

# Optimising iron and manganese oxidation in groundwater for drinking water production

How advanced monitoring technologies can help achieve regulatory compliance and operational excellence in water treatment processes.

by Bart Verdonk  
Applications Development  
Manager, Hach

and Zsombor Dunai  
Sales Representative, Hach

A major drinking water company faced a challenge in ensuring water quality. The groundwater sourced from boreholes adjacent to a river contained iron and manganese levels that exceeded the European Drinking Water Directive 2020/2184 limits. Specifically, the raw water often approached the manganese limit of 50 µg/L and occasionally exceeded the iron limit of 200 µg/L. These elevated levels posed risks of discolouration, taste and odour and staining, leading to consumer complaints and potential health concerns. Pre-oxidation was deemed necessary to remove these metals and ensure compliance with regulatory standards.

## Solution

The water company implemented Hach® EZ series online analysers for real-time monitoring of iron and manganese levels. The EZ1000 Manganese Analyser and EZ2000 Total Iron Analyser were installed to provide continuous, accurate measurements. These analysers utilize colorimetric technologies to detect and quantify dissolved iron and manganese in the water. The data generated by these instruments is integrated into the plant's SCADA system, enabling early detection of deviations from regulatory limits and ensuring timely corrective actions.

The EZ1000 Manganese Analyser employs the formaldoxime method to measure dissolved manganese at 450 nm, with a range of 0-1 mg/L. The



Cascade System - Drinking Water Production. Inset: EZ1000 Manganese Analyser in Drinking Water Plant

EZ2000 Iron Analyser uses the TPTZ reagent to form a deep blue-purple colour, measuring dissolved iron (Fe(II), Fe(III), and total dissolved iron) within the same range. These analysers are equipped with smart, automated features that enhance analytical performance, minimise downtime, and reduce the need for operator intervention. They can also measure multiple streams simultaneously, reducing the cost per sampling point.

## Benefits

The implementation of the EZ series analysers has brought several benefits to the customer. Firstly, the continuous, real-time monitoring of iron and manganese levels ensures that the water treatment process remains within regulatory limits, guaranteeing the quality of the drinking water supplied to consumers. This real-time data allows for early warnings and timely interventions, preventing potential issues before they escalate.

Moreover, the online analysers have replaced the need for frequent manual grab sample testing in the laboratory, significantly reducing labour and operational costs. The automated cleaning, calibration, and validation features of the EZ analysers further

contribute to their reliability and ease of use, ensuring consistent performance with minimal maintenance.

By optimising the pre-oxidation process and ensuring compliance with regulatory standards, the water company has enhanced its operational efficiency and customer satisfaction. The ability to provide high-quality drinking water consistently not only meets regulatory requirements but also reinforces the company's commitment to public health and environmental sustainability.

## Conclusion

The adoption of Hach® EZ series online analysers has proven to be a valuable investment for the water company. It has enabled the company to effectively manage iron and manganese levels in its water supply, ensuring the delivery of safe, clean, and high-quality drinking water to customers. This solution highlights the importance of advanced monitoring technologies in modern water treatment processes and their role in achieving regulatory compliance and operational excellence.

[www.uk.hach.com](http://www.uk.hach.com)