

ICS 37.100.99
CCS A 17



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

GB/T 18721.3-2024

**Graphic technology - Prepress digital data exchange - Part 3:
CIELAB standard colour image data(CIELAB/SCID)**

印刷技术 印前数据交换 第3部分： CIELAB标准彩色图像数据（CIELAB/SCID）
(English Translation)

Issued on: March 15, 2024

Implemented on: March 15, 2024

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

Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 Requirement	
5 Data Description and Definition	
5.1 Dataset Definition	
5.2 Color coding used in this document	
5.2.1 Image Data Coding	
5.2.2 Image Data Arrangement	
5.2.3 CIELAB image data (16 bits per channel)	
5.2.4 CIELAB image data (8 bits per channel)	
5.3 Natural Images	
5.4 Synthetic Image	
5.4.1 Color Table	
5.4.2 Gradient Image	
5.4.3 Composite Image Format	
6 Electronic Data	
6.1 Image file characteristics	
6.2 Image file formats	
Appendix A (Normative) Guidelines for the use of digital data	
Appendix B (Informative) Definition of reference color gamut	
Appendix C (Normative) Checksum Data	
Appendix D (Informative) Typical TIFF file header for image files	
Appendix E (Informative) Insert text	
Appendix F (Informative) Histogram and Color Gamut Diagram	
Appendix G (Informative) CIELAB values in color tables	
Reference	

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 3 of GB/T 18721 "Printing Technology Prepress Data Exchange". GB/T 18721 has been published as follows 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 12640-3:2022 "Printing technology prepress data exchange Part 3: CIELAB standard color image Data (CIELAB/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.

As a well-defined dataset of standard groups, standard test images contain high-definition images with typical common image contents, which enable users to confirm We believe that, if mapped properly, this image will produce high-quality replicas and provide a reasonable test of the evaluation task.

The image set provided in this document can fully test any system, but it can obtain reasonable testing expectations with a limited image set.

The existence of datasets like these enables users in different regions to compare images without having to exchange images before copying them.

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, in general, there is no consensus among experts on how best to accomplish this task. Therefore, in each part of GB/T 18721, Data for three different image states is considered preferable.

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 printed, so these data are only suitable for evaluation of CMYK printing applications and cannot be transferred to other image states.

The state and color coding may not be well defined. In fact, because in traditional printing applications, these image data are defined in "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 will not be reproduced as a satisfactory image. In addition, with only 8 bits per channel in this case, any color change may produce artifacts.

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 viewing in the reference sRGB viewing environment and on 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.

It is designed for systems that use sRGB as the reference encoding and is therefore primarily suitable for the consumer market and for those whose color displays are used as "distributed" devices.

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.

In common printing technology and photography, some application software involves large color gamut and printing-related output color gamut.

In this case, it is considered desirable to produce an image set that allows encoding of full-gamut colors close to the boundaries of the achievable surface color gamut.

In addition, from the perspective of color management, if the image uses the D50 reference illuminant, it is beneficial for both the observation and measurement of the image, because the the illuminant is the primary reference illuminant used in printing and photography. For this reason, it is also the illuminant used in most color management applications.

The main reference illuminant.

The purpose of this document is to provide a test image dataset with a large color gamut related to the illuminant D50. The bit depth of natural images is this document provides a set of test image data for a wide color gamut of reflective media, using D50 Illumination of the object. The bit depth of natural images is 16 bits per channel, while color tables and gradient maps are 8 bits per channel. For printing technology and photography in applications where large color gamuts are common in printing and printing-related output color gamuts, it is considered desirable to generate an image set that allows for close in addition, from a color management perspective, if the image adopts the main If you want to refer to the illuminant D50, it is beneficial for both observation and measurement of images. For this reason, this illuminant is also the reference illuminant for most color management applications.

The main reference illuminant used.

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 generally require less vivid color remapping when printed than sRGB -encoded images.

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.

Therefore, AdobeRGB is preferred over the other two options. Since the color mapping integrity of opRGB is somewhat fuzzy, that is, when inputting ROMMRGB (ISO 22028-2) is