

# SOLUTIONS

Tech Note  
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Low Emissivity Targets

## How To Measure

Aluminum

Stainless Steel

Chrome

There are many industrial applications where it is desired to measure targets with low emissivity. Some of these materials include aluminum, stainless steel and chrome for example.

While often a challenge, there are some alternatives that frequently enable the user to obtain accurate, stable and repeatable temperature information. If it is a lab or R&D environment as opposed to a production application, it may be possible to “paint” the surface or place some high temperature masking tape on the surface. In either instance, the emissivity of the surface being measured is now close to 0.9 and the overall measurement accuracy can be significantly enhanced. By definition, if the target has an emissivity of 0.20 as an example, that means it has a reflective component of 0.80 (reflects 80% and emits 20% of the



total energy). Since the IR sensor can't distinguish energy strictly from the target being measured and that from stray reflections, unstable readings are often a result. Care should be taken to locate the sensor away from other potential heat sources and in some cases a shield or shroud around the sensor is also helpful to minimize reflections.

On cold roll applications, the top surface is



quite shiny but often the bottom surface has a coating or higher emissivity making that easier to measure.

Another approach is to condition the signal for emissivity and surrounding influences. ATC has developed the ST-5000 *SMART* transmitter specifically for the Exergen family of infrared thermocouples. The ST-5000 incorporates several signal processing features which enable it to assist the user obtain meaningful information for many difficult applications including:

- Digital emissivity compensation
- Linear output of 4-20 ma that can be scaled to any desired temperature range.

Exergen offers LoE model *IRt/c's* which have a special filter (0.1-5  $\mu$ m) to filter out reflective components of energy. This is very useful for metallic targets that have low emissivity or may change emissivity. However the energy levels at low temperatures are too low to provide enough mV signal to match the conventional *t/c* output. With the aid of the ST-5000, the signal levels from some *IRt/c's* can be conditioned to measure LoE targets at low temperatures. Send samples to ATC or Exergen for evaluation. A professional product recommendation will result from the sample test.

  
**APPLIED TECHNOLOGY CONCEPTS**

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