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Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Lighting and Light-Signalling****Ninety-first session**

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Item 7 (b) of the provisional agenda

Device UN Regulations:**UN Regulation No. 149 (Road Illumination Devices)****Proposal for a Supplement to the 01 series of amendments to UN Regulation No. 149 and to the 06, 07, 08 and 09 series of amendments to UN Regulation No. 48****Submitted by the expert from the International Automotive Lighting and Light-Signalling Expert Group***

The text reproduced below was prepared by the expert from the International Automotive Lighting and Light-Signalling Expert Group (GTB) with the aim to amend failure detection and signalisation requirements to reflect technological progress in multiple light sources. The modifications to the existing text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2024 as outlined in proposed programme budget for 2024 (A/78/6 (Sect. 20), table 20.5), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

A. Proposal for a Supplement to the 01 series of amendments to UN Regulation No. 149

Paragraph 3.1.2.2., amend to read:

- “3.1.2.2. A brief technical description stating in particular:
- (a) In the case of lamps with replaceable UN approved light sources, the category or categories of light source(s) prescribed;
 - (b) In the case of lamps with replaceable light source modules, the light source module specific identification code;
 - (c) The make and type of electronic light source control gear(s), if any and if not being part of an installation unit;
 - (d) In the case the lamp shall also be approved with the LED substitute light source(s) according to UN Regulation No. 128, the category or categories of light source(s) prescribed;
 - (e) If the device (lamp) is equipped with an adjustable reflector, the mounting position(s) of the lamp in relation to the ground and the longitudinal median plane of the vehicle;
 - (f) **The measures provided to ensure compliance with the provisions of paragraph 4.13.1. where applicable.”**

Paragraph 4.13., amend to read:

“4.13. If ~~applicable~~ **required by the provisions of the relevant UN Regulations Nos. 48, 53, 74 or 86** the ~~lamp device (lamp)~~ shall be so made that, if a light source and/or ~~an LED-light source~~ module has failed, a **signal indicating the failure** ~~signal in order to comply with the relevant provisions of UN Regulation No. 48 or UN Regulation No. 53~~ is provided.

4.13.1. In case a specific function, which is realised with more than one element for visible radiation (see definition of “light source” in UN Regulation No. 48) wired so that a failure of any one of them does not cause all of them to stop emitting light, a signal indicating the failure of that specific function shall be provided, according to the applicant’s selection of one or more of the following options:

- (a) **One or more element(s) for visible radiation stops emitting light;**
- (b) **As a consequence of one or more element(s) for visible radiation stops emitting light, the resulting luminous intensity value in any of the photometric requirements is less than 80% of the minimum luminous intensity value required for the type approval;**
- (c) **As a consequence of one or more element(s) for visible radiation stops emitting light, the resulting luminous flux value has changed by more than 5% compared to the luminous flux value when no failure occurs;**
- (d) **More than 5% of the elements for visible radiation stop emitting light. In case more than one light source is used, this provision applies to the sum of all elements and to the elements of each light source separately;**
- (e) **If fitted, one or more UN approved light source(s) stops emitting light”.**

Annex I,

Insert a new item 9.1.13., to read:

“9.1.13. Failure signal produced according to paragraph 4.13.:

No² Yes: (a) / (b) / (c) / (d)/ (e) ²”

Insert a new item 9.2.14., to read:

“9.2.14. Failure signal produced according to paragraph 4.13.:

No² Yes: (a) / (b) / (c) / (d)/ (e) ²”

Annex 9, item 1.2., amend to read:

“1.2. 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.”~~

B. Proposal for a Supplement to the 06, 07 and 08 series of amendments to UN Regulation No. 48

Paragraph 6.2.8.2., amend to read:

“6.2.8.2. A ~~visual failure~~ tell-tale **indicating failure**, 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 LED modules are used to produce the principal dipped-beam, except when they are wired so that the failure of any one LED module 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) **At the discretion of the manufacturer, either**
 - In case of a failure of any one of the LED module(s) producing the principal dipped-beam, except when they are wired so that the failure of any one LED module causes all of them to stop emitting light; **or**
 - **If a failure signal is received in accordance with paragraph 4.13. of the 01 and any subsequent series of amendments to UN Regulation No. 149.**

In any case, once activated, it ~~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.”

C. Proposal for a Supplement to the 09 series of amendments to UN Regulation No. 48

Paragraph 6.2.8.2., amend to read:

“6.2.8.2. A ~~visual failure~~ tell-tale **indicating failure**, 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 module(s) or non-replaceable light source(s) or if more than one UN approved light source(s) are used to produce the principal dipped-beam, except when they are wired so that the failure of any one of them causes all of them to stop emitting light.

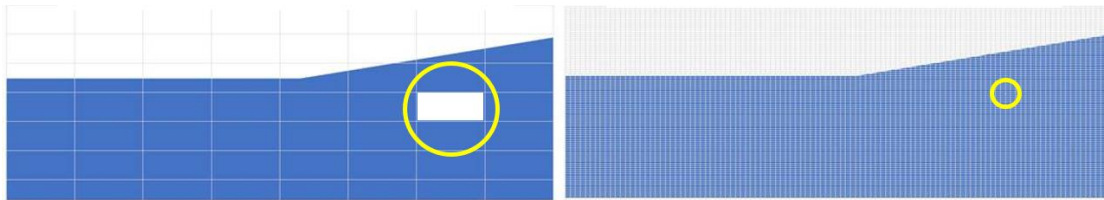
It shall be activated:

- (a) In the event of a malfunction of the displacement of the kink of the elbow of the cut-off; or
- (b) **At the discretion of the manufacturer, either**
 - 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 dipped-beam, except when they are wired so that the failure of any one of them causes all of them to stop emitting light; **or**
 - **If a failure signal is received in accordance with paragraph 4.13. of the 01 and any subsequent series of amendments to UN Regulation No. 149.**

In any case, once activated, 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.”

II. Justification

1. In the past the failure provisions for standard and adaptive front-lighting system (AFS) headlamps were consistent with the technologies used at that time, as any light-emitting part of the light source(s) was substantially necessary for fulfilling the photometric requirements. Based on the new technologies and light sources, passing beams constituted of a large number of elements for visible radiation are presently available, where a failure of any first of these does not consequentially lead to a lack of performance in photometric values.



2. In order to take into account these new technologies, the requirements regarding failures in passing beam using multiple light sources need to be extended and improved.

3. This amendment proposes to include in UN Regulation No. 149 different provisions allowing that a failure signal is only triggered when a significant change in the beam is detected and ensuring that the most suitable failure provision can be applied for each technology used:

(a) First failure

Failure recognition and activation of the related signal if the first element for visible radiation of a light source fails.

(b) Required luminous intensity value

Failure recognition and activation of the related signal if, due to this failure, any of the minimum luminous intensity values inside the light distribution pattern of the specific function is reduced to a value less than the 80% of the required value for type approval.

(c) Luminous flux

Failure recognition and activation of the related signal if the loss in the overall luminous flux exceeds 5%, independently from their location in the beam.

The relatively small percentage (5%) is proposed to avoid the unlikely formation of dark holes within the light pattern. In addition, it has to be considered that the failures of elements for visible radiation in a High Definition (HD) lighting device/system are

generally randomly distributed. Thus, this 5% of defective elements will be mostly due to a single or a couple of elements but not to a larger elements cluster.

(d) Number of elements for visible radiation

Failure recognition and activation of the related signal if the failed number of elements for visible radiation is more than 5% of the overall number of elements, independently from their location in the beam.

The same technical considerations of point (c) above apply.

(e) UN approved light source(s)

In the case a function is made with approved light sources, the failure signal is triggered according to the failure criteria of these light sources.

4. The failure provision chosen for the specific function shall be indicated in the Annex 1 (communication form of UN Regulation No. 149), ensuring transparency and ease of understanding for all parties involved.

5. The failure provisions in UN Regulation No. 48, series of amendments 06 to 09, are modified so that a tell-tale indicating failure may also be triggered in the case that the signal indicating the failure is received according to paragraph 4.13. of UN Regulation No. 149.
