

- The zero-offset (during low or no flow) of a Coriolis meter needs to be checked and verified periodically. Errors can occur if the tubes become mechanically unbalanced due to coating or erosion. The BR+ does not require Zero setting.
- Complex electronic filtering by a Coriolis meter can cause delays in flow/response measurement. Therefore, a minor change in flow during a proof run can translate to poor repeatability in a Coriolis meter. The pulses of Brodie's BiRotor+ are created in real-time directly from its pulse wheel, without electronic manipulation. This makes proving straightforward and easy.

Testing and results

The testing conducted by Brodie consisted of 10 repeatability checks at flowrates from 70 to 900 GPM in 100 gallon increments.

The linearity curve of the 4" BR+ meter was nearly flat. The linearity curve of the 3" Coriolis meter was a steady increase. On the meters tested, the linearity of the BR+ meter was $\pm 0.033\%$ vs $\pm 0.106\%$ for the Coriolis meter.

The 3" Coriolis repeatability spread constantly increased at flowrates greater than 500 GPM. At 900 GPM, the repeatability spread was over four times greater than at 500 GPM.

Based on the results achieved, Brodie calculated the implication on cost due to the uncertainties of both meters.

Assumptions

Application: truck loading rack.

Operating flow rate: 600 gpm (2270 lpm).

Operation: 10 hours/day; 365 days/year.

Annual volume: 131 4000 000 gallons/year.

Gasoline cost per gallon: \$ 0.70.

Uncertainty cost per year:

Coriolis: 1,00042 [max meter factor] – 1,00017 [min meter factor] = 0,00025 [uncertainty].

131 400 000 gallons x 0,00025 [uncertainty] = 32 850 gallons/year.

BiRotor+: 1,00030 [max meter factor] – 1,00016 [min meter factor] = 0,00014 [uncertainty].

131 400 000 gallons x 0.00014 [uncertainty] = 18 396 gallons/year.

Difference between both meters = 14 454 gallons/year i.e. a saving of \$10 118/year using the BiRotor+

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Turbidity sensor with IO-Link

Digitisation has branched into industry under the keyword Industry 4.0. IO-Link offers significant advantages when it comes to reliably controlling the entire system technology in process control with a vast number of measuring points, control devices and operating elements. The new dimension of hygienic measurement technology is hybrid and modular.

Anderson-Negele's ITM-51 incorporates flex-hybrid technology with IO-Link and 4-20 mA, which allows data from the sensor to be transmitted digitally, as an analog signal, or in parallel. The bidirectional communication enables status control and preventive maintenance at any time to avoid production downtimes. Installation and commissioning are time and cost-saving thanks to plug-and-play technology, and sensor replacement is easier thanks to 'Smart Replace Design' with automatic detection, configuration and parameterisation.

Modular sensor platform

IO-Link alone is a big step towards industry 4.0 in hygienic process technology. The flex-hybrid connection of digital and analog communication enables the simultaneous use of both to create flexibility. With its application-specific configuration, the modular sensor platform offers equipment that is tailored to

requirements and cost optimised. It enables simple replacement of individual components such as display or electronics. The optional remote version also features separate sensors and electronics housings. The electronics are identical for all sensor types and recognise them independently, while each sensing device can be replaced simply by exchanging and connecting, and only one replacement unit of electronics housing and cable is necessary for all sensor types.

Benefits in the production process

ITM-51 enables active automated phase separation of milk and milk products, beer and yeast, by inline analysis of the turbidity and active switching of the process.

The passive phase separation by means of time or volume control always needs a safety margin. Therefore, in every process step product is lost or quality is affected.

Advantages with ITM-51 include:

- Minimisation of the loss of raw material and thus of value.
- The filling of tanks with incorrect medium is reliably avoided.
- Less cost for wastewater treatment.
- Best possible concentration and thus a constantly high quality of the product.
- Efficient separator control in breweries for uniform quality of beer.



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