



SOCOTEC

Controlling Pathogens in Water Systems with Protex!

Protex! is the electrolytic device for hot water disinfection. Although most bacteria found in potable water supplies are innocuous, there are some microorganisms such as Legionella and Pseudomonas species that can cause waterborne diseases if not maintained within control limits.

Under Health and Safety Law, property owners and/or facilities managers have the legal duty to safeguard water users from contracting any disease. The Approved Code of Practice L8, produced by the Health and Safety Executive (HSE), suggests temperature control as the primary method of preventing the growth of Legionella in hot and cold water systems of buildings. Hot water should be stored at a minimum of 60°C with a flow temperature of 50°C (55°C in healthcare premises), and cold water should be maintained below 20°C.

Although hot water systems in large buildings carry the highest risk of bacteria colonisation, the risk of proliferation in the cold systems of buildings, or in the distribution system, cannot be ruled out.

Over the last five years, SOCOTEC, in collaboration with Brunel University, has developed an electrolytic device which generates disinfectants directly from the water and the chlorides dissolved within it. The innovative electrolytic device provides an environmentally friendly system for Legionella control in recirculatory water systems.

CONTROLLING PATHOGENS IN WATER SYSTEMS WITH PROTEX!

Protex! offers a number of advantages over other methods of Legionella control:

- > Being installed in the recirculation loop, it provides continuous residual disinfection in the form of hypochlorous acid, even in periods of no demand, when the system is most vulnerable.
- > Disinfectants are generated on site, eliminating the handling, storage and transport of hazardous chemicals and reducing the carbon footprint of the water treatment.
- > Used in conjunction with softened water, it has minimum maintenance requirements.

Key benefits of using Protex! include:

- > Eliminates bacteria
- > In-situ generation of disinfectants
- > Continuous provision of residual disinfectants
- > No additional chemical dosing
- > Minimal servicing requirements in softened water
- > Low energy requirements
- > Service agreement offer available

Protex!: the environmental solution to hot water disinfection

In order to achieve the requirement for all new buildings to be nearly zero-energy by 2020 set out in The Energy Performance of Buildings Directive (2010), the energy demand associated with the provision of hot water needs to be addressed. However, maintaining systems at high temperatures renders difficult the use of greener technologies that could reduce the CO2 impact of heating water.

The HSE (2013) advises that if hot water is treated with biocides, water temperatures can be reduced, providing Legionella levels are monitored. Given that Protex! generates disinfectants, water temperatures can be lowered, reducing the energy associated with heating water in buildings. Temperature reduction is not currently permitted in hospitals and healthcare premises (Department of Health, 2006).

Electrolytic disinfection could play an increasingly important role in renewable energy because further reductions can be achieved by heating the water with green technologies such as solar panels that become more efficient if one demands water at a lower temperature.

PROTEX SCHEMATIC			
PROTEX! FRONT VIEW	TOP VIEW	A ELECTROLYSIS	B DISINFECTANTS
<p>Water flows through the unit as shown, with temperature and flow rates being continuously monitored by the flow sensor.</p>		<p>An electric charge is passed through the water, via purposely designed electrodes, causing the decomposition of water and of the chlorides contained within it. As shown in schematic A, positively charged ions (NA+ and H+) migrate to the negative electrode whilst negative charges ions (OH- O- and Cl-) to the positive electrode. Some of the elements expected during electrolysis are shown in schematic B and include ozone, chlorine gas and hypochlorous acid, the disinfectants needed to inactivate pathogens.</p>	