AUTOMOTIVE INDUSTRY STANDARD

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

(Revision 1)

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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

December 2010

Status chart of the standard to be used by the purchaser for updating the record

Sr. No.	Corrigenda.	Amendment	Revision	Date	Remark	Misc.
General remarks :						

INTRODUCTION

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-010 covering mandatory requirements regarding performance requirements of lighting and light signalling devices for use on L category vehicles and their Trailers and Semi-trailers has been published in 2004 and has been implemented thereafter in 2005.

0.2 With technological developments in lighting and light signalling devices, AIS-010 was taken up for revision and now is prepared in five parts.

This part covers 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

The permission to use lighting and light signalling devices covered by this standard are governed by requirements specified by the standard for installation for that category of vehicles.

0.3 This part is based on the ECE R 50- Revision 2 (Supplement 12 to the original version of the Regulation - Date of entry into force: 15 October 2008): 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.

0.4 While preparing this standard attempts have been made to align this standard with the above ECE regulation. 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-009 (Rev 1): 2010	Automotive Vehicles - Installation Requirements of Lighting and Light - Signalling Devices for L Category Vehicles, their Trailers and Semi-Trailers

AIS-010/2004	Performance Requirements of Lighting and Light-Signaling Devices for 2 and 3 Wheeled Motor Vehicles, Their Trailers and Semi-Trailers and Vehicles Treated as such
AIS-010 (Part 5) (Rev 1):2010	Requirements of Chromaticity Co-ordinates of Colour of Light Emitted from Lighting and Light-Signaling Devices
AIS-012 (under revision) (Part 7)	Approval of Reversing Lamps for Power Driven Vehicles and their Trailers
AIS-034(Part 1) (Rev.1):2010	Provisions concerning the Approval of Filament Lamps for use in Approved Lamp Units on Power Driven Vehicles and their Trailers
AIS-053	Automotive Vehicles – Types – Terminology
AIS-037	Procedure for Type Approval and Establishing Conformity of Production for Safety Critical Components
IEC Publication 60061	Lamp Caps and Holders together with Gauges for the Control of Interchangeability and Safety.

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

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

Paragraph No.	Contents	Page No.
1.	Scope	1/23
2.	Definitions	1/23
3.	Application for approval	1/23
4.	Markings	2/23
5.	Approval	3/23
6.	General specifications	4/23
7.	Intensity of light emitted	4/23
8.	Test procedure	7/23
9.	Colour of light emitted	8/23
10.	Conformity of production	8/23
11.	Penalties for non-conformity of production	8/23
12.	Reserved	9/23
13.	Reserved	9/23
14.	Extension of type approval	9/23
15.	Transitional provision	9/23
16.	Establishing compliance of E/e approved lighting and light signalling devices to this standards:	10/23
17.	Amendments to ECE regulations after the level described in 0.3 of Foreword.	10/23
List of Annexes		
Annex A	Minimum horizontal (H) and minimum vertical (V) angles for spatial lamp distribution	11/23
Annex B	Reserved	14/23
Annex C	Reserved	14/23
Annex D	Photometric measurements	14/23

Annex E	Colours of lamps: chromaticity coordinates	16/23
Annex F	Photometric measurements for the rear-registration-plate illuminating device	17/23
Annex G	Information and samples to be submitted at the time of Application for Type Approval	19/23

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

1. SCOPE

This standard applies to front position lamps, rear position lamps, stop lamps, direction indicators, rear-registration-plate illuminating devices and reversing lamps for vehicles of category L, and their trailers and semi trailers as defined in AIS-053.

1.1 The reversing lamps shall comply with the requirements specified in AIS-012 (Part 7)(Rev. 1).

Note: The permission to use lighting and light signalling devices covered by this standard are governed by requirements specified by the standard for installation of requirements of that category of vehicles.

2. DEFINITIONS

2.1. In addition to the following definition, the definitions given in AIS-008, AIS-009 and their amendments in force at the time of application for type approval shall apply to this standard.

2.2. "Front position lamps, rear position lamps, stop lamps, direction indicator lamps and rear-registration-plate illuminating devices of different types" means lamps which differ, in each said category, in such essential respects as:

(a) The trade name or mark,

(b) The characteristics of the optical system (levels of intensity, light distribution angles, category of the filament lamp, light source module, etc.),

A change of the colour of the filament lamp or the colour of any filter does not constitute a change of type.

2.3. 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.

2.4. References made in this standard to standard (étalon) filament lamp(s) and to AIS-034 (Part 1) (Rev. 1) shall refer to AIS-034 (Part 1)(Rev. 1) and its amendments in force at the time of application for type approval.

3. APPLICATION FOR APPROVAL

3.1 Information to be submitted at the time of applying for type approval of the lighting and light signalling devices shall be as given in Annex G.

3.1.1. Reserved

3.1.2. Reserved

3. 1.3. Reserved

3.1.4. Reserved

3.2. Reserved

3.2.1. Reserved

3.2.2. Reserved

3.2.3. Reserved

4. MARKINGS

4.1. Devices submitted for approval shall in a clearly legible and indelible way bear the following markings:

4.1.1. the trade name or mark of the device manufacturer.

4.1.2. with the exception of lamps with non-replaceable light sources, a clearly legible and indelible marking indicating:

(a) the category or categories of filament lamp(s) prescribed; and/or

(b) the light source module specific identification code.

4.2. They shall comprise furthermore a space of sufficient size for the approval mark (see G-10).

4.3. Lamps with non-replaceable light sources or light source module(s) shall bear the marking of rated voltage or the range of voltages, and the rated wattage.

4.4. In the case of light source module(s) the light source module(s) shall bear:

4.4.1. the trade name or mark of the device manufacturer. This marking shall be clearly legible and indelible;

4.4.2. the specific identification code of the module; this marking shall be clearly legible and indelible. This specific identification code shall comprise the starting letters “MD” for “MODULE” followed by the approval mark as per AIS-037 and in the case several non identical light source modules are used, followed by additional symbols or characters; this specific identification code shall be shown in the drawings mentioned in G-10.

The approval marking does not have to be the same as the one on the lamp in which the module is used, but both markings shall be from the same device manufacturer.

Note: Where AIS-037 permits use of E/e mark for the device the marking on the module shall be as per paragraph 4.4.2 of ECE R 50.

4.4.3. the marking of the rated voltage and rated wattage.

4.5 On the prototype for type approval, the markings may be provided by suitable temporary methods and need not necessary be obtained from the tools used for series production.

5. APPROVAL

5.1. If the two devices of a type of device which are submitted in pursuance of 3.above meet the requirements of this standard, approval shall be granted.

5.2. When two or more lamps are part of the same device, approval is only granted, if each of these lamps satisfies the provisions of this standard or of another standard. Lamps not satisfying any one of those standard shall not be part of such device.

5.3. An approval number as per AIS-037 shall be assigned to each type approval.

5.4. Reserved

5.5. Reserved

5.5.1. Reserved

5.5.2. Reserved

5.5.3. in the general case of a direction indicator: a number indicating the category 11, 11a, 11b, 11c or 12 close to approval mark.

5.5.4 in the case of a direction indicator, which does on one side not attain the minimum luminous intensity prescribed up to an angle of H = 80° according to 7.7.1.: a horizontal arrow, the tip of which is oriented to the side where the minimum luminous intensity according to 7.7.1. is complied with up to an angle of at least 80°;

5.5.5. on front or rear position lamps of which the visibility angles are asymmetrical with regard to the reference axis in a horizontal direction, an arrow pointing towards the side on which the photometric specifications are met up to an angle of 80° H.

5.6. Where a device has been found to comply with the requirements of several standards, a single approval mark may be applied comprising the approval numbers and the additional symbols appropriate to each standard under which approval has been granted.

5.7. The approval mark above shall be clearly legible and be indelible. It may be placed on an inner or outer part (transparent or not) of the device emitting the light. In any case the marking shall be visible when the device is fitted on the vehicle or when a movable part such as the set or a compartment cover is opened.

5.8. Annex 3 of the ECE R 50, Rev. 2 (Supplement 12 to the original version of the Regulation - Date of entry into force: 15 October 2008) may be used for the relative location of approval marking and other markings.

6. GENERAL SPECIFICATIONS

6.1. Each device shall conform to the specifications of this standard.

6.2. The devices shall be so designed and constructed that in normal use, and despite the vibrations to which they may be subjected, their satisfactory operation continues to be assured and they retain the characteristics prescribed by this standard.

Note: Requirements of 5.2 above are deemed to be satisfied, if requirements specified in this standard are complied with.

6.3. In the case of light source modules, it shall be checked that:

6.3.1. The design of the light source module(s) shall be such as:

(a) that each light source module can only be fitted in no other position than the designated and correct one and can only be removed with the use of tool(s);

(b) If there are more than one light source module used in the housing for a device, light source modules having different characteristics can not be interchanged within the same lamp housing.

6.3.2. The light source module(s) shall be tamperproof.

6.4. In the case of replaceable filament lamp(s):

6.4.1. Any category or categories of filament lamp(s) approved according to AIS-034 (Part 1) (Rev. 1) may be used, provided that no restriction on the use is made in AIS-034 (Part 1) (Rev. 1) and its amendments in force at the time of application for type approval.

6.4.2. The design of the device shall be such that the filament lamp can be fixed in no other position but the correct one.

6.4.3. The filament lamp holder shall conform to the characteristics given in IEC Publication 60061. The holder data sheet relevant to the category of filament lamp used, applies.

Note: Conditions of 6.4.3 are to be verified by using appropriate gauge or a standard reference filament lamp.

7. INTENSITY OF LIGHT EMITTED

In the reference axis, the intensity of the emitted light of each of the two devices shall be at least equal to the minimum values and not exceed the maximum values of the following table. In no direction, the maximum values indicated shall be exceeded.

		Min. (cd)	max. (cd)
7.1.	Rear position lamp	4	12
7.2.	Front position lamp	4	60
7.2.1.	Front position lamps incorporated in the headlamp	4	100
7.3.	Stop lamp	40	185
7.4.	Direction indicators		
7.4.1.	of the category 11 (*)	90	700
7.4.1.1.	of the category 11a (*)	175	700
7.4.1.2.	of the category 11b (*)	250	800
7.4.1.3.	of the category 11c (*)	400	860
7.4.2.	of the category 12 (*)	50	350
(*) (see Annex A)			

7.5. Outside of the reference axis and within the angle fields defined in the diagrams in Annex A to this standard, the intensity of the light emitted shall, in each direction corresponding to the points in the light distribution table reproduced in Annex D to this standard, be not less than the product of the minima specified in 7.1 to 7.4 above and of the percentage specified in the said table for the direction in question.

7.5.1. In the case of a single lamp containing more than one light source:

(a) the lamp shall comply with the minimum intensity required when any one light source has failed;

(b) when all light sources are illuminated, the maximum intensity for an assembly of two lamps is given by multiplying by 1.4 the value prescribed for a single lamp in 7.1 to 7.4;

(c) all light sources which are connected in series are considered to be one light source

7.6. As an exception to 7.1 above, a luminous intensity of 60 cd maximum shall be permitted for rear position lamps reciprocally incorporated with stop lamps below a plane forming an angle of 5° with and downward from a horizontal plane.

7.7. Moreover,

7.7.1. throughout the fields defined in Annex A, the intensity of the light emitted shall not be less than 0.05 cd for position lamps and not less than 0.3 cd for stop lamps and direction indicators;

7.7.2. if a position lamp is grouped or reciprocally incorporated with a stop lamp, the ratio between the luminous intensities actually measures of the two lamps when turned on simultaneously and the intensity of the rear position lamp when turned on alone shall be at least 5:1 to the eleven measuring points defined in Annex D and situated in the field delimited by straight vertical lines passing through 0°V/± 10°H and the straight horizontal lines passing through ± 5°V/0°H of the light distribution table;

If the rear position lamp or the stop lamp or both contain more than one light source and are considered as a single lamp, as defined in 7.5.1 above, the values to be considered are those obtained with all light sources in operation.

7.7.3. the provisions of 2.2. of Annex D to this standard on local variations of intensity shall be observed.

7.7.4. if an amber colour front position lamp is grouped or reciprocally incorporated with direction indicator lamp, the ratio between the luminous intensities actually measures of the two lamps when turned on simultaneously and the intensity of the front position lamp when turned on alone shall be at least 5:1 to the eleven measuring points defined in Annex D and situated in the field delimited by straight vertical lines passing through 0°V/± 10°H and the straight horizontal lines passing through ± 5°V/0°H of the light distribution table.

7.8. In general the intensities shall be measured with the light sources(s) continuously alight.

In the case of lamps intended to work intermittently, precaution shall be taken to avoid overheating of the device. Depending on the construction of the device, for example, the use of light-emitting diodes (LED) or the need to take precautions to avoid overheating, it is allowed to measure the lamps in flashing mode.

This shall be achieved by switching with a frequency of f = 1.5 ± 0.5 Hz with the pulse width greater than 0.3 s, measured at 95 per cent peak light intensity.

In the case of replaceable filament lamps the filament lamps shall be operated at reference luminous flux during on time. In all other cases the voltage as required in 8.1. shall be switched with a rise time and fall time shorter than 0.01 s; no overshoot is allowed.

In the case of measurements taken in flashing mode the reported luminous intensity shall be represented by the maximum intensity.

7.9. Annex D, to which reference is made in 7.5 above, gives particulars of the methods of measurement to be used.

7.10. The rear-registration-plate illuminating device shall comply with the specifications indicated in Annex F to this standard.

7.11. Maximum values of front direction indicator lamps

7.11.1. For devices of categories 11 and 11a, the intensity of the light emitted outside the zone defined by the measuring points ± 10 degrees H and ± 10 degrees V (10 degrees-field) shall not exceed the following values:

Direction indicator of category	Maximum values in cd outside the 10 degrees-field	
	Single lamp	Single lamp containing more than one light source
11	400	560
11a	400	560

Between the boundaries of the 10 degrees-field (± 10 degrees H and ± 10 degrees V) and the 5 degrees-field (± 5 degrees H and ± 5 degrees V), the maximum admissible values of the intensities are linearly increased up to the values as defined in 7.4.1 and 7.4.1.1;

7.11.2. For devices of categories 11b and 11c, the intensity of the light emitted outside the zone defined by the measuring points ± 15 degrees H and ± 15 degrees V (15 degrees-field) shall not exceed the following values:

Direction indicator of category	Maximum values in cd outside the 15 degrees-field	
	Single lamp	Single lamp containing more than one light source
11b	250	350
11c	400	560

Between the boundaries of the 15 degrees-field (± 15 degrees H and ± 15 degrees V) and the 5 degrees-field (± 5 degrees H and ± 5 degrees V), the maximum values are increased linearly up to the values as defined in 7.4.1.2 and 7.4.1.3

8. TEST PROCEDURE

8.1. All measurements shall be carried out with an uncoloured standard filament lamp of the category prescribed for the device, adjusted to produce the reference luminous flux prescribed for the filament lamp involved (see AIS-034 (Part 1)(Rev. 1)). All measurements on lamps with non-replaceable light sources shall be made at 6.75 V and 13.5 V respectively.

8.2. The limits of the apparent surface in the direction of the reference axis of a light-signalling device shall be determined.

9. COLOUR OF LIGHT EMITTED

Stop lamps and rear position lamps shall emit red light, front position lamps shall emit white light or amber light, direction indicators shall emit amber light. The colour of the light emitted inside the field of the light distribution grid defined at 2. of Annex D, shall be measured using a light source having a colour temperature of 2,856 K, (Corresponding to illuminant A of the Commission internationale de l'éclairage (CIE)) in accordance with Annex E to this standard and shall meet the requirement of chromaticity coordinates prescribed in Part 5 of this standard. Outside this field no sharp variation of colour shall be observed.

However, for lamps equipped with non-replaceable light sources, the colorimetric characteristics should be verified with the light sources present in the lamps at a voltage of 6.75 V, 13.5 V or 28.0 V.

9.1 Use of white or amber coloured Front Position Lamps are governed by prescriptions in AIS-009

10. CONFORMITY OF PRODUCTION

10.1. Every device bearing an approval mark as prescribed under this standard shall conform to the type approved and shall comply with the requirements of this standard. However, in the case of a device picked at random from series production, the requirements as to the respectively, minimum and maximum intensities of the light emitted (measured with a standard filament lamp as referred to in 8. above) shall be at least 80 per cent of the minimum values specified and not exceed 120 per cent of the maximum values allowed.

10.2 The conformity of production procedures shall comply with those set out in the AIS-037 with the following requirements:

10.2.1 During the verification as per 10.2, if tests are required, the following tests shall be carried out:

10.2.1.1 Intensity of light emitted (See 7).

10.2.1.2 Colour of light emitted (See 9).

10.3 Devices with apparent defects are disregarded.

10.4 The reference mark is disregarded.

10.5 The normal frequency of these verifications shall be once every two years.

11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

Penalties for non-conformity of production shall be as prescribed in AIS-037.

12. Reserved

13. Reserved

14. EXTENSION OF TYPE APPROVAL

14.1 Details given in 9 of part 1 of this standard are applicable to this part also.

15. TRANSITIONAL PROVISIONS

15.1 At the request of the applicant, type approvals for compliance to AIS-010 (Part 3) (Rev.1):2010, shall be granted by test agencies from 27th October 2010 (date of adoption in CMVR-TSC). Such type approvals shall be deemed to be compliance to Annex A or Annex B of AIS-010:2004.

15.2 At the request of applicant, type approval to the compliance to Annex A or Annex B AIS-010:2004 shall be granted up to the notified date of implementation of AIS-010 (Part 3) (Rev.1):2010.

15.3 Type approvals issued for compliance to Annex A or Annex B of AIS-010 : 2004 shall be extended to approval of AIS-010 (Part 3) (Rev.1):2010 subject to satisfactory compliance of the following:

15.3.1 Marking as per 4.0 and sub-clauses for 5.0 applicable for marking.

15.3.2 In case of "E/e" approved devices, requirements specified in 16.

15.3.3 In the case of front direction indicator lamps of categories, 11, 11a, and 11b, the photometric requirements, in particular those prescribed in 7.11 of this standard.

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 Annex A or Annex B of AIS-010:2004.

15.4 Extension of Approvals for engineering and administrative changes:

15.4.1 In the case of 15.1, extensions shall be granted subject to the conditions of AIS-010 (Part 3) (Rev.1):2010. Such extensions shall be deemed to be compliance to AIS-010:2004.

15.4.2 In the case of 15.2, extensions shall be granted subject to conditions of AIS-010:2004 till the notified date of implementation of AIS-010(Part 3) (Rev.1):2010.

15.5 Type approvals for compliance to AIS-037, already been granted, shall continue to be valid for AIS-010 (Part 3) (Rev.1):2010.

Note : Necessary corrections to the reference of verification reports as per this standard shall be incorporated while issuing the next COP certificate. In the meantime for issuing of vehicle certificate, test/verification report as per this standard shall deemed to be the proof of compliance of AIS-037.

16. ESTABLISHING COMPLIANCE OF E/e APPROVED LIGHTING AND LIGHT SIGNALLING DEVICES TO THIS STANDARD

16.1 As an exception to 7.4 of AIS-037 (or related administrative decisions) for certifying compliance of "E"/"e" approved front position lamps, rear position lamps, stop lamps, direction indicators rear-registration-plate illuminating devices and Reversing Lamp to this standard, the following test shall be carried out by testing agency

16.1.1 Photometric requirements measured with a standard filament lamp as referred to in 8 above shall be at least 80 per cent of the minimum values specified and shall not exceed 120 per cent of the maximum values specified in 7.0.

16.1.2 Colourimetric requirements shall be specified in 9.0 within the limits specified.

17. AMENDMENTS TO ECE REGULATIONS AFTER THE LEVEL DESCRIBED IN 0.3 OF FOREWORD

17.1 Supplements

Note : 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.

Such changes will be considered for inclusion in this standard at the time of its next amendment /revision.

17.2 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.

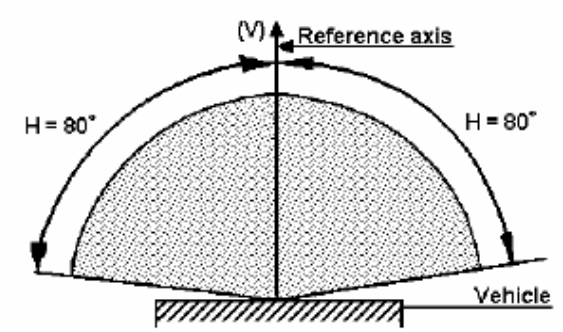
This shall be incorporated in the test report.

Note: Such changes will be considered for inclusion in this standard at the time of its next revision.

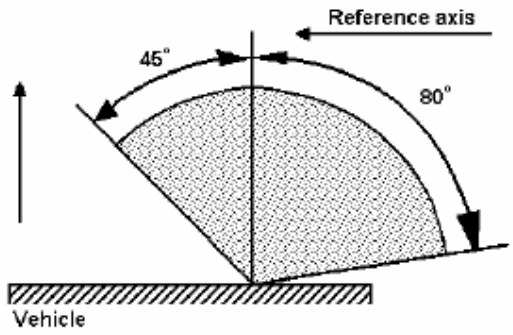
ANNEX A
(See 7.4)

MINIMUM HORIZONTAL (H) AND MINIMUM VERTICAL (V) ANGLES FOR SPATIAL LIGHT DISTRIBUTION

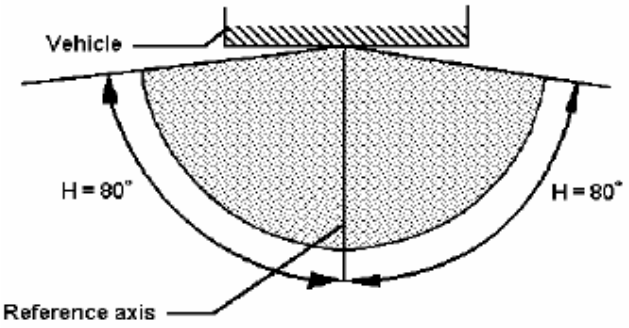
1. Front position lamps
V = +15° / -10°



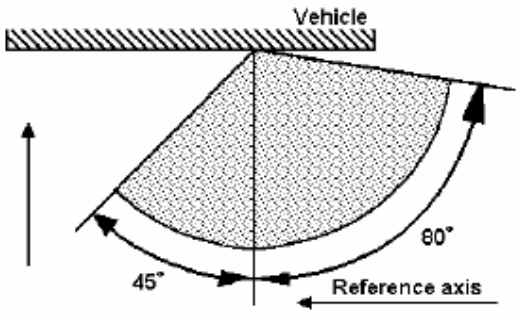
Front position lamps
(for a pair of lamps)
V = + 15° / - 10°



2. Rear position lamps
V = +15°/-10°



Rear position lamps
(for a pair of lamps)
V = +15° / -10°



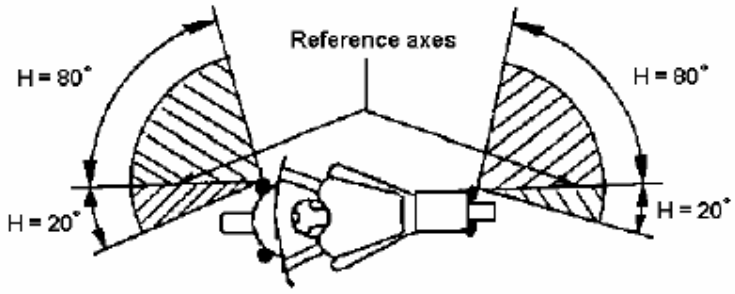
3. Direction indicators of categories 11, 11a, 11b, 11c and 12

V = ± 15°

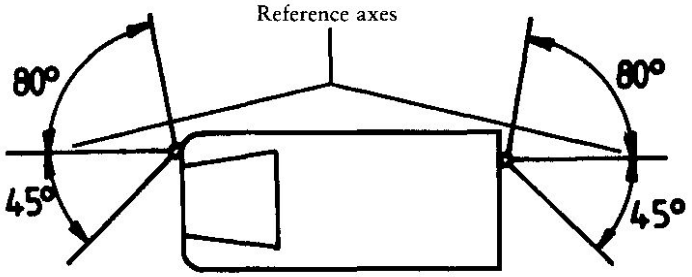
Minimum horizontal angles of light distribution in space:

Categories 11, 11a, 11b and 11c:	direction indicators for the front of the vehicle;
Category 11:	for use at a distance not less than 75 mm from the passing beam headlamp;
Category 11a:	for use at a distance not less than 40 mm from the passing beam headlamp;
Category 11b:	for use at a distance not less than 20 mm from the passing beam headlamp;
Category 11c:	for use at a distance less than 20 mm from the passing beam headlamp.

For two-wheel vehicles

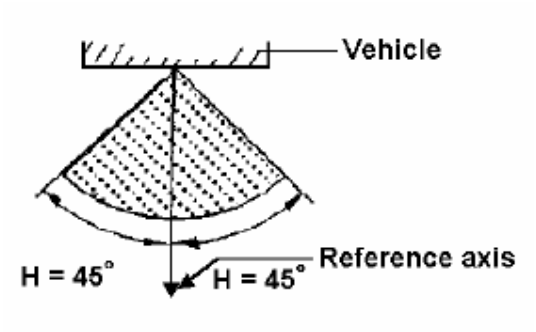


For three-wheel vehicles



4. Stop lamps

V = +15° / -10°



ANNEX B (Reserved)

ANNEX C (Reserved)

ANNEX D

(See 7.5, 7.7.2, 7.7.3, 7.9 and 9)

PHOTOMETRIC MEASUREMENTS

D-1. Measurement methods

D-1.1. During photometric measurements, stray reflections shall be prevented by appropriate masking.

D-1.2. Should the results of measurements be challenged, measurements shall be carried out in such a way as to meet the following requirements:

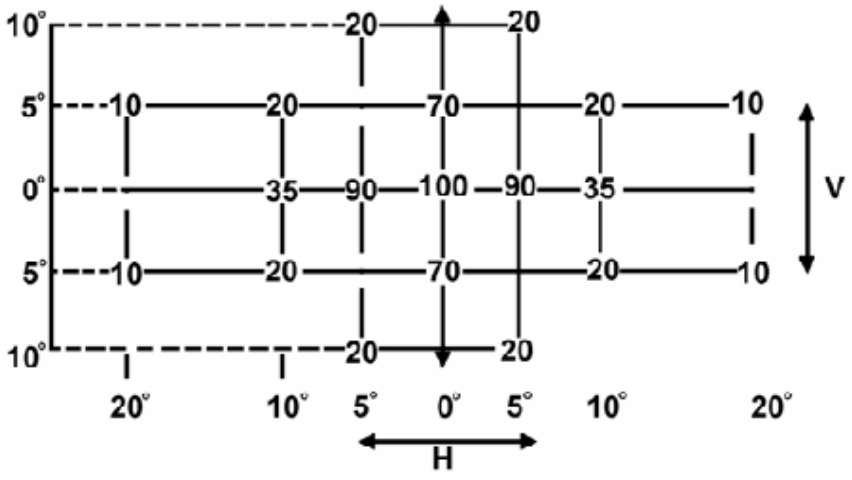
D-1.2.1. the distance of measurements shall be such that the law of the inverse of the square of the distance is applicable;

D-1.2.2. the measuring equipment shall be such that the angular aperture of the receiver viewed from the reference centre of the lamp is between 10' and 1°;

D-1.2.3. the intensity requirement for a particular direction of observation shall be deemed to be satisfied if that requirement is met in a direction deviating by not more than 15' from the direction of observation.

D-1.3. In the case where the device may be installed on the vehicle in more than one or in a field of different positions the photometric measurements shall be repeated for each position or for the extreme positions in the field of the reference axis specified by the manufacturer

D-2. Standard luminous intensity distribution table



.

D-2.1. The direction H = 0° and V = 0° corresponds to the reference axis. (On the vehicle it is horizontal, parallel to the median longitudinal plane of the vehicle and oriented in the required direction of visibility). It passes through the centre of reference. The values shown in the

table give, for the various directions of measurements, the minimum intensities as a percentage of the minimum required in the axis for each lamp (in the direction H = 0° and V = 0°).

D-2.2. Within the field of light distribution of D-2, schematically shown as a grid, the light pattern should be substantially uniform so that the light intensity in each direction of a part of the field formed by the grid lines meets at least the lowest minimum percentage value being shown on the grid lines surrounding the questioned direction.

D-3. Test conditions

The photometric performance shall be checked:

D-3.1. For non-replaceable (fixed) filament lamps or other light sources:

At the voltage prescribed by the manufacturer; the test laboratory may require from the manufacturer the special power supply needed to supply such lamps;

D-3.2. For replaceable filament lamps:

when equipped with filament lamps at 6.75 V, 13.5 V or 28.0 V the luminous intensity (luminance) values produced shall be corrected. The correction factor is the ratio between the reference luminous flux and the mean value of the luminous flux found at the voltage applied (6.75 V, 13.5 V or 28.0 V). The actual luminous fluxes of each filament lamp used shall not deviate more than $\pm$ 5 per cent from the mean value. Alternatively a standard filament lamp may be used in turn, in each of the individual positions, operated at its reference flux, the individual measurements in each position being added together.

D-3.3. For any signalling lamps, except those equipped with filament lamps, the luminous intensities measured after one minute and after 30 minutes of operation shall comply with the minimum and maximum requirements; direction indicators shall be operated in the flashing mode (f = 1.5 Hz, duty factor 50 per cent). The luminous intensity distribution after one minute of operation can be calculated from the luminous intensity distribution after 30 minutes of operation by applying at each test point the ratio of luminous intensities measured at HV after one minute and after 30 minutes of operation.

ANNEX E

(See 9)

COLOURS OF LAMPS: CHROMATICITY COORDINATES

For checking the colorimetric characteristics of lamps a source of light at a colour temperature of 2856 K (illuminant A of the International Commission on Illumination (CIE)), in combination with appropriate filters, may be used. However, for the lamps equipped with non-replaceable light sources, the colorimetric characteristics should be verified with the light sources present in the lamps at a voltage of 6.75 V, 13.5V or 28.0 V.

ANNEX F

(See 7.10)

PHOTOMETRIC MEASUREMENTS FOR THE REAR-REGISTRATION-PLATE ILLUMINATING DEVICE

F-1. Space to be illuminated

Devices shall be designed in such a way as to illuminate a position measuring at least 50 X 150.

F-2. Colour of the light

The light of the illuminating device shall be sufficiently colourless in order not to modify noticeably the colour of the rear-registration-plate.

F-3. Angle of incidence

The manufacturer of the illuminating device shall specify one or more or a field of positions in which the device is to be fitted in relation to the space for the registration plate; when the lamp is placed in the position(s) specified by the manufacturer the angle of incidence of the light on the surface of the plate does not exceed 82° at any point of the surface to be , this angle being measured from the mid-point of the edge of the illuminating surface of the device which is furthest from the surface of the plate. If there is more than one illuminating device, the foregoing requirement shall apply only to the part of the plate intended to be illuminated by the device concerned.

The device shall be so designed that no light is emitted directly towards the rear, with the exception of red light if the device is combined or grouped with a rear lamp.

F-4. Measuring procedure

Luminance measurements shall be made on a piece of clean white blotting paper with a minimum diffuse reflection factor of 70 per cent, having the same dimensions as the registration plate, placed in the position normally occupied by it and 2 mm in front of its holder.

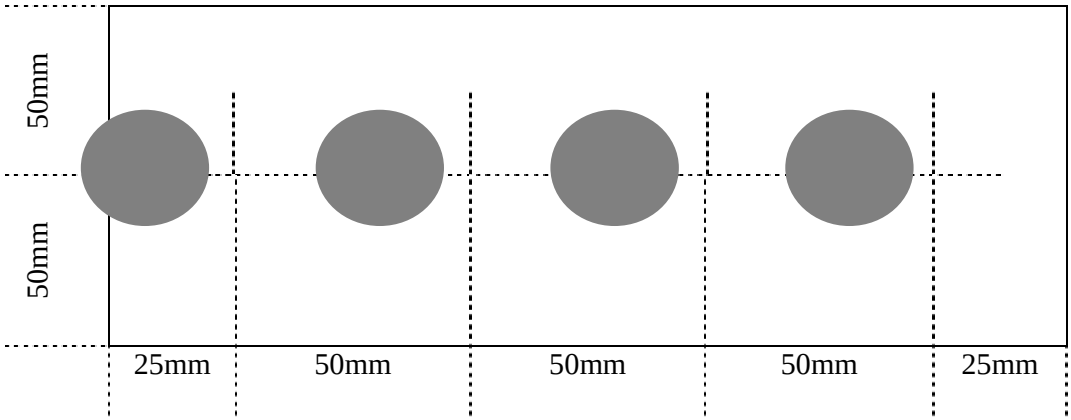
Luminance measurements shall be made perpendicular to the surface of the paper at the points shown in F-5. of this annex, each point representing a circular area of 25 mm in diameter.

For an illuminating device not equipped with filament lamps, the luminance values measured after one minute and after 30 minutes of operation shall comply with the minimum requirements. The luminance distribution after one minute of operation can be calculated from the luminance distribution after 30 minutes of operation, by applying at each test point the ratio of luminance values measured at one point after one minute and after 30 minutes of operation.

F-5. Photometric characteristics

At each of the points of measurement shown below, the luminance B shall be not less than 2 cd/m^2.

Figure F1 – Points for measurement (See F-4)



The gradient of the luminance between the values B1 and B2, measured at any two points 1 and 2 selected from among those mentioned above, shall not exceed 2 x B0/cm, B0 being the minimum luminance measured at the various points, that is to say

$$\frac{B2 - B1}{\text{distance } 1-2 \text{ in cm}} \leq 2 \times B_0/\text{cm}$$

ANNEX G

(See 3.1)

INFORMATION AND SAMPLES TO BE SUBMITTED AT THE TIME OF APPLICATION FOR TYPE APPROVAL

At the time of application, the manufacturer shall declare to the testing agency the Information given below:

G-1 Manufacturer's name & address

G-2 Telephone No

G-3 FAX. No.

G-4 E mail address

G-5 Contact person

G-6 Plant/(s) of manufacture.

G-7 the purpose or purposes for which the device submitted for approval is intended;

G-8 in the case of a front position lamp, indication that it is intended to emit white light;

G-9 in the case of a direction indicator: the category.

G-10 Drawings, in sufficient detail to permit identification of the type of device and showing in what geometrical position(s) the device may be mounted on the vehicle; the axis of observation to be taken as the axis of reference in the tests(horizontal angle H = 0°, vertical angle V = 0°) and the point to be taken as the centre of reference in the said tests; the drawings shall show the position intended for symbols approval mark.

G-11 A brief technical description giving details, in particular, with the exception of lamps with non-replaceable light source/Light source module:

(a) the category or categories of filament lamp(s) prescribed in AIS-034 (Part 1)(Rev. 1).

(b) the light source module specific identification code.

G-12 Two devices

G-13 Colour of light emitted (Red/White/Amber/Selective Yellow)

G-14 Material of Lens: Glass/plastic

G-15 In case the light source is replaceable, Category, rated voltage and quantity of filament lamp

G-16 At the choice of the applicant, that the device may be installed on the vehicle with different inclinations of the reference axis in respect to the vehicle reference planes and to the ground or rotate around its reference axis or, in the case of a rear registration plate lamp, that the device my be fitted in more than one or a field of positions in relation to the space to be occupied by the registration plate; these different conditions of installation (or different positions) shall be indicated in the application form / test report.

ANNEX H

(See Introduction)

COMPOSITION OF AISC PANEL ON LIGHTING AND LIGHT SIGNALLING DEVICES*

Convener	
Mr. T. M. Balaraman	Bajaj Auto Ltd., (SIAM)
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Mr. B. V. Shamsundara	The Automotive Research Association of India (ARAI)
Mr. D. P. Saste	Central Institute of Road Transport (CIRT)
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Dr. Madhusudan Joshi	International Centre for Automotive Technology (ICAT)
Mr. G.R.M. Rao	Vehicle Research & Dev. Estt. (VRDE)
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Mr. P. K. Banerjee	Society of Indian Automobile Manufacturers (SIAM) (Tata Motors Ltd)
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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 J
(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
Deputy Director
The Automotive Research Association of India, Pune

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