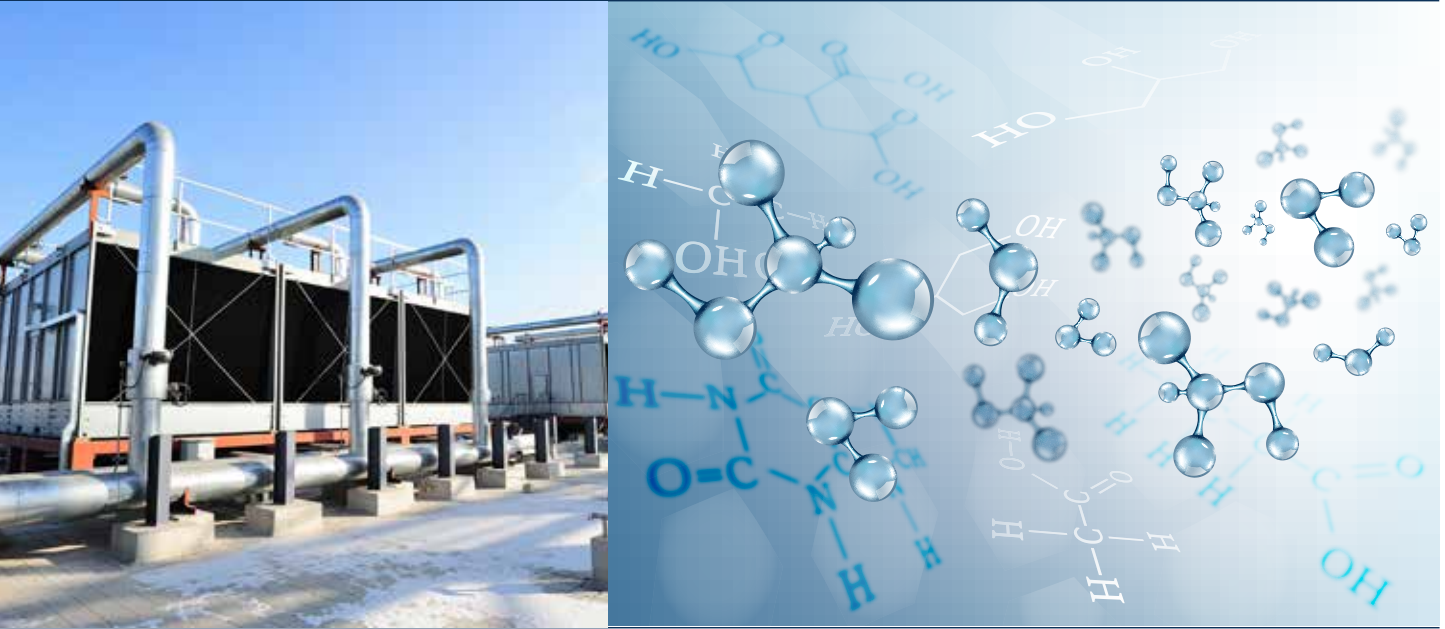


FOCUS ON EVAPORATIVE COOLING TOWERS



ONLINE MEASUREMENT OF OXIDIZING BIOCIDES

Cooling water treatment

Cooling water circuits of evaporative cooling towers demand a great deal of water treatment and monitoring. Primarily, operating the system according to the hygienic regulations has to be ensured, and in addition, the system has to be protected against occurrent corrosion. Combating microbiological deposits, which have a negative impact on the efficiency of the evaporative cooling tower and can also be home to pathogenic bacteria, requires dosing of biocides to the cooling water circuit.

Non-oxidizing and oxidizing biocides

In order to fight microorganisms, either non-oxidizing or oxidizing biocides are added to the cooling water circuit. On the one hand, non-oxidizing biocides possess good material compatibility, but the underlying mechanism of the biocidal effect allows the bacteria present in the cooling water circuit to develop resistance. Therefore, the alternation of two different non-oxidizing biocides at regular intervals is highly recommended. As the effectiveness of oxidizing biocides is based on another mechanism, it prevents the bacteria from developing resistance. However, common active substances act aggressively on materials used, cause corrosion damage and thus require additional cooling water treatment with corrosion inhibitors. Yet, the advantage of oxidizing biocides is that the concentration of active substance actually present in the cooling water circuit can be measured and monitored continuously; either by measuring ORP as indirect parameter for disinfection effectiveness or directly measuring the biocide concentration by means of specific amperometric sensors.



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Sensors for online measurement of oxidizing biocides

Especially for the application in evaporative cooling towers, ProMinent designed sensors that cope perfectly with permanently varying water quality as well as periodic presence of biocide due to shock dosage.

■ Sensors for free chlorine, free bromine and organic bromine compounds

Hypochlorite, hypobromite and organic bromine compounds, such as BCDMH, represent the most commonly used oxidative biocides for cooling water treatment although their biocidal effectiveness based on the active substances, free chlorine and free bromine, significantly depends on the pH value. Due to their chemical equilibrium free chlorine and free bromine respectively, only exist in enough quantities that guarantee efficient combating of microorganisms up to pH values of 7.5 and 8.5 respectively. In addition, these biocides generate toxic by-products, e.g. AOX-compounds, which end up in the wastewater.

Our specific amperometric sensors continuously monitor the biocide concentration individually for each active substance actually present in the cooling water circuit (CBR: free chlorine, free bromine; CTE: total chlorine, i.e. all free and bound oxidative chlorine compounds; BCR: organic bromine compounds).

- Diaphragm-covered sensors for stable measurement even at fluctuating flow rates or contaminants in the water
- Increased resistance to films of dirt or microbiological growth due to electrolyte with antimicrobial effect
- Optimised electrolyte diaphragm system for usage at higher pH values of up to 9.5

■ Chlorine dioxide sensor

Chlorine dioxide guarantees effective disinfection regardless of the pH value; it does not form toxic by-products like THM- and AOX-compounds and due to its gaseous state allows intensive penetration of microbiological films. Because of their simple handling, ready to use chlorine dioxide solutions are very popular in cooling water treatment.

The chlorine dioxide sensor CDR optimised by ProMinent for the cooling water application is characterised by its robustness, long lifetime and little maintenance requirements.

- No cross sensitivity to free chlorine and chlorite
- Diaphragm-covered sensor for stable measurement even at fluctuating flow rates or contaminants in the water
- Increased resistance to films of dirt or microbiological growth due to pore-free diaphragm

■ Ozone sensor

Ozone is considered the most environmentally friendly disinfectant; it generates no by-products and possesses an excellent disinfection behaviour towards bacteria, viruses, fungi and parasites. But the great reactivity of ozone requires that it is produced from oxygen on-site by special generators.

ProMinent offers complete solutions for the treatment of cooling water with ozone, including proper measuring and control equipment in addition to appropriate generators. To ensure reliable disinfection, our ozone sensor OZR is tailored to the particular needs of this application.

- No cross sensitivity to chlorine and hydrogen peroxide
- Diaphragm-covered sensor for stable measurement even at fluctuating flow rates or contaminants in the water
- Increased resistance to films of dirt or microbiological growth due to pore-free diaphragm
- Also suited for discontinuous ozone treatment

