

Hasselblad Technology - Background Article

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Hasselblad has developed the Hasselblad Natural Color Solution (HNCS) in order to make photographers able to achieve colors, which out-of-the-box in all respects to lighting, and subject matter look perceptually correct. This has been established by the cleverly combining of math with a series of color transformations of the original raw RGB color data coming from the calibrated sensor of a Hasselblad digital camera.

Achieving color that appears correct to a human observer is a complex matter. The observer has his own, very special ideas as to the absolute correct color of, for example, skin or foliage. The standard solution for achieving color that looks “right” is to provide different profiles for different subject matter – one profile for optimum skin tones, another profile for the best rendition of industrial products, and still another for the most pleasing reproduction of foliage. Unfortunately, photographic tasks often defy such rigid classifications – how are we to deal with a subject involving both skin and foliage? There may be a generic profile as an alternative to a specific one, but generic profiles are a compromise – there’s nothing completely wrong, but nothing completely right either.

In HNCS, Hasselblad did strive for a universal profile to relieve the photographer from having to choose between different profiles optimized for different subject matter, but without the compromises typical for generic profiles. Profiles are transforming one color space into another, optimizing different colors in different ways. This optimization is quite a complex task even technically. One may visualize a color space as a palette of colors drawn on a rubber sheet. To change the rendition of one color, one would drag it in a chosen direction, but neighboring colors would be dragged along, which may not be intended. If one had optimized skin tones first and then commenced to optimize the green colors of foliage, these changes could undo the original optimizations applied to the skin tones and vice-versa. If one pulled too hard in opposite directions, the metaphorical rubber sheet would eventually tear apart, corresponding to a discontinuity in the color space: nearly identical colors would get rendered quite distinctly, wreaking havoc with smooth transitions from one color to another.

Hasselblad’s universal profile began with a first approximation, taking into account known facts about human color vision. This initial version was progressively refined based on the outcome of experiments with professional photographers judging the rendition of skin tones and other critical areas of the color space. Changes suggested by the results of these tests were incorporated manually into the profile. In the end, Hasselblad arrived at a profile giving consistently good results for any subject matter exposed under any lighting conditions.

At the end of a color handling, contrast is optimized, in order to use most of the available digital levels to represent the most important parts of the image in between highlight and dark point. We call this discipline to apply a “film curve” as film always has used this trick to deliver the best possible contrast. The colors are now finished and described in a device independent color space. The final transformation to work with the colors in Photoshop or to output the colors on a specific device is done by simply choosing the Hasselblad RGB input profile in the Phocus imaging software.

All in all a long way of applying different disciplines of mathematics to have basic RGB color values turn into consistent and good looking color matching what the human eye is used to see in the real world. With the use of HNCS the needs for choosing a specific color profile in order to capture good colors correctly is gone. The HNCS colors simply come out correctly.

This background article on Hasselblad technology can also be found at the Hasselblad Press Lounge at press.hasselblad.com