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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB 17509-xxxx
Replaces GB17509-1998

Photometric characteristics of direction indicators for motor vehicles
and their trailers

(Draft Submitted for Approval)

Announced XX-XX-200X

Effective XX-XX-200X

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

Announced by:

Standardization Administration of China

Foreword

The entire technical content of the present standard is mandatory.

The present standard corresponds to United Nations Economic Commission for Europe ECE R6 Rev3 Amend5 “Uniform provisions concerning the approval of direction indicators for power-driven vehicles and their trailers.” The level of conformity between the two documents is “non-equivalent.” They differ primarily with respect to the following:

- deleted the administrative provisions;
- deleted the “Minimum requirements for conformity of production control methods of manufacturer” annex;
- deleted the “Minimum requirements for sampling by an inspector” annex;
- added inspection rules.

The main technical requirements of the present standard, such as general requirements, photometric characteristics, light colours, and test methods, are the same as those of the Provisions above.

The present standard replaces GB 17509-1998 “Photometric characteristics of direction indicators for motor vehicles and their trailers” and changes the previous version primarily with respect to the following:

- revises Chapter 2 “Cited standards” of the previous version;
- revises Chapter 3 “Terms and classifications” of the previous standard, changing it to Chapter 3 “Terms and definitions” and Chapter 4 “Classifications;”
- revises Chapter 4 “Photometric characteristics” of the previous version, changing it to “Requirements,” which is Chapter 6 of the present version;
- deletes Chapter 5 “Provisions on light bulbs” of the previous version, with additional related contents added to the “Requirements,” which is Chapter 6 of the present version;
- revises Chapter 6 “Photometric methods” of the previous version, changing it to Chapter 7 “Test methods” of the present version;
- deletes Chapter 7 “Colorimetric methods” of the previous version, with additional related contents added to Chapter 6 “Requirements” and Chapter 7 “Test methods” of the previous version;
- revises Chapter 8 “Inspection provisions” of the previous version, changing it to Chapter 8 “Inspection rules” of the present version;
- adds light source module-related content;
- adds testing requirements for flashing illumination;
- adds measurement methods for direction indicators with non-replaceable light sources;
- adds photometric requirement limiting installation of direction indicators to a height of 750 mm;
- adds photometric requirements when direction indicators have more than one position or have different positions within one field.

Beginning on the date that the present standard takes effect, lamps that are the subject of new requests for type inspections shall comply with the present standard.

Transitional requirements relating to implementation of the present standard: If lamps that pass type inspections before the present standard takes effect are found not to comply in light of the relevant provisions of the present version of the standard, a 24-month transition period shall be granted.

The present standard was put forward by the National Development and Reform Commission.

The present standard is under the jurisdiction of the National Automotive Standardisation Technical Committee.

The Shanghai Automotive Lamp Research Institute was responsible for drafting the present standard.

The main authors of the present standard: Wang Hua, Chen Ji, Yu Peifeng.

The previous versions replaced by the present standard are:

JB 4131-85 and GB 17509-98.

Photometric characteristics of direction indicators for motor vehicles and their trailers

(Draft Submitted for Approval)

1 Scope

The present standard specifies the technical requirements, test methods and inspection rules for photometric characteristics of direction indicators for motor vehicles and their trailers.

The present standard applies to various types of direction indicators used by vehicles of categories M, N and O. In the present standard, the aforesaid direction indicators are also referred to as devices.

2 Cited regulatory documents

The clauses in the documents below become clauses of the present standard by virtue of being cited by the present standard. If a date is indicated for a cited document, no subsequent revision sheet (not including corrigenda) or amended version shall apply to the present standard. Nevertheless, the parties to agreements based on the present standard are encouraged to study whether the most recent versions of these documents can be used. If no date is indicated for a cited document, then the most recent version applies to the present 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 R37	Uniform provisions concerning the certification of filament lamps of power-driven vehicles and their trailers

3 Terms and definitions

The terms and definitions established in GB 4785 apply to the present standard.

4 Classification

4.1 Categories of direction indicators

A device's category and minimum light distribution angle are prescribed according to its mounting position and function on the vehicle (see Fig. 1):

- | | |
|------------------------------------|--|
| a) Category 1 device | Front direction signal whose mounting position is at least 40 mm from the dipped-beam headlamp or front fog lamp |
| b) Category 1a device | Front direction signal whose mounting position is more than 20 mm, but less than 40 mm from the dipped-beam headlamp or front fog lamp |
| c) Category 1b device | Front direction signal whose mounting position is no more than 20 mm from the dipped-beam headlamp or front fog lamp. |
| d) Category 2a device | Rear direction signal mounted on the rear of the vehicle and having one level of luminous intensity |
| e) Category 2b device | Rear direction signal mounted on the rear of the vehicle and having two levels of luminous intensity |
| f) Category 3 device | Front-side direction indicator for use on a vehicle equipped with this category of direction indicator only |
| g) Category 4 device | Front-side direction indicator for use on a vehicle equipped with category 2a or 2b devices |
| h) Category 5 or category 6 device | Supplementary side direction indicator for use on a vehicle also equipped with categories 1, 1a or 1b and 2a or 2b devices |

4.2 The vertical angle V in Fig. 1 is the angle relative to the horizontal plane. Above the horizontal plane, the angle is positive, and below the plane it is negative. The horizontal angle H is the angle relative to the reference axis and the driving direction; in terms of device photometry, the angle to the right of the reference axis is positive and to the left is negative.

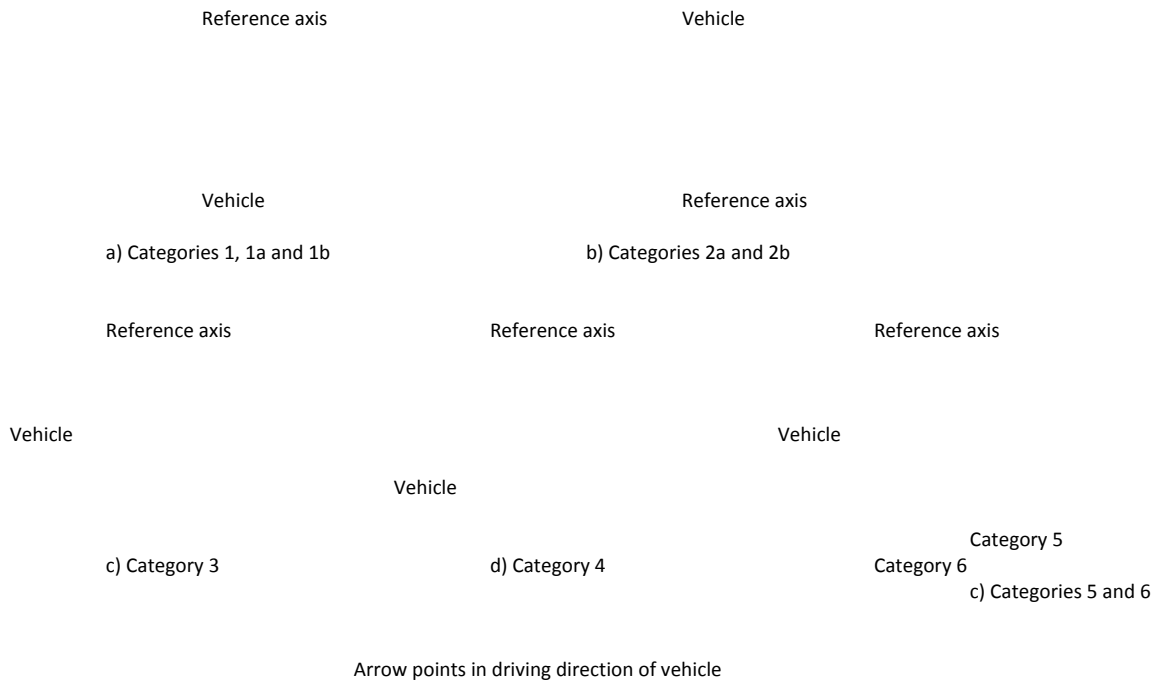


Fig. 1 Categories and minimum light distribution angles of direction indicators

5 Different types of direction indicators

Devices that differ primarily with respect to the following:

- a) trademark name or trademark;
- b) optical system characteristics (level of luminous intensity, minimum light distribution angle, the kinds of filament lamps or light source modules used, etc.);
- c) category of device.

However, devices that change with respect to filament lamp colour or filter colour may be regarded as being the same type.

6 Requirements

6.1 The devices shall be designed and manufactured such that, under normal use conditions, and even if subject to vibrations, they can ensure that use requirements are met and that the provisions of the present standard are complied with.

6.2 In the area shown in Fig. 2, the colour of light from the device shall be amber, and its chrominance properties shall conform to the provisions of GB 4785. The colour of the light shall not undergo any obvious change outside the area.

6.3 Devices whose light sources can be replaced shall employ filament lamps that conform to the provisions of GB 15766.1 or ECE R37.

6.4 Light source modules that are used shall be designed so that they can be mounted in the correct positions even in darkness and so that they can prevent incorrect operation.

6.5 Photometric characteristics

6.5.1 See Fig. 2 for light distribution requirements. The numbers at the intersections of the grid lines in Fig. 2 are percentages which indicate the ratio of the minimum luminous intensity in said direction to the minimum luminous intensity in the direction of the reference axis (categories 1, 1a, 1b, 2a, 2b, 3 or 4 (forward)) or direction A (category 6). Direction A is the direction where $H = 5^\circ$ and $V = 0^\circ$.

6.5.2 The luminous intensity of each category of device in the reference axis direction or direction A shall conform to the specifications in Table 1.

a) Categories 1, 1a, 1b, 2a, 2b, 3 and 4 (forward)

Towards the outer side of the vehicle

b) Category 6

Fig. 2 Photometric distribution

6.5.3 Directions other than the reference axis direction and direction A within the scope of luminous intensity distribution (see Fig. 2):

6.5.3.1 The luminous intensities of categories of devices corresponding to other directions shall be no less than the product of the minimum luminous intensity in Table 1 and the percentage indicated for the corresponding direction.

6.5.3.2 Light shining within said scope shall change uniformly. Luminous intensity measured in any direction within the scope delimited by the grid lines shall be no less than the minimum luminous intensity in the directions surrounding said direction.

6.5.4 The requirements for each category of device within the scope of minimum light distribution angles (see Fig. 1):

6.5.4.1 Luminous intensity shall comply with the following:

- a) category 1b device no less than 0.7 cd;
- b) categories 1, 1a, 2a, 3, and 4 (forward) and 2b (day) no less than 0.3 cd;
- c) category 2b (night) device no less than 0.07 cd;
- d) category 4 (rear-direction) and category 5 device no less than 0.6 cd.

Table 1

Unit: candela

Category	Minimum luminous intensity	Maximum luminous intensity		
		Single lamp	Single lamp marked "D"	Assembly of two lamps
1	175	700 ^a	490 ^a	980 ^a
1a	250	800 ^a	560 ^a	1120 ^a
1b	400	860 ^a	600 ^a	1200 ^a
2a	50	350 ^a	350 ^a	350 ^a
2b (day)	175	700 ^a	490 ^a	980 ^a
2b (night)	40	120 ^a	84 ^a	168 ^a
3 (forward)	175	700 ^a	490 ^a	980 ^a
3 (reverse)	50	200 ^a	140 ^a	280 ^a
4 (forward)	175	700 ^a	490 ^a	980 ^a
4 (reverse)	0.6	200 ^a	140 ^a	280 ^a
5	0.6	200 ^a	140 ^a	280 ^a
6	50	200 ^a	140 ^a	280 ^a

^a With the exception of category 2a, two or more lamps that have the same functions may, according to the definition in GB 4785, be considered single in terms of their installation on a vehicle. In such a situation, when any one light source fails, it still shall comply with the minimum luminous intensity requirement. When all light sources are turned on, they shall not exceed the corresponding maximum luminous intensity in Table 1. Said maximum luminous intensity is 1.4 times the limit for a single lamp. As for single lamps that contain more than one light source:

- a) all serially-connected lights sources are considered to be one light source;
- b) when a light source fails, it shall still meet the minimum luminous intensity requirement. However, for lamps that are designed to be used with only two light sources, the minimum luminous intensity on the reference axis of the lamp is permitted to be 50% of the original value, provided that the technical description states that the vehicle on which said lamp is mounted has an operating display which can display when either light source fails;
- c) when all light sources are illuminated, the maximum luminous intensity is permitted to exceed the specified value for a single lamp (provided that it is not marked "D"), but is not permitted to exceed the specified value for the corresponding assembly of two lamps in Table 1.

6.5.4.2 Outside the 10° visual field (i.e., $H = \pm 10^\circ$, $V = \pm 10^\circ$), the luminous intensities of devices of categories 1, 2b (night), 3 (forward), and 4 (forward) shall not exceed the limits in Table 2. In the area between (inclusive of boundaries) the 10° visual field and the 5° visual field (i.e., $H = \pm 5^\circ$, $V = \pm 5^\circ$), the maximum luminous intensities permissible for these devices shall increase steadily to the maximum values specified in Table 1.

Table 2

Unit: candela

Category	Maximum luminous intensity outside the 10° visual field		
	Single lamp	Single lamp marked "D"	Assembly of two lamps
2b (night)	100	70	140
1, 3 (forward) and 4 (forward)	400	280	560

6.5.4.3 Outside the 15° visual field (i.e., $H = \pm 15^\circ$, $V = \pm 15^\circ$), the luminous intensities of devices of categories 1a and 1b shall not exceed the value in Table 3. In the area between the 15° visual field and the 5° visual field, the maximum luminous intensities permissible for these devices shall also increase steadily to the maximum values specified in Table 1.

Table 3

Unit: candela

Category	Maximum luminous intensity outside the 15° visual field		
	Single lamp	Single lamp marked "D"	Assembly of two lamps
1a	250	175	350
1b	400	280	560

6.5.5 Luminous intensity shall be no greater than the maximum value in Table 1 in any direction from which the device is visible.

6.6 Category 2b devices shall be measured under night and day use conditions, with the time required for such measurement from when the light source is energised until the luminous intensity in the reference axis direction reaches 90% of the initial measurement taken when the light source was continuously alight. The time corresponding to night conditions shall not exceed the time corresponding to day conditions.

6.7 When the device is mounted at a height no greater than 750 mm, h-h-5° measurement points and areas are not measured.

7 Test methods

7.1 The test dark room, devices, and equipment shall comply with the provisions of GB 4599.

7.2 The visual surface boundaries shall be determined in the reference axis direction of the device.

7.3 Photometric test voltage

7.3.1 In the case of devices that are equipped with replaceable filament lamps, measurement of photometric characteristics shall make use of the standard filament lamps of the corresponding categories and shall be carried out under the specified luminous flux for the test.

7.3.2 Photometric measurement of devices with non-replaceable light sources shall be conducted at 6.75 V, 13.5 V, or 28.0 V, respectively.

7.3.3 In the case of devices that require special power supplies, the manufacturer shall provide the special power supply required for this type of light source, and the measurement shall be carried out at the voltage specified by the manufacturer.

7.3.4 In the case of category 2b (night) devices that make use of supplementary devices to achieve night-time luminous intensity, the voltage applied to the supplementary device for night-time luminous intensity shall equal the voltage applied to the lamp to measure day-time luminous intensity.

7.4 Prior to photometric characteristics measurement, the light source shall be turned on at the measurement voltage so that the photometric characteristics tend to stabilize.

7.5 If, due to device structural constraints, overheating can be avoided only through use of a light-emitting diode (LED) or intermittent operation, the measurement may be carried out in flashing mode.

7.5.1 Switching shall be effected at a frequency of $f = (1.5 \pm 0.5)$ Hz, and measurement shall be performed at 95% peak luminous intensity. Pulses shall have a continuous duration no greater than 0.3 s.

7.5.2 In devices equipped with replaceable filament lamps, the filament lamp shall be illuminated at test luminous flux. In all other cases, the voltage specified in 6.3 shall be used, with a rise time and a fall time no greater than 0.01 s.

7.5.3 In flashing mode measurement, the final measured luminous intensity result is the maximum luminous intensity.

7.6 Photometric characteristics measurement of each category of device:

7.6.1 In the case of photometric measurement of devices with non-replaceable light sources, the existing light source in the device shall be used.

7.6.2 When several filament lamps have been installed, measurement may be carried out using mass-produced filament lamps at 6.75 V, 13.5 V, or 28.0 V voltages, and the luminous intensities produced shall be corrected. The ratio of the corresponding test luminous flux specified in 6.3 to the mean luminous flux at the test voltage (6.75 V, 13.5 V, or 28.0 V) is the correction factor. The actual luminous flux of each filament lamp shall deviate from its mean value by no more than $\pm 5\%$. Or measurements can be carried out using standard lamps, operating them in test luminous flux mode at each individual lamp position in turn and then totalling the individual measurement results of each position.

7.6.3 In the case of devices that are not equipped with filament lamps, their luminous intensity shall, after 1 min and 30 min in flashing mode ($f = 1.5$ Hz, the ratio of illumination time to one entire flash period being 50%), comply with the maximum and minimum requirements in Table 1, Table 2, and Table 3. The luminous intensity of each point after 1 min of illumination shall be calculated by multiplying the luminous intensity ratio in HV after 1 min of illumination and 30 min of illumination with the luminous intensity measurement result at each point after 30 min of illumination.

7.7 When photometric tests are conducted, stray light shall be avoided by providing appropriate masking.

7.8 The distance of photometric characteristics measurement shall ensure that the optical law of the square of the inverse of distance can be applied.

7.9 When observations are made from the reference centre of the light, the field angle of the light receiver shall be between 10' and 1°.

7.10 When measuring in any direction in Fig. 1, the angle deviation shall be no greater than 15'.

7.11 If a device can be mounted on a vehicle in more than one position or in different positions of one field, photometric measurement shall be carried out at each position or at the extreme positions within the reference axis field specified by the manufacturer.

7.12 A standard light source A (colour temperature 2856K) shall be used for the colour inspection under 6.2. In the case of devices with non-replaceable light sources, measurement shall be carried out at 6.75 V, 13.5 V, or 28.0 V. Observe colour changes outside of field 2 with the naked eye.

8 Inspection rules

8.1 Different types of devices are judged according to the provisions of chapter 5.

8.2 The device shall undergo a type inspection and a production conformity inspection. Devices that comply with the relevant provisions of 8.3 or 8.4 shall be regarded as having passed the type inspection or production conformity inspection for said devices.

8.3 Type inspection

8.3.1 The manufacturer shall provide:

a) drawings in triplicate sufficient to identify the type of device, with the following marked: reference axis ($H = 0^\circ$, $V = 0^\circ$), reference centre, and the geometric positions for mounting on the vehicle;

b) a concise technical description, which, excepting devices with non-replaceable light sources, specifies the category of filament lamp to be used;

c) two sample lights (including filament lamps in the case of devices with non-replaceable light sources); in the case of category 2b devices, supplementary devices capable of two luminous intensity levels shall be provided when necessary.

8.3.2 Each sample light shall comply with the provisions of 6.1, 6.3, or 6.4 and with the provisions of 6.6.

8.3.3 When testing **in accordance with** the provisions of chapter 7, each sample light shall comply with the relevant provisions of **6.2 and 6.5**.

8.4 Production conformity inspection

8.4.1 In the case of devices that have passed type inspection, use sample lights randomly selected from mass-produced products to judge their production conformity.

8.4.2 Randomly selected samples shall comply with the provisions of 6.1, 6.3, or 6.4 and with the provisions of 6.6.

8.4.3 When testing in accordance with the provisions of chapter 7, the randomly selected sample lights shall comply with the provisions of 6.2.

8.4.4 When testing in accordance with the provisions of chapter 7, the randomly selected sample lights shall comply with the relevant provisions of 6.5, permitting therein:

a) minimum luminous intensity no less than 80% of the value specified in 6.5;

b) maximum luminous intensity no greater than 120% of the value specified in 6.5.