

Affordable thermal imagers detect energy waste in buildings

By the end of this year, thousands of European businesses will have to meet the new EU Building Directive, as well as many other energy efficiency regulations. Energy Performance Certificates (EPCs) will become mandatory within the EU for new buildings and large building refurbishments.

Many more companies will therefore need to investigate equipment within buildings and the building envelope itself for faults. They will not only have to comply with the regulations, they will have to demonstrate compliance.

The easiest and quickest method of detecting energy waste in buildings (Figure 1) is infrared thermography. This is a non-destructive, non-contact method of locating faults by measuring the infrared radiation emitted by surfaces. Viewing a thermal image immediately points users to anomalies which could indicate potential faults. It identifies a whole range of issues including missing or damaged insulation, air leakage, moisture intrusion in roofs and walls, actual and potential mold areas, thermal bridges and water leakages.

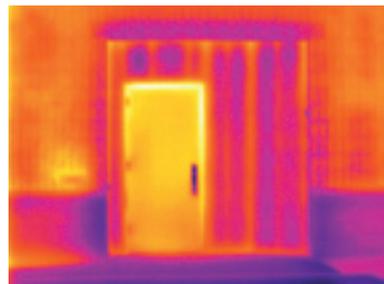


Figure 1: Energy loss via the door of a building.

Until now, such imagers have been expensive. Recent technological developments have, however, reduced their price considerably. These smart tools will therefore open doors to new business for many new companies, particularly those already involved in building certification to the new EU directives. They will give a significant advantage to businesses involved in energy saving in buildings.

Application Note

Activities like building services, insulation activities and energy performance assessments will all become easier with a fast infrared survey. Companies will be able to give an exact and documented overview of fault locations in the building. That will ultimately lead to considerable savings for their customers: the designers, housing associations, architects, installation companies, building experts, buyers, owners and tenants.

Detecting heat loss and moisture

Thermal imaging can detect heat loss and cool infiltration or exfiltration and heating and ventilation problems. Hot spots can indicate overheating and failing equipment, and missing insulation panels in heating ducts. Cold spots can reveal moisture, poor insulation, blocked radiators, defective heating elements in underfloor heating systems, faulty construction, and failing HVAC equipment.

In roofing surveys, the imagers detect wet insulation under the roof membrane in flat roof systems, allowing wet portions of the roofing structure to be repaired or replaced before the entire roof is damaged (Figure 2).

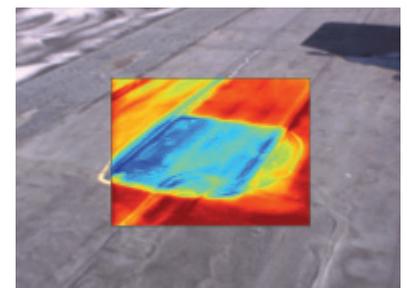


Figure 2: Wet insulation in flat roofs can cause rotting unless detected and corrected.

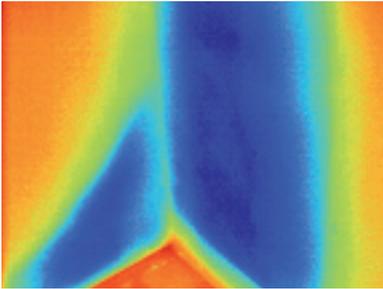


Figure 3: Fluke's TiR Series finds hidden cold spots and moisture behind walls and other surfaces.

In restoration projects, moisture can be detected despite being concealed behind walls (Figure 3), ceilings or covered floors. That helps control mold by finding sources of moisture that would otherwise go undetected.

Thermal imagers help identify the specific problems that push up energy bills and cause discomfort and possible health problems for building occupants. Users of the imagers have even uncovered problems that have paid for the imager within a month.

Fluke's TiR Series

An example of these new affordable thermal imagers are the new Fluke TiR and TiR1, built specifically for building diagnostics. These entry-level models are – like the rest of the range – intuitive and easy to use even for novices in thermography.



Figure 4: IR-Fusion helps pinpoint problems in buildings by combining infrared and visible images.

All users need to do is point the imager, focus it, and capture. And like most Fluke thermal imagers they feature IR-Fusion®. Although infrared imaging clearly highlights temperature differences, pure infrared images can be difficult to interpret. The affected areas can be hard to pinpoint – a cold patch somewhere on a wall (Figure 4), or a wet patch in a large roof. Fluke's IR-Fusion® technology solves the problem by superimposing the infrared image on a detailed

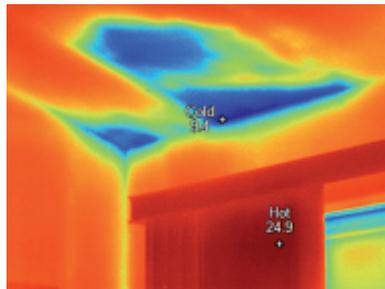


Figure 5: Thermal resolution for the TiR Series is as low as 0.07 ° Celsius. This gives the clearest possible view of possible problem areas.

visible image, allowing users to clearly identify critical points within the thermal image.

Their optimized thermal sensitivity (NETD = Noise Equivalent Temperature Difference) identifies the smallest temperature differences. This is particularly important in building diagnostics, where a small difference can indicate a potentially large problem (Figure 5).

Identifying energy waste and building defects

The appearance of affordable thermal imagers will make energy surveys profitable in many more buildings throughout Europe. A thermal image highlights defects in the building fabric and other sources of energy waste. Once the defects have been rectified, users simply print out a report at the end of the survey to confirm building certification.

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