APPLICATION REPORT

COMPRESSED AIR BALANCING IN A ROLLING MILL

Steel Industry

“Interruptions of supply and high costs for necessary calibrations and pipework are now a thing of the past with Flexim’s non-intrusive flow measurement technology.“

Jörg Zacharias,
Energy Department, Vallourec,
Düsseldorf-Rath Plant

Measuring Task

Compressed air measurements in the compressor systems to balance the generation quantities and consumption levels

Vallourec Deutschland GmbH operates two hot rolling mills at the traditional location in Düsseldorf’s Rath district, where seamless steel pipes have been manufactured using the “Mannesmann process” since 1899: The pilger line produces premium quality pipes with an outside diameter of 9.5“ to 28“ using the pilger rolling process, while the neighboring plug line produces quality steel pipes with an outside diameter of 7“ to 16“ as well as square and rectangular hollow sections.

The “Central Technical Service” department is responsible for supplying both production plants with water, energy, and compressed air. The compressed air, which is primarily required for pneumatic drives and for blowing out pipes, is generated in two compressor stations and distributed over the entire plant at pressure levels of 85 psi and 115 psi. The quantities of compressed air generated must be measured to record consumption as part of energy management in accordance with ISO 50001 and for cost allocation. In the past, thermal mass and vortex flow meters were used for this purpose. Both measuring techniques are subject to wear and tear. The thermal mass flow meters must

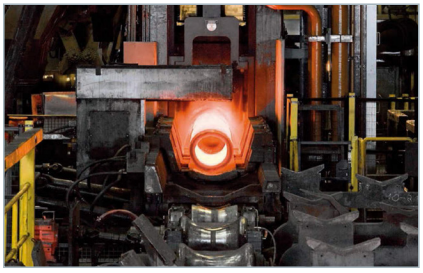
be calibrated regularly. Calibration, maintenance, or the replacement of defective measuring devices requires the respective line to be shut off, i.e. an interruption in the supply, and causes a great deal of effort for the necessary pipework. The technicians from the central technical service were therefore looking for a permanently wear-free measurement solution that would not impair plant operation.

Solution

Once again, Flexim's clamp-on ultrasonic technology proves to be the best measurement solution. A change in technology is usually associated with certain risks. However, not the switch to non-intrusive flow measurement with FLUXUS®.
Since the ultrasonic transducers are simply mounted on the outside of the pipeline, the user is convinced of the suitability of the acoustic measurement technology without any risk. This is usually done first with a test measurement, which is also the case at Vallourec in Düsseldorf. A home game for Axel Dickfeld, Flexim sales engineer in the field. With his portable FLUXUS® G601, he easily demonstrated the basic suitability of Flexim's clamp-on ultrasonic technology for the measurement task on a 6-bar line. As a result, Vallourec decided to initially fit the 85-psi compressor system with a stationary FLUXUS® G704 CA ultrasonic system to record the amount of compressed air generated there. Low-frequency GRK1N52 ultrasonic transducers, which stimulate the pipe wall with Lamb waves, ensure a strong measurement signal. Immediately next to the flow measuring point, a clamp-on Pt100 sensor also records the temperature non-invasively. The transmitter calculates the standard volume flow from the actual volume flow, temperature, and the pressure fed in via a current output.

Since the clamp-on compressed air measurement also proved to be convincing in continuous operation, the 115-psi compressed air station has now also been fitted with a FLUXUS® G704 CA. A third FLUXUS® G704 CA measures the compressed air consumed by a blasting system and an upsetting press on a 2" pipe. An additional advantage of acoustic measurement technology is its extraordinary dynamics.
Unlike the thermal mass flow or vortex flow measurement, the ultrasonic measurement does not require a minimum inflow. As a result, even low consumption is now reliably recorded for the first time.

The pipe mill in Düsseldorf-Rath
© Vallourec



The heart of the pilger line
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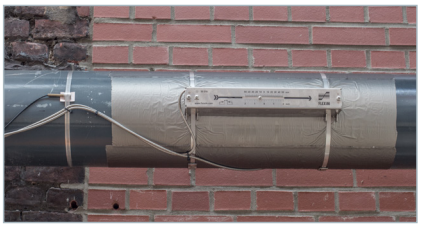
Compressors and compressed air storage in the compressed air centre

Not only well-acquainted with Düsseldorf but especially with compressed air and flow measurement: Axel Dickfeld, Flexim sales engineer in the field.



Measuring point with the ultrasonic flow transducers mounted in the VARIOFIX L mounting device and the Pt100 temperature sensor

The FLUXUS® G704 CA is used as the measuring transmitter.

Measuring Points and Instrumentation

Pipelines	steel, 8” and 2”
Medium	compressed air 85 psi, compressed air 115 psi

3 stationary clamp-on FLUXUS® G704 CA ultrasonic systems
2 pairs of clamp-on ultrasonic GRK1N52 flow transducers (Lamb wave) for gases, mounted in VARIOFIX L
1 pair of clamp-on ultrasonic GRP1N52 flow transducers (Lamb wave) for gases, mounted in VARIOFIX L
3 clamp-on Pt100 temperature sensors

Advantages

- Reliable and accurate non-intrusive recording of compressed air quantities (standard volume flow)
- Simple installation without interfering with the existing piping system with minimal assembly work and without the costs for additional fittings and piping work
- No wear and tear, no maintenance and calibration costs
- High measurement dynamics also enable the recording of small consumption quantities

Customer

Vallourec Deutschland GmbH, Düsseldorf-Rath Plant, Germany

Vallourec is a market leader in premium tube solutions for the energy markets and industrial applications. The products and services are used in challenging oil and gas wells, in almost all fields of application for renewable energies, in unusual architectural projects, and in high-performance machines and systems. In over twenty countries, around 17,000 employees work with their customers and help them to realise even the most demanding projects. Vallourec Deutschland GmbH is a 100% Vallourec subsidiary. The company operates two tube plants with different manufacturing processes in North Rhine-Westphalia (Düsseldorf and Mülheim an der Ruhr) and a globally unique research centre in Saxony (Riesa). Vallourec Germany employs around 2,400 people.

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