AUTOMOTIVE INDUSTRY STANDARD

Installation Requirements of Lighting and Light - Signalling Devices for Motor Vehicle having more than Three Wheels including Quadricycles, Trailer and Semi-Trailer excluding Agricultural Tractors

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Installation Requirements of Lighting and Light - Signalling Devices for Motor Vehicle having more than Three Wheels including Quadricycles, Trailer and Semi-Trailer excluding Agricultural Tractors

1.0	**SCOPE**
	This standard applies to the approval of power-driven vehicles intended for use on the road, with or without bodywork, with not less than four wheels and a maximum design speed exceeding 25 km/h, and of their trailers, with the exception of vehicles, which run on rails, agricultural or forestry tractors and machinery, and public works vehicles. Note: "This standard does not apply to Special Purpose Vehicle except Motor Caravans."
1.1	**References**
	The following standards are necessary adjuncts to this standard:
1.1.1	IS: 9211-2003 "Terms and Definitions of Weights of Road Vehicles other than 2 and 3 wheelers".
1.1.2	IS 14272: 2011 "Automotive Vehicles - Types – Terminology"
1.1.3	IS: 9435: 2004 "Terms and Definitions Relating to Dimensions of Road Vehicles".
2.0	**DEFINITIONS**
2.1	**General**
2.1.1	The definitions given in this Standard and its series of amendments in force at the time of application for type approval shall apply to the Light-Signalling Devices (LSD), Road Illumination Devices (RID) and Retro-Reflective Devices (RRD) Standards.
2.1.2	References to standard (étalon) light source(s) shall refer to AIS 034 (Part 1 and 2) and AIS 130 standards respectively, and to their series of amendments in force at the time of application for type approval.
2.1.3	**"Approval of a vehicle"** means the approval of a vehicle type with regard to the number and mode of installation of the lighting and light-signalling devices.
2.1.4	**"Device"** means an element, or an assembly of elements used to perform one or more functions.
2.1.4.1	**"Lighting function"** means the light emitted by a device to

	illuminate the road and objects in the direction of vehicle movement.
2.1.4.2	**"Light-signalling function"** means the light emitted or reflected by a device to give to other road users visual information on the presence, identification and/or the change of movement of the vehicle.
2.1.5	**"Lamp"** means a device designed to illuminate the road or to emit a light signal to other road users. Rear registration plate lamps and retro-reflectors are likewise to be regarded as lamps. For the purpose of this Standard, light-emitting rear registration plates, [the service-door-lighting system according to the provisions of UN Regulation No. 107 on vehicles of Categories M2 and M3 and] external status indicator as defined in this Standard are not considered as lamps.
~~2.1.6~~	~~**"Change index"** means a sequential number, starting from 0, specific to each lamp (function) covered by AIS 198, AIS 199 and AIS 200 standards. It indicates the number of times that the new series of amendments to the pertinent AIS standard (AIS 198, AIS 199 and AIS 200) have introduced higher stringency requirements for this lamp (function).~~
2.1.6	**"Manufacturer logo"** means a graphic mark, emblem, word, or a combination of those elements, used to aid and promote public identification and recognition of a vehicle manufacturer's brand name.
2.2	**Type Definitions**
2.2.1	**"Vehicle type with regard to the installation of lighting and light-signalling devices"** means vehicles which do not differ in the essential respects mentioned in Clauses 2.2.1.1. to 2.2.1.4.
	The following are likewise considered not to be "vehicles of a different type": vehicles which differ within the meaning of Clauses 2.2.1.1. to 2.2.1.4., but not in such a way as to entail a change in the kind, number, positioning and geometric visibility of the lamps and the inclination of the dipped-beam prescribed for the vehicle type in question, and vehicles on which optional lamps are fitted or are absent:
2.2.1.1	The dimension and the external shape of the vehicle;
2.2.1.2	The number and positioning of the devices;
2.2.1.3	The headlamp-levelling system;
2.2.1.4	The suspension system.
2.3	**Vehicle**
2.3.1	**"Unladen vehicle"** means the vehicle in kerb weight condition as

	specified in IS: 9211- 2003.
2.3.2	**"Laden vehicle"** means a vehicle loaded to its maximum permissible weight (GVW), as stated by the manufacturer, who shall also specify the distribution of this weight between the axles.
2.3.3	**"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:
2.3.3.1	Of tyres near their point of contact with the ground, and of connections for tyre-pressure gauges;
2.3.3.2	Of any anti-skid devices mounted on the wheels;
2.3.3.3	Of devices for indirect vision;
2.3.3.4	Of side direction-indicator lamps, end-outline marker lamps, front and rear position lamps, parking lamps, retro-reflectors and side-marker lamps.
2.3.3.5	Of customs seals affixed to the vehicle, and of devices for securing and protecting such seals.
2.3.3.6	Of service-door lighting systems on vehicles of Categories M2 and M3 as specified in Clause 2.1.5.
2.3.4	**"Overall dimensions"** means the distance between the two vertical planes defined in Clause 2.3.3. above.
2.3.4.1	**"Overall width"** means the distance between the two vertical planes defined in Clause 2.3.3. above.
2.3.5	**"Operating tell-tale"** means a visual or auditory signal (or any equivalent signal) indicating that a device has been switched ON and is operating correctly or not.
2.3.6	**"Closed-circuit 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.
2.3.7	**"Ground"** means the surface on which the vehicle stands which should be substantially horizontal.
2.3.8	**"Movable components"** of the vehicle mean those 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.
2.3.9	**"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.
2.3.10	**"Normal condition of use of a vehicle"** means:
2.3.10.1	For a motor vehicle, when the vehicle is ready to move with its propulsion engine running and its movable components are in the normal position(s) as defined in Clause 2.3.9.;
2.3.10.2	And for a trailer, when the trailer is connected to a drawing motor vehicle in the conditions as prescribed in Clause 2.3.10.1. and its movable components are in the normal position(s) as defined in Clause 2.3.9.
2.3.11	**"Park condition of a vehicle"** means:
2.3.11.1	For a motor vehicle, when the vehicle is at standstill and its propulsion engine is not running and its movable components are in the normal position(s) as defined in Clause 2.3.9.;
2.3.11.2	And for a trailer, when the trailer is connected to a drawing motor vehicle in the condition as described in clause 2.3.11.1. and its movable components are in the normal position(s) as defined in clause 2.3.9.
2.4	**Lamps Generalities**
2.4.1	**"Equivalent lamps"** means lamps having the same function ~~and authorized in the country in which the vehicle is registered~~; such lamps may have different characteristics from those installed on the vehicle when it is approved on condition that they satisfy the requirements of this Standard.
2.4.2	**"Independent lamps"** means devices having separate apparent surfaces in the direction of the reference axis,**(1)** separate light sources and separate lamp bodies.
	(1) *In the case of lighting devices for the rear registration plate and direction-indicators of Categories 5 and 6, the "light-emitting surface" shall be used.*
2.4.3	**"Grouped lamps"** means devices having separate apparent surfaces in the direction of the reference axis**(2)** and separate light sources, but a common lamp body.
2.4.4	**"Combined lamps"** means devices having separate apparent surfaces in the direction of the reference axis**(2)**, but a common light source and a common lamp body.
2.4.5	**"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 apparent surfaces in the direction of the

	reference axis[(2)] and a common lamp body.[(2)]
	[(2)] *Examples to enable a decision regarding reciprocal incorporation of lamps can be found in Annex A, Part 7.*
2.4.6	**"Single-function lamp"** means a part of a device which performs a single lighting or light-signalling function.
2.4.7	**"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 means. The term **"retractable"** is used more particularly to describe a concealable lamp the displacement of which enables it to be inserted within the bodywork.
2.4.8	**"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 Standard, the exact edges of apparent surfaces need not be determined.
2.4.9	**"Optional lamp"** means a lamp, the installation of which is left to the discretion of the manufacturer.
2.4.10	**"Pair"** means the set of lamps of the same function on the left- and right-hand side of the vehicle.
2.4.10.1	**"Matched pair"** means the set of lamps of the same function on the left- and right-hand side of the vehicle, which, as a pair, complies with the photometric requirements.
2.4.11	**"Single and Multiple Lamps"**
2.4.11.1	**"A single lamp"** means:
	(a) A device or part of a device having one lighting or light-signalling function, one or more light source(s) and one apparent surface in the direction of the reference axis, which may be a continuous surface or composed of two or more distinct parts; or
	(b) Any assembly of two lamps marked "D", whether identical or not, having the same function; or
	(c) Any assembly of two independent retro-reflectors, whether identical or not, that have been approved separately; or
	(d) Any interdependent lamp system composed of two or three interdependent lamps marked "Y" approved together and providing the same function.
2.4.11.2	**"Two lamps"** or **"an even number of lamps"** in the shape of a band or strip, means two lamps with a single light emitting surface,

	providing such a band or strip is placed symmetrically in relation to the median longitudinal plane of the vehicle.
2.4.12	**"Interdependent lamp system"** means an assembly of two or three interdependent lamps providing the same function.
2.4.12.1	**"Interdependent lamp marked "Y""** means a device operating as part of an interdependent lamp system. Interdependent lamps operate together when activated, have separate apparent surfaces in the direction of the reference axis and separate lamp bodies, and may have separate light source(s).
2.4.13	**"Lamps marked "D""** means independent lamps, approved as separate devices in such a way that they are allowed to be used either independently or in an assembly of two lamps to be considered as a "single lamp".
2.4.14	Headlamps of different "Classes" mean headlamps identified by particular photometric provisions.
2.4.15	Definitions with regard to Headlamps emitting a driving-beam and/or a symmetrical passing-beam for vehicles of Categories L and T:
2.4.15.1	**"Additional lighting unit"** means the part of a headlamp system that provides the bend lighting. It is independent from the device that provides the principal passing beam, may consist of optical, mechanical and electrical components, and it may be grouped and/or reciprocally incorporated with other lighting or light-signalling devices.
2.4.16	Definitions with Regard to Retro-reflectors:
2.4.16.1	**"Retro-reflection"** means the reflection in which radiation is returned in directions close to the direction from which it came, this property being maintained even over wide variations of the direction of the incident radiation:
2.4.16.2	**"Retro-reflective device"** means an assembly ready for use and comprising one or more retro-reflective optical units; Retro-reflective devices are divided into classes according to their photometric characteristics: Class IA or IB, Class IIIA or IIIB, and Class IVA. Retro-reflective devices of Classes IB and IIIB are devices combined with other signal lamps which are not watertight and which are integrated into the body of a vehicle.
2.4.17	Definition with Regard to Retro-reflective Marking:
2.4.17.1	**"Retro-reflective marking material"** means a surface or a device from which, when directionally illuminated, a relatively large portion of the incident radiation is retro-reflected.

2.4.17.2	**"Rear marking plate"** means a plate faced with retro-reflective and fluorescent material or devices intended to increase the visibility and permit easy identification of heavy and long vehicles.
2.4.17.3	**"Slow moving vehicle (SMV) rear marking plate"** means a triangular plate with truncated corners with a characteristic pattern faced with retro-reflectors or retro-reflective materials and retro-reflective or fluorescent material.
2.4.17.4	**"Sample unit"** means a complete retro-reflective device ready to be mounted on a vehicle and representative of current production.
2.4.17.5	**"Fluorescence"** means when certain substances are brought near to a source of ultraviolet or blue radiations, they emit radiations which are nearly always of longer wave-length than those producing the effect. This phenomenon is called fluorescence. By day and in twilight, fluorescent colours are brighter than normal colours because they reflect part of the light falling upon them, and in addition they emit light. At night they are not brighter than ordinary colours.
2.5	**Lamps**
2.5.1	**"Driving-beam (main-beam) headlamp"** means the lamp used to illuminate the road over a long distance ahead of the vehicle.
2.5.2	**"Passing-beam (dipped-beam) headlamp"** means the lamp used to illuminate the road ahead of the vehicle without causing undue dazzle or discomfort to oncoming drivers and other road-users.
2.5.2.1	**"Principal passing-beam (principal dipped-beam)"** means the dipped-beam produced without the contribution of infrared (IR) emitter and/or additional light sources for bend lighting.
2.5.3	**"Direction-indicator lamp"** means the lamp used to indicate to other road-users that the driver intends to change direction to the right or to the left. A direction-indicator lamp or lamps may also be used according to the provisions of AIS 076 standard.
2.5.4	**"Stop lamp"** means a lamp used to indicate to other road users to the rear of the vehicle that the longitudinal movement of the vehicle is intentionally retarded.
2.5.5	**"Rear-registration plate illuminating device"** means the device used to illuminate the space reserved for the rear registration plate; such a device may consist of several optical components.
2.5.6	**"Front position lamp"** means the lamp used to indicate the presence and the width of the vehicle when viewed from the front.
2.5.7	**"Rear position lamp"** means the lamp used to indicate the presence and width of the vehicle when viewed from the rear.

2.5.8	**"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 Standard the following are not considered as retro-reflectors:
2.5.8.1	Retro-reflecting number plates;
2.5.8.2	The retro-reflecting signals ~~mentioned in the ADR (European Agreement concerning the international carriage of dangerous goods by road);~~
2.5.8.3	Other retro-reflective plates and signals which shall be used to comply with national requirements for use as regards certain categories of vehicles or certain methods of operation;
2.5.8.4	Retro-reflecting materials approved as Class D or E or F according to ~~[AIS-057] or~~ AIS 200 standard~~s~~ and used for other purposes in compliance with national requirements.
2.5.9	**"Conspicuity marking"** means a device intended to increase the conspicuity of a vehicle, when viewed from the side or rear (or in the case of trailers, additionally from the front), by the reflection of light emanating from a light source not connected to the vehicle, the observer being situated near the source.
2.5.9.1	**"Contour marking"** means a conspicuity marking intended to indicate the horizontal and vertical dimensions (length, width and height) of a vehicle.
2.5.9.1.1	**"Full contour marking"** means a contour marking that indicates the outline of the vehicle by a continuous line.
2.5.9.1.2	**"Partial contour marking"** means a contour marking that indicates the horizontal dimension of the vehicle by a continuous line, and the vertical dimension by marking the upper corners.
2.5.9.2	**"Line marking"** means a conspicuity marking intended to indicate the horizontal dimensions (length and width) of a vehicle by a continuous line.
2.5.10	**"Front fog lamp"** means a lamp used to improve the illumination of the road ahead of the vehicle in case of fog or any similar condition of reduced visibility.
2.5.11	**"Rear fog lamp"** means a lamp used to make the vehicle more easily visible from the rear in dense fog.
2.5.12	**"Reversing lamp"** means the lamp used to illuminate the road to the rear of the vehicle and to warn other road-users that the vehicle is

	reversing or about to reverse.
2.5.13	**"Parking lamp"** means a lamp which is used to draw attention to the presence of a stationary vehicle in a built-up area. In such circumstances it replaces the front and rear position lamps.
2.5.14	**"End-outline marker lamp"** means the lamp fitted near to the extreme outer edge and as close as possible to the top of the vehicle and intended to indicate clearly the vehicle's overall width. This lamp is intended, for certain vehicles and trailers, to complement the vehicle's front and rear position lamps by drawing particular attention to its bulk.
2.5.15	**"Side marker lamp"** means a lamp used to indicate the presence of the vehicle when viewed from the side.
2.5.16	**"Daytime running lamp"** means a lamp facing in a forward direction used to make the vehicle more easily visible when driving during daytime.
2.5.17	**"Cornering lamp"** means a lamp used to provide supplementary illumination of that part of the road which is located near the forward corner of the vehicle at the side towards which the vehicle is going to turn.
2.5.18	**"Exterior courtesy lamp"** means a lamp used to provide supplementary illumination to assist the entry and exit of the vehicle driver and passenger or in loading operations;
2.5.19	**"Manoeuvring lamp"** means a lamp used to provide supplementary illumination to the side of the vehicle to assist during slow manoeuvres.
2.5.20	**"External status indicator"** means an optical signal mounted on the outside of the vehicle to indicate the status or the change of the status for Vehicle Alarm System (VAS), Alarm System (AS) and immobilizer of AIS 076 standard, when the vehicle is parked.
2.6	**Signal**
2.6.1	**"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.
2.6.2	**"Emergency stop signal"** means a signal to indicate to other road users to the rear of the vehicle that a high retardation force has been applied to the vehicle relative to the prevailing road conditions.
2.6.3	**"Rear-end collision alert signal (RECAS)"** means an automatic signal given by the leading vehicle to the following vehicle. It warns that the following vehicle needs to take emergency action to avoid a

	collision.
2.7	**System**
2.7.1	**"Aiming"** means the positioning of the beam or part thereof on an aiming screen according to the relevant criteria;
2.7.2	**"Adjustment"** means the use of the means provided by the system for vertical and/or horizontal aiming of the beam;
2.7.3	**"Bend lighting"** means a lighting function to provide enhanced illumination in bends.
2.7.4	**"Adaptive front lighting system"** (or **"AFS"**) means a lighting device type-approved according to ~~AIS 127 or~~ AIS 199 standard, providing beams with differing characteristics for automatic adaptation to varying conditions of use of the dipped-beam (passing-beam) and, if it applies, the main-beam (driving-beam).
2.7.4.1	**"Lighting unit"** means a light-emitting component designed to provide or contribute to one or more front lighting function(s) provided by the AFS.
2.7.4.2	**"Installation unit"** means an indivisible housing (lamp body) which contains one or more lighting unit(s).
2.7.4.3	**"Lighting mode"** or **"Mode"** of a front-lighting function provided by an AFS means a beam within the provisions either for one of the passing beam classes or for the main beam, designed and specified by the manufacturer for adaptation to dedicated vehicle and ambient conditions;
2.7.4.4	**"System control"** means that part(s) of the AFS receiving the AFS control signals from the vehicle and controlling the operation of the lighting units automatically.
2.7.4.5	**"AFS control signal"** (V, E, W, T) means the input to the AFS in accordance with the Clause 6.22.7.4. of this Standard.
2.7.4.6	**"Neutral state"** means the state of the AFS when a defined mode of the Class C passing-beam ("basic passing-beam") or of the main beam in the maximum condition of activation, if any, is produced, and no AFS control signal applies.
2.7.4.7	**"Adaptive main-beam"** means a main-beam of the AFS that adapts its beam pattern to the presence of oncoming and preceding vehicles in order to improve the long-range visibility for the driver without causing discomfort, distraction or glare to other road users.
2.7.5	Definitions with Regard to AFS:

2.7.5.1	**"Class"** of a passing beam (C, V, E or W) means the designation of a passing beam, identified by particular provisions according to AIS 008 standard (For explanation only. The provisions of the passing-beam classes are dedicated to conditions as follows: C for the basic passing-beam, V for use in lit areas such as towns, E for use on roads such as motorways, W for use in adverse conditions such as wet road);
2.7.5.2	**"Bending mode"** means the designation of a mode of a front-lighting function with its illumination being laterally moved or modified (to obtain an equivalent effect), designed for bends, curves or intersections of the road, and, identified by particular photometric provisions;
	(a) "Category 1 bending mode" means a bending mode with horizontal movement of the kink of the cut-off;
	(b) "Category 2 bending mode" means a bending mode without horizontal movement of the kink of the cut-off;
2.7.5.3	**"Right side"** respectively "left side" means the combined total of the lighting units intended to be installed to that side of the longitudinal median plane of the vehicle, relative to its forward motion;
2.7.5.4	**"Signal"** means any AFS control signal or any additional control input to the system or a control output from the system to the vehicle;
2.7.5.5	**"Signal generator"** means a device, reproducing one or more of the signals for system tests;
2.7.5.6	**"Supply and operating device"** means one or more components of a system providing power to one or more parts of the system, including such as power and/or voltage control(s) for one or more light sources as e.g. electronic light source control gears;
2.7.5.7	**"System reference axis"** for an AFS means the intersection line of the vehicle's longitudinal median plane with the horizontal plane through the centre of reference of one lighting unit specified in the drawings accompanying the application for approval of the device;
2.7.5.8	**"Traffic-change function"** means any front-lighting function or a mode thereof, or part(s) thereof only, or any combination of these, intended to avoid glare and provide sufficient illumination in case where a vehicle being equipped with a system designed for one traffic direction only is temporarily used in a country with the opposite direction of traffic.
2.7.5.9	**"Substitute function"** means any specified front-lighting and/or front light-signalling, be it a front-lighting and/or a front light-signalling function, or a mode thereof, or part(s) thereof only, or any combination of it, intended to replace a front-lighting function/mode

	in case of failure.
2.7.5.10	**"Functional unit"** means a part of a lighting unit providing a specific light distribution which may be used for different modes or classes. If used for the bending mode its light distribution may vary as a function of the T-signal (turn-radius); however, the light distribution shall be identical for a given T-signal (turn-radius) in all modes or classes.
2.7.6	**"Sequential activation"** means an electrical connection where the individual light sources of a lamp are wired such that they are activated in a predetermined sequence.
2.7.7	**"Retro-reflecting optical unit"** means a combination of optical components producing retro-reflection.
2.8	**Lens**
2.8.1	**"Lens"** means the outermost component of the lamp (unit) which transmits light through the illuminating surface;
2.8.2	**"Coating"** means any product or products applied in one or more layers to the outer face of a lens;
2.8.3	**"Textured outer lens"** or **"Textured outer lens area"** means all or part of an outer lens, designed to modify or influence the propagation of light from the light source(s), such that the light rays are significantly diverted from their original direction.
2.9	**Light Sources**
2.9.1	**"Light source"** means one or more elements for visible radiation, with a base for mechanical and electrical connection, possibly assembled with one or more components to control the elements for visible radiation.
2.9.1.1	**"Replaceable light source"** means a light source which is designed to be inserted in and removed from the holder of its device without tool.
2.9.1.2	**"Non-replaceable light source"** means a light source which can only be replaced by replacement of the device to which this light source is fixed.
	(a) In case of a light source module: a light source which can only be replaced by replacement of the light source module to which this light source is fixed;
	(b) In case of AFS: a light source which can only be replaced by replacement of the lighting unit to which this light source is fixed.
2.9.1.3	**"Light source module"** means an optical part of a device which is specific to that device. It contains one or more non-replaceable light

	sources and it may optionally contain one or more holders for approved replaceable light sources.
2.9.1.4	**"Filament light source"** (filament lamp) means a light source where the only element for visible radiation is one or more filaments producing thermal radiation.
2.9.1.5	**"Gas-discharge light source"** means a light source where the only element for visible radiation is a discharge arc producing electroluminescence.
2.9.1.6	**"Light-emitting diode (LED) light source"** means a light source where the only element for visible radiation is one or more solid state junctions producing electroluminescence possibly completed with one or more elements for fluorescence-based conversion.
2.9.1.6.1	**"LED substitute light source"** means a LED light source of a category which has a counterpart light source category producing light by another light generating technology.
2.9.1.7	**"LED module"** means a light source module containing as light sources only LEDs. However, it may optionally contain one or more holders for approved replaceable light sources.
2.9.2	**"Electronic light source control gear"** means one or more components between supply and light source to control voltage and/or electrical current of the light source.
2.9.2.1	**"Ballast"** means one or more components, either between supply and light source or integrated with the light source, to control the electrical current of a gas-discharge light source.
2.9.3	**"Variable intensity control"** means the device which automatically controls rear light signalling devices producing variable luminous intensities to assure the unvarying perception of their signals. The variable intensity control is part of the lamp, or part of the vehicle, or split between the said lamp and the vehicle.
2.10	**Photometry**
2.10.1	**"Objective luminous flux"** means:
	(a) In the case of a light source:
	The value of the objective luminous flux, not including any tolerances, as indicated in the relevant data sheet of the applicable light source Standard according to which the light source is approved;
	(b) In the case of an LED module:

	The value of the objective luminous flux as indicated in the technical specification submitted with the LED module for approval of the lamp of which the LED module is a part;
2.10.2	**"Light emitting surface"** of a **"lighting device"**, **"light-signalling device"** or a retro-reflector means the surface as declared in the request for approval by the manufacturer of the device on the drawing, see Annex A (see e.g., Parts 1, and 4).
	This shall be declared according to one of the following conditions:
	(a) In the case where the outer lens is textured, the declared light emitting surface shall be all or part of the exterior surface of the outer lens;
	(b) In the case where the outer lens is non-textured the outer lens may be disregarded and the light emitting surface shall be as declared on the drawing, see Annex A (see e.g., Part 5).
2.10.3	**"Illuminating Surface"** (see Annex A).
2.10.3.1	**"Illuminating surface of a lighting device"** (Clauses 2.5.1., 2.5.2., 2.5.10., 2.5.12. and 2.5.17.) 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 Clause 2.10.3.2. 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 dipped-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.
	In the case of AFS being installed: where a lighting function is produced by two or more simultaneously operated lighting units on a given side of the vehicle, the individual illuminating surfaces, taken together, constitute the illuminating surface to be considered (for example, in the figure of Clause 6.22.4. below, the individual illuminating surfaces of the lighting units 8, 9 and 11, regarded together and taking into account their respective location, constitute the illuminating surface to be considered for the right hand side of the vehicle).
2.10.3.2	**"Illuminating surface of a light-signalling device other than a retro-reflector"** (Clauses 2.5.3. to 2.5.7., 2.6.1., 2.5.11. and 2.5.13. to 2.5.16.) 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% 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 to verify the distance to the extreme edges of the vehicle and the height above the ground.
	For other applications of the illuminating surface, e.g., distance between two lamps or functions, the shape of the periphery of this illuminating surface shall be used. The screens shall remain parallel, but other orientations are allowed to be used.
	In the case of a light-signalling device whose illuminating surface encloses either totally or partially the illuminating surface of another function or encloses a non-lighted surface, the illuminating surface may be considered to be the light emitting surface itself (see e.g., Annex A, Parts 2, 3, 5 and 6).
2.10.3.3	**"Illuminating surface of a retro-reflector"** (Clause 2.5.8.) means, as declared by the applicant during the component approval procedure for the retro-reflectors, the orthogonal projection of a retro-reflector in a plane perpendicular to its axis of reference and delimited by planes contiguous to the declared outermost parts of the retro-reflectors' 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.
2.10.4	The **"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;
	Or the light-emitting surface;
	Only in the case of a light-signalling device producing variable luminous intensities, its apparent surface that may be variable as specified in Clause 2.9.3. shall be considered under all conditions permitted by the variable intensity control, if applicable.
	In a plane perpendicular to the direction of observation and tangential to the most exterior point of the lens. Different examples of the application of apparent surface can be found in Annex A to this Standard.
2.10.5	**"Axis of reference"** (or **"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°, V = 0°) for angles of field for photometric measurements and for installing the lamp on the

	vehicle.
2.10.6	**"Centre of reference"** means:
	(a) The intersection of the axis of reference with the exterior light-emitting surface or
	(b) A point on or near a retro-reflective area
	Which is designated to be the centre of the device for the purpose of specifying its performance; it is specified by the manufacturer of the lamp.
2.10.7	**"Angles of geometric visibility"** means the angles which determine the field of the minimum solid angle in which the apparent surface of the lamp is visible. That field of the solid angle is determined by the segments of the sphere of which the centre 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 ß correspond to the longitude and the vertical angles α to the latitude.
2.10.8	**"Photometric stability has occurred"** means the variation of the luminous intensity for the specified test point is less than 3% within any 15min period.
2.10.9	**"Gonio(photo)meter system (if not otherwise specified in a particular** Standard**)"** means a system used for the photometric measurements specified by the angular coordinates in degrees on a sphere with a vertical polar axis according to CIE publication No. 70, Vienna 1987, i.e. corresponding to a gonio(photo)meter system with a horizontal ("elevation") axis fixed to the ground and a second, moveable ("rotation") axis perpendicular to the fixed horizontal axis (see Annex L to this Standard). **Note:** The above mentioned CIE publication specifies a procedure to correct the angular coordinates in the case where an alternative gonio(photo)meter system is used.
2.10.10	**"H plane"** means the horizontal plane containing the centre of reference of the lamp.
2.10.11	**"Transverse plane"** means a vertical plane perpendicular to the median longitudinal plane of the vehicle.
2.10.12	**''Angle of divergence"** means the angle between the straight lines connecting the centre of reference to the centre of the receiver and to the centre of the source of illumination.
2.10.13	**''Illumination angle"** means the angle between the axis of reference and the straight line connecting the centre of reference to the centre of the source of illumination.

2.10.14	**"Angle of rotation"** means the angle through which the retro-reflective device is rotated about its axis of reference starting from one given position.		
2.10.15	**"Angular diameter of the retro-reflective device"** means the angle subtended by the greatest dimension of the visible area of the illuminating surface, either at the centre of the source of illumination or at the centre of the receiver.		
2.10.16	**"Illumination of the retro-reflective device"** is the abbreviated expression used conventionally to designate the illumination measured in a plane perpendicular to the incident rays and passing through the centre of reference.		
2.10.17	**"Coefficient of luminous intensity (CIL)"** means the quotient of the luminous intensity reflected in the direction considered, divided by the illumination of the retro-reflective device for given angles of illumination, divergence and rotation.		
2.11	**Colour**		
2.11.1	Colour of the Light Emitted from a Device		
2.11.1.1	**"White"** means the chromaticity coordinates (x,y)[(3)] of the light emitted that lie inside the chromaticity areas defined by the boundaries:		
	W12	green boundary	y = 0.150 + 0.640 x
	W23	yellowish green boundary	y = 0.440
	W34	yellow boundary	x = 0.500
	W45	reddish purple boundary	y = 0.382
	W56	purple boundary	y = 0.050 + 0.750 x
	W61	blue boundary	x = 0.310
	With intersection points:		
		x	y
	W1	0.310	0.348
	W2	0.453	0.440
	W3	0.500	0.440

	W4	0.500	0.382
	W5	0.443	0.382
	W6	0.310	0.283
	(3) *CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer.*		
2.11.1.2	**"Selective-yellow"** means the chromaticity coordinates (x,y)(3) of the light emitted that lie inside the chromaticity areas defined by the boundaries:		
	SY12	green boundary	y = 1.290 x - 0.100
	SY23	the spectral locus	
	SY34	red boundary	y = 0.138 + 0.580 x
	SY45	yellowish white boundary	y = 0.440
	SY51	white boundary	y = 0.940 – x
	With intersection points:		
		x	y
	SY1	0.454	0.486
	SY2	0.480	0.519
	SY3	0.545	0.454
	SY4	0.521	0.440
	SY5	0.500	0.440
2.11.1.3	**"Amber"** means the chromaticity coordinates (x,y)(3) of the light emitted that lie inside the chromaticity areas defined by the boundaries:		
	A12	green boundary	y = x - 0.120
	A23	the spectral locus	
	A34	red boundary	y = 0.390
	A41	white boundary	y = 0.790 - 0.670 x
	With intersection points:		

		x	y
	A1	0.545	0.425
	A2	0.560	0.440
	A3	0.609	0.390
	A4	0.597	0.390
2.11.1.4	**"Red"** means the chromaticity coordinates (x,y)[3] of the light emitted that lie inside the chromaticity areas defined by the boundaries:		
	R12	yellow boundary	y = 0.335
	R23	the spectral locus	
	R34	the purple line	(its linear extension across the purple range of colours between the red and the blue extremities of the spectral locus).
	R41	purple boundary:	y = 0.980 – x
	With intersection points:		
		x	y
	R1	0.645	0.335
	R2	0.665	0.335
	R3	0.735	0.265
	R4	0.721	0.259
2.11.2	Night-time Colour of the Light Retro-reflected from a Device Excluding Retro-reflective Tires ~~According to UN Regulation No. 88~~		
2.11.2.1	**"White"** means the chromaticity coordinates (x,y)[3] of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	W12	blue boundary:	y = 0.843 - 1.182 x
	W23	violet boundary	y = 0.489 x + 0.146

	W34	yellow boundary	y = 0.968 - 1.010 x
	W41	green boundary	y = 1.442 x - 0.136
	With intersection points:		
		x	y
	W1	0.373	0.402
	W2	0.417	0.350
	W3	0.548	0.414
	W4	0.450	0.513
2.11.2.2	**"Yellow"** means the chromaticity coordinates (x,y)**(3)** of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	Y12	green boundary	y = x - 0.040
	Y23	the spectral locus	
	Y34	red boundary	y = 0.200 x + 0.268
	Y41	white boundary	y = 0.970 – x
	With intersection points:		
		x	y
	Y1	0.505	0.465
	Y2	0.520	0.480
	Y3	0.610	0.390
	Y4	0.585	0.385
2.11.2.3	**"Amber"** means the chromaticity coordinates (x,y)**(3)** of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	A12	green boundary	y = 1.417 x - 0.347
	A23	the spectral locus	
	A34	red boundary	y = 0.390
	A41	white boundary	y = 0.790 - 0.670 x

	With intersection points:		
		x	y
	A1	0.545	0.425
	A2	0.557	0.442
	A3	0.609	0.390
	A4	0.597	0.390
2.11.2.4	**"Red"** means the chromaticity coordinates (x,y)[3] of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	R12	yellow boundary	y = 0.335
	R23	the spectral locus	
	R34	the purple line	
	R41	purple boundary	y = 0.978 – x
	With intersection points:		
		x	y
	R1	0.643	0.335
	R2	0.665	0.335
	R3	0.735	0.265
	R4	0.720	0.258
2.11.3	Day-time Colour of the Light Reflected from a Device		
2.11.3.1	**"White"** means the chromaticity coordinates (x,y)[3] of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	W12	violet boundary	y = x - 0.030
	W23	yellow boundary	y = 0.740 – x
	W34	green boundary	y = x + 0,050
	W41	blue boundary	y = 0.570 – x
	With intersection points:		

		x	y
	W1	0.300	0.270
	W2	0.385	0.355
	W3	0.345	0.395
	W4	0.260	0.310
2.11.3.2	**"Yellow"** means the chromaticity coordinates (x,y)**(3)** of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	Y12	red boundary	y = 0.534 x + 0.163
	Y23	white boundary	y = 0.910 - x
	Y34	green boundary	y =1.342 x - 0.090
	Y41	the spectral locus	
	With intersection points:		
		x	y
	Y1	0.545	0.454
	Y2	0.487	0.423
	Y3	0.427	0.483
	Y4	0.465	0.534
2.11.3.3	**"Red"** means the chromaticity coordinates (x,y)**(3)** of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	R12	red boundary	y = 0.346 – 0.053 x
	R23	purple boundary	y = 0.910 – x
	R34	yellow boundary	y = 0.350
	R41	the spectral locus	
	With intersection points:		
		x	y
	R1	0.690	0.310

	R2	0.595	0.315
	R3	0.560	0.350
	R4	0.650	0.350
2.11.4	Day-time Colour of the Fluorescent a Device		
2.11.4.1	**"Red"** means the chromaticity coordinates (x,y)[(3)] of the light reflected that lie inside the chromaticity areas defined by the boundaries:		
	FR12	red boundary	y = 0.346 – 0.053 x
	FR23	purple boundary	y = 0.910 – x
	FR34	yellow boundary	y = 0.315 + 0.047 x
	FR41	the spectral locus	
	With intersection points:		
		x	y
	FR1	0.690	0.310
	FR2	0.595	0.315
	FR3	0.569	0.341
	FR4	0.655	0.345
	[(3)] *CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer.*		
3.0	**Reserved**		
4.0	**Reserved**		
5.0	**GENERAL SPECIFICATIONS**		
5.1	The lighting and light-signalling devices shall be so fitted that under normal conditions of use as defined in Clauses 2.3.10., 2.3.10.1. and 2.3.10.2. and notwithstanding any vibrations to which they may be subjected, they retain the characteristics prescribed by this Standard and enable the vehicle to comply with the requirements of this Standard. In particular, it shall not be possible for the lamps to be inadvertently maladjusted.		
5.2	The illuminating lamps described in Clauses 2.5.1., 2.5.2. and 2.5.10. shall be so installed that correct adjustment of their orientation can		

	easily be carried out.
5.2.1	In the case of headlamps fitted with measures to prevent discomfort to other road-users in a country where traffic operates on the side of the road opposite to that of the country for which the headlamp was designed, such measures shall be achieved automatically or by the vehicle user with the vehicle in the park condition without the need for special tools (other than those provided with the vehicle[(4)]). Detailed instructions shall be provided by the vehicle manufacturer with the vehicle.
	[(4)] *This does not apply to dedicated objects that may be added to the exterior of the headlamp.*
5.3	For all light-signalling devices, including those mounted on the side panels, the reference axis of the lamp when fitted to the vehicle shall be parallel to the bearing plane of the vehicle on the road; in addition it shall 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 ±3° shall be allowed. In addition, any specific instructions as regards fitting laid down by the manufacturer shall be complied with.

5.4	In the absence of specific instructions, the height and orientation of the lamps shall be verified with the vehicle unladen and placed on a flat, horizontal surface, in the condition defined in Clauses 2.3.10., 2.3.10.1. and 2.3.10.2. and, in the case where an AFS is installed, with the system in its neutral state.
5.5	In the absence of specific instructions lamps constituting a pair shall:
5.5.1	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 referred to in Clause 2.10.3.);
5.5.2	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;
5.5.3	Satisfy the same colorimetric requirements and have substantially identical photometric characteristics. This shall not apply to a matched pair of Class F3 front fog lamps.
5.5.4	Have substantially identical photometric characteristics.
5.5.5	In case of lamps incorporating a manufacturer logo, only two lateral logos (one on each side) or one central logo can be fitted on the rear

	of the vehicle and only two lateral logos (one on each side) or one central logo can be fitted on the front of the vehicle. All logos that are not vehicle manufacturer or body manufacturer logos are prohibited.
5.6	On vehicles whose external shape is asymmetrical the above requirements shall be satisfied so far as is possible.
5.7	**Grouped, Combined or Reciprocally Incorporated or Single Lamps**
5.7.1	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 requirements, if any, are fulfilled.
5.7.1.1	The photometric and colorimetric requirements of a lamp shall be fulfilled when all other functions with which this Lamp is grouped, combined or reciprocally incorporated are switched OFF.
	However, when a front or rear position lamp is reciprocally incorporated with one or more other function(s) which can be activated together with them, the requirements regarding colour of each of these other functions shall be fulfilled when the reciprocally incorporated function(s) and the front or rear position lamps are switched ON.
5.7.1.2	Stop lamps and direction indicator lamps are not permitted to be reciprocally incorporated.
5.7.1.3	Where stop lamps and direction indicator lamps are grouped the following conditions shall be met:
5.7.1.3.1	Any horizontal or vertical straight line passing through the projections of the apparent surfaces of these functions on a plane perpendicular to the reference axis, shall not intersect more than two borderlines separating adjacent areas of different colour.
5.7.1.3.2	Their apparent surfaces in the direction of the reference axis, based upon the areas bounded by the outline of their light emitting surfaces, do not overlap.
5.7.2	Single Lamps
5.7.2.1	Single lamps as defined in Clause 2.4.11.1 Sub-clause (a), the apparent surface of which is composed of two or more distinct parts, shall be installed in such a way that:
	(a) Either the total area of the projection of the distinct parts of the apparent surface in the direction of the reference axis on a plane tangent to the exterior surface of the outer lens and perpendicular to the reference axis shall occupy not less than 60% of the

	smallest quadrilateral circumscribing the projection of the said apparent surface in the direction of the reference axis; or
	(b) The minimum distance between the facing edges of two adjacent/tangential distinct parts of the apparent surface in the direction of the reference axis shall not exceed 75mm when measured perpendicularly to the reference axis.
	These requirements shall not apply to a single retro-reflector.
5.7.2.2	Single lamps as defined in Clause 2.4.11.1., Sub-clause (b) or (c), composed of two lamps marked "D" or two independent retro reflectors, shall be installed in such a way that:
	(a) Either the projection of the apparent surfaces in the direction of the reference axis of the two lamps or retro reflectors occupies not less than 60% of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis; or
	(b) The minimum distance between the facing edges of the apparent surfaces in the direction of the reference axis of two lamps or two independent retro reflectors does not exceed 75mm when measured perpendicularly to the reference axis.
5.7.2.3	Single lamps as defined in Clause 2.4.11.1., Sub-clause (d) shall fulfil the requirements of Clause 5.7.2.1. Where two or more lamps and/or two or more separate apparent surfaces are included into the same lamp body and/or have a common outer lens these shall not be considered as an interdependent lamp system. However, a lamp in the shape of a band or strip may be part of an interdependent lamp system.
5.7.2.4	Two lamps or an even number of lamps in the shape of a band or strip shall be placed symmetrically in relation to the median longitudinal plane of the vehicle, extending on both sides to within at least 0.4m of the extreme outer edge of the vehicle, and are not less than 0.8m long; the illumination of such a surface shall be provided by not less than two light sources placed as close as possible to the ends; the light emitting surface may be constituted by a number of juxtaposed elements on condition that these individual light-emitting surfaces, when projected on a transverse plane fulfil the requirements of Clause 5.7.2.1.
5.8	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.

	Where the (maximum and minimum) height above the ground clearly meets the requirements of the Standard, the exact edges of any surface need not be determined.
5.8.1	For the purposes of reducing the geometric visibility angles, the position of a lamp with regard to height above the ground, shall be measured from the H plane.
5.8.2	In the case of dipped-beam headlamp, the minimum height in relation to the ground is measured from the lowest point of the apparent surface in the direction of the reference axis independent of its utilisation.
5.8.3	The position, as regards width, will be determined 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 when referred to the overall width, and from the inner edges of the apparent surface in the direction of the reference axis when referred to the distance between lamps.
	Where the position, as regards width, clearly meets the requirements of the Standard, the exact edges of any surface need not be determined.
5.9	In the absence of specific instructions, the photometric characteristics (e.g. intensity, colour, apparent surface, etc.) of a lamp shall not be intentionally varied during the period of activation of the lamp.
5.9.1	Direction-indicator lamps, the vehicle-hazard warning signal, amber side-marker lamps complying with Clause 6.18.7. below, and the emergency stop signal shall be flashing lamps.
5.9.2	The photometric characteristics of any lamp may vary:
	(a) In relation to the ambient light; (b) As a consequence of the activation of other lamps; or (c) When the lamps is being used to provide another lighting function; provided that any variation in the photometric characteristics is in compliance with the technical provisions for the lamp concerned.
5.9.3	The photometric characteristics of a direction indicator lamp of Categories 1, 1a, 1b, 2a or 2b may be varied during a flash by sequential activation of light sources as specified in ~~Clause 5.6. of AIS 012 standard or~~ Clause 5.6.11. of AIS 198. This provision shall not apply when direction indicator lamps of Categories 2a and 2b are operated as emergency stop signal

	according to Clause 6.23.1. of this Standard.
5.10	No red light which could give rise to confusion shall be emitted from a lamp as defined in Clause 2.1.5. in a forward direction and no white light which could give rise to confusion, shall be emitted from a lamp as defined in Clause 2.1.5. in a rearward direction. No account shall be taken of lighting devices fitted for the interior lighting of the vehicle. In case of doubt, this requirement shall be verified as follows:
5.10.1	For the visibility of red light towards the front of a vehicle, with the exception of a red rearmost side-marker lamp, there shall be no direct visibility of the apparent surface of a red lamp if viewed by an observer moving within Zone 1 in a transverse plane situated 25m in front of the vehicle (see Annex B);
5.10.2	For the visibility of white light towards the rear of a vehicle, with the exception of reversing lamps and white side conspicuity markings, there shall be no direct visibility of the apparent surface of a white lamp if viewed by an observer moving within Zone 2 in a transverse plane situated 25m behind the vehicle (see Annex B);
5.10.3	In their respective planes, the Zones 1 and 2 explored by the eye of the observer are bounded:
5.10.3.1	in height, by two horizontal planes 1m and 2.2m respectively above the ground;
5.10.3.2	In width, by two vertical planes which, forming to the front and to the rear respectively an angle of 15° outwards from the vehicle's median longitudinal plane, pass through the point or points of contact of vertical planes parallel to the vehicle's median longitudinal plane delimiting the vehicle's overall width; if there are several points of contact, the foremost shall correspond to the forward plane and the rearmost to the rearward plane.
5.11	The electrical connections shall be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched ON and OFF simultaneously.
5.11.1	This condition does not apply
5.11.1.1	When Front and rear position lamps are switched ON, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps; or
5.11.1.2	When Side-marker lamps flash in conjunction with direction indicators; or
5.11.1.3	When light signaling system operates according to Clause 6.2.6.7.2

	and 6.19.7.3.
5.11.1.4	Front position lamps when their function is substituted under the provisions of Clause 5.12.1. below.
5.11.2	In the case of an interdependent lamp system, all light sources shall be switched ON and OFF simultaneously.
5.12	The electrical connections shall be such that the main-beam and dipped-beam headlamps and the front fog lamps cannot be switched ON unless the lamps referred to in Clause 5.11. are also switched ON. This Requirement shall not apply, however, to main-beam or dipped-beam headlamps when their luminous warnings consist of the intermittent lighting up at short intervals of the main-beam headlamp or the intermittent lighting up at short intervals of the dipped-beam headlamp or the alternate lighting up at short intervals of the main-beam and dipped-beam headlamps.
5.12.1	The dipped-beam headlamps and/or the main-beam headlamps and/or the front fog lamps may substitute the function of the front position lamps, provided that:
5.12.1.1	Their electrical connections are such that in case of failure of any of these lighting devices the front position lamps are automatically reactivated and
5.12.1.2	The substituting lamp/function meets, for the respective position lamp, the requirements concerning:
	(a) The geometric visibility prescribed for the front position lamps in Clause 6.9.5; and (b) The minimum photometric values according to the angles of light distribution; and
5.12.1.3	Appropriate evidence demonstrating compliance with the requirements indicated in Clause 5.12.1.2. above is provided in the test reports of the substituting lamp.
5.13	**Tell-tale**
	Where a closed-circuit tell-tale is prescribed by this Standard, it may be replaced by an "operating" tell-tale.
5.14	**Concealable Lamps**
5.14.1	The concealment of lamps shall be prohibited, with the exception of the main-beam headlamps, the dipped-beam headlamps and the front fog lamps, which may be concealed when they are not in use.
5.14.2	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.	
5.14.3	It shall 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 main-beam and dipped-beam headlamps, the control referred to above is required only to activate the dipped-beam headlamps.	
5.14.4	It shall 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 may light up only when they have reached their position of use.	
5.14.5	When the concealment device has a temperature of -30°C to +50°C the headlamps shall be capable of reaching the position of use within 3s of initial operation of the control.	
5.15	The colours of the light emitted by the lamps[(5)] are the following:	
	[(5)] *Measurement of the chromaticity coordinates of the light emitted by the lamps is not part of this Standard.*	
	Main-beam headlamp:	White
	Dipped-beam headlamp:	White
	Front fog lamp:	White or selective yellow
	Reversing lamp:	White
	Direction-indicator lamp:	Amber
	Hazard warning signal:	Amber
	Stop lamp:	Red
	Emergency stop signal:	Amber or red
	Rear-end collision alert signal:	Amber
	Rear registration plate lamp:	White
	Front position lamp:	White

	Rear position lamp:	Red
	Front fog lamp:	White or selective yellow
	Rear fog lamp:	Red
	Parking lamp:	White in front, red at the rear, amber if reciprocally incorporated in the side direction-indicator lamps or in the side-marker lamps.
	Side-marker lamp:	Amber; however the rearmost side marker lamp can be red if it is grouped or combined or reciprocally incorporated with the rear position lamp, the rear end-outline marker lamp, the rear fog lamp, the stop lamp or is grouped or has part of the light emitting surface in common with the rear retro-reflector.
	End-outline marker lamp:	White in front, red at the rear
	Daytime running lamp:	White
	Rear retro-reflector, non-triangular:	Red
	Rear retro-reflector, triangular:	Red
	Front retro-reflector, non-triangular:	Identical to incident light [(6)]
	Side retro-reflector, non-triangular:	Amber; however the rearmost side retro-reflector can be red if it is grouped or has part of the light emitting surface in common with the rear position lamp, the rear end-outline marker lamp, the rear fog lamp, the stop-lamp, the red rearmost side-marker lamp or the rear retro-reflector, non-triangular.
	Cornering lamp:	White
	Conspicuity marking:	White to the front; White or yellow to the side; Red or

		yellow to the rear.~~(7)~~
	Adaptive front-lighting systems (AFS):	White
	Exterior courtesy lamp:	White
	Manoeuvring lamp:	White
	(6) *Also known as white or colourless retro-reflector.* ~~(7) Nothing in this Standard shall preclude the Contracting Parties applying this Standard from allowing the use of white conspicuity markings to the rear in their territories.~~	
5.16	**Number of Lamps**	
5.16.1	The number of lamps mounted on the vehicle shall be equal to the number indicated in the individual specifications of this Standard.	
5.17	Any lamp may be installed on movable components provided that the conditions specified in Clauses 5.18., 5.19. and 5.20. are fulfilled.	
5.18	Rear position lamps, rear direction-indicators and rear retro-reflectors, triangular as well as non triangular, may be installed on movable components only:	
5.18.1	If at all fixed positions of the movable components the lamps on the movable components meet all the position, geometric visibility, colorimetric and photometric requirements for those lamps.	
5.18.2	In the case where the functions referred to in Clause 5.18. are obtained by an assembly of two lamps marked "D" (see Clause 2.4.11.1.), only one of the lamps needs to meet the position, geometric visibility and photometric requirements for those lamps at all fixed positions of the movable components.	
	~~Or~~	
5.18.3	Where additional lamps for the above functions are fitted and are activated when the movable component is in any fixed open position, provided that these additional lamps satisfy all the position, geometric visibility and photometric requirements applicable to the lamps installed on the movable component.	
5.18.4	In the case where the functions referred to in Clause 5.18. are obtained by an interdependent lamp system either of the following	

	conditions shall apply:
	(a) Should the complete interdependent lamp system be mounted on the moving component(s), the requirements of Clause 5.18.1. shall be satisfied. However, additional lamps for the above functions may be activated, when the movable component is in any fixed open position, provided that these additional lamps satisfy all the position, geometric visibility, colorimetric and photometric requirements applicable to the lamps installed on the movable component;
	or
	(b) Should the interdependent lamp system be partly mounted on the fixed component and partly mounted on a movable component, with the exception of direction indicator lamps, the interdependent lamp(s) specified by the Applicant during the device approval procedure shall meet all the position, outwards geometric visibility, colorimetric and photometric requirements for those lamps, at all fixed positions of the movable component(s).
	The inwards geometric visibility requirement(s) is(are) deemed to be satisfied if this (these) interdependent lamp(s) still conform(s) to the photometric values prescribed in the field of light distribution for the approval of the device, at all fixed positions of the movable component(s).
	For direction indicator lamps, the interdependent lamp(s) specified by the Applicant during the device approval procedure shall meet all the position, geometric visibility, photometric and colorimetric requirements at all fixed positions of the movable component(s). This does not apply where, to fulfil or complete the geometric visibility angle, additional lamps are activated, when the movable component is in any fixed open position, provided that these additional lamps satisfy all the position, photometric and colorimetric requirements applicable to the direction indicator lamps installed on the movable component.
5.19	When the movable components are in a position other than a "Normal position of use", the devices installed on them shall not cause undue discomfort to road users.
5.20	When a lamp is installed on a movable component and the movable component is in the "normal position(s) of use", the lamp shall always return to the position(s) specified by the manufacturer in accordance with this Standard. In the case of dipped-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 ten 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% from the average of the ten measured values. If this value is exceeded each limit specified in Clause 6.2.6.1.1. shall then be modified by this excess to decrease the allowed range of inclinations when checking the vehicle according to Annex D.
5.21	The apparent surface in the direction of the reference axis of front and rear position lamps, front and rear direction-indicator lamps and retro-reflectors shall not be hidden more than 50% by any movable component, with or without a light-signalling device installed on it, in any fixed position different from the "normal position of use".
	Fixed position of a movable component means the stable or natural rest position(s) of the movable component specified by the vehicle manufacturer, whether locked or not.
	If the above requirement is not practicable:
5.21.1	Additional lamps satisfying all the position, geometric visibility, colorimetric and photometric requirements for the above indicated lamps shall be activated when the apparent surface in the direction of the reference axis of these lamps is more than 50% hidden by the movable component; or
5.21.2	A remark in the technical information to be submitted by the vehicle manufacturer/test report (see clause 7.0) shall inform other Administrations that more than 50% of the apparent surface in the direction of the reference axis can be hidden by the movable components; and 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; for example by means of a warning triangle or other devices according to national requirements for use on the road.
5.21.3	Clause 5.21.2. does not apply to retro-reflectors.
5.22	With the exception of retro-reflectors, a lamp even type approved ~~bearing an approval mark~~ is deemed not to be present when it cannot be made to operate by the sole installation of a light source and/or a fuse.
5.23	Lamps approved with light source(s) according to AIS 034 (Part 1) standard, except when such light sources are used as non-replaceable light source(s) as defined in Clause 2.9.1.2., shall be fitted in a vehicle in such a way that the light source can be correctly replaced without the need for expert assistance and without the need for special tools, other than those provided with the vehicle by the manufacturer. The vehicle manufacturer shall provide with the

	vehicle a detailed description of the procedure for replacement.
	Note : Standard tools like spanner, Allen key, screw-drivers etc. are not considered as special tools. In case special tools are necessary, vehicle manufacturers to provide the same.
5.23.1	In the case where a light source module includes a holder for an approved replaceable light source according to AIS 034 (Part 1) standard, this light source shall be replaceable as required in Clause 5.23. above.
5.24	Any temporary fail-safe replacement of the light-signalling function of a rear position lamp is allowed, provided that the replacement function in case of a failure is similar in colour, main intensity and position to the function that has ceased to operate and provided that the replacement device remains operational in its original safety function. During replacement, a tell-tale on the dashboard (Clause 2.3.5. of this Standard) shall indicate occurrence of a temporary replacement and need for repair.
5.25	Where an AFS is fitted, it shall be considered equivalent to a pair of dipped-beam headlamps and, if it provides main-beam function(s), it shall be considered equivalent to a pair of main-beam headlamps.
5.26	Rear direction indicator lamps, rear position lamps, stop lamps (except stop lamps of Category S4) and rear fog lamps with variable luminous intensity control are allowed, which respond simultaneously to at least one of the following external influences: ambient lighting, fog, snowfall, rain, spray, dust clouds, contamination of the light emitting surface, provided that their prescribed intensity relationship is maintained throughout variation transitions. No sharp variation of intensity shall be observed during transition. Stop lamps of Category S4 may produce variable luminous intensity independent from the other lamps. It may be possible for the driver to set the functions above to luminous intensities corresponding to their steady category and to return them to their automatic variable category.
5.27	For vehicles of M and N Categories the applicant shall demonstrate to the Test agency responsible for type approval testing that the electric power supply conditions for the devices indicated in Clauses 2.5.1., 2.5.2., 2.5.4., 2.5.6. and 2.5.7. above comply, when the electrical system of the vehicle is in a constant voltage operating condition, representative for the relevant category of powered vehicle as specified by the applicant, with the following provisions:
5.27.1	The voltage supplied at the terminals of devices which, according to their type approval documentation, have been tested by the application of a special power supply/electronic light source control gear, or in a secondary operating mode or at a voltage requested by the applicant, shall not exceed the voltage specified for the relevant

	devices or functions as they have been approved.
5.27.2	In all cases of electric power supply conditions not covered by Clause 5.27.1., the voltage at the terminals of the device(s) or function(s) shall not exceed 6.75V (6 Volt-Systems), 13.5V (12 Volt-Systems) or 28.V (24 Volt-Systems) by more than 3%. The means of controlling the maximum voltage at the terminals of the device may, for convenience, be located within the body of the device.
5.27.3	The provisions of Clauses 5.27.1. and 5.27.2. shall not apply to devices which include an electronic light source control gear or a variable intensity control being part of the device.
5.27.4	A report shall be attached to the approval documentation describing the methods used to demonstrate compliance and the results obtained.
5.28	**General Provisions Relating to Geometric Visibility**
5.28.1	There shall be no obstacle on the inside of the angles of geometric visibility to the propagation of light from any part of the apparent surface of the lamp observed from infinity. However, no account is taken of obstacles, if they were already presented when the lamp was type-approved.
5.28.2	If measurements are taken closer to the lamp, the direction of observation shall be shifted parallel to achieve the same accuracy.
5.28.3	If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, proof shall be furnished that the part of the lamp not hidden by obstacles still conforms to the photometric values prescribed for the approval of the device.
5.28.4	When the vertical angle of geometric visibility below the horizontal may be reduced to 5° (lamp at less than 750mm above the ground measured according to the provisions of Clause 5.8.1. above) the photometric field of measurements of the installed optical unit may be reduced to 5° below the horizontal.
5.28.5	In the case of an interdependent lamp system the geometric visibility requirements shall be fulfilled when all its interdependent lamps are operated together.
5.29	A LED module does not need to be replaceable, if so stated in the technical specification of the component type approval.
5.30	All lamps (devices) shall, where applicable, be type approved according to the corresponding device standards as specified in the relevant sub-clauses of Clause 6 of this Standard when installed on

	a vehicle.
5.30.1	Especially in case of light-signalling lamps incorporating a manufacturer logo, the lamp shall be type approved according to the requirements of the AIS 198.
5.31	Lamps installed on a vehicle which is approved according to this Standard and approved for one or more replaceable light source categories according to AIS 034 (Part 1 and 2) and AIS 130 standards, shall be fitted with light sources approved according to these light source categories only.
	This requirement does not concern light source modules, LED modules and non-replaceable light sources, except for when they are required to be approved by the applicable standard.
5.32	**External Status Indicator**
	One external status indicator for Vehicle Alarm System (VAS), Alarm System (AS) and immobilizer is allowed if:
	(a) The light intensity in any direction does not exceed 0.5cd; (b) The colour of the light emitted is white, red or amber; (c) The area of the apparent surface is not larger than 20cm^2. Up to two external status indicators for Vehicle Alarm System (VAS), Alarm System (AS) and immobiliser are allowed on a vehicle provided that the apparent surface does not exceed 10cm^2 per indicator.
~~5.33~~	~~A device type approved according to any preceding series of amendments to AIS 198 and/or AIS 199 and/or AIS 200 standards is deemed equivalent to one approved according to the latest series of amendments to the pertinent AIS 198 and/or AIS 199 and/or AIS 200 standards, when the change indexes (defined in Clause 2.1.6.) related to each individual lamp (function) do not differ. In this case such a device may be fitted on the vehicle to be type approved without any update of the device type approval documents and device markings.~~
5.33 ~~4~~	The use of lamps approved for and equipped with LED substitute light source(s), is allowed exclusively in the case where the statement given in technical specifications submitted during type approval ~~indicated in Clause 3.2.8~~, is present and positive.
	To verify that this statement is respected, ~~both at the~~ during type approval ~~and in the conformity of production verification~~, the presence of the marking on the lamps related to the use of LED substitute light source(s) shall be checked.

6.0	**INDIVIDUAL SPECIFICATIONS**
6.1	**Main-beam Headlamp (~~AIS 010 or~~ AIS 199 standard)**
6.1.1	Presence
	Mandatory on all motor vehicles of category L7, M & N. Prohibited on trailers.
6.1.2	Number
	Two or four, type approved according to
	(a) [AIS 010 standard, excluding Class A headlamp; or
	(b) AIS 199 standard, Classes B and D headlamps only.]
	For vehicles of the Category N3: Two extra main-beam headlamps may be installed.
	Where a vehicle is fitted with four concealable headlamps the installation of two additional headlamps shall only be authorized for the purpose of light-signalling, consisting of intermittent illumination at short intervals (see Clause 5.12. above) in daylight.
6.1.3	Arrangement
	No individual specifications.
6.1.4	Position
6.1.4.1	In width: no individual specifications.
6.1.4.2	In height: no individual specifications.
6.1.4.3	In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.
6.1.5	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, shall 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.

6.1.6	Orientation
	Towards the front.
	Not more than one main-beam headlamp on each side of the vehicle may swivel to produce bend lighting.
6.1.7	Electrical Connections
6.1.7.1	Except when they are used to give intermittent luminous warnings at short intervals, the main-beam headlamps may be switched ON only when the master light switch is in headlamps ON position or in "AUTO" (automatic) position and the conditions for automatic activation ~~switching ON~~ of dipped-beam exist. In the latter case, the main beam headlamps shall be switched OFF automatically when the conditions for automatic activation of dipped-beam ceased to exist.
6.1.7.2	The control of the main-beam headlamps may be automatic regarding their activation and deactivation, the control signals being produced by a sensor system which is capable of detecting and reacting to each of the following inputs:
	(a) Ambient lighting conditions;
	(b) The light emitted by the front lighting devices and front light-signalling devices of oncoming vehicles;
	(c) The light emitted by the rear light-signalling devices of preceding vehicles.
	Additional sensor functions to improve performance are allowed.
	For the purpose of this Clause, "vehicles" means vehicles of Categories L, M, N, T, as well as bicycles, such vehicles being equipped with retro-reflectors, with lighting and light-signalling devices, which are switched ON.
6.1.7.3	It shall always be possible to switch the main-beam headlamps ON and OFF manually and to manually switch off the automatic control of the main-beam headlamps.
	Moreover, the switching OFF of the main-beam headlamps and of their automatic control shall be by means of a simple and immediate manual operation; the use of sub-menus is not allowed.
6.1.7.4	The main-beam headlamps may be switched ON either simultaneously or in pairs. In case the extra two main-beam headlamps are installed, as permitted under Clause 6.1.2. for vehicles of the Category N3 only, no more than two pairs may be simultaneously lit. For changing over from the dipped to the main beam at least one pair of main-beam headlamps shall be switched

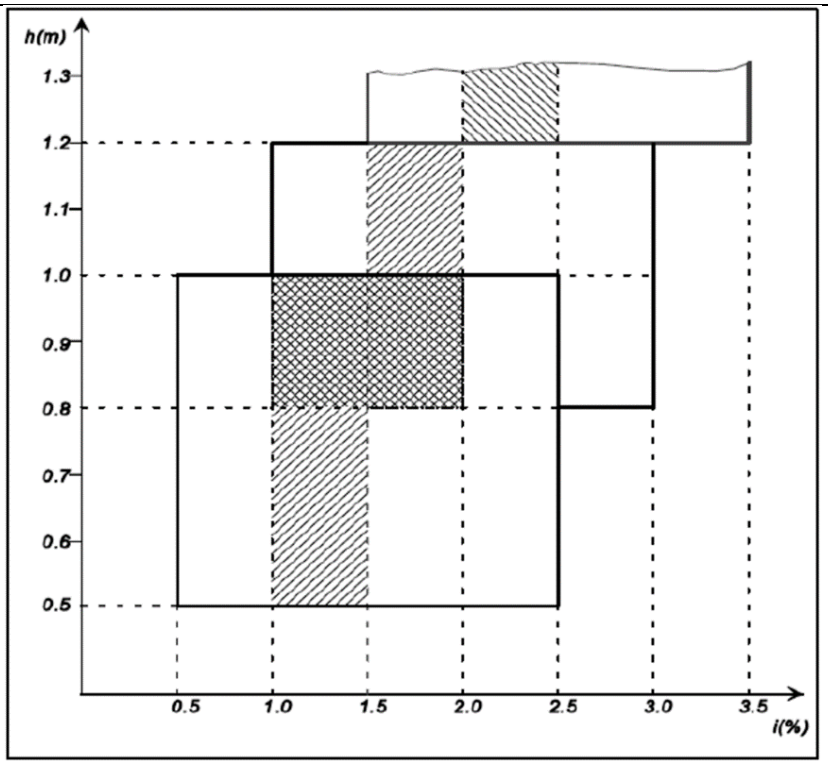
	ON. For changing over from the main-beam to the dipped-beam all main-beam headlamps shall be switched OFF simultaneously.	
6.1.7.5	The dipped-beams may remain switched ON at the same time as the main beams.	
6.1.7.6	Where four concealable headlamps are fitted their raised position shall prevent the simultaneous operation of any additional headlamps fitted, if these are intended to provide light signals consisting of intermittent illumination at short intervals (Clause 5.12.) in daylight.	
6.1.8	Tell-tale	
	Circuit-closed tell-tale mandatory.	
6.1.8.1	If the control of the main-beam headlamps is automatic as described in Clause 6.1.7.1. above an indication shall be provided to the driver that the automatic control of the main-beam function is activated. This information shall remain displayed as long as the automatic operation is activated.	
6.1.9	Other Requirements	
6.1.9.1	The aggregate maximum intensity of the main-beam headlamps which can be switched ON simultaneously shall not exceed 430,000cd, which corresponds to a reference value of 100.	
6.1.9.2	This maximum intensity shall be obtained by adding together the individual reference marks which are indicated on the several headlamps. The reference mark shall be given to each of the headlamps marked as per ~~AIS 012 or~~ AIS 199.	
6.1.9.3	Automatic activation and deactivation of the main-beam headlamps:	
6.1.9.3.1	The sensor system used to control the automatic activation and deactivation of the main-beam headlamps, as described in Clause 6.1.7.1., shall comply with the following requirements:	
6.1.9.3.1.1	The boundaries of the minimum fields in which the sensor is able to detect light emitted from other vehicles defined in Clause 6.1.7.1. above are defined by the angles indicated below.	
6.1.9.3.1.1.1	Horizontal angles: 15° to the left and 15° to the right.	
	Vertical angles:	
	Upward angle	5°

	Mounting height of the sensor (centre of sensor aperture above the ground)	Less than 2m	Between 1.5m and 2.5m	Greater than 2.0m
	Downward angle	2°	2° to 5°	5°
	These angles are measured from the centre of the sensor aperture relative to a horizontal straight line through its centre and parallel to the longitudinal median plane of the vehicle.			
6.1.9.3.1.2	The sensor system shall be able to detect on a straight level road:			
	(a) An oncoming power driven vehicle at a distance extending to at least 400m;			
	(b) A preceding power driven vehicle or a vehicle-trailers combination at a distance extending to at least 100m;			
	(c) An oncoming bicycle at a distance extending to at least 75m, its illumination represented by a white lamp with a luminous intensity of 150cd with a light emitting area of $10cm^2 \pm 3cm^2$ and a height above a ground of 0.8m.			
	To verify compliance with (a) and (b) above, the oncoming and preceding power driven vehicle (or vehicle-trailer combination) shall have position lamps (if applicable) and dipped-beam headlamps switched ON.			
6.1.9.3.2	The transition from main-beam to dipped-beam and vice versa according to the conditions indicated in Clause 6.1.7.1. above may be performed automatically and shall not cause discomfort, distraction or glare.			
6.1.9.3.3	The overall performance of the automatic control shall be verified by:			
6.1.9.3.3.1	Means of simulation or other means of verification accepted by the test agency responsible for type approval testing, as provided by the applicant.			
6.1.9.3.3.2	A test drive according to Clause 1 in Annex J. The performance of the automatic control shall be documented and checked against the applicant's description. Any obvious malfunctioning shall be contested (e.g. excessive angular movement or flicker).			

6.1.9.3.4	The control of the main-beam headlamps may be such that the main-beam headlamps are switched ON automatically only when:
	(a) No vehicles, as mentioned in Clause 6.1.7.1. above, are detected within the fields and distances according to Clauses 6.1.9.3.1.1. and 6.1.9.3.1.2.; and
	(b) The detected ambient lighting levels are as prescribed in Clause 6.1.9.3.5. below.
6.1.9.3.5	In the case where main-beam headlamps are switched ON automatically, they shall be switched OFF automatically when oncoming or preceding vehicles, as mentioned in Clause 6.1.7.1. above, are detected within the fields and distances according to Clauses 6.1.9.3.1.1. and 6.1.9.3.1.2.
	Moreover, they shall be switched OFF automatically when the illuminance produced by ambient lighting conditions exceeds 7,000lx.
	Compliance with this requirement shall be demonstrated by the applicant, using simulation or other means of verification accepted by the authority responsible for type approval testing. If necessary the illuminance shall be measured on a horizontal surface, with a cosine corrected sensor on the same height as the mounting position of the sensor on the vehicle. This may be demonstrated by the manufacturer by sufficient documentation or by other means accepted by the test agency responsible for type approval testing.
6.2	**Dipped-beam Headlamp (~~AIS 010 or~~ AIS 199 standard)**
6.2.1	Presence
	Mandatory on motor vehicles. Prohibited on trailers.
6.2.2	Number
	Two, type approved according to
	(a) [AIS 010 standard, excluding Class A headlamp, or
	(b) AIS 199 standard, Classes B and D headlamps only.]
6.2.3	Arrangement
	No special requirement.
6.2.4	Position
6.2.4.1	In width: that edge of the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall be not more than 400mm from the extreme

	outer edge of the vehicle.
	The inner edges of the apparent surfaces in the direction of the reference axes shall be not less than 600mm apart. This does not apply, however, for L7, M1 and N1 Category vehicles; for all other categories of motor vehicles this distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.2.4.2	In height: not less than 500mm and not more than 1,200mm above the ground. For Category N2G, N3G, M2G, M3G (off-road) vehicles, the maximum height may be increased to 1,500mm.
6.2.4.3	In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.
6.2.5	Geometric Visibility
	Defined by angles α and ß as specified in Clause 2.10.7:
	α = 15° upwards and 10° downwards,
	ß = 45° outwards and 10° inwards.
	The presence of partitions or other items of equipment near the headlamp shall not give rise to secondary effects causing discomfort to other road users.
6.2.6	Orientation
	Towards the front.
6.2.6.1	Vertical Orientation
6.2.6.1.1	The initial downward inclination of the cut-off of the dipped-beam to be set in the unladen vehicle state with one person in the driver's seat shall be specified within an accuracy of 0.1% by the manufacturer and indicated in a clearly legible and indelible manner on each vehicle close to either headlamp or the manufacturer's plate by the symbol shown in Annex E. The value of this indicated downward inclination shall be defined in accordance with Clause 6.2.6.1.2.
6.2.6.1.2	Depending on the mounting height in metres (h) of the lower edge of the apparent surface in the direction of the reference axis of the dipped-beam headlamp, measured on the unladen vehicles, the vertical inclination of the cut-off of the dipped-beam shall, under all the static conditions of Annex C, remain between the following limits and the initial aiming shall have the following values:

	h < 0.8
	Limits: between -0.5% and -2.5% Initial aiming: between -1.0% and -1.5%
	0.8 ≤ h ≤ 1.0
	Limits: between -0.5% and -2.5% Initial aiming: between -1.0% and -1.5%
	Or, at the discretion of the manufacturer,
	Limits: between -1.0% and -3.0% Initial aiming: between -1.5% and -2.0%
	The application for the vehicle type-approval shall, in this case, contain information as to which of the two alternatives is to be used.
	h > 1.0
	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 Category N3G (off-road) vehicles where the headlamps exceed a height of 1,200mm, 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%.

	
6.2.6.2	Headlamp Levelling Device (not applicable for quadricycles)
6.2.6.2.1	In the case where a headlamp levelling device is necessary to satisfy the requirements of Clauses 6.2.6.1.1. and 6.2.6.1.2., the device shall be automatic.
6.2.6.2.2	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 Clause 6.2.6.1.1. by means of the usual adjusting screws or similar means. These manually adjustable devices shall be operable from the driver's seat. Continually adjustable devices shall have reference marks indicating the loading conditions that require adjustment of the dipped beam.
	The number of positions on devices which are not continuously adjustable shall be such as to ensure compliance with the range of values prescribed in Clause 6.2.6.1.2. in all the loading conditions defined in Annex C.
	For these devices also, the loading conditions of Annex C that require adjustment of the dipped beam shall be clearly marked near the control of the device (see Annex F).
6.2.6.2.3	In the event of a failure of devices described in Clauses 6.2.6.2.1. and 6.2.6.2.2., the dipped-beam shall not assume a position in which

	the dip is less than it was at the time when the failure of the device occurred.
6.2.6.3	Measuring Procedure
6.2.6.3.1	After adjustment of the initial inclination, the vertical inclination of the dipped-beam, expressed in per cent, shall be measured in static conditions under all the loading conditions defined in Annex C.
6.2.6.3.2	The measurement of the variation of dipped-beam inclination as a function of load shall be carried out in accordance with the test procedure set out in Annex D.
6.2.6.4	Horizontal Orientation
	The horizontal orientation of one or both dipped-beam headlamps may be varied to produce bend lighting, provided that if the whole beam or the kink of the elbow of the cut-off is moved, the kink of the elbow of the cut-off shall not intersect the line of the trajectory of the centre of gravity of the vehicle at distances from the front of the vehicle which are larger than 100 times the mounting height of the respective dipped-beam headlamps.
6.2.7	Electrical Connections
6.2.7.1	The control for changing over to the dipped-beam shall switch off all main-beam headlamps simultaneously.
6.2.7.2	The dipped-beam may remain switched ON at the same time as the main-beam.
6.2.7.3	In the case of dipped-beam headlamps according to ~~AIS 010 or~~ AIS 199 Standard the gas-discharge light sources shall remain switched ON during the main-beam operation.
6.2.7.4	One additional light source or one or more LED module(s), located inside the dipped-beam headlamps or in a lamp (except the main-beam headlamp) grouped or reciprocally incorporated with the respective dipped-beam headlamps, may be activated to produce bend lighting, provided that the horizontal radius of curvature of the trajectory of the centre of gravity of the vehicle is 500m or less. This may be demonstrated by the manufacturer by calculation or by other means accepted by the test agency responsible for type approval testing.
6.2.7.5	Dipped-beam headlamps may be switched ON or OFF automatically. However, it shall be always possible to switch these dipped-beam headlamps ON and OFF manually.
6.2.7.6	If daytime running lamps are present and operate according to clause 6.19., either

6.2.7.6.1	The dipped-beam headlamps may be switched ON and OFF automatically relative to the ambient light conditions (e.g. switch ON during night time driving conditions, tunnels, etc.) according to the requirements of Annex K. or
6.2.7.6.2.	Daytime running lamps operate in conjunction with the lamps listed in clause 5.11. Where, as a minimum requirement, at least the rear position lamps shall be activated; or
6.2.7.6.3.	Distinctive means are provided to inform the driver that the headlamps, position lamps and if so equipped end outline marker lamps and side marker lamps are not illuminated. Such means are:
6.2.7.6.3.1.	Two distinctly different levels of instrument panel illumination intensity are provided during night and day, indicating to the driver that the dipped-beam headlamps shall be switched ON; or
6.2.7.6.3.2.	Non-illuminated indicators and identification of hand controls that are required by Standard AIS 071 to be illuminated when the headlamps are activated; or
6.2.7.6.3.3.	A tell-tale visual, auditory or both, shall be activated only in reduced ambient lighting conditions as defined in Annex K to inform the driver that the dipped-beam headlamps should be switched ON. Once the tell-tale is activated, it shall only be extinguished when the dipped-beam headlamps have been switched on or the device which starts and/or stops the engine (propulsion system) is set in a position which makes it impossible for the engine (propulsion system) to operate.
6.2.7.7	Without prejudice to Clause 6.2.7.6.1, the dipped-beam headlamps may switch ON and OFF automatically relative to other factors such as time or ambient conditions (e.g. time of the day, vehicle location, rain, fog, etc.).
6.2.8	Tell-tale
6.2.8.1	Tell-tale optional.
6.2.8.2	A visual tell-tale whether flashing or not is mandatory:
	(a) In the case where the whole beam or the kink of the elbow of the cut-off is moved to produce bend lighting; or
	(b) If one or more LED modules are used to produce the principal dipped-beam, except when they are wired so that the failure of any one LED module causes all of them to stop emitting light.
	It shall be activated:
	(a) In the event of a malfunction of the displacement of the kink of

	the elbow of the cut-off; or
	(b) In case of a failure of any one of the LED module(s) producing the principal dipped-beam, except when they are wired so that the failure of any one LED module causes all of them to stop emitting light. It shall remain activated while the failure is present. It may be cancelled temporarily, but shall be repeated whenever the device, which starts and stops the engine, is switched ON and OFF.
6.2.9	Other Requirements
6.2.9.1	The requirements of Clause 5.5.2. shall not apply to dipped-beam headlamps.
6.2.9.2	Dipped-beam headlamps with a light source or LED module(s) producing the principal dipped-beam and having a total objective luminous flux which exceeds 2,000lm shall only be installed in conjunction with the installation of headlamp cleaning device(s) according to AIS 083 standard [7].
	[7] *certifying agency can still prohibit the use of mechanical cleaning systems when headlamps with plastic lenses, marked "PL", are installed.*
6.2.9.3	With respect to vertical inclination the provisions of Clause 6.2.6.2.2. above shall not be applied for dipped-beam headlamps with a light source or LED module(s) producing the principal dipped beam and having an objective luminous flux which exceeds 2,000lm.
	In the case of filament lamps for which more than one test voltage is specified, the objective luminous flux which produces the principal dipped-beam, as indicated in the technical specification for the type approval of the device, is applied.
	In the case of dipped-beam headlamps equipped with an approved light source, the applicable objective luminous flux is the value at the relevant test voltage as given in the relevant data sheet in the Standard, according to which the applied light source was approved, without taking into account the tolerances to the objective luminous flux specified on this Datasheet.
6.2.9.4	Only dipped-beam headlamps according to ~~AIS 010 or~~ AIS 199 standard may be used to produce bend lighting.
	If bend lighting is produced by a horizontal movement of the whole beam or the kink of the elbow of the cut-off, it shall be activated only if the vehicle is in forward motion; this shall not apply if bend lighting is produced for a left turn in left hand traffic.

6.3	**Front Fog Lamp (~~AIS 012 or~~ AIS 199 standard)**
6.3.1	Presence
	Optional on motor vehicles. Prohibited on trailers.
6.3.2	Number
	Two, complying with ~~either the requirements of AIS 012 standard or~~ the requirements of AIS 199 standard.
6.3.3	Arrangement
	No special requirement.
6.3.4	Position
6.3.4.1	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 400mm from the extreme outer edge of the vehicle.
6.3.4.2	In Height:
	Minimum: Not less than 250mm above the ground.
	Maximum: For L7, M1 and N1 Category vehicles: not more than 800mm above the ground; For all other categories except N3G (off-road)~~(1)~~ vehicles: not more than 1,200mm above the ground. For Category N3G vehicles: the maximum height may be increased to 1,500mm.
	No point on the apparent surface in the direction of the reference axis must be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.
6.3.4.3	In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.
6.3.5	Geometric Visibility
	Defined by angles α and ß as specified in Clause 2.10.7.:
	α = 5° upwards and downwards,

	ß = 45° outwards and 10° inwards.
	The presence of partitions or other items of equipment near the front fog lamp shall not give rise to secondary effects causing discomfort to other road users.
6.3.6	Orientation
	Toward the front.
6.3.6.1	Vertical Orientation
6.3.6.1.1	In the case of Class "B" front fog lamps the vertical inclination of the cut-off to be set in the unladen vehicle state with one person in the driver's seat shall be -1.5% or lower.~~(1)~~
6.3.6.1.2	In the case of Class "F3" front fog lamps:
6.3.6.1.2.1	When the total objective luminous flux of the light source for each front fog lamp does not exceed 2,000lms:
6.3.6.1.2.1.1	The vertical inclination of the cut-off to be set in the unladen vehicle state with one person in the driver's seat shall be -1.0% or lower
6.3.6.1.2.1.2	When the total objective luminous flux of the light source for each front fog lamp exceeds 2,000lms:
6.3.6.1.2.1.2.1	Depending on the mounting height in metres (h) of the lower edge of the apparent surface in the direction of the reference axis of the front fog lamp, measured on the unladen vehicles, the vertical inclination of the cut-off shall under all the static conditions of Annex C automatically remain between the following values:
	$h \leq 0.8$
	Limits: between -1.0% and -3.0% Initial aiming: between -1.5% and -2.0%
	$h > 0.8$
	Limits: between -1.5% and -3.5% Initial aiming: between -2.0% and -2.5%
6.3.6.1.2.2.2	The initial downward inclination of the cut-off to be set in the unladen vehicle state with one person in the driver's seat shall be specified within an accuracy of one decimal place by the manufacturer and indicated in a clearly legible and indelible manner on each vehicle close to either the front fog lamp or the manufacturer's plate or in combination with the indication referred to in Clause 6.2.6.1.1. by the symbol shown in Annex E to this

	Standard. The value of this indicated downward inclination shall be defined in accordance with Clause 6.3.6.1.2.2.1.
6.3.6.2	Front Fog Lamp Levelling Device
6.3.6.2.1	Where a levelling device is fitted for a front fog lamp, independent or grouped with other front lighting and light signalling functions, it shall be such that the vertical inclination, under all the static loading conditions of Annex C of this Standard, shall remain between the limits prescribed in Clause 6.3.6.1.2.2.1.
6.3.6.2.2	In the case where the front fog lamp of Category "F3" is part of the dipped-beam headlamp or is part of an AFS system, the requirements of Clause 6.2.6. shall be applied during the use of the front fog beam as part of the dipped beam. In this case the levelling limits defined in Clause 6.2.6. may be applied also when this front fog lamp is used as such.
6.3.6.2.3	The levelling device may also be used to automatically adapt the inclination of the front fog beam in relation to the prevailing ambient conditions, provided that the limits for the downward inclination specified in Clause 6.3.6.1.2.2.1. are not exceeded.
6.3.6.2.4	In the case of a failure of the levelling device, the front fog beam shall not assume a position in which the cut off is less inclined than it was at the time when the failure of the device occurred.
6.3.7	Electrical Connections
	It shall be possible to switch the front fog lamps ON and OFF independently of the main-beam headlamps, the dipped-beam headlamps or any combination of main- and dipped-beam headlamps, unless:
	(a) The front fog lamps are used as part of another lighting function in an AFS; however, the switching ON of the front fog lamps function shall have the priority over the function for which the front fog lamps are used as a part, or
	(b) The front fog lamps cannot be simultaneously lit with any other lamps with which they are reciprocally incorporated.
6.3.8	Tell-tale
	Circuit-closed tell-tale mandatory. An independent non-flashing warning light.
6.3.9	Other Requirements
	In the case where there is a positive indication in the technical specification ~~communication form~~ in ~~Annex 1 of UN Regulation~~

	~~No. 19 or in Annex 1 of UN Regulation No. 149~~ Annex 1 of AIS 199 standard, the alignment and the luminous intensities of the Class "F3" front fog beam may be automatically adapted in relation to the prevailing ambient conditions. Any variations of the luminous intensities or alignment shall be performed automatically and in such a way that no discomfort, neither for the driver nor to other road users, is caused.
6.4	**Reversing Lamp (~~AIS 012 or~~ AIS 198 standard~~s~~)**
6.4.1	Presence
	Mandatory on motor vehicles and on trailers of Categories T2, T3 and T4. Optional on trailers of Category T1.
6.4.2	Number
6.4.2.1	One device mandatory and a second device optional on motor vehicles of Category L7-M, M1 and on all other vehicles with a length not exceeding 6,000mm.
6.4.2.2	Two devices mandatory and two devices optional on all vehicles with a length exceeding 6,000mm, except vehicles of Category M1 and L7-M.
6.4.3	Arrangement
	No special requirement.
6.4.4	Position
6.4.4.1	In Width:
	No special requirement.
6.4.4.2	In Height: Not less than 250mm and not more than 1,200mm above the ground. For Category N2G, N3G, M2G, M3G (off-road) vehicles the maximum height may be increased to 1,400mm.
6.4.4.3	In Length: At the rear of the vehicle.
	However, if installed, the two optional devices mentioned in Clause 6.4.2.2. may be fitted on the side of the vehicle, provided that the requirements of Clauses 6.4.5.2. and 6.4.6.2. below are fulfilled.
6.4.5	Geometric Visibility
6.4.5.1	Devices installed at the rear of the vehicle:

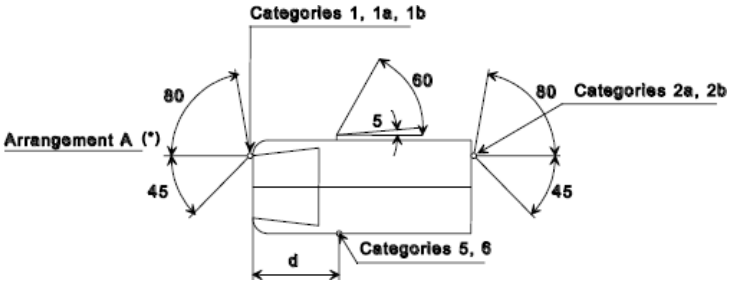
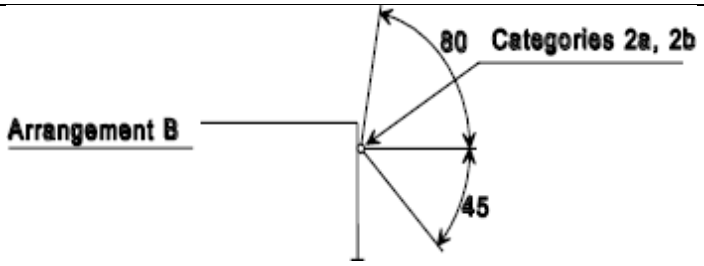
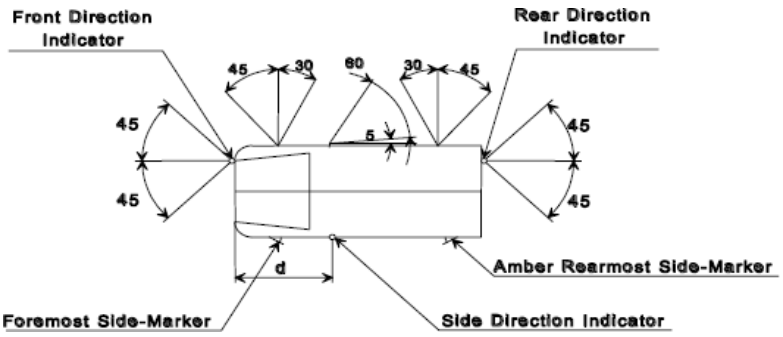
	Defined by angles α and β, as specified in Clause 2.10.7.:
	α = 15° upwards and 5° downwards,
	β = 45° to right and to left if there is only one device,
	45° outwards and 30° inwards if there are two.
6.4.5.2	Two optional devices mentioned in Clause 6.4.2.2. if fitted on the side of the vehicle:
	The geometric visibility is considered to be ensured if the reference axis of the respective device is directed outwards with an angle β not exceeding 15° relative to the median longitudinal plane of the vehicle. The vertical aim of the two optional devices may be directed downwards.
6.4.6	Orientation
6.4.6.1	Rearwards.
6.4.6.2	In addition, if the two optional devices mentioned in Clause 6.4.2.2., are fitted on the side of the vehicle, the provisions of Clause 6.4.5.2. above shall apply.
6.4.7	Electrical Connections
6.4.7.1	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 ~~propulsion system~~ 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.
6.4.7.2	Moreover, the electrical connections of the two optional devices mentioned in Clause 6.4.2.2. shall be such that these devices cannot illuminate unless the lamps referred to in Clause 5.11. are switched ON.
	The devices fitted on the side of the vehicle may be switched ON for slow manoeuvres in forward motion of the vehicle up to a maximum speed of 10km/h, provided that the following conditions are fulfilled:
	(a) The devices shall be activated and deactivated ~~switched ON and OFF~~ manually by a separate switch;
	(b) If so activated ~~switched ON~~, they may remain illuminated ~~ON~~ after reverse gear is disengaged;
	(a) They shall be automatically switched OFF if the forward speed of the vehicle exceeds 10km/h, regardless of the position of the separate switch; in this case they shall remain switched OFF

	until deliberately being switched ON again.
6.4.8	Tell-tale
	Tell-tale optional.
6.4.9	Other Requirements
	None.
6.5	**Direction-indicator Lamp (~~AIS 012 or~~ AIS 198 standard~~s~~)**
6.5.1	Presence (see Figure below)
	Mandatory. Types of direction-indicator lamps fall into Categories (1, 1a, 1b, 2a, 2b, 5 and 6) the assembly of which on one vehicle constitutes an arrangement ('A' and 'B').
	Arrangement 'A' shall apply to all motor vehicles.
	Arrangement 'B' shall apply to trailers only.
6.5.2	Number
	According to the arrangement.
6.5.3	Arrangements (see Figure below)
	For all motor vehicles of category L7, M & N
	A: Two front direction-indicator lamps of the following
	categories: 1 or 1a or 1b, If the distance between the edge of the apparent surface in the direction of the reference axis of this lamp and that of the apparent surface in the direction of the reference axis of the dipped-beam headlamp and/or the front fog lamp, if there is one, is at least 40mm;
	1a or 1b, If the distance between the edge of the apparent surface in the direction of the reference axis of this lamp and that of the apparent surface in the direction of the reference axis of the dipped-beam headlamp and/or the front fog lamp, if there is one, is greater than 20mm and less than 40mm;
	1b, If the distance between the edge of the apparent surface in the direction of the reference axis of this lamp and that of the apparent surface in the direction of the reference axis of the dipped-beam

	headlamp and/or the front fog lamp, if there is one, is less than or equal to 20mm;
	Two rear direction-indicator lamps (Category 2a or 2b);
	Two optional lamps (Category 2a or 2b) on all vehicles in Categories M2, M3,
	N2, N3. Two side direction-indicator lamps of the Categories 5 or 6 (minimum requirements):
	5 For all L7 and M1 vehicles; For N1, M2 and M3 vehicles not exceeding 6m in length.
	6 For all N2 and N3 vehicles; For N1, M2 and M3 vehicles exceeding 6m in length.
	It is permitted to replace Category 5 side direction-indicator lamps by Category 6 side direction-indicator lamps in all instances.
	Where lamps combining the functions of front direction-indicator lamps (Categories 1, 1a, 1b) and side direction-indicator lamps (Categories 5 or 6) are fitted, two additional side direction-indicator lamps (Categories 5 or 6) may be fitted to meet the visibility requirements of Clause 6.5.5.
	B: Two rear direction-indicator lamps (Categories 2a or 2b)
	Two optional lamps (Category 2a or 2b) on all vehicles in Categories T2, T3, and T4.
	A maximum of three optional Category 5 or one optional Category 6 device per side on vehicles of Type T2 exceeding 9m in length.
	Where an AFS is fitted, the distance to be considered for the choice of the category is the distance between the front direction indicator lamp and the closest lighting unit in its closest position contributing to or performing a passing beam mode.
6.5.3.1	In addition, for vehicles of categories:
	(a) M2, M3, N2, and N3 of above 6m and up to including 9m in length one additional Category 5 device is optional;
	(b) M2, M3, N2, and N3 exceeding 9m in length three additional Category 5 devices distributed as evenly as practicable along

	each side are mandatory;
	(c) T3 and T4 three Category 5 devices distributed as evenly as practicable along each side are mandatory.
	These requirements do not apply if there are at least three amber side marker lamps that flash in phase and simultaneously with the direction indicator lamps on the same side of the vehicle.
6.5.4	Position
6.5.4.1	In width: the edge of the apparent surface in the direction of the reference axis farthest from the median longitudinal plane of the vehicle shall not be more than 400mm from the extreme outer edge of the vehicle. This condition shall not apply to the optional rear lamps.
	The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall not be less than 600mm.
	This distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.5.4.2	In Height:
	Above the ground.
6.5.4.2.1	The height of the light-emitting surface of the side direction indicator lamps of Categories 5 or 6 shall not be:
	Less than: 350mm for L7, M1 and N1 Category of vehicles, and 500mm for all other categories of vehicles, both measured from the lowest point; and
	More than: 1,500mm measured from the highest point.
6.5.4.2.2	The height of the direction-indicator lamps of Categories 1, 1a, 1b, 2a and 2b, measured in accordance with Clause 5.8., shall not be less than 350mm and not more than 1,500mm.
6.5.4.2.3	If the structure of the vehicle does not permit these upper limits, measured as specified above, to be respected, and if the optional rear lamps are not installed, they may be increased to 2,300mm for side direction-indicator lamps of Categories 5 and 6, and to 2,100mm for the direction-indicator lamps of Categories 1, 1a, 1b, 2a and 2b.
6.5.4.2.4	If optional rear lamps are installed, they shall be placed at a height compatible with the applicable requirements of Clause 6.5.4.1., 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 600mm above the mandatory lamps.

6.5.4.3	In length: (see Figure below)
	The distance between the light-emitting surface of the side direction-indicator lamp (Categories 5 and 6) and the transverse plane which marks the forward boundary of the vehicle's overall length, shall not exceed 1,800mm.
	However, this distance shall not exceed 2,500mm:
	(d) For M1 and N1 Category vehicles;
	(a) For all other categories of vehicles if the structure of the vehicle makes it impossible to comply with the minimum angles of visibility.
	Optional Category 5 side direction indicator lamps, shall be fitted, spaced evenly, along the length of the vehicle.
	Optional Category 6 side direction indicator lamp shall be fitted in the area between the first and last quartiles of the length of a trailer.
6.5.5	Geometric Visibility
6.5.5.1	Horizontal Angles: (see Figure below)
	Vertical angles: 15° above and below the horizontal for direction-indicator lamps of Categories 1, 1a, 1b, 2a, 2b and 5.
	However:
	(a) Where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1), the downward angle of 15° may be reduced to 5°;
	(b) Where an optional rear lamp is mounted above 2,100mm (measured according to the provisions of Clause 5.8.1. above) the upward angle of 15° may be reduced to 5°.
	30° above and 5° below the horizontal for direction indicator lamps of Category 6.
	Figure (see Clause 6.5)

	
	(*) The value of 5° given for dead angle of visibility to the rear of the side direction-indicator is an upper limit d ≤1.80m (for L7, M_1 and N_1 Category vehicles d ≤ 2.50m).
	For the direction indicator lamps of Categories 1, 1a, 1b, 2a and 2b mounted below 750mm (measured according to the provisions of Clause 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.
	
6.5.5.2	Or, at the discretion of the manufacturer, for L7, M1 and N1 Category vehicles: Front and rear direction indicator lamps, as well as side-marker lamps(**).
	Horizontal angles: (see Figure below)
	
	(**) The value of 5° given for the dead angle of visibility to the rear of the side direction-indicator is an upper limit. d ≤2.50m
	However, for the direction indicator lamps of Categories 1, 1a, 1b, 2a and 2b mounted below 750mm (measured according to the

	provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane.
	Vertical angles: 15° above and below the horizontal. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1), the downward angle of 15° may be reduced to 5°.
	To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5cm^2, except for side direction indicators of Categories 5 and 6. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.
6.5.6	Orientation
	According to the specifications for installation by the manufacturer, if any.
6.5.7	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.
	On M1 and N1 vehicles less than 6m in length, with an arrangement complying with Clause 6.5.5.2. above, the amber side-marker lamps, when mounted, shall also flash at the same frequency (in phase) with the direction-indicator lamps.
6.5.8	Tell-tale
	Operating tell-tale mandatory for direction indicator lamps of Categories 1, 1a, 1b, 2a and 2b. 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 these direction indicator lamps, is either extinguished, or remains alight without flashing, or shows a marked change of frequency. If it is entirely auditory it shall be clearly audible and shall show a marked change of frequency, at least in the event of the malfunction of any of these direction-indicator lamps.
	It shall be activated by the signal produced according to ~~Clause 6.2.2. of AIS 012 standard or according to~~ Clause 5.6.3. of AIS 198 or another suitable way.
	If a motor vehicle is equipped to draw a trailer, it shall 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 direction-indicator lamps on motor vehicles and trailers, operating tell-tale shall not be mandatory.
6.5.9	Other Requirements
	The light shall be a flashing light flashing 90 ± 30 times per minute.
	Operation of the light-signal control shall be followed within not more than 1s by the emission of light and within not more than 1 and ½s 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 indicator lamps of the trailer. In the event of failure, other than short-circuit, of one direction-indicator lamp, the others shall continue to flash, but the frequency in this condition may be different from that prescribed.
6.6	**Hazard Warning Signal**
6.6.1	Presence
	Mandatory.
	The signal shall be given by simultaneous operation of the direction-indicator lamps in accordance with the requirements of Clause 6.5. above.
	All direction indicators of the Category 1 (1, 1a, 1b) activated simultaneously shall operate in the same mode; i.e. static or sequential.
	All direction indicators of the Category 2 (2a, 2b) activated simultaneously shall operate in the same mode; i.e. static or sequential.
6.6.2	Number
	As specified in Clause 6.5.2.
6.6.3	Arrangement
	As specified in Clause 6.5.3.
6.6.4	Position
6.6.4.1	Width
	As specified in Clause 6.5.4.1.
6.6.4.2	Height

	As specified in Clause 6.5.4.2.
6.6.4.3	Length
	As specified in Clause 6.5.4.3.
6.6.5	Geometric Visibility
	As specified in Clause 6.5.5.
6.6.6	Orientation
	As specified in Clause 6.5.6.
6.6.7	Electrical Connections
6.6.7.1	The signal shall be operated by means of a separate manual control enabling all the direction-indicator lamps to flash in phase
6.6.7.2	The hazard warning signal may be activated automatically in the event of a vehicle being involved in a collision or after the deactivation of the emergency stop signal, as specified in Clause 6.23. below. In such cases, it may be turned OFF manually.
	In addition, the hazard warning signal may be switched ON automatically to indicate to other road-users the risk of imminent danger as defined by Standards; in this case, the signal shall remain switched ON until it is manually or automatically switched OFF
6.6.7.3	On M1 and N1 Vehicles less than 6m in length, with an arrangement complying with Clause 6.5.5.2. above, the amber side-marker lamps, when mounted, shall also flash at the same frequency (in phase) with the direction-indicator lamps.
6.6.8	Tell-tale
	Flashing circuit-closed tell-tale mandatory.
6.6.9	Other Requirements
	As specified in Clause 6.5.9. 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 engine is in a position which makes it impossible to start the engine.
6.7	**Stop Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.7.1	Presence

	Devices of S1 or S2 Categories: mandatory on all L7, M and N categories of vehicles.
	Devices of S3 or S4 Category: mandatory on M1 and N1 Categories of vehicles; except for chassis-cabs and those N1 Category vehicles with open cargo space; Not applicable for quadricycles. optional on other categories of vehicles.
6.7.2	Number
	Two S1 or S2 Category devices and one S3 or S4 Category device on all categories of vehicles.
6.7.2.1	Except the case where Category S3 or S4 device is installed, two optional Category S1 or S2 devices may be installed on vehicles in Categories M2, M3, N2, N3, T2, T3 and T4.
6.7.2.2	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 device of the S3 or S4 Category on the median longitudinal plane above such movable parts, either:
	Two devices of the S3 or S4 Category Type "D" may be installed, or
	One device of the S3 or S4 Category may be installed offset to the left or to the right of the median longitudinal plane, or
	An independent lamp system of Category S3 or S4 may be installed.
6.7.3	Arrangement
	No special requirement.
6.7.4	Position
6.7.4.1	In Width:
	For L7, M1 and N1 Category vehicles:
	For S1 or S2 Categories devices that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400mm from the extreme outer edge of the vehicle; For the distance in between the inner edges of the apparent surfaces in the direction of the reference axes there is no special requirement. For all other categories of vehicles: For S1 or S2 Categories devices the distance in between the inner edges of the apparent surfaces in the direction of the reference axes

	shall be not less than 600mm. This distance may be reduced to 400mm if the overall width of the vehicle is less than 1,300mm. For S3 or S4 Category devices: the centre of reference shall be situated on the median longitudinal plane of the vehicle. However, in the case where the two devices of the S3 or S4 Category are installed, according to Clause 6.7.2., they shall be positioned as close as possible to the median longitudinal plane, one on each side of this plane. In the case where one S3 or S4 Category lamp offset from the median longitudinal plane is permitted according to Clause 6.7.2., this offset shall not exceed 150mm from the median longitudinal plane to the centre of reference of the lamp.
6.7.4.2	In Height:
6.7.4.2.1	For S1 or S2 Categories devices:
	Above the ground, not less than 350mm nor more than 1,500mm (2,100mm if the shape of the bodywork makes it impossible to keep within 1,500mm and if the optional lamps are not installed).
	If the optional lamps are installed, they shall be positioned at a height compatible with the requirements of the width and the symmetry of the lamps, and at a vertical distance as large as the shape of the bodywork makes it possible, but not less than 600mm above the mandatory lamps.
6.7.4.2.2	For S3 or S4 Categories devices:
	The horizontal plane tangential to the lower edge of the apparent surface shall: either not be more than 150mm below the horizontal plane tangential to the lower edge of the exposed surface of the glass or glazing of the rear window, or not be less than 850mm above the ground. However, the horizontal plane tangential to the lower edge of the apparent surface of a S3 or S4 Category device shall be above the horizontal plane tangential to the upper edge of the apparent surface of S1 or S2 Categories devices.
6.7.4.3	In Length:
6.7.4.4	For S1 or S2 Categories Devices:
	At the rear of the vehicle.
6.7.4.5	For S3 or S4 Category Devices:
	No special requirement.

6.7.5	Geometric Visibility
	Horizontal angle:
	For S1 or S2 Categories devices: 45° to the left and to the right of the longitudinal axis of the vehicle
	However, for the stop lamps of Categories S1 and S2 mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane.
	For S3 or S4 Category devices: 10° to the left and to the right of the longitudinal axis of the vehicle;
	Vertical angle:
	For S1 or S2 Category devices: 15° above and below the horizontal.
	However,
	(a) Where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°;
	(b) Where an optional lamp is mounted above 2,100mm (measured according to the provisions of Clause 5.8.1. above) the upward angle of 15° may be reduced to 5°.
	For S3 or S4 Category devices: 10° above and 5° below the horizontal.
6.7.6	Orientation
	Towards the rear of the vehicle.
6.7.7	Electrical Connections
6.7.7.1	All stop lamps shall light up simultaneously when the braking system provides the relevant signal defined in IS 11852/AIS 150 & IS 15986/AIS 151 standards.
6.7.7.2	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.
6.7.8	Tell-tale
	Tell-tale optional, however, a tell-tale indicating failure is mandatory if required by the component Standard.

	Where the above tell-tale is fitted, this tell-tale shall 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.
6.7.9	Other Requirements
6.7.9.1	The S3 or S4 Category device may not be reciprocally incorporated with any other lamp.
6.7.9.2	The S3 or S4 Category device may be installed outside or inside the vehicle.
6.7.9.2.1	In the case where it is installed inside the vehicle:
	The light emitted shall not cause discomfort to the driver through the devices for indirect vision and/or other surfaces of the vehicle (i.e. rear window)
6.8	**Rear Registration Plate Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.8.1	Presence
	Mandatory.
6.8.2	Number
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.
6.8.3	Arrangement
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.
6.8.4	Position
6.8.4.1	In Width:
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.
6.8.4.2	In Height:
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.
6.8.4.3	In Length:
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.

6.8.5	Geometric Visibility
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.
6.8.6	Orientation
	Such that the device illuminates the site of the registration plate according to the type-approval documentation of the device.
6.8.7	Electrical Connections
	In accordance with Clause 5.11.
6.8.8	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.
6.8.9	Other Requirements
	When the rear registration plate lamp 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 lamp may be modified during the illumination of the stop lamp or the rear fog lamp.
6.9	**Front Position Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.9.1	Presence
	Mandatory on all motor vehicles.
	Mandatory on trailers over 1,600mm
	wide.
	Optional on trailers which are not more than 1,600mm wide.
6.9.2	Number
	Two.
6.9.3	Arrangement
	No special requirement.
6.9.4	Position
6.9.4.1	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 400mm from the extreme outer edge of the vehicle. In the case of a trailer, that point on the apparent surface in the direction of the reference axis which is farthest from the median longitudinal plane shall not be more than 150mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall: For L7, M1 and N1 Category vehicles: No special requirement; For all other categories of vehicles: Not less than 600mm. This distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.9.4.2	In Height:
	Above the ground, not less than 250mm nor more than 1,500mm (2,100mm for T1 and T2 Categories of vehicles, or if for any other categories of vehicles the shape of the bodywork makes it impossible to keep within 1,500mm).
6.9.4.3	In Length:
	No individual specification.
6.9.4.4	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 shall be used to verify compliance with the positioning requirements (Clauses 6.9.4.1. to 6.9.4.3.)
6.9.5	Geometric Visibility
6.9.5.1	Horizontal Angle:
	45° inwards and 80° outwards. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane. In the case of trailers, the angle inwards may be reduced to 5°. Vertical angle: 15° above and below the horizontal. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°.

6.9.5.2	For M1 and N1 Category vehicles, as an alternative to Clause 6.9.5.1. above, at the discretion of the manufacturer or his duly accredited representative, and only if a front side-marker lamp is installed on the vehicle. Horizontal angle: 45° outwards to 45° inwards. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane. Vertical angle: 15° above and below the horizontal. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°. To be considered visible, the lamp shall provide an unobstructed view of the apparent surface of at least 12.5cm^2. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.
6.9.6	Orientation
	Forwards.
6.9.7	Electrical Connections
	In accordance with Clause 5.11.
	However, if a front position lamp is reciprocally incorporated with a direction-indicator the electrical connection of the front position lamp on the relevant side of the vehicle or the reciprocally incorporated part of it may be such that it is switched OFF during the entire period (both ON and OFF cycle) of activation of the direction-indicator lamp.
6.9.8	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. This Requirement does not apply when light signalling system operates according to Clause 6.2.7.6.2 and 6.19.7.3. However, a tell-tale indicating failure is mandatory if required by the component Standard.

6.9.9	Other Requirements
6.9.9.1	If one or more infrared radiation generator(s) is (are) installed inside the front position lamp, it (they) is (are) allowed to be activated only when the headlamp on the same side of the vehicle is switched ON and the vehicle is in forward motion. In the event that the front position lamp or the headlamp on the same side fails, the infrared radiation generator(s) shall be automatically switched OFF.
6.9.9.2	In case an AFS providing a bending mode is installed, the front position lamp may be swivelled together with a lighting unit to which it is reciprocally incorporated.
6.10	**Rear Position Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.10.1	Presence
	Devices of R or R1 or R2 Categories: Mandatory.
6.10.2	Number
	Two.
6.10.2.1	Except the case where end-outline marker lamps are installed, two optional position lamps may be installed on all vehicles in Categories M2, M3, N2, N3, T2, T3 and T4.
6.10.3	Arrangement
	No special requirement.
6.10.4	Position
6.10.4.1	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 400mm from the extreme outer edge of the vehicle. This condition shall not apply to the optional rear lamps. The distance between the inner edges of the apparent surfaces in the direction of the reference axes shall: For L7, M1 and N1 Category vehicles: have no special requirement; For all other categories of vehicles: be not less than 600mm. This distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.10.4.2	In Height:
	Above the ground, not less than 350mm nor more than 1,500mm (2,100mm if the shape of the bodywork makes it impossible to keep

	within 1,500mm 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 Clause 6.10.4.1., 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 600mm above the mandatory lamps.
6.10.4.3	In length: the rear of the vehicle.
6.10.5	Geometric Visibility
6.10.5.1	Horizontal angle: 45° inwards and 80° outwards.
	However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane.
	Vertical angle: 15° above and below the
	horizontal. However,
	(a) Where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°;
	(b) Where an optional lamp is mounted above 2,100mm (measured according to the provisions of Clause 5.8.1. above) the upward angle of 15° may be reduced to 5°.
6.10.5.2	For M1 and N1 Category vehicles, as an alternative to Clause 6.10.5.1. above, at the discretion of the manufacturer or his duly accredited representative, and only if a rear side-marker lamp is installed on the vehicle, Horizontal angle: 45° outwards to 45° inwards. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane. Vertical angle: 15° above and below the horizontal. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°. To be considered visible, the lamp shall provide an unobstructed view of the apparent surface of at least 12.5cm^2. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded.
6.10.6	Orientation

	Rearwards.
6.10.7	Electrical Connections In accordance with Clause 5.11. However, if a rear position lamp is reciprocally incorporated with a direction-indicator, the electrical connection of the rear position lamp on the relevant side of the vehicle or the reciprocally incorporated part of it may be such that it is switched OFF during the entire period (both ON and OFF cycle) of activation of the direction-indicator lamp.
6.10.8	Tell-tale Circuit-closed tell-tale mandatory. It shall be combined with that of the front position lamps. This requirement does not apply when light-signalling system operates according to Clause 6.2.7.6.2 and 6.19.7.3. However, a tell-tale indicating failure is mandatory if required by the component Standard.
6.10.9	Other Requirements
	None.
6.11	**Rear Fog Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.11.1	Presence
	Devices of F or F1 or F2 Categories: Optional
6.11.2	Number
	One or two.
6.11.3	Arrangement
	No special requirement.
6.11.4	Position
6.11.4.1	In Width:
	If there is only one rear fog lamp, it shall 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.
6.11.4.2	In Height:

	Not less than 250mm nor more than 1,000mm above the ground. For rear fog lamps grouped with any rear lamp the maximum height may be increased to 1,200mm. For Categories N2G, N3G, M2G, M3G (off-road) vehicles the maximum height may be increased to 1,400mm.
6.11.4.3	In Length:
	At the rear of the vehicle.
6.11.5	Geometric Visibility
	Defined by angles α and ß as specified in Clause 2.10.7:
	α = 5° upwards and 5° downwards;
	ß = 25° to right and to left.
6.11.6	Orientation
	Rearwards.
6.11.7	Electrical Connections
	These shall be such that:
6.11.7.1	The rear fog-lamp(s) cannot be switched ON unless the main beams, dipped-beams or front fog-lamps are switched ON;
6.11.7.2	The rear fog-lamp(s) can be switched OFF independently of any other lamp;
6.11.7.3	Either of the following applies:
6.11.7.3.1	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;
6.11.7.3.2	A warning, at least audible, additional to the mandatory tell-tale (Clause 6.11.8.) 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 (Clause 6.11.7.1.) are ON or OFF, whilst the rear fog lamp switch is in the ON position.
6.11.7.4	Except as provided in Clauses 6.11.7.1., 6.11.7.3. and 6.11.7.5., the operation of the rear fog lamp(s) shall not be affected by switching ON or OFF any other lamps.
6.11.7.5	The rear fog lamp(s) of a drawing motor vehicle may be automatically switched OFF while a trailer is connected and the rear fog lamp(s) of the trailer is (are) activated.

6.11.8	Tell-tale
	Circuit-closed tell-tale mandatory. An independent non-flashing warning light.
6.11.9	Other Requirements
	In all cases, the distance between the rear fog lamp and each stop lamp shall be greater than 100mm.
6.12	**Parking Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.12.1	Presence
	On motor vehicles not exceeding 6m in length and not exceeding 2m in width, optional. On all other vehicles, prohibited.
6.12.2	Number
	According to the arrangement.
6.12.3	Arrangement
	Either two lamps at the front and two lamps at the rear, or one lamp on each side.
6.12.4	Position
6.12.4.1	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 400mm from the extreme outer edge of the vehicle.
	Furthermore, if there are two lamps, they shall be on the sides of the vehicle.
6.12.4.2	In Height:
	For L7, M1 and N1 Category vehicles: no special requirement;
	For all other categories of vehicles: above the ground, not less than 350mm nor more than 1,500mm (2,100mm if the shape of the bodywork makes it impossible to keep within 1,500mm).
6.12.4.3	In Length:
	No special requirement.
6.12.5	Geometric Visibility
	Horizontal angle: 45° outwards, forwards and rearwards.

	However, where a front or rear parking lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the inward angle of 45° may be reduced to 20° under the H plane.
	Vertical angle: 15° above and below the horizontal.
	However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°.
6.12.6	Orientation
	Such that the lamps meet the requirements for visibility forwards and rearwards.
6.12.7	Electrical Connections
	The connection shall allow the parking lamp(s) on the same side of the vehicle to be lit independently of any other lamps.
	The parking lamp(s) and, if applicable, the front and rear position lamps according to Clause 6.12.9. below, shall be able to operate even if the device which starts the engine is in a position which makes it impossible for the engine to operate. A device which automatically deactivates these lamps as a function of time is prohibited.
6.12.8	Tell-tale
	Circuit-closed tell-tale optional. If there is one, it shall not be possible to confuse it with the tell-tale for the front and rear position lamps.
6.12.9	Other Requirements
	The functioning of this Lamp may also be performed by simultaneously switching ON the front and rear position lamps on the same side of the vehicle. In this case, lamps that meet the requirements of front or rear position lamps are deemed to meet the requirements of parking lamps.
6.13	**End-outline Marker Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.13.1	Presence
	Devices of A or AM Categories (visible from the front), and devices of R, R1, R2, RM1 or RM2 Categories (visible from the rear):
	Mandatory on vehicles exceeding 2.10m in width. Optional on vehicles between 1.80 and 2.10m in width. On chassis-cabs the rear

	end-outline marker lamps are optional.
6.13.2	Number
	Two visible from the front and two visible from the rear. Additional lamps may be fitted as follows:
	(a) Two visible from the front;
	(b) Two visible from the rear.
6.13.3	Arrangement
	No special requirement.
6.13.4	Position
6.13.4.1	In Width:
	Front and rear: As close as possible to the 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 400mm from the extreme outer edge of the vehicle.
6.13.4.2	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 shall 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. The additional lamps, as specified in Clause 6.13.2. (b), shall be fitted as far separated in height as practicable in respect to the mandatory ones, provided that their position is compatible with design/operational requirements of the vehicle and symmetry of the lamps.
6.13.4.3	In Length: No special requirement. The additional lamps, as specified in Clause 6.13.2. (a), shall be fitted as close as practicable to the rear; this requirement shall be

	deemed to be satisfied if the distance between the additional lamps and the rear of the vehicle does not exceed 400mm.
6.13.5	Geometric Visibility
	Horizontal angle: 80° outwards. Vertical angle: 5° above and 20° below the horizontal. "This requirement does not apply to vehicles where it is not possible, for practical reasons including limitation of the shape, structure, design or operational requirements, to meet Geometric visibility for the downward angle. Provided subject vehicle comply with rear conspicuity marking requirement showing width of vehicle as per ~~AIS-090~~ AIS 200."
6.13.6	Orientation
	Such that the lamps meet the requirements for visibility forwards and rearwards.
6.13.7	Electrical Connections
	In accordance with Clause 5.11.
6.13.8	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. However, a tell-tale indicating failure is mandatory if required by the component Standard.
6.13.9	Other Requirements
	Provided that all other requirements are met, the mandatory or optional lamps, visible from the front and the mandatory or optional lamps visible from the rear on the same side of the vehicle may be combined into one device. Two of the lamps visible from the rear may be grouped, combined or reciprocally incorporated in accordance with Clause 5.7.
	The position of an end-outline marker lamp in relation to corresponding position lamp shall be such that the distance between the projections on a transverse vertical plane of the points nearest to one another on the apparent surfaces in the direction of the respective reference axes of the two lamps considered is not less than 200mm. The additional lamps, as specified in Clause 6.13.2. (a), used to mark

	the rear end outline of the vehicle, the trailer or the semi-trailer shall be fitted in such a way to make it visible within the fields of vision of the approved main rear-view devices for indirect vision.
6.14	**Rear Retro-reflector, Non-triangular (~~AIS 057 or~~ AIS 200 standard~~s~~)**
6.14.1	Presence
	Mandatory on all motor vehicles of L7, M and N category
	Provided that they are grouped together with the other rear light-signalling devices, optional on trailers.
6.14.2	Number
	Two, the performances of which shall conform to the requirements concerning Class IA or IB retro-reflectors in ~~AIS 057 or~~ AIS 200 standard. Additional retro-reflecting devices and materials (including two retro-reflectors not complying with Clause 6.14.4. below), are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.
6.14.3	Arrangement
	No special requirement.
6.14.4	Position
6.14.4.1	In Width:
	That point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall: For L7, M1 and N1 Category vehicles: have no special requirement; For all other categories of vehicles: be not less than 600mm. This distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.14.4.2	In Height: Above the ground, not less than 250mm nor more than 900mm (not more than 1,200mm if grouped with any rear lamp(s), 1,500mm if the shape of the bodywork makes it impossible to keep within 900mm or 1,200mm respectively).

6.14.4.3	In Length: At the rear of the vehicle.
6.14.5	Geometric Visibility
	Horizontal angle: 30° inwards and outwards. Vertical angle: 10° above and below the horizontal. However, where a retro-reflector is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 10° may be reduced to 5°.
6.14.6	Orientation
	Rearwards.
6.14.7	Other Requirements
	The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the rear.
6.15	**Rear Retro-reflector, Triangular (~~AIS 057 or~~ AIS 200 standard)**
6.15.1.	Presence
	Mandatory on trailers.
	Prohibited on motor vehicles of categories L7, M & N
6.15.2	Number
	Two, the performances of which shall conform to the requirements concerning Class IIIA or Class IIIB retro-reflectors in ~~AIS 057 or~~ AIS 200 standard. Additional retro-reflecting devices and materials (including two retro-reflectors not complying with Clause 6.15.4. below), are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.
6.15.3	Arrangement
	The apex of the triangle shall be directed upwards.
6.15.4	Position
6.15.4.1	In Width:
	That point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400mm

	from the extreme outer edge of the vehicle. The inner edges of the retro-reflectors shall not be less than 600mm apart. This distance may be reduced to 400mm if the overall width of the vehicle is less than 1,300mm.
6.15.4.2	In Height:
	Above the ground, not less than 250mm nor more than 900mm (not more than 1,200mm if grouped with any rear lamp(s), 1,500mm if the shape of the bodywork makes it impossible to keep within 900mm or 1,200mm respectively).
6.15.4.3	In Length:
	At the rear of the vehicle.
6.15.5	Geometric Visibility
	Horizontal angle: 30° inwards and outwards.
	Vertical angle: 15° above and below the horizontal. However, where a retro-reflector is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 15° may be reduced to 5°.
6.15.6	Orientation
	Rearwards.
6.15.7	Other Requirements
	The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the rear.
6.16	**Front Retro-reflector, Non-triangular (~~AIS 057 or~~ AIS 200 standard)**
6.16.1	Presence
	Mandatory on trailers.
	Mandatory on motor vehicles having all forward facing lamps with reflectors concealable. Optional on other motor vehicles.
6.16.2	Number
	Two, the performances of which shall conform to the requirements concerning Class IA or IB retro-reflectors in ~~AIS 057 or~~ AIS 200 standard. Additional retro-reflecting devices and materials (including two retro-reflectors not complying with Clause 6.16.4.

	below), are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.
6.16.3	Arrangement
	No special requirement.
6.16.4	Position
6.16.4.1	In Width:
	That point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400mm from the extreme outer edge of the vehicle.
	In the case of a trailer, the point of the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be farther than 150mm from the extreme outer edge of the vehicle.
	The distance between the inner edges of the two apparent surfaces in the direction of the reference axes shall:
	For M1 and N1 Category vehicles: have no special requirement;
	For all other categories of vehicles: be not less than 600mm. This distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.16.4.2	In Height:
	Above the ground, not less than 250mm nor more than 900mm (1,500mm if the shape of the bodywork makes it impossible to keep within 900mm).
6.16.4.3	In Length:
	At the front of the vehicle.
6.16.5	Geometric Visibility
	Horizontal angle, 30° inwards and outwards. 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 (Clause 6.16.4.1. above), which shall, in conjunction with the mandatory retro-reflectors, give the necessary visibility angle. Vertical angle: 10° above and below the horizontal. However, where a retro-reflector is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 10°

	may be reduced to 5°.
6.16.6	Orientation
	Towards the front.
6.16.7	Other Requirements
	The illuminating surface of the retro-reflector may have parts in common with the apparent surface of any other lamp situated at the front.
6.17	**Side Retro-reflector, Non-triangular (~~AIS 057 or~~ AIS 200 standard)**
6.17.1	Presence
	Mandatory: On all motor vehicles the length of which exceeds 6m. On all trailers. Optional: On motor vehicles the length of which does not exceeds 6m.
6.17.2	Number
	Such that the requirements for longitudinal positioning are complied with. The performances of these devices shall conform to the requirements concerning Class IA or IB retro-reflectors in ~~AIS 057 or~~ AIS 200. Additional retro-reflecting devices and materials (including two retro-reflectors not complying with Clause 6.17.4. below), are permitted provided they do not impair the effectiveness of the mandatory lighting and light-signalling devices.
6.17.3	Arrangement
	No special requirement.
6.17.4	Position
6.17.4.1	In Width:
	No special requirement.
6.17.4.2	In Height:
	Above the ground, not less than 250mm nor more than 900mm (not more than 1,200mm if grouped with any lamp(s), 1,500mm if the shape of the bodywork makes it impossible to keep within 900mm or 1,200mm respectively or if the presence of the device is not mandatory according to Clause 6.17.1).

6.17.4.3	In Length:
	At least one side retro-reflector shall be fitted to the middle third of the vehicle, the foremost side retro-reflector being-not further than 3m from the front.
	The distance between two adjacent side retro-reflectors shall not exceed 3m. This does not, however, apply to L7-M, M1 and N1 Category vehicles.
	If the structure, design or the operational use of the vehicle makes it impossible to comply with such a requirement, this distance may be increased to 4m. The distance between the rearmost side retro-reflector and the rear of the vehicle shall not exceed 1m. However, for motor vehicles the length of which does not exceed 6m, it is sufficient to have one side retro-reflector fitted within the first third and/or one within the last third of the vehicle length.
	However, for motor vehicles the length of which does not exceed 6m, it is sufficient to have one side retro-reflector fitted within the first third and/or one within the last third of the vehicle length.**(1)** For M1 Vehicles the length of which exceeds 6m but does not exceed 7m it is sufficient to have one side retro-reflector fitted not further than 3m from the front and one within the last third of the vehicle length.
6.17.5	Geometric Visibility
	Horizontal angle: 45° to the front and to the rear.
	Vertical angle: 10° above and below the horizontal. However, where a retro-reflector is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 10° may be reduced to 5°.
6.17.6	Orientation
	Towards the side.
6.17.7	Other Requirements
	The illuminating surface of the side retro-reflector may have parts in common with the apparent surface of any other side lamp.
6.18	**Side-marker Lamps (~~AIS 012 or~~ AIS 198 standard)**
6.18.1	Presence
	Mandatory: On all vehicles the length of which exceeds 6m, except for chassis-cabs.

	The SM1 Type of side-marker lamp shall be used on all categories of vehicles; however the SM2 Type of side-marker lamps may be used on the M1 Category of vehicles.
	In addition, on M1 and N1 Category vehicles less than 6m in length, side-marker lamps shall be used, if they supplement the reduced geometric visibility requirements of front position lamps conforming to Clause 6.9.5.2. and rear position lamps conforming to Clause 6.10.5.2.
	Optional: On all other vehicles.
	The SM1 or SM2 Types of side-marker lamps may be used.
6.18.2	Minimum Number per Side
	Such that the rules for longitudinal positioning are complied with.
6.18.3	Arrangement
	No individual specifications.
6.18.4	Position
6.18.4.1	In Width:
	No individual specifications.
6.18.4.2	In Height:
	Above the ground, not less than 250mm nor more than 1,500mm (2,100mm if the shape of the bodywork makes it impossible to keep within 1,500mm).
6.18.4.3	In Length:
	At least one side-marker lamp must be fitted to the middle third of the vehicle, the foremost side-marker lamp being not further than 3m from the front. The distance between two adjacent side-marker lamps shall not exceed 3m. If the structure, design or the operational use of the vehicle make it impossible to comply with such a requirement, this distance may be increased to 4m.
	The distance between the rearmost side-marker lamp and the rear of the vehicle shall not exceed 1m.
	However, for vehicles the length of which does not exceed 6m and for chassis-cabs, it is sufficient to have one side-marker lamp fitted within the first third and/or within the last third of the vehicle length. For M1 Vehicles the length of which exceeds 6m but does not exceed 7m it is sufficient to have one side-marker lamp fitted not further than 3m from the front and one within the last third of the

	vehicle length.
6.18.5	Geometric Visibility
	Horizontal angle: 45° to the front and to the rear; however for vehicles on which the installation of the side-marker lamps is optional this value can be reduced to 30°.
	If the vehicle is equipped with side-marker lamps used to supplement the reduced geometric visibility of front and rear direction indicator lamps conforming to Clause 6.5.5.2. above and/or position lamps conforming to Clauses 6.9.5.2. and 6.10.5.2. above, the angles are 45° towards the front and rear ends of the vehicle and 30° towards the centre of the vehicle (see the figure in Clause 6.5.5.2. above).
	Vertical angle: 10° above and below the horizontal. However, where a lamp is mounted below 750mm (measured according to the provisions of Clause 5.8.1. above), the downward angle of 10° may be reduced to 5°.
6.18.6	Orientation
	Towards the side.
6.18.7	Electrical Connections
	On M1 and N1 Category vehicles less than 6m in length amber side-marker lamps may be wired to flash, provided that this flashing is in phase and at the same frequency with the direction indicator lamps at the same side of the vehicle.
	On M2, M3, N2, N3, T3 and T4 vehicles mandatory amber side marker lamps may flash simultaneously with the direction-indicator lamps on the same side of the vehicle. However, where there are direction indicator lamps of Category 5 installed according to Clause 6.5.3.1. on the side of the vehicle these amber side marker lamps shall not flash.
6.18.8	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,
6.18.9	Other Requirements
	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.

	Rear side-marker lamps shall be amber if they flash with the rear direction-indicator lamp.
6.19	**Day-time Running Lamp (~~AIS 012 or~~ AIS 198 standard)**
6.19.1	Presence
	Optional on motor vehicles. Prohibited on trailers.
6.19.2	Number
	Two.
6.19.3	Arrangement
	No special requirement.
6.19.4	Position
6.19.4.1	In Width:
	The distance between the inner edges of the apparent surfaces in the direction of the reference axes shall not be less than 600mm.
	This distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
6.19.4.2	In Height:
	Above the ground not less than 250mm nor more than 1,500mm.
6.19.4.3	In length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.
6.19.5	Geometric Visibility
	Horizontal: outwards 20° and inwards 20°.
	Vertical: upwards 10° and downwards 10°.
6.19.6	Orientation
	Towards the front.
6.19.7	Electrical Connections
6.19.7.1	If installed, the daytime running lamps shall be switched ON automatically when the device which starts and/or stops the engine (propulsion system) is set in a position which makes it possible for the engine (propulsion system) to operate. However, the daytime

	running lamps may remain OFF while the following conditions exist:
6.19.7.1.1	The automatic transmission control is in the park position; or
6.19.7.1.2	The parking brake is in the applied position; or
6.19.7.1.3	Prior to the vehicle being set in motion for the first time after each manual activation of the device, which starts and/or stops the propulsion system.
6.19.7.2	The daytime running lamp shall switch OFF automatically when the device which starts and/or stops the engine (propulsion system) is set in a position which makes it impossible for the engine (propulsion system) to operate or the front fog lamps or headlamps are switched ON, except when the latter are used to give intermittent luminous warnings at short intervals.
6.19.7.3	The lamps referred to in Clause 5.11. may be switched ON when the daytime running lamps are switched ON, except if daytime running lamps are operating according to clause 6.2.6.7.2, where at least the rear position lamps shall be switched ON.
6.19.7.4	If the distance between the front direction-indicator lamp and the daytime running lamp is equal or less than 40mm, the electrical connections of the daytime running lamp on the relevant side of the vehicle may be such that either:
	(a) It is switched OFF; or
	(b) Its luminous intensity is reduced during the entire period (both ON and OFF cycle) of activation of a front direction-indicator lamp.
6.19.7.5	If a direction indicator lamp is reciprocally incorporated with a daytime running lamp, the electrical connections of the daytime running lamp on the relevant side of the vehicle shall be such that the daytime running lamp is switched OFF during the entire period (both ON and OFF cycle) of activation of the direction-indicator lamp.
6.19.7.6	It may be possible to activate and deactivate the automatic switching ON of daytime running lamps without the use of tools.
6.19.8	Tell-tale Closed-circuit tell-tale optional, however a tell-tale indicating failure is mandatory if required by the component Standard.
6.19.9	Other Prescriptions

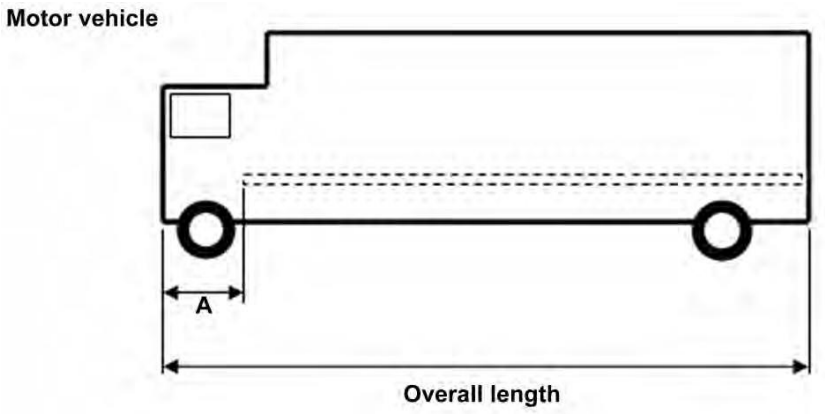
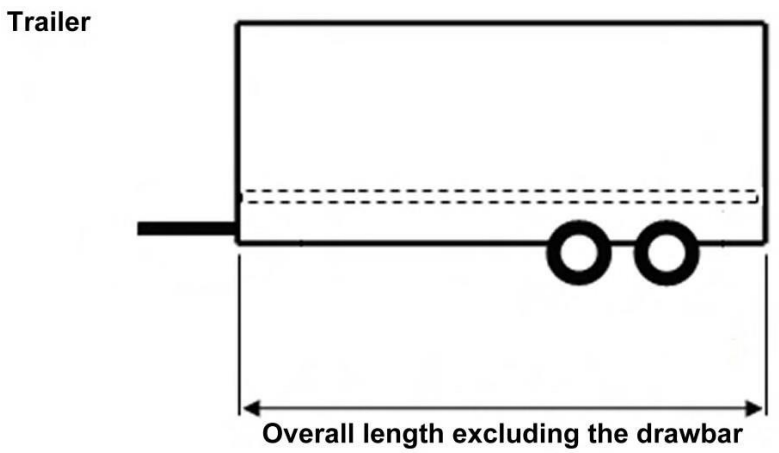
	No prescription.
6.20	**Cornering Lamp (~~AIS 012 or~~ AIS 199 standard)**
6.20.1	Presence
	Optional on motor vehicles.
6.20.2	Number
	Two.
6.20.3	Arrangement
	No special requirement.
6.20.4	Position
6.20.4.1	In width: one cornering lamp shall be located on each side of the vehicle's median longitudinal plane.
6.20.4.2	In Length:
	Not further than 1,000mm from the front.
6.20.4.3	In Height:
	Minimum: Not less than 250mm above the ground. Maximum: Not more than 900mm above the ground;
	However, no point on the apparent surface in the direction of the reference axis shall be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.
6.20.5	Geometric Visibility
	Defined by angles α and β as specified in Clause 2.10.7.:
	α = 10° upwards and downwards, β = 30° to 60° outwards.
6.20.6	Orientation
	Such that the lamps meet the requirements for geometric visibility.
6.20.7	Electrical Connections
	The cornering lamps shall be so connected that they cannot be activated unless the main-beam headlamps or the dipped-beam headlamps are switched ON at the same time.

6.20.7.1	The cornering lamp on one side of the vehicle may only be switched ON automatically when the direction indicators on the same side of the vehicle are switched ON and/or when the steering angle is changed from the straight-ahead position towards the same side of the vehicle.
	The cornering lamp shall be switched OFF automatically when the direction-indicator is switched OFF and/or the steering angle has returned in the straight-ahead position.
6.20.7.2	When the reversing lamp is switched ON, both cornering lamps may be switched ON simultaneously, independently from the steering wheel or direction-indicator position.
	If so activated, both cornering lamps shall be switched OFF either:
	(a) When the reversing lamp is switched OFF; or (b) When the forward speed of the vehicle exceeds 10km/h
6.20.8	Tell-tale
	None.
6.20.9	Other Requirements
	The cornering lamps shall not be activated at vehicle speeds above 40km/h.
6.21	**Conspicuity Markings (~~AIS 090 or~~ AIS 200 standard~~s~~)**
6.21.1	Presence
6.21.1.1	Prohibited: on vehicles of Category L7, M1 and T1.
6.21.1.2	Mandatory:
6.21.1.2.1	To the rear:
	(i) Full contour marking on ~~vehicles~~ following vehicle categories using reflective tape of width not less than 50 mm.
	(a) N2 with a maximum mass 7.5t and above and N3 (with the exception of chassis-cabs, incomplete vehicles and tractors for semi-trailers)
	(b) T3 and T4 (with the exception of incomplete vehicles).
	(ii) Contour marking on Type II and Type III buses of M3 category using reflective tape of width not less than 50 mm

	(iii) Red Reflective tapes for the following categories.
	(a) Reflective tape of width not less than 20 mm for N1 category and N2 category with mass above 3.5 tonnes but less than 7.5 tonnes.
	(b) Reflective tape of width not less than 50 mm for buses of M2 and M3 categories which are not covered under Clause No 6.21.1.2.1 (ii) above.
6.21.1.2.2	To the side:
6.21.1.2.2.1	(i) Partial contour marking on following categories using reflective tape of width not less than 50 mm:
	(a) N2 with a maximum mass 7.5t and above and N3 (with the exception of chassis-cabs, incomplete vehicles and tractors for semi-trailers)
	(b) T3 and T4 (with the exception of incomplete vehicles)
	(ii) Reflective tapes of width not less than 50 mm for M3 category.
6.21.1.2.3	To the front
	(i) Reflective tape of width not less than 20 mm for N1 category and N2 category with mass above 3.5 tonnes but less than 7.5 tonnes.
	(ii) Reflective tape of width not less than 50 mm for vehicles of N2 category with maximum mass of 7.5 tonnes and above, N3, M2 and M3.
6.21.1.2.4 ~~3~~	A line marking may be installed instead of the mandatory contour marking if the shape, structure, design or operational requirements of the vehicle make it impossible to install the mandatory contour marking.
6.21.1.2.5 ~~4~~	If the exterior surfaces of the bodywork are partially constituted of flexible material, this line marking shall be installed on (a) rigid part(s) of the vehicle. The remaining portion of conspicuity markings may be fitted on the flexible material. If the exterior surfaces of the bodywork are constituted fully of flexible material, the line marking may be fitted on the flexible material.
6.21.1.2.6 ~~5~~	In cases where the manufacturer, after verification by the test agency, can prove to the satisfaction of the authority responsible for type approval that it is impossible, due to the operational requirements which may require special shape, structure or design of the vehicle, to comply with the requirements contained in Clauses 6.21.2. to 6.21.7.5. below, then partial fulfilment of some of these requirements is acceptable. This is conditional upon a portion of the

	requirements being met where possible, and the application of conspicuity markings that partially meet requirements maximised on the vehicle structure. This may include fitting of additional brackets or plates containing material compliant with ~~AIS 090 or~~ AIS 200 standard where structure is available to ensure clear and uniform signalling compatible with the objective of conspicuity. Where partial fulfilment is deemed acceptable, retro-reflective devices like retro-reflectors of Class IVA of ~~AIS 057 or~~ AIS 200 standard or brackets containing retro-reflecting material compliant with photometric requirements of Class C of ~~AIS 090 or~~ AIS 200 standard may substitute part of the required conspicuity markings. In this case, at least one of these retro-reflective devices shall be installed per 1,500mm. The necessary information shall be indicated in the technical specification sheet.
6.21.1.3	Optional:
6.21.1.3.1	To the rear and to the side:
	On all other categories of vehicles, not otherwise specified in Clauses 6.21.1.1. and 6.21.1.2. above, including the cab of tractor units for semi-trailers and the cab of chassis-cabs.
	Partial or full contour marking may be applied instead of mandatory line markings, and full contour marking may be applied instead of mandatory partial contour marking.
6.21.1.3.2	To the front:
	Line marking on vehicles of Categories T2, T3 and T4. Partial or full contour marking may not be applied to the front.
6.21.2	Number
	According to the presence.
6.21.3	Arrangement
	The conspicuity markings shall be as close as practicable to horizontal and vertical, compatible with the shape, structure, design and operational requirements of the vehicle; if this is not possible, the full or partial contour markings, when fitted, shall follow as close as practicable the contour of the outer shape of the vehicle.
	Furthermore, the conspicuity markings shall be spaced as evenly as possible over the horizontal dimensions of the vehicle such that the total length and/or width of the vehicle can be identified.

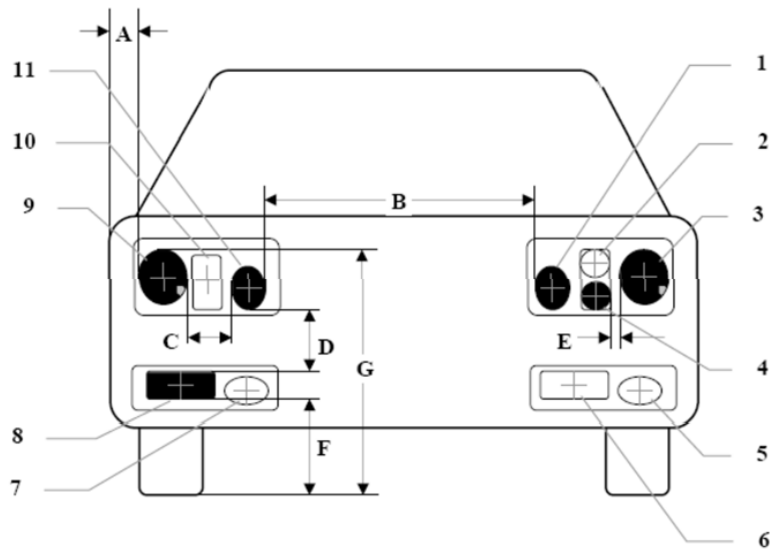
6.21.4	Position
6.21.4.1	Width
6.21.4.1.1	The conspicuity markings shall be as close as practicable to the edge of the vehicle.
6.21.4.1.2	In case of Rear reflective tape, the cumulative horizontal length of the elements, as mounted on the vehicle, shall equate to at least 70% of the overall width of the vehicle as per clause 6.21.4.1, excluding any horizontal overlap of individual elements
6.21.4.1.3	In case of Front reflective tape, the cumulative horizontal length of the conspicuity marking elements, as mounted on the vehicle, shall equate to at least 80 per cent of the overall width as per clause 6.21.4.1, excluding any horizontal overlap of individual elements prove to the satisfaction of the test agency responsible for type approval that it is impossible to achieve the value referred above, the cumulative length may be reduced to 60 per cent and shall be indicated in the technical specification and test report.
6.21.4.2	Length
6.21.4.2.1	The conspicuity marking shall be as close as practicable to the ends of the vehicle and reach to within 600mm of each end of the vehicle.
6.21.4.2.1.1	For motor vehicles, each end of the vehicle, or in the case of tractors for semi-trailers each end of the cab;
	However, an alternative marking mode within 2,400mm from the front end of the motor vehicle is allowed where a series of retro-reflectors of Class IVA of ~~AIS 057 or~~ AIS 200 standard or Class C of ~~AIS 090 or~~ AIS 200 standard are mounted followed by the required conspicuity marking as follows:
	(a) Retro-reflector size minimum 25cm^2;
	(b) One retro-reflector mounted not more than 600mm from the front end of the vehicle;
	(c) Additional retro-reflectors spaced not more than 600mm apart;
	(d) The distance between the last retro-reflector and the start of the conspicuity marking shall not exceed 600mm.
6.21.4.2.1.2	For trailers, each end of the vehicle (excluding the drawbar).
6.21.4.2.2	The cumulative horizontal length of the conspicuity marking elements, as mounted on the vehicle, excluding any horizontal overlap of individual elements, shall equate to at least 70% of:

6.21.4.2.2.1	For motor vehicles, length of vehicle, or in the case of tractors for semi-trailers, if fitted, the length of the cab; however, when using the alternative marking mode per Clause 6.21.4.2.1.1., the distance beginning within 2,400mm from the front end of vehicle to its rear end.
	
	A is the distance between the foremost conspicuity marking and the front end of the vehicle. The maximum value of A is 2,400mm (see Clause 6.21.4.2.1.1.).
6.21.4.2.2.2	For trailers, the overall length of the vehicle (excluding the drawbar).
	
6.21.4.3	Height
6.21.4.3.1	Line markings and contour markings lower element(s): As low as practicable within the range:
	Minimum: not less than 250mm above the ground.
	Maximum: not more than 1,500mm above the ground.
	However, a maximum mounting height of 2,500mm may be accepted where the shape, structure, design or operational

	conditions of the vehicle prevent compliance with the maximum value of 1,500mm or, if necessary, to fulfil the requirements of Clauses 6.21.4.1.2. 6.21.4.1.3, and 6.21.4.2.2., or the horizontal positioning of the line marking or the lower element(s) of the contour marking.
	The necessary justification for installation of conspicuity material higher than 1,500mm shall be indicated in the technical specification ~~communication form~~.
6.21.4.3.2	Contour markings upper element(s): As high as practicable, but within 400mm of the upper extremity of the vehicle.
6.21.5	Visibility
	The conspicuity marking shall be considered visible, if at least 70% of the illuminating surface of the installed marking is visible when viewed by an observer positioned at any point within the observation planes defined below:
6.21.5.1	For rear and front conspicuity markings (see Annex I, Figures 1a and 1b) the observation plane is perpendicular to the longitudinal axis of the vehicle situated 25m from the extreme end of the vehicle and bounded by:
6.21.5.1.1	In height, by two horizontal planes 1m and 3.0m respectively above the ground,
6.21.5.1.2.	In width, by two vertical planes which form an angle of 4° outwards from the vehicle's median longitudinal plane and which pass through the intersection of the vertical planes parallel to the vehicle's median longitudinal plane delimiting the vehicle's overall width, and the plane perpendicular to the longitudinal axis of the vehicle that delimits the end of the vehicle.
6.21.5.2	For side conspicuity markings (see Annex I, Figure 2) the observation plane is parallel to the longitudinal median plane of the vehicles situated 25m from the extreme outer edge of the vehicle and bounded by:
6.21.5.2.1	In height, by two horizontal planes 1.0m and 1.5m respectively above the ground,
6.21.5.2.2	In width, by two vertical planes which form an angle of 4° outwards from a plane perpendicular to the vehicle's longitudinal axis and which pass through the intersection of the vertical planes perpendicular to the vehicle's longitudinal axis delimiting the vehicle's overall length and

	the extreme outer edge of the vehicle.
6.21.6	Orientation
6.21.6.1	To the Side:
	As close as practicable to being parallel to the median longitudinal plane of the vehicle, compatible with the shape, structure, design and operation requirements of the vehicle; if this is not possible, it shall follow as close as practicable the contour of the outer shape of the vehicle.
6.21.6.2	To the Rear and to the Front:
	As close as practicable to being parallel to the transverse plane of the vehicle, compatible with the shape, structure, design and operation requirements of the vehicle, if this is not possible, it shall follow as close as practicable the contour of the outer shape of the vehicle.
6.21.7	Other Requirements
6.21.7.1	Conspicuity markings shall be considered continuous if the distance between adjacent elements are as small as possible and do not exceed 50% of the shortest adjacent element length. However, if the manufacturer can prove to the satisfaction of the authority responsible for type approval testing that it is impossible to respect the value of 50%, the distance between adjacent elements may be larger than 50% of the shortest adjacent element, and it shall be as small as possible and not exceed 1,000mm.
6.21.7.2	In the case of a partial contour marking, each upper corner shall be described by two lines at 90° to each other and each at least 250mm in length; if this is not possible, the marking shall follow as close as practicable the contour of the outer shape of the vehicle.
6.21.7.3	For the vehicles N2 with a maximum mass 7.5 tonnes and above and N3, the distance between the conspicuity marking fitted to the rear of a vehicle and each mandatory stop lamp should be greater than 200mm.
6.21.7.4	Where rear marking plates conforming ~~either AIS 089 standard or~~ to AIS 200 standard are installed these may be considered, at the discretion of the manufacturer, as part of the conspicuity marking to the rear, for the purposes of calculating the length of the conspicuity marking and its proximity to the side of the vehicle.
6.21.7.5	The minimum width of the location~~s~~ on the vehicle designated for conspicuity markings shall be more than the width of the conspicuity markings as applicable.

6.21.8	**Rear marking plates**
	Rear Marking Plates meeting ~~AIS-089~~ AIS 200 for vehicle categories notified by Central Motor Vehicle Rules shall be installed as per guidelines given in Annex N.
6.22	**Adaptive Front Lighting System (AFS) (~~AIS 127 or~~ AIS 199 standard~~s~~)**
	Where not otherwise specified below, the requirements for main-beam headlamps (Clause 6.1.) and for dipped-beam headlamps (Clause 6.2.) of this Standard apply to the relevant part of the AFS.
6.22.1	Presence
	Optional on motor vehicles. Prohibited on trailers.
6.22.2	Number
	One.
6.22.3	Arrangement
	No special requirements.
6.22.4	Position
	The AFS shall, prior to the subsequent test procedures, be set to the neutral state;
6.22.4.1	In Width and Height:
	For a given lighting function or mode the requirements indicated in the Clauses 6.22.4.1.1 through 6.22.4.1.4 below shall be fulfilled by those lighting units which are energized simultaneously for that lighting function or mode of a function, according to the applicant's description.
	All dimensions refer to the nearest edge of the apparent surface(s) observed in the direction of the reference axis, of the lighting unit(s).
6.22.4.1.1	Two symmetrically placed lighting units shall be positioned at a height in compliance with the requirements of the relevant Clauses 6.1.4 and 6.2.4, where "Two symmetrically placed lighting units" shall be understood to be two lighting units, one on each side of the vehicle, positioned such that the (geometric) centres of gravity of their apparent surfaces are at the same height and at the same distance from the vehicle's longitudinal median plane within a tolerance of 50mm, each; their light emitting surfaces, illuminating surfaces, and light outputs, however, may differ.

6.22.4.1.2	Additional lighting units, if any, on either side of the vehicle shall be positioned at a distance not exceeding 140mm[(8)] in horizontal direction (E in the Figure) and 400mm in vertical direction above or below (D in the Figure) from the nearest lighting unit;
	[(8)] *In case of additional "two symmetrically placed lighting units" the horizontal distance may be 200mm (C in the Figure).*
6.22.4.1.3	None of the additional lighting units described in Clause 6.22.4.1.2 above shall be positioned lower than 250mm (F in the Figure) nor higher than indicated in Clause 6.2.4.2 of this Standard (G in the Figure) above the ground;
6.22.4.1.4	Additionally, in width:
	For each mode of the passing beam lighting: The outer edge of the apparent surface of at least one lighting unit on each side of the vehicle shall not be more than 400mm from the extreme outer edge of the vehicle (A in the Figure); and, The inner edges of the apparent surfaces in the direction of the reference axes shall be not less than 600mm apart. This does not apply, however, for M1 and N1 Category vehicles; for all other categories of motor vehicles this distance may be reduced to 400mm where the overall width of the vehicle is less than 1,300mm.
	Apparent Surfaces of Lighting Units 1 through 11 of an AFS (Example)
	
	Lighting units being simultaneously energized for a given lighting mode: [redacted]

	No. 3 and 9: (two symmetrically placed lighting units) No. 1 and 11: (two symmetrically placed lighting units) No. 4 and 8:(two additional lighting units)
	Lighting units not being energized for said lighting mode: ☐
	No. 2 and 10: (two symmetrically placed lighting units) No. 5: (additional lighting unit) No. 6 and 7: (two symmetrically placed lighting units)
	Horizontal dimensions in mm:
	A ≤400 B ≥600, or, ≥400 if vehicle overall width <1,300mm, however no requirement for Category M1 and N1 vehicles C ≤200 E ≤140
	Vertical dimensions in mm:
	D ≤400 F ≥250 G ≤1,200
6.22.4.2	In length:
	All lighting units of an AFS shall be mounted at the front. This requirement is deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the devices for indirect vision and/or other reflecting surfaces of the vehicle.
6.22.5	Geometric Visibility
	On each side of the vehicle, for each lighting function and mode provided: The angles of geometric visibility prescribed for the respective lighting functions according to Clauses 6.1. and 6.2.5. of this Standard, shall be met by at least one of the lighting units that are simultaneously energized to perform said function and mode(s), according to the description of the applicant. Individual lighting units may be used to comply with the requirements for different

	angles.
6.22.6	Orientation
	Towards the front.
	The AFS shall, prior to the subsequent test procedures, be set to the neutral state, emitting the basic passing beam.
6.22.6.1	Vertical Orientation:
6.22.6.1.1	The initial downward inclination of the cut-off of the basic passing beam to be set in the unladen vehicle state with one person in the driver's seat shall be specified with a precision of 0.1% by the manufacturer and indicated in clearly legible and indelible manner on each vehicle, close to either the front lighting system or the manufacturer's plate, by the symbol shown in Annex E.
	Where differing initial downward inclinations are specified by the manufacturer for different lighting units that provide or contribute to the cut-off of the basic passing beam, these values of downward inclination shall be specified with a precision of 0.1% by the manufacturer and indicated in clearly legible and indelible manner on each vehicle, close to either the relevant lighting units or on the manufacturers plate, in such a way that all the lighting units concerned can be unambiguously identified.
6.22.6.1.2	The downward inclination of the horizontal part of the "cut-off" of the basic passing beam shall remain between the limits indicated in Clause 6.2.6.1.2. of this Standard under all the static loading conditions of the vehicle of Annex C to this Standard; and the initial aiming shall be within the specified values.
6.22.6.1.2.1	In case the passing-beam is generated by several beams from different lighting units, the provisions according to Clause 6.22.6.1.2. above apply to each said beam's "cut-off" (if any), which is designed to project into the angular zone, as indicated under ~~Item 9.3. of the communication form conforming to the model in Annex 1 to UN Regulation No. 123 or~~ Item 9.3.3. in Annex 1 to AIS 199 standard ~~UN Regulation No. 149~~.
6.22.6.2	Headlamp Levelling Device
6.22.6.2.1	In the case where a headlamp levelling device is necessary to satisfy the requirements of Clause 6.22.6.1.2., the device shall be automatic.
6.22.6.2.2	In the event of a failure of this device, 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.

6.22.6.3	Horizontal Orientation: For each lighting unit the kink of the elbow of the cut-off line, if any, when projected on the screen, shall coincide with the vertical line through the reference axis of said lighting unit. A tolerance of 0.5° to that side which is the side of the traffic direction shall be allowed. Other lighting units shall be adjusted according to the applicant's specification, as defined according to ~~Annex J of AIS 127 standard or~~ Annex 14 of AIS 199 standard.
6.22.6.4	Measuring Procedure:
	After adjustment of the initial setting of beam orientation, the vertical inclination of the passing beam or, when applicable, the vertical inclinations of all the different lighting units that provide or contribute to the cut-off(s) according to Clause 6.22.6.1.2.1. above of the basic passing beam, shall be verified for all loading conditions of the vehicle in accordance with the specifications in Clauses 6.2.6.3.1. and 6.2.6.3.2. of this Standard.
6.22.7	Electrical Connections
6.22.7.1	Main Beam Lighting (if provided by the AFS)
6.22.7.1.1	The lighting units for the main-beam may be activated either simultaneously or in pairs. For changing over from the dipped-beam to the main-beam at least one pair of lighting units for the main-beam shall be activated. For changing over from the main-beam to the dipped-beam all lighting units for the main-beam shall be deactivated simultaneously.
6.22.7.1.2	The main-beam may be designed to be adaptive, subject to the provisions in Clause 6.22.9.3., the control signals being produced by a sensor system which is capable of detecting and reacting to each of the following inputs:
	(a) Ambient lighting conditions;
	(b) The light emitted by the front lighting devices and front light-signalling devices of oncoming vehicles;
	(c) The light emitted by the rear light-signalling of preceding vehicles;
	Additional sensor functions to improve performance are allowed.
	For the purpose of this Clause, "vehicles" means vehicles of Categories L, M, N, T, as well as bicycles, such vehicles being equipped with retro-reflectors, with lighting and light-signalling devices, which are switched ON.

6.22.7.1.3	It shall always be possible to switch the main-beam headlamps, adaptive or non-adaptive, ON and OFF manually and to manually switch OFF the automatic control. Moreover, the switching OFF, of the main-beam headlamps and of their automatic control shall be by means of a simple and immediate manual operation; the use of sub-menus is not allowed.
6.22.7.1.4	The dipped-beams may remain switched ON at the same time as the main beams.
6.22.7.1.5	Where four concealable lighting units are fitted their raised position shall prevent the simultaneous operation of any additional headlamps fitted, if these are intended to provide light signals consisting of intermittent illumination at short intervals (see Clause 5.12.) in daylight.
6.22.7.2	Passing-beam lighting:
	(a) The control for changing over to the dipped-beam shall switch OFF all main-beam headlamps or deactivated all AFS lighting units for the main-beam simultaneously;
	(b) The dipped-beam may remain switched ON at the same time as the main-beams;
	(c) In the case of lighting units for the dipped-beam being equipped with gas discharge light sources, the gas-discharge light sources shall remain switched ON during the main-beam operation.
6.22.7.3	Switching ON and OFF of the passing beam is subject to the requirements for "Electrical connection" in Clause 5.12. and 6.2.7. of this Standard.
6.22.7.4	Automatic Operation of the AFS The changes within and between the provided classes and their modes of the AFS lighting functions as specified below, shall be performed automatically without causing discomfort, distraction or glare, neither for the driver nor for other road users. The following conditions apply for the activation of the classes and their modes of the passing beam and, where applicable, of the main-beam and/or the adaptation of the main-beam.
6.22.7.4.1	The Class C mode(s) of the passing beam shall be activated if no mode of another passing beam class is activated.
6.22.7.4.2	The Class V mode(s) of the passing beam shall not operate unless one or more of the following conditions is/are automatically detected (V-signal applies):

	(a) Roads in built-up areas and the vehicle's speed not exceeding 60km/h;
	(b) Roads equipped with a fixed road illumination, and the vehicle's speed not exceeding 60km/h;
	(c) A road surface luminance of 1cd/m^2 and/or a horizontal road illumination of 10lx being exceeded continuously;
	(d) The vehicle's speed not exceeding 50km/h.
6.22.7.4.3	The Class E mode(s) of the passing beam shall not operate unless the vehicle's speed exceeds 60km/h and one or more of the following conditions is/are automatically detected.
	(a) The road characteristics correspond to motorway conditions[(9)] and/or the vehicle's speed exceeds 110km/h (E-signal applies).
	(b) In case of a Class E mode of the passing-beam which, according to the system's approval documents/communication sheet, complies with a "data set" of ~~AIS 127, Annex 3, Table 6, or of~~ AIS 199, Table 14 only.
	Data set E1: The vehicle's speed exceeds 100km/h (E1-signal applies);
	Data set E2: The vehicle's speed exceeds 90km/h (E2-signal applies);
	Data set E3: The vehicle's speed exceeds 80km/h (E3-signal applies).
	[(9)] *Traffic directions being separated by means of road construction, or, a corresponding lateral distance of opposing traffic is identified. This implies a reduction of undue glare from vehicles headlamps in opposing traffic.*
6.22.7.4.4	The Class W-mode(s) of the passing-beam shall not operate unless the front fog lamps, if any, are switched OFF and one or more of the following conditions is/are automatically detected (W-signal applies):
	(a) The wetness of the road has been detected automatically;
	(b) The windshield wiper is switched ON and its continuous or automatically controlled operation has occurred for a period of at least two minutes.
6.22.7.4.5	A mode of a Class C, V, E, or W passing beam shall not be modified to become a bending mode of said class (T-signal applies in combination with the signal of said passing beam class according to Clauses 6.22.7.4.1. through 6.22.7.4.4. above) unless at least one of

	the following characteristics (or equivalent indications) are evaluated:
	(a) The angle of lock of the steering;
	(b) The trajectory of the centre of gravity of the vehicle.
	In addition the following provisions apply:
	(i) A horizontal movement of the asymmetric cut-off side-wards from the longitudinal axis of the vehicle, if any, is allowed only when the vehicle is in forward motion[(10)] and shall be such that the longitudinal vertical plane through the kink of the elbow of the cut-off does not intersect the line of the trajectory of the centre of gravity of the vehicle at distances from the front of the vehicle which are larger than 100 times the mounting height of the respective lighting unit;
	(ii) One or more lighting units may be additionally energized only when the horizontal radius of curvature of the trajectory of the centre of gravity of the vehicle is 500m or less.
	[(10)] *This provision does not apply for passing beam lighting when bend lighting is produced for a left turn in left-hand traffic.*
6.22.7.5	It shall always be possible for the driver to set the AFS to the neutral state and to return it to its automatic operation.
6.22.8	Tell-tale:
6.22.8.1	The provisions of Clauses 6.1.8. (for the main-beam headlamp) and 6.2.8. (for the dipped-beam headlamp) of this Standard apply to the respective parts of an AFS.
6.22.8.2	A visual failure tell-tale for AFS is mandatory. It shall be non-flashing. It shall be activated whenever a failure is detected with respect to the AFS control signals or when a failure signal is received in accordance with ~~Clause 5.9. of AIS 127~~ Clause 4.13 of AIS 199. It shall remain activated while the failure is present. It may be cancelled temporarily but shall be repeated whenever the device which starts and stops the engine is switched ON and OFF.
6.22.8.3	If the main-beam is adaptive, a visual tell-tale shall be provided to indicate to the driver that the adaptation of the main beam is activated. This information shall remain displayed as long as the adaptation is activated.
6.22.8.4	A tell-tale to indicate that the driver has set the system into a state according to ~~Clause 5.8. of AIS 127 or~~ Clause 4.12. of AIS 199 is optional.

6.22.9	Other Requirements
6.22.9.1	An AFS shall be permitted only in conjunction with the installation of headlamp cleaning device(s) according to AIS 083 standard[(11)] for at least those lighting units, which are indicated in ~~AIS 127 or~~ AIS 199, if the total objective luminous flux of the light sources of these units exceeds 2,000lm per side, and which contribute to the Class C (basic) passing-beam.
	[(11)] *Certifying agency can still prohibit the use of mechanical cleaning systems when headlamps with plastic lenses, marked 'PL', are installed.*
6.22.9.2	Verification of Compliance with AFS Automatic Operating Requirements
6.22.9.2.1	The applicant shall demonstrate with a concise description or other means acceptable to the test agency responsible for type approval testing:
	(a) The correspondence of the AFS control signals
	(i) To the description required in Clause 3.2.6. of this Standard and (ii) To the respective AFS control signals specified in the AFS type approval documents, and,
	(b) Compliance with the automatic operating requirements according to Clauses 6.22.7.4.1. through 6.22.7.4.5. above.
6.22.9.2.2	To verify, whether, according to the Clause 6.22.7.4., the AFS automatic operation of the passing beam functions does not cause any discomfort, the test agency shall perform a test drive which comprises any situation relevant to the system control on the basis of the applicants description; it shall be notified whether all modes are activated, performing and de-activated according to the applicant's description; obvious malfunctioning, if any, shall be contested (e.g. excessive angular movement or flicker).
6.22.9.2.3	The overall performance of the automatic control shall be demonstrated by the applicant by documentation or by other means accepted by the test agency responsible for type approval testing. Furthermore the manufacturer shall provide a documentation package which gives access to the design of "the safety concept" of the system. This "safety concept" is a description of the measures designed into the system, for example within the electronic units, so as to address system integrity and thereby ensure safe operation even in the event of mechanical or electrical failure which could cause any discomfort, distraction or glare, either to the driver or to oncoming and preceding vehicles. This description shall also give a

	simple explanation of all the control functions of the "system" and the methods employed to achieve the objectives, including a statement of the mechanism(s) by which control is exercised.
	A list of all input and sensed variables shall be provided and the working range of these shall be defined. The possibility of a fall-back to the basic passing beam (Class C) function shall be a part of the safety concept.
	The functions of the system and the safety concept, as laid down by the manufacturer, shall be explained. The documentation shall be brief, yet provide evidence that the design and development has had the benefit of expertise from all the system fields which are involved.
	For periodic technical inspections, the documentation shall describe how the current operational status of the "system" can be checked.
	For Type Approval purposes this documentation shall be taken as the basic reference for the verification process.
6.22.9.2.4	To verify, that the adaptation of the main-beam does not cause any discomfort, distraction or glare, neither to the driver nor to oncoming and preceding vehicles, the test agency shall perform a test drive according to Clause 2. in Annex J. This shall include any situation relevant to the system control on the basis of the applicant's description. The performance of the adaptation of the main-beam shall be documented and checked against the applicant's description. Any obvious malfunctioning shall be contested (e.g. excessive angular movement or flicker).
6.22.9.3	Adaptation of the Main-beam
6.22.9.3.1	The sensor system used to control the adaptation of the main-beam, as described in Clause 6.22.7.1.2., shall comply with the following requirements
6.22.9.3.1.1	The boundaries of the minimum fields in which the sensor is able to detect light emitted from other vehicles as defined in Clause 6.22.7.1.2. above are given by the angles indicated in Clause 6.1.9.3.1.1. of this Standard.
6.22.9.3.1.2	The sensor system sensitivity shall comply with the requirements in Clause 6.1.9.3.1.2. to this Standard.
6.22.9.3.1.3	The adaptive main-beam shall be switched OFF when the illuminance produced by ambient lighting conditions exceeds 7,000lx.
	Compliance with this Requirement shall be demonstrated by the applicant, using simulation or other means of verification accepted

	by the authority responsible for type approval testing. If necessary the illuminance shall be measured on a horizontal surface, with a cosine corrected sensor on the same height as the mounting position of the sensor on the vehicle. This may be demonstrated by the manufacturer by sufficient documentation or by other means accepted by the test agency responsible for type approval testing.
6.22.9.4	The aggregate maximum intensity of the lighting units that can be energized simultaneously to provide the main-beam lighting or its modes, if any, shall not exceed 430,000cd, which corresponds to a reference value of 100.
	This maximum intensity shall be obtained by adding together the individual reference marks indicated on the several installation units that are simultaneously used to provide the main-beam.
6.22.9.5	The means according to the provisions of Clause 5.8. of AIS 123 or Clause 4.12 of AIS 199, which allow the vehicle to be used temporarily in a territory with the opposite direction of driving than that for which approval is sought, shall be explained in detail in the owner's manual.
6.23	**Emergency Stop Signal**
6.23.1	Presence
	Optional.
	The emergency stop signal shall be given by the simultaneous operation of all the stop or direction-indicator lamps fitted as described in Clause 6.23.7.
6.23.2	Number
	As specified in Clause 6.5.2. or 6.7.2.
6.23.3	Arrangement
	As specified in Clause 6.5.3. or 6.7.3.
6.23.4	Position
	As specified in Clause 6.5.4. or 6.7.4.
6.23.5	Geometric Visibility
	As specified in Clause 6.5.5. and 6.7.5.
6.23.6	Orientation
	As specified in Clause 6.5.6. or 6.7.6.

6.23.7	Electrical Connections
6.23.7.1	All the lamps of the emergency stop signal shall flash in phase at a frequency of 4.0 ± 1.0Hz.
6.23.7.1.1	However, if any of the lamps of the emergency stop signal to the rear of the vehicle use filament light sources the frequency shall be 4.0 +0.0/-1.0Hz.
6.23.7.2	The emergency stop signal shall operate independently of other lamps.
6.23.7.3	The emergency stop signal shall be activated and deactivated automatically.
6.23.7.3.1	The emergency stop signal shall be activated only when the vehicle speed is above 50km/h and the braking system is providing the emergency braking logic signal defined in IS 11852/AIS 150 & IS 15986/AIS 151 standards.
6.23.7.3.2	The emergency stop signal shall be automatically deactivated if the emergency braking logic signal as defined in IS 11852/AIS 150 & IS 15986/AIS 151 standards is no longer provided or if the hazard warning signal is activated.
6.23.8	Tell-tale
	Optional.
6.23.9	Other Requirements
6.23.9.1	Except as provided in Clause 6.23.9.2. below, if a motor vehicle is equipped to tow a trailer, the control of the emergency stop signal on the motor vehicle shall also be capable of operating the emergency stop signal on the trailer.
	When the motor vehicle is electrically connected to a trailer, the operating frequency of the emergency stop signal for the combination shall be limited to the frequency specified in Clause 6.23.7.1.1. However, if the motor vehicle can detect that filament light sources are not being used on the trailer for the emergency stop signal, the frequency may be that specified in Clause 6.23.7.1.
6.23.9.2	If a motor vehicle is equipped to tow a trailer fitted with a service braking system of either continuous or semi-continuous type, as defined in IS 11852/AIS 150 standard, it shall be ensured that a constant power supply is provided via the electrical connector for the stop lamps to such trailers while the service brake is applied.
	The emergency stop signal on any such trailer may operate independently of the towing vehicle and is not required to operate either at the same frequency as, or in phase with that on the towing

	vehicle.
6.23.	**Exterior Courtesy Lamp**
6.24.1	Presence
	Optional on motor vehicles.
6.24.2	Number
	Two, however further exterior courtesy lamps to illuminate steps and/or door handles are permitted. Each door handle or step shall be illuminated by not more than one lamp.
6.24.3	Arrangement
	No special requirement, however the requirements of Clause 6.24.9.3. apply.
6.24.4	Position
	No special requirement.
6.24.5	Geometric Visibility
	No special requirement.
6.24.6	Orientation
	No special requirement.
6.24.7	Electrical Connections
	No special requirement.
6.24.8	Tell-tale
	No special requirement.
6.24.9	Other Requirements
6.24.9.1	The exterior courtesy lamp shall not be switched ON unless the vehicle is stationary and one or more of the following conditions is satisfied:
	(a) The engine is stopped; or
	(b) A driver or passenger door is opened; or
	(c) A load compartment door is opened.
	The provisions of Clause 5.10. shall be met in all fixed positions of

	use.
6.24.9.2	Approved lamps emitting white light with the exception of main beam head lamps, day time running lamps and reversing lamps may be activated as courtesy lamp function. They may also be activated together with the exterior courtesy lamps and the condition of Clauses 5.11. and 5.12. above may not apply.
6.24.9.3	The test agency shall, to the satisfaction of the authority responsible for type approval testing, perform a visual test to verify that there is no direct visibility of the apparent surface of the exterior courtesy lamps, if viewed by an observer moving on the boundary of a zone on a transverse plane 10m from the front of the vehicle, a transverse plane 10m from the rear of the vehicle, and two longitudinal planes 10m from each side of the vehicle; these four planes to extend from 1m to 3m above and perpendicular to the ground as shown in Annex L.
	At the request of the applicant and with the consent of the test agency this requirement may be verified by a drawing or simulation.
6.25	**Rear-end Collision Alert Signal**
6.25.1	Presence
	Optional
	The rear-end collision alert signal shall be given by the simultaneous operation of all the direction indicator lamps fitted as described in Clause 6.25.7.
6.25.2	Number
	As specified in Clause 6.5.2.
6.25.3	Arrangement
	As specified in Clause 6.5.3.
6.25.4	Position
	As specified in Clause 6.5.4.
6.25.5	Geometric Visibility
	As specified in Clause 6.5.5.
6.25.6	Orientation
	As specified in Clause 6.5.6.

6.25.7	Electrical Connections	
	Compliance with these requirements shall be demonstrated by the applicant, by simulation or other means of verification accepted by the test agency responsible for type approval.	
6.25.7.1	All the lamps of the rear-end collision alert signal shall flash in phase at a frequency of 4.0 ± 1.0Hz.	
6.25.7.1.1	However, if any of the lamps of the rear end collision alert signal to the rear of the vehicle use filament light sources the frequency shall be 4.0 +0.0/-1.0Hz.	
6.25.7.2	The rear-end collision alert signal shall operate independently of other lamps.	
6.25.7.3	The rear-end collision alert signal shall be activated and deactivated automatically.	
6.25.7.4	The rear-end collision alert signal shall not be activated if the direction indicator lamps, the hazard warning signal or the emergency stop signal is activated.	
6.25.7.5	The rear-end collision alert signal may only be activated under the following conditions:	
	Vr	Activation ~~switch ON~~
	Vr > 30km/h	TTC ≤ 1.4
	Vr ≤ 30km/h	TTC ≤ 1.4 / 30 × Vr
	"Vr (Relative Speed)": means the difference in speed between a vehicle with rear-end collision alert signal and a following vehicle in the same lane.	
	"TTC (Time to collision)": means the estimated time for a vehicle with rear-end collision alert signal and a following vehicle to collide assuming the relative speed at the time of estimation remains constant.	
6.25.7.6	The activation period of the rear-end collision alert signal shall be not more than 3s.	
6.25.8	Tell-tale	
	Optional	
6.26	**Manoeuvring Lamps (AIS 198 standard)**	
6.26.1	Presence	

	Optional on motor vehicles.
6.26.2	Number
	One or two (one per side)
6.26.3	Arrangement
	No special requirement, however, the requirements of Clause 6.26.9. apply.
6.26.4	Position
	No special requirement.
6.26.5	Geometric Visibility
	No special requirement.
6.26.6	Orientation
	Downwards, however the requirements of Clause 6.26.9. apply.
6.26.7	Electrical Connections
	Manoeuvring lamps shall be so connected that they cannot be activated unless the main-beam headlamps or the dipped-beam headlamps are switched ON at the same time.
	The manoeuvring lamp(s) shall be activated automatically for slow manoeuvres up to 10km/h provided that one of the following conditions is fulfilled:
	(a) Prior to the vehicle being set in motion for the first time after each manual activation of the propulsion system; or
	(b) Reverse gear is engaged; or
	(c) A camera based system which assists parking manoeuvres is activated.
	The manoeuvring lamps shall be automatically switched OFF if the forward speed of the vehicle exceeds 10km/h and they shall remain switched OFF until the conditions for activation are met again.
6.26.8	Tell-tale
	No special requirement.
6.26.9	Other Requirements
6.26.9.1	The test agency responsible for type approval, perform a visual test

	to verify that there is no direct visibility of the apparent surface of these lamps, if viewed by an observer moving on the boundary of a zone on a transverse plane 10m from the front of the vehicle, a transverse plane 10m from the rear of the vehicle, and two longitudinal planes 10m from each side of the vehicle; these four planes to extend from 1m to 3m above and parallel to the ground as shown in Annex L.
6.26.9.2	At the request of the applicant and with the consent of the test agency the requirement of clause 6.26.9.1 may be verified by a drawing or simulation or deemed be satisfied if the installation conditions comply with Clause 5.10.2. of AIS 198
7.0	**TECHNICAL SPECIFICATIONS TO BE SUBMITTED**
7.1	The specifications to be submitted by the manufacturer at the time of applying for the type approval of the vehicle to this standard shall contain at least the information listed in the following clauses of AIS-007 (Rev.5). [A1, A1.1, A1.2, A1.3, A1.4, A1.5, A1.6, A1.7. A3, A3.1, A3.2.1 A6, A6.1, A6.1.1, A6.1.2, A6.1.3, A6.2 A10, A10.1, A10.2, A10.3 A7, A7.2.1, A7.2.2, A7.2.3, A7.3, A7.3.1, A7.3.2, A7.4, A7.4.1, A7.4.2 B10, B10.1, B10.5. E2, E2.1, E2.2, E2.3 E3, E3.1, E3.2, E3.3 E4, E4.1, E4.2, E4.3 E5, E5.1, E5.2, E5.3 E6, E6.1, E6.1.1, E6.1.2, E6.1.3, E6.2, E6.2.1, E6.2.3 E7, E7.1, E7.2, E7.3 E8, E8.1, E8.2, E8.3 E9, E9.1, E9.1.1, E9.1.2, E9.1.3, E9.2, E9.2.1, E9.2.2, E9.2.3, E9.3, E9.3.1, E9.3.2, E9.3.3, E9.3.4. E10, E10.1, E10.1.1, E10.1.2, E10.1.3, E10.2, E10.2.1, E10.2.3, E10.3, E10.3.1, E10.3.2, E10.3.3 E11, E11.1, E11.1.1, E11.1.2, E11.1.3, E11.1.4, E11.2, E11.2.1, E11.2.3, E11.2.4, E11.3, E11.3.1, E11.3.2, E11.3.3, E11.3.4. E12, E12.1, E12.2, E12.3.]
7.2	In addition, the maximum intensity of main-beam head lamp (cd) and a diagram of the vehicle indicating the location of all lighting and light signalling devices and following dimensions (in mm) shall be submitted.
7.2.1	Along the Width of the Vehicle (applicable only in case there are more than one lamp for same function).
7.2.1.1	Horizontal distance between the inner edges of apparent surfaces in the direction of reference axes or illuminating surfaces, as applicable.
7.2.1.2	Distance between outermost edges of the apparent surfaces in the direction of reference axes or illuminating surfaces, as applicable from the extreme outer edge of the vehicle.
7.2.1.3	Distance between the nearest points of apparent surfaces in the direction of reference axes of the front direction indicator and the

	dipped-beam headlamps and category of the front direction indicator 1 or 1a or 1b. and that of rear direction indicator 2a or 2b.
7.2.1	Along Length of the Vehicle Where Applicable:
7.2.2	The distance between the edges of the apparent surfaces in the direction of reference axis or illuminating surfaces or light emitting surfaces, as applicable and the transverse plane which marks the forward boundary of the vehicle's overall length.
7.2.3	Height: Heights of highest and lowest points of apparent surfaces in the direction of reference axes or illuminating surfaces or light-emitting surfaces, as applicable from ground.
7.2.4	Contour of the vehicle parts limiting the geometric visibility of the lamps (where applicable).
7.2.5	Reference axis of the device.
7.2.6	Location of the extreme outer edge of the vehicle.
7.2.7	Mark of the illuminating surface, light-emitting surface or apparent surface in the direction of reference axis, as applicable, of the device as declared by the manufacturer.
7.2.8	Mark of the median longitudinal plane of the vehicle.
7.3	If the above information is submitted in a consolidated form of AIS-007 (Rev. 5), for the type approval of the whole vehicle, it is not necessary to submit this information again.
7.4	Changes in the technical specifications already type approved:
7.4.1	Every modification pertaining to the information declared in accordance with clause 7.1, 7.2 shall be intimated by the manufacturer to the certifying agency.
7.4.2	If the changes in parameters are not related to the provisions, no further action needs to be taken. If the changes in parameters are related to the provisions, the Testing Agency may then consider whether, a) the model with the changed specifications still complies with provision; or b) any further verification is required to establish compliance. For considering whether any further verification is required or not, guidelines given in clause 8 (Criteria for Extension of Approval) may be used.

7.4.3	In case of 7.4.2(b), verification for only those parameters which are affected by the modifications need to be carried out.
7.4.4	In case of fulfilment of criteria of clause 7.4.2 (a), or after results of further verification as per clause 7.4.2 (b) are successful, the approval of compliance shall be extended for the changes carried out.
8.0	**CRITERIA FOR EXTENSION OF APPROVAL**
8.1	In case of following changes, the verification shall be carried out for establishing compliance of the changed parameters to the requirements specified in this standard.
8.2	Number of any of the mandatory lighting and light signalling devices and any addition to fitment of optional lamps.
8.3	In case any increase in the dimensions for which a minimum value is specified or any decrease in the dimensions for which a maximum value is specified in this standard, verification on the prototype is not required if the difference between the modified dimension declared by the manufacturer and the requirement specified in this standard is more than 25 mm.
8.4	If there are changes in the contour of the vehicle, which increase the geometric visibility, verification on the prototype is not required.
8.5	While approving fitment of different makes of lighting devices or light-signalling devices, if any of the parameters specified above are affected, verification of compliance to such parameters shall be carried out.
8.6	In case of following changes, the compliance to the clause.6.2.6.1.2 of the standard, verification by way of actual testing or by calculations, is required,
8.6.1	Decrease in the wheel base by more than 10 percent
8.6.2	Decrease in the height of head lamp in unladen condition.
8.6.3	Increase in GVW by more than 10 percent
8.6.4	Increase in the ratio of FAW (Front Axle Weight) to RAW (Rear Axle Weight) in unladen condition.
8.7	For changes other than the above, the provisions given in the Preamble of Annex C of AIS-017 (Procedure for Type Approval and Certification of Vehicles for Compliance to Central Motor Vehicles Rules) may be followed.
9.0	**CONFORMITY OF PRODUCTION REQUIREMENTS**

	Whole vehicle COP procedure laid down by the Ministry of Road Transport & Highways shall be applicable. For the purpose of COP, verification of parameters decided in COP standard shall be carried out.
10.0	**TRANSITIONAL PROVISIONS**
	At the request of the applicant, type approvals for compliance to [AIS-008 (Rev.3):20XX], shall be granted by test agencies from [XX/YY/] Such type approvals shall be deemed to be compliance to [AIS-008 (Rev.1): 2010]
11.0	**AMENDMENTS TO UN REGULATIONS AFTER THE LEVEL DESCRIBED IN [PARA. 4 OF INTRODUCTION]**
11.1	Supplements In case of changes in UN regulation, which are issued as supplements (Supplements do not affect the earlier type approvals) at the request of applicant, approval of compliance to this standard shall be issued taking into account the changes arising out of such supplement(s) to UN regulation with approval from Chairman AISC. This shall be incorporated in the test report. Note: Such changes will be considered for inclusion in this standard at the time of its next amendment /revision.
11.2	Series of amendments Changes in UN regulation, which are issued as series of amendments (series of amendments may affect the earlier type approvals) will not be considered for issuing approval to this standard. However, Chairman, AISC may, on a case to case basis, permit to accept latest series of amendments. This shall be incorporated in the test report. Note: Such changes will be considered for inclusion in this standard at the time of its next revision.

ANNEX A

EXAMPLES OF LAMP SURFACES, AXES, CENTRES OF REFERENCE, AND ANGLES OF GEOMETRIC VISIBILITY

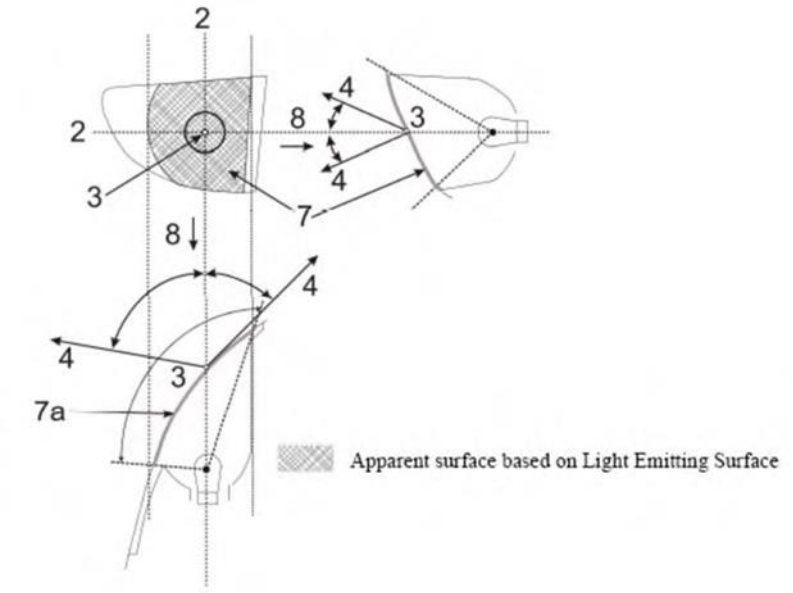
These examples show some arrangements to aid the understanding of the provisions and are not intended to be design restrictive.

KEY for all examples in this Annex:

1. Illuminating surface	IO	Inner optical part
2. Axis of reference	LG	Light guide
3. Centre of reference	L	Outer lens
4. Angle of geometric visibility	R	Reflector
5. Light-emitting surface	S	Light source
6. Apparent surface based on the illuminating surface	X	Not part of this function
7a. Apparent surface based on the light-emitting surface according to Clause 2.10.2. (a) (with outer lens)	F1	Function one
	F2	Function two
7b. Apparent surface based on the light-emitting surface according to Clause 2.10.2. (b) (without outer lens)		
8. Direction of visibility		

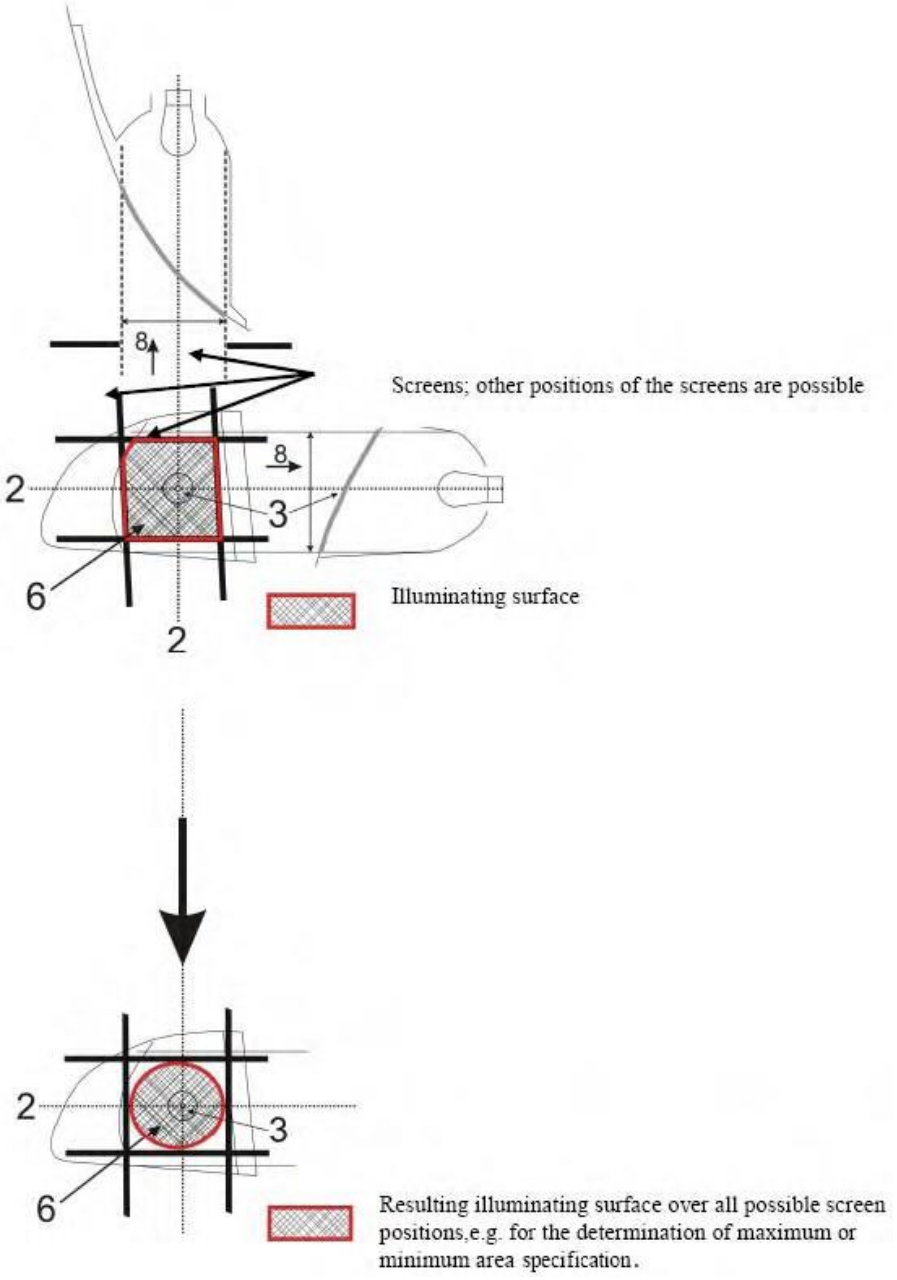
PART 1

LIGHT EMITTING SURFACE OF A LIGHT-SIGNALLING DEVICE OTHER THAN A RETRO-REFLECTOR



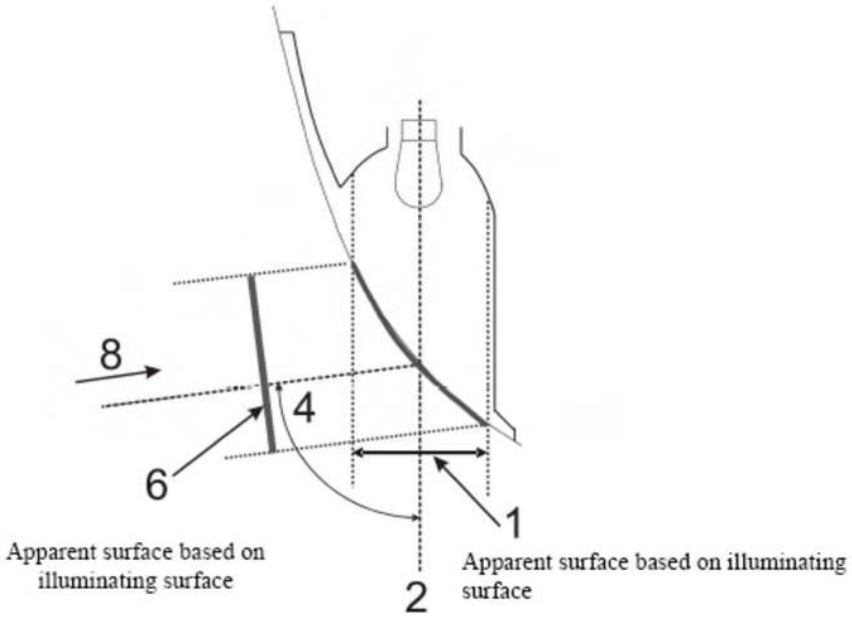
PART 2

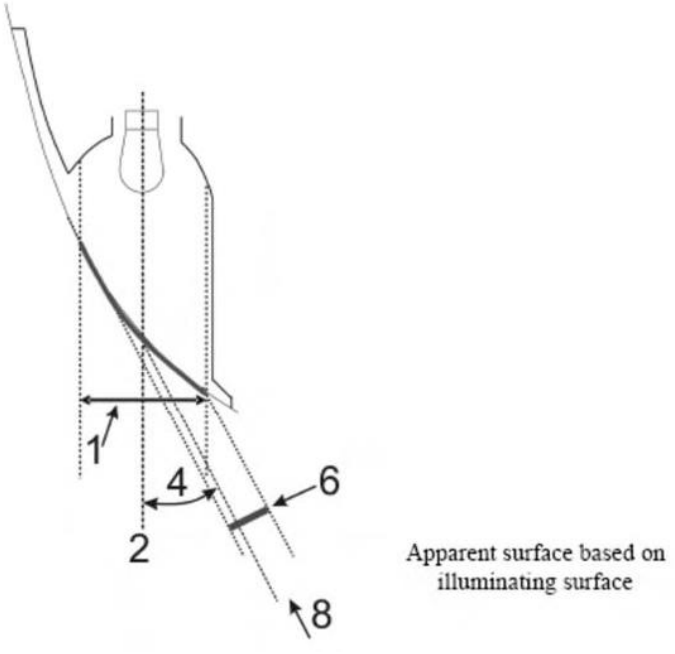
ILLUMINATING SURFACE OF A LIGHT-SIGNALLING DEVICE OTHER THAN A RETRO-REFLECTOR



PART 3

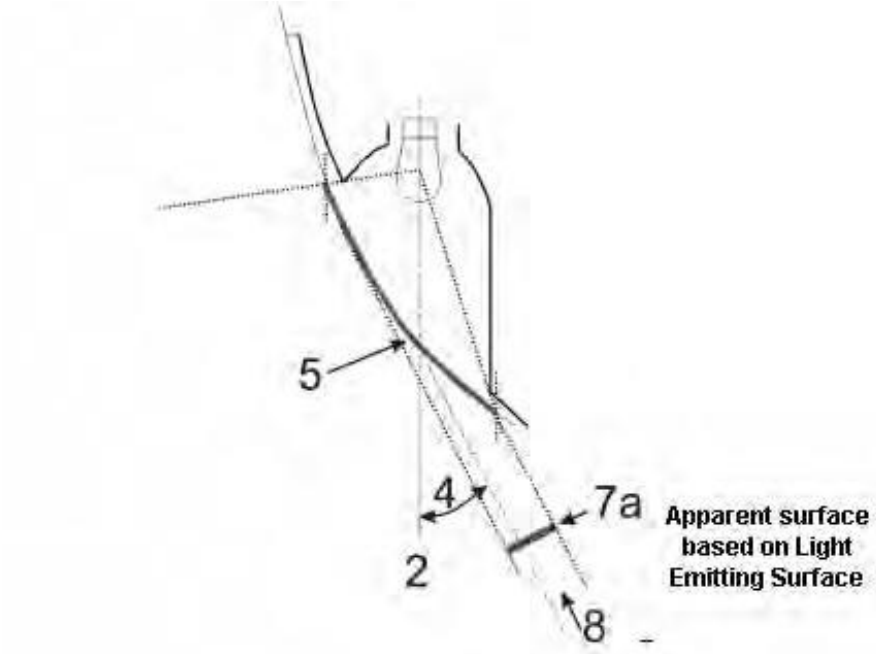
EXAMPLES OF APPARENT SURFACE BASED ON ILLUMINATING SURFACE IN DIFFERENT DIRECTIONS OF GEOMETRIC VISIBILITY

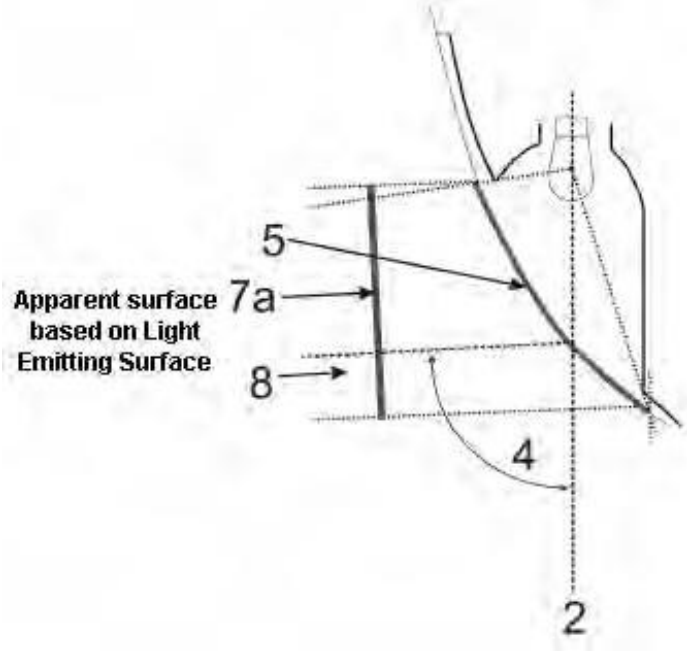




PART 4

EXAMPLES OF APPARENT SURFACE BASED ON LIGHT EMITTING SURFACE IN DIFFERENT DIRECTIONS OF GEOMETRIC VISIBILITY



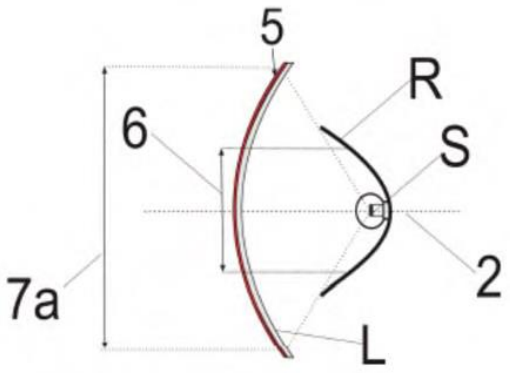


PART 5

EXAMPLE OF ILLUMINATING SURFACE IN COMPARISON WITH LIGHT-EMITTING SURFACE IN THE CASE OF A "SINGLE FUNCTION LAMP"

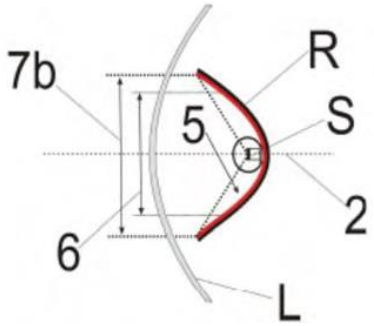
(See Clauses 2.10.2. to 2.10.3. of this Standard) Examples of a light source with a reflector optic behind an outer lens:

Example 1:



(Including the outer lens)

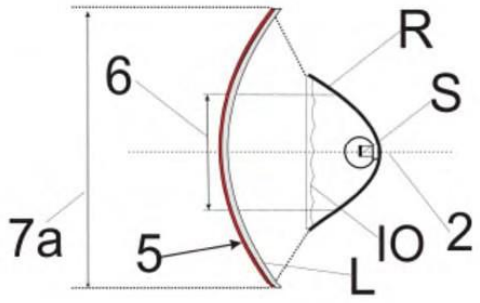
Example 2



(Excluding the non-textured outer lens)

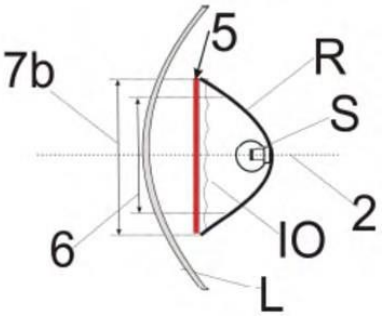
Examples of a light source with a reflector optic with an inner lens behind an outer lens:

Example 3



(Including the outer lens)

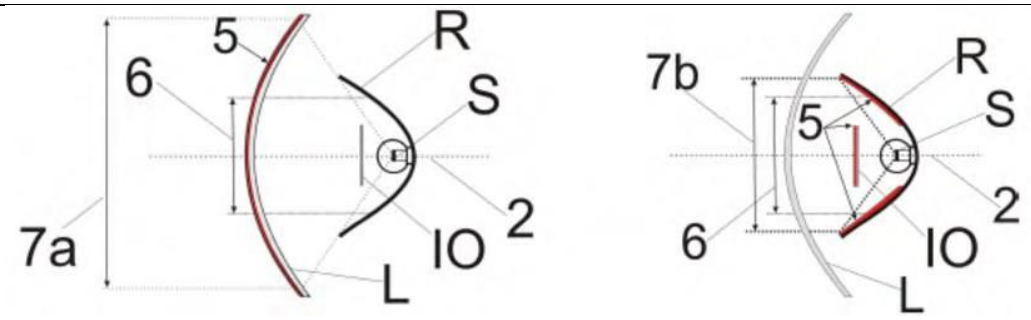
Example 4



(Excluding the non-textured outer lens)

Examples of a light source with a reflector optic with a partial inner lens behind an outer lens:

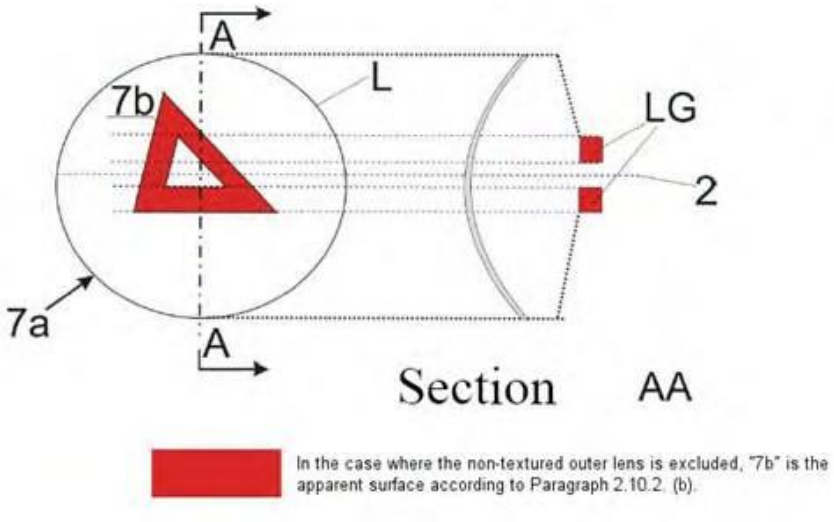
Example 5 **Example 6**



(Including the outer lens) (Excluding the non-textured outer lens)

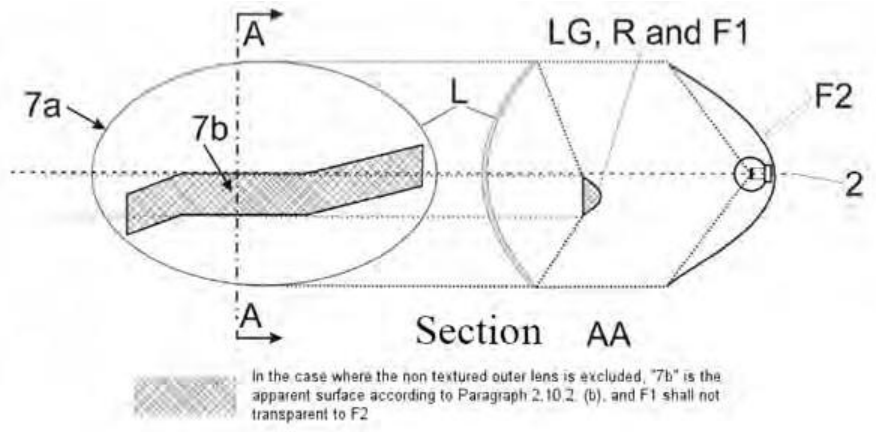
Example of a light guide optic behind an outer lens:

Example 7:



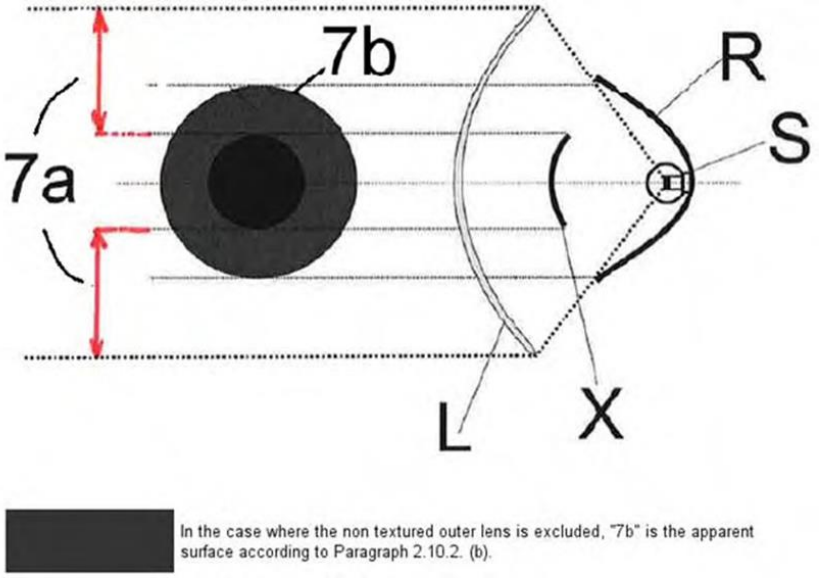
Example of a light guide optic or a reflector optic behind an outer lens:

Example 8:



Example of a light source with a reflector optic in combination with an area which is not part of this function, behind an outer lens:

Example 9:



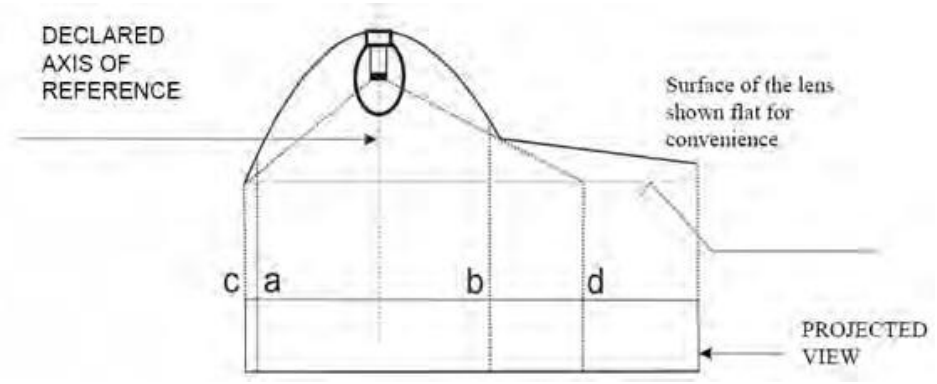
PART 6

EXAMPLES SHOWING THE DETERMINATION OF THE LIGHT-EMITTING SURFACE IN COMPARISON WITH ILLUMINATING SURFACE

(See Clauses 2.10.2. and 2.10.3. of this Standard)

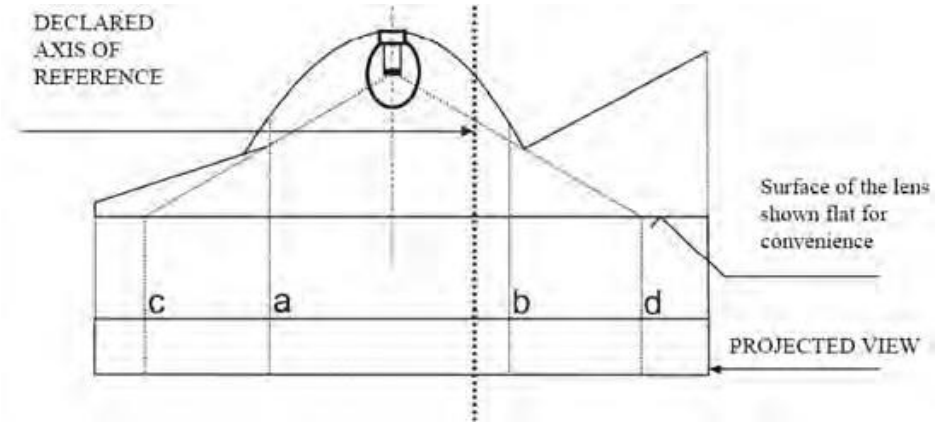
Note: Reflected light could/may contribute to the determination of the light emitting surface

Example A:



	Illuminating Surface	Declared Light-emitting Surface According to 2.10.2. (a)
Edges are	a and b	c and d

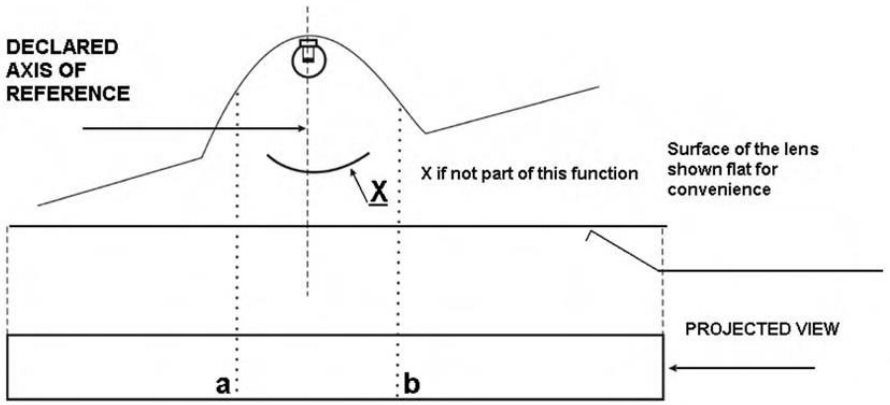
Example B:



	Illuminating Surface	Declared Light-emitting Surface According to 2.10.2. (a)
Edges are	a and b	c and d

Example C:

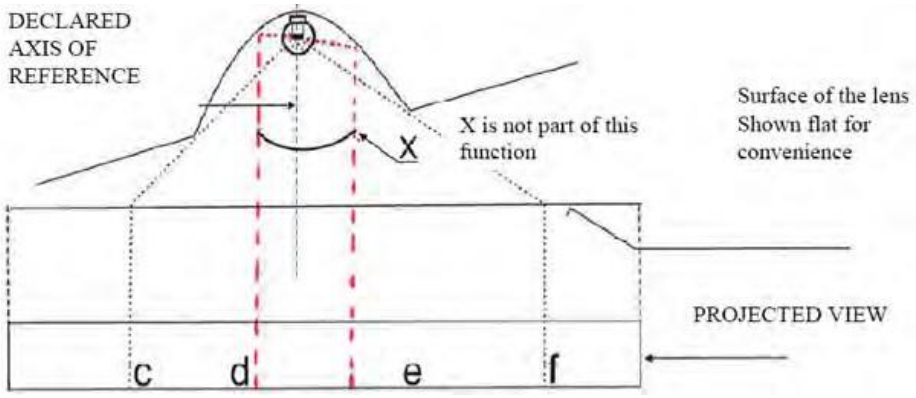
Example to determine the illuminating surface in combination with an area which is not part of the function:



	Illuminating Surface
Edges are	a and b

Example D:

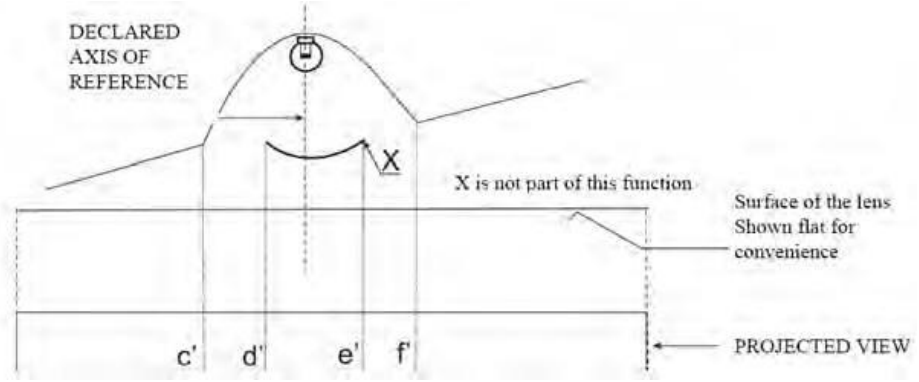
Example to determine a light emitting surface according to 2.10.2. (a) in combination with an area which is not part of the function:



	Declared Light-emitting Surface According to 2.10.2. (a)
Edges are	c-d and e-f

Example E

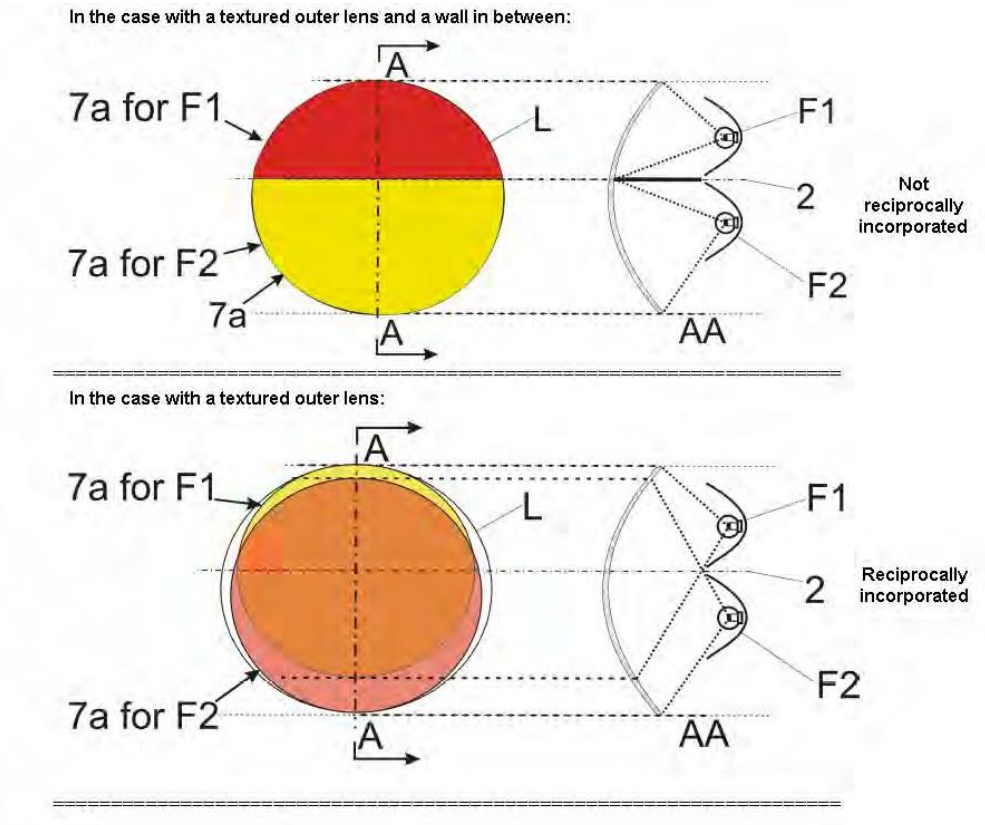
Example to determine the apparent surface in combination with an area which is not part of the function and a non-textured outer lens (according to 2.10.2. (b)):

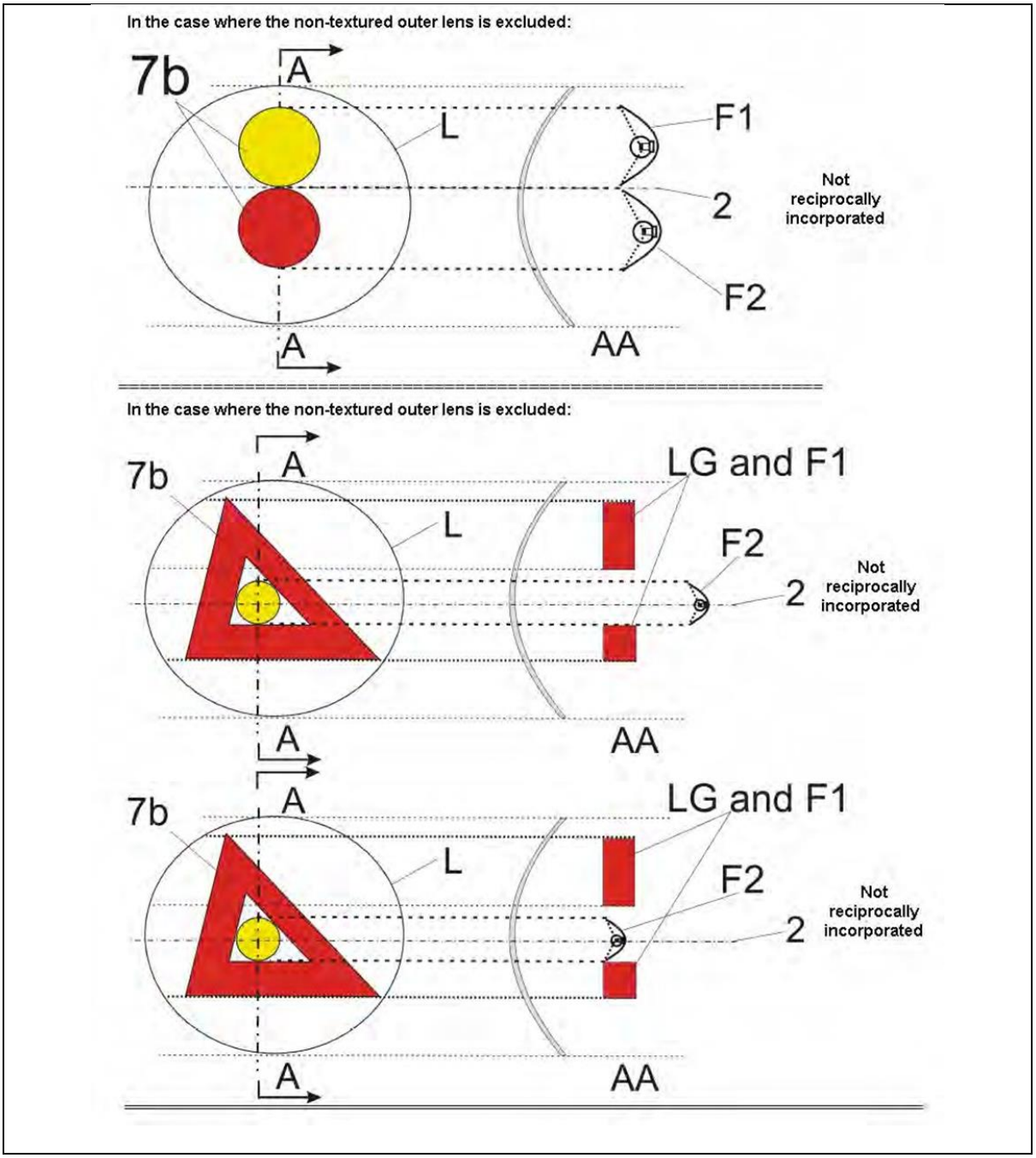


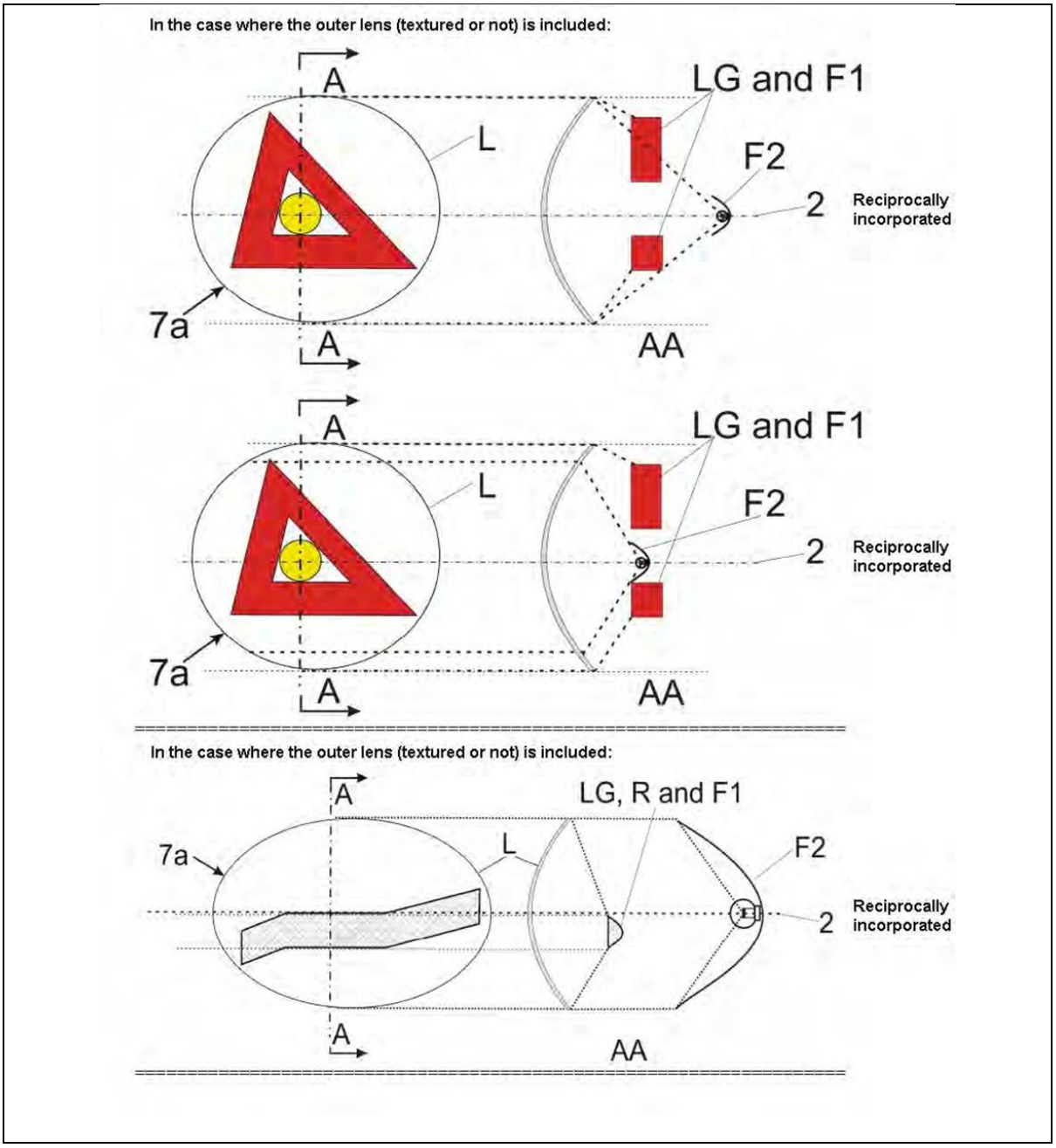
	Declared Light Emitting Surface According to 2.10.2. (b) for Example
Edges are	c'-d' and e'-f'

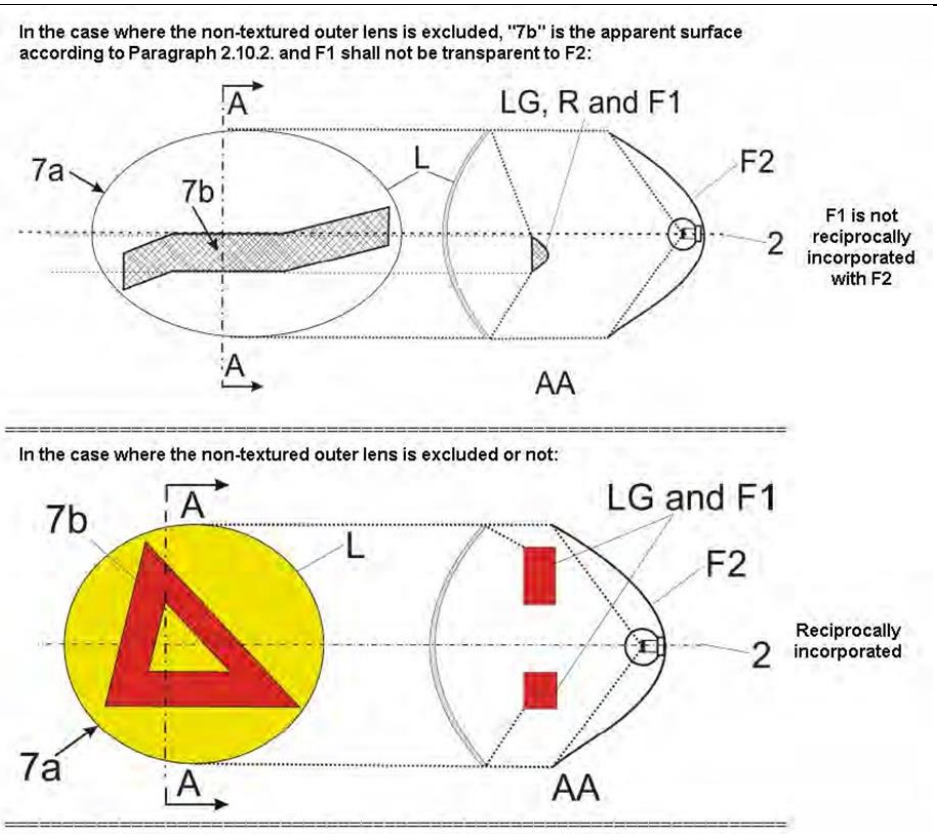
PART 7

EXAMPLES TO ENABLE A DECISION REGARDING THE RECIPROCAL INCORPORATION OF TWO FUNCTIONS




In the case where the non-textured outer lens is excluded:
7b
A
L
F1
2
F2
A
AA
Not reciprocally incorporated
In the case where the non-textured outer lens is excluded:
7b
A
L
LG and F1
F2
2
A
AA
Not reciprocally incorporated
7b
A
L
LG and F1
F2
2
A
AA
Not reciprocally incorporated


In the case where the outer lens (textured or not) is included:
A
LG and F1
L
F2
2
Reciprocally incorporated
7a
A
AA
A
LG and F1
L
F2
2
Reciprocally incorporated
7a
A
AA
In the case where the outer lens (textured or not) is included:
A
LG, R and F1
7a
L
F2
2
Reciprocally incorporated
A
AA


In the case where the non-textured outer lens is excluded, "7b" is the apparent surface according to Paragraph 2.10.2. and F1 shall not be transparent to F2:
A
LG, R and F1
7a
7b
L
F2
2
F1 is not reciprocally incorporated with F2
A
AA
In the case where the non-textured outer lens is excluded or not:
7b
A
L
LG and F1
F2
2
Reciprocally incorporated
7a
A
AA

ANNEX B

VISIBILITY OF A RED LAMP TO THE FRONT AND VISIBILITY OF A WHITE LAMP TO THE REAR

(See Clauses **5.10.1. and 5.10.2. of this Standard)**

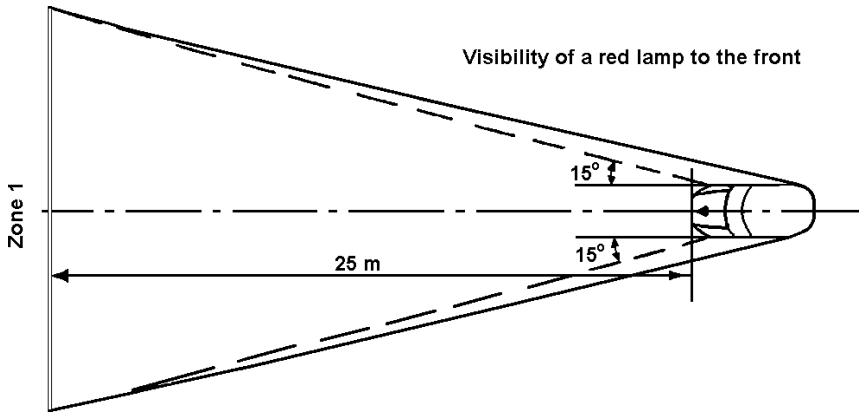


Figure 1

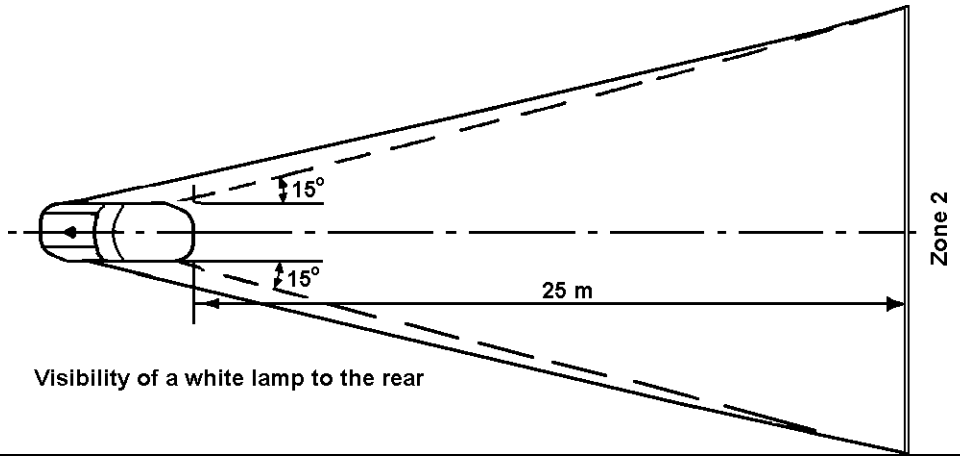


Figure 2

ANNEX C	
STATES OF LOADING TO BE TAKEN INTO CONSIDERATION IN DETERMINING VARIATIONS IN THE VERTICAL ORIENTATION OF THE DIPPED-BEAM HEADLAMPS	
Loading conditions on axles referred to in Clause 6.2.6.1. and 6.2.6.3.1.	
1.	For the following tests, the mass of the passengers shall be calculated on the basis of 75kg per person.
2.	**LOADING CONDITIONS FOR DIFFERENT TYPES OF VEHICLES:**
2.1.	**Vehicles in Category M1:**
2.1.1.	The angle of the light beam of the dipped-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 boot, in order to obtain the permissible load on the rear axle or on the front axle if the boot is at the front. If the vehicle has a front and a rear boot, the additional load shall 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 boot(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 boot, 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 boot(s) shall be limited to the figure which enables that mass to be reached.
2.1.2.	In determining the above loading conditions, account shall be taken of any loading restrictions laid down by the manufacturer.
2.2.	**Vehicles in Categories M2 and M3;**
	The angle of the light beam from the dipped-beam headlamps shall 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 dipped-beam headlamps shall 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% 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 D

MEASUREMENT OF THE VARIATION OF DIPPED-BEAM INCLINATION AS A FUNCTION OF LOAD

1. SCOPE

This Annex specifies a method for measuring variations in motor vehicle dipped-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 dipped-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 dipped-beam inclination or vehicle inclination measured with the vehicle in condition No. 1, as defined in Annex C, 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. Dipped-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% is equal to 10mrad).

If the inclination is expressed in percentage inclination, it can be calculated by means of the following formula:

$$\frac{(h_1 - h_2)}{L} \times 100$$

Where:

h1 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.

h2 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 h1):

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.

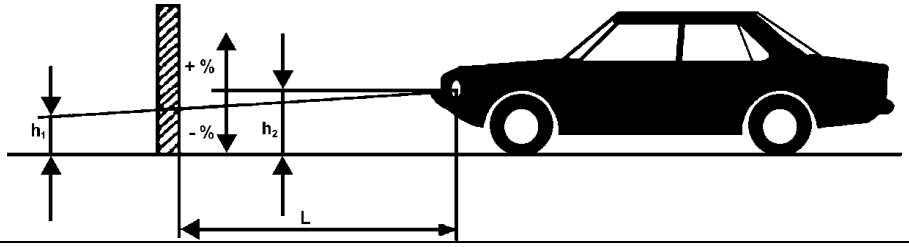


Figure 1

Dipped-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 dipped-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 dipped-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 10m.

3.2. The ground on which measurements are made shall be as flat and horizontal as possible, so that the reproducibility of measurements of dipped-beam inclination can be assured with an accuracy of ±0.5mrad (±0.05% 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 dipped-beam inclination can be assured with an accuracy of ±0.5mrad (± 0.05% 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 1,000km and 10,000km, preferably 5,000km.

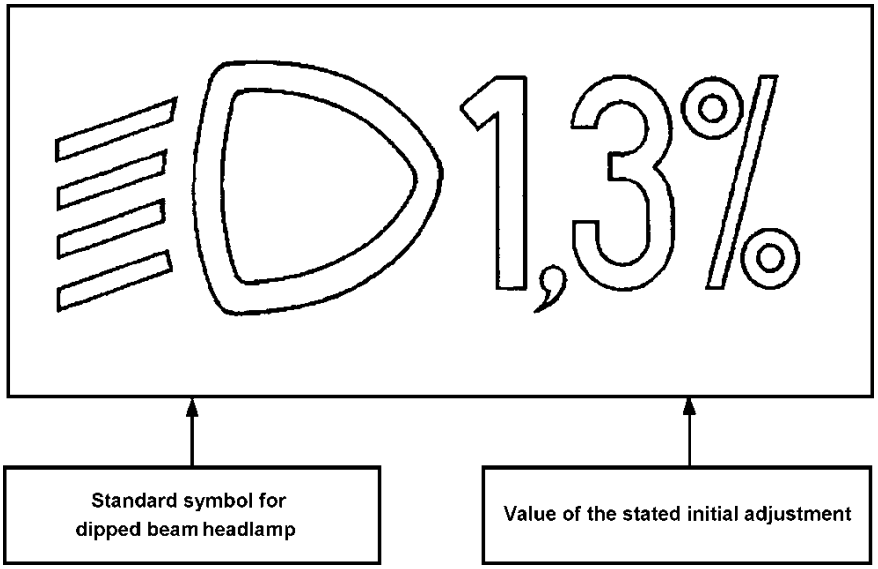
4.2.	Tyres shall be inflated to the full-load pressure specified by the vehicle manufacturer. The vehicle shall be fully replenished (fuel, water, oil) and equipped with all the accessories and tools specified by the manufacturer. Full fuel replenishment means that the fuel tank shall be filled to not less than 90% 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 8h at the temperature specified in Clause 3.4. above.
4.5.	If a photometric or visual method is used, headlamps with a well-defined dipped-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 dipped-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 C, shall be within the limits set out in Clause 5.5. below. The load shall be applied gradually without subjecting the vehicle to excessive shocks.
5.1.1.	Where an AFS is fitted, the measurements shall be carried out with the AFS in its neutral state.
5.2.	**Determination of the Measured Initial Inclination**
	The vehicle shall be prepared as specified in Clause 4 above and laden as specified in Annex C (first loading condition of the respective vehicle category). Before each measurement, the vehicle shall be rocked as specified in Clause 5.4. below. Measurements shall be made three times.
5.2.1.	If none of the three measured results differ by more than 2mrad (0.2% 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 2mrad (0.2% 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 ±0.2mrad (±0.02% inclination).
5.4.	**Treatment of Vehicle in each Loading Condition**

	The vehicle suspension and any other part likely to affect dipped-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 shall 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 Category M1 vehicles described in Clause 5.4.1. is not possible, the method described in Clauses 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 dipped-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 dipped-beam shall be assessed for each of the different loading conditions in relation to the measured initial inclination determined in accordance with Clause 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 C).
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 4mrad (0.4% inclination).
5.5.2.	If the result(s) of any measurement(s) does (do) not lie within the safety margin indicated in Clause 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 Clause 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 2mrad (0.2% 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 2mrad (0.2% 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 Clauses 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 Clause 5.2. and the inclination measured under each loading condition is less than the values calculated in Clause 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.

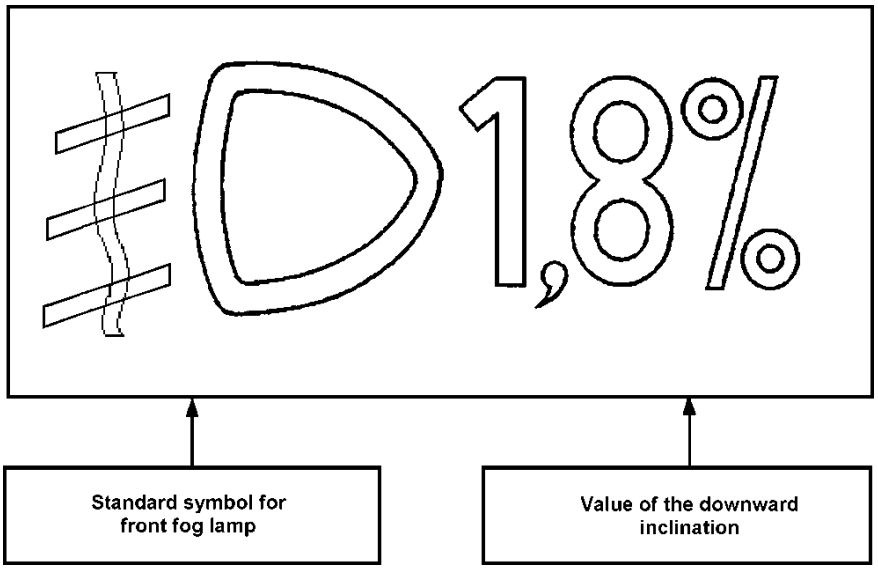
ANNEX E

INDICATION OF THE DOWNWARD INCLINATION OF THE DIPPED-BEAM HEADLAMPS CUT-OFF REFERRED TO IN CLAUSE 6.2.6.1.1. AND DOWNWARD INCLINATION OF THE FRONT FOG LAMP CUT-OFF REFERRED TO IN CLAUSE 6.3.6.1.2. OF THIS STANDARD



Example 1

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



Example 2

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

ANNEX F

THE CONTROLS FOR THE HEADLAMP-LEVELLING DEVICES REFERRED TO IN CLAUSE 6.2.6.2.2. OF THIS STANDARD

1. SPECIFICATIONS

1.1. Downward inclination of the dipped-beam shall 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 counter clockwise 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 shall be installed to the left or below the button(s) for other dipped-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 shall carry symbols indicating clearly the movements corresponding to the downward and upward inclination of the dipped-beam.

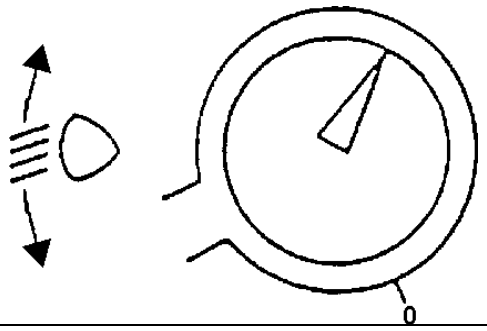
1.2. The "0" position corresponds to the initial inclination according to Clause 6.2.6.1.1. of this Standard.

1.3. The "0" position which, according to Clause 6.2.6.2.2. of this Standard has to be a "stop position", need not necessarily be at the end of the scale.

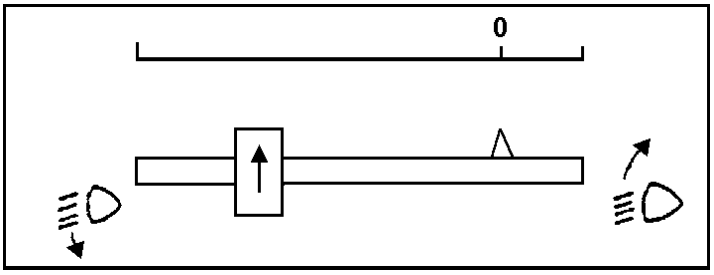
1.4. The marks used on control shall be explained in the owner's handbook.

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

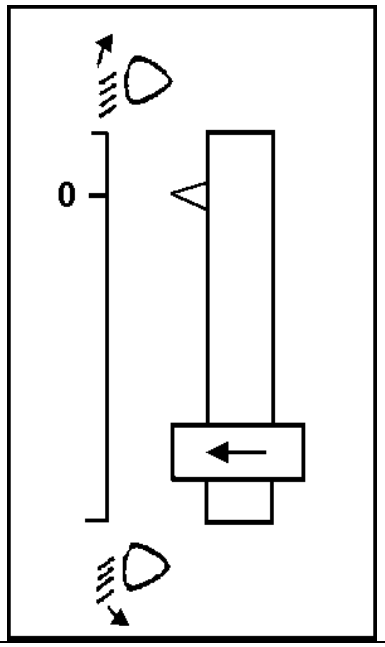
Symbols employing five lines instead of four may also be used



Example 1:



Example 2:



Example 3:

ANNEX G

Reserved

~~**CONTROL OF CONFORMITY OF PRODUCTION**~~

~~**1. TESTS**~~

~~**1.1. Position of Lamps**~~

~~The position of lamps, as defined in Clause 2.1.6. of this Standard, in width, in height and in length shall be checked in accordance with the general requirements set out in Clauses 2.10.2., 2.10.3., 2.10.4., 2.3.3. and 5.4. of this Standard.~~

~~The values measured for the distances shall be such that the individual specifications applicable to each lamp are fulfilled.~~

~~**1.2. Visibility of Lamps**~~

~~*1.2.1.* The angles of geometric visibility shall be checked in accordance with Clause 2.10.7. of this Standard.~~

~~The values measured for the angles shall be such that the individual specifications applicable to each lamp are fulfilled except that the limits of the angles may have an allowance corresponding to the ±3° variation permitted in Clause 5.3. for the mounting of the light-signalling devices.~~

~~*1.2.2.* The visibility of red light towards the front and of white light towards the rear shall be checked in accordance with Clause 5.10. of this Standard.~~

~~**1.3. Alignment of Dipped-beam Headlamps and Class "F3" Front Fog Lamps Towards the Front**~~

~~*1.3.1.* Initial Downward Inclination~~

~~The initial downward inclination of the cut-off of the dipped beam and the Class "F3" front fog lamps shall be set to the plated figure as required and shown in Annex E.~~

~~Alternatively the manufacturer shall set the initial aim to a figure that is different from the plated figure where it can be shown to be representative of the type approved when tested in accordance with the procedures contained in Annex D and in particular Clause 4.1.~~

~~1.3.2. Variation of Inclination with Load~~
~~The variation of the dipped beam downward inclination as a function of the loading conditions specified within this section shall remain within the range:~~
~~0.2% to 2.8% for headlamp mounting height h <0.8;~~
~~0.2% to 2.8% for headlamp mounting height 0.8 ≤ h ≤ 1.0; or~~
~~0.7% to 3.3% (according to the aiming range chosen by the manufacturer at the approval);~~ ~~0.7% to 3.3% for headlamp mounting height 1.0 < h ≤ 1.2m;~~
~~1.2% to 3.8% for headlamp mounting height h > 1.2m.~~
~~In the case of a Class "F3" front fog lamp with (a) light source(s) having a total objective luminous flux which exceeds 2,000lm, the variation of the downward inclination as a function of the loading conditions specified within this Section shall remain within the range:~~
~~0.7% to 3.3% for front fog lamp mounting height h ≤ 0.8;~~ ~~1.2% to 3.8% for front fog lamp mounting height h > 0.8m.~~
~~The states of loading to be used shall be as follows, as indicated in Annex C of this Standard, for every system adjusted accordingly.~~
~~1.3.2.1. Vehicles in Category M1:~~
~~Clause 2.1.1.1.~~
~~Clause 2.1.1.6. taking into account~~
~~Clause 2.1.2.~~
~~1.3.2.2. Vehicles in Category M2 and M3:~~
~~Clause 2.2.1.~~
~~Clause 2.2.2.~~
~~1.3.2.3. Vehicles in Category N with Load Surfaces:~~
~~Clause 2.3.1.1.~~
~~Clause 2.3.1.2.~~
~~1.3.2.4. Vehicles in Category N without Load Surfaces:~~
~~1.3.2.4.1.Drawing Vehicles for Semi-trailers:~~

Clause 2.4.1.1.
Clause 2.4.1.2.
1.3.2.4.2.Drawing Vehicles for Trailers:
Clause 2.4.2.1.
Clause 2.4.2.2.
1.4. Electrical Connections and Tell-tales
The electrical connections shall be checked by switching on every lamp supplied by the electrical system of the vehicle.
The lamps and tell-tales shall function in accordance with the provisions set out in Clauses 5.11. to 5.14. of this Standard and with the individual specifications applicable to each lamp.
1.5. Light Intensities
1.5.1. Main-beam Headlamps
The aggregation maximum intensity of the main-beam headlamps shall be checked by the procedure described in Clause 6.1.9.2. of this Standard. The value obtained shall be such that the requirements in Clause 6.1.9.1. of this Standard is fulfilled.
1.6. The presence, number, colour, arrangement and, where applicable, the category of lamps shall be checked by visual inspection of the lamps and their markings.
These shall be such that the requirements set out in Clauses 5.15. and 5.16. as well as in the individual specifications applicable to each lamp are fulfilled.

ANNEX H

RESERVED

ANNEX I

VISIBILITY OF CONSPICUITY MARKINGS TO THE REAR, FRONT AND SIDE OF A VEHICLE

(See Clause 6.21.5. of this Standard)

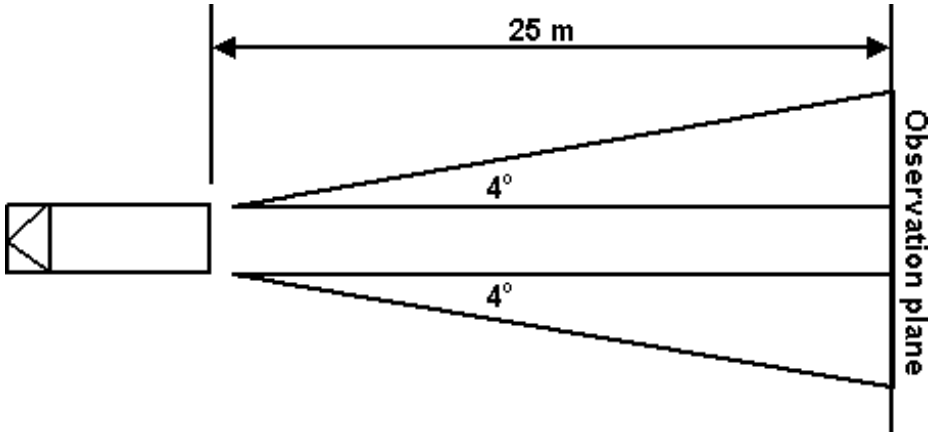


Figure 1a Rear

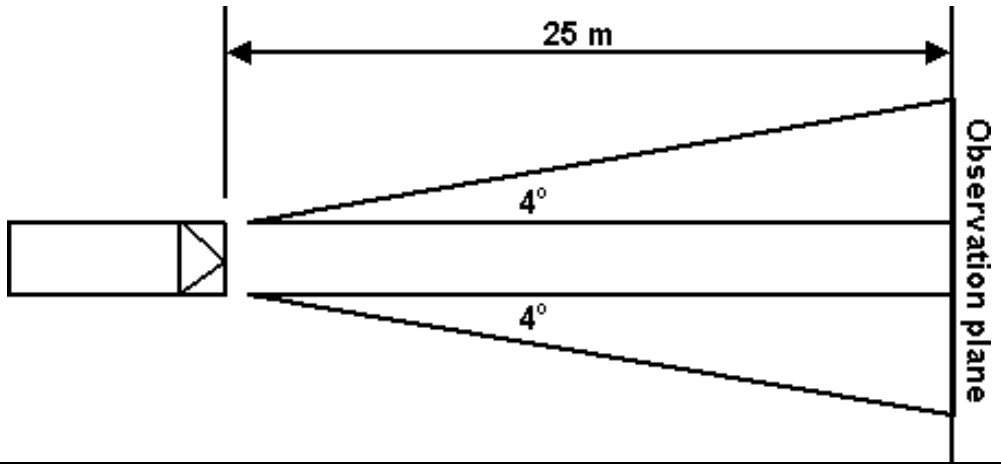


Figure 1b Front (Trailers Only)

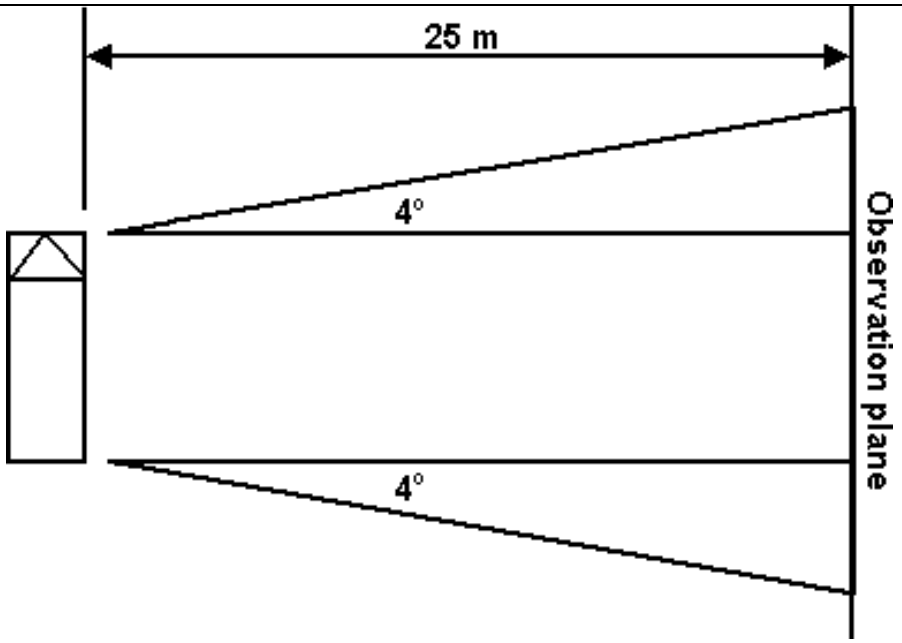


Figure 2 Side

ANNEX J

TEST DRIVE

1. TEST DRIVE SPECIFICATIONS FOR THE AUTOMATIC CONTROL OF THE MAIN-BEAM HEADLAMPS

1.1. The test drive shall be carried out in clear atmosphere[(1)] and with clean headlamps.

[(1)] *Good visibility (meteorological optical range MOR >2,000m defined according to WMO, Guide to Meteorological Instruments and Methods of Observation, Sixth Edition, ISBN: 92-63-16008-2, pp 1. 9. 1/1. 9. 11, Geneva 1996).*

1.2. The test course shall comprise test sections with traffic conditions, at speed corresponding to the relevant type of road, as described in Table 1 below:

Table 1

Test Section	Traffic conditions	Road type		
		Urban areas	Multi lane road, e.g. motorway	Country road
	Speed	50 ± 10km/h	100 ± 20km/h	80 ± 20km/h
	Average percentage of the full test course length	10%	20%	70%
A	Single oncoming vehicle or single preceding vehicle in a frequency so that the main beam will switch ON and OFF.		X	X
B	Combined oncoming and preceding traffic situations, in a frequency so that the main beam will switch ON and OFF.		X	X
C	Active and passive overtaking manoeuvres, in a frequency so that the main beam will switch ON and OFF.		X	X
D	Oncoming bicycle, as described in Clause 6.1.9.3.1.2.			X
E	Combined ~~situations~~ oncoming and preceding traffic	X		

	situations			

1.3. Urban areas shall comprise roads with and without illumination.

1.4. Country roads shall comprise sections having two lanes and sections having four or more lanes and shall include junctions, hills and/or slopes, dips and winding roads.

1.5. Multi-lane roads (e.g. motorways) and country roads shall comprise sections having straight level parts with a length of more than 600m. Additionally they shall comprise sections having curves to the left and to the right.

1.6. Dense traffic situations shall be taken into account.

2. TEST DRIVE SPECIFICATIONS FOR ADAPTIVE MAIN-BEAM HEADLAMPS

2.1. The test drive shall be carried out in clear atmosphere[(2)] and with clean headlamps.

[(2)] *Good visibility (meteorological optical range MOR >2,000m defined according to WMO, Guide to Meteorological Instruments and Methods of Observation, Sixth Edition, ISBN: 92-63-16008-2, pp 1. 9. 1/1. 9. 11, Geneva 1996).*

2.2. The test course shall comprise test sections with traffic conditions, at speed corresponding to the relevant type of road, as described in Table 2 below:

Table 2

Test Section	Traffic conditions	Road type		
		Urban areas	Multi lane road, e.g. motorway	Country road
	Speed	50 ± 10 km/h	100 ± 20 km/h	80 ± 20 km/h
	Average percentage of the full test course length	10%	20%	70%
A	Single oncoming vehicle or single preceding vehicle in a frequency so that the adaptive main beam will react to demonstrate the adaptation process.		X	X
B	Combined oncoming and preceding traffic situations, in a frequency so that the adaptive main beam will react to		X	X

	demonstrate the adaptation process.			
C	Active and passive overtaking manoeuvres, in a frequency so that the adaptive main beam will react to demonstrate the adaptation process.		X	X
D	Oncoming bicycle, as described in Clause 6.22.9.3.1.2.			X
E	Combined oncoming and preceding traffic situations	X		

2.3. Urban areas shall comprise roads with and without illumination.

2.4. Country roads shall comprise sections having two lanes and sections having four or more lanes and shall include junctions, hills and/or slopes, dips and winding roads.

2.5. Multi lane roads (e.g. motorways) and country roads shall comprise sections having straight level parts with a length of more than 600m. Additionally they shall comprise of sections having curves to the left and to the right.

2.6. Dense traffic situations shall be taken into account

2.7. For the test Sections A and B in the table above the engineers conducting the tests shall evaluate and record the acceptability of the performance of the adaptation process in relation to oncoming and preceding road users. This means that the test engineers shall be seated in the vehicle being tested and additionally be seated in the oncoming and preceding vehicles.

ANNEX K

AUTOMATIC SWITCHING CONDITIONS DIPPED-BEAM HEADLAMPS

Automatic Switching Conditions Dipped-beam Headlamps[1]		
Ambient light outside the vehicle[2]	Dipped-beam headlamps	Response time
less than 1,000lx	ON	no more than 2s
between 1,000lx and 7,000lx	at manufacturer's discretion	at manufacturer's discretion
more than 7,000lx	OFF	more than 5s, but no more than 300s

[1] *Compliance with these conditions shall be demonstrated by the applicant, by simulation or other means of verification accepted by the Test agency responsible for type approval.*

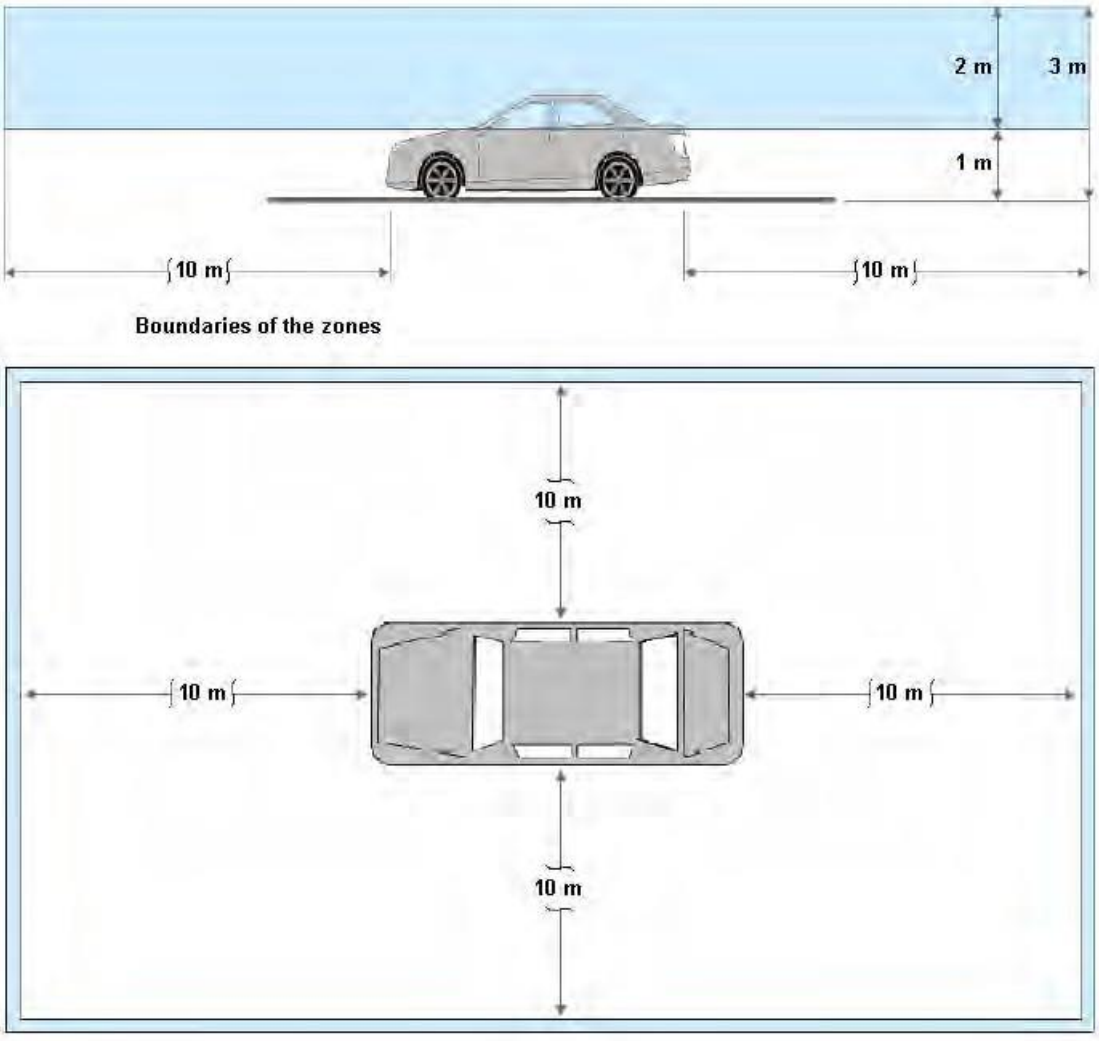
[2] *The illuminance shall be measured on a horizontal surface, with a cosine corrected sensor on the same height as the mounting position of the sensor on the vehicle. This may be demonstrated by the manufacturer by sufficient documentation or by other means accepted by the Test agency responsible for type approval.*

ANNEX L

OBSERVING AREA TOWARDS THE APPARENT SURFACE OF MANOEUVRING AND COURTESY LAMPS

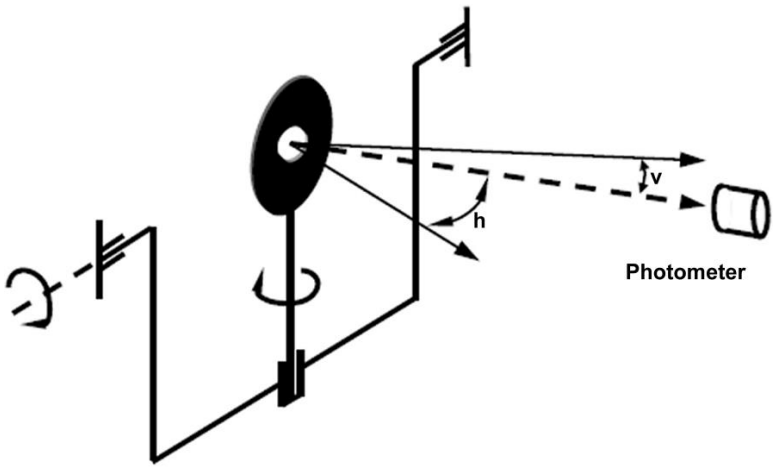
Zones of observation

This drawing shows the zone from one side, the other zones are from the front, the rear and from the other side of the vehicle



ANNEX M

GONIO(PHOTO)METER SYSTEM USED FOR THE PHOTOMETRIC MEASUREMENTS AS DEFINED IN CLAUSE 2.10.9. OF THIS STANDARD



ANNEX N

Guidelines for installation of rear marking plates on heavy and long vehicles

1.0 It is recommended to apply on vehicles specified in clause 2 of this Annex "Rear marking plates for heavy and long vehicles" conforming to ~~AIS-089~~ AIS 200 standard and the specific requirements relating to its scope in accordance with the guidelines given in this Annex.

2.0 SCOPE

The main purpose of these guidelines is to establish requirements for Installation, arrangement, position and geometric visibility of rear marking plates on heavy and long vehicles. It increases the visibility and permits an easy identification of these vehicles.

2.1. **Heavy Motor Vehicles**

The installation of rear marking plates for heavy motor vehicles according to the provisions of this Annex is required for vehicles of Category N2, with a maximum mass exceeding 7.5 tonnes and N3, with the exception of tractors for semi-trailers and for articulated buses.

2.2. **Long Vehicles**

The installation of rear marking plates for long vehicles, according to the provisions of this Annex, is required for the following vehicles:

Categories T1, T2, T3 − trailers/semi-trailers exceeding 8 m in length (including the drawbar).

All vehicles of Category T4.

3.0 NUMBER

3.1 One, two, or four.

3.2 Where rear marking plates conforming to ~~AIS-089~~ AIS 200 are installed these may be considered, at the discretion of the manufacturer, as part of the conspicuity marking to the rear as referred in [clause 7.4 of Annex 7 of AIS-090], for the purposes of calculating the length of the conspicuity marking and its proximity to the side of the vehicle.

3.3. Where rear conspicuity markings conforming to ~~AIS-090~~ AIS 200 is installed, the vehicle, except for trailers and semi-trailers of length exceeding 8m and vehicles conforming to [clause 1.2.3 of Annex 7 of AIS-090], shall be deemed to have complied with the requirements of rear marking plates as per ~~AIS-089~~ AIS 200.

4.0 ARRANGEMENT

Every rear marking shall be fitted such that the lower edge is horizontal.

Every part of a rear marking shall lie within 5° of a transverse vertical Plane at right angles to the longitudinal axis of the vehicle and shall face to the rear. The set of marking plates shall be arranged symmetrically with respect to the median longitudinal plane of the vehicle.

The rear marking plates shall be type approved and meet the requirements of this standard with the following classification.

(a) For heavy vehicles:

Class 1	alternate, oblique stripes of red fluorescent and yellow retro-reflective materials;
Class 3	alternate, oblique stripes of red retro-reflective and yellow retro-reflective materials.

(b) For long vehicles:

Class 2	yellow retro-reflective centre with a red fluorescent border;
Class 4	yellow retro-reflective centre with a red retro-reflective border.

5.0. POSITION

In width: No individual specifications.

In height: Above the ground, not less than 250 mm (lower edge),

nor more than 2,100 mm (upper edge).

6.0 GEOMETRIC VISIBILITY

Horizontal angle : 30° inwards and outwards

Vertical angle : 15° above and below the horizontal

Orientation: rearwards.