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## GB 4785-2007

Replacing GB 4785-1998

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### **Prescription for installation of the external lighting and light-signaling devices for motor vehicles and their trailers**

汽车及挂车外部照明和光信号装置的安装规定

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- ADD the contents of the daytime running lamp;
- In view of the requirements for automotive lighting by the rapid development of transportation, this standard refers to ECE R48 (2003 version) to modify the relevant content of the reversing lamp; and ADD such contents as the gas-discharge light source headlamp and bend lighting, etc.;

The main technical requirements of this standard such as the general provisions, special provisions, lamp surface, reference axis, reference center and angle of geometric visibility, invisibility of front view red light and rear view white light, various load conditions to determine the dipped-beam variations along vertical direction, the measurement of the change of the dipped-beam inclination with the loading change, the indication of the initial adjustment, the headlamp dimming device controller, and the production conformity control are consistent with ECE R48.

This standard replaces GB 4785-1998 “Prescription for installation of the external lighting and light-signaling devices for motor vehicles and their trailers”. As compared with the 1998 version, this standard has the following main changes:

- MODIFY and ADD the contents of Chapter 2 “Normative references” of the previous version;
- MODIFY the contents of Chapter 3 “Definitions” of the previous version, CHANGE it into Chapter 3 “Terms and definitions” of this version;
- MODIFY the relevant clauses in Chapter 4 “Technical requirements” of the previous version (e.g. general provisions, lamp light color, and special requirements);
- MODIFY Chapter 5 “Test methods” and Chapter 6 “Inspection rules” of the previous version;
- ADD the relevant clauses on the headlamp dimming device;
- ADD such contents as the automotive gas-discharge light source headlamp, bend lighting, daytime running lamp, and so on.

Appendix A, Appendix B, Appendix C, Appendix D, Appendix E and Appendix F of this standard are normative.

From the date of implementation of this standard, GB 4785-1998 is abolished. The automotive products newly applying for type test must comply with this standard.

# **Prescription for installation of the external lighting and light-signaling devices for motor vehicles and their trailers**

## **1 Scope**

This standard specifies the technical requirements, test methods and inspection rules for the installation of external lighting and light-signaling device for motor vehicles and their trailers.

This standard applies to the motor vehicles of categories M, N and O and their trailers.

## **2 Normative references**

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 3977 Specification of colors

GB/T 3978 Standard illuminants and illuminating-viewing conditions

GB 4599 Motor vehicle headlamps equipped with filament lamps

GB/T 7922 Method of measuring the color of light sources

GB 21259 Headlamps equipped with gas-discharge light sources for motor vehicles

GB 21260 Headlamp cleaner

## **3 Terms and definitions**

The following terms and definitions apply to this standard.

### 3.1

#### **Type test of a vehicle**

It refers to the type test conducted against a vehicle type on the installation quantity and method of the external lighting and the light-signaling device.

### 3.2

#### **Transverse plane**

It refers to a vertical plane perpendicular to the median longitudinal plane of the vehicle.

### 3.3

#### **Unladen vehicle**

It refers to a vehicle without driver, crew, passengers and load, BUT with a full supply of fuel, spare wheel and the tools normally carried;

### 3.4

#### **Laden vehicle**

It refers to a vehicle loaded to its technically permissible maximum mass, as stated by the manufacturer, who shall also fix the distribution of this mass between the axles in accordance with the method as described in Appendix A.

### 3.5

#### **Lamp**

It refers to a device designed to illuminate the road or to emit a light signal to other road users. Rear registration plate lamps and retro-reflectors are likewise to be regarded as lamps.

#### 3.5.1

##### **Equivalent lamps**

It refers to the lamps having the same function and authorized by the competent authorities; such lamps may have different characteristics from those installed on the vehicle when it is approved on condition that they satisfy the requirements of this standard.

#### 3.5.2

It refers to the lamp used to illuminate the road to the rear of the vehicle and to warn other road users that the vehicle is reversing or about to reverse.

### **3.5.19**

#### **Parking lamp**

It refers to a lamp which is used to draw attention to the presence of a stationary vehicle in a certain area. In such circumstances it replaces the front and rear position lamps.

### **3.5.20**

#### **End-outline marker lamp**

It refers to the lamp fitted near to the extreme outer edge and as close as possible to the top of the vehicle and intended to indicate clearly the vehicle's overall width. This lamp is intended, for certain vehicles and trailers, to complement the vehicle's front and rear position lamps by drawing particular attention to its bulk.

### **3.5.21**

#### **Side marker lamp**

It refers to a lamp used to indicate the presence of the vehicle when viewed from the side.

### **3.5.22**

#### **Daytime running lamp**

It refers to a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime.

## **3.6**

### **Illuminating surface (SEE Appendix B)**

#### **3.6.1**

##### **Illuminating surface of a lighting device (3.5.7, 3.5.8, 3.5.16 and 3.5.18)**

It refers to the orthogonal projection of the full aperture of the reflector, OR in the case of headlamps with an ellipsoidal reflector of the "projection lens", on a transverse plane. If the lighting device has no reflector, the definition of 3.6.2 shall be applied. If the light emitting surface of the lamp extends over

- C) Of devices for indirect vision;
- D) Of side direction-indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps, retro-reflectors and side-marker lamps;
- E) Of customs seals affixed to the vehicle, AND of devices for securing and protecting such seals.

### 3.12

#### **Overall width**

It refers to the distance between the two vertical planes defined in the paragraph 3.11 above.

### 3.13

#### **A single lamp**

It refers to a device or part of a device having one lighting or light-signaling function, one or more light sources and one apparent surface in the direction of the reference axis.

For vehicle installation, a single lamp also refers to an assembly consisting of two independent lamps or grouped lamps, which, whether identical or not, have the same function AND the projection of their apparent surfaces in the direction of the reference axis occupies not less than 60 percent of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis.

In the above case, each lamp in this type of independent lamp shall be subjected to "D" type lamp type test if requiring the type test.

But the grouped lamp aforementioned does not apply to the driving beam headlamp, passing beam headlamp, and front fog lamp.

### 3.14

#### **Two lamps or an even number of lamps**

It refers to a single light-emitting surface in the shape of a band or strip if such band or strip is placed symmetrically in relation to the median longitudinal plane of the vehicle, extends on both sides to within at least 400 mm of the extreme outer edge of the vehicle, AND is not less than 800 mm long; the illumination of such surface shall be provided by not less than two light sources placed as close as possible to its ends; the light-emitting

## **4.1 General provisions**

**4.1.1** Lighting and light-signaling devices must comply with the appropriate standards AND pass the product type test. They shall be so fitted that under normal conditions of use as defined in 3.23.1, 3.23.2 and 3.23, and notwithstanding any vibrations to which they may be subjected, they retain the characteristics prescribed by this standard AND enable the vehicle to comply with the requirements of this standard. In particular, it shall not be possible for the lamps to be inadvertently maladjusted.

**4.1.2** The illuminating lamps described in paragraphs 3.5.7, 3.5.8 and 3.5.16 shall be so installed that correct adjustment of their orientation can easily be carried out.

**4.1.3** For all light-signaling devices, including those mounted on the side panels, the reference axis of the lamp when fitted to the vehicle shall be parallel to the bearing plane of the vehicle on the road; in addition it shall be perpendicular to the median longitudinal plane of the vehicle in the case of side retro-reflectors and of side-marker lamps AND parallel to that plane in the case of all other signaling devices. In each direction a tolerance of  $\pm 3^\circ$  shall be allowed. In addition, any specific instructions as regards fitting laid down by the manufacturer shall be complied with.

**4.1.4** In the absence of specific instructions, the height and orientation of the lamps shall be verified with the vehicle unladen and placed on a flat, horizontal surface in the condition defined in paragraph 3.23.1 and 3.23.2 of 3.23 above.

**4.1.5** In the absence of specific instructions lamps constituting a pair shall:

**4.1.5.1** Be fitted to the vehicle symmetrically in relation to the median longitudinal plane (this estimate to be based on the exterior geometrical form of the lamp AND not on the edge of its illuminating surface referred to in paragraph 3.6);

**4.1.5.2** Be symmetrical to one another in relation to the median longitudinal plane, this requirement is no valid with regard to the interior structure of the lamp;

**4.1.5.3** Satisfy the same colorimetric requirements;

**4.1.5.4** Have substantially identical photometric characteristics.

**4.1.6** On vehicles whose external shape is asymmetrical the above requirements shall be satisfied so far as is possible.



**4.1.10.3** In their respective planes, the zones I and II explored by the eye of the observer are bounded:

**4.1.10.3.1** In height, by two horizontal planes 1 m and 2.2 m respectively above the ground;

**4.1.10.3.2** In width, by two vertical planes which, forming to the front and to the rear respectively an angle of 15° outwards from the vehicle's median longitudinal plane, pass through the point or points of contact of vertical planes parallel to the vehicle's median longitudinal plane delimiting the vehicle's overall width; If there are several points of contact, the foremost shall correspond to the forward plane and the rearmost to the rearward plane.

**4.1.11** The electrical connections shall be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched ON and OFF simultaneously. However, when the front and rear position lamps are switched ON, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps, this condition does not apply.

**4.1.12** The electrical connections shall be such that the main-beam and dipped-beam headlamps and the front fog lamps cannot be switched on unless the lamps referred to in paragraph 4.1.11 are also switched on. This requirement shall not apply, however, to main-beam or dipped-beam headlamps when their luminous warnings consist of the intermittent lighting up at short intervals of the main-beam headlamp and the dipped-beam headlamp OR the intermittent lighting up alternatively at short intervals of main-beam headlamp and dipped-beam headlamp.

#### **4.1.13 Tell-tale**

Where a closed-circuit tell-tale is prescribed by this standard, it may be replaced by an "operating" tell-tale.

#### **4.1.14 Concealable lamps**

**4.1.14.1** The concealment of lamps shall be prohibited, with the exception of the main-beam headlamps, the dipped-beam headlamps, and the front fog lamps, which may be concealed when they are not in use.

**4.1.14.2** In the event of any failure affecting the operation of the concealment device the lamps shall remain in the position of use, if already in use, OR shall be capable of being moved into the position of use without the aid of tools.

**4.1.14.3** It shall be possible to move the lamps into the position of use AND to switch them on by means of a single control, without excluding the possibility

### **4.3.1 Main-beam headlamps**

**4.3.1.1** Presence: mandatory on motor vehicles AND prohibited on trailers.

**4.3.1.2** Number: 2 or 4; for vehicles of the category N<sub>3</sub>: two extra main-beam headlamps may be installed. Where a vehicle is fitted with four concealable headlamps the installation of two additional headlamps shall only be authorized for the purpose of light-signaling, consisting of intermittent illumination, at short intervals in daylight.

**4.3.1.3** Arrangement: No special requirements.

#### **4.3.1.4** Position

**4.3.1.4.1** In width: No special requirements.

**4.3.1.4.2** In height: No special requirements.

**4.3.1.4.3** In length: At the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.

**4.3.1.5** Geometric visibility: The visibility of the illuminating surface, including its visibility in areas which do not appear to be illuminated in the direction of observation considered, shall be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5° with the axis of reference of the headlamp. The origin of the angles of geometric visibility is the perimeter of the projection of the illuminating surface on a transverse plane tangent to the foremost part of the lens of the headlamp, as shown in in Figure 1.

**4.3.1.9** Other requirements: the aggregate maximum intensity of the main-beam headlamps which can be switched on simultaneously shall not exceed 225000 cd.

### **4.3.2 Dipped-beam headlamp**

**4.3.2.1** Presence: Mandatory on motor vehicles. Prohibited on trailers.

**4.3.2.2** Number: 2.

**4.3.2.3** Arrangement: No special requirements.

#### **4.3.2.4 Position**

**4.3.2.4.1** In width: That edge of the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle.

The inner edges of the apparent surfaces in the direction of the reference axis shall be not less than 600 mm apart. This does not apply, however, for M<sub>1</sub> and N<sub>1</sub> category vehicles; for all other categories of motor vehicles, this distance may be reduced to 400 mm where the overall width of the vehicle is less than 1300 mm.

**4.3.2.4.2** In height: not less than 500 mm and not more than 1200 mm above ground. For category N<sub>3</sub>G (off-road) vehicles, the maximum height may be increased to 1500 mm.

**4.3.2.4.3** In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly through the devices for indirect vision and/or other reflecting surface of the vehicle.

**4.3.2.5** Geometric visibility: defined by angles  $\alpha$  and  $\beta$  as specified in paragraph 3.10.

$\alpha$  = 15° upwards AND 10° downwards;

$\beta$  = 45° outwards AND 10° inwards.

Since the photometric values required for dipped-beam headlamps do not cover the full geometric field of vision, a minimum value of 1 cd in the space remaining is required for type inspection purposes. The presence of partitions or other items of equipment near the headlamp shall not give rise to secondary effects causing discomfort to other road users, as shown in Figure 2.

**4.3.2.6** Orientation: Towards the front.

**4.3.3.3.1.2** Two rear direction-indicator lamps (category 2a or 2b); AND two optional lamps (category 2a or 2b) on all vehicles in categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub> and N<sub>3</sub>.

**4.3.3.3.1.3** Two side direction-indicator lamps of the categories 5 or 6 (minimum requirements):

Category 5 applies to all M<sub>1</sub> vehicles AND for N<sub>1</sub>, M<sub>2</sub> and M<sub>3</sub> vehicles not exceeding 6 m in length.

Category 6 applies to all N<sub>2</sub> and N<sub>3</sub> vehicles AND for N<sub>1</sub>, M<sub>2</sub> and M<sub>3</sub> vehicles exceeding 6 m in length.

It is allowed to replace category 5 side direction-indicator lamps by category 6 side direction-indicator lamps in all instances.

Where lamps combining the functions of front direction-indicator lamps (categories 1, 1a and 1b) and side direction-indicator lamps (categories 5 and 6) are fitted, two additional side direction-indicator lamps (categories 5 and 6) may be fitted to meet the visibility requirements of paragraph 4.3.3.5.

**4.3.3.3.2** Arrangement B: only for trailers. Two rear direction-indicator lamps (categories 2a or 2b). Two optional lamps (categories 2a or 2b) on all vehicles in categories O<sub>2</sub>, O<sub>3</sub> and O<sub>4</sub>.

**4.3.3.4** Installation position

**4.3.3.4.1** In width: the edge of the apparent surface in the direction of the reference axis farthest from the median longitudinal plane of the vehicle shall not be more than 400 mm from the extreme outer edge of the vehicle. This condition shall not apply to the optional rear lamps.

The distance between the inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm.

This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1300 mm.

**4.3.3.4.2** In height: above the ground.

**4.3.3.4.2.1** The height of the light-emitting surface of the side direction-indicator lamps of categories 5 or 6 shall not be less than 350 mm for M<sub>1</sub> and N<sub>1</sub> category of vehicles, and 500 mm for all other categories of vehicles, both measured from the lowest point; AND shall not be more than 1500 mm measured from the highest point.

To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 cm<sup>2</sup>, except for side direction-indicators of categories 5 and 6. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.

**4.3.3.6 Orientation:** According to the specifications for installation by the manufacturer, if any.

**4.3.3.7 Electrical connections:** Direction-indicator lamps shall switch on independently of the other lamps. All direction-indicator lamps on one side of a vehicle shall be switched on and off by means of one control AND shall flash in phase. On M<sub>1</sub> and N<sub>1</sub> vehicles less than 6 m in length, with an arrangement complying with Figure 4b), the amber side-marker lamps, when mounted, shall also flash at the same frequency (in phase) with the direction-indicator lamps.

**4.3.3.8 Tell-tale:** The front and rear direction-indicator lamps must be equipped with an operating tell-tale, which may be visual or auditory or both. If it is visual, it shall be a flashing light which, at least in the event of the malfunction of any of these direction-indicator lamps, is either extinguished OR remains alight without flashing, OR shows a marked change of frequency. If it is entirely auditory, it shall be clearly audible AND shall show a marked change of frequency, at least in the event of the malfunction of any of these direction-indicator lamps.

If a motor vehicle is equipped to draw a trailer, it shall be fitted with a special visual operational tell-tale for the direction-indicator lamps on the trailer unless the tell-tale of the drawing vehicle allows the failure of any one of the direction-indicator lamps on the vehicle combination thus formed to be detected.

#### **4.3.3.9 Other requirements**

The light shall be a flashing light flashing  $90 \pm 30$  times per minute.

Operation of the light-signal control shall be followed within not more than 1 s by the emission of light AND within 1 s ~ 1.5 s by its first extinction.

If a motor vehicle is equipped to draw a trailer, the control of the direction-indicator lamps on the drawing vehicle shall also operate the indicator lamps of the trailer.

In the event of failure, other than short-circuit, of one direction-indicator lamp, the others shall continue to flash, BUT the frequency in this condition may be different from that prescribed.

#### **4.3.4 Stop lamp**

**4.3.5.2** Number: Such that the device illuminates the site of the registration plate.

**4.3.5.3** Arrangement: Such that the device illuminates the site of the registration plate.

**4.3.5.4** Installation position: in width, in height and in length are based on the lighting requirements of the registration plate.

**4.3.5.5** Geometric visibility: Such that the device illuminates the site of the registration plate.

**4.3.5.6** Orientation: Such that the device illuminates the site of the registration plate.

**4.3.5.7** Electrical connection: as specified in 4.1.11.

**4.3.5.8** Tell-tale: Optional. If equipped, its function shall be carried out by the tell-tale required for the front and rear position lamps.

**4.3.5.9** Other requirements

When the rear registration plate lamp is combined with the rear position lamp, reciprocally incorporated in the stop lamp or in the rear fog lamp, the photometric characteristics of the rear registration plate lamp may be modified during the illumination of the stop lamp or the rear fog lamp.

#### **4.3.6 Front position lamp**

**4.3.6.1** Presence: It is mandatory on all motor vehicles and trailers over 1600 mm wide. AND it is optional on trailers which are not more than 1600 mm wide.

**4.3.6.2** Number: Two.

**4.3.6.3** Arrangement: No special requirements.

**4.3.6.4** Installation position

**4.3.6.4.1** In width: That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme edge of the vehicle.

In case of a trailer, that point on the apparent surface in the direction of the reference axis which is farthest from the median longitudinal plane shall not be more than 150 mm from the extreme outer edge of the vehicle.

axis. For all other categories of vehicles, it shall be not less than 600 mm. AND this distance may be reduced to 400 mm where the overall width of the vehicle is less than 1300 mm.

**4.3.7.4.2** In height: above the ground, not less than 350 mm nor more than 1500 mm. It shall be 2100 mm if the shape of the body work makes it impossible to keep within 1500 mm AND if the optional lamps are no installed. The height of the ground is not less than 350mm and not more than 1500mm. If the optional lamps are installed, they shall be placed at a height compatible with the applicable requirements of 4.3.7.4.1, the symmetry of the lamps, AND at a vertical distance as large as the shape of the bodywork makes it possible, BUT not less than 600 mm above the mandatory lamps.

**4.3.7.4.3** In length: It is installed in rear of the vehicle.

**4.3.7.5** Geometric visibility: SEE Figure 7.

Horizontal angle: 45° inwards and 80° outwards.

Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of lamps less than 750 mm above the ground. The vertical angle above the horizontal may be reduced to 5° in the case of optional lamps not less than 2100 mm above the ground.

For M<sub>1</sub> and N<sub>1</sub> category vehicles, at the discretion of the manufacturer, if a rear side-marker lamp is installed to substitute the rear position lamp:

Horizontal angle: 45° outwards to 45° inwards.

Vertical angle: 15° above and below the horizontal. AND the vertical angle below the horizontal may be reduced to 5° in the case of lamps less than 750 mm above the ground.

To be considered visible, the lamp shall provide an unobstructed view of the apparent surface of at least 12.5 cm<sup>2</sup>. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.

**4.3.7.6** Orientation: Rearwards.

**4.3.7.7** Electrical connections: as specified in 4.1.11.

**4.3.7.8** Tell-tale: Circuit-closed tell-tale is mandatory. It shall be combined with that of the front position lamps.

**4.3.7.9** Other requirements: none.

the direction of the reference axis shall be as follows: For M<sub>1</sub> and N<sub>1</sub> category vehicles, there is no special requirement; for all other categories of vehicles: it shall be less than 600 mm. AND this distance may be reduced to 400 mm where the overall width of the vehicle is less than 1300 mm.

**4.3.10.4.2** In height: Above the ground, not less than 250 mm nor more than 900 mm (1500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

**4.3.10.4.3** In length: It is installed at the front of the vehicle.

**4.3.10.5** Geometric visibility: SEE Figure 10.

Horizontal angle: 30° inwards and outwards. In the case of trailers, the angle inwards may be reduced to 10°. If because of the construction of the trailers this angle cannot be met by the mandatory retro-reflectors, then additional (supplementary) retro-reflectors shall be fitted, without the width limitation, which shall, in conjunction with the mandatory retro-reflectors, give the necessary visibility angle.

Vertical angle: 10° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of a retro-reflector less than 750 mm above the ground.

**4.3.10.6** Orientation: Towards the front.

**4.3.10.7** Other requirements: The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the front.



**4.3.12.1** Presence: It is mandatory. The signal shall be given by simultaneous operation of the direction-indicator lamps.

**4.3.12.2** Number: As specified in 4.3.3.2.

**4.3.12.3** Arrangement: As specified in 4.3.3.3.

**4.3.12.4** Installation position:

**4.3.12.4.1** In width: As specified in 4.3.3.4.1.

**4.3.12.4.2** In height: As specified in 4.3.3.4.2.

**4.3.12.4.3** In length: As specified in 4.3.3.4.3.

**4.3.12.5** Geometric visibility: As specified in 4.3.3.5.

**4.3.12.6** Orientation: As specified in 4.3.3.6.

**4.3.12.7** Electrical connections: The signal shall be operated by means of a separate manual control enabling all the direction-indicator lamps to flash in phase. On  $M_1$  and  $N_1$  vehicles less than 6 m in length, with an arrangement complying with Figure 4b), the amber side-marker lamps, when mounted, shall also flash at the same frequency (in phase) with the direction-indicator lamps.

**4.3.12.8** Tell-tale: Circuit-closed tell-tale is mandatory. The flashing warning light may operate in conjunction with the tell-tale as specified in 4.3.3.8.

**4.3.12.9** Other requirements: As specified in 4.3.3.9, if a power-driven vehicle is equipped to draw a trailer, the hazard warning signal control shall also be capable of bringing the direction-indicator lamps on the trailer into action. The hazard warning signal shall be able to function even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

### **4.3.13 Front fog lamp**

**4.3.13.1** Presence: It is optional on motor vehicles AND prohibited on trailers.

**4.3.13.2** Number: Two.

**4.3.13.3** Arrangement: No special requirements.

**4.3.13.4** Installation position

**4.3.14.7** Electrical connections: These shall be such that:

**4.3.14.7.1** The rear fog lamp cannot be switched on unless the main beams, dipped beams or front fog lamp are lit.

**4.3.14.7.2** The rear fog lamp can be switched off independently of any other lamps.

**4.3.14.7.3** One of the following two requirements shall be met:

**4.3.14.7.3.1** The rear fog lamp may continue to operate until the position lamps are switched off, AND the rear fog lamp shall then remain off until deliberately switched on again.

**4.3.14.7.3.2** A warning, at least audible, additional to the mandatory tell-tale (paragraph 4.3.14.8) shall be given if the ignition is switched off OR the ignition key is withdrawn AND the driver's door is opened, whether the main-beam, dipped-beam or front fog lamp are on or off, whilst the rear fog lamp switch is in the "on" position.

**4.3.14.7.4** Except as provided in paragraph 4.3.14.7.1 and 4.3.14.7.3, the operation of the rear fog lamp shall not be affected by switching on or off any other lamps.

**4.3.14.8** Tell-tale: Circuit-closed tell-tale is mandatory, which is an independent non-flashing warning light.

**4.3.14.9** Other requirements: In all cases, the distance between the rear fog lamps and each stop lamp shall be greater than 100 mm.

or rear of the vehicle, in conformity with the requirements of paragraphs 4.3.15.5 and 4.3.15.6.

**4.3.15.5** Geometric visibility: It is defined by angles  $\alpha$  and  $\beta$  as specified in paragraph 3.10. SEE Figure 14.

$\alpha$  = 15° upwards and 5° downwards;

$\beta$  = 45° to right and to left if there is only one device, 45° outwards and 30° inwards if there are two.

The reference axis of the two optional devices mentioned in paragraph 4.3.15.2.2, if fitted on the side of the vehicle shall be orientated sideward horizontally with an inclination of  $10^\circ \pm 5^\circ$  in relation to the median longitudinal plane of the vehicle.

**4.3.15.6** Orientation: Rearwards or sideward.

**4.3.15.7** Electrical connections: They shall be such that the lamp can light up only if the reverse gear is engaged and if the device which controls the starting and stopping of the engine is in such a position that operation of the engine is possible. It shall not light up or remain lit if either of the above conditions is not satisfied.

**4.3.15.8** Tell-tale: Optional.

**4.3.15.9** Other requirements: none.

#### **4.3.17.9 Other requirements**

Provided that all other requirements are met, the end-outline marker lamps visible from the front and the end-outline marker lamps visible from the rear on the same side of the vehicle may be combined into one device.

The position of an end-outline marker lamp in relation to corresponding position lamp shall be such that the distance between the projections on a transverse vertical plane of the points nearest to one another on the apparent surfaces in the direction of the respective reference axis of the two lamps considered is not less than 200 mm.

#### **4.3.18 Side-marker lamps**

**4.3.18.1 Presence:** It is mandatory on all vehicles the length of which exceeds 6 m, except for chassis-cabs. The length of the trailer shall be calculated including the draw bar. The SM1 type of side-marker lamp shall be used on all categories of vehicles; however, the SM2 type of side-marker lamps may be used on the M<sub>1</sub> category of vehicles. In addition, on M<sub>1</sub> and N<sub>1</sub> category vehicles with lengths less than 6 m, side-marker lamps shall be used, if they supplement the reduced geometric visibility requirements of front position lamps conforming to the respective requirements (4.3.6.5 and 4.3.7.5). The SM1 or SM2 side-marker lamps are optional on the vehicles of other categories.

**4.3.18.2 Minimum number per side:** Such that the rules for longitudinal positioning are complied with.

**4.3.18.3 Arrangement:** No special requirements.

##### **4.3.18.4 Installation position**

**4.3.18.4.1 In width:** No special requirements.

**4.3.18.4.2 In height:** Above the ground, not less than 250 mm nor more than 1500 mm (2100 mm if the shape of the bodywork makes it impossible to keep within 1500 mm).

**4.3.18.4.3 In length:** at least one side-marker lamp shall be fitted to the middle third of the vehicle, the foremost side-marker lamp being not further than 3 m from the front. As for trailer, the distance measurement shall count in the length of the draw bar.

The distance between the two adjacent side-marker lamps shall not exceed 3 m. If the structure, design or the operational use of the vehicle makes it

**4.3.18.7** Electrical connection: On M<sub>1</sub> and N<sub>1</sub> category vehicles less than 6 m in length, amber side-marker lamps may be wired to flash, provided that this flashing is in phase and at the same frequency with the direction-indicator lamps at the same side of the vehicle. For all other categories of vehicles, there is no special requirement.

**4.3.18.8** Tell-tale: Optional. If it exists, its function shall be carried out by the tell-tale required for the front and rear position lamps.

**4.3.18.9** Other requirements: When the rearmost side-marker lamp is combined with the rear position lamp reciprocally incorporated with the rear fog-lamp or stop lamp, the photometric characteristics of the side-marker lamp may be modified during the illumination of the rear fog lamp or stop lamp.

### **4.3.19 Daytime running lamp**

**4.3.19.1** Presence: It is optional on motor vehicles and prohibited on trailers.

**4.3.19.2** Number: Two.

**4.3.19.3** Arrangement: No special requirements.

#### **4.3.19.4** Installation position

**4.3.19.4.1** In width: That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle.

The distance between the inner edges of the apparent surfaces in the direction of the reference axis shall not be less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1300 mm.

**4.3.19.4.2** In height: Above the ground not less than 250 mm nor more than 1500 mm.

**4.3.19.4.3** In length: It is installed at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.

**4.3.19.5** Geometric visibility: SEE Figure 18

Horizontal angle: outwards 20° and inwards 20°.

Vertical angle: upwards 10° and downwards 10°.

AND the value obtained shall be such that the requirements in paragraph 4.3.1.9 of this standard are fulfilled.

**5.6** The presence, number, color, arrangement and, where applicable, the category of lamps shall be checked by visual inspection of the lamps and their markings. These shall be such that the requirements set out in Chapter 4 as well as in the individual requirement applicable to each lamp are fulfilled. If there is objection on the light color, it shall be tested in accordance with 4.2.

## **6 Inspection rules**

**6.1** In terms of the installation of the lighting and light-signaling devices, it refers to the provisions of the same category.

The vehicles which are basically same in the following aspects are deemed as the same vehicle category:

- a) The size and shape of the vehicle;
- b) The installation number and position of various devices;
- c) Headlamp dimming system;
- d) Suspension system;
- e) The following are also considered to be of the same category:

Some of the vehicles differ from the meanings aforementioned in a) ~ d), but the difference does not change the category, number, position and geometric visibility of the installed lamps specified by the vehicle in question, the inclination of the dipped-beam, and the availability of the installed lamps and optional lamps.

### **6.2 Type inspection**

**6.2.1** A type inspection application of the lighting and light-signaling device of a certain category of vehicle shall be with the following document (in triplicate) as submitted by the manufacturer of the said category vehicle:

- a) A description on the shape and size of the vehicle category, the installation number and position of various devices, the headlamp dimming system, and the suspension system, as well as the loading capacity, especially the maximum capacity of the luggage boot.
- b) A lighting and light-signaling device form as specified by the manufacturer. In this form, the devices of various categories may be

**A.2.2** Vehicles in categories M<sub>2</sub> and M<sub>3</sub>:

The angle of the light beam from the dipped-beam headlamps shall be determined under the following loading conditions:

- a) Vehicles unladen and one person in the driver's seat;
- b) Vehicle unladen such that axle carries its maximum technically permissible load or until the maximum permissible mass of the vehicle is attained by loading the front and rear axles proportionally to their maximum technically permissible loads, whichever occurs first.

**A.2.3** Vehicles in category N with load surfaces:

The angle of the light beam from the dipped-beam headlamp shall be determined under the following loading conditions:

- a) Vehicle unladen and one person in the driver's seat;
- b) Driver, plus a load so distributed as to give the maximum technically permissible load on the rear axle or axles, or the maximum permissible mass of the vehicle, whichever occurs first, without exceeding a front axle load calculated as the sum of the front axle load of the unladen vehicle plus 25% of the maximum permissible payload on the front axle. Conversely, the front axle is so considered when the load platform is at the front.

**A.2.4** Vehicles in category N without load surfaces:

**A.2.4.1** Drawing vehicles for semi-trailers:

The angle of the light beam from the dipped-beam headlamp shall be determined under the following loading conditions:

- a) Unladen vehicle without a load on the coupling attachment and one person in the driver's seat;
- b) One person in the driver's seat: technically permissible load on the coupling attachment in the position of the attachment corresponding to the highest load on the rear axle.

**A.2.4.2** Drawing vehicles for trailers:

- a) Vehicle unladen and one person in the driver's seat;
- b) One person in the driver's seat, all the other places in the driving cabin being occupied.

dipped-beam inclination can be assured with an accuracy of  $\pm 0.5$  mrad ( $\pm 0.05\%$  inclination).

**D.3.3** If a screen is used, its marking, position and orientation in relation to the ground and to the median longitudinal plane of the vehicle, shall be such that the reproducibility of measurement of the dipped-beam inclination can be assured with an accuracy of  $\pm 0.5$  mrad ( $\pm 0.05\%$  inclination).

**D.3.4** During the measurement, the ambient temperature shall be between 10 °C and 30 °C.

#### **D.4 Vehicle preparation**

**D.4.1** Measurements shall be carried out on a vehicle which has travelled a distance of between 1000 km and 10000 km, preferably 5000 km.

**D.4.2** Tires shall be inflated to the full-load pressure specified by the vehicle manufacturer. The vehicle shall be fully replenished (fuel, water, lubricant) and equipped with all the accessories and tools specified by the manufacturer. Full fuel replenishment means that the fuel tank shall be filled to not less than 90% of its capacity.

**D.4.3** The vehicle shall have the parking brake released AND the gearbox in neutral.

**D.4.4** The vehicle shall be conditioned for at least 8 h at the temperature as specified in D.3.4 above.

**D.4.5** If a photometric or visual method is used, headlamps with a well-defined dipped-beam cut-off shall preferably be installed on the vehicle under test in order to facilitate the measurements. Other means are allowed to obtain a more precise reading (for example, removal of the headlamp lens).

#### **D.5 Test procedure**

##### **D.5.1 General**

The variations in either dipped-beam or vehicle inclination, depending on the method chosen, shall be measured separately for each side of the vehicle. The results obtained from both left and right headlamps under all the load conditions as specified in Appendix A, shall be within the limits set in paragraph D.5.5 below. The load shall be applied gradually without subjecting the vehicle to excessive shocks.

##### **D.5.2 Determination of the measured initial inclination**



**D.5.4.2.1** If the treatment method for category M<sub>1</sub> vehicles described in paragraph D.5.4.1 is not possible, the method described in paragraphs D.5.4.2.2 or D.5.4.2.3 may be used.

**D.5.4.2.2** With the vehicle standing on the measuring site AND the wheels on the ground, ROCK the vehicle by temporarily varying the load.

**D.5.4.2.3** With the vehicle standing on the measuring site AND the wheels on the ground, ACTIVATE the vehicle suspension and all other parts which may affect the dipped-beam inclination by using a vibration rig. This can be a vibrating platform on which the wheels rest.

**D.5.4.3** As for the vehicles with non-conventional suspension, where the engine has to be running, WAIT until the vehicle has assumed its final attitude with the engine running before making any measurement.

### **D.5.5 Measurements**

The variation of the inclination of the dipped-beam shall be assessed for each of the different loading conditions in relation to the measured initial inclination determined in accordance with paragraph D.5.2 above.

If the vehicle is fitted with a manual headlamp dimming system, the latter shall be adjusted to the positions as specified by the manufacturer for given loading conditions.

**D.5.5.1** To begin with, a single measurement shall be made in each loading condition. Requirements have been met if, for all the loading conditions, the variation in inclination is within the calculated limits (for example, within the difference between the stated initial inclination and the lower and upper limits specified for type inspection) with a safety margin of 4 mrad (0.4% inclination).

**D.5.5.2** If the result of any measurement does not lie within the safety margin indicated in paragraph D.5.5.1 OR exceed the limit value, a further three measurements shall be made in the loading conditions corresponding to this result as specified in paragraph D.5.5.3 below.

**D.5.5.3** For each of the above loading conditions

**D.5.5.3.1** IF none of the three measured results differs by more than 2 mrad (0.2% inclination) from the arithmetic mean of the results, that mean shall constitute final result.

**D.5.5.3.2** If any measurement differs from the arithmetic mean of the results by more than 2 mrad (0.2% inclination), a further series of 10 measurements shall be made, the arithmetic mean of which shall constitute the final result.

## **No.1 Amendment of National Standard GB 4785-2007**

### **“Prescription for installation of the external lighting and light-signaling devices for motor vehicles and their trailers”**

This amendment was approved by the Standardization Administration of the People's Republic of China on October 9, 2009 AND implemented from November 1, 2009.

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1. In the Chapter 2 “Normative references”, ADD “Unified provisions on ECE R13 on approving the vehicles of categories M, N and O in respect of braking” AND “Unified provisions on ECE R13h on approving the vehicles of categories M, N and O in respect of braking (Coordinate version among Europe, United States and Japan)”.

2. ADD clause 3.30:

“Emergency stop signal

It refers to the warning signal issued to the other road users after the vehicle indicating that the vehicle is in emergency braking at high deceleration.”

3. CHANGE the clause 4.1.9 “Unless otherwise specially described, in the operation period of the lamps, the optical system characteristics (e.g. luminous intensity, color, and apparent surface, etc.) shall not be changed”.

4. ADD the clause 4.1.9.1 “Unless otherwise specially described, only the indication-indicator lamp, hazard warning signal, emergency braking signal, and the side-marker lamps complying with the requirements of 4.3.18.7 below are flashing”.

5. ADD the clause 4.1.9.2:

“It is allowed for the photometric characteristics of any lamps to change under the following conditions, provided that such change complies with the technical requirements of the relevant lamps:

- a) As relative to ambient light;
- b) As caused by the initiation of other lamps;
- c) Is being used to provide other lighting functions.”

15. ADD the clause 4.3.20.7: “Electrical connection.”

16. ADD the clause 4.3.20.7.1: “As for all the lamps emitting the emergency braking signals, the flashing frequency shall be within the range of  $4_{-1.0}^{+1.0}$  Hz.”

17. ADD the clause 4.3.20.7.1.1: “However, if any rear lamp issuing an emergency braking signal uses a filament lamp, the flashing frequency shall be in the range of  $4_{-1.0}^{+0.0}$  Hz.”

18. ADD the clause 4.3.20.7.2: “Emergency braking signals shall be operated independently of other lamps.”

19. ADD the clause 4.3.20.7.3: “Emergency braking signals shall be automatically activated and released.”

20. ADD the clause 4.3.20.7.3.1: “The emergency braking signal shall be activated only when the vehicle speed is higher than 50 km/h AND the brake system issues an emergency brake logic signal as specified by ECE R13 or ECE R13h.”

21. Add the clause 4.3.20.7.3.2: “The emergency brake signal shall be automatically released when the emergency brake logic signal specified in ECE R13 or ECE R13h is no longer issued OR the hazard warning signal is activated.”

22. ADD the clause 4.3.20.8: “Tell-tale: optional”

23. Add the clause 4.3.20.9: “Other requirements.”

24. Add the clause 4.3.20.9.1:

“Except for the case as described in 4.3.20.9.2, the control of the emergency braking signal on the vehicle shall also be capable of operating the emergency braking signal on the trailer if the vehicle is equipped with trailer equipment.

When the vehicle is electrically connected to the trailer, the working frequency of the combined emergency braking signal shall be limited to the range as specified in 4.3.20.7.1.1. However, if the vehicle can detect that the emergency braking signal on the trailer is not using the filament bulb, the frequency may be in the range as specified in 4.3.20.7.1.”

25. ADD the clause 4.3.20.9.2:

circle of diameter 80 mm; if the light-emitting surface is not round, its shape shall be such as to be able to accommodate a 40 mm diameter circle.”

VI. ADD one line to Table 1:

Marker lamp for draw-bar-trailer	White in front and red in rear
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VII. MODIFY the clause 4.3.1.9 from “Other requirements: When all headlamps are turned on, the total maximum main-beam luminous intensity shall not exceed 225000 cd.” to “Other requirements: When all headlamps are turned on, the total maximum main-beam luminous intensity shall not exceed 430000 cd.”

VIII. In the clause 4.3.3.5, ADD “Except for the side direction-indicator lamps of category 5 and 6, the apparent surface of non-obstructed observation of the other lamps shall be not less than 12.5 cm<sup>2</sup> (excluding any non-transparent retro-reflector illuminating surface). It is not applicable to the lamps complying with the provisions of 4.1.23”.

IX. In the clause 4.3.7.5, ADD “In consideration of visibility, the apparent surface of non-obstructed observation of the lamps shall be not less than 12.5 cm<sup>2</sup> (excluding any non-transparent retro-reflector illuminating surface). It is not applicable to the lamps complying with the provisions of 4.1.23”.

X. ADD the clause 4.3.21:

“4.3.21 Marker lamp for draw-bar-trailer

**4.3.21.1 Presence**

It is mandatory for draw-bar trailer. AND it is prohibited for other vehicles.

**4.3.21.2 Number**

Two.

**4.3.21.3 Arrangement**

No special requirements.

**4.3.21.4 Installation position**

**4.3.21.4.1** In width: That point on the apparent surface which is farthest from the vehicle’s median longitudinal plane shall be less than 150 mm from the extreme outer edge of the trailer.

**4.3.21.4.2** In height: the height to the front fence of the trailer shall be not less than 300 mm nor more than 400 mm.

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