Panametrics
a Baker Hughes business

Application note

Clamp on application for high pressure ethylene for EVA (Ethylene Vinyl Acetate) production

Benefits

- Low Maintenance
- No Pressure drop
- No Interruption to operations
- Safe measurement
- Long term stability and drift free characteristics

Summary

Panametrics' customer, Jiangsu Sierbang Petrochemical Co. Ltd in China, produces Ethylene Vinyl Acetate (EVA), a copolymer resin used for its lightweight and excellent foamability performance. This process is part of the polyethylene plant and requires a high pressure of ethylene from reciprocating compressors.

On this line the customer has to measure the flowrate to ensure that the EVA produced remains within specifications for use across various applications. If the flow rate is too low, it will lead to incomplete reaction.

The pressure inside the pipeline reaches up to 200 MPa. Flow measuring instruments that require the pipe to be cut are not suitable here for safety reasons.

The customer knew how difficult these measurements can be and was not overly confident that a clamp on solution would deliver the required accuracy. So they requested a field demonstration by the Panametrics team.

Challenge

The application was for a DN100 (4") line with 35 mm wall thickness. This presented a challenge – it was the first time that a Panametrics clamp-on flow meter had been used in such thick 4" gas lines. There was a concern that the signal strength and SNR would be too weak due to the acoustic signal dissipation outside of the pipe, leading to potential measurement losses.

However, the team pulled out all the stops and demonstrated the quality of Panametrics technology.

Solution

After sharing site specific process parameters, the calculation and subsequent meter and transducer recommendations were confirmed.

Fig. 1: Clamp on installation on high pressure hydrogen line

Fig. 2: Good flowmeter readings

At these working conditions, ethylene is in a supercritical state with a sound speed approaching 1700m/s. As a result, Panametrics recommended its Transport PT900 with CRS 401 transducer for the demonstration – a liquid meter! Only the clamping fixture was for gas measurement – CFG – to ensure the accurate positioning of transducers.

On-site installation went smoothly and the testing was very successful. The flowmeter displayed 1679 m/s sound speed which equated to the same ethylene theoretical sound speed at 20°C and 200MPa. The customer was impressed and very satisfied with the end solution.

Jiangsu Sierbang Petrochemical has now adopted Panametrics clamp on flowmeter technology.

Ater having successfully demonstrated that Panametrics technology is effective across thick 4" gas lines, a number of other customers are requesting demos with a view to implemeting this solution!

Specifications (OPT)

- Fluid: Ethylene gas
- Pipe: 121mm x 35mm (4"¾ x 1.38")
- Pipe material: Carbon steel
- Process temperature: 20°C (68°F)
- Process pressure: 195 MPa (28,282 psi)
- Fluid density: 586kg/m^3 (36.58 lb/ft^3)
- Fluid sound speed: 1679 m/s
- More than enough straight runs up and downstream

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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