

Copper and Silver Ionisation - Residual Value

What is copper and silver ionisation?

Copper and silver ionisation is a relatively new modality for the control of Legionella, Pseudomonas and other pathogens in water systems. The use of copper and silver ionisation was first recorded in the USA in 1990 (Lin et al. 2011), although it was pioneered by NASA in the 1960s (Albright et al. 1967). The ProEconomy copper and silver ionisation system is known by its trade name of Orca.

How does copper and silver ionisation work?

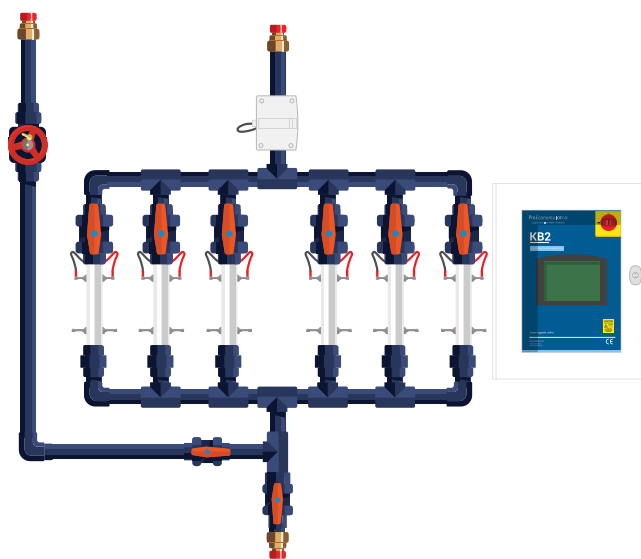
Copper and silver ionisation works through the generation of copper and silver ions in water by water flowing through a turbine of a flow sensor. This sends a signal to the control unit, which then passes a low DC current between two copper and two silver electrodes located in an electrode chamber. The current causes ionisation, i.e. the release of copper and silver ions into the flowing water. Being electrically charged the copper and silver ions seek opposite polarity and find this in the negatively charged sites on cell wall of bacteria, such as Legionella, Pseudomonas and E.coli. The ions distort and weaken the cell wall and then damage the cell by binding at specific sites to DNA, RNA, cellular protein and respiratory enzymes denying all life support systems to the cell, causing death.

How copper and silver ionisation provides residual efficacy

The copper and silver ions remain active until they are consumed, therefore maintaining a residual treatment effect throughout the water system. The Orca Legionella control system destroys underlying problems that cause Legionella contamination, such as biofilm. Unlike chemical water treatments, such as chlorine dioxide and chlorine, for example, copper and silver ions do not decay or 'gas off' over distance and the necessary concentrations at the taps are maintained. Efficacy is not affected by high water temperatures, again, unlike chlorine dioxide and also UV light systems.

A study by Liu et al. (1998) evaluated copper-silver ionisation systems installed onto the hot water recirculation lines of two hospital buildings colonised with *L. pneumophilla* s1 and compared with a control also colonised with *L. pneumophilla*

s1. Four weeks after activation of the system, distal site positivity for Legionella in the first test building dropped to zero. After operating for 16 weeks the system was disconnected and installed onto the second test building. Twelve weeks of disinfection reduced the distal site positivity for Legionella in the second test building to zero. Legionella recolonisation did not occur in the first test building for 6-12 weeks and in the second test building for 8-12 weeks after inactivation of the system. This shows that the ions have a residual value, unlike most other biocides used for pathogen control in water systems.



References

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Lin Y., Stout J.E., Yu V.L. (2011). Controlling Legionella in Hospital Drinking Water: An Evidence-Based Review of Disinfection Methods. *Infection Control and Hospital Epidemiology*. 32(2):166-173.

Liu Z., Stout J.E., Boldin M., Rugh J., Diven W.F., Yu V.L. (1998). Intermittent use of copper-silver ionisation for Legionella control in water distribution systems: A potential option in buildings housing individuals at low risk of infection. *Clinical Infectious Diseases* 26:138-140.



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Copper and Silver Water Treatment

proven Legionella control