Quest Integrity™
A TEAM Company

CorrectIR™

IR Temperature Correction Software

Background

Fired heaters and reformers can experience problems that threaten plant safety. Incorporating infrared (IR) monitoring into the overall tube integrity management program allows the plant to measure the key reliability and integrity operating window (IOW) parameter for fired heaters and reformers: tube metal temperature.

IR thermometry has been used for 30 years to monitor tube metal temperatures in industrial furnaces. It has proven to be an excellent diagnostic tool for detecting tube hot spots from internal fouling, catalyst failure and heat distribution non-uniformity. However, to fully utilize IR thermometry, a proven methodology is required to measure accurate temperatures in a repeatable process.

Capabilities

CorrectIR software performs correction calculations to remove common errors from infrared thermometry tube temperature measurements taken with pyrometers or thermal imaging cameras. By utilizing a mathematical model directly tied to the actual furnace geometry, the corrected temperatures are more accurate than conventional infrared measurements.

The proven methodology is repeatable and less dependent upon technician interpretation of the thermal images. The corrected temperatures may be used to validate operation within IOW, manage tube reliability and assess failure risk. CorrectIR uses a database structure to store and statistically compare the corrected temperatures with future infrared measurements.

Applications

- Fired Heaters
- Reformers

Industries served:

- Refining
- Chemical
- Syngas

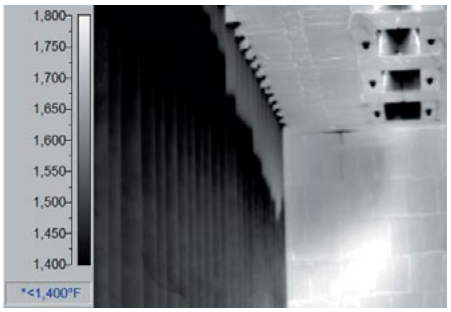

Figure 1. Catalyst Settling

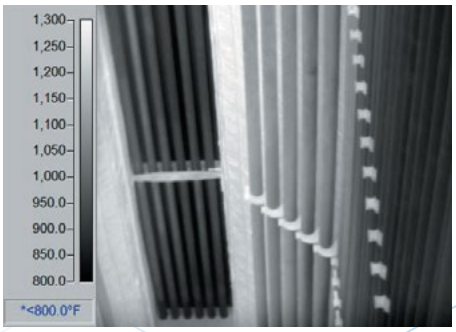

Figure 2. Poor Heat Distribution

Features

- Utilizes unique geometry for each furnace application in the correction calculations
- Calculates an effective background temperature for each tube location analyzed
- Assigns a probability range to each corrected temperature value
- Corrects for common measurement errors:
  - Tube emissivity
  - Reflection errors from background objects
  - Atmospheric (flue gas) absorption and emission error
  - Instrument calibration and size of source effect errors

Benefits

- Avoid catastrophic failures by managing hot tubes before they reach a critical state
- Prevent unplanned outages and lost production time
- Optimize online production, extend run times
- Manage integrity proactively and make informed decisions concerning the scope, timing and coordination of maintenance
- Assess tube remaining life accurately
- Build an operating record that is based upon accurate and repeatable temperature measurements