
Electrical Panel Infrared Thermography Inspection Checklist

1.0 Objective & Intent

The objective of this Standard Operating Procedure (SOP) is to establish a safe, repeatable, and compliant method for conducting infrared thermography inspections on energized electrical panels within the cabinet and millwork manufacturing facility. This procedure is designed to identify hot spots, loose connections, and overloaded circuits that could lead to equipment failure, fire, or arc flash events, thereby preventing injuries and unplanned downtime.

This SOP aligns with WorkSafeBC regulations (OHS Regulation Part 19 – Electrical Safety) and CSA Z462 – Workplace Electrical Safety standards. The primary risk mitigated is the arc flash hazard, which can cause severe burns, blast injuries, and fatalities. By following this procedure, the company ensures that only qualified personnel perform inspections using appropriate PPE and safe work practices.

2.0 Operational Scope

This procedure applies to all maintenance electricians, reliability engineers, and authorized thermographers who perform infrared inspections on electrical panels rated 600V and below. It covers all main distribution panels, motor control centers (MCCs), lighting panels, and sub-panels located in the production areas, warehouse, and maintenance shops.

Personnel performing this task must hold a valid BC Electrical Contractor License or equivalent certification, have completed arc flash training, and be authorized in writing by the Plant Safety Officer. This SOP does not apply to high-voltage equipment (above 600V) or to panels that have been de-energized and locked out.

3.0 Hazard Identification & Mandatory PPE

- Arc Flash: Exposure to explosive energy release from electrical faults. Risk of third-degree burns, blindness, and blast trauma.
- Shock Hazard: Contact with energized conductors can cause electrocution or cardiac arrest.
- Hot Surfaces: Components may exceed 60°C, causing contact burns.
- Trip Hazards: Cables, tools, and equipment on the floor around panels.
- Arc Flash Rated Clothing: Minimum 8 cal/cm² arc-rated shirt and pants (CAT 2) or full arc flash suit if incident energy exceeds 8 cal/cm².
- Arc Flash Face Shield: With hard hat rated for arc flash (e.g., 40 cal/cm² face shield).
- Safety Glasses: CSA Z94.3 approved, worn under face shield.
- Voltage Rated Gloves: Class 00 (1000V) or higher, with leather protectors, inspected and tested within last 6 months.
- CSA-Approved Steel Toed Boots: With electrical hazard (EH) rating.
- Hearing Protection: Earplugs or earmuffs rated for impulse noise (arc flash).
- Flame Resistant (FR) Balaclava or Hood: If required by arc flash boundary calculation.

4.0 Required Safety Equipment & Tools

- Infrared Thermal Imaging Camera: Minimum 320x240 resolution, with temperature range up to 350°C, and emissivity

adjustment.

- Lockout/Tagout (LOTO) Kit: With personal padlock, hasp, and danger tags (for panels that must be opened for inspection).
- Non-Contact Voltage Tester: To verify absence of voltage before opening covers.
- Insulated Hand Tools: Screwdrivers, nut drivers, and wrenches rated for 1000V.
- Arc Flash Boundary Barrier Tape: To cordon off the work area.
- Incident Energy Analysis Labels: Affixed to each panel, showing arc flash boundary and PPE requirements.
- Emergency Stop Button / Shutdown Procedure: Posted near the panel.
- First Aid Kit: Including burn dressings and eye wash station nearby.
- Communication Device: Two-way radio or phone to call for help if needed.

5.0 Step-by-Step Safety Procedure

1. Obtain a valid Safe Work Permit from the Plant Safety Officer or Shift Supervisor. Review the permit for specific hazards, required PPE, and emergency contact numbers.
2. Identify the electrical panel to be inspected and verify its incident energy analysis label. Note the arc flash boundary distance and required PPE category. If label is missing or illegible, do not proceed; contact the electrical safety coordinator.
3. Cordon off the area with arc flash boundary tape at the calculated distance (typically 1.5m for 480V panels). Ensure no unauthorized personnel enter the zone. Post a warning sign: 'DANGER – ARC FLASH HAZARD – AUTHORIZED PERSONNEL ONLY'.
4. Don all required arc flash PPE as specified by the incident energy analysis. Perform a buddy check to ensure the face shield is properly positioned, gloves are not damaged, and all zippers and closures are secure.
5. Using a non-contact voltage tester, verify that the panel cover is not energized. If the tester indicates voltage, stop immediately and report to the Plant Safety Officer. Do not proceed until the source of stray voltage is identified and resolved.
6. With insulated tools, carefully remove the panel cover screws. Place the cover on a non-conductive surface away from the work area. Do not set the cover on the floor where it can be stepped on or create a trip hazard.
7. Stand outside the arc flash boundary (or behind a barrier) and use the infrared camera to scan all bus bars, breakers, fuses, and connections. Record thermal images and note any temperature differentials greater than 10°C between similar components. Do not touch any energized parts.
8. If a hot spot is detected (temperature > 60°C or delta > 10°C), do not attempt to tighten or repair the connection while energized. Mark the panel with a 'DO NOT OPERATE' tag and report the finding to the Plant Safety Officer for a planned shutdown and corrective maintenance.
9. After completing the scan, replace the panel cover using insulated tools. Ensure all screws are tightened to the manufacturer's torque specification. Verify that the cover is properly seated and no gaps exist.
10. Remove the arc flash boundary tape and warning signs. Complete the inspection checklist and submit the thermal images and report to the Plant Safety Officer within 24 hours. Sign off the Safe Work Permit and return it to the issuing authority.

Regulatory Disclaimer: This document is a generic safety template provided for educational and informational purposes only. It does not constitute professional engineering, legal, or regulatory compliance advice. The end-user assumes all liability for validating all safety protocols against specific machinery manufacturer manuals and local occupational health and safety regulations (e.g., WorkSafeBC, CSA standards) before deployment.