



SAFETY ASSESSMENT
FEDERATION

Guidance

In-Service Inspection Procedures

Thermographic Surveys of Electrical Systems

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SITUATION

The development of thermal cameras and their application to electrical inspections has prompted concerns over its general use for detecting electrical faults. This document offers guidance on the practicality and capability of thermographic surveys of electrical systems and, in particular, the importance of how the results are interpreted, for both engineer surveyors and clients.

GUIDANCE

What is a Thermal Camera?

This is an instrument that creates pictures of heat rather than light. It measures infrared (IR) energy and converts the data to corresponding images of temperature. Infrared thermography is an effective predictive maintenance technology that quickly, accurately and safely locates problems.



How does it detect problems?

Nearly everything that uses or transmits power gets hot before it fails. Whether viewing electrical components or carrying out mechanical inspections, thermal-imaging cameras can quickly locate hot spots, which occur prior to failure. Implementing a predictive maintenance program using thermal imaging can significantly reduce both maintenance and production costs.

Can anyone use a Thermal Camera?

It is important that the person carrying out the thermographic survey understands the principles of electrical energy as well as the principles of thermal energy. This is because thermal energy behaves in a different way to light energy and a lot of electrical equipment produces heat when in normal use. The skill is to identify heat where it is not expected and to identify patterns of heat that should not occur on healthy equipment. Formal training is a good indication of the competence of a camera operator.

1. Can Thermal Imaging replace Inspection & Testing?

Thermal imaging is NOT a replacement to periodic inspection and testing, it is a complementary service.

2. Inspection and testing provides the following:

- Identifies incorrect selection & installation
- Identifies electrical and physical defects
- Reduces electrical shock & fire risk
- Meets current HSE guidance on electrical safety



3. Thermal imaging provides:

- An indication of heat source (this may or may not indicate a potential fault)
- Reduced fire risk
- Can reduce overall maintenance by targeting specific areas
- Can prevent breakdowns, reduce downtime and prevent equipment damage.

4. What are the disadvantages?

Thermal cameras cannot “see” through metal, glass or Perspex. As such, covers will need to be removed and the system under as much load as possible to obtain the best results. This will require careful risk assessment and a suitable safe system of work to determine if the work can be carried out safely. The resulting survey requires competent interpretation to ensure that natural heat generation is not identified as a defect and prevent speculation over the reasons for heat without further evidence.

5. Summary

- It can provide an indicator of a potential defect, for further examination
- Thermographic survey of electrical systems can provide an indication of ‘hot spots’
- The results need to be properly interpreted by a competent person
- It does not replace inspection and testing of electrical installations.