

Digital Infra Red Photography

an article by David Summerhayes ©

Introduction - At various times in my photographic life I have used black and white infra red film in both scientific photography and for its curiously haunting effect for landscape photography. For the uninitiated, the effect is similar to black and white film shot through a red filter. Very basically, a filter lets in light of its own colour and blocks light of its opposite colour to varying degrees. So, a monochrome image of a typical landscape scene shot through a red filter would have a characteristically deep grey sky with very white clouds. Strong green foliage appears darker while pale green and autumn tones are usually rendered lighter than normal. Infra red imaging typically renders blue skies almost black with billowing white clouds. Grass and foliage actually reflect infra red much better than visible red so trees and grasses in a landscape are rendered very pale and almost look as if they were covered in light snow or printed in negative tones. Other interesting things happen when photographing people wearing sunglasses. Black clothes can suddenly have detail, skin tones look soft, pale and dreamy but with menacingly dark eyes. The drawbacks from using film are that it has to be handled carefully and loaded into the camera in total darkness.

I have recently re-discovered its use for landscapes using digital capture. Silicon based CMOS and CCD sensors are quite sensitive to infra red light, however most of the latest professional digital SLRs are no good for capturing infra red images because they have an inbuilt infra red barrier filter that blocks the very wavelengths needed for the process. The earlier built digital SLRs had no or at least inefficient barrier filters fitted so I decided to experiment with a 5 year old 2.74 mega pixel Nikon D1 and a Hoya R72 visibly opaque infra red filter. There are places that modify digital SLRs by removing the barrier filter and resetting the focus but it makes them useless for straight photography. I have never considered doing this, as for me; infra red photography is just a fun diversion from my more serious photography.



Adelaide Hills – digital infrared Nikon D1

Equipment – I used a Nikon D1 but try any other early digital camera. I set the mode to raw capture (use B&W tiff if you are unfamiliar with raw conversions or working in 16 bit mode). The most readily available filter around is the Hoya R72 filter. It has no transmission below 680 nanometers (nm) and 50% at 720nm. The normal human visible spectrum is from 400nm (blue) to about 700nm (red) and 720 is the start of the wavelengths that are useful for this type of photograph. A normal red 25A filter is not as useful as it lets too much visible light through. Need I say, a tripod is almost a necessity and composition must be sorted out before attaching the filter. As for lens choice, just about any will do. Some lenses may produce a hot spot in the middle of the image due to internal reflections and lens coatings. I usually stick to prime lenses rather than zooms and the older the better. Infra red light focuses at a point on the CCD sensor slightly longer than visible light so a focus shift may be necessary. Some older lenses have an infra red focus mark on them to assist calculations but if not, it is best to focus well in front of the main point of interest. I find that choosing a medium aperture of say f5.6 or f8 and manually setting for the hyper focal distance for infinity is a close approximation. (i.e. move the ∞ mark to line up with the 5.6 or 8 mark on the depth of field scale on the lens)

Exposure – I recommend setting the ISO to 200. The infra red filter still blocks quite a bit of light so exposures are generally long. 200 is just a good compromise for best exposure time and least CCD noise. Actually any ISO can be used and I would encourage experimentation. Infra red radiation can vary from time of day and between subjects. I find that on generally sunny days with the Nikon D1 I use about half a second at f8. Don't worry too much about what the histogram on the camera looks like as I believe on early Nikons only the green channel information is displayed as an average. It is best to use trial and error at first then experience later. Take note of exposures for later reference and don't be shy about bracketing exposures.

Post production – If I shoot in raw I open the file in camera raw through Photoshop. The basic settings I use are depth 16bit, saturation -100, contrast +100, brightness and exposure tweaked as necessary. I also upsize the image here in 16 bit straight from the raw file to get the best possible image to work further with in Photoshop. Once in Photoshop whether from the raw file or from a tiff or jpg it is up to the individual to decide on the look of the final image. Personally I prefer the traditional film look of being quite contrasty. I achieve best results through the strong use of curves. Not forgetting the advantages of digital over film in that there are also blending modes, luminosity masks shadow and highlight adjustments at our disposal.

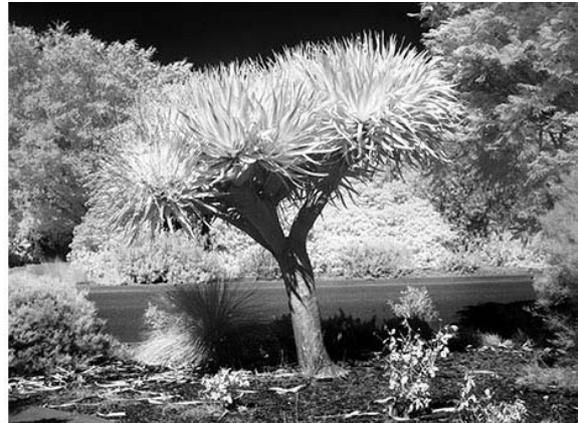
Update – I have recently been testing and using my point and shoot camera for infrared. I have a Canon Ixus 800IS which works well for IR although I sometimes get a hot spot from flare. An easy test to see if a point and shoot will be useful for IR is to put in infra red filter over the lens and get someone to point a TV remote control at the camera from half a meter away while the viewfinder is switched on. If it is sensitive to infra red you should see a bright light whenever one of the remote control buttons is pressed. The advantages of using a small camera like an Ixus is that the image can be seen and composed through the viewing screen with the filter attached and the smaller sensor and short focal length lenses, halve the focusing problems. In fact I find that the auto focus does a quite a good job and the image stabilizer can enable hand held shooting if conditions are right. The technique is simple. Set the ISO to 200 and the image to black and white. Cover the lens with the filter, compose, and then press the expose button. I had heard a rumor that a piece of unexposed but processed E6 film can be used as a substitute for an R72 filter. I tried it; it is true. Although not as optically sound as a glass

filter the effect is quite nice. I mounted a few pieces of film in slide mounts and now keep them in the car and my camera bag in case I am caught without my glass filter. Once I had done this I went out and made an infra red photo on my phone camera using a piece of film as the filter. It was useless to print as any of my phone pics are but it sure had captured infra red. (I'm not a fan of camera phones).



My front yard

Ixus colour



Ixus BW infrared

False Colour Infra red – Kodak make a false colour Ektachrome film and is described by Kodak as; intended for various photographic applications where infrared discriminations may yield useful results, such as: artistic, industrial, scientific, and aerial or technical ground photography. False-colour films can be used to emphasize differences between objects that are visually quite similar.

Colour film in its simplest explanation is just three layers of black and white film that are coupled to certain dyes when developed. Basically with this film, the normal red dye layer in the film is sensitive to infra red, the normal green layer records red (so anything red will appear green) and the blue dye layer is sensitive to green. As with the black and white infra red film it requires special handling and processing. However it is quite easy to emulate the effect digitally.



Normal colour



Infrared BW



Infrared false colour

Here's how.

Using a tripod, compose and take 2 consecutive photographs. First a normal colour shot and then a second black and white infra red shot. It is important that they are the same as they will be aligned to each other in Photoshop so again a tripod is recommended. Open the straight colour shot first. Go to the channels palette and select and copy the Green channel. Select the Blue channel and paste the copied Green channel into it – replacing it. Next do the same to the Red channel, copying it to the green channel. Almost there! Now open the black and white image and copy the Red channel or the Gray channel if it has been saved as Grayscale. Finally open the colour shot and paste the Infra red layer into the Red colour channel.

Here are few handy short cuts for selecting and copying channels. Control is the PC version, Command is the Mac version. Ctrl/Cmd+1 selects the Red channel. Ctrl/Cmd+2 selects the Green channel. Ctrl/Cmd+3 selects the Blue channel. Ctrl/Cmd+a selects all. Ctrl/Cmd+c copies to the clip board and Ctrl/Cmd+v pastes from the clipboard.

Hope the technique is useful and inspiring. I encourage experimentation and I don't believe infra red at least for landscape photography is an exact science. The best technique is the one that gives the most pleasing results for you! I hope at least this will be a starting point.