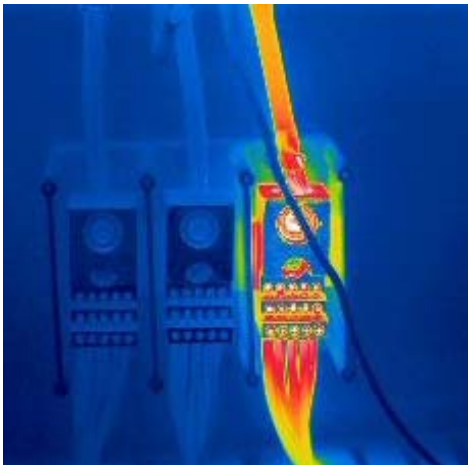
Think Thermally®

Practical news for practicing thermographers

August 2005

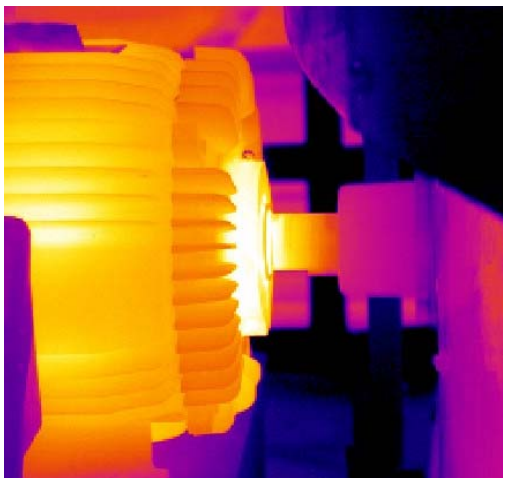
See inside:

Heat Transfer Issues: Mechanical vs. Electrical Inspections



Often thermographers are asked to inspect both electrical and mechanical components of critical equipment. When doing such inspections it is very important to ensure that the equipment has reached operational temperature before conducting the mechanical portion of the survey.

We define operational temperature as the maximum temperature the equipment reaches while it is in operation. Steady state heat transfer is another way to describe this condition. If a piece of equipment is at steady state, it is not heating up or cooling down. (In actuality steady state is rarely achieved. Most objects experience quasi-steady state, which means the temperature at full operational conditions may vary slightly around what we may define as the steady state temperature.)



Mechanical inspections often consider trends in the thermal performance of the equipment. The thermographer takes images and temperatures over time and then compares them to detect any indication of a problem. In order to do this the equipment must be at steady state. If a thermographer takes a baseline survey with the equipment at full-load steady state and then takes a subsequent image when the equipment is not at full-load steady state, it is all but impossible to make an informed conclusion on the condition of the equipment.

Electrical inspections on the other hand are primarily looking for exceptions, something out of the ordinary, for example a loose connection in a 3-phase circuit. Exceptions will usually show up as long as the electrical load is adequate (>40%) and the equipment has been on long enough to heat up the relatively low mass connections. The loading and the temperature may vary, but as long as the load is adequate to heat up the connection, the inspection should be successful.

So remember: just because you are able to see an electrical exception on a piece of equipment does not mean that conditions are right to conduct a successful trending inspection of mechanical equipment.

A Very Useful Thermography Tool

General Thermography Messageboard

[Home | Post a message]

- Flame Temp Rory Paul 8/2/2005 6:46:17 PM
  - re: Flame Temp roberto cruz 8/2/2005 11:16:42 PM
  - re: Flame Temp Jeff Gadd 8/3/2005 12:19:42 PM
  - re: Flame Temp Bob Berry 8/3/2005 12:42:51 PM
    - re: Flame Temp Rory Paul 8/3/2005 2:13:51 PM
      - re: Flame Temp Jack Kleinfeld 8/3/2005 5:45:04 PM
- Hysteresis Bill Schmitt 7/30/2005 5:36:05 AM
- AGEMA 880 John D. Pickering 7/23/2005 12:46:45 PM
  - re: AGEMA 880 Pelle 7/25/2005 5:23:20 AM
  - re: AGEMA 880 Bob Stevenson 7/30/2005 4:53:38 PM
- FLIR E45 or Infrared Solutions Flexcam T? Murat Ayyildiz 7/11/2005 4:37:06 AM
  - re: FLIR E45 or Infrared Solutions Flexcam T? Art Stout 7/11/2005 6:30:48 AM
    - re: FLIR E45 or Infrared Solutions Flexcam T? Murat Ayyildiz 7/11/2005 7:48:54 AM
- gneral help/info alan robertson 7/9/2005 1:22:25 PM
  - re: gneral help/info Tony Holliday 7/9/2005 4:03:29 PM
  - re: gneral help/info Kat Thompson 7/13/2005 9:04:55 AM
- Is it a Cell Phone or an Infrared Imager…? Rory Paul 7/7/2005 1:46:14 PM
- New FLUKE Camera under $6000 WOW Marcus Feder 6/23/2005 9:00:55 AM

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It may be argued whether Al Gore did indeed invent the Internet or not, but one thing is for certain: the Internet is a wonderful learning resource. One such place, the Snell Infrared Messageboards, is a great place to learn about thermography: http://www.snellinfrared.com/messageboards/index.asp.

For example, our Classified Messageboard is currently listing several dozen cameras for sale, as well as a number of people looking to buy various brands of thermal imagers. Common accessories, such as lenses and batteries, are also advertised. There are also people looking for employment, as well as service providers listing their services, on the same board.

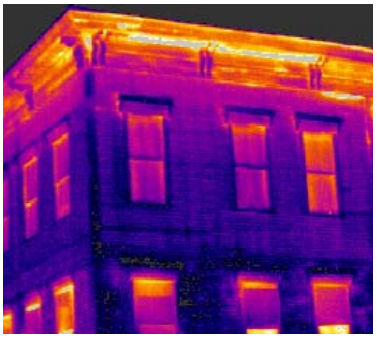
Over on the Thermographic Applications or General Thermography Messageboards, there is always a huge amount of information available for thermographers. People post very specific questions along with images, or ask theoretical questions about all phases of infrared and applications. This is one place that seasoned veterans can find useful information and stay current on what's happening in the IR industry.

For example, there was a recent lively thread of responses on the General Messageboard from infrared service providers about daily rates, certification and qualification, quality work, educating the client and professionalism. The General Messageboard was also the location of a question involving imaging a metal object through a sapphire window in a furnace that was 650–750°C. The thermographer was wondering about the accuracy of his readings due to a host of transmittance issues. The answers that came back detailed specific transmittance percentages at varying temperatures, as well as pointing out some spectral considerations. The response also discussed three other important parameters of significance that may have a dramatic effect on temperatures in that specific measurement situation.

On the Thermographic Applications Messageboard, someone asked about calculating overall U Values for a building, based on internal/ external temperatures. The answer that came back was a very detailed description of the Temperature Index Method to do the calculations. The author, Snell Infrared's Greg McIntosh, included three reference books and articles for even more detail. He also had several caveats for anyone wanting to be successful in performing these calculations.

So what are you waiting for? Visit this wonderful infrared thermography resource brought to you by Snell Infrared. Whether you are a "lurker" or an active participant, there is a wide range of valuable information for novices posted by seasoned veterans of thermography just waiting for your questions.

New Building Thermography Track Added to Thermal Solutions®



A new track completely specific to building applications is being added to the Thermal Solutions® conference, January 23–26, 2006 in Sarasota, Florida. This update is part of an expanded event that will feature two separate tracks of papers; Condition Monitoring and Building Thermography.

Those who have come to know Thermal Solutions as the leading independent thermography conference for infrared maintenance applications need not be concerned. Thermal Solutions® 2006 continues its tradition as one of the most valuable condition monitoring forums available in the industry. Participants can learn from a variety of paper presentations, short courses, panel discussions and networking sessions. What is new for 2006 is an entire section dedicated to the fast-growing industry of building thermography.

The Building Thermography track will have its own selection of paper presentations that focus specifically on using infrared for buildings. Topics planned include how infrared is applied to energy audits, moisture/mold inspections, roof surveys and pest detection. A dedicated line-up of "Ask the Experts" who specialize in building systems will be present to answer questions on a number of subjects related to their field. A panel discussion specific to building thermography as well as a number of short courses will also be available for those who are attending the conference.

According to John Snell, President of Snell Infrared, "The use of infrared technology for building diagnostics is expanding exponentially and having a separate track for these applications was logical."

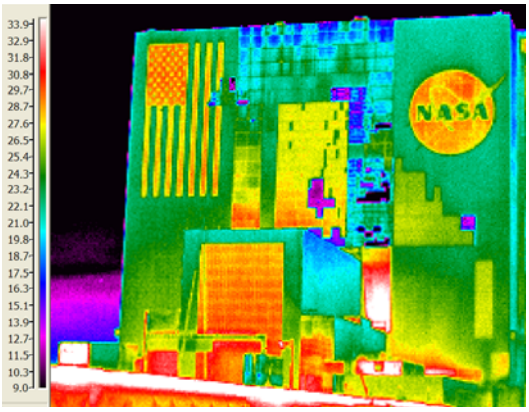
If you are a home inspector, building scientist or entrepreneur that is using or considering infrared for building applications, Thermal Solutions® is now the place to learn about the technology, find out how it is applied, as well as meet others who share similar interests in the industry.

For more information on Thermal Solutions®, visit the conference web site at www.thermalsolutions.org or call (800) 636-9820.

High Prices, Low Temperatures

We recently read an article that found a correlation with the temperature of shopping stores and their prices. In New York City a reporter visited several commercial shops in Manhattan and found that the colder the temperature in the store, the higher the prices tended to be. An example of several clothing stores: Bergdorf Goodman 20.2°C (68.4°F), Bloomingdale's 21.6°C (70.9°F), Macy's 22.8°C (73°F), the Original Levi's Store 24.9°C (76.8°F) and Old Navy 26.8°C (80.2°F). Then, of course, there was the high-end specialty stores of Hermès 20.3°C (68.5°F), where you can pay $1,200 for a stainless steel Thermos.

Kennedy Space Center



Over the past few years, Snell Infrared has conducted several very successful sessions of the course Thermal NDT of Materials at Kennedy Space Center in Florida. After a recent course instructor Rob Spring captured a thermal image of the Vertical Assembly Building (VAB). The image here shows how absorption of solar radiation varies depending on the color of the painted areas; darker areas tend to warm up more than the lighter spots. A few anomalous areas, unusually cooler, also were apparent. A visual check clearly showed these to be sections of the building that had been damaged by last year's hurricanes and were in the process of being repaired.

The VAB is one of the largest buildings in the world from a volumetric standpoint. It stands 160 meters (525 feet) tall and has a floor area of over 32,500 square meters (8.5 acres). Size and function are well matched. Before making its trip to the launch pad, the Space Shuttle Orbiter is mated to the external fuel tank and solid rocket boosters inside the VAB. It is almost impossible to gain a perspective of how immense the building is from these images until one realizes that each stripe on the flag painted on the front is wide enough to be a traffic lane for a 50-passenger tour bus and each star on the flag is six feet across.

Snell Infrared

Remaining 2005 North American Training Schedule

Level I	$1,495
Charlotte, North Carolina	September 12–16
Indianapolis, Indiana	October 3–7
Toronto, Ontario	October 17–21
San Antonio, Texas	November 7–11
Montpelier, Vermont	December 5–9
Toronto, Ontario	December 12–16

Level II	$1,495
Cincinnati, Ohio	September 19–23
Toronto, Ontario	October 24–28
San Antonio, Texas	November 7–11

Level III Best Practices	$1,495
Indianapolis, Indiana	September 19–22

Software	$750
Toronto, Ontario (Mikron)	September 29–30
Toronto, Ontario (FLIR)	December 8–9

Research & Development**	$750
Toronto, Ontario	September 27–28

Electrical Applications*	$750
Detroit, Michigan	September 13–14
Dallas, Texas	November 14–15
Toronto, Ontario	November 29–30

Mechanical Equipment*	$750
Detroit, Michigan	September 15–16
Dallas, Texas	November 16–17
Toronto, Ontario	December 1–2

Building Systems*	$750
Minneapolis, Minnesota	October 5–6
Toronto, Ontario	December 6–7

*Level I or extensive thermographic experience is a recommended pre-requisite for these two-day Specialty Courses.
**Level I training required.

Snell Infrared

Enabling The World To Think Thermally!™

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New Building Thermography Track
at Thermal Solutions® 2006