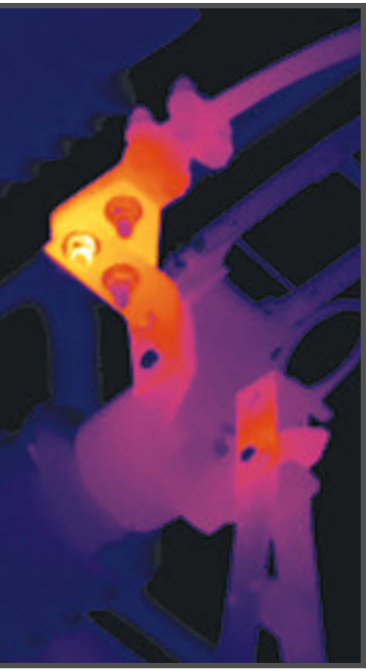
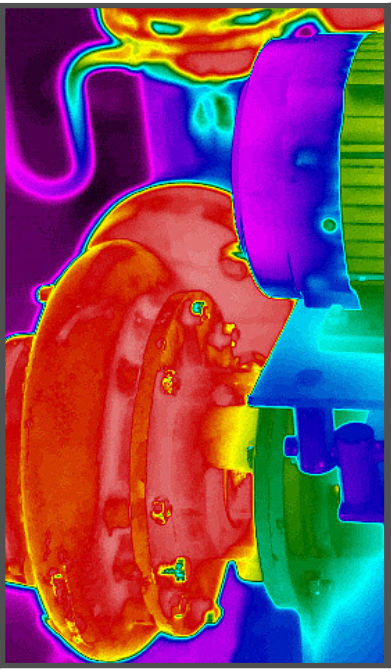
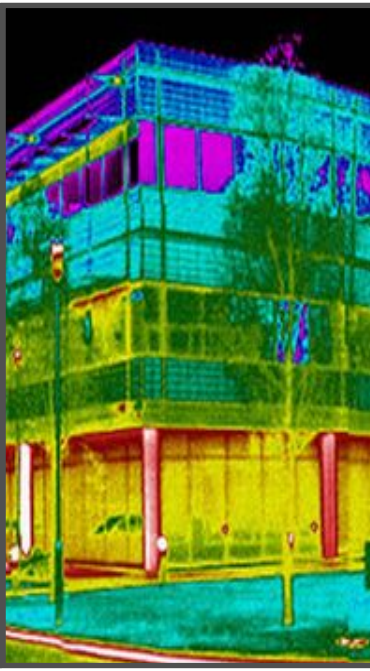
World class
PREDICTIVE MAINTENANCE

IRTC
predictive maintenance

Infrared and Ultrasound







ELECTRICAL EQUIPMENT

MECHANICAL EQUIPMENT

BUILDING SURVEYS

Infrared and Ultrasound

APPLICATIONS

Welcome

IRTC Infrared Thermal Consultancy prides themselves in offering a World Class predictive Infrared and Ultrasound service utilizing modern equipment to ensure the best possible techniques used in the industry. Thermography and Ultrasound is ideal for carrying out Electrical, Mechanical and Building surveys, We all understand the consequences of electrical and mechanical system failure, and the costs implications.

Check list

- Rotating machinery
- Motors
- Generators
- Pumps
- A/C units
- Fans
- Gearboxes
- Chillers
- Motor controls
- Lighting systems
- Electrical system
- Switchgear
- Transformers
- Cables/wiring
- Switches
- Circuit breakers
- Metering
- Grounding systems
- Surge arrestors
- Filters and reactors
- Outdoor bus structures
- Emergency systems
- UPS
- Generators
- Transfer Switch

Inspection Guidelines

Deteriorated Connections

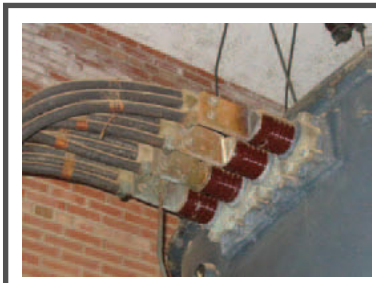
- What to look for: Compare temperatures of connections and switch contacts, look for abnormally hot or cool connections.
- What the image shows: Abnormal heating at the point of the connection or switch contact. (Abnormally cool would mean complete device failure).
- Recommendations: A delta T between similar components under similar loading exceeding 15°C requires immediate repair. Use a clamp meter or power quality analyser to investigate. Look for corroded or loose connections.

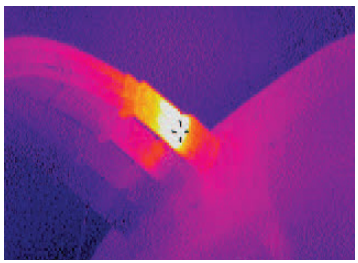
Three-phase Unbalance and Overloads

- What to look for: Compare temperatures between phases on high-load connections; An abnormally hot phase can indicate unbalance or overload.
- What the image shows: Abnormal heating along the entire circuit or phase run (not just at the connection). An imbalance heats both the line and load sides of the phase.
- Recommendations: Use a clamp meter or power quality analyser to measure load. Look for a power delivery problem, low voltage on one leg, bad connections, insulation resistance breakdown, or harmonics.

Substations

- What to look for: Examine transformers and compare similar connections under similar loads, looking for hot or cool anomalies. Heat can be caused by harmonics, connection degradation, unbalance, or overload.
- What this image shows: Hot secondary connections on transformer.
- Recommendations: Conduct an electrical inspection to determine cause..





Predictive Condition Surveys

What the human eye can't see

Check list

- Concrete integrity inspections
- Flat roof leak detection for buildings, plants, facilities
- Power generation generator inspections.
- Substation Electrical inspections, transformers and capacitor evaluation
- Overhead urban and rural distribution electrical inspections
- Electrical motor inspections, mechanical bearing inspections
- Heat ventilation air conditioning equipment evaluation
- Cold Storage cooling losses.
- Refinery process line insulation loss or leak detection
- Refinery process evaluation
- Furnace refractory (insulation) inspections
- Pipeline inspection, leak detection, stress corrosion cracking areas

Bearing and shaft

- What to look for: Compare bearing and housing temperature against baseline images or other known acceptable thermal values. Compare end bell to end bell or stator to end bell temperatures.
- What the image shows: Warm bearing with heat transferring to coupling.
- Recommendations: Conduct a vibration analysis, measure lubrication, check windings, check electrical load balance.

Casing

- What to look for: Use the exterior thermal gradient as an indicator of the internal temperature. Other components should not be as hot as the motor housing. Each 10°C rise above its rated temperature cuts a motor's life in half.
- What the image shows: An abnormal thermal pattern, probably due to airflow/ obstructed cooling or misalignment.
- Recommendations: Check nameplate for normal operating temperature. Use other test tools to check for inadequate airflow, impending bearing failure, shaft coupling problems, and insulation degradation in the rotor or stator.

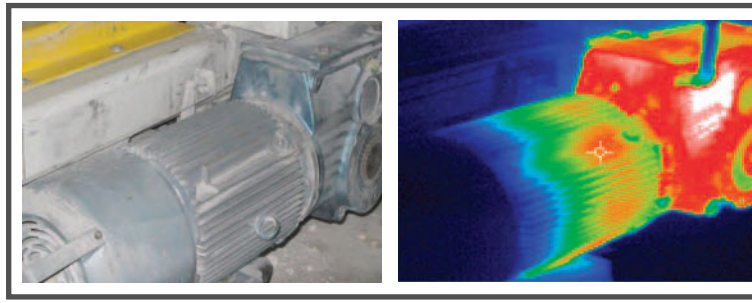
Gearbox

- What to look for: A properly functioning gearbox runs temperatures slightly above ambient, about the same as the motor housing case. Low lubricant or gear problems often show as hot spots.
- What the image shows: Motor (right) is uniformly cool, while gearbox (left) has a hot (white) anomaly at bottom right.
- Recommendations: Investigate mechanics (lubrication, gears) immediately.

Pipes

- What to look for: Check all transmission lines, including underground, for temperature anomalies indicating leaks and condensation in the bottom of the pipes.
- What the image shows: Yellow areas indicate abnormal hot spots, possibly related to a breakdown of the insulation. The cold blue band is probably a buildup of product on the inside.
- Recommendations: Further inspection and repair.

ELECTRICAL FAILURE



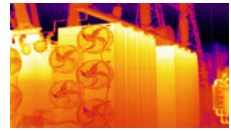
It takes more than one to save the World

Thermography & Ultrasound

Leaving a green foot print behind

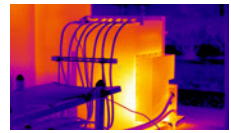
Valves and traps

- What to look for: While system is operating, compare inlet/outlet temperatures and check for condensation at the bottom of the trap. If inlet/outlet are same, trap has failed open; equally low inlet/outlet temp means trap failed closed.
- What the image shows: Trap failed open, plus condensation.
- Recommendations: Follow up with visual inspection and ultrasound check. look for closed valves or pipe blockage.



Tanks and vessels

- What to look for: Check liquid and gas levels within tanks, look for settling or differentiation between air and solid material, and check for blocking at tubes.
- What the image shows: Liquid level and settling.
- Recommendations: Depends on tank contents and cleaning schedule.

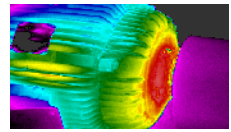


Chimney

- What to look for: Industrial chimneys accumulate materials on the inside lining that can appear as a cool region, if the material causes an insulating effect, or as a hot spot. Hot spots can also indicate cracks/gas leaks and developing failures in the refractory insulation.
- What this image shows: Minor cool anomalies, indicating possible buildup.
- Recommendations: Monitor over time, consider investigating with secondary method

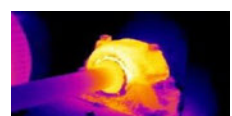
Roof

- What to look for: Anomalies indicating moisture. Check outside walls and roof after a hot day. Ensure roof is properly sealed.
- What the image shows: Clear moisture differentiation at rubber roof seams.
- Recommendations: Use a moisture meter and/or a core sample to verify the thermal indication.



Moisture and insulation leakage

- What to look for: Check ceilings and walls for cool and hot thermal anomalies. Moisture can be hot, if conducting, and cool, if evaporating. Air leakage can be into (cool) or out of (hot) a building.
- What the image shows: Moisture in a drop ceiling.
- Recommendations: Follow up with core samples and a moisture meter. check for for leaks, water pipe breaks, fire-sprinkler discharges, uneven insulation, and damaged seals.



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