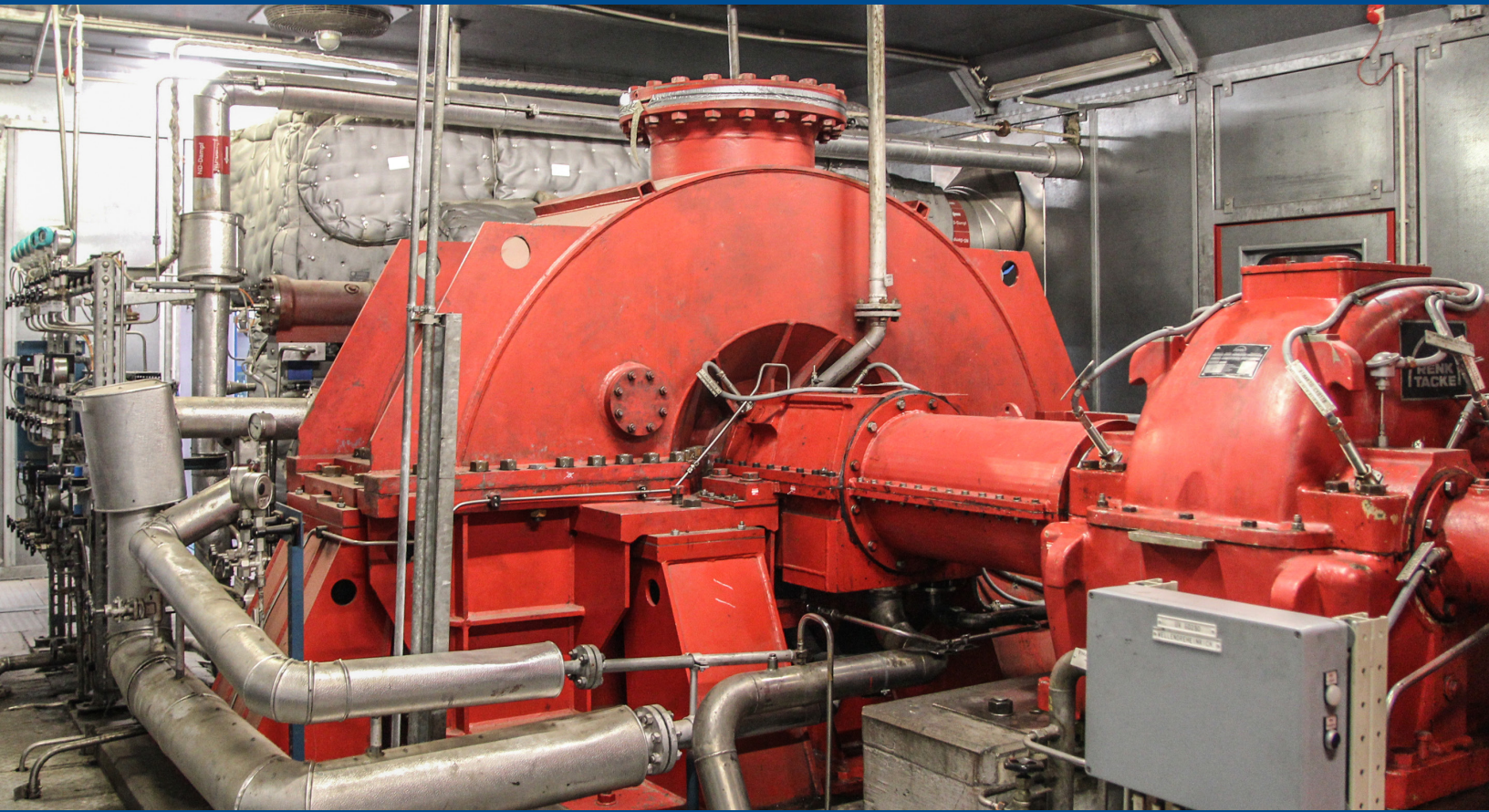




STEAM MEASUREMENT IN A WASTE PROCESSING PLANT



Power Plants

“Only the non-intrusive measurement technology from Flexim gave us the opportunity to replace the defective measurement without having to deal with a total downtime.”

*Thomas Köppel,
Head of Maintenance,
AVA Waste Exploitation Plant
Augsburg KU.*



Measuring Task

Flow measurement of ~ 420 °F hot saturated steam in the inlet to a low-pressure turbine in the waste-to-energy plant of the AVA Waste Exploitation Plant Augsburg KU

Waste is valuable material. With this fundamental belief, AVA recycles the waste of well over a million people. It operates a waste-to-energy plant with integrated hospital waste incineration, slag processing, and a biowaste fermentation plant at the Augsburg location at a high level of environmental technology.

The throughput of residual waste and commercial waste in the waste-to-energy plant is around 250,000 tons per year. The heat generated during combustion is used to create steam, which is routed through two turbines. This generates electricity and district heating (combined heat and power).

An inline ultrasonic measurement is installed in the inlet to a turbine. This measurement is used for balancing but is also responsible for protecting the sensitive turbine from excessive amounts of steam. When obvious measurement errors and failures increased in the wetted ultrasonic system, the system technicians began to look for a suitable measurement technology to replace it with as little effort as possible.



Solution

The non-intrusive measurement technology from Flexim has always been recommended when it comes to setting up a flow measurement point on an existing pipeline. Therefore, the news from Berlin that Flexim had succeeded in expanding the application area of non-intrusive flow measurement to superheated steam was met with great interest among the Augsburg plant engineers.

In contrast to the otherwise commonly used ultrasonic flow measurement technology, which works with the transit-time difference principle, high-temperature steam measurement with FLUXUS® ST-HT works according to the cross-correlation method: Two pairs of ultrasonic transducers are mounted on the pipe at a defined distance from one another, thus forming two acoustic measurement barriers. The ultrasonic signals radiated into the pipe are modulated by the vortices of the turbulently flowing fluid. Since 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, FLUXUS® ST-HT determines the flow velocity of the steam and calculates the mass flow based on the geometry of the measuring point and the physical parameters.

A characteristic advantage of the non-intrusive measurement technology from Flexim is that its actual suitability for the respective measurement task can be subjected to practical tests on site. In addition, modifications can be made to the measuring device at any time – also without any impairment of system operation. The Flexim team made extensive use of this advantage when setting up the steam measuring point in Augsburg: The on-site service technicians repeatedly made changes to the installation and the transducer technology, while the development engineers at the company's Berlin headquarters analyzed measurement and diagnostic data. As a result, the waste-to-energy plant now has precise and reliable steam quantity measurement, which completely replaces the old inline measurement that was prone to failure. The plant operators particularly value the advantage that the installation of the measuring system did not require the pipeline to be opened. In order to be able to open the pipeline, it would have been necessary to shut down the entire waste incineration plant.



AVA Waste Exploitation Plant Augsburg
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The steam line insulation only needs to be temporarily removed to mount the clamp-on ultrasonic transducers and the WaveInjector® high-temperature sensor mounting device. The measuring point is set up during operation.



After installation, the measuring device can be integrated into the insulation.



Flexim measurement expert Guido Jary and his work after the job is done. The stationary ultrasonic system FLUXUS® G722 ST-HT is used as the transmitter.



The transmitter calculates the mass flow from the measured values for volume flow, pressure, and temperature.

Measuring Points and Instrumentation

Pipeline steel 20", wall thickness 0.25"

Medium saturated steam, temperature ~ 420 °F, pressure ~ 100 psi

1 stationary clamp-on ultrasonic FLUXUS® G722 ST-HT flowmeter for superheated steam
2 pairs of GDM2E52 clamp-on ultrasonic transducers
2 pairs of high-temperature WaveInjector® transducer mounting devices

Advantages

- Reliable and accurate flow measurement from outside
- Easy retrofitting without opening the pipeline and without disturbing the operation
- No pressure loss, no energy loss, no risk of leakage
- Excellent cooperation between the plant technicians and the Flexim service team

Customer

AVA Abfallverwertung Augsburg KU, Augsburg, Germany

At the Augsburg site, AVA operates a waste-to-energy plant with integrated hospital waste incineration, slag processing, and an organic waste fermentation plant. AVA not only stands for the guarantee of disposal security in the entire region but also makes an important contribution to a decentralised, environmentally friendly energy supply.



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