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Lighting equipment for bicycles

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Bicycle Promotion Institute (JBPI)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS C 9502** : 2014), which has been technically revised.

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Lighting equipment for bicycles

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 6742-1** : 2015, Edition 3, **ISO 6742-3** : 2015, Edition 1, **ISO 6742-4** : 2015, Edition 1 and **ISO 6742-5** : 2015, Edition 1 by incorporating the parts corresponding to this Standard [luminous intensity distribution characteristic of head lamp (low beam and high beam), output characteristics, environmental performances] without any modifications of the technical contents, but also adding some **JIS** specification contents [luminous intensity distribution characteristic (general purpose beam) for head lamp, shock resistance, cyclic temperature change performance, construction and appearance] that are not given in the said corresponding International Standards.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standards. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies the requirements for the lighting equipment mounted on bicycles specified in **JIS D 9111** (hereafter referred to as lighting equipment).

For electric power assisted cycles which use batteries both for driving a power assisting system and for powering a head lamp and rear lamp, this Standard is applicable to the items which can be tested only with a head lamp and a rear lamp.

NOTE The International Standards corresponding to this Standard and the symbol of degree of correspondence are as follows.

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 6742-4 : 2015 *Cycles — Lighting and retro-reflective devices — Part 4 : Lighting systems powered by the cycle's movement*

ISO 6742-5 : 2015 *Cycles — Lighting and retro-reflective devices — Part 5 : Lighting systems not powered by the cycle's movement* (overall evaluation : MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text,

constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 1501 *Rolling bearings — Balls*

JIS C 0920 *Degrees of protection provided by enclosures (IP Code)*

NOTE Corresponding International Standard : IEC 60529 *Degrees of protection provided by enclosures (IP Code)*

JIS C 7510 *Incandescent lamps for bicycle dynamo lamps*

JIS C 8500 *Primary batteries — General*

NOTE Corresponding International Standard : IEC 60086-1 : 2015 *Primary batteries — Part 1 : General*

JIS C 8514 *Safety of primary batteries with aqueous electrolyte*

NOTE Corresponding International Standard : IEC 60086-5 : 2015 *Primary batteries — Part 5 : Safety of batteries with aqueous electrolyte*

JIS C 8515 *Primary batteries — Physical and electrical specifications*

NOTE Corresponding International Standard : IEC 60086-2 : 2015 *Primary batteries — Part 2 : Physical and electrical specifications*

JIS C 8708 *Secondary sealed nickel-metal hydride cells and batteries for portable applications*

JIS C 8711 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Secondary lithium cells and batteries for portable applications*

NOTE Corresponding International Standard : IEC 61960-3 : 2017 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Secondary lithium cells and batteries for portable applications — Part 3 : Prismatic and cylindrical lithium secondary cells and batteries made from them*

JIS C 8713 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Mechanical tests for sealed portable secondary cells and batteries*

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

NOTE Corresponding International Standard : IEC 60068-2-6 *Environmental testing — Part 2-6 : Tests — Test Fc : Vibration (sinusoidal)*

JIS D 9111 *Cycles — Classification, terminology and essential characteristics*

JIS D 9419 *Bicycles — Hubs*

JIS K 5600-5-4 *Testing methods for paints — Part 5 : Mechanical property of film — Section 4 : Scratch hardness (Pencil method)*

JIS Z 2371 *Methods of salt spray testing*

NOTE Corresponding International Standard : ISO 9227 *Corrosion tests in artificial atmospheres — Salt spray tests*

JIS Z 8722 Methods of colour measurement — Reflecting and transmitting objects

JIS Z 8781-2 Colorimetry — Part 2 : CIE standard colorimetric illuminants

IEC 60086-4 : 2019 *Primary batteries — Part 4 : Safety of lithium batteries*

IEC 62133-1 : 2017 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications — Part 1 : Nickel systems*

IEC 62133-2 : 2017 *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications — Part 2 : Lithium systems*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS D 9111**, and the following apply.

3.1

lighting equipment for bicycles

generic term for head lamps and rear lamps to be mounted on a bicycle

3.2

head lamp

lighting equipment emitting a white or an amber light to the front of bicycle so as to indicate its presence on the road at night or during poor visibility, and at the same time to identify obstacles on the road ahead

3.3

rear lamp

lighting equipment emitting a red light to the rear of bicycle so as to indicate its presence on the road at night or during poor visibility

3.4

low beam

luminous intensity distribution characteristic of a head lamp that illuminates the road in front of the bicycle without dazzling other road users from the opposite direction

3.5

high beam

luminous intensity distribution characteristic of a head lamp that illuminates the road

for a long distance ahead of the vehicle

3.6

general purpose beam

luminous intensity distribution characteristic which is intermediate between those of a low beam and a high beam

3.7

front position lamp

lamp emitting a white or an amber light to the front of bicycle so as to indicate its presence on the road

3.8

stop-lamp

lamp used to indicate to other road users that the cycle brakes or significantly decelerates

3.9

direction indicators

lamps used to indicate to other road users that the cyclist intends to change direction to the right or the left

3.10

stand-light

light emitted by a lamp for a time after the cycle has stopped

3.11

filament lamp

lamp in which light is produced by means of an element heated to incandescence by the passage of an electric current

3.12

light emitting diode (LED)

type of semiconductor element which emits light when passing an electric current.

Also called as luminescent diode.

3.13

dynamo lamp

lighting equipment powered by an electric current that the dynamo generates

3.14

dynamo

power generator for lighting the lighting equipment or the like, rotated by rotating

parts (e.g. tyre, rim) of a bicycle, including a hub dynamo

3.15

hub dynamo

type of power generator integrated in a hub of bicycle

3.16

open system

lighting equipment in which lamps and an interchangeable power source are combined

This system is designed so that lamps and an interchangeable power source are combined. The open system works with any power source having the properties specified by the manufacturer.

3.17

closed system

lighting equipment in which lamps and a dedicated power source are combined

This system is designed so that lamps and a dedicated power source are combined.

The closed system works with a power source specified by the manufacturer.

3.18

reference axis

characteristic horizontal axis of the lamp, as determined by the manufacturer or by the direction light is emitted with greatest intensity, to serve as a direction of reference during use in service and during test measurements

3.19

line HH

horizontal plane parallel to the ground passing through the reference axis

3.20

line VV

vertical plane through the reference axis

3.21

rated voltage

designed voltage that can be used stably

For the lighting equipment employing an LED light source, the voltage of supply side determined by the manufacturer.

4 Classification

The lighting equipment is classified according to application, light source, luminous intensity distribution characteristic of head lamp and power source as shown in Table 1.

NOTE Annex JA shows reference information related to front position lamps, stop-lamps, direction indicators and stand-lights used for a bicycle.

Table 1 Classification of lighting equipment

Application	Light source	Luminous intensity distribution characteristic of head lamp	Power source	Rating of power source (for reference)
Head lamp Rear lamp	Filament lamp LED	Low beam High beam General purpose beam	Dynamo (open system) Primary battery (open system) Secondary battery (open system) Dynamo (closed system) Secondary battery (closed system)	Example : 6 V–3 W type of battery × number of pieces

5 Names of components and constructions

Figure 7 to Figure 9 show examples of the names of components and constructions of lighting equipment. Rear lamps, cords, dress guards and brackets may be omitted from the construction of dynamo lamp.

6 Beams colours and distribution of luminous intensity of lighting equipment

6.1 General

If the reference axis is not mentioned by the manufacturer, this direction shall be determined by that in which light is emitted with greatest intensity. Within the field of light distribution, schematically shown as a grid, the luminous intensity in each direction of a part of the field formed by the grid lines meets at least the lowest minimum value being shown on the grid lines surrounding the questioned direction.

6.2 Luminous intensity distribution characteristic of head lamp

The luminous intensity distribution characteristic of head lamp shall conform to the following a) or c), or both a) and b). A head lamp shall emit a continuous light.

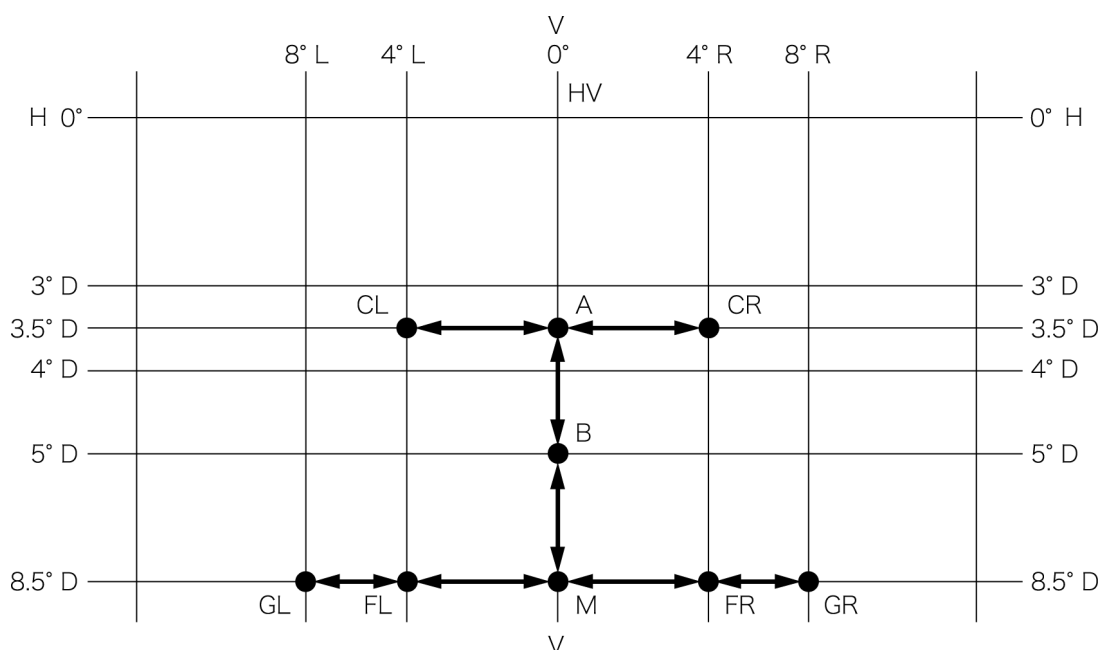
If a head lamp employs an LED light source whose luminous waveforms vary periodically, the frequency shall be at least 35 Hz at a bicycle speed of 15 km/h.

- a) **Low beam** The illuminance of low beam shall conform to Table 2, when tested in accordance with 12.2. Figure 1 shows the measuring positions of luminous intensity distribution.

Table 2 Illuminance of low beam

Unit: lx

Measuring position	Illuminance ^{a)}
On Line HH and above Line HH	$E \leq 2$
A	$E_A^{b)} \geq 10$
From CL to CR	$E \geq E_A/2$
Vertical line between A and B (included)	If $E_A \leq 20$, $E \geq E_{\max}/2$ If $E_A > 20$, $E \geq 10$
From B to M	If $E_A \leq 20$, $E > 1.5$ If $E_A > 20$, $E > 3$
From FL to FR	If $E_A \leq 20$, $E > 1$ If $E_A > 20$, $E > 2$
From GL to FL and from FR to GR	If $E_A \leq 20$, no requirement If $E_A > 20$, $E > 2$
Area bounded by lines 3° D, 4° D, 4° L and 4° R	$E \leq 1.2 E_A$
Area below horizontal line 4° D down and between vertical lines 4° L and 4° R	$E \leq E_A$
Notes ^{a)} E is the illuminance in lux measured on a vertical screen at 10 m ahead from the head lamp. ^{b)} E_A is the illuminance at Point A.	



A : point 3.5° below Line HH on Line VV

CL/CR : point on horizontal line 3.5° below Line HH at 4° left and right from Line VV

B : point 5° below Line HH on Line VV

M : point 8.5° below Line HH on Line VV

FL/FR : point on horizontal line 8.5° below Line HH at 4° left and right from Line VV

GL/GR : point on horizontal line 8.5° below Line HH at 8° left and right from Line VV

Line HH : horizontal line at vertical angle 0°

Line VV : vertical line at horizontal angle 0°

D : downward degrees from horizontal plane

L and R : degrees to left and right from vertical plane

Figure 1 Illuminance measuring positions of low beam

- b) **High beam** The illuminance of high beam shall conform to Table 3, when tested in accordance with 12.2. Figure 2 shows the measuring positions of luminous intensity distribution.

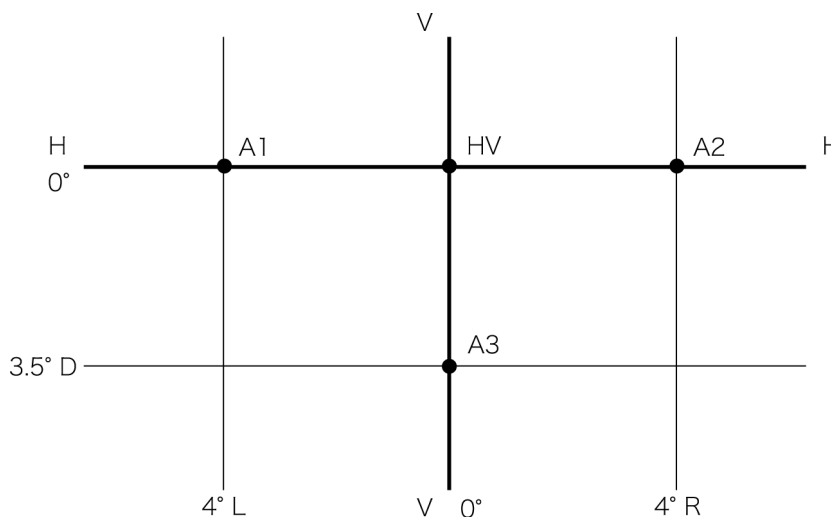
The head lamp having a high beam shall be equipped with a device which ensures that the user can modify the light distribution from high beam to low beam and vice versa with just one movement so that it meets the relevant requirements. An appropriate triggering mechanism/device can be installed separately from the lighting equipment itself.

If the light source of the low beam lamp is different from the light source of the high beam lamp but incorporated into the same casing, Point HV of both light sources need to be identical.

Table 3 Illuminance of low beam

Unit: lx

Measuring position	Illuminance ^{a)}
HV	$E_{HV} \geq 50$
A1	$E_{A1} \geq E_{HV}/2$
A2	$E_{A2} \geq E_{HV}/2$
A3	$E_{A3} \geq 10$
Note ^{a)} Illuminance in lux measured on a vertical screen at 10 m ahead from the head lamp.	



Line HH : horizontal plane, parallel to the ground

Line VV : vertical plane passing through bicycle

A1/A2 : point on Line HH at 4° left and right from Line VV

A3 : point 3.5° below Line HH on Line VV

D : downward degrees from horizontal plane

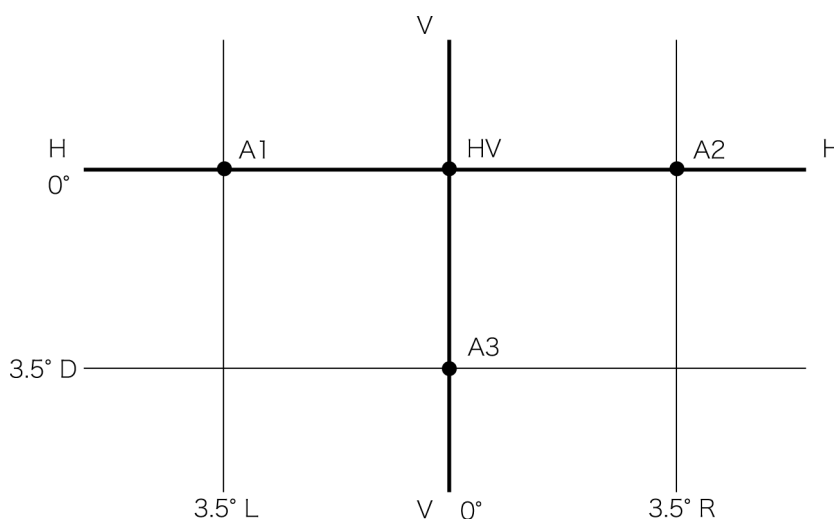
L and R : degrees to left and right from vertical plane

Figure 2 Illuminance measuring positions of high beam

- c) **General purpose beam** The illuminance of general purpose beam shall conform to Table 4, when tested in accordance with 12.2. Figure 3 shows the measuring positions of luminous intensity distribution.

Table 4 Illuminance of general purpose beam

Unit: lx	
Measuring position	Illuminance ^{a)}
HV	$E_{HV} \geq 8$
A1	$E_{A1} \geq 4$
A2	$E_{A2} \geq 4$
A3	$E_{A3} \geq 4$
Note ^{a)} Illuminance in lux measured on a vertical screen at 10 m ahead from the head lamp.	



Line HH : horizontal plane, parallel to the ground

Line VV : vertical plane passing through bicycle

A1/A2 : point on Line HH at 3.5° left and right from Line VV

A3 : point 3.5° below Line HH on Line VV

D : downward degrees from horizontal plane

L and R : degrees to left and right from vertical plane

Figure 3 Illuminance measuring positions of general purpose beam

6.3 Luminous intensity distribution of rear lamp

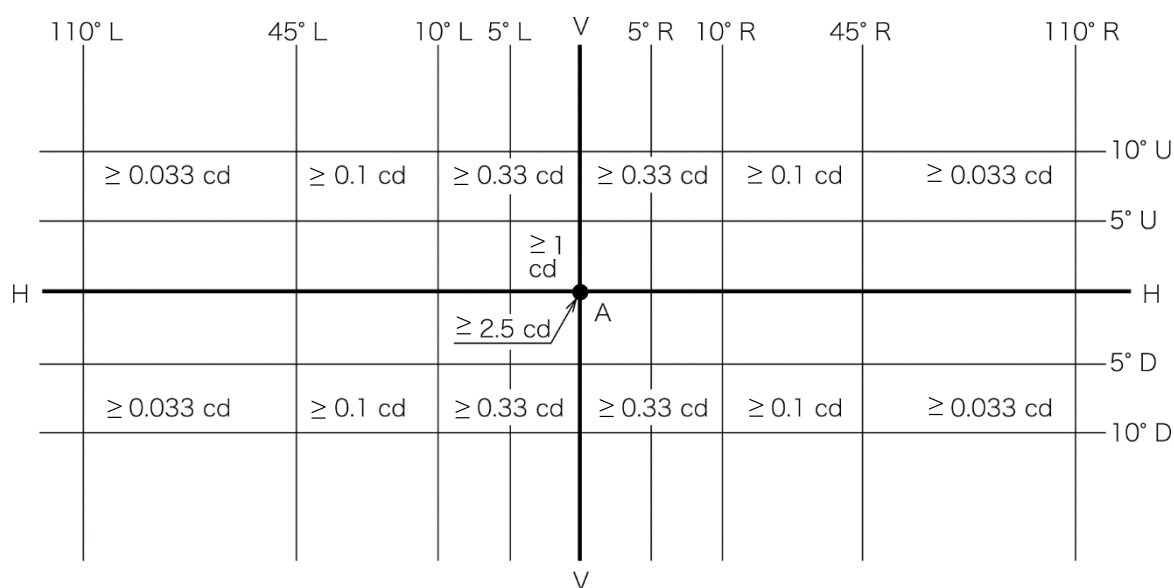
The luminous intensity distribution of rear lamp shall conform to Table 5, when tested in accordance with 12.2. Figure 4 shows the measuring positions of luminous intensity. A rear lamp shall emit continuous light.

If a rear lamp employs an LED light source whose luminous waveforms vary periodically, the frequency shall be at least 35 Hz at a bicycle speed of 15 km/h.

Table 5 Luminous intensity of rear lamp

Measuring position	Luminous intensity
Intersection A of horizontal plane and vertical plane	≥ 2.5
Rectangular area bounded by lines 5° U, 5° D, 5° L and 5° R	≥ 1
Rectangular area bounded by lines 10° U, 10° D, 10° L and 10° R	≥ 0.33
Rectangular area bounded by lines 10° U, 10° D, 45° L and 45° R	≥ 0.1
Rectangular area bounded by lines 10° U, 10° D, 110° L and 110° R	≥ 0.033
On Line HH and above Line HH	≤ 12

Unit: cd



Line HH : horizontal plane through the reference axis, parallel to the ground

Line VV : vertical plane passing through the reference axis

U and D : upward and downward degrees from horizontal plane

L and R : degrees to left and right from vertical plane

Figure 4 Illuminance measuring positions of rear lamp

6.4 Beam colours emitted from lighting equipment

The beam colours emitted from lighting equipment shall be those shown in Table 6, and they shall be within the ranges of chromaticity coordinates shown in Table 7, when tested in accordance with 12.3. Figure 5 shows each range of chromaticity coordinates.

Table 6 Beam colours emitted from lighting equipment

Lighting equipment	Beam colour
Head lamp	White ^{a)}
Rear lamp	Red
Note ^{a)} Indicates the white colours and those of beam emitted from a head lamp employing an LED light source as shown in Table 7.	