

# Water & Wastewater

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## Keeping the waters at bay

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# Costs cutting ways of wireless chlorine analysis

Rosemount Analytical's new advanced wireless technologies make remote continuous online monitoring affordable for more water treatment plants

Ensuring the safety of drinking water is a multi-step and complex process, and water treatment plants face numerous challenges to ensure they provide their communities with safe, clean water for drinking, agricultural and industrial use. New wireless chlorine measurement technologies can help water treatment plants reduce costs and improve monitoring, compliance and plant efficiency.

Water treatment varies based on the quality of the water source, size of the plant, and if ground water or surface water is used. As water travels through the ground, or sits in lakes and rivers, it comes in contact with organic materials, which dissolve in water. These organics in water become a food source for microorganisms. This spells disaster for people, since these microorganisms (like Giardia lamblia or the protozoa Cryptosporidium) can be harmful or even lethal to humans. Chlorine is a critical part of the water treatment process to kill and remove these harmful microorganisms, but it's an unstable liquid and it's expensive to sustain it at the correct levels to kill pathogens and organisms, especially in remote plant locations. Wireless technologies help reduce these costs.

It is best practice to measure chlorine on-line with continuous, real-time monitoring through free chlorine or monochloramine analysis systems. However, high costs and difficulty of installation of chlorine analysis units in remote locations, where operators are

**Next-generation wireless adaptor technologies use the WirelessHART protocol, an open platform, industry standard in wireless technology that supports a broad range of instruments.**

The Smart Wireless THUM Adaptor from Emerson Process Management installs on any HART Device, including the Rosemount Analytical 56 and 1056, enabling wireless communication and transmission of measurement and diagnostic information. The THUM Adaptor is especially well suited to measurement points that are difficult to reach, dangerous to access or in remote locations.



required to be sent to the field to download data, are hindering factors for plants to adopt this method. Hence, many plants resort to grab samples as a way of testing free chlorine levels, but this approach can be problematic from a water quality and compliance standpoint.

A significant advancement in liquid analytical technology, however, is addressing this issue – the shift to wireless. New advanced wireless technologies make remote continuous on-line monitoring affordable for more water treatment plants. New device adaptors allow wireless to be enabled for any existing HART communications analysers. These adaptors, such as the Smart Wireless THUM adaptor from Emerson, can be retrofitted onto any two- or four-wire HART device and enables wireless transmission of measurement and diagnostic information. This solution doesn't require additional hardware, software upgrades or batteries. The upgrade to a wireless system is simple, scalable, cost-effective,

and can reduce field maintenance requirements and personnel costs. Chlorine analysis in drinking water treatment presents unique challenges, but wireless THUM adaptor technology can help cost effectively address the issues associated with remote monitoring.

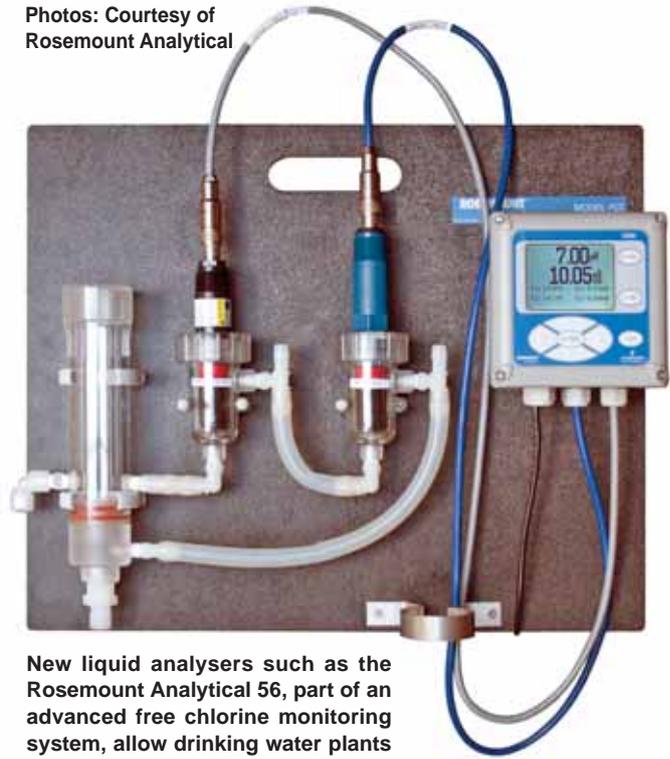
### Isolated islands

Throughout the pre-filter, filtration and effluent water treatment stages, there are several points where chlorine must be measured to meet compliance and quality assurance requirements. However, many of these locations can be remote and difficult for plants to install analytical instrumentation. Traditionally, these areas have been connected through a wired system to the central SCADA or DCS network and asset management system, but a wired installation is costly and complex. For these situations, a wireless solution that includes an advanced intelligent analyser, chlorine analysis system and a wireless adaptor is a good resolution since it enables the wireless transmission of measurement data and advanced diagnostic information through the WirelessHART protocol. This kind of an implementation decreases costs over installing a wired system, by up to two thousand dollars per linear foot. In fact, transitioning to wireless this way can reduce installation costs for water plants by up to 90 per cent.

It's very common to find that the remote locations in the water treatment network where chlorine analysis is required are complicated or remote and it's inconvenient or even impossible to integrate the chlorine systems into the network. As a result, these systems aren't connected to the central control network at all. Within the plant, these measurement points become isolated islands, and their data can only be accessed locally, so an operator must go on site to work with the instrument. This isolation represents a huge expense in terms of maintenance and man-hour requirements for plants.

Next-generation wireless adaptor technologies use the WirelessHART protocol, an open platform, industry standard in wireless technology that supports a broad range of instruments. The WirelessHART protocol enables a "self-organising" network where devices automatically find the best communications pathways for greatest network efficiency and reliability. Every wireless device on the network acts as a repeater for nearby devices, so that all the devices work together to identify and use the most efficient communication path for each message. If there's a problem with an individual device, the other devices can carry the message, so if an obstruction is introduced, data will continue to flow through the other devices in the network. Without any manual intervention or data flow disruption, the network dynamically reconfigures itself to carry the data over

Photos: Courtesy of Rosemount Analytical



**New liquid analysers such as the Rosemount Analytical 56, part of an advanced free chlorine monitoring system, allow drinking water plants to take advantage of cost reductions; significantly improved diagnostics and network communications of wireless technology.**

the fastest, most reliable route to the central system. In this way, the self-organising network ensures data transmission reliability and availability.

### Security considerations

Security cannot be overlooked for drinking water plants worldwide. The WirelessHART standard provides multilayered security features including encryption with device authentication, automatic key rotation, and data verification. External interference is mitigated by spread-spectrum broadcast and noisy radio interferences are prevented by automatic channel selection. With these protocols in place, next-generation wireless networks offer the same level of security and reliability as traditional hard-wired solutions.

Chlorine monitoring and analysis ensures safe drinking water, but effective chlorine measurement in remote areas of the drinking water plant and distribution network can be challenging and expensive. New wireless technologies for chlorine analysis and reporting help plants maintain chlorine control, improve water quality and meet compliance requirements, while reducing costs. **WWA**

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