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

**Part 4:  
Lighting systems powered by the  
cycle's movement**

**iTeh STANDARD PREVIEW**  
*Cycles — Dispositifs d'éclairage et dispositifs rétroréfléchissants —  
Partie 4: Systèmes d'éclairage alimentés par dynamo*  
(standards.iteh.ai)

ISO 6742-4:2015

<https://standards.iteh.ai/catalog/standards/sist/7b9bd308-9207-46df-9203-7a859829bc82/iso-6742-4-2015>



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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 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*, SC 1, *Cycles and major sub-assemblies*.

ISO 6742 consists of the following parts, under the general title *Cycles — Lighting and retro-reflective devices*:

- *Part 1: Lighting and light signalling devices*
- *Part 2: Retro reflective devices*
- *Part 3: Installation and use of lighting and retro-reflective devices*
- *Part 4: Lighting systems powered by the cycle's movement*
- *Part 5: Lighting systems not powered by the cycle's movement*

# Cycles — Lighting and retro-reflective devices —

## Part 4:

## Lighting systems powered by the cycle's movement

### 1 Scope

This part of ISO 6742 is applicable to lighting systems used on cycles intended to be used on public roads and, especially, bicycles complying with ISO 4210 and ISO 8098.

This part of ISO 6742 specifies requirements and test methods for the performance of lighting systems powered by the cycle's movement. It applies to light devices complying with ISO 6742-1. Lighting systems include lighting devices and power supplied by cycle's movement such as generator.

### 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 6742-1:2015, *Cycles — Lighting and retro-reflective devices — Part 1: Lighting and light signalling devices*

ISO 6742-3:2015, *Cycles — Lighting and retro-reflective devices — Part 3: Installation and use of lighting and retro-reflective devices*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

IEC 60529, *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 6742-1 and the following apply.

#### 3.1

##### **frictional drive generator**

generator for which the rotor or stator is linked to a pulley which press against the driving wheel over a swivel bearing through force

#### 3.2

##### **positive drive generator**

generators which are not concerned by the definition of *frictional drive generator* (3.1)

#### 3.3

##### **integrated lamp and power source**

system including power source and at least one type of light designed to be used together, closed system

Note 1 to entry: Power generator characteristics are depending of vehicle movement.

Note 2 to entry: Light output performances are depending of the speed of the vehicle, or the time during which bicycle has been stopped.

## 4 Lamps and interchangeable generators

### 4.1 General

The complete system shall be designed as open system which requires compatibility between lamps and generators.

### 4.2 Requirements

#### 4.2.1 Dynamo-operated front lights

Dynamo-operated front lights (lamps emitting light to the front) shall correspond with the requirements of ISO 6742-1:2015, 4.2 (Front position lamp), 4.5 (Low beam) and 4.6 (High beam).

Voltage limiting resources shall only become effective above the test voltage. Here, the value of the DC voltage,  $U$ , corresponds with the root mean square of the AC voltage,  $U_{eff}$ .

Furthermore:

- the nominal voltage of the light source shall be equal to the system voltage or the light source shall be powered via an appropriate electronic ballast;
- the lighting effect shall be deployed at  $3 U_{eff}$  at the latest;
- the lighting evaluation shall be performed at test voltage;
- the power consumption shall be  $\leq 110$  % of the nominal value;
- the power consumption shall be 2,4 W or less at the test voltage;
- electronic ballasts in these units shall have the corresponding electrical rating.

Head lamps with integrated capacitor to power the light while halting shall be built so that the load of the entire equipment on the supply system is not substantially higher than that intended for this equipment according to ISO 6742-1:2015, 4.8. The entire equipment shall fulfil the necessary requirements at test voltage, where, based on a discharged capacitor, a charging time of 120 s using test voltage is permissible and the reduction of the dynamo voltage through the charging of the capacitor shall correspond with the following conditions:

- a) not exceeding 60 % after 15 s;
- b) not exceeding 37 % after 30 s;
- c) not exceeding 15 % after 60 s;
- d) not exceeding 5 % after 90 s;
- e) not exceeding 1,5 % after 120 s.

Any stand light shall emit visible light for at least 240 s.

#### 4.2.2 Dynamo-operated rear lights

Dynamo-operated rear lights (lamps emitting light to the rear) shall correspond with the requirements of ISO 6742-1:2015, 4.3 (Rear lamp), 4.4 (Stop lamp) and 4.8 (Stand light). And the power consumption shall be 0,6 W or less at the test voltage.

Rear lamps with integrated stand lights shall be built so that the load of the entire equipment on the supply system is not substantially higher than that intended for this equipment. The entire equipment shall fulfil the necessary requirements at test voltage, where, based on a discharged capacitor, a charging

time of 120 s using test voltage is permissible and the reduction of the dynamo voltage through the charging of the capacitor shall correspond with the following conditions:

- a) not exceeding 60 % after 15 s;
- b) not exceeding 37 % after 30 s;
- c) not exceeding 15 % after 60 s;
- d) not exceeding 5 % after 90 s;
- e) not exceeding 1,5 % after 120 s.

Any stand light shall emit visible light for at least 240 s.

## 4.2.3 Dynamos

### 4.2.3.1 General characteristics of generators

For measurements according to 4.2.3, voltage and power of dynamos shall meet the values of Table 1.

For generators, for which the outputs characteristics are depending on diameter of the wheel, the minimum values given in Table 1 of the voltage and the efficiency refer to the largest outside diameter of the wheel as provided by the manufacturer. The measurement of the maximum values in Table 1 of the voltage refers to the smallest outside diameter of the wheel as stated by the manufacturer.

**Table 1 — Characteristics of generators**  
(standards.itech.ai)

Type of generator	System	Speed km/h				Efficiency $\eta$ %
		15	≥5	≥10	≥15 ≤30	
Frictional drive	6 V/3 W and 6 V/2,4 W and 6 V/1,5 W with fixed resistor	≥5,7 V ≤7,5 V	≥3 V ≤7,5 V		≥5,7 V ≤7,5 V	≥30
	6 V/1,5 W with electric load	≥1,35 W ≤4,7 W	≥0,2 W ≤4,7 W		≥1,35 W ≤4,7 W	≥30
Positive drive	6 V/3 W and 6 V/2,4 W and 6 V/1,5 W with fixed resistor	≥5,7 V ≤7,5 V	≥3 V ≤7,5 V		≥5,7 V ≤7,5 V	≥30
	6 V/1,5 W with electric load	≥1,35 W ≤4,7 W	≥0,2 W ≤4,7 W		≥1,35 W ≤4,7 W	≥30

### 4.2.3.2 Generator — Frictional dynamo

For dynamos which press against the driving wheel over a swivel bearing through spring force, the spring force, measured perpendicularly to the rotational axis of the dynamo, shall be 10 N inside of the total swivel area to loose contact with tyre. This value shall also be used for the measurement of the efficiency.

Should an AC voltage of 50 V<sub>eff</sub> or a DC voltage of 75 V be exceeded for this unloaded dynamo within the specified speed range, additional measures shall be provided in order to meet this voltage limit.

### 4.2.3.3 Generator — Positive drive

For dynamos without gears and for the largest outside diameter of the wheel permissible for these dynamos and at a speed of 5 km/h, the frequency of the AC voltage shall be at least 6 Hz.

Should an AC voltage of 50 V<sub>eff</sub> or a DC voltage of 75 V be exceeded for this unloaded dynamo within the specified speed range, additional measures shall be provided in order to meet this voltage limit.

### 4.3 Test Methods

#### 4.3.1 Dynamo-operated front lights

Dynamo-operated front lights (lamps emitting light to the front) have to be tested corresponding with the test methods of ISO 6742-1:2015, 4.2 (Front position lamp), 4.5 (Low beam) and 4.6 (High beam). The test voltage shall be the rated voltage of substantially sinusoidal AC (frequency 50 Hz or 60 Hz) or DC.

Measure the voltage at the terminal of the dynamo.

#### 4.3.2 Dynamo-operated rear lights

Dynamo-operated rear lights (lamps emitting light to the rear) have to be tested corresponding with the test methods of ISO 6742-1:2015, 4.3 (Rear lamp), 4.4 (Stop lamp) and 4.8 (Stand light). The test voltage shall be the rated voltage of substantially sinusoidal AC (frequency 50 Hz or 60 Hz) or DC.

Measure the voltage at the terminal of the dynamo.

#### 4.3.3 Dynamos

##### 4.3.3.1 General characteristics of generators

Measure the voltage and power at the terminal of the dynamo.

The efficiency can be measured according to [Annex B](#) and each parameter shall be defined by a manufacture of generators.

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##### 4.3.3.2 Frictional dynamos

6 V/3 W dynamos at a load of 12 Ω, 6 V/2,4 W dynamos at a load of 15 Ω and 6 V/1,5 W LED dynamos at an electronic load according to [Annex A](#) shall then be applied or at a load of 24 Ω.

Before the measurement, the dynamo thus loaded shall be operated at an ambient temperature of (23 ± 5) °C without forced cooling for 20 min at a number of revolutions corresponding to a speed of 30 km/h. After cooling of the dynamo to ambient temperature, the voltage characteristics as well as the efficiency shall be determined. Here, a driving wheel with a treadless surface shall be used.

The measurements shall be carried out with the following procedure:

- determine output voltage and efficiency after 5 min of continuous operation at a speed of 15 km/h;
- determine output voltage after reduction of speed to 5 km/h;
- determine output voltage after raising speed up to, but not exceeding 30 km/h.

##### 4.3.3.3 Positive drive dynamos

6 V/3 W dynamos at a load of 12 Ω, 6 V/2,4 W dynamos at a load of 15 Ω and 6 V/1,5 W LED dynamos at an electronic load according to [Annex A](#) shall then be applied or at a load of 24 Ω.

Before the measurement, the dynamo thus loaded shall be operated at an ambient temperature of (23 ± 5) °C without forced cooling for 20 min at a number of revolutions corresponding with a speed of 30 km/h. After cooling of the dynamo to ambient temperature the voltage characteristics as well as the efficiency shall be determined.



The measurements shall be carried out with the following procedure:

- determine output voltage and efficiency after 5 min of continuous operation at a speed of 15 km/h;
- determine output voltage after reduction of speed to 5 km/h;
- determine output voltage after raising speed up to, but not exceeding 30 km/h.

## 5 Lamps and dedicated generators

### 5.1 General

The complete system shall be designed as closed system which does not have compatibility between lamps and generators.

### 5.2 Requirements

#### 5.2.1 Principle of lighting system

This system concerns front position lamps, rear lamps, stop lamps, direction indicators, low beam lamps and high beam lamps.

- a) Measure the voltage ( $V_{\text{eff}}$ ) at output of the generator for the different speeds with the lighting devices.
- b) Reproduce the output signal ( $V_{\text{eff}}$  at the same frequency as sinusoidal shape) to lighting devices to check the photometrical performances.

It could be necessary to supply several samples in order to test the product.

#### 5.2.2 Speed ranges

Because this system is depending on the cycle's movement, we are defining three speed ranges.

##### 5.2.2.1 Very low speed: below 5 km/h

No requirement.

##### 5.2.2.2 Low speed: from 5 km/h to 15 km/h

The light output level should be in conformity with the position ("to be seen") function according to ISO 6742-1:2015, 4.2 (Front position lamp), 4.3 (Rear lamp) and 4.7 (Direction indicators).

It is allowed that the light is flashing.

##### 5.2.2.3 Normal running speed: above and from 15 km/h

No visible flashing.

Photometrical performances should comply with corresponding category of the light included into the system.

## 5.3 Safety requirements

### 5.3.1 Environmental behaviour

This system should match the same requirements than any other corresponding product as described in ISO 6742-1 and ISO 6742-3.