

Safety Code of Practice 58

1<sup>st</sup> Edition, May 2023

# THE CONTROL OF LEGIONELLA IN DEPARTMENTAL WATER SYSTEMS & EQUIPMENT



Summary			
<p>This code of practice applies to the control of Legionella in water systems and items of equipment that are not considered to be part of the building fabric and which are susceptible to colonisation by Legionella bacteria growth.</p> <p>Such water systems and equipment would contain water which is held or recirculated at a temperature between 20 - 45 °C and would not be maintained by Estates. In this context, the term "departmental" applies equally to Schools and Functions.</p> <p>Schools/Functions should avoid creating or adopting new water systems or equipment and should obtain authorisation in writing from the Estates Legionella Duty Holder/Responsible Person before creating or adopting new water systems and equipment.</p> <p>Estates has produced the "<i>Control of Legionella Bacteria Within Water Systems Policy document</i>" which should be read in conjunction with this document (Safety Code of Practice 58 "The Control of Legionella in Departmental Water Systems &amp; Equipment").</p>			
Document Control			
Document type (CoP / SN)		CoP	
Document owner		August Pistorius	
Document status (Draft / Final)		Final	
Version		1.0	
Approved by		UHS&W Committee	
Checked for accessibility		Date	01/05/2023
Date of publication	01/05/2023	Next review date	01/05/2028
Date of original publication	01/05/2023	Revision frequency	5 Years
Superseded documents		<i>H&amp;SS Safety Note 43</i>	
Related documents		<i>"Control of Legionella Bacteria Within Water Systems Policy document"</i> produced by Estates	

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## 1 INTRODUCTION

This Code of Practice establish responsibilities and requirements around control of legionella bacteria in water systems outside the control of Estates.

Legionella bacteria can cause serious ill-health, including a potentially fatal form of pneumonia. Everyone can be infected. The risk increases with age, and some people are at higher risk, including people over 45, people suffering from chronic disease or with an impaired immune system.

Legionella bacteria are common in natural water sources, but usually in low numbers. Legionnaires' disease is normally contracted by inhaling small droplets of water in the air which contain bacteria. Outbreaks of the illness typically occur from exposure to legionella growing in purpose-built systems where water is maintained at a temperature high enough to encourage growth, conditions are favourable, and the bacteria has multiplied. Consequently it is important to control the risks by not allowing proliferation of the organisms in water systems and reducing exposure to water droplets. This reduces the risk of exposure to legionella bacteria.

The control of legionella in most University water systems is established "*Control of Legionella Bacteria Within Water Systems Policy document*" produced by Estates. It is designed to ensure compliance with the HSE's Approved Code of Practice L8 *Legionnaires' Disease The control of legionella bacteria in water systems*. The *Policy* applies to water systems considered part of the fabric of buildings and managed by Estates.

However, the *Policy* does not address equipment and water systems which are owned, operated or maintained by Schools and Functions other than Estates. Schools/Functions have various water systems or equipment which uses or stores water that may potentially produce a legionella risk. Schools/Functions must have adequate controls in place to eliminate the risks associated with this potentially fatal disease, or to reduce the risk to an acceptable level as far as reasonably practicable. This Code of Practice provides clarity for these systems.

Heads of Schools/Functions are strongly advised to appoint the University's specialist water treatment contractor to act as their competent person and to take responsibility for managing the risks to help Schools/Functions to comply with their health and safety duties.

## 2 SCOPE

This Code of Practice applies to water systems and equipment under the control of Schools and Functions other than Estates. This may include irrigation and misting systems, laboratory equipment and constructed experiments, water curtains in spray or coating booths, machinery cooling systems, art installations, theatrical or performance equipment producing sprays, mists or aerosols, food production equipment producing sprays, coatings or mists, recreational equipment, etc.

This Code of Practice applies to equipment at the University's campuses, farms, within glasshouses and polytunnels, or at fieldwork sites.

### 3 RESPONSIBILITIES

**Heads of Schools/Functions are responsible for :**

- Appoint competent persons to help them comply with the requirements set out in the Approved Code of Practice, L8; and take responsibility for managing the risks.
- Ensure that departmental equipment is maintained to the standard necessary for the control of legionella.
- Keep servicing and maintenance records of water systems and departmental equipment;
- Provide suitable and sufficient resources to enable compliance with the *Policy* document
- Facilitate any monitoring or inspection work for departmental water systems and equipment.
- Ensure that no modifications/alterations or additions to water systems are carried out, unless written approval is obtained from the Estates Duty Holder.
- Notify the Estates Duty Holder of any equipment that requires permanent fixture to the water supply.
- Carrying out a risk assessment to establish any potential risks and implement measures to either eliminate or control the risks.
- Inform the University's Health & Safety Services Director at the earliest possible opportunity if a Legionnaires Disease outbreak occurs.

**Estates are responsible for:**

- Appointing through employment the legionella Duty Holder and Responsible Person and providing them with suitable and sufficient resources to carry out their duties.
- Maintenance of fixed water systems which are considered to be part of the fabric of each building and ensuring water systems comply with Approved Code of Practice, L8.
- Reviewing any new requests for water systems and equipment and authorising in writing within a reasonable time.

**Responsible Person (Water quality consultant) is responsible for:**

- Providing competent and professional advice upon request to Heads of Schools/Functions on legionella management and making sure the University complies with its legal duties.

- Liaison with all Stakeholders and monitor the quality of work carried out by the University's specialist water treatment contractors.
- Maintaining and updating the University's *"Control of Legionella Bacteria Within Water Systems Policy document"*.

**Specialist water treatment contractor (SMS) where appointed will be responsible for:**

- Upon request conducting risk assessments, carrying out routine monitoring, testing, chlorination and pasteurisation for water quality.
- Liaison with all stakeholders and ensuring compliance with the Approved Code of Practice, L8.

**HSCs are responsible for:**

- Supporting and advising Heads of Schools/Functions and their nominated competent persons in carrying out risk assessments for their water systems and equipment and making them aware of their roles and responsibilities.

**H&SS are responsible for:**

- Reviewing and publishing this Code of Practice on "The control of legionella in departmental water systems & equipment".
- Reporting under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), any cases of legionellosis of an employee who has worked on water systems or equipment that are likely to be contaminated with legionella.
- Upon request assisting HSC in providing support and advising Schools/Functions on their water systems and equipment.

## **4 REQUIREMENTS**

### **4.1 Avoid creating or adopting new water systems and equipment**

Schools/Functions should avoid creating or adopting new water systems or equipment. If this is not possible Heads of Schools/Functions should seek advice from the Estates Duty Holder/Responsible Person before creating or adopting new water systems and equipment.

It is strongly advised that Schools/Functions should come to an agreement with Estates to adopt and take responsibility for the installation, maintenance and management of new School/Function water systems or equipment including stand alone water systems.

New water systems and equipment may only be used once the Estates Duty Holder/Responsible Person has provided authorisation in writing.

## 4.2 Appoint competent persons to assist the Head of School/Function

Head of School/Function responsible for managing the legionella risk in water systems or equipment of Schools/Functions, should appoint a competent person to help them take responsibility for managing the risks and comply with the requirements set out in the Approved Code of Practice, L8;

It is strongly advised to appoint the University's specialist water treatment contractor to act as the Schools/Functions competent person and take responsibility for managing the risks to help to comply with their health and safety duties. All such nominations or appointments should be made in writing. If no such nominations or appointments are made, it will be assumed that the Head of School/Function will be retaining the day-to-day responsibility for the management of these tasks.

The competent person must be given suitable information, instruction, and training to ensure they are competent to carry out the role and enable them to understand the nature of the risks and to undertake their duties in a safe manner.

People nominated to undertake this role need to have access to all equipment and areas within the Head of Schools/Functions' control to undertake the risk assessment process and subsequent development of control measures and written schemes on the Head of Schools/Functions' behalf.

## 4.3 Identify & assess the source of risk

The competent person for the School/Function will need to identify all water systems or equipment where water is either used or stored. A risk assessment will need to be made of each piece of equipment to identify whether one or more of the risk factors are present.

The risk assessment must also identify those persons at risk, for example because of their duties in respect of use, cleaning, adjustment, or maintenance of relevant items of equipment. Sampling for legionella is not normally required or recommended unless the need is identified by the risk assessment.

The following list taken from the "*HSG 274 Legionnaires disease: Technical guidance Part3: The control of legionella bacteria in other risk systems*" provides examples of the types of systems that may present a foreseeable risk of legionella exposure.

This list is not exhaustive but examples of these types of systems include, but are not limited to:

- ultrasonic humidifiers/foggers
- misting devices used for humidifying vegetables, meat and other food products
- spray humidifiers
- air washers, wet scrubbers, particle and trivial gas scrubbers;
- water softeners
- emergency showers, eye wash and face wash fountains

- sprinkler and hose reel systems
- spa pools
- whirlpool baths
- horticultural misting systems
- vehicle washers including automatic washers for cars, buses, lorries and railway rolling stock
- powered dental equipment
- fountains and decorative water features including those on display for sale
- non-disposable nebulisers used for respiratory therapy
- industrial effluent treatment plants
- irrigation systems
- fire, dust and odour suppression systems
- paint spray preparation equipment
- tunnel pasteurisers and similar equipment
- lab bench sinks
- fit-up hoses to outlets

If you conclude that there is no reasonably foreseeable risk or the risks are low and are being properly managed to comply with the law, your assessment is complete. You may not need to take any further action at this stage, but any existing controls must be maintained and the assessment reviewed regularly in case anything changes in your system.

#### **4.4 Managing the risk identified**

The prevention and maintenance schedule must be operated in such a way that exposure to any contaminated aerosols is either prevented, or (if prevention is not possible), minimised. Note that exposure minimisation must not rely on the routine use of respiratory protective equipment (R.P.E.). There are no items of R.P.E. that are certified to provide protection against infection by airborne biological agents, as only one viable organism/contaminated droplet of water may be sufficient to cause infection.

The highest risk of colonisation or contamination of equipment will arise where water is stored or recirculated in the critical temperature range of 20–45°C (peaking at 37 °C), but temperatures outside this range may also present a risk. Equipment producing sprays of fine droplets of water will create the greatest risk of exposure.

#### **4.5 Preventing or controlling the risk**

You should first consider whether you can prevent the risk of legionella by looking at the type of water system or equipment you need and identify whether it is possible to replace the water system or equipment with one that poses less or no risk. The key point is to design, maintain and

operate your water system or equipment under conditions that prevent or adequately control the growth and multiplication of legionella.

If a potential legionella hazard is identified, then the risk assessment needs to consider whether the process could aerosolise or create droplets that could allow infection; in other words, a credible and relevant exposure risk be created.

Following the risk assessment, appropriate control measures must be put in place. In most cases, this would be by the establishment of a suitable cleaning and/or maintenance schedule, which may also involve the use of suitable biocides.

The equipment manufacturer should be consulted regarding "suitability" of any biocide being considered for use. Note that the use of biocides will require a COSHH assessment before being used.

It is important to control the risks by introducing measures that will both prevent or inhibit proliferation of the organisms in the water and reduce exposure to water droplets as much as possible.

The extent and complexity of any required control measures will vary from system to system depending on the level of risk. If you identify a risk that you are unable to prevent, you must introduce a course of action ie a written control scheme, that will help you to manage the risk from legionella by implementing effective control measures which could include:

- your system, eg develop a schematic diagram
- who is responsible for carrying out the assessment and managing its implementation
- the safe and correct operation of your system
- what control methods and other precautions you will be using
- what checks will be carried out, and how often will they be carried out, to ensure the controls remain effective

You should:

- ensure that the release of water spray is properly controlled
- avoid water temperatures and conditions that favour the growth of legionella and other micro-organisms
- ensure water cannot stagnate anywhere in the system by keeping pipe lengths as short as possible or removing redundant pipework
- avoid materials that encourage the growth of legionella (The Water Fittings & Materials Directory references fittings, materials, and appliances approved for use on the UK Water Supply System by the Water Regulations Advisory Scheme)
- keep the system and the water in it clean
- treat water to either control the growth of legionella (and other microorganisms) or limit their ability to grow
- monitor any control measures applied
- keep records of these and other actions taken, such as maintenance or repair work

Should there be any significant change including building use or occupancy which may affect the water system or equipment the risk assessment and control measures will need to be reviewed and any necessary changes implemented.

## 5 RECORDS & RETENTION REQUIREMENTS

Heads of Schools/Functions will ensure records of servicing, inspection and maintenance of water systems and equipment are kept for at least 5 years. Records should be available for review when requested and should include details of the following:

- a. Person or persons responsible for conducting the risk assessment and managing and implementing the written scheme
- b. Significant findings of the risk assessment
- c. Written control scheme and details of its implementation
- d. Details of the state of operation of the system, ie in use/not in use
- e. Results of any monitoring inspection, test or check carried out, and the dates
- f. If a biocide is used records should be kept of all tests carried out, together with the results of the tests, and details of any changes made to the biocide level

## 6 TRAINING

Heads of Schools/Functions will be responsible for arranging suitable information, instruction and training to all staff and competent persons responsible for managing the legionella risk in water systems and equipment of their Schools/Functions,

If Heads of Schools/Functions are in doubt about training, they should contact the legionella Responsible Person for Estates as identified in "*Control of Legionella Bacteria Within Water Systems Policy document*" for advice.

## 7 REVIEW & AUDIT

The competent person for the School/Function should review all water systems or equipment identified using or storing water at least every 12 months. This include risk assessments, records of servicing, inspection and maintenance of water systems and equipment

Should there be any significant change including use or occupancy of any water system or equipment the risk assessment and control measures will need to be reviewed and any necessary changes implemented.

The legionella Responsible Person as identified in the "*Control of Legionella Bacteria Within Water Systems Policy document*" will be responsible for carrying out audits of water systems and equipment owned by Schools/Functions.

## 8 RELEVANT LEGISLATION

- [Health and Safety at Work Act 1974](#)
- [Management of Health and Safety at Work Regulations 1999](#)
- [Reporting of Injuries, Diseases and Dangerous Occurrences Regulation 2013](#)
- [Control of Substances Hazardous to Health Regulation 2002](#)

## 9 GUIDANCE AND ADDITIONAL INFORMATION

- ["Control of Legionella Bacteria Within Water Systems Policy document"](#) produced by Estates

The HSE have produced the following documentation and technical guidance to assist in complying with the regulatory requirements:

- [Approved Code of Practice & Guidance \(L8 - Legionnaires' disease: the Control of legionella bacteria in water systems\)](#)
- [HSG 274 Part 3: The control of legionella in other risk systems](#)
- [Legionnaires' disease: A brief guide for dutyholders](#)

### Guidance: Control procedures of departmental equipment and water systems

Examples of departmental equipment and water systems include:

- Laboratory water baths;
- Water-jacketed incubators;
- Departmental water purification equipment
- Items of susceptible equipment in University-owned buildings
- Items of susceptible equipment that are the responsibility of Estates Maintenance and the Specialist Water Quality Contractors
- Vending machines that are not permanently plumbed into the building water system

## Control procedures

Recommendations for specific items of departmental equipment are:

### Laboratory water baths recirculating or storing water between 20–45 °C

If possible, the water bath should be thermally disinfected on a monthly basis, by increasing the temperature to >60°C and maintaining the increased temperature for 30 minutes. After treatment, the water should be disposed of to drain without splashing, and the bath thoroughly cleaned and descaled before being refilled with deionised or distilled water.

Using deionised or distilled water will reduce the accumulation of limescale, which can harbour biofilms / Legionella organisms. If thermal disinfection is not possible and the volume of water contained is large, it may be impracticable to regularly drain the water. In such cases, the use of a chemical biocide may be necessary – the manufacturer of the water bath should be consulted to identify suitable chemicals that are compatible with the equipment. In all cases, measures must be taken to prevent splashing both during use and cleaning/ maintenance.

Laboratory water baths operating in the critical temperature zone are liable to support a thriving population of Legionella and even baths operating at a lower temperature (<20°C) may become contaminated but the growth rate of the organisms is reduced. Baths regularly operated at temperatures > 55°C are normally free of Legionella.

Normally, the risk of dissemination of contaminated water droplets is low, but if a stirrer or recirculation Pump is fitted to the water bath and the water level is allowed to drop to expose the top of the stirrer paddles, then there is an increased risk of splashing and aerosol generation. Older-style shaking water baths also present a risk of aerosol generation

### Water jacketed incubators

Water-jacketed incubators contain water which is normally held at the operating temperature of the incubator. This is normally only ever drained if the incubator is moved to a new position, or repair is required. The water contained within the jacket may be in place for years, and may become heavily contaminated by biofilms and Legionella, as the water within the jacket is normally static.

During normal operation, topping-up of the water jacket may be the only routine operation that is undertaken. This operation presents a minimal risk of exposure to contaminated aerosols, for example, when the filling-port is opened. By contrast, if the incubator has to be moved, or the water-jacket drained down for repair, then there is a greater potential for exposure to contaminated aerosols.

This operation must be done in such a way that splashing and generation of aerosols is minimised. A flexible hose should be attached to the drain port, and the drainage water directed into the waste pipe of a sink. Flushing deionised water through the water jacket should minimise recolonisation. When the jacket is refilled to bring the equipment back into use, deionised or distilled water should be used. Many such incubators have a copper water jacket, which may in itself have an initial biocidal action against Legionella and so minimise recolonisation.

However, note that biocidal action requires the presence of free Copper ions, usually at a pH of 5.5 or less. Once water in the jacket has been in place for several weeks, the copper will be covered in a thin oxide film, which will prevent any further dissociation of copper ions into the water

### Departmental water purification equipment

Most Departmental water purification equipment (such as water softeners - see Section 4.10 of the *Control of Legionella policy document*) are permanently plumbed into the water supply for the building. Such systems would normally be the responsibility of Estates Maintenance, as they are considered to be part of the building fabric. Departmental staff may however be involved in the routine regeneration of resins in the equipment, and they must be made aware of the possibility that the waste water arising during regeneration may be contaminated by Legionella. Disposal of the waste water must be effected without splashing or aerosol generation

Servicing or maintenance of such units is frequently under a maintenance Contract with the manufacturer of the equipment: the manufacturer's recommendations should be followed. The results of any water quality control checks required by the equipment manufacturer must be recorded and returned to ESTATES Maintenance.

In some cases, specific items of equipment may be purchased with their own integral water purification systems. Such systems must not be plumbed into the building water supply without prior approval from Estates.

The manufacturer's recommendations and instructions should be followed if cleaning and routine maintenance is undertaken by Departmental staff. The results of any quality checks must be recorded and returned to the Estates Legionella Duty Holder.

Examples include units to provide ultra-pure water for analytical instruments in laboratories, reverse osmosis units; hollow-fibre cartridge water purifiers etc.

Normally, the ultra-pure or High Quality (HQ) water produced by the unit is not liable to be contaminated: it is the "feed" side of the unit which may become contaminated by the growth of a biofilm, especially if the water velocity through the unit is low. In a cartridge unit for example, development of a biofilm would be evident from the reduction in flow and increase in pressure required to generate a given volume of ultra-pure water. The manufacturer's instructions should be followed for cartridge / membrane regeneration, but operators must be made aware of the probability of Legionella contamination in the flush water. Splashing and aerosol generation must be avoided when disposing of the effluent.

#### **Items of susceptible equipment in University-owned buildings**

There may be several types of equipment to which this description applies, and where the equipment is the property of the building occupant (tenant). Unless the tenant has an arrangement with Estates to undertake maintenance of the equipment, the responsibility for ensuring that the equipment remains free from risk of colonisation by or dissemination of Legionella remains with the building tenant.

#### **Items of susceptible equipment that are the responsibility of Estates Maintenance and the Specialist Water Quality Contractors**

Equipment such as emergency drench showers and emergency spray heads in laboratories are the responsibility of Estates Maintenance, who will arrange for risk assessment and any associated control measures such as regular flushing (normally undertaken by Estates Maintenance or by the Specialist Water Quality Contractor).

IF Departmental staff are involved in flushing of emergency showers/spray heads, the flushing operation must be undertaken in such a way that creation of aerosols is avoided, and any potentially contaminated water discharged to drain without splashing. A suitable system of work should be identified by the risk assessment.

Vending machines that are not permanently plumbed into the building water system,

Note that some equipment such as vending machines dispensing drinks may well be under a maintenance contract from the manufacturer/ supplier. The terms of the contract should be carefully studied to examine whether (for example) routine cleaning is included. See also the "*Control of Legionella Bacteria Within Water Systems Policy*" document" section 4.9 produce by Estates.