

Fast drinking water analyzer helps Anglian Water optimize treatment



Most public drinking water supplies in the developed world are treated with a disinfectant chemical such as chlorine, to eliminate any harmful organisms and to preserve the quality and safety of the water throughout the distribution network. However, reaction between the disinfectant and naturally occurring organic compounds in the water can form disinfection by-products (DBPs) which may, in themselves, pose a risk to human health. The use of chemical disinfectants is therefore a balance between protecting against microbial and the potential health risks of DBPs.

The demand for clean, reliable drinking water has and will continue to be of primary concern worldwide.





The most common DBPs are chemical compounds known as trihalomethanes (THMs).

The four main THM compounds are:

- Chloroform
- Bromoform
- Bromodichloromethane
- Dibromochloromethane

To reduce the potential risk of DBPs to public health, the World Health Organization (WHO) sets guidelines for maximum levels of THMs in drinking water:

- 300 µg/l of chloroform
- 100 µg/l of bromoform
- 60 µg/l of bromodichloromethane
- 100 µg/l of dibromochloromethane

Many governments set drinking water standards mandating even lower levels of THMs.

In the USA, for example, the Environmental Protection Agency (EPA) stipulates that drinking water should contain less than 80 parts per billion (80 µg/l) total trihalomethanes (TTHM). Within the EU, the standard is 100 µg/l, although in some countries this figure is lower – in Germany and the Netherlands, for example, it is 50 µg/l. In England and Wales, the Drinking Water Inspectorate (DWI) enforces the EU standard of 100 µg/l for total THM concentration; failure to comply with this standard is a criminal offence and renders the water company liable to prosecution.

Water supply companies therefore closely monitor THM levels to ensure compliance with this regulatory limit and maintain water quality and safety. Most water supply companies currently rely on laboratories for THM analysis. This involves sending samples to the laboratory and waiting for the results – a procedure that can take from days to weeks, depending on the laboratories' workload and location.

As well as being expensive, this approach means that the analysis data cannot be used for realtime process control – which can lead to over-use of disinfectant or in the worst case could result in contaminated water being consumed before the laboratory results were available.

Anglian Water

First UK water company to adopt real-time analyzer technology.

Before now, Anglian Water has relied on a laboratory for THM analysis. The company decided to look for an alternative onsite method which would take pressure off its laboratory and deliver a same-day result. During the last five years, the company has invested more than £100 million in drinking water improvements, surpassing some of the most stringent quality targets in the world.

In July 2015, Anglian Water took the strategic decision to further enhance its water treatment and supply processes by installing an in-house trihalomethane (THM) sample monitoring and analysis system. Capable of analyzing samples in less than 30 minutes, with no reagents or sample preparation.



The analyzer is an integrated purge-and-trap system connected to a compact gas chromatograph column and a very sensitive surface acoustic wave (SAW) detector. It provides a completely self-contained solution for realtime measurement and analysis of THM concentration levels, down to as low as 1 part per billion (ppb) for each individual species of THMs. The analyzer can measure chloroform, dichlorobromomethane, dibromochloromethane and bromoform – the four species that make up total THMs – to within 10% accuracy.

About Anglian

Water Anglian Water is the largest water and water recycling company in England and Wales by geographic area, covering some 27,500 square kilometers. It supplies water and water recycling services to more than six million domestic and business customers in the east of England and Hartlepool, providing almost 1.2 billion liters of drinking water every single day.

Anglian Water operates 1,257 water and water recycling plants and its service region stretches from the Humber north of Grimsby to the Thames estuary, and from Buckinghamshire to Lowestoft on the east coast.

“Using the THM analyzer we are now able to measure THM concentrations inhouse, and in less than 30 minutes. We are currently analyzing over 20 samples a week and have found the system to be very easy to use. Aside from the potential costsaving benefits, the much faster analysis capabilities provide scope for further improvements in operational efficiency.”

Mark Berry, Innovation Project Manager, Anglian Water

Trihalomethane (THM) Analyzer

Rapid measurement of THMs ensures safe drinking water without sample preparation



A key advantage of THM analyzer is that it does not require sample preparation – a tedious task traditionally associated with gas chromatography.

The analyzer's purge & trap function automates the measurement process to the extent that the user simply connects the collected water sample to the analyzer's sparging system and pushes the 'start' button. All sample purging, THM component separation and data analysis operations are then performed entirely automatically. Individual species and total THM information is displayed on a front panel LCD touchscreen and on the associated laptop computer, as analysis progresses.

After each analysis run, the system's PC-based software displays the processed chromatogram showing the compound peaks and corresponding chromatography data. Analytical results, including:

- measured concentration
- detailed chromatography data
- as well as optional data such as carrier gas pressure, GC column and pre-concentrator temperature profiles, are automatically archived for more in-depth data analysis and review.

Features and Benefits:

- 30-minute analysis
- No sample preparation required
- Fast and easy operation; all-in-one sample purging, component separation and data analysis
- Rapid operator feedback
- Long term cost benefits (reduced laboratory analysis costs and more efficient use of disinfectants)