

Measurement and metering of light

Purpose:

- Energy management. You need the correct amount of energy to affect a specific chemical change in the photographic film surface.

Theory:

- Reflectivity
Some portion of the light that strikes an object is absorbed by the object; the rest is reflected.
- 18% "gray" (reflectant)
Somewhere, some band of engineers decided that the average scene reflects 18% of the light that hits it. So, they made in-camera light meters expect exactly that.
- Not necessarily "gray"
Any object, of any color, that reflects 18% of the light that strikes it, is 18% reflective, and will be measured correctly by a reflective light meter.
- Directionality
Light comes from, and moves in, a specific direction. Hard light is light from a small source; soft light is light from a large source.
- Exposure latitude
If the film is capable of recording more variation in brightness than the scene contains, then the entire scene can be recorded. The lower the contrast in the scene, the more margin for error the photographer has.
- Reciprocity
The rate of response of the film is not linear; at long exposures, film "slows down". Usually, by the time reciprocity failure is a concern, the light is too low for a standard photographer's light meter.

How to do it:

- Use a knowledge base
 - Sunny 16
Set the aperture to f16, and the shutter to your film ISO speed, and there you have it -- correct exposure on a sunny day.
 - Previous experience
Keep a good notebook.
 - Guide numbers
Read your flash manual. It will contain a guide number. $G = fD$ is the base formula, where G is the guide number, D is the distance from flash to subject, and f is the aperture. Have two, solve for the third.
- In-camera meters/metering
In-camera meters are always reflective. Reflective metering on a reference surface known to be at 18% reflectance will yield the same reading as an incident reading.
- Hand held meters
 - Incident metering
 - Reflective metering
 - Spot metering

- Flash metering

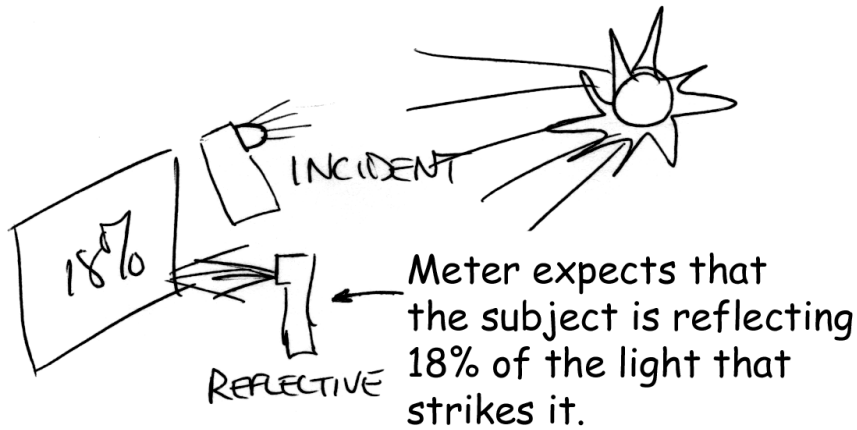
Other factors:

- Human judgment
 - Work out a compensation factor; know the difference between reflective and incident readings, and make corrections accordingly.
- Artistic judgment
 - If you can't record everything in the scene, what can you do without? What can you intentionally force out-of-gamut to get rid of it?
- Lab judgment
 - The lab may print your negatives "up" or "down"; brighter or darker than you would have like it. You must learn to read negatives to know how your exposures came out.
- Unusual conditions:
 - Strong backlight
 - Bright light from behind will fool a reflective meter. Correct for it by using a spot meter, or an incident meter reading.
 - Transmitted light
 - Reflective-meter the light source, then add at least two stops to burn it in.
 - Odd reflective surfaces
 - Water, for example, may be a very bright reflection, or a dark area.
 - Extra-bright scenes
 - Scenes which reflect more than 18% will fool a reflective meter into thinking there's more available light than there really is; the meter will advise that you stop-down to correct for it, and you'll underexpose the scene. Use an incident reading to prevent this.

General

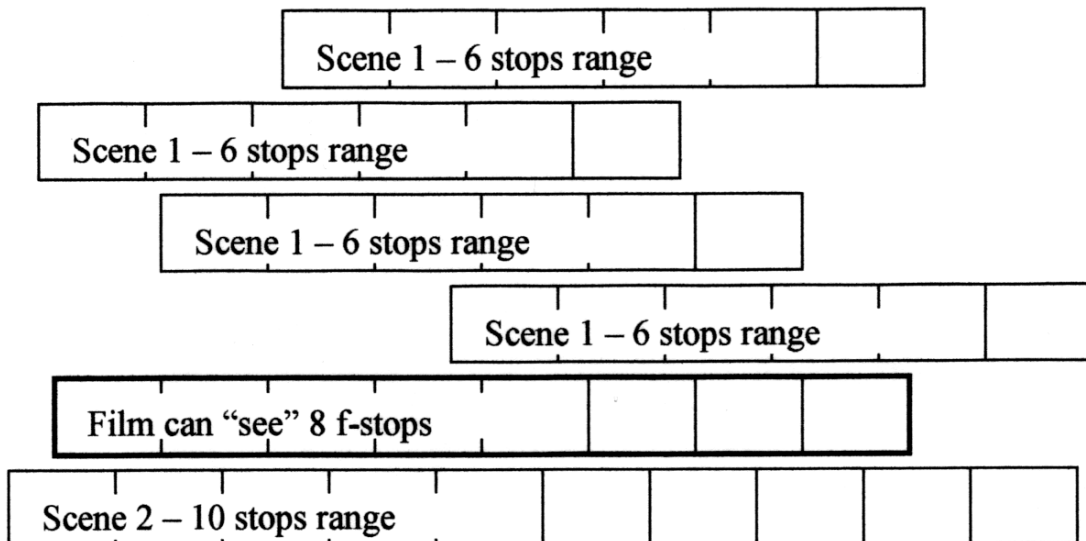
- Use good techniques
- Own a tripod

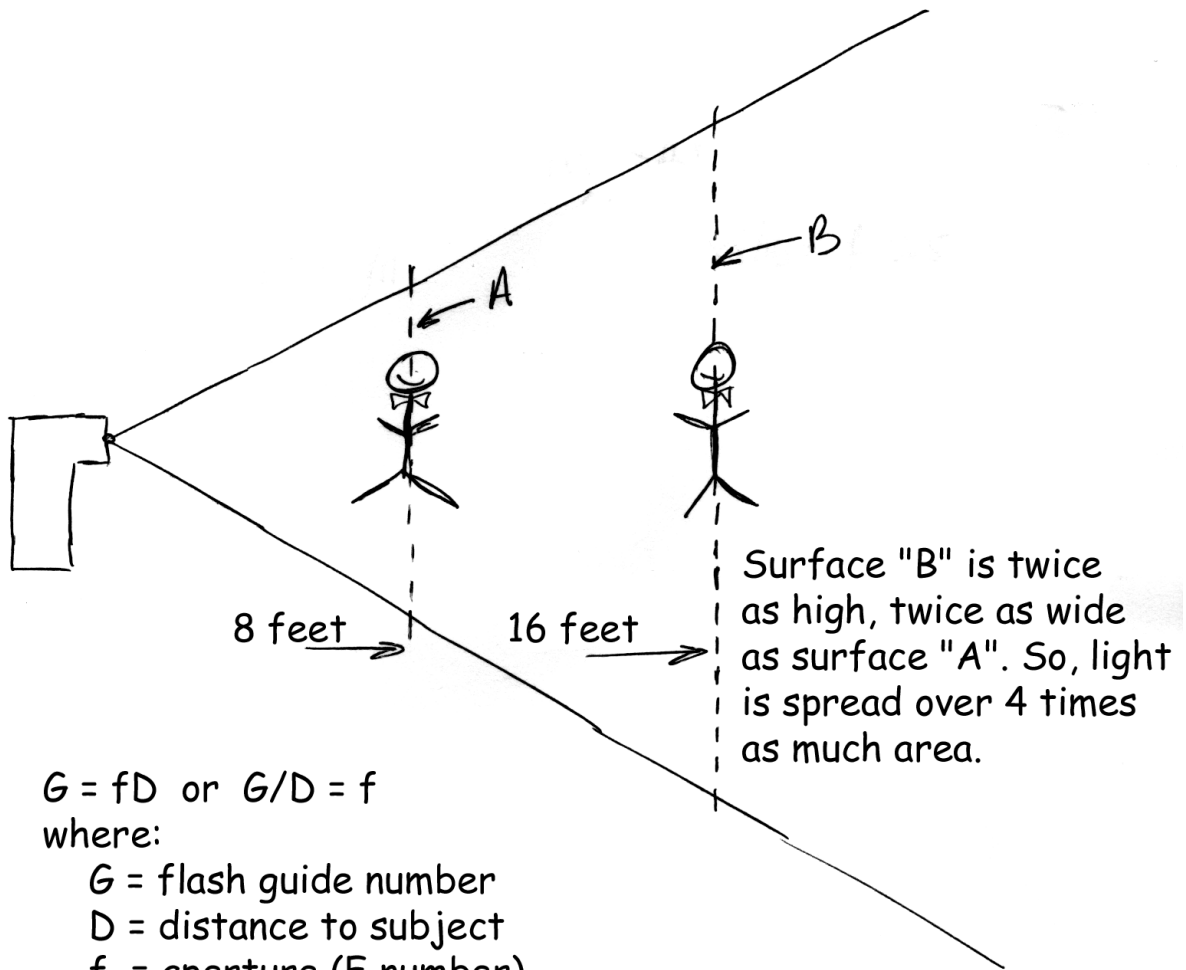
Incident Vs. Reflective:



When subject is 18% reflective, incident and reflective meter readings will be the same.

Exposure latitude





$$G = fD \text{ or } G/D = f$$

where:

G = flash guide number

D = distance to subject

f = aperture (F number)

At "A"

$$G = 88; \quad D = 8$$

$$G/d = 88/8 = f11$$

At "B"

$$G = 88; \quad D = 16$$

$$G/D = 88/16 = f5.5$$

