



**STANDARD**

**ANSI/ASHRAE Standard 188-2018**  
(Supersedes ANSI/ASHRAE Standard 188-2015)  
Includes ANSI/ASHRAE addenda listed in Annex D

# **Legionellosis: Risk Management for Building Water Systems**

See Informative Annex D for approval dates.

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**NOTE**

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## FOREWORD

ASHRAE Standard 188 establishes minimum legionellosis risk management requirements for building water systems. The 2018 edition benefits from changes to improve usability and from comprehensive updates that replace permissive language with enforceable, code-intended language to facilitate adoption of the standard for code and regulatory purposes. For a full list of changes to the 2015 edition of Standard 188, see Informative Annex D.

“Legionellosis” refers to two distinct clinical illnesses. When the bacterium *Legionella* causes pneumonia, the disease is referred to as “Legionnaires’ disease” (LD). The Centers for Disease Control and Prevention (CDC) estimates that each year there are between 8000 and 18,000 cases of LD in the United States and that more than 10% of these cases are fatal. *Legionella* can also cause a less-severe influenza-like illness known as “Pontiac fever.” Most outbreak cases of legionellosis are the result of exposure to *Legionella* associated with building water systems.

The presence of *Legionella* bacteria in building water systems is not in itself sufficient to cause LD. Other necessary factors include building water system design and use conditions that promote the growth of *Legionella*; a means of transmitting the bacteria to people in the building, such as aerosol generation; and exposure of susceptible persons to LD colonized water that is inhaled or aspirated into the lungs. *Legionella* bacteria have been only once attributed to transmission from person to person and are not generally transmitted into the lungs through normal eating or drinking of contaminated water. Susceptible persons considered at-risk for Legionnaires’ disease include, but are not limited to, those receiving treatment for burns, chemotherapy for cancer, solid organ transplant, or bone marrow transplant; those with underlying diseases, such as cancer, renal disease, diabetes, and chronic lung disease; and people that are immunocompromised, such as the elderly, smokers, and those taking drugs that weaken the immune system.

This standard is intended for use by owners and managers of human-occupied buildings and those involved in the design, construction, installation, commissioning, operation, maintenance, and service of centralized building water systems and components.

Standard 188 consists of numbered normative sections followed by normative and informative annexes. The normative sections and the normative annex contain the requirements that must be met in order to comply with this standard. Building water systems vary substantially in their design, use, and capability for transmission of *Legionella*. The informa-

tive annexes contain additional information that may be helpful for a given building water system.

ASHRAE Standing Standard Project Committee (SSPC) 188 has devoted a considerable amount of time and thought to reviewing and responding to continuous maintenance proposals and public review comments by affected and interested parties. The committee thanks everyone who participated in the development of the standard, especially those who submitted proposals and public review comments.

Standard 188 is on a continuous maintenance cycle, which allows it to be updated through the publication of approved addenda. The current schedule anticipates republication of Standard 188, with approved addenda and errata, every third year.

## 1. PURPOSE

The purpose of this standard is to establish minimum legionellosis risk management requirements for building water systems.

## 2. SCOPE

**2.1** This standard provides minimum legionellosis risk management requirements for the design, construction, commissioning, operation, maintenance, repair, replacement, and expansion of new and existing buildings and their associated (potable and nonpotable) water systems and components.

**2.2** This standard applies to human-occupied commercial, institutional, multiunit residential, and industrial buildings. This standard does not include single-family residential buildings. Only where specifically noted in this standard shall certain building water systems or parts of building water systems be exempt.

**2.3** This standard is intended for use by owners and managers of human-occupied buildings, excluding single-family residential buildings. This standard is also intended for those involved in the design, construction, installation, commissioning, operation, maintenance, and service of centralized building water systems and components.

## 3. DEFINITIONS

**analysis of building water systems:** the systematic evaluation of potentially hazardous conditions associated with each step in the process flow diagrams.

**at-risk:** any person who is more susceptible than the general population to developing legionellosis because of age, health, medication, occupation, or smoking.

**authority having jurisdiction (AHJ):** an organization, office, or individual responsible for enforcing the requirements of this standard.

**beneficial occupancy:** stage of construction when all or part of a building is to be occupied for its intended purpose, whether before or after completion.

**building water systems:** potable and nonpotable water systems in the building or on the site.

**centralized building water system:** any system that distributes water to multiple uses or multiple locations within the building or site.

**construction documents:** drawings and specifications used to construct a building, building systems, or portions thereof.

**control:** to manage the conditions of an operation in order to maintain compliance with established criteria.

**control location:** a point where a physical, mechanical, operational, or chemical *control measure* is required.

**control limit:** a maximum value, a minimum value, or a range of values of a chemical or physical parameter associated with a *control measure* that are monitored and maintained in order to reduce the occurrence of a *hazardous condition*.

**control measure:** a *disinfectant*, heating, cooling, filtering, flushing, or other means, methods, or procedures used to maintain the physical or chemical conditions of water to within *control limits*.

**corrective action:** action to be taken to return *control* values to within established limits when *monitoring* or measurement indicates the *control* values are outside the established *control limits*.

**designee:** the individual designated by the building owner to meet the requirements placed on the owner by the standard.

**disinfectant:** chemical agent or physical treatments used to kill or inactivate pathogens.

**disinfection:** the process of killing or inactivating pathogens.

**disinfectant residual:** the net amount of a chemical *disinfectant* remaining in treated water after chemical demand exerted by the water is satisfied.

**hazard:** *Legionella* bacteria in a *building water system* that, in the absence of *control*, has the potential to cause harm to humans.

**hazardous condition:** a condition that contributes to the potential for harmful human exposure to *Legionella*.

**HVAC&R:** heating, ventilating, air conditioning, and refrigeration.

**immunocompromised:** a condition describing an individual who has increased susceptibility to infections due to existing human disease, medication regimens, or other types of medical treatment. (See *at-risk*.)

**Legionella:** the name of the genus of bacteria that was subsequently identified as the causative pathogen associated with the 1976 outbreak of disease at the American Legion convention in Philadelphia. *Legionella* are common aquatic bacteria found in natural and *building water systems*, as well as in some soils.

**legionellosis:** the term used to describe Legionnaires' disease, Pontiac fever, and any illness caused by exposure to *Legionella* bacteria.

**monitoring:** conducting a planned sequence of observations or measurements of the physical and chemical characteristics of *control measures*.

**multiple housing units:** a classification of housing where multiple separate housing units for residential and commercial inhabitants are contained within one or more buildings within one complex.

**nonpotable:** water that is not fit for drinking or for personal or culinary use and that has the potential to cause harmful human exposure to *Legionella*.

**potable water system:** a building water distribution system that provides hot or cold water intended for direct and indirect human contact or consumption.

**process flow diagram:** a step-by-step drawing of a *building water system* that includes the location of all water processing steps—including, but not limited to, conditioning, storing, heating, cooling, recirculation, and distribution—that are part of the *building water systems*.

**Program:** the *water management program*.

**Program documents:** procedures, work instructions, specifications, and records for all activities of the *Program*, established or collected by the *Program Team* and residing in one or more locations and formats.

**Program Team:** the group or individual designated by the building owner or *designee* to be responsible for developing, implementing, and maintaining the *Program*.

**risk:** the potential for harm to humans resulting from exposure to *Legionella*.

**risk management:** systematic activities to reduce *risk*.

**testing:** conducting a planned sequence of observations or measurements of physical, chemical, or microbial characteristics of water to assess whether conditions throughout *building water systems* meet the goals set by the *Program Team*.

**validation:** initial and ongoing confirmation that the *Program*, when implemented as designed, controls *hazardous conditions* throughout the *building water systems*.

**verification:** initial and ongoing confirmation that the *Program* is being implemented as designed.

**water management program:** the *risk management* plan for the prevention and *control* of *legionellosis* associated with *building water systems*, including documentation of the plan's implementation and operation. (See *Program*.)

**water service disruption:** planned or unplanned events that reduce water delivery pressure below 20 psi (140 kPa) and that are caused by, but not limited to, new construction ties; replacement of valves, hydrants, or meters; pumping failures; pipeline breaks; and other system repairs or emergency conditions.

**water-use end points:** the points at which water exits from all potable and *nonpotable building water systems*, fixtures, and equipment.

#### 4. COMPLIANCE

The results of each Section 4 compliance determination and the associated building survey in Section 5 shall be documented and shall be physically or electronically on site for