APPLICATION NOTE

Food & Beverage

Mass flow measurement for soft drink carbonation

- Repeatable and highly accurate dosing of CO_2 to increase yield
- Establishing a consistently high product quality of carbonized soft drinks
- Minimizing costs and product waste through efficient use of resources

1. Background

A manufacturer of soft drinks operates various beverage plants in South America. Next to bottling and distribution facilities, the company runs a mixing plant where some of their brands are blended and then finally carbonated.

2. Measurement requirements

The mixing plant has an inline blending system where water and syrup are carefully combined in a mixing station with proportioners that regulate the flow rates and ratios of the liquids. Having been mixed together, the finished products are transported to the carbonator. During the carbonation process, a desired quantity of CO_2 is injected into the process to give the soft drinks their sparkling character.

In order to run the carbonation process more efficiently and to improve the product yield of aerated soft drinks, the customer decided to update its dosing equipment. In the past, the customer had been supplied with CO_2 by a gas manufacturer and billed accordingly. The plant operator was therefore searching for a flowmeter that enabled a precise input control of CO_2 and provided transparency over the actual gas quantity consumed.

KROHNE

3. KROHNE solution

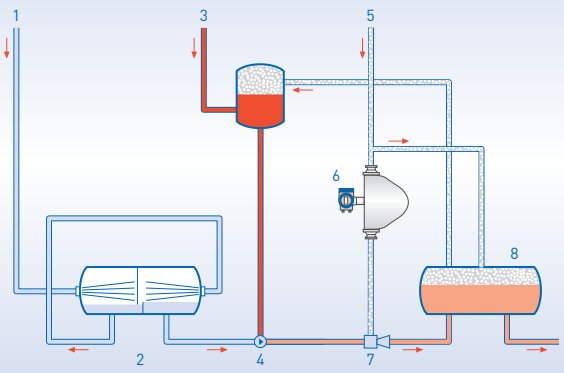
The customer decided on the OPTIMASS 6400 flowmeter. The Coriolis mass flowmeter is a standard measuring device for gas and liquid applications in the food and beverage industry. The KROHNE meter features a twin V-shaped measuring tube and a patented flow splitter that enables an optimised flow profile and minimizes pressure loss. It provides maximum measuring accuracy and repeatability (±0.35% of measured value for gases).

The Coriolis mass flowmeter was supplied with stainless steel (316L) measuring tube. Hygienic process connections were not required as the CO_2 still passes a polisher system to remove impurities before it is dosed into the product stream. The KROHNE flowmeter was therefore mounted with standard flanges (DN50), though a wide range of clamp, SMS or other hygienic fittings would also have been available.

To prevent the build-up of condensation from influencing the measurement, the measuring device has been installed in a horizontal pipeline with the bent dual measuring tube above the longitudinal axis of the pipe (see image below right).

Mixing station for inline blending (general schematic drawing):

1 Water
2 Degassing of the water
3 Syrup concentrate
4 Mixing pump (proportioner)
5 CO_2
6 OPTIMASS 6400
7 Carbonation
8 Finished beverage



Installation of the flowmeter

4. Customer benefits

Using the OPTIMASS 6400 helps the beverage company maximize the soft drink yield. Due to the high accuracy and repeatability of the KROHNE meter, the customer is now able to inject as little CO_2 as necessary to carbonate as many soft drinks as possible. In turn, it also allows the customer to better meet the production quality criteria, enabling a consistently high product quality in terms of carbonation. In this way, the efficiency increase saves on product waste and costs for CO_2 resources.

5. Product used

OPTIMASS 6400 C

- Coriolis mass flowmeter for gases and liquids in the food and beverage industry
- Twin bent tube design with stainless steel (1.4404 / 316L) sensor material
- High accuracy mass, density and volume flow measurement (±0.35% of MV for gases and up to ±0.05% of MV for liquids)
- Available with various hygienic connections (clamps, SMS, DIN 11851 etc.)
- Hygienic certifications and standards: 3A, EHEDG; FDA, EC 1935/2004
- Communication options: HART®, FOUNDATION™ Fieldbus, PROFIBUS® PA & DP, Modbus and PROFINET

Contact
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