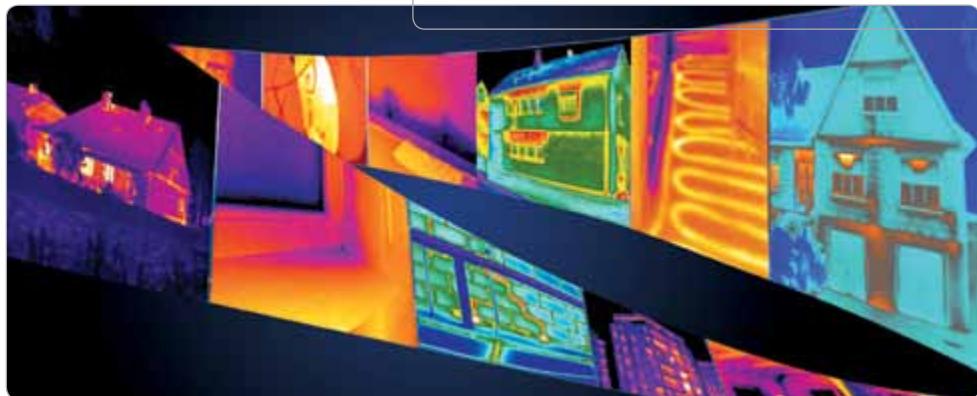


Thermal imaging cameras for Building Inspections

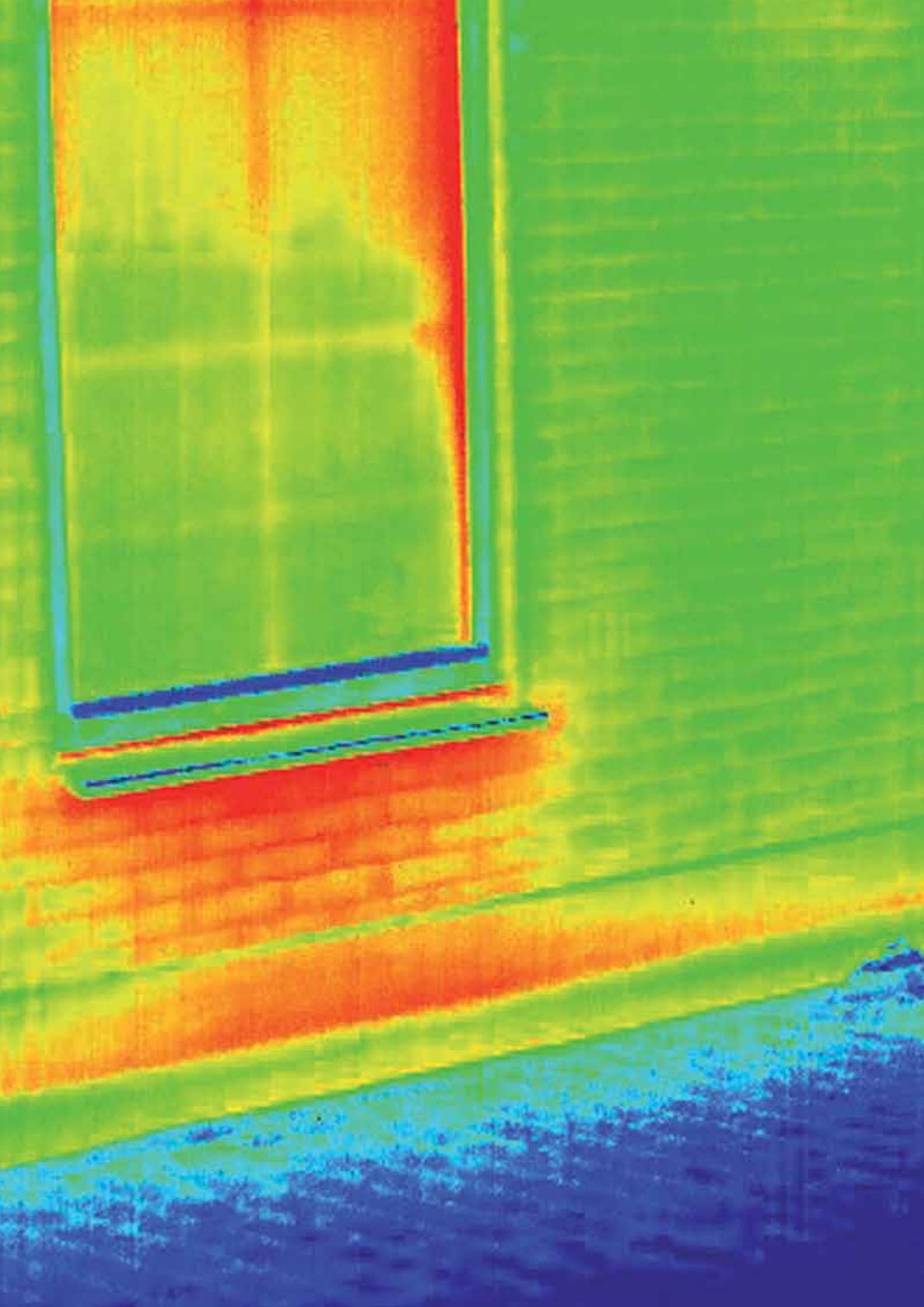


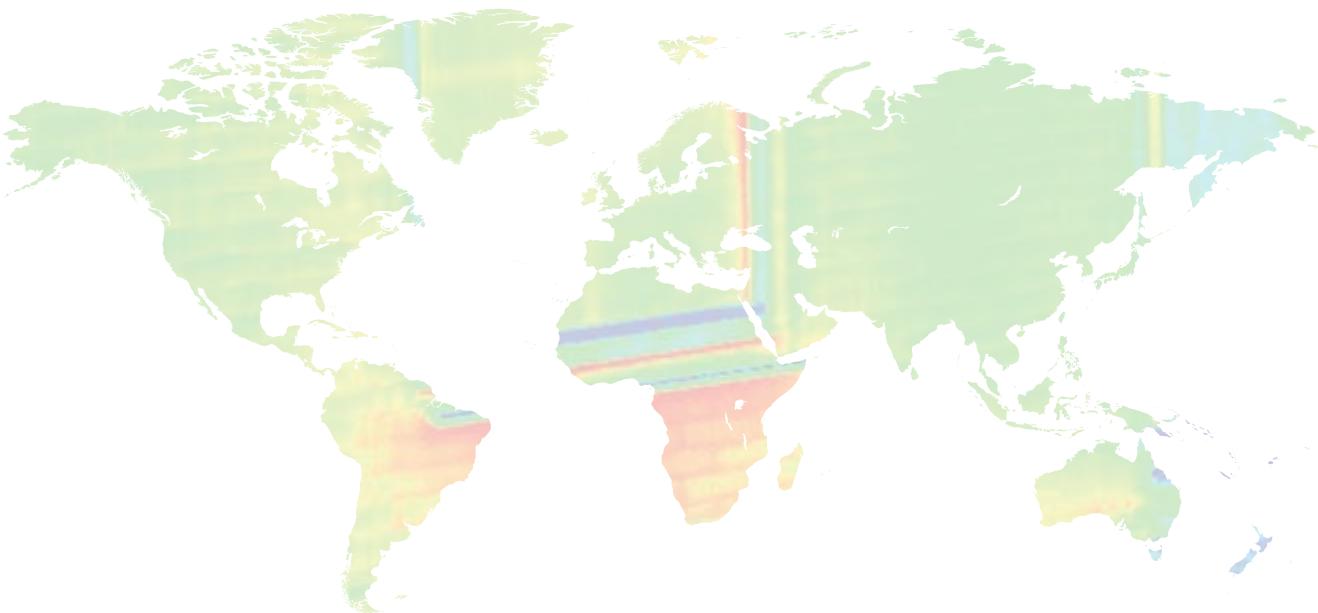
Building inspections

Insulation

Energy loss

Plumbing and piping





FLIR Systems: the world leader for thermal imaging cameras

FLIR Systems is the world leader in the design, manufacturing and marketing of thermal imaging systems for a wide variety of commercial, industrial and government applications.

FLIR Systems' thermal imaging systems use state-of-the-art infrared imaging technology that detects infrared radiation - or heat. Based on detected temperature differences, thermal imaging cameras can create a crisp image. Complicated algorithms make it also possible to read correct temperature values from this image. We design and manufacture all of the critical technologies inside our products, including detectors, electronics, and special lenses ourselves.



FLIR Systems Stockholm



FLIR Systems Portland
Corporate Headquarters



FLIR Systems Boston



FLIR Systems Santa Barbara,
California

Rapidly emerging markets and organization

Interest for thermal imaging has grown considerably over the last few years in a large variety of markets.

To face this increased demand, FLIR Systems has expanded its organization drastically. Today we employ more than 1,900 people. Together, these infrared specialists realize a consolidated annual turnover of more than 1 billion US dollars. This makes FLIR Systems the largest manufacturer of commercial thermal imaging cameras in the world.

Manufacturing capabilities

FLIR Systems currently operates 5 manufacturing plants: three in the USA (Portland, Boston and Santa Barbara, California) one in Stockholm, Sweden, one in Estonia and one in Paris, France.

Thermal imaging:

more than building a camera

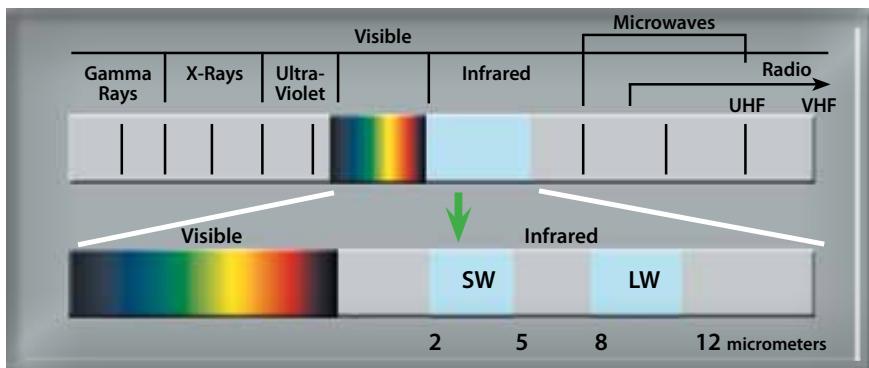
There is more to the world of thermal imaging than building a camera. FLIR Systems is not only committed to providing you with the best camera, we are also able to offer you the best software, service and training to suit your thermal imaging needs.

INFRARED: more than meets the eye

Infrared - part of the electromagnetic spectrum

Our eyes are detectors that are designed to detect visible light (or visible radiation). There are other forms of light (or radiation) that we cannot see. The human eye can only see a very small part of the electromagnetic spectrum. At one end of the spectrum we cannot see ultraviolet light, while at the other end our eyes cannot see infrared. Infrared radiation lies between the visible and microwave portions of the electromagnetic spectrum. The primary source of infrared radiation is heat or thermal radiation.

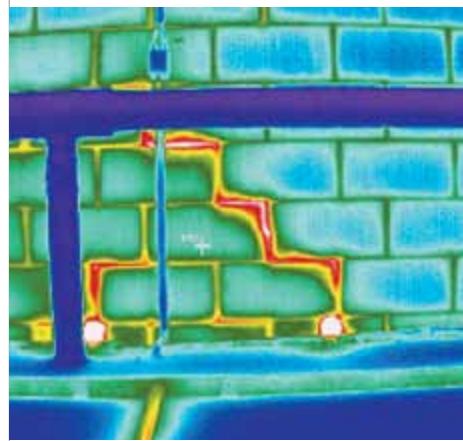
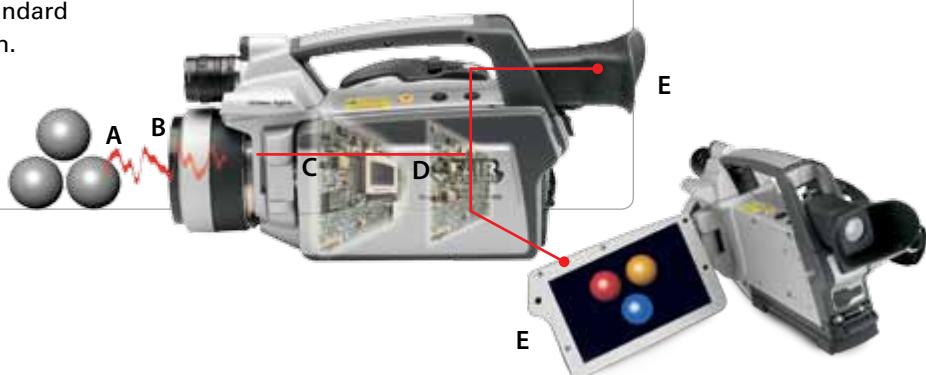
Any object that has a temperature above absolute zero (-273.15 degrees Celsius or 0 Kelvin) emits radiation in the infrared region. Even objects that we think of as being very cold, such as ice cubes, emit infrared radiation. We experience infrared radiation every day. The heat that we feel from sunlight, a fire or a radiator is all infrared. Although our eyes cannot see it, the nerves in our skin can feel it as heat. The warmer the object, the more infrared radiation it emits.



The infrared camera

Infrared energy (A) coming from an object is focused by the optics (B) onto an infrared detector (C). The detector sends the information to sensor electronics (D) for image processing. The electronics translate the data coming from the detector into an image (E) that can be viewed in the viewfinder or on a standard video monitor or LCD screen.

Infrared thermography is the art of transforming an infrared image into a radiometric one, which allows temperature values to be read from the image. In order to do this, complex algorithms are incorporated into the infrared camera.



Why use thermal imaging cameras?

Why would you choose a FLIR thermal imaging camera? There are other technologies available to help you measure temperatures in a non-contact mode. Infrared thermometers for example.

Infrared thermometers vs thermal imaging cameras

Infrared (IR) thermometers are reliable and very useful for single-spot temperature readings, but, for scanning large areas, it's easy to miss critical parts like air leakages, areas with insufficient insulation or water intrusion.

A FLIR thermal imaging camera can scan entire buildings, heating and HVAC installations. It never misses a potential problem area no matter how small this might be.

Use thousands of infrared thermometers at the same time

With an infrared thermometer you are able to measure the temperature at one single spot. FLIR thermal imaging cameras can measure temperatures on the entire image. The i5 has an image resolution of 80 x 80 pixels. This means that it is equal to using 6,400 IR thermometers at the same time. If we look at the FLIR B660, our top model, which has an image resolution of 640 x 480 pixels, this means 307,200 pixels or using 307,200 infrared thermometers at the same time.



IR thermometer, temperature measurement in one spot



FLIR i5, temperature in 6,400 spots

Find problems faster and easier with extreme accuracy.

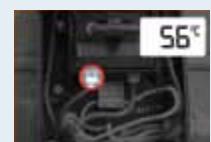
It is easy to miss a critical building problem if you are only using a spot IR thermometer. A FLIR thermal imaging camera will give you a total view of the situation and instant diagnostic insights. It not only locates a construction problem in a building but shows the full extent of problems.



What an IR Thermometer sees



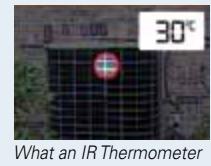
What a thermal imaging camera sees



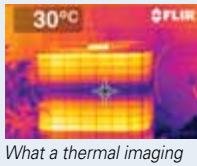
What an IR Thermometer sees



What a thermal imaging camera sees



What an IR Thermometer sees



What a thermal imaging camera sees

Thermal imaging cameras for building applications

Since the 1970s we have become increasingly conscious that energy resources are precious and limited.

Thermal imaging cameras can help you to make insulation problems and other building anomalies clearly visible. This way not only corrective actions can be taken but also energy can be saved.

The building sector accounts for 40% of the EU's energy requirements and offers the largest single potential for energy efficiency. Due to the huge potential the European commission has formed a directive for energy performance regulation of buildings – on which many national laws already are based.

Recent economic stimulus packages in many countries, are likely to drive the demand for Air tightness testing and other methods for investigating energy efficiency. The use of thermal imaging, alone or in combination with other methods, speeds up the work considerably as thermal imaging pinpoints exactly where to focus energy savings efforts – without any destructive testing.

The easiest and quickest method of detecting energy waste in buildings is thermal imaging. A thermal imaging camera shows exactly where the energy waste problems are and helps focus the inspectors attention allowing them to properly diagnose these areas of loss.

Why use thermal imaging in the building industry?



Thermal imaging reveals a hidden window construction invisible to the human eye.



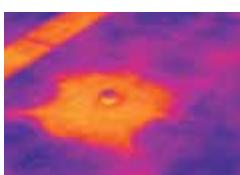
Leaks in an underground district heating network.

Quickly Diagnose Building Conditions:

Buildings can quickly and thoroughly be scanned using a FLIR thermal imaging camera, identifying problem areas that can not be seen by the naked eye. This ensures the integrity of both structural and environmental systems for building inspection, repair verification and insurance related purposes.



The thermal image shows mould on the interior wall due to water infiltration.



The infrared image shows water leakage in the roof.

Easy Non-invasive/Non-destructive Testing:

Thermal imaging can facilitate repairs quickly, easily and safely and much more cost effective than other conventional methods. A thermal imaging camera minimizes the need for building disassembly – saves time and labour by minimizing down time, repair time, labour costs and disturbance of habitants, as well as verification of a job well done.

- Check energy efficiency
- Quickly locate missing insulation and areas of energy loss
- Verify proper systems operation



Thermal imaging cameras:

- Are as easy to use as a camcorder or a digital camera
- Give you a full image of the situation
- Perform inspections when systems are under load
- Identify and locate the problem
- Measure temperatures
- Store information
- Tell you exactly what needs to be fixed
- Find the problems before real problems occur
- Save you valuable time and money



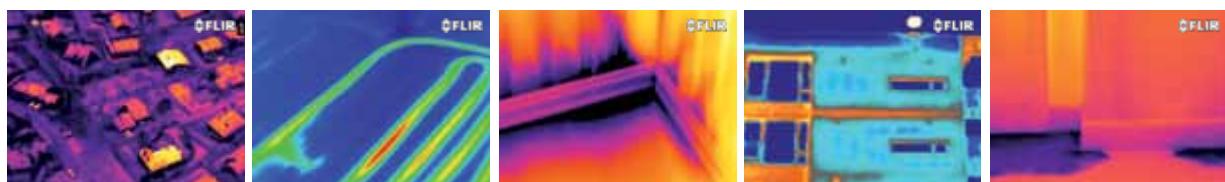
Thermal image shows insulation quality of a low energy house.

This building is warmer on the inside. Missing insulation, impossible to see visually.

Framework construction. Many of the sections are missing insulation as indicated by the warmer colors.

Glass roof above an atrium. Cold air is coming in at the floor.

Missing insulation in parts of the wall.



The buildings with yellow colored roofs show there is a moisture or insulation problem.

The image above shows a water leak from a hot water pipe in the floor heating.

The image shows air-leaks at the base board.

The image shows a thermal bridge at one of the floors.

Moisture intrusion in floor, impossible to see with the human eye, but clearly visible in infrared.

A wide range of thermal imaging cameras for building inspections

FLIR Systems markets a full product range of thermal imaging cameras for building applications. Whether you are just discovering the benefits that thermal imaging cameras have to offer or if you are an expert thermographer, FLIR Systems offers you the correct tool for the job.

Discover our full product range and find out why FLIR Systems is the world leader for thermal imaging cameras.



FLIR i5 & FLIR i7



FLIR i5/i7 is the smallest, lightest and most affordable thermal imaging camera on the market. It is incredibly easy to use and requires no former experience. It really is a matter of "point-shoot-detect" to obtain high-quality thermal images that will immediately give you the thermal information you need.



Outstanding ease-of-use

The camera is extremely easy to understand and operate, designed for entry-level users. The camera is intuitive and comes with a full manual.



Fully automatic

Produces instant, point-and-shoot JPEG thermal imagery that carries all required temperature data and can be stored internally or externally, sent and analyzed.



Focus free

The fixed focus free lens makes using the FLIR i5/i7 a snap.



Compact and lightweight

FLIR i5/i7 weighs only 340 g, and is easy to store in a belt pouch.



SD card storage

Stores images with unique ID in radiometric JPEG format, containing all temperature data on a standard miniSD card. USB file transfer to PC.



Reporting and analysis software included

FLIR QuickReport software is included and the camera is also compatible with the more powerful FLIR Reporter.



Outstanding measurement/accuracy

High accuracy of $\pm 2^\circ\text{C}$ or $\pm 2\%$ produces sensitive thermal images for general purpose maintenance analysis. Measures temperatures up to $+250^\circ\text{C}$ and detects temperature differences as small as 0.10°C .



Measurement functions

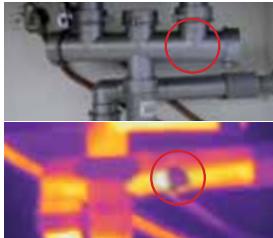
Spotmeter, box with max./min. temperatures, isotherm above/below (depending on model).

Quickly diagnose
Building conditions



The thermal inspection locates missing insulation in the roof. This can now be repaired and further energy loss prevented.

Detect plumbing
issues



The blockage in this pipe is quickly located using a thermal camera. Action will be taken before the problem gets worse.



Point



Shoot



Detect



Save time and money
in 3 steps:

- Detect hidden problems, make quick damage assessments and perform preventive inspections
- Identify energy losses and poor insulation
- Spot electrical faults before it is too late
- Produce instant thermal images of your findings
- Create reports, analyse and document your findings with the easy-to-use software

FLIR i5 / i7 camera model comparison



FLIR i5



Thermal image quality:
80x80 pixels

Field of View: 17°(H) x 17°(V)

Spotmeter only

FLIR i7



Thermal image quality:
120x120 pixels

Field of View: 25°(H) x 25°(V)

Spotmeter, box with max./min. temperature, isotherm above/below

FLIR b-Series



Lightweight design, Heavyweight performers

The FLIR b-Series are small and lightweight infrared cameras designed for those needing higher resolution and more features and for whom documentation of findings are important.

The FLIR b-models include the features you need to make well informed building decisions like built-in insulation and dew point alarms. The cameras are specifically designed for building inspections such as, HVAC heating and cooling issues, air flow, moisture detection, plumbing problems, and much more.

180
X
180

Up to 180 x 180 pixels resolution

The FLIR b-Series infrared image resolution ranges from 120x120 pixels to 180x180 pixels depending on camera model. Every additional pixel means more valuable temperature information to isolate problem areas.



Small and lightweight

FLIR b-Series models weigh only 600g, easy to store in a belt pouch.



High quality visual camera

2.3 Megapixel (1536 x 1536) visible light camera makes observing and inspecting faster and easier. The FLIR b40 has a visual camera with 0.6 Megapixel resolution.



± 2% accuracy

High accuracy of ± 2% and thermal sensitivity better than 0.1°C.



LCD screen

Large 3.5" LCD color screen.



Thumbnail Image Gallery

Allows quick search of stored images.



Built-in LED lights

All FLIR b-Series cameras have built-in LED lamps that ensures quality visual images regardless of job site lighting levels.



Long life battery

With a 5 hour battery life (field replaceable) its easy-to-replace Lithium Ion batteries will keep up with your demanding schedule.



Laser Pointer

A conveniently located button activates the laser pointer that will help you associate the hot or cold spot in the IR image with the real physical target in the field.



Laser Alignment (FLIR b60)

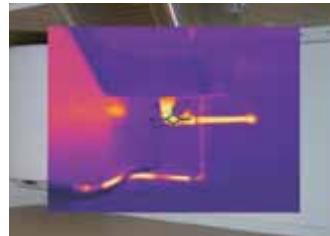
Associates hot or cold spot in the IR image with the physical target in the field to ensure that the exact area is being evaluated.





Picture-in-Picture (PiP)

A function for overlying the infrared image on the visual image while retaining all measurement data. This feature helps to spot and highlight sensitive or dangerous temperature developments and makes report interpretation easy even for a person unfamiliar with infrared. FLIR b40 has a fixed PiP. FLIR b50 has a 3 step PiP and finally FLIR b60 has a fully scalable PiP.



MeterLink™ (FLIR b60)

FLIR MeterLink technology* simplifies the work in electrical or building inspections by making it possible to transfer, via Bluetooth®, the data acquired by an Extech clampmeter or multi function moisture meter and psychrometer into the infrared camera. The MeterLink technology saves time and eliminates the risk of erroneous records or notes.



Copy to USB

Upload images and measurement findings directly from the thermal imaging camera to a USB stick.



Dew point/Insulation Alarm

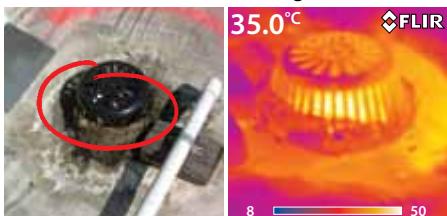
The Relative Humidity Alarm alerts you to the areas where there is a risk of condensation. An Insulation Alarm shows the insulation performance of the building structure. By inputting relevant values into the camera the areas that fail to fulfill requirements will appear as colored.

Identify air leakages



The cold spot indicates cold air infiltration from the window.

Find and assess water damage



The thermal image shows water leakage in the roof.

Verify repairs and installations



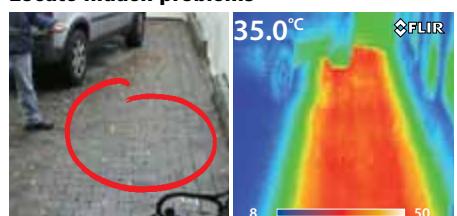
The thermal inspection reveals an incorrect window installation.

Identify energy losses and poor insulation



The thermal inspection locates missing insulation in the wall.

Locate hidden problems



Heated pavement, but only a part of it is working.

Locate HVAC problems



Check-up of a heat, ventilation or air conditioning installation quick and easy.

FLIR b-Series camera model comparison

FLIR b40



Thermal image quality: 120x120 pixels

Thermal sensitivity: 100 mk

0.6 megapixel digital camera

Fixed Picture-in-Picture

FLIR b50



Thermal image quality: 140x140 pixels

Thermal sensitivity: 90 mk

2.3 megapixel digital camera

3 step Picture-in-Picture

FLIR b60



Thermal image quality: 180x180 pixels

Thermal sensitivity: 70 mk

2.3 megapixel digital camera

Scalable Picture-in-Picture

Laser alignment

Voice comments

MeterLink™

FLIR B-Series



The choice of the professional thermographer

The FLIR B-Series of portable thermal imaging cameras takes ergonomics, weight and ease-of-use to a new level. Usability is key: our engineers have translated user feedback on comfort and clarity into a series of comprehensive and innovative features. Furthermore, the FLIR B-Series has been specifically developed for building environments.

It contains features like dewpoint and insulation alarms that will make the life of any building thermographer a lot easier.

320
X
240

Up to 320 x 240 pixel resolution

The B-Series thermal image resolution ranges from 240 x 180 pixels to 320 x 240 pixels depending on camera model.



Camera sensitivity

The thermal sensitivity in the FLIR B-Series ranges from 70 mK to < 50 mK depending on model.



High quality visual camera

All models in the FLIR B-Series have an integrated 3.1 Mpixel digital camera. This makes observing and inspecting faster and easier.



Panorama support (FLIR B250/B425)

Take images in a sequence and automatically combine them to one large image using the FLIR BuildIR SW. The images can be shot in vertical or horizontal direction or in a combination of the two.



Measurement range

Temperature measurement range -20°C to +350°C (depending on camera model)



Interchangeable infrared lenses

The B-Series features a standard 25° lens and optional 6°, 15°, 45° and 90° lenses.



Flexible interfaces

The B-Series is equipped with standard video, USB outputs as well as a removable SD card.



MPEG-4 video

Create visual and infrared non radiometric MPEG-4 video files.



Radiometric IR video streaming

16 bit radiometric IR video can be streamed to a PC (via USB) running the FLIR QuickPlot or FLIR ResearchIR software.



Thermal Fusion (B365/ B425)

Merges visual and infrared images to offer better analysis.



Picture-in-Picture

Create an infrared overlay on your visual image. Scalable, moveable and resizable, depending on models.



Text and voice annotations

Text comments can be made from a pre-defined list or using the touch screen. A headset can be connected to make voice annotations.



Sketch annotations (B250/B365/B425)

Use the touch screen as pen and paper to add sketch annotations.



Image storage

FLIR uses a non proprietary radiometric JPEG image format that allows for post processing and report writing with Microsoft Word® based FLIR software.



Touch screen

3.5" LCD touch screen plus stylus brings interactivity and user comfort to a new level.



Temperature sound, image alarms

Make surveying easier and faster.



Measurement Modes

Measurement spots, area with auto hot/cold spot indication, isotherms, ΔT calculation.



MeterLink™

FLIR MeterLink technology makes it possible to transfer, via Bluetooth, the data acquired by an Extech clampmeter or multi function moisture meter and psychrometer into the infrared camera. The MeterLink technology saves time and eliminates the risk of erroneous records or notes.



Copy to USB

Transfer on board images or reports directly from the thermal imaging camera to a USB stick.



Instant reports (B365/ B425)

Create instant reports directly in camera, easily copy report to USB.



Humidity Alarm/Insulation Alarm

The Relative Humidity Alarm alerts you to the areas where there is a risk of condensation. An Insulation Alarm shows the insulation performance of the building structure. By inputting relevant values into the camera the areas that fail to fulfill requirements will appear as colored.