FLEXIM

Ultrasonic flow measurement with FLUXUS®

Non-intrusive water and wastewater flow measurement

Versatile. Economic. Leakage-free.

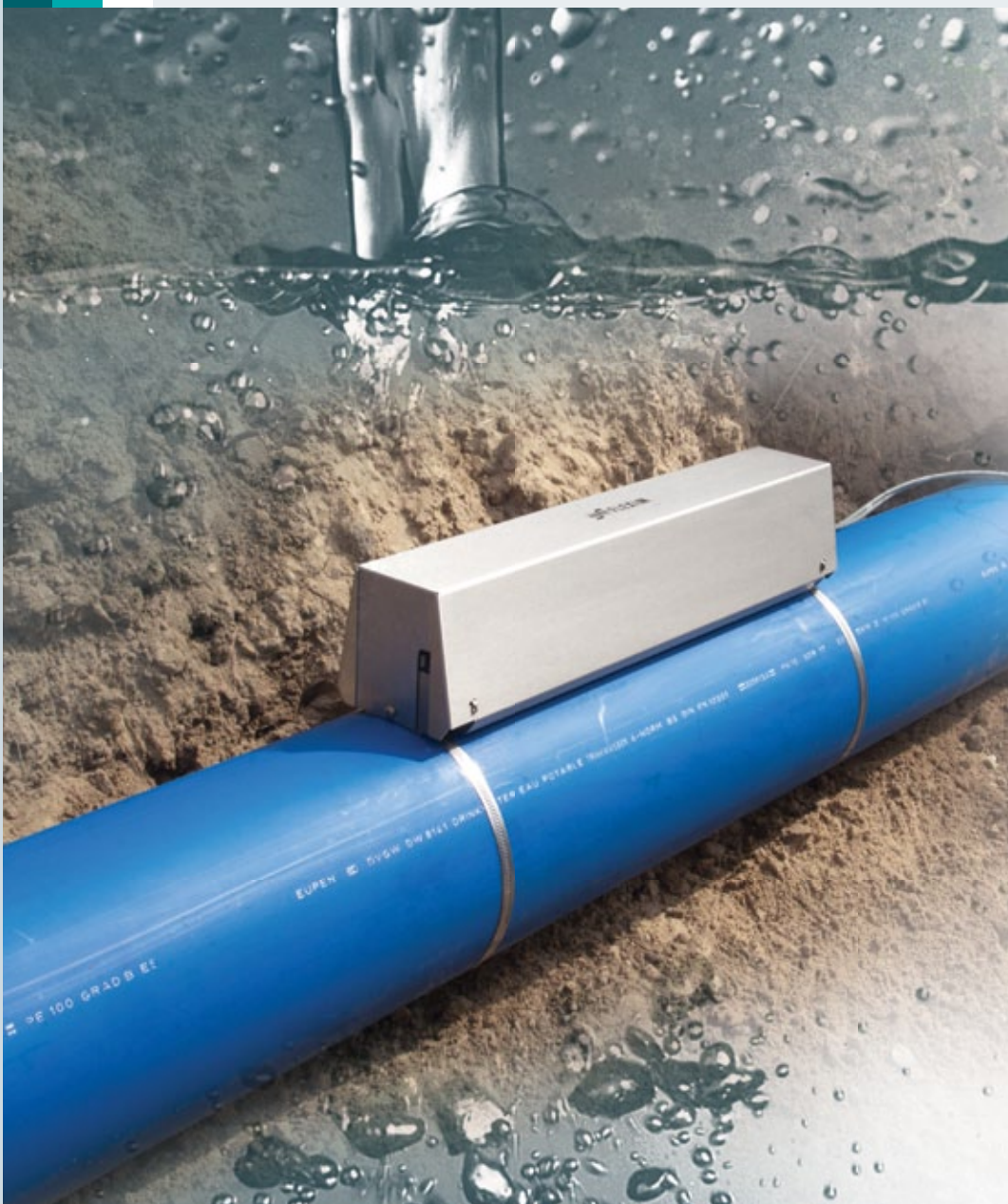
Drinking water supply

Network monitoring and balancing

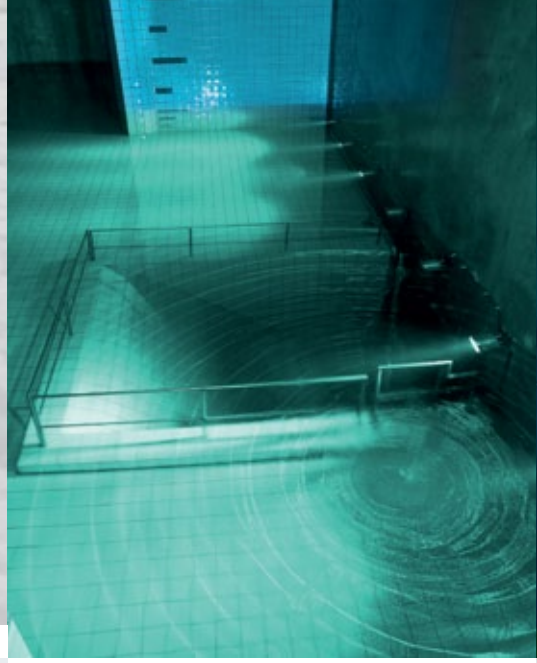
Leakage detection

Wastewater disposal

External measurement of internal flow



The ideal measuring system for drinking water supply ...



Withdrawal of drinking water usually begins at wells and large water tanks. Pipes with large nominal diameters carry the extracted water quantities and pass them on to the local network.

Compact transducers for large pipes

Large nominal diameters also mean high costs for wetted measuring systems. This isn't the case however, with ultrasonic non-intrusive flow measurement. If, for example, a defective magnetic-inductive flowmeter has to be replaced on a large-caliber transmission pipeline, the FLUXUS® ADM 7407 proves to be a superior alternative.

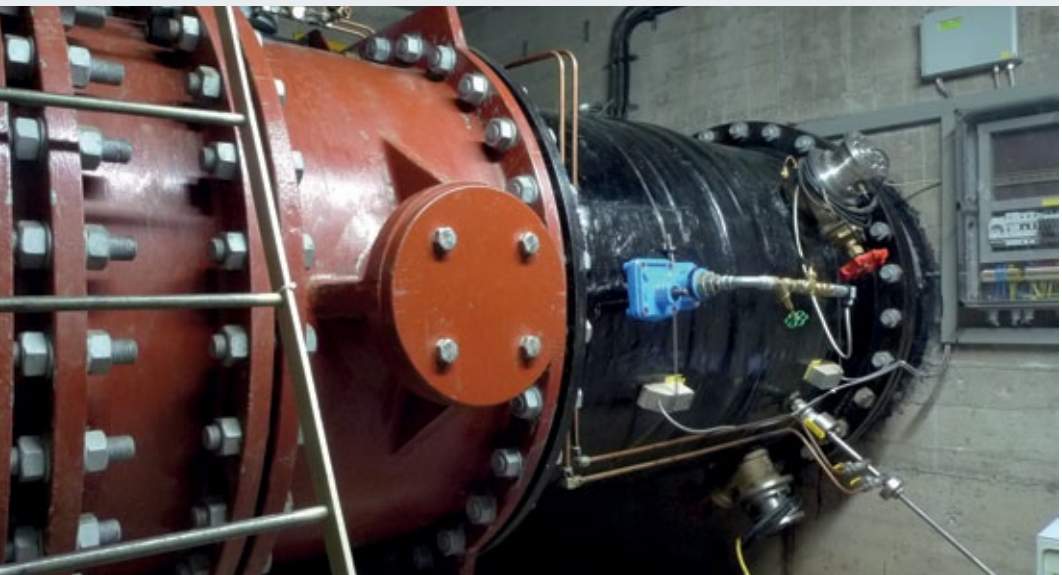
The ultrasonic system is not only much cheaper at such pipe sizes, but it can be retrofitted during ongoing operation and without the additional cost of engineering work and pipework. The compact clamp-on ultrasonic transducers are simply attached to the outside of the pipe. The existing magnetic-inductive flowmeter doesn't even have to be removed. The high-performance FLUXUS® ultrasonic flowmeters also achieve very good measuring signals despite internal lining and external coating of the pipes.

In addition to that, FLEXIM's non-intrusive FLUXUS® flowmeters are impressive due to their:

- wear and maintenance-free measurement
- absolute hygiene (no direct contact with the medium)
- independence from the pressure conditions in the pipe, its diameter and material

For small nominal diameters

FLEXIM also offers the right solution; the cost-effective FLUXUS® ADM 5107 for simple water applications.



Flow measurement in an elevated drinking water tank

In an elevated tank of a communal drinking water supply, only the outlet was fitted with venturi nozzles for quantification of the flow rate, which was calculated based on the geometry and filling level of the container.

To improve the operational control and for early detection of possible water loss through leaks in the piping system, the rate of water flowing in the tank also had to be measured. However, due to the difficult installation conditions, magnetic-inductive measuring devices could not be installed.

FLEXIM's non-invasive ultrasonic FLUXUS® flowmeters proved to be the ideal solution in this instance. Since clamp-on ultrasonic transducers are simply attached to the outside of the pipe, there is no need to disrupt the supply during retrofitting. Even under difficult flow conditions, the use of dual channel FLUXUS® ultrasonic flowmeters allows for accurate and reliable detection of incoming water flow rates.

Advantages:

- Simple retrofitting without any pipework or service interruption
- Wear and maintenance-free measurement
- Hygiene: no direct contact between the measuring system and the medium

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Proven in daily use:

- Permanent and maintenance-free external flow measurement
- Accurate and reliable flow measurement on pipe diameters up to 6.5 m
- Safe and durable underground operation by means of IP68 transducers and the VARIOFIX C mounting fixture
- Simple and cost-effective retro-fitting on existing pipelines
- Accurate detection of even very low flow rates
- High measuring dynamics and stable measurement results over long periods of time without measurement dropouts
- Ideal measuring system for emergency circuit control of valves which in turn prevents property damage and personal injury
- Flow direction indicator
- Measurement of small flow rates without any narrowing of the cross section

Pipeline monitoring and leakage detection in the drinking water supply network

Given the aging water supply infrastructure, water loss caused by leakages in the pipeline network is becoming more and more significant. Active monitoring of leaks is a question of safety and efficiency of the supply network. Initiatives to upgrade existing networks have often failed up until now due to the huge costs involved in installing conventional wetted flowmeters.

Bury and forget

FLEXIM's non-intrusive ultrasonic FLUXUS® ADM 7407 flowmeter provides a superior solution.

There is no need to interrupt operation to install the measuring system – the transducers are simply attached to the outside of the pipe wall.
Secure and stable operation directly in the ground is possible without any problems thanks to the permanent connection to the pipe, the special protection provided by the stainless steel VARIOFIX C mounting device and the IP68 degree of protection of the transducers.

Consequently, engineers only very briefly need access to the supply lines – the transducers can be installed, sealed and buried shortly afterwards without any further shaft construction.

Underground flow measurement points on drinking water lines

A considerable amount of work and effort is often involved when it comes to retrofitting existing pipelines of a drinking water supply system with flow measurement devices:

In order to install a conventional magnetic-inductive flowmeter, civil engineering work must first be carried out to expose the pipeline. In addition to that, the pipe must be shut off for the installation which means an interruption of supply.

Not only due to its advantages in terms of retrofitting, non-intrusive, ultrasonic flow measurement is already an established standard measurement technology in the water sector. The compact and extremely sturdy IP68 clamp-on ultrasonic transducers are simply attached to the outside of the pipe.

The site only has to be dug up for a short time in order to access the supply pipeline and is then filled in immediately after installation. Permanent acoustic coupling and therefore maintenance-free measurement is ensured by the extremely solid VARIOFIX C mounting fixture. Advanced monitoring systems use the FLUXUS® ultrasonic flowmeter as a measurement source, where the data is transferred to the process control system via a mobile radio link.

Advantages:

- Reliable non-intrusive flow measurement
- Durable measuring device with IP68 transducers and robust mounting fixtures
- Underground installation directly in the ground without any expensive shaft construction

Detecting substantial pipe breaks and the smallest leaks

In order to be able to identify real water losses promptly, the inflows of a supply system must be monitored constantly.
Pipe ruptures, which require rapid isolation of the particular pipe section, can easily be identified by abnormal changes in flow behaviour using appropriate measurement techniques.

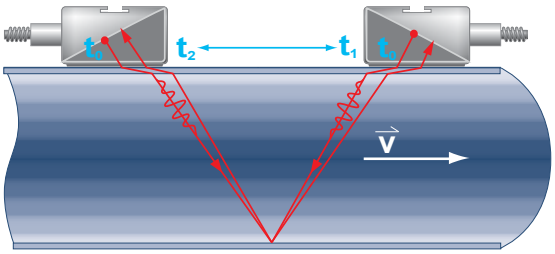
By using pairs of transducers that are perfectly matched as well as unique measurement algorithms for signal evaluation, the FLUXUS® ultrasonic flowmeter also detects the smallest volume flow rates with high precision. With a system of several flow measurement points, leaks, which are primarily not a safety concern but may affect the efficiency of the drinking water network significantly, can be pinpointed and the communal network can be run safely.

In particular during the night when consumption is low, the smallest flow rates are detected reliably and allow for an analysis of possible leaks.

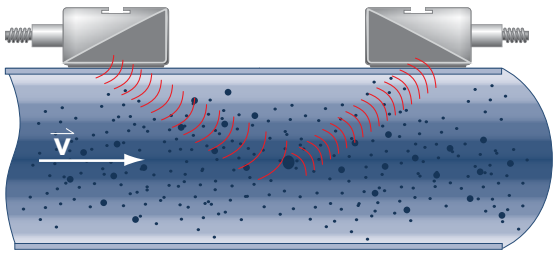
The system of choice – also for wastewater management

Reliable detection of wastewater flow rates fed in and out of wastewater disposal systems is also of great importance. Different pipe diameters with different wastewater and solids contents pose particular challenges for flow measurement. Challenges that are met by the FLUXUS® ultrasonic flowmeter with innovative technologies. Normally, the volume flow rate is determined based on the transit-time difference method. The accuracy achieved is unrivalled.

Transit-time difference method in the event of low solids content



In media with higher solids contents (>10%), the transit-time difference method can no longer be employed as the ultrasonic signals are becoming absorbed through particles or gas inclusions flowing within the liquid.
The Hybrid Trek mode of the FLUXUS® recognises this situation and automatically switches to Doppler measurement, in which the frequency shift of the ultrasonic signal is measured by the particles floating in the liquid.



Automatic shifting to NoiseTrek mode in the event of high solids content

Due to the strong transmission power of the measuring systems, deposits on the pipe wall have no major impact on the measurement. This is also the case for fluctuations of the flow rate itself, which do not affect the reliability of the measurement. Therefore, accurate and, above all, reliable determination of the volume flow rate is always ensured during the flow measurement of wastewater.

Flow measurement of wastewater in a sewage treatment plant

With the expansion of the capacity of a sewage treatment plant for a population equivalent of 700.000, the inlets to the denitrification tanks and recirculation lines had to be fitted with a permanent flow measurement.

Non-intrusive flow measurement with ultrasonic FLUXUS® flowmeters has proven to be a very good and cost-effective alternative to magnetic-inductive flowmeters used in water and wastewater management.

Since the clamp-on transducers are attached to the outside of pipe, there are no additional costs for pipework. Installation and commissioning proved to be simple and the measuring systems even work smootly and reliably when there are high particle loads.

Advantages:

- Reliable and safe measurement even in the event of high solids contents
- Resistant to deposits on the pipe wall
- High measuring dynamics – precise measurement at low and high flow rates
- Huge cost advantage over magnetic-inductive flowmeters

FLEXIM

In partnership

For more than twenty years, FLEXIM has led the way for process instrumentation in many areas of industry. FLEXIM has repeatedly set standards as a technology leader and pioneer in the area of clamp-on ultrasonic flow measurement of liquids and gases. In addition to non-intrusive flow measurement, innovative process analytical methods using ultrasound or refractometry are also part of our extensive portfolio.

Effective and forward-looking

We're not resting on our laurels. Every year, we invest significantly in research and development to further strengthen our position as a technological leader. In addition to that, we maintain close contact with our customers. Innovative and reliable products that meet the requirements of end users are the result.

Customer service at FLEXIM

FLEXIM not only sees itself as a manufacturer of measuring instruments, but more comprehensively as a provider of customer-driven solutions and services. As the user, you are at the centre of all our efforts. Our corporate philosophy is to provide you with the most suitable and highest quality measuring system for your process applications and to be a reliable partner who can offer you the best possible support and service.

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