THERMOVIEW

Thermography & Infrared Services

Benefits For the Wine Industry

- *Thermography is a non-contact, non-destructive test method that utilizes a thermal imager to detect, display and record thermal patterns and temperatures across the surface of an object.*

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Thermography and relevance to your industry

Electrical power consumption in the winemaking process can be roughly broken into the following end uses:

- 40–60% **refrigeration**
- 10–35% **pumps, fans and drives**
- 8–20% lighting
- 3–10% **compressed air**
- 3–15% other (including **de-steamers, presses, rotary drum vacuum,** high pressure cleaners, battery operated forklifts, **package heating and cooling units**)
- 8–30% **packaging and bottling (including pumps, compressed air, machinery such as fillers, conveyors, labellers, packers and glue melters**)

"A guide to energy efficiency innovation in Australian wineries
Energy efficiency best practice – Aust Government "

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- Electrical – Mechanical – Building Performance - Energy

- What should your Thermography Survey include ?
- *More than just images -*
- An accepted code or standard methodology
- The Thermographers Qualification – Industry and method.
- Thermographic Equipment's Requirements - Calibration
- Inspection Procedures for effective reliable results.
- Classification of Results
- Contents of the Report

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- Not Best Practice But Next Practice

  Thermal Imaging is
  - Predictive Maintenance
  - Problem Identification
  - Risk Identification
  - Safety Enhancement

- Independent Risk Assesment
- PAS55 Asset Management.

Advantages and Benefits

Quick problem detection without interrupting service

Prevention of premature failure and extension of equipment life

Identification of potentially dangerous or hazardous equipment

Cost Benefit

Hartford Steam Boiler Inspections and Insurance Company completed a ten year study evaluating the cost/benefits of infrared, in which it was determined a proper infrared predictive maintenance program produces hard cost savings of $4:1.

Electrical Systems :

General inspection areas are:

- **Electrical inspections in buildings, plants, facilities, refineries.**
- **Overhead urban and rural distribution electrical inspections**
- **Substation Electrical inspections, transformers and capacitor evaluation**
- **Power generation generator inspections.**
- **Circuit board, Distribution board and Main Switchboard inspections**
- **Power distribution units**

60-70% of fire claims can be linked to electrical issues.

Mechanical Systems:

Predictive maintenance – Business Continuity

- **Electrical motor inspections, mechanical bearing inspections**
- **Power Plant boiler flue gas leak detection**
- **Refinery process line insulation loss or leak detection**
- **Refinery process evaluation**
- **Heat exchanger quality and efficiency evaluation**
- **Furnace refractory (insulation) inspections**
- **Furnace Internal flame evaluation and tube inspections**
- **Flame propagation explosion analysis.**

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Buildings and Processing Equipment:

Mandatory Energy Disclosure – Indemnity Claims

- **Thermal heat loss inspections for buildings, plants, facilities, refineries.**
- **Moisture contamination evaluations in buildings, condo's, plant facilities**
- **Tank Levels and contamination**
- **Concrete Water Heated floor inspections for leaks and temperature distribution**
- **Flat roof leak detection for buildings, plants, facilities**
- **Cold Storage cooling losses.**
- **Heat ventilation air conditioning equipment evaluation**

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ELECTRICAL SYSTEMS

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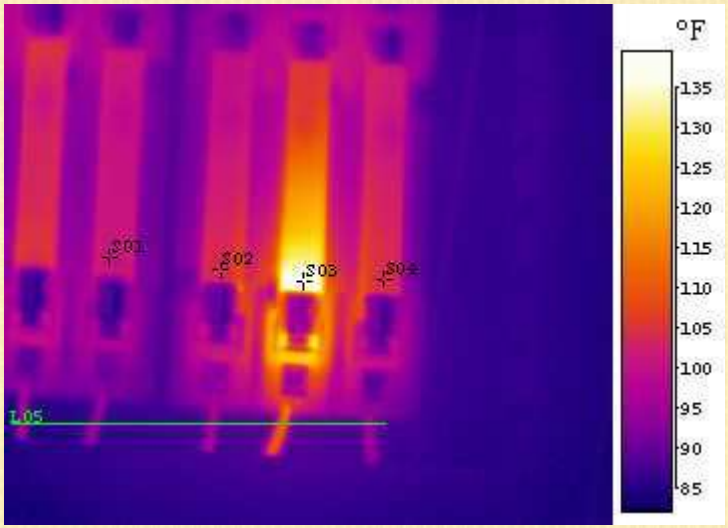
HOT FUSE CLIP

Visible Light Image

Infrared Thermal Image



This B phase fuse clip appears to be loose or corroded. These spring clips start to soften and lose their tension at 200°. The connection then becomes loose and allows dirt to enter and then the corrosion starts.
Corrosion builds resistance and resistance builds heat.

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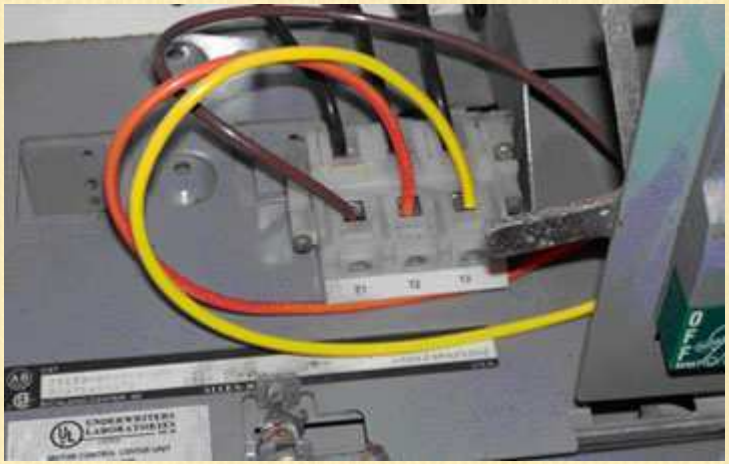
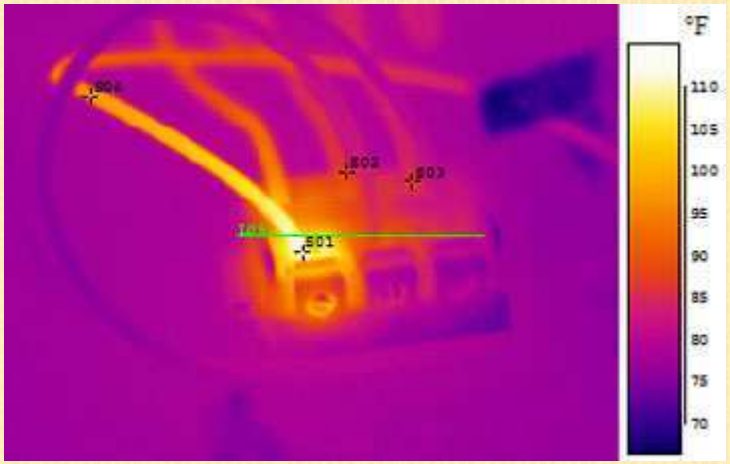
WIRE CONNECTION

Visible Light Image



Infrared Thermal Image

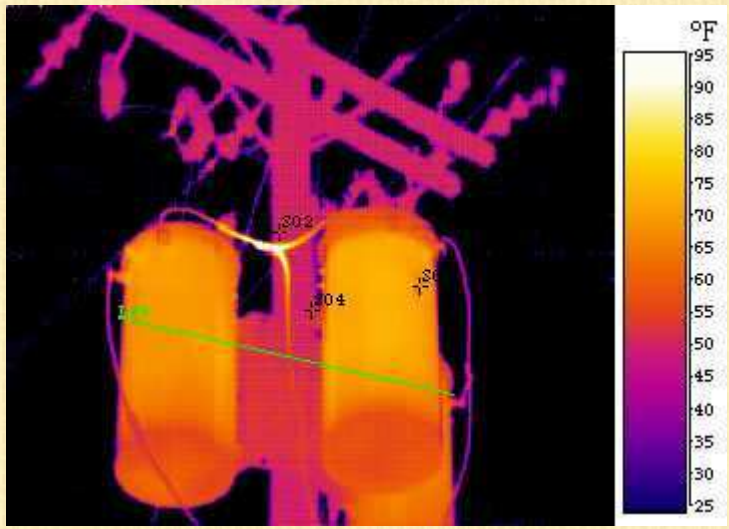


Here we see that even the smaller wire connections can cause potential problems.
This control wire connection is loose and if it fails ,the machine that it controls is shut down.

SWITCHING AND FUSES ABOVE TRANSFORMERS

Visible Light Image

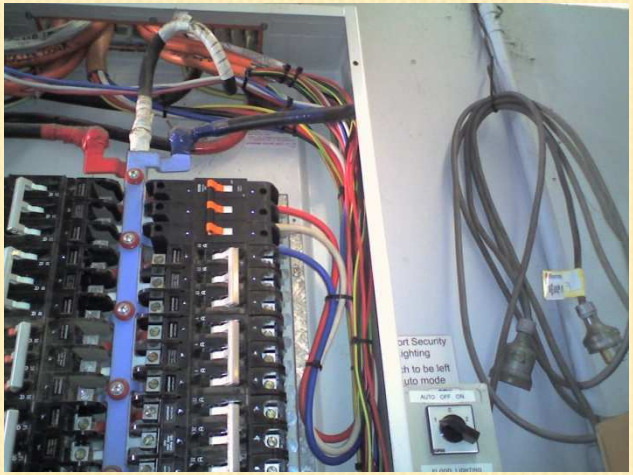
Infrared Thermal Image



These crimped connections between these transformers appear to be loose. They should be checked. A failure here would shut down the entire system.

OVERLOADED CIRCUITS

Visible Light Image

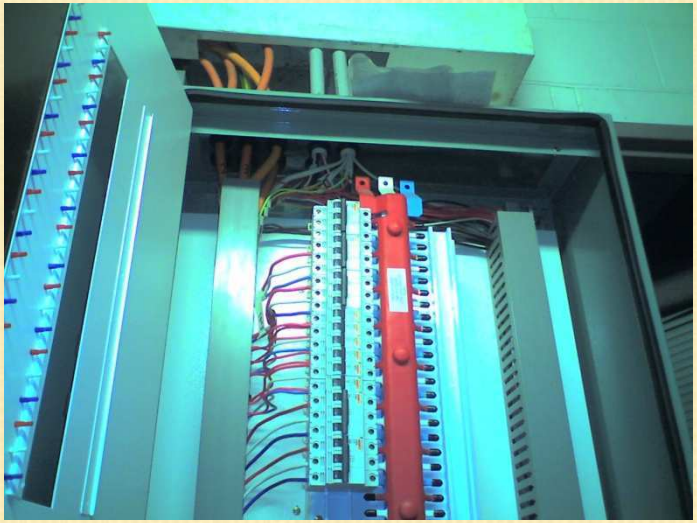


Infrared Thermal Image

Circuits show overloading of current

OVERLOADED CIRCUITS

Visible Light Image



Infrared Thermal Image

Circuits show overloading of current

MECHANICAL SYSTEMS

Thermoview a broker of NDT Capabilities

Linked to

Vibration analysis.

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ELECTRIC MOTORS

Visible Light Image

Infrared Thermal Image

Notice the hest in the inboard bearing. Normally the bearings should be cooler than the jacket of the motor. The centre of the motor is where the very slight tolerances are from the rotor bars and the stator turning. It should be hotter in the middle of the motor and not on the ends. This bearing is most likely in the first or early second stage of failure. The grease will break down and start leaking out and the bearing will eventually fail.

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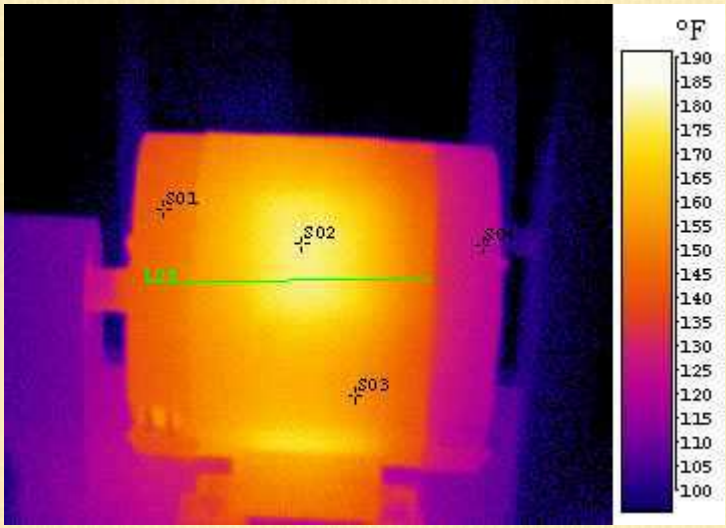
MOTORS – maintenance and performance

Visible Light Image

Infrared Thermal Image



This motor is running too hot. Most motors are rated at 40C (104°F) over ambient for a maximum heat rise. Once a motor reaches that maximum for any length of time, the life expectancy of the motor is cut in half. For every 10° above that maximum heat rise, the life expectancy is cut in half again. Heat could take a 20 year motor and turn it into a 5 year motor pretty fast. This motor is probably overloaded or over greased.

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BUILDING AND PROCESSING SYSTEMS

Retrofit – New Construction – Tune Up – Commissioning

Government funded study of facade of CBD building

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Building Applications

Building Performance

- Windows – Glazing – poor seals – facade performance
- Insulation –
- Walls and Frames – Thermal Bridging
- HVAC
- Cold Room
- Plumbing – leaks blockages
- Insulation lagging
- Moisture
- Electrical
- Mechanical

Energy rating

Rating against international standards.

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FLAT ROOF LEAK DETECTION

Visible Light Image

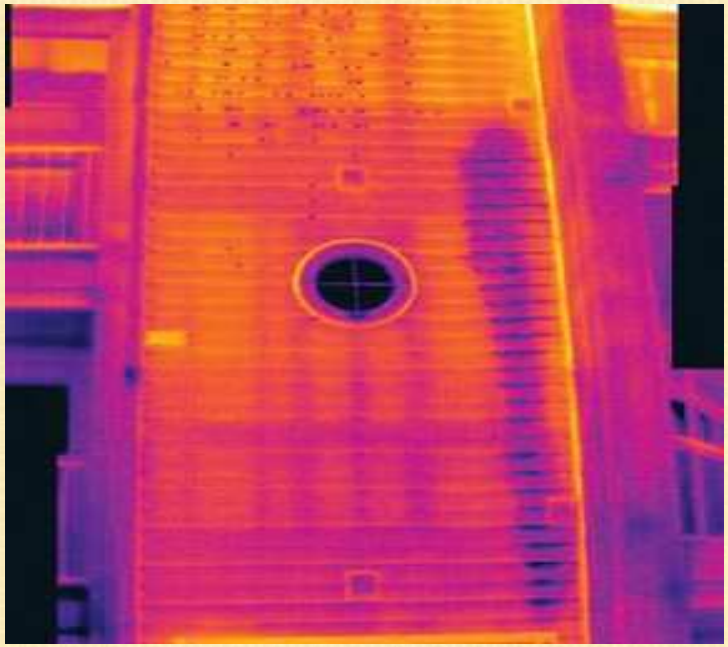
Infrared Thermal Image

Interior infrared survey conducted during daytime hours reveals central area saturated with moisture and in need of immediate repair.

MOISTURE CONTAMINATION

Visible Light Image

Infrared Thermal Image



The thermogram of this vinyl-sided 3-floor apartment house clearly shows the path of a serious leak from a washing machine on the third floor, which is completely hidden within the wall.

PARTIALLY BLOCKED DRAIN PIPES

Visible Light Image

Infrared Thermal Image

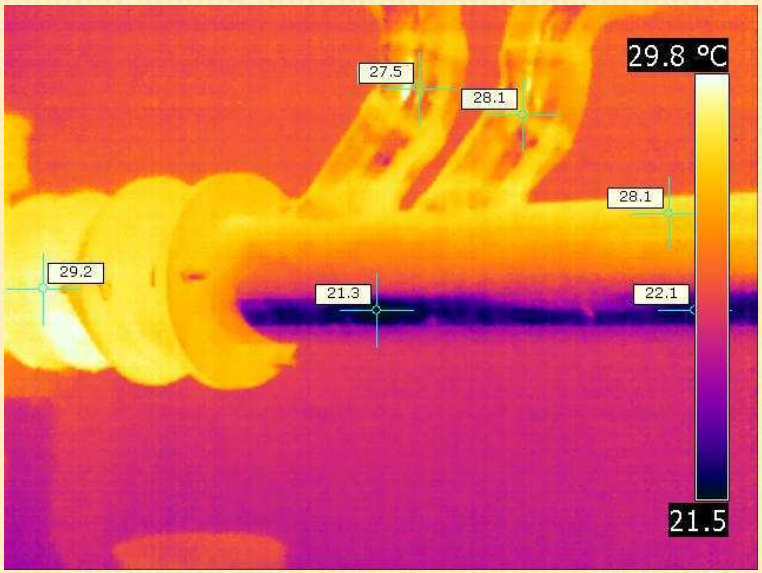
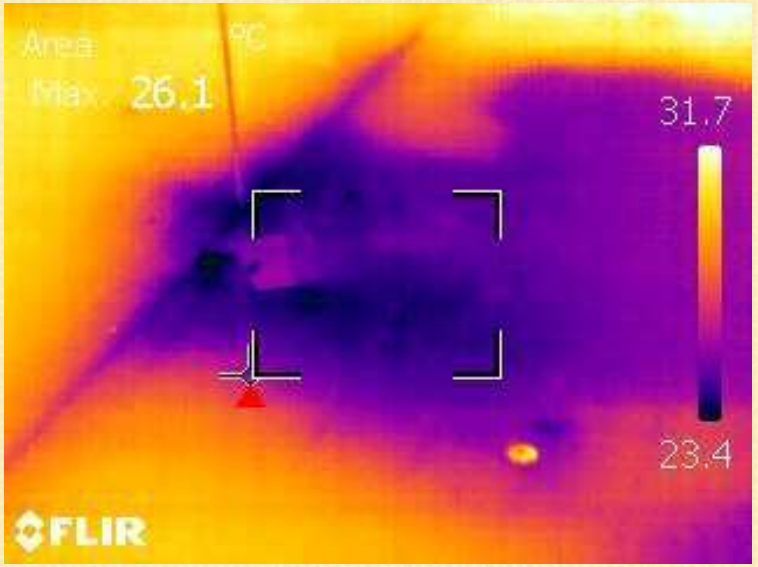


Image shows pipes becoming blocked. Further build up has likelihood of a serious blockage and consequent damage.

WATER LEAKS

Visible Light Image

Infrared Thermal Image



Water logged cool room insulation.

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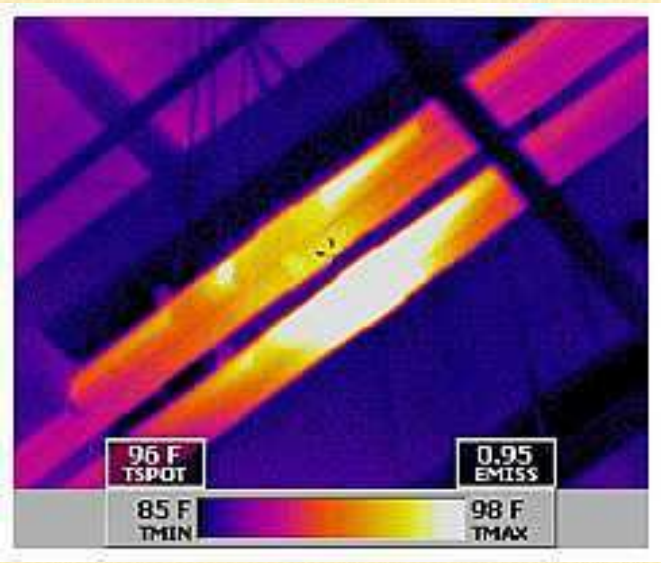
STRUCTURAL STEEL

Visible Light Image

Infrared Thermal Image

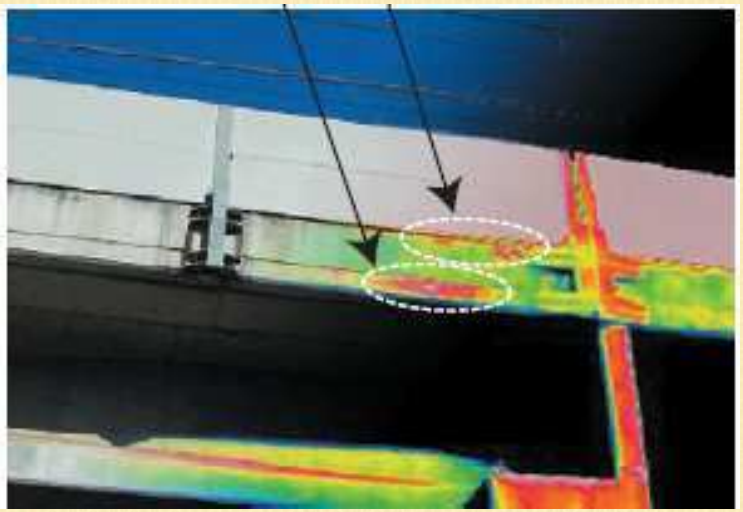


This is usually where the bars are joined in a bolted splice. Over time the expansion and contraction from heating and cooling along with vibration from the plants daily routines, will cause the bolts to become loose. There is no way to see this without Infrared Thermal Imaging. This was done from the floor, without climbing up and opening the boxes.

CONCRETE DETERIORATION

Visible Light Image

Infrared Thermal Image



Note the de-bonded concrete layer on viaduct parapet wall. The thermographic image has made it possible to efficiently and accurately detect the precise development of loosening or cracking concrete that can lead to concrete exfoliation in future. The safeguarding of third parties against potential disasters is dramatically improved through thermal imaging.

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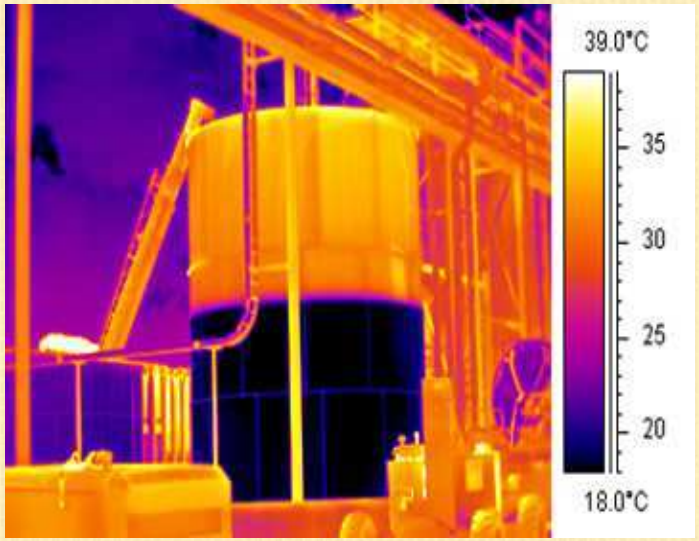
PROCESSING

Visible Light Image

Infrared Thermal Image



Here we used Infrared Thermal Imaging to see the level of liquid in the tank. The vapour space above the liquid is warmer than the liquid and thus we see the temperature differential. The liquid will have a higher thermal capacitance (ability to store energy) than the vapour space, and that is why we can see the difference.

Risk and Maintenance

Experts have recognized the benefits of infrared scanning in fire loss prevention. Section 18-16.5 of the

NFPA (National Fire Protection Association)

"Recommended Practice for Electrical Equipment Maintenance" states: "Routine infrared inspections of electrical systems should be performed annually. Where warranted by loss experience; installation of new equipment; environmental; operational; or load change condition, more frequent infrared inspections, e.g., quarterly or semi-annually, should be performed."

Thermoview – Unique Reporting

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Overview of Reporting system.

Routes of locations and equipment are bar coded
for the automatic retrieval of each asset's past inspection history.

Reports – Options that can be generated by Thermoview

- Historical Test Status Matrix for every survey completed.
- Infrared Documentation pages – Issues to be addressed by priority.
- Before vs. After repair function if required.
- Problem Trending
- Prioritized List of Problems
- Cost Benefit Analysis –
- Inventory Test Status
- Problem Status/Aging and trends.
- Visual Problems -
- Equipment Baseline Trending

Saving you time in analysis and asset review.

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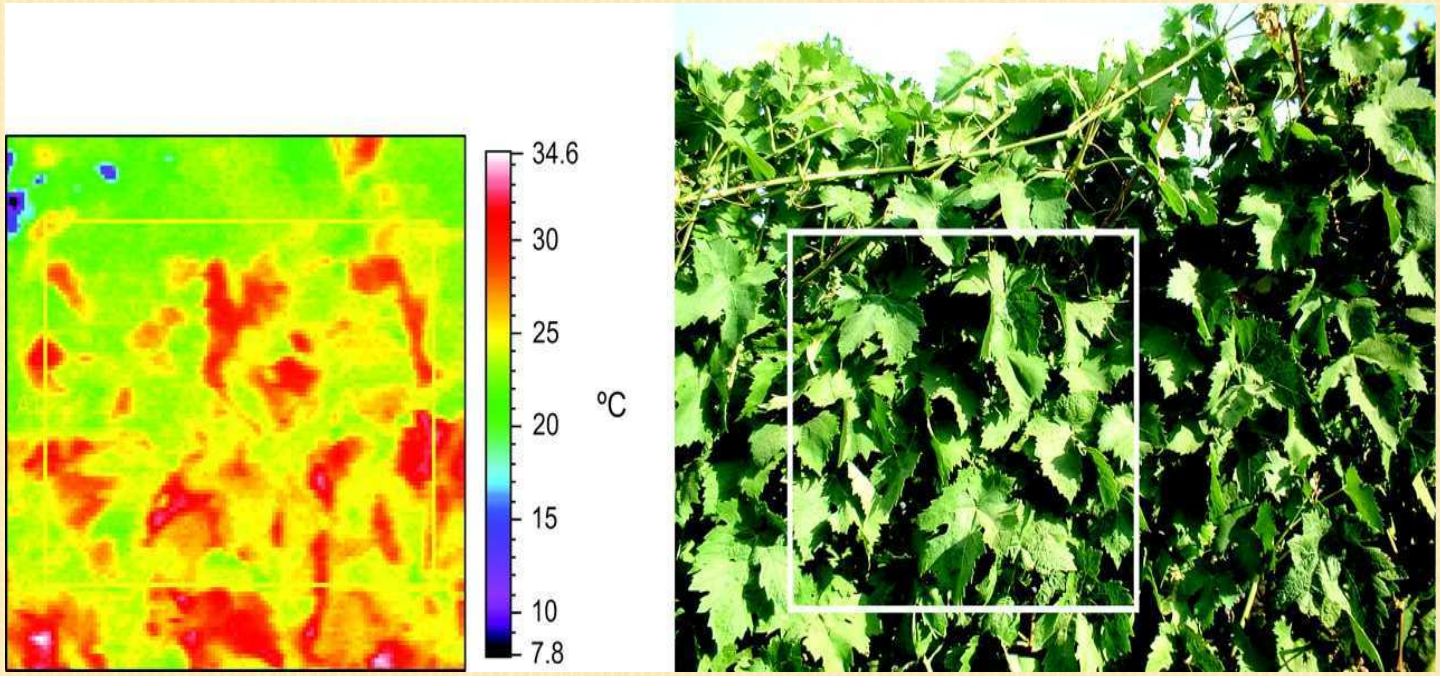
Infrared – Irrigation guide and plant assessment

Waite Institute have developed methodology – Siigfredo Fuentes



JOURNAL OF
Experimental Botany

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Refrigeration – Maintenance – Energy Studies

In alliance with **Food Chain Intelligence**
Air Leakage in cold stores, trucks, containers and refrigerated equipment.
Degradation of insulation in panels.
Poor door seal performance.
Electrical switchboard review.
Electric Motor heating.
Moisture build up.
Roof leakage
Thermal bridging.
Insurance – risk management validation.
Cost Benefit Analysis

THERMOVIEW

- Established since 1989 -National operations based in Adelaide
- Servicing blue chip clients in Property, Mining, Manufacturing , Government
- Independent Thermography Auditors
- Highly qualified and experienced staff
- Adhere to industry best practices and standards
- State of the art Flir cameras, equipment and technology
- Strong alliances and strategic partners
  Parsons Brickenhoff, Cundall, Green Ochre, CBC and overseas groups.
- Member of Aust Institute of Non Destructive Testing

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Summary benefits for Wine Industry

- Confirm integrity of electrical, mechanical and safety factors
- Provide Independent Audit Service to assist insurer's risk assessment
- Condition monitoring
  - Machinery breakdown prevention
  - Business Interruption minimization
  - Identifying hidden hotspots in electrical systems

    (60-70% of fire claims linked to electrical issues)
    - Refrigeration – trouble shooting and energy study.
    - Insurance enhancement – claims and business interruption.
    - Energy review and identification of issues.

THERMOVIEW

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