

ICS 37.100.99
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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 18721.5-2024

**Graphic technology - Prepress digital data exchange - Part 5:
Scene-referred standard colour image data(RIMM/SCID)**

印刷技术 印前数据交换 第5部分：场景相关的标准彩色图像数据（RIMM/SCID）
(English Translation)

Issued on: March 15, 2024

Implemented on: March 15, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 5 of GB/T 18721 "Printing Technology Prepress Data Exchange".

GB/T 18721 has published the following part.

- Part 1: CMYK standard color image data (CMYK/SCID);
- Part 2: Standard color image data based on XYZ/sRGB encoding (XYZ/SCID);
- Part 3: CIELAB standard color image data (CIELAB/SCID);
- Part 4: Wide color gamut standard color image data for display [AdobeRGB (1998)/SCID];
- Part 5: Scene-related standard colour image data (RIMM/SCID).

This document is equivalent to ISO 12640-5:2013 "Printing technology prepress data exchange Part 5: Scene-related standard color map Image Data (RIMM/SCID)".

Introduction

0.1 The need for standard digital test images the standard test images provide a set of data that can be used for any of the following tasks.

- Evaluate the color reproduction of the imaging system;
- Evaluate color image output devices;
- Evaluate the effectiveness of image processing algorithms applied to images;
- Evaluate the coding technologies required for storing and transmitting high-definition image data, etc.

As a standard well-defined dataset containing high-definition images with typical common image contents, standard test images can make users confident that If the mapping is done properly, the image will produce a high-quality replica and provide a reasonable test of the evaluation task.

Any system, but the image set provided in this document can be expected to obtain reasonable testing with a limited image set. In addition, the existence of a standard set makes it possible to Users in the same region can compare images without exchanging images before copying.

However, different applications require standard image data to use different image encodings in different image states (see ISO 22028-1).

The user needs to select the encoded image data that is suitable for the evaluation task. Although it is always possible to transform the image data into another image state, Generally speaking, there is no consensus among experts on how to best accomplish this task. Therefore, in the various parts of GB/T 18721, Considering providing data for different image states, Figure 1 shows the relationship between image states and the applicable parts of GB/T 18721.

Figure 1 Relationship between image states

GB/T 18721 "Printing Technology Prepress Data Exchange" is divided into 5 parts.

- Part 1: CMYK standard color image data;
- Part 2: Standard color image data based on XYZ/sRGB encoding (XYZ/SCID);
- Part 3: CIELAB standard color image data (CIELAB/SCID);
- Part 4: Wide color gamut standard color image data for display [AdobeRGB (1998)/SCID];
- Part 5: Scene-related standard colour image data (RIMM/SCID).

GB/T 18721.1 provides a set of 8-bit data per channel defined by CMYK dot percentage.

The colors are strictly defined only when printing, so these data are only suitable for evaluation of CMYK printing applications.

In fact, because in traditional printing applications, these image data are defined in the use of "Typical" ink systems and "typical" tone value mappings produce "satisfactory" images, while CMYK printing differs from this.

Printing systems that use inks of significantly different colors or produce very different tonal value mappings may not be useful without clear Without a defined color conversion, the data cannot be reproduced as a satisfactory image. Furthermore, with a bit depth of only 8 bits per channel, any any color changes may be affected by human intervention.

GB/T 18721.2 provides a set of test image data, which are encoded with XYZ values ranging from 0 to 65535 per channel, and Encoded in sRGB (defined in IEC 61966-2-1) with a bit depth of 8 bits per channel. (Due to the perceptual non-uniformity of linear color spaces the two sets of data are the same for the reference sRGB viewing environment and the reference sRGB CRT display.

The images are optimized and the XYZ tristimulus values are calculated relative to the CIE standard illuminant D65 before scaling.

A system that uses sRGB as a reference encoding and is therefore primarily suitable for the consumer market and for those devices that use color displays as "distributed" Although these systems have some applications in the printing industry, sRGB is definitely not the most common image encoding.

A significant disadvantage is that the shape of the sRGB color gamut is very different from the typical offset color gamut. This difference may require more vivid colors to be re-colored.

Mapping is done to produce the best printing results for sRGB image data.

GB/T 18721.3 provides a set of test image data for a wide color gamut of reflective media,

using D50 illumination.

The depth is 16 bits per channel, while the color table and gradient map are 8 bits per channel.

In applications where the output color gamut plays a role, it is considered desirable to generate an image set that allows the entire color range close to the surface color gamut boundary to be in addition, from the perspective of color management, if the image uses D50, the main reference illuminant in printing and photography, the image it is also the primary reference illuminant for most color management applications.

GB/T 18721.4 provides a set of wide color gamut test image data encoded as AdobeRGB with a bit depth of 16 bits per channel.

These data are optimized for viewing under the AdobeRGB reference viewing environment and on an AdobeRGB reference monitor.

RGB (1998) color image encoding specification]. These images are designed primarily for use with systems that use AdobeRGB as the reference encoding.

This workflow is mainly suitable for the professional market and systems where wide color gamut color monitors are "distributed" devices.

AdobeRGB is very popular among photographers and is increasingly used in printing technology.

Closer to the typical offset printing gamut. Although this difference may require color remapping between AdobeRGB images and sRGB images, AdobeRGB -encoded images usually require less vivid color remapping when printed than sRGB -encoded images.

Therefore, the purpose of GB/T 18721.4 is to provide a test image dataset with a larger color gamut than sRGB, which is consistent with the AdobeRGB wide color gamut.

The bit depth of natural and synthetic images is 16 bits per channel.

Possible wide gamut color encoding options include AdobeRGB, opRGB (IEC 61966-2-5), and ROMM RGB.

(ISO 22028-2). We hope to perfectly map the image on a well-defined large color gamut reference display through GB/T 18721.4.

It prefers AdobeRGB over the other two options. Since opRGB 's color mapping is somewhat fuzzy, it is not very useful in output.

The surface is not clear enough, so the reference medium and viewing conditions are slightly different. ROMM RGB (ISO 22028-2) is clear in output However, the reference medium is a virtual reflective print (ICC-perceived reference medium). Therefore, the image status is the same as GB/T 18721.3.