

Just  
brilliant.

**GWF4D** technology®



# Intro

Welcome to GWF's 4D technology®. We appreciate your interest in our cutting-edge flow measurement. GWF's 4D technology® has been developed based on our extensive experience in the water flow measurement domain – and started on a blank sheet of paper...

When we began the development, we wanted to do things differently. Our R&D team analyzed a variety of basic technologies – from magnetic inductive to fluidic oscillator, from acoustic to optical principles. Finally, we discovered the ultrasonic principle of Time Reversed Acoustics (TRA).

This principle has not been used in flow measurement before – and we were thrilled. Our initial research concluded that a measurement system based on TRA is capable of providing an unprecedented dynamic range, is very robust to water turbulences, and offers many additional benefits.

Over the past years our team of experts across the globe has developed physics a number of patents and patent applications leading to our unique GWF 4D technology®. What we now consider as GWF's 4D technology® is the combination of our innovative, 4-dimensional time reversed acoustic signal processing, a high-performance electronic implementation, highly robust mechanics, and a modular approach to data communication and systems integration.

This brochure will give you a brief overview of our technology and two product series that build on our 4D technology®.

We look forward to engaging in discussions with you. Please do not hesitate to contact us.

## Your GWF team

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## Great people.

We jointly develop a work environment for motivated team players who enjoy their roles and responsibilities, take an active part in creating the future of GWF and keep pushing their own development.



## Winning with value.

We create long term value for our customers and partners with our leading products, systems and services; by doing so, we contribute to the responsible use of valuable resources.



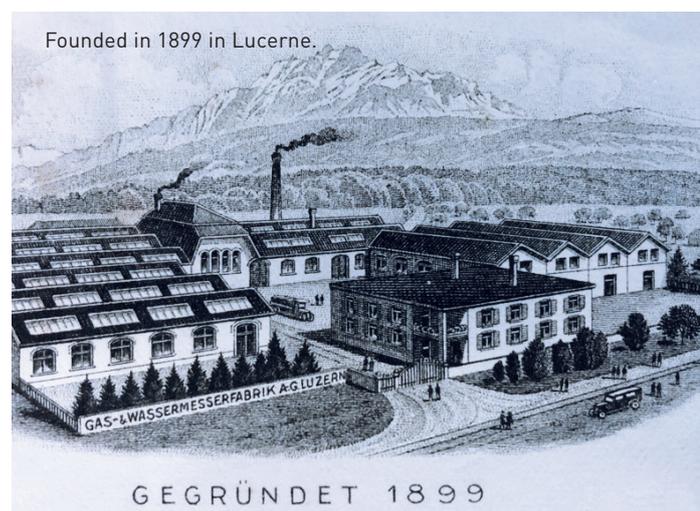
## Future oriented.

We generate robust economic profit for further investments in innovation, the progressive development of our company and the preservation of our independence.

You can't preserve what you can't measure.  
That's why we are committed to deliver  
innovative measurement solutions for  
valuable resources.



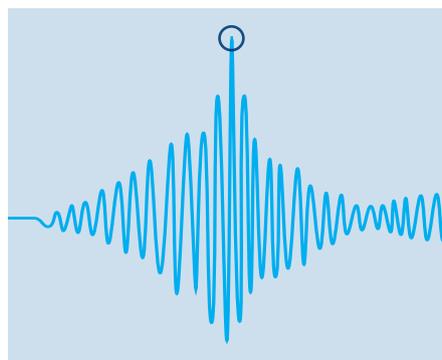
Family owned and committed to the future.



Founded in 1899 in Lucerne.

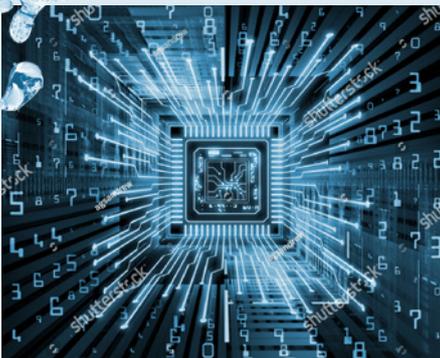
GEGRÜNDET 1899

# Rocket science



## 4D ultrasonic signal processing

Based on our patented Time Reversed Acoustics approach, we developed a unique methodology for ultrasound signal processing and correction. Our signal structure does not follow a 'path', instead we work in 'panes', capturing the entire flow channel. Also, instead of using cumbersome and sensitive correction tables, we use proprietary correction algorithms based on the physical flow profile. This enhances measuring stability and repeatability of results even in adverse conditions such as strong flow turbulences.



**High-performance electronic implementation**

The implementation of our 4D technology® results in optimized signal generation and post processing of the measured data. Additionally, the signal-to-noise ratio is maximized at the receiver's end due to the patented method applied, which leads to high performance.



**Highly robust mechanical design**

Our unique approach to transducer handling and product integration leads to long-term product stability. Also, our overall mechanical design in the Ductus S and sonico® product lines is cutting-edge: the unique transducer housings of our Ductus S systems allow for internal and external installation. The sonico® series is designed for 20+ years in the field. The straight and empty pipe design without any cavities and with its dry transducers has clear advantages for all water and installation conditions. Finally, our material selection for housings, coatings and other mechanical parts meets highest standards.



**Modular approach to data communication and systems integration**

We have extensive experience with data communication and integration of devices into systems for billing, grid management and process control. Communication of collected data into wired, wireless, fixnet, drive-by or other communication backbones is critical to success for any of our devices. The ever faster changing standards, protocols and modules require highest possible flexibility. Our products are set up completely modular and offer open and flexible interfaces for systems integration.

# The sonico® advantage!

Robustness  
by design.

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Robustness through well-selected materials and elaborate mechanical design to avoid tampering, influence from external factors such as temperature or submerged installations.

Longevity  
by design.

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Clean and straight measuring pipe without cavities results in minimal pressure loss as well as long lifetime and measurement stability.

Accuracy  
by design.

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Highest accuracy and repeatability across the entire flow profile leads to a cutting-edge dynamic range.

## Plug-and-Play.

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Future-proof connectivity with modular, field-exchangeable communication modules or integrated radio with non-proprietary and over the air updateable communication protocols allows for integration in any data communication management system.

## Highest Adaptivity.

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Simple installation and reliable measurements across the entire flow range even in challenging conditions without any straight runs.

## One-Tech-fits-all.

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One technology fits all meter sizes from DN15 to DN300 and all measurement point requirements for simplified inventory management and seamless integration into cloud based data management system infin.io.

# sonico<sup>®</sup> EDGE

## Concept

Sonico<sup>®</sup> EDGE has been developed for highly challenging measurements of fresh water flow in pressurized pipes. The product concept is modular and flexible in terms of overall mechanical design and communication. Sonico<sup>®</sup> EDGE is equipped with the latest GWF 4D technology<sup>®</sup>.

## Advantages

Besides the high turndown ratio that enables a dynamic measurement range between 0.02 m<sup>3</sup>/h and 90 m<sup>3</sup>/h (DN50) at highest precision, the devices are extremely flexible when it comes to installation conditions. GWF's 4D technology<sup>®</sup> allows for sonico<sup>®</sup> EDGE to be installed directly after or before 90° elbows, valves or pumps. Moreover, the turndown ratio R1000 is guaranteed over the entire measurement range, far beyond the very basic MID requirements.

Due to the clean and open 4D-shape pipe design, the measuring device has unparalleled low pressure loss. Furthermore, the utility-grade IP68 design and excellent material selection result in highest product robustness.

## Applications

Sonico<sup>®</sup> EDGE is designed for flow measurement of water, e.g. drinking or utility water. Typical installation sites include reservoirs, water towers or pumping stations.

Sonico<sup>®</sup> EDGE is suitable for difficult installation conditions such as placement directly before or after 90° elbows.



sonico® EDGE  
DN50



sonico® EDGE  
DN80 & DN100



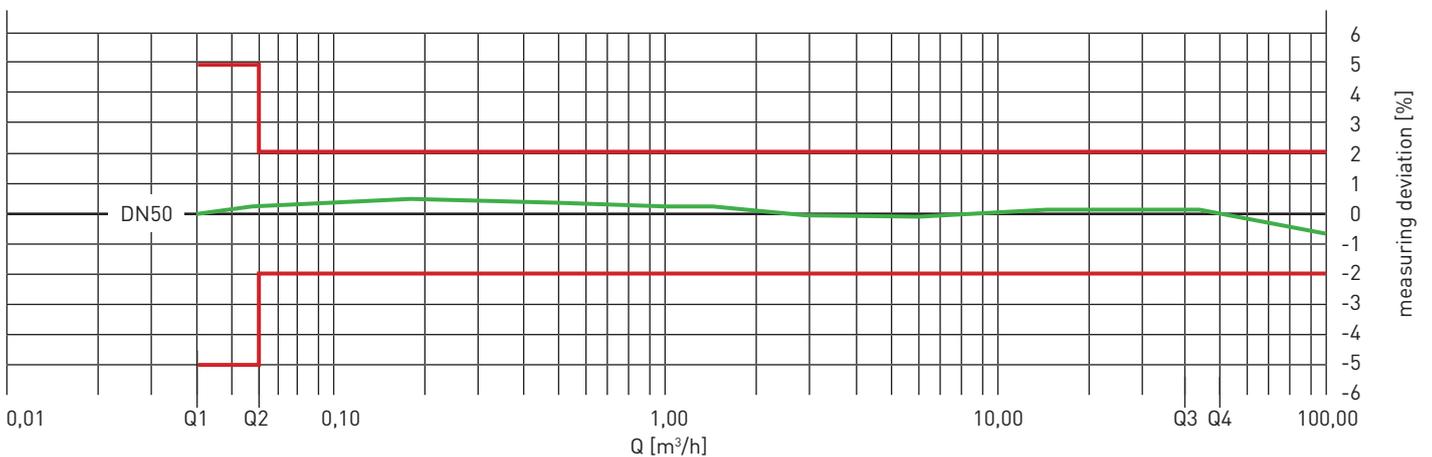
sonico® EDGE  
DN150 & DN200



sonico® EDGE  
DN250 & DN300

## sonico® EDGE measuring accuracy

4D technology® offers a turndown ratio R1000 and is extremely robust against changes in the flow profile caused by bends, valves or pumps. The Time Reversed Acoustics principle enables a new level of measuring repeatability independent of flow conditions, electromagnetic or grounding interference and medium conductivity.



# sonico<sup>®</sup> NANO

## Advantages

Sonico<sup>®</sup> NANO's measurement performance is unmatched in the industry allowing utility companies access to reliable and true measurement data. Sonico<sup>®</sup> NANO delivers accurate and stable low flow measurements and leakage notification. To prevent contamination of the drinking water, the meter measures continuously the water temperature and dangerous reverse flows into the water networks or reservoirs. For transparent and correct billing of the water consumption, the forward, reverse and cumulative water consumption is measured together with various alarms and send by different end-to-end encrypted wireless communications to backend data management platforms. The product design allows for full flexibility in data communication.

The plug and play functionality reduces the installation costs and delivers installation flexibility by automatic flow direction. Together with the integrated dual mode, Sonico<sup>®</sup> NANO connects automatically to the periodized LoRa WAN, or if not available uses the wMBus network for drive by or fix net readouts. The simple and seamless integration into the GWF infin.io data management platform can be used for data management and optimization to the water grid.

The sustainable manufacturing process and the robust design including a possible retrofitting increase the lifetime of the product, reduces CO<sub>2</sub> footprint and ensures end of life recycling. Moreover, the meter software can be updated in field and over the air to increase product life cycle time and update for new features.

## Applications

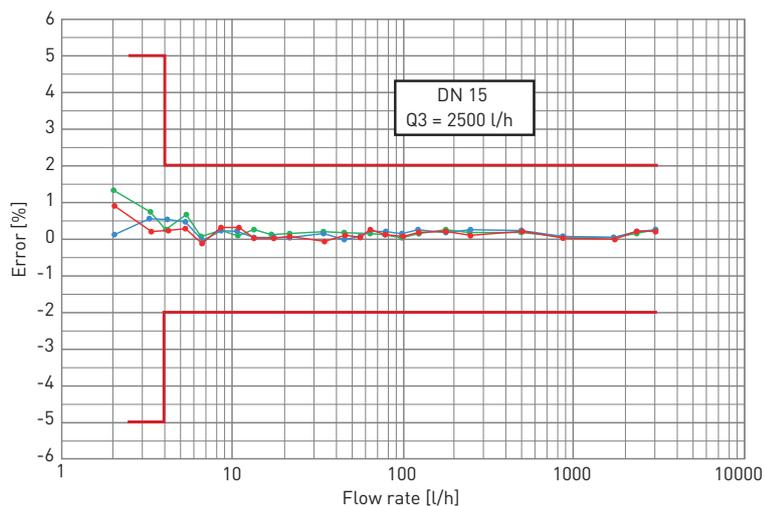
- > Cold water supply systems (water temperature up to 50 °C) requiring reliable and accurate water consumption metering
- > Reliable data communication on site (NFC) and integrated radio technology (RF) for mobile or fixed network / smart metering collection systems (AMR)



sonico® NANO  
DN15 & DN20

## sonico® NANO measuring accuracy

GWf's 4D technology® shows linear behavior in all operating regions, which is in laminar, transition and the turbulent flow. Thus, the 4D technology® clearly can be used in environments where a large dynamic range of 1000 and larger is required (e.g. low flow and leak detection, overflows, or bursts). In addition, this technology is insensitive to the media, pressure cycles, entrapped air as well as salinity. Furthermore, as an additional advantage, dry transducers can be used – this guarantees that a maximum possible overdrive flow in the meter can be measured without running into cavitation. The flow tube incorporates no obstacles and hence, an extremely low head loss of 0.14 bar at nominal flow (Q3) is reported.



# Production and quality system

## GWF production

GWF has a legacy of efficient and high-quality production in Switzerland. Since 1899, we manufacture gas and water meters at our headquarter in Lucerne – in limited numbers, but highest quality. To manufacture the sonico® product line, GWF invested in a world-leading production test bench 'LUZ1'. The test bench was installed in early 2018 as one of the most accurate production equipments in the world.





Headquarter  
GWf AG  
Obergrundstrasse 119  
6005 Lucerne  
Switzerland

T +41 41 319 50 50  
F +41 41 310 60 87  
info@gwf.ch

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→ [gwf.ch](https://www.gwf.ch)

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