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Photometric characteristics of daytime running lamps for motor vehicles

Draft for approval

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Foreword

All of the technical contents set out in this Standard are mandatory.

This Standard corresponds to Revision 1, Amendment 4 of ECE R87 of the United Nations Economic Commission for Europe (UNECE), “Uniform provisions concerning the approval of daytime running lamps for power-driven vehicles”; the conformance degree between this Standard and ECE R87 is non-equivalent, and the main differences are:

- the Scope has been modified;
- Normative References have been added;
- the following sections and appendix relating to administration in ECE R87 have been deleted:
 - 4. Marking;
 - 5. Approval;
 - 12. Type modification and Approval extension of daytime running lamps;
 - 13. Conformity of production;
 - 14. Penalties for non-conformity of production;
 - 15. Production definitely discontinued;
 - 16. Names and addresses of the Technical Service Department responsible for conducting approval tests and of Administrative Department;
 - Appendix 1 Notice of Approval or of refusal or extension or withdrawal of approval or production definitely discontinued of a type of daytime running lamp pursuant to Regulation No 87
 - Appendix 2 Example of arrangement of the approval mark;
 - Appendix 4 Colour of light - Chromaticity coordinates;
 - Appendix 5 Minimum requirements for conformity of production control procedures;
 - Appendix 6 Minimum requirements for sampling by inspectors”;
- Inspection Rules have been added.

This Standard is proposed by China National Development and Reform Commission.

This Standard is under the jurisdiction of the National Automobile Standardisation Technical Committee.

The organisations that participated in the drafting of this Standard are:
Shanghai Automotive Lamp Research Institute;
Changchun Hella Automotive Lighting Ltd.

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Photometric characteristics of daytime running lamps for motor vehicles

(Draft for approval)

1 Scope

This Standard specifies the technical requirements, test methods and inspection rules for the photometric characteristics of daytime running lamps for motor vehicles.

This Standard applies to all types of daytime running lamps for use with Category M and Category N motor vehicles.

The daytime running lamps referred to in this Standard are also referred to as lamps.

2 Normative References

The provisions of the following documents become provisions of this Standard after being referenced. For dated reference documents, all later amendments (excluding corrigenda) and versions do not apply to this Standard; however, the parties to the agreement are encouraged to study whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB 4599 Motor vehicle headlamps equipped with filament lamps

GB 4785 Installation regulations for car and trailer exterior illumination and light signal devices

GB 15766.1 Filament lamps for road vehicles – Dimensional, electrical and luminous requirements

ECE R.37 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 terms and definitions specified in GB 4785 apply to this Standard.

4 Lamps of different types

Lamps which differ in essential respects such as:

- (a) the trade name or mark;
- (b) the characteristics of the optical system (such as the level of luminous intensity, the minimum angle of light distribution, the category of employed filament lamp or the light source module);

However, a change of the colour of the filament lamp or the colour of any light filter does not constitute a change of type.

5 Requirements

5.1. The lamps shall be designed and constructed so that under normal conditions of use, despite the vibrations to which they may be subjected, they continue to function in accordance with the provisions set out in this Standard and continue to meet the operational requirements.

5.2 In the case of the lamps which use light source module(s), the light source module(s) shall be designed so as to be installable at the correct location even in the dark, and so as to avoid the incorrect usage thereof.

5.3 In the case of lamps that are incorporated along with another function using the same light source, then an electronic light source control gear can be used to regulate the luminous intensity.

5.4 The colour of light emitted by the lamps shall be white; the chromaticity characteristics thereof shall conform to the provisions set out in GB 4785.

5.5 If filament lamps are used, the filament lamps shall conform to the provisions set out in GB 15766.1 or ECE R37.

5.6 The area of the light emitting surface shall not be smaller than 40cm².

5.7 Photometric characteristics

5.7.1 The intensity of the light emitted by the lamp on the reference axis shall not be less than 400cd.

5.7.2 The luminous intensity of the light emitted by each lamp on every measuring direction, projected on to the points of the light distribution field in Diagram 1, shall not be lower than the product of the percentage value of the each spot indicated in Diagram 1 multiplied by 400cd.

5.7.3 In any direction, the luminous intensity emitted by the lamp shall not exceed 800cd.

5.7.4 If a lamp contains more than one light source, the lamp shall comply with the minimum luminous intensity required when any one light source has failed; when all the light sources are illuminated, the maximum luminous intensity shall not be exceeded.

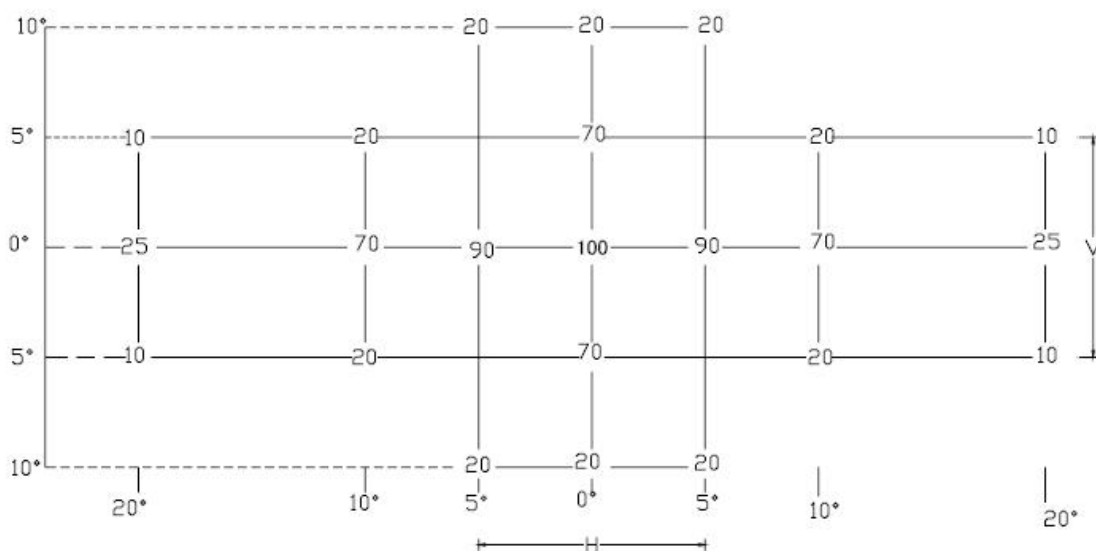


Diagram 1 Table of standard light distribution

5.7.5 The direction $H = 0^\circ$ and $V = 0^\circ$ corresponds to the reference axis (when it is installed on the vehicle, it is horizontal, parallel to the median longitudinal plane of the vehicle and oriented in the required direction of visibility). It passes through the centre of reference. Diagram 1 shows the minimum numerical value for the various directions of measurement, and is represented as the required minimum percentage in the axis for each lamp (in the direction $H = 0^\circ$ and $V = 0^\circ$).

5.7.6 The light distribution area, as mentioned below in Article 6.10, shall be the same as in Section 5.7.5, in the light distribution field formed by grid lines, the luminous intensity in each direction of the field shall meet at least the lowest required minimum percentage value shown on the grid lines.

5.8 Heat resistance characteristics

5.8.1 After the lamp has undergone the heat resistance test, and is stable under an ambient temperature, there shall be no visible distortions, deformations, cracking or colour modifications on the lamp.

5.8.2 If there is any doubt with respect to the results of Section 5.8.1, the measurement of the photometric characteristics shall be repeated. The measured result shall be at least 90% of the result measured before the heat resistance test.

6 Test methods

6.1 The equipment and facilities of the test-darkroom shall conform to the provisions set out in GB 4599.

6.2 The boundary of the apparent surface in the direction of the reference axis of the lamp shall be determined.

6.3 The voltage when measuring the photometric characteristics

6.3.1 For lamps equipped with a replaceable filament lamp, when testing the photometric characteristics a colourless Standard filament lamp should be used, as set out in GB 15766.1 or ECE R37; the measurement should be taken under the specified reference luminous flux.

6.3.2 For lamps equipped with non-replaceable light source or other light source, measurements should be taken at a voltage of 6.75v, 13.5v or 28v. Where necessary, the manufacturer shall provide the special power supply prescribed for this type of light source, and take the measurement under the voltage specified by the manufacturer.

6.4 Before the photometric characteristics test, illuminate the light source using the test voltage, enabling its light characteristics to be stable.

6.5 During the test of photometric characteristics, appropriate masking shall be provided, to avoid stray reflection.

6.6 Requirements for the light distribution measurement of the lamps with different light source:

6.6.1 For non-replaceable light sources, use the light source found in the lamp.

6.6.2 For lamps with a replaceable light source: when equipped with filament lamps, the luminous

intensity value produced with a voltage of 6.75v, 13.5v or 28.0v shall be corrected. The correction factor is the ratio between the reference luminous flux and the mean value of the luminous flux found at the applied voltage (6.75v, 13.5v or 28.0v); filament lamps for which the deviation between the actual luminous flux and the mean value is not greater than $\pm 5\%$ shall be used. Alternatively, a Standard filament lamp may be used in turn, in each of the individual positions, operated at its reference flux, the individual measurements in each position being added together.

6.6.3 Where an electronic light source control gear is used

6.6.3.1 If an electronic light source control gear is part of the lamp, then all the measurements, both photometric and colorimetric, shall be appropriately applied at the voltages of 6.75v, 13.5v and 28.0v respectively.

6.6.3.2 If an electronic light source control gear is not part of the lamp, the voltage declared by the manufacturer shall be applied to the input terminals of the lamp, and the required electronic light source control gear shall be provided by the manufacturer.

6.6.4 In the case of any lamps - except those equipped with filament lamps - the luminous intensities measured after one minute and after 30 minutes of operation shall comply with the maximum and minimum value of requirements specified in Article 5.7. The luminous intensity after one minute of operation can be calculated from the luminous intensity distribution after 30 minutes of operation applied at each test points, the ratio of luminous intensity measured at HV after one minute and after 30 minutes of operation.

6.7 The measuring distance for the photometric characteristics shall ensure that the inverse-square law of photometry is applicable.

6.8 Observing from the centre of the reference of the lamp, the field angle of the optical receiver shall be between the range of 10 angular minutes and one degree.

6.9 The angle deviation shall not exceed 15' when the measurement is taken in any of the directions shown in Diagram 1.

6.10 Where lamps are installed on the vehicle in more than one position, or in a field of different positions, the photometric characteristics measurements shall be repeated for each location or for the extreme locations of the field of the reference axis specified by the manufacturer.

6.11 Heat resistance test

6.11.1 Test methods

The lamps shall be under the ambient temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the filament lamps used shall be filament lamps of the category specified for the lamps. For lamps equipped with non-replaceable light sources, the light source present in the lamps shall be used and the lamps shall be subjected to a 20-minute ageing test and a one-hour test of continuous operation.

6.11.2 Test voltage

6.11.2.1 For lamps with a replaceable light source, adjust the voltage of the filament lamp to 90% of the maximum rated power as specified in GB15766.1 or corresponding regulation ECE R37. Unless

specified by the manufacturer, use the filament lamp power of nominal rated voltage 6v, 12v or 24v. Under the first condition, use a filament lamp with maximum rated power to perform the test.

6.11.2.2 For lamps with a non-replaceable light source, the test voltage shall be carried out in accordance with the requirements specified in Section 6.3.2.

6.12 Chromaticity inspection

6.12.1 For the chromaticity inspection, use an illumination A light source (colour temperature 2,856K).

6.12.2 For lamps with a non-replaceable light source, carry out the inspection under the test voltage.

7 Inspection rules

7.1 The different types of lamps shall be determined in accordance with the provisions set out in Clause 4.

7.2 Daytime running lamps are subject to type inspection approval and the inspection of conformity of production. If the lamp conforms to the corresponding provisions set out in 7.3 or 7.4, then it shall be considered to have passed the inspection for type approval and the inspection for conformity of production.

7.3 Type approval

7.3.1 The manufacturer shall provide a detailed technical manual that describes the lamps which may be installed on the vehicle with different inclinations of the reference axis in respect to the vehicle reference planes and to the ground or rotate around its reference axis, as well as:

- a) drawings (three copies) in sufficient detail to allow identification of the type of the lamp and showing geometrically the position(s) in which the lamp may be mounted onto the vehicle, the axis of observation to be taken as the axis of reference in the tests (horizontal angle $H = 0^\circ$, vertical angle $V = 0^\circ$) and the point to be taken as the centre of reference in the said tests; and the illuminating surface;
- b) a brief technical description stating, in particular, with the exception of lamps with non-replaceable light sources, the category or categories of filament lamp(s) prescribed;
- c) two sample lamps (lamps with changeable light source shall be provided with filament lamp).

7.3.2 Each of the sample lamps shall conform to the corresponding provisions specified in Article 5.1, Article 5.2, Article 5.3, Article 5.5 and Article 5.6.

7.3.3 According to Clause 6, in order to carry out tests, both sample lamps shall conform to the corresponding provisions specified in Article 5.4, Article 5.7 and Article 5.8.

7.4 Checking conformity of production

7.4.1 For products which have qualified for type approval, the randomly selected sample lamps shall be used to determine the conformity of production thereof.

7.4.2 The randomly selected lamps shall conform to the corresponding provisions set out in Article 5.1, Article 5.2, Article 5.3, Article 5.5 and Article 5.6.

7.4.3 According to Clause 6, in order to carry out the test, the randomly selected lamps shall conform to the corresponding provisions set out in Article 5.4 and Article 5.8.

7.4.4 According to Clause 6, in order to carry out the test, the randomly selected lamps shall conform to the corresponding provisions set out in Article 5.7, and:

- a) the minimum luminous intensity value shall not be smaller than 80% of the value specified in Article 5.7;
- a) the maximum luminous intensity shall not be greater than 120% of the value specified in Article 5.7.