

מראות לרכבי משא ולאוטובוסים

Mirrors for cargo vehicles and buses

מסמך זה הוא הצעה בלבד

מכון התקנים הישראלי
The Standards Institution of Israel



הקדמה לתקן הישראלי

תקן ישראלי זה הוא הדירקטיבה של האיחוד האירופי 2003/97/EC מנובמבר 2003, בכל הנוגע למראות ברכבי משא ובאוטובוסים בלבד, שאושר כתקן ישראלי בשינויים ובתוספות לאומיים או

תקן ישראלי זה הוא תקנת האומות המאוחדות:

E/ECE/324, E/ECE/TRANS/505} Rev.1/Add.45/Rev.3, Regulation 46

מאוקטובר 2009, לרבות Corrigendum1 ממרס 2010 ו-Amendment 1 מדצמבר 2011, בכל הנוגע למראות ברכבי משא ובאוטובוסים בלבד, שאושרה כתקן ישראלי בשינויים ובתוספות לאומיים

הערה:

תקן זה מאפשר בחירה בין עמידה בדרישות הדירקטיבה של האיחוד האירופי לבין עמידה בדרישות תקנת האומות המאוחדות.

התקן כולל, בסדר המפורט להלן, רכיבים אלה:

- סעיף החלות (Article 1) של הדירקטיבה של האיחוד האירופי בשינויים ובתוספות לאומיים (בעברית)
- פירוט השינויים והתוספות הלאומיים לסעיפי הדירקטיבה של האיחוד האירופי (בעברית)
- סעיף חלות תקנת האומות המאוחדות בשינויים ובתוספות לאומיים (בעברית)
- פירוט השינויים והתוספות הלאומיים לסעיפי תקנת האומות המאוחדות (בעברית)
- הדירקטיבה של האיחוד האירופי (כלשונה)
- תקנת האומות המאוחדות, על עדכוניה (כלשונה)

חלות הדירקטיבה האירופית (Article 1 של הדירקטיבה בשינויים ובתוספות לאומיים)
תקן זה דן בדרישות ובשיטות בדיקה למראות ברכבי משא ובאוטובוסים.

פירוט השינויים והתוספות הלאומיים לסעיפי הדירקטיבה האירופית

ANNEX III - Requirements Concerning The Fitting Of Mirrors And Other Devices For Indirect Vision To Vehicles

ה-ANNEX חל בשינויים המפורטים להלן.

Mirrors

2.1 Number

2.1.1 (ללא כותרת)

בטבלה המצורפת לסעיף זה, בשורות M2 ו-M3, בעמודה שכותרתה "Front mirror Class VI", המילה "Optional" אינה חלה, ובמקומה יחול:
חובה.

חלות תקנת האומות המאוחדות (סעיף 1 של תקנת האומות המאוחדות בשינויים ובתוספות לאומיים) תקנה זו דנה בדרישות ובשיטות בדיקה למראות ברכבי משא ובאוטובוסים.

פירוט השינויים והתוספות הלאומיים לסעיפי תקנת האומות המאוחדות

15. REQUIREMENTS

הסעיף חל בשינויים המפורטים להלן.

15.2. MIRRORS

15.2.1. Number

15.2.1.1. (ללא כותרת)

בטבלה המצורפת לסעיף זה, בשורות M2 ו-M3, בעמודה שכותרתה "Front mirror Class VI", המילה "Optional" אינה חלה, ובמקומה יחול: חובה.

סעיף התאמה לתקן

המראות מתאימות לתקן ישראלי זה, ת"י 6229, אם עמדו בדרישות למראות לרכבי משא ולאוטובוסים של אחד המסמכים האלה:

- הדירקטיבה של האיחוד האירופי ECE/2003/97 מנובמבר 2003
- תקנת האומות המאוחדות:

E/ECE/324, E/ECE/TRANS/505 } Rev.1/Add.45/Rev.3, Regulation 46

מאוקטובר 2009, לרבות Corrigendum1 ממרס 2010 ו-Amendment 1 מדצמבר 2011.

לרבות כל המפורט לגביהם בחלק העברי בפרקי "פירוט השינויים והתוספות הלאומיים".

I

(Acts whose publication is obligatory)

DIRECTIVE 2003/97/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**of 10 November 2003****on the approximation of the laws of the Member States relating to the type-approval of devices for indirect vision and of vehicles equipped with these devices, amending Directive 70/156/EEC and repealing Directive 71/127/EEC****(Text with EEA relevance)**

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 95 thereof,

Having regard to the proposal from the Commission ⁽¹⁾,

Having regard to the opinion of the European Economic and Social Committee ⁽²⁾,

Acting in accordance with the procedure laid down in Article 251 of the Treaty ⁽³⁾,

Whereas:

(1) Council Directive 71/127/EEC of 1 March 1971 on the approximation of the laws of the Member States relating to the rear-view mirrors of motor vehicles ⁽⁴⁾ was adopted as one of the separate directives of the EC type-approval procedure which was established by Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating

to the type-approval of motor vehicles and their trailers ⁽⁵⁾. Consequently, the provisions laid down in Directive 70/156/EEC relating to vehicle systems, components and separate technical units apply to Directive 71/127/EEC.

(2) Existing provisions, in particular in the case of categories N₂, N₃, M₂ and M₃ have proved inadequate as regards the exterior field of vision to the side, front and rear of the vehicle. In order to remedy this shortcoming, it is necessary to require an extension of the field of vision.

(3) In the light of the experience gained and the present state of the art, it is now possible to amplify certain requirements of Directive 71/127/EEC with a view to improving road safety and to permit the use of mirrors to be supplemented by other technologies.

(4) Taking into account the nature and the number of changes necessary to the requirements in force today, it is advisable to repeal and replace Directive 71/127/EEC by this Directive. Since the type-approval and the conformity of production procedures are provided for in Directive 70/156/EEC, it is not necessary to repeat them in this Directive.

⁽¹⁾ OJ C 126 E, 28.5.2002, p. 225.

⁽²⁾ OJ C 149, 21.6.2002, p. 5.

⁽³⁾ Opinion of the European Parliament of 9 April 2002 (OJ C 127 E, 29.5.2003, p. 25, Council common position of 8 April 2003 (OJ C 214 E, 9.9.2003, p. 7), position of the European Parliament of 1 July 2003 (not yet published in the Official Journal) and Council decision of 20 October 2003.

⁽⁴⁾ OJ L 68, 22.3.1971, p. 1. Directive as last amended by the 1994 Act of Accession.

⁽⁵⁾ OJ L 42, 23.2.1970, p. 1. Directive as last amended by Regulation (EC) No 807/2003 (OJ L 122, 16.5.2003, p. 36).

(5) The Annexes to Directive 70/156/EEC should be amended accordingly,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

The aim of this Directive is to harmonise rules relating to the type-approval of devices for indirect vision and of vehicles equipped with these devices.

These rules are contained in the Annexes to this Directive.

For the purpose of this Directive 'vehicle' means any motor vehicle as defined in Section A of Annex II to Directive 70/156/EEC.

Article 2

1. With effect from 26 January 2005, Member States shall not, on grounds relating to devices for indirect vision,

- refuse to grant EC type-approval or national type-approval of a vehicle or a device for indirect vision,
- prohibit the sale, registration or entry into service of vehicles or devices for indirect vision,

if the vehicles or devices for indirect vision comply with the requirements of this Directive.

2. With effect from 26 January 2006, Member States shall refuse to grant EC type-approval for any new type of vehicle on grounds relating to the device for indirect vision or for any new type of device for indirect vision, if the requirements of this Directive are not fulfilled.

However, this date shall be postponed by 12 months as regards the requirements concerning a class VI front mirror as a component and its installation on vehicles.

3. With effect from 26 January 2006, Member States shall prohibit the national type-approval for any new type of vehicle on grounds relating to the device for indirect vision if the requirements of this Directive are not fulfilled.

However this date shall be postponed by 12 months as regards the requirements concerning a class VI front mirror as a component and its installation on vehicles.

4. With effect from 26 January 2010 for vehicles of categories M₁ and N₁, and with effect from 26 January 2007 for all vehicles of other categories, Member States:

- shall consider certificates of conformity which accompany new vehicles in accordance with the provisions of Directive 70/156/EEC to be no longer valid for the purposes of Article 7(1) of that Directive,
- shall prohibit the sale, registration or entry into service of vehicles,

on grounds relating to the device for indirect vision if the vehicles do not comply with the requirements of this Directive.

5. With effect from 26 January 2010 for vehicles of categories M₁ and N₁, and with effect from 26 January 2007, for all vehicles of other categories, the requirements of this Directive relating to the device for indirect vision as a component shall apply for the purposes of Article 7(2) of Directive 70/156/EEC.

6. Notwithstanding paragraphs 2 and 5, for the purposes of replacement parts, Member States shall continue to grant EC type-approval and to permit the sale and entry into service of components or separate technical units intended for use on vehicle types which have been approved before 26 January 2007, pursuant to Directive 71/127/EEC and, where applicable, subsequent extensions to those approvals.

7. Notwithstanding paragraph 3, Member States may continue to grant national type-approval for any new type of articulated vehicle of category M₂ and M₃, class I, as defined in Annex I, point 2.1.1.1 to Directive 2001/85/EC⁽¹⁾, composed of at least three articulated rigid parts, which do not comply with the provisions of this Directive, provided that the requirements for the driver's field of vision are respected as referred in Annex III, point 5 to this Directive.

8. The provisions laid down in this Directive shall also contribute to establishing a high level of protection in the context of the international harmonisation of legislation in this area. Therefore, as soon as possible after the adoption of this Directive, the Commission shall submit a proposal to the United Nations Economic Commission for Europe with the aim of aligning the provisions of UNECE Regulation 46 with the provisions of this Directive.

⁽¹⁾ Directive 2001/85/EC of the European Parliament and of the Council of 20 November 2001 relating to special priorities for vehicles used for the carriage of passengers comprising more than eight seats in addition to the driver's seat (OJ L 42, 13.2.2002, p. 1).

ANNEX III

REQUIREMENTS CONCERNING THE FITTING OF MIRRORS AND OTHER DEVICES FOR INDIRECT VISION TO VEHICLES**General**

- 1.1. Mirrors and other 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.
- 1.2. The conditions laid down in item 1.1 must be maintained when the vehicle is moving at speeds of up to 80 % of its maximum design speed, but not exceeding 150 km/h.
- 1.3. The fields of vision defined below shall be established using ambinoocular vision, the eyes being at the 'driver's ocular points' as defined in Annex I, point 1.1.1.12. The fields of vision shall be determined when the vehicle is in running order as defined in Directive 97/27/EC, Annex I, point 2.5. They shall be established through windows which have a total light transmission factor of at least 70 % measured normal to the surface.

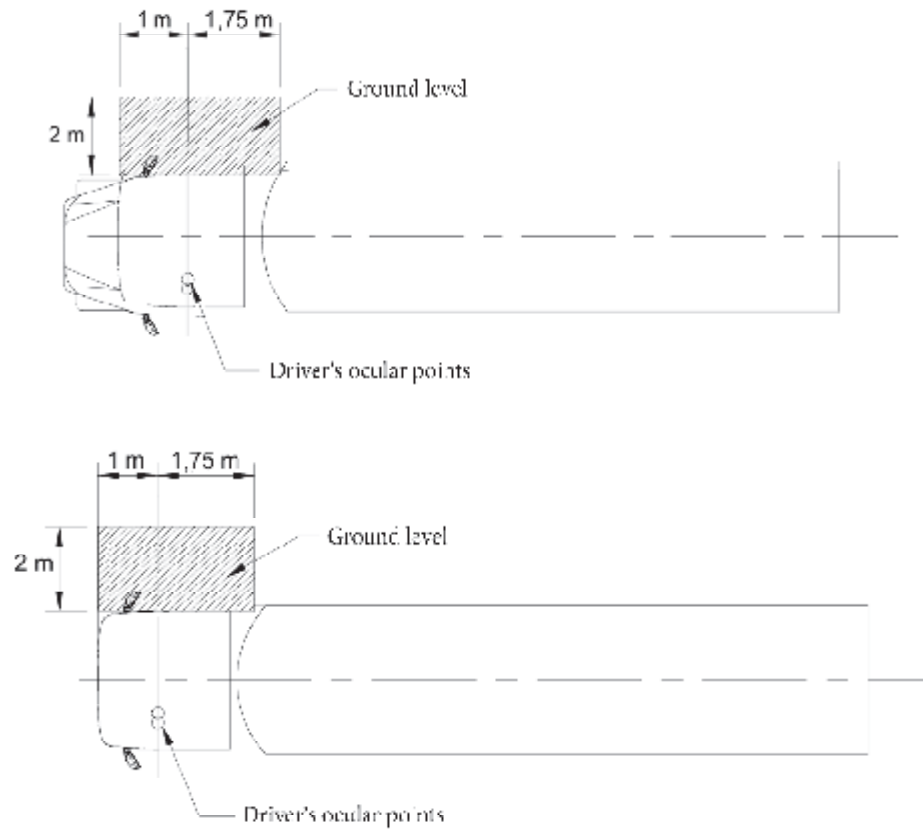
Mirrors

2. Number
 - 2.1. Minimum number of compulsory mirrors
 - 2.1.1. The fields of vision prescribed in point 5 shall be obtained from the minimum number on mandatory mirrors set out in the following table. Where the presence of a mirror is not requested on a mandatory base, this means that no other system for indirect vision can be requested on a mandatory base.

| Vehicle category | Exterior mirrors | | | | | |
|------------------|---|---|----------------------------------|--|---|---|
| | Interior mirror Class I | Main mirror (large) Class II | Main mirror (small) Class III | Wide-angle mirror Class IV | Close-proximity mirror Class V | Front mirror Class VI |
| M ₁ | <p>Compulsory</p> <p>Unless a mirror would not provide rearward vision (as defined in item 5.1 Annex III)</p> <p>Optional</p> <p>If the mirror does not provide rearward vision</p> | Optional | Compulsory | Optional | Optional | Optional |
| M ₂ | Optional (no requirements for the field of view) | Compulsory One on the driver's side and one on the passenger's side | Not permitted | Optional One on the driver's side and/or one on the passenger's side | Optional One on the driver's side and one on the passenger's side (both must be fitted at least 2 m above the ground) | Optional (must be fitted at least 2 m above the ground) |
| M ₃ | Optional (no requirements for the field of view) | Compulsory One on the driver's side and one on the passenger's side | Not permitted | Optional One on the driver's side and/or one on the passenger's side | Optional One on the driver's side and one on the passenger's side (both must be fitted at least 2 m above the ground) | Optional (must be fitted at least 2 m above the ground) |
| N ₁ | <p>Compulsory</p> <p>Unless a mirror would not provide rearward vision (as defined in item 5.1 Annex III)</p> <p>Optional</p> <p>If the mirror does not provide rearward vision</p> | Optional | Compulsory | Optional | Optional | Optional |

| Vehicle category | Exterior mirrors | | | | | |
|------------------------|--|---|----------------------------------|---|--|---|
| | Interior mirror Class I | Main mirror (large) Class II | Main mirror (small) Class III | Wide-angle mirror Class IV | Close-proximity mirror Class V | Front mirror Class VI |
| N ₂ ≤ 7,5 t | Optional (no requirements for the field of view) | Compulsory One on the driver's side and one on the passenger's side | Not permitted | Optional One on the driver's side and one on the passenger's side | Optional One on the passenger's side one on the driver's side (both must be fitted at least 2 m above the ground) | Optional One front mirror (must be fitted at least 2 m above the ground) |
| N ₂ > 7,5 t | Optional (no requirements for the field of view) | Compulsory One on the driver's side and one on the passenger's side | Not permitted | Compulsory One on the driver's side and one on the passenger's side | Compulsory, see Annex III items 3.7 and 5.5.5 One on the passenger's side Optional One on the driver's side (both must be fitted at least 2 m above the ground) | Compulsory, see Annex III item 2.1.2 One front mirror (must be fitted at least 2 m above the ground) |
| N ₃ | Optional (no requirements for the field of view) | Compulsory One on the driver's side and one on the passenger's side | Not permitted | Compulsory One on the driver's side and one on the passenger's side | Compulsory, see Annex III items 3.7 and 5.5.5 One on the passenger's side Optional One on the driver's side (both must be fitted at least 2 m above the ground) | Compulsory, see Annex III item 2.1.2. One front mirror (must be fitted at least 2 m above the ground) |

- 5.5.5. In case the field of vision described in Figures 10a and 10b can be perceived through the combination of the field of vision from a Class IV wide-angle mirror and that of a Class VI front mirror, the installation of a Class V close proximity mirror is not compulsory.



Figures 10a and 10b: Field of vision of Class V close-proximity mirror

5.6. Front mirror (Class VI)

- 5.6.1. The field of vision must be such that the driver can see at least a flat horizontal portion of the road, which is bounded by:

- one traverse vertical plane through the outermost point of the front of the vehicle-cab
- one traverse vertical plane 2 000 mm in front of the vehicle
- 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
- one 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 11).

The provisions for front mirrors are compulsory for forward-controlled (as defined in Directive 70/156/EEC, Annex I(a), footnote (Z)) vehicles of categories $N_2 > 7,5$ t and N_3 .

If vehicles of these categories with other construction characteristics regarding the bodywork cannot fulfil the requirements by using a front mirror, a camera/monitor device shall be used. If either of these options do not provide the adequate field of vision then any other device for indirect vision shall be used. 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 11.

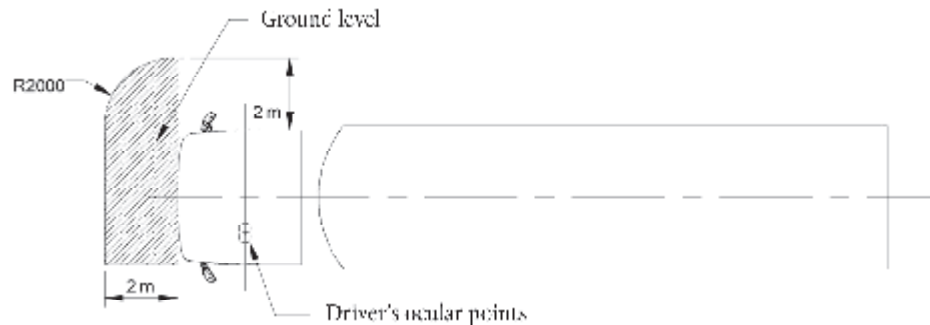


Figure 11: Field of vision of Class VI front mirror

5.6.2. 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 of class VI is not mandatory.

5.7. In the case of mirrors consisting of several reflecting surfaces which are either of a different curvature or make an angle with each other, at least one of the reflecting surfaces must provide the field of vision and have the dimensions (see point 2.2.2 of Annex II) specified for the class to which they belong.

5.8. Obstructions

5.8.1. Interior rear-view mirror (Class I)

The field of vision may be reduced by the presence of headrest and devices such as, in particular, sun visors, rear windscreen wipers, heating elements and stop lamp of category S3 or by components of bodywork such as window columns of rear split doors, provided that all these devices together do not obscure more than 15 per cent of the prescribed field of vision when projected onto a vertical plane perpendicular to the longitudinal median plane of the vehicle. The degree of obstruction shall be measured with the headrests adjusted to their lowest possible position and with the sun visors folded back.

5.8.2. Exterior mirrors (Classes II, III, IV, V and VI)

In the fields of vision specified above, obstruction due to the bodywork and some of its components, such as other mirrors, door handles, outline marker lights, direction indicators 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 % of the specified field of vision.

5.9. Test procedure

The field of vision shall be determined by placing powerful light sources at the ocular points and examining the light reflected on the vertical monitoring screen. Other equivalent methods may be used.

Devices for indirect vision other than mirrors

6. A device for indirect vision shall give such performances that a critical object can be observed within the described field of vision, taking into account the critical perception.

12 October 2009

AGREEMENT

CONCERNING THE ADOPTION OF UNIFORM TECHNICAL PRESCRIPTIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES AND THE CONDITIONS FOR RECIPROCAL RECOGNITION OF APPROVALS GRANTED ON THE BASIS OF THESE PRESCRIPTIONS */

(Revision 2, including the amendments which entered into force on 16 October 1995)

Addendum 45: Regulation No. 46

Revision 3

Incorporating all valid text up to:

Corrigendum 1 to the 02 series of amendments (Russian only) - Date of entry into force:
15 November 2006

Corrigendum 2 to the 02 series of amendments - Date of entry into force: 12 November 2008

Supplement 1 to the 02 series of amendments - Date of entry into force: 10 November 2007

Supplement 2 to the 02 series of amendments - Date of entry into force: 11 July 2008

Supplement 3 to the 02 series of amendments - Date of entry into force: 15 October 2008

Supplement 4 to the 02 series of amendments - Date of entry into force: 22 July 2009

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF DEVICES FOR INDIRECT VISION AND OF MOTOR VEHICLES WITH REGARD TO THE INSTALLATION OF THESE DEVICES



UNITED NATIONS

*/ Former title of the Agreement:

Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

Regulation No. 46

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF DEVICES FOR
INDIRECT VISION AND OF MOTOR VEHICLES WITH REGARD
TO THE INSTALLATION OF THESE DEVICES

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1. SCOPE

This Regulation applies:

- (a) to devices for indirect vision, for vehicles of category M, N and of L category vehicles 1/ with bodywork at least partly enclosing the driver;
- (b) to the installation of devices of indirect visions for vehicles of categories M and N and of L category vehicles 1/ with bodywork at least partly enclosing the driver.

I. DEVICES FOR INDIRECT VISION

2. DEFINITIONS

For the purposes of this Regulation:

- 2.1. "Devices for indirect vision" means devices to observe the traffic area adjacent to the vehicle which cannot be observed by direct vision. These can be conventional mirrors, camera-monitors or other devices able to present information about the indirect field of vision to the driver.
 - 2.1.1. "Mirror" means any device, excluding devices such as periscopes, intended to give a clear view to the rear, side or front of the vehicle within the fields of vision defined in paragraph 15.2.4.
 - 2.1.1.1. "Interior mirror" means a device as defined in paragraph 2.1., which can be fitted in the passenger compartment of a vehicle.
 - 2.1.1.2. "Exterior mirror" means a device as defined in paragraph 2.1., which can be mounted on the external surface of a vehicle.
 - 2.1.1.3. "Surveillance mirror" means a mirror other than the ones defined in paragraph 2.1.1. 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.
 - 2.1.1.4. "Vision support system" means a system to enable the driver to detect and/or see objects in the area adjacent to the vehicle.
 - 2.1.1.5. "r" means the average of the radii of curvature measured over the reflecting surface, in accordance with the method described in Annex 7.

1/ As defined in Annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), (document TRANS/WP.29/78/Rev.1/Amend.2 as last amended by Amend.4).

- 14.3. Notice of approval or of refusal or of extension or withdrawal of approval of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in Annex 4 to this Regulation.
15. REQUIREMENTS
- 15.1. GENERAL
- 15.1.1. The compulsory and optional devices for indirect vision, set out in the table under paragraph 15.2.1.1.1., installed on the vehicle shall be of a type approved under this Regulation.
- 15.1.2. Mirrors and other 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.
- 15.1.3. The conditions laid down in paragraph 15.1.2. must be maintained when the vehicle is moving at speeds of up to 80 per cent of its maximum design speed, but not exceeding 150 km/h.
- 15.1.4. The fields of vision defined below shall be established using ambinocular vision, the eyes being at the "driver's ocular points" as defined in paragraph 12.1. The fields of vision shall be determined when the vehicle is in running order as defined in document TRANS/WP.29/78/Rev.1/Amend.2, Annex 7, paragraph 2.5.4., plus for M1 and N1 vehicles one front seat passenger (75 kg). When established through windows, the glazing shall have a total light transmission factor in accordance with Regulation No. 43, Annex 21.
- 15.2. MIRRORS
- 15.2.1. Number
- 15.2.1.1. Minimum number of compulsory mirrors
- 15.2.1.1.1. The fields of vision prescribed in paragraph 15.2.4. shall be obtained from the minimum number on mandatory mirrors set out in the following table. Where the presence of a mirror is not requested on a mandatory base, this means that no other system for indirect vision can be requested on a mandatory base.

| Vehicle category | Exterior mirrors | | | | | |
|------------------|---|---|---|--|---|---|
| | Interior mirror Class I | Main mirror (large) Class II | Main mirror (small) Class III | Wide-angle mirror Class IV | Close-proximity mirror Class V | Front mirror Class VI |
| M ₁ | 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 must be fitted at least 2 m above the ground) | Optional (must be fitted at least 2 m above the ground) |
| M ₂ | 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 must be fitted at least 2 m above the ground) | Optional (must be fitted at least 2 m above the ground) |
| M ₃ | 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 must be fitted at least 2 m above the ground) | Optional (must be fitted at least 2 m above the ground) |
| N ₁ | 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 must be fitted at least 2 m above the ground) | Optional (must be fitted at least 2 m above the ground) |

| Vehicle category | Exterior mirrors | | | | | |
|---------------------------|--|--|----------------------------------|--|--|---|
| | Interior mirror Class I | Main mirror (large) Class II | Main mirror (small) Class III | Wide-angle mirror Class IV | Close-proximity mirror Class V | Front mirror Class VI |
| N ₂ ≤ 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 | Compulsory (see paragraphs 15.2.2.7. and 15.2.4.5.5.) 1 on the passenger's side Optional 1 on the driver's side (both must be fitted at least 2 m above the ground). A tolerance of + 10 cm may be applied" | Optional 1 front mirror (must be fitted at least 2 m above the ground) |
| N ₂ > 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 | Compulsory (see paragraph 15.2.2.7. and 15.2.4.5.5.) 1 on the passenger's side Optional 1 on Driver's side (both must be fitted at least 2 m above the ground) | Compulsory (see paragraph 15.2.1.1.2) 1. front mirror (must be fitted at least 2 m above the ground) |
| N ₃ | 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 | Compulsory (see paragraph 15.2.2.7. and 15.2.4.5.5.) 1 on the passenger's side Optional 1 on driver's side (both must be fitted at least 2 m above the ground) | Compulsory (see paragraph 15.2.1.1.2) 1. front mirror (must be fitted at least 2 m above the ground) |

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, 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 of up to 10 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 the case where the vehicle is moving forward at a higher speed than 10 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.

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

| Category of vehicle | Interior mirror (Class I) | Main exterior mirror(s) (Classes III and VII) |
|--|------------------------------|---|
| L category motor vehicles fitted with bodywork which partly or wholly encloses the driver | 1 <u>1/</u> | 1, if there is an interior mirror; 2, if there is not an interior mirror |
| <u>1/</u> No interior rear-view mirror is required if the visibility conditions referred to in paragraph 15.2.5.4.1. below cannot be met. In this case two exterior rear-view mirrors are required, one on the left and one on the right hand side of the vehicle. | | |

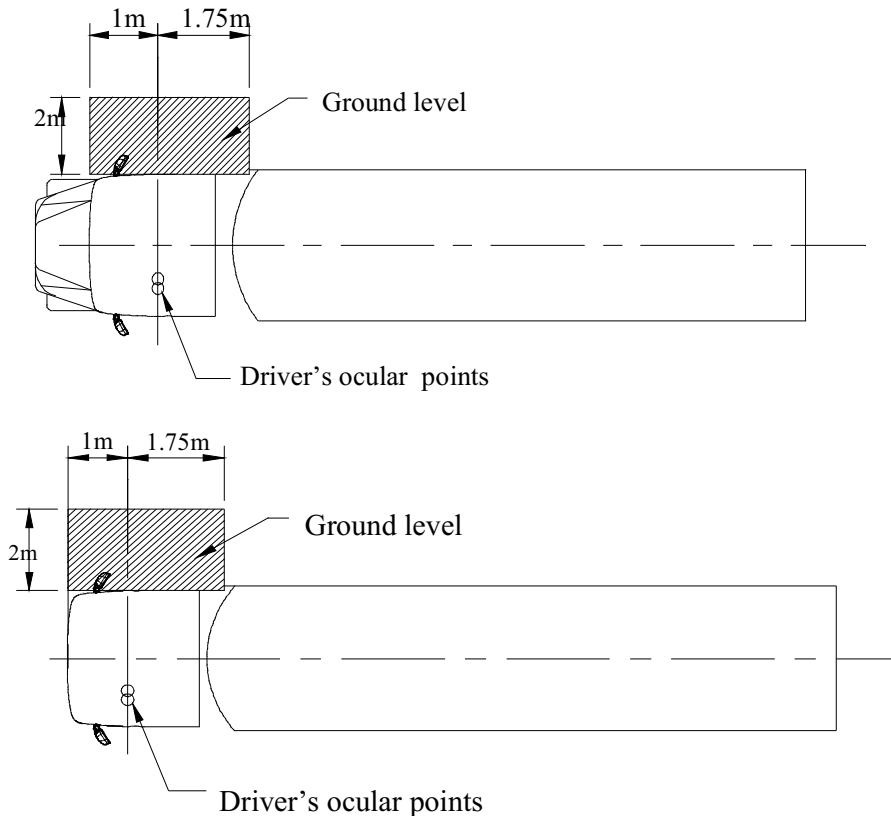
Where a single exterior rear view mirror is fitted this shall be located on the left hand side of the vehicle in those countries where the traffic drives on the right and on the right hand side of the vehicle in those countries where the traffic drives on the left.

15.2.1.1.4. Optional rear-view mirrors for L-category vehicles

The fitting of an exterior rear-view mirror on the side of the vehicle opposite to that of the mandatory rear-view mirror referred to in paragraph 15.2.1.1.3, is permissible. The rear-view mirror shall meet the requirements of this Regulation.

- 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 must be mounted at least 2 m above the ground when the vehicle is under a load corresponding to its maximum technical permissible mass.
- 15.2.2. Position
- 15.2.2.1. Mirrors must be so placed that the driver, when sitting on 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.
- 15.2.2.2. Exterior mirrors shall be visible through the side windows or through the portion of the windscreen that is swept by the windscreen wiper. Nevertheless, for design reasons, this last provision (i.e. the provisions relating the cleaned part of the windscreen) shall not apply to:
- (a) exterior mirrors on the passenger side and optional exterior mirrors on the driver side of vehicles of categories M₂ and M₃;
 - (b) Class VI mirrors.
- 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 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 (see Annex 4).
- 15.2.2.4. The prescribed exterior mirror on the driver's side of the vehicle must 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 and through the centre of the straight line 65 mm long which joins the driver's two ocular points.
- 15.2.2.5. Mirrors 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.
- 15.2.2.6. Where the lower edge of an exterior mirror is less than 2 m above the ground when the vehicle is loaded to its technically permissible maximum laden mass, this mirror must not project more than 250 mm beyond the overall width of the vehicle measured without mirrors.
- 15.2.2.7. Class V and Class VI mirrors shall be mounted on vehicles in such a way that, regardless of their position after adjustment, no part of these mirrors or their holders is less than 2 m from the ground when the vehicle is under a load corresponding to its technically permissible maximum laden mass.

- 15.2.4.5.5. In case the field of vision described in Figures 8a and 8b can be perceived through the combination of the field of vision from a Class IV wide-angle mirror and that of a Class VI front mirror, the installation of a Class V close proximity mirror is not compulsory.



Figures 8a and 8b: Field of vision of Class V close-proximity mirror

15.2.4.6. Front mirror (Class VI)

- 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 transverse vertical plane through the outermost point of the front of the vehicle;
 - a transverse vertical plane 2,000 mm in front of the plane defined in (a),
 - 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 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 9).

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

The provisions for front mirrors are compulsory for forward controlled (as defined in paragraph 12.5.) vehicles of categories $N_2 > 7.5$ t and N_3 .

If vehicles of these categories cannot fulfil the requirements by using a front mirror or a camera/monitor device, 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 height and with a diameter of 30 cm within the field defined in figure 9.

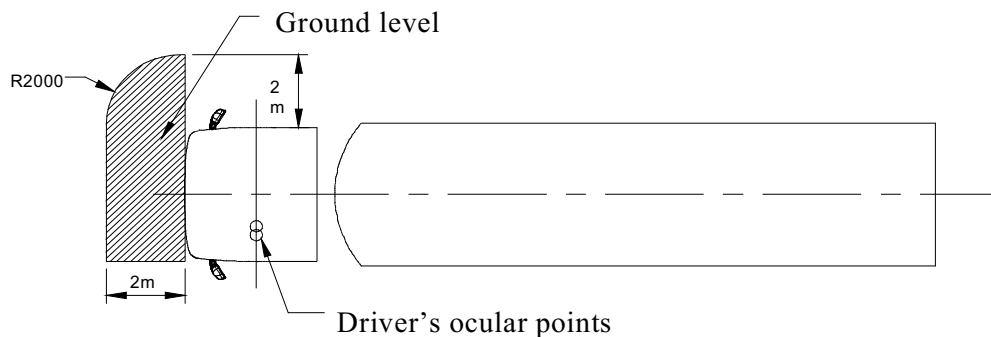


Figure 9: Field of vision of Class VI front mirror

- 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 of Class VI is not mandatory.
- 15.2.4.6.3. For the purpose of paragraphs 15.2.4.6.1. and 15.2.4.6.2. parts permanently attached to the vehicle that are situated both above the driver's eye points and in front of the transverse vertical plane passing through the foremost surface of the vehicle's front bumper shall not be taken into account when defining the front of the vehicle.
- 15.2.4.7. L-category mirror (Class VII).
- 15.2.4.7.1. Exterior rear-view mirror on the driver's side

The field of vision must be such that the driver can see at least a 2.50 m wide, flat, horizontal portion of the road, which is bounded by a plane parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle on the driver's side of the vehicle and extends from 10 m behind the driver's ocular points to the horizon (see Figure 10).

15.2.4.7.2. Exterior rear-view mirror on the passenger's side

The field of vision must be such that the driver can see at least a 4 m wide flat, horizontal portion of the road which is bounded by a plane parallel to the median longitudinal vertical plane passing through the outermost point of the vehicle on the passenger's side and which extends from 20 m behind the driver's ocular points to the horizon (see Figure 10).

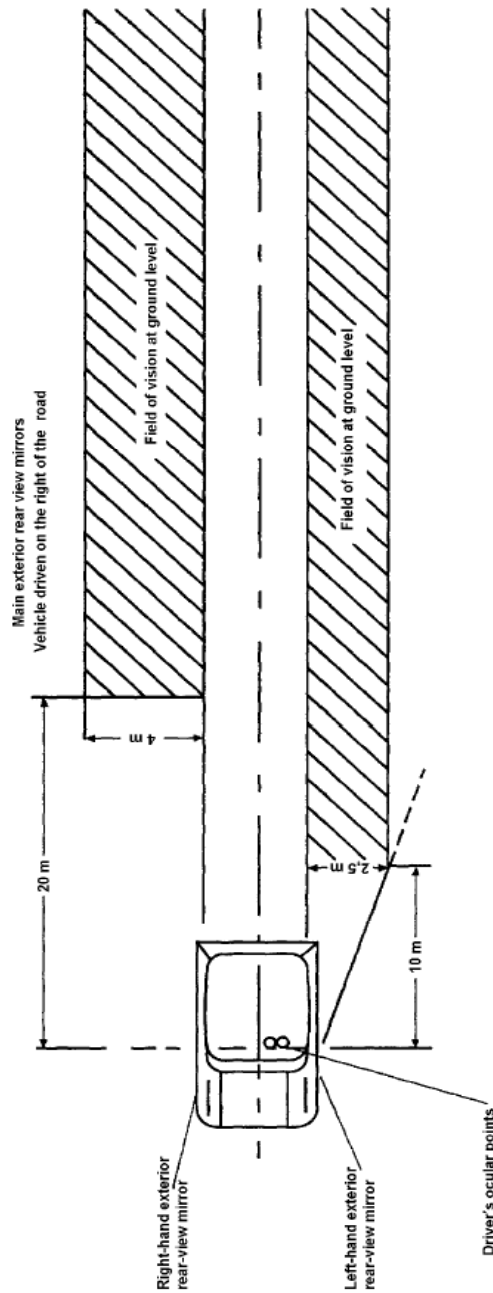


Figure 10: Field of vision of Class VII mirrors

15.2.4.8. In the case of mirrors consisting of several reflecting surfaces which are either of different curvature or make an angle with each other, at least one of the reflecting surfaces must provide the field of vision and have the dimensions (paragraph 6.1.2.1.2.2.) specified for the class to which they belong.

15.2.4.9. Obstructions

15.2.4.9.1. Interior rear-view mirror (Class I)

The field of vision may be reduced by the presence of devices such as sun visors, windscreen wipers, heating elements and stop lamp of category S3, provided that all these devices together do not obscure more than 15 per cent of the prescribed field of vision. Headrests or framework or bodywork such as window columns of rear split doors, rear window frame shall be excluded from the calculation. This requirement shall be tested by projection on to a vertical plane at right angles to the longitudinal centreplane of the vehicle. The degree of obstruction shall be measured with the sun visors folded back.

15.2.4.9.2. Exterior mirrors (Classes II, III, IV, V, VI and VII)

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 caused by the special features may be more than 10 per cent but not more than necessary for its special function.

15.2.4.10. Test procedure

The field of vision shall be determined by placing powerful light sources at the ocular points and examining the light reflected on the vertical monitoring screen. Other equivalent methods may be used.

15.3. DEVICES FOR INDIRECT VISION OTHER THAN MIRRORS

15.3.1. A device for indirect vision shall give such performances that a critical object can be observed within the described field of vision, taking into account the critical perception.

15.3.2. Obstruction of the driver's direct view caused by the installation of a device for indirect vision shall be restricted to a minimum.

15.3.3. For the determination of the detection distance in case of camera-monitor devices for indirect vision, the procedure of Annex 10 shall be applied.