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**Economic Commission for Europe**

Inland Transport Committee

**World Forum for Harmonization of Vehicle Regulations****Working Party on General Safety Provisions****125th session**

Geneva, 27–31 March 2023

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 Supplement 1 to the 05 Series of Amendments to  
UN Regulation No. 46 (Devices for indirect vision)****Submitted by the expert from the International Organization of Motor  
Vehicle Manufacturers \***

The text reproduced below was prepared by the expert from the International Organization of Motor Vehicle Manufacturers (OICA) to introduce provisions adapted to centre-steered vehicles of categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub> and N<sub>3</sub>. It is based on GRSG.124-20-Rev.1 distributed at the 124th session of the Working Party on General Safety (GRSG). The modifications to the current text of the UN Regulation are marked in bold for new and strikethrough for deleted characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2023 as outlined in proposed programme budget for 2023 (A/77/6 (Sect. 20), table 20.6), 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

*Insert new paragraphs 12.7. to 12.9., to read:*

- 12.7. "Centre-steered vehicle" means a vehicle that is steered from a central driving position."**
- 12.8. "Central driving position" is defined when Y coordinate of the "R" point<sup>1</sup> is in Y<sub>0</sub> position within ±60 mm.**
- 12.9. "Side-steered vehicle" means a vehicle which is not a centre-steered vehicle."**

*Paragraph 15.2.1.1.1., amend to read:*

- "15.2.1.1.1. The fields of vision prescribed in paragraph 15.2.4. below shall be obtained from the minimum number of mandatory mirrors or camera-monitor devices set out in the following table.

A minimum number of camera-monitor systems is undefined, but they shall provide the same field of vision as given in the table below and the provision on the minimum mounting height does not apply.

In the case of camera-monitor systems, the maximum number of monitors shall not exceed the corresponding number of mirrors.

<i>Vehicle category</i>	<i>Rear-view Class I</i>	<i>Main rear-view Class II</i>	<i>Main rear-view Class III</i>	<i>Wide-angle view Class IV</i>	<i>Close-proximity view Class V</i>	<i>Front-view Class VI</i>
M <sub>1</sub>	Compulsory Unless the vehicle is fitted with anything other than safety glazing material in the field of vision prescribed in paragraph 15.2.4.1.	Optional	Compulsory 1 on the driver's side and 1 on the passenger's side Class II mirrors may be fitted as an alternative.	Optional 1 on the driver's side and/or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (both shall be fitted at least 2 m above the ground)	Optional (shall be fitted at least 2 m above the ground)
M <sub>2</sub>	Optional (no requirements for the field of view)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted	Optional 1 on the driver's side and/or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (both shall be fitted at least 2 m above the ground)	Optional (shall be fitted at least 2 m above the ground)
M <sub>3</sub>	Optional (no requirements for the field of view)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted	Optional 1 on the driver's side and/or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (both shall be fitted at least 2 m above the ground)	Optional (shall be fitted at least 2 m above the ground)
N <sub>1</sub>	Compulsory Unless the vehicle is fitted with anything other than safety glazing material in the field of vision prescribed in paragraph 15.2.4.1.	Optional	Compulsory 1 on the driver's side and 1 on the passenger's side Class II mirrors may be fitted as an alternative.	Optional 1 on the driver's side and/or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (both shall be fitted at least 2 m above the ground)	Optional (shall be fitted at least 2 m above the ground)

<i>Vehicle category</i>	<i>Rear-view Class I</i>	<i>Main rear-view Class II</i>	<i>Main rear-view Class III</i>	<i>Wide-angle view Class IV</i>	<i>Close-proximity view Class V</i>	<i>Front-view Class VI</i>
N <sub>2</sub> ≤ 7.5 t	Optional (no requirements for the field of view)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted	Compulsory For both sides if a Class V mirror can be fitted  Optional For both sides together if not  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).	Compulsory (see paragraphs 15.2.2.7. and 15.2.4.5.5.)  1 on the passenger's side  <b>For centre-steered vehicles (see paragraphs 15.2.2.7. and 15.2.4.5.5.) on both sides</b>  Optional 1 on the driver's side (both shall be fitted at least 2 m above the ground). A tolerance of +10 cm may be applied  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).	Optional 1 front mirror (shall be fitted at least 2 m above the ground)  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).

<i>Vehicle category</i>	<i>Rear-view Class I</i>	<i>Main rear-view Class II</i>	<i>Main rear-view Class III</i>	<i>Wide-angle view Class IV</i>	<i>Close-proximity view Class V</i>	<i>Front-view Class VI</i>
N <sub>2</sub> > 7.5 t	Optional (no requirements for the field of view)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted	Compulsory 1 on the driver's side and 1 on the passenger's side  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).	Compulsory (see paragraph 15.2.2.7. and 15.2.4.5.5) 1 on the passenger's side <b>For centre-steered vehicles (see paragraphs 15.2.2.7. and 15.2.4.5.5.) on both sides</b>  Optional 1 on Driver's side (both shall be fitted at least 2 m above the ground)  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).	Compulsory (see paragraph 15.2.1.1.2)  1 front mirror (shall be fitted at least 2 m above the ground)  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).

<i>Vehicle category</i>	<i>Rear-view Class I</i>	<i>Main rear-view Class II</i>	<i>Main rear-view Class III</i>	<i>Wide-angle view Class IV</i>	<i>Close-proximity view Class V</i>	<i>Front-view Class VI</i>
N <sub>3</sub>	Optional (no requirements for the field of view)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted	Compulsory 1 on the driver's side and 1 on the passenger's side  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).	Compulsory (see paragraph 15.2.2.7. and 15.2.4.5.5) 1 on the passenger's side  <b>For centre-steered vehicles (see paragraphs 15.2.2.7. and 15.2.4.5.5.) on both sides</b>  Optional 1 on driver's side (both shall be fitted at least 2 m above the ground)  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).	Compulsory (see paragraph 15.2.1.1.2) 1 front mirror (shall be fitted at least 2 m above the ground)  In addition according to paragraphs 15.2.4.5.6. to 15.2.4.5.11. for vehicles with a mounting height of the Class V mirror of not less than 2.4 m (see paragraph 15.2.4.5.12.): the required field of vision (paragraphs 15.2.4.5.6. to 15.2.4.5.9.) may be viewed using a combination of direct view and indirect vision devices (of Classes IV, V, VI).

Paragraphs 15.2.1.1.2. and 15.2.1.1.3., remain unchanged and re-positioned after the tables  
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 **for side-steered vehicles** 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) 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~~
- (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.; **and**
- (e) ~~The~~ **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 ~~9~~ **9.1**).

**The field of vision shall be such that the driver can see at least a flat horizontal portion of the road, which is for centre-steered vehicles bounded by:**

- (f) **A transverse vertical plane through the outermost point of the front of the vehicle;**
- (g) **A transverse vertical plane 2,000 mm in front of the plane defined in (a);**
- (h) **A longitudinal vertical plane parallel to the longitudinal vertical median plane 2,000 mm outside the outermost side of both sides of the vehicle; and**
- (i) **The front of this field of vision on both sides may be rounded off with a radius of 2,000 mm (see Figure 9.2).**

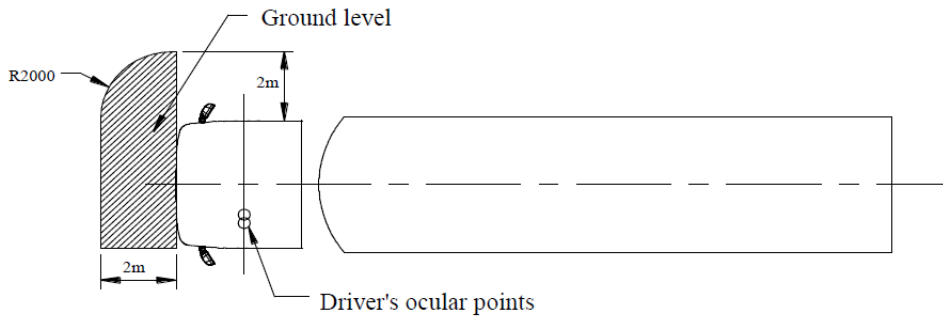
For the defined field of vision, see also paragraph 15.2.4.9.2. below.

The provisions for Class VI front-view devices are compulsory for forward controlled (as defined in paragraph 12.5. of this Regulation) vehicles of categories  $N_2 > 7.5$  t and  $N_3$ .

If vehicles of these categories cannot fulfil the requirements by using a front-view device, a vision support system shall be used. In the case of a vision support system this device shall be able to detect an object of 50 cm height and with a diameter of 30 cm within the field defined in Figure ~~9~~ **9.1 and Figure 9.2.**"

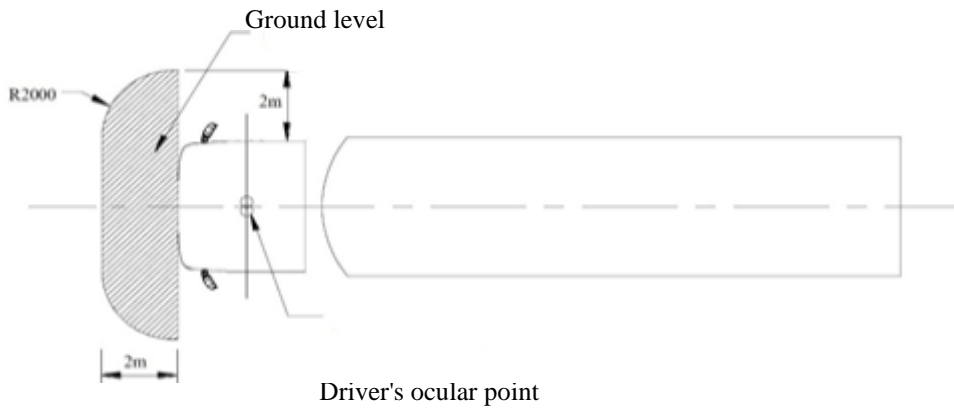
Figure 9.1., amend to read:

Figure 9  
**Figure 9.1**  
 Class VI field of vision for side-steered vehicle



Insert a new figure 9.2., to read:

**Figure 9.2**  
 Class VI field of vision for centre-steered vehicle



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 **for side-steered vehicles or on both sides for centre-steered vehicles**, a Class VI device for indirect vision is not mandatory."

Paragraph 16.1.3.1. (current), 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 minimum average magnification factor indicated below.~~

~~The minimum magnification factor shall not be less than:~~

- (a) ~~for Class I: 0.31;~~
- (b) ~~for Class II (driver's side): 0.26;~~
- (c) ~~for Class III (driver's side): 0.29;~~
- (d) ~~for Class IV (driver's side): 0.054;~~



- (e) — for Class II (passenger's side): 0.13;
- (f) — for Class III (passenger's side): 0.19;
- (g) — for Class IV (passenger's side): 0.016.

The average magnification factor shall not be less than:

- (h) — for Class I: 0.33;
- (i) — for Class II (driver's side): 0.31;
- (j) — for Class III (driver's side): 0.31;
- (k) — for Class IV (driver's side): 0.091;
- (l) — for Class II (passenger's side): 0.16;
- (m) — for Class III (passenger's side): 0.20;
- (n) — for Class IV (passenger's side): 0.046."

*Insert new paragraphs 16.1.3.1.1. and 16.1.3.1.2., to read:*

**"16.1.3.1.1. Magnification factor for side-steered vehicles. The minimum and the average magnification factors of CMS, in both horizontal and vertical directions shall not be lower than the minimum average magnification factor indicated below.**

**The minimum magnification factor shall not be less than:**

- (a) For Class I: **0.31;**
- (b) For Class II (driver's side): **0.26;**
- (c) For Class III (driver's side): **0.29;**
- (d) For Class IV (driver's side): **0.054;**
- (e) For Class II (passenger's side): **0.13;**
- (f) For Class III (passenger's side): **0.19;**
- (g) For Class IV (passenger's side): **0.016.**

**The average magnification factor shall not be less than:**

- (h) For Class I: **0.33;**
- (i) For Class II (driver's side): **0.31;**
- (j) For Class III (driver's side): **0.31;**
- (k) For Class IV (driver's side): **0.091;**
- (l) For Class II (passenger's side): **0.16;**
- (m) For Class III (passenger's side): **0.20;**
- (n) For Class IV (passenger's side): **0.046."**

*Insert a new paragraph 16.1.3.1.2., to read:*

**"16.1.3.1.2. Magnification factor for centre-steered vehicles of categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub> and N<sub>3</sub>. The minimum and the average magnification factors of the CMS, in both horizontal and vertical directions shall not be lower than the minimum average magnification factor indicated below. The minimum magnification factor shall not be less than:**

- (a) For Class II (driver center): **0.22;**
- (b) For Class IV (driver center): **0.043.**

**The average magnification factor shall not be less than:**

- (c) For Class II (driver center): **0.23;**

(d) For Class IV (driver center): 0.068."

## II. Justification

1. *Paragraphs 12.7. to 12.9.*

Creation of a new definition for centre steer vehicles, which is based on UN Regulation No. 43 paragraph 2.38.:

*""Central driving position" is defined when Y coordinate of the R point is in Y<sub>0</sub> position within ±60 mm."*

2. For differentiation in the rest of the text, the proposal also inserts a new definition for side-steered vehicles.

*Paragraph 15.2.1.1.1.*

Since the driver is sitting on the longitudinal axis of the vehicle, further away from the side window (compared to the driver's side of a side-steered vehicle), the direct vision next to the vehicle is more obstructed. The driver cannot see straight down to the road on either side on centre-steered vehicles. Therefore, the indirect vision requirement class V is necessary on both sides of the vehicle to provide adequate vision.

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