an f-stop of 8. It is also important to remember that as the f-stop numbers get larger, the opening of the iris diaphragm gets smaller.

All lenses will absorb some of the light passing through them, and as such, there is a more precise representation of the amount of light reaching the film through the lens. This is called a *t-stop*. While an f-stop is a mathematical calculation based on the size of the opening of the diaphragm, a t-stop is a measurement of the actual amount of light transmitted through the lens at a particular diaphragm opening. The t-stop takes into account any light that is lost due to absorption through the many optical elements of the lens. The t-stop is more accurate and should always be used when setting the exposure on the lens. F-stops and t-stops are discussed further in Chapter 4 (see Figure 1.13).

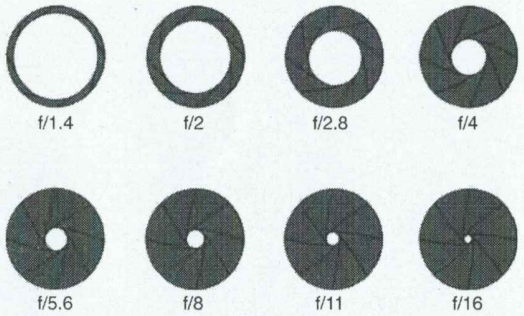


**Figure 1.13** Examples of f-stop openings.

## EXPOSURE TIME

The length of time that each frame of film is exposed to light is called the exposure time. At sync speed, film travels through the camera at the speed of 24 frames per second. This means that each frame is traveling through the camera at a speed of 1/24 of a second. Essentially for one half the time, the film is being moved in and out of position in an area of the camera known as the *gate*, and for one half the time it is being held steady in the gate so that it can be exposed to the light entering the lens. Half of 1/24 of a second is equal to 1/48 of a second. For convenience this is rounded to 1/50 of a second, and most light meters are calibrated with a setting for 1/50 of a second. This is the actual amount of time that each frame of film is being exposed to the light. Therefore, at sync speed we say the standard exposure time for all motion picture photography is 1/50 of a second. If you want to be



precise, 1/48 of a second is the actual exposure time when shooting with a 180 degree shutter angle on the camera, and 1/50 of a second is the actual exposure time when shooting with a 172.8 degree shutter angle on the camera. Many cameras with adjustable shutter angles have a setting for 172.8 degrees. On cameras without an adjustable shutter, most DPs will still use the exposure time of 1/50 of a second because the difference in the amount of light is negligible.

To find your exposure time you must know the camera speed (fps) and shutter angle. See Appendix E for the formula for calculating your exposure time.

## EXPOSURE METERS

To determine the correct exposure setting for the particular shot, we measure the intensity of the light with an *exposure meter* or *light meter*. The two basic types of light meters used for measuring the exposure of an object are incident meters and reflected meters. Any light that is falling on an object is called *incident light* and is measured with an *incident light meter*. The meter contains a white, translucent dome called a *photosphere*, which is mounted over a light sensor. The photosphere simulates a three-dimensional object, such as the human face, and averages the light falling on the object from all angles. The standard procedure for using an incident light meter is to stand at the position of the subject being photographed and point the photosphere toward the camera when taking the light reading (see Figure 1.14).

Any light that bounces off or is reflected by an object is called *reflected light* and is measured with a *reflected light meter*. The light that is reflected by an object is based on the color and texture of the object. A white object reflects more light than a black object. A smooth object reflects more light than a textured object of the same color. The area in which a reflected meter actually reads the light is called the *angle of acceptance*. The most commonly used reflected light meters are called spot meters and have a very narrow angle of acceptance, usually around 1 degree. The standard procedure for using a reflected or spot meter is to stand at the position of the camera and point the meter toward the subject being photographed (see Figure 1.15).

In recent years a new type of light meter has been introduced that is becoming quite popular among cinematographers. It is a combination meter that combines an incident and reflected light meter into one compact light meter. A major advantage of the combination meter is that you don't need to have two separate meters to measure the light (see Figure 1.16).