

GOLD CUP THE ULTIMATE REFERENCE PYROMETER FOR REFORMER TUBES



AMETEK LAND HAS BEEN MANUFACTURING PRECISION MEASURING EQUIPMENT SINCE 1947. WE ARE SPECIALISTS IN NON-CONTACT TEMPERATURE MEASUREMENT AND COMBUSTION MONITORING WITH APPLICATIONS ACROSS DIVERSE INDUSTRIES SUCH AS STEEL AND GLASS MAKING, POWER GENERATION AND CEMENT MANUFACTURE.

As part of AMETEK Process & Analytical Instruments Division since 2006, our customers benefit from the worldwide AMETEK sales and service team.

MEASURING THE TEMPERATURE OF REFORMER TUBE SURFACES

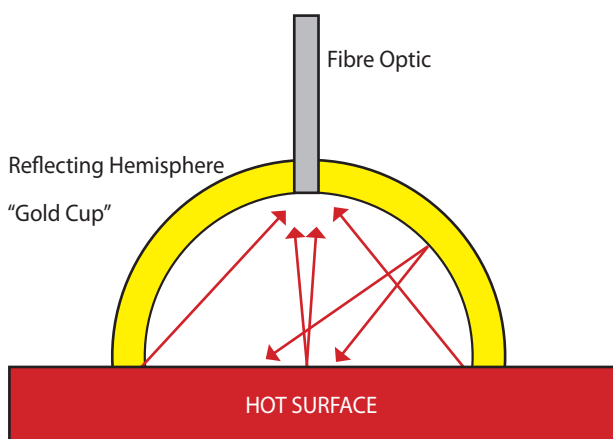
Various non-contact infrared methods are used to measure reformer tube temperatures. However, these measurements rely on the accurate determination of tube surface emissivity, and require a method of compensating for reflections from the hotter surrounding furnace environment. Depending on how the furnace is fired, you may experience interference to these measurements caused by "dirty" furnace atmospheres.

OUR SOLUTION IS THE GOLD CUP PYROMETER

The AMETEK Land "Gold Cup Thermometer" is the only instrument that can provide a repeatable, reliable reference temperature. It cancels out all the inherent errors typically found within other infrared thermometer devices. This instrument consists of a gold cup hemispherical reflector. This Gold cup reflector produces a measurement area, which is emissivity independent when placed upon the surface, making it ideal for unknown emissivity tubes.



HOW DOES IT WORK?



The Gold Cup has a narrow protective edge suitable for tube contact. This edge prevents reflected radiation from the hotter surroundings from entering the cavity formed between the tube and the gold cup (see diagram).

The gold reflective hemisphere integrates the emitted and reflected radiation producing black body conditions. This enhanced energy now escapes through a small aperture in the back of the hemisphere where it is measured by the thermometer module's silicon detector.

The thermometer module then transmits the temperature signal to the display unit. The battery powered portable display unit also powers the thermometer. The range of the thermometer is 700 to 1300 °C (1292 to 2372 °F).

GOLD CUP

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USING THE GOLD CUP

The Gold Cup pyrometer is first connected to its water-cooling supply and the thermometer is connected to a display unit. Care should be taken in using this device because, when filled with cooling water it becomes very heavy. The gold cup is inserted through a port into the furnace and the cup is placed onto a tube to be measured. The temperature reading is immediately recorded before the tube has a chance to cool.

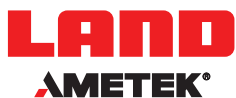
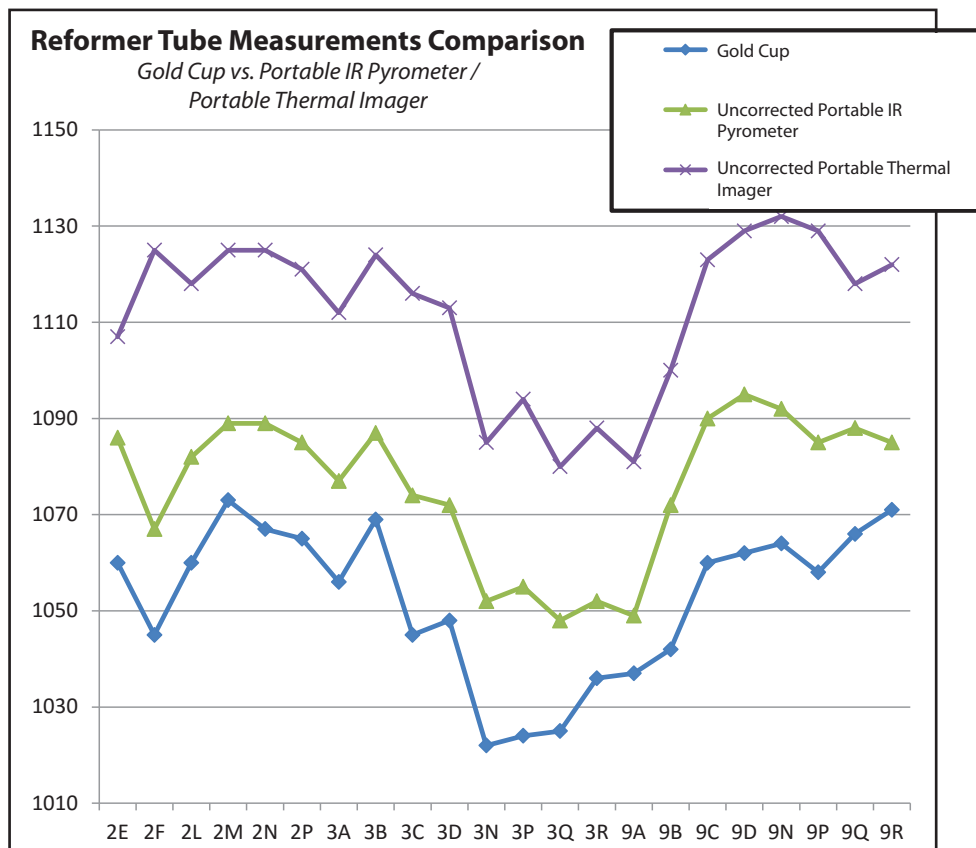
NOTE: The gold cup is not intended to replace the use of other temperature measurement methods. It is used as the reference method to which other temperature measuring devices are checked and corrected.

RESULTS

The graph (below) shows the comparison between a gold cup probe, a portable IR thermometer and a portable thermal imager. As you can see before "correction" the difference in temperature recorded (at a single point) has been recorded to be as much as 30 °C / 86 °F for the portable IR thermometer and 81 °C / 178 °F with the portable thermal imager.

RECOMMENDATION

Practically, using the information gained from the gold cup probe, modifications to the "setup" of the portable thermal imager and IR thermometer - will increase the accuracy, and ultimately lead to increased tube life and greater product yield.



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