1985

Action infrared photography

Andrew Davidhazy

Follow this and additional works at: http://scholarworks.rit.edu/article

Recommended Citation


This Technical Report is brought to you for free and open access by RIT Scholar Works. It has been accepted for inclusion in Articles by an authorized administrator of RIT Scholar Works. For more information, please contact ritscholarworks@rit.edu.
Action photography with black and white infrared film while probably never practiced to a great degree by photographers in general has, in my opinion, very nearly disappered from the present day photographic scene as a result of the popularity of the SLR camera. The reason for this statement is based on the fact that the filters required to expose film to infrared rays only are visually opaque.

Why would anyone wish to photograph using only infrared "light" anyway? ("IR light" is more properly referred to as infrared rays, radiation or energy since infrared can't be seen by the eye and thus does not fit the definition of "light".) Two reasons for using IR come readily to mind. The first is that subjects which look similar or even identical by light may record, and thus appear, differently by infrared. This may be caused by differences in IR reflectivity and/or transmittance. Applications of this method are a special concern of forensic photographers in forgery detection and of art historians and restoration specialists when dealing with the chronology and restoration of art objects. The second reason is that the photographer may not wish the subject to know that a photograph is being taken. Thus, since infrared rays are invisible they find direct application in surveillance and security related photography. The reason I am interested in using IR photography relates simply to the fact that IR photographs even of rather mundane subjects often have a special "look" to them. This is especially true of photographs of people.

In each of the above cases the technique which would be used is generally referred to as "reflected infrared photography". In order to photograph by the energy of these invisible rays you would use the only readily available film for this purpose and this is Kodak's High Speed Infrared film.

There are a number of caveats associated with the use of this film and they are presented to you here in the order in which you will probably run across them in actual use.

The film comes in a black container which you should not open except in a totally dark room or if this is impractical in a room lit dimly by fluorescent lamps only. The reason for this is that the felt trap in the cassettes is not opaque to infrared and if the film is exposed to this radiation the film may be badly fogged. Fluorescent lamps generally do not emit much IR energy and limited exposure to this source reduces the possibility of fogging. In addition the film has a clear base and "light piping" into the cassette is also a possibility producing additional fogging of the film.
While much has been said about the instability of the film when it comes to tolerance of high temperature or humidity the film seems to me to simply require the same care in storage as one would give color films, for it to deliver quality results.

Reflected infrared photography is usually accomplished by using readily available light sources (the sun, incandescent light bulbs, and electronic flash are all good sources of IR rays) and taking the photographs after placing an infrared filter over the camera lens just prior to making an exposure. The reason for waiting until the last moment to place the filter over the lens is that the filters commonly used, such as the 87, 87B or 87C do not transmit any visible wavelengths or light. Since the placement of one of these filters over the SLR camera's lens completely blacks out the viewfinder photographers have generally been restricted to using the camera on a tripod to photograph either landscapes or very slowly moving subjects. That is, photography of fast moving or changing events ("action" IR photography) is precluded by this method.

There is, however, a solution to this problem and it is to locate filter in a different place. Yes, you guessed it...placing it behind the lens and behind the mirror...just in front of the film! Very good results can be obtained by cutting a 23 mm by 45 mm section from a 3" x 3" standard gelatin infrared filter and installing it just in front of the film between the focal plane rails of the camera. The filter is held in place by small pieces of thin adhesive tape such as Scotch tape, attaching the filter to the body casting on each of the narrow ends. The placement of the filter in this position, while sometimes apparently in direct contact with the film emulsion, did not cause any noticeable scratches or abrasions in my experience. However, small pieces of dust which adhered to the filter showed up clearly in the same location on each negative. Careful removal of lint and use of a fresh piece of filter material is suggested.

An improved location for the filter is somewhere where it can't possibly come into contact with the film. This location exists just in front of the shutter mask of the camera. Placing the filter in this place is much more difficult and I would not recommend it unless you are planning to do extensive action infrared photography. The filter size will now have to be slightly larger than the film gate, about 26 mm x 38 mm, and is best installed if the shutter is locked in the open position and the mirror locked up safely out of the way.

The filter is fitted into the body from the front of the camera so it lays on the shutter mask. Its size may have to be adjusted to fit the particular dimensions of your camera. Because the filter is so light it can still be held in place by small pieces of tape. This forward location will not only protect the film from scratches but will also cover the whole aperture and prevent the edges of the film from being fogged by white light which is a small problem when the filter is placed between the film plane guide rails.

Since infrared rays generally come to a focus just a bit further away from the lens than light rays a slight focus adjustment needs to be made to achieve the sharpest results. This
is accomplished by moving the "visible" focused distance over to the infrared focusing mark indicated on most lenses by a red line, dot or letter R. The focus adjustment is quite small and especially when using small apertures can be ignored for the new focus will probably fall within the depth of field of the lens.

Exposure determination for the infrared film is still usually a matter of trial and error. Manufacturer suggested data indicate that for daylight illumination you can use as a starting point the aperture/shutter speed combinations as read with a normal light meter by setting the ASA value to 10 if using a 87C filter over the lens (or over the film!). For a tungsten source a speed of 25 is recommended. Unfortunately, the ratio of visible to infrared energy present in various light sources is not a constant and thus proper exposure under all conditions is not guaranteed by the above method.

You may be able to increase your chances of achieving a properly exposed negative under unusual lighting conditions by covering your meter's cell with the same filter material which you use over your camera and calibrating the combination so you consistently end up with usable images. As a starting point, with a Luna Pro as illustrated, try a meter setting of ISO 2400 with the cell covered by an 87C filter. Under these conditions my meter reads a #14 or so in broad daylight. Bracket around the exposure recommended by the modified meter and adjust your ASA rating vs. the 2400 figure to arrive at the speed setting which gives negatives to your liking. This seems to happen for me when the meter is set for ISO 2400 but different meters may react differently. I use the meter only in the "reflected" mode since what is usually desired is a negative with printable densities rather than one which properly translates the subject's invisible infrared tonal values.

A proof of the usefulness of a particular working method is the frequency with which it delivers acceptable results. Substantive proof of the usefulness of the techniques mentioned here is provided by the illustration of the matched set of contact prints photographed simultaneously on regular black and white film and High Speed infrared film exposed without bracketing. (This illustration is not available here).

Some subjects which you may wish to experiment with using IR film to show very dramatic changes in rendition as compared with normal film might include the face of a color TV set, a photograph of a color slide or color print, subjects with a variety of skin tones, vegetation and writing produced by inks from a variety of pens or markers.

While it is granted that the drawback of viewfinder blackout mentioned above could also be overcome by using a separate optical viewfinder, or using a rangefinder-type camera or a twin-lens reflex camera this way you would obviously lose the advantage of through-the-lens viewing and focusing.
Should you undertake the installation of an IR filter into a camera body you should clearly mark that body as having been modified because if you inadvertently use it with regular film you will end up with a completely unexposed roll of film!

Illustrations:
1. Twin camera set-up
2. Meter with 87C filter
3. Camera with 87C filter
4. Contact prints
5. IR photograph of a painting
6. Action infrared photograph

NOTE:

In the interest of being able to post many articles, actual illustrations have had to be omitted. If you would like a printed or faxed copy of this article send e-mail to the author's POSTOFFICE BOX HERE making sure to mention the article and giving your postal address or fax number.