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**SLR-45-03**

***Based on paragraph 4 and Annex 8 in SLR-44-03/Rev.1***

*Based on SLR-43-22, including the changes indicated in SLR-44-04 and those agreed at SLR-44.*

Amended for Light Source issues: 2021-02-03

Following the RID approach to have the light-source-testing completely covered in Annex 8

Changes in:

* 4.3, agreed in the home-work-team
* 4.7
* Annex 8

**Simplification of the UN Lighting and Light Signalling Regulations**

**- Stage 2, Step 1 -**

**Draft consolidated proposal to amend**

**UN Regulation No. 148 (Light-Signalling Devices)**

4. General technical requirements

Each lamp submitted for approval shall conform to the requirements set forth in paragraphs 4. and 5.

4.1. The requirements contained in sections 5 "General specifications" and 6 "Individual specifications" (and in the Annexes referenced in the said sections) of UN Regulations Nos. 48, 53, 74 or 86, and their series of amendments in force at the time of application for the lamp type approval shall apply to this Regulation.

The requirements pertinent to each lamp and to the category/ies of vehicle on which the lamp is intended to be installed shall be applied, where its verification at the moment of lamp type approval is feasible.

4.2. The lamps must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

4.3. Light sources:

4.3.1. Use of light sources

The lamp shall only be equipped with:

- replaceable light source(s) approved according to UN Regulations Nos. 37, 99 and/or 128, provided that no restriction on the use is made at the time of application for type approval, and/or

- light source module(s) and/or

- non-replaceable light source(s)

4.3.2. General requirements with regard to light sources

4.3.2.1. In case a light source category or categories or type(s) is restricted for use in lamps on vehicles in use and originally equipped with such lamps, the applicant for type approval of the lamp shall declare that the lamp is only intended for installation on those vehicles; this shall be noted in the communication form

4.3.2.2. In case of replaceable UN approved light source(s),

(a) The design of the lamp shall be such that the light source(s) can be fixed in no other position but the correct one;

(b) The light source(s) holder shall conform to the characteristics given in IEC Publication 60061. The holder data sheet relevant to the category of light source(s) prescribed, applies. In addition, where a category of LED substitute light source(s) is also prescribed, the holder data sheet relevant to the category of LED substitute light source(s) applies.

4.3.2.3. [EMPTY]

4.3.2.4. Light Signalling Devices shall not generate radiated or power line disturbances, which cause a malfunction of other electric/electronic systems of the vehicle.[[1]](#footnote-1)

4.3.2.5. In case of replaceable light source module(s), the design of the light source module(s) shall be such that

(a) it can only be fitted in the designated and correct position and can only be removed with the use of tool(s); and

(b) it is tamperproof; and

(c) regardless of the use of tool(s), it is not interchangeable with:

- any replaceable UN approved light source; and/or,

- any other replaceable light source module having different characteristics that is located in the same lamp housing.

~~4.3.2.5.1.~~ ~~In the case of a replaceable light source module~~ ~~the removal and replacement of this light source module shall be demonstrated to the satisfaction of the Technical Service~~.

~~4.3.2.5.1.1.~~ (d) ~~The design of replaceable LED module(s) shall be such that~~ when the light source module is removed and replaced by another module provided by the applicant and bearing the same light source module identification code, the photometric requirements of device shall be met.

4.3.2.6. In the case of lamps equipped with non-replaceable filament light source(s) or light source module(s) equipped with non-replaceable filament light source(s), the applicant shall annex to the type approval documentation a report, acceptable to the Authority responsible for type approval, that demonstrates compliance of these non-replaceable filament light source(s) with the requirements as specified in paragraph 4.11 of IEC 60809, Edition 3.

4.4. Independent and interdependent lamps

4.4.1. An assembly of two independent lamps to be type approved as lamp marked "D" is applicable to front and rear position lamps ~~except for categories MA, MR~~, stop lamps ~~except for category MS~~, front and rear end-outline marker lamps, daytime running lamps and direction indicator lamps ~~except for categories 11, 11a, 11b, 11c and 12~~;

4.4.2. An interdependent lamp system to be type approved as lamps marked “Y” is applicable to front and rear position lamps, stop lamps, front and rear end-outline marker lamps, daytime running lamps and direction indicator lamps.

4.5. Lamps as such or grouped, combined, reciprocally incorporated:

4.5.1. Lamps having been approved as front or rear position lamps, are deemed being also approved end-outline marker lamps.

4.5.2. Front and rear position lamps which are grouped or combined or reciprocally incorporated may also be used as end-outline marker lamps.

4.5.3. Position lamps or daytime running lamps, which are reciprocally incorporated with another function, using a common light source, and designed to operate permanently with an additional system to regulate the intensity of the light emitted, are permitted.

4.5.4. However, in the case of rear position lamp reciprocally incorporated with a stop lamp, the lamp shall either:

(a) Be a part of a multiple light source arrangement; or

(b) Be intended for use in a vehicle equipped with a failure monitoring system for that function.

In either case, a note shall be made within the communication document.

4.5.5. If the front position lamp incorporates one or more infrared radiation generators, the photometric and colour requirements for this front position lamp shall be met with and without the operation of the infrared radiation generator(s).

4.6. Failure provisions

4.6.1. Failure of a single lamp containing more than one light source

4.6.1.1. In a single lamp containing more than one light source, a group of light sources, wired so that the failure of any one of them causes all of them to stop emitting light, shall be considered to be one light source.

4.6.1.2. In case of failure of any one light source in a single lamp containing more than one light source, at least one of the following provisions shall apply:

(a) The light intensity complies with the minimum intensity required in the pertinent table of standard light distribution as shown in Annex 3 and when all light sources are illuminated the maximum intensities shall not be exceeded; or

(b) A signal for activation of a tell-tale indicating failure, as indicated in paragraphs 6.4.8., 6.7.8., 6.9.8, 6.10.8., 6.11.8., 6.12.8., 6.13.8. and 6.18.8. of UN Regulation No. 48, is produced, provided that the luminous intensity in the axis of reference is at least 50 per cent of the minimum intensity required. In this case a note in the communication form states that the lamp is only for use on a vehicle fitted with a tell-tale indicating failure.

~~4.6.1.3. The requirements of paragraph 4.6.1.2. do not apply to daytime running lamps that shall comply with the requirements of paragraph 5.4.4.~~

4.6.1.3. For daytime running lamps, instead of the requirements of paragraph 4.6.1.2. and in addition to the requirements of paragraph 4.6.1.1., the following provisions apply:

In case of failure of any one light source in a single lamp containing more than one light source, one of the following provisions shall apply:

(a) The light intensity at the points of standard light distribution defined in paragraph 2.2. of Annex 3 shall be at least 80 per cent of the minimum intensity required; or

(b) The light intensity in the axis of reference shall be at least 50 per cent of the minimum intensity required, provided that a note in the communication form states that the lamp is only for use on a vehicle fitted with an operating tell-tale.

~~4.6.1.4. The requirements of paragraph 4.6.1.2. do not apply to direction indicator lamps of category 1, 1a, 1b, 2a, 2b, 11, 11a, 11b, 11c and 12 that shall comply with the requirements of paragraph 5.6.3.~~

4.6.1.4. For direction-indicator lamps of categories 1, 1a, 1b, 2a, 2b, 11, 11a, 11b, 11c and 12, instead of the requirements of paragraph 4.6.1.2. and in addition to the requirements of paragraph 4.6.1.1., the following provisions apply:

A signal for activation of the tell-tale prescribed in paragraph 6.5.8. of Regulation No. 48 or paragraph 6.3.8. of Regulation No. 53 shall be produced on the basis of either option a), b) or c) (notwithstanding the provisions stated in paragraph 4.6.):

(a) Any one light source has failed;

(b) In the case of a lamp designed for only two light sources, the intensity in the axis of reference is less than 50 per cent of the minimum intensity required;

(c) As a consequence of a failure of one or more light sources, the intensity in one of the following directions as indicated in paragraph 2.1. of Annex 3, is less than the minimum intensity required:

(i) H=0°, V=0°

(ii) H=20° outwards ~~to the outside of the vehicle~~, V= +5°

(iii) H=10° inwards ~~to the inside of the vehicle~~, V= 0°.

4.6.1.5. The requirements of paragraph 4.6.1.2. do not apply to rear registration platelamps ~~devices~~. However, the requirements of paragraph 4.6.1.1. are still applicable.

4.6.1.6. The requirements of paragraph 4.6.1.2. (b) do not apply to stop- and position lamps for vehicles of category L**.** However, the requirements of paragraph 4.6.1.1. and paragraph 4.6.1.12. (a) are still applicable

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4.6.2. In case of failure of the variable intensity control of:

(a) A rear position lamp category R2 emitting more than the maximum value of category R1;

(b) A rear end-outline marker lamp category RM2 emitting more than the maximum value of category RM1;

(c) A stop lamp category S2 emitting more than the maximum value of category S1;

(d) A stop lamp category S4 emitting more than the maximum value of category S3;

(e) A direction indicator of category 2b emitting more than the maximum value of category 2a;

(f) A rear fog lamp of category F2 emitting more than the maximum value of category F1.

Requirements of steady luminous intensity of the respective category shall be fulfilled automatically.

4.7. Testing

4.7.1 Testing of the lamp with respect to light sources

Test of the lamp/device shall be carried out according to Annex 8.

4.7.1.1 In the case where the lamp, at the discretion of the applicant, also has to be approved with LED substitute light source(s), all measurements, photometric and colorimetric, shall be repeated using the LED substitute light source(s) prescribed.

4.7.2. The limits of the apparent surface in the direction of the reference axis of a light-signalling lamp shall be determined. However, in the case of category 5 and 6 direction indicators, the limits of the light emitting surface shall be determined. This requirement shall not apply to rear-registration plate illuminating lamps.

4.7.3. In the case of a lamp, which is intended to be mounted inside the vehicle a sample plate or sample plates (in case of different possibilities) as supplied (see paragraph 3.1.2.8.) shall be positioned in front of the lamp to be tested, in the geometrical position(s) as described in the application drawing(s) (see paragraph 3.1.2.2.).

4.8. Photometric measurements

4.8.1. Measurement provisions

4.8.1.1. During photometric measurements, stray reflections shall be avoided by appropriate masking.

4.8.1.2. In case the results of measurements should be challenged, measurements shall be carried out in such a way as to meet the following requirements:

4.8.1.2.1. The distance of measurement shall be such that the law of the inverse of the square of the distance is applicable;

4.8.1.2.2. The measuring equipment shall be such that the angular aperture of the receiver viewed from the reference centre of the light is comprised between 10' and 1 degree;

4.8.1.2.3. The intensity requirement for a particular direction of observation shall be deemed to be satisfied if that requirement is met in a direction deviating by not more than one-quarter of a degree from the direction of observation.

4.8.1.3. In the case where the lamp may be installed on the vehicle in more than one or in a field of different positions the photometric measurements shall be repeated for each position or for the extreme positions of the field of the reference axis specified by the manufacturer.

4.8.2. Measurement methods

4.8.2.1. The photometric performance shall be checked in accordance with the relevant sub-paragraph of paragraph 4.7.

4.8.2.2. For multiple replaceable light sources:

When equipped with light source(s) at 6.75 V, 13.5 V or 28.0 V, the luminous intensity values produced shall be corrected. For these replaceable filament light sources the correction factor is the ratio between the reference luminous flux and the mean value of the luminous flux found at the voltage applied (6.75 V, 13.5 V or 28.0 V).

For LED light sources the correction factor is the ratio between the objective luminous flux and the mean value of the luminous flux found at the voltage applied (6.75 V, 13.5 V or 28.0 V).

The actual luminous fluxes of light source used shall not deviate more than 5 per cent from the mean value. Alternatively, and in case of filament light sources only, a standard filament light source 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.

4.8.2.3. For lamps except those equipped with filament light source(s)

4.8.2.3.1. For reversing lamps and maneuvering lamps, the luminous intensities measured after one minute and after 10 minutes of operation, shall comply with the minimum and maximum requirements. The luminous intensity distribution after one and after 10 minutes of operation shall be calculated from the luminous intensity distribution measured after photometric stability has occurred by applying at each test point the ratio of luminous intensities measured at HV:

(a) After one minute;

(b) After 10 minutes; and

(c) After photometric stability has occurred.

4.8.2.3.2. For all other lamps, the luminous intensities measured after 1min and after 30min of operation shall comply with the minimum and maximum requirements.

Operation of direction indicator lamps shall be done in flashing mode (f = 1.5 Hz, duty factor 50 per cent).

The luminous intensity distribution after 1min of operation can be calculated from the luminous intensity distribution after 30 min of operation by applying at each test point the ratio of luminous intensities measured at HV after 1 min and after 30 min of operation.

4.8.2.4. If not otherwise specified, the intensities shall be measured with the light source continuously lit .

4.8.2.5. In the case of a lamp with variable intensity, the time that elapses between energising the light source(s) and the light output measured on the reference axis to reach 90 per cent of the value measured in accordance with paragraph 5. shall be measured for the extreme levels of luminous intensity produced by the lamp. The time measured to obtain the lowest luminous intensity shall not exceed the time measured to obtain the highest luminous intensity.

4.8.2.6. Particulars of the methods of measurement to be used are given in Annex 3.

4.8.3. Luminous intensities

4.8.3.1. If not otherwise specified, the intensity of light emitted by each of the two samples supplied shall:

(a) On the reference axis (HV),   
be not less than the minimum specified in the table of the pertinent function in paragraph 5.;

(b) In no direction where the lamp is visible,   
exceed the maximum, specified in the table of the pertinent function in paragraph 5.;

(c) Outside the reference axis,   
- be not less than the product of the minimum specified in the table of the pertinent function in paragraph 5., by the percentage specified in the pertinent light distribution figure reproduced in Annex 3 for each direction in question, or

- be not less than the intensity value as specified in the pertinent light distribution figure reproduced in Annex 3 for each direction in question;

(d) Within the angles of geometric visibility defined in the tables in Annex 2, be not less than the minimum specified in the table of the pertinent function in paragraph 5.

The provisions of the relevant paragraphs of Annex 3 on local variations of intensity shall be observed.

4.8.3.1.1. In addition, in order to verify the visibility of red light towards the front and/or white light towards the rear of a vehicle required in UN Regulation No.48, the applicant may request an additional test, to show that in the angular field from 165° to 180° outboard in horizontal direction and -2.5° to +5° in vertical direction, the maximum intensity is not more than 0.25 cd. This additional test may be conducted taking into account the influence of the vehicle body.

4.8.3.2. When an assembly of two independent lamps, to be type approved as lamps marked "D" and having the same function, is deemed to be a single lamp, it shall comply with the requirements for:

(a) Maximum intensity if all lamps together are lit;

(b) Minimum intensity if either lamp has failed.

4.8.3.3. An interdependent lamp system shall meet the requirements when all its interdependent lamps are operated together.

However:

(a) If the interdependent lamp system providing the rear position lamp is partly mounted on the fixed component and partly mounted on a movable component, the interdependent lamp(s) specified by the applicant shall meet the outboard geometric visibility colorimetric and photometric requirement, at all fixed positions of the movable component(s). In this case, the inboard geometric visibility requirement is deemed to be satisfied if this (these) interdependent lamp(s) still conform to the photometric values prescribed in the field of light distribution for the approval of the device, at all fixed positions of the moveable component(s);

(b) If the interdependent lamp system providing the rear direction indicator function is partly mounted on the fixed component and partly mounted on a movable component, the interdependent lamp(s) specified by the applicant shall meet the geometric visibility, colorimetric and photometric requirement, at all fixed positions of the movable component(s). This does not apply to interdependent direction indicator lamp(s) intended for fitting on vehicle(s) where, to fulfil or complete the geometric visibility angle, additional lamps are activated when the movable component is in any fixed open position, provided that these additional lamps satisfy all the position, photometric and colorimetric requirements applicable to the direction indicator lamps installed on the movable component.

~~4.8.6. The provisions of the relevant paragraphs of Annex 3 on local variations of intensity must be observed.~~

~~4.8.7. If not otherwise specified, the intensities shall be measured with the light source~~~~continuously alight and, in the case of lamps emitting red light, in coloured light.~~

~~4.8.8. In the case of lamps of categories R2, RM2, S2, S4, F2 and 2b, the time that elapses between energising the light source(s) and the light output measured on the reference axis to reach 90 per cent of the value measured in accordance with paragraph 5. shall be measured for the extreme levels of luminous intensity produced by the lamp. The time measured to obtain the lowest luminous intensity shall not exceed the time measured to obtain the highest luminous intensity.~~

4.8.3.4. The variable intensity control shall not generate signals which cause luminous intensities:

4.8.3.4.1. Outside the range specified in paragraph 5.; and

4.8.3.4.2. Exceeding the respective steady luminous intensity maximum specified in paragraph 5. for the specific lamp:

(a) For systems depending only on daytime and night-time conditions: under night-time conditions;

(b) For other systems: under standard conditions[[2]](#footnote-2).

~~4.8.10. Particulars of the methods of measurement to be used are given in Annex 3.~~

4.8.3.5. If a rear position lamp and/or a rear end-outline marker lamp is reciprocally incorporated with a stop lamp producing either steady or variable luminous intensity, the ratio between the luminous intensities actually measured of the two lamps when turned on simultaneously at the intensity of the rear position lamp or end-outline marker lamp when turned on alone should be at least 5: 1 in the field delimited by the straight horizontal lines passing through ±5° V and the straight vertical lines passing through ±10° H of the light distribution table.

If the one or both of the two reciprocally incorporated lamps contain(s) more than one light source and is (are) considered as a single lamp, the values to be considered are those obtained with all sources in operation;

4.9. Colour of light emitted

The colour of the light emitted shall be measured inside the field of the light distribution grid defined for the specific function in the relevant paragraph of Annex 3. To check these colorimetric characteristics, the test procedure described in paragraph 4.7. shall be applied. Outside this field no sharp variation of colour shall be observed.

However, for lamps equipped with non-replaceable light sources, the colorimetric characteristics should be verified with the light sources present in the lamp, in accordance with relevant subparagraphs of paragraph 4.7.

Annex 8

Testing procedures with respect to light sources

1. General test requirements

1.1. The luminous intensity distribution and the colour of the light is measured and checked for compliance after photometric stability.

1.2. Depending on the light source technology and on the lamp (function), the luminous intensity distribution is additionally checked for compliance (minimum and maximum luminous intensities) at the point in time listed in Table A8-1.

***Table A8-1 Points in time for additional testing***

|  |  |  |
| --- | --- | --- |
| Lamp (function) | Time after activation (seconds) | Test point |
| Rear-registration plate illumination | 4 | any measurement point given in Annex 3 |
| Direction Indicator Cat 1, 2, 11, 12 | 0,2 | HV |
| Direction Indicator Cat 5, 6 | 0,2 | H5, V0 |
| Front and rear position | 4 | HV |
| Stop | 0,2 | HV |
| End-outline marker | 4 | HV |
| Reversing | 0,2 | HV |
| Maneuvering | N.A. | N.A. |
| Rear fog | 4 | HV |
| Parking | 4 | HV |
| Daytime running | 4 | HV |
| Side marker lamps | 4 | HV |

1.2.1. In case a lamp (function) uses filament technology only, a lamp (function) is deemed to comply with the corresponding intensity requirements at all points in time, if the values measured after photometric stability are compliant.

1.2.2. In case a lamp (function) uses LED technology only, a lamp (function) is deemed to comply with the corresponding intensity requirements at all points in time, if the values measured at 1 minute after activation and after photometric stability are compliant.

1.2.3. In case of doubt (e.g. unexpected run-up behaviour), the corresponding minimum intensity requirements of a lamp (function) are additionally tested and checked for compliance at all points in time starting at the corresponding point in time listed in Table A8-1 and ending when photometric stability is reached.

1.2.4. In case of any other light generating technology, the corresponding intensity requirements of a lamp (function) are tested and checked for compliance at the corresponding point in time listed in Table A8-1. and ending when photometric stability is reached.

1.2.5. In case a lamp (function) uses more than one light generating technology, the corresponding intensity requirements of a lamp (function) are tested following the strictest time requirements in paragraphs 1.2.1. to 1.2.4. for the combination of them and checked for compliance.

1.3. In case a lamp (function) uses other light generating technologies than incandescent technology, the colour of the light emitted is additionally checked for compliance at 1 minute after activation.

2. Light source specific test conditions

Depending on the kind of light source used, the following conditions shall apply.

2.1. In the case of replaceable UN approved filament light sources:

The lamp shall be checked by means of colourless standard (étalon) filament light sources as specified in R.E.5.

During the testing of the lamp the power supply to the filament light source(s) shall be regulated so as to obtain the reference luminous flux at 13.5 V as indicated on the relevant data sheet of UN Regulation No. 37.

2.1.1. In order to protect the standard (étalon) filament light source during the process of photometric measurement it is permissible to carry out the measurements at a luminous flux that differs from the reference luminous flux. If the Technical Service chooses to carry out measurements in such a manner, the luminous intensity shall be corrected by multiplying the measured value by the individual factor F lamp of the standard (étalon) filament light source in order to verify the compliance with the photometric requirements where:

F lamp = Φ reference / Φ test

Φ reference is the reference luminous flux as specified in the relevant data sheet of UN Regulation No. 37

Φ test is the actual luminous flux used for the measurement.

In the case of more than one filament light source, the mean value of the correction factors of the individual standard light sources shall be applied, while each individual correction factor shall not deviate more than 5 per cent from this mean value.

2.2. In the case of replaceable UN approved gas-discharge light sources:

A standard light source shall be used as specified in R.E.5, which has been aged during at least 15 cycles, in accordance with paragraph 4. of Annex 4 to UN Regulation No. 99.

During testing of the lamp, the voltage at the terminals of the ballast or at the terminals of the light source in case the ballast is integrated with the light source shall be regulated to maintain 13.5 V for a 12 V system, or at the vehicle voltage as specified by the applicant, with a tolerance of ±0.1 V.

The objective luminous flux of the gas-discharge light source may differ from that specified in UN Regulation No. 99. In this case, the luminous intensity values shall be corrected. The correction factor is the ratio between the objective luminous flux and the value of the luminous flux found at the voltage applied. In the case of more than one gas-discharge light source, the mean value of the correction factors shall be applied, while each individual correction factor shall not deviate more than 5 per cent from this mean value.

*2.3.* In the case of replaceable UN approved LED light sources:

The lamp shall be checked by means of a standard light source as specified in R.E.5.

During testing of the lamp, the voltage supplied to the light source(s) shall be regulated to maintain 13.5 V for a 12 V system or 28 V for a 24 V system, or at the vehicle voltage as specified by the applicant, with a tolerance of ±0.1 V.

The luminous intensity values produced shall be corrected. The correction factor is the ratio between the objective luminous flux and the value of the luminous flux found at the voltage applied. In the case of more than one LED light source, the mean value of the correction factors shall be applied, while each individual correction factor shall not deviate more than 5 per cent from this mean value.

2.4. In the case of light source modules:

All measurements on lamps equipped with light source module(s) shall be made at 6.75 V, 13.5 V or 28.0 V respectively, if not otherwise specified within this Regulation. Light source modules operated by an electronic light source control gear or a variable intensity control shall be measured with the input voltage as specified by the applicant or with a supply and operating device which replace this control gear or a variable intensity control for the photometric test.

2.5. In the case of non-replaceable light sources:

2.5.1. The photometric performance shall be checked with the light sources present in the lamp;

2.5.2 All measurements on lamps equipped with non-replaceable light sources shall be made at 6.75 V, 13.5 V or 28.0 V or at other vehicle voltage as specified by the applicant. The test laboratory may require from the applicant the special power supply needed to supply the light sources. The test voltages shall be applied to the input terminals of the lamp.

2.6. Light Signalling Devices equipped with different kinds of light sources, the part of the lamp equipped:

(a) With replaceable UN approved filament light sources shall be tested according to paragraph 2.1.; and/or

(b) With replaceable UN approved gas-discharge light sources shall be tested according to paragraph 2.2.; and/or

(c) With replaceable UN approved LED light sources shall be tested according to paragraph 2.3.; and/or

(d) With light source modules shall be tested according to paragraph 2.4.; and/or

(e) With non-replaceable light sources shall be tested according to paragraph 2.5.

and then added to the previous result obtained from the light sources tested.

2.7. Despite the provisions in paragraphs 2.1. to 2.6., in the case of a lamp that uses an electronic light source control gear or a variable intensity control:

2.7.1. If the electronic light source control gear or a variable intensity control is part of the lamp, the voltage declared by the applicant shall be applied to the input terminals of that lamp.

2.7.2. If the electronic light source control gear or a variable intensity control is not part of the lamp the voltage declared by the applicant shall be applied to the input terminals of that electronic light source control gear or a variable intensity control. The test laboratory shall require from the applicant the special electronic light source control gear or a variable intensity control needed to supply the light source and the applicable functions. The identification of that electronic light source control gear or variable intensity control if applicable and/or the voltage applied, including the tolerances, shall be noted in the communication form in Annex 1.

2.7.3. In the case of replaceable UN approved light sources, the lamp shall be checked by means of a standard light source as specified in R.E.5.

Additionally, in the case of replaceable UN approved filament light sources, the standard filament light source shall have a luminous flux value that does not deviate more than 5 per cent from its reference luminous flux value when test voltage is applied.

3. Lamp (function) specific test condition

3.1. For any reversing lamps and manoeuvring lamps except those equipped with filament light source(s), the luminous intensities, measured after one minute and after 10 minutes of operation, shall comply with the minimum and maximum requirements. The luminous intensity distributions after 1 minute and after 10 minutes of operation shall be calculated from the luminous intensity distribution measured after photometric stability has occurred by applying at each test point the ratio of luminous intensities measured at HV:

(a) After one minute;

(b) After 10 minutes; and

(c) After photometric stability has occurred.

1. Compliance with the requirements for electromagnetic compatibility is relevant to the vehicle type. [↑](#footnote-ref-1)
2. Good visibility (meteorological optical range MOR > 2,000 m defined according to WMO, Guide to Meteorological Instruments and Methods of Observation, Sixth Edition, ISBN: 92-63-16008-2, pp 1.9.1/1.9.11, Geneva 1996) and clean lens. [↑](#footnote-ref-2)