



ProEconomy | orca

Copper and Silver Water Treatment

Case Study

Basildon University Hospital

Controlling Legionella in a UK hospital using copper and silver ionisation

Background:

This case study for Basildon Hospital presents data from before and after using a copper and silver ionisation (CSI) system, comprising 99.99% copper and 99.99% silver electrodes installed as a replacement to a failing chlorine dioxide system for Legionella control. The CSI system was used in conjunction with the existing temperature regime and was installed upstream of the water storage tanks to allow adequate build-up of copper and silver in tanks so that good levels were available for distribution to outlets.

Sampling:

Samples were taken monthly and analysed for Legionella, by the culture method, and for copper and silver by Inductively Coupled Plasma-Optical Emission Spectroscopy/ Mass Spectrometry over a four-year period. Temperature was also measured.

Results:

Table 1 shows the results for Legionella counts and water temperature before the CSI was installed. The highest count was observed in the cold water supply to a Thermostatic Mixing Valve (TMV) at 19.6 °C. This shows that keeping cold water temperatures below 20 °C at outlets did not control *L. pneumophila* s1 at this outlet. The hot water temperature recorded (52.0–59.4 °C) showed the difficulty of keeping hot water temperatures above 55 °C.

Table 1 – Pre-commissioning Results: Legionella spp. and water temperature (August 2011)

Sample description	Temp °C	Legionella CfU/L
Basin Hot TMV	54.2	10000 s1; 10000 s2-14
Basin Cold TMV	18.3	ND
Shower Hot TMV	59.4	18000 s1; 72000 s2-14
R13 Bath Hot TMV	57.7	10000 s1; 20000 s2-14
R13 Bath Cold TMV	19.3	ND
R13 Basin Hot TMV	56.5	1500 np
R13 Basin Cold TMV	19.7	ND
R6 Basin Hot TMV	52.0	36000 s1; 54000 s2-14
R6 Basin Cold TMV	19.6	290000 s1
R6 Basin en suite Hot TMV	52.1	10000 s2-14
R6 Basin en suite Cold TMV	19.1	ND
R6 shower en suite Hot TMV	53.5	ND
Shower en suite MT TMV	41.7	ND
Toilet room Hot MT TMV	58.1	ND

ND=not detected (detection limit=20 cfu/L); np=Legionella non-pneumophila; s1= Legionella pneumophila serogroup 1; s2-14= Legionella pneumophila serogroup 2-14; TMV=thermostatically-controlled mixing valve.

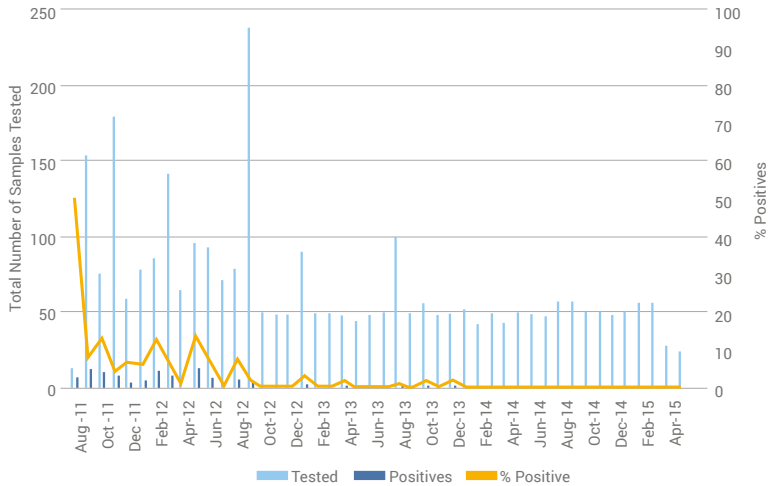


Figure 1 – Number of samples tested and number and percentages of positive samples for Legionella between Aug 2011 and April 2015, Basildon Hospital.

Figure 1 shows the number of samples tested, number and percentage positives for Legionella. The CSI system was installed in October 2011 and initial problems occurred during the commissioning stage up to four months after commissioning. These initial problems (deadlegs, deadends and low-use outlets) were rectified Legionella was controlled consistently, with only low positives counts occurrences in 2013. Monthly monitoring of outlets has showed no positive result for 15 months, between January 2014 and April 2015.

Conclusion: It was concluded that Legionella could not be effectively controlled using a temperature regime alone, even when temperature was maintained at below 20 °C or at above 55 °C; and that copper and silver ionisation used in conjunction with the temperature system already in place was effective for Legionella control at this hospital. Legionella is still being controlled successfully at Basildon Hospital since the last data shown in the graph. As per ProEconomy usual service when providing their Orca system, the system was

regularly monitored to ensure the required concentration of ions was maintained, so that potential Legionella sources, such as build-up of biofilms in rubber-lined hoses, were dealt with as soon as detected.

Testimonial taken from HSE led Independent Review of hospitals using Copper and Silver Ionisation

‘Despite capital investment of around £2million...Legionella continued to be a problem’

‘Despite dosing Chlorine Dioxide at elevated levels (2ppm) and also achieving good levels of temperature control, 3 further cases...were diagnosed in 2011 with one death.’

There have been ‘zero positive samples reported since the beginning of October 2012 [when the Orca system was installed]...the hospitals water system is now under control!’

David Hastings, Estates Manager at Basildon University Hospital.