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Correct Infrared Thermometer Usage

Like all scientific instruments they are only accurate if used properly and for applications for which they are suitable.

Infrared Thermometers measure reflected infrared light and this is affected by several factors:

1) **Distance** As you increase the distance from the object, the SPOT being measured grows in diameter (the laser spot only indicates the centre of the area measured). A higher D:S (Distance to Spot) ratio means you can measure smaller spots from farther away. For example, a 1:1 D:S ratio means a spot 1" in diameter is measured from 1" away. An 8:1 D:S ratio means a spot 1" in diameter is measured from 8" away and so on. Thus if you point an IR thermometer at a box close up you will only be measuring the box and get a correct surface reading, but if you measure it from far away you will be measuring the box and the wall behind it and get an averaging of the box and wall.

2) **Emissivity or reflectivity of object measured**. If an IR thermometer is calibrated for objects of a specific emissivity it will be more accurate with objects of a similar emissivity. Most IR thermometers are fixed at 0.95 emissivity simply because this is most common for wood, paper skin etc. However, variable emissivity allows units to be fine tuned for specific products, but will also make them less accurate for many others. Therefore it is important to limit usage of each IR thermometer for usage with specific materials.

3) **Steam, smoke, dust**. These are optical devices; try to keep the lenses clean using optical grade lens cleaners. Also try not taking readings through steam or smoke as the particles may reflect their temperature instead of the object of choice being monitored.

4) **Temperature variances**. Our units use temperature compensation in the electronics to help offset rapid changes in temperature that typically can affect electronics. But rapid changes in moving from one zone to another may still cause errors and it is better if the temperature of the units is kept relatively stable. (same in standard thermocouples or other instruments)

5) They measure reflected light and therefore **only take the surface temperature**, not internal temperatures of products (correlations can be done for internal temperature but only under very controlled circumstances)

To test the unit's accuracy:

Use the Scigiene Infra-Red Comparator Validation Cup. This cup can be used at any temperature up to 80C within the ambient range of the instrument to be tested. The Comparator consists of an aluminum cup with a solid matte black base. The base incorporates a 3.5 mm reference thermometer hole for probe insertion. The cup should be placed at set temperature to stabilize for about 1-2 hours. You should also place the infra-red thermometer that is going to be tested with the comparator cup to allow the electronics within the thermometer to stabilize. Sudden temperature fluctuations of the infra-red thermometer can lead to temperature variations up to 10C. You will then insert your reference thermometer into the base and point the infrared gun straight into the center of the black base. Wait at least 30 seconds for the reference thermometer to have a stable reading. By comparing the readings you will be able to determine the accuracy of all your infrared thermometers.

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