APPLICATION REPORT

Food & Beverage

Flow measurement of raw milk with a high air content

- Monitoring the volume of raw milk for balancing the milk yield
- Volume measurement of product flow with entrained gas
- Continuous and uninterrupted operation of the measuring point

frischli MILCH UND MEHR

1. Background

Frischli Milchwerke GmbH produces fresh and long-life dairy products for retailers, catering establishments and other large consumers at several locations in Germany. The privately-owned dairy also operates one of Europe's largest and most modern production sites for individual coffee cream portions in Eggenfelden, Germany, producing around 1 billion portions at this location annually.

2. Measurement requirements

The raw milk needed for production (max. 22,000 kg/h / 808 lbs/m) is fed through the raw milk reception via two pipelines (DN 50 / 2") to several buffer tanks. The milk is first stored in these buffer tanks and then further processed into coffee milk in several stages. In order to compare the milk yield with the amount of raw milk delivered, it is necessary to have an accurate measurement of the raw milk volume as possible. To determine the volume of raw milk, Frischli previously used two standard mass flowmeters. The measurements, however, were repeatedly affected by entrained gas in the raw milk caused during transportation. Due to low temperatures and the corresponding viscosity, the operation of a deaeration tank also could not fully eliminate the entrained air. A two-phase stream occurs due to the entrained air which affects the oscillation signal of the traditional measuring device, thereby causing inconsistent sensor amplitudes. As a result, the electronics of the devices used was regularly disrupted when searching for the natural resonant frequency of the measuring tube, causing significant measuring errors or "frozen" measured values taken during the last stable readings. The required transparency of the processed raw milk volume could therefore never permanently be established, and so Frischli decided to install a mass flowmeter which can also reliably measure media with gas entrainment.

KROHNE

3. KROHNE solution

KROHNE recommended the replacement of the old device with the OPTIMASS 6400 C. The Coriolis mass flowmeter was installed in the two raw milk lines in front of the buffer tank. In accordance with the legal requirements, it has a hygienic aseptic flange connection according to DIN 11864.

In contrast to other mass flowmeters available on the market, the OPTIMASS 6400 maintains operation over a wide range of gas fractions and complex flow conditions. Using the patented functionality of Entrained Gas Management (EGM™), the flowmeter maintains operation even with air entrainments of up to 100% in the raw milk.

Installation of the OPTIMASS 6400 in front of the buffer tank

4. Customer benefits

Frischli is very pleased with the OPTIMASS 6400. The problems of flow measurement caused by entrained gas have now been resolved and continuous monitoring of the raw milk volume is possible. Significant measurement distortions or even the failure of the measuring point no longer occur. The measuring point is maintained regardless of the gas content in the raw milk, and the customer can continue to work with stable measuring results.

Today, by using the KROHNE measuring device, frischli benefits from greater transparency of the volume of raw milk delivered. The customer uses this knowledge to balance the raw milk yield. In this way, the dairy plant can always compare the coffee cream produced with the actual raw milk volume delivered and, if required, determine the optimization potential of operational processes.

5. Product used

OPTIMASS 6400 C

- Twin bent tube Coriolis mass flowmeter for liquids and gases
- Entrained Gas Management (EGM™): maintains operation with gas entrainment of up to 100%
- Communication: HART®, FOUNDATION™ Fieldbus, PROFIBUS® and Modbus
- Modular electronics concept

Contact
Would you like further information about these or other applications?
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