



National Association of Commercial
Building Inspectors and Thermographers™
www.nacbi.com

*A National Network of Property Condition Assessment
Service Providers*

and Thermal Imaging Specialists across the U.S. and Canada.

THERMAL IMAGING INSPECTIONS

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Members across the USA and Canada

Infraspection Institute's "Standards of Practice for Infrared Thermal Imaging Inspections" is the recognized national standard for thermal imaging inspections.

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About the National Association of Commercial Building Inspectors and Thermographers

Representing the Commercial Building Inspection and Commercial Infrared Thermal Inspection Industries across the U.S. and Canada, The National Association of Commercial Building Inspectors and Thermographers™ is a trade association providing resources for any organization, business, or individual involved with the commercial building inspection process.

Our inspectors represent the best of the best with experience and professionalism for our respective trades. NACBI members follow the industry nationally accepted guidelines of ASTM International for Property Condition Assessments and Infraspection Institute standards of practice for infrared thermal imaging inspections.

Many of the following have benefited from the services of NACBI inspectors and thermographers:

- Commercial Property owners – commercial maintenance inspections and property condition assessments (PCA)
- Commercial Property Net Lease Occupants (also known as Commercial Triple Net Lease) – commercial property inspections and condition assessments (PCA)
- Commercial Property Investors (or Investment Groups) – commercial property inspections and condition assessments (PCA)
- Commercial Property Realtors and Brokers – commercial property inspections and condition assessments (PCA)
- Commercial Engineering and Architect Firms – commercial infrared thermal imaging services including roof scans, electrical assessments, and heat loss assessments
- Commercial Construction Commissioning Agents – commercial infrared thermal imaging services including roof scans, electrical assessments and acceptance testing, and heat loss assessments
- Individual or Business Commercial Property purchasers – commercial property inspections and condition assessments (PCA)

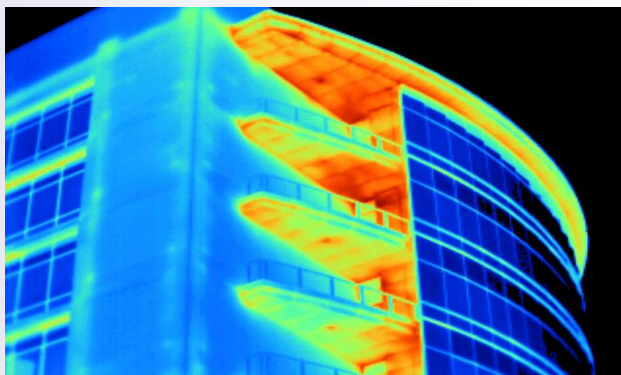
Why choose a NACBI/Infraspection Institute Certified Thermographer®?

By NACBI Staff

Thermography is extremely dependent on the capabilities and skill of the thermographer to conduct a thermal inspection correctly, understand the limitations of the work, record all relevant data, and properly interpret the results. The compiled data and variables encountered by a Thermographer can be

varied and numerous. It is imperative that thermographers be properly trained and qualified to perform thermal inspections along with having a network of support. NACBI thermographers have all completed extensive training offered by Infraspection Institute® or other equitable training facilities. Each member is

carefully screened and qualified before placement within our network of thermographers.



Copyright Photo courtesy of B C Warner Inspections, Dayton, OH

Thermography Basics?

by NACBI Staff

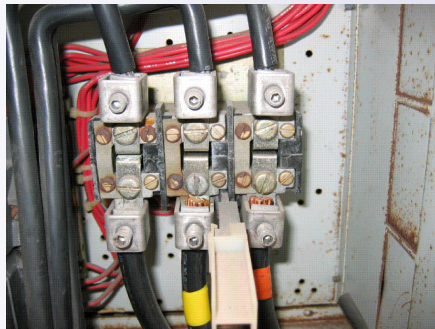
Thermography, through the application of thermal imaging, is used to perform many critical inspections of various systems for commercial and industrial systems. They include but are not limited to inspecting electrical equipment which includes motors, distribution/process

equipment and substations. Thermography is also commonly used for Building diagnostics which include checking for roof moisture/leakage, building insulation inspections for air leakage and moisture detection within the building envelope, walls, ceilings, etc.

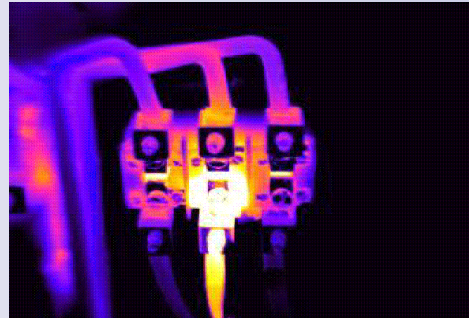
A Complete Listing Of NACBI Thermographer locations and contact information is available at

<http://www.nacbi.com/map/user>

What you see may look normal to the naked eye



What we see is an overloaded block



Why choose a NACBI/Infraspection Institute Certified Thermographer®? (Continued from page 2)

NACBI's network of thermographers provides a unique support system for all of our members by providing an enormous amount of information, guidance, and supervision on every thermal imaging inspection provided by a NACBI members in the United States or Canada.

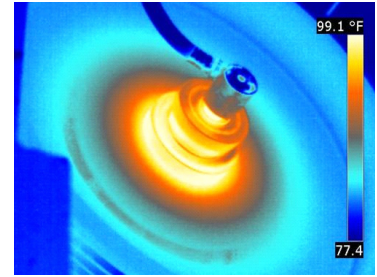
Our network of inspectors varies from Certified Level I to Level III and are available for your company's thermal inspection needs. Our support program provides the necessary skills and expertise necessary to perform any type of thermal analysis on any system or component of any building or industrial operations.

Inspect your Electrical Equipment Safely with Thermal Imaging

By NACBI Staff

Electrical equipment poses severe safety concerns even during the most basic inspection. The simple opening of a panel door can trigger an arc flash if the latch is defective

or objects, such as pests or dust debris, inside the enclosure are disturbed. Thermal imaging is a noncontact safer alternative that alleviates the use of hands, probes and meters. Additionally the use of thermal imaging is extremely quicker in the analysis of electrical equipment compared to the use of the naked eye, probes and meter methods. In fact no electrical equipment needs to be shut-off and within a matter of minutes defective, loose, overloaded, and malfunctioning electrical system components can easily be identified.



The first sign of impending equipment failure is increased heat.

Copyright photo courtesy of David A. Anderson & Assoc., Nashville,

The National Fire Protection Association® (NFPA) recommends Electrical Equipment Maintenance Thermal Inspections

By NACBI Staff

The NFPA reports that every year in the United States alone, faulty electrical/lighting equipment is the source of more than 45,000 structural fires. On average, these fires kill at least 240 people, injure another 1,200, and inflict more than \$1-billion in direct property damage. Infrared Thermal Imaging of electrical equipment has become the most widely recommended method for detecting these critical electrical faults before they cause catastrophic fires.

“Infrared inspections of electrical systems are beneficial to reduce the number of costly and catastrophic equipment failures and unscheduled plant shutdowns...”

The National Fire Protection Association®: Publication NFPA 70-B – “Recommended Practice for Electrical Equipment Maintenance”, in part states:

- “Routine infrared inspections of energized electrical systems should be performed annually...”
- “Infrared inspections of electrical systems are beneficial to reduce the number of costly and catastrophic equipment failures and unscheduled plant shutdowns...”
- “Infrared detection can be accurate, reliable, and expedient to use in a variety of electrical installations. More important, it can be relatively inexpensive to use considering the savings often realized by preventing equipment damage and business interruptions...”

“Many organizations are finding it preferable to obtain these surveys from qualified outside contractors. Because of their more extensive experience, their findings and recommendations are likely to be more accurate, practical, and economical than those of a part-time in-house team...” .

Sample use of thermal imaging for a metal roof system

By David A. Anderson, Nashville, TN and John Bowman, Elmira, NY

Infrared thermal imaging is an advanced system of non-destructive technology that enhances the capabilities of the building inspector during a property condition assessment. These advanced inspections can be used as a stand alone type of inspection for both commercial and residential properties or they can be contracted to be performed as an ancillary service or in conjunction with property condition assessments.

Highly trained thermographers have the ability to go beyond the basics of building diagnostics. For example:

Here is what an inspector or anyone else sees (Figure 1) compared to what a Thermographer sees (Figure 2). Copyright Photo's courtesy of David A. Anderson & Associates®, Nashville, TN

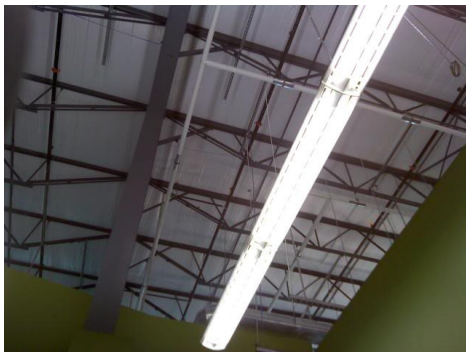


Figure 1

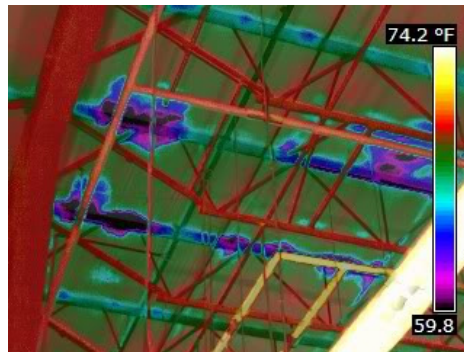


Figure 2

Without the use of thermal imaging many inspectors or building maintenance personnel would not only fail to identify deficiencies but also be unable to pinpoint the actual source of the deficiency for evaluation and correction.

From the thermal image scans the thermographer was able to identify several deficiencies of the metal roof system. Leaks at lap joints (figure 3); and leaks from around the hatch (figures 4 and 5). Copyright Photo's courtesy of David A. Anderson & Associates®, Nashville, TN

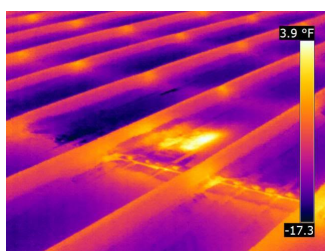


Figure 3

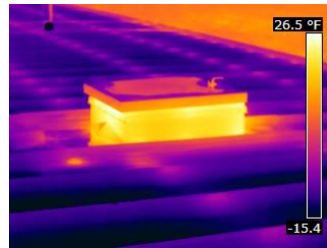


Figure 4

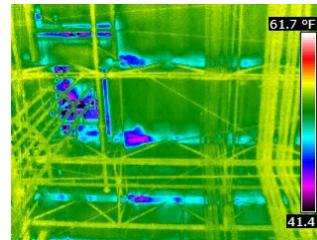


Figure 5

On this particular day and under the proper conditions 39 leaks were found, pinpointed and identified for the client. Reflection, emissivity, & T Reflect were major objectives to overcome during this difficult thermal scan of a metal roof.

The complex nature of this type of thermal scan required the professionalism of a highly trained thermal imaging expert. Here at NACBI we have members who specialize in thermal imaging inspections. Our professional thermographers have prepared inspection reports utilizing thermal scanning on all property types and systems throughout the United States and Canada. We are ready to answer your questions and guide you through the entire process. For more information on thermal imaging of a metal roof system or any other roof system give us a call at 1-480-309-4967 or visit our website at www.nacbi.com and use our convenient Thermographer and Inspector Locator at <http://www.nacbi.com/map/user>



*National Association of Commercial Building
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**See us on the web and join us
on our forum at
www.nacbi.com**

Industry standards for NACBI Commercial Building Inspectors and Thermographers

Standards commonly used by NACBI Commercial Building Inspections and Thermographers (This is **NOT** a complete listing)

ASNT (American Society for Nondestructive Testing)

ASNT CP-189 Standard for qualification of NDT personnel
ASNT TC-1A, Guidelines for qualification of NDT personnel

ASTM (American Society for Testing and Materials)

ASTM C1060, Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings
ASTM C1153, Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging
ASTM E1186 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
ASTM E1862 Measuring and compensating for reflected temperature using infrared imaging radiometers.
ASTM E1897, Measuring and compensating for transmittance of attenuating medium using infrared imaging radiometers.
ASTM E2018, Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process

Canadian National Master Specifications (NMS)

NMS, Section 02 27 13, Thermographic Assessment: Building Envelope
NMS, Section 02 27 16, Thermographic Assessment: Roofing
NMS Section 02 27 19, Thermographic Assessment: Mechanical Equipment
NMS, Section 02 27 23, Thermographic Assessment: Electrical System

Infraspection Institute

Standard for Infrared Inspection of Electrical Systems & Rotating Equipment
Standard for Infrared Inspection of Insulated Roofs
Standard for Infrared Inspections to Detect Pests and Pest Related Damage
Standard for Measuring and Compensating for Reflected Temperature Using Infrared Imaging Radiometers
Standard for Measuring and Compensating for Emittance Using Infrared Imaging Radiometers
Standard for Measuring and Compensating for Transmittance of an Attenuating Medium Using Infrared Imaging Radiometers
Standard for Measuring Distance/Target Size Values for Infrared Imaging Radiometers

ISO

ISO 6781, Thermal insulation – Qualitative detection of thermal irregularities in building envelopes – Infrared method

NACBI (The National Association of Commercial Building Inspectors & Thermographers)

NACBI Code of Ethics
NACBI Standards of Practice

NETA Maintenance Testing Specifications

Section 9.0 Thermographic Survey (2005)

NFPA (National Fire Protection Assoc.)

NFPA 70B, Recommended practice for electrical equipment maintenance.
NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces.

RESNET (Residential Energy Services Network)

Interim Guidelines for Thermographic Inspections of Buildings (2010)