

Informal document No. GRE-65-33  
(65th GRE, 28-31 March 2011,  
agenda item 5(g))

GTB information to GRE  
Date: 2011-03-30

## Background related to GRE/2011/20 and GRE/2011/21

### Clarification of the definition of LED modules in ECE R48 and ECE R112

---

**GTB**

*The International Automotive Lighting  
and Light Signalling Expert Group*

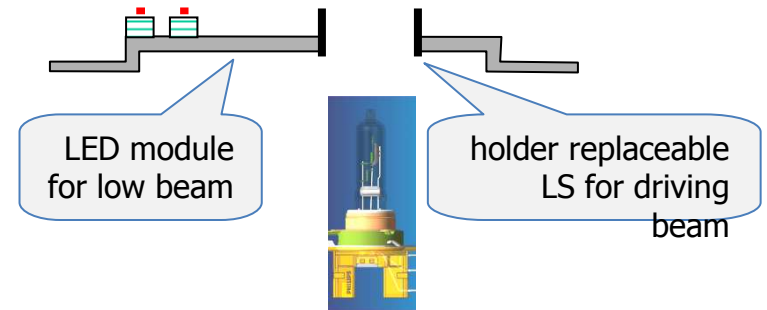
*Groupe de Travail "Bruxelles 1952"*

# Clarification of the definition of LED modules in ECE R48 and ECE R112

- supp. 8 to ECE R112 entered into force July 11, 2008 allowing the installation of LED modules into headlamps
- adaptation of definition in line with technical progress proposed
- documents GRE/2011/20 and GRE/2011/21 address specifically one new topic and some editorial clarifications:
  1. explicitly allow the presence of a holder for a replaceable light source on a light source module
  2. clearer separation between light source module definition and requirements related to light source modules
  3. clarification of the requirements related to the ease of replacement of light sources according to ECE R37
  4. allowing non-replaceable LED modules in headlamps

# Clarification of the definition of LED modules in ECE R48 and ECE R112

- explicitly allow the presence of a **holder for a replaceable light source** on a light source module
  - in 2.7.1.1.3. and 2.7.1.1.7. of R48
- with restrictions in
  - 5.23.1. of R48  
ease of replacement applies
  - 5.10 of R112  
no hybrid solutions allowed for principal passing beam,  
bending light or (each of the) driving beam(s)



# Clarification of the definition of LED modules in ECE R48 and ECE R112

- clearer separation between light source module **definition and requirements** related to light source modules (editorial)

"2.7.1.1.3. *"Light source module"* means an optical part of a device which is specific to that device. **It contains** one or more non-replaceable light sources and **it may optionally contain one or more holders for approved replaceable light sources** is only removable from its device with the use of tool(s). A light source module is so designed that regardless the use of tool(s), it is not mechanically interchangeable with any replaceable approved light source."

"5.29.



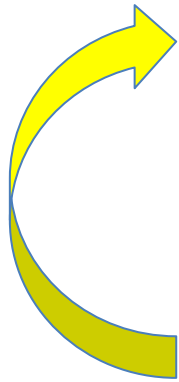
**A light source module shall be:**

- only removable from its device with the use of tools and**
- so designed that regardless of the use of tool(s), it is not mechanically interchangeable with any replaceable approved light source.**

# Clarification of the definition of LED modules in ECE R48 and ECE R112

- (editorial) clarification of the requirements related to the **ease of replacement of light sources** according to ECE R37
  - state clearly where it is required instead of exemptions
  - replacement of light source modules should only be done by experts and not by drivers

"5.23.



Lamps **approved with light source(s) according to Regulation No. 37 and/or according to Regulation No. XXX** shall be fitted in a vehicle in such a way that the light source can be correctly replaced without the need for expert assistance and without the need for special tools, other than those provided with the vehicle by the manufacturer. The vehicle manufacturer shall provide with the vehicle a detailed description of the procedure for replacement. **This paragraph is not applicable to:**

- (a) — Devices approved with a non-replaceable light source;
- (b) — Devices approved with light sources according to Regulation No. 99."

# Clarification of the definition of LED modules in ECE R48 and ECE R112

- allowing **non-replaceable** LED modules in headlamps
  - in ECE R48

5.29.1. A LED module does not need to be replaceable, if so stated in the communication sheet of the component type approval."

- in ECE R112

"2.2.2. A brief technical ... this shall include:

...

- (b) A drawing with dimensions and the basic electrical and photometric values and the objective luminous flux **and for each LED module a statement whether it is replaceable or not;**

..."

# Clarification of the definition of LED modules in ECE R48 and ECE R112

- motivation for allowing **non-replaceable** LED modules in headlamps
    - technical solutions for reliable thermal interface include permanent gluing of LED light source to heat sink or other sensitive interconnect
    - active cooling (fan) may be attached to heat sink
    - accurate alignment and robust positioning of multiple LED light sources in optical systems of short focal length sensitive to tolerances asks for specific manufacturing technique
- => LED module comprising thermal management and optics may be rather big and complex

# Clarification of the definition of LED modules in ECE R48 and ECE R112

- LED headlamp design illustrated with example of Audi R8 LED headlamp



source: „Lichttechnische Innovationen bei Audi“ Dr. Wolfgang Huhn, Audi AG, Germany;  
proceedings of seminar „Zukunftsentwicklungen in der Lichttechnik“, Haus der Technik, Essen, Germany, Dec 2008



courtesy of Automotive Lighting



# Clarification of the definition of LED modules in ECE R48 and ECE R112

- motivation for allowing **non-replaceable** LED modules in headlamps
  - special skills, equipment and/or tooling for assembly not present at car driver, but also not at garages
  - if leveling is present, specific interconnect needed
- large openings would be needed bearing large risk for leakage and dirt contamination
- exchange economically not attractive since majority of value in LED module

=> after several sessions to come forward with a clear solution  
GTB proposes to explicitly allow non-replaceable LED  
modules and to give applicant the freedom of choice