

Translated English of Chinese Standard: GB45831-2025

www.ChineseStandard.net → Buy True-PDF → Auto-delivery.

Sales@ChineseStandard.net

GB

NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 43.040.20

CCS T 38

GB 45831-2025

**Light sources for power-driven vehicles - Safety
requirements**

机动车用光源 安全性要求

Issued on: May 30, 2025

Implemented on: January 01, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the People's Republic of China.**

Table of Contents

Foreword	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Type identification	6
5 General requirements and test methods	6
5.1 Marking	6
5.2 Glass bulb or optical surface	8
5.3 Lamp cap	8
6 Filament light source requirements and test methods	8
6.1 Aging	8
6.2 Filament position and size	9
6.3 Color	9
6.4 Ultraviolet (UV) radiation	9
6.5 Initial photoelectric performance	10
6.6 Inspection of optical quality	10
6.7 Standard filament light source	11
7 Requirements and test methods for gas discharge light sources	12
7.1 Aging	12
7.2 Position and size of electrodes, arc and light shielding band	12
7.3 Start-up, rising and thermal retrigger performance	12
7.4 Electrical properties	13
7.5 Luminous flux	13
7.6 Color	14
7.7 Ultraviolet (UV) radiation	14
7.8 Standard gas discharge light source	15
8 LED light source requirements and test conditions	15
8.1 Aging	15
8.2 Position and size of the luminous surface	15

Light sources for power-driven vehicles - Safety requirements

1 Scope

This document specifies the same type determination, general requirements, filament light source requirements, gas discharge light source requirements, LED light source requirements and inspection rules for light sources for power-driven vehicles, and describes the corresponding test methods.

This document applies to substitute light sources installed in road lighting and light signaling devices of categories M, N, O and L power-driven vehicles.

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.

GB 4599, Road illumination devices and systems for motor vehicles

GB 4785, Prescription for installation of the external lighting and light-signalling devices for motor vehicles and their trailers

GB/T 26178-2010, The measurement of luminous flux

GB/T 45603-2025, Specification of categories of light sources for power-driven vehicles

IEC 60061-1, Lamp caps and holders together with gauges for the control of interchangeability and safety - Part 1: Lamp caps

IEC60061-2, Lamp caps and holders together with gauges for the control of interchangeability and safety - Part 2: Holders

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB 4785 and GB/T 45603-2025 as well as the following apply:

3.1

category of light sources

Standardized naming based on standardized light source design features.

Note: Each light source type has a prescribed name, such as: H4, P21W, T4W, PY21W, RR10W, D2S, LW2, LY3 and LR1.

3.2

LED substitute light source

LED light source type having a paired filament light source type, which is provided with a lamp cap having a different lamp cap positioning key structure from that of the corresponding filament light source type.

4 Type identification

Light sources that do not differ in the following main aspects are of the same type.

- Light source type.
- Manufacturer.
- Glass bulb design and/or lamp cap of filament light sources and gas discharge light sources, and structure of LED light sources. For filament light sources and gas discharge light sources, the selective yellow glass bulb or the additional selective yellow outer glass bulb is only used to change the color of the emitted light without changing other characteristics and does not constitute a change in the type of light source.
- Nominal voltage.
- Type of filament light sources (ordinary filament light sources and halogen filament light sources).

5 General requirements and test methods

5.1 Marking

5.1.1 Filament light source marking

The filament light source shall be marked with the following symbols on its lamp cap or glass bulb (if the symbol is marked on the glass bulb, it shall not have an adverse effect on its optical performance).

- Trademark of the manufacturer or seller.

5.1.4 Inspection method of marking

The markings in 5.1.1 ~ 5.1.3 shall be clear and durable, and shall be inspected by the following methods:

- The markings are clear and can be visually inspected;
- To test the durability of the marking, use a soft cloth dampened with water to wipe the marked area on the unburned light source with for 15 seconds. After the test, determine whether the marking is still clear.

5.2 Glass bulb or optical surface

For light source glass bulb or optical surface of the LED light source, there shall be no scratches or spots that may affect its efficiency and optical performance by visual inspection.

For filament light sources with coated glass bulbs, after aging according to 6.1, the glass bulb surface shall be gently wiped with a cotton cloth soaked in a mixed solution of 70% heptane and 30% toluene by volume. After 5 minutes, visually inspect the glass bulb surface, and there shall be no obvious changes.

For gas discharge light sources with colored (outer) glass bulbs, after working for 15 hours at the test voltage, the surface of the glass bulb shall be gently wiped with a cotton cloth soaked in a mixed solution of 70% heptane and 30% toluene by volume. After 5 minutes, visually inspect the glass bulb surface, and there shall be no obvious changes.

5.3 Lamp cap

5.3.1 The light source shall be equipped with a lamp cap as specified in GB/T 45603-2025 and comply with the provisions of the corresponding lamp cap data sheet in IEC 60061-1.

5.3.2 The lamp cap shall be subjected to visual inspection and dimensional inspection and may be inserted into a lamp holder complying with IEC 60061-2 for trial installation test.

5.3.3 The lamp cap shall be firmly fixed on the light source glass bulb or the bracket of the LED light source.

6 Filament light source requirements and test methods

6.1 Aging

The filament light source shall first be aged at the test voltage for 1 hour. For double-filament filament light sources, each filament shall be aged separately. For filament light sources specified for more than one test voltage, the highest test voltage shall be

used for aging. The tests in 6.2 ~ 6.6 shall be carried out after the filament light source has been aged.

6.2 Filament position and size

6.2.1 The geometric shape, position and size of the filament shall comply with the provisions of filament light source data sheet in GB/T 45603-2025.

6.2.2 The position and size of the filament shall be measured according to the method in Appendix A, unless otherwise specified in the filament light source data sheet in GB/T 45603-2025.

6.2.3 When measuring the position and size of the filament, the filament light source shall be ignited at 90% ~ 100% of the test voltage. For filament light sources with multiple test voltages specified, the highest test voltage value shall be used to measure the position and size of the filament.

6.3 Color

6.3.1 The color of light emitted by a filament light source shall be white, unless otherwise specified in GB/T 45603-2025.

6.3.2 The chromaticity range of the emitted light shall comply with the provisions of GB 4785.

6.3.3 The color of the emitted light shall be measured according to the method in Appendix B. Each measured value shall be within the specified chromaticity range (for the consistency requirements of checking amber and red products, at least 80% of the measurement points shall be within the specified chromaticity range). Furthermore, for filament light sources emitting white light, the deviation of the measured value from a chosen point on the Planckian locus shall not exceed 0.020 in the x and/or y direction.

6.3.4 Colored filament light sources used in optical signal devices shall be subjected to color durability tests in accordance with the provisions of Appendix C. After the test, the color of the light shall be measured according to the method specified in Appendix B. For amber or red light sources, at least 80% of the measurement results at all measurement points shall be within the specified chromaticity range. For color filter coatings, cracks shall not be visible without the use of specialized optical tools.

6.4 Ultraviolet (UV) radiation

Halogen filament light sources shall comply with UV radiation component requirements.

The UV radiation component of the halogen filament light source is calculated according to Formula (1) and Formula (2).

7 Requirements and test methods for gas discharge light sources

7.1 Aging

The aging of gas discharge light source shall be carried out in accordance with D.4 in Appendix D.

7.2 Position and size of electrodes, arc and light shielding band

7.2.1 The position and size of the electrodes shall be measured before aging. The gas discharge light source shall not be lit during the test. Optical methods shall be used to measure through the glass bulb. The measurement results shall comply with the provisions of the data sheet in GB/T 45603-2025.

7.2.2 The position and shape of the arc shall be measured after aging. During the measurement, the gas discharge light source shall be lit at the test voltage using a ballast, or the gas discharge light source with an integrated ballast shall be lit at the test voltage. The measurement results shall comply with the provisions of the data sheet in GB/T 45603-2025.

7.2.3 The position, size and transmittance of the light shielding band shall be measured after aging. During the measurement, the gas discharge light source shall be lit at the test voltage using a ballast, or the gas discharge light source with an integrated ballast shall be lit at the test voltage. The measurement results shall comply with the provisions of the data sheet in GB/T 45603-2025.

7.3 Start-up, rising and thermal retrigger performance

7.3.1 Startup

When testing in accordance with D.6 of Appendix D, the gas discharge light source shall be started directly and remain lit.

7.3.2 Rising

7.3.2.1 General

When conducting tests 7.3.2.2 ~ 7.3.2.5 according to D.7 in Appendix D, the target luminous flux shall comply with the provisions of the data sheet in GB/T 45603-2025.

7.3.2.2 Gas discharge light sources with a target luminous flux exceeding 2 000 lm

During the test, after 1 s the gas discharge light source shall emit at least 25% of the target luminous flux; after 4 s it shall emit at least 80% of the target luminous flux.

7.3.2.3 Gas discharge light sources with a target luminous flux not exceeding 2 000 lm and without a light shielding band

During the test, after 1 s the gas discharge light source shall emit a luminous flux of at least 800 lm; after 4 s it shall emit a luminous flux of at least 1 000 lm.

7.3.2.4 Gas discharge light sources with a target luminous flux not exceeding 2 000 lm and a light shielding band

During the test, after 1 s the gas discharge light source shall emit a luminous flux of at least 700 lm; after 4 s it shall emit a luminous flux of at least 900 lm.

7.3.2.5 Gas discharge light sources with multiple target luminous fluxes, at least one of which does not exceed 2 000 lm

During the test, after 1 s the gas discharge light source shall emit a luminous flux of at least 800 lm; after 4 s it shall emit a luminous flux of at least 1 000 lm.

7.3.3 Thermal retrigger

When tested in accordance with the provisions of D.8 in Appendix D, the gas discharge light source shall be restarted directly after being turned off for the time specified in the data sheet in GB/T 45603-2025. After 1 s, the gas discharge light source shall reach at least 80% of the target luminous flux.

7.4 Electrical properties

When tested in accordance with D.9 in Appendix D, the voltage and power of the gas discharge light source shall be within the limits specified in GB/T 45603-2025.

7.5 Luminous flux

When measured in accordance with the provisions of D.9 in Appendix D, the luminous flux shall be within the limits specified in GB/T 45603-2025. For the same type of white and selective yellow light sources, the target value applies to the gas discharge light source emitting white light, while the luminous flux of the gas discharge light source emitting selective yellow light shall be at least 68% of the target value.

8 LED light source requirements and test conditions

8.1 Aging

The LED light source shall first be aged at the test voltage for at least 48 hours. For multifunctional LED light sources, each function shall be aged separately. The tests in 8.2 ~ 8.6 and 8.8 ~ 8.10 shall be carried out after the LED light source has been aged.

8.2 Position and size of the luminous surface

The position and size of the luminous surface shall comply with the requirements of the data sheet in GB/T 45603-2025.

8.3 Luminous flux

When measured under the conditions specified in Appendix E, the luminous flux shall comply with the requirements of the data sheet in GB/T 45603-2025.

8.4 Normalized light intensity distribution/cumulative luminous flux distribution

When measured in accordance with Appendix E, the normalized light intensity distribution or cumulative luminous flux shall be within the limits of the data sheet in GB/T 45603-2025.

8.5 Color

8.5.1 The color of the emitted light shall be measured according to the method specified in Appendix E. The integral value of the measured chromaticity coordinates shall be within the required chromaticity range. The color of the light emitted by the LED light source shall comply with the provisions of the data sheet in GB/T 45603-2025, and the chromaticity range shall comply with the provisions in GB 4785.

8.5.2 For LED light sources that emit white light and are used in front lighting devices, the color of the light shall be measured in the direction of the light intensity distribution specified in the data sheet in GB/T 45603-2025, but only in the direction where the specified minimum normalized light intensity exceeds 50 cd/klm. The deviation value of each chromaticity coordinate is 0.025 in the x direction and 0.050 in the y direction. The measured values in the direction of maximum lighting intensity and all measured values for the standard LED light source shall also be within the required white light chromaticity area.

8.5.3 For LED light sources emitting white light, the red light component requirements shall be met and the red light component shall be calculated according to Formula (5).

$$k_{\text{red}} = \frac{\int_{610}^{780} E_e(\lambda) V(\lambda) d\lambda}{\int_{380}^{780} E_e(\lambda) V(\lambda) d\lambda} \geq 0.05 \quad \dots\dots\dots (5)$$

Where:

k_{red} – red light component;

$E_e(\lambda)$ – spectral distribution of radiant flux, in watts per nanometer (W/nm);

$V(\lambda)$ – spectral luminous efficiency;

λ – wavelength, in nanometers (nm), which shall be calculated in steps of 1 nm.

8.6 Ultraviolet (UV) radiation

LED light sources shall meet the requirements of low UV radiation light sources. For low UV radiation light sources, calculate according to Formula (6).

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----