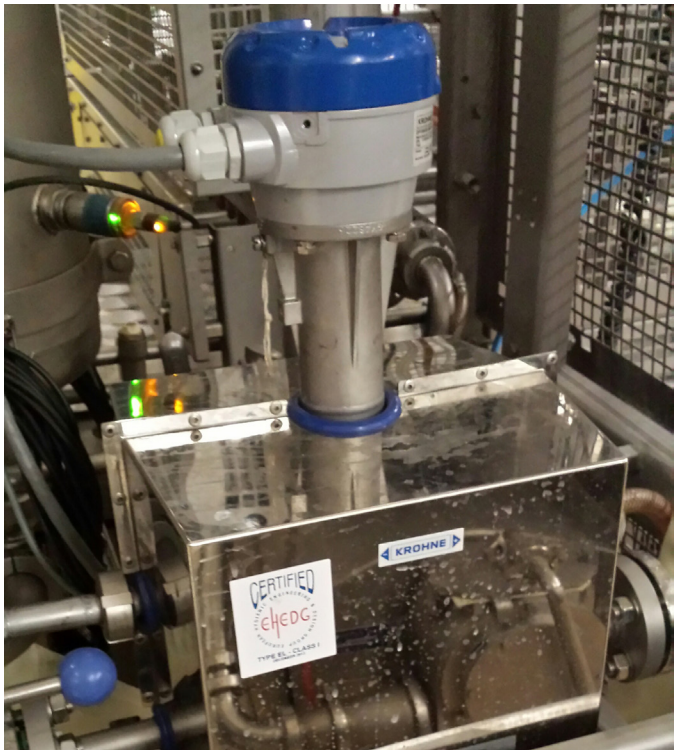
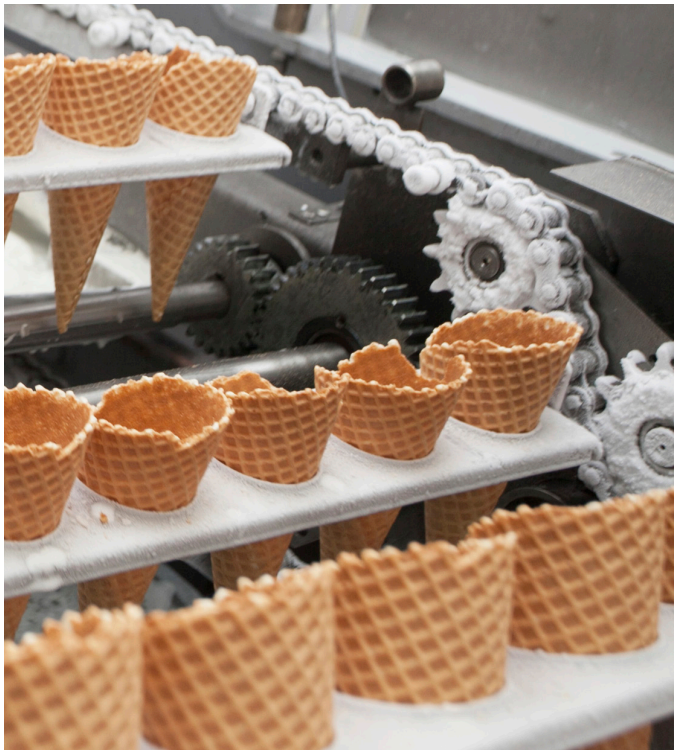




APPLICATION NOTE

Food & Beverage

Dosing liquid chocolate in the production of ice cream

- Filling waffle cones with a chocolate plug
- Coriolis mass flow measurement to control a filling machine
- Incorporation into the control system via a PROFIBUS® DP interface

1. Background

At one of its locations in Germany, a milk processing company also produces milk ice cream. Ice cream in a waffle cone is one of the company's ice cream creations.

2. Measurement requirements

To help the waffle cones maintain their consistency over a long period of time and prevent them from getting soggy, a liquid plug is inserted before filling the cones with ice cream.
Therefore, a filling machine fills each waffle cone with 4...6 gr / 0.13...0.2 US fl.oz. of liquid chocolate.

The amount of chocolate used was not continuously measured in the past. The company had simply started up production and then taken random samples to gradually see when the desired filling level was attained. This resulted in a significant waste of product that could no longer be used due to quality issues.

Medium	Liquid chocolate
Flow rate	100 kg/h / 3.67 lb/min
Density	1.09 gr/cm³
Pressure	1 barg / 14.5 psig
Temperature	+33...+37 °C / +91.5...+98.5 °F
Viscosity	130 mPas

For this reason the customer was looking to find a technical solution to better control the filling process. Due to the specifications, a Coriolis mass flowmeter was the instrument of choice for this application. The possibility of entrained gas in the product flow meant that increased requirements were placed on the reliability of the measuring instrument. To enable smooth communication with the existing control unit, the measuring device needed to have a PROFIBUS® DP interface.

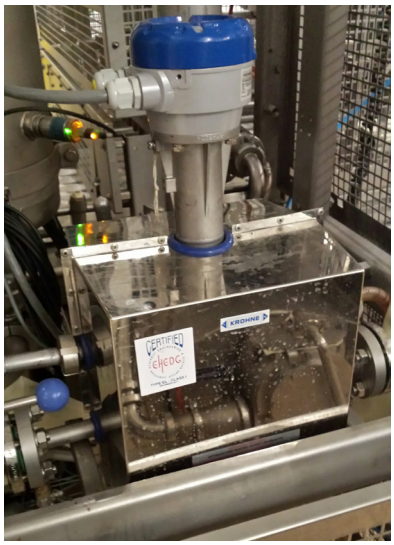
KROHNE

3. KROHNE solution

The ice cream producer decided on the OPTIMASS 6400 F.
The Coriolis mass flowmeter was supplied in stainless steel (316 L) with measuring tube size DN 8. It was installed with a hygienic process connection (milk thread as per DIN 11851) in the customer's horizontal dosing line. Because the flow of the chocolate depends on the temperature, the OPTIMASS 6400 was supplied with a heating jacket. This way the medium maintains the desired temperature range (+33...+37 °C / +91.5...+98.5 °F) and cannot solidify.

Unlike other mass flowmeters on the market, the OPTIMASS 6400 maintains operation over a wide range of gas fractions and complex flow conditions. It has been designed for applications with entrained gas thanks to the patented functionality of the "Entrained Gas Management" (EGM™).

The measuring tube for the device is EHEDG-certified and thus guarantees simple cleaning. The OPTIMASS 6400 is connected to the customer's control unit via its PROFIBUS® DP interface.



Dosing liquid chocolate using the OPTIMASS 6400 (with heating jacket)

4. Customer benefits

With the help of the OPTIMASS 6400 the ice cream producer can now automate the dosing process, controlling the amount of chocolate used much more accurately. The result is not only consistently high product quality. Waste is also significantly reduced, allowing the customer to save on both resources and costs on a permanent basis.

The measuring device is very reliable and maintains operation even in the case of entrained gas of up to 100%. This saves the customer expensive process interruptions. The ice cream manufacturer is thus extremely satisfied with the technical advice, the design of the application and the performance of the KROHNE measuring device.

5. Product used

OPTIMASS 6400 F

- Coriolis mass flowmeter for liquids and gases with V-shaped twin measuring tube
- Entrained Gas Management (EGM™): maintains operation with gas entrainment of up to 100%
- Optimised flow divider for minimum pressure loss
- Suitable for hygienic applications (EHEDG, 3A; FDA, EC 1935/2004)
- HART®, FOUNDATION™ fieldbus, PROFIBUS® PA and DP, Modbus etc.

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