Application note

Panametrics Technology Ensures Reliable Flow and Gas Content Measurement at a German Fertilizer Plant

Benefits:

- Wide turndown ratio
- No pressure drop
- Reliability
- Binary gas content determination

PanaFlow Z1G installed on the gas lines

Summary

Fertilizers use ammonia, nitrogen and hydrogen. A fertilizer plant in Germany had applications involving ammonia (NH_3) and nitrogen (N_2) gas mixture and were seeking a solution to measure the flow on two lines.

On the ammonia synthesis loop, the ammonia and nitrogen mixture circulate through the reactor and the heat exchangers loop to condense ammonia with excess nitrogen. Measuring the NH_3 in N_2 is an indication of the reaction completion and highlights if more hydrogen needs to be injected. Therefore, the customer wanted to determine the percentage content of NH_3 and N_2 in the pipeline. This required the combination of a flowmeter and a dedicated analyzer.

However, the available technologies combined with cost considerations made it very challenging to find a suitable analyzer for this application.

Application

Medium:	NH_3/N_2 gas mixture
Pipe size and material:	SS316, 219.1mm (8″)
Flow rate:	10 to 6000 m^3/h (353 to 212,000 CFH)
Temperature:	-33°C to 20°C (-29 °F to 68°F)
Pressure:	1 bar (14.5 psig)
Requested accuracy:	<±1.5% of reading

Challenges

The application required the meter to deliver highly accurate and repeatable measurements across an exceptionally broad flow range—from very low to very high rates—a challenge that exceeds the capabilities of many technologies and manufacturers.

To make the application even more challenging, available analyzer technologies within a reasonable cost range were limited.

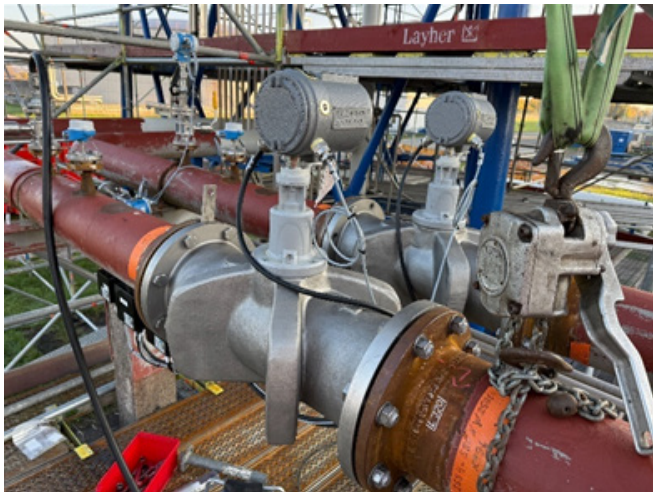
Additionally, there was a possibility of a certain level of wet gas due to the presence of small traces of condensate.

However, recognizing the ability to achieve efficiencies, improve productivity and secure a competitive advantage, the customer was determined to find a solution… and so turned to Panametrics.

Solution

To meet the demanding application requirements, Panametrics selected the PanaFlow Z1G gas meter. This advanced meter is capable of accurately measuring an exceptionally wide flow range and offers binary gas content determination by leveraging differences in the speed of sound between gases at the same temperature—a critical advantage for this application. Furthermore, the meter's transducers are specifically engineered to handle wet gas conditions, drawing on robust mechanical design and a powerful signal developed from Panametrics' legacy in flare measurement technology.

The customer has experienced consistently reliable performance with the PanaFlow Z1G meters and appreciates the convenience of a single solution that overcomes three major challenges: accurately measuring a wide flow range, providing integrated analyzer capabilities, and ensuring dependable operation even in wet gas conditions.



PanaFlow Z1G view from the back

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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