

Proposal to draft amendments to Regulations No. 3, 27, 69, 70, 104 and 48

Note: The text reproduced below was prepared by the experts from the Czech Republic and CLEPA in order to introduce into the above-mentioned Regulations collective amendments regarding colour specifications for the retro reflective and fluorescent materials specified in the Regulations in question.

A1 – Proposal to draft amendments to Regulation No. 3

REGULATION No. 3. – (Retro-reflecting devices for power-driven vehicles and their trailers)

Insert a new paragraph 2.15 to read:

“2.15. “Colour of the reflected light of the device.” The definitions of the colour of the reflected light are given in paragraph 2.29. of Regulation No. 48 (as last amended).

Paragraph 5.2., amend to read by deleting references to Annex 6:

“5.2. If the approval granted in respect of a retro-reflecting device is extended to other such devices differing only in colour, the two samples in any other colour submitted in conformity with paragraph 3.1.4. of this Regulation shall be required to meet only the colorimetric specifications, the other tests”

Annex 4. paragraph 2., amend to read by deleting references to Annex 6:

“2. After verification of the general specifications (paragraph 6 of the Regulation) and the specifications of shape and dimensions (Annex 5), the ten samples shall be subjected to the heat resistance test described in Annex 10 to this Regulation and at least one hour after this test examined as to their colorimetric characteristics and CIL...”

Annex 4. paragraph 3.1., amend to read by replacing references to Annex 6 with those to Regulations No. 48:

“3.1. a colour which satisfies the conditions laid down in paragraph 2.29. of Regulation No.48 for clear, red or amber retro-reflecting devices. This shall be ...”

Annex 6., delete paragraphs 2 and 3 and insert new paragraph 2 to read:

“2. For checking the colorimetric characteristics, paragraph 2.29. of Regulation No. 48 (as last amended) applies.”

Annex 14. paragraph 2., amend to read by deleting references to Annex 6:

“2. and one hour minimum after this test examined as to their colorimetric characteristics and CIL ...”

Annex 14. paragraph 4.1., amend to read by replacing references to Annex 6 with those to Regulation No. 48:

“4.1. A colour which satisfies the conditions laid down in Regulation No.48, paragraph 2.29. This shall be”

A2 – Proposal to draft amendments to Regulation No. 27

REGULATION No. 27. – (Advance-warning triangle)

Insert a new paragraph 2.9. to read:

“2.9. “Colour of the reflected/fluorescent light of the device.” The definitions of the colour of the reflected/fluorescent light are given in paragraph 2.29. and 2.31. of Regulation No. 48 (as last amended).”

Paragraph 7.2.1.2., amend to read:

„7.2.1.2. When the retro-reflecting device is illuminated by the CIE standard illuminant A, with an angle of divergence of $1/3^\circ$ and an illumination angle $V = H = 0^\circ$, or, if this produces a colourless surface reflection, an angle $V = \pm 5^\circ$, $H = 0^\circ$, the trichromatic co-ordinates of the red reflected luminous flux shall be within the limits according to paragraph 2.29. of Regulation No.48 (as last amended).”

Annex 5. paragraph 2.1.1., amend to read:

“2.1.1. within the colour limits defined in paragraph 2.29. of Regulation No.48 (as last amended).“

A3 – Proposal to draft amendments to Regulation No. 69

REGULATION No. 69. – (Rear-marking plates for slow-moving vehicles (by construction) and their trailers)

Insert a new paragraph 2.4.4. to read:

“2.4.4. “Colour of the reflected light of the device.” The definitions of the colour of the reflected light are given in paragraphs 2.29. and 2.30. of Regulation No. 48 (as last amended).”

Paragraph 2.5., amend to read:

„2.5. Fluorescence

2.5.1. When certain substances are brought near than ordinary colours.“

Insert a new paragraph 2.5.2. to read:

“2.5.2. “Colour of the fluorescent light of the device.” The definitions of the colour of the fluorescent light are given in paragraph 2.31. of Regulation No. 48 (as last amended).”

Annex 6, paragraph 2.1., amend to read:

“2.1. When measured with a spectrophotometer in accordance with the provisions of CIE document No. 15 (1971) and illuminated with the CIE Standard illuminant D_{65} at an angle of 45° to the normal and viewed along the normal (45/0 geometry), the colour of the material in new condition shall be within the limits according to paragraph 2.30. of Regulation No.48 (as last amended).”

Insert a new paragraph 2.1.1. to read:

“2.1.1. Luminance factor for red colour shall be $\geq 0,03$.”

Annex 6, paragraph 2.2., amend to read:

“2.2. When illuminated by the CIE Standard Illuminant A at an entrance angle $\beta_1 = \beta_2 = 0^\circ$ or, if this produces a colourless surface reflection, an angle $\beta_1 = \pm 5^\circ$, $\beta_2 = 0^\circ$, and measured at an observation angle of 20° , the colour of the material in new condition shall be within the limits according to paragraph 2.29. of the Regulation No.48 (as last amended).”

Annex 6, paragraph 3.1., amend to read:

“3.1. When measured with a spectrophotometer in accordance with the provisions of CIE document No. 15 (1971) and illuminated polychromatically with the CIE Standard Illuminant D₆₅ at an angle 45° to the normal and viewed along the normal (geometry 45/0), the colour of the material in new condition shall be within the limits according to paragraph 2.31. of the Regulation No.48 (as last amended).”

Insert a new paragraph 3.1.1. to read:

“3.1.1. Luminance factor shall be $\geq 0,30$.”

Annex 8, paragraph 1.3., amend to read:

“1.3. Colour fastness – The colours of the exposed specimen shall still meet the requirements specified in annex 6.”

A4 – Proposal to draft amendments to Regulation No. 70

REGULATION No. 70. – (Rear-marking plates for heavy and long vehicles)

Insert a new paragraph 2.4.4. to read:

“2.4.4. “Colour of the reflected light of the device.” The definitions of the colour of the reflected light are given in paragraphs 2.29. and 2.30. of Regulation No. 48 (as last amended).”

Paragraph 2.5., amend to read:

„2.5. Fluorescence

2.5.1. When certain substances are brought near than ordinary colours.“

Insert a new paragraph 2.5.2. to read:

“2.5.2 “Colour of the fluorescent light of the device.” The definitions of the colour of the reflected light are given in paragraph 2.31. of Regulation No. 48 (as last amended).”

Annex 6, paragraph 2.1., amend to read:

“2.1. When measured with a spectrophotometer in accordance with the provisions of CIE document No. 15 (1971) and illuminated with the CIE Standard illuminant D₆₅ at an angle of 45° to the normal and viewed along the normal (45/0 geometry), the colour of the material in new condition shall be within the limits according to paragraph 2.30 of Regulation No.48 (as last amended).”

Insert a new paragraph 2.1.1. to read:

“2.1.1. Luminance factor for yellow colour shall be $\geq 0,16$
for red colour shall be $\geq 0,03$.”

Annex 6, paragraph 2.2., amend to read:

“2.2. When illuminated by the CIE Standard Illuminant A at an entrance angle $\beta_1 = \beta_2 = 0^\circ$ or, if this produces a colourless surface reflection, an angle $\beta_1 = \pm 5^\circ$, $\beta_2 = 0^\circ$, and measured at an observation angle of 20', the colour of the material in new condition shall be within the limits according to paragraph 2.29. of Regulation No.48 (as last amended).”

Annex 6, paragraph 3.1., amend to read:

“3.1. When measured with a spectrophotometer in accordance with the provisions of CIE document No. 15 (1971) and illuminated polychromatically with the CIE Standard Illuminant D₆₅ at an angle 45° to the normal and viewed along the normal (geometry 45/0), the colour of the material in new condition shall be within the limits according to paragraph 2.31. of Regulation No.48 (as last amended).”

Insert a new paragraph 3.1.1. to read:

“3.1.1. Luminance factor for red colour shall be $\geq 0,30$.”

Annex 8, paragraph 1.3, amend to read:

“1.3. Colour fastness – The colours of the exposed specimen shall still meet the requirements specified in annex 6.”

A5 – Proposal to draft amendments to Regulation No. 104

REGULATION No. 104. – (Retro-reflective markings for heavy and long vehicles and their trailers)

Insert a new paragraph 2.4.5. to read:

“2.4.5. “Colour of the reflected light of the device.” The definitions of the colour of the reflected light are given in paragraphs 2.29. of Regulation No. 48 (as last amended).”

Annex 6, paragraph 2, amend to read:

“2. When illuminated by the CIE Standard Illuminant A at an entrance angle $\beta_1 = \beta_2 = 0^\circ$ or, if this produces a colourless surface reflection, an angle $\beta_1 = \pm 5^\circ$, $\beta_2 = 0^\circ$, and measured at an observation angle of 20° , the colour of the material in new condition shall be within the limits according to paragraph 2.29. of Regulation No.48 (as last amended).”

Annex 8, paragraph 1.3, amend to read:

“1.3. Colour fastness – The colours of the exposed specimen shall still meet the requirements specified in annex 6.”

B - Proposal to draft amendments to Regulation No. 48

A.9. PROPOSAL

REGULATION No. 48 - (Installation of lighting and light-signalling devices) (The following text is based upon Supplement 03 to the 03 series of amendments).

2.28. Colour of the light emitted from a device – see UK proposal, document ECE/TRANS/WP.29/GRE/2007/62

Insert new paragraphs 2.29., 2.30. and 2.31. and footnote ^{4/}, to read:

"2.29. Nighttime Colour of the light reflected from a device

2.29.1. "White" means the chromaticity coordinates (x,y) ^{4/} of the light reflected that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	Blue Boundary:	$y=0.843 - 1.182x$
W ₂₃	Violet Boundary:	$y=0.489x + 0.146$
W ₃₄	Yellow Boundary:	$y=0.968 - 1.010x$
W ₄₁	Green Boundary:	$y=1.442x - 0.136$

with intersection points:

	x	y
W1	0.373	0.402
W2	0.417	0.350
W3	0.548	0.414
W4	0.450	0.513

2.29.2. "Yellow" means the chromaticity coordinates (x,y) ^{4/} 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:	$y=0.20x + 0.268$
Y ₄₁	White Boundary:	$y=0.970 - x$

with intersection points:

	x	y
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^{4/} CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer.

Y_1	0.505	0.465
Y_2	0.520	0.480
Y_3	0.610	0.390
Y_4	0.585	0.385

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

A_{12}	Green Boundary:	$y=1.417x - 0.347$
A_{23}	The Spectral Locus	
A_{34}	Red Boundary:	$y=0.390$
A_{41}	White Boundary:	$y=0.790 - 0.670x$

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

2.29.4. "Red" means the chromaticity coordinates (x,y) 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:	$y=x + 0.978$

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

2.30. Daytime Colour of the light reflected from a device

When measured with a spectrophotometer in accordance with the provisions of CIE document No. 15 (1971) and illuminated with the CIE Standard illuminant D₆₅ at an angle of 45° to the normal and viewed along the normal (45/0 geometry), the colour of the material in new condition shall be located within the area defined by the chromaticity co-ordinates (x,y) ^{4/} as follows.

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

W ₁₂	Violet Boundary	$y = 0.300 + x$
W ₂₃	Yellow Boundary	$y = 0.740 - x$
W ₃₄	Green Boundary	$y = x + 0,050$
W ₄₁	Blue Boudary	$y = 0.570 - x$

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

2.30.2. "Yellow" means the chromaticity coordinates (x,y) 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

2.30.3. "Red" means the chromaticity coordinates (x,y) 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

2.31. Daytime Colour of the fluorescence of a device

When measured with a spectrophotometer in accordance with the provisions of CIE document No. 15 (1971) and illuminated with the CIE Standard illuminant D₆₅ at an angle of 45° to the normal and viewed along the normal (45/0 geometry), the colour of the material in new condition shall be located within the area defined by the chromaticity co-ordinates (x,y) ^{4/} as follows.

2.31.1. "Red" means the chromaticity coordinates (x,y) of the fluorescence 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

Justification

Chairman of GRE asked the Czech delegation during the 58th session to prepare this proposal, which is in close relation to the UK document ECE/TRANS/WP.29/GRE/2007/62. CLEPA was asked and offered its support for the preparation of such document as well.

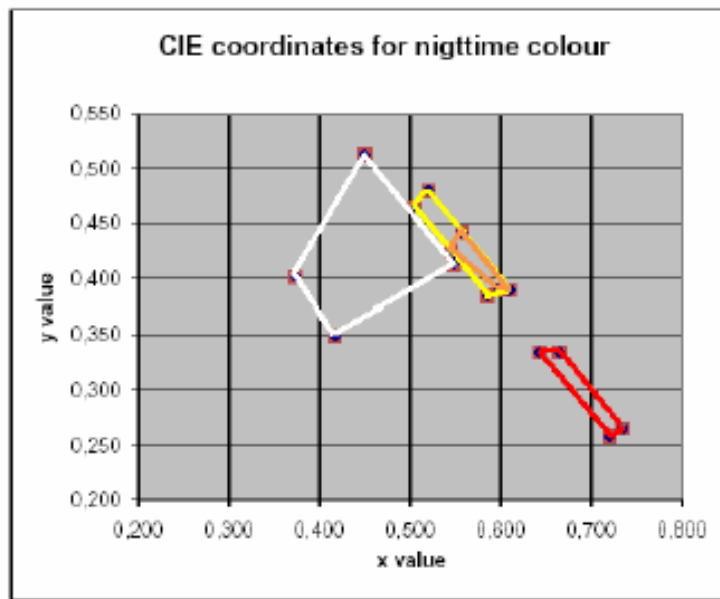
The mentioned UK document integrates all colorimetric coordinates of active lamps into ECE Regulation No. 48. The purpose of this document is to continue the task undertaken by the UK and integrate all colorimetric coordinates of passive retro-reflective devices into ECE Regulation No. 48.

The colorimetric coordinates as defined in this document result from the actual data contained in the passive device Regulations, in particular ECE Regulations No. 3, 27, 69, 70 and 104, and consolidate the requirements for white, yellow, amber and red colours in case of the nighttime reflected light; white, yellow and red colours in case of the daytime reflected light and the requirements for red colour in case of the daytime fluorescence emitted colour.

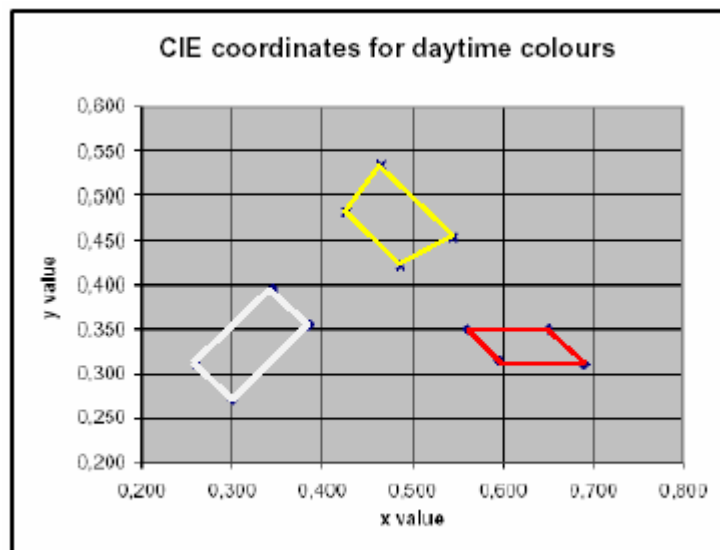
The aim of this document is mainly to unify the colorimetric coordinates of the passive light devices and to place all these coordinates into one location: ECE Regulation No. 48, following the concept of paragraph 2.28. defined in the UK document ECE/TRANS/WP.29/GRE/2007/62.

This proposal amends the individual Regulations in question and introduces paragraphs 2.29. for nighttime visibility conditions, 2.30. for daytime conditions of standard colours and 2.31. for daytime conditions of the fluorescent colours.

The drawings bellow represent the final colorimetric coordinates for both conditions as defined in this document.



White	Yellow	Amber	Red
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White	Yellow	Red
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