

AMENDMENT 1
To
AIS-009 (Rev. 1) : 2011
Automotive Vehicles –Installation Requirements of Lighting and
Light-Signalling Devices for L Category Vehicles,
their Trailers and Semi-Trailers

1. Page 20/47, clause 6.3.9

Substitute following text for the existing text:

6.3.9 "Circuit-closed" tell-tale

Mandatory. Shall be optical. It shall be (a) flashing green lamp(s), which, in the event of defective operation of any of the direction-indicators, is extinguished; remains alight without flashing, or show a marked change of frequency. An additional auditory circuit closed tell-tale may also be fitted.

2. Page 22/47, clause 6.4.7

Substitute following text for the existing text:

6.4.7 "Circuit-closed" tell-tale:

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

PRINTED BY
THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P.B. NO. 832, PUNE 412 004

ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES - TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

September 2012

AUTOMOTIVE INDUSTRY STANDARD

**Automotive Vehicles -
Installation Requirements of
Lighting and Light-signalling Devices
for L Category Vehicles, their
Trailers and Semi-Trailers**

(Revision 1)

PRINTED BY
THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P.B. NO. 832, PUNE 411 004

ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

May 2011

INTRODUCTION

- 0.0 The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MOST) has constituted a permanent Automotive Industry Standards Committee (AISC) vide order No.RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the Secretariat of the AIS Committee, has published this standard. For better dissemination of this information ARAI may publish this document on their web site.
- 0.1 Accordingly AIS-009 covering mandatory requirements regarding Installation of Lighting and Light-signalling devices for 2 and 3 Wheelers, their Trailers and Semi-Trailers has been published in 2001 and has been implemented thereafter in 2004.
- 0.2 With technological developments in lighting and light-signalling devices, AIS-009 was taken up for revision and covers requirements regarding Installation of Lighting and Light-signalling Devices for L-category vehicles, their Trailers and Semi-Trailers
- 0.3 This part is based on the following ECE Regulations and EEC directives:

ECE R 53 - Supplement 10 to the 01 series of amendment of R53- Date of entry into force 24 October 2009	Uniform provisions concerning the approval of category L3 vehicles with regard to the installation of lighting and light-signalling devices
ECE R 74 – Supplement 6 to the 01 series of amendments Date of Entry into Force: 22 July 2009	Uniform provisions concerning the approval of: Category L1 vehicles with regard to the installation of lighting and light-signalling devices
EEC Directive 93/92/EEC as amended by 2000/73/EC	Installation of lighting and light-signalling devices on two or three-wheel motor vehicles

- 0.4 While preparing this standard attempts have been made to align with the above ECE regulations and EEC directive. However, certain changes were necessary in the Indian context.

- 0.5 The following standards contain provisions, which through reference in this text constitute provisions of the standard.

AIS-053	Automotive Vehicles – Types – Terminology
AIS-008 (Rev.1): 2010	Installation Requirements of Lighting and Light-signalling Devices for Motor Vehicle having more than Three Wheels, Trailer and Semi-Trailer excluding Agricultural Tractor and Special Purpose Vehicle
AIS-010 (Part 3) (Rev.1) :2010	Provisions concerning the Approval of Front position lamps, rear position lamps, stop lamps, direction indicators, rear-registration-plate illuminating devices and Reversing Lamp for vehicles of category L and their Trailers and Semi-trailers.
AIS-010 (Part 5) (Rev. 1) :2010	Requirements of Chromaticity coordinates of colour of light emitted from Lighting and Light-signalling Devices
AIS-012 (Part 5) (Rev. 1)	Approval of Direction Indicators for Power-Driven Vehicles and their trailers
AIS-034 (Part 2) (Rev. 1) :2010	Provisions Concerning the Approval of Gas discharge Light Sources for use in approved Gas discharge lamp units of power driven vehicles
AIS-076	Approval of Vehicle Alarm Systems (VAS) for M1 and N1 Category of Vehicles and of these Vehicles with regard to their Alarm Systems (AS)
IS 11432 : 2002	Terms and definitions of dimensions of two wheeled motor vehicles.
IS 9435: 1980	Terms and Definitions Relating to Dimensions of Road Vehicles Other than 2 and 3 Wheelers

- 0.6 The AISC panel and Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annex E and Annex F respectively.

**Automotive Vehicles -Installation Requirements of Lighting
and Light-signalling Devices for L Category Vehicles
their Trailers and Semi-Trailers**

Para. No.	Contents	Page No.
1.	Scope	1/47
2.	Definitions	1/47
3.	Application for approval	6/47
4.	Approval	7/47
5.	General specifications	7/47
6.	Individual specifications	13/47
7.	Extension of Approval	35/47
8.	Reserved	36/47
9.	Reserved	36/47
10.	Reserved	36/47
11.	Transitional provisions	36/47
12.	Reserved	37/47
13.	Amendments to ECE regulations after the level described in 0.3 of introduction	37/47
List of Annexes		
Annex A	Technical specification of vehicle to be submitted at the time of type approval.	38/47
Annex B	Reserved	39/47
Annex C	Lamp surfaces, axis and centre of reference, and angles of geometric visibility.	40/47
Annex D	Forward visibility of red lights and rearward visibility of white lights	42/47

Automotive Vehicles - Installation Requirements of Lighting and Light-signalling devices for L Category Vehicles their Trailers and Semi-Trailers

1. SCOPE

This standard applies to vehicles of category L vehicles, as defined in AIS-053 and their trailers and Semi-trailers with regard to the installation of lighting and light-signalling devices.

For the purpose of this standard, the limiting speed of L1 category is 50km/h, instead of 45km/h described in AIS-053.

2. DEFINITIONS

For the purpose of this standard:

- 2.1. "**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;
- 2.2. "**Vehicle type**" means a category of vehicles which do not differ from each other in such essential respects as:
 - 2.2.1. the dimensions and external shape of the vehicle;
 - 2.2.2. the number and position of the devices;
 - 2.2.3. the following shall likewise not be deemed to be "vehicles of a different type":
 - 2.2.3.1. vehicles which differ within the meaning of 2.2.1. and 2.2.2. above but not in such a way as to entail a change in the kind, number, position and geometric visibility of the lamps prescribed for the vehicle type in question; and
 - 2.2.3.2. vehicles on which lamps approved under one of the standards for lighting and light-signalling devices, are fitted, or are absent where their fitting is optional;
- 2.3. "**Transverse plane**" means a vertical plane perpendicular to the median longitudinal plane of the vehicle;
- 2.4. "**Unladen (kerb) mass**" (kg) means the mass of the vehicle in running order, unoccupied and, the mass of fuel, in the case of liquid fuels, corresponding to 90 per cent of the capacity of the fuel tank specified by the manufacturer, and in the case of gaseous fuels such as CNG, LPG etc. the legally permitted maximum, and the masses of coolant, lubricant, tools and spare wheel, if any.

- 2.5. "Lamp" means a device designed to illuminate the road or to emit a light signal to other road users. Rear registration plate lamp and retro-reflectors are likewise to be regarded as lamps;
- 2.5.1. "Equivalent lamps" means lamps having the same function; such lamps may have different characteristics from those of the lamps with which the vehicle is equipped at the time of approval, on condition that they satisfy the requirements of this standard;
- 2.5.2. "Independent lamps" means devices having separate illuminating surfaces, separate light sources and separate lamp bodies;
- 2.5.3. "Grouped lamps" means devices having separate illuminating surfaces and separate light sources, but a common lamp body;
- 2.5.4. "Combined lamps" means devices having separate illuminating surfaces, but a common light source and a common lamp body;
- 2.5.5. "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 illuminating surfaces and a common lamp body;
- 2.5.6. "Driving beam (main-beam) headlamp" means the lamp used to illuminate the road over a long distance ahead of the vehicle;
- 2.5.7. "Passing beam (dipped-beam) headlamp" means the lamp used to illuminate the road ahead of the vehicle without dazzling or causing undue discomfort to oncoming drivers and other road users;
- 2.5.8. "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 provisions of AIS-076 (Vehicle Alarm System).
- 2.5.9. "Stop lamp" means the lamp used to indicate to other road-users to the rear of the vehicle that its driver is applying the service brake;
- 2.5.10. "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;
- 2.5.11. "Front position lamp" means the lamp used to indicate the presence of the vehicle when viewed from the front;
- 2.5.12. "Rear position lamp" means the lamp used to indicate the presence of the vehicle when viewed from the rear;

- 2.5.13. **"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 purpose of this standard, retro-reflecting number plates are not considered as retro-reflectors;

- 2.5.14. **"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;

- 2.5.15. **"Front fog lamp"** means the lamp used to improve the illumination of the road in case of fog, snowfall, rainstorms or dust clouds;

- 2.5.16. **"Rear fog lamp"** means the lamp used to make the vehicle more easily visible from the rear in dense fog;

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

- 2.6. **"Light-emitting surface"** of a "lighting device", "light-signalling device" or a retro-reflector means all or part of the exterior surface of the transparent material as declared in the request for approval by the manufacturer of the device on the drawing, see Annex C;

- 2.7. **Illuminating surface"** (see Annex C);

- 2.7.1. **"Illuminating surface of a lighting device"** (2.5.6., 2.5.7. and 2.5.15.) 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 2.7.2. shall be applied. If the light emitting surface of the lamp extends over part only of the full aperture of the reflector, then the projection of that part only is taken into account.

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

- 2.7.2. **"Illuminating surface of a light-signalling device other than a retro-reflector"** (2.5.8., 2.5.9., 2.5.11., 2.5.12., 2.5.14. and 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 per cent of the total luminous intensity of the light to persist in the direction of the axis of reference. To determine the lower, upper and lateral limits of the illuminating surface, only screens with horizontal or vertical edges shall be used;

- 2.7.3. **"Illuminating surface of a retro-reflector"** (Para. 2.5.13.) means the orthogonal projection of a retro-reflector in a plane perpendicular to its axis of reference and delimited by planes continuous to the outermost parts of the retro-reflector's optical system and parallel to that axis. For the purposes of determining the lower, upper and lateral edges of the device, only horizontal and vertical planes shall be considered;
- 2.8. 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 (a-b),
- or the light-emitting surface (c-d),
- in a plane perpendicular to the direction of observation and tangential to the most exterior point of the lens (see Annex C to this standard);
- 2.9. **"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 ($H = 0^\circ$, $V = 0^\circ$) for angles of field for photometric measurements and for installing the lamp on the vehicle;
- 2.10. **"Centre of reference"** means the intersection of the axis of reference with the exterior light-emitting surface; it is specified by the manufacturer of the lamp;
- 2.11. **"Angles of geometric visibility"** means the angles which determine the field of the minimum solid angle in which the apparent surface of the lamp shall be 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 β , correspond to the longitude and the vertical angles α to the latitude. 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. If measurements are taken closer to the lamp, the direction of observation shall be shifted parallel to achieve the same accuracy.

On the inside of the angles of geometric visibility no account is taken of obstacles, if they were already presented when the lamp was type-approved.

If, when the lamp is installed, any part of the apparent surface of the lamp is hidden by any further parts of the vehicle, proof shall be furnished that the part of the lamp not hidden by obstacles still conforms to the photometric values prescribed for the approval of the device as an optical unit (see Annex C of this standard). Nevertheless, when the vertical angle of geometric visibility below the horizontal may be reduced to 5° (lamp at less than 750 mm above the ground) the photometric field of measurements of the installed optical unit may be reduced to 5° below the horizontal;

- 2.12. **"Extreme outer edge"**, on either side of the vehicle means the plane parallel to the median longitudinal plane of the vehicle and touching the lateral extremity of the vehicle, disregarding the projection or projections:
- 2.12.1. of rear-view mirrors,
 - 2.12.2. of direction-indicator lamps,
 - 2.12.3. of front and rear position lamps and retro-reflectors;
- 2.13. **"Over-all width"** means the distance between the two vertical planes defined in 2.12. above;
- 2.14. **"A single lamp"** means:
- (a) a device or part of a device having one lighting or light-signalling function, one or more light source(s) and one apparent surface in the direction of the reference axis, which may be a continuous surface or composed of two or more distinct parts, or
 - (b) any assembly of two independent lamps, whether identical or not, having the same function, both approved as type "D" lamp and installed so that the projection of their apparent surfaces in the direction of the reference axis occupies not less than 60 per cent of the smallest quadrilateral circumscribing the projections of the said apparent surfaces in the direction of the reference axis.
- 2.15. **"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;
- 2.16. **"Operating tell-tale"** means a visual or auditory signal (or any equivalent signal) indicating that a device has been switched on and whether or not it is operating correctly;
- 2.17. **"Circuit-closed tell-tale"** means a visual (or any equivalent signal) indicating that a device has been switched on, but not indicating whether or not it is operating correctly;
- 2.18. **"Optional lamp"** means a lamp, the installation of which is left to the discretion of the manufacturer;
- 2.19. **"Ground"** means the surface on which the vehicle stands which should be substantially horizontal;
- 2.20. **"Device"** means a component or combination of components used in order to perform one or several functions.

- 2.21. **"Colour of the light emitted from the device"**. The definitions of the colour of the light emitted given in AIS-010 (Part 5)(Rev 1) in force at the time of application for type approval shall apply to this standard.
- 2.22. **"Gross vehicle mass"** or "maximum mass" means the technically permissible maximum laden mass as declared by the manufacturer.
- 2.23. **"Laden"** means so loaded as to attain the gross vehicle mass as defined in 2.22.
- 2.24. **"Type A of L5 category of vehicle"** means an L5 category vehicle whose maximum design speed is not more than 50 km/h and maximum net power does not exceed 4 kW in the case of internal combustion engines or maximum 30 minutes power in the case of an electric motor.
- 2.25. **"Type B of L5 category of vehicle"** means an L5 category vehicle which is not Type A.
- 2.26. **"Longitudinal median plane of vehicle"** as defined in IS 11432:1985 or IS 9435:1980 as applicable to the type of vehicle.
- 2.27. **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.

3. APPLICATION FOR APPROVAL

- 3.1. Information to be submitted at the time of applying for type approval shall be as given in Annex A.

Note: If the above information is submitted in a consolidated form, for the type approval of the whole vehicle, it is not necessary to submit this information again.

- 3.2. Reserved.
- 3.2.1. Reserved.
- 3.2.2. Reserved
- 3.2.3. Reserved
- 3.2.4. Reserved
- 3.2.5. Reserved.

- 3.3. An unladen vehicle fitted with a complete set of lighting and light-signalling equipment, as prescribed in Annex A, and representative of the vehicle type to be approved shall be submitted to the testing agency responsible for conducting approval tests.

4. APPROVAL

- 4.1. If the vehicle submitted for approval pursuant to this standard meets the requirements of the standard in respect of all the devices specified in the list, approval of that vehicle type shall be granted.
- 4.2. Reserved.
- 4.3. Reserved.
- 4.4. Reserved.
- 4.4.1. Reserved.
- 4.4.2. Reserved.
- 4.5. Reserved.
- 4.6. Reserved.
- 4.7. Reserved.
- 4.8. Reserved.

5 GENERAL SPECIFICATIONS

- 5.1. The lighting and light-signalling devices shall be so fitted that in normal conditions of use, and notwithstanding the 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.

Note: This is a general requirement and no verification is needed for this clause to approve the lighting and light-signalling devices for compliance to this standard.

- 5.2. The illuminating lamps shall be so installed that, correct adjustment of their orientation can easily be carried out.
- 5.3. For all light-signalling devices 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 parallel to that plane in the case of all light-signalling devices. A tolerance of $\pm 3^\circ$ shall be allowed in each direction. In addition, if specifications for fitting are provided by the manufacturer they 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, its median longitudinal plane being vertical and the handlebars being in the position corresponding to the straight ahead movement. The tyre pressures shall be those prescribed by the manufacturer for the particular conditions of loading required in this standard.

- 5.5. In the absence of specific instructions:
 - 5.5.1. single lamps or reflectors shall be mounted such that their centre of reference lies in the median longitudinal plane of the vehicle;
 - 5.5.2. lamps constituting a pair and having the same function shall:
 - 5.5.2.1. be mounted symmetrically in relation to the median longitudinal plane;
 - 5.5.2.2. be symmetrical to one another in relation to the median longitudinal plane;
 - 5.5.2.3. satisfy the same colorimetric requirements; and
 - 5.5.2.4. have same nominal photometric characteristics;
 - 5.5.2.5. come on and go off simultaneously;
- 5.6. Grouped, combined or reciprocally incorporated lamps
 - 5.6.1. 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.
 - 5.6.1.1. However, where stop lamps and direction indicator lamps are grouped, any horizontal or vertical straight line passing through the projections of the apparent surfaces of these functions on a plane perpendicular to the reference axis, shall not intersect more than two borderlines separating adjacent areas of different colour.
 - 5.6.2. Where the apparent surface of a single lamp is composed of two or more distinct parts, it shall satisfy the following requirements:
 - 5.6.2.1. Either the total area of the projection of the distinct parts on a plane tangent to the exterior surface of the transparent material and perpendicular to the reference axis shall occupy not less than 60 per cent of the smallest quadrilateral circumscribing the said projection, or the distance between two adjacent/tangential distinct parts shall not exceed 15 mm when measured perpendicularly to the reference axis.
- 5.7. The maximum height above 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. For passing beam headlamps, the minimum height from the ground shall be measured from the lowest point of the effective outlet of the optical system (e.g. reflector, lens, projection lens) independent of its utilisation.

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.

When referring to the distance between lamps, the position, as regards width, shall be determined from the inner edges of the apparent surface in the direction of the reference axis.

Where the position, as regards width, clearly meets the requirements of the standard, the exact edges of any surface need not be determined.

- 5.8. In the absence of specific instructions, no lamps other than direction-indicator lamps and the vehicle-hazard warning signal shall be flashing lamps.
- 5.9. No red light shall be visible towards the front and no white light shall be visible towards the rear. Compliance with this requirement shall be verified as shown hereunder (see drawing in Annex D):
 - 5.9.1. visibility of red light towards the front; a red lamp shall not be directly visible to an observer moving in zone 1 of a transverse plane situated 25 m forward of the foremost point on the vehicle;
 - 5.9.2. visibility of white light towards the rear: a white lamp shall not be directly visible to an observer moving in zone 2 of a transverse plane situated 25 m rearward of the rearmost point on the vehicle;
 - 5.9.3. in their respective planes, the zones 1 and 2 explored by the eye of the observer are bound:
 - 5.9.3.1. in height, by two horizontal planes 1 m and 2.2 m respectively above the ground;
 - 5.9.3.2. in width, by two vertical planes which, forming to the front and 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 and delimiting the vehicle's over-all width; if there are several points of contact, the foremost shall correspond to the forward plane and the rearmost to the rearward plane.
 - 5.9.4. Requirements of 5.9.2 and related clauses are not applicable in the case of following:
 - a. White light illuminating the rear registration mark
 - b. White light of reversing lamp, if fitted.
 - c. White light from interior lighting of the vehicle
- 5.10. The electrical connections shall be such that the front position lamp or the passing beam headlamp, if there is no front position lamp, the rear position lamp and the rear-registration-plate illuminating device cannot be switched on or off otherwise than simultaneously.

- 5.11. In the absence of specific instructions, the electrical connection shall be such that the driving beam headlamp, the passing beam headlamp and the fog lamp cannot be switched on unless the lamps referred to in 5.10. above are likewise switched on.

This requirement need not, however, be satisfied in the case of the driving beam headlamp and passing beam headlamp where their luminous warnings consist in switching on the passing beam headlamp intermittently, at short intervals, or in switching on the driving beam headlamp intermittently, or in switching on the passing beam headlamp and driving-beam headlamp alternately at short intervals.

- 5.11.1. The headlamp may optionally automatically be on when the engine is running. If installed, the daytime running lamp shall automatically be ON when the engine is running.

5.12. **Tell-tale lamps**

- 5.12.1. Every tell-tale lamp shall be readily visible to a driver in the normal driving position.

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

5.13. **Colours of the lights**

The colours of the lights referred to in this standard shall be as follows:

Note: Measurement of the chromaticity coordinates of the light emitted by the lamps is not part of this standard

Driving beam headlamp:	White
Passing beam headlamp:	White
Direction-indicator lamp:	Amber
Stop lamp:	Red
Rear-registration plate lamp:	White
Front position lamp:	White or amber
Rear position lamp:	Red
Rear retro-reflector, non-triangular:	Red
Side retro-reflector, non-triangular:	Amber at the front, Amber or red at the rear
Front retro-reflector, non-triangular:	White
Pedal retro-reflector, non-triangular:	Amber
Vehicle-hazard warning signal:	Amber
Front fog lamp :	White or selective yellow
Rear fog lamp :	Red
Daytime running lamp:	White
Reversing lamp:	White

- 5.14. Every vehicle submitted for approval pursuant to this standard shall be equipped with the following lighting and light-signalling devices:

L2 category	L1 category	L5 category - Type B	L5 category- Type A
Driving beam headlamp (6.1.)	Passing beam headlamp (6.2).	Driving beam headlamp (6.1) (See Note 1)	Passing beam headlamp (6.2). (See Note 1)
Passing beam headlamp (6.2.)	Rear position lamp (6.7).	Passing beam headlamp (6.2). (See Note 1)	Front position lamp (6.6.)
Direction-indicator lamps (6.3.)	Side retro reflectors, non-triangular (6.12.)	Direction-indicator lamps (6.3)	Rear position lamp (6.7.)
Stop lamp (6.4.)	Rear retro reflector, non-triangular (6.8).	Stop lamp (6.4).	Rear retro reflector, non-triangular (6.8).
Rear-registration-plate illuminating device (6.5.)	Pedal Retro-Reflector in the case of only L1 category of vehicles with pedals. (6.14) (See Note 2)	Rear-registration-plate illuminating device (6.5).	Stop lamp (6.4.)
Front position lamp (6.6.)	Stop lamp (6.4).	Front position lamp (6.6).	Direction-indicator lamps (6.3.)
Rear position lamp (6.7.)	Rear-registration-plate illuminating device (6.5).	Rear position lamp(6.7).	Rear-registration-plate illuminating device (6.5.)
Rear retro reflector, non-triangular (6.8.)		Rear retro reflector, non-triangular (6.8).	
Side retro reflectors, non-triangular (6.12.)		Vehicle-hazard warning signal (6.9)	
		Reversing lamp (6.16)	Reversing lamp (6.16)
Note 1	One headlamp is permitted only when overall width of vehicle is not exceeding 1400 mm and where the seat for driver is located centrally.		
Note 2	No component approval is anticipated for pedal reflector.		

5.15. It may, in addition, be equipped with the following lighting and light-signalling devices.

L2 category	L1 category	L5 category- Type B	L5 category - Type A
Vehicle-hazard warning signal (6.9.)	Driving beam headlamp (6.1)	Front Fog lamps. (6.10).	Driving beam headlamp (6.1) (See Note 1)
Front fog lamp (6.10.)	Front position lamp (6.6)	Rear Fog lamps (6.11).	Side retro reflectors, non-triangular (6.12.)
Rear fog lamp (6.11.)	Front retro reflectors, non-triangular (6.15)	Side retro reflectors, non-triangular (6.12).	Front Fog lamps. (6.10).
Daytime running lamp. (6.13)	Rear Fog lamps (6.11).	Stop lamp category S3 (High mount stop lamp) (6.17)	Rear Fog lamps (6.11).
Stop lamp category S3 (High mount stop lamp) (6.17)	Front Fog lamps. (6.10).		Vehicle-hazard warning signal (6.9)
	Direction-indicator lamps (6.3)		
	Stop lamp category S3 (High mount stop lamps) (6.17)		Stop lamp category S3 (High mount stop lamps) (6.17)
Note 1	If fitted, one headlamp is permitted only when overall width of vehicle is not exceeding 1400 mm and where the seat for driver is located centrally.		

5.16. The fitting of each of the lighting and light-signalling devices mentioned in 5.15. (when fitted) and 5.14. above shall be effected in conformity with the relevant requirements in 6 of this standard.

5.17. The fitting of any lighting and light-signalling devices other than those mentioned in 5.14. and 5.15. is prohibited for the purposes of type approval.

5.18. Lighting and light-signalling devices type-approved for four-wheeled vehicles of categories M1 and N1 and referred to in 5.14. and 5.15. above may also be fitted. to L category vehicles.

6. INDIVIDUAL SPECIFICATIONS

6.1. Driving beam headlamp

6.1.1. **Number:** One or two according to:

For L2 category having a cylinder capacity $\leq 125 \text{ cm}^3$	L5 category -Type A and L1 category (if fitted)	L5 category- Type B
Driving beam headlamp of Class B, C, D or E of AIS-010 (Part 2) (Rev. 1).	Driving beam headlamp of Class A, B, C, D or E of AIS-010 (Part 2) (Rev. 1)	Driving beam headlamp of Class B, C, D or E of AIS-010 (Part 2) (Rev. 1).
OR	OR	OR
Driving beam headlamp of AIS-010 (Part 1) (Rev. 1)	Driving beam headlamp class A of AIS-010 (Part 1) (Rev.1)	Driving beam headlamp of AIS-010 (Part 1) (Rev.1)
OR		
Driving beam headlamp of AIS-010 (Part 4) (Rev. 1).		

6.1.1.2. For L2 category, having a cylinder capacity $> 125 \text{ cm}^3$

(a) One or two according to:

Driving beam headlamp of Class B, D or E of AIS-010 (Part 2) (Rev. 1) or

Driving beam headlamp of AIS-010 (Part 1) (Rev. 1) or

Driving beam headlamp of AIS-010 (Part 4) (Rev. 1) or

(b) Two according to Class C of AIS-010 (Part 2) (Rev. 1).

6.1.2. Arrangement

No special requirement.

6.1.3. Position

6.1.3.1. Width

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

- 6.1.3.1.2. a driving beam headlamp, that is reciprocally incorporated with another front lamp, shall be fitted in such a way that its reference centre lies within the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with an independent passing beam headlamp, or a passing beam headlamp that is reciprocally incorporated with a front position lamp alongside the driving beam headlamp, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle.
- 6.1.3.1.3. two driving lamps of which either one or both are reciprocally incorporated with another front lamp shall be fitted in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.
- 6.1.3.2. The length: at the front of the vehicle. This requirement is regarded as satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly by means of the rear-view mirrors and/or reflective surfaces on the vehicle.
- 6.1.3.3. In any case, the distance between the edge of the illumination surface of any independent driving lamp and the edge of that of the passing lamp shall not exceed 200 mm. The distance between the edge of the illuminating surface of any independent driving lamp and the ground shall be a minimum of 500 mm and a maximum of 1300 mm.
- 6.1.3.4. In the case of two driving lamps:
 - 6.1.3.4.1 In the case of L1 and L2 category vehicles, the distance separating the illuminating surfaces of two driving lamps shall not exceed 200 mm.
 - 6.1.3.4.2 In the case of L5 category vehicles, with two driving beam headlamps, the distance between the inner edges of the apparent surfaces in the direction of reference axes shall be minimum of 300 mm when overall width of the vehicle does not exceed 1400 mm and minimum of 500 mm when overall width of the vehicle exceeds 1400 mm.
 - 6.1.3.4.3 In the case of L5 category vehicles, the edges of the apparent surfaces in the direction of the reference axes furthest from longitudinal median plane of vehicle shall not be more than 300 mm from the extreme outer edge of the vehicle.

6.1.4. **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.

6.1.5. **Orientation**

Forwards. The lamp(s) may move with the steering angle.

6.1.6. May not be “combined” with any other lamp.

6.1.7. **Electrical connections**

The driving beam headlamps shall switch on simultaneously. When switching from the passing to the driving beam all of the driving-beam headlamps shall be lit. When switching from the driving beam to the passing beams all of the driving-beam headlamps shall be switched off simultaneously. The passing beam(s) may remain illuminated with the driving beam(s).

6.1.8. **“Circuit-closed” tell-tale”**

Mandatory. Non flashing Blue signal lamp.

6.1.9. **Other requirements**

The maximum intensity of the driving-beam headlamps which can be switched on at the same time shall not exceed 225 000 cd (component type-approval value).

6.2. **PASSING BEAM HEADLAMP**

6.2.1. **Number:**

6.2.1.1. One or two according to:

For L2 category having a cylinder capacity $\leq 125 \text{ cm}^3$	L5 category -Type A and L1 category	L5 category -Type B
Passing beam headlamp of Class B, C, D or E of AIS-010 (Part 2)(Rev. 1)	Passing beam headlamp of AIS-010 (Part 2) (Rev. 1)	Passing beam headlamp of Class B, C, D or E of AIS-010 (Part 2) (Rev. 1)
OR	OR	OR
Passing beam headlamp of AIS-010 (Part 1)(Rev. 1)	Passing beam headlamp class A of AIS-010(Part 1)(Rev. 1)	Passing beam headlamp of AIS-010 (Part 1) (Rev. 1)
OR		
Passing beam headlamp of AIS-010 (Part 4) (Rev. 1)		

- 6.2.1.2. For L2 category, having a cylinder capacity $> 125 \text{ cm}^3$
- (a) One or two according to:
- Passing beam headlamp of Class B, D or E of AIS-010 (Part 2) (Rev. 1) or;
 - Passing beam headlamp of AIS-010 (Part 1) (Rev. 1) or;
 - Passing beam headlamp of AIS-010 (Part 4) (Rev. 1) or;
- (b) Two according to Class C of AIS-010 (Part 2) (Rev. 1).
- 6.2.2. **Arrangement**
- No special requirement.
- 6.2.3. **Position**
- 6.2.3.1. **Width**
- 6.2.3.1.1. an independent passing lamp may be installed above, below or to one side of another front lamp: if these lamps are one above the other the reference centre of the passing lamp shall be located within the median longitudinal plane of the vehicle; if these lamps are side by side their reference centre shall be symmetrical in relation to the median longitudinal plane of the vehicle.
- 6.2.3.1.2. a passing beam headlamp, that is reciprocally incorporated with another front lamp, shall be fitted in such a way that its reference centre lies within the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with an independent driving beam headlamp, or a driving beam headlamp that is reciprocally incorporated with a front position lamp alongside the passing beam headlamp, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle.
- 6.2.3.1.3. two passing lamps, of which either one or both are reciprocally incorporated with another front lamp shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.
- 6.2.3.2. Height: a minimum of 500 mm and a maximum of 1,200 mm above the ground.
- 6.2.3.3. Length: at the front of the vehicle. This requirement is regarded as satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly by means of the rear-view mirrors and/or reflective surfaces of the vehicle.
- 6.2.3.4. In the case of two passing lamps:
- 6.2.3.4.1 In the case of L1 and L2 category vehicles, the distance separating the illuminating surfaces of two passing lamps shall not exceed 200 mm.

6.2.3.4.2 In the case of L5 category vehicles, with two passing beam headlamps, the distance between the inner edges of the apparent surfaces in the direction of reference axes shall be minimum of 300 mm when overall width of the vehicle does not exceed 1400 mm and minimum of 500 mm when overall width of the vehicle exceeds 1400 mm.

6.2.3.4.3 In the case of L5 category, the edges of the apparent surfaces in the direction of the reference axes furthest from longitudinal median plane of vehicle shall not be more than 300 mm from the extreme outer edge of the vehicle.

6.2.4. **Geometric visibility**

Defined by angles α and β as specified in 2.11. :

α = 15° upwards and 10° downwards;
 β = 45° to the left and to the right for a single lamp;
 β = 45° outwards and 10° inwards for each pair of lamps.

The presence of partitions or other items of equipment near the head-lamp shall not give rise to secondary effects causing discomfort to other road users.

6.2.5. **Orientation**

6.2.5.1. Forwards. The lamp(s) may move in line with the steering angle.

6.2.5.2. The vertical inclination of the passing beam headlamp shall remain between - 0.5 and - 2.5 per cent, except in the case where an external adjusting device is present.

6.2.5.3. For passing beam headlamps with a light source having an objective luminous flux which exceeds 2,000 lumen, the vertical inclination of the passing beam headlamp shall remain between -0.5 and -2.5 per cent. A headlamp levelling device (manual or automatic) may be used to satisfy the requirements of this paragraph.

Note: According to ECE R 53, This requirement has to be achieved by an automatic device with a lead time of 60 months. This requirement will be incorporated only in the next revision with commensurate lead time.

6.2.5.4. The requirement in 6.2.5.3. shall be tested on the vehicle in the following conditions:

Condition A (rider alone):

A mass of 75 kg \pm 1 kg, simulating the rider, shall be placed on the vehicle in such a way as to reproduce the axle loads declared by the manufacturer for this loading condition.

The vertical inclination (initial aiming) of the passing beam headlamp shall be set, following the manufacturer's instructions, between -1.0 and -1.5 per cent.

Condition B (fully laden motorcycle):

masses, simulating the manufacturer's maximum total mass, shall be placed on the vehicle in such a way as to reproduce the axle loads declared by the manufacturer for this loading condition.

Before making the measurements, the vehicle shall be rocked 3 times up and down and then moved backwards and forwards for at least a complete wheel revolution."

6.2.6. May not be "**combined**" with any other lamp.

6.2.7. **Electrical connections**

The passing -beam headlamps shall switch on simultaneously.

The control for changing over to the passing beam(s) shall switch off the driving beam(s) simultaneously.

Passing beam headlamps with a light source approved in accordance with AIS-034 (Part 2)(Rev.1) shall remain switched on when the driving-beam is illuminated.

6.2.8. **Tell-tale**

Optional; non-flashing green signal lamp.

6.2.9. **Other requirements**

None.

6.3. **Direction indicator lamp**

6.3.1. **Number**

Two per side.

6.3.2. **Arrangement**

Two front indicators (category 1 as specified in AIS-012 (Part 5) (Rev. 1) or category 11 specified in AIS-010 (Part 3)(Rev. 1).

Two rear indicators (category 2 as specified in AIS-012 (Part 5) (Rev. 1). or category 12 specified in AIS-010 (Part 3)(Rev. 1).

6.3.3. **Position**

6.3.3.1. in width:

6.3.3.1.1. For front indicators, the following requirements shall all be met:

(a) Dimension:

(i) In the case of L1 and L2 categories, there shall be a minimum distance of 240 mm between illuminating surfaces,

(ii) In the case of two wheelers fitted with side car and L5 category vehicles:

The edges of the apparent surfaces in the direction of reference axes furthest from longitudinal median plane shall not be more than 300 mm from the extreme outer edge of the vehicle.

The inner edges of apparent surfaces in the direction of reference axes shall be at least 500 mm apart.

- (b) the indicators shall be situated outside the longitudinal vertical plane tangential to the outer edges of the illuminating surface of the headlamp(s),
- (c) there shall be a minimum distance between the illuminating surface of the indicators and passing beam headlamp closest to one another as follows: (see figure (a) below)

Minimum indicator intensity (cd)	Minimum separation (mm)
90	75
175	40
250	20
400	≤ 20

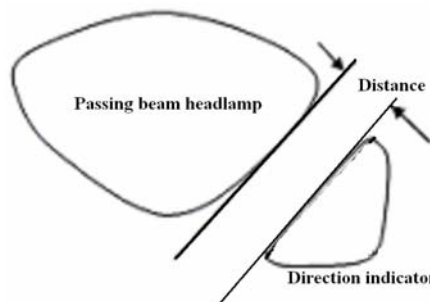


Figure (a)

- 6.3.3.1.2. For rear indicators
 - (i) In the case of L1 and L2 category vehicles, the clearance between the inner edges of the two illuminating surfaces shall be at least 180 mm on the condition that the prescriptions of 2.11. are applied even when the registration plate is mounted;
 - (ii) In the case of two wheelers fitted with side car and L5 category vehicles, conditions prescribed in 6.3.3.1.1(a) (ii) shall apply.
- 6.3.3.2. in height: not less than 350 mm nor more than 1200 mm for L1 and L2 category and 1500 mm in case of L5 category above the ground;

- 6.3.3.3. in length: the forward distance between the centre reference of the rear indicators and the transverse plane which constitutes the rearmost limit of the vehicle's over-all length shall not exceed 300 mm.
- 6.3.4. **Geometric visibility**
- Horizontal angles:
- 20° inwards and 80° outwards for L1 and L2 category and;
45° inwards 80° outwards for L5 category.
- Vertical angles: 15° above and below the horizontal.
- The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamps is less than 750 mm.
- 6.3.5. **Orientation**
- The front direction-indicators may move in line with the steering angle.
- 6.3.6. Shall not be "combined" with any other lamp.
- 6.3.7. Shall not be "reciprocally incorporated" with any other lamp; and
- 6.3.8. **Electrical connections**
- 6.3.8.1 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.
- 6.3.8.2 If the front direction indicator lamp and amber coloured front position lamp are grouped and condition of 7.7.4. of AIS-010 (Part 3)(Rev. 1) are not met, the electrical connections shall be such that the front position shall be switched off during the entire period (both ON and OFF cycle) of activation of the direction indicator lamp.
- 6.3.9 **"Circuit-closed" tell-tale**
- Mandatory. This may be optical or auditory or both. If it is optical it shall be (a) flashing green lamp(s), which, in the event of defective operation of any of the direction-indicators, is extinguished, remains alight without flashing, or shows a marked change of frequency.
- 6.3.10. **Other requirements**
- The characteristics indicated below shall be measured with no other load on the electrical system than that required for the operation of the engine and the lighting devices.
- 6.3.10.1. In the case of all vehicles the direction indicator lamps of which are supplied with direct current, the light flashing frequency shall be 90 ± 30 times per minute;

- 6.3.10.1.1 the flashing of the direction-indicators on the same side of the vehicle may occur synchronously or alternately;
- 6.3.10.2. Where a vehicle is fitted with direction indicator lamps which are supplied with alternating current, when the engine speed lies between idling and 100% of engine RPM at max. power, declared by the manufacturer, the following condition shall be met:
 - 6.3.10.2.1. The lamps shall flash at a frequency of 90 ± 30 times per minute when the engine speed lies between 50 % and 100 % of the engine RPM at max. power, declared by the manufacturer.
 - 6.3.10.2.2 The lamps shall flash at a frequency between $(90 + 30)$ and $(90 - 45)$ times per minute when the engine speed lies between the idling speed specified by the manufacturer and 50% of the engine RPM at max. power, declared by the manufacturer.
 - 6.3.10.2.3 the flashing of the direction-indicators on the same side of the vehicle may occur synchronously or alternately;
- 6.3.10.3. Operation of the light-signal control shall be followed within not more than one second by the appearance of the light and within not more than one-and-one half seconds by the first extinction of the light.
- 6.3.10.4. In the event of failure, other than a short circuit, of one direction-indicator lamp, the other(s) direction-indicator lamp(s) indicating the same direction shall continue to flash or remain alight, but the frequency in this condition may be different from that prescribed.
- 6.4. **Stop lamp**
 - 6.4.1. **Number**
 - 6.4.1.1. One or two in the case of L1 and L2 category vehicles.
 - 6.4.1.2. Two or three in case of two wheelers fitted with side car, one of which shall be on side car
 - 6.4.1.3. Two in the case of L5 category vehicles
 - 6.4.2. **Arrangement**

No special requirement.
 - 6.4.3. **Position**
 - 6.4.3.1. Width :

If there is only one stop lamp its centre of reference shall lie within the median longitudinal plane of the vehicle, or if there are two stop lamps they shall be symmetrical to the median longitudinal plane of the vehicle.

6.4.3.1.1 In the case of L5 category vehicles with two rear wheels: at least 600 mm between the two lamps. The distance may be reduced to 400 mm of the maximum width if the vehicle is less than 1400 mm.

6.4.3.1.2 In the case of L5 category vehicles with two rear wheels and two wheelers fitted with side cars, the edges of the illuminating surfaces furthest from the median longitudinal plane of the vehicle shall not be more than 300 mm from the outermost part of the vehicle,

6.4.3.2. in height: not less than 250 mm nor more than 1500 mm above the ground;

6.4.3.3. in length: at the rear of the vehicle.

6.4.4. **Geometric visibility**

Horizontal angle: 45° to left and to right for a single lamp;
45° outwards and 10° for L1 and L2 category vehicles and 30° for L5 category vehicles inwards for each pair of lamps;

Vertical angle: 15° above and below the horizontal.

The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.

6.4.5. **Orientation**

Towards the rear of the vehicle.

6.4.6. **Electrical connections**

Shall light up at any service brake application The stop lamps need not function if the device which starts and/or stops the engine is in a position which makes it impossible for the engine to operate.

6.4.7. **"Circuit-closed" tell-tale**

Tell-tale optional; where 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.

6.4.8. **Other requirements**

None.

6.5. **Rear-registration-plate illuminating device**

6.5.1. **Number**

One The device may consist of several optical components designed to illuminate the space reserved for the registration plate.

6.5.2. **Arrangement**

6.5.3. **Position**

Such that the device illuminates the space reserved for the rear registration plate.

6.5.3.1. in width:

6.5.3.2. in height:

6.5.3.3. in length:

6.5.4. **Geometric visibility**

6.5.5. **Orientation**

6.5.6. **Tell-tale**

Optional: Its function shall be performed by the tell-tale prescribed for the position lamp.

6.5.7. **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.

6.6. **Front position lamp**

6.6.1. **Number**

6.6.1.1. One or two for L1 and L2 category

6.6.1.2. Two or three in case of two wheelers fitted with side car, one of which shall be on side car.

6.6.1.3. Two for L5 category

6.6.2. **Arrangement**

No special requirement.

6.6.3. **Position**

6.6.3.1. Width:

an independent front position lamp may be fitted above or below, or to one side of another front lamp: if these lamps are one above the other, the reference centre of the front position lamp shall be located within the median longitudinal plane of the vehicle; if these lamps are side by side, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle;

a front position lamp, that is reciprocally incorporated with another front lamp, shall be installed in such a way that its reference centre is situated in the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with another front lamp alongside the front position lamp, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle.

Two front position lamps, one or both of them reciprocally incorporated with another front lamp, shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.

6.6.3.1.1. In the case of two wheelers fitted with side car and L5 category vehicles the edges of the apparent surfaces in the direction of reference axes furthest from longitudinal median plane of vehicle shall not be more than 300 mm from the extreme outer edge of the vehicle.

6.6.3.1.2. In the case of L5 category vehicles, the distance between the inner edges of the apparent surfaces in the direction of reference axes shall be minimum of 400 mm when overall width of vehicle does not exceed 1400 mm and minimum of 600- mm when overall width of vehicle exceeds 1400 mm.

6.6.3.2. in height: not less than 350 mm nor more than 1200 mm above the ground.

6.6.3.3. in length: at the front of the vehicle.

6.6.4. **Geometric visibility**

Horizontal angle: 80° to left and to right for a single lamp:

the horizontal angle may be 80° outwards and 45° inwards for each pair of lamps.

Vertical angle: 15° above and below the horizontal.

The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm

6.6.5. **Orientation**

Forwards. The lamp(s) may move in line with the steering angle.

6.6.6. **"Circuit-closed" tell-tale**

Mandatory. Non-flashing green signal lamp. This tell-tale shall not be required if the instrument illumination lighting can be switched on or off only simultaneously with the position lamp(s).

6.6.7. **Other requirements**

None.

6.7. **Rear position lamp**

6.7.1. **Number**

6.7.1.1. One or two for L1 and L2 category

6.7.1.2. Two or three in case of two wheelers fitted with side car, one of which shall be on side car.

6.7.1.3. Two for L5 category

6.7.2. **Arrangement**

No special requirements.

6.7.3. **Position**

6.7.3.1. **Width**

6.7.3.1.1. The reference centre shall be located on longitudinal median plane of the vehicle if there is only one rear position lamp or, if there are two rear position lamps, these shall be symmetrical to longitudinal median plane of the vehicle.

6.7.3.1.2. In the case of vehicles with two rear wheels, and two wheelers fitted with side car, the edges of the apparent surfaces in the direction of the reference axes furthest from longitudinal median plane of vehicle shall not be more than 300 mm from the extreme outer edge of the vehicle.

6.7.3.1.3. In the case of L5 category vehicles, the distance between the inner edges of the apparent surfaces in the direction of reference axes shall be minimum of 400 mm when overall width of the vehicle does not exceed 1400 mm and minimum of 600 mm. when overall width of the vehicle exceeds 1400 mm.

6.7.3.2. in height: not less than 250 mm nor more than 1500 mm above the ground;

6.7.3.3. in length: at the rear of the vehicle.

6.7.4. **Geometric visibility**

Horizontal angle:	80° to left and to right for a single lamp: the horizontal angle may be 80° outwards and 45° inwards for each pair of lamps.
-------------------	---

Vertical angle:	15° above and below the horizontal.
-----------------	-------------------------------------

The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.

- 6.7.5. **Orientation**
Rearwards.
- 6.7.6. **"Circuit-closed" tell-tale**
Optional: Its function shall be performed by the device prescribed for the front position lamp.
- 6.7.7. **Other requirements**
None.
- 6.8 **Rear retro-reflector, non-triangular**
- 6.8.1. **Number**
- 6.8.1.1. One or two of for L1 and L2 category
- 6.8.1.2. Two for L5 category
- 6.8.2. **Arrangement**
No special requirement.
- 6.8.3. **Position**
in height: not less than 250 mm nor more than 900 mm above the ground;
- 6.8.4. **Geometric visibility**
- | | |
|-------------------|---|
| Horizontal angle: | 30° to left and to right for a single reflector; |
| | 30° outwards and 10° inwards for each pair of reflectors; |
| Vertical angle: | 15° above and below the horizontal. |
- The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.
- 6.8.5. **Orientation**
Rearwards.
- 6.8.6. **Position- Width**
- 6.8.6.1. The reference centre shall be located on longitudinal median plane of the vehicle if there is only one retro-reflector. If there are two retro-reflectors, these shall be symmetrical to longitudinal median plane of the vehicle.

6.8.6.2. In addition, In the case of two wheelers-fitted with a side car and L5 category vehicles, the edges of the illuminating surfaces furthest from longitudinal median plane of vehicle shall not be more than 300 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the illuminating surfaces shall be minimum of 400 mm when overall width of the vehicle does not exceed 1400 mm and minimum of 500 mm when overall width of the vehicle exceeds 1400 mm.

6.9. **Vehicle-hazard warning signal**

6.9.1. The signal shall be given by simultaneous operation of the direction-indicator lamps in accordance with the requirements of 6.3. above.

6.9.2. **Electrical connections**

The signal shall be given by means of a separate control enabling all the direction-indicators to be supplied with current simultaneously.

6.9.3. **"Circuit-closed" tell-tale**

Mandatory. Flashing red signal lamp or, in the case of separate tell-tales, the simultaneous operation of the tell-tale prescribed in 6.3.9

6.9.4. **Other requirements**

Light flashing 90 ± 30 times per minute.

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

6.10. **Front fog lamp**

6.10.1. **Number**

One or two

6.10.2. **Arrangement**

No special requirement.

6.10.3. **Position**

6.10.3.1. in width:

a single lamp the centre of reference shall be in the median longitudinal plane of the vehicle; or the edge of the illuminating surface which is nearest to that plane shall be not more than 250 mm away from it;

6.10.3.1.1 A front fog lamp shall be installed above, below or next to another front lamp; if these lamps are on top of each other, the reference centre of the front fog lamp shall be located within the median longitudinal plane of the vehicle; if the two lamps are side by side, their reference centers shall be symmetrical in relation to the median longitudinal plane of the vehicle,

A front fog lamp that is reciprocally incorporated with another front lamp shall be installed in such a way that its reference centre is situated in the median longitudinal plane of the vehicle, Two front fog lamps, one or both of them, reciprocally incorporated with another front lamp, shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.

6.10.3.1.2 In the case of L5 category vehicles with two front fog lamps, the edges of the illuminating surface furthest from the median longitudinal plane of the vehicle shall not be further than 400 mm from the outermost edge of the vehicle.

6.10.3.2. in height: not less than 250 mm above the ground. No point on the illuminating surface shall be higher than the highest point on the illuminating surface of the passing beam headlamp.

6.10.3.3. in length: at the front of the vehicle. This requirement shall be deemed to be satisfied if the light emitted does not cause discomfort to the driver either directly, or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.

6.10.4. **Geometric visibility**

Defined by angles α and β as specified in 2.11.:

α = 5° upwards and downwards;

β = 45° to left and to right for a single lamp, except for an off-centre light, in which case the inward angle $\beta = 10^\circ$;

β = 45° outwards and 10° inwards for each pair of lamps

6.10.5. **Orientation**

Forwards. The lamp(s) may move in line with the steering angle.

6.10.6. Shall not be combined with any other front lamp.

6.10.7. **"Circuit-closed" tell-tale**

Optional; non-flashing green signal.

6.10.8. **Other requirements**

None.

6.10.9 **Electrical connections**

It shall be possible to switch the fog lamp(s) on or off independently of the driving beam headlamp(s) and/or passing beam headlamp(s).

6.11. **REAR FOG LAMP**6.11.1. **Number**

One or two

6.11.2. **Arrangement**

No special requirement.

6.11.3. **Position width:**

A rear fog lamp shall be installed above, below or next to another rear lamp; if these lamps are on top of each other, the reference centre of the rear fog lamp shall be located within the median longitudinal plane of the vehicle; if the two lamps are side by side, their reference centers shall be symmetrical in relation to the median longitudinal plane of the vehicle,

A rear fog lamp that is reciprocally incorporated with another rear lamp shall be installed in such a way that its reference centre is situated in the median longitudinal plane of the vehicle, Two rear fog lamps, one or both of them, reciprocally incorporated with another rear lamp, shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.

In the case of L5 category vehicles fitted with two wheels, and two wheelers fitted with side cars, when two rear fog lamps are fitted, the edges of the illuminating surface furthest from the median longitudinal plane of the vehicle shall not be further than 300 mm from the outermost edge of the vehicle. The distance between the inner edges of the illuminating surfaces in the direction of reference shall be minimum of 400 mm when overall width of the vehicle does not exceed 1400 mm and minimum of 600 mm when overall width of the vehicle exceeds 1400 mm.

6.11.3.1. in height: not less than 250 mm nor more than 900 mm in the case of L2 category and two wheelers with side car and 1000mm in case of L5 category vehicles above the ground;

6.11.3.2. in length at the rear of the vehicle.

6.11.3.3. the distance between the illuminating surface of the rear fog lamp and that of the stop lamp shall not be less than 100 mm.

6.11.4. **Geometric visibility**

Defined by angles α and β as specified in 2.11

α = 5° upwards and downwards;

β = 25° to left and to right for a single lamp;

= 25° outwards and 10° inwards for each pair of lamps.

6.11.5. **Orientation**

Rearwards.

6.11.6. **Electrical connections**

They shall be such that the rear fog lamp can light up only when one or more of the following lamps are switched on: driving beam headlamp, passing beam headlamp, front fog lamp.

If there is a front fog lamp, it shall be possible to switch off the rear fog lamp independently of the front fog lamp.

The rear fog lamp(s) may continue to operate until the position lamps are switched off and they shall remain off until deliberately switched on again.

6.11.7. **"Circuit-closed" tell-tale**

Mandatory. Non-flashing amber signal lamp.

6.11.8. Other requirements

None.

6.12. **Side retro-reflector, non-triangular**

6.12.1. Number per side

One or two

6.12.2. Arrangement

No special requirement.

6.12.3. Position

6.12.3.1. on the side of the vehicle.

6.12.3.2. in height:

not less than 300 mm nor more than 900 mm above the ground.

6.12.3.3. in length: should be placed in such a position that under normal conditions it may not be masked by the driver's or passenger's clothes.

6.12.4. **Geometric visibility**

Horizontal angles $\beta = 30^\circ$ to the front and to the rear.

Vertical angles $\alpha = 15^\circ$ above and below the horizontal.

The vertical angle below the horizontal may be reduced to 5° , however, if the height of the retro-reflector is less than 750 mm.

6.12.5. **Orientation**

The reference axis of the retro-reflectors shall be perpendicular to the vehicle's median longitudinal plane and directed outwards. The front side retro-reflectors may move with the steering angle

6.13. **Daytime running lamp**

6.13.1. **Presence**

Optional

6.13.2. **Number**

One or two

6.13.3. **Arrangement**

No special requirement.

6.13.4. **Position**

6.13.4.1. In width:

6.13.4.1.1. An independent daytime running lamp may be installed above, below or to one side of another front lamp: If these lamps are one above the other, the reference centre of the daytime running lamp shall be located within the median longitudinal plane of the vehicle; if these lamps are side by side, the edge of the illuminating surface shall not be more than 250 mm from the median longitudinal plane of the vehicle.

6.13.4.1.2. A daytime running lamp, that is reciprocally incorporated with another front lamp (driving beam headlamp or front position lamp), shall be fitted in such a way that the edge of the illuminated surface lies not more than 250 mm from the median longitudinal plane of the vehicle.

6.13.4.1.3. Two daytime running lamps, of which either one or both are reciprocally incorporated with another front lamp, shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.

6.13.4.1.4. In the case of two daytime running lamps, the distance separating the illuminating surfaces shall not exceed 240 mm.

- 6.13.4.2. In height:
Above the ground not less than 250 mm and not more than 1500 mm.
- 6.13.4.3. In length:
At the front of the vehicle.
- 6.13.5. **Geometric visibility**
Horizontal angle: outwards 20° and inwards 10°.
Vertical angle: upwards 10° and downwards 10°.
- 6.13.6. **Orientation**
Towards the front. The lamp(s) may move in line with the steering angle.
- 6.13.7. **Electrical connections**
- 6.13.7.1. If installed, the daytime running lamp shall be switched ON automatically when the device, which starts and/or stops the engine, is in a position which makes it possible for the engine to operate.

The daytime running lamp shall switch OFF automatically when the headlamps are switched ON, except when the latter are used to give intermittent luminous warnings at short intervals.

Furthermore, the lamps referred to in 5.10. shall not be switched ON when the daytime running lamps are switched ON.
- 6.13.7.2. If the distance between the front direction-indicator lamp and the daytime running lamp is equal or less than 40 mm, 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.
- 6.13.7.3. 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.
- 6.13.8. **Tell-tale**
Closed-circuit tell-tale optional
- 6.14. **Pedal retro-reflectors**
- 6.14.1 Number
Four retro-reflectors or retro-reflector groups.

- 6.14.2 Arrangement
No special requirement.
- 6.14.3 Other Requirements
The outer faces of the illuminating surface of the retro-reflectors shall be recessed into the body of the pedal.

The retro-reflectors shall be mounted in the pedal body in such a way as to be clearly visible both to the front and to the rear of the vehicle. The reference axis of such retro-reflectors, the shape of which shall be adapted to that of the pedal body, shall be perpendicular to the pedal axis.

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

They shall not be fitted to pedals which serve as controls for the vehicle or which serve only as footrests for the rider or passenger.

They shall be visible to the front and the rear.
- 6.15. **Front retro-reflector, non-triangular**
- 6.15.1. Number
One
- 6.15.2. Arrangement
No special requirement.
- 6.15.3. Position
in height: not less than 400 mm nor more than 1200 mm above the ground;
- 6.15.4. Geometric Visibility
Horizontal angle: 30° to the left and to the right.
Vertical angle: 15° above and below the horizontal.
The vertical angle below the horizontal may be reduced to 5°, however, if the height of the reflector is less than 750 mm.
- 6.15.5. Orientation
Forwards. The reflector may move in line with the steering angle.
- 6.15.6. Other requirements
None

- 6.16. **Reversing lamp**
- 6.16.1 Number: one or two
- 6.16.2 Arrangement: no individual specifications
- 6.16.3 Position
- 6.16.3.1 Width: In case of two reversing lamps, they shall be mounted at rear, symmetrical with respect to longitudinal median plane of the vehicle. If there is only one, it may be mounted to one side of the vehicle at rear.
- 6.16.3.2 Height: minimum 250 mm, maximum 1200 mm above the ground.
- 6.16.3.3 Length: at the rear of the vehicle.
- 6.16.4 Geometric Visibility
- Defined by angles α and β as specified in 2.11
- $\alpha = 15^\circ$ upwards and 5° downwards;
- $\beta = 45^\circ$ to the right and to the left if there is only one reversing lamp;
- $\beta = 45^\circ$ outwards and 30° inwards if there are two reversing lamps.
- 6.16.5 Alignment: towards the rear.
- 6.16.6
- a) May be grouped with any other rear lamp.
 - b) May not be combined with any other lamp.
 - c) May not be reciprocally incorporated with another lamp.
- 6.16.7 Electrical Connections
- Reversing lamp shall light up on engagement of reverse gear. However, it need not light up before the engine is started.
- 6.16.7 Circuit-closed telltale
- Optional.
- 6.17. **Stop lamp category S3 (high mount stop lamp)**
- 6.17.1. **Number** : One
- 6.17.2. **Arrangement**: No special requirement
- 6.17.3. **Position**
- The centre of reference shall be situated on the median longitudinal plane of the vehicle.

- 6.17.4. **Height**
 Wherever applicable the horizontal plane tangential to the lower edge of the apparent surface shall either :
- a) not be more than 150 mm below the horizontal plane tangential to the lower edge of the exposed surface of the glass or glazing of the rear window, or
 - b) not be less than 850 mm above the ground.
- 6.17.5. **Length** : no special requirement.
- 6.17.6. **Geometric visibility**
 $\beta = 10$ degrees to the left and right of the longitudinal axis of the vehicle.
 $\alpha = 10$ degrees above and 5 degrees below the horizontal.
- 6.17.7. **Orientation** : Towards the rear of the vehicle.
- 6.17.8. **Electrical connections**: Same as 6.4.6.
- 6.17.9. **Tell-tale**: Same as 6.4.7.
- 6.17.10. **Other requirements**
- 6.17.10.1. The device shall not be reciprocally incorporated with any other lamp.
 - 6.17.10.2. Wherever applicable the device shall be installed outside or inside the vehicle. In the case where it is installed inside the vehicle, the light emitted shall not cause discomfort to the driver through the rear-view mirrors and/or other surfaces of the vehicle (i.e. rear window).
- 7. EXTENSION OF APPROVAL**
- 7.1 Every functional modification in technical specifications pertaining to installation of lighting and light-signalling devices declared in accordance with 7.2, shall be intimated to the testing agency. Testing agency may then consider, whether,
- 7.1.1 Vehicle with modifications complies with specified requirements, or,
 - 7.1.2 any testing is required.
- 7.2 For considering whether testing is required or not, guidelines given in given below shall be followed.
- 7.2.1 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:

- 7.2.1.1 Number of any of the mandatory lighting and light-signalling devices and any addition to fitment of optional lamps.
- 7.2.1.2 Dimensions prescribed in this standard (or the corresponding paragraphs of AIS-007 when the amendment to AIS-007 for the incorporating the above becomes effective)
- 7.2.1.3 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.
- 7.2.1.4 If there are changes in the contour of the vehicle, which increase the geometric visibility, verification on the prototype is not required.
- 7.2.1.5 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.
- 7.2.2 Changes other than those listed in 7.2.1 are considered to have no adverse effect on the indirect vision
- 7.3 In case of 7.1.2., checks for those parameters which are affected by the modifications only need to be carried out.
- 7.4 In the event of 7.1.1. or in the case of 7.1.2 after successful compliance to requirements, the certificate of compliance shall be validated for the modified version.

8. to 10. Reserved

11. TRANSITIONAL PROVISIONS

- 11.1 At the request of the applicant, type approvals for compliance to AIS-009 (Rev.1): 2011, shall be granted by test agencies from 22nd February 2011 (date of adoption in CMVR-TSC). Such type approvals shall be deemed to be compliance to AIS-009: 2001.
- 11.2 At the request of applicant, type approval to the compliance to AIS-009:2001 shall be granted up to the notified date of implementation of AIS-009 (Rev.1): 2011.
- 11.3 Type approvals issued for compliance to AIS-009:2001 shall be extended to approval of AIS-009 (Rev.1): 2011, subject to satisfactory compliance of the following:
 - 11.3.1. For all categories, subject to verification of 6.3.8.2, if applicable
 - 11.3.2. For L1 and L2 categories and two wheelers fitted with side car, subject to verification of compliance of 6.6, 6.12 and verification of compliance to the installation requirements of any additional devices specified in 5.15, as applicable.

11.3.3. For L2 category vehicles with engine capacity below 70 cm³, subject to verification of 6.3 (direction indicator fitment)

11.3.4. For L5 category vehicles, No verification is required except verification of compliance to the installation requirements of any additional devices specified in 5.15, as applicable.

Note: Additional verification for the above need not be carried out, if compliance to the above requirements has already been established during the type approval as per AIS-009: 2001

11.4 Extension of Approvals for engineering and administrative changes:

11.4.1 In the case of 11.1, extensions shall be granted subject to the conditions of AIS-009 (Rev.1): 2011. Such extensions shall be deemed to be compliance to AIS-009:2001

11.4.2 In the case of 11.2, extensions shall be granted subject to conditions of AIS-009:2001 till the notified date of implementation of AIS-009 (Rev.1): 2011.

12. Reserved.

13 **AMENDMENTS TO ECE REGULATIONS AFTER THE LEVEL DESCRIBED IN 0.3 OF INTRODUCTION**

13.1 Supplements

In case of changes in ECE 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 ECE 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.

13.2 **Series of amendments**

Changes in ECE 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
(See 3.1)

**TECHNICAL SPECIFICATION OF VEHICLE TO BE
SUBMITTED AT THE TIME OF TYPE APPROVAL**

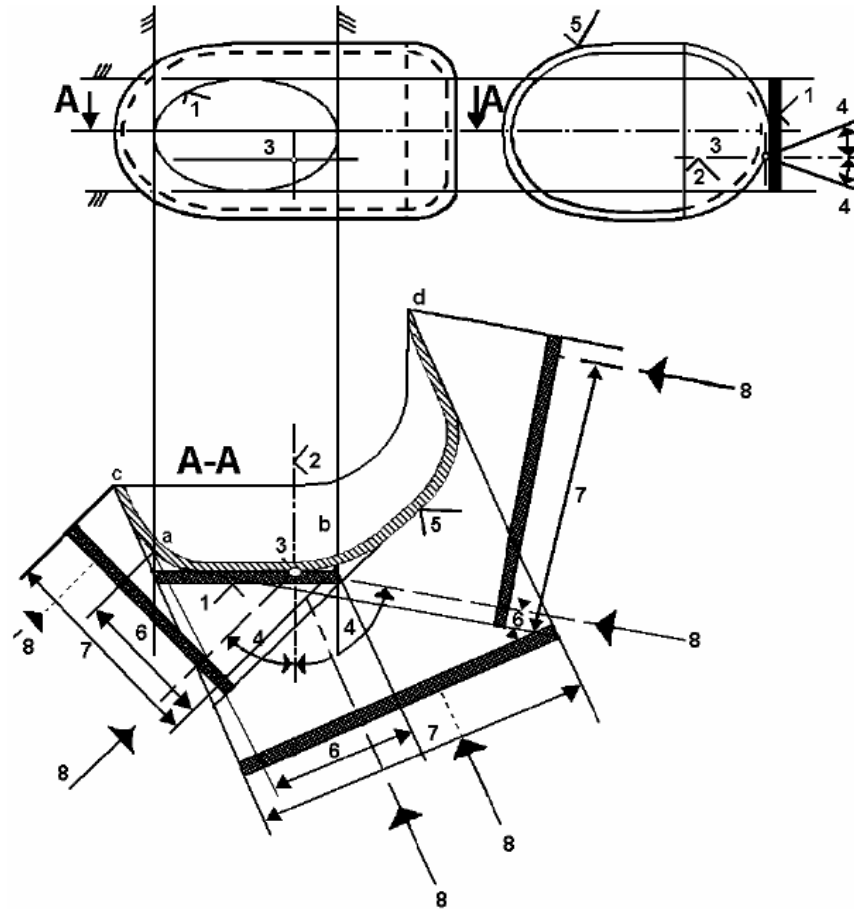
A-1 The specification submitted by manufacturer (applicant) at the time of applying for the type approval of the vehicle to this standard shall contain at least the information set out in the following entries of Table 1 of AIS-007 (Revision 4).

0.2., 0.4., 0.5., 0.5.1, 0.5.2, 1.2, 2, 2.1, 2.1.1, 2.3.1, 3, 3.2.1.3, 5.2., 5.2.1, 5.2.2., 8.0, 8.1, 8.2, 8.3, 8.4, 8.6.

ANNEX B
(Reserved)

ANNEX C
(See 2.7)

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



KEY

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

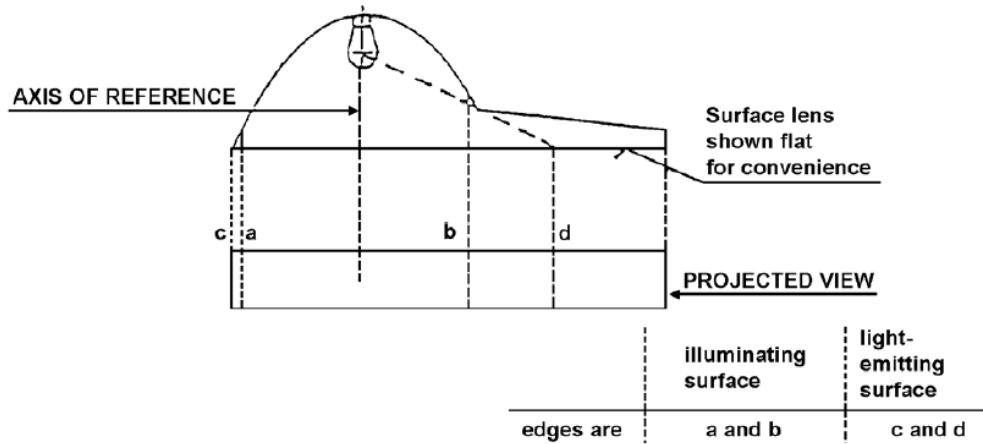
Note: Notwithstanding the drawing, the apparent surface is to be considered as tangent to the light-emitting surface.

ILLUMINATING SURFACE IN COMPARISON WITH LIGHT-EMITTING SURFACE

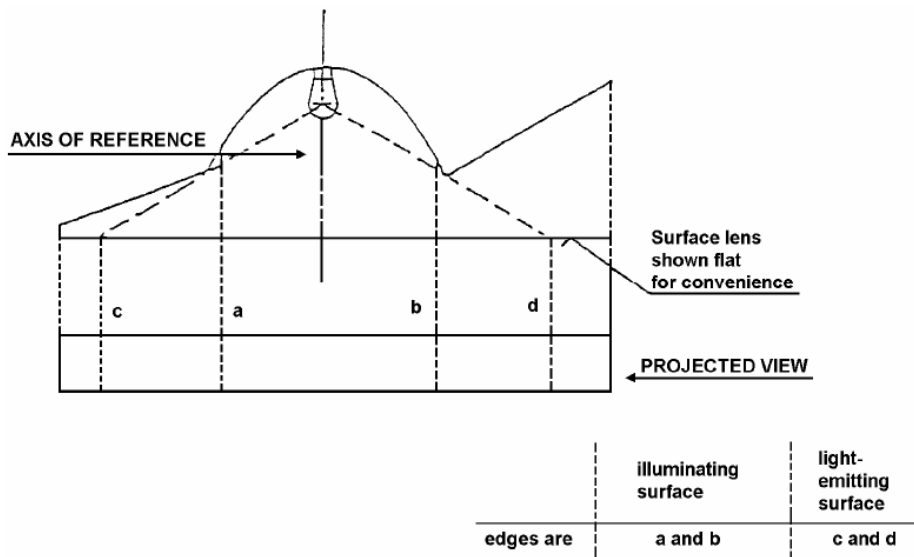
(See 2.8. and 2.9. of this standard)

	Illuminating surface	Light-emitting surface
Edges are	a and b	c and d

SKETCH A



SKETCH B



ANNEX D

(See 5.9.)

FORWARD VISIBILITY OF RED LIGHTS AND REARWARD VISIBILITY OF WHITE LIGHTS

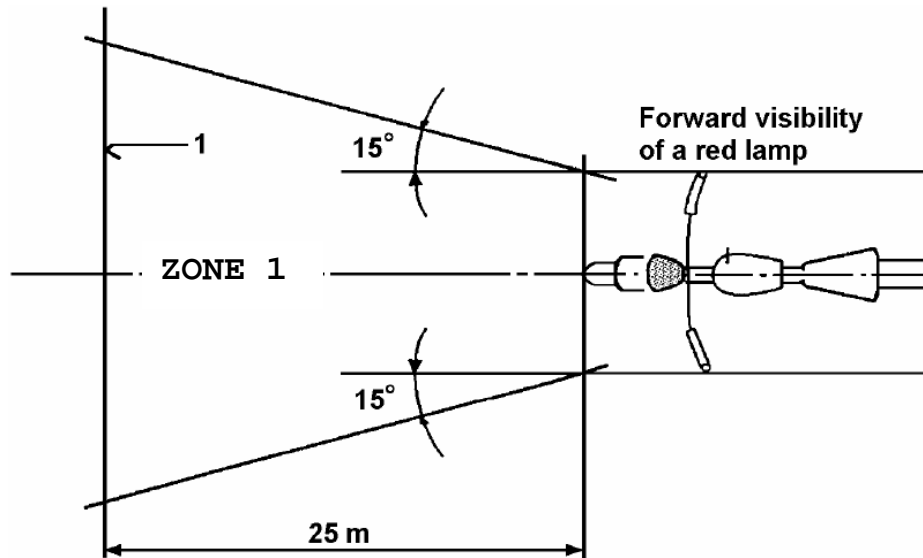


Figure 1

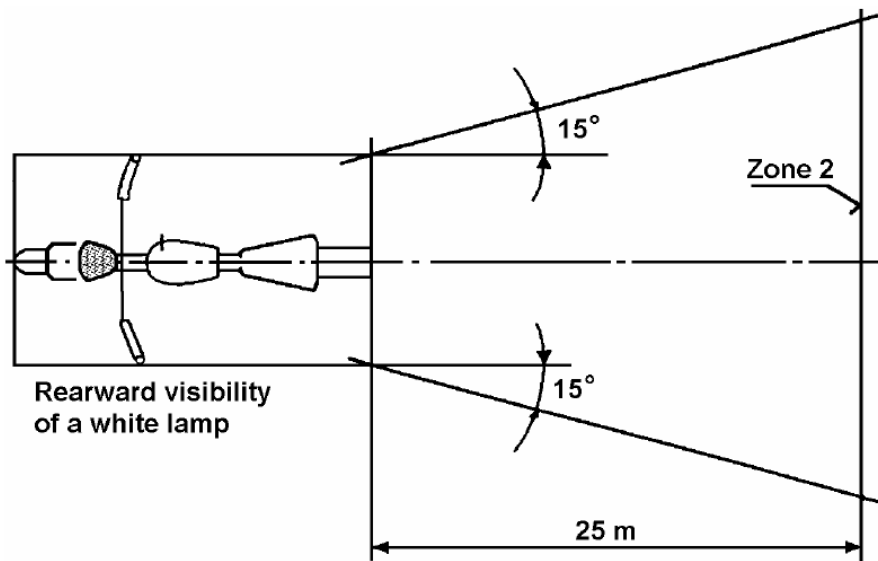


Figure 2

As regard to height, Zone 1 and Zone 2, as seen by observer is limited within two horizontal planes which are 1 meter and 2.2 meter respectively above the ground.

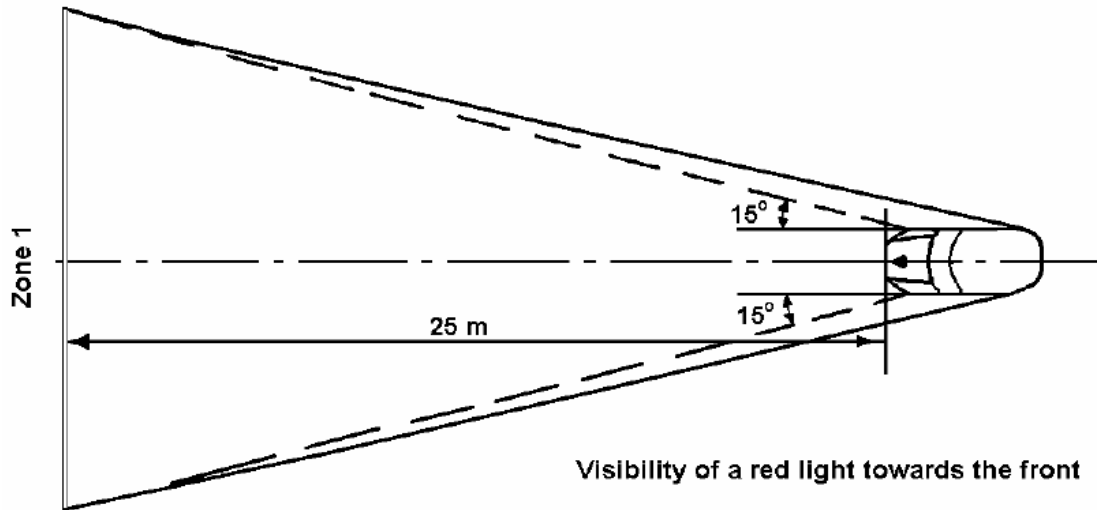


Figure 3

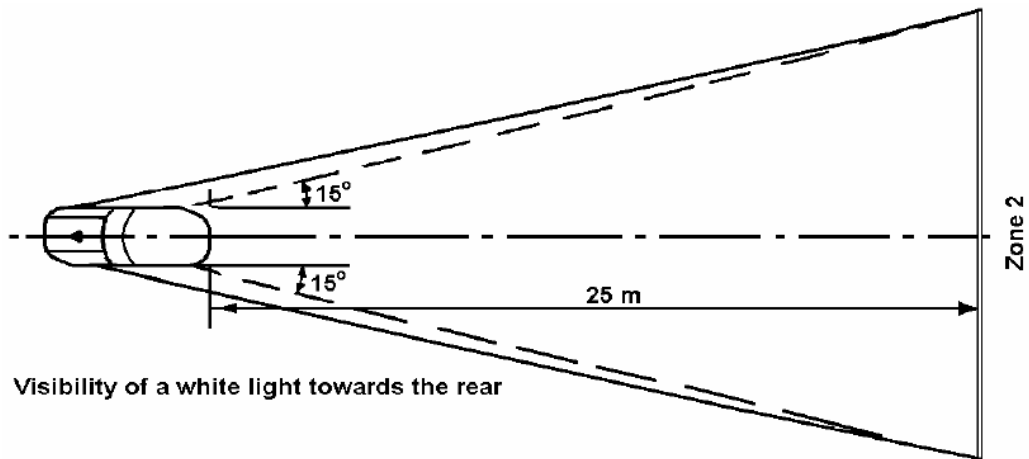


Figure 4

As regard to height, Zone 1 and Zone 2, as seen by observer is limited within two horizontal planes which are 1 meter and 2.2 meter respectively above the ground.

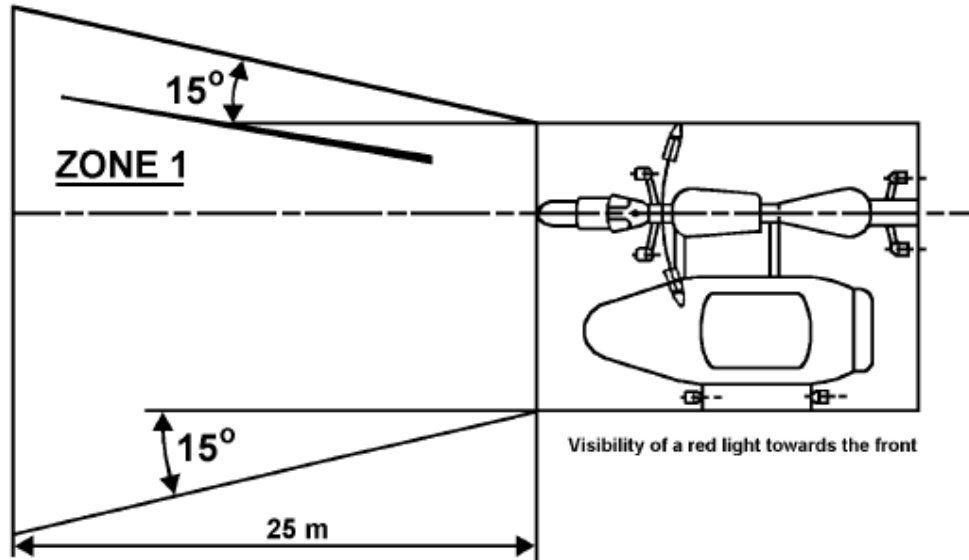


Figure 5

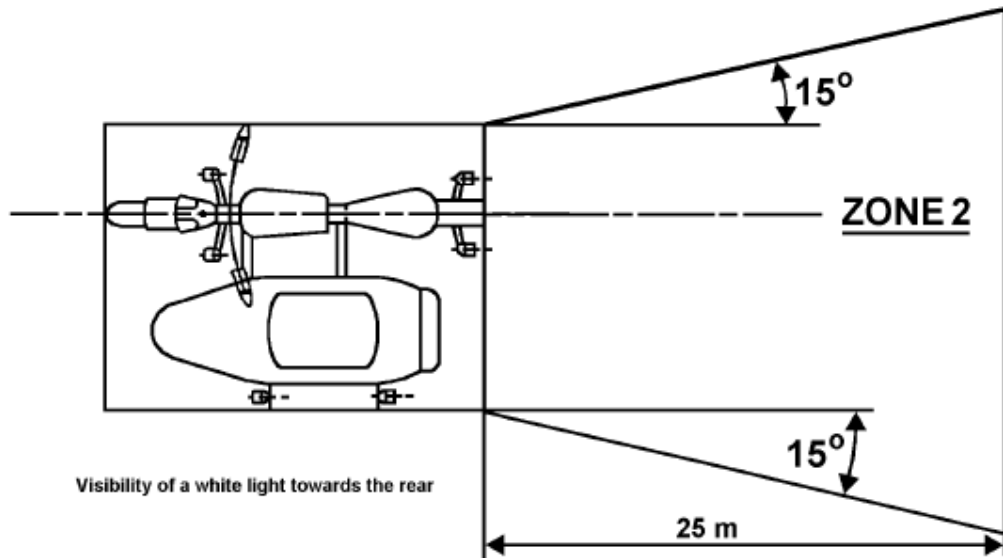


Figure 6

As regard to height, Zone 1 and Zone 2, as seen by observer is limited within two horizontal planes which are 1 meter and 2.2 meter respectively above the ground.

ANNEX E
(See introduction)

**COMPOSITION OF AISC PANEL ON
LIGHTING AND LIGHT SIGNALLING DEVICES***

Convener	
Mr. T. M. Balaraman	Hero Honda Motors Ltd., (SIAM)
Members	Representing
Mr. A. S. Bhale	The Automotive Research Association of India (ARAI)
Mr. B. V. Shamsundara	The Automotive Research Association of India (ARAI)
Mr. D. P. Saste	Central Institute of Road Transport (CIRT)
Mr. V. D. Chavan	Central Institute of Road Transport (CIRT)
Dr. Madhusudan Joshi	International Centre for Automotive Technology (ICAT)
Mr. G.R.M. Rao	Vehicle Research & Dev. Estt. (VRDE)
Dr. N. Karuppaiah	National Automotive Testing and R&D Infrastructure Project (NATRIP)
Mr. K. K. Gandhi	Society of Indian Automobile Manufacturers (SIAM)
Mr. G. K. Binani	Society of Indian Automobile Manufacturers (SIAM) (Tata Motors Ltd)
Mr. P. K. Banerjee	Society of Indian Automobile Manufacturers (SIAM) (Tata Motors Ltd)
Mr. R. M. Kanitkar	Society of Indian Automobile Manufacturers (SIAM) (Force Motors Ltd.)
Mr. Z. A. Mujawar	Society of Indian Automobile Manufacturers (SIAM) (Mahindra and Mahindra Ltd)
Mr. Nagendra H. V.	Society of Indian Automobile Manufacturers (SIAM) (Toyota Kirloskar Motor Pvt. Ltd)
Mr. Prakash Vemali	Society of Indian Automobile Manufacturers (SIAM) (Mercedes Benz India Ltd.)
Mr. Jitendra Malhotra	Society of Indian Automobile Manufacturers (SIAM) (Maruti Suzuki India Ltd)
Mr. Sumit Sharma	Society of Indian Automobile Manufacturers (SIAM) (Volkswagen India Private Ltd.)
Mr. Harjeet Singh	Society of Indian Automobile Manufacturers (SIAM) (Hero Honda Motors Ltd)
Mr. Harsh Agrawal	Society of Indian Automobile Manufacturers (SIAM) (Hero Honda Motors Ltd)
Mr. S Ramiah	Society of Indian Automobile Manufacturers (SIAM) (TVS Motor Company Limited)
Mr. T.C. Gopalan,	Tractor Manufacturers Association (TMA)

Mr. K. N. D. Nambudiripad	Automotive Component Manufacturers Association (ACMA)
Mr. G. V. George	FIEM Industries Ltd. (ACMA)
Mr. Rajagopalan	FIEM Industries Ltd. (ACMA)
Mr. Virendra Sachdev	Lumax Industries Ltd. (ACMA)
Mr. Sagar Kulkarni	Rinder India Pvt. Ltd. (ACMA)
Mr. T. V. Singh	Bureau of Indian Standards (BIS)
Mr. Rajiv Agarwal	All India Auto & Miniature Bulbs & Component Mfrs. Association
Mr. C. K. Choudhari	All India Auto & Miniature Bulbs & Component Mfrs. Association

* At the time of approval of this Automotive Industry Standard (AIS)

ANNEX F
(See introduction)

COMMITTEE COMPOSITION *
Automotive Industry Standards Committee

Chairman	
Shri Shrikant R. Marathe	Director The Automotive Research Association of India, Pune
Members	Representing
Representative from	Ministry of Road Transport & Highways (Dept. of Road Transport & Highways), New Delhi
Representative from	Ministry of Heavy Industries & Public Enterprises (Department of Heavy Industry), New Delhi
Shri S. M. Ahuja	Office of the Development Commissioner, MSME, Ministry of Micro, Small & Medium Enterprises, New Delhi
Shri T. V. Singh	Bureau of Indian Standards, New Delhi
Director Shri D. P. Saste (Alternate)	Central Institute of Road Transport, Pune
Dr. M. O. Garg	Indian Institute of Petroleum, Dehra Dun
Shri C. P. Ramnarayanan	Vehicles Research & Development Establishment, Ahmednagar
Representatives from	Society of Indian Automobile Manufacturers
Shri T.C. Gopalan	Tractor Manufacturers Association, New Delhi
Shri K.N.D. Nambudiripad	Automotive Components Manufacturers Association of India, New Delhi

Member Secretary
Mrs. Rashmi Urdhwareshe
Sr. Deputy Director
The Automotive Research Association of India, Pune

* At the time of approval of this Automotive Industry Standard (AIS)