



Training Bulletin

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Reading Surface Temperature



Emissivity refers to the ability of a material to emit thermal radiation. It is a dimensionless value ranging from 0 to 1, where a value of 1 represents an ideal emitter (known as a blackbody) that emits and absorbs all radiation, while a value of 0 indicates a material that does not emit any radiation.

Thermal imaging cameras (TICs) used in firefighting operations are set to a default emissivity value of 0.95, which is commonly associated with materials like concrete or sheetrock. This means that the camera assumes the object being measured has a high level of emissivity, allowing for more accurate temperature readings. However, when TICs encounter reflective objects like steel with a lower emissivity value (e.g., 0.45), the camera may provide artificially low temperature readings. When comparing the emissivity values of concrete and steel, it is important to consider their practical implications, especially in relation to steel's failure rate. Steel tends to fail at temperatures around 1000 degrees Fahrenheit. This means that when using a thermal camera with a fixed emissivity setting of 0.95, the camera may give an artificially low temperature reading of 100 degrees Fahrenheit for a steel surface that is actually much hotter, such as 300 degrees Fahrenheit.

- TICs are typically set to a default emissivity value of 0.95, which is suitable for materials like concrete or sheetrock.
- Reflective objects such as steel with a lower emissivity value (e.g., 0.45) can result in artificially low temperature readings on TICs.
- The further the emissivity value is from 0.95, the less accurate the temperature readings may be on the TIC.

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