

Australian Professional Thermography Association Inc.

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There's more to Thermography than meets the eye.

SCOPE OF WORK – ELECTRICAL THERMOGRAPHY

INSPECTION AND REPORTING OF EXCEPTION ITEMS

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Overview

The intention of this Scope of Work is to provide a reference for the client of a thermography service provider to better understand what is involved in carrying out an effective thermal inspection of electrical infrastructure. The purpose of a thermal inspection is to identify and document apparent temperature anomalies or exception items, including those exceeding normal operating parameters. This includes, and is not limited to, high resistance electrical connections, current overload, faulty components and/or devices that have an internal defect.

The Thermographer

The Thermographer is to be:

A licensed electrician or,

A technician accompanied by a licensed electrician or

A technician with training and experience to be competent in the removal and refitting of escutcheons on live electrical boards as well as having knowledge and understanding of the components which are inspected in both normal and abnormal conditions.

The Thermographer is to be trained and/or Certified to a minimum Category/Class/Level 1.

The Infrared Camera

To be suitable for electrical inspections the Infrared Camera:

Must be able to record thermal images.

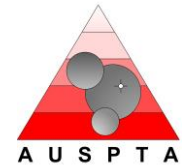
Should have a minimum 320 x 240 matrix detector. This resolution is recommended to be able to identify faults on small electrical components.

Should preferably have a temperature range of up to 250°C.

May include a built-in visual (digital) camera to record visual images corresponding to thermal images. Alternatively, a separate digital camera should be used to record visual images for the report.

The Inspection

A thorough and comprehensive Job Safety Analysis (JSA) or Safe Work Method Statement (SWMS) must be completed prior to the inspection, which would also include any specific site requirements. The inspection must follow the procedures written in the JSA/SWMS.



The Inspection - *continued*

The inspection is performed when the site is operating under normal or higher electrical loads. This ensures the best conditions for the detection of temperature anomalies (exceptions). Where possible, load shall be applied to a circuit or equipment which is not running at the time of the inspection, such as lighting in car parks during day light hours etc.

A factory's mechanical loads will change with seasonal variation such as air conditioning in summer, and heating in winter.

A residential dwelling's loads may be higher in the early morning or late afternoon/early evening, depending on the occupant's situation, or higher when air conditioning/heating and white goods are running.

Infrared energy is detected on surfaces. It is not transmitted through acrylic (clear or opaque) or metal covers. Where safe to do so, switchboard covers are to be removed from switchboards to expose internal components.

Subject to the client's actual site requirements, the Thermal Inspection should include, and not be limited to, the following items:

HV/LV Main Supply Transformers; Points of Attachment (external inspection).
Main Switchboards; Bus Bar and Cable Zones; Power Factor Correction Units.
Metering and Link Boxes; Distribution & Sub-Distribution Boards; Fuse panels.
Generator and Auto Transfer Switches (under load); Batteries and UPS panels.
Riser fuse boxes; Mechanical Services Switchboards (MSSBs); Chiller Units
HVAC Control Panels; Lift SB & Control Panels; Tee-Off Boxes
Motor Control Centres (MCCs); Variable Speed Drives (VSDs)
PLC Panels; Pump Control Panels.

The Thermal Inspection of these items should include, and not be limited to, the following components:

Incoming Supply; Main & Sub-Main Switches. Bus bars and cabling.
Isolators, Circuit Breakers, RCDs/ELCB's; Fuses and connections.
Contactors & Overloads; Relays and PLC I/O blocks.
Active, neutral, earth links and terminals.
Control Voltage Transformers.
Capacitors and shunt transformers in Power Factor Correction Units.
Various other components and circuit wiring within the panels.

All exception items are recorded with a Thermal and Visual Image. Field Notes are to include:

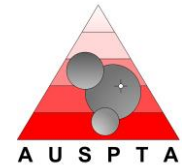
Location and name of panel.
Description of component and exception item with relevant comments.

Serious faults are to be brought to the immediate attention of the client, and a list of all exception items should be provided and/or discussed with the client at the end of the inspection or at the end of each day.

The Report

The Thermal Imaging Survey/Inspection report shall contain a covering page showing:

Site location and date of inspection.
Recipient's name and contact details; Thermographer's name and contact details.
Other details as may be applicable.



The Report - continued

The report shall have a summary table of exception items.

Each thermal image page shall contain the following:

- Name and location of panel.
- A thermal Image of the item and a digital visual image of the item.
- Component identification; A description of the condition.
- Apparent temperature indications of the item and if needed a reference temperature.
- A temperature scale for the image to give an indication of surrounding temperatures.
- Comments on repair and recommended priority level for repair.

The report shall include a statement which describes how repair priorities are determined:

Priority levels are usually based on a description or numbering system. Generally they will range from a low priority (e.g. # 5) which may be “continue to monitor” or “review at next inspection” through to urgent or the highest priority (e.g. # 1) which may require a shut down for repairs to be carried out immediately.

When establishing priorities, Thermographers shall consider the following:

The hotspot temperature; a relevant reference temperature; the ambient temperature; the electrical load at the time and the visual condition.

The report shall also include a list of all the items inspected including those which were not able to be inspected, for what ever reason. The report shall be available in both hard and soft copies.

Responsibilities

The Thermographer shall:

- Perform the inspection, in accordance with safety requirements, at a time when environmental and physical conditions favour the gathering of accurate data.
- Have sufficient knowledge of the equipment to interpret the infrared images in both normal and abnormal conditions or be accompanied by a person with such technical and relevant safety knowledge.

The Client shall:

- Provide or assist in the development of a list of all equipment to be inspected.
- Provide authorization and access to the equipment to be inspected.
- Provide all necessary inductions and site safety information.
- Provide where possible, the equipment operating at higher load for sufficient time to ensure optimum stable conditions for inspection.

Disclaimer: This document is presented as a guide. While AUSPTA has attempted to be thorough and comprehensive, it is based on generic content and format. It is recommended that the client and the thermography services provider give due consideration to any additional requirements to meet specific site needs.

For further information please contact the Australian Professional Thermography Association by email: admin@auspta.asn.au