

Camera

There are 2 ways to try infrared: an external filter that can be attached to any camera's lens or a buying or renting a camera that has been permanently converted to capture infrared light.

IR external filter on an unconverted camera

- External filters are often very inexpensive and allow the photographer to try out different infrared spectrums, but they have significant limitations
- The filters by nature are very dark and require long exposures
- You have to shoot only still subjects from a tripod
- Each time you want to refocus, you need to remove the filter, manually focus, and then put the filter back on

A converted camera

- Cameras are converted to capture infrared light by removing an infrared blocking filter that is just in front of the sensor and adding a filter that lets some portion of the infrared light to reach the sensor. Converted cameras allow you to shoot like you normally do with a regular camera using autofocus and exposure times that you can handhold
- Conversions can cost several hundred dollars above the cost of the camera itself depending on the choices you make (see conversion choices below)
- Some camera rental companies (e.g.; lensrentals.com) rent infrared converted cameras, which gives you a chance to try the genre before making a big investment. Just search their inventory for infrared. If they offer different nanometer choices (usually 720nm or 850nm), we suggest you get 720nm. Just a warning, rental companies are not always the best at delivering a clean camera ready to use. Allow enough time before your workshop to get them to replace it if need be.
- A word about camera type:
 - DSLR: When you look through the viewfinder of a regular DSLR camera you see a scene that looks exactly like what your eyes see without the camera. This is also what the sensor sees and records when you click the shutter. Your eye, the viewfinder, and the sensor see the exact same thing. When a camera is converted to capture infrared, this changes. What you see with your naked eye will still be the same as what you see through the viewfinder, but what the sensor captures will be very different. A good example of this is the white foliage often seen in infrared photos. When you look through the viewfinder of a DSLR, that foliage will look green as normal, yet your camera's sensor will capture it as white.
 - Mirrorless: When you look through the viewfinder of a mirrorless camera, you see a projection created by the camera of what the sensor sees. Since a converted mirrorless' sensor now captures infrared light, what you see in the viewfinder and what the camera captures is infrared light. You see the world in infrared in the viewfinder.

Lens

Lenses are not manufactured for infrared light, and some have internal surfaces that cause infrared light to reflect onto the sensor in a way that creates a bright, desaturated spot in the center of your image known as a hotspot. While you can often fix these in post-production, doing so is time consuming.

Before you rent or convert a camera, check with online resources, the rental company, or the company converting your camera to determine which lenses are your best choice to avoid hotspots.

One of the most popular conversion companies in the United States, Kolar Vision, maintains a database on their website that lists lenses and identifies whether they produce hotspots or not. That list can be found at: <https://kolarivision.com/articles/lens-hotspot-list/>

Choosing Your Conversion Spectrum

Infrared for photography is divided into spectrums typically identified by a number followed by the letters “nm,” which stands for nanometers. The spectrums you will most frequently encounter are 590nm, 665nm, 720nm, and 850nm. Each of these allows a different mixture of visible light and infrared light to enter the camera and therefore yields a different result. The lower the nanometer number the more visible light the camera captures. The more visible light, the more color you can create in your image.

Because conversions are not cheap, we recommend you take some time to determine which infrared spectrum best suits your photographic style and intent before making a selection. Styles of infrared photography can be grouped into three primary categories: intense black & white, surreal color, and the more common (and more traditional) moderate black and white and color.

- The intense black & white images are very high contrast and feature the darkest blacks and brightest whites. These are best created with filters above 800nm.
- Surreal color infrared images are the ones that most severely depart from reality, often featuring pink, red, and purple foliage. A filter below 590nm or special patented filters are used to create these images.
- Traditional black & white and color images are created with filters between 665nm and 750nm.

The most popular filter choices are:

- 720nm – this is known as a Standard filter and is the most often chosen option. It captures infrared light plus a small amount of visible light, which means you can create stunning black and white images or images that have blue skies and white foliage. It most closely resembles what infrared film images looked like. It is what we most typically use.
- 590nm – this is known as a Super Color filter. It captures infrared light plus significantly more visible light than the 720nm does. While you can produce lovely black and white images, they

will have less contrast and depth than those from the 720nm. However, your color images will have more intense color.

- 850nm – this is known as Deep Black and White. It captures only infrared light, so you cannot produce color images at all. The black and white images produced with an 850nm are high contrast with deep rich blacks and bright whites. One caution is you often have to shoot at higher ISO settings or longer shutter speeds to get a good exposure.

Another option, albeit an expensive one, is what is known as Full Spectrum. In this case, the conversion company removes the infrared blocking filter, but does not replace it with an infrared passing filter inside the camera. You must purchase external filters that do that job. The benefit is you can change the spectrum by just changing the filter. You can even use a hot mirror filter to capture regular visible spectrum images. (*Note: Because the infrared blocking filter has been removed, you will not have the shooting complications mentioned at the start of this document for external filters on a regular camera.*)

One other thing to note is you can always take a converted camera to a higher spectrum by using an external filter. For example, let's say you think you want to mostly produce 590nm color images and occasionally produce 820nm deep black and white. You could have your camera converted to 590nm and purchase an 820nm external filter. Sadly, this trick does not work in reverse. You cannot go down in spectrum using external filters, only up.

Below are some resources to help you. Both of the conversion companies listed do exceptional work and are more than willing to help you with your selections.

Resources

Conversion companies:

- Kolari Vision <https://kolarivision.com>
- LifePixel www.lifepixel.com

Infrared photography galleries and examples:

- <https://www.lifepixel.com/galleries/infrared-photography-gallery>
- <https://speckyboy.com/infrared-photography/>
- <https://www.pinterest.com/kortkramer/infrared-photography/>
- <https://www.webdesignerdepot.com/2009/06/100-outstanding-and-inspirational-infrared-photos/>

Filter choice illustrations:

- <https://www.lifepixel.com/infrared-filters-choices>
- <https://www.spencerscamera.com/ir-filter-options.cfm>