



Infrared Thermometers & Emissivity

The TPI line of fixed emissivity thermometers are very useful for measuring surface temperatures. These thermometers have an emissivity set at 0.95, which is useful in many applications. Fixed emissivity thermometers do have limitations and will read less accurately on low emissivity objects. **It is important to remember that all infrared thermometers measure surface temperatures of an object only.**

Emissivity is the ratio of the energy radiated by an object at a given temperature to the energy emitted by a perfect radiator, or blackbody, at the same temperature. An emissivity of 1.00 implies that the material is 100% efficient at radiating energy. An emissivity of 0.20 implies that the material radiates only 20% of that which it is capable of radiating.

In general, the higher the emissivity of an object, the easier it is to obtain an accurate temperature measurement. Objects with low emissivity (below 0.2) can be difficult to measure. Some polished, shiny metallic surfaces, such as aluminum, are so reflective measurements are not always possible.

When using a fixed emissivity infrared thermometer to measure a shiny or low emissivity object you can compensate by covering the surface to be measured with flat black paint. Measure the temperature of the painted surface.

Partial List of Emissivity

Material	Emissivity
Aluminum (oxidized)	0.25
Aluminum (polished)	0.1
Asbestos	0.95
Brass (oxidized)	0.6
Brass (polished)	0.1
Carbon	0.75
Carborundum	0.85
Cardboard	0.9
Cast Iron (polished)	0.2
Cast Iron (rusted)	0.95
Chromium (polished)	0.1
Concrete	0.7
Copper (oxidized)	0.8
Copper (polished)	0.05
Gold (polished)	0.1
Iron plate	0.7 to 0.85
Lead (oxidized)	0.3
Lead (pure)	0.1