

# Mitigating the Risk of Building Water Systems

(Information following the Covid-19 lockdown)

## Introduction

As businesses return to buildings following the COVID-19 lockdown, it is important to ensure the safety of building water systems before occupancy resumes.

While restaurants, gyms, leisure centres, schools and other buildings have been unoccupied during the lockdown to prevent the spread of COVID-19, water left sitting in pipes could change in quality and so it is important to assess the state of the water systems in buildings before re-opening them.

Stagnant or standing water can cause conditions that increase the risk for growth and spread of Legionella, other biofilm-associated bacteria and harmful contaminants. When water is stagnant, hot and cold water temperatures can decrease or increase respectively to the Legionella growth range (20–50 degC). Stagnant water can also lead to low or undetectable levels of disinfectant, such as chlorine. It is therefore vital to ensure that water systems are safe to use after a prolonged shutdown to minimise the risk of Legionnaires' disease and other diseases associated with poor water quality.

For further information see HSE Guidance:

- [HSE Legionnaires' Guidance](#)

Information on site operating procedures and social distancing is available from:

- [Site operating procedures](#)
- [Social distancing in the workplace](#)

## Water Stagnation

When water is not drawn through a building's water system over an extended period, the water could become stagnant, which is normally prevented through regular water use, inducting fresh water from the public mains (typically containing disinfectant).

Indicators of stagnation include: a bad or 'off' taste; unpleasant odour; and/or discoloration. These factors can indicate bacteriological growth and/or pipe corrosion. Stagnation can support the accelerated growth of bio-slime, waterborne micro-organisms and pathogens, such as Legionella, as well as heavy metals which can cause harm to building occupants and users.

An empty system that has been drained results in very damp pipe work that contains oxygen. Over a period of time this will increase the corrosion risk inside the pipe work especially at compression joints. When the system is re-commissioned leaks may occur which can be difficult to trace and especially hard to repair.

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It is recommended that a competent person is appointed to oversee any plumbing and heating engineering work to ensure the integrity of the plumbing being commissioned. Commissioning in line with a Water Safety (Management) Plan should be carried out including pressure testing of all systems. The Water Safety Plan and policy should follow the guidance presented in the [BS 8680 Code of Practice](#).

For residential properties the following document applies: [PD 855468:2015 – Guide to the flushing and disinfection of services supplying water for domestic use within buildings and their curtilages](#), published by the British Standards Institution (September 2015).

Employers, the self-employed and people in control of premises, such as landlords, have a duty to identify and control risks associated with legionella. If a building was closed or has reduced occupancy during the coronavirus (COVID-19) outbreak, water system stagnation can occur due to lack of use, increasing the risks of Legionnaires' disease. Due to this increased risks of Legionella HSE has launched a new website (18 May 2020) at <https://www.hse.gov.uk/news/legionella-risks-during-coronavirus-outbreak.htm>.

## Flushing water systems

Flush your water system before your business or building reopens. Flush water through all points of use within the building before re-opening (e.g. showers, sinks, toilets).

Flushing procedures will vary depending on the building and may need to occur in sections (e.g. floors or individual rooms) due to facility size and water pressure. In some properties it is appropriate to flush plumbing systems on a weekly basis. It is important to document and keep up to date records of all such maintenance activities. The purpose of building flushing is to replace all water inside building piping with fresh water in line with the Water Safety Plan and Policy.

**Note:** when developing a flushing procedure, consideration should be given to any insurance policy requirements and restrictions which may be in place. Further information is available through the document entitled 'Managing Escape of Water Risk on Construction Sites' published by the Construction Insurance Risk Engineers Group (CIREG). In addition, further guidance on 'Competent Persons' is available from the Commissioning Specialists Association.

### Example procedure for flushing/re-commissioning of a building water supply system for resumption of operation

#### Step One:

Remove tap aerators, point-of-use filters, shower hoses and strainer baskets where possible. Once removed disinfect as required.

**Note 1:** their removal will allow the water flow rate to be faster and limit the amount of sediment trapped during flushing.

**Note 2:** their removal will give the opportunity to clean and descale them before they are re-installed.

#### Step Two:

Organise flushing to maximise the flow of water; for example:

- a) Open all cold water outlets to flush the service line and internal pipework taking care of mitigating suction phenomenon on furthest outlets (with large buildings flush parts of the system gradually working around the building);
- b) Open all hot taps and follow the procedure in a) above. Make sure blending/mixing valves and taps are opened for hot and cold systems alike.
- c) Flush all outlets individually, starting near where the water enters the building and moving systematically through the building to the most distant outlet;
- d) Record and document the outlets opened and the duration they were open for.

**Note:** Flush all the cold water pipework first, and then the hot water. Pasteurisation should also be considered prior to occupation especially with hot water secondary returns. However, it is important to check that the system materials are suitable to accommodate these higher temperatures.

### Step Three:

Run enough water through all outlets to replace all water inside building plumbing system (piping and stored water if provided) with fresh water. *Note: the required duration will vary based on pipework volume and outlet velocity.*

### Step Four:

Clean and/or replace all tap aerators, point-of-use filters, shower hoses and strainer baskets.

Additional precautions may be warranted if there is excessive disruption of limescale or if there are concerns about biofilm development. Remedial action that might be warranted would be to disinfect/flush through the plumbing system following PD 855468:2015 guidance (in respect of residential buildings). Alternative guidance, primarily aimed at buildings other than single family dwellings, is available in CIBSE TM13 and CIBSE Guide M.

## Additional considerations

### Water samples

Assess whether water samples should be taken prior to testing so that water wastage can be minimised.

### Floor drains

If the building has floor drains, pour water into the drain to make sure that the trap water seal is fully restored in order to keep sewer gases from entering the building. Trap water seals can be lost due to evaporation within unoccupied buildings.

**Note:** if there is a risk that the water seal is lost when returning to the building, caution must be taken when entering wet rooms as sewer gases could escape, potentially creating a dangerous environment with the presence of toxic / explosive gases.

### Building Services (HVAC/fire/electrical/gas systems etc)

Each building is different and depending on the duration that a building was shut down prior to lockdown, additional work may be necessary to ensure buildings are safely recommissioned before occupancy. If Solar Thermal systems are installed refer to the respective manufacturer's commissioning guidance before reinstatement. It is recommended that building supervisors ensure buildings are safely recommissioned by a competent person before occupancy where necessary. Further guidance on Coronavirus and HVAC is available from CIBSE as follows:

<https://www.cibse.org/coronavirus-covid-19/coronavirus-covid-19-and-hvac-systems>. Please check their website for latest guidance.

### Hotels and Leisure complexes

When systems have been shut down or not used in total or part, full system disinfection should be implemented (usually hyperchlorination) but in such instances, a specialist should be appointed to ensure that over chlorination does not occur. Guidance is available from recognised expert groups such as the document: 'ESGLI *Legionella* in buildings' water systems during the COVID-19 pandemic'; These guidelines have been developed specifically for hotels; <https://tinyurl.com/y8dez9dz>. If these guidelines are not deemed practical an alternative disinfection procedure is to be carried out under the supervision of a competent Water or Building Services Engineer.

### Pool hygiene and safety

Recommissioning should be undertaken in accordance with the pool manufacturer's guidance.

When recommissioning does occur it should include the thorough cleaning of pools and filters; dosing equipment for disinfectant, pH monitoring, flocculant; ensuring the integrity and correct pressures and flows of sand or other types of filter; checking pump and circulation rates; and, where applicable, the visual inspection for water slide safety. This should follow the [Code of Practice](#) published by the Pool Water Treatment Advisory Group (PWTAG).

### Chilled water and heating systems

Restart and recommissioning of closed-loop water systems providing chilled water or heating to the building, should be carefully undertaken following the recommendations of the service provider and guidance presented in BSRIA document [BG 50/2013 Water Treatment for Closed Heating and Cooling Systems](#).

Partially completed or installed closed-loop water systems should be continuously managed, including a series of inspection and monitoring tests following the service provider recommendations and guidance presented in BSRIA's newly updated guide [BG 29/2020 Pre-Commission Cleaning of Pipework Systems 6th edition](#).

### Further information

More information on the management of reactivating buildings is available here: [www.sfg20.co.uk](http://www.sfg20.co.uk)

### Competent Persons

Information about competent persons can be obtained from:

Chartered Institute of Plumbing and Heating Engineering – [www.ciphe.org.uk](http://www.ciphe.org.uk)

Chartered Institution of Building Services Engineers – [www.cibse.org](http://www.cibse.org)

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