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# People's Republic of China National Standard

GB 17510-XXXX  
Replaces GB 17510-1998

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## Photometric characteristics of light signalling devices for motorcycles

(Draft for approval)

Issued 20xx-xx-xx

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Issued by  
General Administration of Quality Supervision, Inspection and Quarantine of the PRC  
China State Standardisation Management Committee

## Forward

### **All technical content within this standard is mandatory.**

This standard corresponds to United Nations Economic Commission for Europe ECE R50-2004, “Uniform provisions concerning the approval of front position lamps, rear position lamps, brake lamps, direction indicators and rear registration plate illuminating devices for mopeds and motorcycles”; it is not equivalent, the chief differences being as follows:

- The management articles have been deleted;
- The “minimum requirements of the factory consistency inspection” annex has been deleted;
- The dimensions and measurement points for registration plates have been amended based on the situation in China.

Key technical requirements, such as normal technical requirements, luminosity, light colour and test screens, are identical to the aforementioned legislation, however.

This standard replaces GB 17510-1998 “Photometric characteristics of light signalling devices for motorcycles”, and the more significant changes from previous versions are as follows:

- The classifications and limits for direction indicators in version 3.2 and version 4.2 have been revised;
- The dimension specifications for type 1 and type 2 registration plates in version 3.3 have been deleted;
- The maximum value for brake lamps in version 4.2 has been revised;
- The light colour requirements for front position lamps in version 5.1 have been revised;
- The principles for determining different forms in version 9.1 have been revised;
- A maximum limit for front position lamps which are mixed with headlamps has been added;
- A testing requirement for lights with multiple installation locations has been added;
- A testing requirement for non-filament light bulb signal lamps has been added;
- A testing requirement for lamps which perform flashing tasks has been added.

GB 17510-1998 shall be abolished from the date of implementation of this standard. Where a reapplication for a form inspection has been made, such devices must comply with this standard.

Transitional requirements for the implementation of this standard: If devices which have successfully passed form inspections before this standard is implemented are not in compliance therewith, a transition period of 24 months shall be granted.

This standard was proposed by the National Development and Reform Commission (NDRC).

This standard falls under the jurisdiction of the National Automotive Standardisation Technical Committee.

Drafting of this standard was carried out by Shanghai Automotive Illumination Research Institute and the National Motorcycle Testing Centre (Tianjin).

Key persons in the drafting of this standard: Fei Yin, Yu Peifeng, Li Gang.

Previously issued versions of the standard replaced by this standard are as follows:

- GB 17510-1998.

**Photometric characteristics of light signalling devices for motorcycles**  
(Draft for approval)

**1 Scope**

This standard specifies the technical requirements, testing methods and inspection regulations relating to the photometric characteristics of front position lamps, rear position lamps, brake lamps, direction indicators and rear registration plate lamps for use on mopeds and motorcycles.

This standard is applicable to front position lamps, rear position lamps, brake lamps, direction indicators and rear registration plate lamps for use on mopeds and motorcycles.

The various types of signal lamp mentioned above are also referred to as “devices” within this standard.

**2 Normative documents cited**

Citation of the documents listed below within this standard renders the articles of such documents as articles of this standard. No amendments (excluding typographic corrections) or revised versions of any dated documents cited shall be applicable to this standard; however, all parties reaching agreements according to this standard are encouraged to explore the possibility of using the latest versions of such documents. The latest versions of all undated documents cited shall be applicable to this standard.

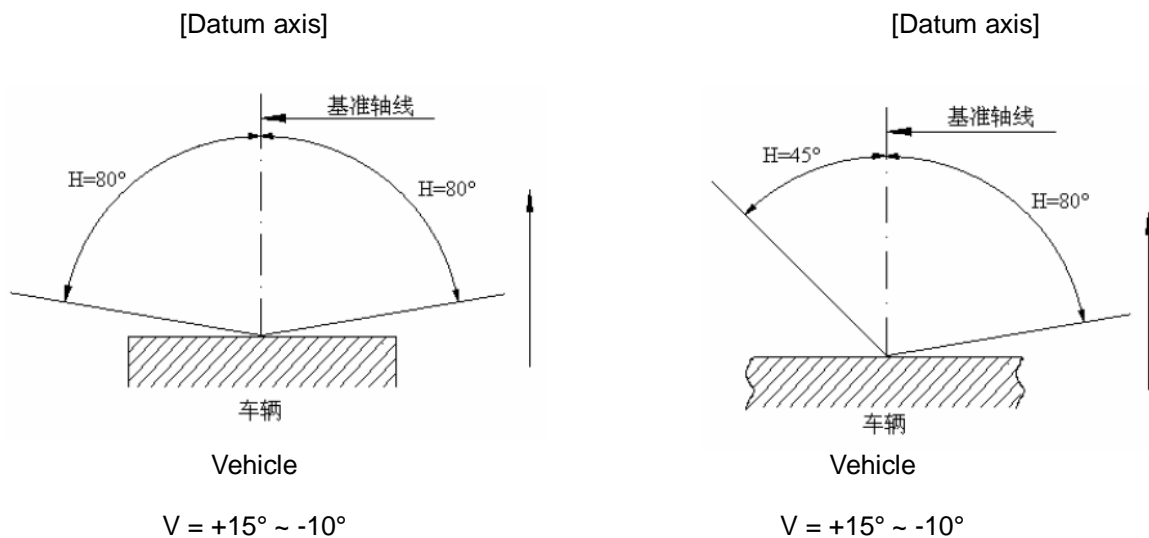
- GB 4599 Photometric characteristics of automotive filament light bulb headlamps
- GB 4785 Installation regulations for car and trailer exterior illumination and light signal devices
- GB 18100 Installation regulations for motorcycle illumination and light signal devices
- GB 15766.1 Road motor vehicle filament light bulbs – requirements on dimensions and photoelectric characteristics
- ECE R37 Uniform provisions concerning the approval of filament lamps for use in approved lamp units of power-driven vehicles and their trailers

**3 Terminology and definitions**

The terminology and definitions established below and in GB 18100 are applicable to this standard.

3.1 Installation locations and functions on vehicles, categories of regulation device and light distribution minimum angle ranges for specified devices:

- 3.1.1 Front position lamps (see Figure 1)
- a) Individually installed front position lamps;
  - b) Front position lamps installed in pairs.

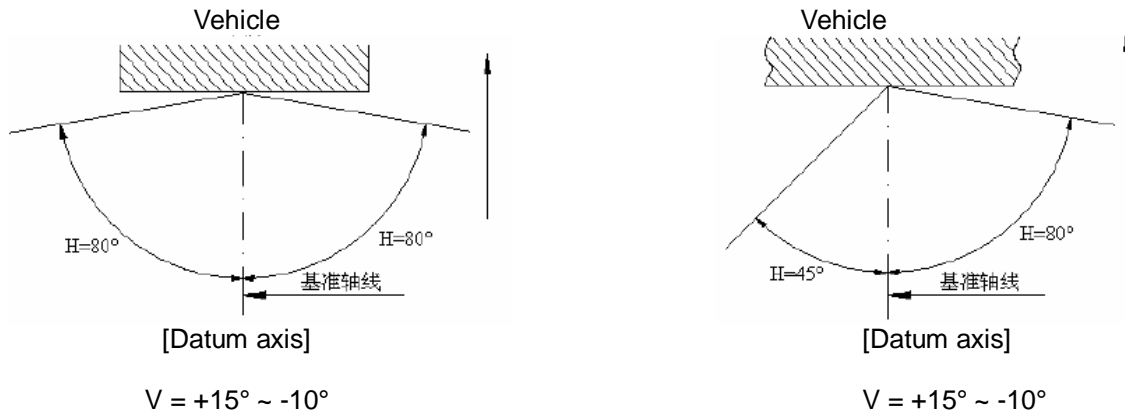


a) Individually installed front position lamps                      b) Front position lamps installed in pairs (left side)

**Figure 1 Categories and light distribution minimum angles for front position lamps**

3.1.2 Rear position lamps (see Figure 2).

- a) Individually installed rear position lamps;
- b) Rear position lamps installed in pairs.



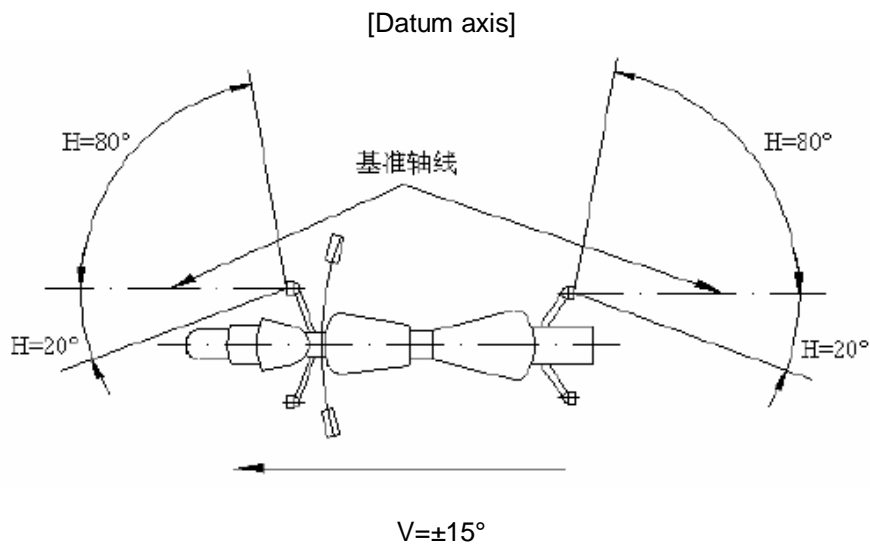
a) Individually installed rear position lamps

b) Rear position lamps installed in pairs (left side)

**Figure 2 Categories and light distribution minimum angles for rear position lamps**

3.1.3 Direction indicator lamps (see Figure 3)

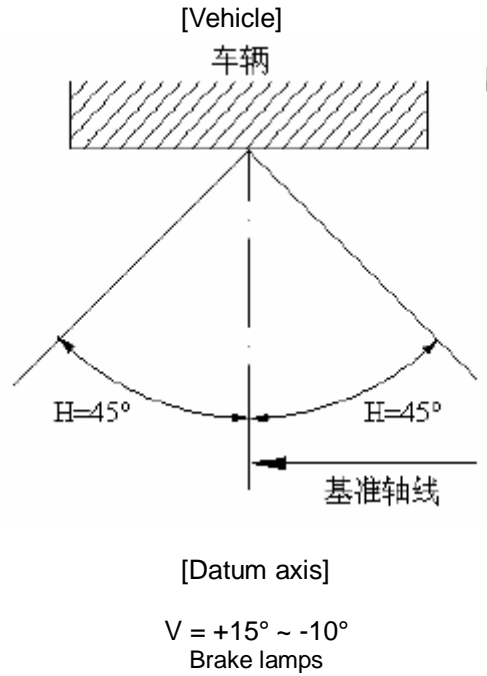
- a) Type 11 devices: Front direction indicator lamps at a minimum distance of at least 75mm from the nearest front low-beam headlamp;
- b) Type 11a devices: Front direction indicator lamps at a minimum distance of at least 40mm from the nearest front low-beam headlamp;
- c) Type 11b devices: Front direction indicator lamps at a minimum distance of at least 20mm from the nearest front low-beam headlamp;
- d) Type 11c devices: Front direction indicator lamps at a minimum distance of less than 20mm from the nearest front low-beam headlamp;
- e) Type 12 devices: Direction indicator lamps installed on the rear of a motorcycle.



Type 11, type 11a, type 11b, type 11c and type 12 direction indicator lamps

**Figure 3 Categories and light distribution minimum angles for direction indicator lamps**

3.1.4 Brake lamps (see Figure 4)

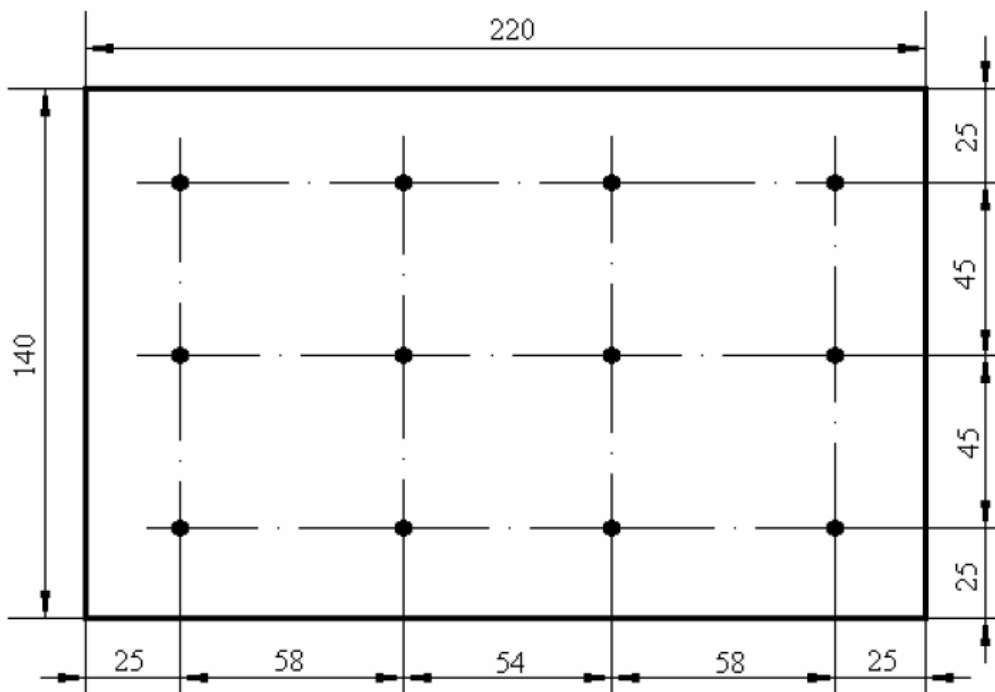


**Figure 4 Light distribution minimum angle for brake lamps**

3.2 The perpendicular angle  $V$  in figures 1, 2, 3 and 4 is an angle relative to the horizontal plane, such that above this plane it is positive and below the plane it is negative; the horizontal angle  $H$  is an angle relative to the datum axis and the vehicle's forward movement direction, and in the device's luminosity test state, it is positive to the right of the datum axis and negative to the left of the datum axis. The arrows show the vehicle's forward movement direction.

3.3 Based on the region of illumination, the regulation illumination region and test points of the rear registration plate lamps are specified as shown in Figure 5; the dimensions are 220mm x 140mm.

Unit: mm



**Figure 5 Illumination region and test points of rear registration plate lamps**

**4 Different forms of device**

Devices differ in the following key aspects:

- a) Brand name or logo;
- b) Optical system characteristics (luminosity rating, light distribution minimum angle, type of filament light bulb or light source module etc.)
- c) Category of device.

However, changing the colour of the filament light bulb or light filter sheet has no affect on changes of the form of the device.

**5 Technical requirements**

5.1 General requirements

5.1.1 Devices must be designed and manufactured so that their ability to meet usage requirements and comply with the stipulations of this standard is ensured under normal conditions of use, even when subject to vibration.

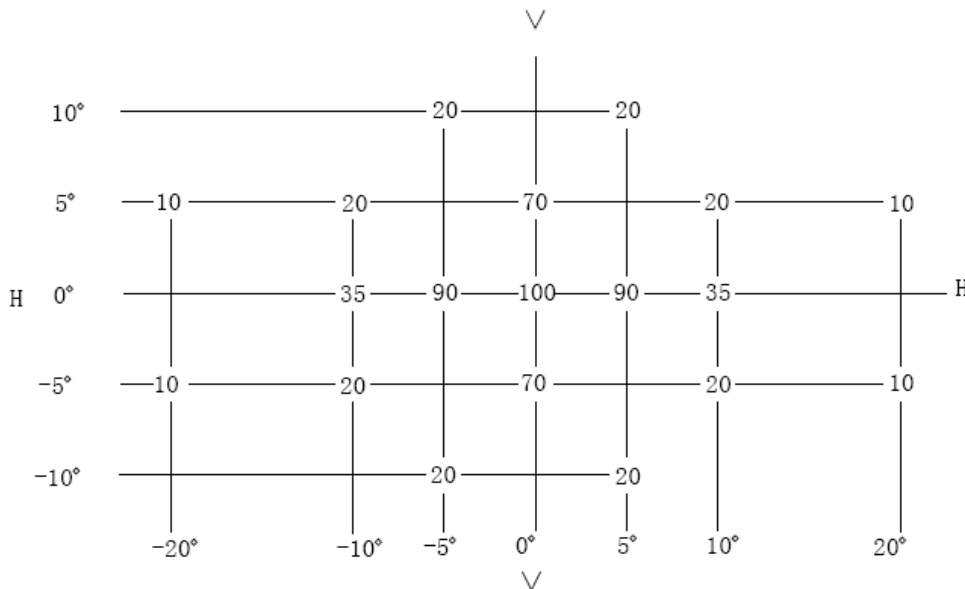
5.1.2 Any light source modules used must be designed so that they may be installed in the correct location even in dark conditions; they must also be capable of preventing erroneous operation.

5.1.3 If filament light bulbs are used, the bulbs must comply with the stipulations of GB 15766.1 or ECE R37.

5.2 Photometric characteristics

5.2.1 See Figure 6 for light distribution requirements for front position lamps, rear position lamps, brake lamps and direction indicators. The numbers at the intersecting points of the lines in the grid are percentage points, which indicate the ratio of the minimum luminosity value in that direction to the minimum luminosity value in the datum axis direction. H=0° and V=0° in the diagram are relative to the datum axis direction.

Within the luminosity distribution range (see Figure 6), the light emitted by each type of device should be uniform, i.e. the luminosity detected in any direction within the area surrounded by the grid lines may not be less than the minimum luminosity value in all the surrounding directions.



**Figure 6 Luminosity distribution range**

5.2.2 The luminosity of front position lamps, rear position lamps, brake lamps and direction indicators on the datum axis must comply with the stipulations of Table 1; in addition, the luminosity within the light distribution minimum angle range must not be less than the minimum luminosity value stipulated in Table 1.

**Table 1 Luminosity of front position lamps, rear position lamps, brake lamps and direction indicators on the datum axis**

Unit: cd

Name of lamp	Minimum value	Maximum value	Min. luminosity value within the light distribution min. angle range
Rear position lamp	4	12 <sup>a</sup>	0.05
Front position lamp	4	60 <sup>b</sup>	0.05
Brake lamp	40	185	0.3
Type 11 direction indicator	90	700 <sup>c</sup>	0.3
Type 11a direction indicator	175	700 <sup>c</sup>	0.3
Type 11b direction indicator	250	800 <sup>c</sup>	0.3
Type 11c direction indicator	400	860 <sup>c</sup>	0.3
Type 12 direction indicator	50	350	0.3

<sup>a</sup> If the rear position lamp and the brake lamp form a combined lamp, a luminosity of 60cd is permitted in directions below 5° below the horizontal plane.  
<sup>b</sup> If the front position lamp and the headlamp are combined, the maximum value shall be 100cd.  
<sup>c</sup> This limit only applies within the range H=±5° and V=±10°; outside the range H=±5° and V=±10°, the maximum luminosity value shall be 400cd.

### 5.2.3 Individual lamps with multiple light sources:

5.2.3.1 The minimum luminosity value requirements must still be met if any one light source becomes ineffective.

5.2.3.2 The maximum luminosity value when all light sources are lit is given by multiplying the maximum value in Table 1 by 1.4.

5.2.3.3 All light sources connected in series may be regarded as a single light source.

5.2.4 If the rear position lamp and the brake lamp form or are combined into a single device, the quotient of the actual luminosity detected when both lamps are lit simultaneously to when the rear position lamp alone is lit must not be less than 5, within the range H=±10° and V=±5° in the 11 measurement directions (see Figure 6).

If the rear position lamp and the brake lamp are individual lamps containing more than one light source, then the aforementioned detected value should be measured once all such light sources are lit.

5.2.5 If a device has more than one installation location on the vehicle or may occupy multiple locations within a single area, then luminosity measurements should be repeated for each location; alternatively, measurements may be taken based on the extreme limit location for the area corresponding to the datum axis specified by the manufacturer.

5.2.6 The luminosity of the rear registration plate lamps shining on each measurement point (see Figure 5) must not be less than 2cd/m<sup>2</sup>, and must also comply with the following uniform luminosity requirement:

$$\frac{B_2 - B_1}{L} \leq 2B_0 / cm$$

In which: B<sub>1</sub> and B<sub>2</sub> are the luminosity at any two measurement points, cd/m<sup>2</sup>;  
 B<sub>0</sub> is the minimum luminosity value of all measurement points shown in Figure 4, cd/m<sup>2</sup>; and  
 L is the distance between B<sub>1</sub> and B<sub>2</sub>, cm.

5.2.7 Registration plate lamp manufacturers must specify one or more locations, or an area relevant to the registration plate, suitable for installing the device. When the light bulb is installed in a location specified by the manufacturer, the angle of incidence of the emitted light at any point on the registration plate must not exceed  $82^\circ$ , this angle to be measured from the extreme location of the illumination area furthest from the registration plate surface. If the device contains more than one illuminating optical element, then this requirement shall only apply to the relevant parts of the illumination area supplied with illumination by the relevant elements.

## **6 Light colours**

6.1 Front position lamps shall emit white light; rear position lamps and brake lamps shall emit red light; direction indicators shall emit amber light; rear registration plate lamps shall emit white light which does not cause significant changes in the colour of the rear registration plate.

6.2 If the rear registration plate lamp forms or is combined into a single lamp with other rear lamps, this lamp shall not directly emit non-red light to the rear.

6.3 The chromatic characteristics of each colour must comply with the stipulations of GB 4785.

## **7 Test methods**

7.1 Test darkrooms, devices and facilities must comply with the stipulations of GB 4599.

7.2 Standard light bulbs should be used during the testing of devices which use interchangeable filament light bulbs, and such devices should be made to work in a state where they emit a test luminous flux.

7.3 Measurement of devices which utilise several light sources

7.3.1 Mass-produced light bulbs may be used for measurement in devices which use mass-produced interchangeable 6.75V or 13.5V filament light bulbs, and the luminosity values obtained should be corrected. The compensation factor shall be the coefficient of the average values of the test luminous flux and the luminous flux under test voltage (6.75V or 13.5V). The deviation between the actual luminous flux of each filament light bulb used and its average value should not be greater than  $\pm 5\%$ ; a standard bulb working in a test luminous flux state may also be used successively for measurement in each light bulb's location, and the individual measurement results at each location may be totalled.

7.3.2 In situations where non-interchangeable or other light sources are used, tests should be carried out according to the manufacturer's rated voltage, and manufacturers should provide specialised power supply equipment if necessary.

7.4 For all devices not using filament light bulbs, luminosity measurements should be taken 1 min and 30 mins after lighting respectively, and the results must comply with the minimum and maximum value requirements in Table 1. The luminosity at each measurement point 1 min after lighting may be calculated using the luminosity after 30 mins, the conversion factor being the coefficient of the luminosity at the HV point 1 min and 30 mins after lighting. Measurements for direction indicators should be taken in a flashing state (1.5Hz, with a time ratio of the time lit to a complete flash process of 50%).

7.5 The initial measurement location of the device shall be determined according to the datum axis and datum centre specified by the manufacturer.

7.6 The photometric inverse square law must be used to calculate the measurement distance.

7.7 The spread angle of the light receiver observed from the datum centre should be in the range  $10'$  to  $1^\circ$ .

7.8 The angle deviation of each measurement direction shall not exceed  $0.25^\circ$ .

7.9 The device should be adequately pre-burned before measurements are taken, in order to stabilise its photometric characteristics.

7.9.1 Normal luminosity values should be measured in conditions where the light source is lit for a sustained period.

For lights which perform flashing tasks, it necessary to avoid overheating the light during the measurement process. If necessitated by the limitations of the device structure, the taking of measurements in a flashing state is permitted, for example in situations where LEDs are used or a device can only be worked intermittently without overheating.

In such cases the switch must be alternated at a frequency of  $f=(1.5\pm 0.5)\text{Hz}$  and measurements must be taken when the luminosity value reaches 95% of peak; the pulse sustain time should be greater than 0.3s.

For lamps which use interchangeable filament light bulbs, the filament light bulbs must be lit at test luminous flux. In all other situations, the voltages stipulated in articles 7.2 and 7.3 if this standard should be used. The rise and fall times of the voltage should not exceed 0.01s.

In flashing measurement situations, the final measurement result should be the greatest luminosity measured.

7.10 The luminosity of rear registration plate lamps shall be measured on a achromatic diffuse surface with a known diffuse reflectance. The dimensions of the achromatic diffuse surface should be identical to those of the rear registration plate, or larger than the dimensions required for the measurement points; at the time of measurement, its centre should be aligned with the centre of the measurement point. The achromatic diffuse surface should be placed in the location in which the registration plate is normally situated, 2mm in front of the bracket. Luminosity measurement should be perpendicular to diffuse surface measurement, with a deviation of  $5^\circ$  permitted in any direction of the measurement points shown in Figure 5, the measurement points to be circles 25mm in diameter. Luminosity measurement results should be corrected based on a correction factor which corrects the diffuse reflectance to 1.0.

7.11 An A light source (colour temperature of 2,856K) should be used for chromatic tests. For lamps which use non-interchangeable light sources, measurements should be taken at a voltage of 6.75V or 13.5V. The section outside the light distribution angle range should be visually inspected to check whether any sharpening of colours has occurred.

7.12 A visual inspection should be made to check whether the colour of the registration plate changes when illuminated by the rear registration plate lamp.

## 8 Inspection regulations

8.1 Different forms of device shall be determined according to Chapter 4 of this standard.

8.2 Devices shall be subject to form inspections and production consistency inspections, which they shall be considered to have passed if they are in compliance with the corresponding stipulations of articles 8.3 and 8.4 of this standard.

### 8.3 Form inspections

8.3.1 Manufacturer should provide:

8.3.1.1 The intended use of the device;

8.3.1.2 The type must be explained for direction indicators;

8.3.1.3 Diagrams sufficient to identify the form of device in triplicate, with the datum axis ( $H=0^\circ$ ,  $V=0^\circ$ ), datum centre and geometric position of installation on the vehicle clearly labelled; if there are different installation situations or locations then this should be noted, including:

8.3.1.3.1 The different installation angles of the device's installation location on the vehicle relative to the datum axis of the vehicle datum plane;

8.3.1.3.2 Different angles of the device relative to the ground;

8.3.1.3.3 Different rotational angles of the datum axis of the device itself;

8.3.1.3.4 For rear registration plate illumination devices, the device is permitted to have multiple installation locations relative to the area to be lit, in which the rear registration plate is placed;

8.3.1.4 A concise technical specification. Excluding devices with non-interchangeable light source modules,

the type of filament light bulb used should be specified.

8.3.1.5 Two devices (including filament light bulbs for devices with interchangeable light sources).

8.3.2 Every device must comply with regulation 5.1 of this standard.

8.3.3 Tests shall be carried out in accordance with Chapter 7 of this standard, and every device must comply with regulation 5.2 and Chapter 6 of this standard.

#### 8.4 Production consistency inspection

8.4.1 The production consistency of devices which pass the form inspection shall be determined using samples randomly selected from mass-produced products.

8.4.2 Randomly selected samples must comply with regulation 5.1 of this standard.

8.4.3 Tests shall be carried out in accordance with Chapter 7 of this standard, and randomly selected samples must comply with Chapter 6 of this standard.

8.4.4 Tests shall be carried out in accordance with Chapter 7 of this standard, and the photometric characteristics of samples of front position lamps, rear position lamps, brake lamps and direction indicator lamps must comply with requirements after the minimum luminosity value in Table 1 is reduced to 80% of the original value, and the maximum luminosity value is increased to 120% of the original value.

8.4.5 Tests shall be carried out in accordance with Chapter 7 of this standard, and the photometric characteristics of samples of rear registration plate lamps must comply with regulation 5.2.6 of this standard and installation locations must comply with regulation 5.2.7 of this standard.

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