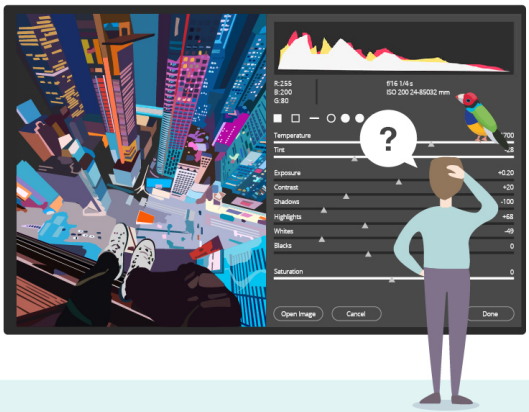
WHAT IS COLOR GAMUT?

Gouldian Finch | March 18, 2019 Photography



What is **color gamut**? The color gamut describes a range of color within the spectrum of colors that are identifiable by the human eye (visible color spectrum).

Take your favorite color for example. Is it red-green or blue-yellow? Of course not, since those colors are impossible to view with the human eye.

For better or for worse, we're limited to the visible color spectrum, or color gamut, that our eyes can see. This is true in all aspects of life - not just in nature, but also in artificial visuals produced by modern day technology. From monitors to tablets and projectors, there is no exception, given their color standards.

Below, we elaborate on this color gamut and ensure that no confusion remains. We hope you find this as exciting as we do!

Understanding Color Gamut

Sure, color gamut refers to the specific range of color that is visible to the human eye, but what is it really?

Consider what you primarily notice when you go shopping for a television or monitor. Sure, the physical size and width are important factors, but you may also pay close attention to the colors contained within the images presented. Dark blacks, vibrant reds and greens, and so on. A striking, color-dominant spec video that reflects reality in ways previously unseen may make the difference between a browser and a shopper.

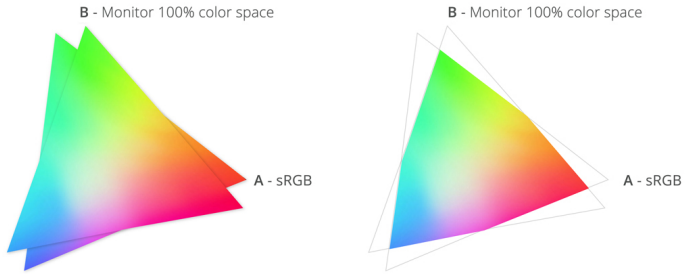
Be warned, it might be tempting to confuse color gamut with resolution. It's understandable, given that color quality and overall quality may seem not just complementary, but interchangeable. With that in mind, the aforementioned representation of color and how it differs between products is directly influenced by color gamut, color coverage, and the many color standards.

Color Coverage

While color gamut has to do with the actual colors, a product's color coverage indicates its ability to reproduce & communicate colors from their source.

For the sake of understanding, consider the visual difference between a modern cinema projector, a previous-gen iPhone camera, and a TV from the 1990s. The way they depict colors couldn't be more different, not only in terms of breadth and depth, but also in relation to how it creates the colors themselves. This is where color standards become a relevant part of this discussion.

how color gamut is depicted on a technical level. Presented as a triangle on an XYZ axis, the Y refers to the maximum color luminance possible within the gamut, while the X and Z points indicate the complete range of chromaticities — a color's hue and colorfulness. When all is said and done, the final result perfectly reflects a color gamut's range of capabilities.



A: The theoretical range of sRGB Color Gamut
B: Total color space a monitor can produce

sRGB coverage (extent of coverage of the sRGB color space)

What are Color Standards and what are the different types?

Oftentimes, especially in commercial applications, colors are generated via the mixture of other colors, rather than natively producing the color on its own. This is mostly due to cost-related factors. Consider for a moment that home printers, typically, only contain ink for cyan, magenta, yellow, and black. All other colors you may see on your printed page are the result of a combination of those base colors.

Which frameworks set the standard for color production, regardless of whether its via printers, monitors, or cameras? The answer lies in color standards, which relate directly to standardized color gamuts. With that in mind, common

DCI-P3.

sRGB

sRGB is the most commonly found color standard around. From cameras to monitors and televisions, it is guaranteed that you have encountered sRGB at some point in the past. That said, sRGB is popular for a reason. Its input and output experiences very little lag time and/or discrepancies. These benefits lead sRGB to become as widespread as it currently is.

Adobe RGB

Adobe RBG is a color standard that was designed to compete with sRGB. When properly implemented Adobe RGB is meant to offer a broader color gamut and to depict colors in a more realistic fashion. At the time of its introduction, and given its attention to vivid detail, Adobe RGB was a tad too ambitious and advanced for the technology of which it was meant to become the standard. As LCD monitors, as well as photography technology, has advanced, Adobe RGB has seen increased levels of use.

DCI-P3

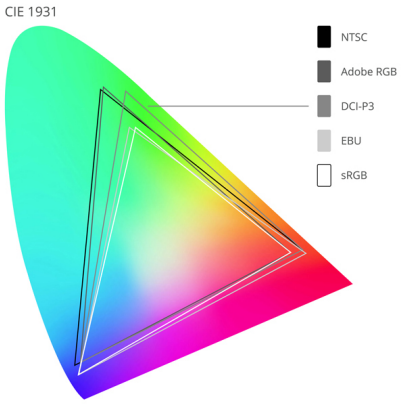
In a buck from the popular options, The Society of Motion Pictures and Television Engineers opted to introduce its own color standard, the DCI-P3. With an emphasis on digital video capture and projection, DCI-P3 opts for a color gamut that is nearly a quarter wider than its sRGB counterpart. Given its organizational roots, the DCI-P3 color standard is compatible with all digital projectors on the cinematic level. On the consumer level, on the other hand, DCI-P3 can be found, notably, within the iPhone X's internal camera.

NTSC

created its own color standard in the hope that it would become the standard for all newly produced televisions. Largely similar to Adobe RGB, the NTSC color standard differed slightly when it comes to the production of red and blue colors. Although it has yet to become the televisual standard, the NTSC color standard has found its niche in monitors meant for professional-level video and photographic editing.

EBU

Just as with the NTSC, the EBU, or the European Broadcasting Union, sought to implement its own color standard. Traditionally, the EBU color standard has been focused on the photography, video editing, and graphic design fields. With the advent of wider color gamuts and ultra high definition resolutions, including 4K, the EBU color standard begun to be placed outside of its niche, and into more common consumer-level products.



Wide Gamut and Color Possibilities

As was previously stated, the range of a color gamut is determined by its placement on the X and Z axes. Until recently, those data points didn't change too widely, regardless of the color standard in use. This was primarily

their creation.

Today, with the presence of OLED technology, the limits on color gamut are no more, thus leading to the creation of wide color gamuts. Unlike their non-wide counterparts, which produces colors based on mixtures of others, wide gamuts are capable of producing pure, native colors.

The implications of this recent developmental possibly are, frankly, astounding. From more accurate printing to the potential production of even the most difficult of colors, the sky's now the limit.

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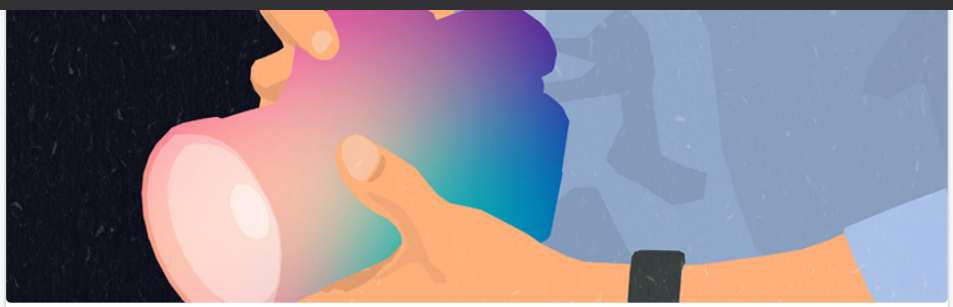

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