UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

TRANS/WP.29/GRE/2004/14/Rev.1
22 July 2004

ENGLISH
Original: ENGLISH
ENGLISH AND FRENCH ONLY

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

World Forum for Harmonization of Vehicle Regulations (WP.29)

Working Party on Lighting and Light-Signalling (GRE)
(Fifty-third session, 4 October - 8 October 2004,
agenda item 11.4.)

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 112

(Headlamps with an asymmetrical passing beam)

Transmitted by the expert from Japan

Note: The text reproduced below was prepared by the expert from Japan, in order to allow additional non-replaceable light source(s) inside the headlamp to be allowed for the night vision system. This document is a package proposal of TRANS/WP.29/GRE/2004/32. Thus, it should be considered along with that document.

The modification to the existing text of the Regulation is marked in **bold** characters.

Note: This document is distributed to the Experts on Lighting and Light-Signalling only.

A. PROPOSAL

Paragraphs 6.2.10. to 6.2.10.3., amend to read:

"6.2.10. Only one principal light source is permitted for each passing beam headlamp. However, additional light sources are permitted as follows:

6.2.10.1. One additional light source inside the passing beam headlamp according to Regulation No. 37 may be used to contribute to bend lighting.

6.2.10.2. One additional light source according to Regulation No. 37 **or additional light source module, inside the passing beam headlamp, may be used for the purposes of generating infrared radiation, provided that generated infrared radiation shall conform to the following requirements.**
To avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR}, over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:

$$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \le 18000 \cdot t^{-0,75} \qquad W \cdot m^{-2} \qquad (t \le 1000\ s) \qquad (4.11a)$$

For times greater than 1000 s the limit becomes:

$$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \le 100 \qquad W \cdot m^{-2} \qquad (t > 1000\ s) \qquad (4.11b)$$

where:

E_λ is the spectral irradiance in $W \cdot m^{-2} \cdot nm^{-1}$,
$\Delta\lambda$ is the bandwidth in nm,
t is the exposure duration in seconds.

Note 1: In cold environments, the limits for long time exposure may be increased to 400 $W \cdot m^{-2}$ at 0°C and 300 $W \cdot m^{-2}$ at 10°C for applications where infrared sources are used for radiant heating.

Note 2: The contribution from IR-C is already incorporated in these limits for all incandescent sources.

It shall only be activated at the same time as the principal light source.

6.2.10.3. In the event of failure of an additional light source **or additional light source module**, the headlamp shall continue to fulfil the requirements of the passing beam."

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B. JUSTIFICATION

At the fifty-second GRE meeting, Japan proposed the amendment of ECE Regulations Nos. 98 and 112 so that additional non-replaceable light source(s) inside the headlamp are allowed for the night vision system, by TRANS/WP.29/GRE/2004/11 and TRANS/WP.29/GRE/2004/14.

There were several comments on this proposal and, after the reconsideration, it is proposed to amend Regulation No. 98 with the following reasons.

The night vision system will be an effective safety device for crash avoidance, as already introduced in Japan. However, even by the state of the art, it is very difficult to make a filter, which cuts whole visible light and infrared (IR) LED for the night vision system, which does not emit visible light entirely for the infrared camera in current technologies. The light sources for infrared rays need to be set inside the lighting or light signalling devices installed at the front of the vehicle to hide the coloured visible light, which escapes from the light source(s).

In addition, when the filament light source is used for infrared radiation, almost the same kind of filament light source as the driving beam will be necessary to have enough output. In addition, modern technology makes it possible to use IR LEDs as an infrared ray emitter with less than a quarter energy consumption compared with conventional filament light source.

The requirements in paragraph 6.2.10.2. are quoted from paragraph 4.3.7. "Infrared radiation hazard exposure limits for the eye" of CIE S 009/E:2002 "Photobiological Safety of Lamps and Lamp Systems".

At the same time, it is proposed to amend Regulation No. 48 separately, so that the additional light source(s) are allowed to activate only in the forward motion of the vehicle for the purpose of eye safety. It is also proposed to move the requirement for the failure condition of the principal light source to Regulation No. 48, as this requirement concerns the vehicle installation rather than the device itself.

This document is closely bound up with TRANS/WP.29/GRE/2004/32 which sets out to add the requirements of the installation of the additional light sources for infrared radiation on dipped-beam headlamp in Regulation No. 48. Thus, it should be considered along with TRANS/WP.29/GRE/2004/32.
