
**Cycles — Lighting and retro-reflective
devices —**

**Part 3:
Installation and use of lighting and
retro-reflective devices**

Cycles — Éclairage et dispositifs rétroréfléchissants —

*Partie 3: Installation et usage des éclairages et des dispositifs
rétroréfléchissants*

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Reference number
ISO 6742-3:2023(E)

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Published in Switzerland

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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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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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*.

This second edition cancels and replaces the first edition (ISO 6742-3:2015), which has been technically revised.

The main changes are as follows:

- [4.1](#) was changed from "Tolerances" to "Accuracy of measurement devices";
- improvement of [Clause 7](#).

A list of all parts in the ISO 6742 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

The test method with power spectral density (PSD) (see [6.1.2.2](#)) reflects today's state of the art and should be preferred to the sine sweep vibration test (see [6.1.2.3](#)).

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Cycles — Lighting and retro-reflective devices —

Part 3: Installation and use of lighting and retro-reflective devices

1 Scope

This document is applicable to lighting and retro-reflective devices used on cycles intended to be used on public roads and, especially, bicycles complying with ISO 4210^[1] and ISO 8098^[2].

This document specifies the safety requirements and test methods of lighting and retro-reflective devices for fastening devices, control, (guidelines for maintenance), instructions for mounting and use.

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

IEC 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6742-1 and the following 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/>

3.1

control

any part of a device directly or indirectly actuated by the cyclist which changes the state or functioning of the lighting devices

4 General

4.1 Accuracy of the measurement devices

Unless stated otherwise, the overall accuracy of the measurement devices in all parts of ISO 6742 shall be within tolerances given in [Table 1](#).

Table 1 — Accuracy of the measurement devices

Physical quantity	Accuracy
Angles	$\pm 0,1^\circ$
Current	$\pm 1 \%$
Forces	$\pm 1 \%$
Speed	$\pm 3 \%$
Time	$\pm 1 \%$
Temperature	$\pm 5 \text{ }^\circ\text{C}$
Voltage	$\pm 1 \%$

4.2 Conditions

Unless otherwise specified, all tests shall be performed at an ambient temperature of $(23 \pm 5) \text{ }^\circ\text{C}$ and at a relative humidity of $(50 \pm 20) \%$.

4.3 Order of tests

Each test shall be conducted on a new test sample, but if only one sample is available, it is allowed to carry out all of the tests on the same sample in the order that they appear in this document.

All components shall be in the fully-finished condition.

5 Requirements

5.1 Lighting devices

5.1.1 Installation requirements

After tested by the method described in [6.1.1](#):

- the lighting device shall be able to be mounted according to manufacturer's instructions;
- the fastening device shall not mask/obscure the light beam.

NOTE All structural components are assembled in accordance with the national regulation in the country, where the cycle is marketed and the manufacturer's instruction that is containing information on.

5.1.2 Fixation requirements

After tested by the method described in [6.1.2](#):

- there shall be no fracture or visible cracks in any part of the lighting device and fixation device;
- the lighting device shall be functional;
- there shall be no bolt failure or loosening;
- there shall be no movement between the lighting device and the fixture.

5.1.3 Control requirements

In case of combination of functions in one product, each function shall be identified on the control device. Control device shall be positioned in order to be easily manipulated by the cyclist. The functions shall be described in the instructions of use.

It is recommended to use the standardised symbols from ISO 7000^[3].

5.2 Retro-reflective devices

When tested by [6.2](#), the optical axis of the reflector (excluding pedal reflectors or spoke mounted reflectors) shall not deflect more than 15° during test, and shall not exhibit a permanent displacement greater than 5° after the test.

6 Test method

6.1 Lighting devices

6.1.1 Test method for installation

All structural components shall be assembled in accordance with the manufacturer's instruction as described in [Clause 7](#).

In case of adjustments are possible, they shall be made in the way to obtain the most onerous situation that can occur in practice (i.e. position of the device which generates the greatest torque on the attachment point).

6.1.2 Test method for fixation

6.1.2.1 General

The lighting system shall be assembled on a fixture that is representative of the part of the cycle to which the lighting system is designed to fit, using the fastening devices supplied by the manufacturer.

The test method shall be performed using one of the methods described in [6.1.2.2](#) or shall be performed using method described in [6.1.2.3](#).

6.1.2.2 Method A

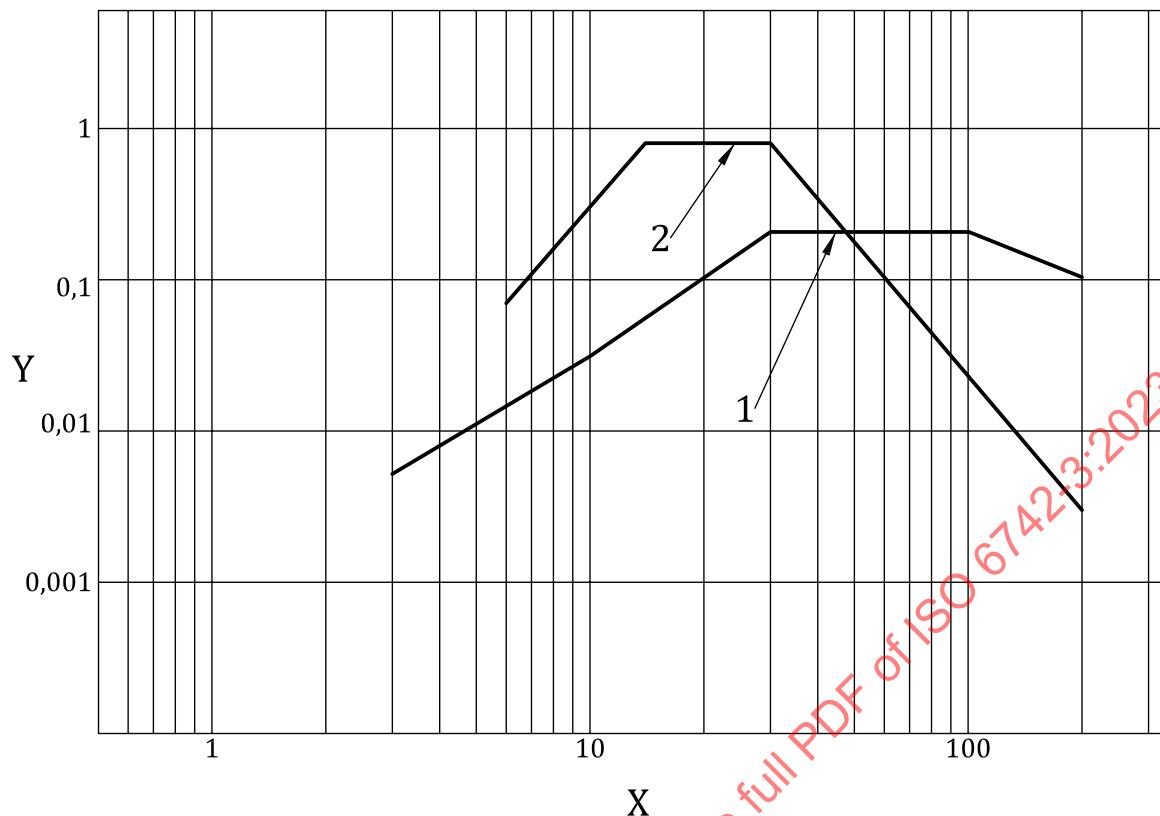
6.1.2.2.1 Equipment

The vibration of the test machine shall be performed randomly according to a normal distribution of the instant values. The vibrations shall be defined by their power spectral density (PSD) and their frequency from 3 Hz to 200 Hz or from 6 Hz to 200 Hz.

6.1.2.2.2 Test method

After mounting the device on the fixture in which it is designed to be fitted to a cycle, as described in [6.1.2.1](#). Fasten the assembly to a vibration test machine in a position similar to its normal operating position. Vibrate the lighting device by the power spectral density (PSD) for 10 h on the vertical direction "Z" under the conditions PSD1 or PSD2 of [Figure 1](#) and [Table 2](#).

The excitation of vibrations is performed by using a measured acceleration. The measured acceleration shall be placed near the fixation point of the lighting device.

**Key**

X	frequency, in Hz
Y	PSD, in g^2/Hz
1	PSD1
2	PSD2

Figure 1 — Power spectral density, PSD**Table 2 — Test conditions for power spectral density, PSD**

PSD1		PSD2	
Frequency Hz	PSD g^2/Hz	Frequency Hz	PSD g^2/Hz
3	0,005 2	6	0,07
10	0,031 2	14	0,8
30	0,208	30	0,8
100	0,208	200	0,003
200	0,104	—	—

6.1.2.3 Method B**6.1.2.3.1 Test Method**

The lighting equipment shall be mounted to the vibration test machine in a position similar to its normal operating position by the designed method to be fitted to a cycle, then it is vibrated under the condition of [Table 3](#) by the method specified in IEC 60068-2-6.

For hub dynamo, the test shall be carried out so that the hub axis part is mounted on the vibration test machine in unit or of the condition integrated with the wheel.

Table 3 — Conditions for the sine sweep vibration test

Condition	Description
Duration of test, min	60
Acceleration, m/s^2	30
Frequency of vibration, Hz	11,7 to 20
Total amplitude, mm	11 to 4
Vibration direction	Upward and downward

6.2 Retro-reflective devices

The retro-reflective device shall be assembled on a rigid fixture that is representative of the position of the part of the cycle to which the retro-reflective device is designed to fit. Apply a force of 90 N to the retro-reflective device in at least three directions selected as most likely to affect its alignment. Maintain this load for 1 min.

7 Manufacturer's instructions

7.1 General

Lighting devices and retro-reflective devices shall be provided with a set of instructions. These instructions can be provided in all type of format (paper, CD, website...) according to national regulations and shall be written in the language of the country where the lighting device is to be marketed or by visual tools, such as pictograms and illustrations shall feature prominently in the product safety information. When an electronic format is provided, a paper version shall be available upon request. The customer shall be made aware of this information either by the manufacturer or the retailer.

The information in [7.2](#) shall be included in the instructions for use of the lighting devices and the information in [7.3](#) shall be included in the instructions for use of the retro-reflective devices.

NOTE Any other relevant information can be added at the discretion of the manufacturer.

7.2 Lighting devices

If a lighting device is sold as an accessory, it shall be delivered with a set of instructions containing information on the topics a) to m). If a lighting device is mounted on a cycle, the information on the subject e) to m) shall be included in the instructions for the cycle (unless such information is provided separately).

- a) the dimension of the part of the cycle to which the lighting system is designed to fit;
- b) proper fit of the lighting and signalling devices on the cycle, with torque values for threaded fasteners, with a warning about the hazard of incorrect mounting;
- c) recommended method for adjusting any adjustable part in order to illuminate the road correctly, with warning about potential blinding of oncoming road users due to incorrect adjustments;
- d) the correct method of assembling any parts supplied unassembled;
- e) an advisory note to draw attention to the cyclist concerning possible national legal requirements;
- f) description of the functions (e.g. stop lamp, daytime running lamp, low beam/high beam ...) for lighting and signalling devices. In case of the stop lamp, the user shall be informed how the stop lamp will be activated;