



APPLICATION NOTE Chemical

Disinfectant monitoring in a cooling water circuit

- Control of chlorine dosing for cooling water treatment
- Temperature and pH-compensated measurement of free chlorine in the bypass of a recooling system
- High operational safety in accordance with immission protection ordinance

1. Background

A German industrial gas manufacturer operates an open thermodynamic cooling water circuit in one of his process plants to dissipate excess heat that can no longer be used. To recool the cooling water, the company uses a honeycomb radiator.

2. Measurement requirements

The operator adds a chlorine-based disinfectant to guarantee that the cooling water treatment is hygienic and to prevent an unwanted formation and colonisation of microorganisms such as legionella bacteria and other pathogens in the cooling water circuit (biofouling). To ensure the safety of employees and residents, the customer controls the process according to the rules of good engineering practice and in accordance with the legal framework for the hygienic operation of recooling systems (immission protection ordinance).

In order to control the use of the disinfectant accordingly, the customer needs a reliable measurement of the free chlorine. The chlorine measurement must be both pH and temperature-compensated at the same time as the ideal measuring range for free chlorine is in the range of a pH value of 4.5...7.5. By thickening the cooling water, however, a pH value of 7.5 is quickly exceeded. The free chlorine thus undergoes a chemical change and can no longer be completely detected. A missing compensation of the pH value would falsify the measured value. The pH measurement also depends on the temperature.

3. KROHNE solution

The operator uses the OPTISYS CL 1100 disinfectant measuring system. This compact measuring system, immediately ready for operation, was provided as a pre-wired solution featuring a converter, a diaphragm-free chlorine sensor, a pH sensor and a temperature sensor as well as related valves, a flow cell and integrated sensor cleaning. The system continuously measures chlorine content, pH value and temperature, transmitting all of the process data for monitoring and storage to the process control system via separate signal outputs. The customer controls the dosage of free chlorine into the cooling water using the measured chlorine concentration.

The compact design of the OPTISYS CL1100 enables free selection of the installation site. The customer uses the system in the bypass of the cooling water circuit. The installation of the measuring system was carried out by the customer according to the installation instructions. The sensors included were inserted into the acrylic glass flow-through assemblies provided and the manual control valve was set to a flowrate of 40l/h. The desired parameterization of the current outputs took place in the transmitter before the basic calibration of the sensors.



OPTISYS CL 1100 for pH- and temperature-compensated chlorine measurement

4. Customer benefits

The operator can purposefully control the disinfection of the cooling water. Hygienically critical conditions and thus health risks for employees and residents can be virtually eliminated. In addition, all measurements are documented in the control room. This way, the customer can prove to the responsible authorities that his cooling system is operated properly and in accordance with the regulations.

The OPTISYS CL 1100 also contributes to the efficient and economical operation of the plant. The optimised dosing of chlorine based biocides does not only save resources but also decreases the risk of corrosion due to overdosing. The operator always adds only as much free chlorine as is required for operational safety.

The customer benefits from an uncomplicated system in which all of the sensors are located on the compact measuring system and are thus always directly accessible. Thanks to integrated automatic sensor cleaning, the OPTISYS CL 1100 requires minimal maintenance. The converter's clear and straightforward menu navigation facilitates start-up and calibration. The measured values were tested against comparative measurements and found to be plausible immediately. For this reason, the chlorine measuring system was quickly put into operation.

5. Product used

OPTISYS CL 1100

- Disinfectant measuring system for water and wastewater applications in bypass lines
- For the potentiostatic, amperometric measurement of free chlorine, chlorine dioxide and ozone
- Completely installed with MAC 100 converter (output: 3 x 4...20 mA)
- Pre-installed and tested
- Cl₂: 0.03...20 mg/l; ClO₂: 0.05...5 mg/l; O₃: 0.05...5 mg/l; max. +50°C / +122°F
- Includes chlorine sensor, valves, flow-through assemblies, optional pH sensor and temperature sensor
- Automatic sensor cleaning (ASR)



Contact

Would you like further information about these or other applications?

Do you require technical advice for your application?

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