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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 8417-2003

**Colours of light signals
(English Translation)**

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Foreword

This standard, through reference, adopt the International Commission on Illumination standard CIE DS 004.4/E-1998 "Colors of light signals". This standard is the revision of GB/T 8417-1987 "Colors of light signals". As compared with the original standard, this standard adds the foreword, CIE foreword, and introduction; in the chapter of Scope, ADD the allowable color of the flash signal AND the color selection for the signal light, warning light, and monitor on the indication instrument panel; ADD the normative references, terms and definitions; it is required for the chromaticity scope to follow the new provisions of the new CIE standard; the chromaticity scope of red, yellow, green, blue, and white is changed, AND blue is deleted; ADD the test methods.

This standard shall, from the date of implementation, replace GB/T 8417-1987.

This standard was proposed by AND shall be under the jurisdiction of National Color Standardization Technical Committee.

This standard was responsibly drafted by the Communication and Signal Research Institute of China Academy of Railway Sciences.

1 Scope

This standard specifies the chromaticity area range and test methods for the color of the light signal (including the flash signal).

This standard applies to signal lights used in ocean, inland waterway, road, aviation, and railway transport system, including the signal lights used in ships, cars, aircraft and trains.

The standard also applies to the signal lights and monitors on the industrial control monitoring instrument panel.

This standard does apply neither to automotive headlamps and fog lamps, nor to the light source of very low color temperature which is used in maritime lights.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, all subsequent amendments, including corrigenda or revisions, are applicable to this standard. However, parties to agreements based on this standard are encouraged to investigate the possibility of using the most recent versions of these documents. For undated references, the latest version applies to this standard.

The provisions in following documents become the provisions of this standard through reference in this standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this standard; however, parties who reach an agreement based on this standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 5697 Illuminated terminology for human engineering

GB/T 5698 Glossary of color terms

GB/T 3977 Specification of colors

3 Terms and definitions

The terms and definitions as determined in GB/T 5697 and GB/T 5698 AND below apply to this standard.

3.1 Luminous intensity

It refers to, within the range of the solid angle (dohm) along a given direction, the ratio between the emitted light flux (dphi) from the light source and this solid angle.

$$I = \text{dphi}/\text{dohm}$$

Where.

I - The luminous intensity of the light source along a given direction, cd;

dphi - The emitted light flux of the light source along a given direction, lm;

dohm - The solid angle containing a given direction, sr.

3.2 Illuminance in the plane of the observer's eye

It refers to the illuminance in the plane of the observer's eye.

$$E = ITd/d^2$$

Where.

E - The illuminance in the plane of the observer's eye, lx;

I - The luminous intensity of the light source along the direction of the observer's eye, cd;

d - The distance between the observer and the light source, m;

T - The transmittance of light in air for the unit distance.

4.1 Color of light signal

The color of the light signal is red, yellow, white, green and blue; AND it is not allowed to use other colors.

Figure 5 Chromaticity area the blue light signal colors drawn on the CIE 1931 chromaticity diagram (x, y)

4.5.1 Category A

Except for the conditions as specified in 4.5.2, the white light signal color must be within the chromaticity range IJKL.

4.5.2 Category B

When the following conditions occur, the white light signal color must be in the chromaticity area IJJ'K'KL.

- a) In the same signal system, there is no yellow signal;
- b) The signal does not need to be distinguished from extraneous background yellow light, such as sodium lamps and low-temperature incandescent lamps used in road lighting;
- c) The distance between the observer and the signal is less than 5 km;
- d) The signal will not be greatly attenuated by air pollution or bad weather.

Note 1: If possible, the white and yellow signals shall not be used in the same signal system, as the two colors can easily be confused with each other, especially in remote or low visibility conditions. If white and yellow signals must be used at the same time, only category A white light can be used.

Note 2: When viewed from a distance, the color of the white light will shift to orange-yellow, due to the attenuation caused by the air, AND it occurs even when the air is clean. When air pollution or bad weather causes a decrease in visibility, this shift will be particularly evident. In the case of reduced visibility, the chromaticity coordinates of the white signal used must be close to the boundary IL.

Note 3: Decreasing the voltage to darken the white signal will cause the color of the signal to shift from orange to yellow. In the overall darkening process, the color of the signal must be in the range IJKL (for category A) or IJJ'K'KL (for category B).

4.6.1 Category A

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