

GREEN TECH THE SERIES COLUMN FOR JANUARY 20, 2016
HEADLINE: THERMAL IMAGING A HOME HAS ITS VALUE

I have had a number of calls on Thermal Imaging recently so will reiterate some information that has appeared in the column previously and expand on it. One reader called about a water leak. Most, however, were concerned about heat loss in the home and have realized that, while this method of testing can be done year round, winter allows for the quickest temperature differential and, in some respects, more accuracy. It not only costs you in regard to heat and air conditioning, excess air loss can affect the quality of life occupancy in the home. Dry air is not healthy, as everyone knows, and it can result in the slow deterioration of furniture and wood flooring, too. I suspect my recent column on humidity is the reason behind some of these questions from readers.

Let's start with a bit of history. This is not new technology. In fact, it has been around since the late 50's. Originally developed for the military to find the bad guys at night or during a battle where smoke is used as a visual deterrent, this technology eliminated the chance of the enemy moving under the cover of darkness or smoke. By 1978, Texas Instruments had developed the first sensors and this technology was used extensively during the 1991 Gulf War, much to the surprise of the Iraq Army. The technology was quickly picked up by the fire departments in the military and handed down to the municipal level where today it is used extensively to find hot spots in a fire that may appear to have been beaten down.

I often get asked, "How does thermal imaging work?" Everything has a certain temperature and emits energy that is called infrared radiation. A thermal imaging camera (TIC) creates pictures of heat rather than light. It measures the infrared energy and converts this data to a picture of temperatures allowing the human eye to see what the camera can. A TIC provides temperature data at each image pixel and depending upon where the TIC is pointed, will produce this image on the camera screen and then can be transferred by digital process to your computer or hard copy document. Warm objects show more energy than cold ones when put within the scan of a TIC. I have a TIC and find that our clients appreciate knowing where a specific area of concern is, be it water related, electrical or air loss.

Today TIC's are used in thousands of fire departments, police departments and vet clinics. During the swine flu epidemic in 2009, the US transport staff used them to detect raised temperatures as people got off airplanes in order to detect

anyone with this life threatening flu. They are used in medical clinics for mammogram testing and are amazingly accurate for these applications.

The largest area of usage today is within the residential and commercial building industry and, specifically, homes that are being upgraded for energy efficiency. Missing insulation, leaks around windows and doors, poorly sealed openings in building walls, it's a long list, actually, of areas that show up on the TIC. The nicest advantage is that, with most cameras, you can capture the image and provide the client with pictures of the actual "pin point" areas that need to be addressed.

I get called on a regular basis by electrical contractors who are having difficulty finding problems with large motors or major service panels. The TIC allows me to produce accurate pictures from a safe distance. If a motor is running, but not running right, the housing is usually warmer or shows the contacts that are hot. Roofing contractors are next on the list, especially flat roof applications. If there is stubborn leak, 9 out of 10 times I can pinpoint the actual location of the leak, even on a sunny day.

Now that I have expounded on the value of a TIC, there is a flip side and I often see cases where inexperienced or untrained operators have made the wrong call. Before I started offering the service, I operated my TIC for close to a year, discreetly, as I learned more on site than the classroom ever taught me. I know of other inspectors with TIC's who did the same thing. The myth that a TIC can find water behind a wall is just that, a myth. The TIC can spot moisture intrusion in the wall materials. To quote Jeff Abramson, director of TI development at Fluke, one of two most recognized TIC manufacturers, "If I spray water on the back of drywall, the TIC will detect the mist of water, if the water is leaking down a pipe and pools on the floor, it will find the pool, but not the location of the leak."

The other area that many operators don't pay close attention to is the emissivity level. Different surfaces affect the accuracy of the TIC. It's also a piece of equipment where cost has value. The greater the pixel array, the more accurate the camera and, while they have come down in cost substantially over the past 10 years, a good camera still costs upwards of \$7,000 to \$10,000.00. There are \$2,000 to \$3000.00 cameras, though they lack the pixel range to achieve accurate results. If you are hiring a TIC inspector, ask him what his camera pixel array is. Much under 320 is minimal and a good camera with a 480-640 array is reasonably accurate.

If you have a home and are considering extensive energy upgrades and insulation improvements, a full house scan done by an experienced TIC inspector will reap benefits, not only from the report, but his experience, as well.

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