Panametrics

Application note

Trace Moisture Measurement in CO_2

Summary

Trace moisture is measured in carbon dioxide (CO_2) for quality control. Carbon dioxide supplied to end users is delivered in liquid transport trailers or gas cylinders. CO_2 is used in several diverse industries including the chemical, metal, plastic, food, beverage, pharmaceutical and agricultural. Impurities such as water vapor adversely affect the end user's process.

Application

At the production facility CO_2 is typically dried by using a molecular sieve dryer. A sample of gas taken directly from the outlet of the dryer is usually drawn off and the water vapor concentration measured with an Aluminum Oxide (AlOx) trace moisture sensor. A check is also made at the loading facility where tanks and trailers are filled. Typical specifications require that the CO_2 contain a maximum of 1 ppmv (part per million by volume).

Specifications for "food grade" CO_2 have been set by the International Society of Beverage Technologists (ISBT). At bottling and beverage production plants the maximum moisture content cannot exceed 20 ppmv.

Challenge

Carbon Dioxide is an "acid gas." When combined with high levels of water it forms carbonic acid which is corrosive to many sensors. Infrared or near infrared absorption techniques such are limited in range particularly below 20 ppmv. CO_2 also absorbs water in the infrared region. Food and pharmaceutical applications require sterile or clean in place sensors. Panametrics meets the requirement by utilizing sample conditioning systems.

Benefits:

- Time proven sensor
- Ability to consistently measure <1 ppmv
- Sensors may be returned to Panametrics for cleaning and recalibration
- Built in data logger on portable analyzer

The solution

Panametrics has several solutions for permanent monitoring including HygroPro II/XP transmitter, dew.IQ analyzer and for spot checks using the PM880 battery operated portable moisture analyzer. For multiple points of measurement, the moisture.IQ may be utilized. It connects to six moisture probes simultaneously. For continuous monitoring the sensors are assembled in a sample system which provides isolation and flow control valves, pressure indication, flow indication and filtration.

Application specifications

- Range: 0 - 100 ppmw
- 4 - 20 mA signal
- Assembled in SS for “wash down” applications

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