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Source: Polymaterials AG

POLYMATERIALS AG

Flow measurement of highly viscous media

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

Long-term stability and easy cleaning by means of SAW sensor

COOPERATION WITH POLYMATERIALS AG

The FLOWave flowmeter is suitable in almost every industry, even for polymer production. Polymaterials AG uses them during scale-up in the technical centre at Chempark Leverkusen to determine the inflow of the highly viscous media upstream of the extruder.

Did you know?

- Polymaterials AG is a professional innovation partner for the development and production of new polymeric materials (molecularly new polymers, new blends and compounds).
- Many years of experience combined with a complete process chain from the development laboratory in Kaufbeuren to the “scale-up” in the technical centre in Chempark Leverkusen enables customers to implement their product ideas under a single provider.
- The capacity of the pilot plant is considerable, with test quantities easily amounting to up to 100 tonnes.



Source: Polymaterials AG

In the pilot plant at Chempark Leverkusen, sample quantities are produced and process development is advanced

“Since our work often involves innovating and exploring new avenues, we also rely on creativity in terms of technical implementation; and especially when it comes to scaling up, we like to think outside the box to find solutions.”

Christian Hauner, Chemical engineer at Polymaterials AG

The smallest changes have big impacts

During scale-up, the production plant for thermal degassing operates with a planetary roller extruder as a chemical reactor. The interactions during the extrusion process are very diverse. Pressure levels, rotation speed, temperature zones and flow play an important role. Since even the smallest change in one of the parameters can have a major impact on the overall process, it is important to know and maintain constant as many influencing factors as possible. “Depending on the process, there can be as many as 50 parameters,” explains Christian Hauner.

To validate the process, the extruder should consistently output a certain amount of polymer granulate at the end. The throughput is therefore an important factor in polymer production. How much polymer flows into the extruder and how much granulate leaves the extruder provides important indicators for assessing product and process quality. Until recently, however, the throughput could only be determined gravimetrically via the granulate obtained. However, collecting and weighing the granulate was very laborious and time-consuming.

“There were no other options available for us to begin with. Unfortunately, flowmeters based on the Coriolis principle installed before the extruder have proven to be unsuitable in the past.”

Christian Hauner, Chemical engineer at Polymaterials AG

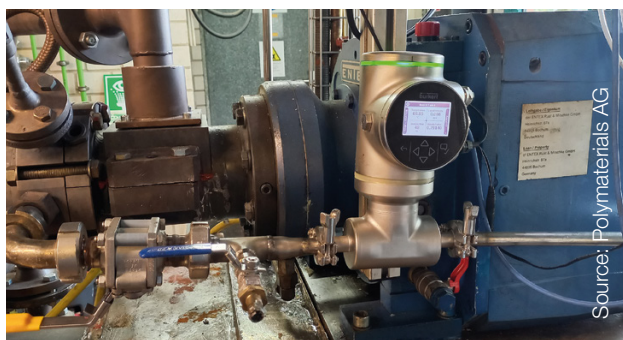
If a test did not go as expected, the sensor had to be disposed of because the curved measurement tubes could not be cleaned. In addition, a large amount of resistance had to be overcome during the start. Of course, it is better to simultaneously control what is flowing into the extruder.

“If we know that, for example, 60 litres flow in per hour, we can ultimately evaluate the process quality based on the granulate obtained. With FLOWave, we can easily implement closed-loop control and stationary operation.”

Christian Hauner, Chemical engineer at Polymaterials AG

Continuous flow measurement at the inlet of the extruder

The polymer specialists finally found a practical solution for flow measurement in the inlet of the extruder when they paid a visit to Bürkert's stand at a trade fair. They opted for the FLOWave flowmeter. The flowmeter has now proven itself in the pilot plant and there are plans to utilise more of its functions in the future, such as density determination.



The FLOWave flowmeter is a practical solution for flow measurement in the inlet of the extruder. It works according to the SAW principle.

The flowmeter works according to the SAW (Surface Acoustic Waves) principle, i.e. it uses the propagation speed of acoustic surface waves in liquids. In extensive testing with highly viscous polymers and temperatures up to 80 °C, the flowmeter proved itself in every aspect of the process. The measuring system does not require any sensor elements to be located inside the measurement tube, which has several advantages:

- No leaks
- No material incompatibilities
- No maintenance
- No pressure drop
- Easy cleaning
- The sensor behaves like a tube (long-term stability, no recalibration)
- Accuracy to within 0.4% of the measured value
- Made of high-quality stainless steel
- Significantly lighter than comparable Coriolis systems.

In the variant installed before the extruder with a nominal diameter of DN 15, it weighs approx. 3 kg, i.e. only about a tenth of a comparable Coriolis measuring system. This made handling during installation much easier. The installation position is flexible. The display can be positioned anywhere so that the flowmeter is easily accessible for configuration during commissioning. Various display and control options are available on the process control system. During operation, the SAW flowmeter consumes very little energy and the wear-free measuring principle saves service costs.



Thanks to the wide range of options and variants, continuous flow measurement based on the SAW principle is also suitable for many other industries, especially since the FLOWave can provide additional measured values such as media temperature and concentration, as well as detect contamination.

“Commissioning was easy. We were able to do it ourselves and if we had any questions we simply gave Bürkert a quick call and they helped us quickly and competently. With Bürkert we have found a helpful and competent partner with whom we will continue to work together in the future.”

Christian Hauner, Chemical engineer at Polymaterials AG

Insight

One sensor, many parameters

Thanks to the wide range of options and variants, continuous flow measurement based on the SAW (Surface Acoustic Waves) principle is also suitable for many other industries, especially since the FLOWave can provide additional measured values such as temperature and media detection, as well as detecting contamination. The straight measurement tube is ideal for applications with high hygiene requirements, such as in the pharmaceutical, food or cosmetics industries. The devices offer either a digital interface (via M12 connector) or are alternatively available with an analogue 4-20 mA interface. Variants with or without on-site digital data display are available, as well as a FLOWave L version with ATEX approval for use in potentially explosive areas, e.g. when measuring alcohol or volatile oils. FLOWave is available for large nominal diameters up to DN 80, and small nominal diameters from DN 8 are also available as a standard variant, e.g. for pharmaceutical and cosmetic applications.



“In extensive testing with highly viscous polymers and temperatures up to 80 °C, the flowmeter proved itself in every aspect of the process. In addition, the measuring system does not require any sensor elements in the measurement tube, which makes cleaning easy if an experiment does not go as expected.”

Christian Hauner, Chemical engineer at Polymaterials AG



Christian Hauner, Chemical engineer at Polymaterials AG
Source: Polymaterials AG



If you have any questions, please do not hesitate to contact Mr Hauner:

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