

Precise metering saves costs

## Quantity accounting of aggressive wastewater

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Measuring in aggressive wastewater: Precise monitoring of water quantity ensures billing accuracy.



**THE ASSEMBLY RING:** on entry into the narrow wastewater inspection manhole.

Picture 1

Highly alkaline and as well as acidic wastewater, as generated in numerous dyeing and specialty chemicals factories, must be treated and neutralised before being discharged into watercourses. To optimise the purification process, as well as to provide verification for the German Water Management Office in accordance with Section 7a of the German Water Resources Act and for billing, wastewater quantities must be continuously monitored.

This requires a standardised measuring procedure and a measuring system that works in extremely aggressive wastewater with convincing accuracy and reliability. Due to the significant discharge fees, it is worthwhile to measure directly at the wastewater collector line instead of using the quantity of freshwater consumption as a measure for the

wastewater quantity. Although many other measuring systems fail because of the wastewater composition, delta wave flowmeters from systec Controls can cope with highly critical wastewater types, as de-

monstrated by their use in chemical parks.

If pH values of between 1 and 11 (!) occur, the wastewater must be adjusted to pH values of between 2 and 4 before transfer to the normal waste-

water system. This is carried out by means of a metering station, where caustic acid solution or hydrochloric acid is metered in in accordance with the current pH level in order to prepare the wastewater for fi-



**PREASSEMBLED TENSIONING RING:** with pre-attached ultrasonic transducers

Picture 2

nal neutralisation in the treatment plant. In this respect, for metering efficiency, it is important to adapt this in accordance with the flow rate. Sebastian Fischer, the responsible product manager at systec Controls, states, "Accuracy of readings is a crucial criterion in terms of metering that preserves resources, and therefore the environment. Alongside measuring accuracy, the chemical resistance of the sensors in contact with the medium is a key criterion for selecting the measuring system. The sensors of the deltaxwave ultrasound flowmeter are absolutely reliable and virtually maintenance-free, even with aggressive wastewater types."

**Precision with partially full pipelines**

deltaxwave uses the calculation equations standardised according to ISO6416. The current flow rate of the wastewater is continuously monitored using ultrasonic transducers in 4 measuring planes in accordance with the transit time method. In this way, and as a result of the high time resolution of the ultrasonic transducers, the 4 flow rates are measured with an uncertainty of 0.1%. In addition, an ultraso-

nic probe monitors the exact water level of the pipeline via an manhole.

Using the level and flow rate parameters, the discharge quantity is then determined with an overall uncertainty of just 2%.

**High barriers to troubleshooting**

Because the wastewater is so aggressive, common assembly and sensor materials such as stainless steel and PE are unsuitable at these pH levels. Since other measuring systems break down in these application conditions due to lack of material resistance, the deltaxwave ultrasonic transducers made from hardened PVC are suitable in all wastewater consistencies tested for chemical factories. Material tests lasting several months under operating conditions confirm the outstanding suitability of these sensors. In combination with a stable, reliable level monitoring system, the flow can be monitored safely even in partially full pipelines and drains.

**Intelligent assembly even in the most challenging installation environments**

For optimum installation speed and security, even in shafts, the ultrasonic transducers can be

preassembled ex works on a tensioning ring in order to minimise installation work. The tensioning ring adapted to the wastewater pipe can – like a carpet – be rolled up to a really small diameter, thus making transportation to the measuring site and installation in the manhole much easier, even where access is cramped or in conditions where access is only possible with protective equipment. The fitter only needs to unroll the tensioning ring in the wastewater pipe and fasten it using a pressure frame. Cross-bracings in the pipe secure the attachment against slipping. No further adjustment of the ultrasonic transducers is required.

**Remote monitoring via the internet, independently of the readings**

Communication is carried out via standardised 4 to 20 mA electric signals and via digital relay and transistor outputs. deltaxwave can transmit measuring signals in digital format with the internet protocol tcp/ip.

To optimise the measuring site, deltaxwave can be fitted with a GSM modem that enables full access to the measuring computer via a normal internet connection. In this way, the measuring site can be monitored by an internet-enabled PC and adapted to changed conditions. deltaxwave even provides clear and traceable measuring results during revision work or failures of the pipeline system. It continuously stores the measured data in an internal memory. This data can be easily evaluated and displayed for billing purposes with the Excel program. In normal operation, the measured data is continuously fed into the process control and management system. The measured data can thus be easily received by the responsible



**PRECISE RESULTS:** Picture 4 deltaxwave evaluation electronics

German Water Management Office.

**Summary and outlook**

Precise monitoring of wastewater quantities creates billing accuracy between the manufacturing plant and other companies connected to the wastewater system. In addition, measurement avoids expensive overdosing during the purification process, thus protecting the environment and resources.



**DELTA WAVE ULTRASONIC SENSOR:** Picture 3 for measuring in the most aggressive wastewater

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