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Economic Commission for Europe**Inland Transport Committee****Working Party on Inland Water Transport****Working Party on the Standardization of Technical
and Safety Requirements in Inland Navigation****Thirty-seventh session**

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Item 5 (d) of the provisional agenda

**Resolution No. 61, “Recommendations on Harmonized
Europe-Wide Technical Requirements for Inland Navigation Vessels”****Requirements concerning lights and the colour of signal
lights on vessels, intensity and range of signal lights on vessels
and general technical specifications applicable to radar
equipment****Note by the secretariat**

1. It is recalled that, following the decision of the Working Party on Inland Water Transport (SC.3) (ECE/TRANS/SC.3/115/Rev.3/Amend.1, paras. 91, 92 and 111) former CEVNI Annexes 4 and 10 (as reflected in ECE/TRANS/SC.3/115/Rev.3) and 5 (as appearing in ECE/TRANS/SC.3/WP.3/2009/1) should be moved to the annex to Resolution No. 61.

2. Reproduced below is the draft Appendix 7 of the annex to Resolution No. 61 “Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels” prepared by the secretariat in accordance with the above-mentioned decision of SC.3. The Working Party may wish to consider the draft, approve it and transmit to SC.3 for possible adoption.

Appendix 7

Part I

Lights and the colour of signal lights on vessels¹

A. General

1. Definitions

2. Lanterns

A lantern is a device for distributing the flux from a light source; it also includes the components needed to filter, refract or reflect the light, and hold or operate the light source.

Lanterns intended to give signals on board a vessel are called signal lanterns.

3. Signal lights

Signal lights are the light signals emitted by signal lanterns.

4. Light sources

Light sources are electrical or non-electrical devices designed to produce light flux in signal lanterns.

5. Technical requirements

The construction of and materials of signal lanterns shall be such as to ensure their safety and durability.

The components of the lantern (for example the cross braces) shall not modify the intensity, colours or dispersion of the light.

It shall be possible to install the lights on board simply and in the correct position.

It shall be easy to replace the light source.

B. Colour of signal lights

1. A five colour signal system is applied to the lights, and comprises the following colours:

“white”

“red”

“green”

“yellow” and

“blue”.

¹ On the inland waterways of Belarus, Kazakhstan, Lithuania, Republic of Moldova, Russian Federation and Ukraine the colour of signal lights on vessels shall satisfy the requirements of the competent national authorities.

This system conforms to the recommendations of the International Commission on Illumination, "Colours of Signal Lights", IEC publication No. 2.2 (TC-1.6) 1975.

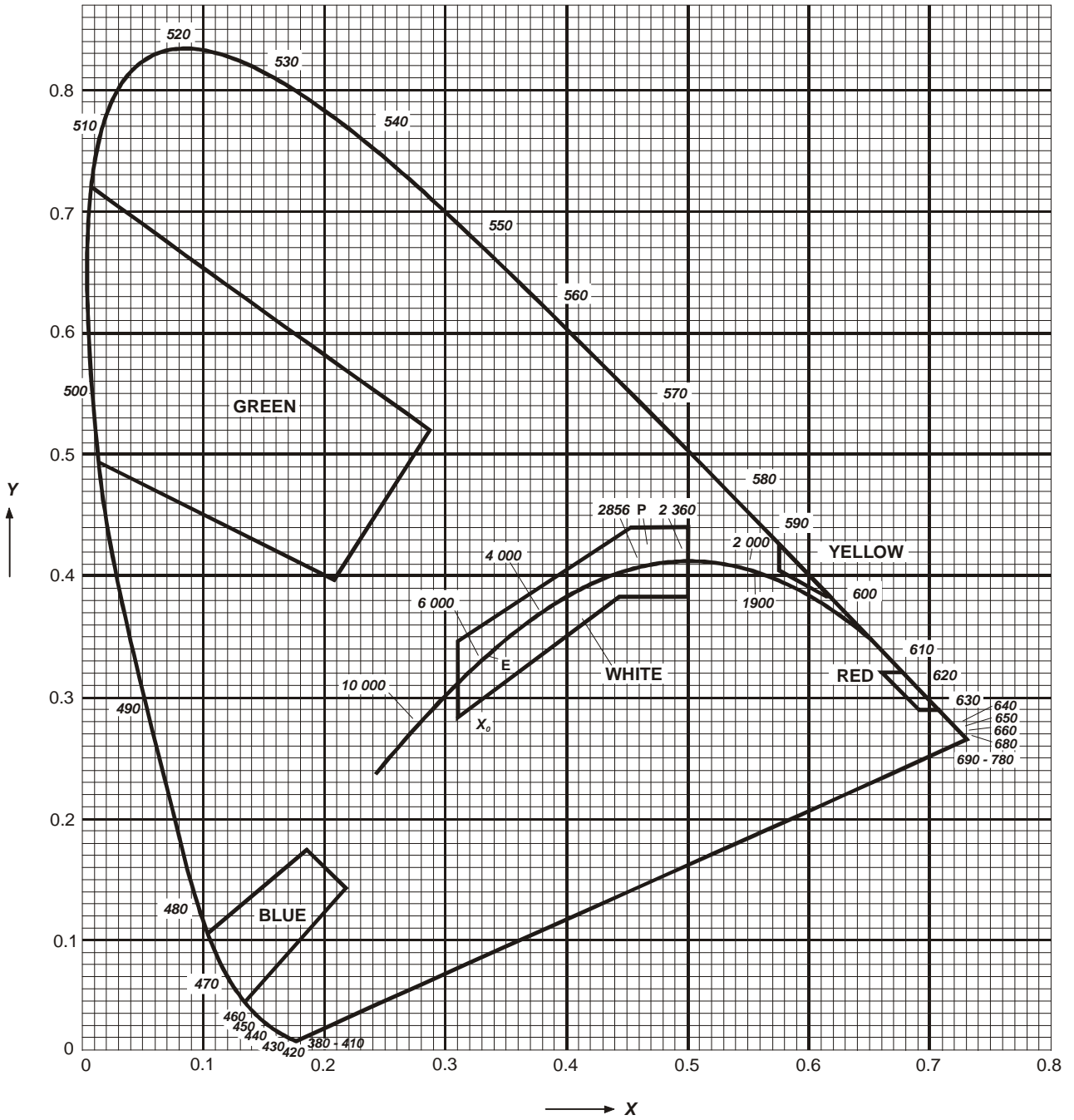
The colours apply to the light fluxes emitted by the lantern.

2. The colour boundaries of signal lights are demarcated by the coordinates (Table 1) of the intersecting points of the chromatic diagram of IEC publication No. 2.2 (TC-1.6) 1975 (Figure 1).

Table 1
Colour boundaries of signal lights

<i>Colour of signal light</i>		<i>Coordinates of the intersecting points</i>					
White	x	0.310	0.443	0.500	0.500	0.453	0.310
	y	0.283	0.382	0.382	0.440	0.440	0.348
Red	x	0.690	0.710	0.680	0.660		
	y	0.290	0.290	0.320	0.320		
Green	x	0.009	0.284	0.207	0.013		
	y	0.720	0.520	0.397	0.494		
Yellow	x	0.612	0.618	0.575	0.575		
	y	0.382	0.382	0.425	0.406		
Blue	x	0.136	0.218	0.185	0.102		
	y	0.040	0.142	0.175	0.105		

Figure 1
IEC chromaticity diagram



2360 K corresponds to the light of a vacuum filament lamp.

2848 K corresponds to the light of a gas-filled filament lamp.

Part II

Intensity and range of signal lights on vessels ²

A. General

1. Signal lights

Signal lights are classified according to their luminous intensity as:

“ordinary lights”

“bright lights”

“strong lights”.

2. Relation between I_O , I_B and t

I_O is the photometric luminous intensity in candela (cd), measured at normal voltage for electric lights.

I_B is the operation luminous intensity in candela (cd).

t is the range in kilometres (km).

Taking into account, for example, the ageing of the light source, the degree of dirtiness of the optic and variations in the voltage of the on-board grid, I_B is 20 per cent less than I_O .

Consequently $I_B = 0.8 \cdot I_O$

The relation between I_B and t of signal lights is given by the following equation:

$$I_B = 0.2 \cdot t^2 \cdot q^{-t}$$

The atmospheric transmission coefficient q has been taken as 0.76, corresponding to a meteorological visibility of 14.3 km.

B. Intensity and range³

1. Luminous intensity and visibility range of signal lights

The following table contains the permitted limits for I_O , I_B and t according to the nature of signal lights. The values indicated apply to the light flux emitted by the lantern.

I_O and I_B are given in cd and t in nautical miles (nm) and kilometres (km).

² On the inland waterways of Belarus, Kazakhstan, Lithuania, Republic of Moldova, Russian Federation and Ukraine, the luminous intensity and range of signal lights on vessels shall satisfy the requirements of the competent national authorities.

³ On certain inland waterways the competent authority may allow the carriage by vessels of signal lights in accordance with the requirements of the Convention on the International Regulations for Preventing Collisions at Sea (COLREG).

Table 2
Minimum and maximum values

Nominal value of visibility range of signal lights	Minimum value of visibility range (t_{min})		Maximum value of visibility range (t_{max})		Operational luminous intensity (I_B)	Minimum horizontal photometric luminous intensity (I_0)*	Maximum horizontal photometric luminous intensity (I_0)*	Nature of signal lights
	nm	km	nm	km		cd	cd	
1	1	1.85	2	3.70	0.9	1.1	5.4	Ordinary
2	2	3.70	5	9.26	4.3	5.4	65	Bright
3	3	5.56	5	9.26	12	15	65	Bright
5	5	9.26	7.5	13.90	52	65**	257	Strong
6	6	11.11	7.5	13.90	94	118**	257	Strong

* To be measured in the laboratory.

** However, for daytime use of the strong yellow scintillating lights a minimum photometric luminous intensity I_0 of 900 cd shall apply.

C. Signal light dispersion

1. Horizontal dispersion of intensity

(a) The luminous intensities indicated in section II apply to all directions of the horizontal plane passing through the focus of the optic or the luminous centre of gravity of the light source correctly adjusted within the operational sector of a vertically positioned lantern;

(b) For the masthead lights, stern lights and side lights, the luminous intensities prescribed shall be maintained throughout the horizontal arc within the sectors prescribed at least up to within 5° of the limits.

As from 5° within the sectors prescribed up to the limit, the luminous intensity may decrease by 50 per cent; it shall subsequently decrease gradually in such a way that, as from 5° beyond the limits of the sector, only a negligible amount of light remains;

(c) The side lights shall have the prescribed luminous intensity in the direction parallel to the axis of the vessel forward. The intensities shall decrease practically to zero between 1° and 3° beyond the limits of the prescribed sector;

(d) For bicoloured or tricoloured lanterns, the dispersion of the luminous intensity shall be uniform so that 3° on either side of the prescribed sector limits, the maximum permitted intensity is not exceeded and the minimum prescribed intensity is reached;

(e) The horizontal dispersion of the luminous intensity of the lanterns shall be uniform throughout the sector, so that the minimum and maximum values observed do not differ more than by a factor of 1.5 from the photometric luminous intensity.

2. Vertical dispersion of intensity

In the event of heeling of power driven vessels of up to $\pm 5^\circ$ or $\pm 7.5^\circ$ from the horizontal, the luminous intensity shall remain at least equal to 100 per cent in the first case, and 60 per cent in the second case, of the luminous intensity corresponding to 0° heeling, although it shall not exceed it by more than 1.2 times.

In the event of heeling of sailing vessels of up to $\pm 5^\circ$ or $\pm 25^\circ$ from the horizontal, the luminous intensity shall remain at least equal to 100 per cent in the first case, and 50 per cent in the second case, of the luminous intensity corresponding to 0° heeling, although it shall not exceed it by more than 1.2 times.

Part III

General technical specifications applicable to radar equipment

The technical parameters of radar installations must satisfy the following requirements:

1. Minimum range of detection	15 m
Maximum range of detection of shore 60 m high (at height of installation 10 m)	32,000 m ⁴
Distance resolution	15 m at scales 0.5-1.6 km; 1% of the scale value at other scales
Angular resolution	1.2°
Accuracy of measurement: range	2. 10 m for variable range circles; 1% of fixed range circles at scales 0.5-2.0 km; 0.8% of the value of the selected scale.
Accuracy of measurement: bearings line:	± 1°
Heading Width	0.5°
Deviation	0.5°
Effective diameter of screen indicator	270 mm
Range scales	0.5; 1; 1.6; 2; 3.2; 4; 8; 16; 32 km: not less than 4 fixed range circles within each scale
Off-centring	1/4-1/3 of the effective diameter of the image
Bearing facilities:	Up to 5 seconds
Timing	± 1°
Error	
Transmission frequency	9.3 – 9.5 GHz (3.2 cm)
Warm-up time	4 minutes
Minimum antenna speed	24 revolutions per minute

⁴ Maximum range of detection is only required to be ensured for radar equipment installed on vessels operated on large lakes, reservoirs and in coastal waters.