

DRAFT

AUTOMOTIVE INDUSTRY STANDARD

Requirements of Chromaticity Co-ordinates of Colour of
Light emitted from Lighting and Light-Signalling Devices

(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						

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 colour chromaticity co-ordinates requirements for lighting and light signalling devices for use in two and three wheelers 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.
0.3	This part covers the requirements of chromaticity co-ordinates for colour of light emitted from lighting and light signalling devices covered in other parts of AIS-010 (Rev.1)
0.4	This part is based on the UN ECE R 48 (Supplement 1 to the 04 series of amendments - Date of entry into force: 15 October 2008).
0.5	The colour coordinates used to be prescribed in each regulation individually. These has been now consolidated in UN ECE R48. Since the AIS-008- Installation Requirements of Lighting and Light-Signaling Devices for Motor Vehicle having more than Three Wheels, Trailer and Semi -Trailer excluding Agricultural Tractor and Special Purpose Vehicle is based on UN ECE R48 is not yet aligned to that level, this part is prepared for giving cross reference of this standard in other standards for lighting and light signalling devices.
0.6	The AISC panel responsible for formulation of this standard is given in Annex ##
0.7	The Automotive Industry Standards Committee (AISC) responsible for approval of this standard is given in Annex ##

**Requirements of Chromaticity Co-ordinates of Colour of Light emitted from Lighting
and Light-Signalling Devices**

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CHECK LIST FOR PREPARING AUTOMOTIVE INDUSTRY STANDARD

Draft AIS-010 (Part 5) (Rev.2)

**REQUIREMENTS OF CHROMATICITY CO-ORDINATES OF COLOUR OF LIGHT
EMITTED FROM LIGHTING AND LIGHT-SIGNALLING DEVICES**

SR. NO.	PARTICULARS	REMARKS
1.	Indicate details of the base reference standard. (eg.UN ECE / EEC Directive/GTR etc.)	UN ECE Regulation No.48 - Rev.12, Supplement 4 to the 06 series of amendments to the Regulation (Date of entry into force: 9 October 2014)
2.	Add an explanatory note indicating differences between the above standard and the draft, if any.	Reference to tyres removed as there are no Indian regulation equivalent to ÚNECE R 88 – Retroreflective tyres for two wheelers.
3.	Specify details of technical specifications to be submitted at the time of type approval relevant to the requirements of this standard covered.	Not Required
4.	Are the details of Worst Case Criteria covered?	No.
5.	Are the performance requirements covered?	No.
6.	Is there a need to specify dimensional requirements?	No.
7.	If yes, are they covered?	Not Required
8.	Is there a need to specify COP requirements? If yes, are they covered?	No,Not Required
9.	Is there a need to specify type approval and routine test separately, as in the case of some of the Indian Standards? If yes, are they covered?	Not required.
10.	If the standard is for a part/component or sub- system; i) AIS-037 or ISI marking scheme be implemented for this part? ii) Are there any requirements to be covered for this part when fitted on the vehicle? If yes, has a separate standard been prepared?	i) No ii) Not required

11.	If the standard is intended for replacing or revising an already notified standard, are transitory provisions for re-certification of already certified parts/vehicles by comparing the previous test result, certain additional test, etc. required? If yes, are they included?	No. No.
12.	Include details of any other international or foreign national standards which could be considered as alternate standard.	No. However further Amendments/ Supplements / corrigendum to UN ECE R 48 may be considered for certification.
13.	Are the details of accuracy and least counts of test equipment/meters required to be specified? If yes, have they been included?	Not required
14.	What are the test equipment for establishing compliance?	As specified in this standards
15.	If possible, identify such facilities available in India.	Test agencies to confirm.
16.	Are there any points on which special comments or information is to be invited from members? If yes, are they identified?	Comments / discussion required on yellow highlighted points.
17.	Does the scope of standard clearly identify vehicle categories?	Yes
18.	Has the clarity of definitions been examined?	Yes

Requirements of Chromaticity Co-ordinates of Colour of Light emitted from Lighting and Light-Signalling Devices

1.0 SCOPE

This standard applies to requirement of chromaticity coordinates of colour of light emitted from lighting and light signalling devices used in motor vehicles.

Note: Test procedure for colour measurement of light emitted from lighting & light signalling devices is given in respective part of the standard.

2.0 CHROMATICITY COORDINATES FOR WHITE

White means the chromaticity coordinates (x,y) ¹ of the light emitted that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	green boundary	$y = 0.150 + 0.640 x$
W ₂₃	yellowish green boundary	$y = 0.440$
W ₃₄	yellow boundary	$x = 0.500$
W ₄₅	reddish purple boundary	$y = 0.382$
W ₅₆	purple boundary	$y = 0.050 + 0.750 x$
W ₆₁	blue boundary	$x = 0.310$

With intersection points:

	X	y
W ₁	0.310	0.348
W ₂	0.453	0.440
W ₃	0.500	0.440
W ₄	0.500	0.382
W ₅	0.443	0.382
W ₆	0.310	0.283

¹CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer.

3.0 CHROMATICITY COORDINATES FOR SELECTIVE YELLOW

Selective-yellow means the chromaticity coordinates $(x,y)^1$ of the light emitted that lie inside the chromaticity areas defined by the boundaries:

SY ₁₂	green boundary	$y = 1.290 x - 0.100$
SY ₂₃	the spectral locus	
SY ₃₄	red boundary	$y = 0.138 + 0.580 x$
SY ₄₅	yellowish white boundary	$y = 0.440$
SY ₅₁	white boundary	$y = 0.940 - x$

With intersection points:

	X	y
SY ₁	0.454	0.486
SY ₂	0.480	0.519
SY ₃	0.545	0.454
SY ₄	0.521	0.440
SY ₅	0.500	0.440

3.0 CHROMATICITY COORDINATES FOR AMBER

"Amber" means the chromaticity coordinates $(x,y)^1$ of the light emitted that lie inside the chromaticity areas defined by the boundaries:

A ₁₂	green boundary	$y = x - 0.120$
A ₂₃	the spectral locus	
A ₃₄	red boundary	$y = 0.390$
A ₄₁	white boundary	$y = 0.790 - 0.670 x$

With intersection points:

	X	y
A ₁	0.545	0.425
A ₂	0.560	0.440
A ₃	0.609	0.390
A ₄	0.597	0.390

5.0 CHROMATICITY COORDINATES FOR RED

"Red" means the chromaticity coordinates (x,y)¹ of the light emitted that lie inside the chromaticity areas defined by the boundaries:

R ₁₂	yellow boundary	$y = 0.335$
R ₂₃	the spectral locus	
R ₃₄	the purple line	(its linear extension across the purple range of colours between the red and the blue extremities of the spectral locus).
R ₄₁	purple boundary:	$y = 0.980 - x$

With intersection points:

	X	y
R ₁	0.645	0.335
R ₂	0.665	0.335
R ₃	0.735	0.265
R ₄	0.721	0.259

6.0 NIGHT-TIME COLOUR OF THE LIGHT RETRO-REFLECTED FROM A DEVICE EXCLUDING RETRO-REFLECTIVE TIRES IF ANY

6.1. "White" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	blue boundary:	$y = 0.843 - 1.182 x$
W ₂₃	violet boundary	$y = 0.489 x + 0.146$
W ₃₄	yellow boundary	$y = 0.968 - 1.010 x$
W ₄₁	green boundary	$y = 1.442 x - 0.136$

With intersection points:

	x	Y
W ₁	0.373	0.402
W ₂	0.417	0.350
W ₃	0.548	0.414
W ₄	0.450	0.513

6.2. "Yellow" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

Y ₁₂	green boundary	$y = x - 0.040$
Y ₂₃	the spectral locus	
Y ₃₄	red boundary	$y = 0.200 x + 0.268$
Y ₄₁	white boundary	$y = 0.970 - x$

With intersection points:

	x	Y
Y ₁	0.505	0.465
Y ₂	0.520	0.480
Y ₃	0.610	0.390
Y ₄	0.585	0.385

6.3. "Amber" means the chromaticity coordinates (x,y)¹ of the light reflected

that lie inside the chromaticity areas defined by the boundaries:

A ₁₂	green boundary	$y = 1.417 x - 0.347$
A ₂₃	the spectral locus	
A ₃₄	red boundary	$y = 0.390$
A ₄₁	white boundary	$y = 0.790 - 0.670 x$

With intersection points:

	x	Y
A ₁	0.545	0.425
A ₂	0.557	0.442
A ₃	0.609	0.390
A ₄	0.597	0.390

6.4. "Red" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

R ₁₂	yellow boundary	$y = 0.335$
R ₂₃	the spectral locus	
R ₃₄	the purple line	
R ₄₁	purple boundary	$y = 0.978 - x$

With intersection points:

	X	y
R ₁	0.643	0.335
R ₂	0.665	0.335
R ₃	0.735	0.265

R ₄	0.720	0.258
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7.0 DAY-TIME COLOUR OF THE LIGHT REFLECTED FROM A DEVICE

7.1 "White" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	violet boundary	$y = x - 0.030$
W ₂₃	yellow boundary	$y = 0.740 - x$
W ₃₄	green boundary	$y = x + 0.050$
W ₄₁	blue boundary	$y = 0.570 - x$

With intersection points:

	X	Y
W ₁	0.300	0.270
W ₂	0.385	0.355
W ₃	0.345	0.395
W ₄	0.260	0.310"

7.2. "Yellow" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

Y ₁₂	red boundary	$y = 0.534 x + 0.163$
Y ₂₃	white boundary	$y = 0.910 - x$
Y ₃₄	green boundary	$y = 1.342 x - 0.090$
Y ₄₁	the spectral locus	

With intersection points:

	x	Y
Y ₁	0.545	0.454
Y ₂	0.487	0.423
Y ₃	0.427	0.483

Y ₄	0.465	0.534
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7.3. "Red" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

R ₁₂	red boundary	$y = 0.346 - 0.053 x$
R ₂₃	purple boundary	$y = 0.910 - x$
R ₃₄	yellow boundary	$y = 0.350$
R ₄₁	the spectral locus	

With intersection points:

	X	Y
R ₁	0.690	0.310
R ₂	0.595	0.315
R ₃	0.560	0.350
R ₄	0.650	0.350"

8.0 DAY-TIME COLOUR OF THE FLUORESCENT A DEVICE

8.1. "Red" means the chromaticity coordinates (x,y)¹ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

FR ₁₂	red boundary	$y = 0.346 - 0.053 x$
FR ₂₃	purple boundary	$y = 0.910 - x$
FR ₃₄	yellow boundary	$y = 0.315 + 0.047 x$
FR ₄₁	the spectral locus	

With intersection points:

	X	Y
FR ₁	0.690	0.310
FR ₂	0.595	0.315
FR ₃	0.569	0.341
FR ₄	0.655	0.345

Transitory Provisions

Verification of colour for clause No. 6,7 and 8 are to be verified when these requirements incorporated in the respective device standard.

1/ CIE Publication 15.2.1986, Colorimetry, the CIE 1931 standard colorimetric observer.