Raw Milk Delivery by Tanker

Coriolis Flowmeter

Raw Milk Tanker Measurement

Plant Name: Dairy Facility

Industry: Food and Beverage

Customer's Product: Raw Milk

Application

The dairy production plant process begins with the receipt of raw milk from a dairy farm. The raw milk arrives in insulated tanker trucks and is unloaded into collection tanks prior to processing. A milk tanker is typically fitted with a pump and flowmeter that records the volume of milk loaded from each individual farm. Confirmation of the total volume of milk delivered to the dairy plant is performed either by weighing the tanker or via flowmeters in the tanker bays.

Measurement of the raw milk delivered to the dairy plant confirms not only the quantity of milk to be processed but also the quality in terms of fat percentage. The price paid to the dairy farmer depends on both figures. This is why the use of highly accurate flow measurement instruments in the tanker bay is critical. Ideally, this system would also measure the density and temperature of the milk at the same time. This allows verification of the quality before the raw milk is transported to the plant storage tanks.

Raw milk tanker trucks at a dairy plant

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Challenges

There are several challenges involved in the measurement of raw milk. One is the high flowrate. For milk, there are constraints on the velocity of the liquid to ensure that the product is not damaged. This requires a larger flowmeter in order to keep the milk velocity within the required limits.

Fluid dynamics when emptying the tanker truck present another challenge. During the unloading process, significant amounts of entrained air and milk foam fill the pipe. This creates a problem for volumetric flowmeters, which require the pipe to be full for accurate measurement.

If the plant uses weighbridges to determine the quantity of raw milk delivered, time is the challenge. Measurement by weighbridges is a time-consuming process that limits the number of tankers that pass through the bay(s) in a given time. This impacts the processing plant feed and tanker truck availability.

Tanker truck unloading raw milk in a tanker bay

Solution

Using a Coriolis flowmeter at each tanker bay provides a very accurate measurement of incoming raw milk. Since a Coriolis flowmeter can provide both mass and volumetric flow, it eliminates the need to weigh a tanker.

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A newly installed ROTAMASS Coriolis flowmeter in a customer process

The ROTAMASS flowmeter allows simultaneous measurement of mass flow, volumetric flow, liquid density and process temperature. Using the multiple I/O and HART communications from the flowmeter, the plant has access to all measurements. ROTAMASS Giga sensors are designed to deliver best-in-class accuracy at high flowrates. The meters provide accuracy up to +/- 0.1% and excellent zero stability. The larger size of the Giga's dual U-tubes allows the milk velocity to be kept within the recommended limits.

Key Technologies

ROTAMASS Giga

- Best-in-class accuracy at high flowrates
- Dual U-tubes
- Simultaneous measurement of mass flow, volumetric flow, liquid density, and process temperature in a single meter
- Enables highest utilization and efficiency for tanker trucks