

How Exposure and Development Affect the Negative:

Film is composed of silver halide crystals that, upon exposure, clump together to form a latent image. When chemically developed, the crystals turn black, and literally a build up on of silver on the film. This silver build up is measurable by an instrument called a densitometer. A negative with a little silver is called thin, and one with lots of silver is called dense. The amount of density on a negative is determined by both exposure and development:

The greater the film exposure, the denser the negative.

The greater the amount of development, the denser the negative.

Negatives have a wide range of densities, depending on the light values of the subject. Brighter areas of the scene will cause more silver to clump together, in turn causing more density. Bright areas are called highlights, while dark areas are called shadows.

Shadows are dark in the subject, thin in the negative (easier to see through), and dark in the print. Highlights are bright in the print, dense on the negative (harder to see through), and bright in the print. The different negative densities create the variety of tonal values (tones) produced in the final print.

Exposure and development play different key roles in determining density:

Exposure controls shadow density.

Development controls highlight density.

Exposure does indeed affect both the shadows and the highlights, but if there is not enough density in the shadows, then there will not be enough detail to print adequately, and will print as textureless, muddy-gray tones. An overexposed negative will print enough shadow detail, but may cause the highlight to “block up” or print bright white, without texture or detail.

Luckily, development is able to control the highlight density. The shadows of a scene will have much less silver on a negative, and will be fully developed in approximately half the time recommended by the manufacturer (for example, HP5 in Sprint 1:9 68° total time is 8 minutes, the shadows will be fully developed by four minutes.) The highlights, with much more silver clumped on them, causes the development to continue for a longer period of time. The manufactures of film developers have done careful tests to estimate the amount of time necessary for correct highlight development for film shot in average situations, and their advice will yield good results.