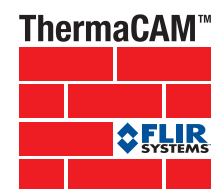
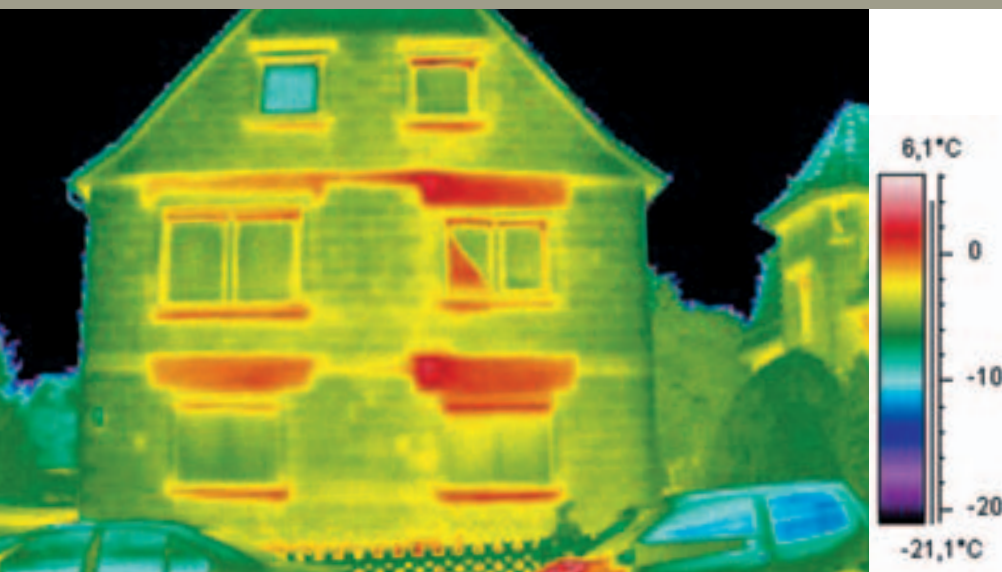
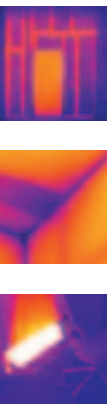
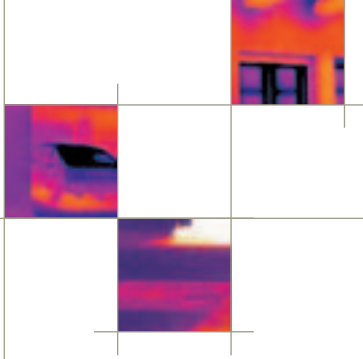


Infrared thermography for the building industry



- FIND MOLD AND BADLY INSULATED AREAS
- SUPERVISE NEW CONSTRUCTIONS
- IMPROVE QUALITY ASSURANCE
- PLAN REDEVELOPMENTS
- FIND LEAKS
- DISCOVER PLANNING AND CONSTRUCTION FAILURES
- MINIMIZE REPAIR DAMAGE
- PROTECT PUBLIC MONUMENTS, ...





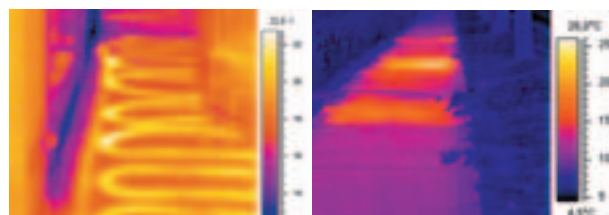
Infrared thermography, the perfect tool for building diagnostics

Infrared thermography a technology with many applications in the building industry

LOCATION OF LEAKS

Thermography is an easy-to-use tool to find and check pipes and tubes for leaks. Even when the water pipes are laid in the floor or under plaster. The heat of the pipes radiates through the surface and the pattern can easily be detected with an infrared camera.

A typical example is localizing leaks in underfloor heating systems. Leaks in district heating systems can also be detected and documented quickly with the help of infrared thermography. Determining the exact location of a leak avoids unnecessary digging and saves costs.

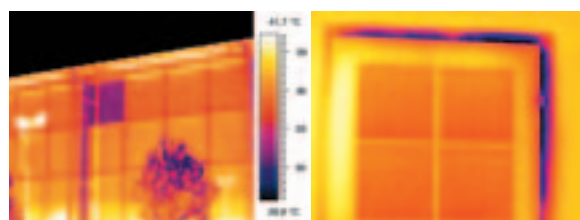


Underfloor heating

Leaks in an underground district heating network

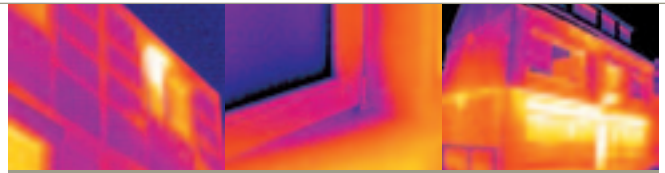
DETECTION OF CONSTRUCTION FAILURES

Thermography is the quickest and best method to discover construction failures. Thanks to thermography it can easily be proven that construction work has been incorrectly executed. It makes heat losses, humidity and air leaks that occur in buildings instantly visible on colorful thermal images.



Single pane window among double panes

Unsealed window



WHY USE INFRARED THERMOGRAPHY IN THE BUILDING INDUSTRY?

Since the oil crisis in the 1970s we have become increasingly conscious that our energy stocks are valuable and limited. Global warming due to CO₂ emissions is also known to be largely caused by pollution related to burning fossil fuels used for heating buildings. Infrared can easily detect building abnormalities that result into energy losses. By repairing these areas energy can be saved.

Architects and contractors are faced with new materials and ever-shorter production times. Efficient planning, supervision and documentation of the execution with regard to air tightness and thermal insulation are demanded. Unhealthy situations, due to mold build-up or moist need to be avoided. Infrared thermography can provide important information so that costly and time-consuming repair work can be avoided.

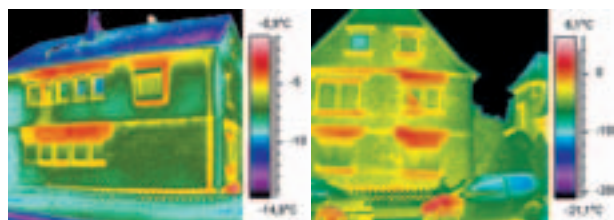
Furthermore, to a building owner or an insurance company involved in property damage settlement, clear images of normally invisible diagnostic evidence can be invaluable for planning the restoration effort and rationalizing settlements.

DRYING OF BUILDINGS

To speed up the drying of a building drying machines are often brought in. The heat generated by this machines evaporates the water which is present in the walls and other parts of the construction. Areas where moisture is still present can be easily detected with an infrared camera. They appear on the infrared image as a "cold spot".

VISUALIZATION OF ENERGY LOSSES – IMPROVING BUILDING INSULATION

Thermal bridges do not only indicate areas in a building where energy is wasted. These spots can also lead to condensation or the precipitation of humidity from the ambient air. Mold subsequently grows in these places, thus creating a risk for the occupant's health. Infrared thermography reveals faulty locations immediately.



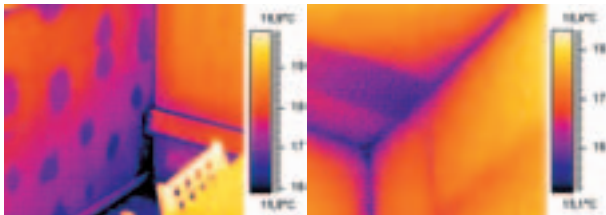
Badly insulated roller blind cases

Heat losses outwards, sound emissions inwards



REDEVELOPMENT PLANNING AND QUALITY ASSURANCE

Infrared technology is used during redevelopment planning. But also in quality assurance and the inspection of new buildings. During construction-drying thermal images make it possible to determine the progress of the drying procedures so that the necessary measures can be taken to speed up the drying process. If this process can be accelerated and it can be proven, with the help of an infrared image, that the construction is totally dry, the building can be surrendered faster to the client. This often means a bonus for the building contractor.

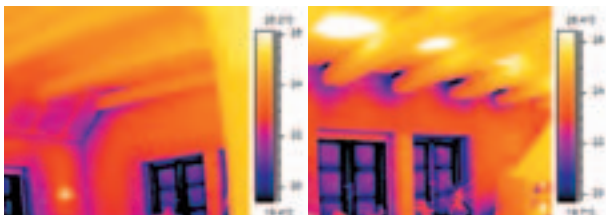


Mold build-up

Thermal bridge

DETECTION OF AIR LEAKS

A further common use is the detection of air leaks through the identification of the air change rate with the help of the so called "blower-door" process. During this process an underpressure is created in the building. Since the air pressure outside the building is higher than the pressure inside the building, the air will try to enter through unsealed areas. The airflow can easily be visualized with an infrared camera. Once identified, untight areas can be easily recognized and fixed before coverings and fittings make eliminating this potential construction fault expensive and cumbersome.

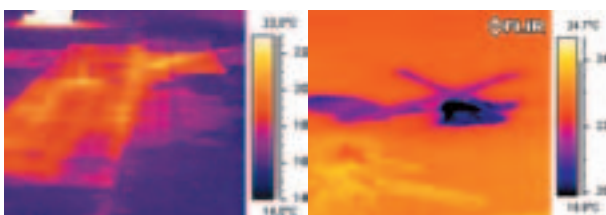


Room under normal pressure

Room under underpressure: the airflow is clearly visualized

FINDING LEAKS IN FLAT ROOFS

Evaluation of built-up roofing systems for water leakage is also a common application. Water retains the heat longer than the rest of the roofing material and can be easily detected with a thermal imaging system at night after the rest of the roof has cooled down. Tremendous savings result when wet areas of a roof can be repaired rather than replacing the entire roof.

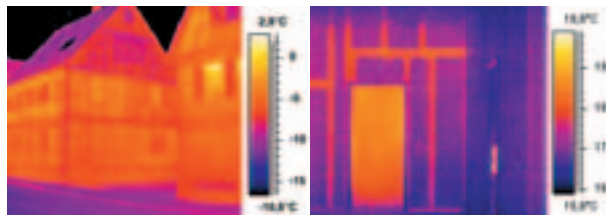


Water penetration in a flat roof

Moist ceiling indicating a leak in the roof

BUILDING RENOVATIONS

Infrared thermography also provides valuable information during the renovation of buildings and monuments. Framework constructions hidden by mineral plaster become clearly visible in the infrared image. It can then be decided whether exposure of these structures is useful. The detachment of plaster from walls can also be located in a very early stage so that preservation measures can be taken.

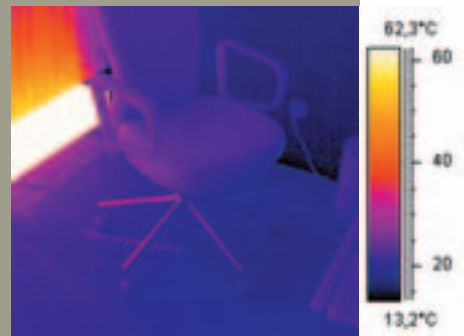


Framework under mineral plaster

Underlying construction in a wall

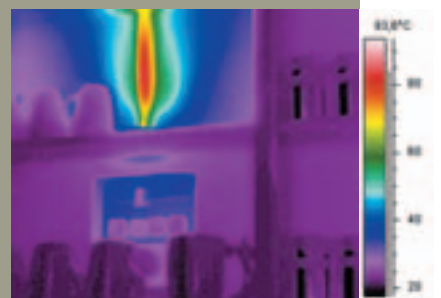
HEATING, VENTILATION AND AIR CONDITIONING

The room climate has a considerable influence on our sense of well-being and capacity to perform. Illness in companies can be due to a poor and incorrect room climate. Infrared thermography can provide useful information on the function of air conditioning covers, radiators or ventilation systems. Workplaces can be optimized with the help of the infrared information and draughty workplaces avoided.

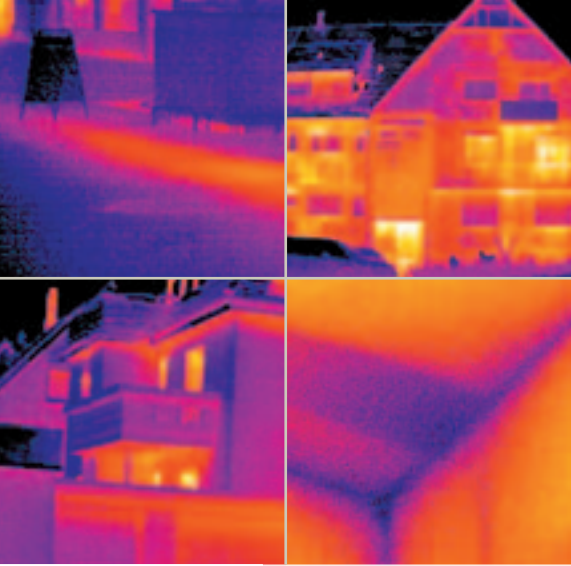


FIRE PROTECTION IS LIFE PROTECTION

Thanks to infrared thermography, crevices, leaking joints and loosening stones in chimneys and exhaust sections of heating systems can be effortlessly discovered when they occur. Overheated locations, which can create chimney fires, become immediately visible on the infrared image. The danger of a fire due to building on too closely to hot heating and exhaust areas can also be recognized at once.

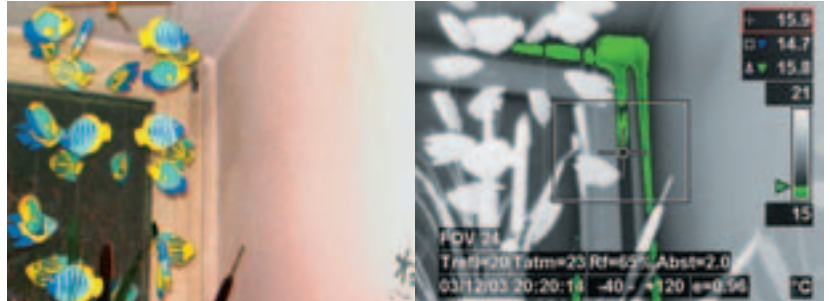


Gas heater built too closely to surrounding material provokes fire hazard



PREVENT MOLD ATTACKS EARLY

Mold makes not only the building structure suffer. Health dangers and allergies develop in living and office spaces where mold build-up is present. Fungus spores find the best preconditions for growth in locations where humidity from the ambient air forms droplets and can precipitate. Mineral substances from walls, wallpaper and paint are excellent breeding grounds. Infrared cameras, with special software functions for dew point visualization, indicate endangered locations automatically on inspection via a color alarm in the image. Potential damage is recognized early and on the spot.



Visual and infrared image of a bedroom. The infrared image clearly shows the areas that are susceptible for mold build-up

FLIR SYSTEMS AB

World Wide Thermography Center
Rinkebyvägen 19 - PO Box 3
SE-182 11 Danderyd
Sweden
Tel.: +46 (0)8 753 25 00
Fax: +46 (0)8 753 23 64
e-mail: sales@flir.se
www.flir.com

FLIR SYSTEMS LTD.

United Kingdom
Tel.: +44 (0)1732 220 011
e-mail: sales@flir.uk.com

FLIR SYSTEMS Co. LTD.

Hong Kong
Tel.: +852 27 92 89 55
e-mail: flir@flir.com.hk

FLIR SYSTEMS GMBH

Germany
Tel.: +49 (0)69 95 00 900
e-mail: info@flir.de

FLIR SYSTEMS SARL

France
Tel.: +33 (0)1 41 33 97 97
e-mail: info@flir.fr

FLIR SYSTEMS S.R.L.

Italy
Tel.: +39 02 99 45 10 01
e-mail: info@flir.it

FLIR SYSTEMS AB

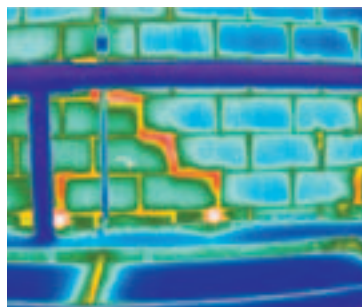
Belgium
Tel.: +32 (0)3 287 87 10
e-mail: info@flir.be

WWW.FLIR.COM

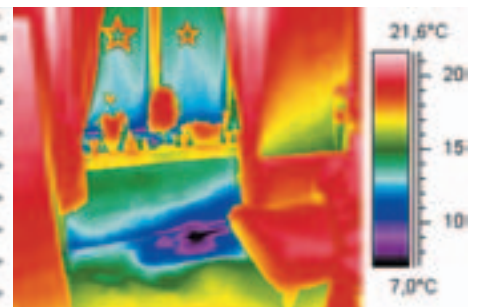


SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE
©Copyright 2004, FLIR Systems, Inc.
All other brand and product names are trademarks of their respective owners

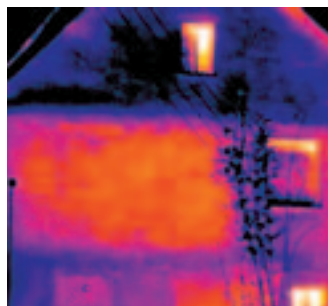
INFRARED THERMOGRAPHY FOR THE BUILDING INDUSTRY - A FEW EXAMPLES



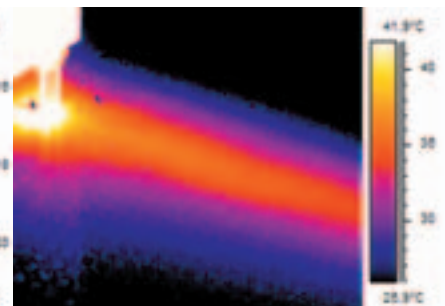
Cracked chimney



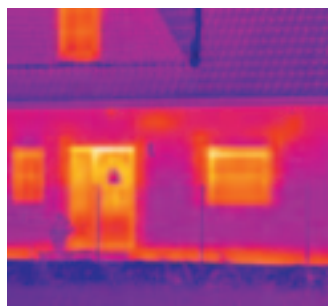
Untight area leads to cold feet in a living room



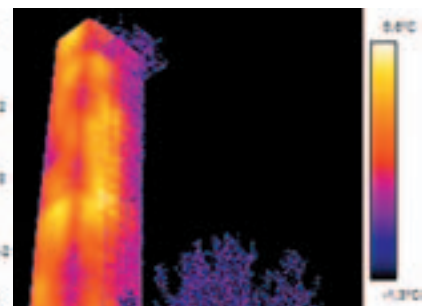
Badly insulated wall



Underfloor heating pipe



Heat losses at doors and windows



Hot spots in an industrial chimney