CLOSEUPS WITH VIEW CAMERA

Most photographic lenses are designed for use in situations where the lens to object distance is much greater than the lens to film distance. In close-up work, the opposite situation is true. As subjects get closer to the lens, the image size increases. When the two distances are equal, the object and image are identical in size.

The most limiting factor in working in these close ranges is bellows draw. In order to produce an image which is the same size as the original object, the lens must be twice its' focal length from BOTH the object and the film plane. In other words if one is using a 180 mm lens, the distance from the lens to the film plane must be 360 mm, and the distance from the lens to the object is also 360 mm. Images can be created where the object is enlarged on the film. In this case the lens to film distance will become greater than the lens to subject distance. Of course even more bellows draw is involved and one must either apply the factors from a chart, or the mathematical equation, or use a calculator similar to the one furnished in your package.

Obviously this longer lens to film distance brings bellows draw into play when computing exposure. A 1:1 reproduction requires such a long bellows extension that four times as much light must pass through the lens to put the same quantity of light on the film as is required at infinity. In other words, one must open up by two stops, or increase the exposure time by a power of four. As distance from lens to film increases, the effective aperture decreases. That is, if a lens is set at ƒ 16 and the distance from lens to film is twice the focal length, the **effective aperture** is **ƒ 32.** With this small effective aperture the extended time will most likely require the use of reciprocity correction in computing exposure.

Example: A 1:1 reproduction is desired with reasonable depth of field.. After setting up and focusing the meter indicates an exposure of ƒ 22 for ½ second. Since the lens is twice its' focal length from the film, the effective aperture is now ƒ 45. To compensate for this smaller effective aperture the time must be increased to 2 seconds. Now reciprocity is definitely a factor. If using Tri-X, or a similar film, the corrected time is 5 seconds, with the aperture set at an indicated ƒ 22.
Then as a result of the lengthened exposure time something else happens - the negative will have more contrast if developed normally. With today's materials, variable contrast paper specifically, we don't have to worry about changing the development time except in extreme cases. This does not mean the photographer should not be aware of the building of contrast in long exposures, because at some point it will become necessary to reduce development of the negative in order to produce a printable negative.

The other obvious problem is the extremely limited depth of field. The longer the distance from lens to film, the less the depth of field. This is true regardless of the focal length of the lens. But since this effective aperture is accomplished by increasing the lens to film distance, there is not an increase in depth of field. The effective depth of field is approximately that of the indicated aperture.

Here then the volume of light can be very important, the more the better. But if the photograph is of a scoop of ice cream, the heat from the lights is a major problem. This is where strobes can be very useful. The problem with using strobes is that the only way to get more light on the film is to open the aperture, creating a more shallow depth of field OR, in most cases, use multiple flashes.

Although not all lenses are designed for closeup work, most will do an adequate job for all but the most critical images. If one is doing really critical work they should purchase an apochromatic lens designed specifically for 1:1 work. The ones currently on the market include the Nikkor M Series, Schneider G-Claron and Apo-Symmar, and the Rodenstock Apo-Ronar.