

APPLICATION STORY



THERMAL IMAGING CAMERA, A TIME MACHINE FOR DAMP DIAGNOSIS

While invasive testing methods may sometimes be necessary to determine the source and extent of damp problems in buildings, there is a variety of frontline tools to assist in the initial diagnosis. Electronic moisture meters, surface thermometers, hygrometers and data loggers all have their part to play. For experts like Brick Tie Preservation in Yorkshire (UK), these are indeed standard tools-of-the-trade. The company also has its own salts analysis and gravimetric testing lab for masonry samples. So with all these options available why did it choose to add thermal imaging to its arsenal?

The answer is the ability to see the 'big picture' in an instant and to factor-in hidden features and defects that have a bearing on the damp problem; these can easily be seen on a thermal image through differences in heat transfer and heat retention. Brick Tie Preservation's MD, Bryan Hindle, compares his thermal imaging camera to a time-machine that can help him see the building's history.

Bryan Hindle had been interested in thermal imaging for some time and having canvassed the opinions of other professionals in the business he decided to enrol on a thermal imaging course with Thermographic Consultancy Limited (TCL) in Swindon to learn more about the technology.

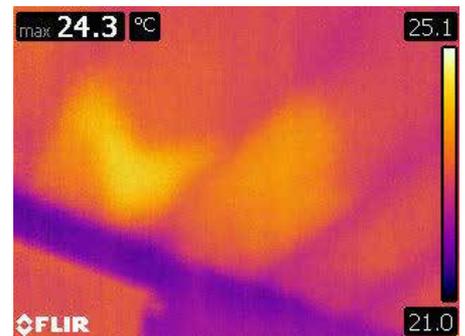
"Although building thermography isn't rocket science, it does require

sound understanding of how it works and what influences equipment and results," Bryan Hindle explained. "I think a Level 1 thermography qualification is perfect for anyone starting out in thermography and I refused to contemplate using an IR camera in my work without it."

Next step was to decide on the most suitable thermal imaging camera and as a result of his training, Bryan realised that an entry-level model would be false economy for his business. Whilst they are a good choice for basic troubleshooting they do not have the performance and functionality needed to see complex problems evidenced by subtle temperature differences.

With expert guidance from Stuart Holland of TCL, himself a Level III thermographer, Bryan Hindle

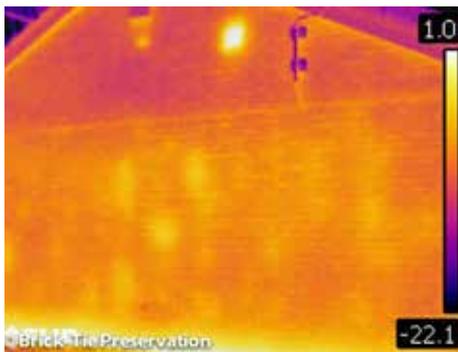
The FLIR T420bx offers sharp thermal resolution at 76,800 pixels for solid accuracy from farther away.



A tool for all seasons.... Bryan's FLIR T420bx is sensitive enough to 'see' warm areas in summer, where missing insulation is allowing heat in the roof void to radiate from the bedroom ceilings.

ultimately chose the FLIR T420bx with an additional wide angle lens as much of the company's work is performed indoors.

"FLIR makes quality products and has good connections with training professionals. I like that in a manufacturer, it's responsible and proactive," Bryan Hindle confirmed. "I looked at other brands but the FLIR T420bx provided the ideal combination of functionality, sensitivity and



Gaps in cavity wall insulation identified using the FLIR T420bx for further investigation via boroscope, without the need to drill many holes.



Bryan Hindle's FLIR MR77, used to transfer the psychrometric data to the FLIR T420bx via meterLink.

resolution. Having tried cheaper 'pistol grip' type units I find the ergonomics of the swivel lens and hand grip much better in use."

He added: "Good sensitivity is a particularly important criterion as I can't count on high temperature differentials and I need to deal with conditions as I find them. Preparation counts for little if, for example, the doors and windows of a building are open when I arrive making the measurement conditions far less than ideal."

MINIMISING DESTRUCTIVE TESTING

Although thermal imaging does not directly diagnose conditions such as rising damp, it helps Bryan Hindle refining the judgements he makes in respect of the problem. He says it adds another layer to his diagnosis. This is important as many damp problems are influenced by work carried out in the past which is often hidden behind plaster or other finishes and of which the building owner or tenant may be completely unaware.

"Thermal imaging helps me make an informed decision on whether time-consuming and destructive testing is necessary. I am able to get this information on site and usually with immediate results," Bryan added.

"Thanks to the technology I was recently able to show a surveyor that a house didn't require a full damp proof course, and lots of work, as the problem was simply one of condensation."

In this particular instance, Bryan Hindle used his FLIR T420bx in combination with his FLIR MR77 moisture meter. Both are equipped with Meterlink, a function that allows measurements from the moisture meter to be embedded in the associated thermal image.

Bryan Hindle continued: "I'm able to give my clients an image with dew points and relative humidity overlaid on a colour isotherm taken of the property so they can see the result of the live readings from the moisture meter. It's a priceless communication tool and, in truth, I wouldn't consider buying a camera without this function now. I hate reports that bamboozle clients, so being able to supply the IR image with a clear explanation of what is going on works extremely well."

BUILDING KNOWLEDGE

As well as being an important aid for diagnosis, Brick Tie Preservation's FLIR T420bx is also helping to build the company's scientific knowledge. For example, it was recently used to provide a deeper understanding of how salts can affect the thermal characteristics of masonry and also how saturated air, common in winter, affects rising damp.

For this particular project Bryan Hindle used FLIR Systems' patented multi-spectral imaging technology, MSX®, to help visualise thermal effects. MSX captures visual data from the built-in digital camera and radiometric data from the thermal camera. Internal software then analyses the image and superimposes key elements from the visual image as a high-contrast 'skeleton' on the thermal output.

"The path edge, bed-joints and path/wall junction are all clear in the image thanks to MSX. I have also used FLIR Systems' excellent FLIR Tools to plot some measurement lines to highlight the temperature gradients and plot the maximum and minimum apparent temperatures on each," Bryan Hindle explained.

WIDE APPLICATION SCOPE

The stand-out benefits of thermal imaging for Brick Tie Preservation is its ability to reveal missing or wet insulation and areas at risk of condensation; also for locating cold bridges such as blocked cavities. In traditional buildings it also helps the company find hidden timber frames and members, bricked-up openings and leaks.

Indeed the flexibility of the camera also recently enabled the Bryan Hindle to find a leak in a central heating system, comprising around 100 metres of pipework under the ground floor screed.

"I was able to find the anomaly within a few minutes with my thermal imaging camera. When the heating was turned back on, the client and I watched as the patch grew and then cooled as new cold water was flushed in," Bryan Hindle added. "All this was detected without any disturbance to furniture, carpet or underlay. The client was delighted as the repair could be localised without the need to strip out lots of finishes and screed."

He concluded: "I did without thermal imaging for years but now, I wouldn't be without it."



The use of a FLIR T420bx. Combined with MeterLink via a FLIR MR77 moisture meter in a damp investigation. Areas at and below the dew point (13.0°C) are highlighted in blue automatically, clearly identifying the areas where condensation is happening in real time. FLIR Tools software can be used to model changes based on expected changes following heating, insulation and ventilation interventions.

For more information about thermal imaging cameras or about this application, please visit:

www.flir.com/building

The images displayed may not be representative of the actual resolution of the camera shown. Images for illustrative purposes only.