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agenda item 8.)

PROPOSAL FOR DRAFT COLLECTIVE AMENDMENTS TO
REGULATIONS Nos. 37 and 99
(with regard to colour definitions)

Transmitted by the expert from the United Kingdom

Note: The text reproduced below was prepared by the expert from the United Kingdom to introduce into the Regulations collective amendments regarding colour specifications. It is based on a document without a symbol (informal document No. GRE-52-14), distributed during the fifty-second GRE session (TRANS/WP.29/GRE/52, para. 39). The modifications to the existing text of the Regulations are marked in **bold** characters.

Note: This document is distributed to the Experts on Lighting and Light-Signalling only.

A. PROPOSAL

ECE REGULATION No. 37 – Filament lamps

(The following text is based upon Supplement 24 to the 03 series of amendments)

Paragraph 3.6.2., amend to read:

"3.6.2. The colour of the light emitted shall have chromaticity coordinates (x,y) (CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer), that lie inside the chromaticity areas defined by the following boundaries:

finished filament lamps emitting white light:

W₁₂	green boundary:	$y = 0.150 + 0.640 x$
W₂₃	yellowish green boundary:	$y = 0.440$
W₃₄	yellow boundary:	$x = 0.500$
W₄₅	reddish purple boundary:	$y = 0.382$
W₅₆	purple boundary:	$y = 0.050 + 0.750 x$
W₆₁	blue boundary:	$x = 0.310$

with intersection points:

	x	y
W₁	0.310	0.348
:		
W₂	0.453	0.440
:		
W₃	0.500	0.440
:		
W₄	0.500	0.382
:		
W₅	0.443	0.382
:		
W₆	0.310	0.283
:		

finished filament lamps emitting selective-yellow light:

SY₁₂	green boundary:	$y = 1.290 x - 0.100$
SY₂₃	<u>the spectral locus</u>	
SY₃₄	red boundary:	$y = 0.138 + 0.580 x$
SY₄₅	<u>yellowish white boundary:</u>	<u>$y = 0.440$</u>

SY₅₁ white boundary:

y = 0.940 - x

with intersection points:

	x	y
SY₁:	0.454	0.486
SY₂:	0.480	0.519
SY₃:	0.545	0.454
SY₄:	0.521	0.440
SY₅:	0.500	0.440

finished filament lamps emitting amber light:

A₁₂	green boundary:	$y = x - 0.120$
A₂₃	the spectral locus	
A₃₄	red boundary:	$y = 0.390$
A₄₁	white boundary:	$y = 0.790 - 0.670 x$

with intersection points:

	x	y
A₁:	0.545	0.425
A₂:	0.557	0.442
A₃:	0.609	0.390
A₄:	0.597	0.390

finished filament lamps emitting red light:

R₁₂	yellow boundary:	$y = 0.335$
R₂₃	the spectral locus	
R₃₄	the purple line	(its linear extension across the purple range of colours between the red and the blue extremities of the spectral locus).
R₄₁	purple boundary:	$y = 0.980 - x$

with intersection points:

	x	y
R₁:	0.645	0.335
R₂:	0.665	0.335
R₃:	0.735	0.265
R₄:	0.721	0.259

"

* * *

ECE REGULATION No. 99 – Gas-discharge light sources
(The following text is based upon Supplement 2 to the Regulation)

Annex 1, sheets DxR/4 and DxS/4, amend the tables to read:

"...

Luminous flux
Chromaticity co-ordinates	Objective		$x = 0.375$	$y = 0.375$
	Tolerance area <u>3/</u>	within boundaries	$x = 0.345$	$y = 0.150 + 0.640 x$
			$x = 0.405$	$y = 0.050 + 0.750 x$
		Intersection points x,y of boundaries	$x = 0.345$	$y = 0.371$
$x = 0.405$	$y = 0.409$			
$x = 0.405$	$y = 0.354$			
$x = 0.345$	$y = 0.309$			
Hot-restrike switch off time	s	10	10	

..."

* * *

B. JUSTIFICATION

To avoid an unnecessary complication of the sheet, it is suggested to keep the design as it is. The above-mentioned examples were given for Regulations Nos. 37 and 99. For the amendments to other Regulations, the texts need to be rephrased.

Alternatives

As an alternative the chromaticity co-ordinates could be:

1. annexed to each relevant Regulation;
2. annexed to Regulation No. 48, (or Regulations Nos. 53, 74 and 86) concerning the installation of lighting and light-signalling devices on vehicles;
3. annexed to Regulations Nos. 37 (filament lamps) and/or 99 (gas-discharge light sources);
4. adopted as a new Regulation concerning general specifications, definitions, colour boundaries, test procedures, etc.

For these purposes, the legal and practical consequences should be considered.

Relevant Regulations (to be completed):

UNECE Regulation		body/ annex	paragrap h	colour of light			
ACTIVE devices				white	selectiv e yellow	amber	red
x	5	sealed beam headlamps		x	x		
x	6	direction indicators				x	
x	7	stop, position, markers		x			x
x	19	front fog		x	x		
x	23	reversing		x			
x	31	halogen sealed beam headlamps		x	x		
x	37	filament light sources		x	x	x	x
x	38	rear fog					x
x	50	position, stop, direction indicators		x?		x	x
?	65	special warning lamps					
?	77	parking lamps					x
x	87	DRL					
x	91	side marker				x	x
x	98	gas-discharge headlamps		x	x		
x	99	gas-discharge light sources		x	x		
x	112	asymmetrical passing beam		x			
x	113	symmetrical passing beam			x		

PASSIVE devices

P	3	retroreflective devices				x	x
P	4	illumination of rear registration plates					
P	27	warning triangles					
P	69	rear marking plates					table s 1,2,3
P	70	rear marking plates heavy and long vehicles				yellow tables 1,2	table s 1,2,3
P	88	retroreflective tyres					
P	104	retroreflective contour markings				yellow table 1	yellow table 2

* * *

C. INFORMATION

The current texts of the Regulations and standards including the amendments for selective yellow read:

Regulation No. 37, paragraph 3.6.2.:

"3.6.2. The colourimetric characteristics of the light emitted, expressed in CIE trichromatic coordinates, shall lie within the following limits:

finished filament lamps emitting white light:

- limit towards blue: $x \geq 0.310$
- limit towards yellow: $x \leq 0.500$
- limit towards green: $y \leq 0.150 + 0.640 x$
- limit towards green: $y \leq 0.440$
- limit towards purple: $y \geq 0.050 + 0.750 x$
- limit towards red: $y \geq 0.382$;

finished filament lamps emitting selective-yellow light:

- limit towards red $y \geq 0.138 + 0.580 x$
- limit towards green $y \leq 1.290 x - 0.100$
- limit towards white: $y \geq 0.940 - x$ and $y \geq 0.440$;

finished filament lamps emitting amber light:

- limit towards green: $y \leq x - 0.120$
- limit towards red: $y \geq 0.390$
- limit towards white: $y \geq 0.790 - 0.670 x$;

finished filament lamps emitting red light:

- limit towards yellow: $y \leq 0.335$
- limit towards purple: $y \geq 0.980 - x$."

Regulation No. 99, annex 1, sheets DxR/4 and DxS/4:

" ...

....			
Colour co-ordinates	Objective		$x = 0.375$ $y = 0.375$
	Tolerance area 3/		$x \geq 0.345$ $y \leq 0.150 + 0.640 x$ $x \leq 0.405$ $y \geq 0.050 + 0.750 x$
....			

...."

CIE standard S 004/E-2001:

"4.2 Specified chromaticity areas:

The colours of light signals shall have chromaticity coordinates (x, y) that lie inside the chromaticity areas defined by the boundaries specified in Table 1 and, where applicable, by the spectral locus and its linear extension across the purple range of colours between the red and blue extremities of the spectral locus.

NOTE 1: For convenience in plotting the chromaticity areas, the intersection points of the chromaticity boundaries, spectral locus and purple line are given in Table 2 and the areas are illustrated in Figures 1 to 5.

NOTE 2: The chromaticity coordinates for plotting the spectral locus in Figures 1 to 5 are given in ISO/CIE 10527-1991.

Table 1 - Boundaries of the allowed chromaticity areas for the colours of light signals

Colour	Notation	Equation of boundary
RED LIGHT SIGNAL COLOURS Class A Yellow boundary Purple boundary	AB AD	$y = 0.320$ $y = 0.980 - x$
etc.		

Table 2 - Coordinates of intersection points of allowed chromaticity area boundaries

Colour	Chromaticity coordinates				
RED LIGHT SIGNAL COLOURS Class A	x	0.660	0.680	0.735	0.721
	y	0.320	0.320	0.265	0.259
etc.					

...."

CIE chromaticity diagram for ECE "active lamps"

