

LEGIONELLA PREVENTION

Legionella is a bacterium that is known to cause legionnaires' disease which is deadly for approximately 1 in 10 people who get it. To pose a health risk, Legionella first must grow then it must be aerosolized. Once aerosolized, people who breath in the small, contaminated water droplets can become infected. Outbreaks occurring at Sport, Leisure, and Entertainment facilities can lead to considerable financial and reputational costs. The following checklist is intended to assist facilities to keep their employees and guests safe from Legionella.

LEGIONELLA PREVENTION PROGRAM

Operating Management Controls

1	<p>Develop a comprehensive water management program for your water system and devices that use water. As a part of this program, a strict record keeping policy should be developed and maintained to ensure that preventive measures are taking place in a timely manner</p> <p><i>Note: The Centers for Disease Control and Prevention (CDC) have developed a toolkit that provides step-by-step instructions on how to set up a water management program. See link below for the CDC Water Management Program toolkit:</i></p> <p>https://www.cdc.gov/Legionella/wmp/toolkit/index.html</p>
2	<p>Consider having the appropriate individual(s) within the organization go through a Legionella water management training program.</p> <p><i>Note: The CDC and partners offer a water management training program that aligns with industry standards on managing risk for Legionella bacteria. See link below for the PreventLD training program:</i></p> <p>https://www.cdc.gov/nceh/ehs/elearn/prevent-LD-training.html</p>

COMMON SOURCES OF INFECTION

Cooling Towers

	Issues	Inspection Type	Mitigation
1	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Temperature Permissive <input checked="" type="checkbox"/> Conditions for Bacteria Spread <input checked="" type="checkbox"/> Stagnation <input checked="" type="checkbox"/> No Disinfectant 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Visual Inspection <input checked="" type="checkbox"/> Check Disinfectant Levels <input checked="" type="checkbox"/> Check Temperature 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Operate at lowest possible temperature <input checked="" type="checkbox"/> Regular servicing, disinfection, and cleaning of system per manufacturers' recommendations and per local health regulations <input checked="" type="checkbox"/> Daily water treatments (oxidizing chemicals and biocides): <ul style="list-style-type: none"> ➤ pH – maintain per manufacturers' recommendations to prevent corrosion ➤ Disinfectants (e.g. chlorine, bromine) maintain residuals throughout each day to ensure bacteria is killed <input checked="" type="checkbox"/> Flush low-flow pipe runs and dead legs at least weekly <input checked="" type="checkbox"/> Heterotrophic colony count (HCC) testing every month or per local health regulations <input checked="" type="checkbox"/> Maintain copies of log sheets, test procedures, service reports, and test results <input checked="" type="checkbox"/> Legionella testing every three months or per local health regulations

Building Water Heater

	Issue	Inspection Type	Mitigation
2	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Temperature Permissive 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Check Temperature 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Ensure the water heater is maintained in accordance to manufacturers recommendations <input checked="" type="checkbox"/> Ensure water temperature is set to at least 140 degrees <p><i>Note: Higher temperatures can further reduce the risk of Legionella growth; however, the proper temperatures need to be set to prevent scalding.</i></p>

Sinks & Showers		
Issues	Inspection Type	Mitigation
3 <input checked="" type="checkbox"/> Stagnation <input checked="" type="checkbox"/> No Disinfectant	<input checked="" type="checkbox"/> Check Disinfectant Levels <input checked="" type="checkbox"/> Check Temperature	<input checked="" type="checkbox"/> Regularly clean water system components such as faucets, spray nozzles, and showerheads <input checked="" type="checkbox"/> Flush infrequently used water outlets on a regular basis <input checked="" type="checkbox"/> Clean and disinfect sink basins and shower floors on a regular basis <input checked="" type="checkbox"/> Drain any standing water and ensure sinks and floor surfaces remain dry when not in use
Hot Tubs & Spas		
Issues	Inspection Type	Mitigation
4 <input checked="" type="checkbox"/> Temperature Permissive <input checked="" type="checkbox"/> Conditions for Bacteria spread <input checked="" type="checkbox"/> No Disinfectant	<input checked="" type="checkbox"/> Visual Inspection <input checked="" type="checkbox"/> Check Disinfectant Levels	<input checked="" type="checkbox"/> Test disinfectant residual and pH in accordance to local health regulations or as often as hourly during heavy use <input checked="" type="checkbox"/> Back wash filters routinely per manufacturer recommendations <input checked="" type="checkbox"/> Replace filters per manufacturer recommendations <input checked="" type="checkbox"/> Drain, scrub, clean, and fill per manufacturer recommendations <input checked="" type="checkbox"/> Maintain copies of log sheets, test procedures, disinfections, cleanings, and test results <input checked="" type="checkbox"/> Consider testing for Legionella per CDC recommendations
Decorative Fountains		
Issues	Inspection Type	Mitigation
5 <input checked="" type="checkbox"/> Temperature Permissive <input checked="" type="checkbox"/> Conditions for Bacteria Spread <input checked="" type="checkbox"/> Stagnation <input checked="" type="checkbox"/> No Disinfectant	<input checked="" type="checkbox"/> Visual Inspection <input checked="" type="checkbox"/> Check Disinfectant Levels	<input checked="" type="checkbox"/> Monitor temperature and disinfectant residual at least weekly <input checked="" type="checkbox"/> Apply algacide as needed <input checked="" type="checkbox"/> Clean and disinfect if cloudy water, visible debris, algae, biofilm, or foul odor are present <input checked="" type="checkbox"/> Maintain copies of inspection log sheets, disinfections, and cleanings <input checked="" type="checkbox"/> Consider testing for Legionella per CDC recommendations
Ice Machines		
Issues	Inspection Type	Mitigation
6 <input checked="" type="checkbox"/> Temperature Permissive <input checked="" type="checkbox"/> Conditions for Bacteria Spread	<input checked="" type="checkbox"/> Visual Inspection	<input checked="" type="checkbox"/> Clean regularly <input checked="" type="checkbox"/> Replace filters per manufacturer recommendations <input checked="" type="checkbox"/> Maintain documentation of inspection log sheets and cleanings <input checked="" type="checkbox"/> Consider testing for Legionella per CDC recommendations
Unoccupied Building Areas (e.g. Floors, Rooms)		
Issues	Inspection Type	Mitigation
7 <input checked="" type="checkbox"/> Temperature Permissive <input checked="" type="checkbox"/> Conditions for Bacteria Spread <input checked="" type="checkbox"/> Stagnation <input checked="" type="checkbox"/> No Disinfectant	<input checked="" type="checkbox"/> Visual Inspection <input checked="" type="checkbox"/> Check Disinfectant Levels <input checked="" type="checkbox"/> Check Temperature	<input checked="" type="checkbox"/> Flush water systems as needed <input checked="" type="checkbox"/> Clean, drain, scrub, disinfect, and dry as needed <input checked="" type="checkbox"/> Confirm all safety equipment, including fire sprinkler systems, eye wash stations, safety showers are cleaned, disinfected, and well-maintained <input checked="" type="checkbox"/> Consider contacting local water utility company to learn about any disruptions in the water supply <input checked="" type="checkbox"/> Consider testing for Legionella per CDC recommendations

FACTORS THAT TRIGGER LEGIONELLA GROWTH

The following are the leading causes of Legionella growth inside and outside of a building. Understanding these causes and developing policies and procedures that addresses them will go a long way to prevent a Legionnaires' outbreak in your building.

Internal Building Factors

Factor	Description/Issue	Mitigation
1 <input checked="" type="checkbox"/> Water Temperature Variations	Legionella grows best within temperature ranges of 77°F and 113°F.	<input checked="" type="checkbox"/> Regular inspections and maintenance of all equipment <input checked="" type="checkbox"/> Regular servicing and cleaning of all equipment <input checked="" type="checkbox"/> Maintain water temperatures outside the ranges for Legionella growth <input checked="" type="checkbox"/> Make sure disinfectant residual amounts are within proper ranges <input checked="" type="checkbox"/> Prevent stagnation by ensuring that water is flowing appropriately throughout the building's water systems <input checked="" type="checkbox"/> Test for Legionella per CDC recommendations
2 <input checked="" type="checkbox"/> Biofilm	A thin, slimy film of bacteria that adheres to a surface. Biofilm eats up disinfectant and provides an ideal environment for Legionella to grow.	
3 <input checked="" type="checkbox"/> Scale	A hard, rock-like buildup that interferes with the proper temperature of the water because it creates a barrier between water and its heating or cooling devices. Scale can also block water flow through pipes and create stagnation.	
4 <input checked="" type="checkbox"/> Sediment	Mineral build-up in a water system that looks like dirt or sand soaks up disinfectant so it can't kill germs.	
5 <input checked="" type="checkbox"/> Water Pressure Changes	Changes in water pressure can dislodge biofilm and free Legionella into the water system.	
6 <input checked="" type="checkbox"/> pH	Disinfectants can only do their job if the water's pH is between 6.5 and 8.5.	
7 <input checked="" type="checkbox"/> Not Enough Disinfectant	Insufficient levels of disinfectant will not adequately kill bacteria.	
8 <input checked="" type="checkbox"/> Stagnation	Standing water encourages biofilm to grow. Stagnation occurs with little or no water flow and are a prim place for Legionella to grow.	

External Building Factors

Factor	Description/Issue	Response
1 Construction	Vibrations and changes in water pressure as a result from building construction can dislodge biofilm and free Legionella into the water that enters the building.	<input checked="" type="checkbox"/> Alert building occupants and inform them of a water boil advisory or to limit/stop water usage <input checked="" type="checkbox"/> Contact local water utility company to inform of situation <input checked="" type="checkbox"/> Flush water systems as needed <input checked="" type="checkbox"/> Measure water quality levels to ensure adequate residual disinfectant is in the water system <input checked="" type="checkbox"/> Document actions and records of water quality readings
2 Water Main Breaks	Changes in water pressure can dislodge biofilm and free Legionella into the water system, while dirt and other materials can be introduced into the water which soaks up the disinfectant used to kill bacteria.	
3 Municipal Water Supply	Changes in water quality can increase sediment, cause pH to be outside of recommended ranges, and lower disinfectant levels used to kill bacteria.	