

# Ultrasonic Flow Meter Solutions



**Time-saving Installation.  
Easy Flow Measurement.**



**Badger Meter**

# Ultrasonic Flow Meters

Badger Meter ultrasonic meters measure flow rate by propagating ultrasound waves into liquid-filled pipes and measuring the reflections. There are two technologies to choose from based on the fluid properties; transit time and Doppler. With clamp-on technology, the Badger Meter ultrasonic meters reside outside the pipe and bring you flow measurement with:

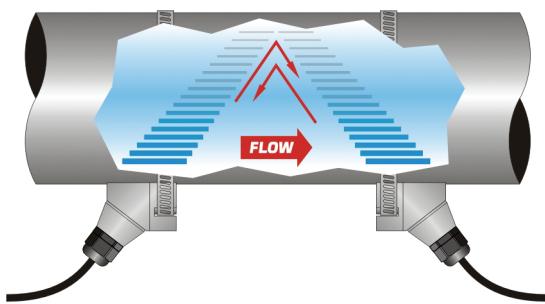
- Reduced installation costs
- Uninterrupted production
- Installation flexibility across a wide range of pipe sizes
- No pressure head loss
- No contact with internal liquid
- No moving parts to maintain

- Ideally suited for permanent, temporary or portable flow verification
- Features a non-intrusive clamp-on design
- Energy and network connectivity options available

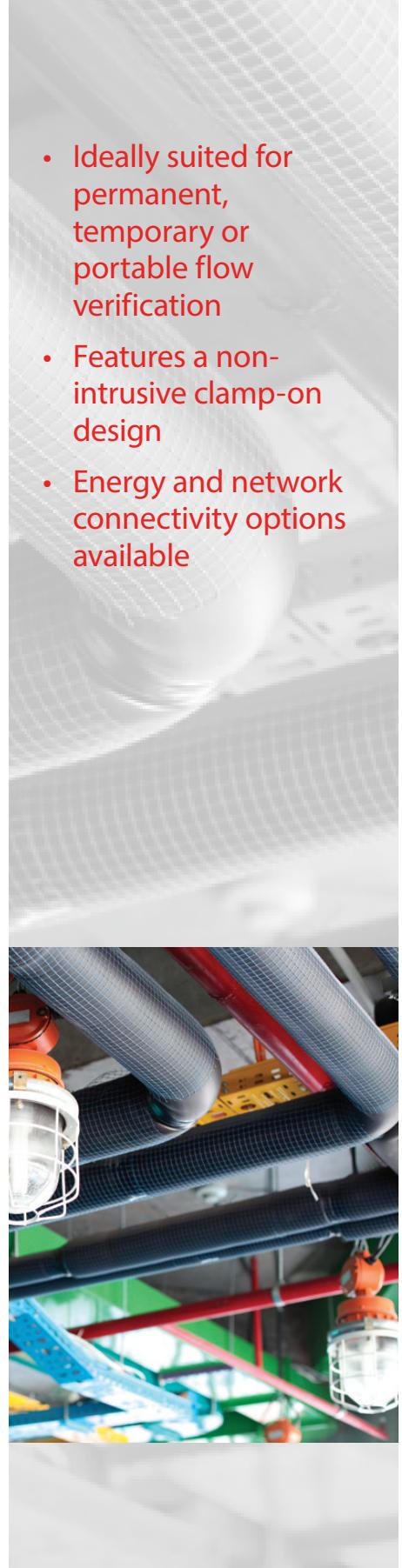
## Transit Time

### Clean fluids with small amounts of suspended solids or aeration

For clean fluids with small amounts of suspended solids or aeration, transit time ultrasonic meters provide the best performance and can be used in a wide range of applications for pipes ½ inch and larger.



Transit time flow meters have two transducers which function as both ultrasonic transmitters and receivers. The flow meters operate by alternately transmitting and receiving a frequency modulated burst of ultrasound energy between the two transducers. The burst is first transmitted in the direction of fluid flow and then against fluid flow. Since ultrasound energy in a moving liquid is carried faster when it travels in the direction of fluid flow (downstream) than it does when it travels against fluid flow (upstream), a differential in the times of flight will occur. The ultrasound's time of flight is accurately measured in both directions and the difference in time of flight is used to determine the velocity of the fluid.



# Transit Time Flow Meters

Transit time flow meters consist of electronics with remote or integral transducer options to measure bidirectional flow of clean liquids.

## TFX Ultra Flow Meter

Supporting the widest range of pipe sizes and network options, TFX Ultra is our most popular ultrasonic flow meter. The compact aluminum enclosure with an easy-to-read display can be installed in a variety of locations.

Pipe sizes: 1/2...96 inch (12...2400 mm) or larger

Accuracy:  $\pm 1\%$  of reading



## TFX Ultra Energy Meter

TFX Ultra meter with dual RTDs can calculate energy usage from the flow and temperature measurements across heating and cooling equipment and zones.

Pipe sizes: 1/2...96 inch (12...2400 mm) or larger.

Accuracy:  $\pm 1\%$  of reading.



## TFXL Flow Meter

An economical meter designed to replace mechanical flow meters, TFXL flow meter outputs square wave or turbine meter simulated signals or 4...20 mA.

Pipe sizes: 1/2...30 inch (12...750 mm) or larger.

Accuracy:  $\pm 1\%$  of reading.



## Transducers for TFX Ultra and TFXL

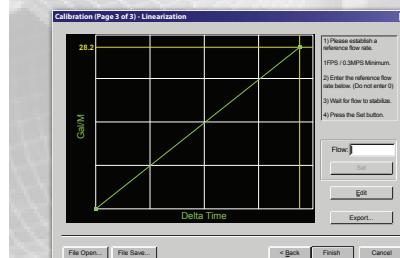
Multiple options are available for a variety of pipe sizes\* and temperature ratings. Cable and flexible armored conduit selections are offered to reduce installation time.



\*Maximum pipe size depends on liquid and pipe material

## Ultralink Software

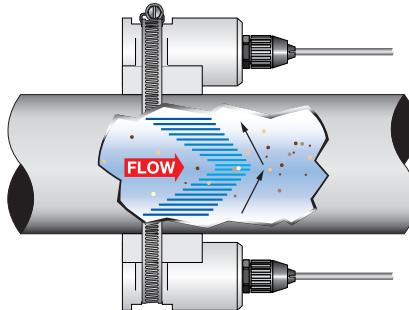
Windows® -based software utility programs TFX Ultra and TFXL flow meters. Ultralink allows you to view the wave forms, configure, calibrate and troubleshoot your Dynasonics device.



# Doppler Flow Meters

## Fluids with suspended solids

For fluids with significant amount of particles or air bubbles such as slurries, sewage and plastics, Doppler ultrasonic meters provide the best performance.



Each Doppler flow meter utilizes either two separate transducer heads, one transducer head or a probe insertion tip. Ultrasonic waves are transmitted from one transducer and reflected by reflectors suspended within the liquid and then recorded by a receiving transducer. If the reflectors are moving within the ultrasound transmission path, ultrasound waves will be reflected at a frequency shifted (Doppler shift) from the transmitted frequency. The difference between the transmitted frequencies and reflected frequencies is directly proportional to the speed of the ultrasonic reflectors.

## DFX Doppler Flow Meter

Designed for semi-clean liquids with suspended sonic reflectors on pipe sizes 1/4 inch (6 mm) and larger. Accuracy:  $\pm 2\%$  full-scale over calibrated span.

## Transducers

Clamp on or hot-tappable insertion probe transducers are available. Cable and flexible armored conduit selections are offered to reduce installation time.



- Ideal for most slurries or aerated liquids
- Low installation cost
- No moving parts to maintain



# Portable Flow Meters

## Portable Flow Troubleshooting Kits

Designed for quick troubleshooting and verifying system performance during commissioning, portable ultrasonic kits are ideal tools throughout the process.

### DXN Hybrid Flow and Energy Meter Kit

Our most versatile flow meter, the DXN measures flow with transit time and Doppler technology. The large easy-to-read color display and intuitive touch screen interface makes set up quick and easy.

Measurements from external devices such as RTDs and pressure transmitters can be logged along with flow data.

Accuracy:  $\pm 1\%$  of reading.



### UFX Doppler Flow Meter Kit

Economical maintenance tool for quickly measuring fluid systems with suspended solids or air bubbles. Includes transducers.

Accuracy:  $\pm 2\%$  full-scale.



## Applications

- Water
- Wastewater
- HVAC/Energy Monitoring
- Power Generation
- Semiconductor
- Food and Beverage
- Flow System Commissioning and Troubleshooting



# Communication Systems

## Communication is Key

Connectivity is a key aspect to a successful flow monitoring system. Badger Meter ultrasonic meters adapt to almost any system utilizing communication networks, pulse, analog, or wireless. We offer modular wireless components and data acquisition systems to provide greater flexibility, collect valuable operation data and allow remote monitoring.

## Simple and Efficient

Our meters offer simple system performance solutions for flow measurement at an affordable cost. With a family of Badger Meter products for a wide range of needs, it is easy to go from a stand-alone system all the way to a full-service process environment.



- Flow/Btu monitors
- Btu energy transmitters
- Data acquisition systems
- BEACON® Advanced Metering Analytics (AMA)

# About Badger Meter



**Badger Meter**

Badger Meter Flow Instrumentation understands that companies cannot manage what they do not measure—and leverages more than a century of flow measurement expertise and a technology-rich portfolio to optimize customer applications worldwide.

An industry leader in both mechanical and electronic flow metering technologies, Badger Meter offers one of the broadest flow control and measurement portfolios in the industry—a portfolio that includes eight of the ten major flow meter technologies. Simply put, Badger Meter Flow Instrumentation provides technology to measure and control whatever moves through a pipe or pipeline—including water, air, steam, oil, other liquids, and gases.

## Variety of Flow Instrumentation Solutions



M-Series® Mag Flow Meters



Industrial Oval Gear Flow Meters



Dynasonics® Ultrasonic Flow Meters



Research Control® Valves and Positioners



Hedland® Variable Area Flow Meters



Recordall® Disc Flow Meters



Impeller Flow Meters



Cox & Blaneckett® Turbine Flow Meters



Vortex Flow Meters



Preso® Differential Pressure Flow Meters



Flo-tech Hydraulic Fluid Testing



Coriolis Flow Meters

- Control
- Manage
- Optimize

## Flow Dynamics® calibration services



- Calibration for most meter types
- OEM production calibrations
- NIST-traceable primary standards

**NVLAP**  
Lab Code 200668-0

Note: NVLAP accreditation applies only to the Badger Meter Flow Dynamics calibration lab, located in Scottsdale, AZ.



## Control. Manage. Optimize.

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