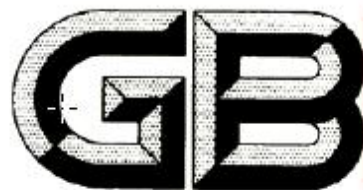


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# **National Standard of the People's Republic of China**

GB5920 – XXXX  
Replaces GB 5920-1999

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## **Photometric characteristics of front and rear position lamps, end-outline marker lamps and stop lamps for motor vehicles and their trailers**

Draft for approval

Issue Date: 20XX – XX – XX

Implementation Date: 20XX – XX – XX

**Issued by General Administration of Quality Supervision, Inspection and  
Quarantine of the People's Republic of China and the**

**Standardisation Administration of the People's Republic of China (SAC)**

## Foreword

**All of the technical contents set out in this Standard are mandatory.**

This Standard corresponds to Revision 4 of ECE R7 of the United Nations Economic Commission for Europe (UNECE), “Uniform provisions concerning the approval of front and rear position (side) lamps, stop lamps and end-outline marker lamps for motor vehicles (except motor cycles) and their trailers”; the conformance degree between this Standard and ECE R7 Rev.4 is non-equivalent, and the main differences are:

- Administrative Provisions have been deleted;
- Annex “Minimum requirements for conformity of manufacturer inspection” has been deleted;
- Inspection Rules have been added.

The main technical requirements of this Standard, such as the general requirements, photometric characteristics, colour of light and test methods, conform to the abovementioned regulation.

This Standard replaces GB 5920-1999, “Photometric characteristics of front and rear position lamps, end-outline marker lamps and stop lamps for motor vehicles and their trailers”. Compared to the previous version, the main changes to this Standard are:

- the content of “Quoted Standards” in Clause 2 of the previous version have been modified to “Normative Reference” in the current version;
- the content of “Definitions” in Clause 3 of the previous version has been modified - changed to “Terms and definitions” in the current version;
- test methods for the photometric characteristics of filament lamps in Section 5.8.2 of the previous version have been modified;
- the principle for determining different types in Article 6.1 of the previous version have been modified, and changed to Clause 4 “Lamps of different types” in the current version;
- the inspection rules in Clause 6 of the previous version have been modified;
- the test requirements for category S3 stop lamps intended to be mounted inside a vehicle have been added;
- test requirements for lamps with multiple installation positions have been added;
- test requirements for lamps with multiple light sources have been modified;
- test requirements for the time length measurement for intensity reduction emitted by stop lamps with two levels of intensity have been added;
- test requirements for lamps which are designed to operate permanently with an additional system have been added;
- test requirements for the signal lamp with no filament lamps have been added;
- requirements for the measurement of the light distribution for lamps with an installation position height not higher than 750mm have been added.

From the implementation date of this Standard, lamps which newly apply for type approval shall comply with this Standard.

Transitional requirements for the implementation of this Standard: for rear fog lamps of power-driven vehicles that have passed the type approval inspection before the implementation date of this Standard; if there are any non-conformity with the corresponding provisions of this Standard, a transitional period of 24 months shall be granted.

This Standard is proposed by China National Development and Reform Commission.

This Standard is under the jurisdiction of the National Automobile Standardisation Technical Committee.

The organisations that participated in the drafting of this Standard are:  
Shanghai Automotive Lamp Research Institute;

The main drafters of this Standard: Fei Yin, Zhang Shijun, Ji Yinhua

This Standard replaces the previously issued Standards:  
GB 5920-1986, GB 5920-1994, GB 5920-1999.

# **Photometric characteristics of front and rear position lamps, end-outline marker lamps and stop lamps for motor vehicles and their trailers**

(Draft for approval)

## **1 Scope**

This Standard specifies the technical requirements, test methods and inspection rules for the photometric characteristics of front and rear lamps, end-outline marker lamps and stop lamps for motor vehicles and their trailers.

This Standard applies to all types of front and rear lamps, end-outline marker lamps and stop lamps for use with Category M, Category N, and Category O motor vehicles and their trailers.

In this Standard, the abovementioned signal lamps are also referred to as lamps.

## **2 Normative References**

The provisions of the following documents become provisions of this Standard after being referenced. For dated reference documents, all later amendments (excluding corrigenda) and versions do not apply to this Standard; however, the parties to the agreement are encouraged to study whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB 4599 Motor vehicle headlamps equipped with filament lamps

GB 4785 Installation regulations for car and trailer exterior illumination and light signal devices

GB 15766.1 Filament lamps for road vehicles – Dimensional, electrical and luminous requirements

ECE R.37 Uniform provisions concerning the approval of filament lamps for use in approved lamp units of power-driven vehicles and of their trailers

## **3 Terms and definitions**

The terms and definitions specified in GB 4785 apply to this Standard.

## **4 Lamps of different types**

The lamps which differ in essential respects such as:

- (a) the trade name or mark;
- (b) the characteristics of the optical system (such as the level of luminous intensity, the minimum angle of light distribution, the category of employed filament lamp or the light source module);
- (c) in the case of stop-lamps with two levels of intensity, the system used to reduce illumination at night.

However, a change of the colour of the filament lamp or the colour of any light filter does not constitute a change of type.

## 5 Requirements

### 5.1 General Requirements

5.1.1 Front and rear lamps, end-outline marker lamps and stop lamps shall be designed and constructed so that under normal conditions of use, despite the vibrations to which they may be subjected, the satisfactory operation thereof is assured and the characteristics thereof continue to conform to the requirements set out in this Standard.

5.1.2 Front and rear lamps which are combined, grouped or incorporated at the same time may also be used as end-outline marker lamps.

5.1.3 If filament lamps are used, they shall conform to the provisions set out in GB 15766.1 or ECE R37.

5.1.4 The light source module(s) in the lamps shall be designed so as to be installable at the correct location even in the dark, and so as to avoid the incorrect usage thereof.

5.1.5 The nominal rated voltages for lamps equipped with non-replaceable light source are 6v, 12v or 24v; the luminous efficiency thereof shall be decided by agreement between the manufacturer and the users.

5.1.6 Position lamps that are incorporated along with another function, and which use a common light source, are permitted to be designed to operate with an additional system to regulate luminous intensity. However, in the case of a rear position lamp that is incorporated along with a stop lamp, the lamp shall either be part of a multiple light source arrangement, or fitted and intended for use in a vehicle equipped with a failure monitoring system for that function.

### 5.2 Photometric characteristics

5.2.1 The luminous intensity of the light emitted by the front and rear lamps, end-outline marker lamps and stop lamps in the direction of the reference axis shall conform to the requirements of Table 1.

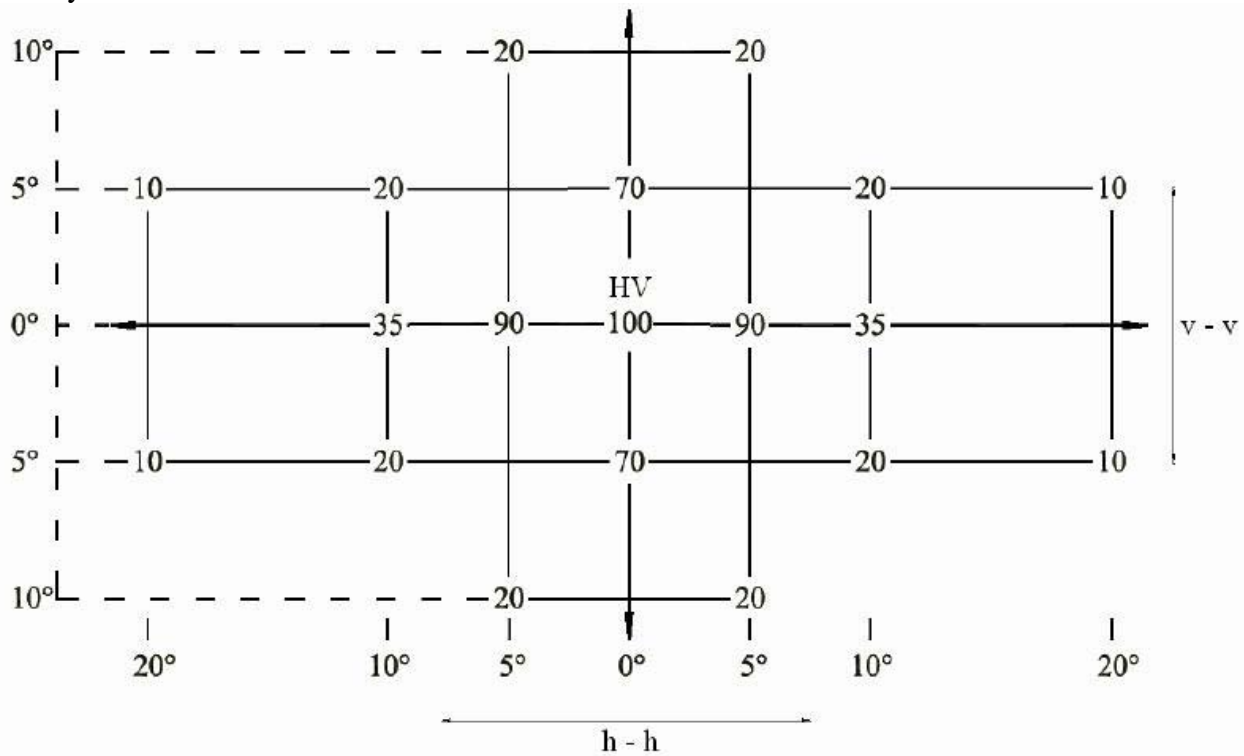
**Table 1 Luminous intensity of light emitted by the front and rear position lamps, end-outline marker lamps and stop lamps in the direction of the reference axis**

Luminous Intensity		Minimum Value	Maximum Value		
			Single lamp	Single lamp, marked "D"	Two or more lamps
Front position lamps, front end-outline marker lamp		4	60	42	84
Front position lamps incorporated in headlamp		4	100	---	---
Rear position lamps, rear end-outline marker lamp		4	12	8.5	17
Stop lamps	With 1 level of intensity (category S1)	60	185	130	260

	With 2 levels of intensity (category S2)	By day	130	520	366	728
		By night	30	80	56	112
	Stop-lamps of category S3		25	80	55	110

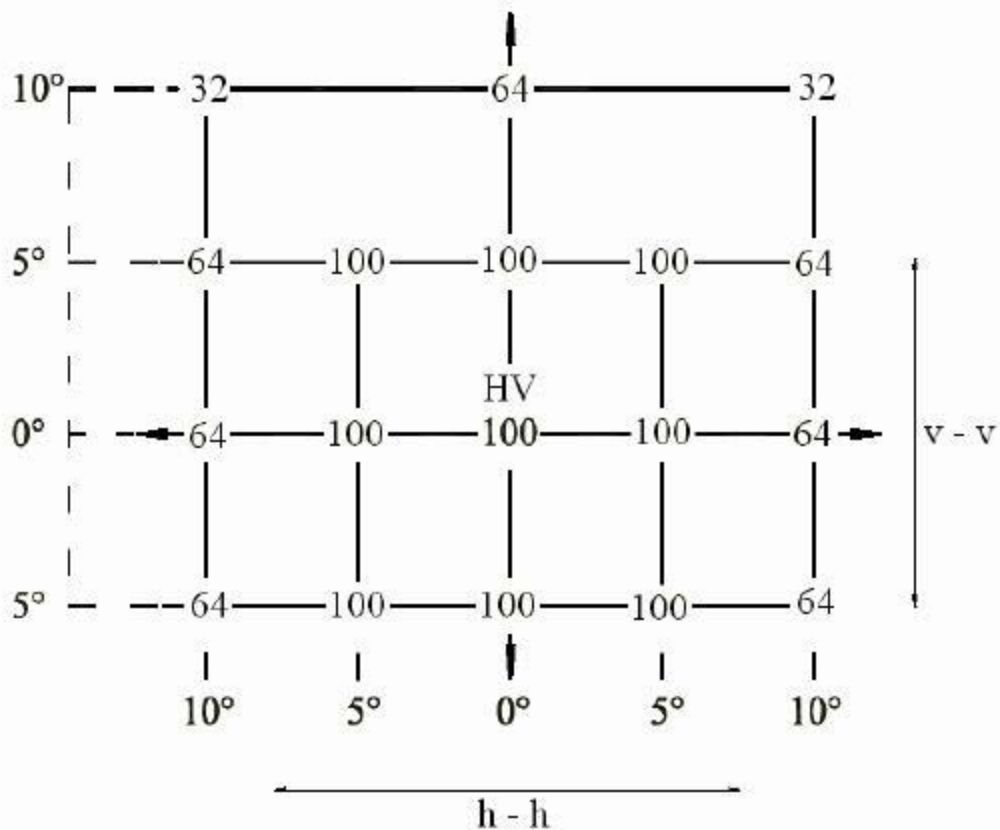
5.2.2 The installation of the lamps shall conform to the regulations set out in GB 4785, and the luminous intensity within the angle of geometric visibility of the lamps installed shall conform to the following regulations:

5.2.2.1 Diagrams 1 and 2 show the requirements for light distribution of the lamps; the digits at the joint of the grid lines in the diagrams are percentage values, to indicate the ratio between the minimum value of the luminous intensity in that direction and the minimum value of the luminous intensity in the direction of the reference axis.



Note: the angles in the diagram are the horizontal angles formed with the h-h line and vertical angles formed with the v-v lines

**Diagram 1 Table of light distribution of the lamps (Category S3 is excluded)**



**Diagram 2 Table of light distribution for Category S3 stop lamps**

5.2.2.2 The light emitted by each type of lamp shall be well distributed within the luminous intensity distribution field, which means that the measured luminous intensity value in any one direction within the range of the field formed by grid lines shall not be smaller than the minimum value of the luminous intensity measured in any direction around this direction.

5.2.2.3 In any direction where the lamp is visible, the luminous intensity shall not exceed the maximum value specified in Table 1.

5.2.2.4 For rear position lamps incorporated along with stop-lamps, from the plane which is 5° below the h-h line and downward, the luminous intensity of 60cd shall be permitted.

5.2.2.5 In any direction where the lamp is visible, the intensity of the light emitted must be not less than 0.5cd for front and rear position lamps and end-outline marker lamps.

5.2.2.6 In any direction where the lamp is visible, the intensity of the light emitted must be not less than 0.3cd for stop-lamps with one level of intensity, and for stop-lamps with two levels of intensity, must be not less than 0.3cd by day, and must be not less than 0.07cd by night.

5.2.2.7 If a rear lamp is incorporated along with a stop-lamp, and in the field is delimited by the straight horizontal line passing through  $\pm 5^\circ$  of the vertical line and the straight vertical line passing through  $\pm 10^\circ$  of the horizontal line, then the ratio between the actually measured luminous intensities of the two lamps when turned on simultaneously and the measured intensity of the rear

lamp when turned on alone should be at least 5:1. If the stop-lamp has two levels of intensity, then this requirement must be satisfied when under night conditions. If the rear lamp and/or the stop-lamp contain more than one light source and is/are defined as a single-lamp, then the measurement values to be taken into consideration are those obtained with all light sources in operation.

5.2.3 If two or more lamps have the same function when installed on a vehicle, according to the definitions set out in GB 4785 they can be considered as a single lamp. Where this is the case, the lamp shall comply with the minimum luminous intensity required when any one light source fails. When all light sources are illuminated, the luminous intensity emitted shall not exceed the maximum intensity value specified in the last row of Table 1. This maximum intensity value is provided by the limit value of single lamp multiplied by 1.4.

5.2.4 For single lamps which contain more than one light source:

5.2.4.1 All light sources that are connected in series are considered to be one light source.

5.2.4.2 The lamps shall comply with the minimum intensity required when one light source has failed. However, for lamps designed for only two light sources, if it is indicated in the technical description that the vehicles which use such a lamp is equipped with an operating signal lamp which indicates when any one of these two light source has failed, then 50% of the original value shall be considered as the minimum value of luminous intensity in the reference axis of the lamp.

5.2.4.3 When all light sources are illuminated, in the case of a single lamp not marked with “D”, its maximum intensity is allowed to exceed the specified value for a single lamp, but is not allowed to exceed the values in Table 1 specified for two or more lamps.

5.2.5 In the case of a stop-lamp providing two levels of intensity, the time taken from the electric power supply being switched on to the luminous intensity measured on the reference axis being reduced to 90% of the initial value both levels of intensity shall be measured, and the time measured for the night condition of intensity shall not exceed the time measured for the day condition of intensity.

5.2.6 If the front lamp incorporates one or more infrared radiation generators, then the requirements for the photometric characteristics and chromaticity characteristics for such front lamps shall be met with or without the operation of the infrared radiation generators.

5.2.7 If the lamps may be installed on the vehicle in more than one or in a field of different positions, the photometric characteristics measurements shall be taken for each location or for the extreme locations of the field of the reference axis specified by the manufacturer.

5.2.8 For Category S3 stop lamps which are mounted inside a vehicle, if multiple installations are permitted, they shall be combined with the corresponding window(s) sample plate(s) and the photometric characteristics measurement shall be taken.

5.2.9 If the installation height of the lamps is not higher than 750mm, then the measurement of the photometric characteristics of the measuring points and area which are underneath the range of 5° below the h-h line is not needed.

## **6 Colour of light**

6.1 Light emitted by the front lamps and front end-outline marker lamps are white; light emitted by



the rear lamps, back end-outline marker lamps and stop lamps are red.

6.2 The chromaticity characteristics of each light colour shall conform to the regulations set out in GB 4785; outside of the visible area, no noticeable changes shall occur to the colour of the light emitted.

## **7 Test methods**

7.1 The equipment and facilities of the test-darkroom shall conform to the provisions set out in GB 4599.

7.2 Luminous intensity shall be measured when the light source is continuously switched on. If the colour of the light emitted by the lamp is red, then the measurement shall be taken under the circumstance of the light emitted being coloured.

7.3 For replaceable filament lamps:

7.3.1 When testing, use a standard filament lamp, and make it work in the state of producing a reference luminous flux.

7.3.2 In the case of a system with more than one intensity, the reference luminous flux prescribed for the specific category of filament lamp shall be applied to the greatest intensity.

7.3.3 When equipped with more than one filament lamps, the measurement for mass-produced filament lamps shall be permitted to be carried out at 6.75v, 13.5v or 28v, and the luminous intensity value produced shall be corrected. The correction factor is the ratio between the reference luminous flux and the mean value of the luminous flux found at the voltage applied (6.75 V, 13.5 V or 28.0 V), the actual luminous flux of each filament lamp used shall not deviate more than  $\pm 5\%$  from the mean value; alternatively a standard filament lamp may be used in turn, in each of the individual positions, operated at its reference flux, the individual measurements taken in each position being added together.

7.4 In the case of the lamps equipped with non-replaceable light sources (filament lamps and others), the photometric characteristics and colorimetric characteristic shall be measured with the light source presented in the lamp at 6.75v, 13.5v or 28v.

7.5 In the case of the light sources supplied by a special electric power supply, the output terminals of the electric power supply shall provide the test voltage specified in 7.3 or 7.4. When testing, the request of the requirement of the special electric power supply required to supply the light source from the manufacturer shall be permitted.

7.6 However, in the case of a stop-lamp for which an additional system is used to obtain night-time intensity, the voltage applied to the system for measuring night-time intensity shall be that which was applied to the filament lamp for measuring the day-time intensity.

7.7 Where a rear lamp is incorporated along with a dual-intensity stop lamp and is designed to operate permanently with an additional system to regulate the luminous intensity of the light emitted, the measurement of the luminous intensity shall be taken with the standard voltage of the system and, if a filament lamp is used, this shall enable the lamp to operate with the prescribed reference luminous flux.

7.7.1 Where a position lamp is incorporated along with another function, using the same light source,

and is designed to operate permanently with an additional system to regulate the intensity of the light emitted: if the additional system is part of the lamp, then the measurement of the light emitted shall be performed at 6.75v, 13.5v or 28v respectively.

7.7.2 Where the additional system is not part of the lamp, then the tests shall be performed at the rated secondary design voltage applied to the light source. The request of the requirement of the additional system needed to regulate the light source from the manufacturer shall be permitted.

7.8 For any lamps which are not equipped with filament lamp(s), the luminous intensities, measured after one minute and after 30 minutes of operation, shall comply with the minimum and maximum requirements specified in Table 1. The luminous intensity after one minute of operation can be calculated from the luminous intensity after 30 minutes of operation by applying at each test point, multiplied by the ratio of luminous intensities measured at HV after one minute and after 30 minutes of operation.

7.9 The lamps shall be sufficiently pre-illuminated, enabling the light characteristics thereof to be stable.

7.10 The distance of measurement of the photometric characteristics shall be such that the inverse-square law of photometry is applicable.

7.11 The angular aperture of the receiver viewed from the reference centre of the lamp is comprised between 10 angular minutes and one degree.

7.12 The angle deviation of each measuring direction shall not exceed 15'.

7.13 The initial measurement position of the lamps shall be determined by the reference axis and reference centre specified by the manufacturer.

7.14 The measurement of chromaticity shall use illumination A light source (colour temperature is 2,856k). For lamps with a non-replaceable light source, carry out the measurements at 6.75v, 13.5v or 28.0v. For Category S3 stop-lamps that are intended to be mounted inside the vehicle, the colorimetric characteristics shall be verified with the worst case combination(s) of lamp and rear window(s) or sample plate (s).

## **8 Inspection rules**

8.1 different types of lamps shall be determined in accordance with the provisions set out in Clause 4.

8.2 The lamps are subject to type inspection approval and the inspection of conformity of production. If it is in conformity with the corresponding provisions in 8.3 or 8.4, then this lamp shall be regarded as having passed the inspection for type approval and the inspection for conformity of production.

### **8.3 Type approval**

8.3.1 If a lamp has passed the inspection for type approval as a front or rear lamp, then this lamp is deemed to have passed the type inspection approval as an end-outline marker lamp.

8.3.2 The manufacturer shall provide:

8.3.2.1 The statement that describes the lamp submitted for type approval, whether it is one of the two lamps of the same type in an assembly.

8.3.2.2 The statement that describes the colour of the light emitted by the end-outline marker lamp, whether it is intended to be red or white;

8.3.2.3 The statement that the S3 stop lamp, whether it is intended to be mounted inside the vehicle (behind the rear window) or outside of the vehicle;

8.3.2.4 When submitting the application, in the case of the lamp may be installed on the vehicle with different inclinations of the reference axis, in respect to the vehicle reference planes, or to the ground, or containing difference rotation angles around its reference axis, these different conditions of installation (or locations of installation) shall be indicated in the technical description;

8.3.2.5 Drawings, in triplicate, in sufficient detail to enable identification of the types of lamp and showing geometrically the position(s) (if the lamp is a Category S3 stop lamp, then the position shall correspond to the rear window) in which the lamps may be mounted on the vehicle, indications of the reference axis (horizontal angle  $H = 0^\circ$ , vertical angle  $V = 0^\circ$ ) and the reference centre;

8.3.2.6 A brief technical description stating, with the exception of lamps with non-replaceable light sources, shall describe the categories of the filament lamps prescribed, or the types of the light source modules. In the case of a category S3 stop lamp, which is intended to be mounted inside the vehicle, the technical description shall contain the parameters of the optical properties (transmission, colour, inclination, etc.) of the rear window(s).

8.3.2.7 In the case of a stop lamp with two levels of intensity, shall provide the relevant information and system description; if there is an additional system to provide intensity at night time, then the function of the additional system and the installation requirements shall be specially stated;

8.3.2.8 Two samples (including light source); if the approval is applied for lamps which are not identical but are symmetrical and suitable for mounting one on the left and one on the right side of the vehicle, then the two samples submitted may be two identical lamps for mounting only on the left or only on the right of the vehicle, or may be two lamps with which, one is suitable to be mounted on the right and another is suitable to be mounted on the left of the vehicle; in the case of a stop lamp with two levels of intensity, the application shall also be accompanied by all the parts of the two samples constituting the system which ensures two levels of intensity.

8.3.2.9 For Category S3 stop lamps that are intended to be mounted inside a vehicle, a sample plate of the actual rear window (if there is more than one installation method, then all sample plates of the corresponding rear windows shall be provided) shall be accompanied.

8.3.3 Each sample lamp shall conform to the provisions specified in Article 5.1.

8.3.4 According to Clause 8 to carry out test, both sample lamps shall conform to the corresponding provisions specified in 5.2 and Clause 6.

8.4 Checking conformity of production

7.4.1 For products which have qualified for type approval, the randomly selected sample lamps shall be used to determine the conformity of production thereof.

8.4.2 The randomly selected lamps shall conform to the corresponding provisions set out in 5.1.

8.4.3 According to Clause, in order to carry out the test, the photometric characteristics of the randomly sampled lamps shall conform to the corresponding provisions set out in 5.2. The minimum value of the luminous intensity shall not be smaller than 80% of the prescribed value, the maximum value of the luminous intensity shall not be greater than 120% of the prescribed value.

8.4.4 According to Clause 7, in order to carry out the test, the randomly selected lamps shall conform to the corresponding provisions set out in Clause 6.