

A guide to maintaining and safely reopening your business post COVID19

Managing hot and cold water systems to minimise the Risk of Legionnaires' Disease

This guide will help you to access information to stay safe and protect others by implementing practical measures to minimise cases of pneumonia caused by the water-borne Legionella bacteria: Legionnaires' disease.

While water systems in businesses may not seem to be high on the priority list during the COVID-19 pandemic, it is important ensure all water systems are managed safely at this time. Water systems that are not being used and maintained effectively are very likely to have increased levels of bacteria present, including the Legionella bacteria.

The groups of people susceptible to Legionnaires' disease are similar to those most susceptible to serious complications from COVID-19 infection:

- those with serious underlying health conditions
- those over 50 years
- smokers

In addition, there is evidence from China (Zhou et al, 2020) that around half of COVID-19 fatalities had experienced a secondary infection. Furthermore, patients could be at increased risk of secondary infections, such as Legionnaire's disease, for some months after recovery.

Reference: Zhou et al, 2020 [www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30566-3/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30566-3/fulltext)

This guide is based upon current advice at the time of publication (28 April 2020).

Symptoms of COVID19 can include a new continuous cough, fever shortness of breath or difficulty breathing and may indicate more serious disease (especially pneumonia).

Symptoms of Legionnaires' disease can be very similar to COVID-19 and include high temperature, feverishness and chills; cough; muscle pains; headache; and pneumonia: <https://www.hse.gov.uk/legionnaires/symptoms.htm>

Legionnaires' disease can be contracted by inhaling small droplets of water (aerosols) suspended in the air containing Legionella bacteria. Legionella bacteria are naturally present in water systems. Unless water systems are maintained, the closure of buildings due to COVID19 restrictions will result in growth of Legionella to a level which may cause illness when buildings are reopened.

Of particular note, the warmer summer months will lead to a greater proliferation of Legionella bacteria in water systems that are not being used or maintained.

All hot and cold water systems need to be considered: shops; hair dressers; beauty salons; offices; hotels; gyms; sports clubs; golf clubs; hotels; pubs; clubs; restaurants; camp sites and anywhere that has a water supply and is currently shut down. Volunteer-run premises need to be included.

The European Society of Clinical Microbiology and Infectious disease (ESGLI) has issued specific guidance on managing Legionella in buildings and offices that have shut down due to the pandemic. The following key summarised information is taken from their guidance (produced on 27 March 2020) and the full document can be downloaded here:

www.escmid.org/fileadmin/src/media/PDFs/3Research_Projects/ESGLI/COVID_buidling_water_system_guidance_27_3_20_v4_DS_pk.pdf

Advice and guidance is changing rapidly in the COVID19 pandemic and you are advised to check for updates to this information (current 28 April 2020)

www.escmid.org/research_projects/study_groups/legionella_infections/

UK updates on COVID-19 are available through <https://www.gov.uk/>

Note: This guidance is not intended to cover complex water systems such as cooling towers, swimming pools, spa pools and other water systems. Specialist guidance is available and referred to under point 9 of this document.

1 Why this guidance?

Legionnaires' disease is a type of pneumonia which can cause serious illness in susceptible individuals. In Europe, just under 1 in 10 of those who acquire Legionnaires' disease die. Legionnaires' disease is caused by the growth of Legionella in building water systems which are not adequately managed.

Aerosolised water from systems containing Legionella can cause Legionnaires' disease to vulnerable persons. During the COVID-19 pandemic there will be an increased number of people with greater susceptibility to Legionnaires' disease due to a compromised respiratory system during or after infection with the virus.

The COVID-19 pandemic has resulted in the closure of many buildings. Closure of buildings, parts of buildings or their restricted use, can increase the risk for Legionella growth in water systems and associated equipment including evaporative air conditioning systems, spa pools / tubs, jet washers and other equipment if they are not managed adequately.

2 Why is this guidance important?

It is a legal requirement under the Health and Safety at Work etc. Act 1974 (HSWA) for employers, business owners and landlords to manage the risks of exposure to Legionella.

It is very important that you manage and keep all water systems safe whilst closed or during partial shutdowns for the future health and safety of guests, visitors and staff. The procedures you follow now will have an impact on how soon you can open your facilities without causing harm to health.

3 What type of buildings is this guidance aimed at?

The guidance is relevant to all public buildings including retail outlets, offices, hairdressers, beauty salons, hotels, pubs, clubs, restaurants, sports centres/clubs, gyms, residential buildings as well as campsites and cruise ships.

4 Who is this guidance document aimed at?

This guidance is aimed at individuals responsible and/or accountable for managing and maintaining a building and for local authority enforcement officers, as a source of reference.

Under the Approved Code of Practice [The control of Legionella bacteria in water systems \(L8\)](#) a 'competent person' is needed to manage your water system and ensure the system is safe when you reopen your business.

This should be someone with sufficient authority, competence, knowledge of the system, and experience. It may be a combination of yourself, one or more workers and/or someone from outside your business.

5 How does Legionella grow in water systems?

Legionella occurs naturally in water systems, even in potable (drinking) water systems. Legionella will grow to levels which may cause infection where the temperature of the water is between 20 °C and 50 °C (even just parts of the system)

Other risk factors which encourage the growth of Legionella:

- Stagnant water or water with poor flow through the system or any parts of the system.
- Use of materials which provide protective niches and nutrients for growth and biofilm formation including sludge, scale, rust, algae and other organic matter which may collect in the system pipework and calorifier particularly during periods of stagnation.
- Contamination from poor quality source water (non-potable water).

Where systems are poorly designed or poorly maintained, biofilms (or slime) develop where Legionella can survive for prolonged periods. Biofilms protect the Legionella bacteria from disinfectants and high temperature pasteurisation which may be used to disinfect water systems.

Biofilms, if allowed to develop, will quickly reseed the water system with Legionella bacteria even after treatment. It is far better to maintain a water system than to try and treat a water system which has gone out of control.

6 How do you get Legionnaires' Disease?

Legionnaires' disease is acquired when tiny droplets of water (aerosolised water) containing the Legionella bacteria are breathed into the lungs.

The illness mostly affects people over 50 years, those with underlying health conditions, those with impaired immunity and smokers. Where levels of the Legionella bacteria are allowed to increase to unsafe levels in water systems and where there is the potential for splashing and aerosols, there is a risk of susceptible individuals contracting Legionnaires' disease.

7 Where should I start in order to reopen my business?

If you have not done so already, you should be thinking about this and taking action now, whilst in shut down and before reopening is imminent. Ideally water systems should have been flushed and maintained throughout, however, some buildings will not have been decommissioned (or partially decommissioned) safely.

Initially:

- Determine/clarify who is responsible and who is the 'competent person'.
- Where necessary, identify a competent contractor to assist. It is recommended that you assess a potential contractor to ensure their competence for your water system: The Legionella Control Association can assist in finding competent contractors: www.legionellacontrol.org.uk/
- Ensure the risk assessment is reviewed and updated to include where water system usage has been reduced or shut down.
- Document how remaining staff, visitors, etc. will be protected when on site during the lock down and when the business reopens.
- Identify all additional elements of the water system and how these will be restarted safely, for example, humidifiers, jet washers, indoor fountains, etc.

National guidelines can be found at:

www.hse.gov.uk/legionnaires/index.htm

www.hse.gov.uk/legionnaires/workplace-risks.htm

8 How can I reopen safely immediately after shut down?

If you wish to remain safe to re-open immediately after the closure then you can do one of the following:

- A - Maintain your normal control regimes, including maintaining a hot water system.
- B - Close down the system without draining.
- C - Drain the system.

A. Maintain your normal control regimes

This is the most straight-forward option if someone can safely flush the system and the water heater is kept running.

- 1 - Maintain your normal control regime so that the hot water is circulating throughout all parts of the system and flow temperature is maintained at $\geq 60^{\circ}\text{C}$ and the return on all loops is at $\geq 50^{\circ}\text{C}$.
- 2 - The temperature reaches all outlets at $\geq 50^{\circ}\text{C}$ within one minute and the cold reaches $\leq 20^{\circ}\text{C}$ after running the outlet (normal flow, avoid splashing) for two minutes. If using a biocide, maintain target levels throughout all of the system.
- 3 - Flush gently (to reduce aerosols) all hot and cold outlets (showers and taps) at least weekly until they achieve the above temperatures. Where there are thermostatic mixer valves ensure the pipework feeding them achieves the same temperatures. Flush all WC cisterns, urinals, by-passes and any other points on the network
- 4 - Ensure drinking water storage tanks remain at 0.2 - 0.5ppm of free chlorine

- 5 - Adjust your monitoring regime to be able to verify these levels have been achieved at all sentinels and other little used outlets.

B. Close own the system without draining

If it is likely that the building is to be closed for more than a month, or you have made the decision not to heat your hot water for energy conservation or have no-one on site.

- 1 - Before closing the system down, turn off the calorifier (heated storage water tanks), drain from the base until the water runs clear, valve off the water supply and drain.
- 2 - Where the system has not been disinfected recently or there have been problems with temperature or biocide levels then consider carrying out a full system disinfection with flushing through to all outlets to achieve 50 ppm free chlorine or equivalent biocide for at least an hour.
- 3 - Flush through and refill and check the biocide is at the highest target normal operating level at the furthest outlets.

Restarting

- 4 - Carry out a full system disinfection of the cold-water system, flushing through to all outlets to achieve 50 ppm free chlorine or equivalent biocide for at least an hour checking that this level is achieved at the furthest outlets, top up when required.
- 5 - Flush out and refill the system to achieve maximum normal operating target levels of disinfection (equivalent to at least 0.2 ppm free chlorine).
- 6 - Refill and reheat the calorifier to 60°C. and when the calorifier/ storage water has been heated to 60°C throughout, open the valves and flush through all outlets taking care to avoid any scalding risk.
- 7 - Monitor temperatures and biocide levels where applicable, adjust where necessary, for at least 48 hours and then take Legionella samples from the sentinel outlets (microbiological samples taken before 48 hours following disinfection may give false negative results).
- 8 - When you are satisfied the hot and cold-water systems are under control then reopen the building.
- 9 - Ensure you keep all documentation for inspection: including the review and update of risk assessments (these can be annotated by hand) including monitoring data etc., with evidence of who carried out the monitoring, add time date and signature.
- 10 - Follow the advice for other additional waters systems or equipment as above.

C. Drain the system down

Any system which is drained, unless very small and simple and can be physically dried, will pose a risk when restarted as there will be remaining pockets of water and condensation which is sufficient to allow microorganisms including Legionella to grow.

- 1 - Carry out a full system disinfection flushing through to all outlets to achieve 50 ppm free chlorine or equivalent biocide for at least an hour and then drain.
- 2 - Before re-opening follow steps 4-10 as for option B, closing down the system without draining.

9 Are there other water systems that need to be considered?

Separate guidance is available for complex, specialist water systems such as swimming pools and spa pools:

[PWTAG temporary pool closure guidance](#)

[HSE HSG282 Spa Pool Systems](#)

Specialist support is needed for maintaining cooling towers and there is specialist advice for other complex water systems on the HSE website:

[The Control of Legionella Bacteria in Evaporative Cooling Systems](#)

[The Control of Legionella Bacteria in Other Risk Systems](#)

This guidance is not intended for specialist sites such as care homes, hospitals and dental surgeries. Separate guidance has been developed for such sites by the ESGLI and can be found at:

[European Study Group for Legionella Infections - link](#)

Please note

While every effort has been made to ensure the accuracy of the material contained in this publication, all water systems are individual in nature as a result of their design, materials and usage.

The author(s) do not accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting or refraining from acting, as a result of a matter contained in this publication.

This guidance is based on the European Society of Clinical Microbiology and Infectious disease guidelines (ESCMID) which were developed by experts from the European Study Group for Legionella Infections (ESGLI) including:- Dr Susanne Surman-Lee (Chair) (UK), Dr Vicki Chalker (UK), Dr Sebastian Crespi (Spain), Dr Birgitta de Jong (Sweden), Dr Jaana Kutsenov (Finland), Dr John V Lee (UK), Dr Maria Louisa Ricci (Italy), Mr Wilco van der Lugt (Netherlands), Dr Jimmy Walker (UK)

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Further Information, Legislation and Guidance

[HSE Legionella and Legionnaires' Disease web page](#)

[HSG274 Part 2 - The Control of Legionella Bacteria in Hot and Cold Water Systems](#)

[HSE Legionella & Legionnaires' Disease FAQs](#)

Legionnaires' Disease is a notifiable disease and Legionella spp. as well as COVID 19 are notifiable causative agents under The Health Protection (Notification) Regulations 2010 www.legislation.gov.uk/ukxi/2010/659/contents/made

See also www.gov.uk/guidance/notifiable-diseases-and-causative-organisms-how-to-report

Both Legionnaires' disease and COVID-19 are reportable under RIDDOR regulations if attributable to the workplace www.hse.gov.uk/riddor/

In England, Environmental Health Officers are involved in the investigation of notifications of Legionnaires' Disease in association with colleagues in Public Health England. Guidance is available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/768364/guidance_on_investigating_cases_clusters_and_outbreaks_of_legionnaires_disease.pdf

Environmental Health staff in Local Authorities enforce health and safety legislation in many premises whilst HSE colleagues enforce in manufacturing type premises, the split in responsibility is explained at www.hse.gov.uk/lau/lacs/23-15.htm

The CIEH, in association with Lewes District Council and Public Health England, produced a toolkit, for investigations undertaken under powers contained in the Public Health (Control of Disease) Act 1984, as amended by the Health and Social Care Act 2008. A suite of new Health Protection Regulations came into effect in April 2010, covering notifications, local authority powers and Part 2A Orders. Local Authority Environmental Health staff were the only people authorised to administer and enforce the Part 2A Orders, though emergency changes to legislation under current situation allows:

www.cieh.org/media/1998/health-protection-regulations-2010-toolkit.pdf

The Secretary of State had no powers to apply for a Part 2A order, to enforce quarantine or to place appropriate restrictions on individuals outside of this process prior to changes in the legislation The Health Protection (Coronavirus) Regulations 2020 www.legislation.gov.uk/ukxi/2020/129/regulation/4/made which authorised both the Secretary of State or a registered public health consultant for the detention of persons.

The revised version of The Health Protection (Coronavirus, Restrictions) (England) (Amendment) Regulations 2020 came into force on 22 April 2020

www.legislation.gov.uk/ukxi/2020/447/made and revises the original version of The Health Protection (Coronavirus, Restrictions) (England) Regulations 2020 which came into force 26th March 2020.

The law relating to control of Legionella in England is:

Health and Safety at Work etc. Act 1974

www.hse.gov.uk/legislation/hswa.htm

Management of Health and Safety at Work Regulations 1999

www.legislation.gov.uk/ukxi/1999/3242/regulation/3/made

Control of Substances Hazardous to Health Regulations 2002

www.hse.gov.uk/nanotechnology/coshh.htm