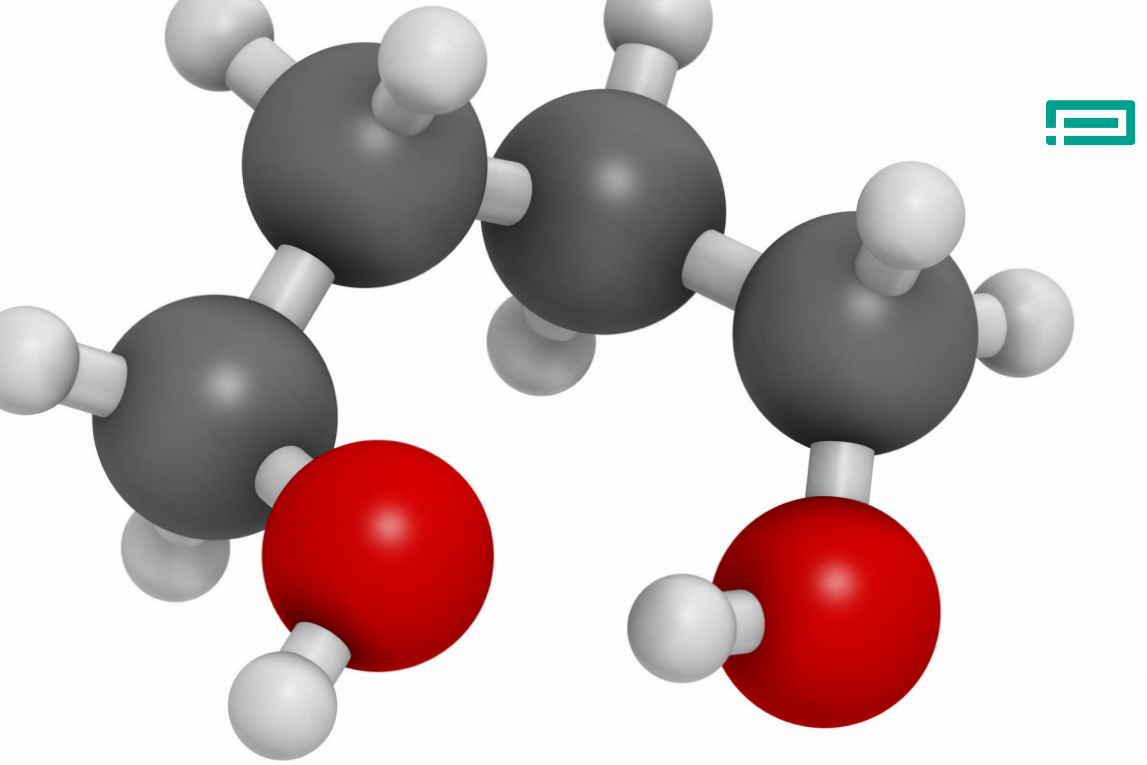

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Application note

Clamp on application in Butanediol

Benefits

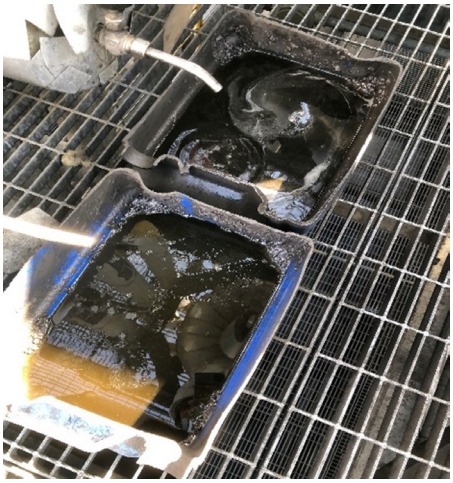
- Low maintenance
- No pressure drop
- No interruption to operations
- Long term stability and drift-free characteristics
- Flow measurement independent of temperature, pressure, viscosity, and conductivity

Summary

A chemical processing plant in China which produces butanediol (BDO) used to manufacture polyurethane, polyester, engineering plastics, high-end chemical fibers and pharmaceuticals, supermarket shopping bags, agricultural film, etc, required Panametrics' technology across one of its key process steps - transforming 1,4-butynediol (BYD) into 1,4-butanediol (BDO – $C_4H_{10}O_2$) by hydrogenation reaction.

Challenge

During the hydrogen reaction, the BDO contains up to 5% of solid particles and a small amount of hydrogen gas. This leads to wear and corrosion on the electrodes of the electromagnetic flowmeters often used as the technology of choice, which increases the maintenance cost of these flowmeters. The customer urgently required a solution that would provide accurate and reliable BDO measurements to optimize and increase the production yield.



Butanediol sample

PT878 diagnostics (used since tablets were not allowed on site)

Solution

As the line on which the measurement was required experienced some significant vibrations, the Panametrics team recommended the CFG-V4 clamping fixture for transducer installation instead of the standard SCF together with the C-RS402 single path because there were no tight accuracy requirements. Once installed with a portable liquid meter, the signal strength was 62.2 (pretty good) with sound speed of 1499.48 m/s and stable flow rate readings of 2.7 m/s. The customer was delighted with the clamp on product performance as the results aligned with the measurements from the pump.

As a result, the customer will replace its six electromagnetic flow meters that are not reliable and causing high maintenance costs with Panametrics PanaFlow LC meters, which are compliant with a hazardous area installation. For future projects, the customer has indicated that its preferred choice will be Panametrics' Clamp-On Ultrasonic Flow Meters.

Specifications

- Fluid: 1,4-butanediol (BDO)
- Pipe size: 2''
- Pipe material: SS
- Process temperature: 70°C (158°F)
- Pressure: 2 MPa (290 psig)
- Density: 920 kg/m3
- Dynamic viscosity: 0.5 mPa.s
- Flow velocity: 1 m/s to 3m/s (3.3 ft/s – 9.84 ft/s)

Panametrics, a Baker Hughes business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement.

Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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