FLUKE®

Infrared inspection for building and facilities maintenance

How to find problems lurking behind the scenes

Application Note

Surface temperature can tell you a lot about a building's structural elements, plumbing installations, and HVAC and electrical systems. Problems that are otherwise invisible to the naked eye are suddenly clear as day when you look through an infrared lens. Air leakage, moisture accumulation, blockages in pipes, structural features behind walls and overheating electrical circuits can all be detected and visibly documented with handheld infrared thermometers and thermal imaging cameras. By scanning surfaces with such inspection tools, you can quickly locate temperature variations, which are often indications of underlying problems, and document them with detailed images in reports.

By pinpointing potential sources of problems, you also save valuable inspection time and repair only what needs to be fixed, rather than performing repairs regardless of actual need. Repeated temperature measurements of the same targets can determine whether repairs were successful and help anticipate future repairs.

Simply point, shoot and read

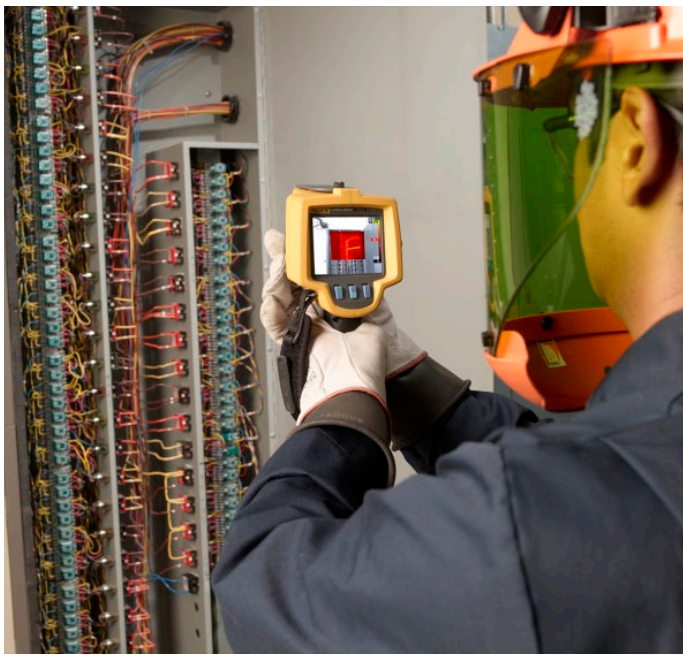
Infrared thermometers measure the infrared energy emitted from surfaces and convert the information into a temperature reading. They are easy to operate—simply point the instrument at the target, pull the trigger and read the temperature value. Because you're measuring from a distance, instead of having to touch the object with a probe, you can check temperatures on operating equipment and in hard-to-reach spaces safely and without special setup. Laser sighting helps you easily mark small targets from optimal distances in low light and in tight spaces.

More than temperature readings

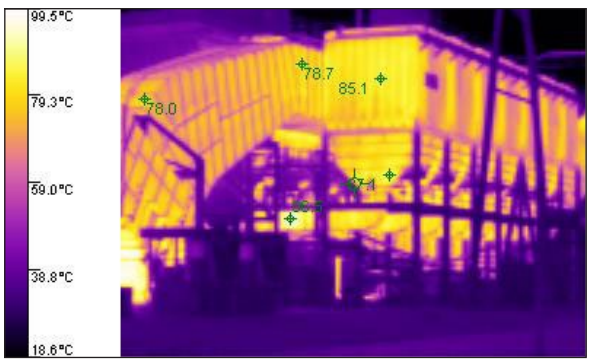
The latest generation of infrared thermometers includes temperature comparison and documentation features to better support your inspection efforts. These features include data logging, or the ability to store temperature readings for multiple locations along an inspection route, and audible alarms set by the user to indicate temperatures above and below acceptable ranges.

Looking behind the scenes

Thermal imaging cameras are another kind of handheld infrared temperature measurement tool. These devices immediately show you the hot and cold spots in the form of thermal images. Traditionally, the high price tag of thermal imagers has been prohibitive, leading many facilities to outsource thermography inspections only once a year. However, new lower cost high-performance cameras make it possible to bring thermal imaging in house. Most Fluke thermal imagers now include IR-Fusion®, a technology that fuses a visual, or visible light, image with an infrared image for better identification, analysis and image management. The dual images are accurately aligned at any distance heightening details,



Obtain high-quality thermal images with a simple "click" of the trigger.



Infrared imaging cameras can identify thermal anomalies within new or existing buildings.

making it much easier to spot where further investigation is needed. Thermal surveys can identify and establish the extent of thermal anomalies within new or existing buildings, for example:

Inspecting electrical systems: Safely locate overheating components in electrical systems, expressed as hot spots in thermal images. Regular inspections of electrical installations should be conducted at full load to identify potential problems, such as loose connections, load imbalance, and overloads, which, when not attended to, can lead to outages, equipment damage, and safety risks including fire.

Checking for missing and damaged insulation: Inspections both inside and outside structures show you the location, shape and intensity of insulation. Key to building conformance is that those responsible for achieving compliance can document that infrared thermography inspections have documented that "insulation is reasonably continuous over the whole visible envelope."

Pinpointing air leakage points: Reducing air leakage, or the uncontrolled movement of air into and out of a building is also important because it can compromise the efficiency of building environmental systems. While best measured with pressurization testing, thermographic surveys can quickly pinpoint leakage points. Inspections inside and outside of structures, along doors, windows, vents and pipes, immediately show you areas of infiltration and exfiltration.

Finding areas of moisture accumulation: Moisture intrudes through joints and cracks in roofs, ceilings and walls, and is trapped, resulting in structural rot and mold, some of which may represent serious health hazards. Regular thermographic inspections, inside and outside of structures, are therefore critical to quickly locate cold spots, which are often signs of moisture intrusion.

Verifying structural elements: Thermographic inspections can help you quickly locate support beams, pipes, electrical cables, and flues in poured walls, floors and ceilings. Simply scan surfaces, and detailed thermal images clearly show you subsurface details.

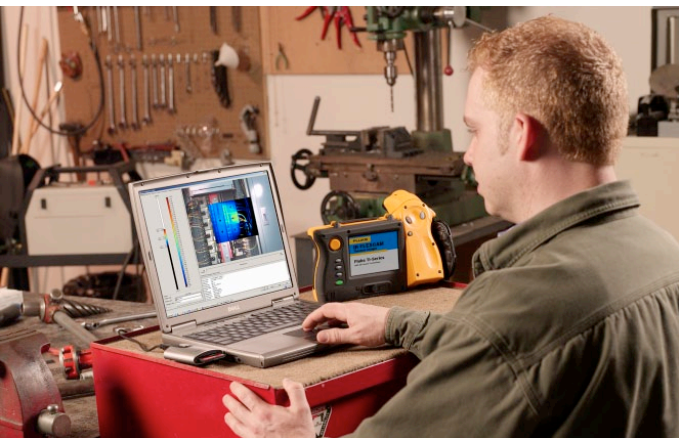
Evaluating building materials: Test the performance of interior and exterior wall surfaces, doors and windows under various environmental conditions to determine their ability to retain or reflect heat and cold. A thermal imager will show you energy leaks.

What you need to get started

To perform your own thermal imaging inspections, you'll need:

- Thermal imager with fast scanning speed, sharp image quality, long battery life and on-board storage of several images to enable uninterrupted inspections in the field.
- Software to adjust images, analyze results, and document findings in reports.
- Training on how to use the equipment to get the best results.

In summary, there are a number of reasons why you should add temperature inspections to your building and/or maintenance inspection checklist. Most importantly, thermographic surveys can save you a lot of time and effort in locating existing and potential problems, which can jeopardize not only building performance, but also compliance with building, health and safety regulations.



Download images and data into the companion Fluke SmartView software for analysis and reporting.

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