



Legionella

WHAT IS LEGIONELLA?

Legionella is a bacteria that can cause Legionellosis, also known as Legionnaires' Disease (a serious lung infection). There are close to 60 species of the bacterial genus Legionella, and Legionella pneumophila is responsible for most human cases.

WHAT ARE THE SOURCES OF LEGIONELLA?

Legionella is ubiquitous in the environment and is found in creeks, ponds, and surrounding soil. Potting soil has also been associated with cases of Legionellosis, though the mechanism is unknown. Legionella does not transmit from person to person.

For building water systems (such as in large residential towers, commercial and industrial sites, and health care complexes), where chlorine residuals and temperatures are more difficult to control, Legionella can grow in a temperature range of 77°F to 113°F (25°C to 45°C). Single family and commercial properties with simple water systems are at a lower risk of exposure.

Exposure may be through aerosolization or inhalation of water spray from hot water systems, air conditioning cooling towers, evaporative condensers, mist machines, decorative fountains, respiratory therapy devices, humidifiers, hot tubs, whirlpool spas, shower heads and sink faucets.

WHAT ARE THE RISKS?

For many people exposure to Legionella will have no effect; however, for others it may cause mild symptoms, such as headache, fever, cough, and shortness of breath. A small percentage of people exposed will become seriously ill. The elderly, smokers and persons with chronic lung disease are at higher risk for infection.

Also at increased risk are immunocompromised individuals such as those with cancer, diabetes, or AIDS. Symptoms of the disease will usually appear a few hours to 3 days after exposure.

The annual incidence of Legionellosis nationally is between 20 and 25 cases per million people since 2015. In San Francisco, it is between 1 and 5 cases per million people since 2015.

HOW CAN LEGIONELLA BE CONTROLLED IN RESIDENTIAL HOMES?

Residential customers can reduce or eliminate potential exposure to Legionella by setting their water heater at or above 140°F (60°C). This is in accord with U.S. Centers for Disease Control (CDC) guidelines and Standard 188 by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), which specifies how to set up and implement a water management program to control Legionella.

However, maintaining such high water temperatures can introduce a scalding risk, so thermostatic mixers may be used to minimize this risk.

WHAT ARE LARGE BUILDING BEST PRACTICES FOR CONTROL OF LEGIONELLA?

The most common location for getting Legionellosis is in large buildings, such as hotels and hospitals. Large building owners should follow the ASHRAE Standard 188 and CDC Guidelines for Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings.

WHAT ARE GREEN BUILDING GUIDELINES TO MINIMIZE LEGIONELLA?

Although Green Building designs can provide significant environmental benefits, they can also pose unique challenges related to Legionella due to elevated water age and loss of chlorine or chloramine residual. When designing Green Buildings, special features such as automated dead-end flushing should be considered. In addition, ASHRAE Standard 188 and other references by EPA, CDC, etc. should be followed. See list of references on back of this fact sheet.

CONTROL AND MONITORING FOR LEGIONELLA IN DRINKING WATER

The Environmental Protection Agency (EPA) has an established Maximum Contaminant Level Goal (MCLG) of zero for the presence of Legionella in drinking water.

The SFPUC meets this non-enforceable guideline through compliance with EPA's Surface Water Treatment Rule, which requires water systems to filter and/or disinfect water so that microorganisms are removed and/or destroyed.

In addition, the SFPUC uses chloramine for a residual disinfectant in the distribution system, and this is superior to chlorine for Legionella control.

Even with these processes, however, there is a remote chance that Legionella can survive and colonize plumbing systems. Consequently, facility managers should develop a water management program that may include controls such as increasing the hot water temperature and ensuring proper biocide treatment to restrict Legionella growth.

Buildings and hospitals may prevent growth and transmission of Legionella by control measures such as disinfection, copper-silver ionization, maintenance of cooling towers, maintaining water in hot water storage tanks at temperatures above 140°F (60°C) and ensuring circulating water is higher

than 124°F (51°C). Maintaining such high water temperatures can introduce a scalding risk, so thermostatic mixers may be used to minimize this risk.

SFPUC - A LEADER IN WATER SYSTEMS FOR LEGIONELLA MONITORING AND CONTROL

In the United States, public water systems are required to maintain either a chlorine residual or a chloramine residual in distribution systems. From 2003 to 2005, the U.S. Centers for Disease Control and Prevention (CDC), San Francisco Department of Public Health (SFPDH), and San Francisco Public Utilities Commission (SFPUC) conducted a special study of Legionella during the SFPUC conversion from chlorine to chloramine. Based on monitoring at 53 buildings in San Francisco, conversion to chloramine reduced the occurrence of Legionella colonies in hot water systems from 60% to 4% (AWWA, 2008). From August 2022 thru October 2023, the SFPUC participated in Water Research Foundation Project 5156, which studied the occurrence of Legionella in drinking water distribution systems. The SFPUC monitored six representative sites during two warm seasons (August thru October) for the presence of Legionella. No Legionella was detected during this sampling. The SFPUC continues to routinely monitor the San Francisco distribution system for the presence of Legionella.

CONSUMER RESOURCES: REGULATION/HEALTH

- [ANSI/ASHRAE Standard 188-2015 "Legionellosis: Risk Management for Building Water Systems"](#)
- [AWWA: "Legionella Reduction after Conversion to Monochloramine for Residual Disinfection" \(2008\)](#)
- [CDC Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings \(2021\)](#)
- [CDC Legionella Information](#)
- [CDPH: "Legionellosis Fact Sheet" \(2018\)](#)
- [EPA: "Legionella: Drinking Water Fact Sheet" \(2000\)](#)
- [EPA: "Surface Water Treatment Rule"](#)
- [EPA: "Technologies for Legionella Control in Premise Plumbing Systems" \(2021\)](#)
- [SFPUC Annual Water Quality Report](#)
- [SFPUC Public Health Goals Report \(2019\)](#)
- [SFPUC: "San Francisco Water Quality Protection Plan" \(2008\)](#)
- [WHO: "Legionella and the Prevention of Legionellosis" \(2007\)](#)

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