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

**中华人民共和国国家标准**

**GB/T 3977-2008**

Replace GB/T 3977-1997

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**Specification of colors**

**颜色的表示方法**

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China**

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## Foreword

This Standard corresponds to the CIE15: 2004 *Colorimetry* published by the International Commission on Illumination, and the consistent degree between them is non-equivalent. The major difference is that the representation of colour stimulus function in the tristimulus values computational formula is not the same.

This Standard is the replacement to GB/T 3977--1997 *Methods of colour specification*.

The main alterations made in this Standard by comparing with GB/T 3977--1997 are as follows:

---the standard English name has been changed from the original "Methods of colour specification" to "Specification of colors";

---add some other definitions such as "CIE standard illuminants", "tristimulus values", "chromaticity coordinates", "color matching function" and so on (See 3.1~3.6 of this Standard);

---the terminologies throughout are normalized and updated according to the latest provisions of CIE15: 2004. The "trichromatic coordinates", "Chroma function", "purple trajectory", "XYZ colormetric system", " $X_{10}Y_{10}Z_{10}$  colormetric system" and "CIE1964 supplementary standard colorimetric observer" of GB/T 397-1977 have been respectively changed into "chromaticity coordinates", "color matching function", "purple boundary", "CIE1931 standard colormetric system", "CIE1964 standard colormetric system" and "CIE1964 standard colorimetric observer";

---provide the equal-energy white light chromaticity coordinates for CIE1931 standard colormetric system and CIE1964 standard colormetric system in 5.2 and 5.4;

---combine the CIE1931 and CIE1964 chromaticity diagrams with the standard colorimetric observer to form one chapter, and modify the positional relationship between the illuminant D65 in the CIE1931 chromaticity diagram and the equal-energy white light E;

---modify the expression of tristimulus values, present general formula (3) and (4) in 6.1 and 6.2, and calculate the tristimulus values of light source color, reflection color and transmission color by altering the parameters;

---replace the integral computation of equation (1)~equation (6) with summation

computation.

This Standard is proposed by and under the jurisdiction of the State Color Standardization Technical Committee.

This Standard is drafted by National Institute of Metrology and Shenzhen Haichuan Limited by Share Ltd.

Main drafters of this Standard: Ma Yu, Chen Ping, Lin Yige, He Weiping, Huang Yongheng

The publication conditions of this Standard replacing previous versions:

This Standard was first published in 1983, and first revised in October, 1997.

# Specification of Colors

## 1 Scope

This Standard stipulates the specification of colors by adopting CIE1931 standard colorimetric system or CIE1964 standard colorimetric system.

In 1°~4° field, the colors are indicated with tristimulus values and chromaticity coordinates of the CIE1931 standard colorimetric system; when the field is above 4°, the colors are indicated with tristimulus values and chromaticity coordinates of the CIE1964 standard colorimetric system.

This standard is applicable to object colors (including reflection colors and transmission colors) and light source color.

## 2 Normative references

The articles contained in the following documents have become this standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

GB/T 3978 Standard illuminants and geometric conditions

GB/T 3979 Methods for the measurement of object color

GB/T 5698 Glossary of color terms

GB/T 7922 Method of measuring the color of light sources

## 3 Terms and definitions

The following terms and definitions determined in GB/T 5698 are applicable to this Standard.

### 3.1

#### CIE standard illuminants

A CIE determined specific relative spectral power distribution produced by the incidence on the object, including CIE standard illuminant A and CIE standard illuminant D65.

### 3.2

#### Tristimulus values



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