Introduction

Top-class milk products and highly productive processes can only be achieved through the accurate measurement of milk quantities. Measurements of this kind have previously been carried out primarily by means of volumetric measurement methods, for example using electromagnetic flowmeters. However, recording solely the volumes means that any inconsistencies in the milk, e.g. air content, are ignored. Furthermore, the measuring accuracy which can be achieved with such methods—typically a margin of error of between 0.2 % and 0.4 % of the measured value—no longer meets current demands.
CoriolisMaster FCB300, FCH300
Continuous flow measurement during milk collection

Instrumentation

The Coriolis measurement method for the FCB300 / FCH300 mass flowmeter combines highly accurate mass, density (fat content), temperature and concentration measurements in a single device. The sensor has a double-tube design with an outstanding signal-to-noise ratio. The increased inside diameter of the tubes and the enlarged measuring spans which reduce pressure loss are particularly noteworthy. Resistance to vibrations, an ability to withstand operating temperatures of up to 200 °C, a wide range of hygienic/process connections (DIN 11851, Tri-Clamp), and awarding of certifications (EHEDG) make the CoriolisMaster FCB300 / FCH300 an ideally suited measuring device for use in the food and beverage industry and in all hygienic applications.

Profitability calculations

The following example illustrates the benefits of a mass flowmeter and highlights the short time within which investment costs can be amortized. The discrepancy between recorded milk delivery values and final production figures was what prompted us to install a mass flowmeter. There was a shortfall of around two tank loads of raw milk per month, caused by variations in density values and the poor level of measuring accuracy of the electromagnetic measurement method used up until that point.

This resulted in a deficit of approximately EUR 6,000 per month (40,000 liters of raw milk at an average price of 0.15 EUR/liter). The new measurement method and the higher level of measuring accuracy which can be achieved has made it possible to reduce this discrepancy substantially, these conditions meant we saw a return on our investment after just two months. The use of density measurements to continuously monitor fat concentration, or in other words milk quality, also boosts efficiency at the same time as improving product quality.
Additional uses

Coriolis mass flowmeters are also being used increasingly frequently for the further processing of raw milk into end products such as whole milk, pasteurized milk or milk-based drinks with particular flavors, plus yogurt or cheese products.

Fig. 2: Recording milk volumes at a pasteurizer supply tank with the CoriolisMaster type MC2

Fig. 3: Coriolis mass flowmeters MC2 and FCB300; used in the milk-processing industry for raw milk measurements, determining fat content and the subsequent blending of raw materials to guarantee a uniformly high quality of milk

Fig. 4: CoriolisMaster FCB300 used in the manufacturing process for instant coffee products to measure milk components before the drying process.
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