New Technologies for Drinking Water Protection

Water quality monitoring is an important part of drinking water protection. Early identification of changes in quality and possible contamination is the prerequisite for an effective response that reduces or entirely prevents the potential adverse impacts to public health.

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Furthermore, the monitoring of drinking water, either at the source or in the distribution system, allows optimisation of operational processes.

Online monitoring of the actual water quality provides valuable information for the timely recognition of changes. Furthermore, online monitoring can provide a wealth of data on the real dynamics of water systems that would ordinarily be impossible to obtain using grab sampling; it provides (near-) continuous information and will miss no quality changes, whereas grab samples provide only snapshots of the water composition on a limited number of points in time.

In drinking water network monitoring, the traditionally measured parameters are Chlorine (free and/or total), Turbidity, pH, Colour and Conductivity. Chlorine is typically to be reported, while the others are to give an overall picture of water quality and eventual problems. With the i::scan, the much more interesting TOC can be added at a small additional cost, and the value of the additional information is enormous.

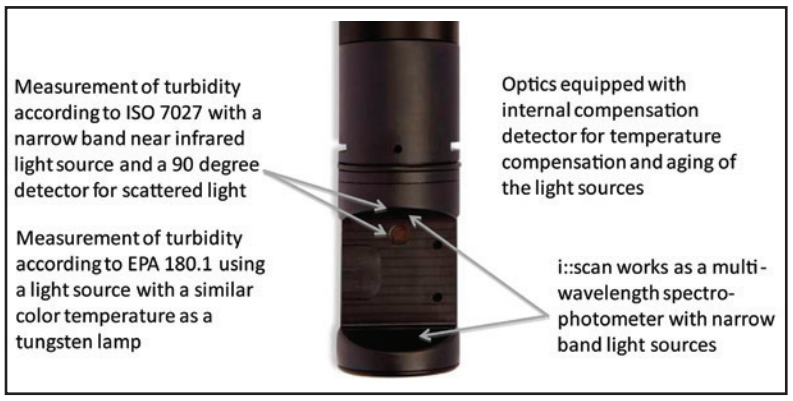

Figure 1: 180° spectral absorption measurement with 90° light scatter measurement combined in a single instrument

Online measurement of Turbidity, Organics, Colour and UV254

The i::scan is a miniature spectrophotometer that is not much more expensive than a good turbidity meter, but can measure up to four parameters online in real-time, all within a single instrument. Parameters that can be measured include Turbidity, Organics (e.g. TOC or COD), Colour and UV254. The i::scan uses a new light source technology which leads to reduced costs and only needs minimal maintenance.

Advanced optics allow the combination of a 180° spectral absorption measurement with a 90° light scatter measurement in a single instrument. This means that turbidity can be measured according to the ISO 7027 - 860nm - and EPA 180.1 - white light – standard (see figure 1).

Vitens is the largest water utility company in the Netherlands, and well known for their innovation culture. They have successfully tested the i::scan, and are going to install a grid of these instruments as a part of an EU funded demonstration project. "The installation of a grid of water quality sensors will allow us to actively manage our water supply distribution networks based on real time status data" says Erik Driessen, innovation manager of Vitens.

There are three different installation options for the i::scan: The i::scan can be mounted submersed in the water, or in a flow cell (bypass installation), or even directly in a pipeline of almost any diameter.

Monitoring water quality directly in the pipe

To prove that the quality of the water remains pristine all over the drinking water network, because contamination can also occur during distribution for example due to bacterial regrowth or leakage.

s::can offers a simple way to install the i::scan directly in drinking water pipes. There are two different in-pipe fixtures available: A simple version (figure 2 left) for smaller diameters, and a "hot-tappable" version (figure 2 right) for large mains pipes. The hot-tap fixture has been developed in close cooperation with Hawle – a company that has more than 50 years of experience with pipes, fittings and valves. Hawle's proven technology allows drilling of all kinds of water pipes under pressure, so it is possible to mount the i::scan sensor without any interruption of the water supply.

The hot-tap fixture also contains a shut off valve, which enables to remove the sensor for maintenance without interfering with the pipe flow, and a drainage pipe that can also be used to connect an acoustic "spy" for leak detection.

Figure 2: In-pipe fixtures for i::scan

Figure 3: The nano::station combines the i::scan with additional sensors for pH, chlorine (free or total) and conductivity.

The nano::station – compact and very cost-effective

The nano::station combines the i::scan with up to three additional sensors for pH, Chlorine (free or total) and Conductivity. All sensors come in one 4-channel flow cell, mounted on a compact panel with all the necessary pipes and fittings. The installation and start-up is plug-and-measure. Also included is a terminal for data visualisation and station management.

The freely customisable combination of sensors makes the nano::station a very versatile system that can easily be adapted to the needs of specific applications.

Monitoring at a groundwater protection area

At a ground water protection area North West of the city of Vienna, the i::scan was used to monitor the effects of a construction site on a nearby drinking water well. By using the i::scan, time-consuming and expensive sample collection and laboratory analyses could be minimised.

Figure 4 shows the measurement results. The turbidity readings ware very stable over time and all the peeks in turbidity could be attributed to one of the following three factors: (i) manual sample collections (a sampling pump was used to gather groundwater for laboratory analyses), (ii) construction activities or (iii) maintenance activities. During the whole measurement period, the turbidity values stayed below the predefined threshold and alarm values. Due to the availability of the water quality data almost in real time, timely countermeasures could have been undertaken if the quality of the drinking water would have been compromised.

The monitored groundwater sometimes had very low oxygen content and conventional grab sampling can be difficult in these situations. With the i::scan the low oxygen did not affect the measurements and no special arrangements had to be taken.

Grab samples were analysed in the laboratory for comparison and a very strong correlation of the laboratory and i::scan values could be observed.

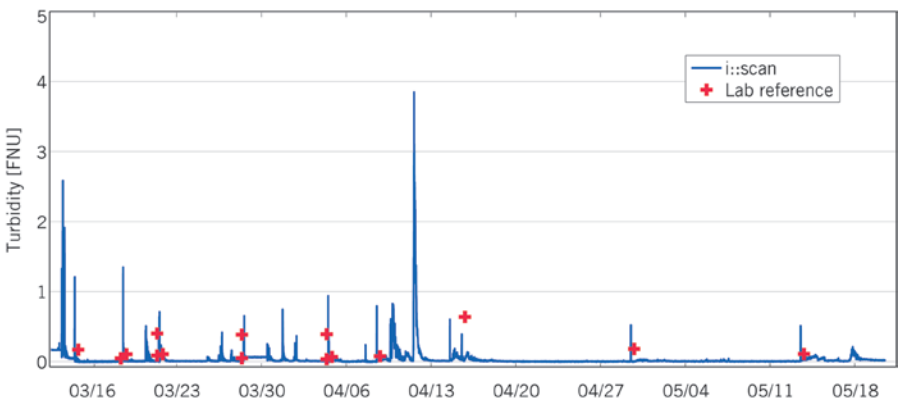

Figure 4: Turbidity measurements in the Lobau. Peeks in turbidity exactly picture the influence of exploration drilling on the groundwater.

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New Brochure Covers Instruments for Process Recording and Control

ABB's Measurement Products' (USA) business announces the availability of a 24-page brochure that details the company's comprehensive range of recording and controlling instrumentation for a broad range of industries. Under the brand names ScreenMaster, ControlMaster and Commander, the products include process controllers, digital indicators, chart and strip recorders and paperless videographic recorders.

The brochure notes that the ScreenMaster range of paperless recorders offers localised display or plant-wide access to electronic data. Associated DataManager Pro PC-based analysis software provides in-depth data analysis. Paper-based Commander circular chart and strip chart recorders and recorder/controllers offer advanced features that include electronic data storage. The Commander line includes stand-alone process controllers and indicators.

According to the brochure, the ControlMaster range comprises a line-up of four instruments: a single-loop controller, a process indicator, and two single or dual-loop controllers. Each ControlMaster has an innovative HMI in common with other ABB instrumentation, simplifying operational familiarity and training.

The brochure contains photos of all devices along with detailed descriptions of features and benefits. The latter pages consist of grids of instrument models versus general capabilities, inputs/outputs, advanced features, communications, and physical attributes.

For More Info, email: 32447pr@reply-direct.com

Aeration Flow Meter with Profibus Bus PA Simplifies Wastewater Plant Upgrade Process

Wastewater treatment plant engineers searching for a solution to flow measurement in aeration basins that is Profibus PA compatible will find **Fluid Components International's** (USA) precision ST100 Thermal Mass Flow Meter provides superior accuracy combined with digital bus communication flexibility to reduce air flow energy costs.

In municipal wastewater plants, the activated sludge treatment method requires the pumping of compressed air into aeration basins where a diffuser system ensures the air is distributed evenly for optimum treatment. Flow meters are typically installed in the system piping to help monitor the air that is released into the basins.

Precisely controlling the air flow is necessary to promote the growth of the micro-organisms that treat the wastewater and to reduce compressed air energy costs. The advanced ST100 Flow Meter is ideal for this task because of the meter's accurate performance over a wide flow range, ease of installation, low maintenance requirements and digital bus communications versatility, including Profibus PA compatibility.

Digital bus communications such as Profibus PA bus ensure flow meters and other process automation field devices are interoperable and compatible through an industry standard bus. The current version of Profibus PA includes many functions that simplify the handling of field devices, including the exchange of one field device for another device from a different manufacturer during routine plant upgrades.

The ST100 Flow Meter with Profibus PA gives wastewater plant engineers excellent device flexibility while providing superior accuracy and reliability in harsh environments. Profibus PA communication facilitates plant system retrofits through a seamless integration process for new field devices including flow meters, which saves time and money.

The ST100 meter's insertion style configuration makes it a simple drop-in replacement where older technology meters were installed previously in wastewater plants. With the ST100 meter, engineers and technicians can easily manage multiple fluid flow process variables and configure the meter remotely from the safety of the control room.

Whether the need is for Profibus, Fieldbus, HART, or Modbus, 4-20 mA analogue, frequency/pulse, or alarm relays, the ST100 Flow meter is the versatile communication solution. If a plant's communication needs change, the ST100 meter adapts with a plug-in card replacement that can be changed out in the field.

The ST100 Flow Meter's unique graphical, multivariable, backlit LCD display/readout brings new meaning to the term "process information". It provides the industry's most comprehensive information with continuous display of all process measurements and alarm status, and the ability to interrogate for service diagnostics.

The user-friendly ST100 stores up to five unique calibration groups to accommodate broad flow ranges, differing mixtures of the same gas and multiple gases, and obtains up to 1000:1 turndown. Also standard is an on-board data logger with an easily accessible, removable 2-GB micro-SD memory card capable of storing 21 million readings.

The ST100 can be calibrated to measure virtually any process gas, including wet gas, mixed gases and dirty gases. The basic insertion style air/gas meter features a thermal flow sensing element that measures flow from 0.07 NMPS to 305 NMPS (0.25 to 1000 SFPS) with accuracy of ±0.75 percent of reading, ±0.5 percent of full scale.

Designed for rugged industrial processes and plants, ST100 Flow Meters include service up to 454°C (850°F) and are available with both integral and remote up to 300 meters (1000 feet) electronics versions. The ST100 has the industry's most comprehensive set of instrument approvals. The ST100 is approved for hazardous environments, including the entire instrument, the transmitter and the rugged, NEMA 4X/IP67 rated enclosure. Approvals include: SIL 1, ATEX, IECEx, FM, FMc, CPA, Inmetro, GOST-R and more.

Fluid Components International is a global company committed to meeting the needs of its customers through innovative solutions to the most challenging requirements for sensing, measuring and controlling flow, level and temperature of air, gases, and liquids.

For More Info, email: 32403pr@reply-direct.com