

# Adobe<sup>SM</sup> Customer Services

## The Lab Color Mode

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The Lab color mode in Photoshop 2.5 allows you for the first time to work in a truly device-independent color space. This document provides a brief overview of device independence and the Lab color model, and offers tips and suggestions on using the Lab color mode in Adobe Photoshop.

### THE NEED FOR DEVICE-INDEPENDENT COLOR

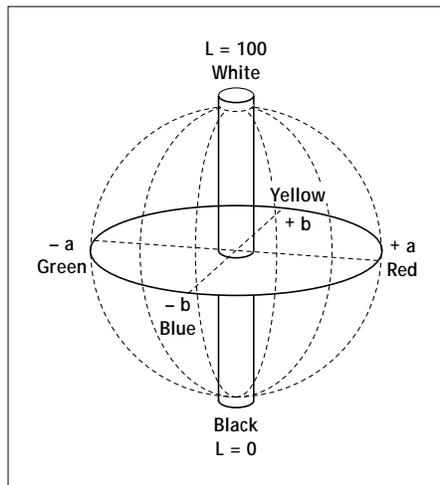
Because different devices reproduce colors so differently, maintaining consistent color from device to device has been a technical obstacle. Color reproduction in an image may not only vary with the type of device—monitor, printer, or slide imager—but may also vary with similar devices from different manufacturers, or even with different units from the same manufacturer. Because of this variability, producing consistent color on different devices is often a logistical nightmare. The purpose of “device-independent” color, therefore, is to give users a way to create consistent color documents regardless of the device used to image the file.

Different methods of reproducing color use different color *models*. Certain color models, such as the RGB and CMYK models, comprise a subset of the visible spectrum. The key to device-independent color is a standardized color model that comprises all colors; such a model can then provide a system for translating color from device to device.

### THE LAB COLOR MODEL

In 1931, the Commission Internationale d’Eclairage (CIE), an international organization formed to standardize color measurement, developed a color model based on the way the human eye perceives color. This model is the basis for all colorimetric measurement. In 1976, the CIE proposed two additional color systems based on their original model; one of these systems is CIE L\* a\* b\*.

The Lab color model defines color using the values L, a, and b, where L defines the lightness of the color, and a and b define the color along a red/green and blue/yellow axis, respectively. The following illustration shows one diagrammatic representation of the Lab color model.



*The Lab model*

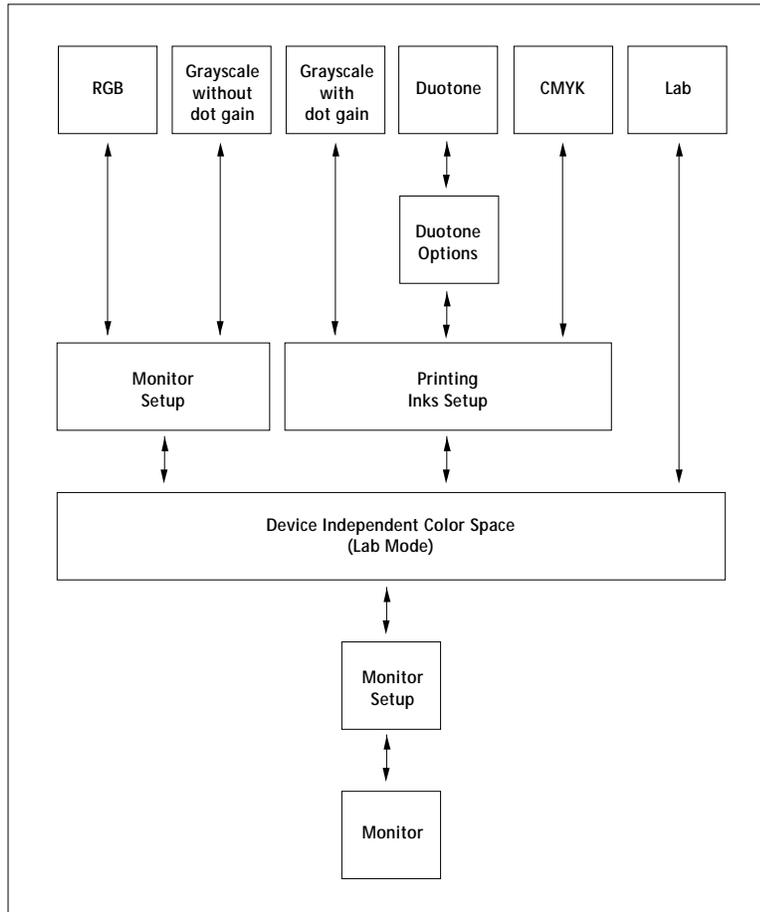
### USES OF LAB COLOR MODE IN PHOTOSHOP 2.5

Like other CIE color models, the Lab model comprises all colors in the visual spectrum and is device independent. It is therefore extremely useful for converting colors between other color models—for example, from an RGB model to a CMYK model; it also provides a way to preserve original color values when colors are transferred from one color reproduction system to another. The following are just some of the benefits that Lab Color mode brings to Photoshop.

### MODE CONVERSION

Internally, Adobe Photoshop uses Lab Color mode when converting color values from one mode to another. Because Lab mode provides a system for defining color values in all modes, using Lab as an intermediate mode for color conversions ensures that colors are not altered in the conversion process, other than the necessary clipping of out-of-gamut colors.

For example, when converting an RGB image to CMYK mode, Photoshop first converts the RGB color values to Lab mode using the information in Monitor Setup. Photoshop then uses information in Printing Inks Setup and Separation Setup to build a color table and convert the image to CMYK mode. Once the image is in CMYK mode, Photoshop must reconvert the color values to RGB to be displayed on an RGB monitor. To do this, Photoshop converts the CMYK values back to Lab (using the same color table if no values in Printing Inks Setup or Separation Setup have been changed) and then back to RGB (again using the Monitor Setup information).



*Mode conversions in Photoshop 2.5*

### **WORKING WITH PHOTO CD IMAGES**

When opening Photo CD images in Photoshop 2.5, open the image in Lab Color mode instead of RGB mode. Opening a Photo CD image in Lab mode preserves all colors in the image. This is because the native color space of Photo CD images, Photo YCC, is another implementation of a CIE Color model and is therefore device independent. After you open the image in the Lab mode, convert the image to RGB mode for editing, or convert the image to CMYK mode for separations.

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## PRINTING TO POSTSCRIPT LEVEL 2 PRINTERS

Because Level 2 printers support device-independent color, convert Photoshop images to Lab Color mode when printing to such a printer directly from Photoshop. The printer then performs the conversion from Lab to CMYK. Before sending the image to the printer, select the appropriate Monitor Setup options; this will ensure the best possible match between the printed image and the monitor screen.

## SELECTIVE COLOR CORRECTION

Because the Lab color mode separates the lightness component (channel L) from the other color components (color channels a and b), use this mode to edit just the lightness values in an image. Similarly, use Lab mode to edit just the red/green component or the yellow/blue component in the image. The following tips are just two examples of how to use this feature:

- To create a grainy quality in a color image, the appearance of speckled color, apply the Add Noise filter to adjust the L channel of an image in Lab Color mode.
- To create painterly effects in a grayscale image, convert the image to Lab Color mode. Create a horizontal gradient fill from black to white in the *a* channel and a vertical gradient fill from black to white in the *b* channel. This creates a blend in the color channels of the image without affecting the image detail in the lightness channel.