TECH TIPS

The following information is a list of definitions and terms used when speaking to customers about infrared thermometry. These terms are important in recommending any infrared thermometers to your customer and having a working knowledge of these definitions will help you get the sale.

How Infrared Thermometers Work: All objects emit infrared energy. The hotter an object is, the more active its molecules are, and the more infrared energy it emits. An infrared thermometer houses optics that, collect the radiant infrared energy from the object and focus it onto a detector. The detector converts the energy into an electrical signal, which is amplified and displayed as a temperature.

Spectral Response: The specific wavelength region where an infrared thermometer responds (in the 0.7 to 20 um band of the electromagnetic spectrum). Instrument response is dependent on the emissivity, reflectance, and transmission of infrared energy. A spectral response in the range of 8 to 14um is good for general use.

Emissivity: An object's ability to emit or absorb energy. Perfect emitters have an emissivity of 1. An object with an emissivity of 0.8 will absorb 80% and reflect 20% of the incident energy. Emissivity may vary with temperature and spectral response (wavelength).

Distance-to-Target Size Ratio: The infrared thermometer focuses infrared energy from an object onto its detector at this ratio. For example, a 4:1 distance to target size ratio means that the infrared thermometer will read a 1" diameter area 4" away. The object must fill the entire area for accurate readings.

Emissivity of Common Materials

Material	*Emissivity*
Asphalt	0.93 to 0.95
Concrete	0.80 to 0.95
Glass	0.76 to 0.85
Cloth	0.95
Metals, unoxidized	0.02 to 0.21
Paper	0.50 to 0.95
Rubber	0.95
Sand	0.90
Snow	0.82 to 0.89
Soil	0.90 to 0.98
Steel, Iron Oxidized	0.65 to 0.95
Steel, stainless	0.10 to 0.80

Water	0.93
Wood	0.89 to 0.94
Ceramics and Brick	0.80 to 0.95
Painted surfaces	0.74 to 0.96

Calibration of Infrared thermometers

One reoccurring question that we get is how to calibrate an infrared thermometer? In many cases your customer will have an IR that has a fixed emissivity value and therefore adjustment is not possible. In cases where the IR thermometer has an adjustable emissivity range more accurate readings can be measured.

Let's say the end user doesn't know what the emissivity of a surface is, how does he/she know that the reading on the IR meter is giving accurate readings? One way to test the accuracy is to attach a piece of matte black electrical tape to the object being measured. When the laser is pointed at the object's surface note the measurement and compare it to the measurement on the tape. They should be close, but if they are not then simply adjust the emissivity on the meter while measuring the surface until the temperature matches the value measured on the tape. I understand this method might not always be possible and OAKTON has come up with a solution to help end users calibrate their equipment.

The new OAKTON Calimat™ is an economical infrared temperature calibrator. It has a magnetized backing that allows one to attach the calibrator to any metallic surface, a display in both Fahrenheit and Celsius, and is easy to use. Simply point the IR thermometer at the target area then compare the reading of the thermometer to the liquid crystal thermometer reading. Please see the attached product sheet for the Calimat.

Please don't hesitate to contact OAKTON if you have any questions regarding the information contained in this newsletter.