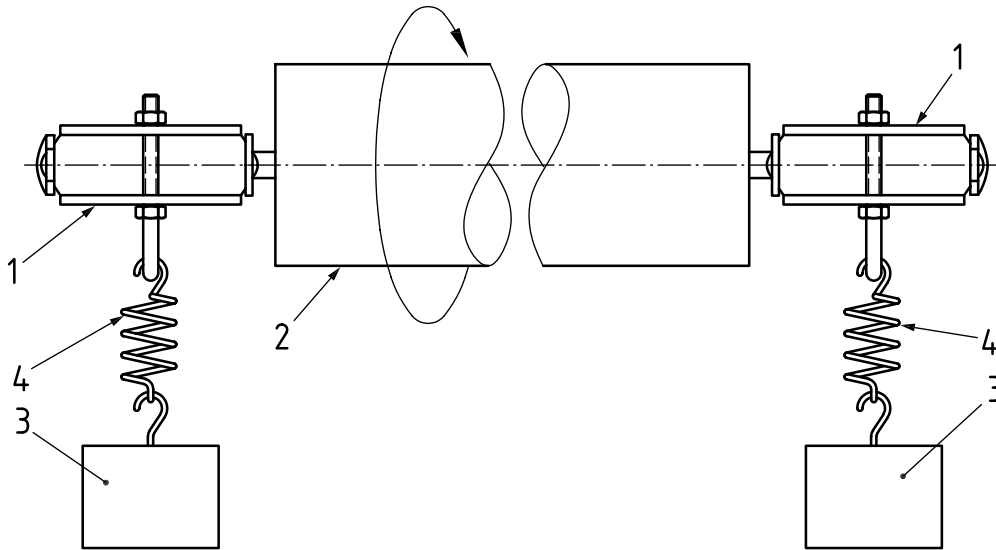
#### 4.3 Pedal — Dynamic durability test

Screw each pedal securely into a threaded hole in a rotatable test shaft as shown in [Figure 4](#) and suspend a weight with a mass,  $m$ , at the centre of the pedal width by means of a tension spring to each pedal, the object of the springs being to minimize oscillations of the load. The masses are given in [Table 1](#).

Drive the shaft at a speed not exceeding  $100 \text{ min}^{-1}$  for a total of 100 000 revolutions. If the pedals are provided with two tread surfaces, they shall be turned through  $180^\circ$  after 50 000 revolutions.

Table 1 — Masses on pedal

Bicycle type	City and trekking bicycle	Young adult bicycle	Mountain bicycle	Racing bicycle
Mass, $m$ kg	80	80	90	90



**Key**

- 1 pedal
- 2 test shaft
- 3 mass
- 4 tension spring

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 Figure 4 — Pedal/pedal-spindle — Dynamic durability test  
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**4.4 Drive system — Static strength test**

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**4.4.1 Test method for drive system with chain** sist/69eaff19-c81f-4320-842d-bed7895986ae/iso-4210-8-2023

**4.4.1.1 General**

Conduct the drive system static load test on an assembly comprising the frame, pedals, transmission system, rear wheel assembly, and, if appropriate, the gear-change mechanism. Support the frame with the central plane vertical and with the rear wheel held at the rim to prevent the wheel from rotating.

**4.4.1.2 Single-speed system**

With the non-drive side crank in the forward position, apply a force,  $F_1$ , increasing gradually to 1 500 N vertically downwards to the centre of the non-drive side pedal. Maintain this force for 1 min.

Should the system yield or the drive-sprockets tighten, such that the crank rotates while under load to a position more than 30° below the horizontal, remove the test force, return the crank to the horizontal position or some appropriate position above the horizontal to take account of yield or movement, and repeat the test.

On completion of the test on the non-drive side crank, repeat the test with the drive side crank in the forward position and with the force applied to the drive side pedal.

**4.4.1.3 Multi-speed system**

- a) Conduct the tests described in [4.4.1.2](#) with the transmission correctly adjusted in its highest gear.