



Legionnaires' Disease

Is the Covid-19 shutdown putting your workers at additional risks from Legionnaires' disease?

Background

In 1976, an outbreak at the Bellevue Stratford Hotel of a mystery "pneumonia-like illness" sickened 221 persons, causing 34 deaths. The outbreak was first noticed among The American Legion (the nation's largest wartime veterans service organisation) gathered to celebrate their 58th annual convention.

On the 2nd night some members started to fall ill, as time went on and following the end of the convention, more attendees fell ill with some dying and others becoming critically ill. The story made national headlines for many weeks following the outbreak due to it happening during America's U.S. bi-centennial celebration.

It was first thought to be a new form of influenza and the Ford administration announced plans for a mass vaccination after repeated warnings that this was going to become a mass epidemic.

On January 18th, 1977, the causative agent was identified as a previously unknown bacterium subsequently named Legionella.

Legionellosis

Is the collective name given to the pneumonia like illness caused by the Legionella bacteria, including the most serious, Legionnaires' disease. Legionella enters the lung either by aspiration of contaminated water or inhalation of aerosolized contaminated water. In the lung, the bacteria are consumed by macrophages, a type of white blood cell, inside of which the Legionella bacteria multiply causing the death of the macrophage. Once the macrophage dies, the bacteria are released from the dead cell to infect other macrophages.

When water systems are in normal use, the risk of infection is diminished because the bacteria cannot multiply as effectively in water that is regularly agitated.

With water systems in many UK workplaces standing idle or operating on reduced capacity during the pandemic, it will be important to make sure that your premises don't become a breeding ground for trouble when they are reoccupied.





The incidence of Legionella bacterium

Legionella bacteria are common and can be found naturally in environmental water sources such as rivers, lakes and reservoirs, usually in low numbers. They can survive a wide variety of environmental conditions. The bacteria have been found in water at temperatures between 6°C and 60°C. Water temperatures in the range 20°C to 45°C seem to favour their growth and the organisms do not appear to multiply below 20°C and will not survive above 60°C. They may however remain dormant in cool water and multiply only when water temperatures reach a suitable level.

The bacteria also require a supply of nutrients to multiply. Sources can include commonly encountered organisms within the water system itself such as algae, amoebic and other bacteria. The presence of sediment, sludge, scale and other material within the system, together with biofilms, are also thought to play an important role in harbouring and providing favourable conditions in which the Legionella bacteria may grow.

A biofilm is a thin layer of micro-organisms that may form slime on the surfaces of equipment in contact with the water.

People at risk

The bacterium is not transmissible from person to person and most people exposed do not become ill.

Those most at risk include alcoholics, smokers, cancer sufferers, and people suffering from, diabetes and chronic respiratory or kidney disease. But healthy people can also be infected. Most reported cases have been in people aged between 40 and 70. Men are more likely to be affected than women.

Action

There are different types of water systems and these will require different actions. The exact control measures should be detailed in your risk assessment. They will also depend on factors such as whether you have sole occupancy or work in a shared building, or if the premises are subject to any form of external building management agreement.

- If you have not done so already, you should conduct or have conducted a risk assessment to identify potential Legionella hazards and appropriate control measures in the workplace.
- If you already have a Legionella risk assessment, it will need to be reviewed to ensure it protects people when supplies are reinstated or returned to use.
- If the water system is still used regularly, maintain the appropriate measures to prevent Legionella growth.



The information below identifies areas for consideration within the workplace as identified in current enforcement guidance and should be used as a tool to assist the organisation in conducting/reviewing or having conducted by a specialist water treatment company (where water systems are high risk or complex) the risk assessment.



Service & Action to Take	Frequency	By Whom	Completed Date and Initials
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, but may be increased as indicated by the risk assessment or result of inspection findings.		
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.			
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).	Monthly		
Hot Water Services (HSW)			
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.			
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	Quarterly (ideally on a rolling monthly rota).		



Service & Action to Take	Frequency	By Whom	Completed Date and Initials
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.			
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 all other sentinel outlets considered on a rotational basis to ensure the whole system is reaching satisfactory temperatures for Legionella control.		
Point of Use (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.		
Record the service start date and lifespan or end date and replace filters as recommended by the manufacturer (0.2 µm 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.		
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	Annually		



Service & Action to Take	Frequency	By Whom	Completed Date and Initials
precautionary measures as determined by the findings of this monitoring regime.			
Check water temperatures at an outlet to confirm the heater operates at 50-60 °C.	Monthly		
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.		



Service & Action to Take	Frequency	By Whom	Completed Date and Initials
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 users.		
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.		
Infrequently used Outlets			
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 recirculating pipework or the pipework supplying a more frequently used upstream fitting) but preferably by removing the feeding 'T'.			
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.			



Service & Action to Take	Frequency	By Whom	Completed Date and Initials
Flush the outlets until the temperature at the outlet stabilises and is comparable to supply water and purge to drain.	Weekly, or as indicated by the risk assessment.		
Regularly use the outlets to minimise the risk from microbial growth in the peripheral parts of the water system, sustain and log this procedure once started.			
For high-risk populations, e.g. healthcare and care homes, more frequent flushing may be required as indicated by the risk assessment.			
Thermostatic Mixer Valves (TMVs)			
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.	Annually or on a frequency defined by the risk assessment, or in accordance with the manufacturer's instructions.		
To maintain protection against scald risk, TMVs require regular routine maintenance carried out by competent persons in accordance with the manufacturer's instructions.			
Expansion Vessels			
Where practical, flush through and purge to drain.	Monthly to six monthly, as indicated by the risk assessment.		
Bladders should be changed according to the manufacturer's guidelines or as indicated by the risk assessment.			