

WATERFLUX

Electromagnetic flowmeters
for applications
in the water and wastewater industry



KROHNE

▶ *achieve more*

- ▶ No inlet and outlet sections
- ▶ Extremely robust measuring tube with Rilsan® liner
- ▶ Suitable for custody transfer, extremely precise, even for very low flow rates
- ▶ Battery powered as option: up to 15 years continuous operation and GSM data transfer



The allure of water – a KROHNE world

Welcome to KROHNE. As a global leader in process instrumentation, we supply products and complete solutions to a wide range of industries – all over the world.

Since 1921 the name KROHNE has stood for innovative, reliable solutions covering every aspect of process instrumentation. Today, our products and services cover the entire range of measurement and analysis processes, from individual measuring points to complete plant solutions. Extensive customer care and consulting services round off the portfolio.

In the water industry, we have over 85 years of experience in metrology to draw on, and we have continuously set new standards in this technology.

In 1961, our engineers developed the first electromagnetic flowmeter. Today, we are the global market leader for electromagnetic flowmeters, which we produce in our factories in the Netherlands, Brazil, China and India.

Water is one of the world's key future markets. As a full-service supplier, we develop single-source engineering solutions that will meet future requirements.



WATERFLUX – High precision, 100 % KROHNE

Throughout the history of our company, KROHNE development and application engineers have been continuously pushing the limits of feasibility in developing and testing new instruments. The results are innovations that go far beyond the statutory requirements, thereby setting new standards for the market.

We continue this tradition with the WATERFLUX – an electromagnetic flowmeter for applications in the field of water and wastewater. As a result, WATERFLUX is designed for custody transfer according to European Directive MI-001. The measuring accuracy reflects the most recent specifications of the ISO/EN, MI-001 and OIML standards. It lies within legal requirements with a ratio of 400 between Q1 and Q3.

The high operating frequency of 1 Hz to 1/20 Hz guarantees reliable measurement results with rapid inflow and outflow rates.

However, WATERFLUX also means "KROHNE proved": This covers specific trials, measurements and tests that go beyond the legal specifications – and on which our customers can rely 100 percent.

For example, we check the WATERFLUX electronics to a series of extensive temperature change tests, in which the converter is exposed to cyclical fluctuations from -20 °C to +60 °C (-4 °F to +140 °F).

Not only do these test help maintain the guaranteed temperature coefficients, but they also make sure the instrument can be used under extremely harsh conditions. This minimizes failure in the field.

Every WATERFLUX meter that leaves our factory is first wet-calibrated on our officially certified calibration rigs (EN 17025).

Typical applications for the WATERFLUX:

- Drinking water billing
- Billing of ground water consumption for irrigation systems
- Distribution network monitoring
- Pipeline leakage detection systems
- Water measurement in wells and transfer chambers





Unobstructed pipe cross section, individual adjustable measuring frequency

The true quality of a water meter lies in its measuring section, which determines whether the instrument can deliver precise, repeatable measurement results even in problematic applications such as suspended particles and solids in the water.

The WATERFLUX measuring tube has a smooth, conical shape. This unique design, consisting of a rectangular cross section, optimized stainless steel electrodes and a homogeneous magnetic field, forms the basis for a flow-optimizing pipe cross section, and thereby provides reliable measurements that are largely independent of the flow profile.

This has an obvious advantage: WATERFLUX can measure the flow bidirectionally.

Another advantage is that you can customize the measuring frequency specifically to your application, thus ensuring that the measurement results are always accurate, even when the flows are changing quickly.

The lining of the measuring tube is made of Rilsan® and is resistant to corrosion, aging and abrasion. As a result, WATERFLUX is a food-grade flowmeter which complies with KTW, DVGW, WRc and NSF as well as ACS and thus also approved for potable water.

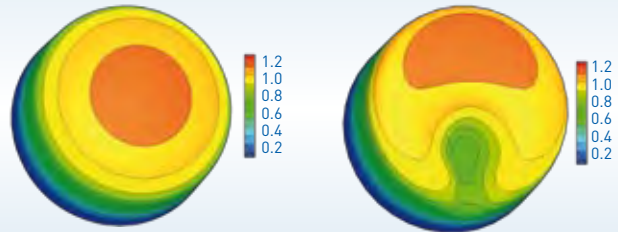
The surface and shape of the measuring tube also minimize mineral deposits, resulting in exemplary measurement quality – even over a long term.

Less is more – Installation without inlets and outlets

- By virtue of the fact that WATERFLUX does not affect the flow profile, it can also be used in applications without inlets and outlets. Independent studies by the Physikalisch-Technische Bundesanstalt (PTB) in Berlin also confirm that the WATERFLUX with its flow profile-optimizing cross section does not require inlets and outlets, unlike measuring devices with round cross sections: The increased flow rate results in improved signal strength and thus an accurate measurement even with low flow rates.

- And it does this with minimum consumption, an indispensable advantage, for example during nighttime operation. Errors in the flow profile are reduced by 80 %. The pressure loss resulting from necking is negligible (< 0.01 bar/0.14 psi).

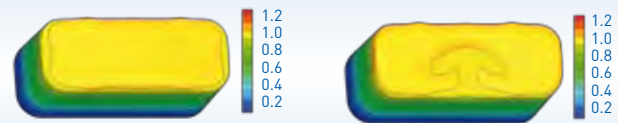
Electromagnetic flowmeter
with round cross section



Uninterrupted
flow profile

Flow profile
after a pipe bend

WATERFLUX with rectangular cross section



Uninterrupted
flow profile

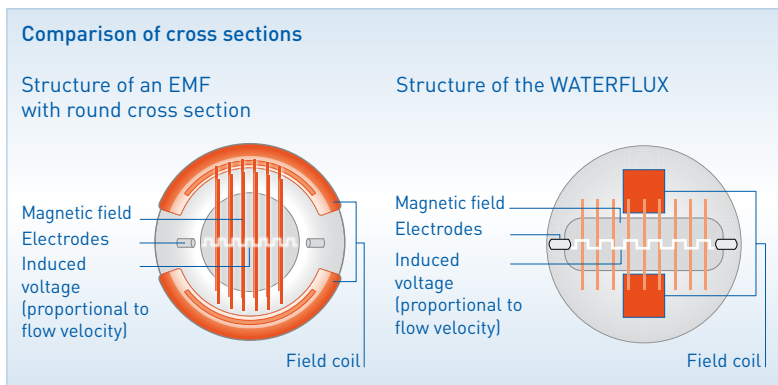
Flow profile
after a pipe bend



WATERFLUX 3070 – Power for 15 years

Electromagnetic water meters have many important advantages over their mechanical counterparts: outstanding long-term stability, maximum process reliability, no maintenance – to name just a few. But they have one small disadvantage: They need power. WATERFLUX minimizes this disadvantage. To guarantee the longest battery life-time possible, all of the components have been optimized to consume a minimum of power.

Thanks to the rectangular cross section used in the WATERFLUX, the magnetic coils are relatively close together compared to round cross sections and thus require less energy to generate an adequately strong and homogenous magnetic field. A magnetic core with a small round coil has been used instead of saddle coils. This round coil has very short turns and therefore offers less ohmic resistance at the same magnetic force.





*optionally available
with two batteries

The result is obvious: thanks to low power consumption and a powerful battery, WATERFLUX 3070 can deliver highly precise measurements for many years. And it does so in places that either have no power or where no power is possible.

The battery life depends, among other things, on the measuring frequency and the number of batteries. Up to 2 batteries can be inserted in the device. At the default measuring frequency of 1/15 Hz and a temperature of approx. 25 °C/77 °F, is the life cycle with

1 integrated battery:	8 years
2 integrated batteries:	15 years
external battery pack:	20 years

With this highly innovative solution, the power consumption is 5,000 times less than that of a conventional electromagnetic flowmeter!

But WATERFLUX can do a whole lot more: The water meter has extensive factory-set diagnostic functions that provide continuous self-diagnosis in accordance with the applicable standards.

Converter operation is also monitored continuously, as are the sensor electrodes, the battery charge level and electronic functions. Malfunctions and irregularities are detected and immediately displayed on the high-contrast, high-resolution display.





No wear, no maintenance, no additional costs

The actual efficiency and economic feasibility of a bulk water meter is often felt only after many years. Or it becomes apparent in just a few seconds – by glancing at its internal qualities.

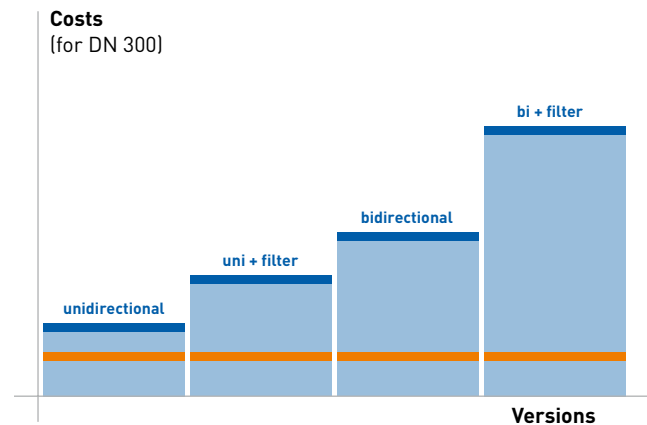
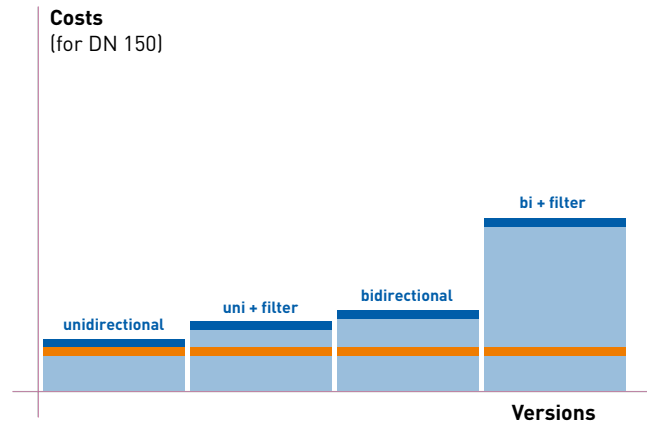
Thanks to its unobstructed measuring section, WATERFLUX is far superior to conventional water meters, with their sensitive mechanical components, where pressure loss and long-term stability are concerned. No moving parts, no parts extending into the measuring tube, no filters or additional grounding rings, no rectifiers or cleaning intervals.

It accurately measures both minimum flows, such as nighttime flows, and maximum flows, such as a fire brigade responses without requiring maintenance. All this over an entire life cycle of 25 years and several calibration periods. WATERFLUX is thus revolutionizing technology in the water industry.

However, the extremely sturdy housing construction of our water meter also contributes to its long-term stability. For example, the measuring sensor features a cast steel flange with protective PU coating, and the converter is made of metal coated in a protective PU coating combination.

A look at the graph clearly shows that the cost advantages offered by WATERFLUX over mechanical water meters rise significantly in proportion to the nominal diameters.

Costs:
WATERFLUX compared to mechanical water meters



■ mechanical water meters
■ WATERFLUX



GSM delivers
up-to-the-minute information –
Anywhere in the world

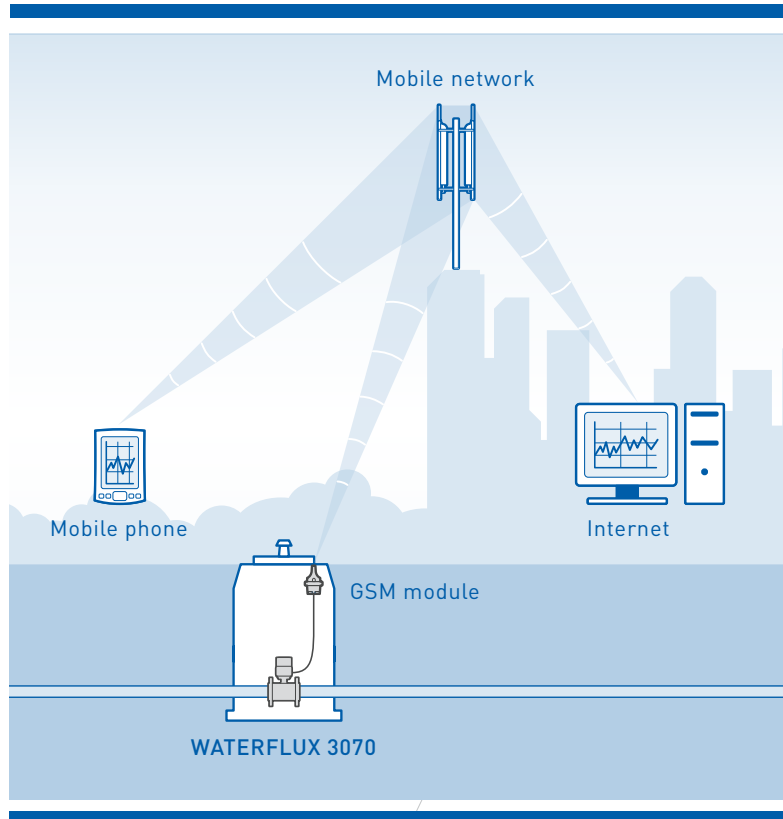


Bulk water meters are sometimes installed in extremely remote measuring points such as water chambers or difficult to reach transitional points.

The ability to read the measured results on-site may be standard, but it does not always meet the current and actual needs of the user or operator.

That is why WATERFLUX comes with an optional, state-of-the-art remote control system: a data logger and a GSM module.

The stored data is transmitted remotely at a customizable frequency (e.g. once a day), by SMS or GPRS to the control system or to a cell phone.



Optimal solution for any application

Depending on the requirements, WATERFLUX can be fitted with a special converter. This modularity is also reflected in the names of the devices: In other words, the device name is made up of the name of the sensor as well as the name of the converter.

For example:

WATERFLUX 3070 is a combination of the WATERFLUX 3000 sensor and the IFC 070 converter.

There are three specialists at your disposal for the different tasks.

WATERFLUX 3070 – when a stand-alone solution is needed.

Combined with the battery-powered IFC 070 converter, WATERFLUX can be perfectly used as a water meter for measuring stations where connection to a power supply is either not available or not possible



WATERFLUX 3000



IFC 070 C
Compact installation on
the sensor



IFC 070 F
Separate installation from
the sensor

WATERFLUX 3300 – when it matters.

Combined with the IFC 300 converter, WATERFLUX has proven itself in a wide range of applications, even those not related to drinking water measurement. Thanks to its extensive diagnostic functions, WATERFLUX 3300 is the first choice, especially for critical applications.

WATERFLUX 3100 – when cost-effectiveness is the priority.

Combined with the IFC 100 converter, WATERFLUX is particularly suited to applications which demand economic measuring technology solutions at a high technological level.



IFC 300 C
Compact installation on the sensor



IFC 300 F
Remote mount up to 300 m/1000 ft from sensor



IFC 100 C
Compact installation on the sensor



IFC 100 W
Separate installation from the sensor



IFC 300 W
Wall-mounting for non-hazardous areas



IFC 300 R
Rack mount version for installation in control rooms

Operating conditions

WATERFLUX 3070 Water meter	
Medium	<ul style="list-style-type: none">- Raw water, well water, potable water etc.- Pure or containing solids- Conductivity > 20 $\mu\text{S}/\text{cm}$
Operating temperature	-5...+70°C; +23...+158°F
Ambient temperature	-20°C...+65°C; -4°F...+149°F
Operating pressure	0...16 bar; 0...232 psi
Pressure loss	<0.01 bar; <0.14 psi
Flow	Bidirectional
Inlets and outlets	ODN/ODN

Technical data

	Design
Measuring accuracy	±0.2% MV ±0.5mm/s (WATERFLUX 3070)* ±0.3% MV ±0.5mm/s (WATERFLUX 3100)* ±0.2% MV ±0.3mm/s (WATERFLUX 3300)*
Liner of measuring tube	Rilsan®
Measuring tube housing	Sheet steel + polyurethane coated
Measuring electrodes	Stainless steel 1.4301, optional HC22
Reference electrode	Stainless steel 1.4301, optional HC22
Converter housing	Aluminum die-cast + polyurethane coated
Connection box (for remote version)	Aluminum die-cast, optional stainless steel 1.4404 (ASME 316 L)
Flange	Cast steel with polyurethane coating
Nominal size	DN25 to 200, PN16; 1 to 8", 150 lbs DN200 to 600, PN10; 8 to 24", 150 lbs
Dimensions, flange to flange	Conforms to DVGW/ISO
Design	Compact and remote version
Mounting position	Any
Protection class (EN 60529/IEC 529)	IP 66/67 Standard IP 68 (compact, remote version) IP 68 subsurface installation (optional for remote version)
External power supply	None
Battery powered	1 or 2 lithium monocell batteries (built-in) External battery pack
Signal outputs	2x passive pulse outputs for forward and reverse flow 2x passive status for alarm function and battery charge status optional integrated remote data transmission
Integrated pressure and temperature sensor	Display in bar/psi or °C/°F (WATERFLUX 3070)

* The specified measuring accuracies refer to use with 3DN/1DN inlets and outlets.
The basic measuring accuracy must be increased by 0.1% for use with 0DN/0DN.

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Product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Measuring systems for the oil and gas industry
- Measuring systems for sea-going tankers



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