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

1 Scope

This Standard specifies the general requirements, special regulations, and inspection rules, etc. for the installation of the external lighting and light-signalling devices for motor vehicles and their trailers.

This Standard applies to type M, N, and O motor vehicles and trailers, etc.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 3977 Specification of colors

GB 4094 Motor vehicles - Symbols for controls, indicators and tell-tales

GB 4599 Motor vehicle headlamps equipped with filament lamps

GB 4660 Motor vehicle front fog lamps equipped with filament lamps

GB 5920 Photometric characteristics of front and rear position lamps, end-outline marker lamps and stop lamps for motor vehicles and their trailers

GB 11554 Photometric characteristics of rear fog lamp for power-driven vehicles and their trailers

GB 11564 Retro-reflector device for motor vehicles

GB 12676 Technical requirements and testing methods for commercial vehicle and trailer braking systems

GB 15235 Photometric characteristics of reversing lamps for power-driven vehicles

GB 15766.1 Lamps for road vehicles - Dimensional electrical and luminous requirements

GB 17509 Photometric characteristics of direction indicators for motor vehicles and their trailers

GB 18099 Photometric characteristics of side-marker lamps for motor vehicles and their trailers

GB 18408 Photometric characteristics of devices for the illumination of rear registration plates of motor vehicles and their trailers

GB 18409 Photometric characteristics of parking lamps for power-driven vehicles

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

GB/T 21260 Headlamp cleaner

GB 21670 Technical requirements and testing methods for passenger car braking systems

GB 23254 Retro-reflective markings for trucks and trailers

GB 23255 Photometric characteristics of daytime running lamps for power driven vehicles

GB 25990 Rear-marking plates for vehicles and their trailers

GB 25991 Automotive headlamps with LED light sources and/or LED modules

GB/T 30036-2013 Adaptive Front-lighting System for Motor Vehicles

GB/T 30511 Photometric characteristics of cornering lamps for motor vehicle

ECE R37 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 following terms and definitions apply to this document.

3.1 Type test

Carry out a type test on the number and method of installation of external

change of motion state of the vehicle.

3.7 Light source

One or several illuminants, which can be composed of one or more lampshades and a lamp holder for mechanical and circuit connection.

3.7.1 Replaceable light source

The light source which can be inserted into and removed from the lamp holder without tools.

3.7.2 Non-replaceable light source

The light source that is fixed in a light source module or lighting unit and can only be replaced along with the light source module or lighting unit as a whole.

3.7.3 Light source module

The dedicated optical component of a device that contains one or more non-replaceable light sources. It may have a lamp holder that meets the requirements for replaceable light sources.

3.7.4 Filament light source

The light source that emits heat and light through the filament itself.

3.7.5 Gas-discharge light source

The light source that emits light through arc discharge.

3.7.6 Light-emitting diode; LED

A solid light source made of semiconductor materials.

3.7.7 LED module

The light source module that contains only LED light source. It may have a lamp holder that meets the requirements for replaceable light sources.

3.7.8 Objective luminous flux

The luminous flux value specified in the light source standard data page, which does not include tolerances.

Note 1: Light source standards include GB 15766.1, ECE R37, ECE R99, ECE R128, etc.

Note 2: For LED modules that do not meet the requirements of ECE R128, the objective

indicator lamps, the apparent surface in this definition is replaced by a light emitting surface.

3.9.3 Combined lamps

The device that has a separate apparent surface, a common light source, and a common lamp body in the direction of reference axis.

Note: For rear-registration plate illuminating devices and category 5 and 6 direction-indicator lamps, the apparent surface in this definition is replaced by a light emitting surface.

3.9.4 Reciprocally incorporated lamps

The device that has a separate light source or single light source (such as optical, mechanical, and electrical differences) that works in different situations in the direction of reference axis, and all or part of which has a common apparent surface and a common lamp body.

Note: For rear-registration plate illuminating devices and category 5 and 6 direction-indicator lamps, the apparent surface in this definition is replaced by a light emitting surface.

3.9.5 Single-function lamp

Relevant parts of the device that produce a single lighting or light-signalling function.

3.9.6 Concealable lamp

The lamp that can be partially or completely hidden by moving the cover, or lamp, or using other appropriate methods when not in use.

3.9.7 Driving-beam headlamp; main-beam headlamp

The lamp for long-distance road lighting in front of the vehicle.

3.9.8 Passing-beam headlamp; dipped-beam headlamp

The lamp used to illuminate the road in front of the vehicle, which does not cause glare or discomfort to oncoming drivers and other road users.

3.9.8.1 Principal passing-beam; principal dipped-beam

Passing beam, excluding beams provided by infrared (IR) emitters and/or additional light sources for corner lighting.

3.9.9 Direction-indicator lamp

bar-trailer, which is used to assist other signal lamps and indicate the presence of vehicle.

3.9.29 Manoeuvring lamp

The lamp that provides auxiliary lighting for the side of the vehicle when the vehicle is moving slowly.

3.9.30 Rear-end collision alert signal; RECAS

An automatic signal sent from the front vehicle to the rear vehicle. It is used to warn the rear vehicle to take urgent action to avoid collision.

3.9.31 Lamps marked “D”

The independent lamps that allow separate use, or for which two lamps are treated as an assembly as a "single lamp" for type test respectively.

3.10 Light emitting surface

All or part of the outer surface of the transparent material. This surface is marked by the device manufacturer in the drawings attached to the test. It should be marked according to the following conditions:

a) In the case that the outer lens is textured, the light emitting surface is all or part of the surface of the outer lens;

b) In the case that the outer lens has no texture, the outer lens can be ignored. The light emitting surface shall be marked in the drawing.

Note 1: For examples of light emitting surface, see B.3.1 and B.3.4 in Appendix B.

Note 2: For an example of condition b), see B.3.5.

3.10.1 Textured outer lens; textured outer lens area

All or part of the outer lens, which is designed to affect the propagation of the light source beam, for example, to cause a significant deviation of light from its original direction.

3.11 Illuminating surface

Note: See Appendix B for examples of illuminating surface.

3.11.1 Illuminating surface of a lighting device

The vertical projection of the entire aperture of the reflector on a transverse plane perpendicular to the reference axis; or for a headlamp with an ellipsoidal

According to the manufacturer's requirements, either the vertical projection OF the boundary of the illuminating surface projected on the outer surface of the lens ON a plane in a specific observation direction, or the vertical projection of the light emitting surface on a plane in a specific observation direction. This plane is perpendicular to the observation direction and is in contact with the outermost point of the lens.

Note 1: The light-signalling device of variable luminous intensity caused by the variable intensity control defined by 3.8.3, in all cases allowed by the variable intensity control, allows its apparent surface to be variable.

Note 2: See Appendix B for examples of apparent surface.

3.13 Axis of reference; reference axis

The characteristic line of lamp specified by the manufacturer, which is used as the reference direction of the angular field-of-view (H=0°, V=0°) during photometric measurement and lamp installation.

3.14 Centre of reference

The intersection of the reference axis and the outer surface of the light emitting surface, which is specified by the lamp manufacturer.

3.15 Angles of geometric visibility

The smallest solid angle visible on the apparent surface of lamp. The solid angle is determined by a part of the ball. The centre of the ball is located at the centre of reference of the lamp. The mid-latitude line is parallel to the ground. Based on the reference axis, the horizontal angle β represents longitude; the vertical angle α represents latitude.

3.16 Extreme outer edge

The plane parallel to the longitudinal symmetry plane of the vehicle and in contact with the outer edge of the vehicle. Except for the following protrusions:

- The contact (deformed) part of the tire with the ground and the connector of the tire pressure sensor;

- Various anti-skid devices on the tire;

- Rearview mirror (indirect field of vision device);

- Side direction-indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps, retro-reflectors, and side marker lamps;

and the side marker lamp, the reference axis shall be perpendicular to the longitudinal symmetry plane of the vehicle; the reference axis of all other light-signalling devices shall be parallel to it. The tolerance in each direction is ±3°. If the manufacturer has special installation instructions, they shall also be followed.

4.4 If there is no special instruction, when inspecting the installation height and direction of the lamps, the vehicle under test shall be unladen and placed on a level ground. The vehicle shall be in the state defined in 3.26. AFS shall be in a neutral state.

4.5 The installation requirements for paired lamps shall meet the following:

a) Relative to the longitudinal symmetry plane of the vehicle, mounted symmetrically on the vehicle (determined by the lamp shape, not the edge of the illuminating surface defined in 3.11).

b) Relative to the longitudinal symmetry plane, they are symmetrical to each other, excluding the internal structure of the lamps.

c) MEET the same chromaticity requirements and photometric requirements. This subclause does not apply to matched-pair F3-class front fog lamps.

4.6 For vehicles with asymmetrical shapes, the requirements of 4.5 shall also be met as far as possible.

4.7 A single lamp, grouped lamps, combined lamps, and reciprocally incorporated lamps shall meet the following requirements:

a) The lamps, in accordance with their respective light colors, installation positions, orientations, geometric visibility, circuit connections, and other requirements, can be grouped, combined, or incorporated with each other. It shall meet the following requirements:

1) When other grouped, combined, or reciprocally incorporated lamps are turned off, the lamps shall meet their photometric and chromaticity requirements. For the case where the front position lamp or the rear position lamp is mixed with one or more functions and working at the same time, it shall be ensured that, when the function and the front position lamp/rear position lamp are turned on at the same time, the chromaticity requirements of the function are met.

2) Stop lamps are not allowed to be incorporated with direction-indicator lamps.

3) In the case of a combination of stop lamps and direction-indicator lamps,

arranged side by side. At this time, the projections of the light emitting surfaces of these illuminating units juxtaposed on the transverse plane shall meet the requirements of 4.7 b)1).

4.8 The maximum ground clearance shall be measured from the highest point of the apparent surface in the direction of reference axis. The minimum ground clearance shall be measured from the lowest point of the apparent surface in the direction of reference axis. (If the installation position clearly meets the requirements of this Standard, it is not necessary to determine the precise edge of any surface.) Except for the following cases:

a) For situations where the ground clearance may reduce the requirement of geometric visibility, the ground clearance shall be measured with the H plane of the lamp as the reference.

b) For passing-beam headlamps and front fog lamps, the minimum ground clearance shall be measured from the lowest point of the effective aperture of the optical system (for example: reflector, lens, projection lens).

c) Lateral installation position, for overall width: determined by the edge of the apparent surface in the direction of the reference axis furthest from the longitudinal symmetry plane of the vehicle. The distance between two lamps is determined by the inner edges of the apparent surface in the direction of reference axis.

4.9 Without special instructions, during the operation of lamp, its optical characteristics (such as: light intensity, color, apparent surface, etc.) must not be changed at will. Except in the following cases:

a) Direction-indicator lamps, hazard warning signals, side marker lamps in accordance with 5.18.7, and emergency stop signals are allowed to flash.

b) Situations in which the optical characteristics allow change:

- Change with external ambient light;

- Changes as other lamps are turned on;

- When the lamp switches to another function.

All the above-mentioned changes in optical characteristics shall comply with the relevant technical regulations of lamps.

c) The optical characteristics of class 1, 1a, 1b, 2a, or 2b direction-indicator lamps, in accordance with the provisions of GB 17509, allow sequential activation flashing mode. Class 2a and 2b direction-indicator lamps, when

4.17 The illuminating surface of a light-signalling device other than a retro-reflector is determined as follows:

a) When determining the upper, lower, and lateral edges of the illuminating surface, the edge of the shielding frame shall be horizontal or vertical. The distance to the outer edge of the vehicle and the height from the ground shall be calculated from this.

   For other applications of the illuminating surface, such as the distance between two lamps or functions, it shall consider the contour boundary of the illuminating surface. The shielding frames remain parallel and allow for any direction to be used.

   If the illuminating surface of a light-signalling device completely or partially surrounds the illuminating surface (or non-illuminating surface) of another function, the illuminating surface may be regarded as the light emitting surface itself (see B.3.2, B.3.3, B.3.5, and B.3.6 in Appendix B).

b) For all applications of the illuminating surface, when determining the upper, lower, and lateral edges, the edges of the shielding frame shall be horizontal or vertical.

4.18 For rear position lamps, rear direction-indicator lamps, triangular/non-triangular rear retro-reflectors mounted on movable components, the following requirements shall be met:

a) The lamps, in all fixed positions of the moving components, meet the requirements of their respective installation positions, geometric visibility, chromaticity, and photometric characteristics. Or when the moving component moves to the fixed open position, there are additional lamps that will automatically turn on, replacing the lamps on the moving component to meet the requirements of installation position, geometric visibility, and photometric characteristics.

b) For a lamp consisting of two lamps marked “D”, only one of them is required to meet the installation position, geometric visibility, and photometric characteristics requirements of the lamp at all fixed positions of the moving component [i.e., 4.18 a)]. Or when the moving component moves to the fixed open position, there are additional lamps that will automatically turn on, replacing the lamps on the moving component to meet the requirements of installation position, geometric visibility, and photometric characteristics.

c) For the use of interdependent lamp system, one of the following conditions shall be met:

the excess subtracted, to reduce the allowable range of the slope.

4.21 When viewed from the direction of reference axis, any movable component (whether or not equipped with a light-signalling device), in all fixed positions, covers the front and rear position lamps, front and rear direction-indicator lamps, and front and rear retro-reflectors at no more than 50% of their apparent surfaces. If the above conditions cannot be met, the following requirements shall be met:

a) There are additional lamps that will automatically turn on. It shall ensure that, when above 50% of the apparent surface of the above lamps in the direction of the reference axis is blocked by the moving component, the lamps can still meet all requirements for installation position, geometric visibility, chromaticity, and photometric characteristics. Or,

b) It shall be explained in the test material of the lamp: In the direction of the reference axis, the moving component will cover more than 50% of the apparent surface; and, in the above case, there shall be precautions on the vehicle clearly indicating the user that in some positions of the movable component, other road users shall be warned of the presence of the vehicle, such as using warning triangles or other devices prescribed by the state. This requirement does not apply to retro-reflectors.

4.22 With the exception of retro-reflectors, all lamps (including those that have passed type test), after being fitted with a light source or/and a fuse, are not considered if they cannot be lit.

4.23 For lamps which use replaceable filament light sources in accordance with GB 15766.1 and ECE R37 (except for non-replaceable light sources as defined in 3.7.2), their installation on vehicles shall ensure that the light source can be replaced without dedicated tools or special tools, unless these tools are already equipped on the vehicle and the manufacturer shall provide detailed instructions on how to replace them.

For the light source module, if it has a lamp holder that is the same as the replaceable light source lamp holder in GB 15766.1 and ECE R37, it shall also comply with this regulation.

4.24 When the rear position lamp has a temporary failure, it is allowed to use a lamp with similar light color, central luminous intensity, and position instead; and, the replacement lamp maintains the original function. During this period, the operating tell-tale (see 3.20) on the panel shall indicate that a temporary replacement has occurred and overhaul is required.

4.25 If AFS is installed, it is equivalent to a pair of passing-beam headlamps and a pair of main-beam headlamps (if equipped).

direction to get the same accuracy.

c) If the apparent surface of the lamp is partially covered by vehicle components when mounting the lamp, proof shall be provided to show that the unshaded part of the lamp still meets the photometric value required for type test.

d) For lamps with an installation height of less than 750 mm from the ground [For measurement method, refer to 4.8 a)], the downward geometric visibility can be reduced to 5°. Its corresponding photometric measurement range can also be reduced to 5°.

e) For an interdependent lamp system, the geometric visibility shall be measured when all the interdependent lamps are turned on.

4.29 The area of the light emitting surface of all rear position lamps, rear direction-indicator lamps, and stop lamps of trucks, special operation vehicles, and trailers with a total mass of not less than 4500 kg shall be not less than the area of a circle of 80 mm diameter. If the light emitting surface is not circular, its shape shall be able to accommodate a circle of 40 mm diameter.

4.30 The LED module is non-replaceable.

4.31 When the vehicle is stationary and one or more of the following conditions are met, external lighting and light-signalling devices not defined in this Standard may be turned on; but the effectiveness of external lighting and light-signalling devices defined in this Standard must not be jeopardized:

- Engine (propulsion system) stops working;

- The driver's or passenger's door has been opened;

- The trunk door has been opened.

5 Special regulations

5.1 Main-beam headlamp (lamp which meets the requirements of GB 4599 other than class A, GB 21259, GB 25991)

5.1.1 Equipping

The motor vehicle shall be equipped with this lamp; the trailer shall not use it.

5.1.2 Number

Two or four. For N_3 vehicles, two more main-beam headlamps can be installed.

- Ambient light conditions;

- Light from front lighting devices and front light-signalling devices on oncoming vehicles;

- Light emitted by the rear light-signalling device of the vehicle ahead.

Allow installation of additional performance-enhancing sensor functions.

"Vehicles" in this subclause refer to vehicles of type L, M, N, O. It is considered that these vehicles are equipped with retro-reflectors and the lighting and light-signalling systems are turned on.

5.1.7.3 The main-beam headlamp shall be able to be manually turned on or off at any time. The main-beam headlamp automatic control function shall be able to be manually turned off. In addition, the manual operation mode of turning off the main-beam headlamp and the main-beam headlamp automatic control function shall be simple and straightforward. No secondary operation is allowed.

5.1.7.4 The main-beam headlamps shall be turned on simultaneously or in pairs. When two more main-beam headlamps are installed in accordance with 5.1.2, N_3 vehicles can only switch on two pairs simultaneously at the most. When changing from passing-beam to main-beam, it shall turn on at least a pair of main-beam headlamps. When changing from main-beam to passing-beam, all main-beam headlamps shall be turned off at the same time.

5.1.7.5 When the main-beam headlamp is on, the passing-beam headlamp is allowed to be on as well.

5.1.7.6 When four concealable headlamps are installed, their raised position shall prevent any additional headlamps from working at the same time. The latter is only used to send intermittent light signals during the day.

5.1.8 Tell-tale

It shall be equipped with a closed-circuit tell-tale. If the headlamps are automatically controlled as described in 5.1.7.1, the driver shall be provided with a reminder that the automatic control of the main-beam has been activated. This message is displayed while the automatic control is on.

5.1.9 Other requirements

5.1.9.1 Maximum luminous intensity limit

The sum of the maximum luminous intensity of all main-beam headlamps that can be turned on at the same time shall not exceed 430000 cd.

It can be performed automatically and shall not cause discomfort, distraction, or dizziness.

5.1.9.3.3 Mode of proof of overall performance of automatic control device

5.1.9.3.3.1 The test may be carried out by a simulation method or other methods proposed by the manufacturer; but shall be approved by the testing agency.

5.1.9.3.3.2 Running test as described in E.1 of Appendix E. The performance of automatic control device shall be inspected in accordance with the manufacturer's description (submission of supporting documents). Objections shall be raised for any apparent failure (such as flashing).

5.1.9.3.4 Automatic turning-on conditions for automatically-controlled main-beam headlamps

Within the areas and distances described in 5.1.9.3.1.1 and 5.1.9.3.1.2, no vehicle mentioned in 5.1.7.2 is detected; and, the measured ambient light is in accordance with 5.1.9.3.5.

5.1.9.3.5 Cases where the automatically-controlled main-beam headlamps shall turn off automatically

In the case that the main-beam headlamp is automatically turned on, when an oncoming or forward running vehicle as defined by 5.1.7.2 is detected in the areas and distances of 5.1.9.3.1.1 and 5.1.9.3.1.2, the main-beam headlamp shall turn off automatically.

When the ambient illumination exceeds 7000 lx, the main-beam headlamp shall be automatically turned off.

Manufacturers shall, using simulation or the method approved by testing agencies, demonstrate compliance with the above requirements. If necessary, use a cosine-corrected sensor to measure illumination on the same level as the vehicle's sensor installation height. Manufacturers can prove by sufficient supporting documents or other methods approved by the testing agency.

5.2 Passing-beam headlamp (lamp which meets the requirements of GB 4599 other than class A, GB 21259, GB 25991)

5.2.1 Equipping

The motor vehicle shall be equipped with this lamp; the trailer shall not use it.

5.2.2 Number

- MOVE the entire passing beam or the cut-off line bend elbow to create a bend lighting function; or

- The principal passing-beam is generated by one or more LED modules (unless the circuit connection guarantees that when any LED module fails, all modules go out).

The tell-tale shall be turned on if:

- The turning of the cut-off line bend elbow fails; or

- Any one of the LED modules used to form the principal passing-beam fails (unless the circuit connection guarantees that when any LED module fails, all modules go out).

When a failure condition occurs, the tell-tale shall always be on, allowing temporary shutdown. But when the engine unit is started or stopped, it shall be turned on again.

5.2.9 Other requirements

The requirements of 4.5 b) of this Standard do not apply to passing-beam headlamps.

When the luminous flux of the single-side passing-beam headlamp light source or the total luminous flux of the LED module used to generate the principal passing-beam exceeds 2000 lm, a headlamp cleaner in accordance with GB/T 21260 shall be provided.

For declination, the devices specified in 5.2.6.2.2 shall not be used in the following cases:

- The objective luminous flux of the single-side principal passing-beam light source or light source module is greater than 2000 lm.

The above "objective luminous flux" is based on the test voltage.

For filament light sources that allow the use of multiple test voltages, the above-mentioned "objective luminous flux" which produces the principal passing-beam is based on the product test voltage for the type test of the light source.

Only passing-beam headlamps which comply with GB 4599 or GB 21259 or GB 25991 can be used to achieve bend lighting.

When turning left, if the bend lighting is achieved by moving the entire beam or the cut-off line bend elbow horizontally, it can only be turned on when the vehicle is moving forward.

specified in 5.2.6 shall apply to the front fog lamp in this case.

5.3.6.2.3 The dimming device can adjust the inclination of the front fog lamp beam to automatically adapt to the surrounding environment, to guarantee the vertical inclination limit specified in 5.3.6.1.2 b)1).

5.3.6.2.4 In the case of a dimming device failure, the cut-off line of the front fog lamp beam shall not be maintained above the failure position.

5.3.6.2.5 If the structure of vehicle type can ensure that the requirements of 5.3.6.1.2 b)1) can be met in all loading conditions defined in Appendix A, it is allowed that no dimming device is installed, but its front fog lamp shall have a device for adjusting the height of the cut-off line.

5.3.6.3 Installation direction

Forward.

5.3.7 Circuit connection

The front fog lamp shall be able to be turned on or off independently of the main-beam headlamp, passing-beam headlamp, or any main- and passing-beam components, unless:

a) The front fog lamp is used as part of another lighting function in the AFS system; however, turning on the front fog lamp shall take precedence over other functions to which the front fog lamp belongs in AFS; or

b) The front fog lamp, in accordance with the requirements of GB 4660, cannot be lit at the same time as other lamps incorporated with it.

5.3.8 Tell-tale

It shall be equipped with a closed-circuit tell-tale. USE independent, non-flashing signals.

5.3.9 Other requirements

For the situations in which the calibration and luminous intensity of F3 front fog lamps can automatically adapt to the general environmental conditions, any illumination changes or sightings shall be adjusted automatically without causing discomfort to the driver or other road users.

5.4 Reversing lamp (lamp which meets the requirements of GB 15235)

5.4.1 Equipping

5.4.7.1 Only when the reversing gear is in the meshing state or the drive system is in the reversing state, and the engine (propulsion system) point and the flameout control device are in a state which enables the engine (propulsion system) to work, the reversing lamp can be turned on; otherwise it cannot be turned on.

5.4.7.2 In addition, for the optional two reversing lamps according to 5.4.2.2, the circuit connection shall ensure that they can only be turned on when the lamps specified in 4.11 are turned on.

If the following conditions are met, the reversing lamp installed on the side of the vehicle, when the vehicle's forward speed is less than 10 km/h, can be used as a manoeuvring lamp:

- It shall be equipped with independent switches for manual turning-on and off;

- As a manoeuvring lamp function, after the reversing gear is released, it can keep lit;

- Regardless of the position of the independent switch (on or off), when the vehicle's forward speed is greater than 10 km/h, the lamp shall be automatically turned off. In this case, the lamp shall be kept off until it meets the turning-on requirements again and is turned on.

5.4.8 Tell-tale

Optional.

5.4.9 Other requirements

No.

5.5 Direction-indicator lamp (lamp which meets the requirements of GB 17509)

5.5.1 Equipping

It shall be equipped, as shown in Figure 2 a).

The direction-indicator lamps can be divided into the following categories (1, 1a, 1b, 2a, 2b, 5, and 6). Layout A and Layout B can be formed by installation on the vehicle.

Layout A applies to all types of motor vehicles. Layout B applies only to trailers.

350 mm and not more than 1500 mm.

5.5.4.2.3 If the structure of vehicle type cannot guarantee the above-mentioned ground clearance upper limits, and the optional rear direction-indicator lamp is not installed, then for category 5 and 6 side direction-indicator lamps, it is not greater than 2300 mm; for category 1, 1a, 1b, 2a, and 2b direction-indicator lamps, it is not greater than 2100 mm.

5.5.4.2.4 The installation of the optional lamp, considering the horizontal installation position (5.5.4.1), the symmetry of the lamp, and the shape of the vehicle body, shall be located as high as possible. The vertical distance from the mandatory lamps shall be no less than 600 mm.

5.5.4.3 Longitudinal [see Figure 2 a)]

The distance between the light emitting surface of the side direction-indicator lamps (categories 5 and 6) and the transverse plane marking the front boundary of the vehicle's overall length shall not be greater than 1800 mm. However, for type M_1 and N_1, the distance can be increased to no more than 2500 mm. When the structure of other vehicle types cannot guarantee the minimum angle of geometric visibility, the distance can also be increased to no more than 2500 mm.

Optional category 5 side direction-indicator lamps shall be installed at even spacing along the length of the vehicle.

Optional category 6 side direction-indicator lamps shall be installed in the area between the first and last quartiles in the length of the trailer.

5.5.5 Geometric visibility

5.5.5.1 Horizontal-direction angle: as shown in Figure 2 a) layout A and layout B.

Vertical-direction angle: 15° above and below the horizontal plane for category 1, 1a, 1b, 2a, 2b, and 5 direction-indicator lamps.

For lamps whose height from the ground is less than 750 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle below the horizontal plane can be reduced from 15° to 5°.

If the height of the optional lamp above the ground is not less than 2100 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle above the horizontal plane can be reduced from 15° to 5°.

For category 6 direction-indicator lamps: 30° above the horizontal plane and 5°

upper limit of the container rail is less than or equal to 1500 mm, and the maximum total design mass is less than or equal to 3500 kg.

5.7.2 Number

5.7.2.1 For various types of vehicles, two S1 or S2 stop lamps and one S3 or S4 stop lamp.

5.7.2.2 Except where S3 or S4 stop lamps are installed, M_2, M_3, N_2, N_3, O_2, O_3, and O_4 vehicles can be equipped with two optional S1 or S2 stop lamps.

5.7.2.3 When the longitudinal symmetry plane of the vehicle is not located on a fixed body panel but on a movable component, one or two movable components (such as doors) which separate the vehicle, and there is not enough space installing a S3 or S4 stop lamp on the moving components on the longitudinal symmetry plane, then two S3 or S4 stop lamps marked “D” can be installed. Or at a position that deviates left and right from the longitudinal symmetry plane of the vehicle, install a S3 or S4 stop lamp. Or, install an interdependent lamp system of S3 or S4 stop lamps.

5.7.3 Layout

There are no special requirements.

5.7.4 Installation position

5.7.4.1 Horizontal

For M_1 and N_1 vehicles: For S1 or S2 stop lamps, the distance from the point on the apparent surface in the direction of reference axis farthest from the longitudinal symmetry plane of the vehicle to the extreme outer edge of the vehicle shall not be greater than 400 mm. There are no special requirements for the distance between the respective inner edges of the apparent surface in the direction of the reference axis.

For all other vehicles:

- Category S1 or S2 stop lamps: The distance between the inner edges of the apparent surface in the direction of reference axis shall not be less than 600 mm. If the overall width is less than 1300 mm, it can be reduced to 400 mm.

- Category S3 or S4 stop lamps: The centre of reference shall be located on the longitudinal symmetry plane of the vehicle. However, in the case of installing two S3 or S4 stop lamps according to 5.7.2, it is required that the two lamps are as close to the longitudinal symmetry plane of the vehicle as

For category S3 or S4 stop lamps: 10° to the left and right of the vehicle's longitudinal axis.

5.7.5.2 Vertical-direction angle

For category S1 or S2 stop lamps: 15° above and below the horizontal plane. Except in the following cases:

- For lamps whose height from the ground is less than 750 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle below the horizontal plane can be reduced from 15° to 5°;

- If the height of the optional lamp above the ground is not less than 2100 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle above the horizontal plane can be reduced from 15° to 5°.

For category S3 or S4 stop lamps: 10° above the horizontal plane and 5° below the horizontal plane.

5.7.6 Direction

Backward.

5.7.7 Circuit connection

5.7.7.1 When using a service braking device which complies with the provisions of GB 12676 or GB 21670, all stop lamps shall be lit at the same time.

5.7.7.2 If the engine (propulsion system) point and flameout control device make the engine (propulsion system) in a non-working state, the stop lamps are not required to function.

5.7.8 Tell-tale

Optional. If equipped, it shall be a non-flashing alarm work indicator lamp. When the stop lamp fails, the indicator lamp is lit.

5.7.9 Other requirements

5.7.9.1 Category S3 or S4 stop lamps shall not be incorporated with any other lamps.

5.7.9.2 Category S3 or S4 stop lamps can be installed outside or inside the vehicle.

If installed in a vehicle, it is required that its emitted light shall not pass through the rearview mirror (indirect field of view device) or other surfaces of the vehicle

Motor vehicles and trailers wider than 1600 mm shall be equipped with this lamp. It is optional for trailers with a width of no more than 1600 mm.

5.9.2 Number

Two.

5.9.3 Layout

There are no special requirements.

5.9.4 Installation position

5.9.4.1 Horizontal: In the direction of the reference axis, the distance from the point on the apparent surface farthest from the longitudinal symmetry plane of the vehicle to the extreme outer edge of the vehicle shall not be greater than 400 mm.

For trailers, the above distance shall not be greater than 150 mm.

In the direction of the reference axis, the distance between the inner edges of the two apparent surfaces: For M_1 and N_1 vehicles, there are no special requirements; for other vehicles, it shall not be less than 600 mm. If the overall width is less than 1300 mm, the above distance can be reduced to 400 mm.

5.9.4.2 Height: The height above the ground is not less than 250 mm and not more than 1500 mm. For O_1 and O_2 vehicles, or other vehicle types whose structure cannot be guaranteed within 1500 mm, it can be increased to 2100 mm.

5.9.4.3 Vertical: There are no special requirements.

5.9.4.4 When the front position lamp is incorporated with other lamps, the apparent surface of other lamps in the direction of the reference axis shall be used to verify whether the installation position requirements of 5.9.4.1~5.9.4.3 are met.

5.9.5 Geometric visibility

5.9.5.1 Horizontal-direction angle: 45° inwards, 80° outwards.

However, for lamps whose height above the ground is not greater than 750 mm [refer to 4.8 a) for the measurement method], the inward angle of geometric visibility below the H plane can be reduced from 45° to 20°.

For trailers, the inward horizontal-direction angle can be reduced to 5°.

it can only be turned on when the headlamp on the same side is turned on and the vehicle is moving forward. If the front position lamp or the headlamp on the same side fails, the infrared generator shall be automatically turned off.

5.9.9.2 For AFS with bend lighting, the front position lamp allows rotation with the mixed lighting unit.

5.10 Rear position lamp (lamp which meets the requirements of GB 5920)

5.10.1 Equipping

The rear position lamp shall be equipped.

5.10.2 Number

Two.

M_2, M_3, N_2, N_3, O_2, O_3, and O_4 vehicles can be equipped with two optional rear position lamps, except when the end-outline marker lamps are installed.

5.10.3 Layout

There are no special requirements.

5.10.4 Installation position

5.10.4.1 Horizontal: In the direction of the reference axis, the distance from the point on the apparent surface farthest from the longitudinal symmetry plane of the vehicle to the extreme outer edge of the vehicle shall not be greater than 400 mm. This requirement does not apply to the optional rear position lamp.

In the direction of the reference axis, the distance between the inner edges of the two apparent surfaces:

- For M_1 and N_1 vehicles, there are no special requirements;

- For vehicles of other types, it shall be no less than 600 mm. If the overall width is less than 1300 mm, the distance can be reduced to no less than 400 mm.

5.10.4.2 Height: The height above the ground is not less than 350 mm and not more than 1500 mm. If the optional lamp is not installed, and the structure of vehicle type cannot be guaranteed within 1500 mm, it can be increased to 2100 mm. If the optional lamp is installed, its height shall be in accordance with 5.10.4.1. And, according to the requirements of the lamp symmetry and the highest possible vertical distance of the body structure, the height shall be positioned so that it is above the mandatory lamp and the distance is not less

of no more than 2 m. Other vehicles shall not be equipped with it.

5.12.2 Number

According to the layout.

5.12.3 Layout

Two at the front and rear of the vehicle respectively; or one at each side of the vehicle.

5.12.4 Installation position

5.12.4.1 Horizontal: In the direction of the reference axis, the distance from the point on the apparent surface farthest from the longitudinal symmetry plane of the vehicle to the extreme outer edge of the vehicle shall not be greater than 400 mm.

In the case of two parking lamps, they shall be installed on both sides of the vehicle.

5.12.4.2 Height: For M_1 and N_1 vehicles, there are no special requirements.

For other vehicles, the height above the ground is not less than 350 mm and not more than 1500 mm. If the structure of vehicle type cannot be guaranteed within 1500 mm, it can be increased to 2100 mm.

5.12.4.3 Longitudinal: There are no special requirements.

5.12.5 Geometric visibility

Horizontal-direction angle: 45° outwards, forwards, and backwards.

However, for lamps whose height above the ground is not greater than 750 mm [refer to 4.8 a) for the measurement method], the inward angle of geometric visibility below the H plane can be reduced from 45° to 20°.

Vertical-direction angle: 15° above and below the horizontal plane.

For lamps whose height from the ground is less than 750 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle below the horizontal plane can be reduced from 15° to 5°.

5.12.6 Direction

It shall meet forward and backward visibility requirements.

5.12.7 Circuit connection

5.13.4.2 Height

Front: For motor vehicles, in the direction of the reference axis, the horizontal plane tangent to the upper edge of the apparent surface shall not be lower than the horizontal plane tangent to the upper edge of the windshield.

For trailers and semi-trailers, considering the overall width, design and operation requirements, and the symmetry of the lamps, the maximum height shall be achieved as far as possible.

Rear: Considering the overall width, design and operation requirements, and the symmetry of the lamps, reach the maximum height as far as possible.

Considering the overall width, design and operation requirements, and the symmetry of the lamps, the installation of optional lamps and mandatory lamps (if applicable) shall be at an appropriate height. The vertical spacing between them shall be as large as possible.

5.13.4.3 Longitudinal

There are no special requirements. The optional front end-outline marker lamp specified in 5.13.4.2 shall be installed as close to the rear of the vehicle as possible. The distance between the additional lamp and the rear of the vehicle shall not be greater than 400 mm.

5.13.5 Geometric visibility

Horizontal-direction angle: 80° outwards.

Vertical-direction angle: 5° horizontally upwards and 20° downwards.

5.13.6 Direction

It shall meet forward or backward visibility requirements.

5.13.7 Circuit connection

According to 4.11.

5.13.8 Tell-tale

Optional. If selected, its function shall be completed by the tell-tale of front and rear position lamps.

5.13.9 Other requirements

On the premise that all the requirements are met, the front end-outline marker lamp and (mandatory or optional) rear end-outline marker lamp on the same

1200 mm, it can be increased to 1500 mm.

5.14.4.3 Longitudinal: Install at the rear of the vehicle.

5.14.5 Geometric visibility

Horizontal-direction angle: 30° inwards and outwards.

Vertical-direction angle: 10° above and below the horizontal plane. For retro-reflectors whose height from the ground is less than 750 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle below the horizontal plane can be reduced from 10° to 5°.

5.14.6 Direction

Backward.

5.14.7 Other requirements

The illuminating surface of the retro-reflector may be shared with the apparent surface portion of other lamps at the rear of the vehicle.

5.15 Triangular rear retro-reflector (lamp which meets the requirements of GB 11564)

5.15.1 Equipping

The trailer shall be equipped with it. The motor vehicle shall not be equipped with it.

5.15.2 Number

Two. Its performance shall meet the requirements of class IIIA or IIIB retro-reflectors. As long as the effectiveness of the required lighting and light-signalling devices is not impaired, the installation and use of additional retro-reflectors and retro-reflective materials (including two retro-reflectors which do not meet the requirements of 5.15.4) are allowed.

5.15.3 Layout

The triangle top shall face up.

5.15.4 Installation position

5.15.4.1 Horizontal: The distance from the point on the illuminating surface farthest from the longitudinal symmetry plane of the vehicle to the extreme outer edge of the vehicle shall not be greater than 400 mm. The distance of the inner edges of the retro-reflectors shall not be less than 600 mm. If the overall width

5.16.4.1 Horizontal: The distance from the point on the illuminating surface farthest from the longitudinal symmetry plane of the vehicle to the extreme outer edge of the vehicle shall not be greater than 400 mm. For trailers, this distance shall not be greater than 150 mm.

In the direction of the reference axis, the distance between the inner edges of the two apparent surfaces of the retro-reflector:

- For M_1 and N_1 vehicles, there are no special requirements;

- For vehicles of other types, it shall be no less than 600 mm. If the overall width is less than 1300 mm, the distance can be reduced to no less than 400 mm.

5.16.4.2 Height: The height above the ground is not less than 250 mm and not more than 900 mm. If the structure of vehicle type cannot be guaranteed within 900 mm, it can be increased to 1500 mm.

5.16.4.3 Longitudinal: Install in the front of the vehicle.

5.16.5 Geometric visibility

Horizontal-direction angle: 30° inwards and outwards. For trailers, the inward horizontal-direction angle can be reduced to 10°. If due to the structure of the trailer, the retro-reflectors which must be equipped cannot meet the above angle requirements, additional (supplemental) retro-reflectors which are not restricted by the horizontal installation position requirements (5.16.4.1) shall be installed. Together with the retro-reflectors which must be equipped, they shall meet the required visibility angle requirements.

Vertical-direction angle: 10° above and below the horizontal plane. For retro-reflectors whose height from the ground is less than 750 mm [refer to 4.8 a) for the measurement method], the vertical-direction angle below the horizontal plane can be reduced from 10° to 5°.

5.16.6 Direction

Forward.

5.16.7 Other requirements

The illuminating surface of the retro-reflector may be shared with the apparent surface portion of other lamps installed in the front of the vehicle.

mandatory amber side marker lamps can flash at the same frequency and phase as the direction-indicator lamps on the same side of the vehicle. However, if category 5 side direction-indicator lamps are installed on the side of the vehicle in accordance with 5.5.3.3, these side marker lamps shall not flash. For other types of vehicles, there are no special regulations.

5.18.8 Tell-tale

Optional. If installed, its function shall be completed by the tell-tale of front and rear position lamps.

5.18.9 Other requirements

When the rear-most side marker lamp is combined with the rear position lamp, and the rear position lamp is incorporated with the rear fog lamp or stop lamp, while the rear fog lamp or stop lamp is on, the photometric characteristics of the side marker lamp is allowed to be changed.

If flashing with the rear direction-indicator lamp, the rear side marker lamp shall be amber.

5.19 Daytime running lamp (lamp which meets the requirements of GB 23255)

5.19.1 Equipping

It is optional for motor vehicles. The trailer shall not be equipped with it.

5.19.2 Number

Two.

5.19.3 Layout

There are no special requirements.

5.19.4 Installation position

5.19.4.1 Horizontal: In the direction of the reference axis, the distance between the inner edges of the two apparent surfaces shall not be less than 600 mm. If the overall width is less than 1300 mm, the distance can be reduced to no less than 400 mm.

5.19.4.2 Height: The height above the ground is not less than 250 mm and not more than 1500 mm.

5.19.4.3 Longitudinal: Install in the front of the vehicle. If the emitted light does

5.22 Adaptive front lighting system (AFS) (lamp which meets the requirements of GB/T 30036-2013)

5.22.1 Equipping

It is optional for motor vehicles. The trailer shall not be equipped with it.

5.22.2 Number

One set.

5.22.3 Layout

There are no special requirements.

5.22.4 Position

5.22.4.1 Horizontal and height: Those lighting units which are required to be lit simultaneously for a specific lighting function or functional mode as described by the manufacturer shall meet the following requirements. All measurements shall be based on the nearest edge of the apparent surface of the lighting unit in the direction of the reference axis:

a) The height of two symmetrically-installed lighting units shall meet the requirements of 5.1.4 and 5.2.4. "Symmetrically-installed lighting units" refer to two lighting units, one on each side of the vehicle. The (geometric) centre of gravity or centre of the apparent surface shall be at the same height. The distance from the longitudinal symmetry plane of the vehicle is the same. The one-sided error is within 50 mm. The light emitting surface, illuminating surface, and beam may be different.

b) If equipped with an additional lighting unit, the maximum horizontal distance between it and the adjacent lighting unit shall not exceed 140 mm. If the additional lighting unit is a "symmetrically-installed lighting unit", the distance shall not exceed 200 mm (see E in Figure 3). The vertical distance between the upper and lower adjacent lighting units shall not exceed 400 mm (see D in Figure 3).

c) The additional lighting unit mentioned in 5.22.4.1 b) shall be installed at a height of not less than 250 mm (see F in Figure 3), meeting the maximum ground clearance requirements of 5.2.4.2 (see G in Figure 3).

d) In the horizontal direction, the following requirements shall also be met: For each mode of passing-beam lighting, on each side of the vehicle, there shall be at least one lighting unit of which the outer edge of the apparent surface is no more than 400 mm from the extreme outer edge of the

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