

SMART ISOTEMP

Process monitoring for optimised boiler operation

The challenge

Combustion of fossil fuels is a complex process in which even the slightest changes can lead to unwanted deposit build-up, corrosion and emissions and jeopardise the efficiency of the plant. Flame and flue gas temperatures, for instance, are important control parameters for assessing combustion. If the combustion temperature is not evenly distributed in the furnace, this flame imbalance may result in local thermally overloaded heating surfaces and may lead to increased slagging. Moreover, a very high furnace exit gas temperature indicates a suboptimal combustion and eases deposit formation in the superheater. Timely optimisation of the combustion process saves the situation and prevents inefficient operation of the plant.

In this case, process monitoring is indicated, which recognises deviations in the temperature profile so that corrective action can be taken in time.

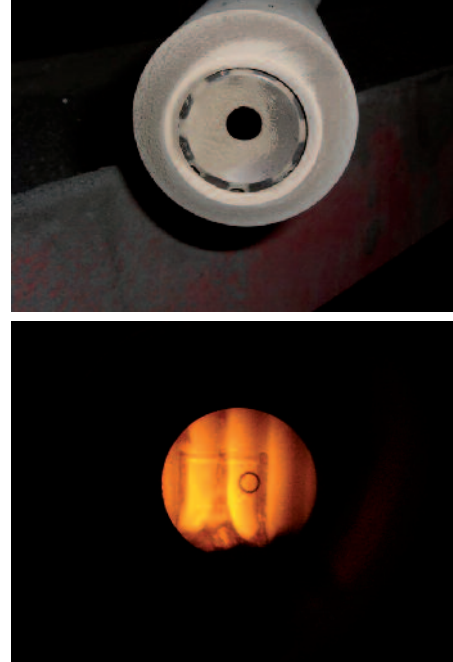
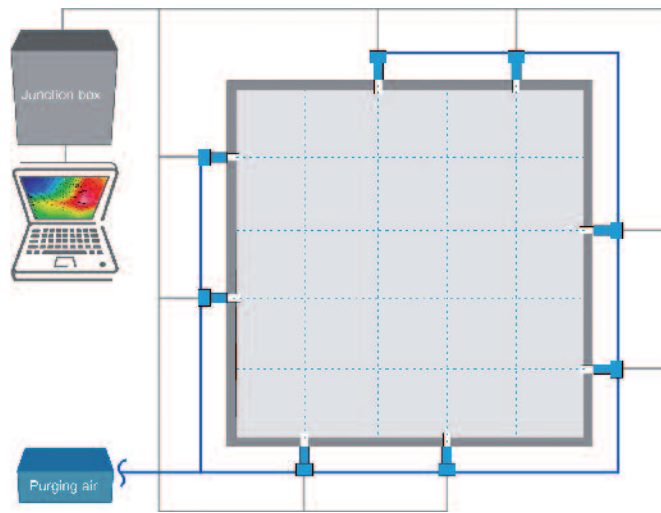
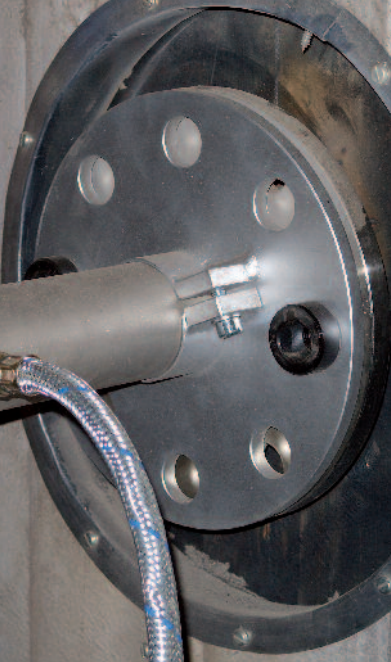
Our solution

Using SMART IsoTemp, we employ an optical measurement system that captures and evaluates the temperature of flames and flue gas continuously and in-situ. Based on these results, corrective action in combustion parameters can be taken promptly in order to keep temperatures in an optimum process range.

We also use the information from this thermal diagnosis to check the cleaning efficiency of the boiler cleaning systems.

Every installation of SMART IsoTemp is customised to meet the individual measuring tasks and specific furnace requirements.





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Thermal diagnostics for immediate optimisation

The functional principle

Measuring based on radiation pyrometry makes use of the fact that radiation intensity in a furnace increases with the rise in temperature. By selecting the suitable wave length, SMART IsoTemp measures this radiation temperature with high measurement accuracy.

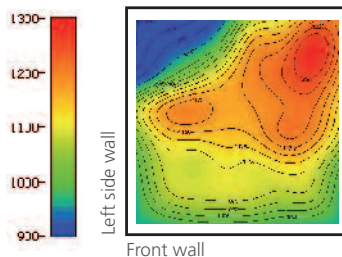
The two-dimensional measurement shows the temperature distribution of a complete furnace level. For this purpose, several SMART IsoTemp pyrometers are grouped along the boiler walls. The number of pyrometers employed is always dependent on the measuring task and the specific furnace conditions. With the use of mathematical models, measurement data as well as the temperature distribution are displayed as a topographical profile.

A small opening in the boiler wall is sufficient to install SMART IsoTemp. Sealing air supply keeps the measurement optics free from deposits.

Your benefits

- Continuous diagnosis of flame and flue gas temperature allow timely recognition of deviations from reference values.
- Corrective action to optimise boiler operation is taken at appropriate times
- SMART IsoTemp provides a reliable data set for SNCR and furnace controls.
- SMART IsoTemp requires little space and is free of any movable mechanical parts.
- Diagnosis of combustion processes using SMART IsoTemp allows optimal operation of boilers and on-load boiler cleaning – an important basis for being able to control and reduce deposits, corrosion and emissions.

Visualisation of the temperature distribution by thermal diagnosis with SMART IsoTemp:



Results:

- Temperature distribution shows extreme flame imbalance

Consequences:

- Local slagging and corrosion
- Thermal overloading of the heat exchanger

Action needed:

- Correction of the furnace settings



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