

**BS EN ISO 4210-9:2014**



## BSI Standards Publication

# **Cycles — Safety requirements for bicycles**

Part 9: Saddles and seat-post test methods  
(ISO 4210-9:2014)

**National foreword**

This British Standard is the UK implementation of EN ISO 4210-9:2014. Together with BS EN ISO 4210-1:2014, BS EN ISO 4210-2:2014, BS EN ISO 4210-3:2014, BS EN ISO 4210-4:2014, BS EN ISO 4210-5:2014, BS EN ISO 4210-6:2014, BS EN ISO 4210-7:2014, BS EN ISO 4210-8:2014 it supersedes BS EN 14764:2005, BS EN 14766:2005 and BS EN 14781:2005, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GME/25, Cycles.

A list of organizations represented on this committee can be obtained on request to its secretary.

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## Foreword

This document (EN ISO 4210-9:2014) 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of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by July 2015.

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The text of ISO 4210-9:2014 has been approved by CEN as EN ISO 4210-9:2014 without any modification.

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## Foreword

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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)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 149, *Cycles*, Subcommittee SC 1, *Cycles and major sub-assemblies*.

This first edition of ISO 4210-9, together with ISO 4210-1, ISO 4210-2, ISO 4210-3, ISO 4210-4, ISO 4210-5, ISO 4210-6, ISO 4210-7, and ISO 4210-8, cancels and replaces ISO 4210:1996, which has been technically revised.

ISO 4210 consists of the following parts, under the general title *Cycles — Safety requirements for bicycles*:

- *Part 1: Terms and definitions*
- *Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles*
- *Part 3: Common test methods*
- *Part 4: Braking test methods*
- *Part 5: Steering test methods*
- *Part 6: Frame and fork test methods*
- *Part 7: Wheels and rims test methods*
- *Part 8: Pedals and drive system test methods*
- *Part 9: Saddles and seat-post test methods*

## Introduction

This International Standard has been developed in response to demand throughout the world, and the aim has been to ensure that bicycles manufactured in compliance with this International Standard 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 is to be used on public roads, national regulations apply.



# Cycles — Safety requirements for bicycles —

## Part 9: Saddles and seat-post test methods

### 1 Scope

This part of ISO 4210 specifies saddle and seat-post test methods for ISO 4210-2.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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: Terms and definitions*

ISO 4210-2:2014, *Cycles — Safety requirements for bicycles — Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles*

ISO 4210-3:2014, *Cycles — Safety requirements for bicycles — Part 3: Common test methods*

### 3 Terms and definitions

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

### 4 Test methods

#### 4.1 General

If a suspension seat-post is involved, the test may be conducted with the suspension system either free to operate or locked. If it is locked, the pillar shall be at its maximum length.

#### 4.2 Saddle/seat-post — Security test

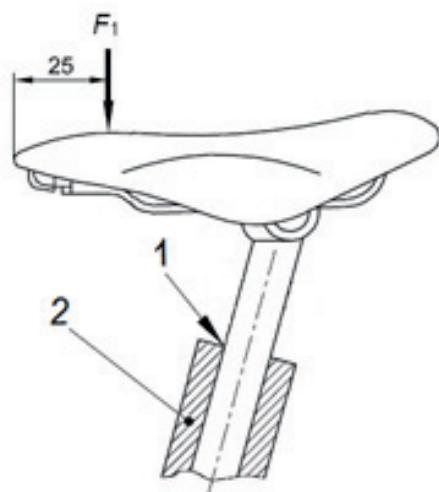
With the seat-post correctly assembled to the bicycle frame at minimum insertion depth of the seat-post (as specified in ISO 4210-2:2014, 4.16.2), and the clamps tightened to the torque recommended by the bicycle manufacturer, apply a force of  $F_1$  vertically downwards at a point 25 mm from either the front or rear of the saddle, whichever produces the greater torque on the saddle clamp. The saddle shall be positioned in the seat-post clamp assembly as defined by the saddle manufacturer's rail markings or instructions. Maintain this force for 1 min. Remove this force and apply a lateral force of  $F_2$  horizontally at a point 25 mm from either the front or rear of the saddle and maintain this force for 1 min, whichever produces the greater torque on the clamp (see [Figure 1](#)). The forces are given in [Table 1](#). The fixture shall be such that it does not damage the surface of the saddle.

**Table 1 — Forces on saddle**

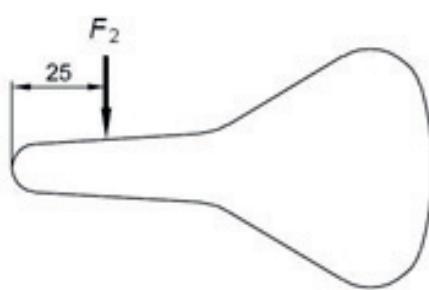
Forces in newtons

Bicycle type	City and trekking bicycles	Young adult bicycles	Mountain bicycles	Racing bicycles
Vertical force, $F_1$	650	650	650	650
Horizontal force, $F_2$	250	250	250	250

Dimensions in millimetres



a) Vertical force



b) Horizontal force

#### Key

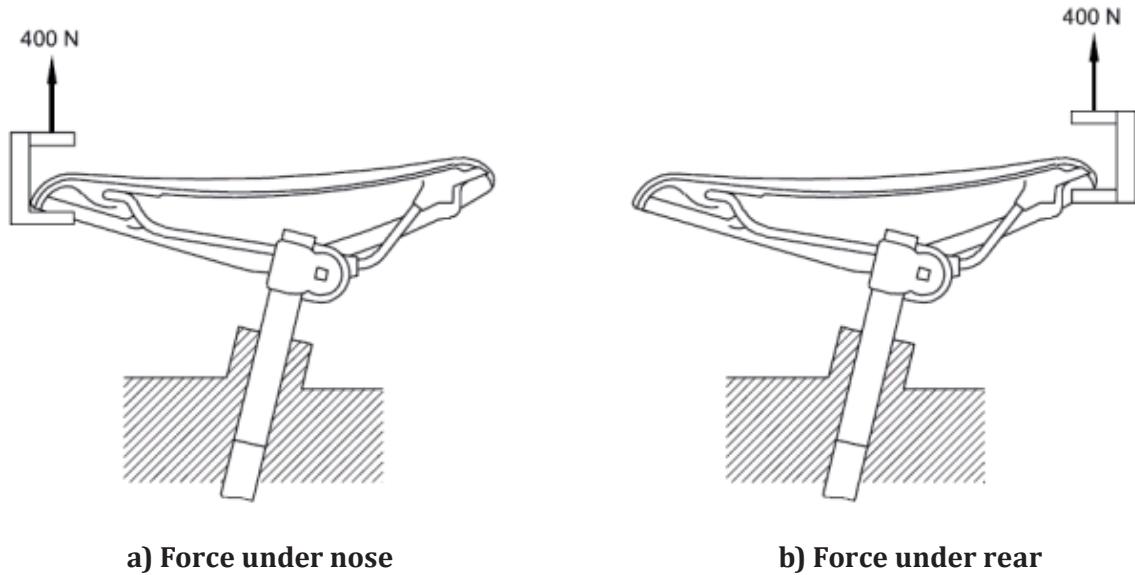
- 1 minimum insertion-depth mark
- 2 bicycle frame

**Figure 1 — Saddle/seat-post — Security test**

### 4.3 Saddle — Static strength test

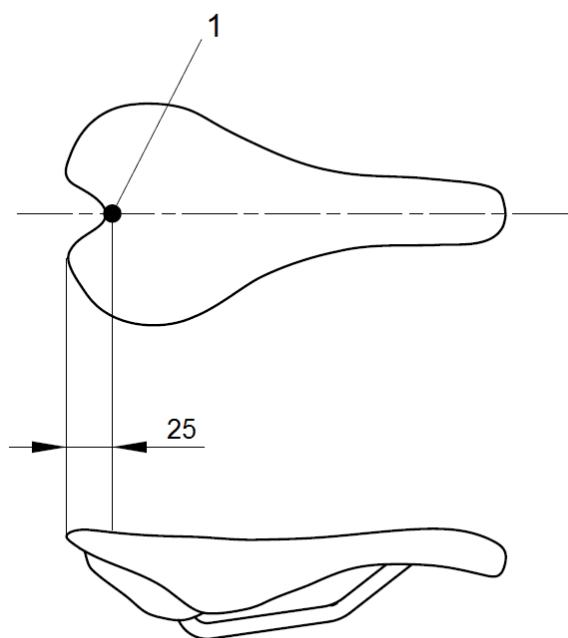
Position the saddle in its maximum rearward direction as defined by the saddle manufacturer's rail markings or instructions, into a suitable fixture representative of a seat-post clamp assembly. Tighten the clamps to the torque recommended by the bicycle manufacturer, and apply forces of 400 N in turn under the rear and nose of the saddle cover, as shown in [Figure 2](#), ensuring that the force is not applied to any part of the chassis of the saddle. The load application point is on the longitudinal plane of the saddle at 25 mm from the back (front) of the saddle. If the saddle design is such that it cannot accept a centreline

load application, the load shall be symmetrically applied at two points of the saddle. Loading on the rear of the saddle shall be symmetrical about its longitudinal axis, as shown in [Figure 3](#).



**Figure 2 — Saddle — Static strength test**

Dimensions in millimetres



**Key**

1 loading point

**Figure 3 — Saddle — Load application point of static strength test**

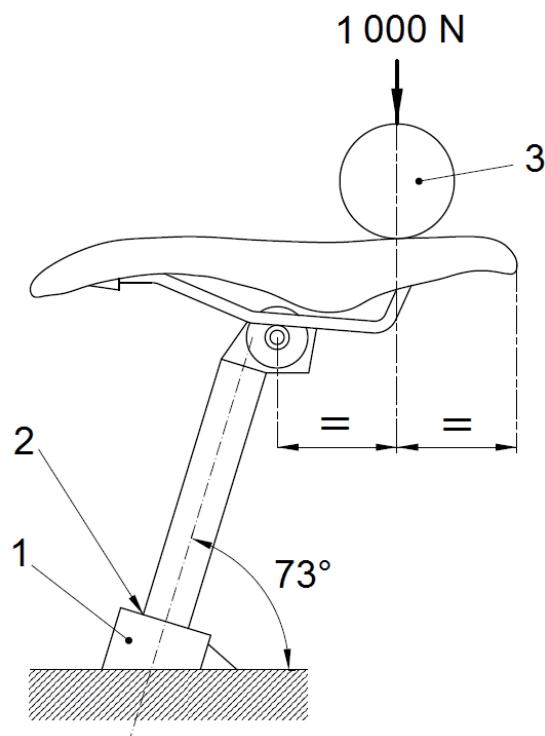
## 4.4 Saddle and seat-post clamp — Fatigue test

### 4.4.1 General

Seat-posts can influence test failures of saddles. For this reason, a saddle shall be tested in combination with a seat-post as recommended by the saddle manufacturer.

### 4.4.2 Test method

Insert the seat-post to its minimum insertion depth (as specified in ISO 4210-2:2014, 4.16.2) in a rigid mount representative of that on the bicycle and with its axis at  $73^\circ$  to the horizontal. The saddle shall be positioned in the seat-post clamp assembly in a maximum rearward direction as defined by the saddle manufacturer's rail markings or instructions. Adjust the saddle to have its upper surface in a horizontal plane and tighten the clamp to the torque recommended by the bicycle manufacturer. Apply a repeated, vertically-downward force of 1 000 N for 200 000 cycles, in the position shown in [Figure 4](#), by means of a pad 300 mm long  $\times$  80 mm diameter to prevent localized damage of the saddle cover. The maximum test frequency shall be maintained as specified in ISO 4210-3:2014, 4.5.



#### Key

- 1 rigid mount
- 2 minimum insertion-depth mark
- 3 pad (length = 300 mm, diameter = 80 mm)

**Figure 4 — Saddle and seat-post clamp fatigue test**

## 4.5 Seat-post — Fatigue test and static strength test

### 4.5.1 General

In the following test, if a suspension seat-post is involved, the test shall be conducted with the suspension system adjusted to give maximum resistance.

### 4.5.2 Test method for stage 1 (fatigue test)

A seat-post shall be inserted to the minimum insertion depth (as specified in ISO 4210-2:2014, 4.16.2) in a suitable fixture with a representative seat collar and clamped to the manufacturer's recommended torque. The seat-post shall be fixed at an angle of  $73^\circ$  from horizontal, as shown in [Figure 5](#).

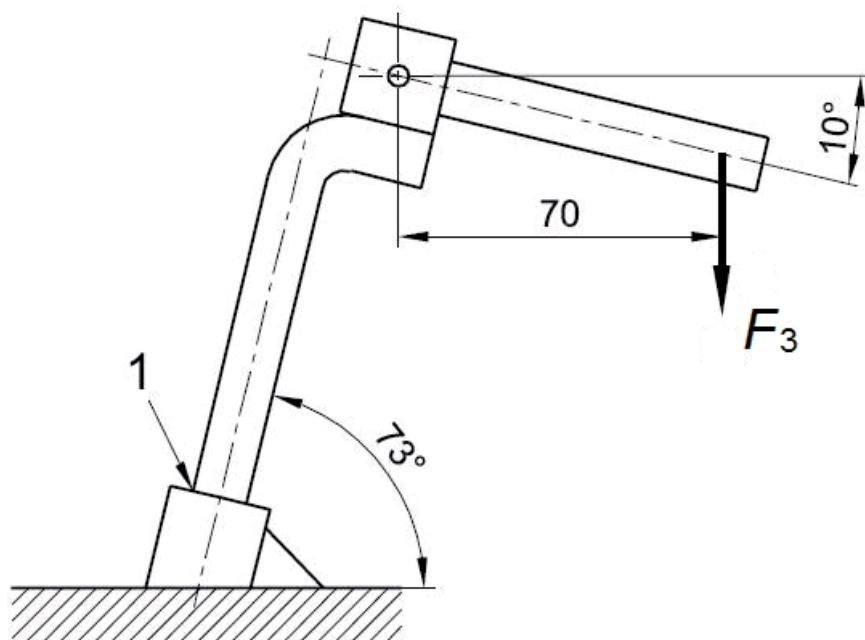
Secure an extension-bar to the saddle attachment point by the appropriate attachment fitting such that the bar extends rearwards and downwards at an angle of  $10^\circ$  below the horizontal to permit the application of a vertical test force at a distance of 70 mm from the centre of the saddle clamp where the centreline of the clamp intersects the axis of the bar, as shown in [Figure 5](#).

Apply a repeated, vertically downward, dynamic force of  $F_3$  to the point described above and shown in [Figure 5](#) for 100 000 cycles. The forces are given in [Table 2](#). The maximum test frequency shall be maintained as specified in ISO 4210-3:2014, 4.5.

**Table 2 — Forces on seat-post**

Bicycle type	City and trekking bicycles	Young adult bicycles	Mountain bicycles	Racing bicycles	Forces in newtons
Force, $F_3$	1 000	1 000	1 200	1 200	

Dimensions in millimetres



#### Key

1 minimum insertion-depth mark

**Figure 5 — Seat-post — Fatigue test**

#### 4.5.3 Test method for stage 2 (static strength test)

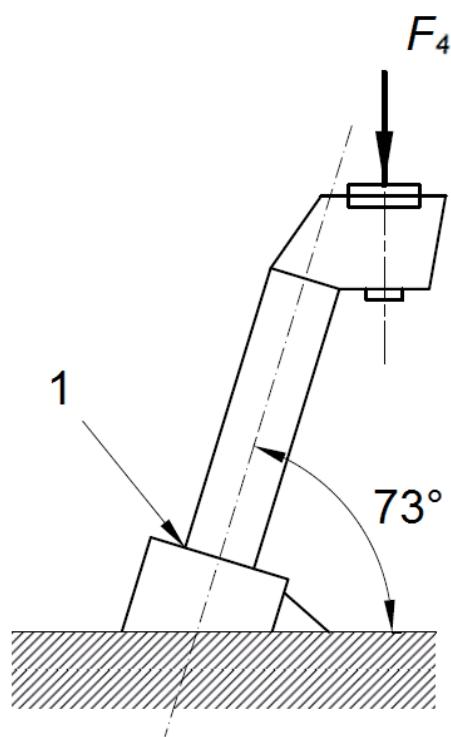
A seat-post shall be inserted to the minimum insertion-depth (as specified in ISO 4210-2:2014, 4.16.2) in a suitable fixture with a representative seat collar and clamped to the manufacturer's recommended torque. The seat-post shall be fixed at an angle of  $73^\circ$  from the horizontal, as shown in [Figure 6](#).

A force of  $F_4$  shall be exerted vertically on the saddle clamp for a duration of 1 min. The displacement at the loading point shall be constantly monitored during testing. The forces are given in [Table 3](#).

**Table 3 — Forces on seat-post**

Forces in newtons

Bicycle type	City and trekking bicycles	Young adult bicycles	Mountain bicycles	Racing bicycles
Force, $F_4$	2 000	1 500	2 000	2 000



**Key**

1 minimum insertion-depth mark

**Figure 6 — Seat-post — Static strength test**







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