Radiamatic II
Non-Contact Infrared Temperature Sensor

Industry: Power Industry
Application: Furnace Exit Temperature Monitoring

Problem

Sonic detection systems are quite expensive to install and their accuracy can be adversely affected by the noise of the soot-blower operation.

Contact-type thermocouples are not as accurate as non-contact infrared temperature sensing due to the lack of penetration of the thermowell, which is typically only 2’ to 3’ long. Consequently, the temperatures measured are the areas along the boiler walls, which are generally cooler than the center of the boiler, which is the desirable measurement.

In addition, in coal fired boilers the thermowells accumulate a soot and ash buildup thereby insulating the thermowell tube. This indicates a much lower operating temperature reading inside of the boiler or waste incinerator than the actual temperature, causing concern of burnout of the refractory and boiler tubes.

Calculation from data points starting at the final gas-exit point, the economizer, and working back, using steam and water temperatures along the way involves too great a potential for error.

Solution

Keeping furnace exit-gas temperatures below ash point and determining when soot blowing is required can be accomplished more effectively by non-contact infrared temperature sensing than by other techniques such as sonic detection, thermocouples, or calculation from data points.

The Radiamatic II infrared thermometers are remote sensing infrared detectors that are permanently flange mounted on any port, door or penetration into the boiler or furnace. The Radiamatic II is supplied with a rugged protective-cooling jacket that is factory assembled and pre-piped with an air cooler, purging and filtering system designed to work in most severe service environments.

The Radiamatic II is a two wire 4-20 mA output device powered by 20 to 40 Vdc with maximum loop impedance of 1200 ohms at 40 Vdc. It has an accuracy of +/- 0.5% of the full scale and is factory calibrated to an NIST certified standard in accordance with ANSI/NCSLZ540-1-1994.

Temperature ranges covered by the infrared transmitter are 700°F to 3500°F (400°C to 2000°C). The detector lens is kept clean by purging it with a flow of industrial air.

The sensor has a conical (30:1 FOV ratio), and measures temperature of up to 15 ft. into the boiler or furnace. Multiple sensors can be combined at each end of the boiler to determine if the fireball (ABB-CE) is centered within the boiler. The Radiamatic II sensors can also be mounted on different levels vertically along the boiler.
Benefit Summary/Feature

- Infrared detection is able to distinguish between tube temperatures and gas temperatures in the furnace.
- The Honeywell sensor measures CO₂ gas temperature, which is a constituent of the flame. Therefore, it measures gas and flame.
- Non-contact gives true gas-flame temperatures and reduces maintenance cycle of boiler.
- Installation of the instrument can be made while the boiler is on-line.
- The door with the mounted transmitter is unobstructed and can be opened at any time for visual observation.
- Removable sealed window assembly allows for easy cleaning of window that protects sensor lens from being scratched. This window also prohibits heat escaping from boiler when removing sensor for recalibration thus protecting the operator.
- The sensor response is preset for 10 seconds to average and smooth output reading in order to reduce the large signal fluctuations caused by the violent combustion process, taking place in the boiler.
- Additional damping can be made at clients computer system.
- Monitor startup temperature
- Fluidized bed boilers
- Soot blower control
- Monitor flue gas temperature
- Low Nox applications
- Fireball Centering
- Reduce Ash fusion
- Waste/Refuse Incinerators
- High temperature monitoring
- Monitor Black Liquor Temperatures

WARRANTY/REMEDY

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