

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.

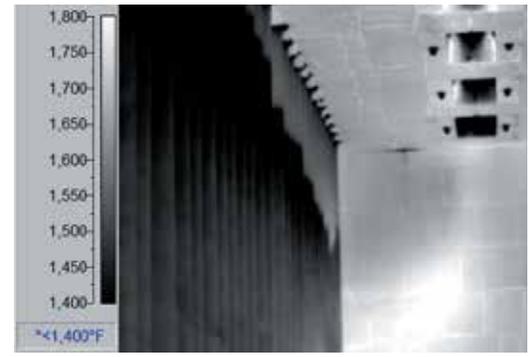
CAPABILITIES

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.

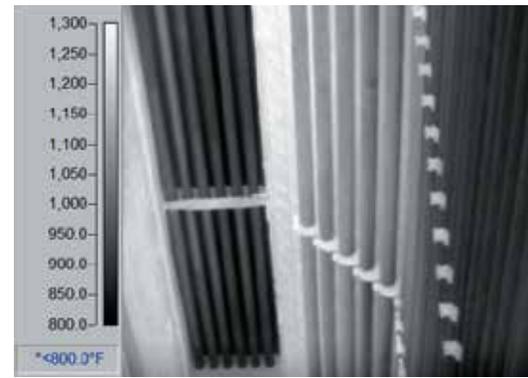
The proven methodology is repeatable and less dependent upon technician interpretation of the thermal images. The corrected temperatures may be used to validate operation within IOW, manage tube reliability and assess failure risk. CorrectIR uses a database structure to store and statistically compare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

APPLICATIONS

- Fired Heaters
 - Reformers
- Industries served:
- Refining
 - Chemical
 - Syngas



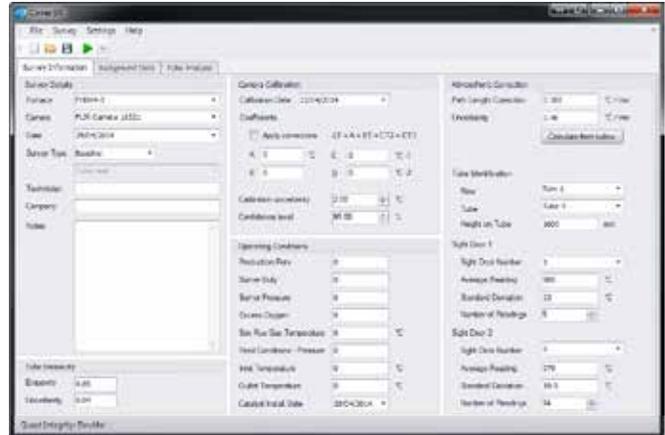
Catalyst Settling



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

The screenshot shows a data table within the Quest Integrity software. The table has the following columns:

1	2	3	4	5	6	7	8	9	10
Tube Number	Height (mm)	Right Door	Tube Reading °C	Calibration Corrected °C	Effective Background Temperature °C	Temperature °C	Scheduling %		
48	6,713,864	852	836	836	830	833	20		
49	6,951,656	854	814	814	848	857	20		
49	6,951,664	850	820	820	848	851	20		
43	3,951,654	850	895	895	845	851	20		
9	6,713,864	885	885	885	820	794	20		
5	6,951,656	890	890	890	810	781	20		
10	3,951,654	885	790	790	807	792	20		
54	3,951,654	799	790	790	819	795	20		
45	3,951,654	796	796	796	810	781	20		
49	3,951,654	799	797	797	817	799	20		
6	6,951,664	797	796	796	813	794	20		
46	3,951,654	796	800	800	810	781	20		
58	6,713,864	806	797	797	823	781	20		
10	3,951,654	797	796	796	814	794	20		
11	6,951,656	799	799	799	811	794	20		
47	3,951,654	799	797	797	819	794	20		
7	6,713,864	797	795	795	806	781	20		
8	6,713,864	791	797	797	849	791	20		
40	3,951,654	797	794	794	803	782	20		
21	6,951,656	795	795	795	825	778	20		
17	3,951,654	795	789	789	819	798	20		
44	3,951,654	799	797	797	847	779	20		
55	6,951,656	797	795	795	816	776	20		
24	6,951,664	796	797	797	849	779	20		
33	3,951,654	791	794	794	811	797	20		