Clamp-on flowmeters deliver reliable ~ 215 °C steam measurement

With the ability to handle incredibly high-temperature and high-pressure fluids such as superheated steam, non-invasive clamp-on ultrasonic technology is taking away the worry of downtime for plant operators looking for an accurate measurement solution, without the risk of contamination. Because flowmeters are safely attached to the outside of the pipe, there's no need for any process interruption whatsoever.

Measuring the flow rate of high temperature steam with ultrasonic flowmeters demands the use of the cross-correlation method rather than the more commonly used transit-time difference principle. Two pairs of ultrasonic transducers are mounted on the pipe at a defined distance from one another, forming two acoustic measurement barriers. The ultrasonic signals radiated into the pipe are modulated by the vortices of the turbulently flowing fluid, and because the vortices are carried along by the flow, they pass through the two measurement barriers with a time delay. By cross-correlating the modulation signals over time, the flowmeter is able to determine the flow velocity of the steam and calculate the mass flow based on the geometry of the measuring point and the physical parameters.

Avoiding a plant shutdown

At a German waste-to-energy plant, it is a fundamental belief that waste should be seen as a precious resource. Recycling the waste of well over a million people, operators were struggling to deal with increasing measurement errors from their existing inline ultrasonic measurement system, installed in the inlet to a turbine. The measurement is required for balancing, as well as to protect the sensitive turbine from excess steam.

System technicians needed an effective replacement measurement technology that would take little effort to install, and not disrupt processes – because if the pipeline needed to be opened, the entire waste incineration plant would have to be shut down.

Invaluable on-site testing prior to installation

A key advantage of non-invasive clamp-on flowmeters is that suitability can be tested onsite before installation takes place, and modifications can also be made at any time if necessary. This meant that service technicians were able to adapt the installation and the transducer technology, while the developmental engineers at the company's headquarters analysed measurement and diagnostic data.

With clamp-on ultrasonic technology now permanently installed, the waste-to-energy plant has the benefit of precise and reliable steam quantity measurement, which completely replaces the old inline measurement that was prone to failure.

For more detailed information on the benefits of non-invasive ultrasonic flow measurement in the measurement of steam, contact Simon Millington - www.flexim.co.uk | sales@flexim.co.uk | +44 (0)1606 781 420 industry, contact Simon Millington - www.flexim.co.uk | sales@flexim.co.uk | +44 (0)1606 781 420