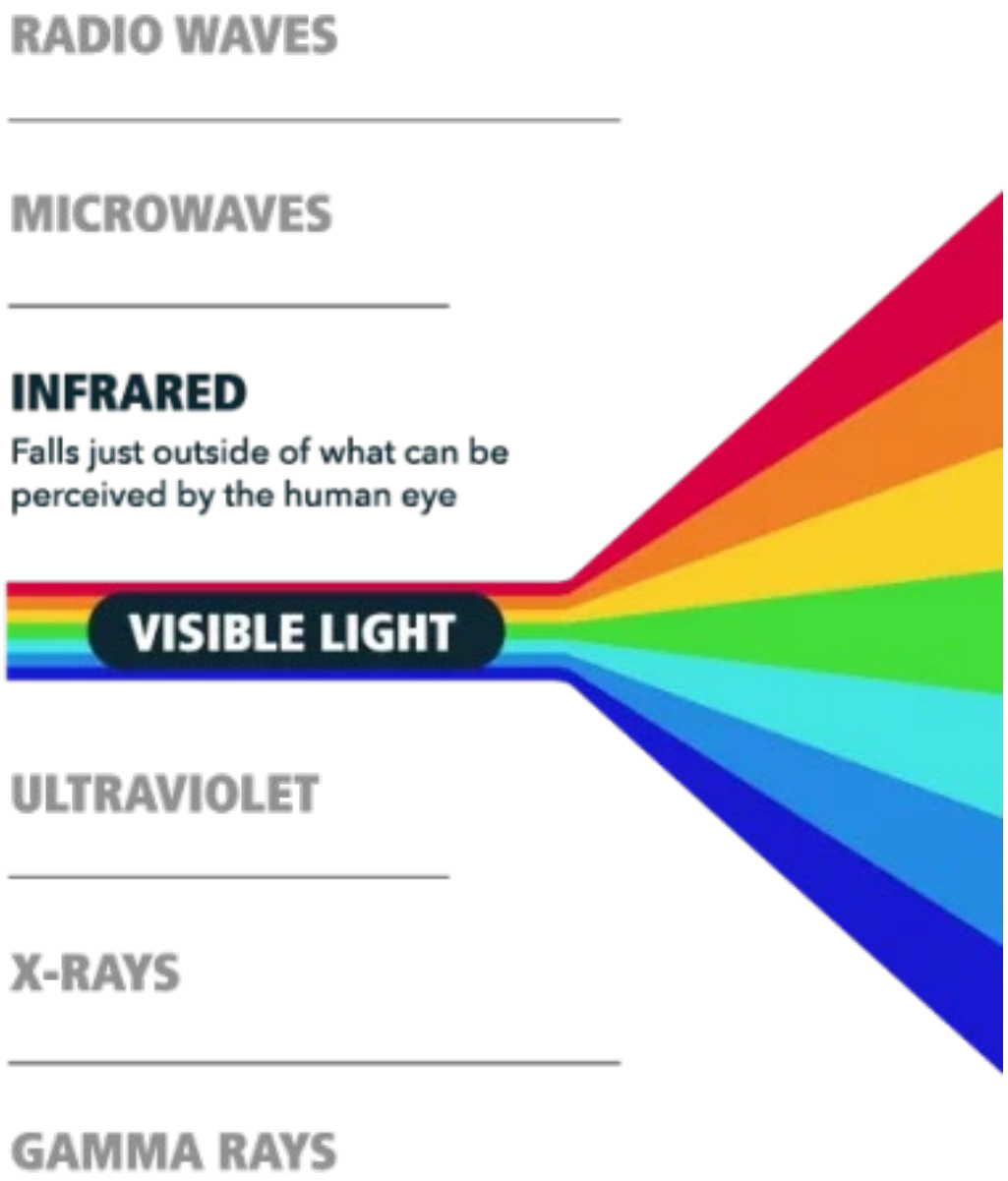
Building Thermography

Principle of Thermography

- Thermography operates on the principle that all objects emit infrared (IR) radiation as a function of their temperature.
- This radiation is invisible to the human eye but can be detected and captured by thermal imaging devices, such as infrared cameras, to produce a visual representation of temperature distribution across a surface.



Infrared Radiation

- Infrared radiation is a type of electromagnetic radiation that has a longer wavelength than visible light and is invisible to the naked eye.
- It is emitted by all objects that have a temperature above absolute zero.
- Infrared radiation has several properties, including wavelength, frequency, and energy.
- It can be used to measure temperature and detect objects in low-light conditions.

Building Inspections

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- Typically, the technique can be used to determine the presence of non-visible defects such as:

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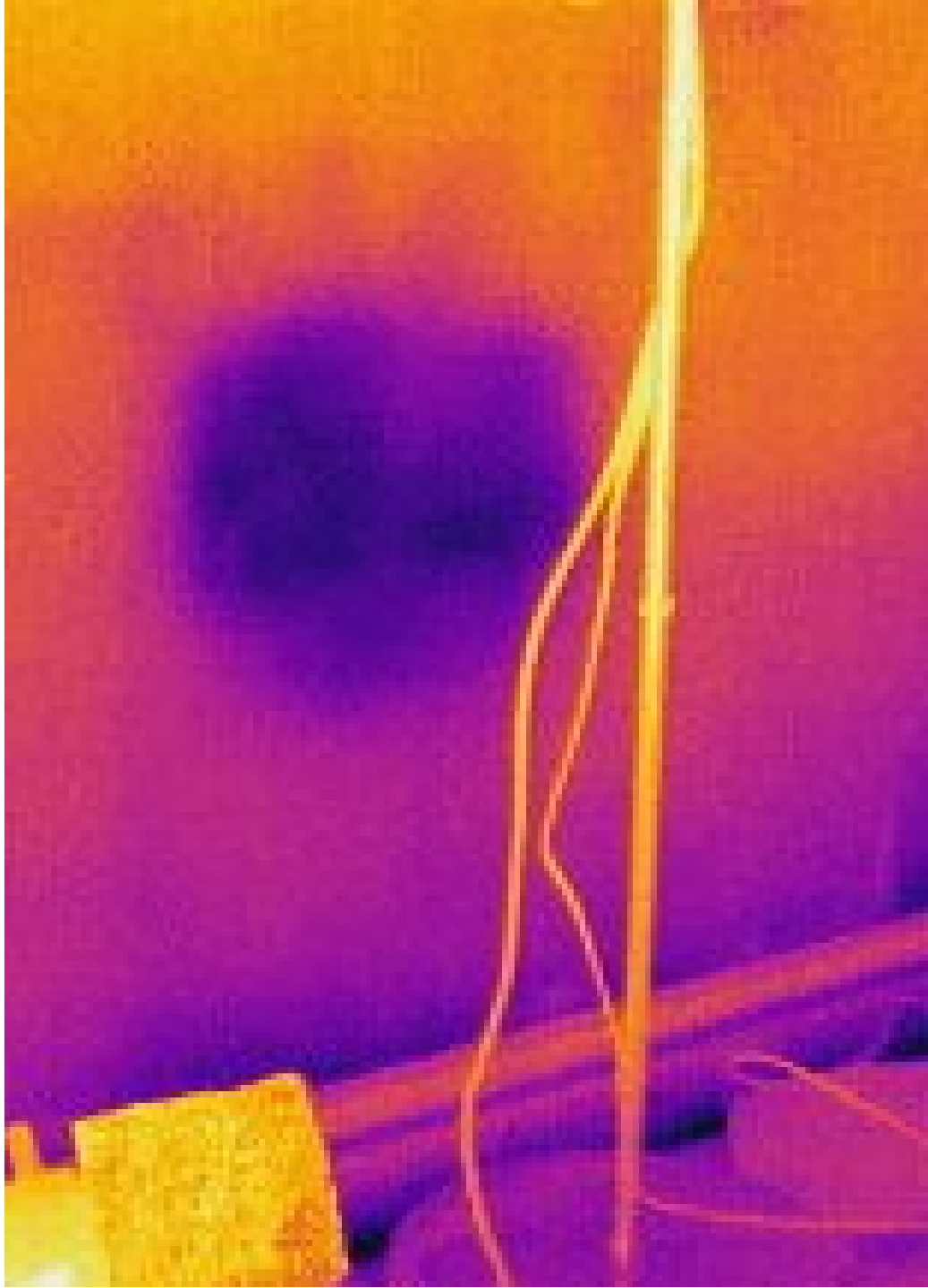
MOISTURE DETECTION



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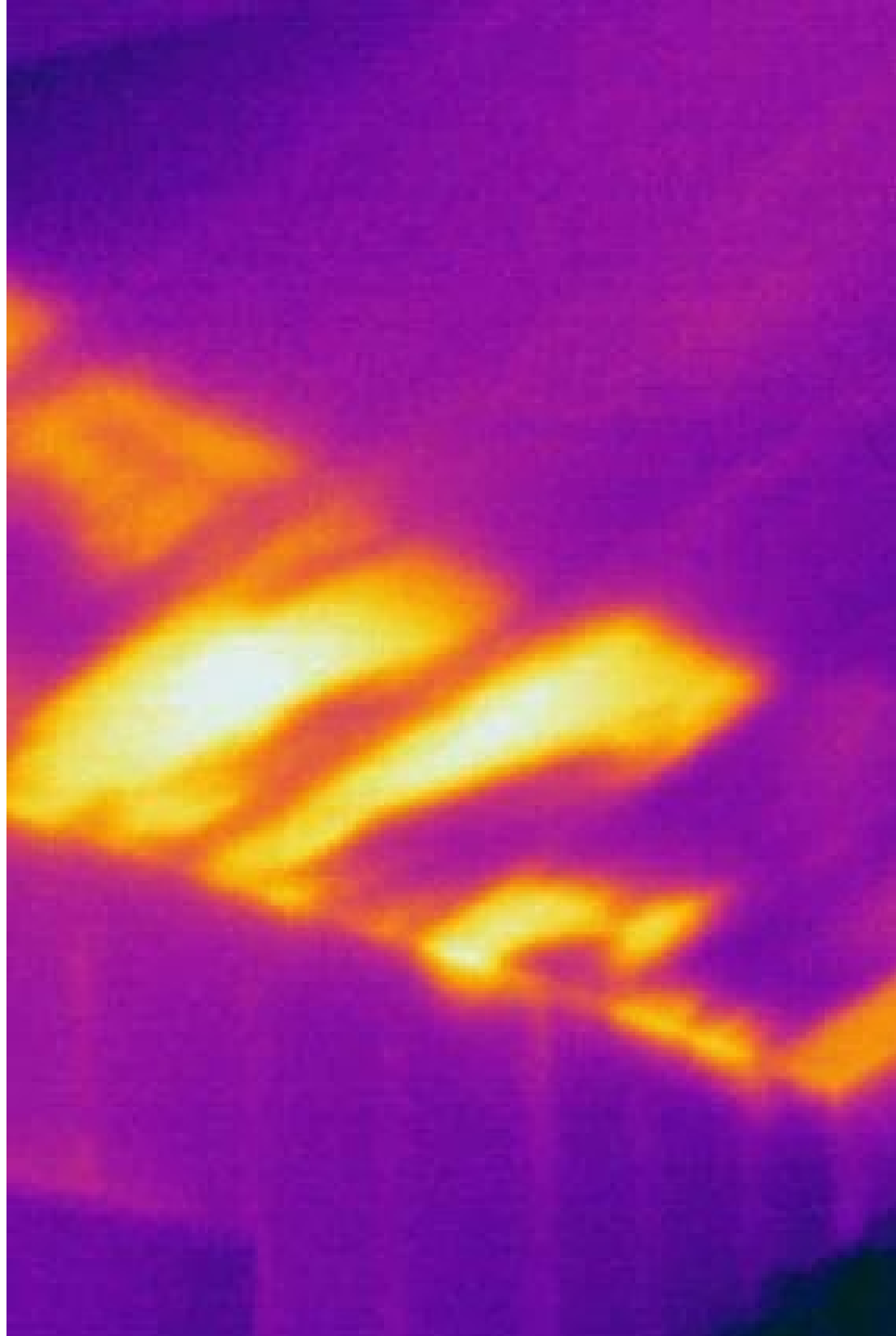
ENERGY EFFICIENCY



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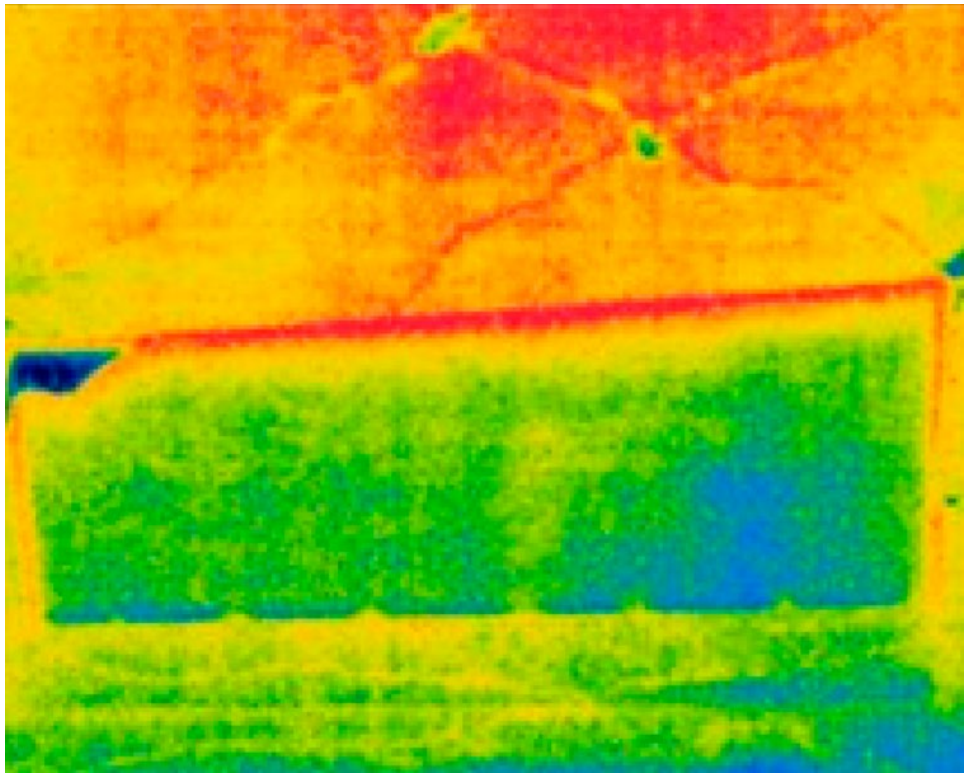

STRUCTURAL INTEGRITY

Building Inspections

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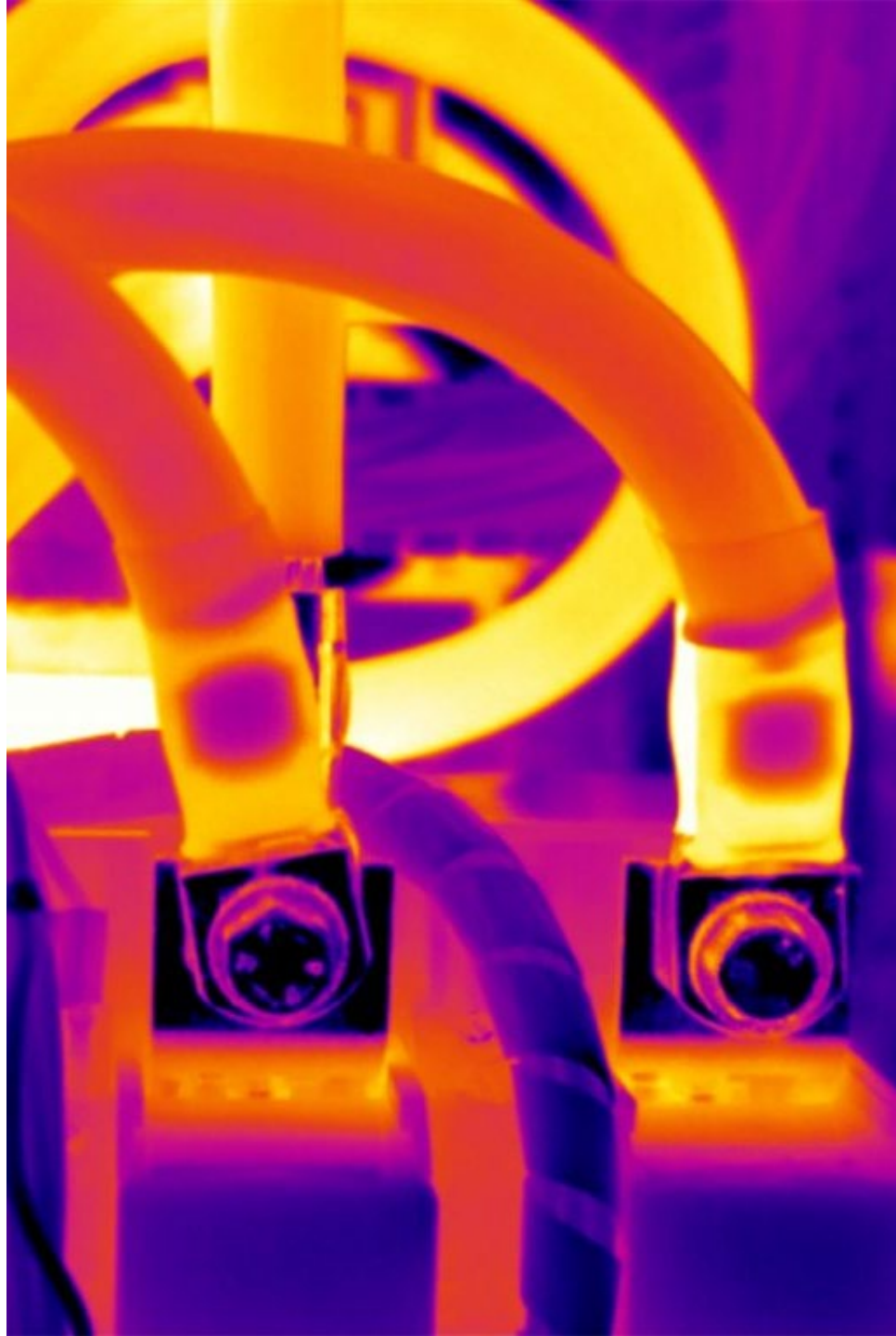
ELECTRICAL SYSTEMS



How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

PREPARATION

- Clearly define what you are assessing, e.g., energy efficiency, moisture intrusion, or structural integrity.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

PREPARATION

- Use a high-resolution infrared camera suitable for building inspections.
- Ensure it has adjustable settings for temperature range and emissivity.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

PREPARATION

- Conduct the survey when temperature differences between inside and outside are sufficient (ideally at least 10 °C difference).
- Avoid surveying under direct sunlight, strong winds, or rain, as these can affect results.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

PREPARATION

- Close windows and doors.
- Turn off any heating, cooling, or ventilation systems that may artificially alter temperature readings.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

CONDUCTING THE SURVEY

- Start by capturing thermal images of the building's exterior.
- Focus on areas prone to heat loss, such as roofs, walls, windows, and doors.
- Look for patterns indicating insulation gaps, air leaks, or moisture accumulation.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

CONDUCTING THE SURVEY

- Inspect interior walls, ceilings, and floors for cold spots, which may indicate poor insulation or moisture presence.
- Check around windows and door frames for air infiltration or thermal bridging.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

CONDUCTING THE SURVEY

- Scan electrical panels, outlets, and HVAC components for hotspots that may signal potential failures.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

DATA ANALYSIS

- Input the correct emissivity settings for the materials being inspected (e.g., walls, glass, or metals).
- Be mindful of reflective surfaces that may give false readings by reflecting surrounding heat sources.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

DATA ANALYSIS

- Look for anomalies such as uneven temperatures or cold/hot spots that deviate from expected patterns.
- Cross-reference findings with architectural plans and insulation layouts.

How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

INTERPRETATION AND REPORTING

- Identify specific issues, such as missing insulation, moisture penetration, or air leaks.
- Quantify heat loss or moisture extent if possible.

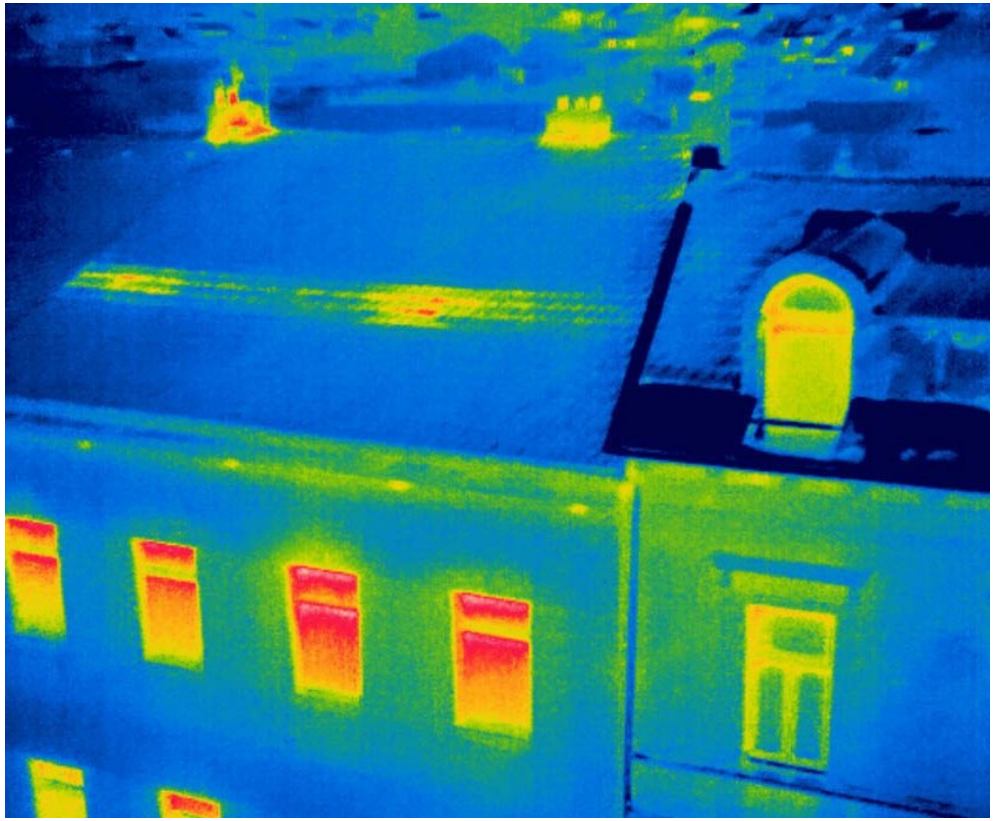
How To Carry Out A Thermographic Survey

To conduct a successful survey, follow these steps:

INTERPRETATION AND REPORTING

- Generate a Report
- Include annotated thermal images, descriptions of identified issues, and recommendations for remedial action.
- Provide a summary of conditions, environmental factors during the survey, and limitations of the study.

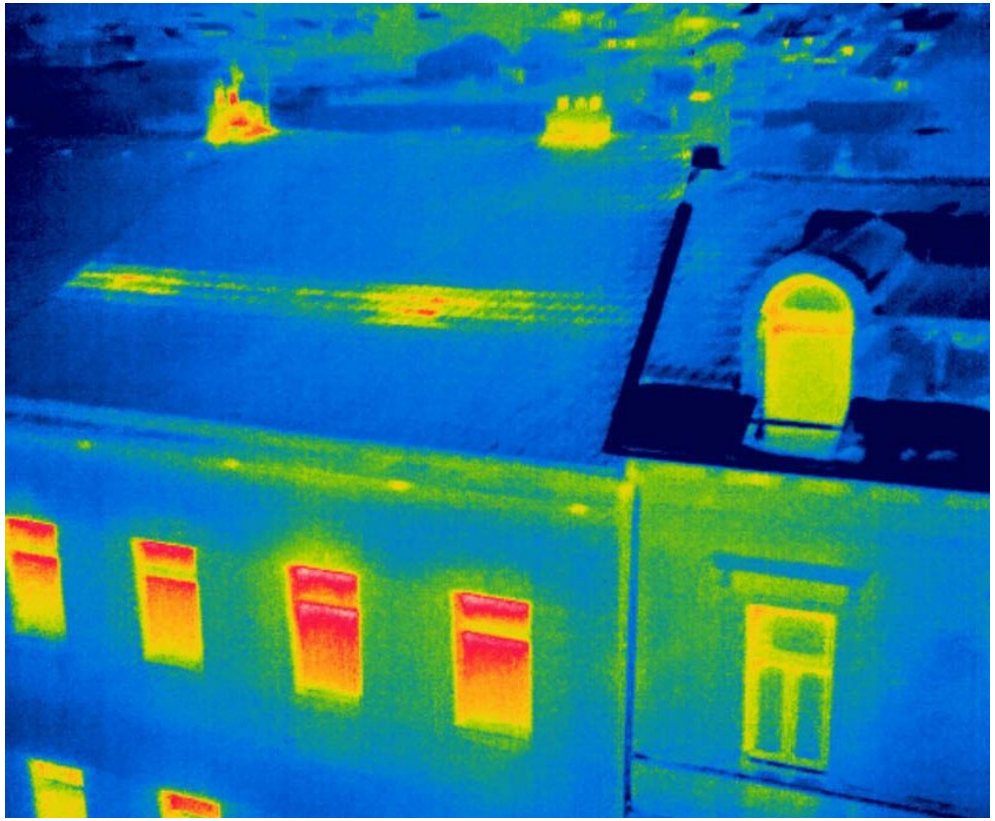
Advantages of Thermography



Non-Invasive

Thermography is a non-invasive imaging technique which allows for inspections without damaging the building structure, making it ideal for ongoing maintenance and diagnostics.

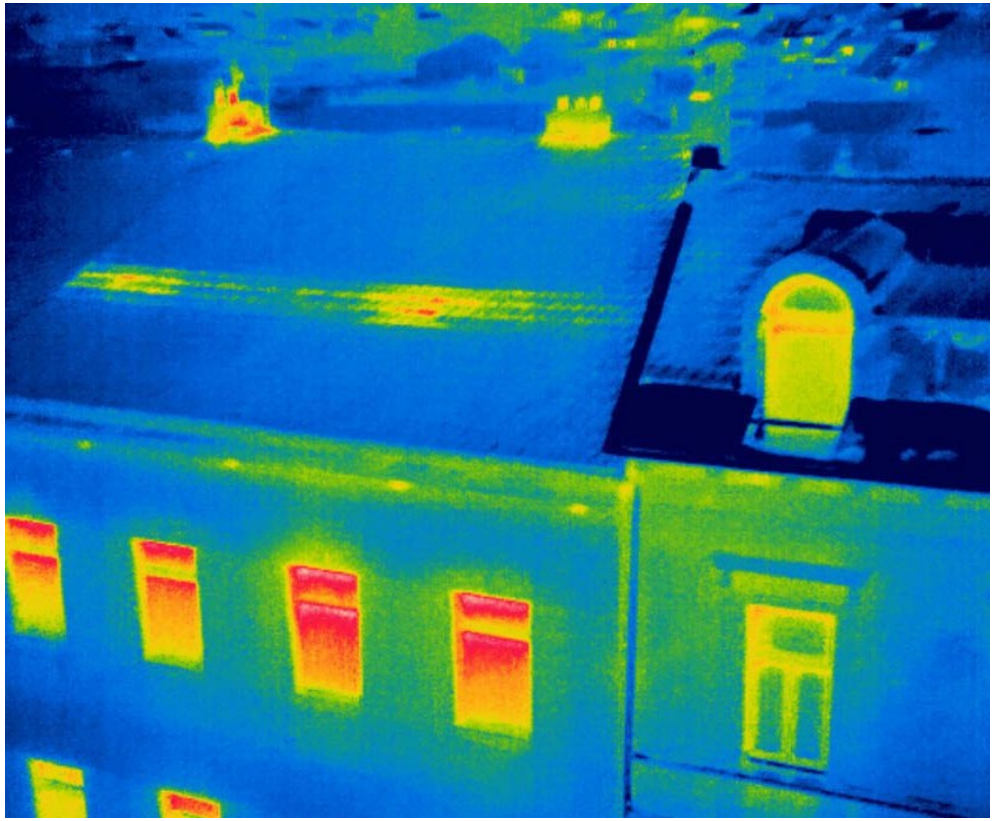
Advantages of Thermography



Cost-Effective

Thermography imaging is less expensive than other imaging techniques, making it an attractive option for a wide range of applications.

Advantages of Thermography



Accuracy

Thermography imaging is highly accurate and reliable, providing detailed information on temperature variations and heat sources that can be used for a variety of applications.