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Working Party on Lighting and Light-Signalling (GRE)

(Forty-seventh session, 1-5 October 2001,
agenda item 1.4.)

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 48

(Installation of lighting and light-signalling devices)

Transmitted by the Expert from the Working Party "Brussels 1952" (GTB)

Note: The text reproduced below was prepared by the expert from GTB in order to introduce in the Regulation provisions concerning the Distributed Lighting Systems (DLS). The new text is introduced in **bold** type. The proposal was considered and approved by GTB at its ninety-first plenary session held in Rome, from 9-11 May 2001.

Note: This document is distributed to the Experts on lighting and light-signalling only.

GE.01-22658

A. PROPOSAL

Paragraph 2.6. to 2.7.1., amend to read:

"2.6. "Device" means an element or an assembly of elements used to perform one or more functions. **A device may also be constituted by the extreme outlet of a light-guide, as part of a distributed lighting or light-signalling system, or another light source, having a built-in outer lens;**

2.7. "Lamp" means a device designed to illuminate the road or to emit a light signal to other road users. **Lighting units of adaptive front lighting systems, rear registration plate lamps and retro-reflectors are likewise to be regarded as lamps;**

2.7.1. Light source

2.7.1.1. "Light source" means one or more elements for optical radiation, which may be assembled with one or more transparent envelopes and with a base for mechanical and electrical connection.

A light source may also be constituted by the extreme outlet of a light-guide, as part of a distributed lighting or light-signalling system not having a built-in outer lens;

2.7.1.1.1. "Replaceable light source" means a light source which can be inserted in and removed from the holder of its device without the use of tools;

2.7.1.1.2. "Non-replaceable light source" means a light source which cannot be removed from its device without damaging the device;

in case of a light source module: a light source which cannot be removed from its light source module without damaging the light source module;

2.7.1.1.3. "Light source module" means an optical part of a device which is specific to that device, is containing one or more non-replaceable light sources, and is only removable from its device with the use of tool(s);

2.7.1.1.4. "Filament light source" (filament lamp) means a light source where the element for optical radiation is one or more heated filaments producing thermal radiation;

2.7.1.1.5. "Gas-discharge light source" means a light source where the element for optical radiation is a discharge arc producing electro-luminescence / fluorescence;

2.7.1.1.6. "Light-emitting diode" (LED) means a light source where the element for optical radiation is one or more solid state junctions producing injection-luminescence / fluorescence;

2.7.1.1.7. "Electro-luminescence plate" means a light source where the element for optical radiation is an active layer producing electro-luminescence.

- 2.7.1.2. "Electronic light source control gear" means one or more components between supply and light source to control voltage and/ or electrical current of the light source;
- 2.7.1.2.1. "Ballast" means an electronic light source control gear between supply and light source to stabilise the electrical current of a gas-discharge light source;
- 2.7.1.2.2. "Ignitor" means an electronic light source control gear to start the arc of a gas-discharge light source.
- 2.7.1.3. "Objective luminous flux" means a design value of the luminous flux of a replaceable light source. To be achieved, within the specified tolerances, when the replaceable light source is energized by the power supply at the specified test voltage as indicated in the data sheet of the light source."

Insert new paragraphs 2.7.26. and 2.7.27., to read: */

- "2.7.26. "Light transmitting component" means any part of a lamp or lamp system which transmits luminous flux;
- 2.7.26.1. "Light-guide" means a light transmitting component based on defraction / reflection;
- 2.7.27. "Distributed lighting system" or "distributed light-signalling system" (DLS) means a lamp or lamp system comprising a light-generator, light-guide(s) and outer lens(es)
- 2.7.27.1. "Light-generator" means an optical device which is a component of a distributed lighting or light-signalling system that collects the luminous flux emitted by the light source(s) and distributes it into one or more light-guides. A light-generator is to be considered a light transmitting component;"

Paragraph 3.2.2., amend to read:

- "3.2.2. a list of the devices **or of the DLS** prescribed by the manufacturer for the lighting and light-signalling assembly. The list may include several types of devices for each operation **or several DLS** Each type must be duly identified (component / **system**, type approval mark, name of the manufacturer, etc.); in addition the list may include in respect of each function the additional annotation "or equivalent devices"."

Paragraph 3.2.3., amend to read:

- "3.2.3. a layout drawing of the lighting and light-signalling equipment as a whol, showing the position of the various devices on the vehicle; **in addition, in the case where a distributed lighting and light-signalling system is fitted, the layout of the system showing the position of its various components (light generator(s), light-guide(s), etc.) in the vehicle;**"

*/ Another paragraph with the same number (2.7.26.) is proposed in document TRANS/WP.29/GRE/2001/36.

Insert new paragraph 5.24., to read:

"5.24. For vehicles equipped with a distributed lighting system, in the case of any failure of the system which results in extinguishing of both lamps of the pair of one or more of the following lighting and light-signalling functions, a temporary fail-safe replacement for each of the failed function shall be automatically put in operation:
dipped-beam headlamps,
rear position lamps,
stop lamps,
direction indicator lamps (front and/or rear).

The substituting function in the case of the dipped-beam headlamps shall be the DRL, or the main-beam headlamp with reduced light intensity, or the front fog lamp.

The substituting function(s) in the case of the above light-signalling functions shall be similar in position and light intensity and shall have the same colour of the light emitted and the same operating characteristics of the function(s) that has ceased to operate.

Moreover the substituting function(s) shall remain operational in its original safety function, if any.

During substitution a tell-tale on the dashboard (see paragraph 2.18 of this Regulation) for each of the above lighting and light-signalling functions shall indicate occurrence of a temporary replacement and need for repair."

Paragraph 6.2.8., amend to read:

"6.2.8. Tell-tale

Tell tale optional.

In the case of vehicles equipped with a distributed lighting system an operational tell-tale (visual and/or audible) operating in conformity with the requirements of paragraph 5.24. is mandatory."

Paragraph 6.2.9., amend to read (footnote 4/ not modified):

"6.2.9. Other requirements

The requirements of paragraph 5.5.2. shall not apply to dipped-beam headlamps.

Dipped-beam headlamps shall not swivel according to the angle of lock of steering.

Dipped-beam headlamps with light sources having an objective luminous flux exceeding 2000 lumen shall only be installed in conjunction with the installation of headlamp cleaning device(s) according to Regulation No. 45. 4/ In addition, with respect to vertical inclination, the provisions of paragraph 6.2.6.2.2. shall not be applied when these headlamps are installed."

B. JUSTIFICATION.

Historically headlighting systems consisted of two or four independent headlamps mounted on the car body. Later, two or more lamps were grouped in one lamp housing. This was followed by the introduction of concealable lamps with movable reflectors. Test requirements for these traditional devices have been established in the well-known headlamp Regulations.

To date, headlamps were characterized by the fact that each individual headlamp employed one light source for each function and this light source was part of the headlamp unit.

In the latest developments of a headlighting and light-signalling system, the light source is no longer a part of the reflector but built in a remote light-module (more popular light generator) serving one or more headlamps through a special light transmitting component: the light-guide (a kind of fiber optics). The total system is called a Distributed Lighting System (DLS). A demonstration of such a system was given at the thirty-ninth session of GRE.

Application of this new development on vehicles requires the modification and/or addition of test requirements. This document covers the proposed amendments to Regulation No. 48 to permit the use of DLS on vehicles. DLS are an alternative to the traditional lighting systems and are to be treated exactly as all other devices/systems are treated.

When one light source emits the light for two headlamps, a new more powerful light-source must be developed. Moreover, it may be expected that in the future a wide variety of distributed lighting systems will be designed, consisting of a combination of high-beam, low-beam, front fog beam and front position beam, each asking for an accommodating light source. Please note that the intent for the above revisions is to address the Headlamp function only at this time. However, the proposed modifications were designed to anticipate and be compatible with the future addition of signalling and marking functions that will minimize further amendments to Regulation No. 48. Therefore, given this approach, the safety aspect was addressed by permitting an "automatic temporary replacement of function" by a similar function in the event of a source/function failure.

The introduction of the new lighting system distributed lighting DLS as well as light source modules as an integral part of lamps alternatively to sealed lamps, further required an amendment of existing and introduction of new definitions. This proposal concerns also general definitions with respect to light sources and serves the specific definitions and specifications as mentioned above. The definition of ballast needed a minor correction by a more general term. For additional clarification, reference is made to the annex.

Notes:

- New and amended paragraphs renumbered to keep definitions grouped. The level of numbering increased to 5 levels at some place to avoid renumbering of paragraphs 2.7.2. until 2.7.24. and references to these paragraphs.
- Definition adapted to add the definition for "Light-guide".
- New format of paragraph 2.7.1. includes the definition for the case of a light-guide used as a light source in a "traditional" device; moreover, other "new" light sources are defined in addition to the existing one.

- Paragraph 2.7.1.3. was modified to be applicable in a more general way [also for light-signalling devices].

The definitions in paragraphs 2.7.25. and 2.7.26. are taken from proposal for draft amendments to Regulation No. 98 and have been slightly modified with the same purpose as paragraph 2.7.1.3.

- The amendment to paragraph 3.2.2. has been modified to use, as much as possible, a terminology defined in the previous paragraphs.

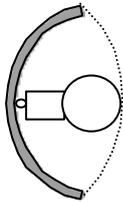
A requirement for the indication of the system lay-out (necessary both to identify the "type approved" system and to verify the installation/protection of the light-guide and other important parts of the system) is deemed necessary and introduced in the paragraph 3.2.3. in addition to the previously required lay-out of the lighting and light-signalling devices positioning.

- The fail-safe provisions and proposed text have been improved and aligned to the existing text for the substitution functions in paragraph 5.23. and moved into the "General requirements" section. In addition, the field of application has been extended, as for the other requirements, to distributed light-signalling systems.
- The text of paragraph 6.2.7. has been modified introducing a requirement based on the same philosophy applied to the proposed amendment to paragraph 6.2.9. (adopted by GRE during the forty-fifth session) to solve the same problem. The need for maintaining lighted the gas discharge (now more than 2000 lumen in flux) light source for dipped-beam is a consequence of the use of a different light source performing the main-beam having a light output not sufficient to guarantee a good illumination after the use of a very high light output dipped-beam light source. Our proposal resolves both problems in a general way by exempting from the respect of the requirements all light sources having a luminous flux equal or more than those of the dipped-beam light source (so, automatically, the light source used for both beams).
- Requirements adopted by GRE at the forty-fifth session will be introduced into Regulation No. 48 before the presentation of this Revision for DLS. The same concept of paragraph 6.2.9. has been adopted for our proposal of amendment to paragraph 6.2.7. (see also GTB document CE-3311).

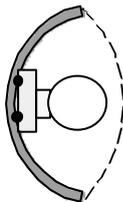
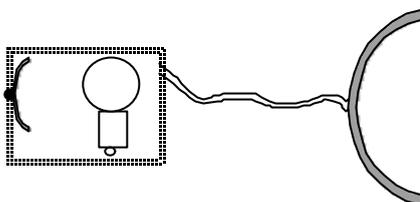
Annex for clarification

Proposed Light Source options

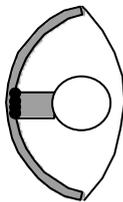
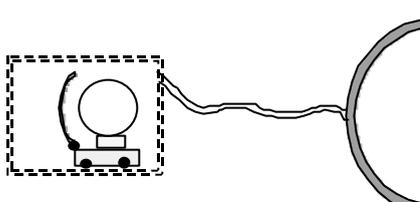
"Standard"



Light Source,
Replaceable
Approved to Regulations



LIGHT SOURCE MODULE
Light Source,
NR. non-replaceable
NA. non-approved



SEALED
Light Source,
NR. non-replaceable
NA. non-approved

