

Reliable Container Cleaning Where Stringent Hygienic Standards Apply



Contents

- SAW flowmeter monitors recipes 2**
- Everything fits into a compact stainless steel control cabinet 3**
- One sensor to measure flow rate and temperature 3**
- Precise and future-proof..... 5**
- Technology box: Innovative flowmeter uses SAW technology 6**
- Information about the images: 6**
- About L.B. Bohle 7**
- About Bürkert 7**
- Further information is available from the links below: 8**
- For further information on the topic, see: 8**
- Join our live Webinar 8**

SAW flowmeter monitors recipes:

Reliable container cleaning where stringent hygienic standards apply

In the food, beverage, pharmaceutical and cosmetics industries, flowmeters are needed that not only work with high precision but also satisfy high standards and statutory requirements. Flowmeters operating on the basis of the patented SAW technology (surface acoustic waves) are a good contender in this regard, not least because the temperature measurement needed in many processes is already integrated. The practical nature of this is demonstrated by the pharmaceutical application described below.



Care is essential in pharmaceutical production – after all, people’s lives and health depend on the correct agent composition and the avoidance of contamination with undesired substances. Production machinery and containers must therefore undergo thorough cleaning in accordance with precisely regulated recipes at regular intervals after each product change. Sometimes this involves very complex processes. L.B. Bohle Maschinen + Verfahren GmbH (see company text box 1) has been a recognized specialist in this field for many years and has established itself around the world with its

machinery and equipment for the pharmaceutical industry, ranging from scales, granulators, sieves and mixers to tablet film coaters and the corresponding cleaning equipment. These include, for example, the PUR pharmaceutical universal cleaning system (Image 1). This system, which is designed specifically for cleaning containers of a variety of sizes, is especially impressive in terms of its compact construction.

Everything fits into a compact stainless steel control cabinet

All of the components for transporting and treating the cleaning water are stored within a stainless steel cabinet. This enables the compact unit to be easily stored in the washing area – washing processes are then run according to recipe and documented automatically. A touch panel directly on the device enables convenient local operation.

The recipes for the various cleaning processes and steps host the proportions of the water volume relative to that the alkaline or acidic cleaning agents. Normally, the mixing proportions range between 1% and 3%, with cleaning solutions of all pH levels being used. Many cleaning processes also specify specific temperature levels in the recipes to optimize the process. This means that not only does the water volume have to be continuously monitored in the PUR systems to regulate the cleaning agent pumps as specified by the recipes, it is also necessary to measure the temperature and adjust it accordingly in order to comply with the minimum and maximum values specified in the formula.

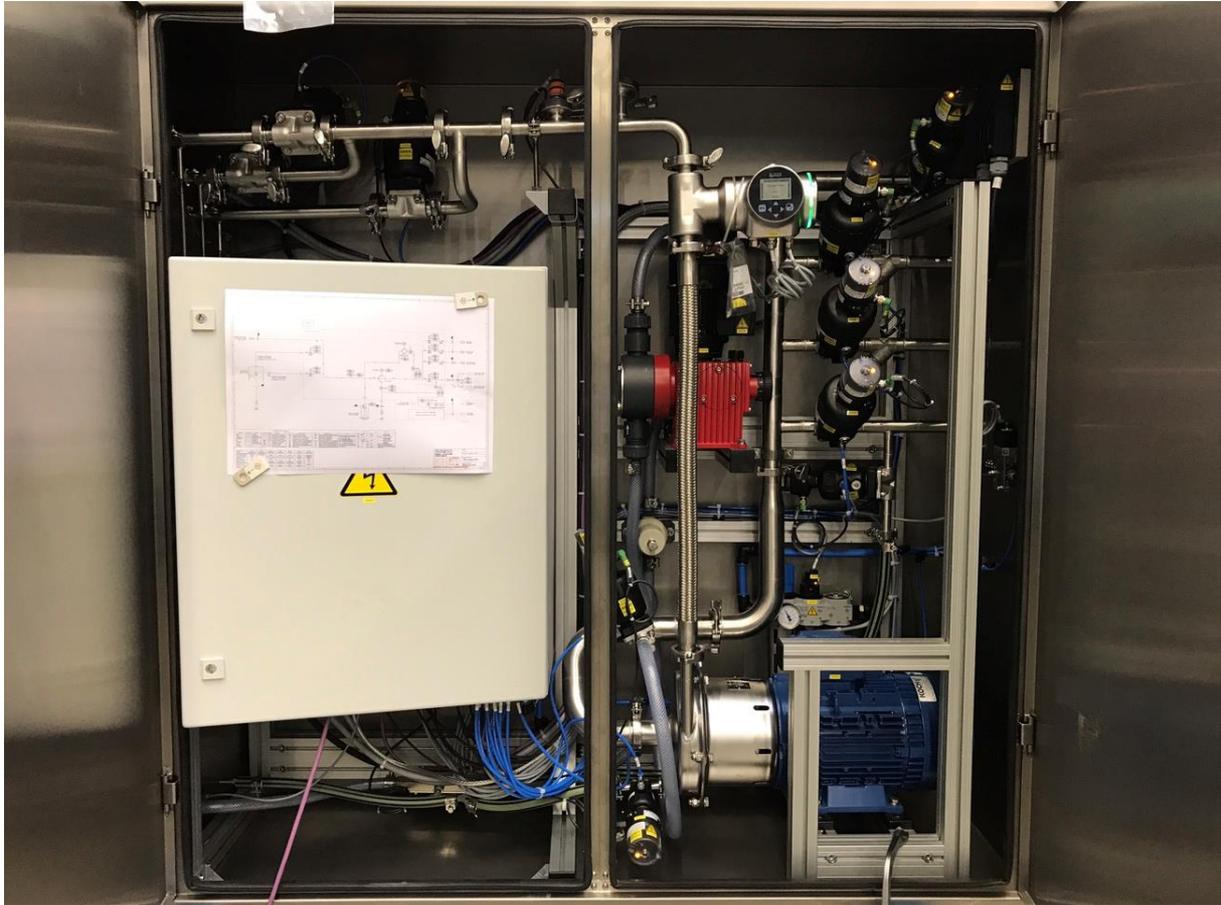
One sensor to measure flow rate and temperature

It was possible to kill two birds with one stone here, because both tasks can be performed by the FLOWave Type 8098 flowmeter (Image 2) from Bürkert. These work using the patented SAW technology (surface acoustic waves), which uses surface waves to perform measurements (see technology box). They also already have a temperature sensor integrated. This allows one sensor to be saved in the PUR systems. This saving helps not only to keep the device's dimensions compact, but also reduces the number of parts needed, which in turn ensures that hygiene standards are quickly met, because a device does not need to undergo cleaning cycles as often.



The North Rhine-Westphalia-based mechanical engineering company L.B. Bohle has since become impressed with numerous benefits offered by these flowmeters in practical use: SAW technology is ideal for use in hygienic applications, because there are no installations or constrictions, which means there are also no empty spaces in the measuring tubes. The measurement is also performed without any contact between the sensor elements and medium. The sensors are not affected by fluids, and the medium is not contaminated by these either. This constitutes hygienic design and makes cleaning easier. Because the measuring tube is no different than any other straight pipe piece for flow purposes, there is also no

pressure drop. The measurement works regardless of whether the fluids are immobile, flowing quickly or alternating.



The compact size and low weight also enable easy installation in the control cabinet (Image 3). A 50 mm (2 inch) orifice sized FLOWave only weighs around 3.5 kilograms (8lbs) and can be easily fitted or replaced by just one person. It can be installed in any direction, enabling the display to be adjusted to ensure its readability and providing easy access to the flowmeter during start-up for configuration. During operation, the flowmeter consumes far less energy than a Coriolis flowmeter, which also occupies a larger footprint. There is virtually no maintenance work necessary, which significantly reduces the operating costs among users of PUR systems.

Precise and future-proof

The flowmeter body is made entirely of stainless steel and measures volume flow rates with a precision of 0.4 % of the measured value. The temperature is measured concurrently with this

with a precision of $\leq 1^{\circ}\text{C}/\text{F}$. Depending on the orifice size, the nominal pressure can be up to 40 bar (580psi). The temperature range is designed so that both CIP and SIP cleaning processes can be performed. The measurement device is offered with the nominal pipe sizes DN15, DN25, DN40 and DN50 with pipe and clamp fixtures in accordance with ASME, ISO and SMS and can in principle also be used without a display.

In addition to the measurement of volume flow rates and temperatures, FLOWave can perform other measures such as density factors (for liquid detection) and acoustic transmission factors (for gas bubble detection). The latter is also of interest to L.B. Bohle for the purpose of further optimizing the cleaning process in the future.

Technology box: Innovative flowmeter uses SAW technology

Surface acoustic wave technology (SAW) uses wave propagation such as that which occurs during seismic activity (e.g. earthquakes) to measure flow rates. The main part of the sensor consists of a measuring tube with interdigital transducers positioned on the surface that are electrically stimulated to trigger the wave propagation. FLOWave technology works with four interdigital transducers capable of operating as both transmitters and receivers. If one is operating as a transmitter, the two furthest away from them act as receivers. The surface acoustic waves generated on the surface of the pipe decouple in the liquid. The decoupling angle is dependent on the liquid and the speed of the wave propagating within it. On the other side of the measuring tube, the waves are recoupled in the measuring tube and are transferred to the next interdigital transducer. For instance, stimulating each interdigital transducer causes a sequence of reception signals at two others. Two interdigital transducers send in the direction of flow, two against it. The volume flow rate is proportional to the time difference between the durations of the wave propagation in the forward and reverse directions. It is especially notable that measurements can be taken on the basis of singular or multiple liquid flows and on the basis of a comparison of all reception signals. Following a relevant mathematical analysis, these provide information about the fluid.

Information about the images:

Image 1: This system, which is designed specifically for cleaning containers of a variety of sizes, is especially impressive in terms of its compact construction. All of the components required for transporting and treating the cleaning water are stored

within a compact stainless steel control cabinet.

(Source: © L.B. Bohle Maschinen + Verfahren GmbH)

Image 2: This flowmeter made entirely from stainless steel uses the patented SAW technology (surface acoustic waves), which measures volume flow with a precision of 0.4 % of the measured value. The temperature is measured concurrently with this with a precision of ≤ 1 °C. (Source: © L.B. Bohle Maschinen + Verfahren GmbH)

Image 3: The compact size and low weight also enable easy installation in the control cabinet. It can be installed in any direction, enabling the display to be easily read and providing easy access to the flowmeter during start-up for configuration. (Source: © L.B. Bohle Maschinen + Verfahren GmbH)

About L.B. Bohle

Lorenz Bohle founded L.B. Bohle Maschinen + Verfahren GmbH in 1981. He established the foundations for a healthy company from the outset, enabling the company to develop into a leading special-purpose machine builder for the pharmaceutical industry. Today, it continues to be an independent SME operating in its Westphalian home of Enningerlohr, serving its customers around the world. Based in North Rhine-Westphalia, this machine engineering company has established itself as a globally recognised brand. Exports account for 80 % of its business today. The service team assists clients with the installation and preparation of the machinery or even manages the entire construction and production launch process, regardless of continent. The Bohle team also professionally and capably performs routine annual maintenance and calibration.

More information available at:

<https://www.lbbohle.com/>

About Bürkert

Bürkert Fluid Control Systems is one of the world's leading manufacturers of measuring, control and regulating systems for liquids and gases. Bürkert products are used in a wide range

of industries and applications – ranging from breweries and labs to medical, bio-engineering and aerospace technology. With a portfolio of more than 30,000 products, Bürkert is the only supplier to offer all fluid control system components, from solenoid valves to process and analytical valves, from pneumatic actuators to sensors.

With its headquarters in Ingelfingen in southern Germany, the company has a wide-ranging sales network in 36 countries and more than 2,500 employees worldwide. Bürkert continuously develops customized solutions and innovative products at its five Systemhaus locations in Germany, China, and the USA, and in four research centers.

Further information is available from the links below:

www.burkert-usa.com

www.facebook.com/BurkertUSA

<https://www.linkedin.com/company/burkertusacorp>

For further information on the topic, see:

<https://www.burkert-usa.com/en/type/8098>

Join our live Webinar



Further questions about flow measurement in pharmaceutical applications such as WFI (water for injection) or CIP (clean in place)? Then meet our experts in a webinar. Practical examples will show how the SAW technology can be used to gain filling time, improve quality and reduce maintenance efforts.

Topic: Improving safety in pharmaceutical production with hygienic flow measurement

Date / Time: September 10th 2020 at 2:00 p.m. ET

Register now: <https://info.pharmamanufacturing.com/webinars-2020-improving-safety-in-pharmaceutical-production-with-hygienic-flow-measurement>