



## Thermographic Inspection Service Scope

The scope of work for our Thermographic Inspections are limited to the use of the Thermal Imaging Camera to perform a non-invasive and non-destructive examination of the following types of equipment and machinery:

- Electrical utility substations, transformers and feeder poles
- Main electrical incoming services, transformers, capacitor banks, etc.
- Plant and machinery: gears, drives, and belts.
- Furnaces: find hot spots caused by refractory failure.
- Kilns and driers: find loss through refractories and insulation.
- Motor-control Centers.
- Motor and generator connections, windings, feeders and exciters.

A Thermographic Inspection is an important part of any facility's predictive maintenance program and should be carried out at least once every 3 years or more regularly in the case of energy intensive operations.

## Thermographic Inspection Service

As recommended in NFPA 70B's suggestions for creating an effective facility electrical preventative maintenance safety program, our Thermographic Inspection service plays a key part in helping to reduce accidents, save lives, and minimize costly break downs and unplanned shutdowns of your production equipment.

Our engineering team takes into account the measured heat signatures and operating temperature ranges of your equipment to provide you dialed in recommendations to mitigate any potential issues in your machinery that may otherwise have created unexpected downtime and/or lost productivity for your company in the future.

### What is a Thermographic Inspection?

A Thermographic inspection makes use of specially designed infrared cameras to generate images that show surface heat variations. This technology has a number of applications.

### How we perform our Thermographic Inspection at your facility

#### In the field:

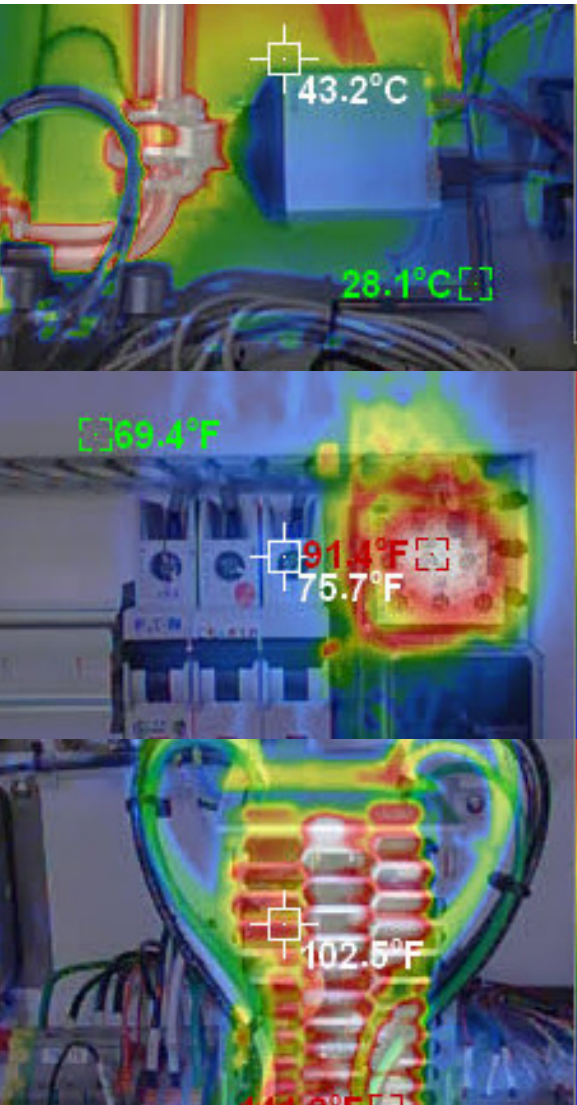
- Determine which pieces of equipment and panels need inspection.
- Create an inventory list of the identified equipment and panels needing inspection.
- Find the temperature limits of the equipment and panels per manufacturer's specs.
- Perform thermographic inspections of the equipment and panels using an IR camera.

#### Out of the field:

- Assign inspection frequencies to each piece of inspected equipment and panel.
- Root cause failure analysis judgements for equipment and panels operating above temperature limits.
- Provide final report and list of potential mitigations per equipment and panel.

### Thermographic Inspection service deliverables include:

- 1) A detailed inspection report including the following:
  - A written narrative of the survey.
  - Report form for every anomaly detected during the inspection.
  - Hard copy and electronic version of the entire report
- 2) A report sheet accompanies each problem which includes:
  - Digital visible light photograph, color thermogram or black/white thermogram images.
  - Complete temperature analysis of the anomaly utilizing ambient temperature or conductor temperature for comparison.
  - Infrared data.



## Thermographic Inspection Scheduling and Next Steps

1. Reach out to our sales team via customersupport@lewisbass.com or call us at 1-(408)-942-8000.
2. Send us your one line diagram so we can identify the equipment needing an assessment.
3. Meet with a LBIES Project Manager to review the list.
4. We will schedule a time for our field engineer to go onsite and perform the requested service.

## Frequently Asked Questions

### How much does a Thermographic Inspection Cost?

The price of a thermographic inspection varies depending on location, access, time spent, and volume of images taken.

Our engineering team can comfortably survey 50 pieces of equipment in a day with guaranteed access and an electrician on site to safely open and close the equipment.

As a guide, 1.0 hour in the field requires approximately 2.0 hours for post-image processing, thermal tuning, image interpretation, analysis, and report generation.

### How often should I have a Thermographic Inspection done?

ANSI/NETA MTS suggests specific inspection intervals based on equipment type and condition. Many insurance companies require Thermographic Inspections be performed as part of their requirements for clients to qualify for and maintain their insurance coverage. They do this to mitigate their losses and their requirement may specify an exact re-inspection interval which can range anywhere from between one to three years.

However, there are cases when more frequent inspections may be required. Higher voltages, and more critical equipment may require an inspection three to six months. Also facilities with substantially different summer and winter loads should consider a survey twice per year.

### Why should I have a Thermographic Inspection Performed?

Thermographic Inspections can help identify poor connections, overloaded circuits, failing components, or imbalanced loads. Any faults on electrical systems are expensive in terms of plant downtime, damage, loss of production or risk from fire. Annual thermographic inspections of your electrical switchboards will help protect your business operations from potential fire and costly damages.

Just some of the reasons you should have a thermal imaging inspection include:

- Maximize tool utilization by preventing downtime.
- Maximize asset utilization by increasing reliability and uptime.
- Reduced liability.
- Reduced utility costs by increasing energy efficiency.
- Reduced cost of maintenance programs.
- Lower repair costs.

### What is predictive maintenance and how does a Thermographic Inspection play a role in it?

According to Wikipedia, "Predictive maintenance techniques are designed to help determine the condition of in-service equipment in order to estimate when maintenance should be performed. This approach promises cost savings over routine or time-based preventive maintenance, because tasks are performed only when warranted."

Thermographic Inspections are considered to be one of key tools in an effective preventative maintenance program due to their non-destructive means of providing accurate, valuable data in both low and high-voltage situations.