

Notes

Legionella – Hot & Cold Water Systems

References:

HSE: The Control of Legionella Bacteria in Water Systems : ACOP & Guidance L8
HELA LAC 46/1: Legionnaires Disease
HSE: Controlling Legionella in Nursing and Residential Care Homes

Risk Assessment

1. Identify and assess source of risk –
 - can bacteria multiply
 - water held between 20-45°C
 - water droplets are generated
 - susceptible people
2. Prepare a scheme for preventing or controlling the risk.
3. Implement, manage and monitor precautions.
4. Record precautions and results of control measures.
5. Named responsible person.

Legal Standards

COSHH
HASWA
RIDDOR – Notifiable Disease
Management Regulations
Notification of Cooling Towers & Evaporative Condensers Regulations 1992

Prevention

- Scheme of system
- Correct and safe operation of system
- Precautions
- Checks that precautions are suitable and frequency of checks is correct
- Remedial action to rectify any of the above

Control

- Control of release of water spray
- Avoidance of water temperature and conditions that favour growth
- Avoid water stagnation
- Avoid materials that harbour bacteria and micro-organisms or provide nutrients
- Maintenance of cleanliness of system and water in it

- Use of water treatment techniques – these may be highly toxic. Chemicals/biocides must not enter drinking water. Seek further guidance on use and disposal
- Action to ensure correct and safe operation and maintenance of system

Record Keeping

- Name of person(s) responsible for conducting risk assessment, managing and implementing the written scheme
- Record significant findings of risk assessment
- Written scheme of plans
- Keep records for 3 years including current year
- Keep records for 5 years if they are the result of any monitoring, inspections or test. Records should be dated and signed

Design of Hot and Cold Water Systems

Hot and cold water systems should be designed to aid safe operation by preventing or controlling conditions which permit the growth of legionella and to allow easy cleaning and disinfection. In particular, the following points should be considered:

- (a) Materials such as natural rubber, hemp, linseed oil-based jointing compounds and fibre washers should not be used in domestic water systems. Materials and fittings acceptable for use in water systems are listed in the directory published by the Water Research Centre.
- (b) Low-corrosion materials (copper, plastic, stainless steel etc) should be used where possible.
- (c) Water storage tanks should be fitted with covers which comply with the Water Regulations and insect screens fitted to any pipework open to the atmosphere, e.g the overflow pipe and vent.
- (d) Multiple linked storage tanks should be avoided because of operational difficulties due to possible unequal flow rates and possible stagnation.
- (e) Accumulator vessels on pressure-boosted hot and cold water services should be fitted with diaphragms which are accessible for cleaning.
- (f) The use of point-of-use hot water generators, with minimal or no storage for remote low use outlets, should be considered.
- (g) Showers (excluding safety showers) should not be fitted where they are likely to be used less than once a week.
- (h) Thermostatic mixing valves (TMVs) should be sited as close as possible to the point of use. Ideally, a single TMV should not serve multiple tap outlets but, if they are used, the mixed water pipework should be kept as short as possible. Where a single TMV serves multiple shower heads, it is important to ensure that these showers are flushed frequently.
- (i) TMVs should not be used with low-volume spray taps in buildings with susceptible populations.

Hot Water Systems

- (a) The storage capacity and recovery rate of the calorifier should be selected to meet the normal daily fluctuations in hot water use without any drop in the supply temperature. The vent pipe from the calorifier which allows for the increase in volume of the water should be large enough and suitably sited on the water circuit, to prevent hot water being discharged. However, if discharged, the water should go to a tun dish.
- (b) Where more than one calorifier is used, they should be connected in parallel and if temperature is used as a means of control, each should deliver water at a temperature of at least 60°C. All calorifiers should have a drain valve located in an accessible position at the lowest point of the vessel so that accumulated sludge can be drained easily and the vessel emptied in a reasonable time. A separate drain should be provided for the hot water system vent (particularly if the feed to the calorifier incorporates a non-return valve).
- (c) If temperature is used as the means of controlling legionella, the hot water circulating loop should be designed to give a return temperature to the calorifier of 50°C or above. The pipe branches to the individual hot taps should be of sufficient size to enable the water in each of the hot taps to reach 50°C within 1 minute of turning on the tap. Thermometer/immersion pockets should be fitted on the flow and return to the calorifier and in the base of the calorifier in addition to those required for control.
- (d) In larger calorifiers, the fitting of time controlled shunt pumps should be considered to overcome temperature stratification of stored water.
- (e) Hot water distribution pipes should be insulated.
- (f) If temperature is used as a means of controlling legionella, trace heating should be provided on non-recirculatory hot water distribution pipework where the discharge temperature would not otherwise reach 50°C in 1 minute.

Cold Water Systems

- (a) Low use outlets should be installed upstream of higher use outlets to maintain frequent flow, e.g a safety shower can be installed upstream of a WC. Access ports should be provided on cold water tanks for inlet valve maintenance, inspection and cleaning (more than one hatch may be needed on large tanks).
- (b) The volume of cold water stored should be minimised; it should not normally be greater than one day's water use. Multiple cold water storage tanks require care in the connecting piping to ensure that the water flows through each of the tanks, so avoiding stagnation in any one tank.
- (c) The cold water storage tank should be sited in a cool place and protected from extremes of temperature by thermal insulation. Piping should be insulated and kept away from hot ducting and other hot piping to prevent excessive temperature rises in the cold water supply; typically not more than 2°C increase should be allowed. The pipework should be easy to inspect so that the thermal insulation can be checked to see that it is in position and has remained undisturbed.

Action in the Event of an Outbreak

1. Legionnaires disease is not notifiable under public health legislation.
2. An outbreak is defined by the Public Health Laboratory Service (PHLS) as two or more confirmed cases of legionellosis occurring in the same locality within a six month period. It is the responsibility of the Proper Officer for the declaration of an outbreak. The Proper Officer is usually a Consultant in Communicable Disease Control.
3. Local authorities will have established incident plans to investigate major outbreaks of infectious disease including legionellosis. These are activated by the Proper Officer.
4. The local authority, CCDC or EHO acting on their behalf (often with health and safety enforcing authority) may make a visit.
5. As part of the outbreak investigation and control, the following requests and recommendations may be made by the enforcing authority:
 - (a) To shut down any processes which are capable of generating and disseminating airborne water droplets and keep them shut down until sampling procedures and any remedial cleaning or other work has been done. Final clearance to restart the system may be required.
 - (b) To take water samples from the system before any emergency disinfection being undertaken. This will help the investigation of the cause of the illness. The investigating officers from the local authority/ies may take samples or require them to be taken.
 - (c) To provide staff health records to discern whether there are any further undiagnosed cases of illness, and to help prepare case histories of the people affected.
 - (d) To co-operate fully in an investigation of any plant that may be suspected of being involved in the cause of the outbreak. This may involve, for example:
 - (i) tracing of all pipework runs;
 - (ii) detailed scrutiny of all operational records;
 - (iii) statements from plant operatives and managers;
 - (iv) statements from water treatment contractors or consultants.

Enforcement Action

- EPA 1990 or HSW Section 2 or 3 to prevent a premises from allowing legionella to be emitted from the premises.
- NB: It may be difficult to identify the source of infection, the widespread presence of the bacterium; care must be taken to establish the proper evidence of risk. Even if a system is found to be contaminated, it cannot be assumed that this is the source of infection.
- HASWA & COSHH may be used for enforcement. This should normally be considered where a water system which may give rise to risk is found, and/or where a suitable and sufficient COSHH assessment has been carried out, or where necessary precautions to control the risks have not been taken in accordance with the ACOP. Refer to enforcement policy.