Operating Open Cooling Systems in a Hygienic Manner

Health risks posed by open recooler systems

Thousands of open recooler systems can be found nationwide – from small roof-top cooling systems to large cooling towers. The waste air produced by operating these systems forms aerosols potentially containing hazardous bacteria (e.g. legionella), which can cause serious illness if inhaled.

Illness and death caused by legionella in the waste air from evaporative cooling systems is a reoccurring issue. Typical sources are industrial plants or systems on top of hospitals, hotels or office buildings.

To mitigate the risk of spreading disease, detailed countermeasures have been specified in the VDI 2047 Part 2 standard "Open recooler systems – Securing hygienically sound operation of evaporative cooling systems". Many countries have also introduced national guidelines, such as the German 42nd Federal Emission Control Regulation (BImSchV), which came into force in August 2017 and on which other European countries have since based their own laws.

Operators taking responsibility

The regulation describes how to operate cooling systems in a hygienic manner. The VDI 2047 Part 2 standard contains detailed guidelines on:

- Continuous water treatment
- Disinfection
- Regular checks on microbiological, chemical and electro-chemical parameters

The plant operator is responsible for carrying out risk analyses, ensuring operational safety through regular maintenance (inspections, maintenance, repair work etc.) and safeguarding the health of all employees, visitors and residents. It is highly recommended that detailed documentation of all the action taken and the measurement results obtained is kept.

From theory to practice

The standard places considerable demands on operators. Operators must measure different parameters for specific processes and systems at least once every two weeks. Our experts have worked through the standard and listed analytical solutions in the table overleaf.

Hach® will be happy to help create a custom concept for you and your cooling system. Hach has the right solution for you – whether you need a measuring instrument that is portable, for lab use or for working online. You can keep an eye on your cooling system at all times and make the right decisions at an early stage.

Analytical Solutions

With many parameters you can choose between different solutions – matching your operational requirements.

Parameter	Spectrophotometer VIS / UV-VIS Portable / Benchtop	Portable Parallel Analyser	Conductivity / pH Meter Portable / Benchtop	Online Analyser for 24/7 Monitoring	Misc
Microbial Load				●	BART, Paddle Tester (Dip slides)
Antimicrobical Conditioning Agents [1]	●	●		●	
Alkalinity [2]	●	●		●	
Total Hardness	●	●		●	
Calcium	●	●		●	
Chloride	●			●	
Sulphate	●			●	
Nitrate	●			●	
Total Phosphorus	●			●	
Ammonium	●	●		●	
Iron	●	●		●	
Chromium	●			●	
Copper	●	●		●	
Nickel	●			●	
Silica	●			●	
Zinc	●			●	
TOC	●			●	
pH		●	●	●	
Conductivity		●	●	●	
Turbidity	●			●	Turbidimeter

[1] Biocides e.g. Chlorine, Chlorine dioxide, Monochloramine and Ozone; [2] Also Acid Capacity

Literature

- European Union Legislation: Directive 2000/54/EC – Protection of workers from risks related to exposure to biological agents at work
- European Technical Guidelines for the Prevention, Control and Investigation of Infections caused by Legionella species
- Council Directive 89/106/EEC: Building Industry / Construction products
- DE: 42nd BImSchV Regulation for evaporative cooling systems, cooling towers, wet scrubbers
- FRA: Guide de Bonnes Practique: Legionella et Tours Aerorefrigerantes
- GB: British Standard BS8580: Water quality – Risk assessments for Legionella control
- US: ASHRAE 188 (American Society for Heating, Refrigeration, and Air Conditioning Engineers), CTI GDL-159 (Cooling Tower Institute), CDC and EPA publications

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