

# Disinfection in drinking water: Choosing the right chlorine analyser for your application

Disinfection is a very important part of the drinking water treatment process, and choosing between an amperometric and colorimetric chlorine analyser is a decision that depends on a variety of factors. Below you will find out why a colorimetric analyser was the right choice for our customer, given their specific situation.

## Problem

Excessive hypochlorite dosing often resulted due to lower than actual chlorine reading in amperometric analysers whose readings were used to control the amount of hypochlorite injected in water.

## Solution

To improve measurement stability and correlation with the official laboratory method, several colourimetric continual free chlorine analysers were installed to replace existing amperometric instruments.

## Advantages

The results showed improved management of the process with correct hypochlorite dosing and a drastic reduction in interventions for checking, calibration and maintenance of the online analysers.

## Initial situation

Gestione Acque SpA is a large company that operates the integrated water services in 58 municipalities in northern Italy. Within its area of coverage, a large proportion of the water enters the network following a simple disinfection treatment with hypochlorite. This treatment was adopted to best manage and respond to the varied characteristics of the source water. Over the years, all of the sites in these 58 municipalities were carefully monitored in order to continuously assess the overall treatment process and the adequacy of the technology used.

In order to determine the correct amount of hypochlorite that would need to be dosed into the water, it was important to constantly monitor the chlorine level in the water. Depending on the chlorine reading, sensor control units would automatically determine how much chlorine would need to be pumped into the water through peristaltic pumps. Therefore, it was very important to have accurate chlorine reading as this determines how much hypochlorite is added to the water.

However, there were instances when the continuous chlorine measurement was lower than the actual chlorine detected using portable analyser following the APAT IRSA 4080 colourimetry method, and this led to excessive dosing of disinfectant in the water.

Such measurement discrepancies can lead to a misinformed conclusion that there is something wrong with the chlorine analyser or that this type of analyser is not reliable. However, it is important to understand that while the amperometric technology has a lot of benefits, it is very sensitive to variations in pH, temperature, and the water flow in the sample cell, as well as the condition of the electrodes and potential contamination of the membranes. Due to this high sensitivity to external factors, amperometric analysers require careful and frequent verification and calibration.

## APPLICATION: DRINKING WATER ANALYSIS; CHLORINE MEASUREMENT

In order to solve their problem and ensure a reliable control of the hypochlorite dosing, the water company started looking for an alternative method for continuous chlorine measurement that would provide reliable results without requiring frequent verification and calibration. In order to determine the most viable solution, the water company tested amperometric and colorimetric analysers in parallel. After careful evaluation of the results and considering both technical and economic factors, the water company decided to switch to colorimetric chlorine analysers.

### Solution

Old amperometric measurement systems were replaced with new colourimetric analysers. Currently, five out of the eighteen existing analysers have been replaced, and goal is to complete the replacement over the coming months, depending on availability of funds.



*Three Free Chlorine on-line Amperometric sensors were compared with on-line DPD Free Colorimetric Analyser (CL17) to measure variations of chlorines concentrations in a range <0,1 mg/L. None of the 3 amperometric systems show the same trend.*



*Hach CL17 Colorimetric Chlorine Analyser*

### Advantages

By changing the type of chlorine analysers to best suit its current situation with varying external factors, the water company was able to improve its process management.

- With the help of the new analysers, the chlorine measurement accurately reflects the disinfectant level in the water and therefore ensures proper hypochlorite dosing. By preventing excessive hypochlorite dosing, the company is able to save on the cost of the disinfectant.
- The new analysers have reliable readings even at low chlorine values, do not produce any signal drift and practically require no calibration after the first six months of use.
- Reduction of maintenance work from one hour per week to 10 minutes per month: the old amperometric analysers required frequent testing to detect any deviations and implement the necessary corrections (1 hour per week); thanks to the recent installation of the new analysers, the commitment is now limited to a quick replacement of the reagents (10 minutes per month). This means more time can be dedicated to other productive activities.

Contact our experts at Hach to get a professional assessment of your particular application. We can help you select the right chlorine analyser.