



APPLICATION NOTE

Food & Beverage

Flow measurement for the cold sterilisation of juices and sparkling beverages

- Efficient DMDC dosing for cold sterilisation of fruit juice beverages
- Determining the beverage volume for proportional control of a dosing system
- Yield maximisation of a safe end product with a long shelf-life

1. Background

One of Germany's largest manufacturers of mineral water and beverages produces juice-based soft drinks such as sparkling apple juice. The beverages are preserved on site to protect the end products from things like bacteria, mould and yeast.

However, to avoid adversely affecting the taste and colour of the beverages, the company stays away from traditional methods such as pasteurisation and hot filling, opting for a state-of-the-art cold sterilisation process.

2. Measurement requirements

The manufacturer uses a highly effective microbial control substance for the cold sterilisation. This food additive, known as dimethyl dicarbonate (DMDC), is added to the end product in extremely small doses to deactivate the enzyme (carboxymethylation). Within a few hours the ester breaks down into negligible amounts of methanol and CO₂. Both are found naturally in many fruit and vegetable juices. Cold sterilisation is thus considered safe and does not pose any health risks.

A dosing unit doses the DMDC. A dosing pump is used to introduce the medium into the main product flow, which is subsequently transported to bottling. In order to set the desired ratio of DMDC to beverage volume and to adhere to the approved limits, the flowrate of the sparkling juice must be continuously and precisely measured.

KROHNE

3. KROHNE solution

To accurately determine the volume flow of the fruit juice beverages the customer installed the OPTIMASS 1400 C Coriolis mass flowmeter. Due to the twin straight tube design featuring an optimised flow splitter there is virtually no pressure loss and the flowmeter is self-draining and easy to clean. For this reason it is the perfect choice for hygienic applications.

Upon customer request the measuring device was made of stainless steel (1.4404) and fitted with aseptic pipe screw connection (DIN 11864-1A) in DN50. It has been installed in the standpipe, immediately before the ester is added using the dosing system. The converter on the Coriolis device is also made of stainless steel. In addition to information about volume flow, the device also provides the added up volume as well as a contact output when a minimum density is not reached.



Measuring the flow of the beverage volume with the OPTIMASS 1400 C



Dosing system for cold sterilisation

4. Customer benefits

Using the OPTIMASS 1400, the customer can add the DMDC according to a proportional control. The KROHNE device thus fulfills an important role in maximising yield. Based on the beverage flow, only the amount of sterilisation agent that is actually necessary to sterilise a maximum beverage volume is added. This makes it possible to effectively prevent expensive overdosing. Limits are observed. The mass flowmeter thus contributes to the production of a safe end product with a long shelf-life and the beverage producer can guarantee the best possible product quality by using this cold sterilisation process to protect the flavour.

5. Product used

OPTIMASS 1400 C

- Coriolis mass flowmeter for universal applications and process control in the food and beverage industry
- Highly accurate measurement of volume flow, mass flow and density
- Entrained Gas Management (EGM™): continuous operation with no loss of measurement at up to 100% gas content in the medium
- Twin straight tube design made of stainless steel (EHEDG, 3A; EC1935/2004, FDA)
- Self-draining and easy to clean (CIP/SIP)
- Numerous hygienic connections: SMS, clamps, DIN 11864-1A, DIN 11851 etc.
- 3 x 4...20 mA, HART®7, Modbus, FF, Profibus-PA/DP, PROFINET



Contact

Would you like further information about these or other applications?
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