

Point and shoot – ten good uses for IR thermometers

Application Note

When it's out of reach, too hot to handle, movin' and shakin', or just generally hands-off, using an infrared (IR) thermometer to make surface temperature measurements offers distinct advantages over contact thermometry solutions.

Accurate temperature monitoring is key to ensuring optimum performance and improving quality, decreasing downtime, and increasing productivity. But there are some situations where it's not possible, practical, or safe to use traditional measurement devices; for example, to:

- Measure rotating or moving objects
- Take measurements of objects where physical contact is dangerous or difficult (high voltage parts; significant distance to measurement target)
- Measure temperatures of hazardous substances or those at risk of contamination
- Measure high temperatures
- Quickly take a series of measurements to allow for amassing a sufficient amount of data in a short period of time

Today's IR thermometers are more reliable and more cost-effective to use than ever before in a wide range of industrial manufacturing, process and quality control, and preventative maintenance/troubleshooting applications.

Ten good uses for IR thermometers in electrical/plant maintenance

Prevent failure, ensure optimum performance or troubleshoot breakdowns by monitoring the temperature of the following:

1. Electrical connections (connectors, panels, circuit breakers, fuses, etc.)
2. Transformers (windings)
3. Ballasts
4. Motors and generators
5. Bearings
6. Production equipment
7. Exhaust systems
8. Electrical bus bars
9. HVAC controls (pipes, duct insulation, room temperature, supply and return air registers)
10. Boilers, kilns, steam traps

Process and quality control

IR is also useful in process and control settings to verify manufacturing processes are operating at peak efficiency or ensure product quality by checking the temperature of manufacturing equipment or monitoring high-temperature substances such as:

- Plastic/rubber
- Metal
- Glass
- Chemicals
- Food products



Getting accurate measurements with IR thermometers

While taking temperature measurements with an IR thermometer is a simple "point-and-shoot" operation, you need to keep several things in mind to ensure that you're getting accurate readings:

Distance-to-target (spot) ratio

Optical resolution is defined by this ratio, which is the distance from the instrument to the object being measured (D) as compared to the size of the spot you're measuring (S). You need to know your intended application to make sure that the optical resolution of the instrument is appropriate for the job. A larger D:S ratio number equals better optical resolution, which means you can measure a smaller spot from a greater distance.

Field of view

To ensure accuracy, you need to make sure that the target (the object you're measuring) is larger than the size of the spot you're measuring. For critical accuracy, the target should be at least twice as large as the spot size.

Environmental conditions

The instrument's optics - and hence the accuracy of the measurement - can be adversely affected by conditions like steam, dust, smoke, noise, vibration, and electromagnetic fields in the environment.

Ambient temperatures

This is the surrounding temperature of the area you're working in. Significant changes in ambient temperature can cause inaccurate readings, so if your IR thermometer is exposed to a temperature difference of 20 degrees or more, let it adjust to the environment for at least 20 minutes.

Emissivity

All matter with a temperature above absolute zero emits infrared radiation (measured in wavelengths) based on its temperature. The material from which the object is made and how reflective or shiny its surface determines this emissivity. To ensure measurement accuracy, the target should have an emissivity in the range of 0.95.

Porous, non-metallic materials such as wood, plastic, rubber, organic materials, rock, or concrete have relatively non-reflective surface finishes, so these objects have high emissivities between 0.8 and 0.95. In contrast, metals, especially those with highly polished or shiny surface will have emissivities at around 0.1.

Fluke IR Thermometers

Fluke's 61 and 65 IR thermometers are designed to meet the needs of electrical, process, plant maintenance, facility maintenance, HVAC/R and automotive professionals. It's easy to take precise aim with their targeting laser, and the single front button design and sleek ergonomic profile make them easy to operate under even the most challenging conditions. (For more information on using IR thermometers, visit the Fluke Digital Library at www.Fluke.com/library)

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