

DRAFT

AUTOMOTIVE INDUSTRY STANDARD

**Performance Requirements for Front and
Rear Position (Side) Lamps, Stop-Lamps
and End-outline Marker Lamps for
Motor Vehicles**

Revision 2

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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

- 0.1 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.
- 0.2 Accordingly AIS-012 covering performance requirements of lighting and light-signalling devices for motor vehicles having more than three wheels, trailers and semi-trailers has been published in 2004 and implemented thereafter in 2005.

With technological advancement in lighting and light-signalling devices and updation in ECE regulations, AIS-012 was taken up for revision and now is prepared in ten parts. This part covers performance requirements for front and rear position (side) lamps, stop-lamps and end-outline marker lamps for motor vehicles.

- 0.3 While preparing this standard considerable assistance has been derived from following ECE regulation.

<p>ECE R 7 Revision 6 - Amendment 4 Supplement 24 to the 02 series of amendments – Date of entry into force: 8 October 2015</p>	<p>Uniform provisions concerning the approval of front and rear position (side) lamps, stop-lamps and end-outline marker lamps for power-driven vehicles and their trailers</p>
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- 0.4 The following standards contain provisions, which through reference in this text constitute provisions of the standard.

AIS-053:2005	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-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-009 (Rev.1): 2011	Automotive Vehicles - Installation Requirements of Lighting and Light-signalling Devices for L Category Vehicles, their Trailers and Semi-Trailers

AIS-010 (Part 5) (Rev. 1):2010	Requirements of Chromaticity Co-ordinates of Colour of Light Emitted from Lighting and Light-signalling Devices
AIS-037:2004	Procedure for Type Approval and Establishing Conformity of Production for Safety Critical Components
AIS 130	Provisions concerning the approval of Light Emitting Diode (LED) light sources for use in approved lamp units on power-driven vehicles and their trailers

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

Performance Requirements for Front and Rear Position (Side) Lamps
Stop-Lamps and End-outline Marker Lamps for Motor Vehicles

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Performance Requirements for Front and Rear Position (Side) Lamps, Stop-Lamps and End-outline Marker Lamps for Motor Vehicles

0 SCOPE

This standard applies to:

- 0.1. front and rear position (side) lamps and stop lamps for vehicles of categories L, M, N, T and A ^{1/}; and,
- 0.2. end - outline marker lamps for vehicles of categories M, N, T and A.

Note: The permission to use front, rear position and end-outline marker lamps covered by this standard are governed by requirements specified by the standard for installation of requirements of that category of vehicles.

1. DEFINITIONS

For the purpose of this standard,

- 1.1 The definitions given in AIS-008(Rev.1) and its amendments in force at the time of application for type approval shall apply to this standard.
- 1.2 "**Front position (side) lamp**" means the lamp used to indicate the presence and the width of the vehicle when viewed from the front;
- 1.3 "**Rear position (side) lamp**" means the lamp used to indicate the presence and the width of the vehicle when viewed from the rear;
- 1.4 "**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. The stop-lamps may be activated by the application of a retarder or a similar device;
- 1.5 "**End-outline marker lamp**" means a lamp fitted near to the extreme outer edges and as close as possible to the top of the vehicle and intended to indicate clearly the vehicle's overall width. In the case of certain power-driven vehicles and trailers, this lamp is intended to complement the vehicle's position (side) lamps and draw special attention to its outline;
- 1.6 "**Front and rear position lamps, stop-lamps and end-outline marker lamps of different type**" 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 filament lamp, light source module, etc.);
 - (c) the variable intensity control, if any.

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

- 1.7 References made in this Standard to standard 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.

References made in this Standard to standard (LED light source(s) and to AIS 130 shall refer to AIS 130 and its amendments in force at the time of application for type approval

1/ As defined in AIS-053: Automotive Vehicles - Types - Terminology

**2.0 APPLICATION FOR APPROVAL: TECHNICAL INFORMATION
TO BE SUBMITTED BY THE APPLICANT AT THE TIME OF
APPROVAL**

Sr. No.	Particulars
A	Manufacturer's name and address
B	Telephone No
C	FAX. No.
D	E mail address
E	Contact person
F	Plant/(s)of manufacture.
G	The intended function(s) of the device.
2.1	The application for approval shall be submitted by applicant. It shall specify:
2.1.1	The purpose or purposes for which the device submitted for approval is intended and whether it may also be used in an assembly of two lamps of the same kind/type;
2.1.2	In the case of an end-outline marker lamp, whether it is intended to emit white or red light;
2.1.3	In the case of a category S3 or S4 stop lamp, whether it is intended to be mounted outside or inside (behind the rear window) the vehicle.
2.1.4	Whether the device produces steady luminous intensity (category R1, S1 or S3) or variable luminous intensity (category R2 , S2 or S4).
2.1.5	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; these different conditions of installation shall be indicated in the communication form
2.2	For each type of device, the application shall be accompanied by:
2.2.1	Drawings, in triplicate, in sufficient detail to permit identification of the type of the device and showing the following: (a) in what geometrical position(s) the device (and if applicable for category S3 or S4 lamps the rear window) may be mounted on the vehicle; the axis of observation to be taken is the axis of reference in the tests (horizontal angle $H = 0^\circ$, vertical angle $V = 0^\circ$); and the point to be taken as the centre of reference in the said tests; (b) The geometrical conditions of installation of the device(s) that meet(s) the requirements of paragraph 6; (C) In the case of an interdependent lamp system, the interdependent lamp or the combination of interdependent lamps that fulfil the requirements of paragraphs 5.10. and 6.1. and of Annex 4 Annex D to this Standard; (d) The position intended for the approval number and the additional

symbols in relation to the circle of the approval mark.

2.2.2 A brief technical description stating, in particular, with the exception of lamps with non-replaceable light sources:

- (a) the category or categories of filament lamp(s) prescribed; this filament lamp category shall be one of those contained in AIS-034 (Part 1) (Rev. 1) and its amendments ; and/or
- (b) The category or categories of LED light source(s) prescribed; this LED light source category shall be one of those contained in AIS 130 and its amendments in force at the time of application for type approval; and/or

(c) the light source module specific identification code.

In the case of a category S3 or S4 stop lamp, which is intended to be mounted inside the vehicle, the technical description shall contain the specification of the optical properties (transmission, colour, inclination, etc.) of the rear window(s).

2.2.3 In the case of a lamp with variable luminous intensity, a concise description of the variable intensity control, an arrangement diagram and a specification of the characteristics of the system ensuring the two levels of intensity;

2.2.4 Two samples; if the approval is applied for devices which are not identical but are symmetrical and suitable for mounting one on the left and one on the right side of the vehicle, the two samples submitted may be identical and be suitable for mounting only on the right or only on the left side of the vehicle.

In the case of a lamp with variable luminous intensity the application shall also be accompanied by the variable intensity control or a generator providing the same signal(s)."

2.2.5 In the case of a category S3 or S4 stop lamp which is intended to be mounted inside the vehicle, a sample plate or sample plates (in case of different possibilities) having the equivalent optical properties corresponding to those of the actual rear window(s).

2.2.6 Two samples; if the approval is applied for devices which are not identical but are symmetrical and suitable for mounting one on the left and one on the right side of the vehicle, the two samples submitted may be identical and be suitable for mounting only on the right or only on the left side of the vehicle; in the case of a stop-lamp with two levels of intensity, the application shall also be accompanied by two samples of the parts constituting the system which ensures two levels of intensity.

2.2.7 In the case of a category S3 stop lamp, which is intended to be mounted inside the vehicle, a sample plate or sample plates (in case of different possibilities) having the equivalent optical properties corresponding to those of the actual rear window(s).

3. MARKINGS

Devices submitted for approval:

- 3.1. Shall bear the trade name or mark of the applicant; this marking shall be clearly legible and be indelible;
- 3.2. With the exception of lamps with non-replaceable light sources it shall bear a clearly legible and indelible marking indicating:
 - (a) the category or categories of light source(s) prescribed; and/or
 - (b) the light source module specific identification code

- 3.3. Shall comprise a space of sufficient size for the approval marking and the additional symbols prescribed in AIS-037 and paragraph 4.2. below; this space shall be shown in the drawings mentioned in paragraph 2.2.1. above;
- 3.4. In the case of lamps with an electronic light source control gear or a variable intensity control and/or non-replaceable light sources and/or light source module(s), bear the marking of the rated voltage or range of voltage and rated maximum wattage.
- 3.5. Lamps operating at voltages other than the nominal rated voltages of 6 V, 12 V or 24 V respectively, by the application of an electronic light source control gear or a variable intensity control being not part of the lamp, or having a secondary operating mode, shall also bear a marking denoting the rated secondary design voltage."
- 3.6. In the case of lamps with light source module(s), the light source module(s) shall bear:
- 3.6.1. the trade name or mark of the applicant; this marking shall be clearly legible and indelible;
- 3.6.2. 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" this specific identification code shall be shown in the drawings mentioned in paragraph 2.2.1. above.
- 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 applicant.
- 3.6.3. The marking of the rated voltage or range of voltage and rated maximum wattage."
- 3.7. An electronic light source control gear or a variable intensity control being part of the lamp but not included into the lamp body shall bear the name of the manufacturer and its identification number."

4 APPROVAL

4.1. General

- 4.1.1. If the two devices which are submitted in pursuance of paragraph 2.2.4. above satisfy the provisions of this standard, approval shall be granted. All the devices of an interdependent lamp system must be submitted for type approval by the same applicant.
- 4.1.2. When two or more lamps are part of the same unit of grouped, combined or reciprocally incorporated lamps, approval may be granted only if each of these lamps satisfies the provisions set out in this standard or in another

standard. Lamps not satisfying the provisions of any of those standards shall not be part of such unit of grouped, combined or reciprocally incorporated lamps. This provision shall not apply to headlamps fitted with a double - filament bulb, where only one beam is approved.

4.1.3.

Reserved.

4.1.4.

Reserved.

4.1.5.

Every device conforming to a type approved under this standard shall bear, in the space referred to in paragraph 3.3. above, and in addition to the markings prescribed in paragraphs 3.1. and 3.2. or 3.4. respectively, an approval mark as described in paragraphs 4.2. and 4.3. below.

4.2.

Composition of the approval mark

The approval mark shall consist of:

4.2.1.

Reserved

4.2.2.

The following additional symbol or symbols:

4.2.2.1

On devices meeting the requirements of this standard in respect of the front position (side) lamps, the letter "A";

4.2.2.2

On devices meeting the requirements of this standard in respect of the rear position (side) lamps, the letter "R", followed by the figure "1" when the device produces steady luminous intensity and by the figure "2" when the device produces variable luminous intensity.

4.2.2.3

On devices meeting the requirements of this Standard in respect of the front end-outline marker lamps, the letters "AM";

4.2.2.4

On devices meeting the requirements of this Standard in respect of the rear end-outline marker lamps, the letters "RM" followed by the Figure "1" when the device produces steady luminous intensity and by the Figure "2" when the device produces variable luminous intensity;

4.2.2.5

On devices meeting the requirements of this standard in respect of the stop-lamps, the letter "S" followed by the figure:

"1" when the device produces steady luminous intensity;

"2" when the device produces variable luminous intensity;

"3" when the device meets the specific requirements for category S3 stop-lamps and produces steady luminous intensity

"4" when the device meets the specific requirements for category S4 stop-lamps and produces variable luminous intensity;

4.2.2.6

On devices comprising both a rear position (side) lamp and a stop- lamp meeting the requirements of this standard in respect of such lamps, the letters "R1" or "R2" and "S1" or "S2" as the case may be, separated by a horizontal dash;

4.2.2.7

On front or rear position lamps of which the visibility angles are asymmetrical with regard to the reference axis in a horizontal direction,

a horizontal arrow pointing towards the side on which the photometric specifications are met up to an angle of 80° H;

- 4.2.2.8 On devices which may be used as part of an assembly of two lamps, the additional letter "D" to the right of the symbol mentioned in paragraphs 4.2.2.1. and 4.2.2.4;
- 4.2.2.9 On devices with reduced light distribution in conformity to paragraph 2.3. in Annex D to this standard a vertical arrow starting from a horizontal segment and directed downwards.
- 4.2.2.10 On interdependent lamps, which may be used as part of an interdependent lamp system, the additional letter "Y" to the right of the symbol mentioned in paragraph 4.2.2.1. to 4.2.2.6. shall be marked on each device.
- 4.2.3. Reserved
- 4.2.4. The marks and symbols referred to in paragraph 4.2.2. above shall be clearly legible and indelible even when the device is fitted in the vehicle.

4.3. Arrangement of the approval mark

- 4.3.1. Reserved
 - 4.3.1.1 It is visible after their installation.
 - 4.3.1.2 Reserved
 - 4.3.1.3 Reserved
 - 4.3.1.4 The main body of the lamp shall include the space described in paragraph 3.3. above and shall bear the approval mark of the actual function(s).
 - 4.3.1.5 Reserved
- 4.3.2. Reserved
- 4.3.3. Reserved
- 4.3.4. The approval marking shall be clearly legible and indelible. It may be placed on an inner or outer part (transparent or not) of the device which cannot be separated from the transparent part 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 hood or boot lid or a door is opened.

5 GENERAL SPECIFICATIONS

- 5.1. Each device supplied shall conform to the specifications set forth in paragraphs 6 and 8 below.
- 5.2. The devices shall be so designed and constructed that in normal

conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this standard.

- 5.3. Lamps having been approved as front or rear position (side) lamps, are deemed being also approved end-outline marker lamps.
- 5.4. Front and rear position (side) lamps which are grouped or combined or reciprocally incorporated may also be used as end-outline marker lamps.
- 5.5. Position (side) lamps, which are reciprocally incorporated with another function, using a common light source, and designed to operate permanently with an additional system to regulate the intensity of the light emitted, are permitted.

- 5.5.1 However, in the case of rear (side) position lamp reciprocally incorporated with a stop lamp, the device shall either:
- (a) be a part of a multiple light source arrangement, or
 - (b) be intended for use in a vehicle equipped with a failure monitoring system for that function.

In either case, a note shall be made in the applicant document

- 5.6. In the case of light source modules, it shall be checked that:
- 5.6.1. 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 cannot be interchanged within the same lamp housing.
- 5.6.2. The light source module(s) shall be tamperproof.
- 5.6.3 A light source module shall be so designed that regardless of the use of tool(s), it shall not be mechanically interchangeable with any replaceable approved light source.
- 5.7 If the front position lamp incorporates one or more infrared radiation generators, the photometric and colour requirements for this front position lamp shall be met with and without the operation of the infrared radiation generator(s).
- 5.8 In case of failure of the variable intensity control of:
- (a) a rear position lamp category R2 emitting more than the maximum value of category R or R1;
 - (b) a stop lamp category S2 emitting more than the maximum value of category S1;
 - (c) a stop lamp category S4 emitting more than the maximum value of category S3 requirements of steady luminous intensity of the respective category shall be fulfilled automatically.

- 5.9 In the case of replaceable light source(s):

- 5.9.1 Any category or categories of light source(s) approved according to AIS 34 and /or AIS 130 may be used, provided that no restriction on the use is made in AIS 34 and its amendments in force at the time of application for type approval or in AIS 130 and its amendments in force at the time of application for type approval.

- 5.9.2 The design of the device shall be such that the light source can be fixed in no other position but the correct one.
- 5.9.3 The light source holder shall conform to the characteristics given in IEC Publication 60061. The holder data sheet relevant to the category of light source used, applies.
- 5.10 An interdependent lamp system shall meet the requirements when all its interdependent lamps are operated together. However, if the interdependent lamp system providing the rear position lamp function is partly mounted on the fixed component and partly mounted on a movable component, the interdependent lamp(s) specified by the Applicant shall meet the outboard geometric visibility, colorimetric and photometric requirement, at all fixed positions of the movable component(s). In this case, the inboard geometric visibility requirement is deemed to be satisfied if this (these) interdependent lamp(s) still conform to the photometric values prescribed in the field of light distribution for the approval of the device, at all fixed positions of the moveable component(s).

6 INTENSITY OF LIGHT EMITTED

- 6.1 The light emitted by each of the two devices supplied shall be in the reference axis, of not less than the minimum intensity and of not more than the maximum intensity specified below:

	<i>Minimum luminous intensity in cd</i>	<i>Maximum luminous intensity in cd when used as</i>	
		<i>Single lamp</i>	<i>Lamp (single) marked "D" paragraph 4.2.2.6.</i>
6.1.1. Front position lamps, front end-outline marker lamp A or AM	4	140	70
6.1.2. Front position lamps incorporated in a headlamp or front fog lamp	4	140	-
6.1.3. Rear position lamps, rear end-outline marker lamp			
6.1.3.1. R, R1 or RM1 (steady)	4	17	8.5
6.1.3.2. R2 or RM2 (variable)	4	42	21
6.1.4. Stop-lamps			
6.1.4.1. S1 (steady)	60	260	130
6.1.4.2. S2 (variable)	60	730	365
6.1.4.3. S3 (steady)	25	110	55
6.1.4.4. S4 (variable)	25	160	80

- 6.1.5 For an assembly of two or more lamps the total intensity shall not exceed the maximum value prescribed for a single lamp.
- 6.1.6 When an assembly of two independent lamps to be type approved as

"D" lamps having the same function is deemed to be a single lamp, it shall comply with the requirements for:

- (a) Maximum intensity if all lamps together are lit;
- (b) Minimum intensity if either lamp has failed.

- 6.1.7 In case of failure of a single lamp containing more than one light source the following provisions shall apply:
 - 6.1.7.1 A group of light sources, wired so that the failure of any one of them causes all of them to stop emitting light, shall be considered to be one light source.
 - 6.1.7.2 The lamp shall comply with the minimum intensity required in the table of standard light distribution in space as shown in Annex 4 when any one light source has failed. However, for lamps designed for only two light sources, 50 per cent of the minimum intensity in the axis of reference of the lamp shall be considered sufficient, provided that a note in the communication form states that the lamp is only for use on a vehicle fitted with an operating tell-tale which indicates when any one of these two light sources has failed.
- 6.2. Outside the reference axis and within the angular fields defined in the diagrams in Annex A to this standard, the intensity of the light emitted by each of the two devices supplied shall:
 - 6.2.1. 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 minimum specified in paragraph 6.1. above by the percentage specified in the said table of the direction in question;
 - 6.2.2. In no direction within the space from which the light-signalling device is visible, exceed the maximum specified in paragraph 6.1. above;
 - 6.2.3. However, a luminous intensity of 60 cd shall be permitted for rear position (side) lamps reciprocally incorporated with stop-lamps (see paragraph 6.1.3. above) below a plane forming an angle of 5° with and downward from the horizontal plane;
 - 6.2.4. Moreover,
 - 6.2.4.1. Throughout the fields defined in the diagrams in Annex A, the luminous intensity of the light emitted must be not less than 0.05 cd for front and rear position lamps and end-outline marker lamps, not less than 0.3 cd for devices of categories S1, S3 and for those of categories S2 and S4 by day; it shall not be less than 0.07 cd for devices of categories S2 and S4 by night
 - 6.2.4.2. If a rear position lamp and/or a rear end-outline marker lamp is reciprocally incorporated with a stop-lamp producing either steady or variable luminous intensity, the ratio between the luminous intensities actually measured of the two lamps when turned on simultaneously at the intensity of the rear position lamp or end-outline marker lamp when turned on alone should be at least 5: 1 in the field delimited by the straight horizontal lines passing through $\pm 5^\circ$ V and the straight vertical lines passing through $\pm 10^\circ$ H of the light distribution table.

If the one or both of the two reciprocally incorporated lamps contain(s) more than one light source and is (are) considered as a single lamp, the values to be considered are those obtained with all light sources in operation;

- 6.2.4.3. The provisions of paragraph D 2.2. of Annex D to this standard on local variations of intensity shall be observed.
- 6.3. The intensities shall be measured with the light source(s) continuously alight and, in the case of devices emitting red light, in coloured light.
- 6.4. In the case of devices of categories R2, S2 and S4 the time that elapses between energising the light source(s) and the light output measured on the reference axis to reach 90 per cent of the value measured in accordance with paragraph 6.3. above shall be measured for the extreme levels of luminous intensity produced by the device. The time measured to obtain the lowest luminous intensity shall not exceed the time measured to obtain the highest luminous intensity.
- 6.5. The variable intensity control shall not generate signals which cause luminous intensities
- 6.5.1 Outside the range specified in paragraph 6.1. above and

- 6.5.2. Exceeding the respective steady luminous intensity maximum specified in paragraph 6.1. for the specific device
- (a) for systems depending only on daytime and night time conditions: under night time conditions
 - (b) for other systems: under standard conditions ^{1/}.
- 6.6 Annex D, to which reference is made in paragraph 6.2.1. above, gives particulars of the methods of measurement to be used.

7 TEST PROCEDURE

- 7.1 All measurements, photometric and colorimetric, shall be made:
- 7.1.1 In case of a lamp with replaceable light source, if not supplied by an electronic light source control gear or a variable intensity control, with an uncoloured or coloured standard filament lamp of the category prescribed for the device, supplied with the voltage :
- (a) In the case of filament lamp(s), that is necessary to produce the reference luminous flux required for that category of filament lamp;
 - (b) In the case of LED light source(s) of 6.75 V, 13.5 V or 28.0 V; the luminous flux value produced shall be corrected. The correction factor is the ratio between the objective luminous flux and the value of the luminous flux found at the voltage applied.
- 7.1.2 In the case of a lamp equipped with non-replaceable light sources (filament lamps and other), at 6.75 V, 13.5 V or 28.0 V respectively.
- 7.1.3 In the case of a system that uses an electronic light source control gear or a variable intensity control, being part of the lamp ^{2/} applying at the input terminals of the lamp the voltage declared by the manufacturer or, if not indicated, 6.75 V, 13.5 V or 28.0 V respectively.
- 7.1.4 In the case of a system that uses an electronic light source control gear or a variable intensity control, not being part of the lamp the voltage declared by the manufacturer shall be applied to the input terminals of the lamp.
- 7.2. However, in the case of light sources operated by a variable intensity control to obtain variable luminous intensity, photometric measurements shall be performed according to the applicant's description.
- 7.3. The test laboratory shall require from the manufacturer the light source control gear or a variable intensity control needed to supply the light source and the applicable functions.
- 7.4 The voltage to be applied to the lamp shall be noted in the application for type approval.
- 7.5 The limits of the apparent surface in the direction of the reference axis of a light-signalling device shall be determined.
- 7.6. In the case of a category S3 or S4 stop lamp, which is intended to be mounted inside the vehicle a sample plate or sample plates (in case of different possibilities) as supplied (see paragraph 2.2.5.) shall be positioned in front of the lamp to be tested, in the geometrical position(s) as described in the application drawing(s) (see paragraph 2.2.1.).

1/ Good visibility (meteorological optical range MOR > 2,000 m defined according to WMO, Guide to Meteorological Instruments and Methods of Observation, Sixth Edition, ISBN: 92-63-16008-2, pp 1.9.1/1.9.11, Geneva 1996) and clean lens.

2/ For the purpose of this standard "being part of the lamp" means to be physically included in the lamp body or to be external, separated or not, but supplied by the lamp manufacturer as part of the lamp system.

8 COLOUR OF LIGHT EMITTED

- 8.1 The colour of the light emitted inside the field of the light distribution grid defined in paragraph D 2 of Annex D shall be within the limits of the coordinates prescribed in AIS-010 (Part 5)(Rev.1). Outside this field, no sharp variation of colour shall be observed.
- 8.2 These requirements shall also apply within the range of variable luminous intensity produced by:
- (a) rear position lamps of category R2;
 - (b) stop lamps of categories S2 and S4.

9 CONFORMITY OF PRODUCTION

- 9.1 The Conformity of Production procedures shall comply with those set out in the AIS-037, with the following requirements:
- 9.2 Lamps approved under this standard shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6 and 8 above.
- 9.3 The minimum requirements for Conformity of Production control procedures set forth in Annex F to this standard shall be complied with.
- 9.4 The minimum requirements for sampling by the testing agency set forth in Annex G to this standard shall be complied with.
- 9.5 The Test Agency which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

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

11 to 13 Reserved

14. **TRANSITIONAL PROVISIONS (To be included later)**

15. ESTABLISHING COMPLIANCE OF “E”/“e” APPROVED FRONT POSITION, REAR POSITION, STOP-LAMP AND END OUTLINE MARKER LAMPS TO THIS STANDARD

- 15.1 As an exception to 7.4 of AIS-037, (or related administrative decisions) for certifying compliance of “E”/“e” marked light and light signalling devices to this standard, the test for the following shall be carried out by testing agency.
- 15.1.1 Photometric requirements shall be within the limits specified in 9.0.
 - 15.1.2 Colourimetric requirements shall be within the limits specified in 6.0.

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

16.1 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.

16.2 Series of amendments

Changes in UN regulation, which are issued as series of amendments (series of amendments may affect the earlier type approvals) will not be considered for issuing approval to this standard.

However, Chairman, AISC may, on a case to case basis, permit to accept latest series of amendments.

This shall be incorporated in the test report.

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

17.1.1 The model with the changed specifications still complies with provisions, or

17.1.2 Any further verification is required to establish compliance.

17.2 For considering whether testing is required or not, guidelines given in 18.0 (Criteria for Extension of Approval) shall be used.

17.3 In case of 17.1.2, tests for only those parameters which are affected by the modifications need be carried out

17.4 In case of fulfillment of criterion of 17.1.1 or after results of further verification as per 17.1.2 are satisfactory, the approval of compliance shall be extended for the changes carried out.

18. CRITERIA FOR EXTENSION OF APPROVAL

The criteria shall be as agreed between the testing agency and applicant.

ANNEX A

(See 6.2)

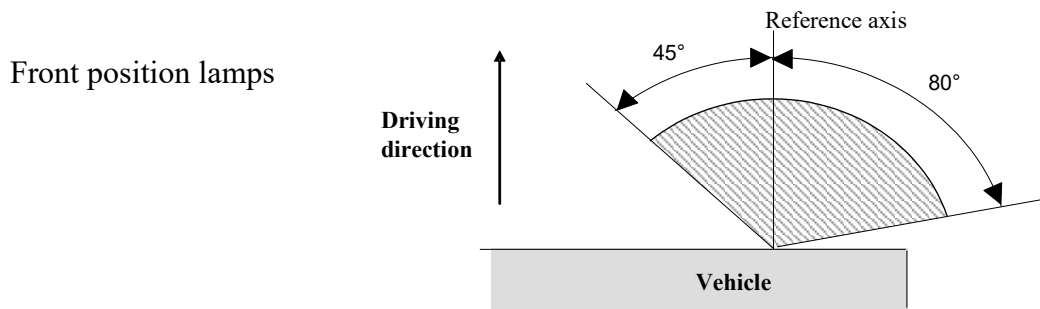
**FRONT AND REAR POSITION (SIDE) LAMPS, END-OUTLINE MARKER
LAMPS AND STOP-LAMPS: MINIMUM ANGLES REQUIRED FOR LIGHT
DISTRIBUTION IN SPACE OF THESE LAMPS^{1/}**

^{1/} The angles shown in these diagrams are correct for devices to be mounted on the right side of the vehicle. The arrows point to the front of the vehicle.

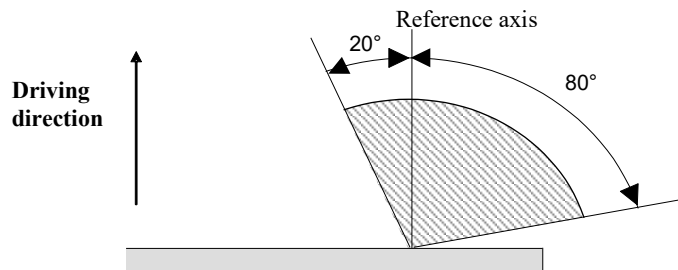
Stop-lamps (S3)

In all cases, the minimum vertical angles of light distribution in space are 15° above and 15° below the horizontal for all categories of devices included in this Standard, except:

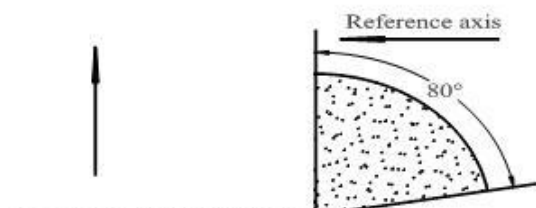
- (a) For lamps intended to be installed with their H plane at a mounting height less than 750 mm above the ground, for which they are 15° above and 5° below the horizontal;
- (b) Optional lamps intended to be installed with their H plane at a mounting height more than 2,100 mm above the ground, for which they are 5° above and 15° below the horizontal;
- (c) For category S3 or S4 stop lamp for which they are 10° above and 5° below the horizontal.



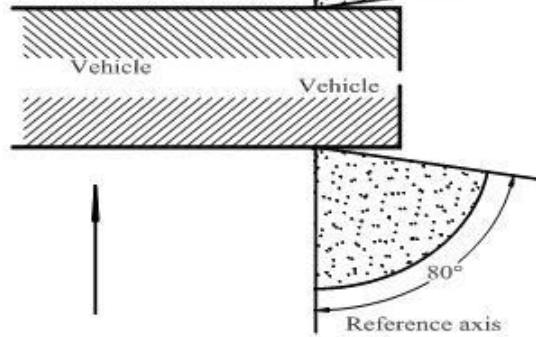
Under the H plane for front position lamps intended to be installed with this plane at a mounting height less than 750 mm above ground.



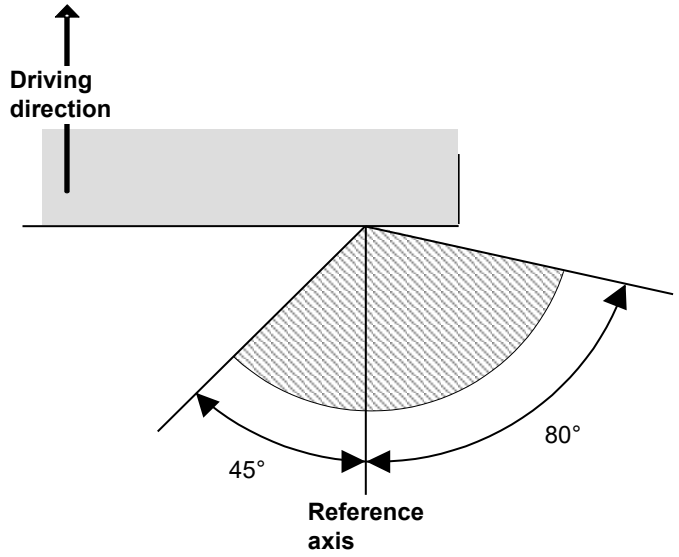
Front end outline marker lamp (AM)



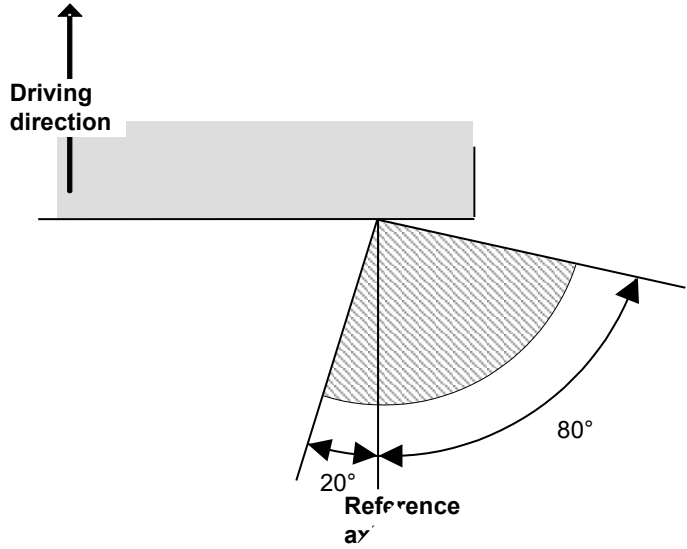
Rear end outline marker lamp (RM1, RM2)



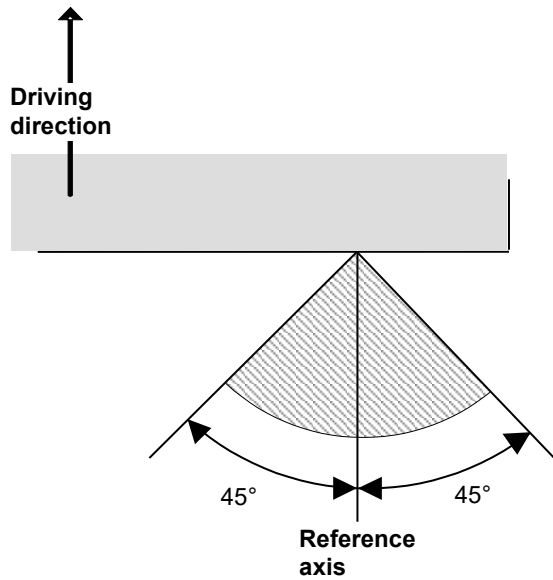
Rear position lamps



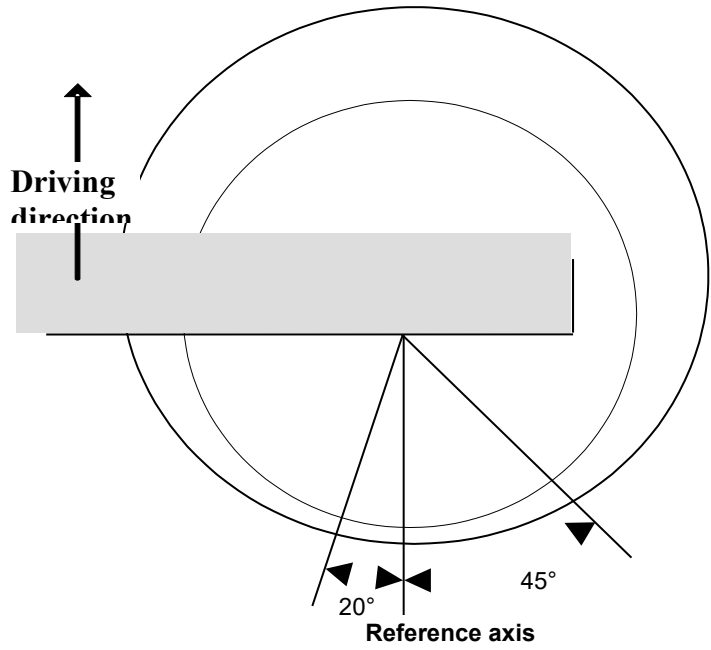
Under the H plane for rear position lamps intended to be installed with this plane at a mounting height less than 750 mm above ground.



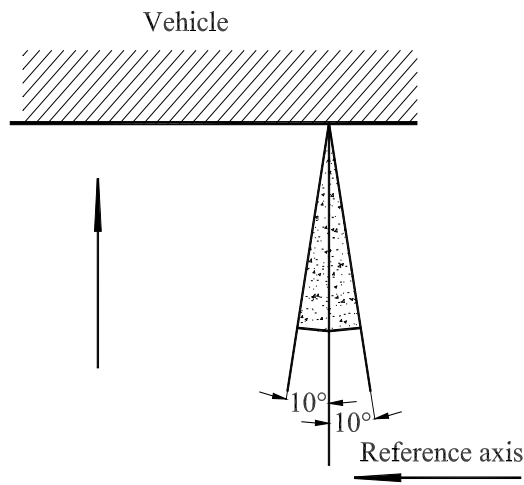
Stop-lamps (S1 and S2)



Under the H plane for stop lamps (S1 and S2) intended to be installed with this plane at a mounting height less than 750 mm above ground.



Stop-lamps (S3 and S4)



ANNEX B
(Reserved)

ANNEX C
(Reserved)

ANNEX D

(See 6.2.1)

PHOTOMETRIC MEASUREMENTS

D1. MEASUREMENT METHODS

- D1.1. During photometric measurements, stray reflections shall be avoided by appropriate masking.
- D1.2. In case the results of measurements should be challenged, measurements shall be carried out in such a way as to meet the following requirements:
 - D1.2.1. The distance of measurement shall be such that the law of the inverse of the square of the distance is applicable;
 - D1.2.2. The measuring equipment shall be such that the angular aperture of the receiver viewed from the reference centre of the lamp is comprised between 10 angular minutes and one degree;
 - D1.2.3. 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 one-quarter of a degree from the direction of observation.
- D1.3. 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 of the field of the reference axis specified by the manufacturer.

D2. TABLE OF STANDARD LIGHT DISTRIBUTION

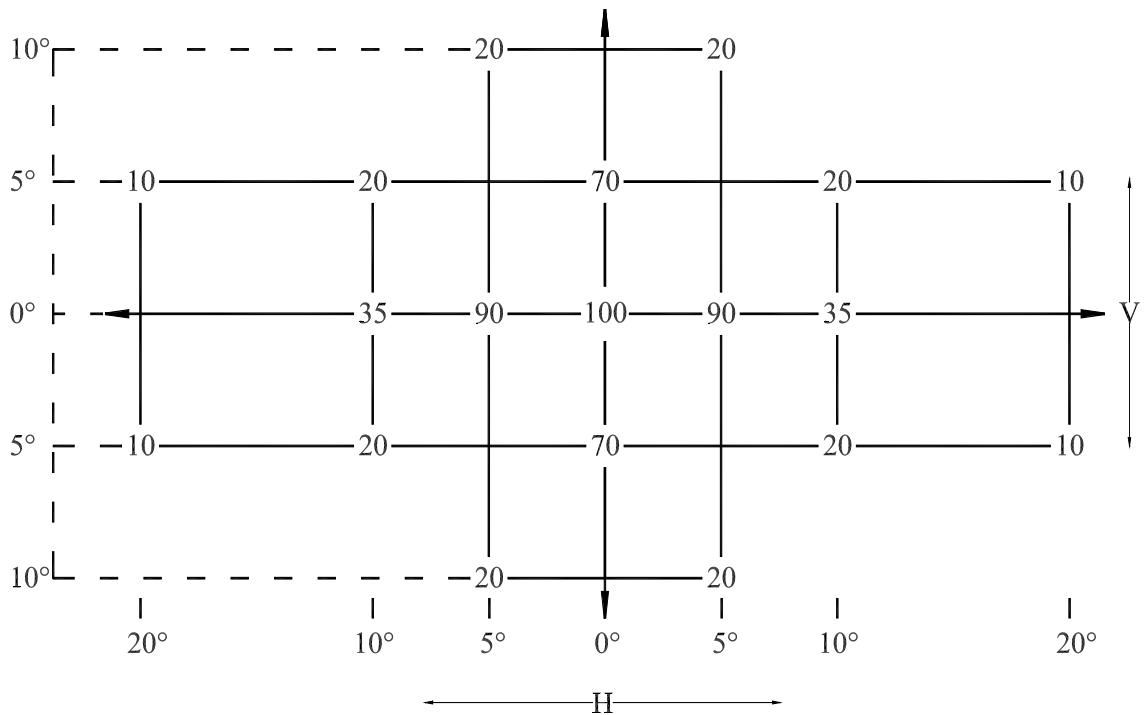


Table of light distribution for category S3 stop-lamp

10°	32	-	64	-	32
5°	64	100	100	100	64
0°	64	100	100	100	64
5°	64	100	100	100	64
	10°	5°	0°	5°	10°

D2.1. The direction $H = 0^\circ$ and $V = 0^\circ$ 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 measurement, the minimum intensities as a percentage of the minimum required in the axis for each lamp (in the direction $H = 0^\circ$ and $V = 0^\circ$).

D2.2. Within the field of light distribution of paragraph D2. schematically shown as a grid, the light pattern should be substantially uniform, i.e. the light intensity in each direction of a part of the field formed by

the grid lines shall meet at least the lowest minimum value being shown on the grid lines surrounding the questioned direction as a percentage.

- D2.3. However, in the case where a device is intended to be installed at a mounting height of equal to or less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.

D3. PHOTOMETRIC MEASUREMENT OF LAMPS

The photometric performance shall be checked:

- D3.1. For non-replaceable light sources (filament lamps and other):
with the light sources present in the lamp, in accordance with the relevant sub-paragraph of paragraph 7.1. of this standard.

- D3.2. For replaceable light source(s):

When equipped with light source(s) at 6.75 V, 13.5 V or 28.0 V, the luminous intensity values produced shall be corrected. For filament lamps 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).

For LED light sources the correction factor is the ratio between the objective 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 light source used shall not deviate more than 5 per cent from the mean value.

Alternatively, and in case of filament lamps only, 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.

- D3.3. For any signalling lamp except those equipped with filament lamp(s), the luminous intensities, measured after one minute and after 30 minutes of operation, shall comply with the minimum and maximum requirements. 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 8)

COLOURS OF LIGHTS

For checking these colorimetric characteristics, the test procedure described in paragraph 7. of this standard shall be applied.

However, for lamps equipped with non-replaceable light sources (filament lamps and other), the colorimetric characteristics should be verified with the light sources present in the lamp, in accordance with the relevant sub-paragraph of paragraph 7.1. of this standard.

In the case of a category S3 or S4 stop lamp, which is intended to be mounted inside the vehicle, the colorimetric characteristics shall be verified with the worst case combination(s) of lamp and rear window(s) or sample plate(s).

ANNEX F

(See 9.3)

MINIMUM REQUIREMENTS FOR CONFORMITY OF PRODUCTION CONTROL PROCEDURES

F1. GENERAL

- F1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this standard.
- F1.2. With respect to photometric performances, the conformity of mass-produced lamps shall not be contested if, when testing photometric performances of any lamp chosen at random according to paragraph 7. of this standard, respectively:
- F1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this standard.
- F1.2.2. If, in the case of a lamp equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on lamps shall be repeated using another standard [light source](#).
- F1.3. The chromaticity coordinates shall be complied when tested under conditions of paragraph 7. of this standard.

F2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of lamp the holder of the approval mark shall carry out at least the following tests, at appropriate intervals. The tests shall be carried out in accordance with the provisions of this standard.

If any sampling shows non-conformity with regard to the type of test concerned, further samples shall be taken and tested. The manufacturer shall take steps to ensure the conformity of the production concerned.

F2.1. Nature of tests

Tests of conformity in this standard shall cover the photometric and colorimetric characteristics.

F2.2. Methods used in tests

- F2.2.1. Tests shall generally be carried out in accordance with the methods set out in this standard.

F2.2.2. In any test of conformity carried out by the manufacturer, equivalent methods may be used with the consent of the testing agency responsible for approval tests. The manufacturer is responsible for proving that the applied methods are equivalent to those laid down in this standard.

F2.2.3. The application of paragraphs F 2.2.1. and F 2.2.2. requires regular calibration of test apparatus and its correlation with measurements made by a testing agency.

F2.2.4. In all cases the reference methods shall be those of this standard, particularly for the purpose of administrative verification and sampling.

F2.3. Nature of sampling

Samples of lamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of lamps of the same type, defined according to the production methods of the manufacturer.

The assessment shall in general cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories, provided these operate under the same quality system and quality management.

F2.4. Measured and recorded photometric characteristics

The sampled lamp shall be subjected to photometric measurements for the minimum values at the points listed in Annex D and the chromaticity coordinates listed in Annex E, provided for in the standard.

F2.5. Criteria governing acceptability

The manufacturer is responsible for carrying out a statistical study of the test results and for defining, in agreement with the testing agency, criteria governing the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 9.1. of this standard.

The criteria governing the acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing a spot check in accordance with Annex G (first sampling) would be 0.95.

ANNEX G

(See 9.4)

**MINIMUM REQUIREMENTS FOR SAMPLING BY A TESTING
AGENCY**

G1. GENERAL

G1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometric standpoint, in accordance with the requirements of this standard, if any, if the differences do not exceed inevitable manufacturing deviations.

G1.2. With respect to photometric performances, the conformity of mass-produced lamps shall not be contested if, when testing photometric performances of any lamp chosen at random according to paragraph 7. of this standard, respectively:

G1.2.1. No measured value deviates unfavourably by more than 20 per cent from the values prescribed in this standard.

G1.2.2. If, in the case of a lamp equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on lamps shall be repeated using another standard light source.

G1.2.3. Lamps with apparent defects are disregarded.

G1.3. The chromaticity coordinates shall be complied when tested under conditions of paragraph 7. of this standard.

G2. FIRST SAMPLING

In the first sampling four lamps are selected at random. The first sample of two is marked A, the second sample of two is marked B.

G2.1. The conformity is not contested

G2.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall not be contested if the deviation of the measured values of the lamps in the unfavourable directions are:

G2.1.1.1. sample A

A1:	one lamp	0 per cent
	one lamp not more than	20 per cent

A2:	both lamps more than	0 per cent
	but not more than	20 per cent
	go to sample B	

G2.1.1.2. sample B

B1:	both lamps	0 per cent
-----	------------	------------

G2.1.2. or, if the conditions of paragraph G1.2.2. for sample A are fulfilled.
G2.2. **The conformity is contested**

G2.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the lamps are:

G2.2.1.1. sample A

A3: one lamp not more than	20 per cent
one lamp more than	20 per cent
but not more than	30 per cent

G2.2.1.2. sample B

B2: in the case of A2	
one lamp more than	0 per cent
but not more than	20 per cent
one lamp not more than	20 per cent

B3: in the case of A2	
one lamp	0 per cent
one lamp more than	20 per cent
but not more than	30 per cent

G2.2.2. or, if the conditions of paragraph G1.2.2. for sample A are not fulfilled.

G2.3. **Non conformity established**

Conformity shall be contested and paragraph 10 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the lamps are:

G2.3.1. sample A

A4: one lamp not more than	20 per cent
one lamp more than	30 per cent

A5: both lamps more than	20 per cent
--------------------------	-------------

G2.3.2. sample B

B4: in the case of A2	
one lamp more than	0 per cent
but not more than	20 per cent
one lamp more than	20 per cent

B5: in the case of A2	
both lamps more than	20 per cent

B6: in the case of A2	
-----------------------	--

- | | | |
|---------|-----------------------------------------------------------------------------------|-------------|
| | one lamp | 0 per cent |
| | one lamp more than | 30 per cent |
| G2.3.3. | or, if the conditions of paragraph G1.2.2. for samples A and B are not fulfilled. | |

G3. REPEATED SAMPLING

In the cases of A3, B2, B3 a repeated sampling, third sample C of two lamps and fourth sample D of two lamps, selected from stock manufactured after alignment, is necessary within two months' time after the notification.

G3.1. The conformity is not contested

G3.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall not be contested if the deviations of the measured values of the lamps are:

G3.1.1.1. sample C

- | | | |
|--|--------------------------|-------------|
| | C1: one lamp | 0 per cent |
| | one lamp not more than | 20 per cent |
| | C2: both lamps more than | 0 per cent |
| | but not more than | 20 per cent |
| | go to sample D | |

G3.1.1.2. sample D

- | | | |
|--|-----------------------|------------|
| | D1: in the case of C2 | |
| | both lamps | 0 per cent |

G3.1.2. or, if the conditions of paragraph G1.2.2. for sample C are fulfilled.

G3.2. The conformity is contested

G3.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the lamps are:

G3.2.1.1. sample D

- | | | |
|--|------------------------|-------------|
| | D2: in the case of C2 | |
| | one lamp more than | 0 per cent |
| | but not more than | 20 per cent |
| | one lamp not more than | 20 per cent |

G3.2.1.2. or, if the conditions of paragraph G1.2.2. for sample C are not fulfilled.

G3.3. **Non conformity established**

Conformity shall be contested and paragraph 10 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the lamps are:

G3.3.1. sample C

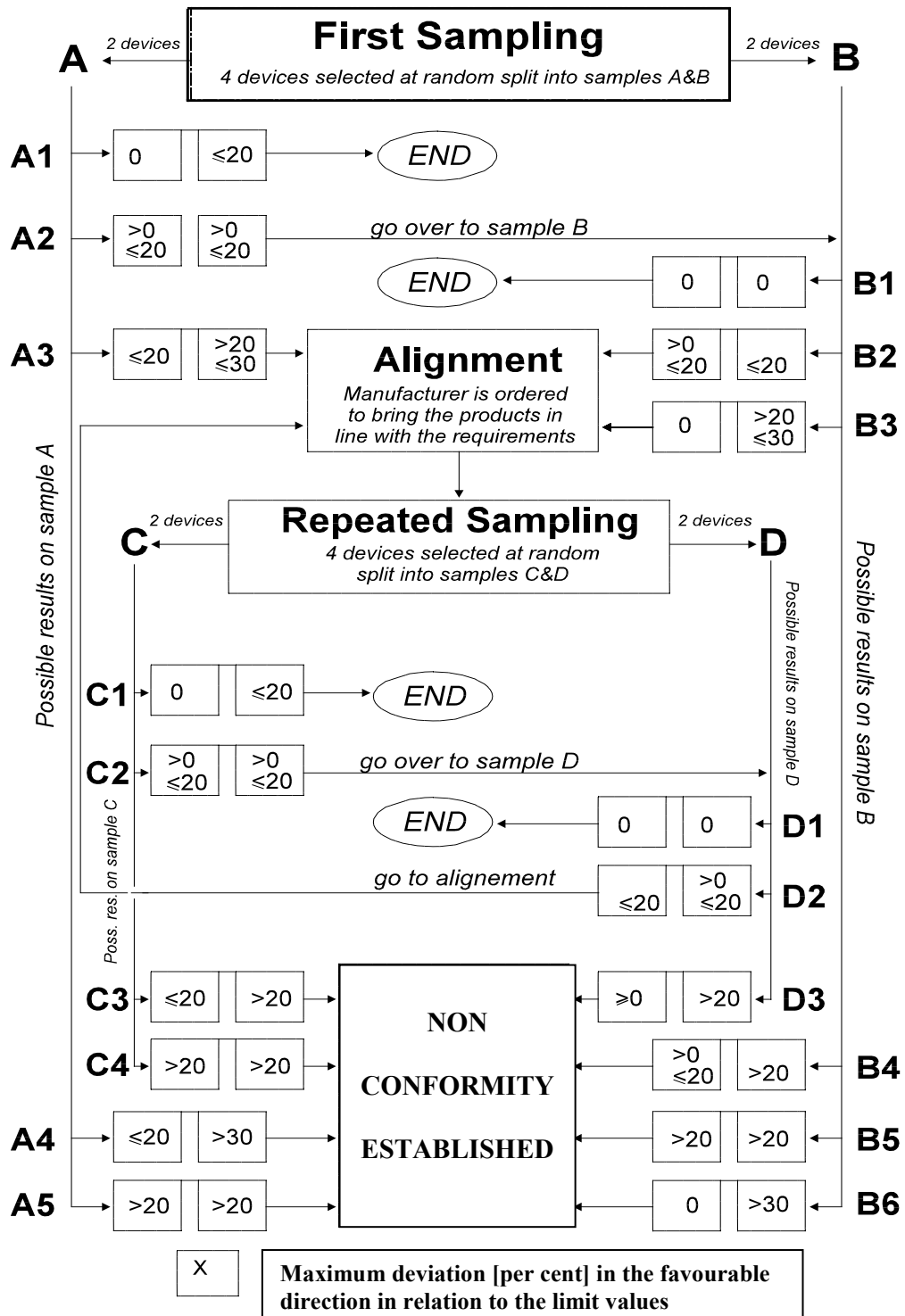
C3:	one lamp not more than	20 per cent
	one lamp more than	20 per cent
C4:	both lamps more than	20 per cent

G3.3.2. sample D

D3:	in the case of C2	
	one lamp 0 or more than	0 per cent
	one lamp more than	20 per cent

G3.3.3. or, if the conditions of paragraph G1.2.2. for samples C and D are not fulfilled.

Figure 1



ANNEX H
(See introduction)

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

(To be included)

ANNEX J
(See introduction)

COMMITTEE COMPOSITION*
Automotive Industry Standards Committee

(To be included)