



APPLICATION REPORT Food & Beverage

Vortex flow measurement of carrier air in a sterilisation facility

- Flow control in a packaging machine for the sterile closure of yogurt pots
- Determination of the standard volume flow to maintain operational tolerances
- Optional media balancing to flexibly adjust to future changes in packaging material



1. Background

NSM Packtec GmbH, based in Ahaus, Germany, designs, manufactures and installs high-performance packaging machinery for international companies in the dairy and beverage industry according to customer specifications. NSM's portfolio includes pot molding, filling and closing machines (FFV). These facilities are designed according to an integrated aseptic concept and use hydrogen peroxide (H_2O_2) for the inline sterilisation of all of the packaging materials.



Sterilisation system

2. Measurement requirements

NSM manufactured a packaging machine with just such a sterilisation system using the H_2O_2 spray method for a milk processing operation in the USA. In this procedure, the materials to be sterilised are sprayed with a heated H_2O_2 aerosol that is versatile and non-destructive. Heated, sterile carrier air is fed to an aerosol lantern in order to convey the H_2O_2 aerosol generated there to a spray chamber. It is then sprayed on to a heat sealing film for sterilisation. The heat sealing film is then applied as a seal for the yogurt pots in the packaging machine. The carrier air must be supplied in a defined quantity to guarantee a consistent, even coating. The plant manufacturer was looking for a suitable flowmeter to accurately monitor the flow of the carrier air even at fluctuating pressures (6...8 bar / 87...116 psi) and temperature conditions (approx. 40 °C / 104 °F).

3. KROHNE solution

NSM decided on the OPTISWIRL 4200 C. The DN 25 vortex flowmeter was installed in the non-sterile area of the sterilisation facility. The device measures the standard volume flow of the carrier air for the aerosol lantern. The air is reduced or regulated to the plant operating pressure, cleaned using sterile filters, heated up and conveyed to the aerosol lantern.

Due to fluctuating process conditions, KROHNE recommended using the device with integrated pressure and temperature compensation. This puts the OPTISWIRL 4200 in a position to take into account fluctuating process conditions when calculating the standard volume while guaranteeing correspondingly high accuracy.



OPTISWIRL 4200 C for the measurement of carrier air

4. Customer benefits

The OPTISWIRL 4200 C guarantees continuous sterilisation of the heat sealing film used to seal the yogurt pots. As the vortex flowmeter measures pressure and temperature in addition to volume flow, there are no additional installation costs for separate pressure or temperature sensors. In addition, familiar measuring errors are eliminated as the OPTISWIRL 4200 measures all parameters at one single position.

Along with increased accuracy and process reliability, the end customer in the dairy industry also benefits from the possibility of quantity balancing for the measuring device. This makes it possible to flexibly adapt sterilisation and sealing in the face of changing requirements. This way, for example, the sealing of the yogurt pots can be adjusted according to changing film materials and dimensions.

5. Product used

OPTISWIRL 4200 C

- Vortex flowmeter for conductive and non-conductive liquids, gases and steam
- Integrated pressure and temperature compensation for auxiliary and supply circuits with changing process conditions
- Advanced technology for signal filtering
- Measuring range: DN15...300 / 1/2...12"
- Also available with integrated nominal diameter reduction
- Developed according to IEC 61508, Edition 2, for SIL2
- ATEX, IECEx, QPS, NEPSI etc.
- HART[®], FOUNDATION[™] fieldbus and PROFIBUS[®] PA



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