Color Management -
A Simple Explanation

Why do colors need management anyway?

Color management is mostly about communicating colors properly. If you visit a big electronics store and take a look at all the different screens lined up on the shelves, you will quickly notice that the colors they display are often quite different, even though the source image is the same for all of them. Why is that?

Various physical and technical factors have an impact on the way an image is being displayed on a screen, such as the built-in components, the used materials, its age – even its temperature. And even the colors of two brand new displays built by the same manufacturer might not match. However, this problem does not only occur with monitors, but also with printers, where factors such as paper and ink come into it as well. Every single combination of ink and paper will produce different results. In short: the colors as they are shown on the camera display are often entirely different ones than those that ultimately end up on paper.

In order to counter these differences in color reproduction, photographers use various color management tools, which ensure that their images are being displayed on the screen and printed on paper in their true colors. This is called a "color managed workflow", meaning that the colors are authentic from the time the picture is being taken up until it is printed. For professional photographers this management begins on location. Luckily, there are nowadays also very simple and easy-to-use solutions available for amateurs and enthusiasts, which solve this problem for "home use".

The screen – the window to view the image

The true colors of an image are embedded in the image file, however, the monitor is the window through which that image can be viewed. Functioning as a display and as an editing canvas, it takes a major role in digital photography. The most important step towards color authentic images is therefore to ensure a correct display of colors on the monitor. This is achieved by calibrating it. That means, a sensor is being put on it and a software application is being run. Within minutes it measures the colors the way the monitor displays them and compares them to what they are supposed to be.
Whatever the differences are, they are being saved as corrective values and written into a file, the monitor profile. From now on, the computer will use this profile to display images on the screen, thereby correcting the colors.

Since the display will change and the monitor will become less bright over time, this calibration needs to be repeated regularly. Now the most important step has been taken: No matter where the images are being sent off to later on, the calibrated screen can be relied on as having displayed them in their true colors.

Correct colors in printing

Just like for screens, color corrective profiles also exist for printers, or rather for combinations of printer models, papers and inks. These can either be created individually, using another sensor which can be used to scan and analyze printed colors, or they can be retrieved from the printer or paper manufacturer, who often provide such profiles. Before printing, the user selects the preferred profile and the printer produces a corrected image, to match the colors on the screen.

Even if you send your images off to a lab to get them printed, you can still influence the results: Good labs will provide their customers with a profile, which can then be used to simulate the print colors on the customer's screen at home. This is called a "Soft Proof" – a feature available in the common image editing applications. Based on the simulation, the customer knows what to expect from the results and can therefore edit the image accordingly.

More information on color management is available from the Knowledge area.