



FLOW AND ENERGY MEASUREMENTS IN A LARGE CONFECTIONARY COMPANY



Food Industry

“Due to its extraordinary versatility, the ultrasonic measuring system is almost permanently in use in a wide variety of applications at our company.”



*Stefan Reschke,
Process & Supply Technology,
Conditorei Coppenrath & Wiese KG*



Measuring Task

Various flow and energy measurements as part of energy and environmental management and predictive maintenance

Ever since cousins Aloys Coppenrath and Josef Wiese had the idea at the beginning of the 1970s to use the then new method of shock-freezing to preserve their freshly made tarts and cakes without the addition of preservatives and thus be able to deliver them freshly baked to consumers, the motto at Coppenrath & Wiese is: “We offer the best alternative to home baking.” For almost five decades, classic baking traditions and the know-how of the confectionery trade have been combined with modern manufacturing methods. It’s clearly a recipe for success as Coppenrath & Wiese is now the market leader for frozen baked goods in Germany.

The highest quality standards and the protection of resources are two sides of the same coin. Apart from the fruit sector, Coppenrath & Wiese procures around 60 percent of its raw materials from the region. Most of the processed milk comes from dairies in the neighbourhood, all the eggs come from free-range farms, and Coppenrath & Wiese only uses flour from controlled cultivation for the dough. Of the 60 to 80 tons of apples that are processed in Mettingen every day, a large proportion comes from the Lake

Constance region or Altes Land near Hamburg.

Product quality and efficient use of resources are based on continuous monitoring of the production processes. Coppenrath & Wiese is certified in accordance with the European standard DIN EN ISO 9001, the International Food Standard (IFS), the British Retail Standard (BRC) and has also installed an environmental management system in accordance with ISO 14001 and an energy management system in accordance with ISO 50001. Since 2007, Coppenrath & Wiese has been keeping a close and critical eye on its manufacturing processes and resource consumption as part of its extensive Conditions program (an acronym for Conditorei-Instandhaltungs-, Optimierungs- und Nachhaltigkeits-System; pastry bakery maintenance, optimization and sustainability system).

All product and relevant energy flows are continuously monitored using permanently installed measuring systems. However, how can the efficiency of heat exchangers, for example, be assessed and how can CIP processes be optimally configured? This is where Flexim's black plastic case comes into play.



Solution

With Flexim's portable FLUXUS® G601 CA Energy ultrasonic system, Coppenrath & Wiese has an all-around instrument for measuring liquid and gas flows as well as for recording liquid-based thermal energy flows.

"Stainless steel is not transparent, i.e. we can't look into the pipe", says Stefan Reschke, engineer for process and supply technology at Coppenrath & Wiese: "However, Flexim's ultrasonic measuring technology allows us to find out what is happening inside by acoustic means."

Originally, the measuring system was primarily purchased for checking permanently installed compressed air meters. In fact, Flexim developed the FLUXUS® G601 CA Energy especially for non-intrusive compressed air measurement; the "CA" in the name stands for "compressed air". Thermal mass meters which are usually used as built-in devices for measuring the flow of compressed air, are extremely sensitive to humidity as a matter of principle. If their transducers are covered with condensation water, the cooling produced during evaporation causes a huge measurement error. This type of malfunction can be quickly discovered by a control measurement with the FLUXUS® G601 CA Energy.

However, its users quickly tapped into further applications for the versatile measuring system. The standard function of the flowmeter is volume flow measurement. The FLUXUS® G601 CA Energy can measure both the flow of liquids and gases non-invasively with clamp-on ultrasonic transducers mounted on the outside of the pipeline. The media whose flow rate was measured with the FLUXUS® G601 CA Energy until now are correspondingly diverse: The spectrum ranges from nitrogen and compressed air to acids and alkalis to various masses and dough.

The most common flowing medium is of course water, also at Coppenrath & Wiese. In addition to being an ingredient and cleaning agent, water is primarily used as a heat transfer medium, i.e. for heating and cooling. With its two temperature inputs to which Pt100 temperature sensors are connected, the FLUXUS® G601 CA Energy is also a complete energy meter.



Compact in its case: the FLUXUS® G601 CA Energy ultrasonic measuring system.

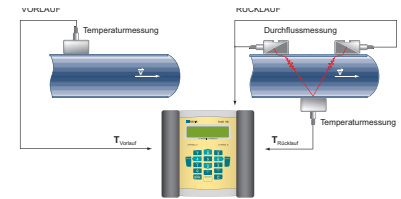


With the FLUXUS® G601 CA Energy, a temporary heat flow measurement can be set up in next to no time (i.e. thermal power measurement).

Heat flow measurement with FLUXUS® is carried out using the differential method, i.e. by determining the amount of heat flowing into and out of the system. FLUXUS® measures the volume flow of the heat transfer medium flowing through the consuming system as well as the temperatures in the flow and return.

FLUXUS® calculates the current output of the system, i.e. the energy flow, from measured values based on enthalpy curves which are stored in the device for various heat transfer media. FLUXUS® can also be used as an energy meter due to the volume meter integrated in the measuring transmitter. A standard application of FLUXUS® G601 CA Energy as a heat flow meter is to monitor the efficiency of heat exchangers as part of predictive maintenance.

Another field of application where the FLUXUS® G601 CA Energy can play out several advantages are the cleaning processes, the Cleaning in Place (CIP). Effective cleaning requires a minimum flow of cleaning media. With the FLUXUS® G601 CA Energy, all you have to do is press a button and the flow velocity appears on the display. In addition, the ultrasonic system always simultaneously measures the acoustic velocity. This is a substance-specific variable. This allows for the changes of medium during the CIP cycles to be closely monitored and therefore optimizes the cleaning processes.



Heat flow measurement with FLUXUS® is carried out using the differential method, i.e. by determining the amount of heat flowing into and out of the system.



The changes of media in the CIP cycles can be precisely observed by measuring the acoustic velocity.



Selling Points

- Accurate non-intrusive measurement of liquid and gas flows as well as of energy consumption without any effect on production operations
- Hygienic, 100% harmless measuring technology without any direct media contact
- Very high measuring accuracy due to high-precision flow measurement with paired and traceable calibrated ultrasonic transducers and high-precision temperature measurement with paired and traceable calibrated temperature sensors (EN 1434-1)
- A single measuring system for a variety of applications, from simple control measurements to use in strategic optimization projects

Measuring Points and Instrumentation

Pipelines	typically 2.5" to 6", steel, stainless steel, copper etc.
Media	various liquids and gases such as hot and cold water, CIP media, dough, compressed air, nitrogen
Measuring Device	<ul style="list-style-type: none"> 1 portable clamp-on ultrasonic FLUXUS® G601 CA Energy flow-meter 1 pair of clamp-on CDP1NZ7 ultrasonic transducers (shear wave) for liquids 1 pair of clamp-on GLP1NZ7 ultrasonic transducers (Lamb wave) for gases 1 pair of clamp-on Pt 100 temperature sensors (paired and calibrated in accordance with EN 1434-1) 1 wall thickness measuring head



Customer

Conditorei Copenrath & Wiese KG, Mettingen, Germany

Conditorei Copenrath & Wiese KG is Germany's largest manufacturer of frozen baked goods. Two out of three frozen baked goods that are bought in Germany come from their ultra-modern production facility, which can produce up to 260,000 cream cakes every day.

Since the company was founded, it has grown continuously – even in times of economic crises. In 1975, production and administration began with 35 employees in a converted dairy in Westerkappeln. Today, around 2,600 committed colleagues work at the two locations in Osnabrück and the nearby Mettingen. In the 2019 financial year, they generated total sales of around EUR 420 million. Conditorei Copenrath & Wiese has also been part of the Oetker Group's food division since 2015.

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AR-202116-Copenrath_&_Wiese-US