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**REGULATION No. 46
(Devices for indirect vision)**

Proposal for draft amendments to Regulation No. 46

Submitted by the expert from Germany */

The text reproduced below was prepared by the expert from Germany in order to permit the use of a camera monitor systems instead of all compulsory and optional mirrors. It is based on informal document No. GRSG-94-24 distributed during the ninety-fourth session of the Working Party on General Safety Provisions (GRSG) (ECE/TRANS/WP.29/GRSG/73, para. 25). The modifications to the current text of the Regulation are marked in bold or strikethrough characters.

*/ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles. The present document is submitted in conformity with that mandate.

A. PROPOSAL

Paragraph 2.1.1.12., amend to read:

"2.1.1.12. "Class of ~~mirror~~ device for indirect vision" means all devices having one or more common characteristics or functions. They are

Paragraph 2.1.4., amend to read:

"2.1.4. "Type of device for indirect vision" means devices that do not differ on the following essential characteristics:
(a) design of the device inclusive, if pertinent, the attachment to the bodywork;
(b) in case of mirrors the class, the shape, the dimensions and radius of curvature of the mirror's reflecting surface;
(c) in case of camera-monitor devices **the class** ~~the detection distance~~ and the range of vision. "

Paragraph 3.3.2., amend to read:

"3.3.2. in case of ~~other~~ devices for indirect vision **other than mirrors**: one sample of all ~~the~~ **these** parts. "

Paragraph 4.2., amend to read:

"4.2. Every device **for indirect vision** shall possess ~~on its protective housing~~ a space large enough to accommodate the approval mark, which ~~must~~ **shall** be legible when the device has been mounted on the vehicle; this space shall be shown on the drawings referred to in Annex 1. "

Paragraph 5.4.3., amend to read:

"5.4.3. ~~An additional~~ **Additional** symbol I ~~or/and~~ II ~~or/and~~ III ~~or/and~~ IV ~~or/and~~ V ~~or/and~~ VI, specifying the class to which the type of the ~~mirror~~ devices for indirect vision belongs ~~or the symbol S in case of any device for indirect vision other than a mirror. The additional symbol shall be placed in any convenient position in the vicinity of the circle containing the letter "E".~~

Paragraph 15.1.2., amend to read:

"15.1.2. ~~Mirrors and other devices~~ **Devices** for indirect vision must be fitted in such a way that the mirror or other device does not move so as significantly to change the field of vision as measured or vibrate to an extent which would cause the driver to misinterpret the nature of the image perceived. "

Paragraph 15.2., amend to read:

"15.2. **MIRRORS DEVICES FOR INDIRECT VISION** "

Paragraph 15.2.1.1.2., amend to read:

"15.2.1.1.2. In case the described field of vision of a ~~front mirror prescribed in paragraph 15.2.4.6. and/or a close proximity mirror described in paragraph 15.2.4.5~~ can be obtained by another device for indirect vision that is approved according to paragraph 6.2. and that is installed according to paragraph 15., this device can be used instead of the relevant mirror or mirrors.

In case a camera/monitor device is used **to replace mirrors prescribed in paragraphs 15.2.4.5. and 15.2.4.6.**, the monitor must exclusively show:

- (a) the field of vision prescribed in paragraph 15.2.4.5. when the close proximity mirror has been substituted,
- (b) the field of vision prescribed in paragraph 15.2.4.6. when the front mirror has been substituted while the vehicle is moving forward with a speed up to 30 km/h, or
- (c) simultaneously the fields of vision prescribed in paragraphs 15.2.4.5. and 15.2.4.6. when the close proximity mirror and the front mirror have been substituted. In cases where the vehicle is moving forward at a higher speed than 30 km/h or moving backwards, the monitor may be used for other information, provided that the field of vision prescribed in paragraph 15.2.4.5. is permanently displayed."

Paragraph 15.2.2.1., amend to read:

"15.2.2.1. ~~Mirrors~~ **Devices for indirect vision** ~~must~~ **shall** be so placed that the driver, when sitting in the driving seat in a normal driving position, has a clear view of the road to the rear, side(s) or front of the vehicle. "

Paragraph 15.2.2.3., amend to read:

"15.2.2.3. In the case of any vehicle, which is in chassis/cab form when the field of vision is measured, the minimum and maximum body widths shall be stated by the manufacturer and, if necessary, simulated by dummy headboards. All vehicles and ~~mirror~~ **devices for indirect vision** configurations taken into consideration during the tests shall be shown on the type-approval certificate for a vehicle with regard to the installation of ~~mirrors~~ **devices for indirect vision** (see Annex 4). "

Paragraph 15.2.2.4., amend to read:

"15.2.2.4. The prescribed exterior ~~mirror~~ **device for indirect vision** on the driver's side of the vehicle ~~must~~ **shall** be so located that an angle of not more than 55° is formed between the vertical longitudinal median plane of the vehicle and the vertical plane passing through the centre of the mirror/**image** and through the centre of the straight line 65 mm long which joins the driver's two ocular points. "

Paragraph 15.2.2.5., amend to read:

"15.2.2.5. ~~Mirrors~~ **Devices for indirect vision** must not project beyond the external bodywork of the vehicle substantially more than is necessary to comply with the requirements concerning fields of vision laid down in paragraph 15.2.4. "

Paragraph 15.2.4.1., amend to read:

"15.2.4.1. ~~Interior rear-view mirror~~ **Device for indirect vision of (Class I).**

The field of vision "

Paragraph 15.2.4.2., amend to read:

"15.2.4.2. ~~Main exterior rear-view mirrors~~ **Devices for indirect vision of (Class II).** "

Paragraph 15.2.4.2.1., amend to read:

"15.2.4.2.1. ~~Exterior rear-view mirror~~ **Device for indirect vision** on the driver's side.

The field of vision "

Paragraph 15.2.4.2.2., amend to read:

"15.2.4.2.2. ~~Exterior rear-view mirror~~ **Device for indirect vision** on the passenger's side.

The field of vision "

Paragraph 15.2.4.3., amend to read:

"15.2.4.3. ~~Main exterior rear-view mirrors~~ **Devices for indirect vision of Class III** "

Paragraph 15.2.4.3.1., amend to read:

"15.2.4.3.1. ~~Exterior rear-view mirror~~ **Device for indirect vision** on the driver's side.

The field of vision "

Paragraph 15.2.4.3.2., amend to read:

"15.2.4.3.2. ~~Exterior rear-view mirror~~ **Device for indirect vision** on the passenger's side.

The field of vision "

Paragraph 15.2.4.4., amend to read:

"15.2.4.4. ~~"Wide angle" exterior mirror~~ **Device for indirect vision of Class IV.** "

Paragraph 15.2.4.4.1., amend to read:

"15.2.4.4.1. ~~"Wide angle" exterior mirror~~ **Device for indirect vision** on the driver's side.

The field of vision "

Paragraph 15.2.4.4.2., amend to read:

"15.2.4.4.2. ~~"Wide angle" exterior mirror~~ **Device for indirect vision** on the passenger's side.

The field of vision "

Paragraph 15.2.4.5., amend to read:

"15.2.4.5. ~~"Close proximity" exterior mirror~~ **Device for indirect vision of Class V.**

The field of vision "

Paragraph 15.2.4.5.5., amend to read:

"15.2.4.5.5. In case the field of vision described in Figures 7a and 7b can be perceived through the combination of the field of vision from a Class IV ~~wide angle mirror device~~ **device for indirect vision** and that of a Class VI ~~front mirror~~ **device for indirect vision**, the installation of a Class V ~~close proximity mirror~~ **device for indirect vision** is not compulsory. "

Paragraph 15.2.4.6., amend to read:

"15.2.4.6. ~~"Front" mirror~~ **Device for indirect vision of Class VI.** "

Paragraph 15.2.4.6.1., amend to read:

- "15.2.4.6.1. The field of vision shall be such that the driver can see at least a flat horizontal portion of the road, which is bounded by:
- (a) a transverse vertical plane through the outermost point of the front of the vehicle,
 - (b) a transverse vertical plane 2,000 mm in front of the plane defined in (a),
 - (c) one longitudinal vertical plane parallel to the longitudinal vertical median plane going through the outermost side of the vehicle at the driver's side and,
 - (d) a longitudinal vertical plane parallel to the longitudinal vertical median plane 2,000 mm outside the outermost side of the vehicle opposite to the driver's side.

The front of this field of vision opposite to the driver's side may be rounded off with a radius of 2,000 mm (see figure 8).

For the defined field of vision, see also paragraph 15.2.4.8.2.

The provisions for ~~front mirrors~~ **devices Class VI** are compulsory for forward controlled (as defined in paragraph 12.5.) vehicles of categories N2 > 7.5 t and N3.

If vehicles of these categories cannot fulfil the requirements by using a front mirror or a ~~camera/monitor~~ **device for indirect vision**, a vision support system shall be used. In the case of a vision support system this device must be able to detect an object of 50 cm height and with a diameter of 30 cm within the field defined in figure 8. "

Paragraph 15.2.4.6.2., amend to read:

- "15.2.4.6.2. However, if the driver can see, taking into account the obstructions by the A pillars, a straight line 300 mm in front of the vehicle at a height of 1,200 mm above the road surface and which is situated between a longitudinal vertical plane parallel to the longitudinal vertical median plane going through the outermost side of the vehicle at the driver's side and a longitudinal vertical plane parallel to the longitudinal vertical median plane 900 mm outside the outermost side of the vehicle opposite to the driver's side, a ~~front mirror~~ **device for indirect vision** of Class VI is not mandatory. "

Paragraph 15.2.4.8.1., amend to read:

- "15.2.4.8.1. ~~Interior rear view mirror~~ **Device for indirect vision** (Class I). "

Paragraph 15.2.4.8.2., amend to read:

"15.2.4.8.2. Exterior ~~mirrors~~ **devices for indirect vision** (Classes II, III, IV, V and VI).

In the fields of vision specified above, obstruction due to the bodywork and its components, such as other cab mirrors, door handles, outline marker lights, direction indicators and front and rear bumpers, as well as reflective-surface cleaning components, shall not be taken into account if they are responsible for a total obstruction of less than 10 per cent of the specified field of vision. In the case of a vehicle designed and constructed for special purposes where, due to its special features, it is not possible to meet this requirement, the obstruction of the required field of vision of a Class VI ~~mirror~~ **device for indirect vision** caused by the special features may be more than 10 per cent but not more than necessary for its special function. "

Paragraph 15.3.4., amend to read:

"15.3.4. Installation requirements for the monitor.

The viewing direction of the monitor shall roughly be the same direction as the one for the ~~main~~ **adequate** mirror. "

Paragraph 15.3.5., amend to read:

"15.3.5. Vehicles **of category M and N** may be equipped **on the rear part of their bodywork with a device for indirect vision other than a mirror in order to ensure the following field of vision** ~~with additional devices for indirect vision.~~ "

B. JUSTIFICATION

Germany would like to permit the use of a camera monitor systems instead of all compulsory and optional mirrors, set out in the table under paragraph 15.2.1.1.1., intended to be installed on motor vehicles to use the safety and environmental benefits of this technology as there are:

- (a) No obstructions
- (b) No adjustment
- (c) Reduced CO₂-emission
- (d) Wider field of view
- (e) Free of pollution
- (f) Night vision
- (g) Integrated advanced driver assistant systems (lane departure warning)

As it is mentioned in informal document GRSG-94-24, Germany is of the opinion, that the current procedure and requirements for the assessment of camera-monitor devices belong to standardization processes at the international level. Germany's proposal is to address these standardization items to the responsible standardization committees like ISO TC 22/SC 13/

WG8, that is also in charge of ISO 15008 and ISO TC159/SC4/WG2 (human factors engineering-visual display requirements). ISO 15008 is addressing the requirements for visual information presentation in vehicles. It should be extended to the requirements and measurement methods for camera-monitor devices and their applications. Future regulations for camera-monitor devices should refer to these standards as usually practiced.
