



Advice on Legionnaires Disease:

The Approved Code of Practice – Legionnaires Disease – the control of legionella bacteria in water systems (L8) was reviewed and the fourth edition published in December 2013.

The document is aimed at duty holders, including employers, those in control of premises and those with health and safety responsibilities for others, to help them comply with their legal duties in relation to legionella. These include identifying and assessing sources of risk, preparing a scheme to prevent or control risk, implementing, managing and monitoring precautions, keeping records of precautions and appointing a manager to be responsible for others.

This fourth edition of the ACOP and guidance on regulations contains revisions to simplify and clarify the text. The main changes are removing Part 2 & Part 3, the technical guidance, which is published separately as HSG274 and giving the following issues ACOP status:

- risk assessment;
- the specific role of the appointed competent person, known as the 'responsible person';
- the control scheme and what it should include;
- review of control measures;
- duties and responsibilities of those involved in the supply of water
- systems including suppliers of services, designers, manufacturers, importers, suppliers and installers of water systems.

What is Legionnaires Disease?

Legionellosis is a collective term for diseases caused by legionella bacteria including the most serious legionnaires' disease, as well as the similar but less serious conditions of Pontiac fever and Lochgoilhead fever. Legionnaires' disease is a potentially fatal form of pneumonia and everyone is susceptible to the infection. The risk increases with age, but some people are at higher risk, including the very young, people over 45, people already suffering from an illness (e.g. especially cancer, chronic respiratory or kidney disease, lung and heart disease or diabetes), people with an impaired immune system, smokers and heavy drinkers.

Legionnaires' disease is normally contracted by inhaling small droplets of water (aerosols), suspended in the air, containing the bacteria. It is important to control the risk by introducing measures which do not allow proliferation of the organisms in the water system and reduce, so far as is reasonably practicable, exposure to water droplets and aerosol.

Legionella Bacteria

Legionella bacteria occur naturally (in low numbers) in most natural sources of water and can survive at temperatures ranging from 6°C to 60°C. They can remain dormant at low temperatures and multiply readily at temperatures between 20°C and 45°C, (which is suitable for growth), providing they have a suitable supply of nutrients. Legionella bacteria are at their most virulent at 37°C. Legionella bacteria can obtain the nutrients that they need to multiply from a wide variety of sources, including algae, amoebae, sediment, sludge, scale, corrosion by-products, biofilms and other bacteria.

Requirement to have a risk assessment

Carrying out a legionella risk assessment and ensuring it remains up to date is required under the health and safety legislation and is a key duty when managing the risk of exposure to legionella bacteria. The requirement to have a risk assessment covers the person in control of the premises or responsible for the water systems in their premises. They have a legal duty to ensure that the risk of exposure to legionella bacteria is properly assessed and controlled. This duty extends to residents, guests, tenants and customers. It also covers those who have, to any extent, control of premises for work-related activities or the water systems in the building have a responsibility to those who are not their employees, but who use those premises.

Where a property has a number of occupiers the management contract should clearly specify who has responsibility for maintenance and safety checks, including managing the risk from legionella. Where there is no contract or agreement in place or it does not specify who has responsibility, the duty is placed on whoever has control of the premises and the water system in it, and in most cases, this will be the landlord themselves.

In estate management, it is increasingly common for there to be several duty holders in one building. In such cases, duties may arise where persons or organisations have clear responsibility through an explicit agreement, such as a contract or tenancy agreement.

The extent of the duty will depend on the nature of that agreement. For example, in a building occupied by one leaseholder, the agreement may be for the owner or leaseholder to take on the full duty for the whole building or to share the duty. In a multi-occupancy building, the agreement may be that the owner takes on the full duty for the whole building. Alternatively, it might be that the duty is shared where, e.g. the owner takes responsibility for the common parts while the leaseholders take responsibility for the parts they occupy. In other cases, there may be an agreement to pass the responsibilities to a managing agent. Where a managing agent is used, the management contract should clearly specify who has responsibility for maintenance and safety checks, including managing the risk from legionella. Where there is no contract or tenancy agreement in place or it does not specify who has responsibility, the duty is placed on whoever has control of the premises, or part of the premises.

All systems require a risk assessment, however not all systems will require elaborate control measures. A simple risk assessment may show that the risks are low and being properly managed to comply with the law (e.g. small domestic-type water systems). In such cases, further action may not be needed but it is important to review regularly in case of any changes and specifically if there is reason to suspect it is no longer valid. (para 25)

The ACOP states that a suitable and sufficient assessment must be carried out to identify and assess the risk of exposure to legionella bacteria from work activities and water systems on the premises and any precautionary measures needed. The duty holder is responsible for ensuring the risk assessment is carried out. The duty holder is either:

- the employer, where the risk from their undertaking is to their employees or others; or
- a self-employed person, where there is a risk from their undertaking to themselves or others; or
- the person who is in control of premises or systems in connection with work, where there is a risk from systems in the building, e.g. where a building is let to tenants, but the landlord keeps responsibility for its maintenance. (Para 28)

The duty holder must ensure that the person who carries out the risk assessment and provides advice on prevention and control of exposure is competent to do so. (Para 29).

The risk assessment must be regularly reviewed and specifically when there is reason to believe that the original assessment is no longer valid. The management and communication procedures should also be updated as appropriate. (Para 32)

The ACOP also states that before any formal health and safety management system for the water systems is implemented, the duty holder should carry out a risk assessment to identify the possible risks. (Para 33) The assessment also enables the duty holder to show they have considered all the relevant factors and the steps needed to prevent or control the risk. (Para 34)

Although the revised ACOP no longer states a review date, best practice would seem to be that the 2 year previously noted is being used as “regular”. However, if anything significant changes then the assessment should be reviewed sooner – this includes changes to the water systems and the persons in control.

Carrying out a the risk assessment

The risk assessment should consider all aspects of operation of the hot and cold water systems and while there will be common factors; the individual characteristics of each system should be taken into account. Site personnel who manage the systems to determine current operational practice should be consulted. The commissioning, decommissioning, periods of operation, maintenance, treatment and subsequent management of each individual aspect of operation will require review and validation to ensure site procedures are effective.

Control measures

These will be site specific and defined in the written scheme and in relation of the checklist in HSG274 Part 2 Table 2:1 and Part 3 Table. (reproduced at the end of this document).

Simple control measures can help manage the risk of exposure to legionella and should be maintained, such as:

- flushing out the system before letting the property;
- avoiding debris getting into the system (e.g. ensure the cold water tanks, where fitted, have a tight-fitting lid);
- setting control parameters (e.g. setting the temperature of the Calorifier to ensure water is stored at 60 °C);

- making sure any redundant pipework identified is removed;
- advising tenants to regularly clean and disinfect showerheads.

More complex systems will require more elaborate control measures.

Where the site has cold water storage tanks

An annual inspection of the cold water storage tank should be done to check its condition inside and outside, and the water within it. These inspections include checks on the condition inside and outside, and that the water, and water surface is clean and free from any visible, significant contamination. Tank lids should be closely fitted and in good condition and there should be insect and vermin screens on the overflow and warning pipes and any vents should be intact. There should be sufficient thermal insulation to the tank so that it protects from extreme temperatures. The cold water storage tanks are cleaned, disinfected and any faults rectified when necessary. If debris, heavy contamination, biofilms or traces of vermin are found, the inspection should be carried out more frequently. Suitable records should be instigated and maintained of all checks, including the results.

The supply and stored water temperature's within each tank should also be checked annually (summer) or as indicated by the temperature monitoring results.

Additionally whenever the building use pattern changes, a record of the total cold water consumption over a typical day should be established to confirm that there is reasonable flow through the tank and that water is turning over within a 24 hour period.

Where the site has hot water Calorifiers

Hot water supply should be distributed so that it reaches the outlets at 50°C (55°C for healthcare premises) within one minute. The minimum temperature at the most distant point should be 50°C /55°C (i.e. the temperature of the hot water as it returns to the Calorifier should not fall below 50°C). Where water temperatures are below 50°C after one minute of running any hot outlet a check of the temperature settings on the supply Calorifier should be made and the flow temperature increased if necessary.

Flow and return water temperatures should be checked monthly, with temperature settings being adjusted when required, to ensure flow above 60°C and return above 50°C (in healthcare premises above 55°C). Annual blow-down checks should be completed to monitor water quality and debris build-up, this should be increased if inspection findings indicate debris build up. The internal condition of each Calorifier should be checked annually, with de-scaling, cleaning and disinfection being completed when necessary.

Where more than one Calorifier is used, they should be connected in parallel and deliver water at a temperature of at least 60°C. The hot water circulating loop should be designed to give a return temperature to the Calorifier from each loop of at least 50°C.

Where the site has Combination Water Heaters (header tank)

The header tank internal condition should be inspected as part of the cold water storage inspection programme and the hot water tank interior condition should be checked annually. De-scaling, cleaning & disinfection should then be conducted if required. If cold water temperatures within the header tank are significantly higher than 20°C, then serious consideration should be given to the replacement of the unit with an alternative style of water heater. The internal condition of the hot water tank should be checked yearly, with de-scaling, cleaning and disinfection being completed when necessary.

Where the site has water heaters

Flow temperatures should be checked monthly with temperature settings being adjusted when required to ensure flow above 60°C so all outlets reach a minimum of 50°C (55°C within a healthcare premises) within one minute of running.

Where the site has point-of-use water heaters (15 litres and below)

Water heaters supply continuous hot water at a rate that is usually limited by their power rating, high flow rates through the units can result in warm water leaving the heater before reaching the target temperature.

Low storage volume heaters serving hot water outlets should be able to achieve a peak temperature of 50–60 °C and where the thermostat is set at these temperatures for this purpose, staff and other users should be informed not to adjust the heater. A unit which is not capable of achieving this, (e.g. a pre-set thermostat), should only be used where there is a very high turnover or an alternative control measure is in place.

Advices for tenants/ occupiers

All occupiers of areas with water supplies should be made aware of their responsibilities to maintain the water systems. All parties should take steps to ensure that each is fulfilling the legal responsibilities for the parts of the building over which they have control. The landlord should take steps, e.g. by contractual arrangements, to ensure that tenants are complying with their duties because if the tenant's water system becomes contaminated with legionella bacteria it may act as a reservoir, seeding it back down into the systems for which the landlord has responsibility.

Where occupiers are responsible for items within their units then they need to be informed of the recommendations made within the risk assessment.

Landlords should have an expectation that their tenants will play their part in ensuring control measures are maintained. They should communicate the results of the risk assessment to their tenants. Other information may include:

- informing tenants of potential risk of exposure to Legionella and its consequences;
- advising tenants of any action which arises from the landlords risk assessment if appropriate;
- ensuring tenancy agreements define who is responsible for the water systems and who to advise if the hot water system is not heating properly, if the cold water is not running cold or if there are any other issues with the system;
- advise tenants to use or flush outlets weekly.

Empty or unoccupied property

The risk from Legionella may increase if the property is unoccupied even for a short period of time, if water is left in the systems. Weekly use or flushing of all outlets is recommended to keep water flow through the system and avoid stagnation. If a property is empty for an extended period then consideration should be given to draining the system. In simple systems that have been drained down, the water systems should be flushed through thoroughly before use and this should be done as close to occupation as possible to minimise the possibility of microbial growth. If the property then remains empty we would recommend that a flushing regime is instigated. When outlets are not in regular use, weekly flushing of these devices for several minutes can significantly reduce the risk of legionella proliferation in the system. Once started, this procedure has to be sustained and logged, as lapses can result in a critical increase in legionella at the outlet.

If a property is empty for longer than 30 days where the water services are isolated and drained down we would recommend that a mains injection chlorination, tank clean (if applicable) and chlorination of all associated hot & cold water outlets is undertaken before it is re-occupied.

Failure to comply

The ACOP has been approved by the Health and Safety Executive, with the consent of the Secretary of State. It gives practical advice on how to comply with the law. If the advice it gives is followed then you will be doing enough to comply with the law in respect of those specific matters on which the Code gives advice. Alternative methods to those set out in the Code may be used in order to comply with the law. However, the Code has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the Code, you will need to show that you have complied with the law in some other way or a Court will find you at fault.

What next?

We would advise that a Legionella risk assessment is carried out if there is not a current one in place for the site (within 2 years). If there is a document in place, review the contents to ensure that the written scheme and control measures are being maintained and monitoring is within the recommended guidelines. Review the current water hygiene programme if required. Confirm that the management structure and communication pathways are current and up-to-date. Confirm that there is a current schematic plan. Ensure that documents relating to the checks being carried out are stored and kept for 5 years.

Further reading

Legionnaires' disease: The control of legionella bacteria in water systems. Approved Code of Practice L8 (Fourth edition) HSE Books 2013 www.hse.gov.uk/pubns/books/l8.htm

Check List for hot and cold water systems Table 2.1 (from HSG274 Part 2)

Service	Action to take	Frequency
Calorifiers	Inspect Calorifier internally by removing the inspection hatch or using a boroscope and clean by draining the vessel. The frequency of inspection and cleaning should be subject to the findings and increased or decreased based on conditions recorded	Annually, or as indicated by the rate of fouling
	Where there is no inspection hatch, purge any debris in the base of the Calorifier to a suitable drain. Collect the initial flush from the base of hot water heaters to inspect clarity, quantity of debris, and temperature	Annually, but may be increased as indicated by the risk assessment or result of inspection findings
	Check Calorifier flow temperatures (thermostat settings should modulate as close to 60°C as practicable without going below 60°C). Check Calorifier return temperatures (not below 50°C, in healthcare premises not below 55°C)	Monthly
Hot Water Services	For non-circulating systems: take temperatures at sentinel points (nearest outlet, furthest outlet and long branches to outlets) to confirm they are at a minimum of 50°C within one minute (55°C in healthcare premises)	Monthly
	For circulating systems: take temperatures at return legs of principal loops (sentinel points) to confirm they are at a minimum of 50°C (55°C in healthcare premises). Temperature measurements may be taken on the surface of metallic pipework.	Monthly
	For circulating systems: take temperatures at return legs of subordinate loops, temperature measurements can be taken on the surface of pipes, but where this is not practicable, the temperature of water from the last outlet on each loop may be measured and this should be greater than 50°C within one minute of running (55°C in healthcare premises) If the temperature rise is slow, it should be confirmed that the outlet is on a long leg and not that the flow and return has failed in that local area	Quarterly (ideally on a rolling monthly rota)
	All HWS systems: take temperatures at a representative selection of other points (intermediate outlets of single pipe systems and tertiary loops in circulating systems) to confirm they are at a minimum of 50°C (55°C in healthcare premises) to create a temperature profile of the whole system over a defined time period	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control
POU water heaters (no greater than 15 litres)	Check water temperatures to confirm the heater operates at 50-60°C (55°C in healthcare premises) or check the installation has a high turnover	Monthly to six monthly, or as indicated by the risk assessment
Combination water heaters	Inspect the integral cold water header tanks as part of the cold water storage tank inspection regime, clean and disinfect as necessary. If evidence shows that the unit regularly overflows hot water into the integral cold water header tank, instigate a temperature monitoring regime to determine the frequency and take precautionary measures as determined by the findings of this monitoring regime	Annually
	Check water temperatures at an outlet to confirm the heater operates at 55-60°C	Monthly

Checklist Continued

Service	Action to take	Frequency
Cold water tanks	Inspect cold water storage tanks and carry out remedial work where necessary	Annually
	Check the tank water temperature remote from the ball valve and the incoming mains temperature. Record the maximum temperatures of the stored and supply water recorded by fixed maximum/minimum thermometers where fitted	Annually (Summer) or as indicated by the temperature profiling
Cold water services	Check temperatures at sentinel taps (typically those nearest to and furthest from the cold tank, but may also include other key locations on long branches to zones or floor levels). These outlets should be below 20°C within two minutes of running the cold tap. To identify any local heat gain, which might not be apparent after one minute, observe the thermometer reading during flushing	Monthly
	Take temperatures at a representative selection of other points to confirm they are below 20°C to create a temperature profile of the whole system over a defined time period. Peak temperatures or any temperatures that are slow to fall should be an indicator of a localised problem	Representative selection of other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for legionella control
	Check thermal insulation to ensure it is intact and consider weatherproofing where components are exposed to the outdoor environment	Annually
Showers and spray taps	Dismantle, clean and descale removable parts, heads, inserts and hoses where fitted	Quarterly or as indicated by the rate of fouling or other risk factors, e.g. areas with high risk patients
POU filters	Record the service start date and lifespan or end date and replace filters as recommended by the manufacturer (0.2 µ membrane POU filters should be used primarily as a temporary control measure while a permanent safe engineering solution is developed, although long-term use of such filters may be needed in some healthcare situations)	According to manufacturer's guidelines
Base exchange softeners	Visually check the salt levels and top up salt, if required. Undertake a hardness check to confirm operation of the softener	Weekly, but depends on the size of the vessel and the rate of salt consumption
	Service and disinfect	Annually, or according to manufacturer's guidelines
Multiple use filters	Backwash and regenerate as specified by the manufacturer	According to manufacturer's guidelines

Checklist Continued

Service	Action to take	Frequency
<i>Infrequently used outlets</i>	<p>Consideration should be given to removing infrequently used showers, taps and any associated equipment that uses water. If removed, any redundant supply pipework should be cut back as far as possible to a common supply (e.g. to the re-circulating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding 'T'</p> <p>Infrequently used equipment within a water system (i.e. not used for a period equal to or greater than seven days) should be included on the flushing regime</p> <p>Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain</p> <p>Regularly use the outlets to minimise the risk form microbial growth in the peripheral parts of the water system, sustain and log this procedure once started</p> <p>For high risk populations, e.g. healthcare and care homes, more frequent flushing may be required as indicated by the risk assessment</p>	Weekly, or as indicated by the risk assessment
<i>TMVs</i>	<p>Risk assess whether the TMV fitting is required, and if not, remove where needed, inspect, clean, descale and disinfect any strainers or filters associated with TMVs</p> <p>To maintain protection against scald risk, TMVs require regular routine maintenance carried out by competent persons in accordance with the manufacturer's instructions. There is further information in paragraphs 2.152 - 2.168</p>	Annually or on frequency defined by the risk assessment, taking account of any manufacturer's recommendations
<i>Expansion vessels</i>	Where practical, flush through and purge to drain	Monthly - six monthly, as indicated by the risk assessment

Checklist for recommended frequency of inspection for other risk system

System/service	Task	Frequency
Ultrasonic humidifiers/ foggers and water misting systems	If the equipment is fitted with UV lights, check to ensure the effectiveness of the lamp (check to see if within working life) and clean filters	Six monthly or according to manufacturer's instructions
	Ensure automatic purge of residual water is functioning	As part of machinery shut down
	Clean and disinfect all wetted parts	As indicated by risk assessment
	Sampling for Legionella	As indicated by risk assessment
Spray humidifiers	Clean and disinfect spray humidifiers and make-up tanks, including all wetted surfaces, de-scaling as necessary	Six monthly
	Confirm the operation of non-chemical water treatment (if present)	Weekly
Air washers, wet scrubbers, particle and trivial gas scrubbers	Clean and disinfect air washers, wet scrubbers, particle and trivial gas scrubbers and water storage tanks	As indicated by risk assessment
	Apply, monitor, and record the results of the water treatment	As indicated by risk assessment
Water softeners	Clean and disinfect resin and brine tank – check with the manufacturer what chemicals can be used to disinfect resin bed	As recommended by manufacturer
Emergency showers, eyebaths and face-wash fountains	Flush through and purge to drain ensuring three to five times the volume of water in the stagnant zone is drawn off	As indicated by risk assessment, but at least every six months
	Inspect water storage tanks (where fitted)	Monthly
	Clean and disinfect shower heads, nozzles, roses, 'Y' strainers, and water storage tanks (where fitted)	Quarterly, or more frequently, as indicated by the risk assessment
Sprinkler and hose reel systems	When witnessing tests of sprinkler blow-down and hose reels ensure that there is minimum risk of exposure to aerosols	As directed
Spa pools	Detailed HSE/PHE guidance on the management of spa pools is available in Management of spa pools: Controlling the risks of infection	
Whirlpool baths	Clean, flush and disinfect air channels Remove, flush and clean jets	As indicated by risk assessment
Horticultural misting systems	Clean and disinfect distribution pipework, spray heads and make-up tanks including all wetted surfaces, de-scaling as necessary	Quarterly or as indicated by risk assessment
Dental equipment	Drain down, clean, flush and disinfect all system components, pipework and bottles	Twice daily (typically at the start and finish of each working day). Disinfectant contact time as recommended by the manufacturer
	Clean storage bottles, rinse with distilled or Reverse Osmosis (RO) water, drain, and leave inverted overnight	Daily
	Take microbiological measurements – refer to <i>Decontamination Health Technical Memorandum 01-05: Decontamination in primary care dental practices</i>	As indicated by risk assessment

System/service	Task	Frequency
Vehicle wash systems	Check and clean filtration systems, collection tanks and interceptor tanks and check treatment system	As indicated by risk assessment
	A biocide programme should be in place and should be monitored and controlled similar to the standards required in cooling towers	
	Clean and disinfect system and ensure sludge tanks are emptied	
	Sample for Legionella	Initially to establish that control has been achieved and thereafter quarterly or as indicated by risk assessment
Fountains and water features	Clean and disinfect ponds, spray heads and make-up tanks including all wetted surfaces, de-scaling as necessary	As indicated by risk assessment, and depending on condition
Industrial process water system	Conduct a risk assessment of each system, preferably using an assessment team comprising members knowledgeable in Legionella management and control, as well as those familiar with the design and operation of the system	Monitoring, inspection, and testing frequencies to be determined as indicated by the risk assessment
	Devise a control scheme based on this risk assessment	

Appendix 3.1 Checklist for recommended frequency of inspection for other risk systems. HSG274 Part 3.