



UNIVERSITY OF  
BIRMINGHAM

**Health and Safety Policy**

**The Control of Legionella Bacteria  
in Water Systems**

**UHSP/24/CLBWS/08**

This document sets out in more detail the arrangements for compliance with University Health and Safety Policy at Budget Centre level and it gives guidance on how these requirements may be met. This document forms a part of the University Health and Safety Policy. It has been approved by the Environment, Health and Safety Executive Committee, in consultation with the Joint Safety Advisory Committee, and it will be subject to review.

The purpose of this Policy and guidance is to prevent anyone contracting Legionnaires' Disease from contaminated water systems. In addition to the main hot and cold water supply networks in the University, water systems includes machine tool coolant systems, spa baths, showers, dental equipment, pumped recirculation systems, etc.

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# CONTENTS

	PAGE
INTRODUCTION	1
Aim of the Policy	1
Background information	1
How Legionnaires' disease is prevented	1
Management of legionella	1
Scope of the Policy and Guidance	1
Responsibilities	1
Further information and advice	2
POLICY	
Heads of Budget Centre	2
Director of Estates	3
Individuals	3
GUIDANCE	
Prevention and Elimination of sources of Risk	4
Identifying and Assessing Sources of Risk	4
Routine Maintenance	4
Purging Systems	5
APPENDIX	
1 <i>The Notification of Cooling Towers and Evaporative Condensers Regulations 1992</i>	6
2 Action in Case of an Outbreak of Legionnaires Disease	6

# The Control of Legionella Bacteria in Water Systems

UHSP/24/CLBWS/08

## INTRODUCTION

### Aim of the Policy

The policy is aimed at preventing anyone contracting "Legionnaires' Disease" by effectively maintaining and using in a safe condition, the water systems owned or controlled by the University.

### Background information

Legionnaires' disease is a potentially fatal pneumonia caused by legionella bacteria. It is the most well known and serious form of a group of diseases known as legionellosis. Other similar (but usually less serious) conditions include Pontiac fever and Lochgoilhead fever.

Infection is caused by breathing in small droplets of water, usually as an aerosol, contaminated by the bacteria. The disease cannot be passed from one person to another. Everyone is potentially susceptible to infection but some people are at higher risk e.g. those over 45 years of age, smokers and heavy drinkers, those suffering from chronic respiratory or kidney disease, and people whose immune system is impaired.

Legionella bacteria are common in natural water courses such as rivers and ponds. They survive low temperatures and thrive at temperatures between 20°C-45°C if the conditions are right, e.g. if a supply of nutrients is present such as rust, sludge, scale, algae and other bacteria. Legionella bacteria are killed by high temperatures. Since legionella bacteria are widespread in the environment, they may contaminate and grow in other water systems such as cooling towers and hot and cold water services.

### How Legionnaires' disease is prevented

The disease is prevented by minimising the chances of people being exposed to the legionella bacteria. This is done by managing water systems to ensure that conditions do not exist for the legionella bacteria to thrive and minimising the use of equipment that can produce an aerosol spray. That is:

- Preventing the build up of stagnant water by good design, removing or draining unused parts of water systems or regularly running water systems;
- Keeping water systems clean by preventing the build up of rust, sludge, scale and algae;
- Keeping the water temperature below 20°C or above 45°C.

In order to do this a robust management scheme is required to manage water systems.

### Management of legionella

Legislation places an explicit duty on the University to manage the risk from legionella. This includes:

- Identifying, assessing and minimising sources of risk.
- Preparing schemes (or courses of action) for preventing and controlling the risk.
- Implementing and managing prevention measures.
- Appointing a person(s) to take managerial responsibility for the required actions and the implementation and supervision of operational procedures.
- Monitoring and checking to ensure prevention methods are effective.
- Keeping up to date records of the monitoring and checking work undertaken.
- Periodically reviewing and monitoring the arrangements.
- Notifying the local authority (via the Estates Office) of any cooling towers or evaporative condensers that the University may have. (See Appendix)

### Scope of the Policy and Guidance

This policy and guidance sets out the University's arrangements for managing legionella.

## Responsibilities

The majority of water systems are associated with the University's buildings and infrastructure. The Estates Office is responsible for the management of the arrangements to control legionella risks in these systems.

Additionally, although water outlets (e.g. taps) are generally the responsibility of the Estates Office, whether they are used or not is only known by the local Budget Centre. In order to assist Estates, Policy requires Budget Centres to notify the Estates Office of any redundant outlets (e.g. taps) that they are aware of so they can be removed from the water distribution system or drained down.

Policy requires infrequently used outlets to be run at least once a week. It is the responsibility of local Budget Centres to identify the outlets concerned to ensure this happens, either by doing it themselves or notifying the Estates Office who will assist in advising or making arrangements for a suitable regime to be implemented.

Certain Budget Centres will have equipment which have water systems associated with them. These Budget Centres are responsible for controlling any legionella risks associated with these systems. Examples are recirculation systems including pumps, machine tool coolant systems, spa baths, dental equipment, showers, humidifiers, etc.

The Policy refers to '**Responsible Person(s)**'. This person(s) must be appointed if there is a need to manage a water system where there is a need to control legionella. For the University's infra structure this will be a member of the Estates Office and for Budget Centre equipment a member of the respective Budget Centre's staff. (See Policy for more details.)

## Further information and advice

Further information about the policy can be obtained from the Health and Safety Unit, e-mail [healthandsafety@bham.ac.uk](mailto:healthandsafety@bham.ac.uk).

Budget Centres should notify their respective Estates Area Maintenance Officer to arrange the removal of redundant outlets and pipe work, and for assistance in arranging for infrequently used outlets to be discharged.

## Note

One of the controls to minimise the risk of legionella forming is to have water at above 50°C at outlets. At these temperatures there is a potential risk of scalding. Where this is high (e.g. showers) thermal control valves should be installed. Signage may be appropriate in other situations, e.g. wash hand basins etc.

# POLICY

**Heads of Budget Centre must make arrangements, for water systems under their control, to ensure:**

### ***Water Systems Design and Control Measures***

- Water systems are designed and constructed to minimise the risk of legionella forming and to enable easy cleaning and maintenance;
- appropriate controls are provided for items of equipment identified in risk assessment that may produce an aerosol or pose a risk of exposure to legionella (see Table 1);
- where taps, showers and other hot and cold water outlets, *which could create and disseminate breathable droplets, or could cause water stagnation to occur* are not in regular use they are either:
  - run once a week for at least five minutes; or
  - if weekly flushing is difficult, the stagnant and possibly contaminated water in these parts of the system be purged to drain before the outlets are used (see Guidance). Consideration should be given to the removal of such parts;
- the Estates Office is notified of all redundant water outlets and associated pipe work for removal or drain down, where possible;

### ***Risk Assessment***

- suitable and sufficient legionella risk assessments are carried out for all water systems to identify if there is a reasonably foreseeable risk of exposure to legionella and appropriate control measures necessary;
- each risk assessment is reviewed regularly or whenever there is a reason to suspect that an assessment is no longer valid, for example, when there is a change of use of a building in which the water system is installed or modifications to Budget Centre equipment;

#### ***Responsible Person(s)***

- a person(s) is appointed, and a record kept of this appointment, to take managerial responsibility for the completion of the risk assessments and for the preparation of all precautionary measures and supervision of operational procedures;

#### ***Routine Maintenance***

- water systems are inspected and maintained in accordance with the schedules in Table 1;
- safe systems of work are established, where necessary.

#### ***Record Keeping***

- records are kept of:
  - schematic drawings of each system;
  - those responsible for conducting the risk assessments;
  - the significant risk assessment findings;
  - written schemes of maintenance and details of their implementation;
  - the results of all monitoring, inspections, tests and checks;

#### ***Information, Training and Equipment***

- staff receive legionella competency training, where appropriate;
- personal protective equipment is provided for those staff when required;

#### ***Liaison with Other Budget Centres***

- liaise with other Heads of Budget Centres and agree responsibilities in areas where there could be confusion over who is responsible for a part of a water system;

#### ***In the Event of an Outbreak of Legionnaires Disease Traced to the University***

- co-operate fully with the appropriate authorities (see appendix 2);

#### ***Cooling Towers and Evaporative Condensers***

- the Estates Office is notified of any cooling towers or evaporative condensers (see Appendix 1).

#### ***Unoccupied Properties***

- the Estates Office, Planning Function, is advised of properties which have been, or are likely to be, taken out of use for one month or more (this will enable arrangements to be made, if practicable, to drain down the water systems);

### **The Director of Estates, in addition to the above, must make arrangements to ensure:**

- for water systems under Estates Office control and when notified by budget centres,
- the removal or drain down, where practicable, of all redundant water outlets and associated pipework;
- when notified by budget centres, that suitable advice and assistance is given in setting up regimes for infrequently used outlets to be run at least once a week;
- the management of the risk of exposure to legionella in unoccupied buildings;
- the Local Authority is notified of any cooling towers or evaporative condensers that the University may have.

### **Individuals must:**

- co-operate in the implementation of this policy;
- bring to the attention of their Head of Budget Centre any situation that they become aware of which may result in the proliferation of legionella bacteria and the formation of aerosols.



# GUIDANCE

## Prevention and Elimination of sources of Risk

Does a water based cooling system need to be used? The presence of legionella is not possible if water is not used. Can dry cooling be used instead?

### *Design of Water Systems*

Good design of water systems will minimise the ability of legionella bacteria to grow. The principles of good design are:

- to ensure water flows regularly through pipework;
- to reduce to a minimum unavoidable pipe branches with closed ends and disconnect or remove non-essential standby equipment;
- avoid water temperatures between 20 and 45°C;
- reduce stored water to a minimum;
- minimise heat loss/gain, e.g., by insulating pipework and storage tanks;
- use materials that are easily disinfected and that do not support growth of microorganisms;
- ease of disinfection, e.g., provide suitable access points in a system and parts that are easily dismantled or removed.

## Identifying and Assessing Sources of Risk

Specialised knowledge is not necessarily needed to carry out a legionella risk assessment for a simple water system. However, for complex systems expert help and guidance will be necessary. Going through the checklist below should be within the competence of existing Budget Centre staff.

### *Checklist*

- is the water temperature between 20 and 45°C?
- are there areas where stagnant water occurs, e.g. pipes to infrequently used (less than once a week) outlets, e.g. showers, taps, washing machines, dishwashers etc?
- is there debris or material in the system which could act as a nutrient or harbour bacteria, e.g. rust, sludge, scale?
- are there thermostatic mixing valves set at a favourable temperature for legionella growth?
- are there susceptible people who may be exposed to a contaminated aerosol?

Answering 'yes' to any of the above in the checklist suggests there may be a risk of legionella exposure which should be appropriately managed. Policy then requires a 'responsible person' to be appointed to carry out legionella risk assessments and implement maintenance regimes.

If there is uncertainty consult the Health and Safety Unit.

## Routine Maintenance

Precautions to prevent the risk of exposure are predominately centred around a water temperature regime which is carefully maintained and regularly monitored. Other measures can include regular treatment, cleaning and disinfection programmes. Treatment of water systems is usually done by adding chemicals that prevent legionella-favourable conditions from arising, to prevent:

- corrosion (anodic and cathodic inhibitors);
- scale formation (scale inhibitors);
- fouling (dispersants and surfactants);
- microbiological activity (biocides).

Manual cleaning and disinfection (using oxidising biocides) of systems are also necessary.

Table 1 below gives examples and will assist Budget Centres in deciding on any necessary maintenance and control arrangements.

**Table 1**

<b>System/Service</b>	<b>Task</b>	<b>Frequency</b>
Machine tool coolant systems	Clean and disinfect storage and distribution system. Drain if out of use.	Six monthly
Experimental Rigs	Minimise 'dead legs'. Clean and disinfect storage and distribution system if temperature of water is regularly between 20 and 45°C. Drain if out of use.	Six monthly
Experimental Rigs	If more than one distribution pump: Change over pumps regularly, i.e. at least weekly.	Weekly
Spa baths	Check filters - sand filters should be backwashed.	Daily
	Check water treatment - pools should be continuously treated with an oxidising biocide.	Three times daily
	Clean and disinfect entire system.	Weekly
Horticultural misting systems.	Clean and disinfect distribution pipework, spray heads and make-up tanks including all wetted surfaces, desiccating as necessary.	Annually
Dental equipment	Drain down and clean.	At the end of each working day
Shower heads	Run for at least five minutes. Dismantle, clean and de-scale showerheads and hoses.	Weekly Quarterly
Emergency showers and eye wash sprays	Flush through and purge to drain.	Weekly
Taps and other water outlets (hot and cold)	Run for at least five minutes. (May be part of normal activities. Little used outlets may have to be run especially.)	Weekly

**Further, more detailed guidance** published by the Health and Safety Executive, can be found in:

*Table of temperature control checks for control of legionella; and*

*Checklist: hot and cold water services*

Available at:

[http://www.hse.gov.uk/foi/internalops/sims/pub\\_serv/07-12-07/appendix3.htm](http://www.hse.gov.uk/foi/internalops/sims/pub_serv/07-12-07/appendix3.htm)

## **Purging systems**

When purging a part of a water system it is important that the procedure is carried out with the minimum production of aerosols, e.g.

### **For taps**

Additional piping may be used to purge contaminated water to a drain. The flow rate should be slow to start, gradually building up over five minutes to full flow. Both the hot and cold supply should be run (if appropriate).

### **For showers**

If possible the shower head should be lowered into the shower tray (or bath) so that it is as near to the drain as possible. If the shower head cannot be lowered far enough to reach the shower tray it should be lowered

into a bucket. If this is not possible a plastic bag can be attached to the shower head with a hole cut in the bottom corner to allow the water to escape. The flow rate should be slow to start, gradually building up over five minutes to full flow. Both the hot and cold supply should be run.

It is advisable that this procedure should not be carried out by anyone in the higher risk groups such as those whose immune system is impaired.

## **APPENDIX 1**

### ***The Notification of Cooling Towers and Evaporative Condensers Regulations 1992***

Those who have, to any extent, control of premises, have a duty under the regulations to notify the local authority in writing of details of 'notifiable devices'. These consist of cooling towers and evaporative condensers, except where they contain water that is not exposed to the air and where the water and electricity supply are not connected. Notification forms are provided by the local authority or Health and Safety Executive. All University notifications will be made on behalf of Budget Centres by the Estates Office.

If a tower becomes redundant and is decommissioned or dismantled, this also is required to be notified.

## **APPENDIX 1**

### **Action in Case of an Outbreak of Legionnaires Disease**

Due to the nature of Legionnaires' Disease it is difficult to immediately trace its source if an outbreak occurs. It is the responsibility of the Local Authority to declare an outbreak. There is no duty on the University to report cases of Legionnaires' disease.

Once an outbreak has been declared the Local Authority will put their incident plan into operation. The Local Consultant in Communicable Disease Control, Environmental Health Officer or relevant officers from the enforcing authorities (either Health and Safety Executive or Local Authority) may make a site visit.

As part of the outbreak investigation and control the enforcing authority may request:

- the shutdown of relevant equipment/process;
- taking of water samples;
- staff health records;
- co-operation with any investigation.

Emergency cleaning of water systems that have been implicated in the outbreak will have to take place as soon as possible.

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