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Replacing GB 19152-2003, partly replacing GB 5948-1998

Motor vehicle headlamps emitting a symmetrical passing beam or a driving beam or both

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Table of Contents

Foreword	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Class and different types of headlamps	7
5 Technical requirements	8
6 Test method	16
7 Inspection rules	20
8 Transitional requirements	22
Annex A (normative) Voltage markings	24
Annex B (normative) Mark of center of reference	25
Annex C (normative) Requirements for LED modules and headlamps including LED modules	26
Annex D (normative) Tests for stability of photometric characteristic of headlamps	30
Annex E (normative) Requirements for headlamps with plastic photometric lenses - Test for photometric lenses or material samples and for complete lamps	36
Annex F (normative) Aiming requirements for cut-off line	41
Annex G (informative) Example of lighting method for test for stability of photometric characteristic	44
Annex H (normative) Test procedures for photometric lenses or material samples and for complete lamps of headlamps with plastic photometric lenses	47
Annex I (normative) Method of measurement of the diffusion and transmission of light	49

Annex J (normative) Test method for mechanical wear	51
Annex K (normative) Adhesive tape adhesion test.....	52

Foreword

Clauses 4, 5 and 6 of this Standard are mandatory and the rest are recommended.

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009.

The technical contents of the Class A headlamps in this Standard replace GB 19152-2003; the technical contents of Class B headlamps replace the relevant specifications on the use of S1, S2 lamps or similar closed headlamps in GB 5948-1998; and compared with the former version, the main changes are as follows:

- ADD the type of light sources allowed to be installed, that is, add the filament lamp, gas-discharge light source or LED module light source;
- Relative to the added type of light source, add the photometric characteristic requirements for a number of new classes of headlamps;
- ADD the photometric characteristic test method for semi-enclosed headlamps with adjustable reflectors;
- ADD the relevant contents of corner illumination;
- MODIFY the test voltage from 12 V to 13.2 V;
- MODIFY the measurement coordinate system from flat system to spherical system, and modify the measurement unit from lux to candela;
- ADD Annex A "Voltage markings";
- ADD Annex B "Mark of centre of reference";
- ADD Annex C "Requirements for LED modules and headlamps including LED modules";
- ADD Annex D "Tests for stability of photometric characteristic of headlamps";
- ADD Annex E "Requirements for headlamps with plastic photometric lenses - Test for photometric lenses or material samples and for complete lamps";
- ADD Annex F "Aiming requirements for cut-off line";
- ADD Annex G "Example of lighting method for test for stability of photometric characteristic";
- ADD Annex H "Test procedures for photometric lenses or material samples and for complete lamps of headlamps with plastic photometric lenses";

Motor vehicle headlamps emitting a symmetrical passing beam or a driving beam or both

1 Scope

This Standard specifies the photometric characteristic, test methods and inspection rules for the motor vehicle headlamps equipped with filament lamps, gas-discharge light sources or LED modules, emitting a symmetrical passing beam and/or a driving beam.

This Standard applies to headlamps equipped with filament lamps, gas-discharge light sources or LED modules, emitting a symmetrical passing beam and/or a driving beam for L-type motor vehicles.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the dated edition cited applies. For undated references, the latest edition of the referenced document (including all amendments) applies.

GB 4599 Motor vehicle headlamps equipped with filament lamps

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

GB 15766.1-2008 Lamps for road vehicles - Dimensional electrical and luminous requirements

GB 17510 Photometric characteristics of light-signaling devices for motorcycles

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

ECE R37 Uniform provisions concerning the approval of filament lamps for use in approved lamp units of power-driven vehicles and of their trailers

ECE R99 Uniform provisions concerning the approval of gas-discharge light sources for use in approved gas-discharge lamp units of power-driven vehicles

ECE R128 Uniform provisions concerning the approval of light emitting diode (LED) light sources for use in approved lamp units on power-driven vehicles and their

trailers

3 Terms and definitions

For the purpose of this document, the following terms and definitions and those defined in GB 4599, GB 4785 and GB 25991 and apply.

3.1

complete headlamp

The entire lamp, including the lamp body parts around the lamp body that may affect the heat dissipation, and electronic light source controllers.

3.2

additional lighting unit

A headlamp system that provides corner illumination, independent of devices providing basic passing beam, may consist of optical, mechanical and electrical components, and may be combined and/or grouped with other lighting or optical signaling devices.

4 Class and different types of headlamps

4.1 Headlamps of different classes

Headlamps of different classes (Classes A, B, C, D or E) are headlamps that comply with particular photometric provisions.

4.2 Headlamps of different types

Headlamps which differ in the following aspects:

- The trade name or mark;
- The characteristics of the optical system;
- The inclusion or elimination of components capable of altering the optical effects by reflection, refraction, absorption and/or deformation during operation;
- The kind of beam produced (passing beam, driving beam or both);
- The category and parameter (such as voltage, power, luminous flux, chromaticity, color rendering, etc.) of filament lamp(s), the gas-discharge light source or the light source/module;

c d and the luminous intensity at 0.86DV be not less than 2400 cd;

c) In addition to the additional light sources/additional lighting units that provides the corner illumination, it will obtain either passing beam or driving beam, and will not stop between the two positions;

d) Using the usual tools, the user cannot change the shape and position of moving parts.

5.1.4 The lamp body of the headlamp shall indicate the type of the filament lamp and/or the gas-discharge light source used; the headlamps with LED modules shall be marked with the rated voltage and the rated power on the lamp body; Class E headlamps shall be marked with the voltage marking shown in Annex A; the reference center mark indicated in Annex B may be marked on the photometric lens. If additional lighting units are used, the headlamps emitting basic passing beam shall be marked with the type of filament lamp used and/or the rated voltage and rated power of the LED modules used for additional lighting units.

5.2 Headlamp's light color

The light color of the headlamp shall be white, and its chromaticity characteristics shall meet the requirements of GB 4785.

5.3 Headlamp's light source

5.3.1 Filament lamps and/or LED modules for Classes A, B, C or D headlamps

5.3.1.1 Filament lamps equipped in additional light sources/ additional lighting units for headlamps and providing corner illumination:

5.3.1.1.1 For basic passing beam, one or two filament lamps light sources may be used; for driving beam, one or more filament lamps light sources may be used;

5.3.1.1.2 It shall use filament lamps complying with GB 15766.1-2008 or ECE R37 and having no application restrictions;

5.3.1.1.3 For light sources for Class A and Class B headlamps, the total reference luminous flux of 13.2 V basic passing beam is not greater than 900 lm; for light sources for Class C and Class D headlamps, the total reference luminous flux of 13.2 V basic passing beam is not greater than 2000 lm;

5.3.1.1.4 The filament lamps shall be installed in the correct position even in the dark.

5.3.1.2 LED modules equipped in additional light sources/ additional lighting units for headlamps and providing corner illumination:

5.3.1.2.1 For basic passing beam, one or more LED modules may be used; for each

Use filament lamps and/or LED modules complying with GB 15766.1-2008 or ECE R37 and having no application restrictions.

5.3.2.4 LED modules and other light sources are not allowed to mixed with each other in basic passing beams, corner illuminations and each driving beam.

5.4 Photometric characteristic stability of headlamps

Classes B, C, C D and E headlamps shall meet the requirements of Annex D “Tests for stability of photometric characteristic of headlamps” of this Standard.

5.5 Headlamps with plastic photometric lenses

Classes B, C, C D and E headlamps with plastic photometric lenses shall meet the requirements of Annex E “Requirements for headlamps with plastic photometric lenses - Test for photometric lenses or material samples and for complete lamps” of this Standard.

5.6 Electromagnetic compatibility of headlamps

For Class E headlamps, headlamps and ballast systems shall not produce radiation or power line harassment that misleads other electrical/electronic systems of motor vehicles¹⁾.

5.7 Photometric characteristics

5.7.1 General requirements

Headlamps shall be so made that they give adequate illumination without dazzle when emitting the passing beam, and good illumination when emitting a driving beam.

5.7.2 Photometric requirements for passing beam

In the photometric screen, the passing beam shall produce a clear cut-off line, and maintain flatly at a range of at least 3° ahead and behind the V-V line; the photometric requirements for passing beam are as follows:

5.7.2.1 The position of photometric test points and zones of basic passing beam of Class A headlamps is as shown in Figure 1, and the luminous intensity limits on the photometric screen shall be in accordance with Table 2.

¹⁾ Compliance with the requirements for electromagnetic compatibility is relevant to the individual vehicle type.

through at least 15 cycles of aging test in accordance with G.4 of Annex G in GB 15766.1-2008, its photometric characteristics are deemed to meet the requirements when meeting the photometric requirements.

- If the gas-discharge light source complies with GB 15766.1 or ECE R99, its luminous flux may not correspond to the specified reference luminous flux, and the luminous intensity value shall be properly corrected. This correction does not apply to situations where the ballast is fully or partially integrated in the headlamp.
- The requirements for determining the size and position of the arc in the standard gas-discharge light source are listed in the relevant data pages in GB 15766.1-2008 and ECE R99.
- For headlamps that have not been illuminated for 30 minutes or longer, after being illuminated for 4 s, for headlamp emitting both passing beam and driving beam, the HV point of the driving beam must be at least 37500 cd and the point 2(0.86D-V) of the passing beam must be at least 3750 cd; or, for the headlamp emitting only passing beam, the point 2(0.86D-V) of the passing beam must be at least 3750 cd. The power supply shall be sufficient to ensure rapid lift to high current pulses.
- Ballast terminal voltage: $13.2\text{ V} \pm 0.1\text{ V}$ for 12 V system, or otherwise specified (see Annex A of this Standard).

6.3 Aiming during photometric test

6.3.1 Passing beam aiming

6.3.1.1 Horizontal direction: the light shape is symmetrical to the V-V line as much as possible. When the driving beam and the passing beam cannot be adjusted separately, the brightest region of the driving beam can be aligned with the V-V line as a reference.

6.3.1.2 Vertical direction: the horizontal part of the cut-off line shall be located at 0.57° below the H-H line.

6.3.1.3 When a problem or ambiguity occurs visually, the mechanical method of F.4 and F.5 of Annex F shall be used for calibration, and the sharpness and straightness of the cut-off line shall be checked.

6.3.1.4 Except for headlamps with unadjusted mechanical device of horizontal aiming, after above aiming, if the passing beam fails to meet the requirements, the cut-off line is allowed to be adjusted in 0.5° left and right in the horizontal direction and 0.25° above and under in the vertical direction. In order to make the cut-off line clear and visible, to allow part of the light shield.

6.3.1.5 Aiming or not is based on visually checking the cut-off line in the range of 3° on

7 Inspection rules

7.1 Type inspection

7.1.1 Materials and samples provided by the manufacturer

7.1.1.1 Drawings that are sufficient to identify the type of headlamps shall be shown in triplicate, which shall indicate the characteristic structure of the photometric lens or lens and indicate the reference axis, the reference center and the geometric position on the vehicle.

For semi-enclosed headlamps with adjustable lenses, the position and the adjustment range of the lens shall be indicated.

For additional lighting units, the installation shall meet the installation geometric position of 5.7.2.4.

7.1.1.2 A concise technical instruction that states:

- a) Headlamps provide both driving beam and passing beam, or only one of the two.
- b) Classes A, B, C, D and E headlamps.
- c) Type of light source used, and:
 - 1) If a filament lamp is used, provide the type included in GB 15766.1-2008 or ECE R37;
 - 2) If a gas-discharge light source is used, provide the type included in GB 15766.1-2008 or ECE R99;
 - 3) If a LED module is used, provide the type and parameters of the LED light source/module, including specification, size and photoelectric parameter and target luminous flux of the LED light source/module; whether it can be replaced; if applicable, provide the type included in ECE R128; electrical interface information of the electronic light source controller for inspection; one LED module of each type and detailed instructions, the electronic light source controller is submitted if applied; if corner illumination is provided, the luminous intensity stability test points are specified.
- d) For headlamps designed to provide corner illumination, they shall meet the minimum inclination required for photometric catachrestic 5.7.2.4a).
- e) For secondary driving beam headlamps, it shall indicate that it emits driving beam with a passing beam headlamp or with a driving beam headlamp.

- submit the test report, only the compliance of headlamps with the same structure (assembly) to this requirement is confirmed, this test it is allowed to be canceled.

7.1.2 Type inspection requirements for headlamps

7.1.2.1 Each sample lamp shall comply with the specifications of 5.1, 5.2 and 5.3.

7.1.2.2 The test shall be carried out in accordance with the specifications of Clause 6 of this Standard. Each sample lamp shall comply with the specifications of 5.7.

7.1.2.3 Classes B, C, D and E headlamps shall be tested in accordance with Annex D of this Standard, complying with the specifications of 5.4.

7.1.2.4 Classes B, C, D and E headlamps shall also be tested in accordance with Annex E of this Standard, complying with the specifications of 5.5.

7.2 Production consistency test

7.2.1 For products passing the type inspection, use randomly selected sample lamps to determine the consistency of its production.

7.2.2 Randomly selected sample lamps shall comply with the specifications of 5.2.

7.2.3 The test shall be carried out in accordance with the specifications of Clause 6, and the photometric characteristic of the randomly selected sample lamp shall meet the following requirements:

- The luminous intensity limit of passing beam is extended by 20 % according to the specifications of 5.7.2; but for zone 1 of Classes B, C, D and E headlamps, extend 255 cd;
- The luminous intensity limit of driving beam is extended by 20 % according to the specifications of 5.7.3.

7.2.4 Classes B, C, D and E headlamps shall comply with the specifications of Annex D.3.3.

7.2.5 Classes B, C, D and E headlamps using plastic photometric lenses shall also comply with the specifications of Annex E.3.

8 Transitional requirements

8.1 From the date of implementation of this Standard, relevant specifications on the use of S1, S2 or similar closed headlamps in GB 19152-2003 and GB 5948-1998 are abolished.

Annex C

(normative)

Requirements for LED modules and headlamps including LED modules

C.1 General requirements

C.1.1 Each LED module sample submitted shall conform to the relevant specifications of this Standard when tested with the supplied electronic light source control-gear(s) (if any).

C.1.2 LED modules shall be used to issue visible light LED light source; other forms of light source is not allowed to use.

C.1.3 LED module(s) shall be so designed as to be and to remain in good working order when in normal use. They shall moreover exhibit no fault in design or manufacture. A LED module shall be considered to have failed if any one of its LEDs has failed.

C.1.4 LED module in the lamp body shall be positioned accurately, fixed well, to prevent the movement.

C.1.5 LED on the LED module shall be mounted on a suitable fixed substrate, which shall have a good strength and stability to protect LED and LED modules.

C.1.6 For replaceable LED modules, the following requirements shall be met:

- a) can be disassembled only when using the tools;
- b) cannot be interchangeable with other replaceable light sources;
- c) the LED modules of different specifications in the same lamp body cannot be interchangeable.

C.2 Test environment

C.2.1 LED module operating environment

If not specified by the manufacturer, LED modules shall be tested inside the headlamp as submitted by the manufacturer.

C.2.2 Ambient temperature

For the measurement of electrical and photometric characteristics, the headlamp shall be operated in dry and still atmosphere at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

C.3.3.1.5 The luminous intensity values measured at 1 min and after luminous stability shall meet the requirements of maximum and minimum values.

C.3.3.2 Color

After lighting for 1 min and stabilizing the light as described in C.3.3.1.2, light color measurements shall be made within the desired range.

C.4 Measurement of target luminous flux for basic passing beam LED modules

C.4.1 The shape of the LED module shall conform to the description of the technical specification specified in 7.1.1. The secondary optical element should be removed. This procedure and the test conditions described below shall be recorded in the test report.

C.4.2 The manufacturer shall provide one and a detailed description of each type of LED module, if the application of the electronic light source controller is to be submitted together.

C.4.3 The heat dissipation of the module during the test shall simulate its condition in the corresponding headlamp.

Before testing, the LED module shall be in the normal conditions of use with the headlamps at least 72 h.

When integrating balls are used, the integrating sphere has a minimum inner diameter of 1 m and is at least 10 times the maximum size of the LED module. The luminous flux measurement can also be measured with a measuring angle photometer (at room temperature).

The LED module shall be lit for about 1 h in a closed integrating sphere or within a measuring angle photometer.

The luminous flux shall be measured in accordance with the luminous stability state described in C.3.3.1.2.

Annex D

(normative)

Tests for stability of photometric characteristic of headlamps

D.1 Preparation of headlamp before test

After the photometric values have been measured according to the specifications of this Standard, a photometric characteristic stability test shall be carried out to the complete lamp sample in the point for $I_{\max}$ for driving beam and in points 0.50U-1.5L, 0.50U-1.5R, 50R and 50L for passing beam of Class B headlamps, or in points 0.86D-3.5R, 0.86D-3.5L, 0.50U-1.5L and 0.50U-1.5R for passing beam of Classes C, D and E headlamps. "Complete headlamp" shall be understood to mean the complete lamp itself, including those surrounding body parts and light sources which could influence its thermal dissipation.

The tests shall be carried out in a dry and still atmosphere at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, the test sample being mounted on a base representing the correct installation on the vehicle.

D.2 Test for stability of photometric characteristic

D.2.1 Clean headlamp

The headlamp shall be operated for 12 hours as described in D.2.1.1 and checked as prescribed in D.2.1.2.

D.2.1.1 Test method

D.2.1.1.1 The headlamp shall be lit in the manner specified below (see Annex G):

- a) For driving or passing beam, the corresponding filament is lit for the corresponding time²⁾;
- b) For headlamps consisting of one passing beam and one or more driving beams, or headlamps consisting of a passing beam and a front fog lamp:

If the manufacturer specifies that a filament is lit when the headlamp is used³⁾, then the passing beam and driving beam are lit in turn half the time.

²⁾ When the tested headlamp is combined with and/or mixed with signaling lamps, the signaling lamp shall be lit for the duration of the test. In the case of a direction indicator lamp, it shall be lit in flashing mode with an on/off time of approximately one to one.

³⁾ Should two or more lamp light source be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the light source simultaneously.

- (b) In case of replaceable gas discharge light source(s): The test voltage for the electronic light source control-gear is 13.2 ± 0.1 volts for 12 V vehicle voltage systems, unless otherwise specified by the manufacturer.
- (c) In the case of non-replaceable light sources operated directly under vehicle voltage system conditions: all measurements on lighting units equipped with non-replaceable light sources (filament light sources and/or others) shall be made at 6.3 V, 13.2 V or 28.0 V or at other voltages according to the vehicle voltage system as specified by the manufacturer respectively.
- (d) In the case of light sources, replaceable or non-replaceable, being operated independently from vehicle supply voltage and fully controlled by the system, or, in the case of light sources supplied by a supply and operating device, the test voltages as specified above shall be applied to the input terminals of that device. It may require from the manufacturer the supply and operating device or a special power supply needed to supply the light source(s).
- (e) LED module(s) shall be measured at 6.75 V, 13.2 V or 28.0 V respectively, unless otherwise specified in this Standard. LED module(s) operated by an electronic light source control gear, shall be measured as specified by the manufacturer.
- (f) Where signaling lamps are grouped or combined into the test sample and operating at voltages other than the nominal rated voltages of 6 V, 12 V or 24 V respectively, the voltage shall be adjusted as declared by the manufacturer for the correct photometric functioning of that lamp.

D.2.1.2 Test results

D.2.1.2.1 Visual inspection

Once the headlamp has been stabilized to the ambient temperature, the photometric lens shall be cleaned with a clean, damp cotton cloth. It shall then be inspected visually; no distortion, deformation, cracking or change in color.

D.2.1.2.2 Photometric test

The photometric values shall be verified at points 0.50U-1.5L, 0.50U-1.5R, 50R and 50L of passing beam of Class B-class headlamps, or points 0.86D-3.5R, 0.86D-3.5L, 0.50U-1.5L and 0.50U-1.5R of passing beam of Classes C, D and E headlamps and driving beam $I_{\max}$. Including the tolerance of photometric method, except for points 0.50U-1.5L, 0.50U-1.5R, before and after the test, a 10 % deviation of the luminous intensity is allowable, the allowable deviation of the luminous intensity of points 0.50U-1.5L, 0.50U-1.5R before and after the test is 255 cd.

Another aiming may be carried out to allow for any deformation of the headlamp base

The test mixture shall be uniformly applied to the entire light-transmitting surface of the headlamps and shall be applied after drying, until the luminous intensity values of each of the following test points have decreased from 15% to 20% of the initial values.

Test points are: For Class B headlamps:

both driving beam lamp and passing beam lamp or driving beam lamp:
 $I_{\max}$ point;

only passing beam lamp: B 50 and 50 V;

For Class C, D and E headlamps:

both driving beam lamp and passing beam lamp or driving beam lamp:
 $I_{\max}$ point;

only passing beam lamp: 0.50U/1.5L and 1.5R, and 0.86D/V.

D.2.2.3 Measuring devices

D.2.2.3.1 Measuring devices similar to the type inspection shall be used.

D.2.2.3.2 During the operation of the test sample, the test base shall not be re-adjusted nor disassembled. The light source used shall be the light source specified for the headlamp.

D.2.2.3.3 In the case of a replaceable light source: use batch produced filament lamp light sources that have been aging for at least 1 h, or gas-discharge light sources that have been aging for at least 15 h, or LED module that have been aging for at least 48 h, cool them down to the ambient temperature before the test as specified in this Standard. The LED module provided by the applicant shall be used.

D.3 Test for change in vertical position of the cut-off line under the influence of heat

This test consists of verifying that the vertical drift of the cut-off line under the influence of heat does not exceed a specified value for a passing lamp.

The headlamp tested in accordance with D.2, shall be tested according to D.3.1, without being removed from or readjusted in relation to its test fixture.

D.3.1 Test

Use batch produced filament lamp light sources that have been aging for at least 1 h, or gas-discharge light sources that have been aging for at least 15 h, or LED module that have been aging for at least 48 h, to adjust the test voltage and light the passing beam of headlamp according to D.2.1.1.2.

E.2.1.2 Results

Before and after the test, for each sample, the luminous intensity changes on the following measurement points shall not exceed 10 %. The measurement points include: for passing beam of passing beam lamps or a combination of passing beam lamps and driving beam lamps, B50, 50L and 50R for Class B headlamps; 0.86D/3.5R, 0.86D/3.5L, 0.50U/1.5L and 0.50U/1.5R for Classes C, D and E headlamps; $I_{\max}$ point for driving beam of driving beam lamps or a combination of passing beam lamps and driving beam lamps;

It shall use standard filament lamps, standard gas-discharge light sources or LED modules in headlamps for photometric measurements.

E.2.2 Weatherability test and chemical agent resistance test

E.2.2.1 Weatherability test

Three new photometric lenses or material samples shall be subject to a weatherability test. The spectral energy distribution of the light source is equivalent to the blackbody of 5500 K ~ 6000K. In order to minimize the radiation effect of wavelengths less than 295 nm and greater than 2500 nm, the corresponding optical filters shall be placed between the light source and the sample. The radiation intensity of the sample is $1200 \text{ W/m}^2 \pm 200 \text{ W/m}^2$, and the radiation energy received during the test is $4500 \text{ MJ/m}^2 \pm 200 \text{ MJ/m}^2$. In the test chamber, the black plate temperature at the same level as the sample is $50 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$. The sample is rotated at a speed of 1 r/min to 5 r/min around the light source. And spray the distilled water with conductivity less than 1 mS/m ($23 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$) in the following cycle, i.e., 5 min spraying and 25 min drying until the end of the test.

E.2.2.2 Chemical agent resistance test

After the weatherability test, the outer surface of three samples shall be tested using the following test mixture.

The volume percentage of the test mixture is as follows:

61.5 % n-heptane, 12.5 % toluene, 7.5 % tetrachloroethane, 12.5 % trichlorethylene and 6 % xylene.

During the test, the cotton cloth impregnated with the above-mentioned mixture is placed on the outer surface of the sample in 10 seconds and a pressure of 50 N/cm^2 (equivalent to 100 N force applied to the test surface of 14 mm x 14 mm) is applied for 10 min. During the test, the cotton cloth shall be soaked into the mixture so that the liquid composition on the surface of the sample is consistent with the test mixture. In order to prevent the sample from cracking due to the application of pressure, compensation is allowed to the applied pressure.

accordance with the method specified in Annex J.

E.2.4.2 Results

After the test, the mean of the sample transmission variation $\Delta t = (T_2 - T_3)/T_2$ and the diffusion variation $\Delta d = (T_5 - T_4)/T_2$, shall be $\Delta t_m \leq 0.100$ and $\Delta d_m \leq 0.050$, when measure three samples in the area specified in 7.1.1.4a) according to the method specified in Annex I.

E.2.5 Adhesion test for photometric lens coating

E.2.5.1 Tests

In the 20 mm × 20 mm surface area of the photometric lens coating, grids of about 2 mm × 2 mm is scored with a blade or a pointed needle, and the force shall be large enough to score through the coating.

Use adhesive tapes with a width of not less than 25 mm and press at least 5 min on the above grid area. The adhesion of the adhesive tape shall be (2 ± 0.4) N/cm (adhesive tape width) under standard conditions specified in Annex K.

The adhesive tape is then peeled off at a uniform speed of $1.5 \text{ m/s} \pm 0.2 \text{ m/s}$ at the end of the adhesive tape, applying a force of balance with the adhesion force perpendicular to the surface direction.

E.2.5.2 Results

After the test, the mesh area shall be no visible damage. Grid intersection and scratch damage shall not exceed 15 % of the grid area.

E.2.6 Complete lamp test of plastic photometric lenses

E.2.6.1 Mechanical wear test

The No. 1 sample lamp shall be subject to mechanical wear test the provisions of Annex J for.

After the test, the luminous intensity value at HV point shall not be larger than 30 % of the specified maximum value. The luminous intensity value at the following test points shall not be less than 10 % of the specified minimum value: 50L and 50R for Class B headlamps, 0.86D/3.5R and 0.86D/3.5L for Classes C, D and E headlamps. For single driving beam lamp, the luminous intensity at HV point shall not be less than 10 % of the specified minimum value.

E.2.6.2 Adhesion test for photometric lens coating

The No. 2 sample lamp shall be tested in accordance with E.2.5 above.

If the horizontal part is not straight but slightly curved or inclined, the cut-off line shall not exceed the vertical range formed by two horizontal lines which are situated from 3°L to 3°R of the V-V line at 0.2° for Class B and 0.3° for Classes A, C, D and E headlamps above and below the nominal position of the cut-off, see Figure F.1.

F.3.3 When the vertical adjustments of three different individuals differs by more than 0.2° for Class B and 0.3° for Classes A, C, D and E head lamps, the horizontal part of the cut-off line is assumed not to provide sufficient linearity or sharpness for performing visual adjustment. In this case the quality of cut-off line shall be tested instrumentally for compliance with requirements as follows.

F.4 Quality of cut-off line

F.4.1 Measurements shall be performed by vertically scanning through the horizontal part of the cut-off line in angular steps not exceeding 0.05° :

- At either a measurement distance of 10 m and a detector with a diameter of approximately 10 mm;
- Or at a measurement distance of 25 m and a detector with a diameter of approximately 30 mm.

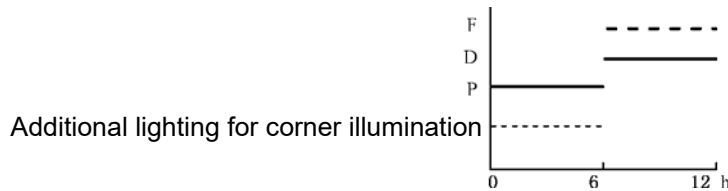
F.4.2 The measurement of the cut-off quality shall be considered acceptable if the requirements of the paragraph F.4.3b) of this annex shall comply with at least one measurement at 10 m or 25 m.

F.4.3 The scanning is performed from its lower position upwards through the cut-off line along the vertical lines at -3° to -1.5° and $+1.5^{\circ}$ to $+3^{\circ}$ from the V-V line. When so measured, the quality of the cut-off line shall meet the following requirements:

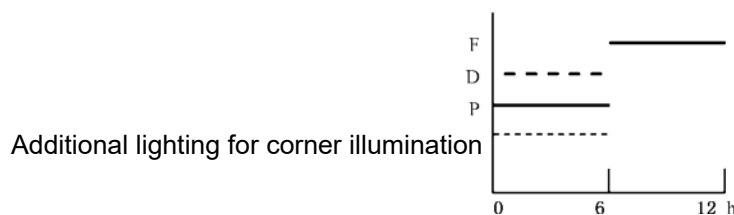
- a) Not more than one cut-off line shall be visible⁵⁾.
- b) Sharpness of cut-off line: if scanned vertically through the horizontal part of the cut-off line along the ± 2.5 -lines, the maximum value measured for: $G = [\log E_V - \log E_{(V + 0.1^{\circ})}]$ is called the sharpness factor G of the cut-off line. The value of G shall not be less than 0.13 for Class B and 0.08 for Classes A, C, D and E.
- c) Linearity: the part of the cut-off line which serves for vertical adjustment shall be horizontal from 3°L to 3°R of the V-V line. This requirement is deemed to be met if the vertical positions of the inflection points according to paragraph 3.2. above at 3° left and right of the V-V line do not differ by more than 0.2° for Class B and 0.3° for Classes A, C, D and E headlamps from the nominal position at the V-V line.

⁵⁾ This clause will be amended, if an objective test method is available.

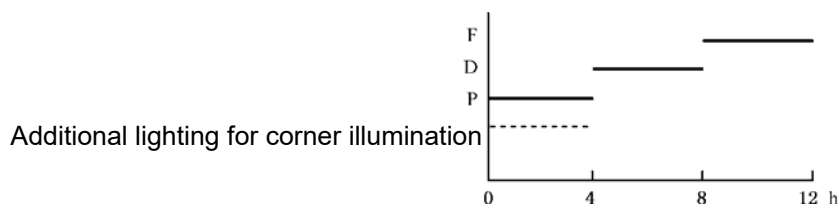
Example 9: P + D + F (A combination of passing beam lamp and diving beam lamp of Class B headlamps, and front fog lamp, whereas the passing beam lamp and other combination of lamps cannot be lit at the same time) or P + D₁ + D₂ + F (A combination of passing beam lamp and diving beam lamp of Class B headlamps, driving beam lamp of Class B headlamps and front fog lamp, whereas the passing beam lamp and other combination of lamps cannot be lit at the same time)



Example 10: P + D + F (A combination of passing beam lamp and diving beam lamp of Class B headlamps, and front fog lamp, whereas the front fog lamp and other combination of lamps cannot be lit at the same time) or P + D₁ + D₂ + F (A combination of passing beam lamp and diving beam lamp of Class B headlamps, driving beam lamp of Class B headlamps and front fog lamp, whereas the front fog lamp and other combination of lamps cannot be lit at the same time)



Example 11: P + D + F (A combination of passing beam lamp and diving beam lamp of Class B headlamps, and front fog lamp, whereas the passing beam lamp and front fog lamp cannot be lit at the same time with other combination of lamps) or P + D₁ + D₂ + F (A combination of passing beam lamp and diving beam lamp of Class B headlamps, driving beam lamp of Class B headlamps and front fog lamp, whereas the passing beam lamp and front fog lamp cannot be lit at the same time with other combination of lamps)



Annex K

(normative)

Adhesive tape adhesion test

K.1 Purpose

This method allows to determine under standard conditions the linear force of adhesion of an adhesive tape to a glass plate.

K.2 Principle

Measurement of the force necessary to unstick an adhesive tape from a glass plate at an angle of 90°.

K.3 Specified conditions

The ambient conditions shall be at 23 °C ± 5 °C and 65 % ± 15 % RH.

K.4 Test pieces of adhesive tape

Before the test, the sample roll of adhesive tape shall be conditioned for 24 h in the above-mentioned specified condition.

5 test pieces each 400 mm long shall be tested from each roll. These test pieces shall be taken from the roll after the first three turns were discarded.

K.5 Method

The test shall be under the specific conditions.

Take the 5 test pieces while unrolling the tape radially at a speed of approximately 300 mm/s, then apply them within 15 s in the following manner.

Apply the tape to the glass plate progressively with a slight length-wise rubbing movement of the finger, without excessive pressure, in such a manner as to leave no air bubble between the tape and the glass plate. Leave the assembly in the specified atmospheric conditions for 10 min. Unstick about 25 mm of the test piece from the plate in a plane perpendicular to the axis of the test piece.

Fix the plate and fold back the free end of the tape at 90°. Apply force in such a manner that the separation line between the tape and the plate is perpendicular to this force and perpendicular to the plate. Pull to unstick at a speed of 300 mm/s ± 30 mm/s and record the force required.

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