**SLR-71-02/Rev.1**

(*Note: the only modification in Rev.1 is the movement of some text from
Par. 4.7.2.5. of Reg. 148 to Par. 3.2 of Annex 8, reflecting the outcome of discussion at SLR-71*)

**German input based on SLR-68-10,**

**taking into account the discussion at SLR-70**

**Idea from Germany for a simplification of the lifetime requirements for non-replaceable light source(s) and non-replaceable light source module(s), with the intention to reduce an unnecessary burden, based on the fact that the lifetime of a LED light source is much higher than the lifetime of a filament lamp**

**IEC draft proposal for Technological Neutrality in**

**UN Regulations Nos. 48, 148 and 149**

## **Proposal – Part 1 – UN Regulation No. 48**

2.10.1. "*Objective luminous flux*" means:

(a) In the case of a UN approved light source:

The value of the objective luminous flux, not including any tolerances, as indicated in the relevant data sheet of the applicable light source Regulation according to which the light source is approved;

(b) In the case of a light source module:

The value of the objective luminous flux as indicated in the technical specification submitted with the light source module for approval of the lamp of which the light source module is a part;

(c) In the case of a non-replaceable light source:

The value of the objective luminous flux as indicated in the technical specification submitted with the non-replaceable light source for approval of the lamp of which the non-replaceable light source is a part;

…

5.29. Alight source module does not need to be replaceable, if so stated in the communication sheet of the component type-approval.

…

5.31 Lamps installed on a vehicle which is approved according to this Regulation and approved for one or more replaceable light source categories according to UN Regulations Nos. 37, 99 or 128, shall be fitted with light sources approved according to these light source categories only.

This requirement does not concern light source modules and non-replaceable light sources, except for when they are required to be approved by the applicable UN Regulation.

…

6.2.7.4. One or more additional light source(s) or one or more light source module(s), located inside the passing-beam headlamps or in a lamp (except the driving-beam headlamp) grouped or reciprocally incorporated with the respective passing-beam headlamps, may be activated to produce bend lighting, provided that the horizontal radius of curvature of the trajectory of the centre of gravity of the vehicle is 500 m or less. This may be demonstrated by the manufacturer by calculation or by other means accepted by the Type Approval Authority.

…

6.2.8.2. A visual failure tell-tale whether flashing or not is mandatory:

(a) In the case where the whole beam or the kink of the elbow of the cut-off is moved to produce bend lighting; or

(b) If one or more light source modules or non-replaceable light source(s) or if more than one UN approved light source(s) are used to produce the principal passing-beam, except when they are wired so that the failure of any one of them causes all of them to stop emitting light.

It shall be activated:

(a) In the event of a malfunction of the displacement of the kink of the elbow of the cut-off; or

(b) In case of a failure of any one of the light source module(s) or non-replaceable light source(s) or UN approved light source(s) producing the principal passing-beam, except when they are wired so that the failure of any one of them causes all of them to stop emitting light.

It shall remain activated while the failure is present. It may be cancelled temporarily, but shall be repeated whenever the device, which starts and stops the propulsion system, is switched ON and OFF.

…

6.2.9.2. Passing-beam headlamps with light source(s) or light source module(s) producing the principal passing-beam having a total objective luminous flux for each headlamp which exceeds 2,000 lumens shall only be installed in conjunction with the installation of headlamp cleaning device(s) according to UN Regulation No. 45.

6.2.9.3.

 In the case of filament lamps for which more than one test voltage is specified, the objective luminous flux which produces the principal passing-beam, as indicated in the communication form for the type approval of the device, is applied.

 In the case of passing-beam headlamps equipped with an approved light source, the applicable objective luminous flux is the value at the relevant test voltage as given in the relevant data sheet in the Regulation, according to which the applied light source was approved, without taking into account the tolerances to the objective luminous flux specified on this datasheet.

## **Proposal – Part 2 – UN Regulation No. 148**

…4.7.2.5. The lifetime of non-replaceable light source(s) and non-replaceable light source module(s) shall be compliant with the minimum requirement for the corresponding light-signalling function as given in paragraph 3. Annex 8. If the Type Approval Authority becomes aware of a shorter lifetime than the minimum requirements in paragraph 3. Annex 8, it can request a verification by the technical service at the applicant's costs. If the minimum requirements in paragraph 3. Annex 8 are not fulfilled during the verification, the approval of the function needs to be withdrawn by the Type Approval Authority within one month.

…

**Annex 8**

**Testing procedures with respect to light sources**

**1. General test requirements**

…

**2. Additional test requirements**

…

**3. Lifetime requirements for non-replaceable light source(s) and non-replaceable light source module(s)**

3.1. The minimum requirement for the corresponding light-signalling function is given in Table A8-2.

Table A8-2

**Minimum lifetime requirements**

|  |  |
| --- | --- |
| Lamp (function) | Minimum lifetime B10 2 in hours |
| Rear-registration plate illuminating lamp | 6200 1 |
| Front, side and rear direction indicator lamp | 500 |
| Front and rear position lamp | 6200 1 |
| Stop lamp | 1000 |
| Front and rear end-outline marker lamp | 6200 1 |
| Reversing lamp | 100 |
| Rear fog lamp | 100 |
| Parking lamp | 6200 1 |
| Daytime running lamp | 4000 |
| Side marker lamp | 6200 1 |

1 In case the applicant declares that these lamps are intended only for vehicles where the function is not switched ON together with the daytime running lamp (DRL) a value of 2200 hours applies

2 B10 is a constant of the Weibull distribution indicating the time during which 10 per cent of a number of the tested light sources of the same type have reached the end of their individual lives (stopped emitting light)

3.2. In case a lamp (function) uses LED technology only, the lifetime of the LED components is deemed to comply with the minimum requirements, when operated within the limits as defined in the data sheet of the LED components (annexed to the type-approval documentation).

3.3. In case of any other light generating technologies, the lifetime data of the light source components shall be provided by the applicant (annexed to the type-approval documentation) and accepted by the Type-Approval Authority.

The lifetime data shall make reference to the same or stricter operating conditions as those given in paragraph 4.8.2. of this Regulation.

## **Proposal – Part 3 – UN Regulation No. 149**

3.1.2.2.1. In the case of a headlamp, it shall specify:

(a) Whether the headlamp is intended to provide both a passing-beam and a driving-beam or only one of these beams;

(b) If the headlamp is intended to provide a passing-beam, whether it is designed for both left-hand and right-hand traffic or for either left-hand or right-hand traffic only;

(c) To which Class(es) (passing-beam and/or driving-beam) the headlamp belongs;

(d) In the case of light source module(s) and non-replaceable light source(s) this shall include:

(i) A brief technical specification of the light source module(s) and non-replaceable light source(s);

(ii) A drawing with dimensions and the basic electrical and photometric values and the objective luminous flux and for each light source module a statement whether it is replaceable or not;

(iii) In case of electronic light source control gear, information on the electrical interface necessary for approval testing;

(e) Whether the left and the right headlamps are operating as matched pair;

3.1.2.2.2. In the case of an AFS, it shall specify:

(a) The lighting function(s) and their modes to be provided by the system;[[1]](#footnote-1)

(b) The lighting units contributing to each of them and the signals[[2]](#footnote-2) with the technical characteristics relevant to their operation;

(c) Which categories of the bending mode requirements apply, if any;

(d) Which additional data set(s) of Class E passing-beam provisions according to Table 12, if any;

(e) Which set(s) of Class W passing-beam provisions according to paragraph 5.3.2., if any;

(f) Which lighting units2 provide or contribute to one or more passing-beam cut-off(s);

(g) The indication(s)2 according to the provisions of paragraph 5.3.5.1. with respect to paragraph 6.22. of UN Regulation No. 48;

(h) Which lighting units are designed to provide the minimum passing-beam illumination according to paragraph 5.3.2.8.1.;

(i) Mounting and operation requirements for test purposes;

(j) Any other relevant information;

(k) In the case of light source module(s) and non-replaceable light source(s) this shall include, for each module:

(i) A brief technical specification of the light source module(s) and non-replaceable light source(s);

(ii) A drawing with dimensions and the basic electrical and photometric values and the objective luminous flux and for each light source module a statement whether it is replaceable or not;

(iii) In case of electronic light source control gear, information on the electrical interface necessary for approval testing;

(l) Any other front-lighting or front light signalling function(s), provided by any lamp(s) being grouped, combined or reciprocally incorporated to the lighting units of the system, for which approval is sought; sufficient information for identification of the respective lamp(s) and indication of the Regulation(s), according to which they are intended to be (separately) approved;

…

4.5.2.4. 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 mechanically 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.

(d) 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 the lamp or AFS system shall be met.

4.5.2.5. Light source modules shall comply with the requirements specified in Annex 9, Part I.

4.5.2.6. Non-replaceable light sources shall comply with the requirements specified in Annex 9, Part II.

4.5.2.7. The lifetime of the non-replaceable light source(s) and non-replaceable light source module(s) shall be compliant with the minimum requirement for the corresponding road-illumination function as given in paragraph 3. Annex 10. The lifetime data of non-replaceable light source(s) and non-replaceable light source module(s) shall be provided by the applicant (annexed to the type-approval documentation) and accepted by the Type-Approval Authority. If the Type Approval Authority becomes aware of a shorter lifetime than the minimum requirements in paragraph 3. Annex 10, it can request a verification by the technical service at the applicant's costs. If the minimum requirements in paragraph 3. Annex 10 are not fulfilled during the verification, the approval of the functionneeds to be withdrawn by the Type Approval Authority within one month.

…

**Annex 9**

**Requirements for light source modules and non-replaceable light sources**

**Part I: Light source modules**

1. General requirements

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

1.2. light source 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 light source module shall be considered to have failed if any one of its light sources has failed.

2. Manufacture of light source modules

2.1. The light source(s) on the light source module shall be equipped with suitable fixation elements.

2.2. The fixation elements shall be strong and firmly secured to the light source(s) and the light source module.

3. Test conditions

3.1. Application

3.1.1. All samples shall be tested as specified in paragraph 4.

3.2. Operating conditions

3.2.1. light source module operating conditions

All samples shall be tested under the conditions as specified in paragraphs 4.6.2.1. and 4.6.2.2. of this Regulation.

3.2.2. Ambient temperature

 For the measurement of electrical and photometric characteristics, the device shall be operated in a dry and still atmosphere at an ambient temperature of 23 °C ± 5 °C.

3.3. Ageing

Upon the request of the applicant the light source module shall be operated for 15 h and cooled down to ambient temperature before starting the tests as specified in this Regulation.

4. Specific requirements and tests

4.1. Colour rendering

4.1.1. Red content

In addition to provisionsas described in paragraph 4.16. of this Regulation.

The minimum red content of the light of a light source module, when tested outside the device, shall be such that:

****

 where:

 Ee(λ) (unit: W) is the spectral distribution of the irradiance;

 V(λ) (unit: 1) is the spectral luminous efficiency;

 (λ) (unit: nm) is the wavelength.

 This value shall be calculated using intervals of one nanometre.

4.2. UV-radiation

 The UV-radiation of a low-UV-type light source module, when tested outside the device, shall be such that:

**

 where:

 S(λ) (unit: 1) is the spectral weighting function;

 km = 683 lm/W is the maximum value of the luminous efficacy of radiation.

 (For definitions of the other symbols see paragraph 4.1.1.).

This value shall be calculated using intervals of one nanometre. The UV‑radiation shall be weighted according to the values as indicated in
Table A9-1:

Table A9-1

**Table UV**

Values according to "IRPA/INIRC Guidelines on limits of exposure to ultraviolet radiation". Wavelengths (in nanometres) chosen are representative; other values should be interpolated.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *λ* | *S(λ)* |  | *λ* | *S(λ)* |  | *λ* | *S(λ)* |
| 250 | 0.430 |  | 305 | 0.060 |  | 355 | 0.000 16 |
| 255 | 0.520 |  | 310 | 0.015 |  | 360 | 0.000 13 |
| 260 | 0.650 |  | 315 | 0.003 |  | 365 | 0.000 11 |
| 265 | 0.810 |  | 320 | 0.001 |  | 370 | 0.000 09 |
| 270 | 1.000 |  | 325 | 0.000 50 |  | 375 | 0.000 077 |
| 275 | 0.960 |  | 330 | 0.000 41 |  | 380 | 0.000 064 |
| 280 | 0.880 |  | 335 | 0.000 34 |  | 385 | 0.000 053 |
| 285 | 0.770 |  | 340 | 0.000 28 |  | 390 | 0.000 044 |
| 290 | 0.640 |  | 345 | 0.000 24 |  | 395 | 0.000 036 |
| 295 | 0.540 |  | 350 | 0.000 20 |  | 400 | 0.000 030 |
| 300 | 0.300 |  |  |  |  |  |  |

5.The measurement of the objective luminous flux of light source module(s) producing the principal passing-beam shall be carried out as follows:

5.1. The light source module(s) shall be in the configuration as described in the technical specification as defined in paragraph 3.1.2.2. of this Regulation. Optical elements (secondary optics) shall be removed by the Technical Service at the request of the applicant by the use of tools. This procedure and the conditions during the measurements as described below shall be described in the test report.

5.2. One module of each type shall be submitted by the applicant with the electronic light source control gear, if applicable, and sufficient instructions.

Suitable thermal management (e.g. heat sink) may be provided, to simulate similar thermal conditions as in the corresponding headlamp or AFSapplication.

Before the test each light source module shall be aged at least for seventy-two hours under the same conditions as in the corresponding headlamp application.

In the case of use of an integrating sphere, the sphere shall have a minimum diameter of one meter, and at least ten times the maximum dimension of the light source module, whichever is the largest. The flux measurements can also be performed by integration using a goniophotometer. The prescriptions in CIE - Publication 84 - 1989, regarding the room temperature, positioning, etc., shall be taken into consideration.

The light source module shall be burned in for approximately one hour in the closed sphere or goniophotometer.

The flux shall be measured after photometric stability has occurred.

**Part II: Non-replaceable light sources**

The requirements from Part I shall apply to non-replaceable light sources accordingly.

…

**Annex 10**

**Testing procedures with respect to light sources**

**1. General test requirements**

...

**2. Additional test requirements**

...

**3. Lifetime requirements for non-replaceable light source(s) and non-replaceable light source module(s)**

3.1. The minimum requirement for the corresponding road-illumination function is given in Table A10-2.

Table A10-2

**Minimum lifetime requirements**

|  |  |
| --- | --- |
| Lamp (function) | Minimum lifetime B10 1 in hours |
| Cornering lamp | 200 |
| Passing beam headlamp | 2000 |
| Bend lighting | 100 |
| Driving beam headlamp (non-adaptive) | 200 |
| Adaptive driving beam | 800 |
| Front fog lamp | 100 |

1 B10 is a constant of the Weibull distribution indicating the time during which 10 per cent of a number of the tested light sources of the same type have reached the end of their individual lives (stopped emitting light)

3.2. In case a lamp (function) uses LED technology only, the lifetime of the LED components is deemed to comply with the minimum requirements, when operated within the limits as defined in the data sheet of the LED components (annexed to the type-approval documentation).

3.3. In case of any other light generating technologies, the lifetime data of the light source components shall be provided by the applicant (annexed to the type-approval documentation) and accepted by the Type-Approval Authority.

The lifetime data shall make reference to the same or stricter operating conditions as those given in paragraph 4.6.2. of this Regulation.

1. To be indicated in a form conforming to the model of Annex 1. [↑](#footnote-ref-1)
2. To be indicated in a form conforming to the model of Annex 14. [↑](#footnote-ref-2)