Light Sources

In the beginning of photography, daylight, or sunlight, was the only light source suitable for exposing the slow film available at that time. Today, photographic film is not only vastly more sensitive to light, however a wide range of light sources have been developed for the needs of the photographer. These light sources include the following: tungsten lamps, tungsten-halogen lamps, fluorescent lamps, and electronic flash.

Hard VS Soft

Light can be either hard or soft, depending on its source and how it is used. Sunlight is a hard light as it casts harsh shadows. An overcast day produces soft light as its light is diffused. Light can also be anywhere in between these two extremes.

Daylight

Sunlight, of course, is the light photographers are most familiar with and for good reason. It is the light they use the most. Naturally, sunlight is the only practical light source for general outdoor photography. Artificial light sources, however, can provide useful supplementary lighting to sunlight as fill-in for shadows (to make them lighter) and take the place of sunlight entirely for photography of small areas and close-ups. Sunlight is often referred to as daylight. The term daylight, as used in photography, is meant to include all forms of light, direct or indirect, that originate from the sun.

Of importance to the photographer is the effect of the atmosphere on sunlight and the amount of atmosphere through which sunlight passes. The shorter wavelengths of light (violet and blue) are scattered by the atmosphere much more than the longer wavelengths. The color composition of sunlight becomes increasingly deficient in blue the further the light has to travel through the atmosphere (early morning and late afternoon when the sun is low on the horizon). As the sunlight becomes more deficient in blue, it appears more yellow. The amount of scattering also depends on the condition of the atmosphere. When the atmosphere is clean (has little moisture

or fine dust in it), there is less scattering than when the atmosphere is hazy or dirty (having a good deal of moisture or tine dust and smoke). The variation in color of sunlight can be expressed as color temperature. Sunlight coming from overhead on a clear day has a color temperature of about 5400 Kelvin. Just after sunrise and just before sunset, the color temperature ranges between 2000 K and 4000 K. Not only is the color of sunlight different early in the morning and late in the afternoon, but the intensity is also diminished. These are important considerations when taking pictures at these times of day. Light scattered by the atmosphere can be regarded as a second source of light. Skylight (scattered light) is different from sunlight because it is caused chiefly from the scattering of the shorter wavelengths. It therefore appears bluer than sunlight. Skylight on a clear day may be as high as 6000 K.

Artificial Light

The types of artificial lighting you use in photography give you complete control over the direction, quality, and strength of the light. You can move these light sources around, diffuse them, or reflect them. You can alter their intensity to suit the situation. There are two types of artificial light sources: spotlights and floodlights**.**

Spotlights provide a concentrated beam of light. Floodlights give diffused, softer, more even, spread out light. You can add to these two basic types of artificial light sources. By using lighting accessories, such as reflectors, barn doors, gels, diffusers, and snoots, you can control the light to provide a variety of lighting effects. Unless special effects are wanted, artificial light sources that are different in color temperature or quality should not be mixed together. When you are viewing a scene, your eyes adapt so color differences between two or several light sources are minimized. Color film, however, cannot adapt and shows the color difference in parts of the scene illuminated by different light sources.

Tungsten-Filament Lamps

Tungsten-light color films are made to be used with tungsten-filament light sources and are color balanced for 3200 K or 3400 K. Tungsten lamps, operated at their rated voltage, produce light of 3200 K and 3400 K. The color temperature of tungsten lamps change with voltage fluctuations, it decreases when the voltage drops and increases when the voltage rises. For example, the color temperature of a tungsten lamp rated for operation at 115 volts increases about ten K for each one-volt increase. Usually, a variation of less than one hundred K has no adverse effect on the rendering of scene colors. However, a shift as low as fifty-K can be noticeable on subjects with important neutral areas, such as white and light shades. When you are using tungsten lamps, the color temperature can shift, depending on the amount of power being drawn on the same circuit.

When possible, you should avoid having other equipment on the same circuit. For these lamps to produce light of the correct color, they must be operated at exactly their rated voltage. When it is not possible to operate the lamps at their proper voltage, appropriate filters can be used to correct the color of the light reaching the film.

Tungsten-Halogen Lamps

Tungsten-halogen lamps have a tungsten filament inside a quartz envelope. This type of lamp does not blacken the inside of the envelope and operates at an almost constant brightness and color temperature throughout its life. Tungsten-halogen lamps for photography operate at color temperatures of 3200 K and 3400 K. Filters can be used to convert them to daylight. For its size, a tungsten-halogen lamp generally delivers more light than a conventional 3200 K lamp. Tungsten-halogen lights are becoming more popular and are rapidly replacing regular tungsten lights for general photographic use.

Fluorescent Lamps

Pictures made on daylight type of color films under fluorescent lights without a filter may be acceptable; however, they usually have a greenish cast. When a tungsten type of color film is used with a fluorescent lamp without a filter, the pictures usually are too blue. Fluorescent light is not generated by heat, as are other types of light. It has special characteristics different from either daylight or tungsten light. Fluorescent lights have no true color temperature, but a value of approximate color temperature has been worked out. Daylight fluorescent lamps: 6500 K Cool, white fluorescent lamps: 4500 K, Warm, white fluorescent lamps: 3500 K.

Electronic Flash

Electronic flash is an excellent light source for both outdoor and indoor photography, especially when the predominant lights are fluorescent. Electronic flash units' use a tube filled with xenon gas and is supplied a powerful charge of electricity from a capacitor. The flash is triggered by means of an electrical current that ionizes the gas. The output, or intensity of the flash, is usually given in effective beam candlepower-seconds and is dependent on the voltage and size of the capacitor. The design of the reflector on an electronic flash has a direct relationship on the efficiency of the unit. Electronic flash resembles daylight in color quality and is excellent for exposing daylight type of color films. The duration of the flash is short, usually 1/500 second or

shorter. With a computerized (automatic) unit used close to the subject, the flash duration can be as short as 1/50,000 second. Computerized electronic flash units have a sensor that switches off the flash when the subject (depending on its distance and tone) has received enough light for proper exposure.

Reflectors

Two types of reflectors are of importance in photography. They are the lamp reflector and the plane reflector**.** The first type, the lamp reflector, is used with artificial light sources – tungsten, tungsten-halogen, fluorescent, and electronic flash lamps to direct the light. The second type, the plane reflector, is used to redirect light from any kind of light source into shaded areas to soften or lighten shadows. This would be better understood by most photographers as a reflector board. While it is true that mirrors are also reflectors, the term reflector is used in photography as a more general term. Mirrors always reflect specular light; and reflectors reflect either specular or diffused light.

Plane Reflectors

When you want to provide fill-in light for shadow areas, it is often desirable to substitute a plane reflector (sometimes called a reflector board) to redirect some of the light from a direct light source like your main light or sunlight. The plane reflector is placed so it receives light from the primary light source and reflects the light into the shadows. The efficiency of such a reflector depends on its surface and tone, as well as size and distance from the subject being photographed. The subject area covered by a plane reflector depends on the size of the reflector. When the surface of the reflector is matte or textured, it reflects diffused light and some of the reflected light is dispersed over a wide angle.

Lamp Reflectors

Light emitted by the filament of a lamp is dispersed in all directions. This is useful when the lamp is for general illumination, such as one suspended from the ceiling to light a room. As a photographer, however, you are usually interested in illuminating only a given area, and it is, therefore, to your advantage to concentrate the light emitted by a lamp onto the area of interest. You can do this by mounting the lamp in a concave reflector that reflects almost all the light onto the area to be photographed. Lamp reflectors generally have a satin or matte finish to diffuse the

reflected light to prevent hot spots that could result if the reflector surface were highly polished. Reflectors of electronic flash units vary considerably in their efficiency and covering power.