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PROPOSAL FOR A GLOBAL TECHNICAL REGULATION:

UNIFORM PROVISIONS CONCERNING VEHICLES  
WITH REGARD TO THE INSTALLATION OF LIGHTING AND LIGHT-SIGNALLING  
DEVICES

Transmitted by the Expert from Canada.

Note: The text reproduced below is based on document TRANS/WP.29/GRE/2001/6/Rev.1. It includes some suggestions contained in informal document No. 23 submitted by the United States of America during the fiftieth session of GRE, and discussed during the fifty-first session; however, it does not include recent amendments to Regulation 48 adopted by GRE. The text of these amendments, once adopted by AC.1, will be included at later time.

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Note: This document is distributed to the Experts on lighting and light-signalling only.

## PROPOSAL FOR A DRAFT GLOBAL TECHNICAL REGULATION:

### UNIFORM PROVISIONS CONCERNING VEHICLES WITH REGARD TO THE INSTALLATION OF LIGHTING AND LIGHT-SIGNALLING DEVICES

#### 1. SCOPE AND PURPOSE

This global technical regulation specifies requirements for the installation of lighting and light signalling devices on vehicles. It identifies the provisions for the location, geometric visibility, colour and operation (electric connection) of vehicle lighting and light signalling devices.

The purpose of this global technical regulation is to ensure the effectiveness, visibility and functioning of lighting and light signalling devices, in order to reduce the safety hazards caused by glare of vehicle lighting devices or confusion and diversion of the driver's attention from the driving task by miscomprehension of vehicle light signalling devices as they relate to presence, identification and/or behaviour of the vehicle on the road.

#### 2. APPLICATION

This global technical regulation applies to [vehicles category 1 and 2 and their trailers] ~~[power driven vehicles intended for use on the road, with or without bodywork and with maximum design speed exceeding 25 km/h, and to their trailers. This Regulation does not apply to motorcycles or mopeds, or their trailers, nor to agricultural or forestry tractors or machinery. Further, t]~~ This regulation does not apply to installation of additional lighting and light signalling devices on public works vehicles.

#### 3. DEFINITIONS

For the purpose of this Regulation:

- 3.1. "Transverse plane" means a vertical plane perpendicular to the median longitudinal plane of the vehicle.
- 3.2. "Unladen vehicle" means a vehicle without driver, crew, passengers and load, but with a full supply of fuel, spare wheel and the tools normally carried.
- 3.3. "Laden vehicle" means a vehicle loaded to its technically permissible maximum mass, as stated by the manufacturer, who shall also fix the distribution of this mass between the axles in accordance with the method described in **annex 3**.

- 3.4. "Overall length" means the distance between two vertical planes perpendicular to the longitudinal median plane of the vehicle and touching the front-end and rear-end of the vehicle. All parts of the vehicle, including any original equipment parts projecting from the front or rear (towing-hooks, bumpers, etc.) are contained between these two planes.

[gtr "0" should be consulted once GRSG finishes its deliberations.]

- 3.5. "Device" means an element or an assembly of elements used to perform one or more functions.
- 3.6. "Function"
- 3.6.1. "Lighting function" means the light emitted by a device to illuminate the road and objects in the direction of vehicle movement, as defined in paragraphs 3.7.9., 3.7.10., 3.7.18., 3.7.20 and 3.7.27;
- 3.6.2. "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 paragraphs 3.7.11. to 3.7.17. and paragraphs 3.7.19. to 3.7.26.
- 3.7. "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.
- 3.7.1. "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.
- 3.7.2. "Objective luminous flux" means a design value of the luminous flux of a replaceable light source. It shall 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.
- 3.7.3. "Independent lamps" means devices having separate illuminating surfaces, 1/ separate light sources and separate lamp bodies.
- 3.7.4. "Grouped lamps" means devices having separate illuminating surfaces 1/ and separate light sources, but a common lamp body.

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1/ 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.

- 3.7.5. "Combined lamps" means devices having separate illuminating surfaces, 1/ but a common light source and a common lamp body.
- 3.7.6. "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 1/ and a common lamp body.
- 3.7.7. "Single-function lamp" means a part of a device which performs a single lighting or light-signalling function.
- 3.7.8. "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.
- 3.7.9. "Driving beam (main-beam, high-beam) headlamp" means a lamp used to illuminate the road over a long distance ahead of the vehicle.
- 3.7.10. "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.
- 3.7.11. "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.
- 3.7.12. "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.
- 3.7.13. "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.
- 3.7.14. "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.
- 3.7.15. "Rear position lamp (tail lamp)" means a lamp used to indicate the presence and width of the vehicle when viewed from the rear.
- 3.7.16. "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:

- 3.7.16.1. retro-reflecting registration plates;
- 3.7.16.2. the retro-reflecting signals mentioned in the ADR (European Agreement concerning the international carriage of dangerous goods by road);
- 3.7.16.3. other retro-reflecting plates and signals which must be used to comply with national requirements for use as regards certain categories of vehicles or certain methods of operation.
- 3.7.17. "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.
- 3.7.18. "Front fog lamp<sup>\*)</sup>" means a lamp used to improve the illumination of the road ahead of the vehicle in case of fog, snowfall, rainstorms or dust clouds.

~~**\*) Applies only if this device is regulated by a Contracting Party.  
/this footnote applies throughout this document/**~~

- 3.7.19. "Rear fog lamp<sup>\*)</sup>" means a lamp used to improve the visibility of a vehicle from the rear in case of fog, snowfall, rainstorms or dust clouds.
- 3.7.20. "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 about to reverse.
- 3.7.21. "Parking lamp<sup>\*)</sup>" means a lamp, which is used to draw attention to the presence of a stationary vehicle.
- 3.7.22. "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.
- 3.7.23. "Side-marker lamp" means a lamp used to indicate the presence of the vehicle when viewed from the side.
- 3.7.24. "Daytime running lamp<sup>\*)</sup>" means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime.

3.7.25. “Identification lamps (ID lamps)\*” means a cluster of three lamps fitted at the top and about the centreline facing towards the front and rear of vehicle to draw particular attention to its bulk. These lamps are intended for certain vehicles and trailers, to complement the vehicle's front and rear position and end outline marker lamps.

3.7.26. “Conspicuity treatment\*” means a system of retro-reflective devices providing information regarding presence, width, length and bulk of a vehicle under condition of low or no ambient light.

3.7.27. “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.

3.8. “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).

3.9. “Illuminating surface” (see annex 1).

3.9.1. “Illuminating surface of a lighting device” (paragraphs 3.7.9., 3.7.10., 3.7.18., 3.7.20. and 3.7.27.) 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 3.9.2. 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.

3.9.2. “Illuminating surface of a light-signalling device other than a retro-reflector” (paragraphs 3.7.11. to 3.7.15., 3.7.17., 3.7.19. and 3.7.21. to 3.7.26.) 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.

{add annex describing measurements procedure to determine 98% of luminous intensity}

- 3.9.3. "Illuminating surface of a retro-reflector" (paragraph 3.7.16.) 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.
- 3.10. "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).
- 3.11. "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.
- 3.12. "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.
- 3.13. "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 correspond to the longitude and the vertical angles to the latitude.
- 3.14. "Extreme outer edge" on either side of the vehicle, means the plane parallel to the median longitudinal plane of the vehicle and touching its lateral outer edge, disregarding the projection:
- 3.14.1. of tyres near their point of contact with the ground, and of connections for tyre-pressure gauges;
- 3.14.2. of any anti-skid devices mounted on the wheels;

- 3.14.3. of rear-view mirrors;
- 3.14.4. of side direction indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps, retro-reflectors and side-marker lamps;
- 3.14.5. of Customs seals affixed to the vehicle, and of devices for securing and protecting such seals.
- 3.15. "Overall width" means the distance between the two opposite extreme outer edges of a vehicle.
- 3.16. The following shall be deemed to be:
- 3.16.1. "A single lamp" means a device or part of a device, having one function and one apparent surface in the direction of the reference axis (see paragraph 3.10. of this Regulation) and one or more light sources.

For the purpose of installation on a vehicle, a "single lamp" also means any assembly of two independent or grouped lamps, whether identical or not, having the same function, if they are 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 rectangle circumscribing the projections of the said apparent surfaces in the direction of the reference axis.

This possible combination does not apply to driving beam headlamps, passing beam headlamps, front fog lamps and cornering lamps.

- 3.16.2. "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 circumscribing the projections of the said individual light-emitting surfaces.
- 3.17. "Distance between two lamps" which face in the same direction, means the shortest distance between the two apparent surfaces in the direction of the reference axis. Where the distance between the lamps clearly meets the requirements of the Regulation, the exact edges of apparent surfaces need not be determined.
- 3.18. "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.



- 3.19. "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.
- 3.20. Categories of lamps:
- 3.20.1. "Mandatory lamp" means a lamp, the installation of which is required by this Regulation;
- 3.20.2. "Optional lamp" means a lamp described in this Regulation, the installation of which is left to the discretion of the manufacturer;
- 3.21. "Ground" means a substantially horizontal surface on which the vehicle stands.
- 3.22. "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.
- 3.23. "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.
- 3.24. "Normal condition of use of a vehicle" means:
- 3.24.1. 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;
- 3.24.2. 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.
- 3.25. "Park condition of a vehicle" means:
- 3.25.1. 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;
- 3.25.2. 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.
- 3.26. "Light-duty vehicle" means passenger car, utility vehicle or light commercial vehicle not exceeding 6000 mm in length, 2032 mm in width, or [5500] 3500 kilograms in gross vehicle weight, ~~and with a maximum seating capacity for 9 persons including the driver.~~

~~[3.27. "Very Heavy Duty Off Road Vehicles (VHDORV)" means ...  
copying of the definition of N3G from RE3 does not work. This document  
requires short description of VHDORV in line with the above "light duty  
vehicle" description.  
Suggestions are welcomed.]~~

3.28. "Heavy-duty vehicle" means on-road vehicles equal to or exceeding 6000 mm in length, 2032 mm in width, or [5500] kilograms in gross vehicle weight.  
**Other suggestions are welcomed.**

3.28. "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.

3.29. "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.

#### 4. GENERAL SPECIFICATIONS

4.1. 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.

4.2. All driving beam headlamps, passing beam headlamps and front fog lamps shall be so installed that correct adjustment of their orientation can be easily carried out.

4.3. 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 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.

4.4. 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.

4.5. In the absence of specific instructions, lamps of the same function, installed on the vehicle in an even number shall:

- 4.5.1. 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;
- 4.5.2. 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;
- 4.5.3. satisfy the same colorimetric requirements; and
- 4.5.4. have substantially identical photometric characteristics.
- 4.6. On vehicles whose external shape is asymmetrical, the above requirements shall be satisfied so far as possible.
- 4.7. Unless otherwise specified in this Regulation, lamps may be grouped, combined or reciprocally incorporated with one another provided that all requirements regarding colour, position, orientation, geometric visibility, electrical connections and other provisions, if any, for each lamp, are fulfilled.
- 4.8. Measurements
  - 4.8.1. In height:

The maximum height above the ground shall be measured from the highest point and the minimum height from the lowest point of the apparent surface, in the direction of the reference axis.

In the case of passing beam headlamp, the minimum height in relation to the ground is measured from the lowest point of the effective outlet of the optical system (e.g. reflector, lens, projection lens) independent of its utilisation.
  - 4.8.2. In width:

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.

The minimum distance between lamps shall be measured between those inner edges of the apparent surface in the direction of the reference axis which are the closest to each other.
  - 4.8.3. In length:

The maximum distance between the lamp and the transverse plane which marks the forward or rearward boundary of the vehicle's overall length (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.

The minimum distance between two lamps which face in the same direction shall be measured between those edges of the apparent surface in the direction of the reference axis which are the closest to each other.

4.8.4. Where the position, as regards maximum or minimum height, width or length, clearly meets the requirements of the Regulation, the exact edges of any apparent surface need not be determined.

4.9. In the absence of specific instructions, no lamps other than direction indicator lamps, the vehicle-hazard warning signal and amber side-marker lamps complying with paragraph 5.18.7 below, shall be flashing lamps.

4.10. Visibility of red light to the front of a vehicle and of white light to the rear of a vehicle shall be verified as follows:

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

4.10.1. For the visibility of red light towards the front of a vehicle, with the exception of a red rearmost side-marker lamp, there must be no direct visibility of the apparent surface of a red lamp if viewed by an observer moving within Zone 1 as specified in annex 2.

4.10.2. For the visibility of white light towards the rear of a vehicle, with the exception of the reversing lamp(s), there must be no direct visibility of the apparent surface of a white lamp if viewed by an observer moving within Zone 2 as specified in annex 2.

4.11. 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 identification lamps, if they exist, can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps, and when side-marker lamps are permitted to flash.

4.12. The electrical connections must be such that full intensity driving beam and passing beam headlamps and the front fog lamps 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 identification lamps, if they exist, are also switched on.

This requirement shall not apply, however, to driving beam or passing beam headlamps when their luminous warnings consist of the intermittent lighting up at short intervals of the driving beam headlamp or the intermittent lighting up at short intervals of the passing beam headlamp or the alternate lighting up at short intervals of the driving beam and passing beam headlamps.

4.13. In the absence of specific provision no lighting or light-signalling device shall be automatically operated.

4.14. Tell-tale

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

4.15. Concealable lamps

4.15.1. Lamps shall not be concealable with the exception of the driving beam headlamps, the passing beam headlamps, the rear fog lamps and the front fog lamps, which may be concealed when they are not in use.

4.15.2. 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.

4.15.3. 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.

4.15.4. 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.

4.15.5. When the concealment device has a temperature of -30°C to +50°C the headlamps must be capable of reaching the position of use within three seconds of initial operation of the control.

~~4.16. The colours of the light emitted by the lamps are the following:~~

~~4.16.1. driving beam headlamp: white~~

- ~~4.16.2. passing beam headlamp: white~~
- ~~4.16.3. front fog lamp\*): white [ or selective yellow ?  
better "in-use enforcement"]~~
- ~~4.16.4. reversing lamp: white~~
- ~~4.16.5. direction indicator lamp: front amber  
rear option a) amber  
option b) amber or red~~
- ~~4.16.6. hazard warning signal: front amber  
rear option a) amber  
option b) amber or red~~
- ~~4.16.7. stop lamp: red~~
- ~~4.16.8. rear registration plate  
illuminating device: white~~
- ~~4.16.9. front position lamp: option a) white  
option b) white or amber~~
- ~~4.16.10. rear position lamp: red~~
- ~~4.16.11. rear fog lamp\*): red~~
- ~~4.16.12. parking lamp\*): towards front white  
towards the rear red, amber if reciprocally  
incorporated in the side direction indicator  
lamps or in the side marker lamps of that  
colour;~~
- ~~4.16.13. end-outline marker lamp: towards the front option a) white  
option b) amber  
towards the rear red;~~
- ~~4.16.14. rear retro-reflector,  
non-triangular: red;~~
- ~~4.16.15. rear retro-reflector,  
triangular\*): red;~~
- ~~4.16.16. front retro-reflector;~~

- ~~non triangular\*): identical to incident light (white or colourless retro-reflector);~~
- 4.16.17. ~~side retro-reflector, non triangular:~~
- |                         |                                    |
|-------------------------|------------------------------------|
| <del>front</del>        | <del>amber</del>                   |
| <del>intermediate</del> | <del>amber</del>                   |
| <del>rearmost</del>     | <del>option a) red</del>           |
|                         | <del>option b) amber or red;</del> |
- 4.16.18. ~~side marker lamp:~~
- |                         |                                    |
|-------------------------|------------------------------------|
| <del>front</del>        | <del>amber</del>                   |
| <del>intermediate</del> | <del>amber</del>                   |
| <del>rearmost</del>     | <del>option a) red</del>           |
|                         | <del>option b) amber or red;</del> |
- 4.16.19. ~~daytime running lamp:~~
- |                                      |
|--------------------------------------|
| <del>option a) white</del>           |
| <del>option b) white to amber;</del> |
- 4.16.20. ~~identification lamps:~~
- |                              |                             |
|------------------------------|-----------------------------|
| <del>towards the front</del> | <del>option a) white</del>  |
|                              | <del>option b) amber;</del> |
| <del>towards the rear</del>  | <del>red;</del>             |
- 4.16.21. ~~cornering lamp\*):~~ ~~white;~~
- 4.16.22. ~~conspicuity devices\*)~~ ~~colour per Contracting Parties regulations.~~

4.17. Number of lamps

The number of lamps mounted on the vehicle shall be equal to the number(s) specified in each of the paragraphs 5.1. to 5.21.

4.18. Except as provided by paragraphs 4.18., 4.19. and 4.21., lamps may be installed on movable components.

4.19. 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 position, geometric visibility and photometric requirements for those lamps or a device meeting all requirements for those lamps is installed.

Should the above functions be obtained by an assembly of two lamps only the lamp installed on the non-movable part of the vehicle must meet the above mentioned requirements.

- 4.20. 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:
- 4.20.1. an alternative device meeting all requirements for those lamps may be installed; or
- 4.20.2. a 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.
- 4.21. 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.
- 4.22. 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. If this value is exceeded, each limit specified in paragraph 5.2.6.1.1. shall then be modified by this excess to decrease the allowed range of inclinations when checking the vehicle according to annex 4.
- 4.23. 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.
- 4.24. With the exception of retro-reflectors, a lamp even bearing an approval mark or other required markings is deemed not to be present when it cannot be made to operate by the sole installation of a light source.
- 4.25. 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 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, a tell-tale shall indicate occurrence of a temporary replacement and need for repair.

4.26. Geometric visibility

There must be no obstacle on the inside of the angles of geometric visibility, as described in 3.13., to the propagation of light from any part of the apparent surface of the lamp observed from infinity.

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

On the inside of the angles of geometric visibility, no account is taken of obstacles, if they were already present when the lamp was photometrically tested.

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.

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 optical unit may be reduced to 5° below the horizontal.

4.27. Lighting and light signalling devices described in paragraph 5. below shall conform with the applicable regulations of a Contracting Party to the 1998 Agreement adopting this GTR, in whose jurisdiction the vehicle would be registered.

~~4.28. Unless otherwise specified in this global technical regulation lighting and light signalling devices shall be wired to be steady burning when activated.~~

5. INDIVIDUAL SPECIFICATIONS

5.1. DRIVING BEAM HEADLAMP

5.1.1. Presence

Mandatory on motor vehicles.  
Prohibited on trailers.

5.1.2. Number

~~option a)~~ Two or four  
~~option b)~~ Two

5.1.3. Arrangement

~~option a) Below or at the same level and~~ inboard of or at the same distance to the edge to the vehicle as the passing beam.  
~~option b) No individual specifications.~~

5.1.4. Position

5.1.4.1. In width: no individual specifications.

5.1.4.2. In height: no individual specifications.

5.1.4.3. 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.

5.1.5. Geometric visibility

The visibility of the illuminating surface, including its visibility in areas which do not appear to be illuminated in the direction of observation considered, must be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5° with the axis of reference of the headlamp.

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

5.1.7.1. The driving beam headlamps shall be switched on ~~either simultaneously or~~ in pairs. For changing over from the passing to the driving beam ~~at least only one the first~~ pair of driving beam headlamps shall be switched on. For changing over from the driving beam to the passing beam ~~at both pairs of~~ driving beam headlamps shall be switched off simultaneously and the second pair shall then remain off until deliberately switched on again.

5.1.7.2. The passing beams may remain switched on at the same time as the one pair of driving beams.

5.1.7.3. 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.

5.1.7.4. Automatic switching from driving beam to passing beam mode is allowed.

5.1.8. Tell-tale

Circuit-closed tell-tale mandatory.

5.1.9. Other provisions

5.1.9.1. Driving beam headlamp and/or its beam pattern 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 shall conform with the requirements of a Contracting Party to the 1998 Agreement that adopted this GTR, and in whose jurisdiction the vehicle would be registered.**

**/to be re-discussed vis-à-vis “levels of stringency”, “options” etc. and with respect to possible creation of an annex listing the choices of Contracting Parties/**

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

~~option a) Above or at the same level and outboard~~  
~~option b) No special requirement~~

5.2.4. Position

5.2.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle and not more than 400 mm from the adjacent extreme outer edge of the vehicle;

5.2.4.2. In height:

not less than 500 mm above the ground ~~and 560 mm to the optical centre of the lamp;~~

light duty vehicles and vehicles equipped with headlamps with a light source having an objective luminous flux which exceeds 2,000 lumen

not more than 950 mm above the ground.

~~other heavy-duty~~ vehicles:

not more than 1200 mm above the ground.

~~[For very heavy-duty off road vehicles:~~

~~not more than 1,500 mm above the ground. ]~~

5.2.4.3. 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.

5.2.5. Geometric visibility - SHOULD COVER AT LEAST THE PHOTOMETRY ANGLE REQUIREMENTS

Horizontal angles:

45° outwards and ~~10°~~ inwards.

Since the photometric values required for passing beam headlamps do not cover the full geometric field of vision, a minimum value of 1 cd in the space remaining is required. The presence of partitions or other items of equipment near the headlamp shall not give rise to secondary effects causing discomfort glare to other road users.

Vertical angles:

15° above and 10° below the horizontal,

5.2.6. Orientation

Towards the front.

5.2.6.1. Vertical orientation prescribed by individual Contracting Parties.

~~5.2.6.1.1.~~ The initial downward inclination of the cut off of the passing beam to be set in the unladen vehicle state with one person in the driver's seat shall be specified within an accuracy of 0.1 per cent by the manufacturer and indicated in a clearly legible and indelible manner on each vehicle close to either headlamps or the manufacturer's plate by the symbol shown in **annex 5**.

~~\_\_\_\_\_~~ The value of this indicated downward inclination shall be defined in accordance with paragraph 5.2.6.1.2.

~~5.2.6.1.2.~~ ~~5.2.6.1.2.~~ Depending on the mounting height in millimetres (h) of the lower edge of the apparent surface in the direction of the reference axis of the passing beam  
~~5.2.6.1.3.~~ headlamp, measured on the unladen vehicles, the vertical inclination of the cut off of the passing beam shall, under all the static conditions of **annex 3**, remain between the following limits and the initial aiming shall have the following values:

~~\_\_\_\_\_~~ ~~h < 800~~ limits: between ~~0.5%~~ and ~~2.5%~~  
initial aiming: between ~~1.0%~~ and ~~1.5%~~

~~\_\_\_\_\_~~ ~~800 ≤ h ≤ 1000~~ limits: between ~~0.5%~~ and ~~2.5%~~  
initial aiming: between ~~1.0%~~ and ~~1.5%~~

~~\_\_\_\_\_~~ or, at the discretion of the manufacturer,  
~~\_\_\_\_\_~~ limits: between ~~1.0%~~ and ~~3.0%~~  
~~\_\_\_\_\_~~ initial aiming: between ~~1.5%~~ and ~~2.0%~~

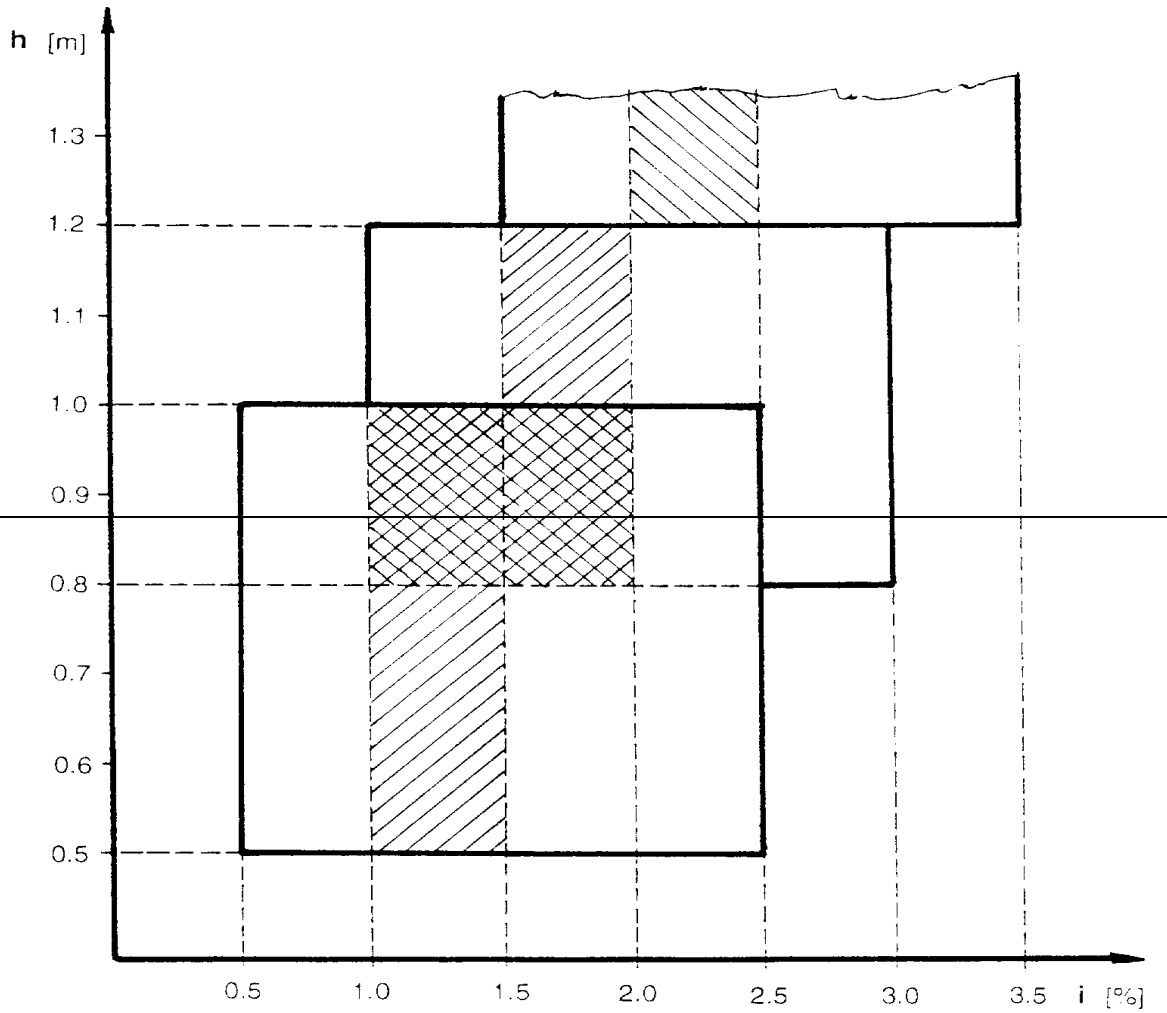
~~\_\_\_\_\_~~ The manufacturer shall, in this case, provide information as to which alternative is to be used.

~~\_\_\_\_\_~~ ~~h > 1000~~ limits : between ~~1.0%~~ and ~~3.0%~~  
initial aiming: between ~~1.5%~~ and ~~2.0%~~

~~\_\_\_\_\_~~ The above limits and the initial aiming values are summarised in the diagram below.

For very heavy duty off road vehicles where the headlamps exceed a height of 1,200 mm, the limits for the vertical inclination of the cut off shall be between: 1.5% and 3.5%. The initial aim shall be set between: 2% and 2.5%.

FIGURE 1



5.2.6.2. Headlamp levelling device

5.2.6.2.1. In the case where a headlamp levelling device is necessary to satisfy the requirements of paragraphs 5.2.6.1.1. and 5.2.6.1.2. the device shall be automatic.

~~5.2.6.2.2. — However, devices which are adjusted manually, either continuously or non-continuously, shall be permitted, provided they have a stop position at which the lamps can be returned to the initial inclination defined in paragraph 5.2.6.1.1. by means of the adjusting screws or similar means.~~

~~— These manually adjustable devices must be operable from the driver's seat.~~

~~— Continuously adjustable devices must have reference marks indicating the loading conditions that require adjustment of the passing beam.~~

~~— The number of positions on devices, which are not continuously adjustable, must be such as to ensure compliance with the range of values prescribed in paragraph 5.2.6.1.2. in all the loading conditions defined in **annex 3**.~~

~~— For these devices also, the loading conditions of **annex 3** that require adjustment of the passing beam shall be clearly marked near the control of the device (see **annex 6**).~~

~~5.2.6.2.3. — In case of a failure of devices described in paragraphs 5.2.6.2.1. and 5.2.6.2.2, the passing beam shall not assume a position in which the dip is less than it was at the time when the failure of the device occurred.~~

~~5.2.6.3. — Measuring procedure~~

~~5.2.6.3.1. — After adjustment of the initial inclination, the vertical inclination of the passing beam, expressed in per cent, shall be measured in static conditions under all the loading conditions defined in **annex 3**.~~

~~5.2.6.3.2. — The measurement of the variation of passing beam inclination as a function of load must be carried out in accordance with the test procedure set out in **annex 4**.<sup>1</sup>~~

5.2.7. Electrical connections

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

The passing beams may remain switched on at the same time as ~~the one pair of~~ driving beams.

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

One additional light source, located inside the passing-beam headlamps or in a lamp (except the driving-beam headlamp) grouped or reciprocally incorporated with the respective passing-beam headlamps, may be activated to produce bend

lighting, provided that the horizontal radius of curvature of the trajectory of the centre of gravity of the vehicle is 500 m or less. This may be demonstrated by the manufacturer by calculation or by other means accepted by the ~~authority responsible for type approval~~ Contracting Party.

Passing-beam headlamps may be switched ON or OFF automatically.  
-option a) However, it shall be always possible to switch these dipped-beam headlamps ON and OFF manually  
option b) No further provisions.

5.2.8. Tell-tale

Tell-tale optional.

5.2.9. Other provisions

The requirements of paragraph 4.5.2. 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 ~~an~~ combined objective luminous flux, which exceeds 2000 lumen shall only be installed in conjunction with the installation of headlamp cleaning device(s). In addition, with respect to vertical inclination, the provisions of paragraph 5.2.6.2.2. shall not be applied.

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 special requirement.

5.3.4. Position



5.3.4.1. In width:  
not more than 400 mm from the adjacent extreme outer edge of the vehicle.

5.3.4.2. In height:  
not less than 250 mm above the ground and  
not more than 800 mm above the ground

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.

5.3.4.3. 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:

45° outwards and 10° inwards.

Vertical angles:

5° above and below the horizontal,

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 can be switched on and off independently of driving and/or passing beam headlamps.

5.3.7.2. ~~Either of the following applies:~~

~~5.3.7.2.1.~~ 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; ~~or~~

~~5.3.7.2.2.~~ a warning, at least audible, additional to the mandatory tell-tale (paragraph 5.3.8.) shall be given if the propulsion system is deactivated and the driver's door is opened, whilst the front fog lamp switch is in the 'on' position.

5.3.8. Tell-tale

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

5.3.9. Other provisions

None.

5.4. REVERSING LAMP

5.4.1. Presence

Mandatory.

5.4.2. Number

One or two.

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:

not less than 250 mm above the ground and

not more than 1,200 mm above the ground.

5.4.4.3. In length:

at the **back** of the vehicle.

5.4.5. Geometric visibility

5.4.5.1. Horizontal angles:

45° to right and to left if there is only one lamp,  
45° outwards and 30° inwards if there are two lamps.

Vertical angles:

15° above and 5° below the horizontal,

5.4.5.2. In case of reversing lamps installed in accordance with paragraph 5.4.9.:

Horizontal angles:

45° to right and to left if there is only one such lamp,

45° outwards and 10° inwards if there are two such lamps.

Vertical angles:

5° above and below the horizontal,

5.4.6. Orientation

Rearwards.

5.4.7. Electrical connection

5.4.7.1. They shall be such that the lamp can light up only if the reverse gear is engaged and if the device which controls the starting and stopping of the engine is in such a position that operation of the engine is possible. It shall not light up or remain lit if either of the above conditions is not satisfied.

5.4.7.2. When reversing lamp(s) installed in accordance with 5.4.9. it (they) shall be switched on and off separately from the mandatory lamp(s), while at the same time the conditions of paragraph 5.4.7.1. remain satisfied. When one of the conditions of paragraph 5.4.7.1. is no longer satisfied, the lamp(s) shall be switched off, and remain off until the conditions of paragraph 5.4.7.1. are fulfilled and the lamp(s) are deliberately switched on again.

5.4.8. Tell-tale

Tell-tale optional.

5.4.9. Other provisions

One or two optional reversing lamps may be fitted on all motor vehicles over 6000 mm in length and all trailers.

5.5. DIRECTION INDICATOR LAMP

5.5.1. Presence

Mandatory.

5.5.2. Number

Motor vehicle:

2 front direction indicator lamps

2 side direction indicator lamps\*)

2 rear direction indicator lamps + 2 optional rear direction indicator lamps

In addition, 2 middle-side direction indicators\*) shall be installed on vehicles exceeding ~~[7,500 kilograms in gross vehicle weight]~~ 9 m in length, ~~[not including busses and tractors towing a semi-trailer].~~

[questions:

why is the concern with the mass of a vehicle rather than length?

- the reason given in the informal document 7 (Japan) from 48<sup>th</sup> GRE session was “to prevent under-running of cyclists and pedestrians by large trucks in their left turns”

- shouldn't the presence of “middle-side direction indicator lamps” be determined by the vehicle length?]

Trailer:

2 side direction indicator lamps\*) for trailers of 6000 mm or more in overall length,

2 rear direction indicator lamps + 2 optional rear direction indicator lamps.

5.5.3. Arrangement (see Figure 2)

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 or the optical centre 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 respectively 40 mm or 100 mm the

photometric output of the direction indicator must be increased according to the regulation of the Contracting Party applying this Regulation and on whose territory the vehicle is to be registered.

5.5.4. Position (see Figure 2)

5.5.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle and not more than 400 mm from the adjacent extreme outer edge of the vehicle, and

not less than 600 mm between the two lamps. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

5.5.4.2. In height:

not less than 350 mm above the ground and

not more than 1,500 mm above the ground.

If the structure of the vehicle does not permit the upper limit to be respected, and if the optional lamps are not installed, the limit may be increased 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\*) on motor vehicles:

the distance between the side direction indicator lamp and front of the vehicle shall not exceed 2500 mm or 1/2 of the vehicle's overall length, whichever is less.

[Side direction indicator lamps\*) on trailers:

the distance between the side direction indicator lamp and front of the vehicle shall be in the middle third of the vehicle's overall length.]

Middle-side direction indicator lamps\*):

????????? [Japan to provide numbers]

Rear direction indicator lamps:

at the rear.

5.5.5. Geometric visibility (see Figure 2.)

5.5.5.1. Horizontal angles:

Front direction indicators:

45° inwards and 80° outwards.

The outward angle may be reduced to 45° when direction indicator is supplemented by flashing front side-marker lamp.

Rear direction indicator:

Motor vehicles:

45° inwards and 80° outwards.

The outward angle may be reduced to 45° when direction indicator is supplemented by flashing rear amber side-marker lamp.

Trailer

45° inwards and 80° outwards.

Side direction indicator:

5° outwards to 60° outwards to the rear as shown in Figure 2.

5.5.5.2. Vertical angles:

15° above and below the horizontal.

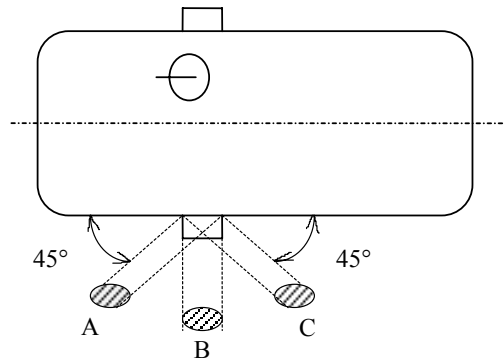
30° above and 5° below the horizontal for side direction indicator lamps.

The vertical angle below the horizontal may be reduced to 5° if the lamps are less than 750 mm above the ground;

The vertical angle above the horizontal may be reduced to 5° if the optional direction indicator lamps are not less than 2,100 mm above the ground.

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:

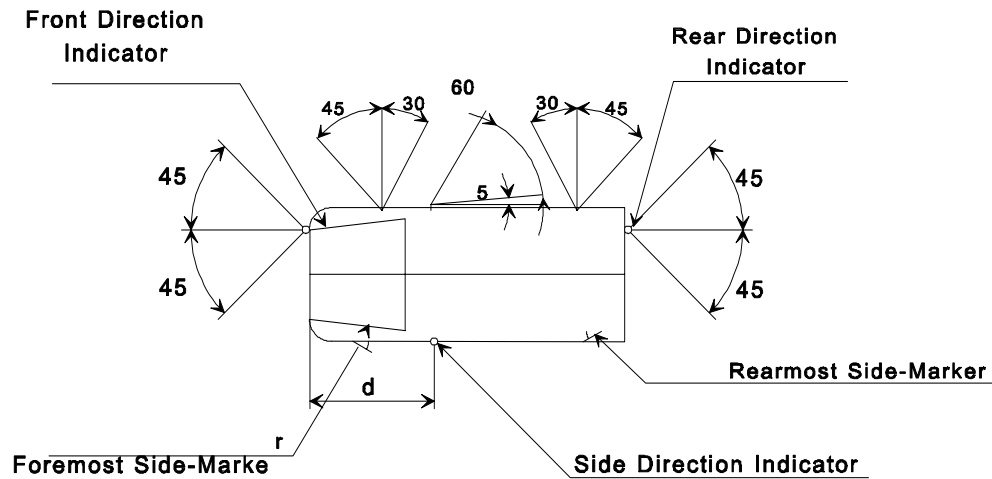
The minimum luminous intensity within the above angles must not be less than 0.3 cd; or



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<sup>2</sup>, except for the side direction indicator for which the minimum area is 10 cm<sup>2</sup>. The apparent surface of any retro-reflector shall be excluded.

In the case of “Middle-side direction indicators” the measurement is performed from 45 degrees forward, from the right angle, and from 45 degrees rearward [ECE requires 30 degrees as per Figure 2], and their measured visible luminous area is required to be at least 40 cm<sup>2</sup> in all of the three directions as shown below. [the drawing in Japan’s document shows three areas “A”, “B” and “C” – it is not clear if the sum of the areas is taken in the account for 40 cm<sup>2</sup>.]/

FIGURE 2. (see paragraphs 5.5. and 5.18.)



Installation of direction indicators and side marker lamps  
/ the above figure will be corrected and 80 deg angle option for direction indicators will be added; **verify angles for all devices.**/

5.5.6. Orientation

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

5.5.7. Electrical connections

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

All direction indicator lamps on one side of a vehicle shall be switched on and off by means of one control and shall flash in phase.

The amber side-marker lamps, if they flash, shall also flash at the same frequency [and in phase] with the direction indicator lamps.

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 setting and unsetting of the vehicle's alarm system.

5.5.8. Tell-tale



Operating tell-tale mandatory for front and rear direction indicator lamps. It may be visual or auditory or both. If it is visual it shall be a flashing light which, at least in the event of the malfunction of any of the front or rear direction indicator lamps, is either extinguished, or remains alight without flashing, or shows a marked change of frequency. If it is 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.

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.

For the optional pair of rear direction indicator lamps on trailers, operating tell-tale shall not be mandatory.

#### 5.5.9. Other provisions

The ~~direction indicator shall emit light at a steady rate of light shall be a flashing light flashing~~  $90 \pm 30$  ~~times-flashes~~ per minute.

Operation of the light-signal control shall be followed within not more than one second by the emission of light and within not more than one and one-half seconds by its first extinction.

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.

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.

Rear direction indicator lamps must not be reciprocally incorporated with stop lamps.

#### 5.6. HAZARD WARNING SIGNAL

##### 5.6.1. Presence

Mandatory. The signal shall be given by simultaneous operation of the direction indicator and, if used, side marker lamps in accordance with the requirements of paragraph 5.5. above.

5.6.2. Number

As specified in paragraph 5.5.2.

5.6.3. Arrangement

As specified in paragraph 5.5.3.

5.6.4. Position

5.6.4.1. In width:

As specified in paragraph 5.5.4.1.

5.6.4.2. In height:

As specified in paragraph 5.5.4.2.

5.6.4.3. In length:

As specified in paragraph 5.5.4.3.

5.6.5. Geometric visibility

As specified in paragraph 5.5.5.

5.6.6. Orientation

As specified in paragraph 5.5.6.

5.6.7. Electrical connections

The signal shall be operated by means of a separate control enabling all the direction indicator lamps to flash in phase.

The amber side-marker lamps, if they flash, shall also flash at the same frequency [(in phase)] with the direction indicator lamps.

5.6.8. Tell-tale

Circuit-closed tell-tale mandatory. Flashing warning light, which can operate in conjunction with the tell-tale(s) specified in paragraph 5.5.8.

5.6.9. Other provisions

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 be capable of bringing the direction indicator lamps on the trailer into action. 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.

5.7. STOP LAMP

5.7.1. Presence

5.7.1.1. Pair of stop lamps:

mandatory

5.7.1.2. Centre stop lamp:

mandatory on light-duty motor vehicles

optional on trailers and other motor vehicles

5.7.2. Number

light duty motor vehicles: 3

other motor vehicles and trailers: 2, 3 or 4 (see Arrangement)

5.7.3. Arrangement

All vehicles:

In addition to the pair of stop lamps, on light-duty vehicles (optional on other vehicles):

One centre stop lamp mounted on the centreline of the vehicle.

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.

In addition on other motor vehicles and trailers:

one optional pair of stop lamps may be installed 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:

as close as practicable to the adjacent extreme edge of the vehicle and not more than 400 mm from the adjacent extreme outer edge of the vehicle;

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:

For the pair of stop lamps:

not less than 350 mm above the ground and 380 mm to the optical centre of the lamp and

not more than 1,500 mm above the ground (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).

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

not less than 850 mm above the ground.

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:

45° inwards and outwards;

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:

15° above and below the horizontal. However, the vertical angle below the horizontal may be reduced to 5°, if the height of the lamp is less than 750 mm. The vertical angle above the horizontal may be reduced to 5° in the case of optional stop lamps installed not less than 2,100 mm above the ground;

For centre stop lamp:

10° above and 5° below the horizontal.

5.7.6. Orientation

Towards the rear of the vehicle.

5.7.7. Electrical connections

~~STILL UNDER DISCUSSION — AWAITING GRRF's INPUT~~

~~————— [All stop lamps must light up simultaneously when the service brake is applied. The stop lamps need not function if the device that activates the propulsion system of the vehicle is in a position, which makes it impossible for the vehicle to operate.~~

~~————— The stop lamps shall also be activated by the application of an endurance brake (retarder) or a similar device either of which is capable of decelerating the vehicle more than  $2.2 \text{ m/s}^2$ .]~~

**Alternatively:**

All stop lamps must light up simultaneously when either the service brake or endurance brake (e.g. retarder) is activated. They must also light up when a complete or partial braking system is activated for the purpose of generating vehicle retardation with or without a direct action of the driver ~~[, resulting from the automatic evaluation of on-board initiated information].~~

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

Tell-tale optional; where fitted, this tell-tale must be an operating tell-tale consisting of a non-flashing warning light which comes on in the event of the malfunctioning of the stop lamps.

5.7.9. Other provisions

5.7.9.1. The centre stop lamp may not be reciprocally incorporated with any other lamp.

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

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. 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.

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 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

~~option a) — Mandatory on all vehicles~~

~~option b) — 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.~~

~~option c) — Mandatory on motor vehicles only.~~

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 and not more from the adjacent extreme outer edge of the vehicle than:~~

~~not more than 400 mm for motor vehicles~~

~~not more than 150 mm for trailers.~~

5.9.4.2. In height:

not less than 350 mm above the ground and not less than 380 mm from the optical centre of the lamp and



not more than 1,500 mm above the ground (2,100 mm for trailer, or any other vehicle 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:

45° inwards and 45° outwards.

Vertical angles:

15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of lamps less than 750 mm above the ground.

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 cm<sup>2</sup>.

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. This tell-tale shall be non-flashing and shall not be required if the instrument panel lighting can only be turned on simultaneously with the front position lamps.

5.9.9. Other provisions

None.

5.10. REAR POSITION LAMP

5.10.1. Presence

Mandatory.

5.10.2. Number

Two.  
[Two optional. See 5.10.4.2.]

5.10.3. Arrangement

No special requirement.

5.10.4. Position

5.10.4.1. In width:

as close as practicable to the adjacent extreme edge of the vehicle and not more than 400 mm from the adjacent extreme outer edge of the vehicle. This condition shall not apply to the optional rear position lamps.

5.10.4.2. In height:

not less than 350 mm above the ground and not less than 380 mm from the optical centre of the lamp and

not more than 1,500 mm above the ground (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm and if the optional lamps are not installed. [If the optional lamps are installed, they shall be placed at a height compatible with the applicable requirements of paragraph 5.10.4.1., the symmetry of the lamps, and at a vertical distance as large as the shape of the bodywork makes it possible, but not less than 600 mm above the mandatory lamps.]

5.10.4.3. In length:  
at the rear of the vehicle.

5.10.5. Geometric visibility

5.10.5.1. Horizontal angles:  
45° inwards and 45° outwards.

Vertical angles:

15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of lamps less than 750 mm above the ground. The vertical angle above the horizontal may be reduced to 5° in the case of optional lamps installed not less than 2,100 mm above the ground.

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<sup>2</sup>.

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

Except in the case where end-outline marker lamps are installed, two optional position lamps may be installed on all vehicles other than light-duty vehicles.

5.11. REAR FOG LAMP\*)

5.11.1. Presence

Optional

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:

not less than 250 mm above the ground and

not more than 1,000 mm above the ground. For vehicles described in 3.27. the maximum height may be increased to 1,200 mm.

5.11.4.3. In length:

at the rear of the vehicle.

5.11.5. Geometric visibility

Horizontal angles:

25° to the left and 25° to the right;

Vertical angles:

5° above and 5° below the horizontal;

5.11.6. Orientation

Rearwards.

5.11.7. Electrical connections

These must be such that:

5.11.7.1. The rear fog lamp(s) cannot be switched on unless the driving beams, passing beams or front fog lamps are lit;

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

5.11.7.3. ~~Either of the following applies:~~

~~5.11.7.3.1. the rear fog lamp(s) may continue to operate until the position lamps are switched off, and the rear fog lamp(s) shall then remain off until deliberately switched on again; or~~

~~5.11.7.3.2. a warning, at least audible, additional to the mandatory tell-tale (paragraph 5.11.8.) shall be given if the ignition is switched off or the ignition key is withdrawn and the driver's door is opened, whether the lamps in paragraph 5.11.7.1. are on or off, whilst the rear fog lamp switch is in the 'on' position.~~

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.

5.11.8. 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 \*)

5.12.1. Presence

On motor vehicles not exceeding 6000 mm in length and not exceeding 2000 mm in width, optional. On all other vehicles, prohibited.

5.12.2. Number

According to the arrangement.

5.12.3. Arrangement

Either two lamps at the front and two lamps at the rear, or one lamp on each side.

5.12.4. Position

5.12.4.1. In width:

not more than 400 mm from the adjacent extreme outer edge of the vehicle. Furthermore, 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:  
45° outwards,

For lamps mounted on the side of the vehicle:  
45° forwards and rearwards.

Vertical angles:

15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is 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.

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.

5.13. END-OUTLINE MARKER LAMP

5.13.1. Presence

Mandatory on vehicle exceeding 2100 mm in width.

Optional on ~~vehicles between 1800 mm and 2100 mm in width.~~

~~Prohibited on all~~ other vehicles.

~~On chassis-cabs the rear end outline marker lamps are optional.~~

5.13.2. Number

~~Two~~ 2 or 4 visible from the front and  
~~two~~ 2 or 4 visible from the rear.

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 the point on the apparent surface in the direction of the reference axis, which is farthest from the vehicle's median longitudinal plane is not more than 400 mm from the adjacent extreme outer edge of motor vehicle and 100 mm from the adjacent extreme outer edge of trailers.

Rear:

as close as possible to the adjacent extreme outer edge of the vehicle. This condition is deemed to have been met when the point on the apparent surface in the direction of the reference axis, which is farthest from the vehicle's median longitudinal plane is not more than 100 mm from the adjacent extreme outer edge of the vehicle.

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:

~~80° outwards~~ 45deg inboard and outboard.



Vertical angles:

~~5~~10° above and 20° below the horizontal.

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.

5.14. REAR RETRO-REFLECTOR, NON-TRIANGULAR

5.14.1. Presence

~~option a)~~—Mandatory on motor vehicles.

~~Mandatory on trailers if either the triangular retro-reflectors or conspicuity treatment are not mandatory.~~

~~If conspicuity treatment is mandatory – optional on trailers.~~

~~If triangular retro-reflectors are mandatory – optional on trailers, provided that these devices are grouped together with the other rear light-signalling devices.~~

~~Option b) – Mandatory on all vehicles.~~

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 and not more than 400 mm from the adjacent extreme outer edge of the vehicle.

5.14.4.2. In height:

not less than ~~250~~350 mm and

not more than 900 mm above the ground (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:

30° to the left and 30° to the right

Vertical angles:

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

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 and not more than 150 mm from the adjacent extreme outer edge of the vehicle (400 mm if the shape of the bodywork makes it impossible to keep within 150 mm).

not be less than 600 mm between the two devices. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1,300 mm.

5.15.4.2. In height:

not less than ~~250~~350 mm above the ground and

not more than 900 mm above the ground (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:

30° inwards and outwards.

Vertical angles:

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

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.

5.16. FRONT RETRO-REFLECTOR, NON-TRIANGULAR \*)

5.16.1. Presence

Mandatory on trailers.

Mandatory on motor vehicles having all forward facing lamps without reflectors or 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 not more than 400 mm from the adjacent extreme outer edge of the vehicle.

In the case of a trailer:

not more than 150 mm from the adjacent extreme outer edge of vehicle.

5.16.4.2. In height:

not less than 250 mm above the ground

not more than 900 mm above the ground (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:

30° to the left and 30° to the right.

In the case of trailers:

the angle inwards 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:

10° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of a retro reflector, less than 750 mm above the ground.

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.

Optional if conspicuity treatment is mandatory.

5.17.2. Number

Vehicles less than 6,000 mm in length:

Two on each side of the vehicle.

Vehicles 6,000 mm or more in 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:

not less than ~~250~~350 mm above the ground

not more than 900 mm above the ground (1,500 mm if the shape of the bodywork makes it impossible to keep within 900 mm).

5.17.4.3. In length:

**[on passenger cars:**

**front: forward of the foremost axle and as far forward as practicable.**

**rear: rearward of the rearmost axle and as far rearward as practicable.**

**on other vehicles:]**

not more than 400 mm from the front of the vehicle(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.

not more than 400 mm from the rear.

**[on all vehicles:]**

The distance between two adjacent side retro-reflectors shall not exceed 3,000 mm.

This does not, however, apply to vehicles less than 6,000 mm in length. 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:

45° to the front and to the rear.

Vertical angles:

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

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. Presence

Mandatory.

5.18.2. Number.

Vehicles less than 6,000 mm in length:

Two on each side of the vehicle.

Vehicles 6,000 mm or more in length:

Such that the requirements for longitudinal positioning are complied with.

On chassis-cabs only the front side-marker lamps are required.

5.18.3. Arrangement

See Figure 2.

5.18.4. Position

5.18.4.1. In width:

no individual specifications.

5.18.4.2. In height:

not less than ~~250~~350 mm above the ground

not more than 1,500 mm above the ground (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

**[on passenger cars:  
forward of the foremost axle and as far forward as practicable.**

**on other vehicles:]**  
not more than 400 mm from the front of the vehicle (600 mm if the shape of the bodywork makes it impossible to keep within 400 mm)

on trailers equipped with a drawbar:

not less than 1,000 mm from the front of the drawbar and

not more than 1,500 mm from the front of the drawbar.

Rearmost side marker lamp

**[on passenger cars:  
rearward of the rearmost axle and as far rearward as practicable.**

**on other vehicles:]**  
not more than 400 mm from the rear of the vehicle.

**[on all vehicles:]**  
In addition, the distance between two adjacent side-marker lamps shall not exceed 3,000 mm. This does not, however, apply to vehicles less than 6,000 mm in



length. 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:

45° to the front and to the rear; however, the rearward angle for the forward side marker lamps and forward angle for the rearward side marker lamp and both angles for the intermediate side marker lamps may be reduced to 30°.

Vertical angles:

10° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° in the case of a side-marker lamp less than 750 mm above the ground.

5.18.6. Orientation

Only towards the side.

5.18.7. Electrical connections

The amber side-marker lamps may be wired to flash, provided that this flashing is [in phase and] at the same frequency with the direction indicator lamps at the same side of the vehicle.

The amber side-marker lamps may also flash simultaneously in association with vehicle alarm systems and/or immobilisers to draw attention to the vehicle and/or during the setting and unsetting 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

- 5.18.9.1. When the rearmost side-marker lamp is combined with the rear position lamp reciprocally incorporated with the rear fog lamp or stop lamp, the photometric characteristics of the side-marker lamp may be modified during the illumination of the rear fog lamp or stop lamp.

5.18.9.4. Additional side-marker lamps are permitted provided they do not impair the effectiveness of other mandatory lighting and light-signalling devices.

6.19. DAYTIME RUNNING LAMP \*)  
(applies only to devices conforming to ECE R87 or SAE J2087)

5.19.1. Presence

~~Optional on motor vehicles. Prohibited on trailers. As regulated by the Contracting Parties (see annex 7.)~~

5.19.2. Number

Two.

5.19.3. Arrangement

No special requirement.

5.19.4. Position

5.19.4.1. In width:

not more than 400 mm from the adjacent extreme outer edge of the vehicle.

not less than 600 mm between the two lamps. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.

5.19.4.2. In height:

not less than ~~250~~350 mm above the ground and

not more than ~~1,500~~1100 mm above the ground.

5.19.4.3. In length:

at the front of the vehicle.

5.19.5. Geometric visibility

Horizontal angles:

20° inwards and outwards.

Vertical angles:

10° above and below the horizontal.

5.19.6. Orientation

Towards the front.

5.19.7. Electrical connections

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.

option a) means shall be provided, such that the daytime running lamps can be intentionally switched off and subsequently on.

option b) there shall be no means allowing manual switching off of daytime running lamps unless a distance sensing device is installed which will automatically reactivate daytime running lamps after the vehicle have travelled 100 m after daytime running lamps were deactivated.

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.

Rear position lamps are permitted to operate simultaneously with the daytime running lamps.

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.

Otherwise optional.

5.20. IDENTIFICATION LAMPS (Front and Rear)\*)

5.20.1. Presence

~~As regulated by the contracting parties (see annex 7.) option a) Mandatory on vehicles over 2032 mm wide~~

~~option b) optional~~

~~option c) prohibited~~

5.20.2. Number

on motor vehicles over 2032 mm wide: three facing forward

on all vehicles over 2032 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:

~~mounted symmetrically about the median longitudinal plane of vehicle with the reference axis of the middle lamp on that plane.~~ The lamps shall form a three-lamp group with lamp centres spaced evenly and horizontally with distance of 150 mm to 300 mm between ~~the 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 but not lower than 350 mm above the road surface.

5.20.4.3. In length:

no specific requirement.

5.20.5. Geometric visibility

Horizontal angles:

45° inwards and outwards

Vertical angles:

20° above and below the horizontal.

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.

5.21.2. Number

Two.

5.21.3. Arrangement

No special requirement.

5.21.4. Position

5.21.4.1. In width:

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

5.21.4.2. In length:

the foremost cornering lamp being not further than 1 m from the front.

5.21.4.3. In height:

minimum: Not less than 250 mm above the ground.

maximum: Not more than 900 mm above the ground;

However, no point on the apparent surface in the direction of the reference axis 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:

10° above and below the horizontal.

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 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.

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]**.

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 \*)

5.22.1. Presence

As regulated by the Contracting Parties (see annex 7.).

5.22.2. Number

trailers:

rear: continuous strip across rear lower body and bumper bar, and if trailer has an upper body structure, 2 pairs of upper body markings each consisting of two white 300 mm long strips forming inverted "L",

side: alternating white and red continuous strip or sections

truck tractors:

rear: 2 pairs of upper body markings each consisting of two white 300 mm long strips forming inverted "L" on the rear of the cab, and 2 continuous 600 mm long strips, alternating white and red.

5.22.3. Arrangement

The edge of white 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.

5.22.4. Position

5.22.4.1. 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

5.22.4.2. 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 1525 mm above the ground.

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

Trailer on the rear:

continuous strip on the frame, as close as practicable to the range of 375 to 1525 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 1525 mm above the ground

5.22.4.3. In length:

Trailer on the side

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

5.22.5. 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.

5.22.6. 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.

5.22.7. Electrical connections

N/A

5.22.8. Tell-tale

N/A

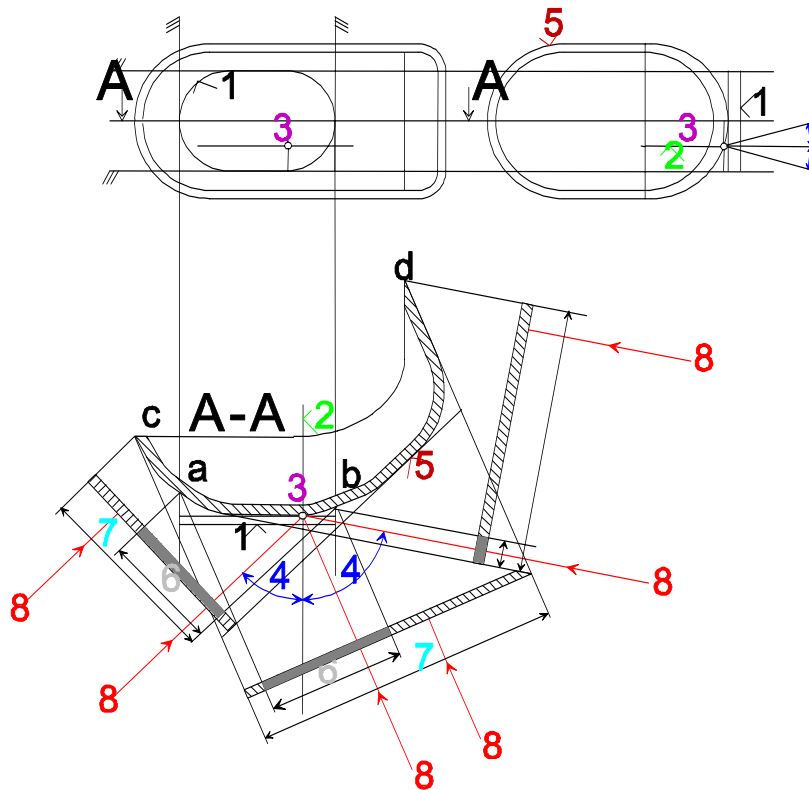
5.22.9. Other provisions

N/A

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Annex 1

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



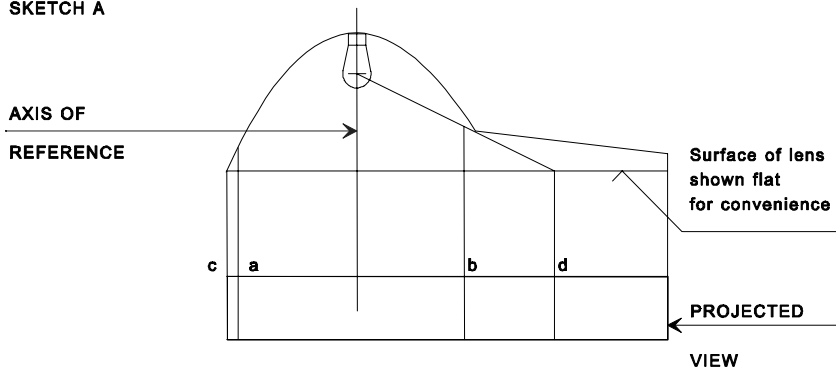
KEY

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.

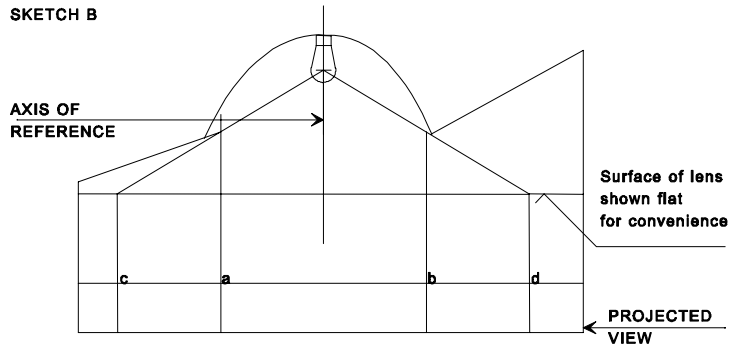
ILLUMINATING SURFACE IN COMPARISON WITH LIGHT-EMITTING SURFACE  
(See paragraphs 3.9. and 3.8. of this Regulation)

SKETCH A



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

SKETCH B



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

Annex 2

VISIBILITY OF A RED LAMP TO THE FRONT

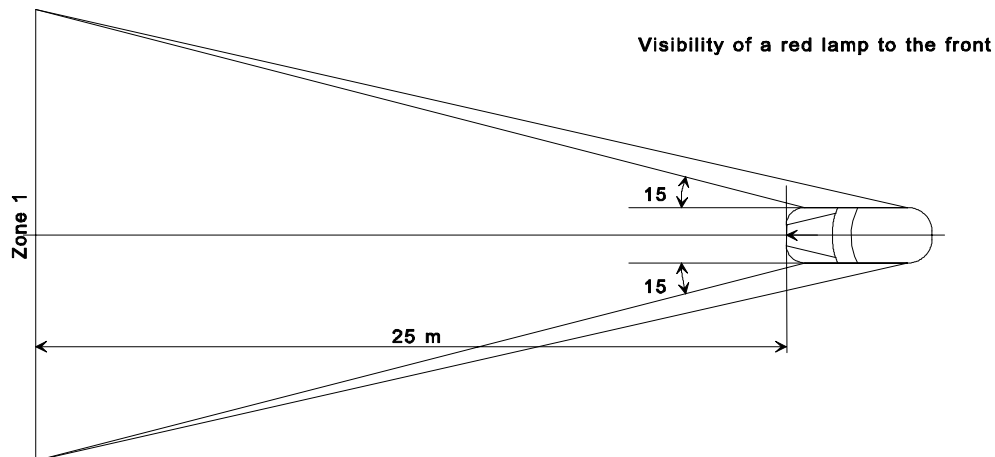


Figure 1

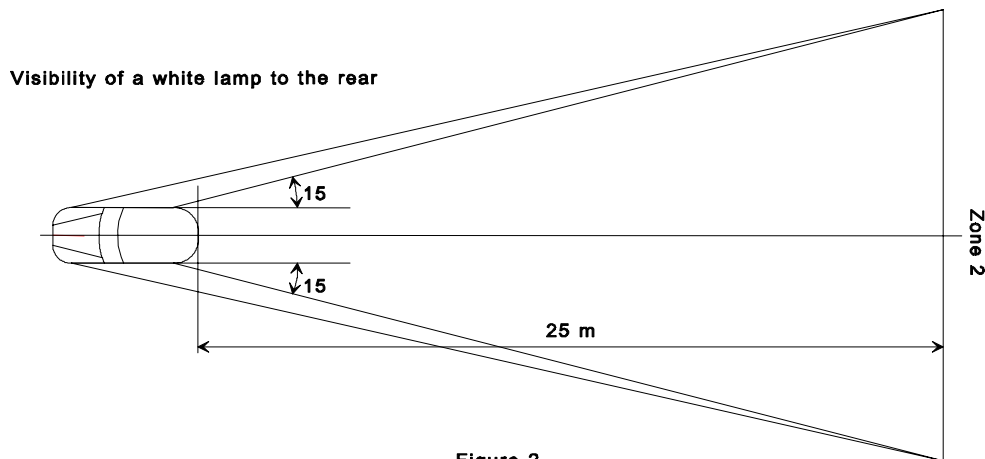


Figure 2

AND VISIBILITY OF A WHITE LAMP 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  $15^\circ$  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.

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### Annex 3

#### STATES OF LOADING TO BE TAKEN INTO CONSIDERATION IN DETERMINING VARIATIONS IN THE VERTICAL ORIENTATION OF THE PASSING-BEAM HEADLAMPS

Loading conditions on axles referred to in paragraphs 5.2.6.1. and 5.2.6.3.1.

1. For the following tests, the mass of the passengers shall be calculated on the basis of 75 kg per person.
2. Loading conditions for different types of vehicles:
  - 2.1. Vehicles in category M1: 1/
    - 2.1.1. The angle of the light beam of the passing-beam headlamps shall be determined under the following load conditions:
      - 2.1.1.1. one person in the driver's seat;
      - 2.1.1.2. the driver, plus one passenger in the front seat farthest from the driver;
      - 2.1.1.3. the driver, one passenger in the front seat farthest from the driver, all the seats farthest to the rear occupied;
      - 2.1.1.4. all the seats occupied;
      - 2.1.1.5. all the seats occupied, plus an evenly distributed load in the luggage compartment, in order to obtain the permissible load on the rear axle or on the front axle if the luggage compartment is at the front. If the vehicle has a front and a rear luggage compartment, the additional load must be appropriately distributed in order to obtain the permissible axle loads. However, if the maximum permissible laden mass is obtained before the permissible load on one of the axles, the loading of the luggage compartment(s) shall be limited to the figure which enables that mass to be reached;
      - 2.1.1.6. driver, plus an evenly distributed load in the luggage compartment, in order to obtain the permissible load on the corresponding axle.

However, if the maximum permissible laden mass is obtained before the permissible load on the axle, the loading of the luggage compartment(s) shall be limited to the figure which enables that mass to be reached.

---

1/ For definitions of the categories, see the Consolidated Resolution on the Construction of Vehicles (R.E. 3, annex 7) (TRANS/WP.29/78/Rev.1).

- 2.1.2. In determining the above loading conditions, account must be taken of any loading restrictions laid down by the manufacturer.
- 2.2. Vehicles in categories M2 and M3; 1/  
  
The angle of the light beam from the passing-beam headlamps must be determined under the following loading conditions:
  - 2.2.1. vehicle unladen and one person in the driver's seat;
  - 2.2.2. vehicles laden such that each axle carries its maximum technically permissible load or until the maximum permissible mass of the vehicle is attained by loading the front and rear axles proportionally to their maximum technically permissible loads, whichever occurs first.
- 2.3. Vehicles in category N with load surfaces:
  - 2.3.1. The angle of the light beam from the passing-beam headlamps must be determined under the following loading conditions;
    - 2.3.1.1. vehicle unladen and one person in the driver's seat;
    - 2.3.1.2. driver, plus a load so distributed as to give the maximum technically permissible load on the rear axle or axles, or the maximum permissible mass of the vehicle, whichever occurs first, without exceeding a front axle load calculated as the sum of the front axle load of the unladen vehicle plus 25 per cent of the maximum permissible payload on the front axle. Conversely, the front axle is so considered when the load platform is at the front.
- 2.4. Vehicles in category N without a load surface:
  - 2.4.1. Drawing vehicles for semi-trailers:
    - 2.4.1.1. Unladen vehicle without a load on the coupling attachment and one person in the driver's seat;
    - 2.4.1.2. one person in the driver's seat: technically permissible load on the coupling attachment in the position of the attachment corresponding to the highest load on the rear axle.
  - 2.4.2. Drawing vehicles for trailers:
    - 2.4.2.1. vehicle unladen and one person in the driver's seat;
    - 2.4.2.2. one person in the driver's seat, all the other places in the driving cabin being occupied. \_\_\_\_\_

## Annex 4

### MEASUREMENT OF THE VARIATION OF PASSING-BEAM INCLINATION AS A FUNCTION OF LOAD

#### 1. Scope

This annex specifies a method for measuring variations in motor vehicle passing-beam inclination, in relation to its initial inclination, caused by changes in vehicle attitude due to loading.

#### 2. Definitions

##### 2.1. Initial inclination

##### 2.1.1. Stated initial inclination

The value of the passing-beam initial inclination specified by the motor vehicle manufacturer serving as a reference value for the calculation of permissible variations.

##### 2.1.2. Measured initial inclination

The mean value of passing-beam inclination or vehicle inclination measured with the vehicle in condition No. 1, as defined in annex 5, for the category of vehicle under test. It serves as a reference value for the assessment of variations in beam inclination as the load varies.

##### 2.2. Passing-beam inclination

It may be defined as follows:

either as the angle, expressed in milliradians, between the direction of the beam towards a characteristic point on the horizontal part of the cut-off in the luminous distribution of the headlamp and the horizontal plane,

or by the tangent of that angle, expressed in percentage inclination, since the angles are small (for these small angles, 1 per cent is equal to 10 mrad).

If the inclination is expressed in percentage inclination, it can be calculated by

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click here to view equation.

means of the following formula:

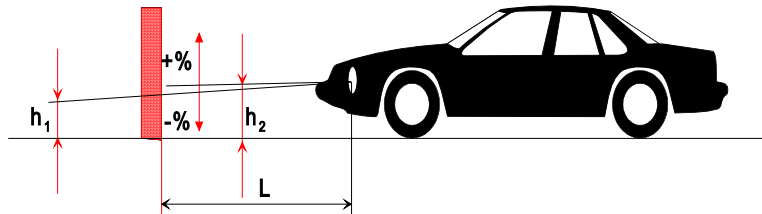
where:

$h_1$  is the height above the ground, in millimetres, of the above-mentioned characteristic point, measured on a vertical screen perpendicular to the



vehicle longitudinal median plane, placed at a horizontal distance  $L$ .

$h_2$  is the height above the ground, in millimetres, of the centre of reference (which is taken to be the nominal origin of the characteristic point chosen in  $h_1$ ):



$L$  is the distance, in millimetres, from the screen to the centre of reference.

Negative values denote downward inclination (see figure 1).

Positive values denote upward inclination.

Figure 1

Passing-beam downward inclination of a category M1 vehicle

Notes:

1. This drawing represents a category M1 vehicle, but the principle shown applies equally to vehicles of other categories.
2. Where the vehicle does not incorporate a headlamp levelling system, the variation in passing-beam inclination is identical with the variation in the inclination of the vehicle itself.

3. Measurement conditions

- 3.1. If a visual inspection of the passing-beam pattern on the screen or a photometric method is used, measurement shall be carried out in a dark environment (for example, a dark room) of sufficient area to allow the vehicle and the screen to be placed as shown in Figure 1. Headlamp centres of reference shall be at a distance from the screen of at least 10 m.
- 3.2. The ground on which measurements are made shall be as flat and horizontal as possible, so that the reproducibility of measurements of passing-beam inclination can be assured with an accuracy of 0.5 mrad.( 0.05 per cent inclination).
- 3.3. If a screen is used, its marking, position and orientation in relation to the ground

and to the median longitudinal plane of the vehicle, shall be such that the reproducibility of the measurement of the passing-beam inclination can be assured with an accuracy of 0.5 mrad (0.05 per cent inclination).

3.4. During measurements, the ambient temperature shall be between 10 and 30 °C.

#### 4. Vehicle preparation

4.1. Measurements shall be carried out on a vehicle which has travelled a distance of between 1,000 km and 10,000 km, preferably 5,000 km.

4.2. Tyres shall be inflated to the full-load pressure specified by the vehicle manufacturer. The vehicle shall be fully replenished (fuel, water, oil) and equipped with all the accessories and tools specified by the manufacturer. Full fuel replenishment means that the fuel tank must be filled to not less than 90 per cent of its capacity.

4.3. The vehicle shall have the parking brake released and the gearbox in neutral.

4.4. The vehicle shall be conditioned for at least 8 h at the temperature specified in paragraph 3.4. above.

4.5. If a photometric or visual method is used, headlamps with a well-defined passing-beam cut-off should preferably be installed on the vehicle under test in order to facilitate the measurements. Other means are allowed to obtain a more precise reading (for example, removal of the headlamp lens).

#### 5. Test procedure

##### 5.1. General

The variations in either passing-beam or vehicle inclination, depending on the method chosen, shall be measured separately for each side of the vehicle. The results obtained from both left and right headlamps under all the load conditions specified in annex 5, shall be within the limits set out in paragraph 5.5. below. The load shall be applied gradually without subjecting the vehicle to excessive shocks.

##### 5.2. Determination of the measured initial inclination

The vehicle shall be prepared as specified in paragraph 4 above and laden as specified in annex 5 (first loading condition of the respective vehicle category).

Before each measurement, the vehicle shall be rocked as specified in paragraph 5.4. below.

Measurements shall be made three times.

5.2.1. If none of the three measured results differ by more than 2 mrad (0.2 per cent inclination) from the arithmetic mean of the results, that mean shall constitute the final result.

- 5.2.2. If any measurement differs from the arithmetic mean of the results by more than 2 mrad (0.2 per cent inclination), a further series of 10 measurements shall be made, the arithmetic mean of which shall constitute the final result.
- 5.3. Measurement methods
- Any method may be used to measure variations of inclination provided that the readings are accurate to within 0.2 mrad (0.02 per cent inclination).
- 5.4. Treatment of vehicle in each loading condition
- The vehicle suspension and any other part likely to affect passing- beam inclination shall be activated according to the methods described below.
- However, the technical authorities and manufacturers may jointly propose other methods (either experimental or based upon calculations), especially when the test poses particular problems, provided such calculations are clearly valid.
- 5.4.1. M1 category vehicles with conventional suspension
- With the vehicle standing on the measuring site and, if necessary, with the wheels resting on floating platforms (which must be used if their absence would lead to restriction of the suspension movement likely to affect the results of measurements), rock the vehicle continuously for at least three complete cycles, for each cycle, first the rear and then the front end of the vehicle is pushed down.
- The rocking sequence shall end with the completion of a cycle. Before making the measurements, the vehicle shall be allowed to come to rest spontaneously. Instead of using floating platforms, the same effect can be achieved by moving the vehicle backwards and forwards for at least a complete wheel revolution.
- 5.4.2. M2, M3 and N category vehicles with conventional suspension
- 5.4.2.1. If the treatment method for light duty vehicles described in paragraph 5.4.1. is not possible, the method described in paragraphs 5.4.2.2. or 5.4.2.3. may be used.
- 5.4.2.2. With the vehicle standing on the measuring site and the wheels on the ground, rock the vehicle by temporarily varying the load.
- 5.4.2.3. With the vehicle standing on the measuring site and the wheels on the ground, activate the vehicle suspension and all other parts which may affect the passing-beam inclination by using a vibration rig. This can be a vibrating platform on which the wheels rest.
- 5.4.3. Vehicles with non-conventional suspension, where the engine has to be running.
- Before making any measurement wait until the vehicle has assumed its final attitude with the engine running.
- 5.5. Measurements

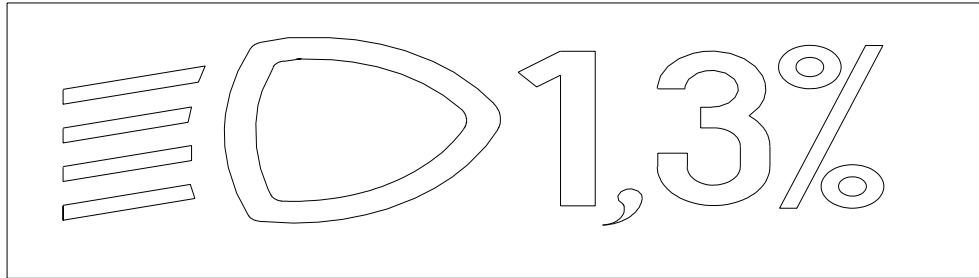
The variation of the inclination of the passing-beam shall be assessed for each of the different loading conditions in relation to the measured initial inclination determined in accordance with paragraph 5.2. above.

If the vehicle is fitted with a manual headlamp-levelling system, the latter shall be adjusted to the positions specified by the manufacturer for given loading conditions (according to annex 5).

- 5.5.1. To begin with, a single measurement shall be made in each loading condition. Requirements have been met if, for all the loading conditions, the variation in inclination is within the calculated limits (for example, within the difference between the stated initial inclination and the lower and upper limits specified for approval) with a safety margin of 4 mrad (0.4 per cent inclination).
- 5.5.2. If the result(s) of any measurement(s) does (do) not lie within the safety margin indicated in paragraph 5.5.1. or exceed(s) the limit values, a further three measurements shall be made in the loading conditions corresponding to this (these) result(s) as specified in paragraph 5.5.3.
- 5.5.3. For each of the above loading conditions:
- 5.5.3.1. If none of the three measured results differs by more than 2 mrad (0.2 per cent inclination) from the arithmetic mean of the results, that mean shall constitute the final result.
- 5.5.3.2. If any measurement differs from the arithmetic mean of the results by more than 2 mrad (0.2 per cent inclination), a further series of 10 measurements shall be made, the arithmetic mean of which shall constitute the final result.
- 5.5.3.3. If a vehicle is fitted with an automatic headlamp-levelling system which has an inherent hysteresis loop, average results at the top and bottom of the hysteresis loop shall be taken as significant values.
- All these measurements shall be made in accordance with paragraphs 5.5.3.1. and 5.5.3.2.
- 5.5.4. Requirements have been met, if, under all loading conditions, the variation between the measured initial inclination determined in accordance with paragraph 5.2. and the inclination measured under each loading condition is less than the values calculated in paragraph 5.5.1. (without safety margin).
- 5.5.5. If only one of the calculated upper or lower limits of variation is exceeded, the manufacturer shall be permitted to choose a different value for the stated initial inclination, within the limits specified for approval.
-

Annex 5

INDICATION OF THE STATED INITIAL ADJUSTMENT REFERRED TO IN  
PARAGRAPH 5.2.6.1.1. OF THIS REGULATION



Example

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□

Standard symbol for  
passing-beam headlamp

Value of the stated  
initial adjustment

The size of the symbol and characters is left to the discretion of the manufacturer.

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Annex 6

THE CONTROLS FOR THE HEADLAMP-LEVELLING DEVICES REFERRED TO  
IN PARAGRAPH 5.2.6.2.2. OF THIS REGULATION

1. Specifications

1.1. Downward inclination of the passing-beam must in all cases be produced in one of the following ways:

- (a) by moving a control downwards or to the left;
- (b) by rotating a control in a counterclockwise direction;
- (c) by depressing a button (push-pull control).

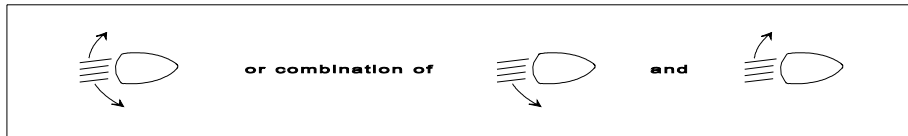
If several buttons are used to adjust the beam, the button which gives the greatest downward inclination must be installed to the left or below the button(s) for other passing-beam positions.

A rotary control which is installed edge-on, or with only the edge visible, should follow the operating principles of control of types (a) or (c).

1.1.1. This control must carry symbols indicating clearly the movements corresponding to the downward and upward inclination of the passing beam.

1.2. The "O" position corresponds to the initial inclination according to paragraph 5.2.6.1.1. of this Regulation.

1.3. The "O" position which, according to paragraph 5.2.6.2.2. of this Regulation has

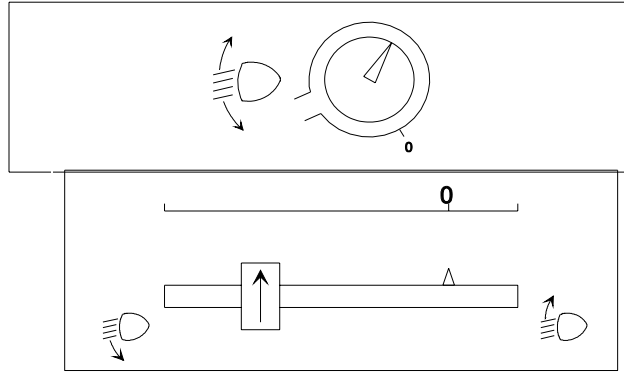


to be a "stop position", need not necessarily be at the end of the scale.

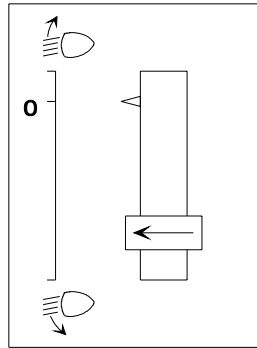
1.4. The marks used on control must be explained in the owner's handbook.

1.5. Only the following symbols may be used to identify the controls:

Symbols employing five lines instead of four may also be used



Example 1:



Example 2:

Example 3:

