



STEAM QUANTITY MEASUREMENT IN FASTFOOD MODE



Production

“With its large measuring range and, in particular, its high sensitivity to low flow velocities, steam measurement from Flexim provides us with the measurement data that we need to further optimize our machines and processes.”



Lars Spristersbach,
Head of Technology ppa.,
Erlenbach GmbH



Measuring Task

Highly dynamic flow measurement of saturated steam during the expansion of particle foams

Whether moulding machine, block moulding machine or pre-expander: Erlenbach's

machines are designed to process a wide variety of materials, from expanded polystyrene – better known under the trade name Styrofoam – to expanded polypropylene to modern biopolymers. At the headquarters in Lautert, Erlenbach has a technical center where work is constantly being carried out on optimizing machines and processes.

In moulding machines, the raw materials are introduced into the desired shape in the form of small spheres and foamed with the addition of steam. The research carried out by developers at Erlenbach is aimed in particular at optimizing the foam processes with regard to cycle times and energy consumption. For this purpose, all physical parameters such as pressure, temperature and flow rate are monitored using measurement technology on the machines in the technical center and visualized and evaluated using specially created software. In order to record the amount of steam, a vortex flowmeter is installed in the main line which supplies the technical centre with hot saturated steam at around 330 °F at up to 100 psi. This technology is widely used for steam measurement,

but has one major disadvantage: its limited measuring range. A minimum flow is required so that eddies form, which can be detected by sensors. Steam quantities with low flow velocities remain undetected. However, the steam additions for the foaming processes, which only take a few seconds, are highly dynamic. That is why Erlenbach was specifically looking for an alternative measurement technology that better depicts what is happening in the steam pipe. Lars Spristersbach, Head of Technology at Erlenbach, came across Flexim during his research and the sales representative responsible for the region, Axel Dickfeld.

Solution



“Yes, we can now also measure steam non-intrusively”, confirmed Axel Dickfeld. The developers at Erlenbach didn’t really care whether it was non-intrusive or not. For them it was the dynamics of the flow measurement that mattered. “Yes, our measurement is highly dynamic”,

stressed Axel Dickfeld. Shortly before, Flexim had expanded the scope of ultrasonic flow measurement using the transit time difference method to include saturated and super-heated steam up to a temperature of 355 °F. A characteristic advantage of the measuring method is the extremely large measuring range and, in particular, the high sensitivity even at the lowest flow rates. Ultrasonic transducers carefully paired in the factory ensure that the transmitter reads zero when nothing is flowing. However, if something is flowing, the flow is reliably detected. Axel Dickfeld only really became aware of the challenge that the measurement task posed during his on-site visit. The foam experts from Erlenbach wanted to precisely record the short steam cycles with the finest possible resolution. Ten seconds is a common value for damping, in which fluctuating measured values are averaged. Erlenbach, on the other hand, wanted fluctuating measured values preferably in the millisecond range. “We have to try it out”, said Axel Dickfeld.

A test measurement was agreed.

The test measurement with the portable FLUXUS® G601 ST initially demonstrated the fundamental suitability of ultrasonic technology for the measurement task. However, the resolution achieved was not yet convincing. FLUXUS® flowmeters have a special measuring mode for rapidly changing flow rates, the FastFood mode. The portable system allows a storage rate every 80 ms. It’s pretty quick but it wasn’t enough for Erlenbach. “Our stationary measuring system has a faster processor”, said Axel Dickfeld.

Now a stationary FLUXUS® G721 ST-LT steam flowmeter measures the amount of steam in the technical center. The storage rate of 20 ms provides the required resolution. In the technical center, the foaming processes can now be followed live on the big screen. Lars Spristersbach is not only convinced of the solution that has been found, but also particularly appreciates the way there: “This fully corresponds to our own understanding of customer proximity. You have to listen, understand and find a solution together.”



The EMMotion 5.0 moulding machine
© Erlenbach



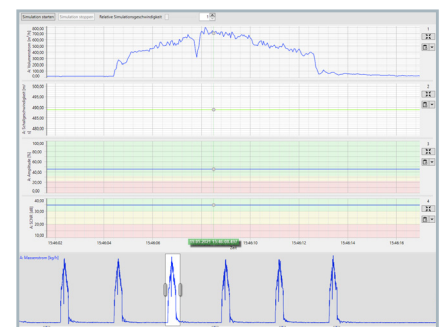
Flexim sales rep Axel Dickfeld in
Erlenbach's technical centre.



The insulation only needs to be temporarily
removed to install the clamp-on ultrasonic
transducers on the pipe.



The stationary FLUXUS® G721 ST-LT with
pressure and temperature compensation is
used as the transmitter.



A steaming and foaming cycle of approx. 8
seconds, visualized with FluxDiag.

Measuring Points and Instrumentation

Pipeline	4", C-steel, pipe wall thickness of 0.15"
Medium	Low pressure steam, approx. 330 °F, up to 100 psi
Measuring equipment	1 stationary clamp-on ultrasonic FLUXUS® G721 ST-LT steam flowmeter 1 pair of GTM1S52 clamp-on ultrasonic transducers for steam 1 pair of Variofix C transducer mounting devices

Advantages

- Highly dynamic, accurate measurement of small amounts of steam even with small opening strokes of the process valves in the machines
- Fast data acquisition in the millisecond range
- The measurements allow cycle times and energy consumption to be optimized at the same time
- Non-intrusive measurement technology can also be used outside of the technical center without significant installation effort

Customer

Erlenbach GmbH, Lautert, Germany

For over 60 years, Erlenbach has been synonymous with extraordinary and, above all, reliable machines for processing particle foams. The company was founded in 1957 by Hans Erlenbach, who processed expanded polystyrene (EPS) himself until 1967 and then devoted himself entirely to the development of particle foam systems. Since then, Erlenbach has delivered over 7,600 processing systems for particle foams, around 90% of which were exported.

Erlenbach is headquartered in Lautert in the Taunus region and has branches in San Antonio (Texas), in Como and in Shanghai. Some 140 employees generated a turnover of EUR 24.0 million in 2019.



The Emerson logo is a trademark and service mark of Emerson Electric Co.
Brand logotype are registered trademarks of one of the Emerson family of companies.
All other marks are the property of their respective owners.
© 2024 Emerson Electric Co.
All rights reserved.

For more information, visit
[Emerson.com/Flexim](https://www.emerson.com/flexim)

AR-202115-Erlenbach-US

FLEXIM

