

Monroe Community College (3 credits)

PHO 106 Fall 2010 Lecture 381, Lab 385 & 386

Instructor: Joe Ziolkowski “Joe Z.”

20100907

F/Stops

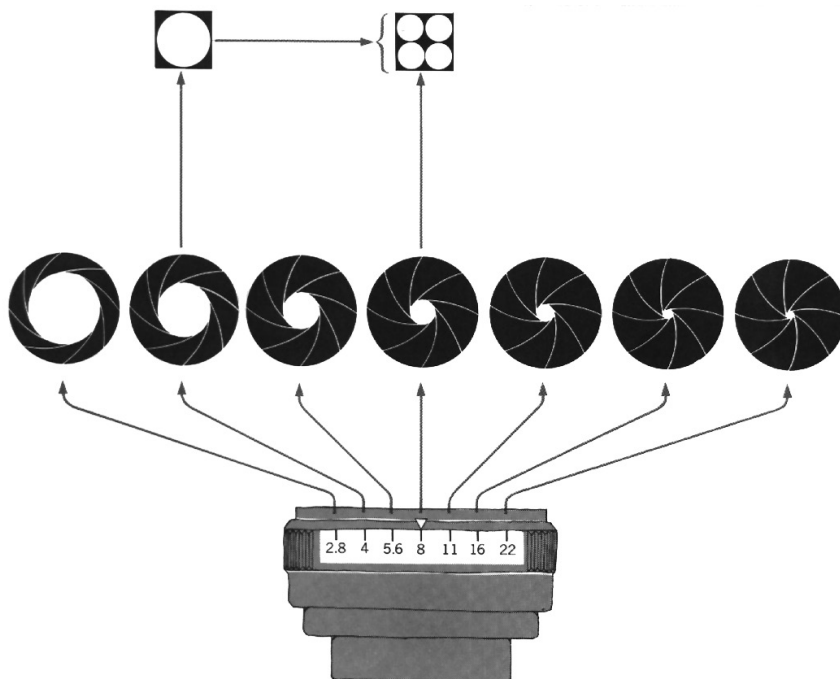
The Modern aperture, located inside the lens, is a mechanism consisting of thin metal leaves overlapping in concentric order to form what is known as the diaphragm. Turning the lens control one way rotates the leaves towards the circumference of the circle and increases the size of the aperture; turning the opposite way rotates the leaves towards the center and closes the aperture down. The size of the aperture controls the amount of light passing through the lens to the film in the camera. F/stops identify aperture sizes in a standard scale of measure. These marked on the ring of the lens control, and the illustration related stops F/2.8 through F/22 to actual openings in the diaphragm. From largest to smallest aperture, each opening is half the size of the preceding one; conversely, from smallest to largest, each opening is twice the size of the immediately preceding one.

More light let into camera. Less light let into camera.

F/1.4 F/2 F/2.8 F/4 F/5.6 F/8 F/11 F/16 F/22 F/32

Stopping Down.

The camera's aperture at F/4 is 4 times the size of the aperture at F/8.



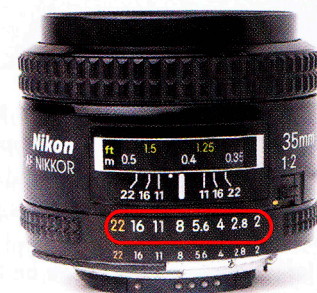
WHERE APERTURE SETTINGS ARE DISPLAYED ON VARIOUS CAMERAS



In the camera's viewfinder



In the data-panel readout



On the lens barrel

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BASIC CAMERA FUNCTIONS.

1. All camera's use a combination of APERTURE also called the F/STOP to control the amount of light that enters the camera, as well as using the SHUTTER SPEED to control the amount of time that light entering the camera strikes the film. The F/STOP also controls the depth of field in a Photograph. This is the amount of foreground and background that will be in focus around your main subject matter.
2. Types of lenses:
Wide Angel Lens, greater field of vision than the human eye. Example 24mm
Normal Lens, mimics the field of vision than the human eye. Example 50mm
Telephoto Lens, narrow field of vision than the human eye. Example 180mm
Zoom Lens, combination above lenses. Example 35-100mm
3. General metering & film Speeds.
The 18% grey card averages a scene and the meter sees 18%.
Set the ISO of the on the camera.

LESS LIGHT

LESS EXPOSURE

MORE LIGHT

MORE EXPOSURE

F/45 F/32 F/22 F/16 F/11 F/8 F/5.6 F/4 F/2.8 F/2 F/1.4

\ /
ONE STOP

1 SEC. 1/2" 1/4" 1/8" 1/15" 1/30" 1/60" 1/125" 1/250" 1/500" 1/1000"

\ /
ONE STOP

MORE TIME

MORE EXPOSURE

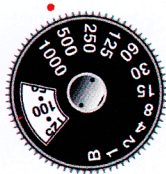
LESS TIME

LESS EXPOSURE

WHERE SHUTTER SPEED SETTINGS ARE DISPLAYED ON VARIOUS CAMERAS



In the camera's viewfinder



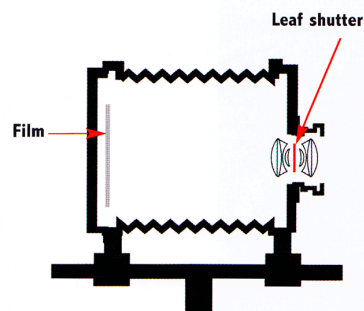
On the shutter-speed dial



In the data-panel readout

For the above examples, each camera is set to 1/500 sec. Notice that the camera displays only the bottom number of the fraction.

HOW SHUTTERS WORK

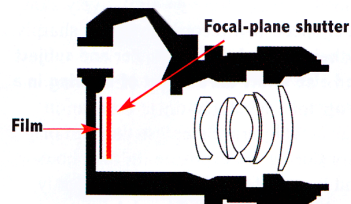
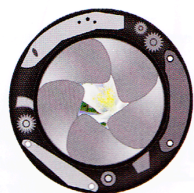
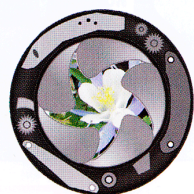
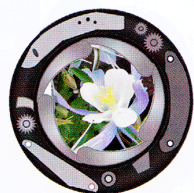
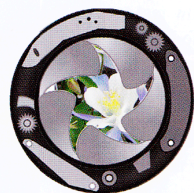
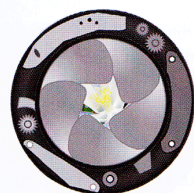


A leaf or between-the-lens shutter is generally located inside the lens itself. All view cameras, many medium-format cameras, and most point-and-shoots use leaf shutters. The leaf shutter consists of a number of small overlapping metal blades. As shown at right, when the shutter is released, the blades open up for an amount of time determined by the selected shutter speed, then shut again. The total amount of light admitted during this cycle produces the fully exposed photograph (see top of the page).

Many compact digital cameras use a particular kind of CCD sensor (called interline transfer) that controls the length of exposure electronically. Most of these have a leaf shutter that is normally open, but closes momentarily before exposure to allow the sensor to initialize.

Advantages/Disadvantages. A leaf shutter is quieter than a focal-plane shutter and can be used with flash at any shutter speed. But since the leaf shutter has to open, stop, and then reverse direction to close again, most have top speeds no higher than 1/500 second. If your interchangeable-lens camera uses leaf shutters, the shutter is probably built into the lens. The cost of a shutter then adds to the price of each lens. Also, actual shutter speeds might be a little slower or faster than each other. Generally, the difference is small, but it could be enough to make a noticeable difference in exposure when changing from one lens to another.

Because a leaf shutter only has to open until it reaches the outer edge of the aperture, many cameras can set a higher shutter speed for small apertures than for large ones. Leaf shutters are so quiet that many compact digital cameras are programmed to emit an electronic shutter-like sound when the button is pressed so the user can tell when an exposure has been made.



A focal-plane shutter is built into the camera body and is located directly in front of the sensor or film; it consists of two overlapping curtains. When the shutter is released at slow shutter speeds, the first (opening) curtain moves across the frame, revealing a window through which the sensor or film is exposed. The shutter waits for the correct amount of time, then it closes the second (following) curtain to stop the exposure. At higher shutter speeds, the following curtain begins to close before the opening curtain has completed its travel. The film or sensor is exposed through what appears to be a moving slit. As the shutter speed increases, this slit narrows.

The series to the right shows the shutter travel at fast shutter speeds. The narrow slit exposes only part of the frame at any one time, but every part of the film or sensor receives light for the same amount of time. Above, see the effect of the entire exposure, with all sections of the film or sensor having received the proper amount of light.

The shutter shown here moves from side to side. Some cameras have another type of focal-plane shutter (called a guillotine) that moves from top to bottom. Some digital single-lens reflex cameras use an interline transfer CCD sensor (see text at left). They also have a focal-plane shutter but do not use it to control the length of exposure.

Advantages/Disadvantages. Interchangeable lenses for a camera with a focal-plane shutter can be less expensive than those for cameras requiring leaf shutters, since a shutter does not have to be built into each lens. And focal-plane shutters can reach higher speeds than leaf shutters—as high as 1/8000 sec.

Generally, however, you can't use electronic flash when both shutter curtains are moving at the same time. The highest shutter speed at which the opening curtain has completed its travel before the following curtain begins to move—called sync speed—may be as slow as 1/60 second. At any faster shutter speed than a camera's sync speed, a flash will illuminate only the slice of the frame revealed by the slit at the moment the flash is triggered.

Because you must use a relatively slow shutter speed with flash, existing (or ambient) light may register on the film or sensor as well as light from the flash. This can leave a "ghost" or second image in the picture.

