



APPLICATION REPORT Food & Beverage

Flow measurement for the filling of fruit preparations

- Highly accurate product filling into special containers for customer delivery
- Mass flow measurement of fruit products with whole fruit chunks
- Addition of hanging scales to automate the filling process with PROFIBUS® DP



1. Background

Zentis GmbH & Co. KG is one of Europe's largest fruit processing companies with over 2000 employees around the world. The company's product range includes fruit preparations and raw mixtures for the dairy and baking industries as well as jams and desserts for the retail sector. Zentis produces around 200,000 t of fruit products per year at the main factory in Aachen, Germany, alone. The products are then delivered to milk processing plants as additions to quark and yoghurt products.

2. Measurement requirements

The products are delivered in special transport containers. Depending on the order, the containers have different capacities of 1000, 500 or 250 kg (approx. 2205, 1102 or 551 lb). The containers must be filled differently according to weight and customer specifications. To guarantee this, Zentis relies on the highly accurate filling of its fruit preparations.

Up until now the customer has been using a hanging scale for filling. The filling process was thus costly and prone to error. As the supply line must always be connected to the container when filling, this measuring process always runs the risk that the weight of the line is added to the scale. The customer decided to replace the hanging scale with a flowmeter in order to minimise the risk of error and automate the filling process using a control unit. The purpose of the flowmeter is to directly measure the mass of the lightly viscous product full of chunks of fruit. The pipe geometry of the measuring device had to be such that the fruits in the product flow could not be destroyed. In addition, the pressure loss resulting from the use of the measuring instrument should be kept to a minimum.

Measuring parameters	
Medium:	Fruit preparation
Measuring range:	30...600 kg/min / 66...1323 lb/min
Minimum measured quantity:	200 kg / 441 lb
Temperature:	+25 °C / +77 °F
Pressure:	1.5 bar abs / 21.75 psia
Density:	1.2 kg/m ³ / 2.02 lb/yd ³
Viscosity:	500 mPas



3. KROHNE solution

Due to the measuring parameters, a Coriolis mass flowmeter without flow splitter was the instrument of choice for this application. The OPTIMASS 7300 W fulfills this requirement and impressed the customer with its superior accuracy. The mass flowmeter has a single straight measuring tube particularly well suited to measuring product flow containing chunks of fruit without causing great pressure loss in the process.

Zentis installed two OPTIMASS 7300 units in the hygienic stainless steel version (DN50) and with industry specific threaded connection (as per DIN 11851) into the filling line in front of the containers. A pump now pumps the fruit preparation from the production tank, through the measuring device into the special containers. The OPTIMASS 7300 communicates with the filling system via its PROFIBUS® DP interface.



Flow measurement of fruit preparations with the OPTIMASS 7300 W

4. Customer benefits

The OPTIMASS 7300 W makes it possible to precisely control the automated filling of the containers. The mass flowmeter measures with a high degree of accuracy and independent of any changes in viscosity or solid-type fruit chunks in the medium.

Its single straight measuring tube design means that it can be installed in confined spaces, is self-draining and easy to clean.

The OPTIMASS 7300 W measuring results are continuously calculated in the transport line and made available in the control room. If necessary, Zentis could also transfer other parameters such as volume and density, which the mass flowmeter also measures directly, via the PROFIBUS® interface into the control room.

5. Product used

OPTIMASS 7300 W

- Coriolis mass flowmeter for extremely demanding food applications
- Single straight tube design without flow splitter for minimal pressure loss
- DN10...100 / ½...4"; flow rates up to 560,000 kg/h / 20,576 lb/min
- Best in class for accuracy and zero stability
- Measuring tubes available in 4 materials (stainless steel, titanium, Hastelloy®, tantalum)
- Modular electronics concept
- Optional heating jacket
- EHEDG, 3A, FDA, EC 1935/2004
- HART®, FOUNDATION™ fieldbus, PROFIBUS® PA and DP etc.



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