

OPTICAL PRINCIPLES

The main lens controls are the focus control and aperture ring. Most lenses also have a distance indicator, telling you how far away the lens is focused, and a depth of field scale, indicating the extent of the zone of sharp focus. The three factors affecting depth of field are aperture, subject-to-camera distance, and the focal length of the lens. Greatest depth of field results from the smallest available aperture on the shortest lens,

focused on infinity (∞). As apertures get larger, focal lengths longer, and subject distances nearer, so depth of field diminishes.

The aperture setting is a key element in film exposure. The best setting to select depends on how much depth of field a scene requires and also the shutter speed setting. A fast shutter speed freezes subject movement and keeps camera shake from affecting the image, while a slow setting produces a blurred image.

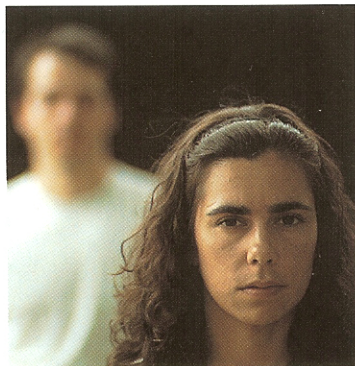
Choosing a lens

Choose the "fastest" lens you can afford – that is, one with the widest maximum aperture. The speed of a lens affects exposure in low-light situations.

FOCUSING AND APERTURE

Depth of field

The zone of acceptably sharp focus surrounding a subject is critical to the appearance of the final image. To make full use of all apertures a lens offers, position the camera on a tripod to prevent camera shake. The two pictures shown here are identical in terms of exposure, but while the first one (*below*) was shot at 1/60 second at f2, the second one (*bottom*) was shot at 1 second at f16. All other aperture and shutter speed combinations in between would also produce a correctly exposed image.



Exposure: 1/60 second at f2



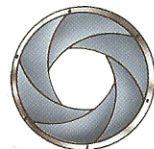
Exposure: 1 second at f16



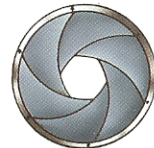
f2 - 1/60 sec



f2.8 - 1/30 sec



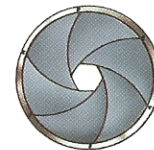
f4 - 1/15 sec



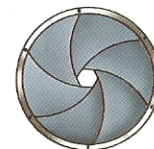
f5.6 - 1/8 sec



f8 - 1/4 sec



f11 - 1/2 sec



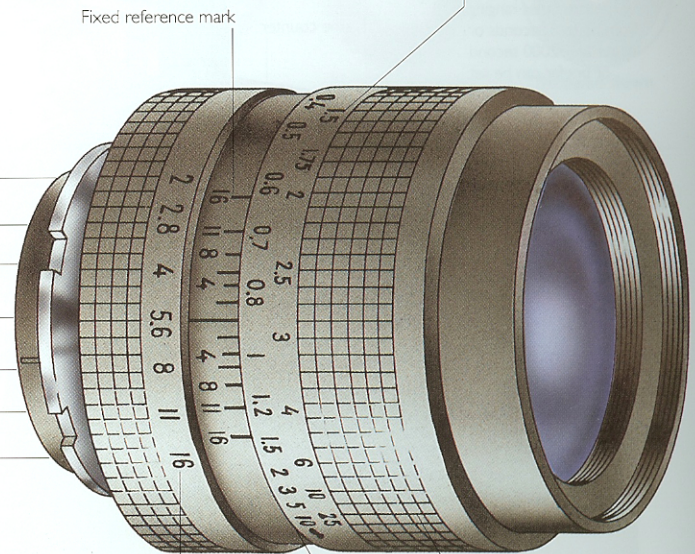
f16 - 1 sec

The f-stop and aperture size

Any type or size of lens set at a specific f-stop transmits an image of near identical luminance, because the diameter of the aperture is directly related to focal length. For example, an 80 mm lens used with an aperture 5 mm in diameter must be set at f16. Thus, the focal length of the lens, divided by the diameter of the aperture, gives the corresponding f-stop number.

Focusing distance indicator

The lens extends from the camera by means of a screw thread operated by the focusing ring. As you turn the ring, you can see the distances being focused on by reading the indicator against the fixed reference mark.



Aperture settings

Moving the aperture ring up to the next f-stop (from f4 to f5.6, for example) halves the aperture size (and so halves the amount of light reaching the film), while moving the ring down (from f4 to f2.8, for example) doubles the aperture size.

Depth of field scale

With the lens focused on the subject, look for the aperture numbers on either side of the fixed reference mark that correspond to (or approximate to) the f-stop of the set aperture. Read these against the focusing distance indicator below to determine the effective depth of field.