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DRAFT PROPOSAL:
GLOBAL TECHNICAL REGULATION

**LIGHTING AND LIGHT-SIGNALLING DEVICES FOR ROAD VEHICLE
- INSTALLATION PROVISIONS FOR VEHICLES OTHER THAN MOTORCYCLES**

Note: This is a working document prepared for the GRE-gtr48-informal session scheduled to be held in Bonn (Germany) from 22 to 25 November.

[text to be used in the future “preamble” to the gtr ...]

Requirements of this gtr may be adopted by Contracting Parties as alternative to their national regulations or they may be incorporated into their national regulations. Alternatively, Contracting Parties may accept products conforming to this gtr.

This gtr is drafted with the understanding that, unless otherwise specified in this gtr, each Contracting Party may mandate the fitting of any optional lighting and light signalling functions included in this gtr but not forbid their presence or mandate the presence of additional lighting and light signalling functions not included in this gtr on vehicle registered in its territory.

DRAFT

GLOBAL TECHNICAL REGULATION

LIGHTING AND LIGHT-SIGNALLING DEVICES FOR ROAD VEHICLE: INSTALLATION PROVISIONS FOR VEHICLES OTHER THAN MOTORCYCLES

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1. SCOPE AND PURPOSE

This global technical regulation (gtr) specifies requirements for the location, geometric visibility and operation (electric connection) of lighting and light-signalling devices installed on road vehicles.

The purpose of this regulation is to ensure the effectiveness, visibility (both in daylight and darkness or other condition of reduced visibility) and functioning of lighting and light-signalling devices in order to reduce the safety hazards caused by a) inadequate illumination of the roadway or glare caused by vehicle lighting devices; and b) confusion and diversion of the driver's attention from the driving task caused by miscomprehension of information from the vehicle's light-signalling devices as they relate to presence, identification and/or behaviour of the vehicle on the road.

2. APPLICATION

This regulation applies to road vehicles category 1 and 2 and their trailers 1/. This regulation does not apply to installation of additional lighting and light-signalling devices on special vehicles designated by the Contracting Party.

3. DEFINITIONS

For the purpose of this regulation:

3.1. "Contracting Party" means a country or a regional economic integration organization, as prescribed by the AGREEMENT CONCERNING THE ESTABLISHING OF GLOBAL TECHNICAL REGULATIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES done at Geneva on 25 June 1998, that has adopted this regulation, and in whose jurisdiction the vehicle would be registered.

3.2. Vehicle characteristics

3.2.1. "Transverse plane" means a vertical plane perpendicular to the median longitudinal plane of the vehicle.

3.2.2. "Unladen vehicle" means a vehicle at its "Unladen Vehicle Mass" 1/.

3.2.3. "Overall length" 1/.

3.2.4. "Overall width" 1/.

1/ [per "R.E.5."]

3.2.5. "Operating tell-tale" means a visual or auditory signal (or any equivalent signal) indicating that a device has been switched on and is operating correctly or not.
[e.g. direction indicators/hazard warning signal]

3.2.6 "Failure tell-tale" means a visual or auditory signal (or any equivalent signal) indicating that a device is not functioning correctly.]

[per UK-inf5-3 definition was requested]

[Italy-inf5-5 does not see a reason for the new definition. Existing definitions are sufficient and suitable for both present and future applications without being design restrictive.]

[... could be the seat belt warning tell-tale a **failure to buckle tell-tale?**]

3.2.7. "Circuit-closed tell-tale" means a visual (or any equivalent signal) indicating that a device has been switched on, but not indicating whether it is operating correctly or not.

[e.g. driving beam headlamps, parking brake]

3.2.8. "Ground" means a substantially horizontal surface on which the vehicle stands.

3.2.9. "Movable components" means those vehicle body panels or other vehicle parts the position(s) of which can be changed by tilting, rotating or sliding without the use of tools. They do not include tiltable driver cabs of trucks.

3.2.10. "Normal position of use of a movable component" means the position(s) of a movable component specified by the vehicle manufacturer for the normal condition of use and the park condition of the vehicle.

3.2.11. "Normal condition of use of a vehicle" means:

3.2.11.1. for a motor vehicle, when the vehicle is ready to move with its movable components in the normal position(s) of use and its propulsion system activated;

3.2.11.2. and for a trailer, when the trailer is connected to a drawing motor vehicle in the normal condition of use and the trailer's movable components are in the normal position(s) of use.

3.2.12. "Park condition of a vehicle" means:

3.2.12.1. for a motor vehicle, when the vehicle is at standstill with its movable components in the normal position(s) of use and its propulsion system not activated;

3.2.12.2. and for a trailer, when the trailer is connected to a drawing motor vehicle in the normal condition of use and the trailer's movable components are in the normal position(s) of use.

3.2.13. "Front" means that part of the vehicle between the transverse vertical plane tangent to the extreme front-end including all original equipment components and the transverse vertical plane passing through the centre of the foremost axle.

3.2.14. "Rear" means that part of the vehicle between the transverse vertical plane tangent to the extreme rear-end including all original equipment components and the transverse vertical plane passing through the centre of the rearmost axle.

~~3.2.15. "Extreme outer edge" means the plane parallel to the median longitudinal plane of the vehicle and touching the vehicle's lateral outer edge, disregarding the projection of:~~

~~- tires near their point of contact with the ground, and of connections for tire pressure gauges;~~

~~- any anti-skid devices mounted on the wheels;~~

~~- rear-view mirrors;~~

~~- **headlamp cleaners;**~~

~~- side direction-indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps, retro-reflectors and side-marker lamps~~

~~- customs seals affixed to the vehicle, and of devices for securing and protecting such seals~~

~~seals~~

~~[Japan-inf5-6 requested a definition of the "extreme outer edge" used in para.4.9.2.; Canada proposes the above text, which is a copy of para. 2.14. of UN/ECE R 48 with the addition of headlamp cleaners.]~~

3.3. LIGHTING AND LIGHT SIGNALLING DEVICES CHARACTERISTICS

3.3.1. "Device" means an element or an assembly of elements used to perform one or more functions.

3.3.2. "Function"

3.3.2.1. "Lighting function" means the light emitted by a device to illuminate the road and objects in the direction of vehicle movement, as defined in paragraph 3.4.;

3.3.2.2. "Light-signalling function" means the light emitted or reflected by a device to give to other road users visual information on the presence and/or the change of movement of the vehicle, as defined in paragraph 3.5.

3.3.3. "Lamp" means a device designed to illuminate the road or to emit a light signal to other road users. Rear registration plate illuminating device and retro-reflectors are likewise to be regarded as lamps.

~~3.3.4. "Light source with regard to filament lamps" means the filament itself. In the case of a lamp having several filaments, each one shall constitute a light source.~~

~~3.3.4. Light source~~

3.3.4.1. "Light source" means one or more elements for visible radiation, which may be assembled with one or more transparent envelopes and with a base for mechanical and electrical connection.

A light source may also be constituted by the extreme outlet of a light-guide, as part of a distributed lighting or light-signalling system not having a built-in outer lens;

3.3.4.2. "Replaceable light source" means a light source which is designed to be inserted in and removed from the holder of its device without tool;

3.3.4.3. "Non-replaceable light source" means a light source which can only be replaced by replacement of the device to which this light source is fixed;

in case of a light source module: a light source which can only be replaced by replacement of the light source module to which this light source is fixed;

3.3.4.4. "Light source module" means an optical part of a device which is specific to that device, is containing one or more non-replaceable light sources, and is only removable from its device with the use of tool(s);

3.3.4.5. "Filament light source" (filament lamp) means a light source where the element for visible radiation is one or more heated filaments producing thermal radiation;

3.3.4.6. "Gas-discharge light source" means a light source where the element for visible radiation is a discharge arc producing electro-luminescence / fluorescence;

3.3.4.7. "Light-emitting diode" (LED) means a light source where the element for visible radiation is one or more solid state junctions producing injection-luminescence / fluorescence;

3.3.4.8. "Electronic light source control gear" means one or more components between supply and light source to control voltage and/ or electrical current of the light source;

3.3.4.9. "Ballast" means an electronic light source control gear between supply and light source to stabilise the electrical current of a gas-discharge light source;

3.3.4.10. "Ignitor" means an electronic light source control gear to start the arc of a gas-discharge light source.

[per TRANS/WP.29/2003/61]

3.3.5. "Objective luminous flux" means a design value of the luminous flux of a replaceable light source. ~~It shall~~To be achieved, within the specified tolerances, when the

replaceable light source is energised by the power supply at the specified test voltage, as indicated in the data sheet of the light source.

[per TRANS/WP.29/2003/61]

- 3.3.6. "Independent lamps" means devices having separate illuminating surfaces 2/, separate light sources and separate lamp bodies.
- 3.3.7. "Grouped lamps" means devices having separate illuminating surfaces 2/ and separate light sources, but a common lamp body.
- 3.3.8. "Combined lamps" means devices having separate illuminating surfaces, 2/ but a common light source and a common lamp body.
- 3.3.9. "Reciprocally incorporated lamps" means devices having separate light sources or a single light source operating under different conditions (for example, optical, mechanical, electrical differences), totally or partially common illuminating surfaces 2/ and a common lamp body.
- 3.3.10. "Concealable lamp" means a lamp capable of being partly or completely hidden, when not in use. This result may be achieved by means of a movable cover, by displacement of the lamp or by any other suitable mean. The term "retractable" is used more particularly to describe a concealable lamp the displacement of which enables it to be inserted within the bodywork.
- 3.3.11. "Light emitting surface" of a lighting device light-signalling device or a retro-reflector means all or part of the exterior surface of the transparent material as defined by the manufacturer of the device (see annex 1).
- 3.3.12. "Illuminating surface" (see annex 1).
- 3.3.12.1. "Illuminating surface of a lighting device" (paragraphs 3.4.1. to 3.4.5.) means the orthogonal projection of the full aperture of the reflector, or in the case of headlamps with an ellipsoidal reflector of the "projection lens" on a transverse plane. If the lighting device has no reflector, the definition of paragraph 3.3.12.2. shall be applied. If the light-emitting surface of the lamp extends over part only of the full aperture of the reflector, then the projection of that part only is taken into account.

In the case of a passing beam headlamp, the illuminating surface is limited by the apparent trace of the cut-off on to the lens. If the reflector and lens are adjustable relative to one another, the mean adjustment should be used.

2/ In the case of lighting devices for the rear registration plate and the side direction indicators, replace by "light-emitting surface" in the absence of an illuminating surface.

3.3.12.2. "illuminating surface of a light-signalling device other than a retro-reflector" (paragraphs 3.5.1. to 3.5.13. and 3.5.15. to 3.5.18.) means the orthogonal projection of the lamp in a plane perpendicular to its axis of reference and in contact with the exterior light-emitting surface of the lamp, this projection being bounded by the edges of screens situated in this plane, each allowing only 98 per cent of the total luminous intensity of the light to persist in the direction of the axis of reference.

To determine the lower, upper and lateral limits of the illuminating surface, only screens with horizontal or vertical edges shall be used.

3.3.12.3. "illuminating surface of a retro-reflector" (paragraph 3.5.14.) means the orthogonal projection of a retro-reflector in a plane perpendicular to its axis of reference and delimited by planes contiguous to the outermost parts of the retro-reflector's optical system and parallel to that axis. For the purposes of determining the lower, upper and lateral edges of the device, only horizontal and vertical planes shall be considered.

3.3.13. "Apparent surface" for a defined direction of observation means, at the request of the manufacturer or his duly accredited representative, the orthogonal projection of either:

- the boundary of the illuminating surface projected on the exterior surface of the lens (a-b), or
- the light-emitting surface (c-d),

in a plane perpendicular to the direction of observation and tangential to the most exterior point of the lens (see annex 1 to this regulation).

3.3.14. "Axis of reference (reference axis)" means the characteristic axis of the lamp determined by the manufacturer (of the lamp) for use as the direction of reference ($H=0^\circ$, $V=0^\circ$) for angles of field for photometric measurements and for installing the lamp on the vehicle.

3.3.15. "Centre of reference" means the intersection of the axis of reference with the exterior light-emitting surface; it is specified by the manufacturer of the lamp.

3.3.16. "Angles of geometric visibility" means the angles, which determine the field of the minimum solid angle in which the apparent surface of the lamp must be visible. That field of the solid angle is determined by the segments of the sphere, the centre of which coincides with the centre of reference of the lamp, and the equator is parallel with the ground. These segments are determined in relation to the axis of reference. The horizontal angles β (beta) correspond to the longitude and the vertical angles α (alpha) to the latitude.

3.3.17. The following shall be deemed to be:

[3.3.17.1. "A single lamp" means a device or part of a device having one lighting or light-signalling function, one or more light source(s) and one apparent surface in the direction of the reference axis, which may be a continuous surface or composed of two or more distinct parts, or any assembly of two independent lamps as defined by an applicable regulations of the Contracting Party.]

[Italy-inf5-5; this definition must be the same as UN/ECE R 48.

[Japan-inf5-6 requested alignment with TRANS/WP.29/2004/4]

Note: the proposed paragraph 3.3.17.1. is in line with the recent amendment to UN/ECE R 48 (TRANS/WP.29/2004/4 – see below); the text in *italic* was removed and replaced by the red text since it refers to type "D" lamps defined in Regs under the 1958 Agreement:

"2.16.1. "A single lamp" means:

- a) a device or part of a device having one lighting or light-signalling function, one or more light source(s) and one apparent surface in the direction of the reference axis, which may be a continuous surface or composed of two or more distinct parts, or
- b) any assembly of two independent lamps, *whether identical or not, having the same function, both approved as type "D" lamp and installed so that the projection of their apparent surfaces in the direction of the reference axis occupies not less than 60 per cent of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis.*"

3.3.17.2. "Two lamps (an even number of lamps)", means a single light-emitting surface in the shape of a band or strip if such band or strip is placed symmetrically in relation to the median longitudinal plane of the vehicle, extends on both sides to within at least 400 mm of the adjacent extreme outer edge of the vehicle, and is not less than 0.8 m long; the illumination of such surface shall be provided by not less than two light sources placed as close as possible to its ends; the light-emitting surface may be constituted by a number of juxtaposed elements on condition that the projections of the several individual light-emitting surfaces on a transverse plane occupy not less than 60 per cent of the area of the smallest ~~rectangle-quadrilateral~~ circumscribing the projections of the said individual light-emitting surfaces.

[Suggested by OICA-inf5-4, who referred to TRANS/WP.29/2004/4. This document dealt with definition of a single lamp, not two lamps. Nevertheless, it seems that the suggested change could be incorporated.

NOTE for OICA – if this change is adopted, please make sure that the ECE-R.48 is amended accordingly]

3.4. LIGHTING DEVICES

3.4.1. "Driving beam (main-beam, high-beam) headlamp" means a lamp used to illuminate the road over a long distance ahead of the vehicle.

- 3.4.2. "Passing beam (dipped-beam, low-beam) headlamp" means a lamp used to illuminate the road ahead of the vehicle without causing undue dazzle or discomfort to oncoming drivers and other road-users.
- [3.4.3.** "Front fog lamp" means a lamp used to improve the illumination of the road ahead of the vehicle in case of fog or any similar condition of reduced visibility.]
- 3.4.4. "Cornering lamp" means a lamp used to provide supplementary illumination of that part of the road which is located near to the forward corner of the vehicle at the side towards which the vehicle is going to turn.
- 3.4.5. "Reversing lamp" means a lamp used to illuminate the road to the rear of the vehicle and to warn pedestrians and other road-users that the vehicle is reversing or is about to reverse.
- 3.5. LIGHT SIGNALLING DEVICES
- 3.5.5. "Direction indicator lamp" means a lamp used to indicate to other road-users that the driver intends to change direction to the right or to the left.
- 3.5.6. "Hazard warning signal" means the simultaneous operation of all of a vehicle's direction indicator lamps to show that the vehicle temporarily constitutes a special danger to other road-users.
- 3.5.7. "Stop lamp" means a lamp used to indicate to other road-users to the rear of the vehicle that the service brake is applied and/or longitudinal movement of the vehicle is intentionally retarded.
- 3.5.8. "Rear registration plate illuminating device" means a device used to illuminate the space reserved for the rear registration plate; such a device may consist of several optical components.
- 3.5.9. "Front position lamp" ("Parking lamp" in North America) means a lamp used to indicate the presence and the width of the vehicle when viewed from the front.
- 3.5.10. "Rear position lamp (tail lamp)" means a lamp used to indicate the presence and width of the vehicle when viewed from the rear.
- 3.5.11. "Rear fog lamp" means a lamp used to improve the visibility of a vehicle from the rear in case of dense fog.
- 3.5.12. "Parking lamp" means a lamp, which is used to draw attention to the presence of a stationary vehicle.

3.5.13. "End-outline marker lamp (clearance lamp)" means a lamp fitted near to the extreme outer edge and as close as possible to the top of the vehicle and used to indicate clearly the vehicle's overall width. This lamp is intended, for certain vehicles and trailers, to complement the vehicles' front and rear position lamps.

3.5.14. "Retro-reflector" means a device used to indicate the presence of a vehicle by the reflection of light emanating from a light source not connected to the vehicle, the observer being situated near the source.

For the purposes of this regulation the following are not considered as retro-reflectors:

3.5.14.1. retro-reflecting registration plates;

3.5.14.2. the retro-reflecting signals mentioned in the ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road);

3.5.14.3. other retro-reflecting plates, conspicuity treatment and signals which must be used to comply with national requirements for use as regards certain categories of vehicles or certain methods of operation.

[Japan-inf5-6 – para. 3 of the preamble to Japanese comments suggests exclusion of any add-on reflective markings from the scope of this document.]

3.5.15. "Side-marker lamp" means a lamp used to indicate the presence of the vehicle when viewed from the side.

3.5.16. "Daytime running lamp" means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime.

3.5.17. "Identification lamp (ID lamp)" means a device fitted at the top and about the centreline of a vehicle to draw particular attention to its bulk. It is intended for certain vehicles and trailers, to complement the vehicle's front and rear position and end outline marker lamps.

~~3.5.18. "Conspicuity treatment" means a system of retro-reflective devices providing information regarding presence, width, length and bulk of a certain type of vehicles under condition of low or no ambient light.~~

[Japan-inf5-6 –see 3.5.14.3. above.]

[Italy-inf5-5 suggested new definition and the UK-inf5-3 objection to be discussed together with para. 4.11.2.]

4. GENERAL SPECIFICATIONS

4.1. As installed on the vehicle, lighting and light signalling devices described in paragraph 5. below shall conform with the applicable regulations of the Contracting Party.]

[Italy-inf5-5 opposes words “as installed on the vehicle” as being ambiguous. Italy proposes following wording:

“4.1. In the absence of gtr(s) applicable to the characteristics and performances of the light and light signalling devices as “independent technical units”, lighting and light signalling devices, whose installation requirements are described in paragraph 5. below, shall conform and shall be marked in conformity with the applicable regulations of the Contracting Party in which the vehicle is intended to be registered.”

[UK-inf5-3 supports Italy-inf5-5]

Italian proposal does not address Canadian concerns. Improperly installed devices conforming to all corresponding requirements may not perform as intended. Lamp tested at test voltage (e.g. 13.5 V), and subsequently installed on a vehicle that provides 12 V or 14.5 V may fail; moreover, lamp recessed by the designers into the vehicle’s body may lose its geometric visibility characteristics. Therefore, Canada proposes the following, possibly clearer text:]

4.1. With all vehicle components present and with power supply normal for the vehicle, all lighting and light signalling devices described in paragraph 5. below, if installed on the vehicle, shall conform with the applicable regulations of the Contracting Party.

4.1.1. Colour specifications are subject to each Contracting Party own regulation. [suggested by OICA-inf5-4; however, if para. 4.1. is adopted, proposed paragraph 4.1.1. becomes redundant since colour specification is included in the regulations of the Contracting Party. Also, the new “Colour” paragraph at the end of this section will be discussed.]

4.2. Lamps that are not described in this Regulation are outside the scope of this Regulation and may not be installed on a vehicle. A Contracting Party may allow the fitting of such lamps on vehicles registered in its territory.

[unchanged, former para. 4.19.]

Suggestion to move this paragraph as 4.2. due to its very general nature.]

4.2. The lighting and light-signalling devices shall be so fitted that under normal conditions of use of the vehicle and notwithstanding any vibrations to which they may be subjected, they retain the characteristics prescribed by this regulation and enable the vehicle to comply with the requirements of this regulation. In particular, it shall not be possible for the lamps to be inadvertently maladjusted.

4.3. All lighting (road illumination) devices, except reversing and cornering lamps, shall be so installed that correct adjustment of their orientation can be easily carried out according to the instructions provided with the vehicle by the vehicle manufacturer, ~~without the use of special tools other than those provided with the vehicle by the~~

~~vehicle manufacturer. The means for adjustment shall conform to the requirements prescribed to it by the Contracting Party.~~
[per Italy-inf5-5] [word "easily was added per R 48]

- 4.4. For all light-signalling devices, including those mounted on the side panels, the reference axis of the lamp when fitted to the vehicle must be parallel to the ground; in addition it must be perpendicular to the median longitudinal plane of the vehicle in the case of side retro-reflectors, and of side-marker lamps and parallel to that plane in the case of all other light-signalling devices. In each direction, a tolerance of $\pm 3^\circ$ shall be allowed. In addition, any specific instructions, laid down by the lamp manufacturer with regard to fitting of the light-signalling device on a vehicle, must be complied with.
- 4.5. In the absence of specific instructions, the height and orientation of the lamps shall be verified with the unladen vehicle under normal condition of use and placed on a ground.
- 4.6. In the absence of specific instructions, lamps of the same function, installed on the vehicle in an even number shall:
- 4.6.1. be fitted to the vehicle symmetrically in relation to the median longitudinal plane (this estimate to be based on the exterior geometrical form of the lamp and not on the edge of its illuminating surface);
- 4.6.2. be symmetrical to one another in relation to the median longitudinal plane, this requirement is not valid with regard to the interior structure of the lamp;
- 4.6.3. satisfy the same colorimetric requirements; and
- 4.6.4. have substantially identical photometric characteristics.
- 4.7. On vehicles whose external shape is asymmetrical, the above requirements shall be satisfied so far as possible.
- 4.8. Grouped, combined or reciprocally incorporated lamps
- 4.8.1. ~~Except as specified in paragraphs 4.8.2. and 4.8.3.,~~ Under conditions in paragraphs 4.8.2. and 4.8.3., lamps may be grouped, combined or reciprocally incorporated with one another provided that all requirements regarding position, orientation, geometric visibility, electrical connections and other requirements, if any, of this regulation, *as well as requirements regarding presence and colour* of the function prescribed by the Contracting Party are fulfilled.
- [OICA-inf5-4 suggests to delete "presence and" from the para. above. if paragraph regarding Colour is adopted the word "colour" should be removed.]

[Italy-inf5-5 suggested to delete the first part of the sentence and move the following two paragraphs where they belong. Subsequently the highlighted text below, as not general in nature, was moved to the appropriate devices in paragraphs 5.xx. together with related comments by OICA and Italy]

~~4.8.2. Rear end outline marker lamp shall not be combined or reciprocally incorporated with a rear position lamp.~~

~~4.8.3. A centre high mounted stop lamp shall be independent of any other lamp or retro-reflective device, except that it may be grouped with a lamp illuminating the cargo compartment.~~

4.8.2. However, where stop lamps and direction indicator lamps are grouped, any horizontal or vertical straight line passing through the projections of the apparent surfaces of these functions on a plane perpendicular to the reference axis, shall not intersect more than two borderlines separating adjacent areas of different colour.

4.8.3. Where the apparent surface of a single lamp is composed of two or more distinct parts, it shall satisfy one of the following requirements:

4.8.3.1. The total area of the projection of the distinct parts on a plane tangent to the exterior surface of the transparent material and perpendicular to the reference axis shall occupy not less than 60 per cent of the smallest quadrilateral circumscribing the said projection, or

4.8.3.2. The distance between two adjacent/tangential distinct parts shall not exceed 15 mm when measured perpendicularly to the reference axis.

[Japan-inf5-6 noted that this para. Should be modified per TRANS/WP.29/2004/4. - italic text in 4.8.1. is an addition to the text in UN/ECE R 48]

4.9. Measurements (see annex 3)

4.9.1. In height:

"H1" – the maximum height above the ground shall be measured from the highest point of the apparent surface, in the direction of the reference axis; and

"H2" – the minimum height from the lowest point of the apparent surface, in the direction of the reference axis.

In the case of passing beam headlamp,

"H2" is measured from the lowest point of the effective outlet of the optical system (e.g. reflector, lens, projection lens) independent of its utilisation.

4.9.2. In width:

"E" – the maximum distance of the lamp from the adjacent extreme outer edge of the vehicle shall be measured from that edge of the apparent surface in the direction of the reference axis which is the furthest from the median longitudinal plane of the vehicle.

4.9.3. In length:

"K" – the maximum distance between the lamp and the transverse plane which marks the forward or rearward boundary of the vehicle's ~~overall-structural~~ length 1/ (front-end or rear-end of the vehicle) shall be measured from that edge of the apparent surface in the direction of the reference axis which is the closest, respectively, to the front-end or rear-end of the vehicle.

[Japan-inf5-6 and OICA-inf5-4's suggestion]

[GENERAL COMMENT: GRE should examine if overall length would not be more suitable to determine location of light signalling devices marking the true dimensions/bulk of the vehicle as it travels on the road.]

4.9.4. Distance between two lamps:

"D" – unless otherwise specified in this document, the distance between two lamps, which face in the same direction, shall be measured between those edges of the two apparent surfaces of these two lamps in the direction of the reference axis, which are the closest to each other.

4.9.5. Where the position, as regards maximum or minimum height, width, length, or distance between lamps, clearly meets the requirements of the regulation, the exact edges of any apparent surface need not be determined.

[4.10. Visibility of light other than white to the front of a vehicle and of light other than red to the rear of a vehicle

Note: No account shall be taken of lighting devices fitted for the interior lighting of a vehicle.

4.10.1. For the visibility of light other than white towards the front of a vehicle, with the exception of a side-marker lamps and direction indicators, there must be no direct visibility of the apparent surface of a lamp capable of projecting or retro-reflecting light of any colour other than white if viewed by an observer moving within Zone 1 as specified in annex 2.

4.10.2. For the visibility of light other than red towards the rear of a vehicle, with the exception of a reversing lamp, cornering lamp, direction indicator lamp, and rear registration plate or its illumination device there must be no direct visibility of the apparent surface of a lamp capable of projecting or retro-reflecting light

other than red if viewed by an observer moving within Zone 2 as specified in annex 2.]

[Japan-inf5-6 would prefer to revert to the text of UN/ECE R 48.]

[This item has to wait. The final wording of 4.10. depends on discussion in GRE on this subject as well as regulatory decisions taken by the Contracting Parties.]

4.11. Electrical connections

4.11.1. The electrical connections must be such that the front and rear position lamps, the side-marker lamps, the rear registration plate illuminating device and the end-outline marker lamps and the identification lamps, if they exist, can only be switched on and off simultaneously either automatically or by means of a manual control. 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.

4.11.2. The electrical connections must be such that the lighting function for driving beam, passing beam or the front fog lamp cannot be switched on unless the front and rear position lamps, the side-marker lamps, the rear registration plate illuminating device and the end-outline marker lamps and the identification lamps, if they exist, are also switched on.

This requirement shall not apply, however, to the driving or passing beams when they are flashed momentarily.

4.11.3. **Unless otherwise specified in this regulation, lighting and light-signalling devices shall be steady burning when activated.**

[- is definition of “steady burning” required? – specifically, is it allowed for the lamp’s intensity modulate within specified maximum and minimum?]

[UK-inf5-3 does not see need for definition.]

~~4.11.4. — In the absence of specific provision no lighting or light signalling device shall be automatically operated.~~

[- replaced with statements in each para. 5.x.7. Electric connections]

4.12. Tell-tale

Where a "circuit-closed" tell-tale is prescribed by this regulation, it may be replaced by an "operating" tell-tale.

[verify suitability of this statement in view of discussion regarding definitions of tell-tales.]

4.13. Concealable lamps

- 4.13.1. Lamps shall not be concealable with the exception of the driving beam headlamps, the passing beam headlamps and the front fog lamps, which may be concealed when they are not in use.
- 4.13.2. In the event of any failure affecting the operation of the concealment device(s) the lamps shall remain in the position of use, if already in use, or shall be capable of being moved into the position of use without the aid of tools.
- 4.13.3. It must be possible to move the lamps into the position of use and to switch them on by means of a single control, without excluding the possibility of moving them into the position of use, without switching them on. However, in the case of grouped driving beam and passing beam headlamps, the control referred to above is required only to activate the passing beam headlamps.
- 4.13.4. It must not be possible deliberately, from the driver's seat, to stop the movement of switched-on lamps before they reach the position of use. If there is a danger of dazzling other road users by the movement of the lamps, they shall light up only when they have reached their position of use.
- 4.13.5. When the concealment device has a temperature of $-30\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ the headlamps must be capable of reaching the position of use within three seconds of initial operation of the control.

4.14. Number of lamps

When installed on a vehicle, the number of lamps and retro-reflective devices described by this regulation shall be equal to the number specified in paragraph 5. below.

[Italy-inf5-5 in support of this para. under condition that the definition of a single lamp is clearly per UN/ECE R 48]

4.15. With the exception of retro-reflectors, a lamp is deemed not to be present when it cannot be made to operate by the sole installation of a light source.

4.16. Lighting devices installed on, or covered by, movable components:

- 4.16.1. Rear position lamps, all direction indicators except side direction indicators and all mandatory retro-reflectors must not be installed on movable components unless at all fixed positions of the movable components the lamps on the movable components meet all the location and geometric visibility requirements for those lamps, or a device meeting all requirements for those lamps is installed.

[OICA-inf5-4 perceives this paragraph as very restrictive, especially in case of coach.]

- 4.16.2. There must not be any movable component, with or without a light-signalling device installed on it, which in any fixed position hides more than 50 per cent of the apparent surface of front and rear position lamps, front and rear direction indicator lamps, side-marker lamps or any retro-reflector when viewed in the reference axis of this specific device. If this is not practicable:
- 4.16.2.1. an alternative device meeting all requirements for those lamps ~~may~~ shall be installed; or in case of position lamps, direction indicator lamps or side-marker lamps: [it should be requirement not permission] [clearer statement regarding applicability of 4.16.2.2. to only lamps with light sources.]
- 4.16.2.2. ~~except in the case of retro-reflector~~ a clear notice in the vehicle shall inform the user that in certain position(s) of the movable components other road users shall be warned of the presence of the vehicle on the road by means provided by the manufacturer with the vehicle.
- 4.16.3. No road illumination device (driving beam headlamp, passing beam headlamp, front fog lamp, etc) shall be mounted on movable component whose movement causes the beam pattern of the device to move upwards, unless the device mounted on such movable component will be automatically switched off while the movable component is moved out of its normal position of use specified for a vehicle being in the normal condition of use.
- 4.16.4. When a lamp is installed on a movable component and the movable component is in the normal position(s) of use, the lamp must always return to the position(s) specified by the manufacturer in accordance with this regulation. In the case of passing beam headlamps and front fog lamps, this requirement shall be considered satisfied if, when the movable components are moved and returned to the normal position 10 times, no value of the angular inclination of these lamps, relative to its support, measured after each operation of the movable component, differs by more than 0.15 per cent from the average of the 10 measured values.
- 4.17. Lamps shall be fitted in a vehicle in such a way that the light source can be correctly replaced according to the instructions provided with the vehicle by the vehicle manufacturer without the use of special tools other than those provided with the vehicle by the vehicle manufacturer. This requirement is not applicable to devices equipped with a non-replaceable light source or gas discharge light source.
- 4.18. Lighting and light signalling devices shall be marked in accordance with the laws and regulations of the Contracting Party.**

If para. 4.1. stays in the document this para. may be removed.

~~4.19. Lamps that are not described in this Regulation are outside the scope of this Regulation and may not be installed on a vehicle. A Contracting Party may allow the fitting of such lamps on vehicles registered in its territory.~~

this paragraph is moved to para. 4.2.

4.20. Any temporary fail-safe substitution of any light-signalling function of a rear position lamp is allowed, provided that the substituting function is identical in colour, main intensity and position to the function that has ceased to operate and provided that the substituting device remains operational in its original safety function. During substitution for the rear position lamp, a tell-tale shall indicate occurrence of a temporary substitution and need for repair.

[Should the above be also extended to the lighting (road illumination) devices and to distributed lighting devices?]

[UK-inf5-3 suggests reversal to original text of UN/ECE R 48

“5.23. Any temporary fail-safe replacement of the light-signalling function of a rear position lamp is allowed, provided that the substituting function in case of a failure is similar in colour, main intensity and position to the function that has ceased to operate and provided that the substituting device remains operational in its original safety function. During substitution, a tell-tale on the dashboard (see para. 2.18. of this Regulation) shall indicate occurrence of a temporary replacement and need for repair.”]

[Italy-inf5-5 agrees in principal with this paragraph, however, Italy prefers to wait with extension of this provision to lighting front lighting systems (AFS and DLS) till discussions in GRE on the subject of “system failures and substituting functions” are concluded.]

4.21. Geometric visibility

4.21.1. There must be no obstacle on the inside of the angles of geometric visibility, as described in paragraph 3.3.16., to the propagation of light from any part of the apparent surface of the lamp observed from infinity; however, no account is taken of obstacles, if they were already present when the lamp was photometrically tested.

4.21.2. If measurements are taken closer to the lamp, the direction of observation must be shifted parallel to achieve the same accuracy.

4.21.3. If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, the part of the lamp not hidden by obstacles must still conform to the photometric values prescribed for the device.

4.21.4. When the vertical angle of geometric visibility below the horizontal may be reduced to 5° (lamp at less than 750 mm above the ground) the photometric field of measurements of the installed device may be reduced to 5° below the horizontal.

[Japan-inf5-6 would like to see colour added to the scope of this document or a clear statement delegating the choice of colour to the Contracting Parties.

Therefore, with the support of several delegations colour were added.

Following paragraph contains several items that consensus regarding colour is challenging.

These items are marked in red and will be discussed during the fifty-third GRE session in October. It was agreed that if consensus cannot be reached in a reasonable time, paragraph 4.22. will be again removed from this gtr.]

4.22. The colours of the light emitted or reflected by the lighting and light signalling devices are the following:

	<i>Device</i>	<i>1958</i>	<i>USA</i>	<i>1998</i>
4.22.1.	driving beam headlamp:	white	white	white
4.22.2.	passing beam headlamp:	white	white	white
4.22.3.	front fog lamp:	white or selective yellow	white or selective yellow	white or selective yellow
4.22.4.	reversing lamp:	white	white	white
4.22.5.	direction indicator lamp:	front rear	amber amber or red	amber amber
4.22.6.	hazard warning signal:	front rear	amber amber or red	amber amber
4.22.7.	stop lamp:	Red	red	red
4.22.8.	rear registration plate illuminating device:	white	white	white
4.22.9.	front position lamp:	white	white or amber	white
4.22.10.	rear position lamp:	red	red	red
4.22.11.	rear fog lamp:	red	red	red
4.22.12.	parking lamp:	towards front towards the rear	white red or amber	- -
				white red or amber

4.22.13.	end-outline marker lamp:	white red red	amber red	???????
	front rear			red
4.22.14.	rear retro-reflector, non-triangular:	red	red	red
4.22.15.	rear retro-reflector, triangular:	red	-	red
4.22.16.	front retro-reflector, non-triangular:	white or same as incident light	-	white or same as incident light
4.22.17.	side retro-reflector, non-triangular:	front intermediate rear	amber amber amber or red	amber amber red
4.22.18.	side-marker lamp:	front intermediate rear	amber amber amber or red	amber amber red
4.22.19.	daytime running lamp:	white	white or amber	white
4.22.20.	identification lamps:	front rear	- -	amber red
4.22.21.	cornering lamp:	white	white	white

5. INDIVIDUAL SPECIFICATIONS

5.1. DRIVING BEAM HEADLAMP

5.1.1. Presence

Mandatory on motor vehicles. Prohibited on trailers.

5.1.2. Number

Two or four

5.1.3. Arrangement:

- 5.1.3.1. No point on the apparent surface in the direction of the reference axis of the driving beam headlamp shall be further outboard than the point, which is closest to the adjacent extreme outer edge of the vehicle, on the apparent surface in the direction of reference axis of the passing beam headlamp.
- 5.1.3.2. Driving beam headlamps shall be fitted in such a way that the light emitted does not cause discomfort glare to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.
- 5.1.4. Position
 - 5.1.4.1. In width: subject the provisions in paragraph 5.1.3.1 and
 - 5.1.4.2. In height: no individual specifications.
 - 5.1.4.3. In length: no individual specifications.
- 5.1.5. Geometric visibility
 - 5.1.5.1. 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° with the axis of reference of the headlamp.
 - 5.1.5.2. The origin of the angles of geometric visibility is the perimeter of the projection of the illuminating surface on a transverse plane tangent to the foremost part of the lens of the headlamp.
- 5.1.6. Orientation

Towards the front.
- 5.1.7. Electrical connections
 - 5.1.7.2. If there are two pairs of the driving beam headlamps they may be switched on either simultaneously or in pairs. For changing over from the passing to the driving beam at least one pair of driving beam headlamps shall be switched on. For changing over from the driving beam to the passing beam all driving beam headlamps shall be switched off simultaneously.
 - 5.1.7.3. The passing beam headlamps may remain switched on at the same time as the driving beam headlamps.

5.1.7.4. Where four concealable headlamps are fitted their raised position must prevent the simultaneous operation of any additional headlamps fitted, if these are intended to provide light signals consisting of intermittent illumination at short intervals in daylight.

5.1.7.5. It shall always be possible to switch the driving-beam headlamps on and off manually. If automatic operation of the driving beam headlamps is provided, it shall be only able to be set by the driver each time after the device which controls the starting and stopping of the engine is put into such a position that operation of the engine is possible.

[study reservation: Japan, United Kingdom - Nederland & Sweden (switch ON) – SAE J565 may be helpful.]

5.1.8. Tell-tale

Circuit-closed tell-tale mandatory.

5.1.9. Other provisions

5.1.9.1. No more than one driving beam headlamp and/or its beam pattern on each side of the vehicle may swivel about a substantially vertical axis in accordance to the direction of the vehicle travel.

5.1.9.2. Where a vehicle is fitted with four concealable driving beam headlamps the installation of two more headlamps shall be allowed only for the purpose of providing light-signalling, consisting of intermittent illumination, at short intervals in the daylight.

5.1.9.3. The aggregate maximum intensity of all driving beam headlamps which can be switched on simultaneously shall not exceed 225,000 cd at any point in the beam pattern when measured at 12.0 V, based on documentation supplied by the vehicle manufacturer.

5.2. **PASSING BEAM HEADLAMP**

5.2.1. Presence

Mandatory on motor vehicles. Prohibited on trailers.

5.2.2. Number

Two.

5.2.3. Arrangement

Fitted in such a way that the light emitted does not cause discomfort glare to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

5.2.4. Position (see annex 3)

5.2.4.1. In width:

E less than or equal to 400 mm;

5.2.4.2. In height:

H2 more or equal to 500 mm; and

Motor vehicles exceeding gross vehicle mass of [~~5,500~~12,000] kg, which are equipped with headlamps whose light sources have an objective luminous flux not exceeding 2,000 lumen each:

[in the future instead of mass we should have H-point as decision parameter]

[Japan and Germany would like to eliminate the physical dimension of a vehicle characteristic]

H1 less than or equal to 1,200 mm.

All other cases

H1 less than or equal to 950 mm.

5.2.4.3. In length:

at the front of the vehicle.

5.2.5. Geometric visibility (see annex 3)

Horizontal angles:

β_1 equal to 45° and
 β_2 equal to 10° .

Vertical angles:

α_1 equal to 15° and
 α_2 equal to 10° ,

5.2.6. Orientation

5.2.6.1. **Towards the front.**

5.2.6.2. The manufacturer shall provide means to ensure that the initial vertical inclination of the passing beam headlamp can be set within the proper initial aiming limits.

5.2.6.3. The vertical inclination of the passing beam headlamp shall be automatically maintained from (the upper initial aiming limit + 0.5% inclination) to (the lower initial aiming limit – 1.0% inclination). Automatic headlamp levelling is not required if under all permissible loading conditions the aiming of the passing beam headlamps is always from (the upper initial aiming limit + 0.5% inclination) to (the lower initial aiming limit – 1% inclination).

5.2.7. Electrical connections

5.2.7.1. The control for changing over to the passing beam must switch off all driving beam headlamps simultaneously.

5.2.7.2. The passing beams may remain switched on at the same time as the driving beams.

5.2.7.3. Passing beam headlamps equipped with gas-discharge light sources shall remain switched on during the driving beam operation.

5.2.7.4. Passing-beam headlamps may be switched on or off automatically. However, it shall always be possible to manually override the automatic operation.

5.2.8. Tell-tale

Tell-tale optional.

5.2.9. Other provisions

The requirements of paragraph 4.6.2. shall not apply to passing beam headlamps.

Passing beam headlamp and/or its beam pattern may swivel about a substantially vertical axis according to the direction of the vehicle travel.

Passing beam headlamps with a light sources having combined objective luminous flux, which exceeds 2,000 lumen shall only be installed in conjunction with the installation of headlamp cleaning device(s).

Mechanical headlamp cleaning devices (wipers) shall not be installed on headlamps with plastic lenses.

5.3. FRONT FOG LAMP

5.3.1. Presence

Optional on motor vehicles. Prohibited on trailers.

5.3.2. Number

Two.

5.3.3. Arrangement

No point on the apparent surface in the direction of the reference axis may be higher than the highest point on the apparent surface in the direction of the reference axis of the passing beam headlamp.

5.3.4. Position

5.3.4.1. In width:

E less than or equal to 400 mm

5.3.4.2. In height:

H1 more or equal to 250 mm

H2 less than or equal to 800 mm

5.3.4.3. In length:

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

5.3.5. Geometric visibility

Horizontal angles:

β_1 equal to 45°

β_2 equal to 10°

Vertical angles:

α_1 equal to 5°

α_2 equal to 5°

5.3.6. Orientation

Towards the front.

They must be directed forward without causing undue dazzle or discomfort glare to oncoming drivers and other road users.

5.3.7. Electrical connections

Shall be such that:

5.3.7.1. The front fog lamps may be switched on and off independently of driving and/or passing beam headlamps.

5.3.7.2. The front fog lamps may continue to operate until the position lamps are switched off, and the front fog lamps shall then remain off until deliberately switched on again.

5.3.7.3. It shall always be possible to switch the front fog lamps on and off manually. If automatic operation of the driving beam headlamps is provided, it shall be only able to be set by the driver each time after the device which controls the starting and stopping of the engine is put into such a position that operation of the engine is possible.

**Alternative preferred by majority participants of 5th informal session:
The front fog lamps shall not be switched on automatically.**

5.3.8. Tell-tale

Circuit-closed tell-tale mandatory.

5.3.9. Other provisions

None.

5.4. REVERSING LAMP

5.4.1. Presence

Mandatory on motor vehicles. Optional on trailers.

5.4.2. Number

5.4.2.1. motor vehicles of category 1-1 and on all other vehicles with an overall length not exceeding 6,000 mm

One device mandatory and
second device optional

5.4.2.2. Other vehicles with an overall length exceeding 6,000 mm, except vehicles of category 1-1

Two devices mandatory and additional two devices optional.]

5.4.3. Arrangement

No special requirement.

5.4.4. Position

5.4.4.1. In width:

no special requirement.

5.4.4.2. In height:

H1 more or equal to 250 mm

H2 less than or equal to 1,200 mm

5.4.4.3. In length:

at the rear of the vehicle.

however, if installed, the additional pair of reversing lamps shall be fitted one on each side of the vehicle or on the rear of the vehicle.

5.4.5. Geometric visibility

5.4.5.1. Horizontal angles:

If one lamp:

β_1 equal to 45°

β_2 equal to 45°

If two lamps:

β_1 equal to 45°

β_2 equal to 30°

Vertical angles:

α_1 equal to 15°

α_2 equal to 5°

5.4.5.2. In case of additional two reversing lamps:

Horizontal angles:

if only one lamp

β_1 equal to 45°

β_2 equal to 45°

if two lamps

β_1 equal to 45°

β_2 equal to 10°

Vertical angles:

α_1 equal to 5°

α_2 equal to 5°

5.4.6. Orientation

Rearwards.

In case of the two optional devices mentioned in paragraph 5.4.2.2., if fitted on the side of the vehicle the above mentioned requirements of paragraph 5.4.5.2. shall not be applied. However, the reference axis of these devices shall be orientated sideward $10^\circ \pm 5^\circ$ horizontally towards the rear in relation to the median longitudinal plane of the vehicle.

5.4.7. Electrical connection

5.4.7.1. Electrical connections shall be such that the lamp(s) can illuminate automatically and 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 illuminate or remain illuminated if either of the above conditions is not satisfied.

- 5.4.7.2. Moreover, the electrical connections of the two optional devices mentioned in paragraph 5.4.2.2. shall be such that these devices cannot illuminate unless the lamps referred to in paragraph 4.11. are switched on.

It is allowed to switch on the devices fitted on the side of the vehicle, for slow manoeuvres in forward motion. For such purposes, the devices shall be activated and deactivated manually by a separate control and may remain illuminated even when reverse gear is disengaged. However, if the forward speed of the vehicle exceeds 10 km/h the devices shall be switched off automatically and shall remain switched off until deliberately switched on again.

- 5.4.8. Tell-tale

Tell-tale optional.

- 5.5. DIRECTION INDICATOR LAMP

- 5.5.1. Presence

In accordance with paragraph 5.5.2.

- 5.5.2. Number

Motor vehicles

Mandatory:

2 front direction indicator lamps

2 rear direction indicator lamps

2 side direction indicator lamps

~~2 additional side direction indicators on category 2 vehicles exceeding [9,000 mm] in overall length or having gross vehicle weight of 8,000 kg or more.~~

~~[see 5.6. per request from Japan]~~

Optional:

2 additional rear direction indicator lamps on other than category 1-1 vehicles

? 2 additional-side direction indicators on category 2 vehicles exceeding [9,000 mm] in overall length or having gross vehicle weight of 8,000 kg or more.

[See new 5.6.]

Trailers

Mandatory:

2 rear direction indicator lamps

2 side direction indicators on trailers exceeding [6,000 mm] in overall length or having gross vehicle weight of 8,000 kg or more.

Optional:

2 additional rear direction indicator lamps

2 side direction indicator lamps on vehicles equal to or less than 6,000 mm in overall length

? 2 additional-side direction indicators on other vehicles.
[See new 5.6.]

5.5.3. Arrangement

5.5.3.1. Where lamps combining the functions of front direction indicator lamps and side direction indicator lamps are fitted, in addition two side direction indicator lamps may be installed to meet the visibility requirements of paragraph 5.5.5.

5.5.3.2. If the distance between the edge of the **apparent surface** in the direction of the reference axis of the direction indicator lamp and that of the **apparent surface** in the direction of the reference axis of the passing-beam headlamp and/or the front fog lamp is less than 40 mm the photometric output of the direction indicator must be increased according to the regulation of the Contracting Party.

If the distance between the centre of reference of the direction indicator lamp and the edge of the apparent surface in the direction of the reference axis of the passing-beam headlamp and/or the front fog lamp is less than 100 mm the photometric output of the direction indicator must be increased according to the regulation of the Contracting Party.

[will reflect decision taken at GRE with respect to UN/ECE R 48]

5.5.4. Position (see annex 3)

5.5.4.1. In width (front and all rear):

E less than or equal to 400 mm

D more or equal to 600 mm

vehicles less than 1,300 mm wide

D more or equal to 400 mm

5.5.4.2. In height (all):

H2 more or equal to 350 mm

H1 less than or equal to 1,500 mm

If the structure of the vehicle does not permit the upper limit to be respected, and if the optional lamps are not installed,

H1 less than or equal to 2,100 mm.

If optional rear direction indicator lamps are installed, they shall be placed at a height compatible with the applicable requirements of paragraph 5.5.4.1. 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 direction indicator lamps.

5.5.4.3. In length:

Front direction indicator lamps:

at the front.

Side direction indicator lamps:

K less than or equal to 2,500 mm

For trailers with drawbars, as an alternative

K less than or equal to 400 mm excluding drawbar (see figure xxx)

Rear direction indicator lamps:

at the rear.

5.5.5. Geometric visibility (see annex 3)

5.5.5.1. Horizontal angles:

Front direction indicators:

β_1 equal to 80°

β_1 equal to 45° when direction indicator is supplemented by flashing front side-marker lamp of the same colour.

β_2 equal to 45°

Rear direction indicator:

Motor vehicles:

β_1 equal to 80°

β_1 equal to 45° when direction indicator is supplemented by flashing rear side-marker lamp of the same colour.

β_2 equal to 45°

Trailer:

β_1 equal to 80°

β_2 equal to 45°

Side direction indicator:

β_3 equal to 60°

η equal to 5°

(angles β_3 and η are measured from the plane tangent to the lens of the side turn signal lamp and parallel to the longitudinal plane of the vehicle)

5.5.5.2. Vertical angles:

α_1 equal to 15° (5° if H1 of the optional direction indicator lamps is more than 2,100 mm)

α_2 equal to 15° (5° if H1 is less than 750mm)

side direction indicator lamps:

α_1 equal to 30° (15° for vehicles of less than 6,000 mm in overall length)

α_2 equal to 15° (5° if H1 is less than 750mm)

5.5.5.3. For the direction indicator to be considered visible throughout the angles of geometric visibility one of the following shall be met:

The minimum luminous intensity within the above angles must not be less than 0.3 cd;

or

Throughout the angles of geometric visibility, with the outward angle up to 45° , the lamp must provide an unobstructed view of the apparent surface of at least 12.5 cm^2 , except for the side direction indicator for which this area is at least 10 cm^2 . The apparent surface of any retro-reflector shall be excluded.

[OICA-inf5-4 questions the area requirement for the side direction indicator.]

5.5.6. Orientation

According to the specifications for installation by the manufacturer, if any.

5.5.7. Electrical connections

5.5.7.1. Direction indicator lamps shall switch on independently of the other lamps.

5.5.7.2. It shall be possible to switch the direction indicator lamps on and off manually. The automatic switching of direction indicator lamps is permissible only for their deactivation.

5.5.7.3. 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 and at the same frequency.

5.5.7.4. When the direction indicator lamps must be supplemented per paragraph 5.5.5.1. by flashing side-marker lamps of the same colour, these side-marker lamps shall flash at the same frequency and in phase with the direction indicator lamps on the same side of the vehicle.

5.5.7.5. All direction indicator lamps may also flash simultaneously in association with vehicle alarm systems and/or immobilisers to draw attention to the vehicle and/or during the arming and disarming of the vehicle's alarm system.

5.5.7.6 Hazard warning signal

5.5.7.6.1. The hazard warning signal shall be operated by means of a separate, manual control enabling all direction indicators on both sides of the vehicle to flash in accordance with the requirements of paragraph 5.5.7.3. above.

5.5.7.6.2. The hazard warning signal may be activated automatically in the event of the vehicle being involved in a collision. In such case it shall only be turned off manually.
[allowance for automatic activation of the hazard warning signal in case of immediate danger will be added if such signal is adopted by GRE for Regulation No. 48]

5.5.7.6.3. As specified in paragraph 5.5.9. If a power-driven vehicle is equipped to draw a trailer the hazard warning signal control shall also enable all direction indicator on the trailer. The hazard warning signal shall be able to function even if the device which starts or stops the propulsion system of the vehicle is in a position which makes it impossible to start the propulsion system.

5.5.8. Tell-tale

5.5.8.1. 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 auditory only, 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.

- 5.5.8.2. If a motor vehicle is equipped to draw a trailer, it must be fitted with a special visual operational tell-tale for the direction indicator lamps on the trailer unless the tell-tale of the drawing vehicle allows the failure of any one of the direction indicator lamps on the vehicle combination thus formed to be detected.
- 5.5.8.3. For the optional pair of rear direction indicator lamps on trailers, operating tell-tale shall not be mandatory.

5.5.8.4. Hazard warning signal

Circuit-closed tell-tale mandatory. Flashing warning light, which can operate in conjunction with the tell-tale(s) for direction indicators.

5.5.9. Other provisions

- 5.5.9.1. **The direction indicator shall emit light at a steady rate of 90 ± 30 flashes per minute.**

[NEED DEFINITION OF "STEADY RATE"]

- 5.5.9.2. 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.
- 5.5.9.3. If a motor vehicle is equipped to draw a trailer, the control of the direction indicator lamps on the drawing vehicle shall also operate the direction indicator lamps of the trailer.
- 5.5.9.4. In case of failure, other than short-circuit, of one direction indicator lamp, the others must continue to flash, but the frequency in this condition may be different from that prescribed.
- 5.5.9.5. Rear direction indicator lamps must not be reciprocally incorporated with stop lamps.

5.6. MIDDLE-SIDE DIRECTION INDICATOR

5.6.1. Presence

Mandatory

5.6.2. Number

2 middle-side direction indicator lamps on category 2 vehicles and trailers exceeding 8,000 kg in gross vehicle mass.

5.6.3. Arrangement

one on each side of the vehicle.

5.6.4. Position (see annex 3)

5.6.4.1. In width:

no requirement

5.6.4.2. In height:

H2 more or equal to 350 mm

H1 less than or equal to 2,300 mm

5.6.4.3. In length

Motor vehicle: within 2,500 mm rearward of the cab's rear end

Trailer: within 4500mm from the front end including a drawbar.

5.6.5. Geometric visibility (see annex 3)

5.6.5.1. The middle-side direction indicator shall be visible from any point on the vertical plane 1,000 mm outwards of the vehicle's outermost point and parallel to the median longitudinal plane of the vehicle, and between a height of 1,000 mm and 1,600 mm from the ground and between the vertical line 1,000 mm forward to the installation position of the middle-side direction indicator and the other vertical line equidistant with the vehicle's rear end from the installation position of the middle-side direction indicator (see Figure 1-1).

5.6.5.2. For the middle-side direction indicator to be considered visible throughout the angles of geometric visibility one of the following shall be met:

The minimum luminous intensity within the above angles must not be less than 3 cd;

or

The apparent surface of the middle-side direction indicator shall be at least 40 cm² as projected onto the vehicle's median longitudinal plane, onto the second plane intersecting with the median longitudinal plane at 45 degrees from forward, and onto the third plane intersecting with the median longitudinal plane at 45 degrees from rearward. (see Figure 1-2)

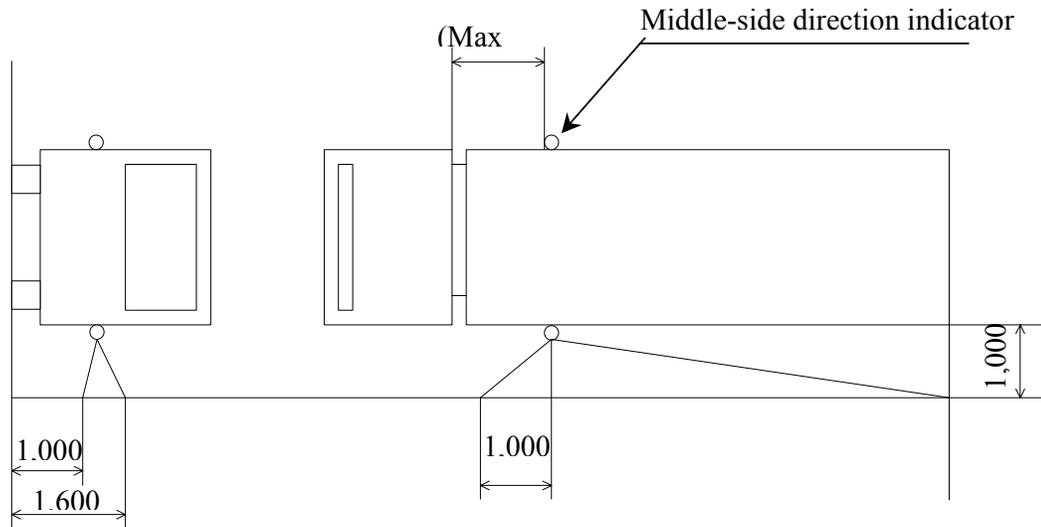


Figure 1-1

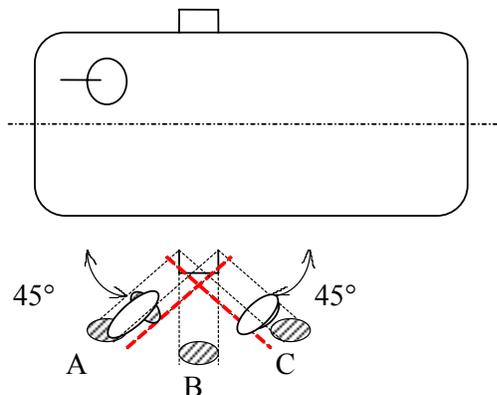


Figure 1-2

5.6.6. Orientation

According to the specifications for installation by the manufacturer, if any.

5.6.7. Electrical connections

Middle-side direction indicator lamps shall function simultaneously with the other direction indicator lamps per paragraph 5.5.7.

5.6.8. Tell-tale

Per paragraph 5.5.8.

5.6.9. Other provisions

No special requirements.

Justifications for middle-side direction indicators

To prevent the under-running of cyclists and pedestrians by large vehicles, Japan in 1980 began the mandatory installation of a direction indicator lamp in the middle area of each lateral side of the large truck exceeding 8 tons GVM (not including tractors trailing a trailer) and also of the trailer exceeding 8 tons GVM. This was combined with the requirements for expanding the left visual field of the drivers of large vehicles and for improving the side-guard structures of large vehicles. As a result, the number of fatal accidents involving these large vehicles making a left turn was substantially reduced.

The reason why the Gross Vehicle Mass, rather than the longitudinal length, was chosen as a criterion for the scope of vehicles is as follows: There were accidents where pedestrians and cyclists are trapped by heavy-duty vehicles when such vehicles are making a steep turn. We believed that the danger comes from the bulk of the vehicle, which is not necessarily equal to the longitudinal length but rather combined with their width and height, and that this bulk makes recognition of pedestrians and cyclists difficult. Actually, heavy-duty dump trucks with relatively short longitudinal length had many accidents of this type in the past. For this reason we believe that the Gross Vehicle Mass is more appropriate as a criterion rather than the longitudinal length.

As for the position of the direction indicator, Japan prescribes that the middle-side direction indicator to be installed within 2,500 mm rearward of the cab's rear end for large trucks. One reason for this is that the middle-side direction indicator needs to be located slightly forward to the side middle point to deal with the different turn radiuses of the front and rear wheels. Another reason is that, if the middle-side direction indicator is located too forward, its visible range will overlap with the visible range of the side direction indicator lamp installed on the cab.

Moreover, Japan introduced the visible range of the middle-side direction indicator in terms of a plane running parallel to each side of the large vehicle. This is intended to ensure a good visibility of the middle-side direction indicator for pedestrians and cyclists progressing side by

side with the vehicle. The height ranges of 1,000 mm to 1,600 mm from the ground covers the eyepoint heights of pedestrians and cyclists ranging from 4-year-olds to adults.]

5.7. STOP LAMP

5.7.1. Presence

Mandatory

5.7.2. Number

Per 5.7.3.

5.7.3. Arrangement

5.7.3.1. two:

All vehicles

5.7.3.2. one centre stop lamp:

Vehicles of categories 1 and 2, except for vehicles of category 2 with gross vehicle mass more than 4,550 kg and whose overall width is more than 2,050 mm.

Optional on other vehicles.

Only, when the median longitudinal plane of the vehicle is not located on a fixed body panel but separates one or two movable parts of the vehicle (e.g. doors), and lacks sufficient space to install a single centre stop lamp on the median longitudinal plane above or below such movable parts, either:

Centre stop lamp composed of two devices may be installed, one on each movable part, or
one centre stop lamp may be installed offset to the left or to the right of the median longitudinal plane.

5.7.3.3. two optional stop lamps:

on other motor vehicles and trailers if centre stop lamp is not installed.

5.7.4. Position

5.7.4.1. In width:

For each lamp of the pair of stop lamps:

E less than or equal to 400 mm;

For centre stop lamp:

the centre of reference shall be situated on the median longitudinal plane of the vehicle.

However, in the case where a centre stop lamp composed of two devices is installed, according to paragraph 5.7.3., they shall be positioned as close as possible to the median longitudinal plane, one on each side of this plane.

In the cases where one centre stop lamp offset from the median longitudinal plane is permitted according to paragraph 5.7.2., this offset shall not exceed 150 mm from the median longitudinal plane to the centre of reference of the lamp.

5.7.4.2. In height:

5.7.4.2.1. For the pair of stop lamps:

H2 more or equal to 350 mm (380 mm to the optical centre of the lamp)

H1 less than or equal to 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 the vertical distance as large as the shape of the bodywork makes it possible, but not less than 600 mm above the mandatory lamps).

5.7.4.2.2. For centre stop lamp the horizontal plane tangential to the lower edge of the apparent surface shall be:

not 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

H2 more or equal to 850 mm

However, the horizontal plane tangential to the lower edge of the apparent surface of centre stop lamp shall be above the horizontal plane tangential to the upper edge of the apparent surface of the symmetrical pair of stop lamps.

5.7.4.3. In length:

For a pair of stop lamps:
at the rear of the vehicle.

For centre stop lamp:
no special requirement.

5.7.5. Geometric visibility

Horizontal angles:

For a pair of stop lamps:

β_1 equal to 45°

β_2 equal to 45°

For centre stop lamp:

10° to the left and to the right of the longitudinal axis of the vehicle;

Vertical angles:

For the pair of stop lamps:

α_1 equal to 15° (5° if H1 of the optional stop lamps is more than 2,100 mm)

α_2 equal to 15° (5° if H1 is less than 750 mm)

For centre stop lamp:

α_1 equal to 10°

α_2 equal to 5°

5.7.6. Orientation

Towards the rear of the vehicle.

5.7.7. Electrical connections

5.7.7.1. All stop lamps must light up simultaneously when either the service brake or endurance brake (e.g. retarder) is activated and when a complete or partial braking system is activated for the purpose of generating vehicle speed retardation with or without a direct action of the driver. They must switch off automatically once the above conditions ceased to exist.

[this paragraph is under revision by GRE and GRRF]

5.7.7.2. Stop lamps must operate only automatically in accordance with 5.7.7.1.

The stop lamps need not function if the device, which starts and/or stops the engine, is in a position that makes it impossible for the engine to operate.

5.7.8. Tell-tale

Failure tell-tale mandatory;

[definition of tell-tales may not be necessary – each case could be addressed separately per device.]

5.7.9. Other provisions

5.7.9.1. The centre stop lamp may be installed outside or inside the vehicle.

5.7.9.2. In the case where it is installed inside the vehicle:

the light emitted shall not cause discomfort glare to the driver through the rear-view mirrors and/or other surfaces of the vehicle (i.e. rear window); and

the photometric requirements of the centre stop lamp must be met with the glazing behind which the lamp is to be installed.

5.7.9.3. A centre stop lamp shall be independent of any other lamp defined in this regulation.

5.7.9.4. **Any stop lamp must not be reciprocally incorporated with rear direction indicator lamp.**

5.8. REAR REGISTRATION PLATE ILLUMINATING DEVICE

5.8.1. Presence

Mandatory.

5.8.2. Number

Such that the device illuminates the site of the registration plate.

5.8.3. Arrangement

Such that the device illuminates the site of the registration plate.

The device shall be located above or on the side(s) of the site of the registration plate.

5.8.4. Position

5.8.4.1. In width:

such that the device illuminates the site of the registration plate.

5.8.4.2. In height:

such that the device illuminates the site of the registration plate.

5.8.4.3. In length:

such that the device illuminates the site of the registration plate.

5.8.5. Geometric visibility

Such that the device illuminates the site of the registration plate.

5.8.6. Orientation

Such that the device illuminates the site of the registration plate.

5.8.7. Electrical connections

In accordance with paragraph 4.11.

5.8.8. Tell-tale

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

5.8.9. Other provisions

When the rear registration plate illuminating device is combined with the rear position lamp, reciprocally incorporated in the stop lamp, direction indicator or in the rear fog lamp, the photometric characteristics of the rear registration plate illuminating device may be modified during the illumination of the stop lamp or the rear fog lamp.

5.9. FRONT POSITION LAMP

5.9.1. Presence

Mandatory on all motor vehicles.

Mandatory on trailers over 1,500 mm wide.

Optional on trailers, which are not more than 1,500 mm wide.

5.9.2. Number

Two.

5.9.3. Arrangement

No special requirement.

5.9.4. Position

5.9.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle.

This condition is only met when:

motor vehicles:

E less than or equal to 400 mm

Except for vehicle category 1-1 and category 2 with GVW not exceeding 3,500 kg

D more than or equal to 600 mm may be reduced to 400 mm when the overall width of the vehicle is less than or equal to 1,300 mm

trailers:

E less than or equal to 150 mm.

5.9.4.2. In height:

H2 more or equal to 350 mm (380 mm from the optical centre of the lamp)

H1 less than or equal to 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm)

5.9.4.3. In length:

no individual specification.

5.9.4.4. Where the front position lamp and another lamp are reciprocally incorporated, the apparent surface in the direction of the reference axis of the other lamp must be used to verify compliance with the positioning requirements (paragraphs 5.9.4.1. to 5.9.4.3.).

5.9.5. Geometric visibility

5.9.5.1. Horizontal angles:

β_1 equal to 80° (45° if side marker lamps are present)

[Italy will consider the above situation in view of colour requirements]

β_2 equal to 45° (5° for trailers)

Vertical angles:

α_1 equal to 15°

α_2 equal to 15° (5° if H1 less than 750 mm)

5.9.5.2. For the front position lamp to be considered visible throughout the angles of geometric visibility the following shall be met:

The minimum luminous intensity within the above angles must not be less than 0.05 cd;

or

The lamp must provide an unobstructed view of the projected apparent surface of at least 12.5 cm².

The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.

5.9.6. Orientation

Forwards.

5.9.7. Electrical connections

In accordance with paragraph 4.11.

5.9.8. Tell-tale

Circuit-closed tell-tale mandatory. **Is not required if the instrument panel lighting can only be turned on simultaneously with the front position lamps.**

5.9.9. Other provisions

None.

5.10. REAR POSITION LAMP

5.10.1. Presence

Mandatory.

5.10.2. Number

Two.

Two optional rear position lamps on vehicles other than:

- category 1-1 vehicles;
- category 2 vehicles with GVW under 3,500 kg; or
- vehicles on which end-outline marker lamps are installed.

5.10.3. Arrangement

No special requirement.

5.10.4. Position

5.10.4.1. In width:

5.10.4.1.1. mandatory rear position lamps;

as close as practicable to the adjacent extreme edge of the vehicle.

This condition is only met when:

E less than or equal to 400 mm

Except for vehicle category 1-1 and category 2 with GVW not exceeding 3,500 kg

D more than or equal to 600 mm may be reduced to 400 mm when the overall width of the vehicle is less than or equal to 1,300 mm

5.10.4.1.2. optional rear position lamps

D more than or equal to 600 mm

5.10.4.2. In height:

H2 more or equal to 350 mm

H1 less than or equal to 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 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.

5.10.4.3. In length:

at the rear of the vehicle.

5.10.5. Geometric visibility

5.10.5.1. Horizontal angles:

β_1 equal to 80° (45° if side marker lamps are present)

β_2 equal to 45°

Vertical angles:

α_1 equal to 15° (5° if H1 of the optional rear position lamps more 2,100 mm)

α_2 equal to 15° (5° if H1 less than 750 mm)

5.10.5.2. For the rear position lamp to be considered visible throughout the angles of geometric visibility the following shall be met:

The minimum luminous intensity within the above angles must not be less than 0.05 cd;

or

The lamp must provide an unobstructed view of the projected apparent surface of at least 12.5 cm^2 .

The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.

5.10.6. Orientation

Rearwards.

5.10.7. Electrical connections

In accordance with paragraph 4.11.

5.10.8. Tell-tale

Circuit-closed tell-tale mandatory. It must be combined with that of the front position lamps.

5.10.9. Other provisions

Rear position lamp shall not be combined with a rear end outline marker lamp.

START FOR 6th INFORMAL SESSION

5.11. REAR FOG LAMP

5.11.1. Presence

Mandatory.

5.11.2. Number

One or two.

5.11.3. Arrangement

No special requirement.

5.11.4. Position

5.11.4.1. In width:

two lamps:

no specific requirements

one lamp:

it must be on the opposite side of the median longitudinal plane of the vehicle to the direction of traffic prescribed in the country of registration, the centre of reference may also be situated on the median longitudinal plane of the vehicle.

5.11.4.2. In height:

H2 more or equal to 250 mm

H1 less than or equal to 1,000 mm.

5.11.4.3. In length:

at the rear of the vehicle.

5.11.5. Geometric visibility

Horizontal angles:

β_1 equal to 25°

β_2 equal to 25°

Vertical angles:

α_1 equal to 5°

α_2 equal to 5°

5.11.6. Orientation

Rearwards.

5.11.7. Electrical connections

5.11.7.1. The rear fog lamp(s) shall be switched on and off manually. However, it(they) may switch on automatically under conditions referred to in paragraph 3.5.11.

Rear fog lamp(s) shall not switch on unless the driving beams, passing beams or front fog lamps are lit;

5.11.7.2. The rear fog lamp(s) may be switched off independently of any other lamp;

5.11.7.3. **If not switched off manually, the rear fog lamp(s) may continue to operate until the position lamps are switched off. The rear fog lamp(s) shall then remain off until deliberately switched on again.**

5.11.7.4 Except as provided in paragraphs 5.11.7.1. and 5.11.7.3., the operation of the rear fog lamp(s) shall not be affected by switching on or off any other lamps.

[5.11.7.5. Rear fog lamps may be switched on and off automatically. However, it shall be always possible to switch these rear fog lamps on and off manually.]

[following the logic of OICA-inf5-4]

[UK-inf5-3 prefers the rear fog lamps to be operated manually, however, UK may agree to automatic switching of REAR fog lamps.]

[Alternative: see 5.11.7.1.]

5.11.8. Tell-tale

Circuit-closed tell-tale mandatory. An independent non-flashing warning light.

5.11.9. Other provisions

In all cases, the distance between the rear fog lamp and each stop-lamp must be greater than 100 mm.

5.12. PARKING LAMP

[UK-inf5-3 questions the presence of this lamp in this gtr. Is it necessary? Can this paragraph be deleted?]

5.12.1. Presence

On ~~light duty~~category 1 vehicles with overall/structural length between 2,000 and 6,000 mm [J]- optional, unless prohibited by the Contracting Party [I].

[Italy-inf5-5 comment to para. 5.12.9.

[Japan-inf5-6]

On all other vehicles, prohibited.

5.12.2. Number

According to the arrangement.

5.12.3. Arrangement

Four lamps: two lamps at the front and two lamps at the rear,
or

Two lamps: one lamp on each side.

5.12.4. Position

5.12.4.1. In width:

E less than or equal to 400 mm.

If there are two lamps, they shall be on the sides of the vehicle.

5.12.4.2. In height:

no special requirement;

5.12.4.3. In length:

no special requirement.

5.12.5. Geometric visibility

Horizontal angles:

For lamps mounted on the front and rear of the vehicle:

β_1 equal to 45°

For lamps mounted on the side of the vehicle:

β_1 equal to 45°

β_2 equal to 45°

Vertical angles:

α_1 equal to 15°

α_2 equal to 15° (5° if H1 less than 750 mm)

5.12.6. Orientation

Such that the lamps meet the requirements for visibility forwards and rearwards.

5.12.7. 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) must be able to function even if the device which activates the propulsion system of the vehicle is in a position which makes it impossible for the vehicle to operate.

The parking lamps ~~shall not~~ may be operated automatically.

[OICA-inf5-4 questions the prohibition of automatic switching of parking lamps.]

5.12.8. Tell-tale

Circuit-closed tell-tale optional. If there is one, it must not be the same as the tell-tale for the front and rear position lamps.

5.12.9. Other provisions

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.

[Italy-inf5-5 comment dealt with in para. 5.12.1.]

5.13. END-OUTLINE MARKER LAMP

5.13.1. Presence

**On ~~heavy-duty~~ vehicle over 2032 mm in overall width
– mandatory**

**On ~~chassis-cabs and~~
vehicles between 1.801800 mm and 2.102032 mm in overall width – optional.**

[Japan-inf5-6 with modification 2,100 mm to 2,032 mm - per US regulation]

5.13.2. Number

**2 ~~or~~ 4 visible from the front and
2 ~~or~~ 4 visible from the rear.**

[Italy-inf5-5]

5.13.3. Arrangement

No special requirement.

5.13.4. Position

5.13.4.1. In width:

Front:
as close as possible to the adjacent extreme outer edge of the vehicle.
This condition is deemed to have been met when:

Motor vehicles:

E less than or equal to 400 mm

Trailers:

E less than or equal 100 mm

Rear:

as close as possible to the adjacent extreme outer edge of the vehicle.

This condition is deemed to have been met when:

E less than or equal to 100 mm

5.13.4.2. In height:

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.

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.

5.13.4.3. In length:

no special requirement.

5.13.5. Geometric visibility

Horizontal angles:

β_1 equal to ~~45~~80°

β_2 equal to 45°

[Italy-inf5-5]

[Japan-inf5-6 suggests allowance for β_2 to be equal to 0°]

Vertical angles:

α_1 equal to 10°

α_2 equal to 20°

[Japan-inf5-6 suggests allowance for α_1 to be equal to 5°]

5.13.6. Orientation

Such that the lamps meet the requirements for visibility forwards and rearwards.

5.13.7. Electrical connections

In accordance with paragraph 4.11.

5.13.8. 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.

5.13.9. Other provisions

Provided that all other requirements are met, the lamp visible from the front and the lamp visible from the rear on the same side of the vehicle may be combined in one device.

Rear end outline marker lamp shall not be combined or reciprocally incorporated with a rear position lamp.

[per FMVSS 108]

The position of an end-outline marker lamp in relation to corresponding position lamp shall be such that the distance between the projections on a transverse vertical plane of the points nearest to one another on the apparent surfaces in the direction of the respective reference axes of the two lamps considered is not less than 200 mm.

[Italy-inf5-5]

5.14. REAR RETRO-REFLECTOR, NON-TRIANGULAR

5.14.1. Presence

Mandatory [**on motor vehicles**].

[Provided that they are grouped together with the other rear light-signalling devices, optional on trailers.]

5.14.2. Number

Two

5.14.3. Arrangement

No special requirement.

5.14.4. Position

5.14.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle.

This condition is only met when:

E less than or equal to 400 mm

5.14.4.2. In height:

H2 more or equal to 350 mm

[Italy-inf5-5 and OICA-inf5-4 suggest changing the figure to 250 mm for alignment with UN/ECE R 48 as the 350 mm requirement could be restrictive on **design** of certain vehicle.

Note: Canada has a problem with low mounted reflex reflectors – in adverse winter conditions they become useless. Also, the angle of visibility from a position of a truck driver may make low mounted reflex reflectors not visible.]

[Japan-inf5-6 does not have objections to the 350 mm limit.]

H1 less than or equal to 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

5.14.4.3. In length:

at the rear of the vehicle.

5.14.5. Geometric visibility

Horizontal angles:

β_1 equal to 30°

β_2 equal to 30°

Vertical angles:

α_1 equal to 10°

α_2 equal to 10° (5° H1 less than 750 mm)

5.14.6. Orientation

Rearwards.

5.14.7. Other provisions

5.14.7.1. The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the rear.

5.14.7.2. Additional retro-reflecting devices and materials are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

5.15. REAR RETRO-REFLECTOR, TRIANGULAR

5.15.1. Presence

Mandatory on trailers.

Prohibited on motor vehicles.

5.15.2. Number

Two.

5.15.3. Arrangement

The apex of the triangle shall be directed upwards.

5.15.4. Position

5.15.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle

This condition is only met when:

E less than or equal to 150 mm (400 mm if the shape of the bodywork makes it impossible to keep within 150 mm).

D more or equal to 600 mm (400 mm if the overall width of the vehicle is less than 1,300 mm)

5.15.4.2. In height:

H2 more or equal to 350 mm

[Italy-inf5-5 and OICA-inf5-4 same comment as for 5.14.4.2.]

[Japan-inf5-6 does not have objections to the 350 mm limit.]

H1 less than or equal to 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

5.15.4.3. In length:

at the rear of the vehicle.

5.15.5. Geometric visibility

Horizontal angles:

β_1 equal to 30°

β_2 equal to 30°

Vertical angles:

α_1 equal to 15°

α_2 equal to 15° (5° if H1 less than 750 mm)

5.15.6. Orientation

Rearwards.

5.15.7. Other provisions

5.15.7.1. No other lamp shall be placed inside the triangle.

5.15.7.2. Additional retro-reflecting devices and materials are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

5.15.7.3. The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the rear.

[per TRANS/WP.29/2004/4]

5.16. FRONT RETRO-REFLECTOR, NON-TRIANGULAR

5.16.1. Presence

Mandatory on trailers.

Mandatory on motor vehicles having all forward facing lamps with reflectors concealable.

Optional on other motor vehicles.

5.16.2. Number

Two.

5.16.3. Arrangement

No special requirement.

5.16.4. Position

5.16.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle-and-
This condition is only met when:

motor vehicle:

E less than or equal to 400 mm

trailer:

E less than or equal to 150 mm

5.16.4.2. In height:

H2 more or equal to 250 mm

H1 less than or equal to 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm)

5.16.4.3. In length:

at the front of the vehicle.

5.16.5. Geometric visibility

Horizontal angles:

β_1 equal to 30°

β_2 equal to 30°

In the case of trailers:

β_2 may be reduced to 10° .

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 limitation (paragraph 5.16.4.1.), which shall, in conjunction with the mandatory retro-reflectors, give the necessary visibility angle.

Vertical angles:

α_1 equal to 10°

α_2 equal to 10° (5° H1 less than 750 mm)

5.16.6. Orientation

Towards the front.

5.16.7. Other provisions

5.16.7.1 The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the front.

5.16.7.2. Additional retro-reflecting devices and materials are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

5.17. SIDE RETRO-REFLECTOR, NON-TRIANGULAR

5.17.1. Presence

Mandatory:

5.17.2. Number

Vehicles less than 6,000 mm in overall length:

4 - 2 on each side of the vehicle.

Vehicles 6,000 mm or more in overall length:

Such that the requirements for longitudinal positioning are complied with.

5.17.3. Arrangement

no special requirement.

5.17.4. Position

5.17.4.1. In width:

no special requirement.

5.17.4.2. In height:

H2 more or equal to 350 mm

[Italy-inf5-5 and OICA-inf5-4 same comment as for 5.14.4.2.]

[Japan-inf5-6 does not have objections to the 350 mm limit.]

H1 less than or equal to 900 mm (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

5.17.4.3. In length:

K less than or equal to 400 mm from the front (600 mm if the shape of the bodywork makes it impossible to keep within 400 mm); in the case of trailers, account shall be taken of the length of the drawbar for the measurement of this distance.

[OICA-inf5-4 suggests keeping the possibility to define the location relative to the respective axles, as an alternative.]

[Note: this would be different that UN/ECE R 48 (?)]

[Japan-inf5-6 accepts]

K less than or equal to 400 mm from the rear.

vehicles over 6,000 mm long

D_n less than or equal to 3,000 mm (If the structure of the vehicle makes it impossible to comply with such a requirement, this distance may be increased to 4,000 mm)

5.17.5. Geometric visibility

Horizontal angles:

β_1 equal to 45°

β_2 equal to 45°

Vertical angles:

α_1 equal to 10°
 α_2 equal to 10° (5° if H1 less than 750 mm)

5.17.6. Orientation

Towards the side.

5.17.7. Other provisions

5.17.7.1. The illuminating surface of the side retro-reflector may have parts in common with the apparent surface of any other side lamp.

5.17.7.2. Additional retro-reflecting devices and materials are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.

5.18. SIDE-MARKER LAMPS

5.18.1. Mandatory

5.18.2. Number.

Minimum four

On vehicles 6,000 mm or more in overall length such that the requirements of paragraph 5.18.4.3. are met. The length of trailers shall be calculated including the drawbar.

5.18.3. Arrangement

no individual specifications.

5.18.4. Position

5.18.4.1. In width:

no individual specifications.

5.18.4.2. In height:

H2 more or equal to 250 mm

H1 less than or equal to 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm)

5.18.4.3. In length:

Foremost side-marker lamp:

K less than or equal to 400 mm (600 mm if the shape of the bodywork makes it impossible to keep within 400 mm)

on trailers equipped with a drawbar:

K more or equal to 1,000 mm from the front of the drawbar and less than or equal to 1,500 mm from the front of the drawbar.

Rearmost side marker lamp:

K less than or equal to 400 mm

vehicles over 6,000 mm long

D_n less than or equal to 3,000 mm (If the structure of the vehicle makes it impossible to comply with such a requirement, this distance may be increased to 4,000 mm)

5.18.5. Geometric visibility

Horizontal angles:

β_1 equal to 45°

β_2 equal to 45°

β_2 for the forward side marker lamps and for the rearward side marker lamp and both β_1 and β_2 angles for the intermediate side marker lamps may be reduced to 30° .

Vertical angles:

α_1 equal to 10°

α_2 equal to 10° (5° if H1 less than 750 mm)

5.18.6. Orientation

Only towards the side.

5.18.7. Electrical connections

5.18.7.1. In accordance with paragraph 4.11.

5.18.7.2 The side-marker lamps of the same colour as direction indicator lamps shall be wired to flash per paragraph 5.5.7.

5.18.7.3. The side-marker lamps may flash simultaneously in association with vehicle alarm system and/or immobiliser to draw attention to the vehicle and/or during the arming and disarming of the vehicle's alarm system.

5.18.8. 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.

5.18.9. Other provisions

When the side-marker lamp is combined with any other lighting or light signalling device the photometric characteristics of the side-marker lamp may be modified during the illumination of this other device.

5.19. DAYTIME RUNNING LAMP

5.19.1. Presence

Optional on motor vehicles.
Prohibited on trailers.

Note: Daytime running light (DRL) function may be made mandatory or prohibited by a-the Contracting Party.

DRL function does not have to be performed by daytime running lamps.

[Japan-inf5-6 – Japan would have to have option of disallowing DRL on their territory.]

5.19.2. Number

Two.

5.19.3. Arrangement

No special requirement.

5.19.4. Position

5.19.4.1. In width:

E less than or equal to 400 mm

D more or equal to 600 mm (400 mm where the overall width of the vehicle is less than 1,300 mm)

5.19.4.2. In height:

H2 more or equal to 350 mm

[Italy-inf5-5 and OICA-inf5-4 same comment as for 5.14.4.2.]

[Japan-inf5-6 does not object.]

H1 less than or equal to 950 mm – may be higher if another, regulated lighting or light signalling device accomplishes daytime running light function.

[Italy-inf5-5 and OICA-inf5-4 suggest that H1 less than or equal to 1500 mm – OICA suggests this only for heavy trucks would be more appropriate, in particular since daytime running lights should not produce glare.]

5.19.4.3. In length:

at the front of the vehicle.

5.19.5. Geometric visibility

Horizontal angles:

β_1 equal to 20°

β_2 equal to 20°

Vertical angles:

α_1 equal to 10°

α_2 equal to 10°

5.19.6. Orientation

Towards the front.

5.19.7. Electrical connections

5.19.7.1. If installed, the daytime running lamps shall be switched ON automatically each time the device, which starts and/or stops the engine, is in a position, which makes it possible for the engine to operate, unless the automatic transmission control is in the park or neutral position, the parking brake is applied, or the propulsion system is started but the vehicle was not set in motion for the first time.

5.19.7.2. At the discretion of the Contracting Party means may be required such that the daytime running lamps can be intentionally switched OFF for the remainder of the trip or for a specified time or distance.

[UK-inf5-3 questions the “specified time or distance”. They are plans to amend Canadian law to be in harmony with possible mandatory DRL in the United States, where such temporary off-switching may be required.]

[in agreement with Italy-inf5-5 comments]

5.19.7.3. The daytime running lamps shall switch off automatically when the headlamps are switched on, except when the latter are used to give intermittent luminous warnings at short intervals.

[UK-inf5-3 prefers DRL to switch off with the activation of position lamps.

This would be against the law in Canada.]

5.19.7.4. Lamps indicated in paragraph 4.11.1. ~~Rear position lamps~~ are permitted to operate simultaneously with the daytime running lamps.

[Italy-inf5-5]

5.19.8. Tell-tale

Circuit-closed tell-tale mandatory if a vehicle is not equipped with a device automatically activating all lamps required for operation of a vehicle at diminished ambient lighting condition.

[Japan-inf5-6 no objections as long as Japanese proposal for 5.1.7.1. (permission for automatic, based on ambient illumination, switch for lighting devices.)

[Italy-inf5-5 suggests an alternative:

Circuit-closed tell-tale optional.

However Contracting Party(ies) may request the mandatory fitting of a circuit closed tell-tale on the vehicles not equipped with a device automatically activating all lamps required for operation of a vehicle at diminished ambient lighting condition intended to be registered on its territory.]

5.20. IDENTIFICATION LAMPS (Front and Rear)

5.20.1. Presence

Mandatory – on vehicles over 2032 mm in overall width.

Note: Contracting Party may request that the identification lamps be “not present” on vehicles intended to be registered on its territory.

[Italy-inf5-5 the added provision was proposed for para. 5.20.9]

[Japan-inf5-6 accepts the mandatory status of this device.]

5.20.2. Number

on motor vehicles over 2,032 mm wide: three facing forward

on all vehicles over 2,032 mm wide excluding truck-tractors: three facing rearward

5.20.3. Arrangement

As specified in paragraph 5.20.4.1.

5.20.4. Position

5.20.4.1. In width:

The lamps shall form a three-lamp group with lamp centres spaced evenly and horizontally with distance of 150 mm to 300 mm between each two lamps. This group shall be mounted horizontally as close as practicable about the median longitudinal plane of vehicle with the reference axis of the middle lamp on that plane.

5.20.4.2. In height:

as high as practicable

The rear identification lamps may be located lower if the door header is narrower than 25 mm, however, H2 shall be more or equal to 350 mm.

5.20.4.3. In length:

no specific requirement.

5.20.5. Geometric visibility

Horizontal angles:

β_1 equal to 45°

β_2 equal to 45°

Vertical angles:

α_1 equal to 20°

α_2 equal to 20°

5.20.6. Orientation

front facing forward and rear facing rearward.

5.20.7. Electrical connections

In accordance with paragraph 4.11.

5.20.8. Tell-tale

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

5.21. CORNERING LAMP

5.21.1. Presence

Optional – on motor vehicles

Prohibited – on trailers

5.21.2. Number

Two.

5.21.3. Arrangement

No special requirement.

5.21.4. Position

5.21.4.1. In width:

E less than or equal to 400 mm

5.21.4.2. In length:

K less than or equal to 1,000 mm

5.21.4.3. In height:

H2 more or equal to 250 mm

H1 less than or equal to 900 mm

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 passing-beam headlamp.

5.21.5. Geometric visibility

Horizontal angles:

30° to 60° outwards.

Vertical angles:

α_1 equal to 10°

α_2 equal to 10°

5.21.6. Orientation

Towards the front side.

5.21.7. Electrical connections

The cornering lamps must be so connected that they cannot be on unless the driving-beam headlamps or the passing-beam headlamps are on the same time. The cornering lamp on one side of the vehicle shall be activated **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. **They shall switch off automatically when the steering wheel returns to its normal position for straight driving and/or when the direction indicators are switched off.**

5.21.8. Tell-tale

None.

5.21.9. Other provisions

5.21.9.1. The distance between the cornering lamp and front direction indicator lamp on the same side of the vehicle shall be at least [20 mm].

[per UK-inf5-3 - The expert from the United Kingdom prefers 100 mm]

[Italy-inf5-5 suggests an alternative:

Contracting Party(ies) may request that the distance between the cornering lamp and front direction indicator lamp on the same side of the vehicle shall be at least [20 mm] on vehicles intended to be registered on its territory.]

[Japan-inf5-6 does not object to the added specification of distance between cornering lamp and direction indicator. The edge of the apparent surface should be limited to the edge of the light emitting surface.]

5.21.9.2. The cornering lamps shall not be activated at the vehicle speed above 40 km/h.

- 5.21.9.3. The vertical inclination shall be specified by the manufacturer.
For height see paragraph 5.21.4.3. above.

5.22. CONSPICUITY TREATMENT

[Japan-inf5-6 – para. 3 of the preamble suggests removal of add-on reflective markings from the scope of this document; therefore it is proposed to remove entire para. 5.22.]

[UK-inf5-3 questioned colour specification of the conspicuity treatment. All references to colour were removed]

Contracting Party may mandate installation of system(s) of retro-reflecting devices/materials to increase the side and rear conspicuity of certain categories of vehicles intended to be registered on its territory.

[Italy-inf5-5 - delete 5.22.1 to 5.22.8 and replace with the above statement.]

5.22.1. Presence

Mandatory – on trailers more than 2,032 mm in overall width and 4,500 kg GVWR.

Optional – on other vehicles

5.22.2. Number

trailers:

rear: continuous

The edge of ~~white~~ the sheeting of the conspicuity system shall not be located closer than 75 mm to the edge of the luminous lens area of any lamp required by this regulation.

~~**The edge of red sheeting of the conspicuity system shall be located not closer than 75 mm to the edge of the luminous lens area of any amber lamp specified by this regulation.**~~

5.22.3. Position

5.22.3.1. **In width:**

upper body markings as far apart as practicable,

trailer:

continuous strip full width of horizontal member of the underride protection device,

truck tractor:

strips as far apart as practicable

5.22.3.2. In height:

upper body markings as high as practicable

Truck tractor:

strips, on fenders, on mud flaps brackets, or within 300 mm below the top of mud flaps.

**If no mud flaps or other supporting structure available on the rear:
strips mounted horizontally on the cab or on frame mounted brackets and as close as practicable to the range of 375 to 1,525 mm above the ground.**

**If on the rear of truck tractor's cab:
minimum 100 mm above the height of rear tyres.**

Trailer on the rear:

continuous strip on the frame, as close as practicable to the range of 375 to 1,525 mm above the ground.

continuous strip on the underride protection device, no height requirement.

Trailer on the side:

as close as practicable to the range of 375 to 1,525 mm above the ground

5.22.3.3. In length:

Trailer on the side

full length or evenly spaced segments over minimum of 50 per cent of vehicle's overall length, starts and ends at the extreme front and rear of the vehicle,

5.22.4. Geometric visibility

As installed on the vehicle, the conspicuity system shall be visible throughout all angles required for the device to comply with photometric requirements, with all vehicular obstructions considered.

5.22.5. Orientation

Rear markings: facing rearward

Side markings: facing sideways

All strips as horizontal as practicable and applied to the surface as vertical as practicable.

Conspicuity treatment manufacturer shall specify acceptable angular deviation from vertical or horizontal.

5.22.6. Electrical connections

N/A

5.22.7. Tell-tale

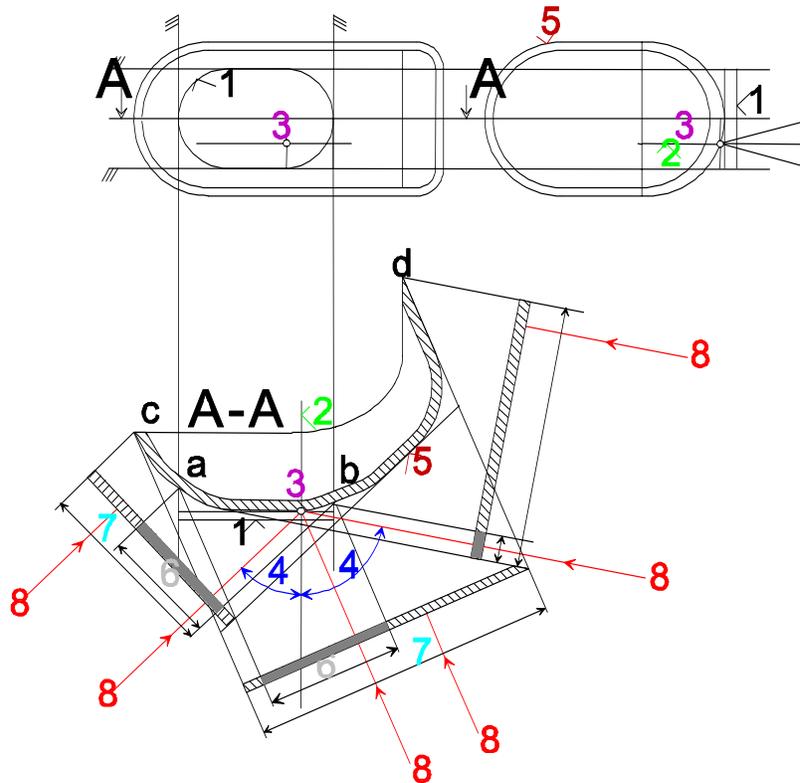
N/A

5.22.8. Other provisions

N/A

Annex 1

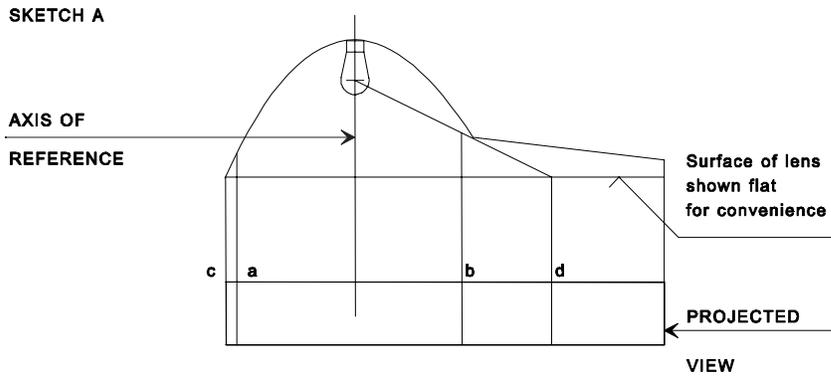
LAMP SURFACES, AXIS AND CENTRE OF REFERENCE,
AND ANGLES OF GEOMETRIC VISIBILITY



KEY

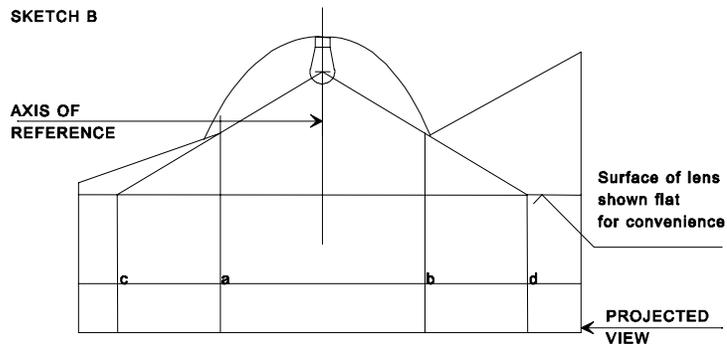
1. Illuminating surface
2. Axis of reference
3. Centre of reference
4. Angle of geometric visibility
5. Light-emitting surface
6. Apparent surface based on illuminating surface
7. Apparent surface based on light-emitting surface
8. Direction of visibility

Note: Notwithstanding the drawing, the apparent surface is to be considered as tangent to the light-emitting surface.



ILLUMINATING SURFACE IN COMPARISON WITH LIGHT-EMITTING SURFACE
 (See paragraphs 3.9. and 3.8. of this regulation)

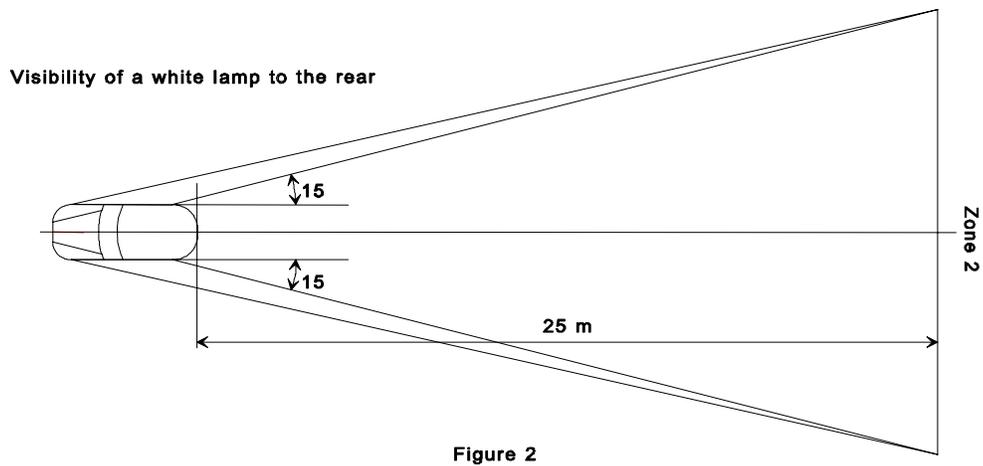
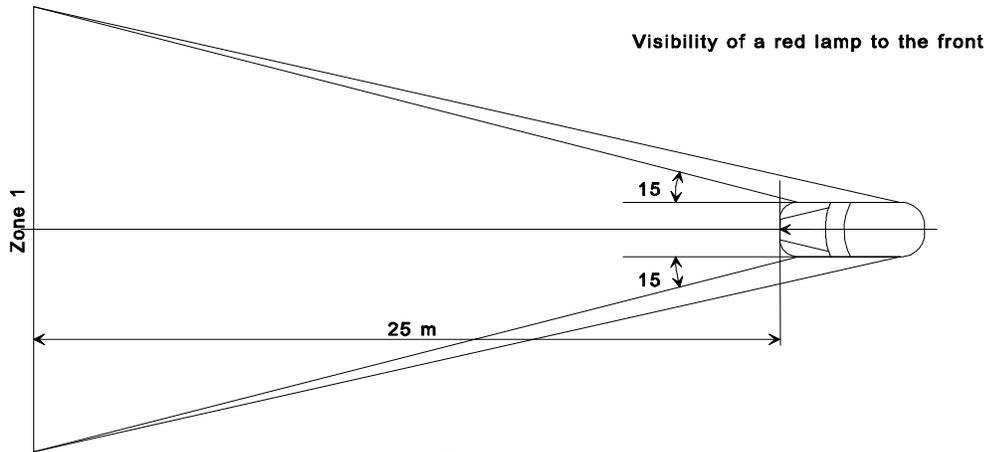
	ILLUMINATING SURFACE	LIGHT-EMITTING SURFACE
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Edges are	a and b	c and d
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	ILLUMINATING SURFACE	LIGHT-EMITTING SURFACE
Edges are	a and b	c and d

Annex 2
**VISIBILITY OF A LAMP OTHER THAN WHITE TO THE FRONT
AND VISIBILITY OF LAMP OTHER THAN RED TO THE REAR**
(See paragraphs 4.10.1. and 4.10.2. of this regulation)



In their respective planes, the zones 1 and 2 explored by the eye of the observer are bounded;
In height: by two horizontal planes 1 m and 2.2 m respectively above the ground,

In width: by two vertical planes which, forming to the front and to the rear respectively an angle of 15° outwards from the vehicle's median longitudinal plane, pass through the point or points of contact of vertical planes parallel to the vehicle's median longitudinal plane delimiting the vehicle's overall width; if there are several points of contact, the foremost shall correspond to the forward plane and the rearmost to the rearward plane.

Annex 3

IDENTIFICATION OF SYMBOLS REGARDING MEASUREMENTS AND ANGLES OF GEOMETRIC VISIBILITY DESCRIBED IN THIS REGULATION

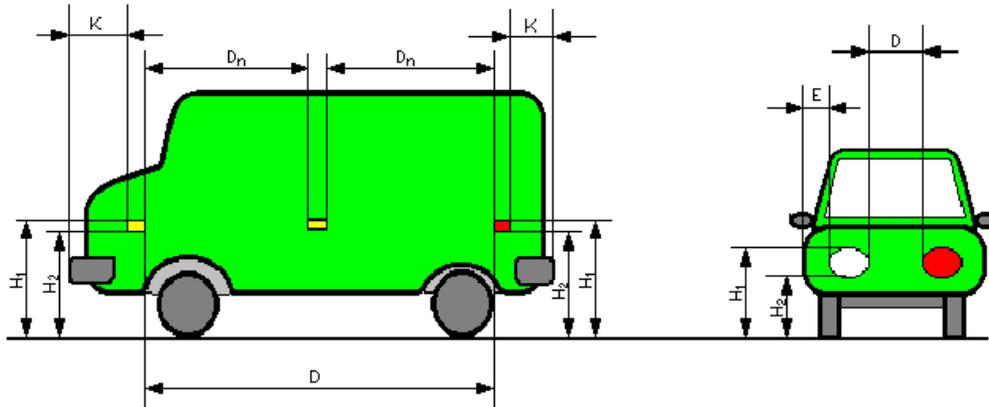


Figure 1. Identification of symbols regarding measurements described in this regulation

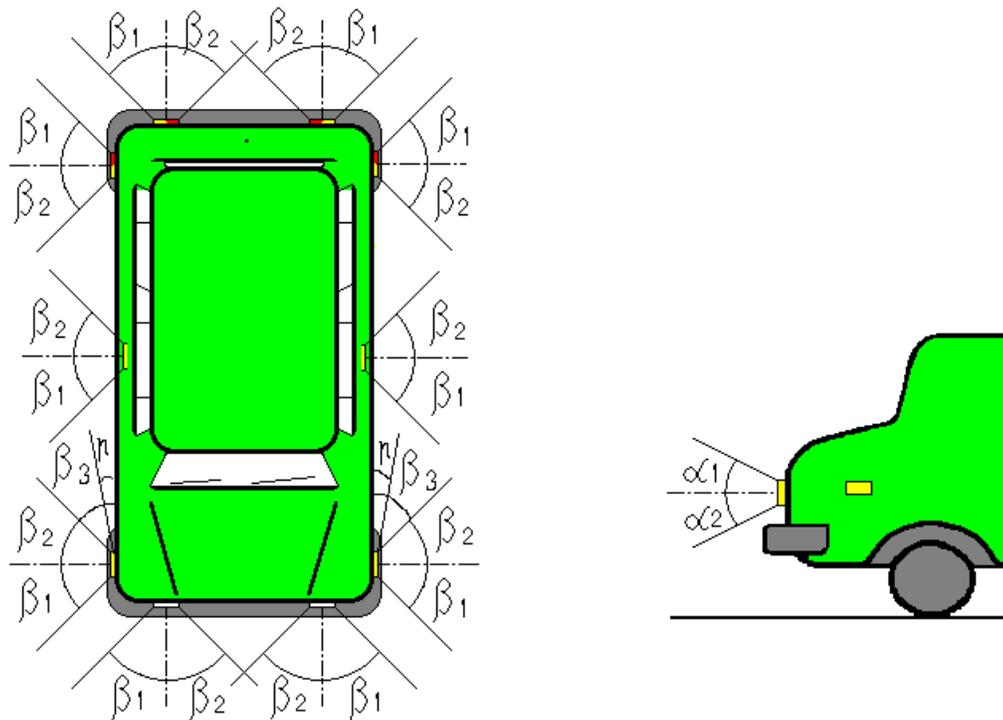


Figure 2. Identification of symbols regarding angles of geometric visibility described in this regulation