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**Economic Commission for Europe****Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on General Safety Provisions****128th session**

Geneva, 7-11 October 2024

Item 4(a) of the Provisional Agenda

**Awareness of the Proximity of Vulnerable Road Users:  
UN Regulation No. 46 (Devices for Indirect Vision)****Proposal for the 07 Series of Amendments to Regulation  
No. 46 (Devices for Indirect Vision)****Submitted by the expert from Germany on behalf of the Task Force on  
UN Regulation No. 46\***

The text reproduced below was prepared by the expert from Germany on behalf of the Task Force on UN Regulation No. 46 (TF UN-R 46). It is based on the discussions of the meetings of TF UN-R 46 on 28 and 29 February 2024 and on 17 and 18 June 2024, both of which were held in-person and online in Cologne, Germany. Participants of the Task Force were experts from Germany, the Netherlands, the Republic of Korea, the European Association of Automotive Suppliers (CLEPA) and the International Organization of Motor Vehicle Manufacturers (OICA). The modifications to the current text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

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\* 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

Paragraph 1.1., amend to read:

- "1.1. This Regulation applies:
- (a) To compulsory and optional devices for indirect vision, set out in the table under paragraph 15.2.1.1.1. of this Regulation for vehicles of category M and N<sup>1</sup> and to compulsory and optional devices for indirect vision mentioned in paragraphs 15.2.1.1.3. and 15.2.1.1.4. of this Regulation for vehicles of category L<sup>1</sup> with bodywork at least partly enclosing the driver;
  - (b) To the installation of devices for indirect visions on vehicles of categories M and N and on vehicles of category L<sup>1</sup> with bodywork at least partly enclosing the driver-;
  - (c) **To surveillance mirrors and surveillance camera-monitor-recording devices with regard to the requirements of paragraphs 15.2.1.2. or 16.3. of this Regulation as applicable. These devices do not need to fulfil any other technical requirements of this Regulation."**

Paragraph 2.2., amend to read:

- "2.2. "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 the case of mirrors, the class, the shape, the dimensions and radius of curvature of the mirror's reflecting surface;
  - (c) In the case of camera-monitor systems, the class, the field of view, the magnification and resolution.
  - (d) **If the device for indirect vision fulfils the requirements for different classes at the same time, it may be approved as one type of device for indirect vision with just one approval number in combination with additional symbols for the specific classes of the devices for indirect vision (e.g. V+VI) covered by the approval. "**

Paragraph 2.3., amend to read:

- "2.3. "*Surveillance camera-monitor-recording device*" means a camera and either a monitor or recording equipment other than the camera-monitor system defined in paragraph 2.1.2. above which can be fitted to the inside or outside of the vehicle in order to provide fields of vision other than those specified in paragraph 15.2.4. of this Regulation or to provide a security system within or around the vehicle, **and which is not regulated under any other UN Regulation, if not explicitly mentioned in this other Regulation.**"

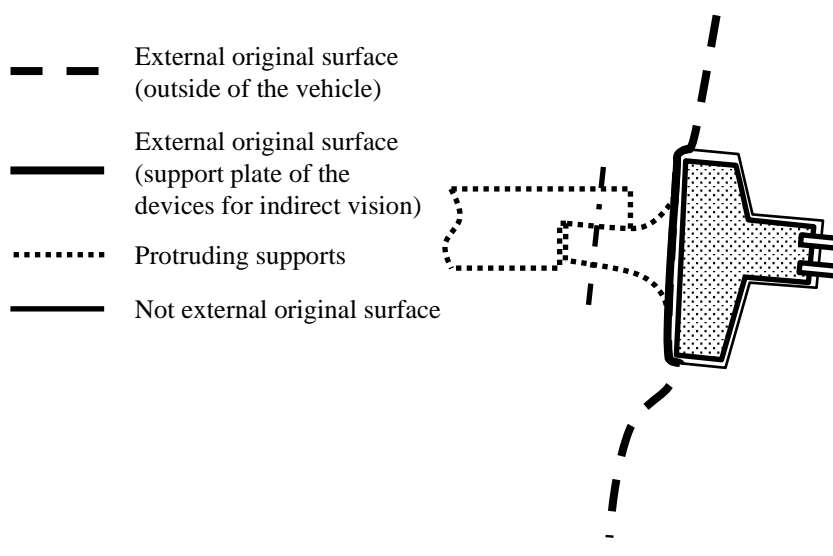
Paragraph 2.7., amend to read:

- "2.7. "*External original surface*" means the outside of the vehicle including the bonnet, the lid of the luggage compartment, the doors, the wings (**fender**), the roof, the lighting and light-signalling devices, the visible strengthening components, **the support plate of devices for indirect vision** and additional external original design surfaces defined by the manufacturer excluding protruding supports for devices of indirect vision.

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<sup>1</sup> As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.7. - <https://unece.org/transport/standards/transport/vehicle-regulations-wp29/resolutions>

**Figure 1a**



Figures 1 (former), renumber as figures 1b to 1c

Paragraph 5.4.3., amend to read:

"5.4.3. Additional symbol(s) **I, II, III, IV, V, VI or VII** ~~or II or/and III or/and IV or/and V or/and VI or/and VII~~, specifying the class to which the type of device for indirect vision belongs. The additional symbols shall be placed in any convenient position in the vicinity of the circle containing the letter "E"."

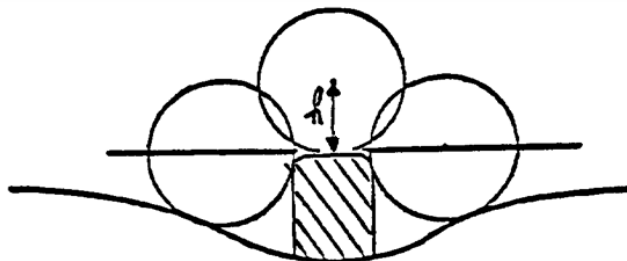
Insert new paragraph 6.1.1.3.1., to read:

**"6.1.1.3.1. In the case of a Class I mirror, the requirement of paragraph 6.1.1.3. does not apply to the backside of the mirror. "**

Paragraph 6.1.1.4.2., amend to read:

"6.1.1.4.2. If the dimension of the projection of a component which is mounted on a surface other than convex cannot be determined by simple measurement, it shall be determined by the maximum variation of the distance of the centre of a 100 mm diameter sphere from the nominal line of the panel when the sphere is moved over and is in constant contact with that component. Figure 1b shows an example of the use of this procedure.

**Figure 1b  
Example for the Measurement by Maximum Variation**



Paragraph 6.1.1.6., amend to read:

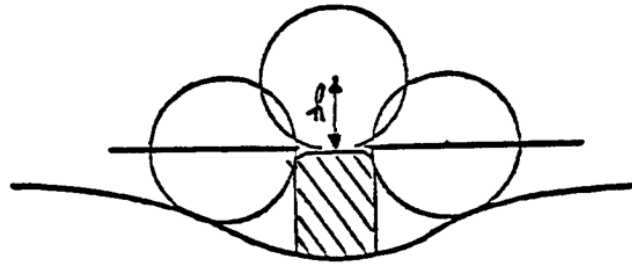
"6.1.1.6. The device for the attachment of mirrors to the vehicle shall be so designed that a cylinder with a 70 mm radius (50 mm in the case of an L-category vehicle), having as its axis the axis, or one of the axes, of pivot or rotation which ensures deflection of the mirror in the direction of impact concerned,

passes through at least part of the external original surface **as defined in paragraph 2.7.** ~~where the device is protruding from.~~"

Paragraph 6.2.2.1.2.2., amend to read:

"6.2.2.1.2.2. If the dimension of the projection of a component which is mounted on a surface other than convex cannot be determined by simple measurement, it shall be determined by the maximum variation of the distance of the centre of a 100 mm diameter sphere from the nominal line of the panel when the sphere is moved over and is in constant contact with that component. Figure 1b shows an example of the use of this procedure.

Figure 1b  
**Example for the Measurement by Maximum Variation**



"

Paragraph 6.3.2.1.1., amend to read:

"6.3.2.1.1. The test rig consists of a pendulum capable of swinging about two horizontal axes at right angles to each other, one of which is perpendicular to the plane containing the "release" trajectory of the pendulum.

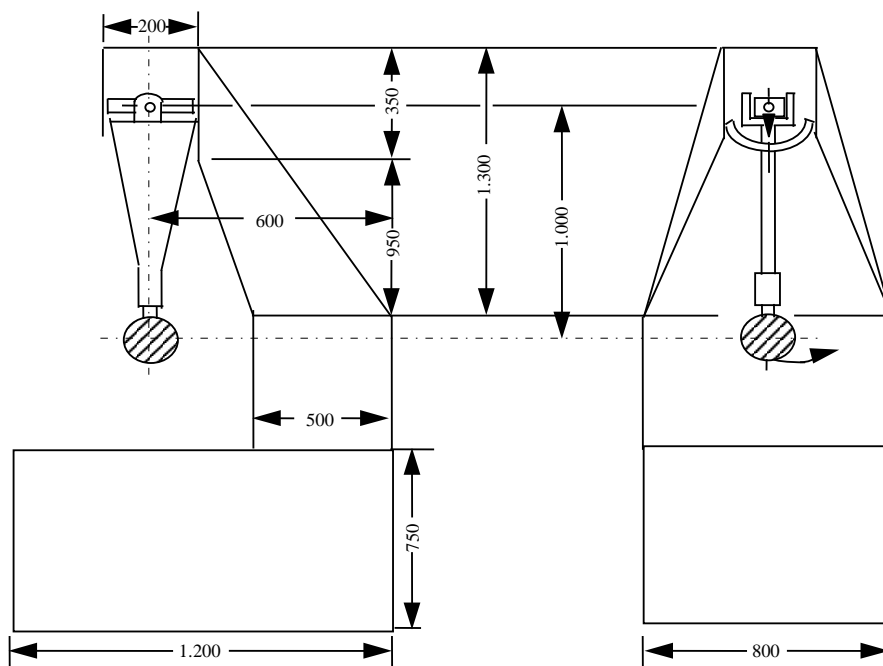
The end of the pendulum comprises a hammer formed by a rigid sphere with a diameter of  $165 \pm 1$  mm having a 5 mm thick rubber covering of Shore A hardness 50.

A device is provided which permits determination of the maximum angle assumed by the arm in the plane of release.

A support firmly fixed to the structure of the pendulum serves to hold the specimens in compliance with the impact requirements specified in paragraph 6.1.3.2.2.7. below.

Figure 1c below gives the dimensions (in mm) of the test rig and the special design specifications:

Figure 1c



Paragraph 15.2.1.1.3., amend to read:

"15.2.1.1.3. Rear-view mirrors required for L-category vehicles with body work

Category of vehicle	Rear-view Class I	Main rear-view Classes III and VII
L category motor vehicles fitted with bodywork which partly or wholly encloses the driver	1 <sup>1</sup>	1, if there is a Class I rear-view mirror; 2, if there is not a Class I rear-view mirror

<sup>1</sup> No rear-view mirror Class I is required if the visibility conditions referred to in paragraph 15.2.5.4.1. below cannot be met. In this case two Class III or VII rear-view mirrors are required, one giving the view on the left and one giving the view on the right hand side of the vehicle.

Where a single Class III or VII rear-view mirror is fitted this shall be located on the left hand side of the vehicle in those countries where the traffic drives on the right and on the right hand side of the vehicle in those countries where the traffic drives on the left.

Paragraph 15.2.1.2., amend to read:

"15.2.1.2. ~~The provisions of this Regulation do not apply to the surveillance mirrors defined in paragraph 2.1.1.3. Nevertheless, the~~ Exterior surveillance mirrors shall be mounted at least 2 m above the ground when the vehicle is under a load corresponding to its maximum technical permissible mass or shall be fully integrated in a housing including Class II or III mirror(s) which is (are) type approved to this Regulation."

Paragraph 15.2.4.9.2., amend to read:

"15.2.4.9.2. Classes ~~II, III, IV~~, V, and VI devices for indirect vision ~~and Class VII mirrors~~

In the fields of vision specified above, obstruction due to the bodywork and its components, such as other cab devices for indirect vision, 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 caused by the special features may be more than 10 per cent but not more than necessary for its special function."

*Insert new paragraph 15.2.4.9.3., to read:*

**"15.2.4.9.3. Classes II, III, IV devices for indirect vision and Class VII mirrors**

**In the fields of vision specified above, obstruction due to the bodywork and its components, such as other cab devices for indirect vision, 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 do not obstruct more than necessary."**

*Paragraph 16.1.1.4.1., amend to read:*

"16.1.1.4.1. The provisions of paragraph 16.1.1.4. do not apply to vehicles, if:

- they are equipped with a feature specifically to enable the de-energization of the electrical circuits according to the "Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)"; **and**
  - **the de-energization is activated; and**
  - they have a control device for the feature to enable the de-energization of the electrical circuits, installed outside of the cabin; and
  - **the impact of the activation of the de-energization feature shall be described in the user's manual including the advice that the actuation of the control device outside is preferred.**
- ~~the feature to enable the de-energization of the electrical circuits is activated via the control device outside of the cabin."~~

*Paragraph 16.1.3.1., amend to read:*

"16.1.3.1. Magnification factor

The minimum and the average magnification factors of the CMS, in both horizontal and vertical directions shall not be lower than the magnification factors indicated below.

**Magnification limit with two digits after the decimal point: round the measured value to the nearest hundredth;**

**Magnification limit with three digits after the decimal point: round the measured value to the nearest thousandth.**

**Examples:**

**0,255 -> 0,26**

**0,0154 -> 0,015"**

*[Insert new paragraph 16.1.5.1.1., to read:*

**"16.1.5.1.1. In case of a monitor for devices of Class I in a vehicle of category M<sub>1</sub> or N<sub>1</sub>, where no reflecting surface is used as an alternative to provide the required field of vision, the centre of the monitor(s) shall not be above a horizontal plane passing through the driver's ocular points, as defined in paragraph 12.1."]**

*Paragraph 16.2.5. ,shall be deleted*

*Insert new paragraphs 16.3. to 16.3.5., to read:*

- "16.3. Surveillance camera-monitor-recording devices**
- 16.3.1. The provisions of this Regulation do not apply to surveillance camera-monitor-recording devices defined in paragraph 2.3. of this Regulation.**
- 16.3.2. Exterior surveillance cameras shall be mounted at least 2 m above the ground when the vehicle is under a load corresponding to its maximum technical permissible mass.**
- 16.3.3. Notwithstanding the provisions of paragraph 16.3.2., exterior surveillance cameras mounted below 2 m from the ground when the vehicle is under a load corresponding to its maximum technical permissible mass shall not project more than 50 mm beyond the overall width of the vehicle measured without this device and shall have radii of curvature according to paragraphs 6.2.2.1.1. to 6.2.2.1.5.**
- 16.3.3.1. In the case of vehicles of category N, the provisions of paragraph 16.3.3. only apply to a surveillance camera-monitor recording device mounted on the external surface according to paragraph 2.1. as defined in UN Regulation No. 61.**
- 16.3.4. Notwithstanding the provisions in paragraph 16.3.2. in case of vehicles of category M2 and M3 the provisions of paragraph 16.3.3. do not apply to surveillance camera-monitor recording devices mounted on the rear wall of the vehicle.**
- 16.3.5. Notwithstanding the provisions in paragraph 16.3.1., monitors of a surveillance camera-monitor-recording device shall fulfil the provisions of paragraphs 6.2.2. to 6.2.2.1.1. and 6.2.2.1.4."**

*Insert new paragraphs 22.33.to 22.39., to read:*

- "22.33. As from the official date of entry into force of the 07 series of amendments, no Contracting Party applying this Regulation shall refuse to grant or refuse to accept type approvals under this Regulation as amended by the 07 series of amendments.**
- 22.34. As from 1 September [2026], Contracting Parties applying this Regulation shall not be obliged to accept type approvals to the preceding series of amendments, first issued after 1 September [2026].**
- 22.35. Until 1 September [2028], Contracting Parties applying this Regulation shall accept type approvals to the preceding series of amendments, first issued before 1 September [2026].**
- 22.36. As from 1 September [2028], Contracting Parties applying this Regulation shall not be obliged to accept type approvals issued to the preceding series of amendments to this Regulation.**
- 22.37. Notwithstanding paragraph 22.36., Contracting Parties applying this Regulation shall continue to accept type approvals issued according to the preceding series of amendments to this Regulation, for the vehicles and devices for indirect vision which are not affected by the changes introduced by the 07 series of amendments.**
- 22.38. Contracting Parties applying this Regulation may grant type approvals according to any preceding series of amendments to this Regulation.**
- 22.39. Contracting Parties applying this Regulation shall continue to grant extensions of existing approvals to any preceding series of amendments to this Regulation."**

*Annex 1, paragraph 9.1.1., amend to read:*

- "9.1.1. In the case of camera-monitor systems of Classes V and VI, the class(es), the detection distance(s) [mm], contrast(s), luminance range(s), glare**

correction(s), display performance(s) (black and white/colour) image repetition frequency(s), luminance reach of the monitor(s): .....

Annex 1, item 9.1.2., amend to read:

"9.1.2. In the case of camera-monitor systems of Classes I to IV, the class(es), field(s) of view, magnification(s) and resolution(s): ....."

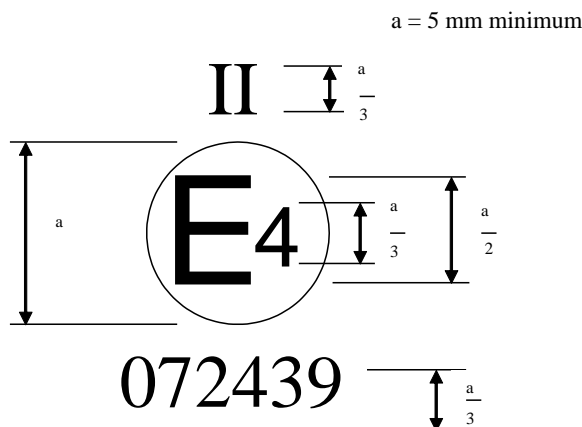
Annex 5, amend to read:

**"Annex 5**

**Arrangement of Approval Mark of a Device for Indirect Vision**

(See paragraph 5.4. of the Regulation)

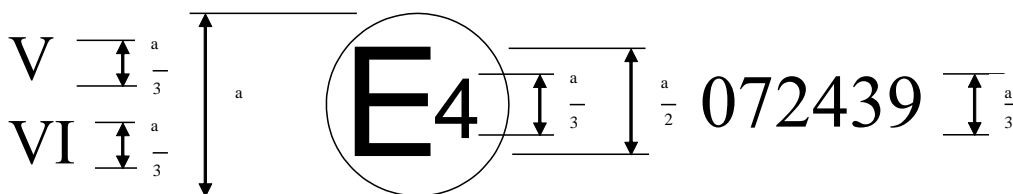
**Example 1**



The above approval mark affixed to a device for indirect vision indicates that the device is a main rear-view device, of Class II, which has been approved in the Netherlands (E 4) pursuant to Regulation No. 46 and under approval number ~~052439~~ **072439**. The first two digits of the approval number indicate that Regulation No. 46 already included the ~~05~~ **07** series of amendments when the approval was granted.

*Note:* The approval number and the additional symbol shall be placed close to the circle and either above or below the "E" or to the left or right of that letter. The digits of the approval number and the additional symbols may be on the same side of the "E" or one on one side and the other on the other side and point in the same direction. The additional symbol shall be directly next or opposite to the approval number. The use of Roman numerals as approval numbers shall be avoided so as to prevent any confusion with other symbols.

**Example 2 One Approval Number for Two Classes**



The above approval mark affixed to a device for indirect vision indicates that the device is a close-proximity view device, of Class V, and a front-view device, of Class VI,

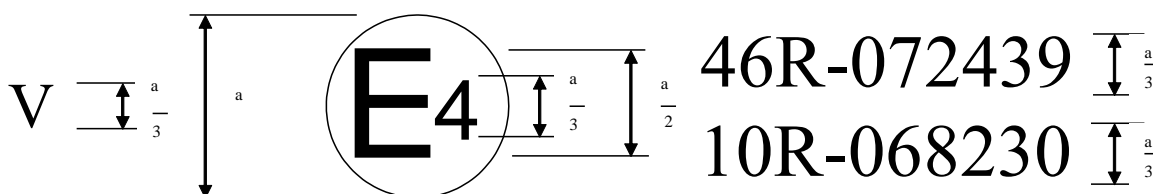


which has been approved in the Netherlands (E 4) pursuant to Regulation No. 46 and under approval number 072439. The first two digits of the approval number indicate that Regulation No. 46 already included the 07 series of amendments when the approval was granted.

*Note:* The approval number and the additional symbol(s) shall be placed close to the circle and on the same side or one to the left and one to the right of that letter. The digits of the approval number and the additional symbols shall point in the same direction. The use of Roman numerals as approval numbers shall be avoided so as to prevent any confusion with other symbols.

**Example 3**

**Combined Approval Mark for UN Regulation No. 46 and UN Regulation No. 10**

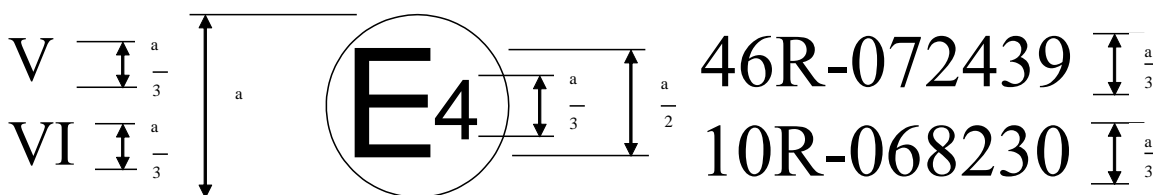


The above approval mark affixed to a device for indirect vision indicates that the device is a close-proximity view device, of Class V, which has been approved in the Netherlands (E 4) pursuant to Regulation No. 46 and under approval number 072439 and pursuant to Regulation No. 10 and under approval number 068230. The first two digits of the approval number indicate that Regulation No. 46 already included the 07 series of amendments and Regulation No. 10 already included the 06 series of amendments when the approval was granted.

*Note:* The approval numbers and the additional symbol shall be placed close to the circle and either above or below the "E" or to the left or right of that letter. The digits of the approval number and the additional symbols may be on the same side of the "E" and point in the same direction. The use of Roman numerals as approval numbers shall be avoided so as to prevent any confusion with other symbols.

**Example 4**

**Combined Approval Mark for UN Regulation No. 46 (One Number for Two Classes) and UN Regulation No. 10**



The above approval mark affixed to a device for indirect vision indicates that the device is a close-proximity view device of Class V, and a front-view device of Class VI, which has been approved in the Netherlands (E 4) pursuant to Regulation No. 46 and under approval number 07243946 and pursuant to Regulation No. 10 and under approval number 068230. The first two digits of the approval number indicate that Regulation No. 46 already included the 07 series of amendments and Regulation No. 10 already included the 06 series of amendments when the approval was granted.

*Note:* The approval numbers and the additional symbols shall be placed close to the circle and on one side or one to the left and one to the right of the "E" or on the same side of the letter. The digits of the approval number and the additional symbols shall

point in the same direction. The additional symbols shall be directly or opposite to the approval numbers. The use of Roman numerals as approval numbers shall be avoided so as to prevent any confusion with other symbols.

## II. Justification

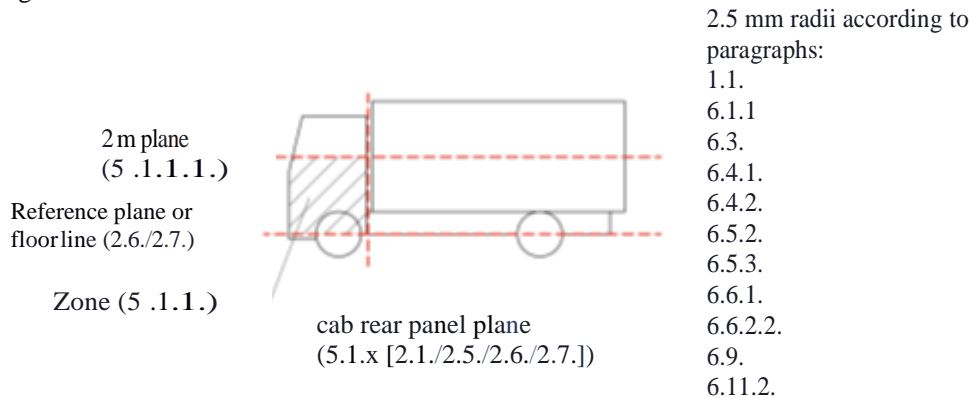
Several amendments are proposed by TF for UN Regulation No. 46 to improve the following:

1. Positioning of the Monitor for a pure Class I device (bi-focal glasses): The position of a pure Class I monitor at the upper edge of the windscreen introduces some disadvantages for drivers wearing bi-focal glasses. The area to improve short-distance view is usually at the bottom of the glasses, which makes it challenging to easily look at the monitor. The TF intended to introduce an angular requirement by adding a new paragraph 16.1.5.1.1., which should lead to lower positions of a pure Class I monitor. Additionally, paragraph 16.1.6. should be considered, which requires the obstruction to the direct view of the driver by such a device to be as less as possible. There was no conclusion on a specific value for this new angle and more research is needed.
2. Requirements on Surveillance Cameras in UN Regulation No. 46: Surveillance cameras shall be addressed by UN Regulation No. 46 as well. The former decision to have only limited requirements was respected. The proposal takes also into account the specificities for external projections of the different vehicle categories. Vehicles of category M<sub>2</sub> and M<sub>3</sub> do not have any further requirements, vehicles of category N have requirements only on the cab, see below:

UN Regulation No. 61 (External projections of commercial vehicles)

(only N1, N2, N3; does not apply to exterior devices for indirect vision)

Figure



3. Type-marking: TF decided to introduce the possibility of type-approving devices for more than one Field of View under one approval number. In addition, it shall be possible to combine the marking of devices for indirect view with the marking of other UN Regulations, e.g. UN Regulation No. 10 on electromagnetic compatibility, if applicable.
4. Obstruction of the field of view: Paragraph 15.2.4.9.2. requires that the obstruction of body parts to the required field of view be reduced to be less than 10 per cent. This value can be calculated, when there is a closed field of view, but some extend to the horizon. TF saw the need for further clarification of the situation for these field of views.
5. Magnification Measurement – Tolerance and Rounding: Provisions for the rounding of the magnification factors are introduced.
6. Definition of "Surveillance camera-monitor-recording device": The definition shall be amended to delimitate these devices and their respective requirements from equipment required by other UN Regulations.

7. Camera Monitoring Systems and vehicles for International Carriage of Dangerous Goods (ADR): At the 127th session of the Working Party on General Safety Provisions, an amendment to UN Regulation No. 46 was adopted on the issue of ADR vehicles equipped with camera-monitor systems. Together with experts of Working Party on the Transport of Dangerous (WP.15), it was considered necessary to further clarify the provisions in paragraph 16.1.1.4.1., which could be seen as contradictory to ADR.
  8. Clarification on external original surface: A drawing shall be added to further explain the idea of "external original surface". Additionally, the wording in paragraph 6.1.1.6. shall be amended for clarity.
  9. Radius of curvature requirement on the backside of Class I mirrors: The radius of curvature shall not be mandatory on the backside of Class I mirrors.
  10. Wrong Reference: A reference in paragraph 15.2.1.1.3. is corrected.
  11. Correct the numbering of the figures: In the current version there are two different figures numbered 1. As a new figure shall be introduced, the new one becomes figure 1a and the former figures 1 become 1b and 1c.
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