



Measurement & Analytics | Measurement made easy

# Measurement made easy for water and wastewater

Power and productivity  
for a better world™



# Expertise in technology

## More than a century of experience

To operate any process efficiently, it is essential to measure, actuate, record and control. With ABB's measurement and analytical solutions, the customer is receiving the best technology, reliability and service in the business. ABB's products are easy to configure, easy to integrate and easy to maintain. With a global network of specialists delivering local service and support, ABB offers a broad range of life cycle services for optimum product performance and customer support.

Research and development is a vital source of ABB's technology leadership. It builds on the foundation of existing technologies for new applications, and continues to develop the breakthrough innovations needed to meet the challenges of the future. ABB and its heritage companies have been leaders in innovation and technology for more than 100 years.

Aztec

**Bailey**

**BOMEM**

Bush Beach Engineering  
Limited

& FISCHER  
PORTER **P**

**Hartmann & Braun**

**K-TEK**

**Kent**

**[ L G R ]**  
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*Taylor*

**TBI-Bailey**

**TORBAR**  
FLOWMETERS LTD

**TOTALFLOW**  
MEASUREMENT & CONTROL SYSTEMS

# Comprehensive measurement solutions

## Serving the water industries

With global water and wastewater application expertise and knowledge, ABB is the best partner throughout the entire water cycle. From abstraction to treatment, distribution and the management of the wastewater process, ABB supplies an extensive range of reliable measurement and analytical products, services and solutions meeting customers' exact requirements.

**Being a single source supplier for automation technology, ABB provides what customers in the water market require.**

- Solutions that best match the industry specific application requirement
- Products that functionally fit the requirements of the water market, including internationally recognized calibration facilities and material certifications
- Products that are easy to commission and install saving time and expense during a startup
- Equipment that can be diagnosed remotely, resulting in time and personnel savings
- High accuracy and reliability with a minimal investment
- Automation services emphasizing optimized product usage and care throughout the entire lifecycle



# Reliable measurement and analytical products

## Serving the entire water cycle

### Treatment plant inlet

- Electromagnetic flow, Variable area flow, ultrasonic open channel flow, Vortex/swirl flow, mass flow, Residual chlorine
- Ammonia, conductivity, level, pH, phosphate, redox, turbidity
- Controllers, recorders

### Industrial use

- Electromagnetic flow, Flow – partially filled pipe
- Pressure
- Ammonia, dissolved oxygen, Fluoride, pH, redox
- Recorders

### Residential use

- Electromagnetic flow

### Pressure boosting

- Electromagnetic flow
- Pressure

### Pumping station

- Electromagnetic flow
- Pressure
- Indicators, level (hydrostatic)
- Controllers, recorders
- Level

### Primary sedimentation

- Electromagnetic flow, Thermal mass flow
- Temperature
- Pressure
- pH
- Level

### Stormwater

- Electromagnetic flow, Flow – partially filled pipes
- Indicators
- Controllers, recorders

### Aeration and digestion

- Electromagnetic flow, Thermal mass flow
- Ammonia, dissolved oxygen, pH, phosphate
- Recorders
- Pressure
- Level

### Sludge incineration

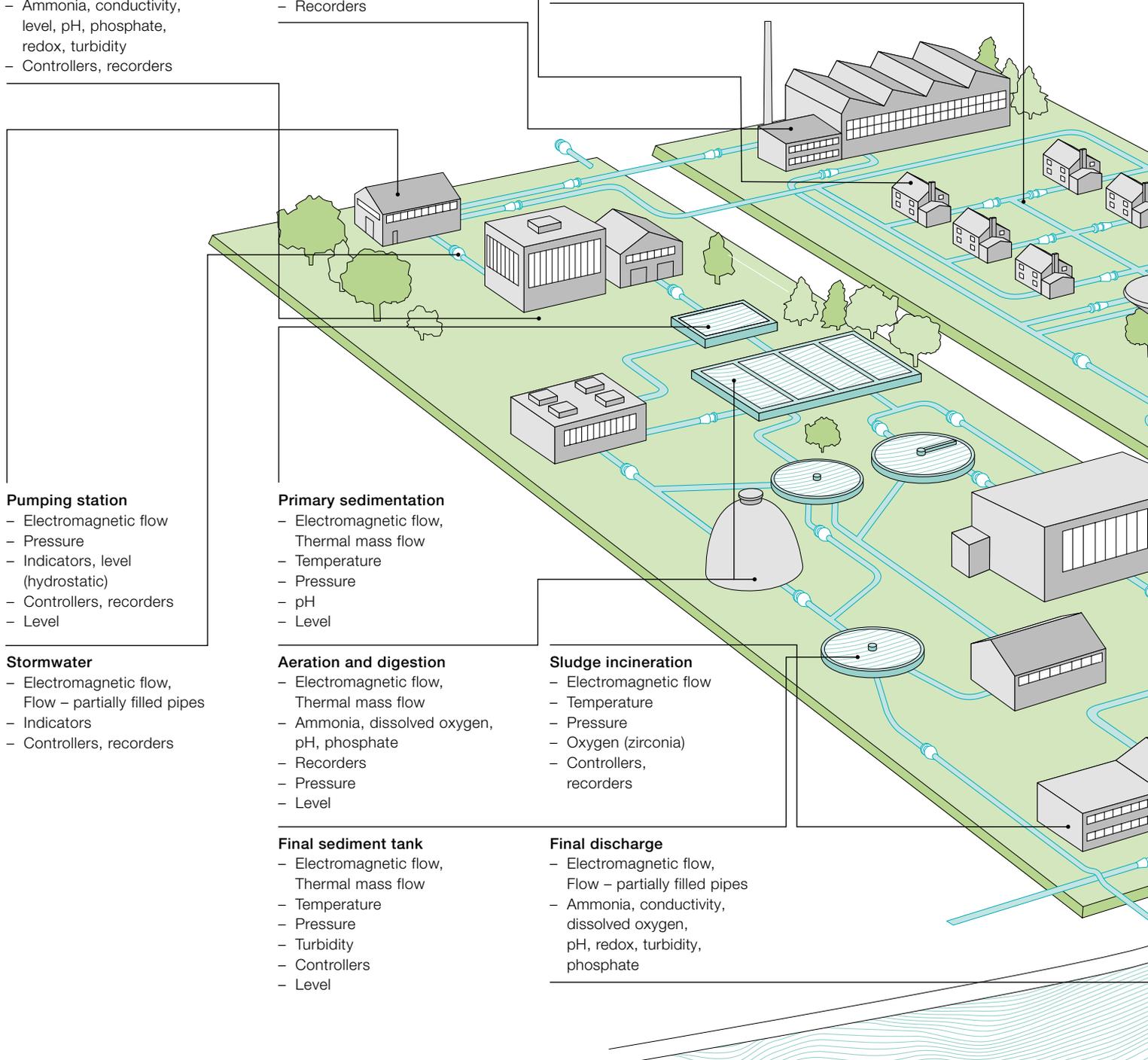
- Electromagnetic flow
- Temperature
- Pressure
- Oxygen (zirconia)
- Controllers, recorders

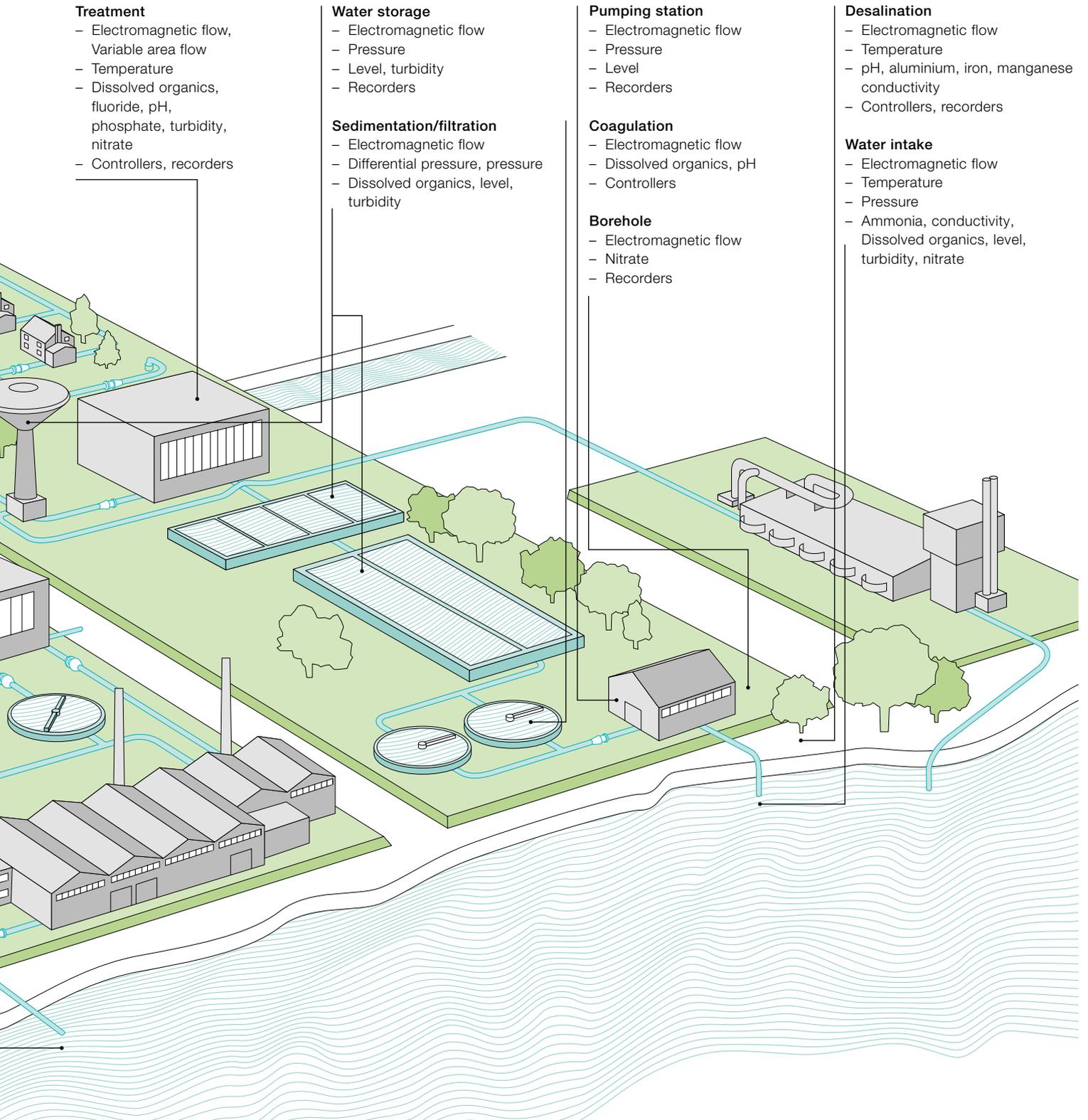
### Final sediment tank

- Electromagnetic flow, Thermal mass flow
- Temperature
- Pressure
- Turbidity
- Controllers
- Level

### Final discharge

- Electromagnetic flow, Flow – partially filled pipes
- Ammonia, conductivity, dissolved oxygen, pH, redox, turbidity, phosphate





# Potable water measurement

## Providing clean and pure drinking water

### Reliable process optimization

With regulations for water quality becoming more stringent, increasing pressure from customers to provide consistent water quality, and rising demand, the water supply industry is continually challenged to optimize water treatment processes. For example, excessive levels of soluble manganese and iron entering the distribution system cause deposition on pipe surfaces and poor aesthetic quality. These soluble species must first be chemically treated to convert to an insoluble form that can be easily filtered out in the treatment process.

#### Improving global water quality

ABB's Aztec series of colorimetric analyzers automatically performs reliable analysis of soluble manganese and iron allowing optimization of chemical dosing leading to operational cost savings and improved water quality. ABB's broad range of reliable on-line analytical instrumentation and process control expertise offer water utilities several advantages, including improvements in treated water quality, increased process efficiency, reduced use of chemicals and energy as well as reduced maintenance and personnel cost.

- Reliable measurement
- Simple to operate and maintain
- Reliable data
- Flexible communications
- Less chemical usage

### Accurate reporting for water networks

Protecting the environment and conserving water resources is a global responsibility. In many regions, water shortages have led to government regulations to control and report the amount of water lost through distribution. Water losses of greater than 50% are not uncommon and the first step in reducing these is closer monitoring and measuring of a water system.

#### Fast leakage detection

ABB's AquaMaster is an electromagnetic flowmeter that has been designed to improve the management of potable water distribution networks. Its features are targeted to the industry's specific requirements, ranging from a total water management solution for revenue (billing) applications, district metering and water distribution to leakage management and irrigation. Flowrate information can be sent via short text messages by the AquaMaster, enable operators to pinpoint difficult, small, slow leaks, virtually as they happen, providing the opportunity to rectify them quickly. The remote configuration options via text messages make further handling very convenient.

- 3 power options: mains powered with back-up, battery powered, external renewable (solar/wind) energy with back-up
- Integrated one stop solution integrating meter, pressure measurement, logger/quad band GSM/SMS communication
- CalMaster2 for in situ verification of flowmeter calibration
- OIML R49/MID approved

Integrated water monitoring system with the Aztec analyzer



AquaMaster for accurate water network reporting



## Meeting flowmeter market requirements

Since their introduction in the late 1960s, electromagnetic flow meters have been the preferred meter type for the water market. No moving parts, low maintenance and high reliability have increased their popularity since their introduction. However, not much has changed in the design, materials of construction or serviceability over the years. With the ever increasing demand from the market, ABB has introduced solutions to customers' requests for a meter that is easier to maintain than early generation products, can be serviced and verified in situ and has a lower whole life cost.

### Flow measurement adhering to industry standards

ABB's WaterMaster is the solution for flow management in sectors as diverse as water, wastewater, sewage and effluent. Its performance adheres to the most stringent global industry standards and is certified to key international approvals. Proven in the toughest applications, the WaterMaster's rugged, robust and buriable sensors eliminate the need of expensive meter chambers. The customer takes advantage of its innovative and versatile attributes to achieve interoperability within a wide range of asset management systems.

- Superior control through advanced sensor design
- Improved performance through digital signal processing (DSP)
- VeriMaster in situ verification capabilities
- Submersible and buriable installation options
- OIML R49/MID approved

WaterMaster unit being installed on water line



## A sound solution for level applications

Ultrasonic level and flow measurements are found throughout the water process. In chemical treatment, for example accurate measurement of these parameters enables safe products and cost reduction. With global privatization of the water industry, highly accurate measurements and solutions will continue to be required.

### Highly accurate level measurement

ABB KSONIK family of ultrasonic level transmitters provides non-contact level measurement and pump control for the water and wastewater industries. Used for both closed tanks and open containment ponds, they work on the principle of time of flight (of sound in air). These simple measuring devices are capable of measuring levels in both clean and harsh environments and are a very cost effective solution for water projects.

In addition to level measurement, open channel flow can be measured in a weir or a flume arrangement, such as at the inlet of a potable water unit. The transducer is positioned above the liquid level and upstream of the engineered obstruction. With the aid of built-in linearizers, derived flow can be accurately calculated from the measured level. The KSONIKs can then provide flow rate and a totalized flow signal.

- Graphic LCD display
- 3 configurable relays
- Configurable as open channel flowmeter
- Pump cycling and pump monitoring
- Automatic variable gain and power for difficult applications

K10 ultrasonic transducer installed in sump service



# Wastewater measurement

## Enabling efficient water treatment

### Securing effluent monitoring

Municipal or industrial plants that have to discharge liquid waste are required to prove to the relevant authorities that the chemical content and volume discharged comply with environmental standards and do not exceed legal limits. Typically, as a minimum, instantaneous pH and flow is monitored and flow is also totalized. These variables must be recorded in a secure method, so that in the event of a downstream incident or an inspection, the original data can be easily retrieved and viewed.

#### Enabling security and easy retrieval of data

ABB's ScreenMaster range of paperless recorders is widely used on effluent monitoring systems. They measure and display the process signals and store them in a secure tamper proof format. Advanced features allow for remote viewing using a webserver or sending emails if an alarm condition occurs. Once recorded, the data can be transferred to remote servers where a long term data storage procedure can be implemented. Using the ABB DataManager software analysis tool, the original data can be verified as intact and can be analyzed on a PC.

- Multichannel process measurement
- Flow totalization
- Secure data storage
- Remote monitoring
- Offline data analysis

### Energy savings in aeration beds

Over 70% of the electrical costs of a wastewater process plant are going to compressor operation for aeration beds. Most customers are looking for ways to reduce the amount of air required to maintain the correct bacteria level in the beds. One simple answer is to monitor the oxygen levels to insure the correct amount of oxygen is present and then not to exceed that level. Customers can save over 25% of their total electrical costs by installing one or more oxygen monitors in combination with simple changes to the control scheme.

#### The solution is a dissolved oxygen analyzer

ABB's dissolved oxygen analyzer and sensing system transmitter provide accurate measurement of the dissolved oxygen value for a wide range of water monitoring applications. The analyzer incorporates the latest technology to provide a highly reliable, yet flexible, feature-packed device that satisfies a diverse range of process monitoring and control applications. It is rugged and reliable for safe operation in harsh environments, simple to install and use, and requires minimum maintenance.

- Sensor life indicator
- Salinity and atmospheric pressure correction capability as standard
- Continuous in-line diagnostics providing reduction in operating costs
- Auto-jet wash/air clean – significantly reduces maintenance

Remote mount videographic recorder SM500F monitoring effluent flow



Dissolved oxygen analyzer system



## Measurement in partially filled sewers

Sewerage is normally discharged via partially filled pipes or sewers. To measure this flow, reliable and easy to install electromagnetic flowmeters are being used. Historically, in order to use these flowmeters for partially filled pipes, a siphon needed to be built. This might have caused problems with deposits and pressure losses and required large chambers.

### Electromagnetic flowmeter Parti-MAG

ABB's Parti-MAG flowmeter is specially designed for wastewater applications and can measure flow in full and also partially filled pipes. It is an easy to install and operate electromagnetic flowmeter that has set the standard for flowmetering of partially filled pipes. Its superiority has been confirmed by many years of successful use in wastewater treatment facilities and channel network management. It is available from size 150 mm up to 1000 mm (5.9 up to 40 inches) with the option for explosion proof design according to Zone 1.

- Superior control through advanced sensor design
- Intuitive navigation and configuration
- Detailed diagnostics for rapid decision making
- Powerful and flexible transmitter

## Measuring gases with mass flowmeters

Throughout the wastewater process, several critical gas measurements are required. The measurement of biogas and activation air are becoming increasingly more common and can be difficult due to low velocities and pressures. Additionally, many customers prefer these measurements be displayed in mass units rather than volumetric format. The answer to this application issue is the use of thermal mass meters, which directly measure mass flow even in harsh environmental conditions.

### The answer is a new generation of mass flowmeters

To meet the needs of the wastewater market, ABB offers its Sensyflow thermal gas mass flowmeters. Using a thermal measuring principle (hot film anemometer), the mass flow meter is capable of measuring all technical gases and gas mixtures directly: biogas and compressed air.

- Highly accurate and reliable
- Short inlet and outlet length
- Manufacturer calibrated
- Explosion proof for Zone 1
- No moving parts, no obstructions

Electromagnetic flowmeter Parti-MAG on wastewater discharge pipe



Sensyflow FMT500-IG measuring activation air in a wastewater plant



# Industrial water measurement

## Helping to protect the environment

### Cleaning industrial water

In the industrial water treatment plants, hazardous and toxic substances need to be removed from the process water before disposal. Products and methods used to treat municipal waste are not suited for use in the treatment of sufficient industrial waste. The solutions to this are products designed with the application in mind.

#### Meeting the needs of the industrial user

ABB's ProcessMaster is used in water and wastewater applications that contain caustic and acids. It is used in treatment areas of plants and has proven to be easy to work with, tough and reliable. Whatever and wherever the application, the ProcessMaster's intelligent design, state-of-the-art technology and advanced features work harder and smarter to make your operations more cost effective. The ProcessMaster delivers more than reliable and accurate measuring values. When integrated with an asset management solution, such as ABB's Asset Master, the instrument plays a key role in maximizing asset optimization.

- Pressure rating up to PN100, CI600
- Choice of liner, electrode and flange materials
- Choice of approvals and certificates
- Enhanced diagnostics such as gasbubble detection or electrode coating detection
- Intuitive operation
- Accuracy up to 0.2%
- Universal transmitter
- ScanMaster in situ verification capabilities

### Water analysis solutions

Regulations for the treatment of industrial water, in order to release it back in the environment, have become extremely stringent and are well monitored by government agencies. Customers are finding traditional lab methods of sampling time consuming, expensive and no longer sufficient to meet the standards. Continuous monitoring of their processes is now required.

#### The solution to reliable measurement

The Aztec series of colorimetric analyzers automatically performs a reliable water analysis. It transmits instantaneous changes during the process and enables the storage of process information for future use, for example, to provide reports to governmental agencies. The entire Aztec series does continuous sampling while using 60% less reagents than other devices on the market and is accurate to 0.5%. The customer benefits from fast, continuous and precise measurements of the process.

- Reliable measurement
- Simple to operate and to maintain
- Reliable data
- Less chemical usage
- Flexible communications

ProcessMaster installed at a filter drain pipe in a water treatment plant



ABB's measurement products help to protect the environment



## Mastering tough level applications

Reliable wastewater level measurement in the treatment unit of any industrial or municipal plant can present challenges to the level measurement instrumentation. The chemical content in the processed water can change drastically due to different acids and hydrocarbons settling to the tank, or sump bottom solids. In such an environment, customer preferences are shifting to non-contact level measurement. The traditional contact level methods often mandate the use of special metals or enclosure constructions.

### The solution is available today

The LM80 laser level transmitter is the latest product to the non-contact level measurement market. The laser level measurement is the best solution for wastewater level measurement in wells, sumps, lift stations and digesters. Applied in water applications with suspended solids and opaque appearance, the LM80 often takes the stage when hydrostatic, ultrasonic and radar transmitters meet their limitations. With beam divergence of less than 0.5° and range up to 30 meters (100ft), the LM80 laser can perform level measurement in confined spaces, thru protective cover grids, inside narrow deep wells and near flat walls.

- Narrow beam, easy to install in confined spaces
- Not sensitive to air temperature, pressure and measured material dielectric
- No calibration required
- Very accurate, instantaneous measurement

LM80 Laser transmitter in wet-well



## Critical pressure measurement solutions

Accurate results from pressure measurement in a pumping or lift station application are critical to the success of water processes. If the nominal process pressure is exceeded or not maintained, the entire system could be subject to failure or inefficiencies. If a water system pressure is too high, pumps will struggle to maintain pressure while the excess pressure will cause additional cost and leakage throughout the system.

### The answer is the perfect mix of features

The 2600T pressure transmitter family meets these expectations and delivers previously unattainable operational benefits. All instruments provide the intuitive four button HMI (Human Machine Interface) for quick commissioning, saving cost and time. The 261 high-quality, cost-effective transmitters are the result of ABB's uncompromised focus on pressure and level measurement. They offer an accuracy of 0.1%, a large turn down ratio, and a stainless steel housing optimized for use in extreme conditions. When it comes to differential pressure measurements, the ABB 266 and 364 transmitters are the performance choice for long and stable maintenance free operations.

- Repeatable accurate measurements
- Maintenance free due to ABB's sensor technology
- Easy operation and set up via the graphic display
- Wide choice of process connections to suit multiple installations

ABB's 261 pressure transmitter for repeatable accurate measurements



# Proven measurement products

## A comprehensive industry portfolio 1/2

### Flow measurement

ABB has decades of experience in flow measurement for the water industries. Based on a thorough understanding of industry requirements, innovative flow measurement products have been developed to control processes, increase profits and save costs. Highest precision in flow measurement is

available, for example when dosing chloride or other chemicals, measuring flow rate of wastewater or detecting leaks in drinking water infrastructure. Flow measurement products featuring self diagnostics and process information make it easy for the customer to be in control of any process.

Product category	Electromagnetic flow						Vortex/swirl	Therm. mass
Product name	WaterMaster	ProcessMaster	SM4000	Parti-MAG	AquaMaster	AquaProbe	VortexMaster / SwirlMaster	Sensyflow
Product type	FEV FEF	FEP300 FEP500	SE41F	DP41 DP46	FEV200 FER200	FEA100 FEA200	FSV400 FSS400	FMT400 FMT500
Product image								
Water intake	X							
Borehole	X				X			
Desalination	X	X	X				X	
Pumping station	X							
Coagulation	X							
Sedimentation/filtration	X	X	X				X	X
Treatment	X	X	X				X	X
Water storage	X				X	X		
Pressure boosting	X	X						
Network management	X					X	X	
Irrigation	X			X	X	X		
Pumping station	X	X			X			
Storm water	X			X		X		
Treatment plant inlet	X	X	X	X			X	
Primary sedimentation	X	X						X
Aeration and digestion	X		X				X	X
Sludge incineration	X	X	X					
Final sedimentation	X							X
Final discharge	X			X		X		

### Pressure, temperature and level measurement

With its portfolio of field instruments and devices, ABB offers an unmatched selection of transmitter and sensor solutions including a common HMI for user-friendly handling. A comprehensive line of contact and non-contact level technologies provide repeatable solutions for reliable inventory and process

control. ABB offers a wide range of industrial recorders and controllers, including single and dual loop indicators that provide high visibility and secure videographic capabilities. With advanced protection against dust or water, as well as clear and bright displays, the process status is seen at a glance.

DP flow	Coriolis	VA meters	Level		Pressure			Diff.pressure	Temperature		
Torbar	CoriolisMaster	VA Master PurgeMaster	Ultrasonic	Magnetic level gauge	Pressure transmitter	Pressure transmitter	Pressure transmitter	Temperature sensor	Temperature sensor	Temperature sensor	
	MS2 / MC2 FCB400	FAM541 10A6100	KMicro LST400	KM26	261G/A	266	266	TSP100	TSP300	TSBA	
											
			X		X						
				X	X	X	X	X		X	
			X		X		X				
	X										
		X	X	X	X	X	X				
X	X	X			X		X	X		X	
			X		X	X					
					X	X					
					X	X					
			X		X						
			X								
X		X									
X	X				X			X			
X		X			X	X		X			
					X			X	X	X	
								X			
			X								

# Proven measurement products

## A comprehensive industry portfolio 2/2

### Analytical measurement

As a world leading supplier of analytical measurement technologies, ABB offers an unmatched line of instruments for a variety of applications in the water and wastewater industry. The liquid and gas analytical products enable cost-effective measurements when monitoring product quality

and controlling chemical usage. Designed to maximize product quality, they support the customer in meeting process requirements and conform to local and global regulations. ABB is the single source supplier of reliable analytical measurement products for the water industries.

Product category	Recorders		Controllers			Analytical instruments		
Product name	ScreenMaster 500	ScreenMaster	Circular chart recorder	ControlMaster	SensyCal	pH/Redox	Conductivity	Turbidity
Product type	SM500	RVG200	C1900	CM10 CM30 CM50	FCU	AP100 AP200 AP300 TB(X)5	AC2	4670
Product image								
Water intake							X	X
Borehole	X							X
Desalination	X	X		X		X	X	
Pumping station	X	X						
Coagulation				X		X		
Sedimentation/filtration								X
Treatment	X	X	X	X		X		X
Water storage						X	X	X
Network management	X							
Irrigation	X		X					
Storm water	X	X		X				
Treatment plant inlet	X	X	X	X		X	X	X
Primary sedimentation						X		
Aeration and digestion	X	X			X	X		
Sludge incineration		X	X	X				
Final sedimentation								
Final discharge	X	X	X			X	X	X

## Service

Dedicated to optimizing plant productivity and performance, ABB's services enable improved utilization and performance of automation equipment, processes and personnel. ABB provides support from the planning phase right through to

commissioning and servicing. ABB's service specialists are strategically located to support all products and systems globally. ABB's broad scope of services lays the foundation for end-to-end support for the customer.

### Analytical instruments

Dissolved Oxygen	Dissolved Organics	Ammonia	Nitrate	Phosphate	Fluoride	Iron	Manganese	Aluminium	Chlorine	Oxygen Zirconia
ADS430 ADS550 AWT440	AV4 AW637	ISE	AV45	AW636	AFM631	AW633	AW634 AW635	AW631	AW400	Oxygen Zirconia
										
	X	X	X			X	X			
			X			X	X			
						X	X	X		
	X									
	X					X	X	X		
	X			X	X	X	X		X	
									X	
		X		X						
X		X		X						
										X
X		X		X						

# Contact us

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