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# Infrared Thermography Applications

Presented to the MMWG Predictive Maintenance  
User's Group.

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# Infrared Thermography Applications

## Infrared Thermography Applications

# Infrared Thermography Applications

## What is Infrared Radiation?

- The transfer of heat by wavelength (longer than visible light) of electromagnetic energy

## What is Infrared Thermographic Analysis?

- An imaging technique that focuses on the infrared radiation that an object produces

## Infrared Detector

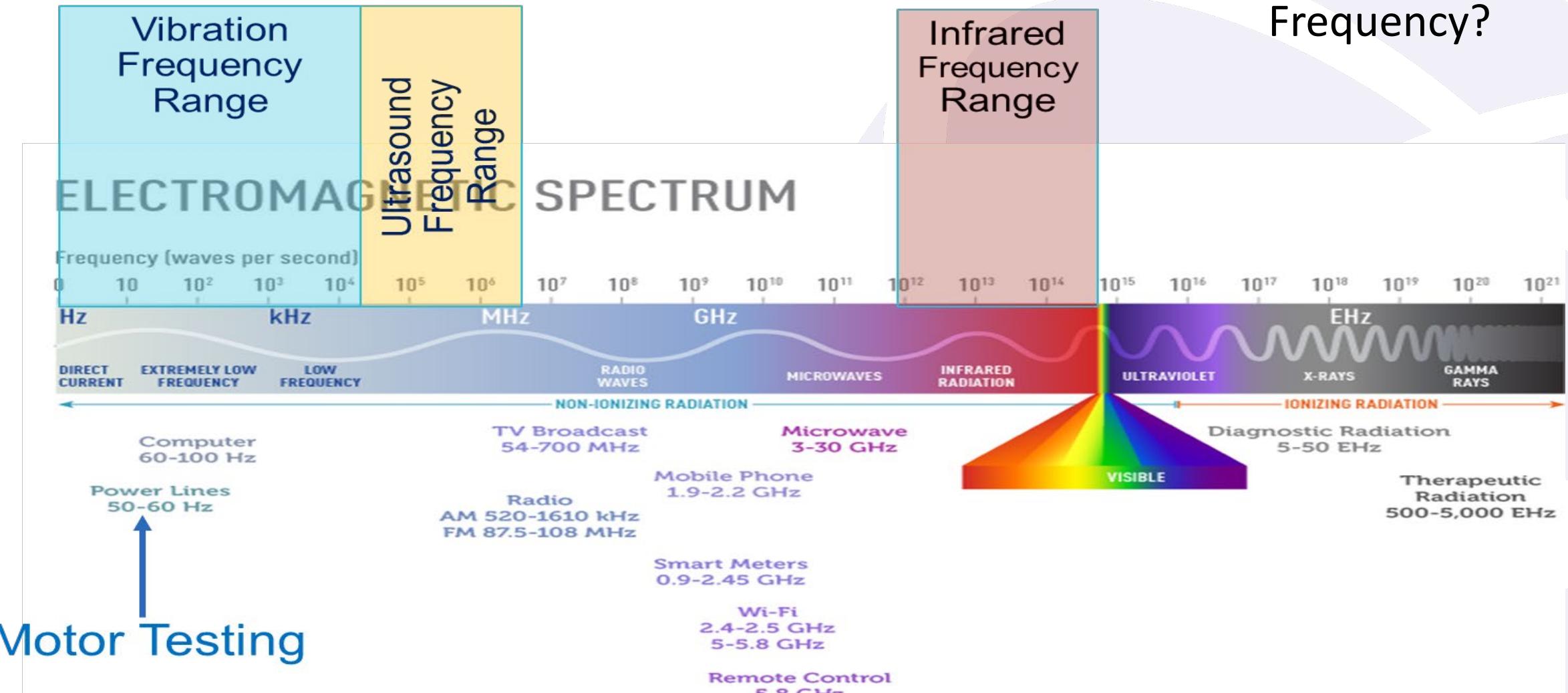
- A device that measures infrared radiation. Temperature can be determined from measured radiation.

## Infrared Thermographic Imager

- Converts infrared radiation to the visible light spectrum and produces a visible image.

# Infrared Thermography Applications

What's the Frequency?



# Infrared Thermography Applications

Infrared Thermography Applications	Common Thermography Applications
<ul style="list-style-type: none"><li>☺ Military/ Law Enforcement</li><li>☺ Remote sensing of Ecological Systems</li><li>☺ Product Testing and Promotion</li><li>☺ Non-Destructive Testing</li><li>☺ Medical</li><li>☺ <b>Predictive Maintenance/ Condition Monitoring</b></li></ul>	<ul style="list-style-type: none"><li>☺ Roof Moisture Surveys</li><li>☺ Rotating Equipment Inspections</li><li>☺ Electrical Equipment Inspections</li><li>☺ Steam Traps</li></ul>

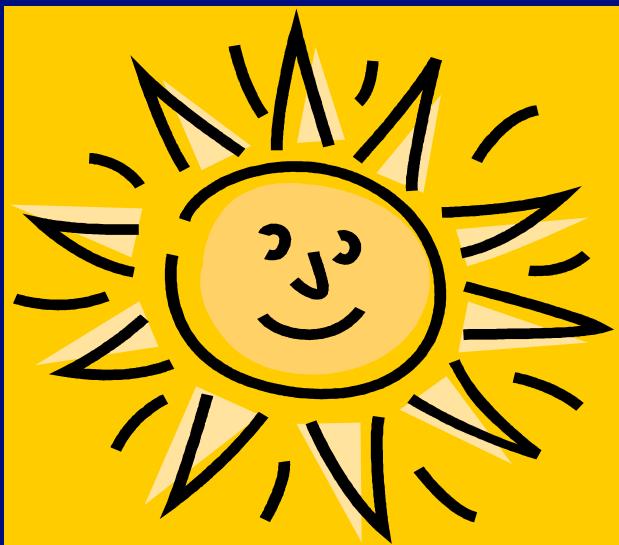
Suspected marijuana growing operation. More significant in some states than others.



# Infrared Thermography Applications

## Roof Moisture Surveys

- Can pinpoint areas of apparent moisture
- Weather Dependent



Wet Roofing  
Insulation

Dry Roofing  
Insulation



Wet Roofing  
Insulation

Dry Roofing  
Insulation

Image taken at 9:45PM

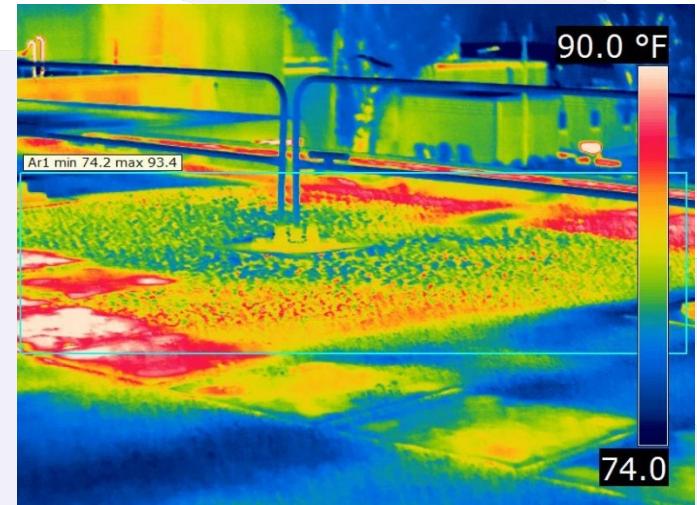
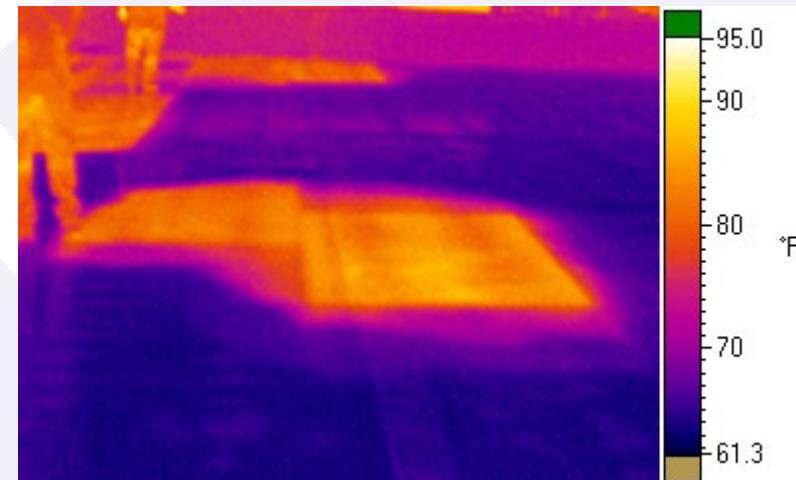


Image taken at 9:30PM



# Infrared Thermography Applications

## Infrared Thermography

### Electrical Equipment Inspections

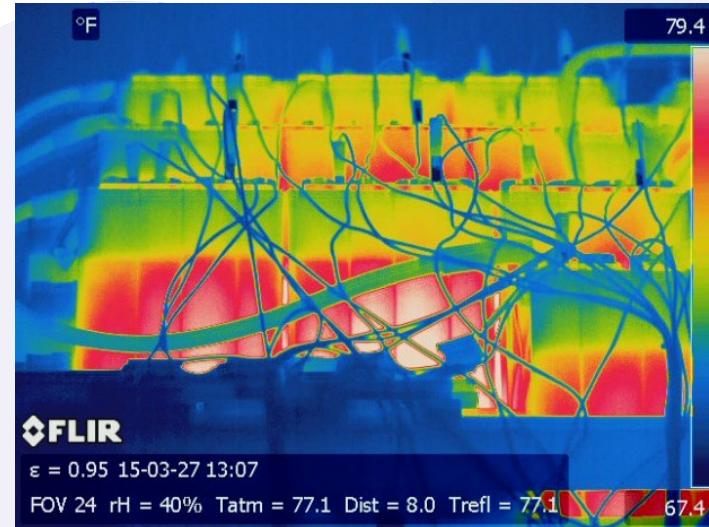
Infrared Technology can be used to check:

- Transformers
- Motor Control Centers
- Switchgear
- Circuit Boards
- Power Distribution System Components
- Bus Runs
- Control Cubicles

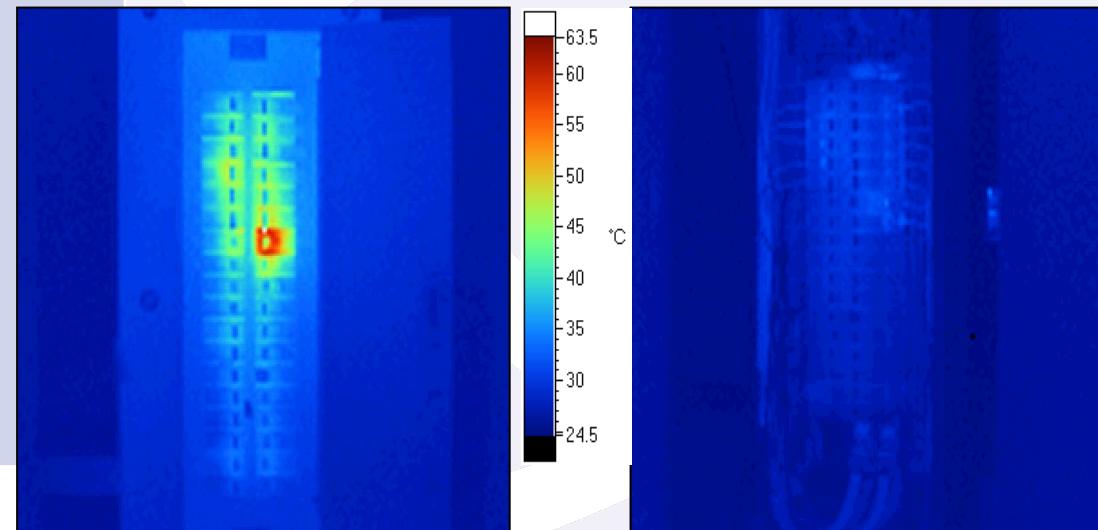
Infrared Technology can detect:

- Poor connections
- Overloads
- Shorts (high resistance connections)
- Inductive heating random pattern

Main Cooling Pump Pony Motor Battery Bank

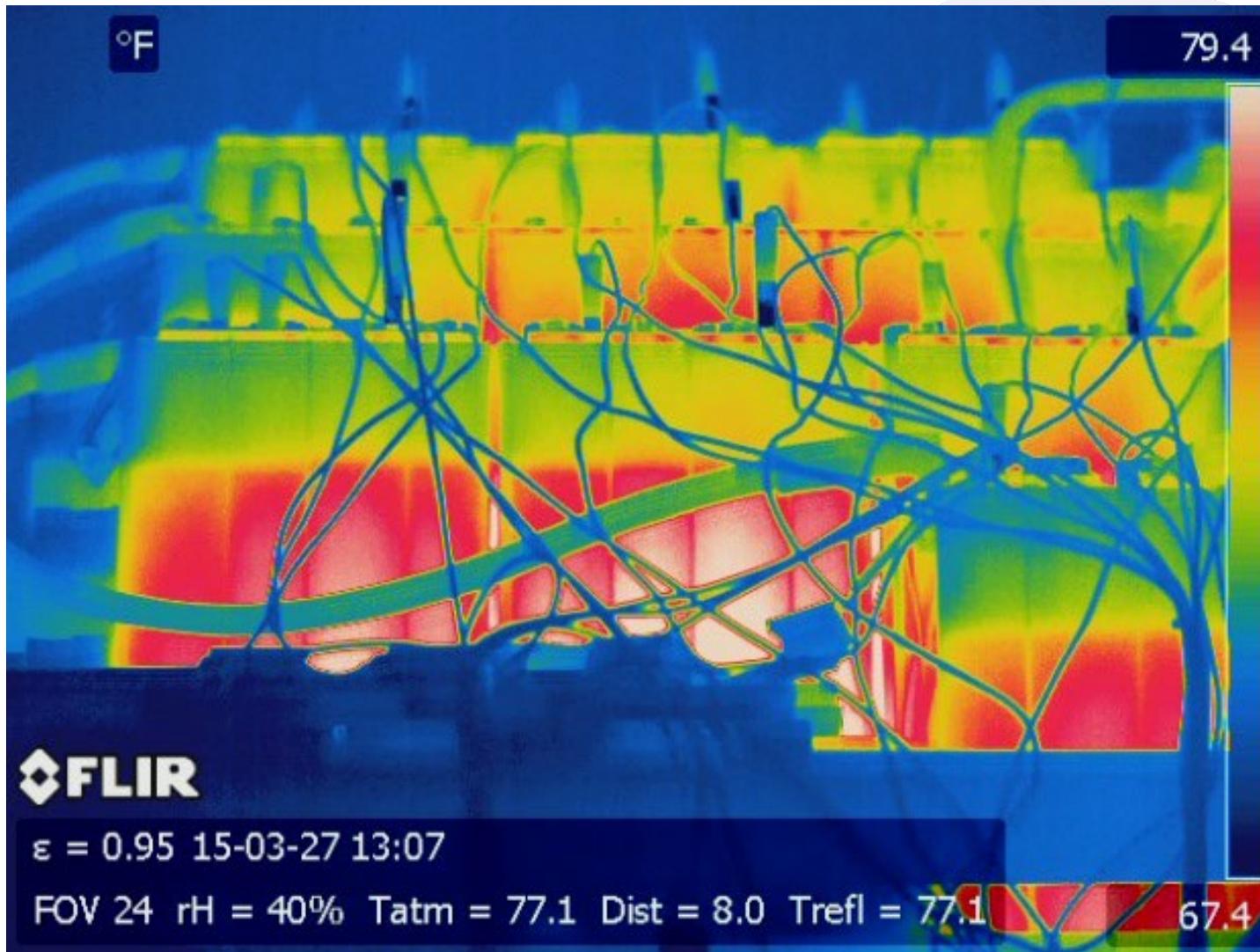


Electrical Panel at a Facility



# Infrared Thermography Applications

Main Cooling Pump Pony Motor Battery Bank



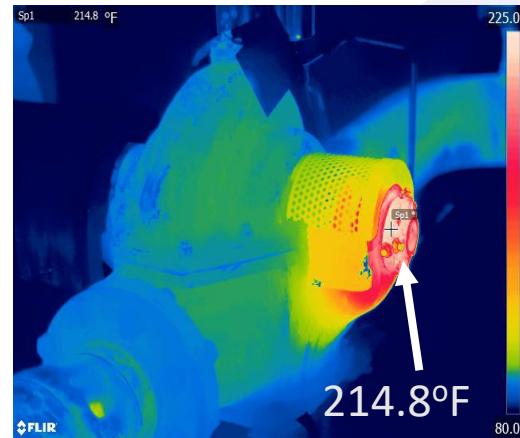
# Infrared Thermography Applications

## Infrared Thermography

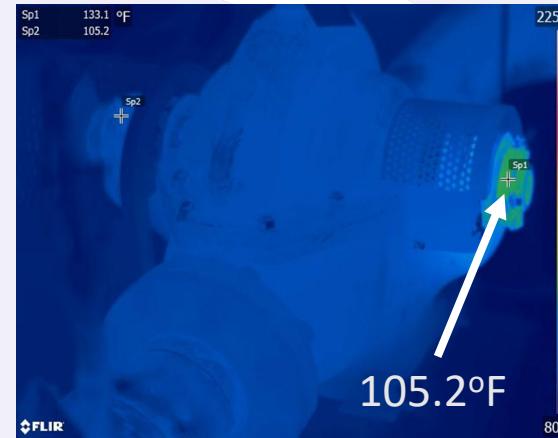
### Rotating Equipment Inspections

Infrared Technology can detect:

- ☺ Electrical problems
- ☺ Ventilation problems
- ☺ Casing problems
- ☺ Bearing problems
- ☺ Coupling problems
- ☺ Belt problems
- ☺ Misalignment



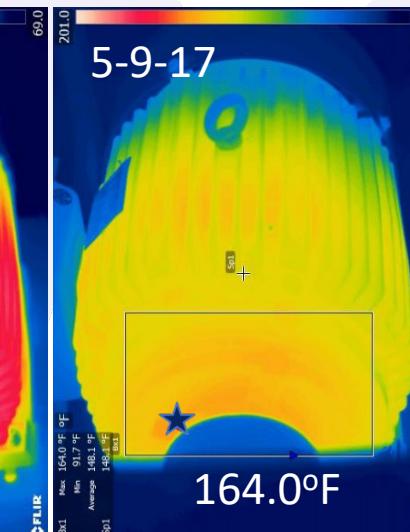
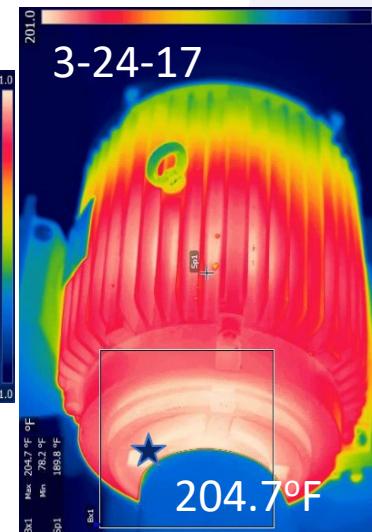
Pool Cooling Pump



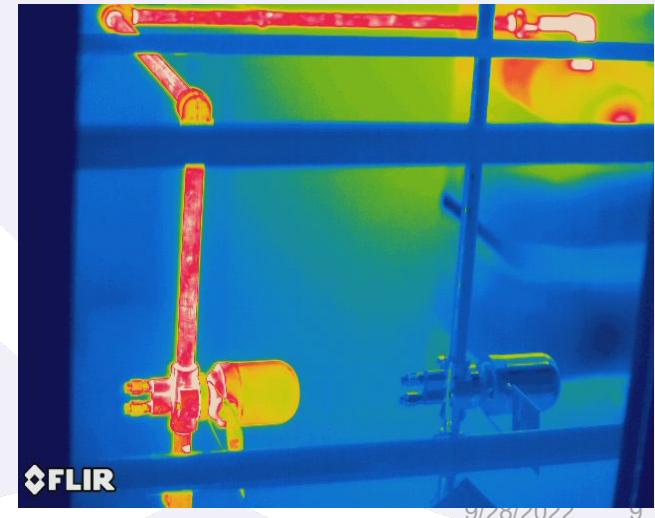
225.0°F

80.0°F

Chilled Water Pump



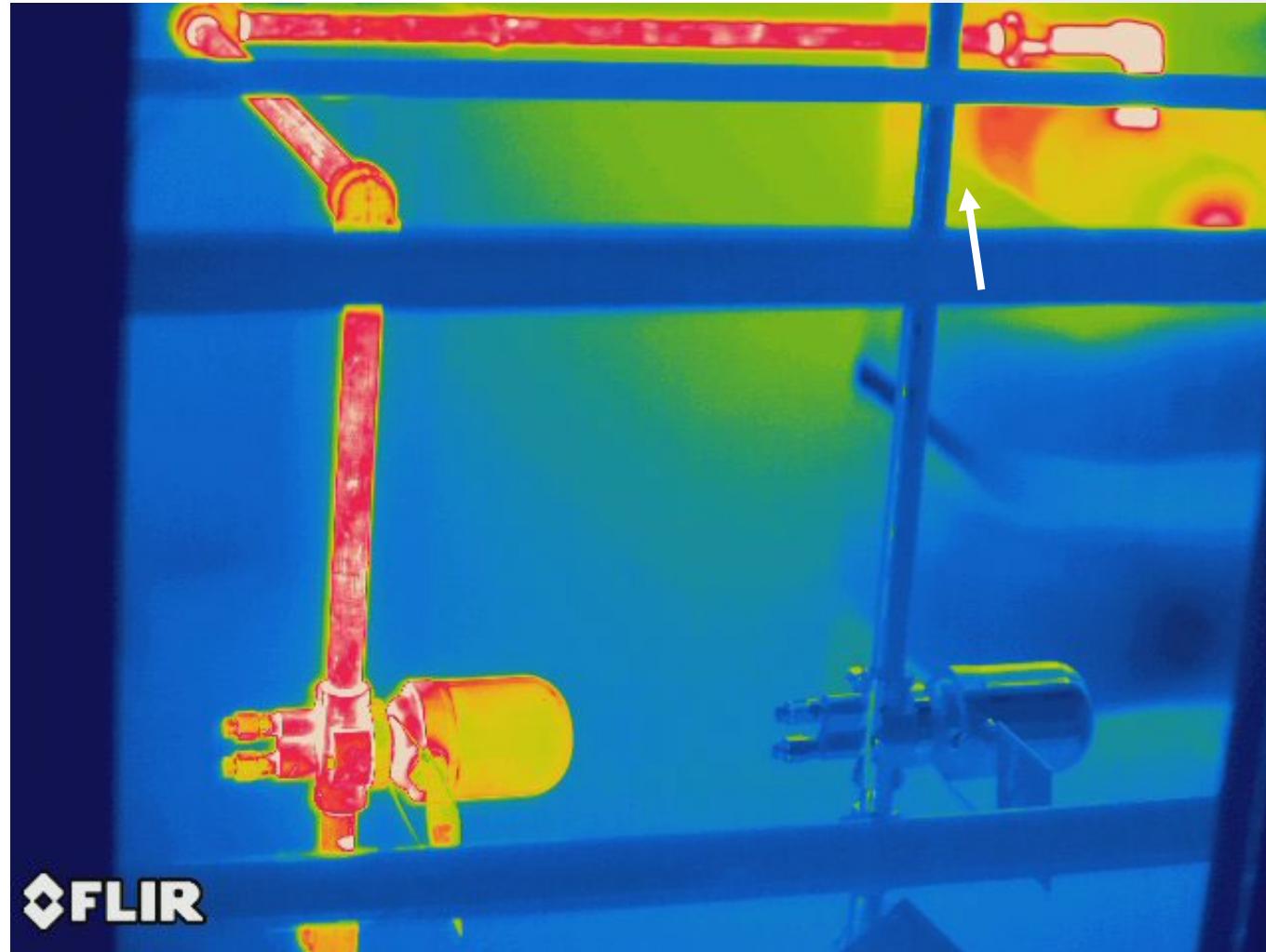
Steam Traps



# Infrared Thermography Applications

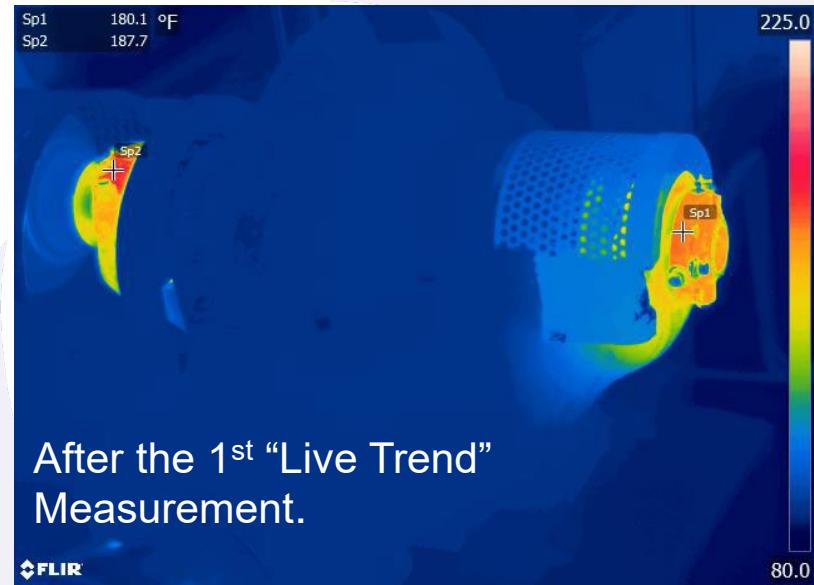
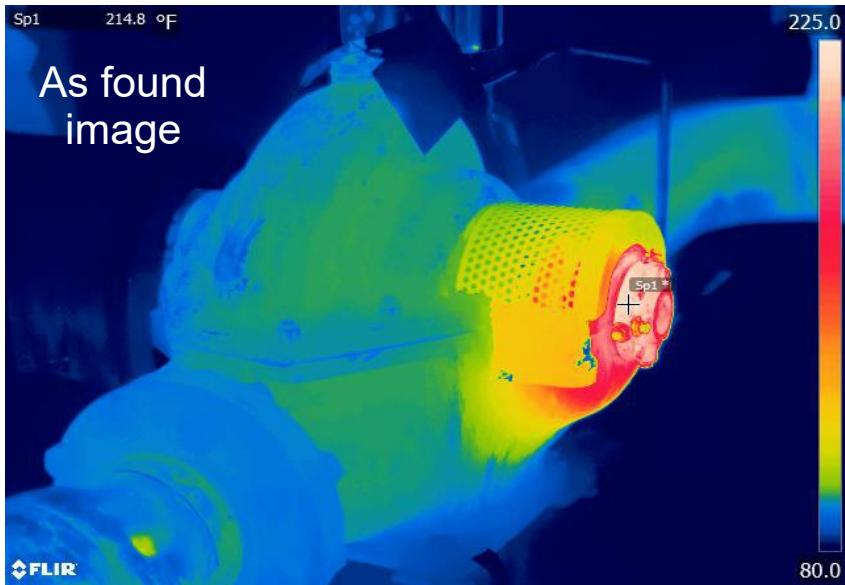
## Infrared Thermography

### Steam Traps



# Infrared Thermography Examples

Side by side comparison of the thermal images.



# Infrared Thermography Examples

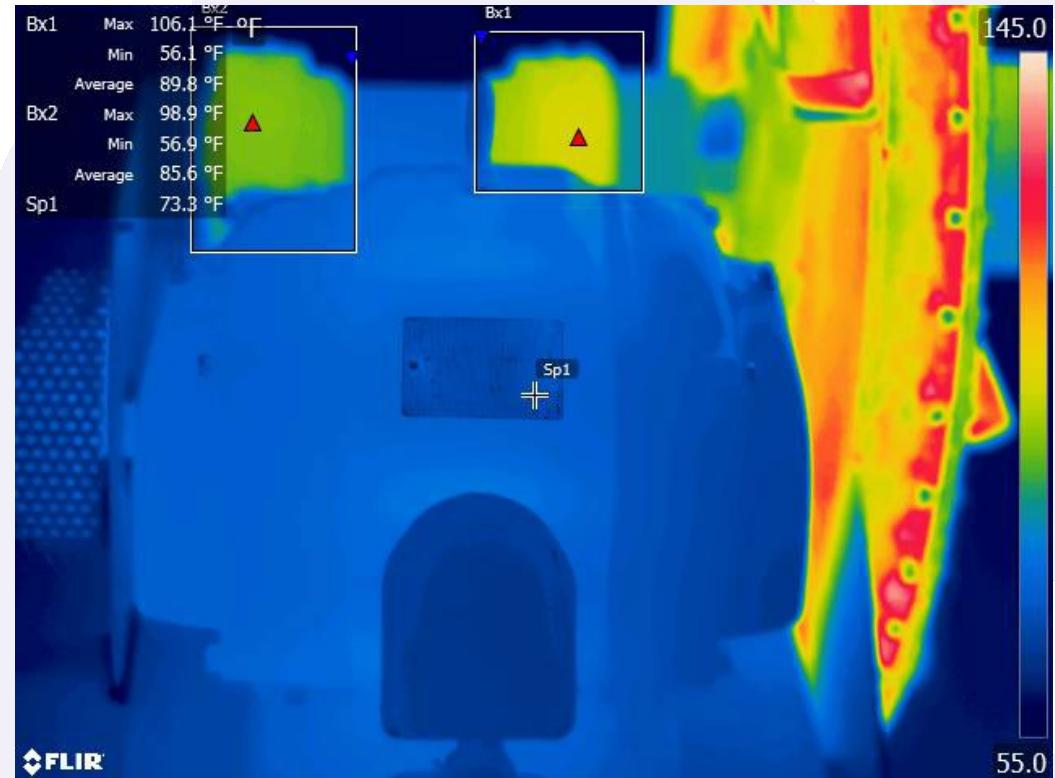
## Elevated Fan bearing Temperature



HOG Fan 5  
Max Temperature 141.2°F

145°F

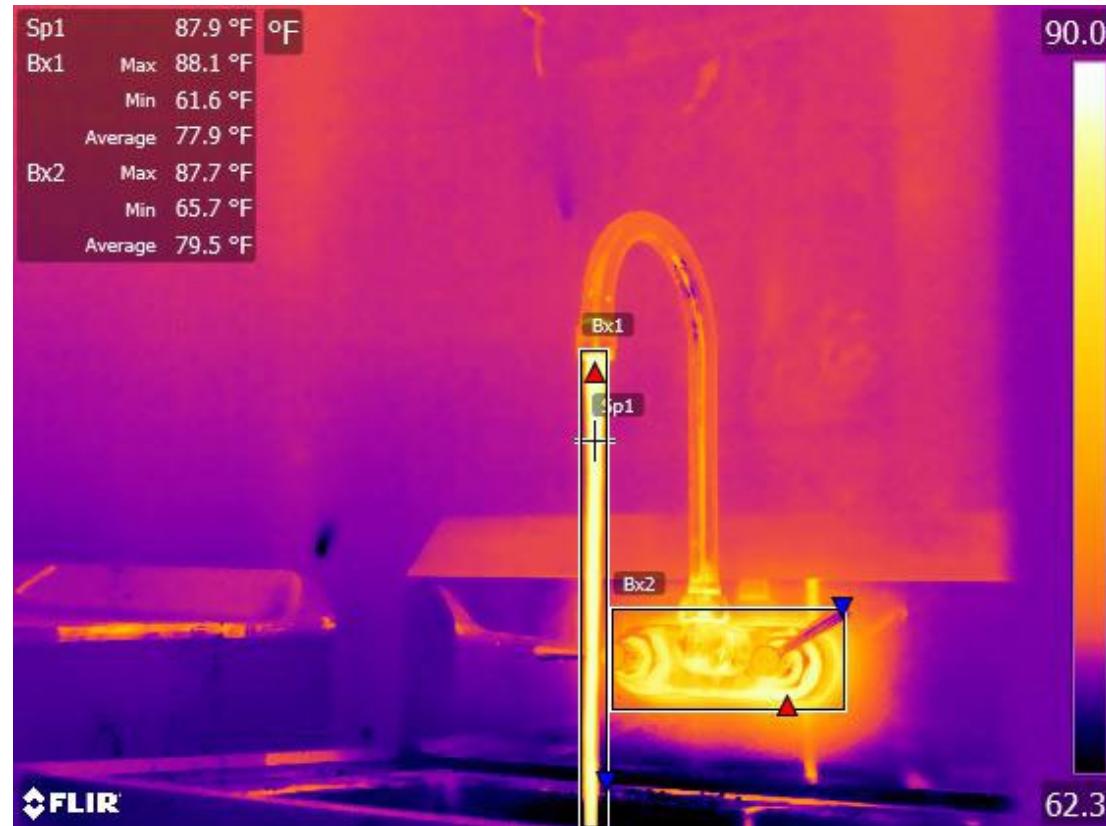
55°F



HOG Fan 3  
Max Temperature 106.1°F

# Infrared Thermography Examples

## Potable Water Case Study



# Infrared Thermography Examples

