

Application note

How Panametrics' clamp-on ultrasonic flowmeters enabled reliable measurement of hot liquids with solids

Summary

Founded in 1999, Zhejiang Xinhecheng Co., Ltd. is a manufacturer of functional chemicals, including nutritional ingredients, fragrances and polymer materials, and provides related R&D, production, sales and service.

For a trial project, the customer needed to measure a liquid containing 10% metallic solid particles at an operating temperature of 150°C.

Traditional electromagnetic and differential-pressure flowmeters proved unsuitable because electrodes and primary elements were quickly worn down by the solid particles.

As a result, the instruments required frequent maintenance, causing unplanned shutdowns and reduced yield – falling short of the customer's expectations. The Zhejiang Xinhecheng team therefore evaluated alternative solutions, with clamp-on ultrasonic technology standing out because it can be installed externally without modifying the pipe or interrupting the process.

Benefits:

- Low to zero maintenance
- No pressure drop
- No process interruption
- High reliability and long term stability



Fig. 1: C-PT 1 MHz installed on 2" SS line

Application

Medium:	Liquid catalyst
Pipe size and thickness:	DN50 (2")
Pipe material:	SS 304
Pressure:	0.2 MPa (29 psig)
Flow rate:	5 – 30 m ³ /h (22 – 132 GPM)
Temperature:	Up to 175°C (347°F)
Requested accuracy:	±1-2% of reading

Challenge

Interrupting production was not feasible, so the operator required a solution that could be implemented without disrupting ongoing operations. As there was no prior experience with this specific application, a field test was conducted to confirm that the flowmeter could perform under the process conditions. Furthermore, the customer expected the clamp-on ultrasonic liquid flowmeter to require minimal maintenance by design.

Solution

Panametrics conducted the field test using a PT900 portable flowmeter with 1 MHz clamp-on transducers. The transducers were mounted on a vertical pipe (Fig. 1) with flow from bottom to top. As the pipe was insulated, the insulation was removed for the test. Installation took approximately 15 minutes.

The customer assessed the meter accuracy by triggering the control valve and compared the resulting changes in flow. The flowmeter responded as expected, with readings tracking the valve's percentage opening. Based on the overall results, the customer was satisfied and decided to purchase permanent clamp-on instrumentation.

The selected solution was XMT1000LC with C-PT 1 MHz transducers, with an initial plan to purchase two units. The meters have now been in service for several years, continuing to meet customer expectations while reducing maintenance costs and improving production yield. For future installations, the customer plans to use C RS HT transducers rated up to 230°C.