Panametrics

Datasheet



BWT™

Panametrics Bundle Waveguide Technology™ system

An advanced flow measurement system for difficult applications
The BWT system is field-proven to give accurate, drift-free, obstructionless flow measurement in the most difficult liquid and gas applications.

PANA006DS Rev. 2

Expands your measurement capability

The BWT system consists of buffer assemblies and transducers. The buffer assemblies use waveguide bundles to efficiently concentrate a greater amount of the transducer ultrasonic signal into the process. At the same time, the bundles act as buffers to protect the transducers from extreme temperatures to ensure unlimited life. This innovative design greatly expands the range of applications possible.

High-viscosity, high–molecular weight liquids

In liquid applications, either 500 kHz or 1 MHz BWT transducers are used. The ultrasonic signal transmitted through the buffer assemblies is powerful enough to penetrate all liquids, including high-viscosity, high–molecular weight liquids and liquids containing excessive second-phase gas bubbles and solids.

PanaFlow™ meter systems

The BWT system is an integral part of our PanaFlow meter system. Our liquid PanaFlow uses BWT transducers exclusively because of their advanced performance capabilities. Our gas PanaFlow uses BWT technology in extreme temperature services to extend PanaFlow's application capability.



A two-path PanaFlow meter system

Features

- No pressure drop
- Low maintenance
- Measures flow over a wide range of flow rates and pipe sizes
- Measures flow rates in high-temperature and high-pressure gases
- Accurate and drift-free measurements
- Corrosion resistant
- Easy serviceability

Applications

The Bundle Waveguide Technology (BWT) system is a mechanical component of wetted liquid and gas ultrasonic transducer installations for high-temperature and high-pressure flow measurement of:

- Hydrocarbon liquids
- Residual flows
- Natural gas
- Steam
- LNG (liquified natural gas)

Technical **Specifications**

Transducers

Designation	BWT1
Material	316L stainless steel
Mounting	1 1/4 in. straight UN thread
Connectors	• Standard: BNC • Optional: Submersible
Temperature	-58°F to 212°F (-50°C to 100°C)
Frequencies	• 200 kHz for gases and steam • 500 kHz or 1 MHz for liquids, depending on the application

System

Area classifications	Explosion-proof: Class I, Division 1, Groups C & D Flameproof: • BWT: ⟨Ex⟩ II 2 G Ex d IIC T6 Gb KEMA 01ATEX2051 Ex d IIC T6 Gb IECEx KEM 09.0010 • JB: ⟨Ex⟩ II 2 G Ex d IIC T6 Gb DEKRA 13ATEX0120X Ex d IIC T6 Gb IECEx DEK 13.0034X
European compliance	Complies with directives 2004/108/EC EMC, 2006/95/EC LVD (Installation category II, pollution degree 2), 94/9/EC ATEX and 97/23/EC PED for DN<25
Pipe sizes	2 in. to 30 in. (50 mm to 750 mm), larger sizes upon request
Velocity ranges	• Gas service: 0.1 to 150 ft/s (0.03 to 46 m/s) • Liquid service: 0.1 to 40 ft/s (0.03 to 12 m/s) The maximum flow velocity specification for gases is variable, depending on gas sound speed, ultrasonic path length and gas density (pressure and molecular weight). For gas flow applications a preamplifier is required. In such system, the supplied preamplifiers may be mounted in the transducer junction boxes.



FTPA extended buffer system (top)
FTPA short buffer system (bottom)

Flanged buffer assemblies

Service	Gases, steam, conductive and non-conductive liquids
Mountings	Lap joint flange, RF, 1.5 inch, 150#, 300#, 600#, 900#, 1500# and 2500# ANSI
Materials	• Standard: 316L stainless steel • Optional: Titanium (FTPA/FIPA short buffers only), available to meet EN10243.1.B and/or NACE requirements
Gasket materials and torque values	Gasket materials and torque values are determined from the fluid and the process temperature for each specific application.
Pressure	• To maximum allowable flange operating pressure • The minimum pressure for gas service is typically 100 psi (6.9 bar), depending on the fluid density.
FTPA/FIPA short buffers	Fluid temperature: –310°F to 600°F (–190°C to 315°C)
FTPA/FIPA extended buffers	Fluid temperature: • Liquids: –310°F to 1,112°F (–190°C to 600°C) • Gases and steam: –310°F to 842°F (–190°C to 450°C) Low-density, low-pressure gases use FIPA buffer assembly. No minimum pressure is required for liquid service. Consult Panametrics for individual application specifications.



FSPA short buffer system



FWPA extended buffer system (top)
FWPA short buffer system (bottom)

Threaded buffer assemblies

Service	Liquids
Mounting	1 in. NPT
Materials	• Standard: 316L stainless steel • Optional: Titanium
FSPA short buffers	Fluid temperature: –40°F to 212°F (–40°C to 100°C)
FSPA extended buffers	Fluid temperature: –40°F to 600°F (–40°C to 315°C)

Socket-weld buffer assemblies

Service	Liquids
Mounting	1 in. socket weld
Material	Standard: 316L stainless steel
FWPA short buffers	Fluid temperature: –40°F to 212°F (–40°C to 100°C)

Markings

N4271 CE

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