



Tonal compression is the process of limiting the tonal range *the range of tones that make up a photograph from the brightest tone to the darkest* of an image by clipping at either one or both ends of the scale, thus producing an image with less tonal information. This process is usually more acceptable when clipping image information at the shadow end than at the highlights, mainly because of the popularity and acceptance of the silhouette.

Global contrast, as opposed to local contrast, affects the entire image while maintaining the original shadow and highlight end points of the scale. This is generally achieved by applying an S-curve or a reverse S-curve to the image.

The Digital Sensor

Although the majority of digital photography is represented in color, the digital sensor actually responds to amounts of light rather than portions of the visible spectrum *and so does film so to speak*. A process of color separation is then conducted to reproduce different colors. This process is generally handled by red, blue and green filters positioned in front of the digital sensor.

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The almost universal approach of reproducing color is handled by the Bayer array, which is a mosaic filter of red, blue and green patterns with green patterns having twice the number of the red or blue in an attempt to simulate the human visual system which responds greater to the yellow/green parts of the visible spectrum.

Black & white photograph shows red, blue & green filters.

To generate a black and white image later, these colors need to be desaturated in order to reproduce a grayscale representation of the image. The main reason for introducing color and then subtracting it is mainly for the benefit of greater latitude in post-processing, giving the photo grapher greater freedom in representing their black and white image by more precise tuning of different specific hues. Digital sensors are much less forgiving than film in their response to light falling on each photo-site. This means that clipping, either at the right end or the left end of the histogram, is more likely to occur especially in scenes with high contrast between highlight and shadow regions.

Digitally Interpreting Light

The digital sensor, as we've mentioned differs in its response to light from both film and the human visual system. It calculates light striking each photo-site and generates a signal corresponding to those calculated amounts. This is a very basic and linear way of interpreting a specific scene, and yields unnatural results compared to the way we actually perceive reality. Both film and the human eye have a way of realizing high dynamic ranges and adapting to varying lighting conditions by somehow compressing information which yields to brightening of the shadow areas and gentler tailing-off towards the highlights. Film's response to increasing exposure slows down. So at the right hand of the histogram, film responds more sluggishly to increasing brightness than it does at the mid-tones.

To reproduce the same results with the digital capture, a Gamma Correction can be applied. If you shoot TIFF or JPEG the camera actually does apply such correction to provide a more natural image by creating a somewhat gentler roll-off in the highlights, and to some extent avoid the sudden break point and banding which occurs in the highlight region when an area shades from bright to pure white.