APPLICATION REPORT

Food & Beverage

Flow measurement of liquid nitrogen for tunnel freezers

- Consumption measurement for freezing goat cheese
- Use of Coriolis mass flowmeters for continuous flow measurement at -170°C / -274°F
- Cost-effective cryogenic process for the best possible product yield

1. Background

EURIAL is France's second largest dairy cooperative. The group includes 24 dairies and cheese dairies with over 4600 employees. The milk processor specialises in the three business areas "conventional cow's milk", "organic cow's milk" and "goat's milk". The EURIAL Group sells its milk products to all major food retailers, wholesalers, restaurant chains and food manufacturers.

2. Measurement requirements

Before it is supplied to restaurants and food producers, goat cheese is fed into tunnel freezers after production. This cryogenic freezing allows the cheese to be preserved for a long time.

Tunnel freezer for cryogenic freezing of goat cheese

For cryogenic processing the company uses liquid nitrogen with a temperature of around -170°C / -274°F that is driven into a cooling system at a pressure of 1.4...2 bar / 20.3...29 psi. As the medium is cost-intensive the cryogenic process must be operated as efficiently as possible. It is therefore important for the customer to continuously determine the liquid nitrogen consumption in his two tunnel freezers.

In the past, the customer had the liquid nitrogen consumption checked only every two years by a service company. However, this sporadic bypass measurement was too inaccurate to identify efficiency loss. In order to permanently optimise the cryogenic process and save costs, the company decided to continuously determine the current and total nitrogen flow.

3. KROHNE solution

KROHNE recommended the OPTIMASS 6400 F for this cryogenic application. Due to its high-end options, the Coriolis mass flowmeter with twin bent tube is ideally designed for the flow measurement of cryogenic media such as liquid nitrogen.

The customer uses the OPTIMASS 6400 in the supply lines to both tunnel freezers. The flowmeters were supplied in size DN25 with measuring tubes made of stainless steel (1.4404 /316L). In addition, both instruments were completely equipped with insulating housings ex works. In order to be able to carry out a zero point calibration of the measuring instruments on site, a valve was mounted behind each Coriolis meter.

Mass flow measurement of liquid nitrogen for tunnel freezers with the OPTIMASS 6400 F

4. Customer benefits

By continuously and accurately determining the current and total mass flow, the customer benefits from precise monitoring of liquid nitrogen consumption.

Using the OPTIMASS 6400 helps the dairy cooperative constantly optimise the cryogenic process to always supply both tunnel freezers with the same amount of nitrogen. This ensures cost-efficient freezing of goat cheese with the best possible product yield in mind.

Shock-frozen goat cheese leaving a tunnel freezer; above: OPTIMASS 6400 F

5. Product used

OPTIMASS 6400 F

- Coriolis mass flowmeter for cryogenic applications (down to -200°C / -328°F) in food and other industries
- Highly accurate measurement of mass flow, density and volume flow
- Flange: DN10...300 / 1/2...12", max. PN 160 / ASME Cl 1500
- Also available as hygienic version

Contact
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