

### 3-1 The installation of lighting and light-signaling devices: Effective date from 2006/7/1

Refer to: R48 02-S12, R53 01-S5, R74 01-S2/C1, R104 00-S2

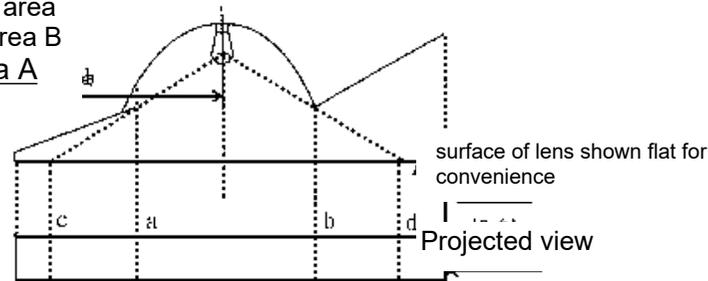
#### 3-1.1 Effective date and Scope:

- 3-1.1.1 As for the category symbols M2, M3, N2, N3 and O, the new vehicle variants effective date from 2006/7/1 and the category symbols M2, M3, N2, N3 and O all vehicle variants effective date from 2008/7/1, shall comply with paragraphs 3-1.4, 3-1.6 and 3-1.7 specified below in this regulation, except for rear fog lamp could be choose install or not install and when choose installed rear fog lamp must comply with paragraphs 3-1.4.5.1 or 3-1.4.5.2 specified below in this regulation.
- 3-1.1.2 As for the category M2, M3, N2, N3 and O, the rear fog lamp fitted to the new vehicle variants as of 2008/1/1 and all vehicle variants as of 2010/1/1, shall comply with paragraphs 3-1.4.5.1 specified below in this regulation.
- 3-1.1.3 As for the category symbol L1 and L3, the gas-discharge headlamp fitted to new vehicle variants as of 2006/7/1 and all vehicle variants as of 2008/7/1, shall comply with the headlamp requirements in paragraphs 3-1.5 specified below in this regulation.
- 3-1.1.4 As for the category symbols M1 and N1, the new vehicle variants as of 2008/1/1 and all vehicle variants as of 2010/1/1, shall comply with paragraphs 3-1.4, 3-1.6 and 3-1.7, but rear fog lamps shall only comply with paragraph 3-1.4.5.1 specified below in this regulation.
- 3-1.1.5 As for the category symbols L1 and L3, the new vehicle variants as of 2009/1/1 and all vehicle variants as of 2011/1/1, shall comply with the headlamp requirements specified in paragraphs 3-1.5 to 3-1.7 specified below in this regulation.
- 3-1.1.6 The same applicant applying for low volume safety approval and the vehicle amount is not over 20 at same year and with same type and specification; or the same applicant applying for vehicle-by-vehicle low volume safety approval and the vehicle amount is not over 20 at same year and with same type and specification, could exempt from the requirement of Horizontal orientation in 3-1.4.2.5.2..
- 3-1.1.7 As for the vehicle category O3 and O4 from 2010/7/1, the dimensions and marking shape and mounting requirements of its body's side and rear retro-reflective marking with strips shall comply with paragraph 3-1.6.14.2 and 3-1.6.14.3.1 specified below in this regulation and the retro-reflective markings used shall comply with the requirements of "retro-reflective markings" in these Directions.

#### 3-1.2 Definitions:

- 3-1.2.1 Light emitting surface: means all or part of the exterior surface of the transparent material, Fig 1.
- 3-1.2.2 Illuminating surface: means the orthogonal projection of the full aperture of the reflector with an ellipsoidal reflector of the "projection lens" on a transverse plane, Fig 1.

The non-inclined line area  
is the essential test area B  
Test area A



a & b : illuminating surface  
c & d : Light-emitting surface

FIG 1

- 3-1.2.3 Bend lighting: means a lighting function to provide enhanced illumination in bends.
- 3-1.2.4 Apparent surface: means the orthogonal projection of: either the boundary of the illuminating surface projected on the exterior surface of the lens, or the light-emitting surface, in a plane perpendicular to the direction of observation and tangential to the most exterior point of the lens.
- 3-1.2.5 Height above the ground: The maximum height above the ground shall be measured from the highest point and the minimum height from the lowest point of the apparent surface in the direction of the reference axis.
- 3-1.2.6 Tell-tale: means a visual signal (or any equivalent signal) indicating that a device has been switched on and is operating correctly. An auditory signal can be used as alternative if stipulated in specific Regulations.
- 3-1.2.7 Angles of geometric visibility: the angles which determine the field of the minimum solid angle in which the apparent surface of the lamp must be visible. If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, proof shall be furnished that the part of the lamp not hidden by obstacles still conforms to the photometric values prescribed for the approval of the device as an optical unit.
- 3-1.2.8 Colour of the light emitted from a device

3-1.2.8.1 "White" means the chromaticity coordinates (x,y) of the light emitted that lie inside the chromaticity areas defined by the boundaries:

- W12 green boundary:  $y = 0.150 + 0.640 x$
- W23 yellowish green boundary:  $y = 0.440$
- W34 yellow boundary:  $x = 0.500$
- W45 reddish purple boundary:  $y = 0.382$
- W56 purple boundary:  $y = 0.050 + 0.750 x$
- W61 blue boundary:  $x = 0.310$

with intersection points:

	x	y
W <sub>1</sub> :	0.310	0.348

W <sub>2</sub> :	0.453	0.440
W <sub>3</sub> :	0.500	0.440
W <sub>4</sub> :	0.500	0.382
W <sub>5</sub> :	0.443	0.382
W <sub>6</sub> :	0.310	0.283

3-1.2.8.2 "Selective-yellow" means the chromaticity coordinates (x,y) of the light emitted that lie inside the chromaticity areas defined by the boundaries:

SY12 green boundary:  $y = 1.290x - 0.100$

SY23 the spectral locus

SY34 red boundary:  $y = 0.138 + 0.580x$

SY45 yellowish white boundary:  $y = 0.440$

SY51 white boundary:  $y = 0.940 - x$

with intersection points:

	x	y
SY <sub>1</sub> :	0.454	0.486
SY <sub>2</sub> :	0.480	0.519
SY <sub>3</sub> :	0.545	0.454
SY <sub>4</sub> :	0.521	0.440
SY <sub>5</sub> :	0.500	0.440

3-1.2.8.3 "Amber" means the chromaticity coordinates (x,y) of the light emitted that lie inside the chromaticity areas defined by the boundaries:

A12 green boundary:  $y = x - 0.120$

A23 the spectral locus

A34 red boundary:  $y = 0.390$

A41 white boundary:  $y = 0.790 - 0.670x$

with intersection points:

	x	y
A <sub>1</sub> :	0.545	0.425
A <sub>2</sub> :	0.557	0.442
A <sub>3</sub> :	0.609	0.390
A <sub>4</sub> :	0.597	0.390

3-1.2.8.4 "Red" means the chromaticity coordinates (x,y) of the light emitted that lie inside the chromaticity areas defined by the boundaries. The official directions are written in Chinese, this English edition is for your reference only.

boundaries:

R12 yellow boundary:  $y = 0.335$

R23 the spectral locus

R34 the purple line (its linear extension across the purple range of colours between the red and the blue extremities of the spectral locus).

R41 purple boundary:  $y = 0.980 - x$

with intersection points:

	x	y
R <sub>1</sub> :	0.645	0.335
R <sub>2</sub> :	0.665	0.335
R <sub>3</sub> :	0.735	0.265
R <sub>4</sub> :	0.721	0.259

3-1.3 The principles for regarding applicable variants and scope of the installation of lighting and light-signaling devices are as below :

3-1.3.1 The same vehicle category symbol.

3-1.3.2 The same variant of vehicle body.

3-1.3.3 The same axle set variant.

3-1.3.4 The same brand and vehicle type.

3-1.3.5 The chassis vehicle have had same axle set variant.

3-1.3.6 The same chassis brand.

3-1.3.7 Chassis manufacturers announced that the same chassis vehicle type.

3-1.3.8 If use chassis vehicle instead of completed vehicle for entire or partial testing, which shall according to suitable variants and range of principle are as below :

3-1.3.8.1 The chassis vehicle have had same axle set variant.

3-1.3.8.2 The same brand.

3-1.3.8.3 Chassis manufacturers announced that the same chassis vehicle type.

3-1.4 In the case of motor vehicles and trailers

3-1.4.1 Main-beam headlamp: Prohibited on trailers.

3-1.4.1.1 The main-beam headlamp shall conform to requirements concerning "Headlamps", "Gas-discharge Headlamps" or "Adaptive front lighting system (AFS)" regulated in VSTD.

3-1.4.1.2 Number: Two or four installed symmetrically on vehicle's both sides. Where a vehicle is fitted with four concealable headlamps the installation of two additional headlamps shall only be authorized for the purpose of light-signalling, consisting of intermittent illumination, at short intervals in daylight.

3-1.4.1.3 The colour of the light emitted by the lamps: white and for both the two side lamps it shall be identical.

3-1.4.1.4 In length: at the front of the vehicle and fitted in such a way that the light emitted does not cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

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- 3-1.4.1.5 Geometric visibility: The visibility of the illuminating surface, including its visibility in areas which do not appear to be illuminated in the direction of observation considered, must be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5 degrees with the axis of reference of the headlamp.
- 3-1.4.1.6 Orientation: Towards the front. Not more than one main-beam headlamp on each side of the vehicle may swivel to produce bend lighting.
- 3-1.4.1.7 Electrical connections: The main-beam headlamps may be switched on either simultaneously or in pairs. For changing over from the dipped to the main beam at least one pair of main-beam headlamps shall be switched on. For changing over from the main-beam to the dipped-beam all main-beam headlamps shall be switched off simultaneously. The dipped-beams may remain switched on at the same time as the main beams.
- 3-1.4.1.8 Tell-tale: Circuit-closed tell-tale mandatory.
- 3-1.4.1.9 Other requirements: The aggregate maximum intensity of the lighting units that can be energized simultaneously to provide the main-beam lighting or its modes, if any, shall not exceed 225,000 cd.
- 3-1.4.2 Dipped-beam headlamp: Prohibited on trailers.
  - 3-1.4.2.1 Number: Two. And the dipped-beam headlamp shall conform to requirements concerning "Headlamps", "Gas-discharge Headlamps" or "Adaptive front lighting system (AFS)" regulated in VSTD.
  - 3-1.4.2.2 The colour of the light emitted by the lamps: white and for both the two side lamps it shall be identical.
  - 3-1.4.2.3 Position:
    - 3-1.4.2.3.1 In width: that edge of the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle. The inner edges of the apparent surfaces in the direction of the reference axes shall be not less than 600 mm apart. This does not apply, however, for M1 and N1 category vehicles; for all other categories of motor vehicles this distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.
    - 3-1.4.2.3.2 In height: not less than 500 mm and not more than 1,200 mm above the ground. For category N3G (off-road) vehicles, the maximum height may be increased to 1,500 mm.
    - 3-1.4.2.3.3 In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.
  - 3-1.4.2.4 Geometric visibility: 15 degrees upwards and 10 degrees downwards, 45 degrees outwards and 10 degrees inwards.
  - 3-1.4.2.5 Orientation: Towards the front.
    - 3-1.4.2.5.1 Vertical orientation:
      - 3-1.4.2.5.1.1 The initial downward inclination of the cut-off of the dipped-beam to be set in the unladen vehicle state with one person in the driver's seat shall be specified within an accuracy of 0.1%.
      - 3-1.4.2.5.1.2 Depending on the mounting height in metres (h) of the lower edge of the apparent surface in the direction of the reference axis of the dipped-beam headlamp, measured on the unladen vehicles, the vertical inclination of the cut-off of the dipped-beam shall, under all the static conditions, remain between the following limits and the initial aiming shall have the following values:

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3-1.4.2.5.1.2.1  $h < 0.8$ :

limits : between -0.5 % and -2.5 %

initial aiming: between -1.0 % and -1.5 %

3-1.4.2.5.1.2.2  $0.8 \leq h \leq 1.0$ :

limits : between -0.5 % and -2.5 %

initial aiming: between -1.0 % and -1.5 %

or, at the discretion of the manufacturer,

limits : between -1.0 % and -3.0 %

initial aiming: between -1.5 % and -2.0 %

3-1.4.2.5.1.2.3  $h > 1.0$ :

limits : between -1.0 % and -3.0 %

initial aiming: between -1.5 % and -2.0 %

3-1.4.2.5.1.2.4 The above limits and the initial aiming values are summarized in the diagram Fig 2 below:

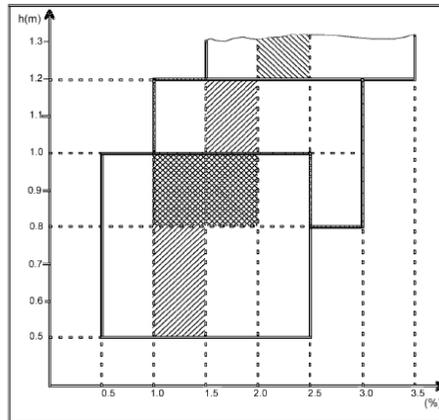


Fig 2

3-1.4.2.5.1.2.5 For category N3G (off-road) vehicles where the headlamps exceed a height of 1,200 mm, the limits for the vertical inclination of the cut-off shall be between: -1.5 % and -3.5 %. The initial aim shall be set between: -2 % and -2.5 %.

3-1.4.2.5.2 Horizontal orientation: The horizontal orientation of one or both dipped-beam headlamps may be varied to produce bend lighting, provided that if the whole beam or the kink of the elbow of the cut-off is moved, the kink of the elbow of the cut-off shall not intersect the line of the trajectory of the centre of gravity of the vehicle at distances from the front of the vehicle which are larger than 100 times the mounting height of the respective dipped-beam headlamps.

3-1.4.2.6 Electrical connections:

3-1.4.2.6.1 The control for changing over to the dipped-beam must switch off all main-beam headlamps simultaneously.

3-1.4.2.6.2 The dipped beam may remain switched on at the same time as the main beams. In the case of dipped-beam

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- headlamps of the gas discharge light sources, it shall remain switched on during the main beam operation.
- 3-1.4.2.6.3 One additional light source, located inside the dipped-beam headlamps or in a lamp (except the main-beam headlamp) grouped or reciprocally incorporated with the respective dipped-beam headlamps, may be activated to produce bend lighting, provided that the horizontal radius of curvature of the trajectory of the centre of gravity of the vehicle is 500 m or less.
- 3-1.4.2.6.4 Dipped-beam headlamps may be switched ON or OFF automatically. However, it shall be always possible to switch these dipped-beam headlamps ON and OFF manually.
- 3-1.4.2.7 Other requirements:
- 3-1.4.2.7.1 In the case where a headlamp levelling device is necessary to satisfy the requirements of paragraphs 3-1.4.2.5.1, the device shall be automatic or have a devices which are adjusted manually, either continuously or noncontinuously, shall be permitted, provided they have a stop position at which the lamps can be returned to the initial inclination defined in paragraph 3-1.4.2.5.1.1 by means of the usual adjusting screws or similar means. These manually adjustable devices must be operable from the driver's seat. Continually adjustable devices must have reference marks indicating the loading conditions that require adjustment of the dipped-beam. Dipped-beam headlamps with gas-discharge light sources, with respect to vertical inclination, shall be fitted with the automatic headlamp levelling device. In the event of a failure of devices, the dipped-beam shall not assume a position in which the dip is less than it was at the time when the failure of the device occurred.
- 3-1.4.2.7.2 Only the dipped-beam headlamp that conforms to the gas-discharging type headlamp or asymmetric headlamp may be used to produce bend lighting. And it should have the function to adjust to the normal using position for fail-safe.
- 3-1.4.2.7.3 If bend lighting is produced by a horizontal movement of the whole beam or the kink of the elbow of the cut-off, it shall be activated only if the vehicle is in forward motion; this shall not apply if bend lighting is produced for a right turn.
- 3-1.4.2.8 Tell-tale: optional. However, in the case where the whole beam or the kink of the elbow of the cut-off is moved to produce bend lighting, an operational tell-tale is mandatory; it shall be a flashing warning light which comes on in the event of a malfunction of the displacement of the kink of the elbow of the cut-off.
- 3-1.4.3 Front position lamp: Optional on trailers which are not more than 1,600 mm wide.
- 3-1.4.3.1 Number: Two. And the front position lamp shall conform to requirements concerning "Front position lamps" regulated in VSTD.
- 3-1.4.3.2 The colour of the light emitted by the lamps: white.
- 3-1.4.3.3 Position:
- 3-1.4.3.3.1 In width: that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. In the case of a trailer, that point on the apparent surface in the direction of the reference axis which is farthest from the median longitudinal plane shall not be more than 150 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall: For M1 and N1 category vehicles: have no special requirement; For all other categories of vehicles: be not less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.
- 3-1.4.3.3.2 In height: above the ground, not less than 350 mm nor more than 1,500 mm (2,100 mm for O1 and O2 categories of

- vehicles, or if for any other categories of vehicles the shape of the bodywork makes it impossible to keep within 1,500 mm).
- 3-1.4.3.4 Geometric visibility:
    - 3-1.4.3.4.1 Horizontal angle for the two position lamps: 45 degrees inwards and 80 degrees outwards. In the case of trailers, the angle inwards may be reduced to 5 degrees.
    - 3-1.4.3.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees in the case of lamps less than 750 mm above the ground.
    - 3-1.4.3.4.3 For M1 and N1 category vehicles, as an alternative to paragraph 3-1.4.3.4.1 and 3-1.4.3.4.2, at the discretion of the manufacturer or his duly accredited representative, and only if a front side-marker lamp is installed on the vehicle. Horizontal angle: 45 degrees outwards to 45 degrees inwards. Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees if the lamps are less than 750 mm above the ground. To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 cm<sup>2</sup>. The illuminating surface area of any retro reflector that does not transmit light shall be excluded.
  - 3-1.4.3.5 Orientation: Forwards.
  - 3-1.4.3.6 Electrical connections: The electrical connections must be such that the front and rear position lamps, the end outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps and when side-marker lamps are permitted to flash.
  - 3-1.4.3.7 Tell-tale: Circuit-closed tell-tale mandatory. This tell-tale shall be non-flashing and shall not be required if the instrument panel lighting can only be turned on simultaneously with the front position lamps.
- 3-1.4.4 Rear position lamp
- 3-1.4.4.1 Number: Two. And the rear position lamp shall conform to requirements concerning "Tail lamps (rear position (side) lamps)" regulated in VSTD.
  - 3-1.4.4.2 The colour of the light emitted by the lamps: red.
  - 3-1.4.4.3 Position: Except the case where end-outline marker lamps are installed, two optional position lamps may be installed on all vehicles in categories M2, M3, N2, N3, O2, O3, and O4.
    - 3-1.4.4.3.1 In width: that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle; this condition shall not apply to the optional rear lamps. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall: For M1 and N1 category vehicles: have no special requirement; For all other categories of vehicles: be not less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.
    - 3-1.4.4.3.2 In height: above the ground, not less than 350 mm nor more than 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm and if the optional lamps are not installed. If the optional lamps are installed, they shall be placed at a height compatible with the applicable requirements of the symmetry of the lamps, and at a vertical distance as large as the shape of the bodywork makes it possible, but not less than 600 mm above

the mandatory.

- 3-1.4.4.4 Geometric visibility:
  - 3-1.4.4.4.1 Horizontal angle: 45 degrees inwards and 80 degrees outwards.
  - 3-1.4.4.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees in the case of lamps less than 750 mm above the ground. The vertical angle above the horizontal may be reduced to 5 degrees in the case of optional lamps not less than 2,100 mm above the ground.
  - 3-1.4.4.4.3 For M1 and N1 category vehicles, as an alternative to paragraph 3-1.4.4.4.1 and 3-1.4.4.4.2, at the discretion of the manufacturer or his duly accredited representative, and only if a rear side-marker lamp is installed on the vehicle, Horizontal angle: 45 degrees outwards to 45 degrees inwards. Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees if the lamps are less than 750 mm above the ground. To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 cm<sup>2</sup>. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.
- 3-1.4.4.5 Orientation: Rearwards.
- 3-1.4.4.6 Electrical connections: The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps and when side-marker lamps are permitted to flash.
- 3-1.4.4.7 Tell-tale: Circuit-closed tell-tale mandatory. It must be combined with that of the front position lamps.
- 3-1.4.5 Rear fog lamp:
  - 3-1.4.5.1 The rear fog lamps device of stipulation one :
    - 3-1.4.5.1.1 Number: One or two shall conform to requirements concerning “rear fog lamp” regulated in VSTD.
    - 3-1.4.5.1.2 The colour of the light emitted by the lamps: red.
    - 3-1.4.5.1.3 Position: In length: at the rear of the vehicle.
      - 3-1.4.5.1.3.1 In width: if there is only one rear fog-lamp, it must be on the opposite side of the median longitudinal plane of the vehicle to the direction of traffic, which is driver’s side, the centre of reference may also be situated on the median longitudinal plane of the vehicle.
      - 3-1.4.5.1.3.2 In height: not less than 250 mm nor more than 1,000 mm above the ground. For category N3G (off-road) vehicles, the maximum height may be increased to 1,200 m
      - 3-1.4.5.1.3.3 In all cases, the distance between the rear fog-lamp and each stop-lamp must be greater than 100 mm.
    - 3-1.4.5.1.4 Geometric visibility:
      - 3-1.4.5.1.4.1 The horizontal angle: 25 degrees to right and to left.
      - 3-1.4.5.1.4.2 The vertical angle: 5 degrees upwards and 5 degrees downwards;
    - 3-1.4.5.1.5 Orientation: Rearwards.
    - 3-1.4.5.1.6 Electrical connections: These must be such that: The rear fog-lamp(s) cannot be switched on unless the main beams, dipped beams or front fog-lamps are lit; The rear fog-lamp(s) can be switched off independently of any other lamp; Either of the following applies:

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- 3-1.4.5.1.6.1 the rear fog lamp(s) may continue to operate until the position lamps are switched off, and the rear fog lamp(s) shall then remain off until deliberately switched on again; or
- 3-1.4.5.1.6.2 a warning, at least audible, additional to the mandatory tell-tale shall be given if the ignition is switched off or the ignition key is withdrawn and the driver's door is opened, whilst the rear fog lamp switch is in the 'on' position.
- 3-1.4.5.1.7 Tell-tale: Circuit-closed tell-tale mandatory. An independent non-flashing warning light.
- 3-1.4.5.2 The rear fog lamps device of stipulation one:
  - 3-1.4.5.2.1 The rear fog lamp can be one or two in quantity, positioned symmetrically on both sides of vehicle.
  - 3-1.4.5.2.2 The rear fog lamp is restricted by red.
  - 3-1.4.5.2.3 Unless the headlamp, front fog lamp, clearance/ front position lamp or trail/ rear position lamp is on, the rear fog lamp shall not be turned on alone. When the front fog lamp is equipped, the rear fog lamp shall be arranged that it could be turned off alone.
  - 3-1.4.5.2.4 The distance between the rear fog lamp center and stop lamp center shall be over 0.1 m.
- 3-1.4.6 Stop lamp:
  - 3-1.4.6.1 The stop lamp shall conform to requirements concerning "Stop-lamp" regulated in VSTD.
  - 3-1.4.6.2 Number: Two S1 or S2 category devices. Except the case where category S3 device is installed, two optional category S1 or S2 devices may be installed on vehicles in categories M2, M3, N2, N3, O2, O3, and O4.
  - 3-1.4.6.3 The colour of the light emitted by the lamps: red.
  - 3-1.4.6.4 Position:
    - 3-1.4.6.4.1 In width:
      - 3-1.4.6.4.1.1 For M1 and N1 category vehicles: For S1 or S2 categories devices that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle;
      - 3-1.4.6.4.1.2 For all other categories of vehicles: For S1 or S2 categories devices the distance in between the inner edges of the apparent surfaces in the direction of the reference axes shall be not less than 600 mm. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1,300 mm.
    - 3-1.4.6.4.2 In height: For S1 or S2 categories devices: above the ground, not less than 350 mm nor more than 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm and if the optional lamps are not installed. If the optional lamps are installed, they shall be positioned at a height compatible with the requirements of the width and the symmetry of the lamps, and at a vertical distance as large as the shape of the bodywork makes it possible, but not less than 600 mm above the mandatory lamps.)
  - 3-1.4.6.5 Geometric visibility:
    - 3-1.4.6.5.1 Horizontal angle: For S1 or S2 categories devices: 45 degrees to the left and to the right of the longitudinal axis of the vehicle;
    - 3-1.4.6.5.2 Vertical angle: For S1 or S2 categories devices: 15 degrees above and below the horizontal. However, the vertical angle below the horizontal may be reduced to 5 degrees, if the height of the lamp is less than 750 mm. The vertical angle above the horizontal may be reduced to 5 degrees in the case of optional lamps not less than 2,100 mm above the ground;

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- 3-1.4.6.6 Orientation: Towards the rear of the vehicle.
- 3-1.4.6.7 Electrical connections: Must light up when the service brake is applied. The stop lamps need not function if the device which starts and/or stops the engine is in a position which makes it impossible for the engine to operate.
- 3-1.4.6.8 Tell-tale: Tell-tale optional; where fitted, this tell-tale must be an operating tell-tale consisting of a non-flashing warning light which comes on in the event of the malfunctioning of the stop lamps.
- 3-1.4.7 High mounted /S3 lamp:
  - 3-1.4.7.1 Devices of S3 category: one mandatory on M1 category of vehicles and the high mounted /S3 lamp shall conform to requirements concerning "High mounted /S3 lamp" regulated in VSTD, optional on other categories of vehicles.
  - 3-1.4.7.2 The colour of the light emitted by the lamps: red.
  - 3-1.4.7.3 Position: high mounted /S3 lamp can be installed in externally or internally of the motor vehicle.
    - 3-1.4.7.3.1 In width: For S3 category devices: the centre of reference shall be situated on the median longitudinal plane of the vehicle. However, in the case where the two devices of the S3 category are installed, they shall be positioned as close as possible to the median longitudinal plane, one on each side of this plane. In the case where one S3 category lamp offset from the median longitudinal plane is permitted, this offset shall not exceed 150 mm from the median longitudinal plane to the centre of reference of the lamp.
    - 3-1.4.7.3.2 In height: For S3 category devices, the horizontal plane tangential to the lower edge of the apparent surface shall: either not be more than 150 mm below the horizontal plane tangential to the lower edge of the exposed surface of the glass or glazing of the rear window, or not be less than 850 mm above the ground.
    - 3-1.4.7.3.3 However, the horizontal plane tangential to the lower edge of the apparent surface of S3 category device shall be above the horizontal plane tangential to the upper edge of the apparent surface of S1 or S2 categories devices specified in paragraph 3-1.4.6.
  - 3-1.4.7.4 Geometric visibility:
    - 3-1.4.7.4.1 Horizontal angle: For S3 category devices: 10 degrees to the left and to the right of the longitudinal axis of the vehicle;
    - 3-1.4.7.4.2 Vertical angle: For S3 category devices: 10 degrees above and 5 degrees below the horizontal.
  - 3-1.4.7.5 Electrical connections: Must light up when the service brake is applied. The stop lamps need not function if the device which starts and/or stops the engine is in a position which makes it impossible for the engine to operate.
  - 3-1.4.7.6 Tell-tale: Tell-tale optional; where fitted, this tell-tale must be an operating tell-tale consisting of a non-flashing warning light which comes on in the event of the malfunctioning of the stop lamps.
- 3-1.4.8 Direction-indicator lamp: Optional on trailers' front direction-indicator lamp.
  - 3-1.4.8.1 The direction-indicator lamp shall conform to requirements concerning "Direction indicator" regulated in VSTD.
  - 3-1.4.8.2 The colour of the light emitted by the lamps: amber.
  - 3-1.4.8.3 Types of direction-indicator lamps fall into categories (1, 1a, 1b, 2a, 2b, 5 and 6) the assembly of which on one vehicle constitutes an arrangement ('A' and 'B') as Fig 3.
    - 3-1.4.8.3.1 Arrangement 'A' shall apply to all motor vehicles: 1, 1a, 1b, 2a, 2b, 5 and 6.
      - 3-1.4.8.3.1.1 Two front direction-indicator lamps of the following categories:
        - 3-1.4.8.3.1.1.1 1 or 1a or 1b, if the distance between the edge of the apparent surface in the direction of the

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- reference axis of this lamp and that of the apparent surface in the direction of the reference axis of the dipped-beam headlamp and/or the front fog lamp, if there is one, is at least 40 mm;
- 3-1.4.8.3.1.1.2 1a or 1b, if the distance between the edge of the apparent surface in the direction of the reference axis of this lamp and that of the apparent surface in the direction of the reference axis of the dipped-beam headlamp and/or the front fog lamp, if there is one, is greater than 20 mm and less than 40 mm;
- 3-1.4.8.3.1.1.3 1b, if the distance between the edge of the apparent surface in the direction of the reference axis of this lamp and that of the apparent surface in the direction of the reference axis of the dipped-beam headlamp and/or the front fog lamp, if there is one, is less than or equal to 20 mm;
- 3-1.4.8.3.1.2 Two rear direction-indicator lamps (category 2a or 2b); two optional lamps (category 2a or 2b) on all vehicles in categories M2, M3, N2, N3;
- 3-1.4.8.3.1.3 Two side direction-indicator lamps of the categories:
- 3-1.4.8.3.1.3.1 5, for all M1 vehicles; for N1, M2 and M3 vehicles not exceeding 6 m in length. It is permitted to replace category 5 side direction-indicator lamps by category 6 side direction-indicator lamps in all instances.
- 3-1.4.8.3.1.3.2 6, for all N2 and N3 vehicles; for N1, M2 and M3 vehicles exceeding 6 m in length.
- 3-1.4.8.3.1.3.3 For concerns of safety or specific operation, two or four optional side direction-indicator lamps (category 5 or 6) may be fitted symmetrically.
- 3-1.4.8.3.1.4 Where lamps combining the functions of front direction-indicator lamps (categories 1, 1a, 1b) and side direction-indicator lamps (categories 5 or 6) are fitted, two additional side direction-indicator lamps (categories 5 or 6) may be fitted to meet the visibility requirements.
- 3-1.4.8.3.2 Arrangement 'B' shall apply to trailers only. Two rear direction-indicator lamps (categories 2a or 2b). Two or four optional lamps (category 2a or 2b) on all vehicles in categories O2, O3 and O4.
- 3-1.4.8.4 Position:
- 3-1.4.8.4.1 In width: the edge of the apparent surface in the direction of the reference axis farthest from the median longitudinal plane of the vehicle must not be more than 400 mm from the extreme outer edge of the vehicle. This condition shall not apply to the optional rear lamps. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall not be less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.
- 3-1.4.8.4.2 In height:
- 3-1.4.8.4.2.1 The height of the light-emitting surface of the side direction-indicator lamps of categories 5 or 6 must not be: less than: 350 mm for M1 and N1 category of vehicles, and 500 mm for all other categories of vehicles, both measured from the lowest point; and more than: 1,500 mm, measured from the highest point.
- 3-1.4.8.4.2.2 The height of the direction-indicator lamps of categories 1, 1a, 1b, 2a and 2b, shall not be less than 350 mm or more than 1,500 mm.
- 3-1.4.8.4.2.3 If the structure of the vehicle does not permit these upper limits, measured as specified above, to be

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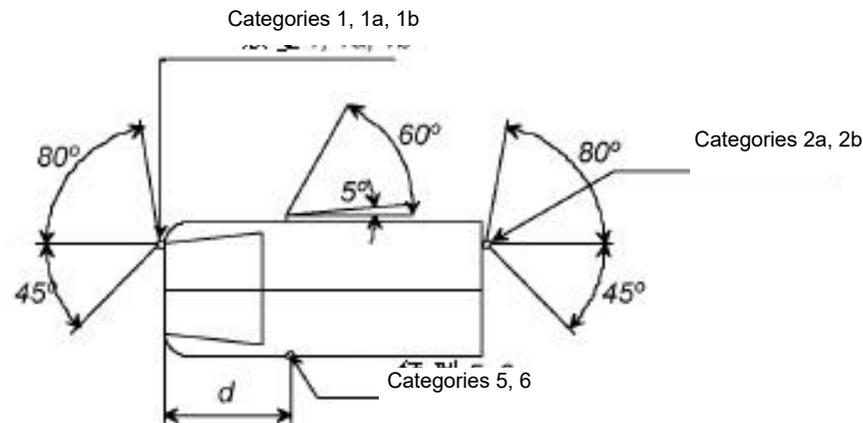
respected, and if the optional lamps are not installed, they may be increased to 2,300 mm for side direction-indicator lamps of categories 5 and 6, and to 2,100 mm for the direction-indicator lamps of categories 1, 1a, 1b, 2a and 2b.

3-1.4.8.4.2.4 If optional rear lamps are installed, they shall be placed at a height compatible with the applicable requirements of the symmetry of the lamps, and at a vertical distance as large as the shape of the bodywork makes it possible, but not less than 600 mm above the mandatory lamps.

3-1.4.8.4.3 In length: The distance between the light-emitting surface of the side direction-indicator lamp (categories 5 and 6) and the transverse plane which marks the forward boundary of the vehicle's overall length, shall not exceed 1,800 mm. However, for M1 and N1 category vehicles, and for all other categories of vehicles if the structure of the vehicle makes it impossible to comply with the minimum angles of visibility, this distance may be increased to 2,500 mm.

3-1.4.8.5 Geometric visibility:

3-1.4.8.5.1 Horizontal angle: as shown in Fig 3 or, at the discretion of the manufacturer, for M1 and N1 category vehicles: Front and rear direction-indicator lamps, as well as side-marker lamps as shown in Fig 4. To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 cm<sup>2</sup>, except for side direction-indicators of categories 5 and 6. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded. The value of 5 degrees given for dead angle of visibility to the rear of the side direction-indicator is an upper limit.  $d < 1.80$  m (for M1 and N1 category vehicles  $d < 2.50$  m).



Arrangement A

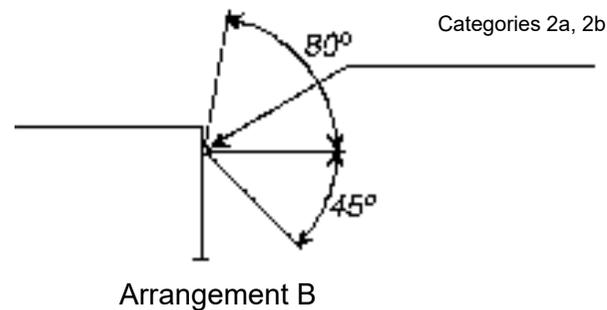


Fig 3. The visibility of direction-indicator lamp -- Horizontal angle

3-1.4.8.5.2 Vertical angles: 15 degrees above and below the horizontal for direction-indicator lamps of categories 1, 1a, 1b, 2a, 2b and 5. The vertical angle below the horizontal may be reduced to 5 degrees if the lamps are less than 750 mm above the ground; 30 degrees above and 5 degrees below the horizontal for direction-indicator lamps of category 6. The vertical angle above the horizontal may be reduced to 5 degrees if the optional lamps are not less than 2,100 mm above the ground.

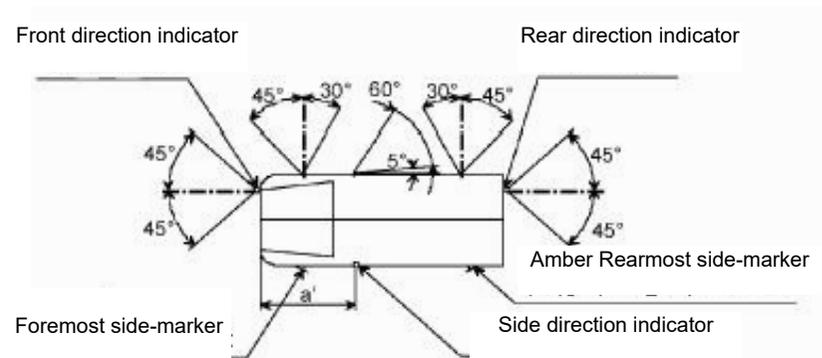


Fig 4. Horizontal angle of front/rear direction-indicator lamp and side-marker lamp

3-1.4.8.6 Electrical connections: Direction-indicator lamps shall switch on independently of the other lamps. All direction-indicator lamps on one side of a vehicle shall be switched on and off by means of one control and shall flash in phase. On M1 and

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- N1 vehicles less than 6 m in length, the amber side-marker lamps, when mounted, shall also flash at the same frequency (in phase) with the direction indicator lamps.
- 3-1.4.8.7 The light shall be a flashing light flashing 90 +/- 30 times per minute. Operation of the light-signal control shall be followed within not more than one second by the emission of light and within not more than one and one-half seconds by its first extinction.
- 3-1.4.8.8 Tell-tale: Operating tell-tale mandatory for front and rear direction-indicator lamps. It may be visual or auditory or both. If it is visual it shall be a flashing light which, at least in the event of the malfunction of any of the front or rear direction-indicator lamps, is either extinguished, or remains alight without flashing, or shows a marked change of frequency. If it is entirely auditory it shall be clearly audible and shall show a marked change of frequency, at least in the event of the malfunction of any of the front or rear direction-indicator lamps.
- 3-1.4.9 Rear registration plate lamp:
- 3-1.4.9.1 The colour of the light emitted by the lamps: white.
- 3-1.4.9.2 The lamp shall be installed at the upper, lower, right or left side of the rear registration plate.
- 3-1.4.9.3 The lamp shall be properly shielded, and its light model, shall not affect the vehicles coming from backside.
- 3-1.4.9.4 Electrical connections: The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps and when side-marker lamps are permitted to flash.
- 3-1.4.10 Reversing lamp: Mandatory on M, N, O2, O3 and O4. Optional on O1.
- 3-1.4.10.1 Number of reversing lamp shall be one or two and all installed reversing lamp have to comply with 「Reversing lamp」.
- 3-1.4.10.2 Optional: additional one or two white fog lamps which conform to requirements concerning “front fog lamp” regulated in VSTD and may be used as reversing lamps on vehicles of categories N2, N3, M2, M3, O2, O3 and O4.
- 3-1.4.10.3 The colour of the light emitted by the lamps: white.
- 3-1.4.10.4 In height: For M1 and N1 category vehicles no special requirement. For all other categories of vehicles not less than 250 mm nor more than 1,200 mm above the ground.
- 3-1.4.10.5 In length: at the back of the vehicle. However, if installed, the two optional devices specified in paragraph 3-1.4.10.2 shall be fitted on the side of the vehicle and comply with the requirements of paragraphs 3-1.4.10.6.
- 3-1.4.10.6 Geometric visibility: 15 degrees upwards and 5 degrees downwards, 45 degrees to right and to left if there is only one light, 45 degrees outwards and 30 degrees inwards. If the geometric visibility of the two optional devices specified in paragraph 3-1.4.10.2 and fitted on the side of the vehicle shall be orientated sideward horizontally with an inclination of 10 degrees +/- 5 degrees in relation to the median longitudinal plane of the vehicle. if there are two. In case of conform to requirements concerning “front fog lamps” regulated in VSTD: 5 degrees upwards and downwards, 45 degrees outwards and inwards if there is only one lamp 45 degrees outwards and 10 degrees inwards if there are two lamps.

3-1.4.10.7

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- 3-1.4.10.8 Orientation: Rearwards.
- 3-1.4.10.9 They shall be such that the lamp can light up only if the reverse gear is engaged and if the device which controls the starting and stopping of the engine is in such a position that operation of the engine is possible. It shall not light up or remain lit if either of the above conditions is not satisfied.
- 3-1.4.11 Hazard warning signal:
  - 3-1.4.11.1 means the simultaneous operation of all of a vehicle's direction-indicator lamps.
  - 3-1.4.11.2 Electrical connections: The signal shall be operated by means of a separate control enabling all the direction indicator lamps to flash in phase. On M1 and N1 vehicles less than 6 m in length, with an arrangement complying with paragraph 3-14.8.5 above, the amber side-marker lamps, when mounted, shall also flash at the same frequency (in phase) with the direction indicator lamps.
  - 3-1.4.11.3 Tell-tale: Circuit-closed tell-tale mandatory. Flashing warning light, which can operate in conjunction with the tell-tale(s).
  - 3-1.4.11.4 If a power-driven vehicle is equipped to draw a trailer the hazard warning signal control shall also be capable of bringing the direction indicator lamps on the trailer into action.
  - 3-1.4.11.5 The hazard warning signal shall be able to function even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.
- 3-1.4.12 Top lamp of commercial passenger vehicle:
  - 3-1.4.12.1 The lamp should be single lamp.
  - 3-1.4.12.2 The colour of the light emitted by the lamps: not be red.
  - 3-1.4.12.3 Using bolt (the drilling type isn't restricted), metal pressing-stripe or roof frame to fix the lamp at the proper location of roof's front half. Magnetic connection is not allowed.
  - 3-1.4.12.4 The lamp's switch should be connected to interact with the charge counter.
- 3-1.4.13 Rear retro-reflector, non-triangular: Mandatory on motor vehicles. Provided that they are grouped together with the other rear light-signalling devices, optional on trailers.
  - 3-1.4.13.1 Number: Two, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in VSTD. If it doesn't influence lights and reflectors' effectiveness that it allow additionally installed retro-reflector and retro-reflective material ◦
  - 3-1.4.13.2 The colour of the light emitted by the lamps: red.
  - 3-1.4.13.3 Position: In length: at the rear of the vehicle.
    - 3-1.4.13.3.1 In width: that point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall: For M1 and N1 category vehicles: have no special requirement; For all other categories of vehicles: be not less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.
    - 3-1.4.13.3.2 In height: above the ground, not less than 250 mm nor more than 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).
  - 3-1.4.13.4 Geometric visibility:
    - 3-1.4.13.4.1 Horizontal angle: 30 degrees inwards and outwards.
    - 3-1.4.13.4.2 Vertical angle: 10 degrees above and below horizontal. The vertical angle below the horizontal may be reduced to 5

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degrees in the case of a retro-reflector less than 750 mm above the ground.

3-1.4.14 Rear retro-reflector, triangular: Mandatory on trailers. Prohibited on motor vehicles.

3-1.4.14.1 Number: Two, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IIIA retro-reflectors regulated in VSTD. If it doesn't influence lights and reflectors' effectiveness that it allow additionally installed retro-reflector and retro-reflective material ◦

3-1.4.14.2 The colour of the light emitted by the lamps: red.

3-1.4.14.3 Position: In length: at the rear of the vehicle. The apex of the triangle shall be directed upwards.

3-1.4.14.3.1 In width: that point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The inner edges of the retro-reflectors shall not be less than 600 mm apart. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1,300 mm.

3-1.4.14.3.2 In height: above the ground, not less than 250 mm nor more than 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

3-1.4.14.4 Geometric visibility:

3-1.4.14.4.1 Horizontal angle: 30 degrees inwards and outwards.

3-1.4.14.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees in the case of a retro-reflector less than 750 mm above the ground.

3-1.4.15 Front retro-reflector, non-triangular: Mandatory on trailers. Mandatory on motor vehicles having all forward facing lamps with reflectors concealable. Optional on other motor vehicles.

3-1.4.15.1 Number: Two, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in VSTD. If it doesn't influence lights and reflectors' effectiveness that it allow additionally installed retro-reflector and retro-reflective material ◦

3-1.4.15.2 Color: identical to incident light (i.e., white or colorless).

3-1.4.15.3 Position: In length: at the front of the vehicle.

3-1.4.15.3.1 In width: that point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. In the case of a trailer, the point of the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be farther than 150 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall: For M1 and N1 category vehicles: have no special requirement; For all other categories of vehicles: be not less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

3-1.4.15.3.2 In height: above the ground, not less than 250 mm nor more than 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

3-1.4.15.3.3 Geometric visibility:

3-1.4.15.3.3.1 Horizontal angle: 30 degrees inwards and outwards. In the case of trailers, the angle inwards may be reduced to 10 degrees. If because of the construction of the trailers this angle cannot be met by the mandatory retro-reflectors, then additional (supplementary) retro-reflectors shall be fitted, without the width

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limitation (paragraph 3-1.4.15.3.1), which shall, in conjunction with the mandatory retro-reflectors, give the necessary visibility angle.

3-1.4.15.3.3.2 Vertical angle: 10 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees in the case of a retro-reflector less than 750 mm above the ground.

3-1.4.16 Side retro-reflector, non-triangular: Mandatory: On all motor vehicles the length of which exceeds 6 m. On all trailers. Optional: On motor vehicles the length of which does not exceed 6 m.

3-1.4.16.1 The performances of these devices shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in VSTD. If it doesn't influence lights and reflectors' effectiveness that it allow additionally installed retro-reflector and retro-reflective material .

3-1.4.16.2 Color: amber; however the rearmost side retro-reflector can be red if it is grouped or has part of the light emitting surface in common with the rear position lamp, the rear end-outline marker lamp, the rear fog lamp, the stop-lamp or the red rearmost side-marker lamp.

3-1.4.16.3 Position: Side of vehicle.

3-1.4.16.3.1 In height: above the ground, not less than 250 mm nor more than 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

3-1.4.16.3.2 In length:

3-1.4.16.3.2.1 At least one side retro-reflector must be fitted to the middle third of the vehicle, the foremost side retro-reflector being not further than 3 m from the front; in the case of trailers, account shall be taken of the length of the drawbar for the measurement of this distance.

3-1.4.16.3.2.2 The distance between two adjacent side retro-reflectors shall not exceed 3 m. This does not, however, apply to M1 and N1 category vehicles. If the structure of the vehicle makes it impossible to comply with such a requirement, this distance may be increased to 4 m. The distance between the rearmost side retro-reflector and the rear of the vehicle shall not exceed 1 m.

3-1.4.16.3.2.3 However, for motor vehicles the length of which does not exceed 6 m, it is sufficient to have one side retro-reflector fitted within the first third and/or one within the last third of the vehicle length.

3-1.4.16.4 Geometric visibility:

3-1.4.16.4.1 Horizontal angle: 45 degrees to the front and to the rear.

3-1.4.16.4.2 Vertical angle: 10 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees in the case of a retro-reflector less than 750 mm above the ground.

3-1.4.17 Side-marker lamp:

3-1.4.17.1 Mandatory: On all vehicles the length of which exceeds 6 m, except for chassis-cabs; the length of trailers shall be calculated including the drawbar. The SM1 type of side-marker lamp shall be used on all categories of vehicles, and the side-marker lamp shall conform to requirements concerning "Side-marker lamp" regulated in VSTD; however the SM2 type of side-marker lamps may be used on the M1 category of vehicles.

3-1.4.17.2 In addition, on M1 and N1 category vehicles less than 6 m in length, side-marker lamps shall be used, if they supplement the reduced geometric visibility requirements of front position lamps conforming to paragraph 3-1.4.3.4.3 and rear position lamps conforming to paragraph 3-1.4.4.3. Optional: On all other vehicles. The SM1 or SM2 types of side-marker lamps

- may be used and shall conform to requirements concerning “Side-marker lamp” regulated in VSTD.
- 3-1.4.17.3 The side-marker lamp fitted to other motor vehicles, shall conform to requirements concerning “Side-marker lamp” regulated in VSTD.
- 3-1.4.17.4 Color: amber; however the rearmost side-marker lamp can be red if it is grouped or combined or reciprocally incorporated with the rear position lamp, the rear end-outline marker lamp, the rear fog lamp, the stop lamp or is grouped or has part of the light emitting surface in common with the rear retro-reflector.
- 3-1.4.17.5 Position:
- 3-1.4.17.5.1 In height: above the ground, not less than 250 mm nor more than 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm).
- 3-1.4.17.5.2 In length:
- 3-1.4.17.5.2.1 At least one side-marker lamp must be fitted to the middle third of the vehicle, the foremost side-marker lamp being not further than 3 m from the front; in the case of trailers account shall be taken of the length of the drawbar for the measurement of this distance.
- 3-1.4.17.5.2.2 The distance between two adjacent side-marker lamps shall not exceed 3 m. If the structure of the vehicle makes it impossible to comply with such a requirement, this distance may be increased to 4 m. The distance between the rearmost side-marker lamp and the rear of the vehicle shall not exceed 1 m.
- 3-1.4.17.5.2.3 However, for vehicles the length of which does not exceed 6 m and for chassis-cabs, it is sufficient to have one side-marker lamp fitted within the first third and/or within the last third of the vehicle length.
- 3-1.4.17.6 Geometric visibility:
- 3-1.4.17.6.1 Horizontal angle: 45 degrees to the front and to the rear; however for vehicles on which the installation of the side-marker lamps is optional this value can be reduced to 30 degrees. If the vehicle is equipped with side-marker lamps used to supplement the reduced geometric visibility of front and rear direction indicator lamps conforming to Fig.4 of paragraph 3-1.4.8.5 and/or position lamps conforming to paragraphs 3-1.4.3.4.3 and 3-1.4.4.4.3, the angles are 45 degrees towards the front and rear ends of the vehicle and 30 degrees towards the centre of the vehicle.
- 3-1.4.17.6.2 Vertical angle: 10 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees in the case of a side-marker lamp less than 750 mm above the ground.
- 3-1.4.17.7 Orientation: Towards the side.
- 3-1.4.17.8 Electrical connections: On M1 and N1 category vehicles less than 6 m in length amber side-marker lamps may be wired to flash, provided that this flashing is in phase and at the same frequency with the direction indicator lamps at the same side of the vehicle.
- 3-1.4.17.9 Tell-tale: optional. If it exists its function shall be carried out by the tell-tale required for the front and rear position lamps.
- 3-1.4.18 End outline marker lamp: Mandatory on vehicle exceeding 2.10 m in width. Optional on vehicles between 1.80 and 2.10 m in width.
- 3-1.4.18.1 Number: Two, and the end outline marker lamp shall conform to requirements concerning “End outline marker lamp” regulated in VSTD, and visible from the front and two visible from the rear.
- 3-1.4.18.2 The colours of the light emitted by the lamps: white in front, red at the rear.
- 3-1.4.18.3 Position:
- 3-1.4.18.3.1 In width: Front and rear: as close as possible to the extreme outer edge of the vehicle. This condition is deemed to

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have been met when the point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane is not more than 400 mm from the extreme outer edge of the vehicle.

3-1.4.18.3.2 In height:

3-1.4.18.3.2.1 Front: Motor vehicles - the horizontal plane tangential to the upper edge of the apparent surface in the direction of the reference axis of the device must not be lower than the horizontal plane tangential to the upper edge of the transparent zone of the wind-screen. Trailers and semi-trailers - at the maximum height compatible with the requirements relating to the width, design and operational requirements of the vehicle and to the symmetry of the lamps.

3-1.4.18.3.2.2 Rear: At the maximum height compatible with the requirements relating to the width, design and operational requirements of the vehicle and to the symmetry of the lamps.

3-1.4.18.4 Geometric visibility:

3-1.4.18.4.1 Horizontal angle: 80 degrees outwards. Before 2009/12/31, the vehicle of framed truck with hoist, truck with combination equipment for tow and dumping framed truck, if the equipment in the rear of vehicle interferes with horizontal angle and can't reach 80 degrees outwards, then the horizontal angle shall be at least 45 degrees.

3-1.4.18.4.2 Vertical angle: 5 degrees above and 20 degrees below the horizontal.

3-1.4.18.5 Electrical connections: The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps and when side-marker lamps are permitted to flash.

3-1.4.18.6 Tell-tale: Tell-tale optional. If it exists, its function shall be carried out by the tell-tale required for the front and rear position lamps.

3-1.4.18.7 Other requirements :

3-1.4.18.7.1 For the vehicles with front mirror's, the end outline marker lamp that stand on the same side of the front mirror may be exempted with the requirements of paragraph 3-1.4.1.8.4, but the others end outline marker lamp shall comply with the requirements of paragraph 3-1.4.1.8.4. If it have to comply with "Installation requirements of Devices for indirect vision", this requirements does not apply.

3-1.5 In the case of motorcycles

3-1.5.1 Driving beam headlamp: Mandatory on L3. Optional on L1.

3-1.5.1.1 Number: One or two symmetrically, and the driving beam headlamp shall conform to requirements concerning "Headlamps" or "Gas-discharge Headlamps" regulated in VSTD.

3-1.5.1.2 The colours of the lights: shall be white. The two lamps installed therein shall have the identical color.

3-1.5.1.3 Position:

3-1.5.1.3.1 Width:

3-1.5.1.3.1.1 an independent driving lamp may be fitted above or below or to one side of another front lamp: if these lamps are on top of the other the reference centre of the driving lamp must be located within the median longitudinal plane of the vehicle; if these lamps are side by side their reference centre must be symmetrical



- reciprocally incorporated with a front position lamp alongside the passing beam headlamp, their reference centers must be symmetrical in relation to the median longitudinal plane of the vehicle.
- 3-1.5.2.3.1.3 two passing lamps, of which either one or both are reciprocally incorporated with another front lamp must be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.
  - 3-1.5.2.3.2 Height: a minimum of 500 mm and a maximum of 1,200 mm above the ground.
  - 3-1.5.2.3.3 Length: at the front of the vehicle. This requirement is regarded as satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly by means of the rear-view mirrors and/or reflective surfaces of the vehicle.
  - 3-1.5.2.3.4 In the case of two passing lamps the distance separating the illuminating surfaces must not exceed 200 mm.
  - 3-1.5.2.4 Geometric visibility:
    - 3-1.5.2.4.1 Horizontal angle: 45 degrees to the left and to the right for a single lamp; 45 degrees outwards and 10 degrees inwards for each pair of lamps.
    - 3-1.5.2.4.2 Vertical angle: 15 degrees upwards and 10 degrees downwards;
  - 3-1.5.2.5 Orientation: Forwards. The lamp(s) may move in line with the steering angle. The vertical inclination of the passing beam headlamp must remain between -0.5 and -2.5 percent, except in the case where an external adjusting device is present.
  - 3-1.5.2.6 Electrical connections: The control for changing over to the passing beam(s) shall switch off the driving beam(s) simultaneously.
  - 3-1.5.2.7 Tell-tale: Optional; non-flashing green signal lamp.
  - 3-1.5.3 Rear position lamp:
    - 3-1.5.3.1 Number: One or two, and the rear position lamp shall conform to requirements concerning "Tail lamps (rear position (side) lamps)" regulated in VSTD.
    - 3-1.5.3.2 (The colours of the lights: red.
    - 3-1.5.3.3 Position: in height: not less than 250 mm nor more than 1,500 mm above the ground;
    - 3-1.5.3.4 Geometric visibility:
      - 3-1.5.3.4.1 Horizontal angle: 80 degrees to left and to right for a single lamp: the horizontal angle may be 80 degrees outwards and 45 degrees inwards for each pair of lamps.
      - 3-1.5.3.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees , however, if the height of the lamp is less than 750 mm.
    - 3-1.5.3.5 Orientation: Rearwards.
    - 3-1.5.3.6 "Circuit-closed" tell-tale: Optional: Its function shall be performed by the device prescribed for the front position lamp.
  - 3-1.5.4 Stop lamp:
    - 3-1.5.4.1 Number: One or two, and the stop lamp shall conform to requirements concerning "Stop lamp" regulated in VSTD.
    - 3-1.5.4.2 The colours of the lights: red.
    - 3-1.5.4.3 Position: in height: not less than 250 mm nor more than 1,500 mm above the ground;
    - 3-1.5.4.4 Geometric visibility:
      - 3-1.5.4.4.1 Horizontal angle: 45 degrees to left and to right for a single lamp; 45 degrees outwards and 10 degrees inwards for

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each pair of lamps;

3-1.5.4.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.

3-1.5.4.5 Orientation: Towards the rear of the vehicle.

3-1.5.4.6 Electrical connections: Shall light up at any service brake application.

3-1.5.5 Direction-indicator lamp: Mandatory on L3, optional on L1.

3-1.5.5.1 Number and arrangement: Two front indicators (category 1 or category 11 shall conform to requirements concerning "Direction-indicator lamp" regulated in "Standards"); Two rear indicators (category 2 or category 12 conform to requirements concerning "Direction-indicator lamp" regulated in VSTD).

3-1.5.5.2 The colours of the lights: orange (amber).

3-1.5.5.3 Position:

3-1.5.5.3.1 In width:

3-1.5.5.3.1.1 For front indicators, there shall be a minimum distance of 240 mm between illuminating surfaces,

3-1.5.5.3.1.2 For front indicators, the indicators shall be situated outside the longitudinal vertical plane tangential to the outer edges of the illuminating surface of the headlamp(s),

3-1.5.5.3.1.3 For front indicators, there shall be a minimum distance between the illuminating surface of the indicators and passing beam headlamp closest to one another as follows:

Minimum Indicator intensity (cd)	Minimum Separation (mm)
90	75
175	40
250	20
400	□ 20

3-1.5.5.3.1.4 For rear indicators, the clearance between the inner edges of the two illuminating surfaces shall be at least 180 mm; in case of vehicles of L1 category symbol, the clearance between the inner edges of the two apparent surfaces shall be at least 160mm.

3-1.5.5.3.2 In height: not less than 350 mm nor more than 1,200 mm above the ground;

3-1.5.5.3.3 In length: the forward distance between the centre reference of the rear indicators and the transverse plane which constitutes the rearmost limit of the vehicle's over-all length shall not exceed 300 mm.

3-1.5.5.4 Geometric visibility:

3-1.5.5.4.1 Horizontal angle: 20 degrees inwards and 80 degrees outwards.

3-1.5.5.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750mm.

3-1.5.5.5 Orientation: The front direction-indicators may move in line with the steering angle. May not be "combined" with any other lamp. May not be "reciprocally incorporated" with any other lamp.

3-1.5.5.6 Electrical connections: Direction-indicator lamps shall switch on independently of the other lamps. All direction-indicator

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- lamps on one side of a vehicle shall be switched on and off by means of one control.
- 3-1.5.5.7 The light flashing frequency shall be 90 +/- 30 times per minute; operation of the light-signal control shall be followed within not more than one second by the appearance of the light and within not more than one-and-one half seconds by the first extinction of the light.
  - 3-1.5.5.8 Tell-Tale: Mandatory. This may be optical or auditory or both. If it is optical it shall be (a) flashing green lamp(s), which, in the event of defective operation of any of the direction indicators, is extinguished, remains alight without flashing, or shows a marked change of frequency.
- 3-1.5.6 Rear-Registration-Plate illuminating device:
- 3-1.5.6.1 The colours of the lights: white.
  - 3-1.5.6.2 Number: One. The device may consist of several optical components designed to illuminate the space reserved for the registration plate.
  - 3-1.5.6.3 Position: Such that the device illuminates the space reserved for the registration plate.
- 3-1.5.7 Front position lamp: Mandatory on L3. Optional on L1.
- 3-1.5.7.1 Number: One or two, and the front position lamp shall conform to requirements concerning "Front position lamp" regulated in VSTD.
  - 3-1.5.7.2 The colours of the lights: white.
  - 3-1.5.7.3 Position: in length: at the front of the vehicle.
    - 3-1.5.7.3.1 In width:
      - 3-1.5.7.3.1.1 an independent front position lamp may be fitted above or below, or to one side of another front lamp: if these lamps are one above the other, the reference centre of the front position lamp must be located within the median longitudinal plane of the vehicle; if these lamps are side by side, their reference centres must be symmetrical in relation to the median longitudinal plane of the vehicle;
      - 3-1.5.7.3.1.2 a front position lamp, that is reciprocally incorporated with another front lamp, must be installed in such a way that its reference centre is situated in the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with another front lamp alongside the front position lamp, their reference centres must be symmetrical in relation to the median longitudinal plane of the vehicle.
      - 3-1.5.7.3.1.3 Two front position lamps, one or both of them reciprocally incorporated with another front lamp, must be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.
    - 3-1.5.7.3.2 In height: in height: not less than 350 mm nor more than 1,200 mm above the ground.
  - 3-1.5.7.4 Geometric visibility:
    - 3-1.5.7.4.1 Horizontal angle: 80 degrees to left and to right for a single lamp: the horizontal angle may be 80 degrees outwards and 45 degrees inwards for each pair of lamps.
    - 3-1.5.7.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.
  - 3-1.5.7.5 Orientation: Forwards. The lamp(s) may move in line with the steering angle.
  - 3-1.5.7.6 "Circuit-closed" tell-tale: Mandatory. Non-flashing green signal lamp. This tell-tale shall not be required if the instrument

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illumination lighting can be switched on or off only simultaneously with the position lamp(s).

- 3-1.5.8 Rear retro-reflector, non-triangular:
  - 3-1.5.8.1 Number: One or two, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in VSTD.
  - 3-1.5.8.2 The colours of the lights: red.
  - 3-1.5.8.3 Position: in height: not less than 250 mm nor more than 900 mm above the ground;
  - 3-1.5.8.4 Geometric visibility:
    - 3-1.5.8.4.1 Horizontal angle: 30 degrees to left and to right for a single reflector; 30 degrees outwards and 10 degrees inwards for each pair of reflectors;
    - 3-1.5.8.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees , however, if the height of the lamp is less than 750 mm.
  - 3-1.5.8.5 Orientation: Rearwards.
- 3-1.5.9 Side retro-reflector, non-triangular: It is suitable for L1 category of motorcycle. If L3 category of motorcycle assembled this device that comply with this regulation.
  - 3-1.5.9.1 Number: One or two, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in VSTD.
  - 3-1.5.9.2 The colours of the lights: amber at the front, amber or red at the rear
  - 3-1.5.9.3 Position: on the side of the vehicle.
    - 3-1.5.9.3.1 In height: in case of vehicles of L1 category symbol, not less than 300mm or more than 1,000mm above the ground;
    - 3-1.5.9.3.2 In height: in case of vehicles of L3 category symbol, not less than 300mm nor more than 900mm above the ground;
    - 3-1.5.9.3.3 In length: should be placed in such a position that under normal conditions it may not be masked by the driver's or passenger's clothes.
  - 3-1.5.9.4 Geometric visibility:
    - 3-1.5.9.4.1 Horizontal angle: 30 degrees to the front and to the rear.
    - 3-1.5.9.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees , however, if the height of the retro-reflector is less than 750 mm.
  - 3-1.5.9.5 Orientation: The reference axis of the retro-reflectors must be perpendicular to the vehicle's median longitudinal plane and directed outwards. The front side retro-reflectors may move with the steering angle.
- 3-1.5.10 Pedal retro-reflectors: Mandatory on L1.
  - 3-1.5.10.1 Number: Four retro-reflectors or retro-reflector groups, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in the VSTD.
  - 3-1.5.10.2 The colours of the lights: orange (amber).
  - 3-1.5.10.3 Other requirements:
    - 3-1.5.10.3.1 The outer faces of the illuminating surface of the retro-reflectors shall be recessed into the body of the pedal.
    - 3-1.5.10.3.2 The retro-reflectors shall be mounted in the pedal body in such a way as to be clearly visible both to the front and to the rear of the vehicle. The reference axis of such retro-reflectors, the shape of which shall be adapted to that of the pedal body, shall be perpendicular to the pedal axis.

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3-1.5.10.3.3 Pedal retro-reflectors shall be fitted only to those pedals of the vehicle which, by means of cranks or similar devices, can be used to provide a means of propulsion alternative to the engine.

3-1.6 The motor vehicle can install the auxiliary lamps and marks that can conform to the following regulations, under the consideration of driving safety or specific operations.

3-1.6.1 Identification lamp for large vehicles:

3-1.6.1.1 The colours of the lights: red, yellow or green at the front; red at the rear. The identification lamp that has no speed-indicating function at the vehicle's front side shall not use green color.

3-1.6.1.2 Number: three at the front and three at the rear. The one with the speed-indicating function shall orient forwards.

3-1.6.2 Cornering lamp:

3-1.6.2.1 Number: Two.

3-1.6.2.2 The colours of the lights: white.

3-1.6.2.3 Position:

3-1.6.2.3.1 In width: that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle.

3-1.6.2.3.2 In height: minimum: Not less than 250 mm above the ground; maximum: Not more than 900 mm above the ground; However, no point on the apparent surface in the direction of the reference axis shall be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.

3-1.6.2.3.3 In length: not further than 1,000 mm from the front.

3-1.6.2.4 Geometric visibility:

3-1.6.2.4.1 Horizontal angle: 30 degrees to 60 degrees outwards.

3-1.6.2.4.2 Vertical angle: 10 degrees upwards and downwards.

3-1.6.2.5 Orientation: Such that the lamps meet the requirements for geometric visibility.

3-1.6.2.6 Electrical connections: The cornering lamps must be so connected that they cannot be activated unless the mainbeam headlamps or the dipped-beam headlamps are switched ON at the same time. The cornering lamp on one side of the vehicle may only be switched ON automatically when the direction indicators on the same side of the vehicle are switched ON and/or when the steering angle is changed from the straight-ahead position towards the same side of the vehicle. The cornering lamp shall be switched OFF automatically when the direction indicator is switched OFF and/or the steering angle has returned in the straight-ahead position.

3-1.6.2.7 The cornering lamps shall not be activated at vehicle speeds above 40 km/h.

3-1.6.3 Daytime running lamp:

3-1.6.3.1 Number: Two.

3-1.6.3.2 The colours of the lights: white.

3-1.6.3.3 Position:

3-1.6.3.3.1 In width: that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the apparent surfaces in the direction of the reference axes shall not be less than 600 mm. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

- 3-1.6.3.3.2 In height: above the ground not less than 250 mm nor more than 1,500 mm.
- 3-1.6.3.3.3 In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.
- 3-1.6.3.4 Geometric visibility:
  - 3-1.6.3.4.1 Horizontal angle: outwards 20 degrees and inwards 20 degrees.
  - 3-1.6.3.4.2 Vertical angle: upwards 10 degrees and downwards 10 degrees.
- 3-1.6.3.5 Orientation: Towards the front.
- 3-1.6.3.6 Electrical connections:
  - 3-1.6.3.6.1 If installed, the daytime running lamps shall be switched ON automatically when the device which starts and/or stops the engine is in a position which makes it possible for the engine to operate. It shall be possible to activate and deactivate the automatic switching ON of daytime running lamps without the use of tools.
  - 3-1.6.3.6.2 The daytime running lamp shall switch OFF automatically when the headlamps are switched ON, except when the latter are used to give intermittent luminous warnings at short intervals.
  - 3-1.6.3.6.3 The signal lamps such as front and rear position lamps and so on, are not switched ON when the daytime running lamps are switched ON.
- 3-1.6.4 Working/cargo lamp, spot lamp:
  - 3-1.6.4.1 The colours of the lights: white or light yellow. It's installed in correspondence to the actual demand.
  - 3-1.6.4.2 The lamp's switch shall not interact with other lamps.
  - 3-1.6.4.3 If the lamp will affect the driver's visual sight of other motor vehicles passing by, then a fixed shielding device shall be required.
- 3-1.6.5 Front fog lamp for motor vehicles:
  - 3-1.6.5.1 Number: Two, the performances of which shall conform to the requirements concerning "Front fog lamp" regulated in "Standards".
  - 3-1.6.5.2 The colours of the light emitted by the lamps: white or yellow
  - 3-1.6.5.3 Position:
    - 3-1.6.5.3.1 In width: that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle.
    - 3-1.6.5.3.2 In height: minimum: Not less than 250 mm above the ground. maximum: For M1 category vehicles not more than 800 mm above the ground; For all other categories of vehicles no maximum height. However, no point on the apparent surface in the direction of the reference axis must be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.
    - 3-1.6.5.3.3 In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.
  - 3-1.6.5.4 Geometric visibility:
    - 3-1.6.5.4.1 Horizontal angle: 45 degrees outwards and 10 degrees inwards.

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- 3-1.6.5.4.2 Vertical angle: 5 degrees upwards and downwards.
- 3-1.6.5.5 Orientation: Towards the front. The alignment of the front fog lamps must not vary according to the angle of lock of the steering.
- 3-1.6.5.6 Electrical connections: It must be possible to switch the front fog lamps on and off independently of the main-beam headlamps, the dipped-beam headlamps or any combination of main- and dipped-beam headlamps.
- 3-1.6.5.7 Tell-tale: Circuit-closed tell-tale mandatory. An independent non-flashing warning light.
- 3-1.6.6 Parking lamp: On motor vehicles not exceeding 6 m in length and not exceeding 2 m in width, optional. On all other vehicles, prohibited.
  - 3-1.6.6.1 Number and arrangement: Either two lamps at the front and two lamps at the rear, or one lamp on each side, the performances of which shall conform to the requirements concerning "Parking lamp" or "Front (side) position lamps"/"Rear position (side) lamps" regulated in VSTD.
  - 3-1.6.6.2 The colour of the light emitted by the lamps: white in front, red at the rear, amber if reciprocally incorporated in the side direction-indicator lamps or in the side-marker lamps.
  - 3-1.6.6.3 Position:
    - 3-1.6.6.3.1 In width: that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. Furthermore, if there are two lamps, they shall be on the sides of the vehicle.
    - 3-1.6.6.3.2 In height: For M1 and N1 category vehicles: no special requirement; For all other categories of vehicles: above the ground, not less than 350 mm nor more than 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm).
  - 3-1.6.6.4 Geometric visibility:
    - 3-1.6.6.4.1 Horizontal angle: 45 degrees outwards, forwards and rearwards.
    - 3-1.6.6.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the lamp is less than 750 mm.
  - 3-1.6.6.5 Electrical connections: The connection must allow the parking lamp(s) on the same side of the vehicle to be lit independently of any other lamps. The parking lamp(s) and, if applicable, the front and rear position lamps according to paragraph 3-1.6.6.7. below, must be able to operate even if the start switch is in engine-off position.. A device which automatically deactivates these lamps as a function of time is prohibited.
  - 3-1.6.6.6 Tell-tale: Circuit-closed tell-tale optional. If there is one, it must not be possible to confuse it with the tell-tale for the front and rear position lamps.
  - 3-1.6.6.7 Other requirements: The functioning of this lamp may also be performed by simultaneously switching on the front and rear position lamps on the same side of the vehicle. In this case, lamps that meet the requirements of front or rear (side) position lamps are deemed to meet the requirements of parking lamps.
- 3-1.6.7 Front fog lamp for motorcycle: Optional on vehicles of category symbol L3.
  - 3-1.6.7.1 Number: One or two, the performances of which shall conform to the requirements concerning "Front fog lamp" regulated in VSTD.
  - 3-1.6.7.2 The colour of the light: white or enlarged selective yellow.

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- 3-1.6.7.3 The installing location:
  - 3-1.6.7.3.1 In width: for a single lamp the centre of reference shall be in the median longitudinal plane of the vehicle; or the edge of the illuminating surface which is nearest to that plane shall be not more than 250 mm away from it;
  - 3-1.6.7.3.2 In height: not less than 250 mm above the ground. No point on the illuminating surface shall be higher than the highest point on the illuminating surface of the passing beam headlamp.
  - 3-1.6.7.3.3 In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.
- 3-1.6.7.4 Geometric visibility:
  - 3-1.6.7.4.1 Horizontal angle: 45 degrees to left and to right for a single lamp, except for an off-centre light, in which case the inward angle 10 degrees ; 45 degrees outwards and 10 degrees inwards for each pair of lamps
  - 3-1.6.7.4.2 Vertical angle: 5 degrees upwards and downwards;
- 3-1.6.7.5 Orientation: Forwards. The lamp(s) may move in line with the steering angle.
- 3-1.6.7.6 May not be combined with any other front lamp.
- 3-1.6.7.7 Tell-tale: "Circuit-closed" tell-tale. Optional; non-flashing green signal.
- 3-1.6.7.8 Electrical connections: It shall be possible to switch the fog lamp(s) on or off independently of the driving beam headlamp(s) and/or passing beam headlamp(s).
- 3-1.6.8 Rear fog lamp for motorcycle: Optional on vehicles of category symbol L3.
  - 3-1.6.8.1 Number: One or two.
  - 3-1.6.8.2 The colour of the light: red.
  - 3-1.6.8.3 Position:
    - 3-1.6.8.3.1 In height: not less than 250 mm nor more than 900 mm above the ground;
    - 3-1.6.8.3.2 In length: at the rear of the vehicle. The distance between the illuminating surface of the rear fog lamp and that of the stop lamp shall not be less than 100 mm.
  - 3-1.6.8.4 Geometric visibility:
    - 3-1.6.8.4.1 Horizontal angle: 25 degrees to left and to right for a single lamp; 25 degrees outwards and 10 degrees inwards for each pair of lamps;
    - 3-1.6.8.4.2 Vertical angle: 5 degrees upwards and downwards.
  - 3-1.6.8.5 Orientation: Rearwards.
  - 3-1.6.8.6 Electrical connections: They shall be such that the rear fog lamp can light up only when one or more of the following lamps are switched on: driving beam headlamp, passing beam headlamp, front fog lamp. If there is a front fog lamp, it shall be possible to switch off the rear fog lamp independently of the front fog lamp. The rear fog lamp(s) may continue to operate until the position lamps are switched off and they shall remain off until deliberately switched on again.
  - 3-1.6.8.7 Tell-tale: "Circuit-closed" tell-tale. Mandatory. Non-flashing amber signal lamp.
- 3-1.6.9 Front retro-reflector, non-triangular: Optional on vehicles of category symbol L3.
  - 3-1.6.9.1 Number: One, the performances of which shall conform to the requirements of "Retro-reflector" concerning Class IA or IB retro-reflectors regulated in VSTD.

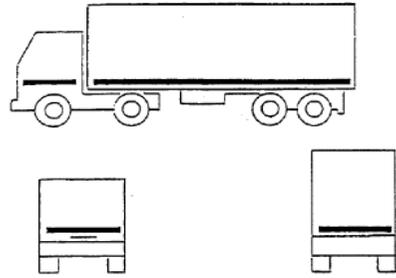
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- 3-1.6.9.2 The colour of the light: white.
- 3-1.6.9.3 Position: in height: not less than 400mm nor more than 1,200mm above the ground;
- 3-1.6.9.4 Geometric visibility:
  - 3-1.6.9.4.1 Horizontal angle: 30 degrees to the left and to the right.
  - 3-1.6.9.4.2 Vertical angle: 15 degrees above and below the horizontal. The vertical angle below the horizontal may be reduced to 5 degrees, however, if the height of the reflector is less than 750mm.
- 3-1.6.9.5 Orientation: Forwards. The reflector may move in line with the steering angle.
- 3-1.6.10 Auxiliary stop lamp for motorcycle:
  - 3-1.6.10.1 The colour of the light: red.
  - 3-1.6.10.2 Its reference centre lies within the median longitudinal plane of the vehicle and above other rear lamps.
  - 3-1.6.10.3 The light emitted shall be Non-flashing.
- 3-1.6.11 Hazard warning signal for motorcycle: Optional on vehicles of category symbol L3. The signal shall be given by means of a separate control enabling all the direction indicators to be supplied with current simultaneously. The other aspects are identical to the regulations specified in the direction-indicator lamp section.
- 3-1.6.12 Daytime running lamp:
  - 3-1.6.12.1 Number: One, or two symmetrically.
  - 3-1.6.12.2 The colour of the light: white or light yellow. For the two-lamp case the two lamps' color should be identical.
  - 3-1.6.12.3 Position: The height of illuminating surface above ground shall be within 0.5 to 1.2m.
- 3-1.6.13 Parking lamp for motorcycle:
  - 3-1.6.13.1 While stationary, the light emitted shall be non- flashing.
  - 3-1.6.13.2 The colour of the light: white or light yellow at the front, and red at the rear.
- 3-1.6.14 Retro-reflective markings for heavy and long vehicles and their trailers: Vehicles of category symbols M2, M3, N and O, the performances of which shall conform to the requirements concerning retro-reflective marking regulated in VSTD.
  - 3-1.6.14.1 It may consist of marking materials of class "D" if the total retro-reflective area is less than 2m<sup>2</sup>; if the total retro-reflective area is at least 2m<sup>2</sup> class "E" shall be used.
  - 3-1.6.14.2 The width of a side and/or rear marking material shall be 50 mm +10/-0 mm. The markings shall be made of strips of retro-reflective material.
  - 3-1.6.14.3 Guidelines for the marking shape and mounting requirements:
    - 3-1.6.14.3.1 Side and rear marking with strips:
      - 3-1.6.14.3.1.1 Retro-reflective marking materials installed on vehicles may be made up of an element or several elements preferably continuously, parallel or as close as possible parallel to the ground. The same rule applies for tractors, semi-trailers and other vehicle combinations.
      - 3-1.6.14.3.1.2 Those installed on the rear of vehicles may be red in colour.
      - 3-1.6.14.3.1.3 Those installed on the sides of vehicles shall be white or yellow in colour.
      - 3-1.6.14.3.1.4 The mounting of the markings should identify as close as possible the entire length and width of the vehicle. "Entire" means at least 80 % of the length and/or width.
      - 3-1.6.14.3.1.5 In case of non-continuous strips the distance between single elements should be as small as possible and

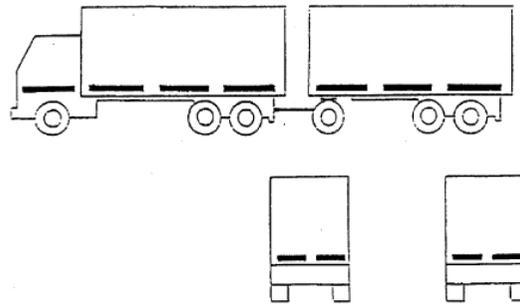
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- should not exceed 50 % of the shortest element length.
- 3-1.6.14.3.1.6 Retro-reflective marking materials shall have a minimum height above the ground of at least 250 mm and a maximum height of 1,500 mm. However, 2,100 mm may be accepted in cases where technical conditions forbid the compliance with the maximum value of 1,500 mm.
- 3-1.6.14.3.1.7 The distance between the retro-reflective marking materials fitted to the rear of a vehicle and each obligatory stop lamp should be greater than 200mm.
- 3-1.6.14.3.2 Contour marking:
- 3-1.6.14.3.2.1 The mounting of the contour markings should identify as close as possible the overall shape of the vehicle to the side and rear.
- 3-1.6.14.3.2.2 Contour markings installed on the rear of vehicles may be red in colour.
- 3-1.6.14.3.2.3 Contour markings installed on the sides of vehicles shall be white or yellow in colour.
- 3-1.6.14.3.2.4 In case of non-continuous strips, the distance between single elements should be as small as possible and should not exceed 50 % of the shortest element length.
- 3-1.6.14.3.2.5 The lower part of the retro-reflective marking materials should have a minimum height above the ground of at least 250 mm and a maximum height of 1,500 mm.
- 3-1.6.14.3.2.6 The distance between the retro-reflective marking materials fitted to the rear of a vehicle and each obligatory stop lamp should be greater than 200mm.
- 3-1.6.14.3.3 Distinctive markings and graphics:  
Retro-reflective distinctive markings and/or graphics should only be placed within the contour marking on the side of a vehicle, provided they do not impair the effectiveness of the contour marking and the mandatory lighting and light-signaling devices. Compared to the contour marking, the distinctive markings and/or graphics should be decent as specified below:
- 3-1.6.14.3.3.1 The number of the letters/characters is less than 15;
- 3-1.6.14.3.3.2 The height of the letters/characters is between 300 mm and 1,000 mm;
- 3-1.6.14.3.3.3 The whole retro-reflective area is not larger than 2.0 m<sup>2</sup>.
- 3-1.6.14.4 Examples of retro-reflective markings:
- 3-1.6.14.4.1 Examples of retro-reflective markings with strips
- 3-1.6.14.4.2

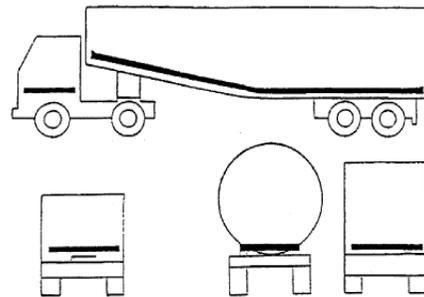
#### Example A



Example B

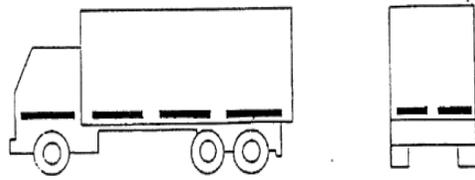


Example C

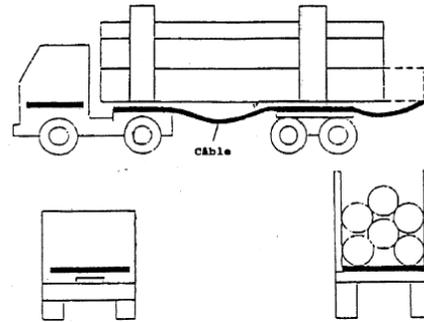


Example D

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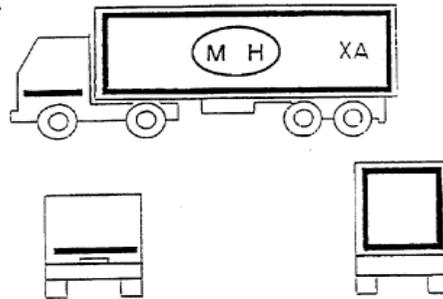


Example E

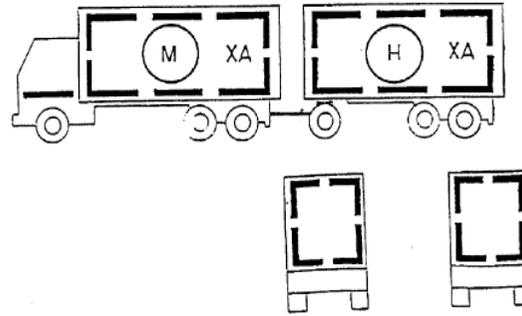


3-1 6.14.4.2 Examples of retro-reflective contour markings (with distinctive markings and graphics)

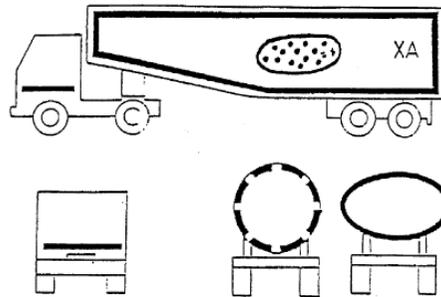
Example A



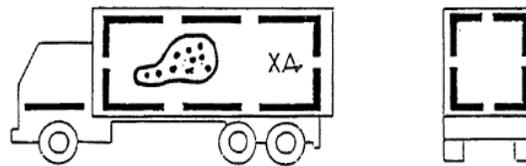
Example B



Example C



Example D



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3-1.6.15 Side direction-indicator lamps : The category of O2, O3 and O4 vehicles could add two or four lamps for conform to side direction-indicator lamps (categories 5 or 6) stipulate in “Direction indicator” regulated in VSTD.

3-1.7 The lamps not included in the above three chapters (3-1.4, 3-1.5 and 3-1.6) should acquire the approval of in-charge authority before installing them into the motor vehicles, trailers or motorcycles.