

# Revolutionary flow measurement solutions in experimental reactor processes

In the field of industrial processing, the need for precise and adaptable flow measurement technologies is paramount for the development, testing, and optimisation of various operations. A leading process engineering company recently showcased the effectiveness of clamp-on ultrasonic flow measurement at their technical centre, utilising this advanced technology in processes involving changing mediums in batch reactors.

To appreciate this specific application, it's essential to first understand the basics of clamp-on ultrasonic flowmeter technology. Using ultrasonic transducers that are externally mounted on a pipe, these transducers emit ultrasonic waves through the pipe wall and medium flowing inside, with the flow rate being determined by measuring the time it takes for the sound waves to travel with and against the flow direction. This non-intrusive technique is particularly beneficial for measuring flow in pipes containing corrosive, abrasive, or viscous fluids, as there is no direct contact between the sensor and the medium.

## Challenges in flow measurement

In the company's technical centre, each test system is uniquely designed for specific customer processes. The facility can test a broad range of media, often dealing with corrosive substances, and those that vary from viscous to sticky. A significant challenge arose during an experiment involving the production of an oligomer in a batch-operated heated reactor. The process required accurate measurement of volume flow in the circulation line, complicated by the medium's changing properties – increasing viscosity and density as the reaction progressed.

## Collaboration and solution implementation

To address this challenge, the technical centre team collaborated with Flexim's field sales engineer, who provided a portable flowmeter, along with a comprehensive introduction to its operation. The clamp-on ultrasonic flowmeter proved to be an ideal solution, offering several benefits:

1. **Non-intrusiveness:** The external mounting of transducers means they aren't exposed to corrosive or viscous media, reducing wear and damage risks.
2. **High measurement dynamics:** The technology can detect even minimal flow rates and low velocities, essential for precise control in experimental processes.
3. **Flexibility and versatility:** The ease of setting up a measuring point and the transmitter's internal substance database allowed for swift adaptation to various media.
4. **Configurability:** Users could create custom data sets for specific mediums, improving the accuracy of measurements.

## Investment and future applications

Impressed by the portable flowmeter's performance, the company invested in a stationary system with enhanced digital communication features. A significant advantage of this technology is its ability to record flow rates non-intrusively and provide insights into the reaction process by simultaneously measuring the speed of sound in the medium.

The successful deployment of clamp-on ultrasonic flowmeter technology in this industrial setting highlights its potential as a versatile, accurate, and reliable tool for process engineering. It demonstrates how modern measurement technologies can significantly contribute to the efficient and safe design of industrial processes.

***To find out more about the capabilities and benefits of clamp-on ultrasonic flow measurement in the chemical industry, contact Simon Millington – [www.emerson.com](http://www.emerson.com) [flexim-uk@emerson.com](mailto:flexim-uk@emerson.com) | +44 (0)1606 781 420***

