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ASHRAE Guideline 12-2023
Managing the Risk of Legionellosis Associated with Building Water Systems

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

ASHRAE Guideline 12 provides information and guidance to assist in control of legionellosis associated with building water systems. It also provides guidance useful in the implementation of ANSI/ASHRAE Standard 188, Legionellosis: Risk Management for Building Water Systems*. Use of Guideline 12 does not require previous training or certification in any hazard analysis, risk assessment, or risk management methodologies.*

"Legionellosis" refers to two distinct clinical illnesses. When the bacterium Legionella *causes pneumonia, the disease is referred to as "Legionnaires' disease". With nearly 10,000 cases reported by health departments in 2018 for the United States, the Centers for Disease Control and Prevention (CDC) website estimates there could be as many as 18,000 to 27,000 cases of Legionnaires' disease in the U.S. and that approximately 10% of these cases are fatal* [1]. Legionella *can also cause a less-severe influenza-like illness known as "Pontiac fever." Most cases of legionellosis are the result of exposure to* Legionella *associated with building water systems.*

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

The presence of Legionella *bacteria in building water systems is not by itself sufficient to cause Legionnaires' disease. Other factors necessary for Legionnaires' disease to occur include environmental 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 water colonized by* Legionella *that is inhaled or aspirated into the lungs.* Legionella *are not transmitted person-to-person or by normal consumption of contaminated water. Persons who are more susceptible to developing legionellosis than the general population include, but are not limited to, smokers; those receiving treatment for burns or receiving chemotherapy for cancer; those receiving treatment associated with solid organ or bone marrow transplantation; those with underlying diseases, such as cancer, renal disease, diabetes, and chronic lung disease; those taking drugs that weaken the immune system; those who are otherwise immunocompromised; and the elderly.*

Guideline 12 consists of numbered informative sections and appendices. The sections and appendices include information and guidance that may assist in the control of legionellosis in building water systems. Building water systems vary substantially in their design, use, and operation, and in their capability for transmission of Legionella*. Scientific evidence is lacking or inconclusive in certain aspects of* Legionella *control. Therefore, the references and bibliography in Guideline 12 provide sources for additional information about* Legionella *and legionellosis.*

Because changes to improve the guideline and keep it aligned with Standard 188 are expected, Guideline 12 has been placed on continuous maintenance, which permits it to be updated through the publication of approved addenda. Comments to documents under continuous maintenance can be made on the ASHRAE website at www.ashrae.org/technical-resources/standards-and-guidelines/standards-and-guidelines-under-continuous-maintenance.

ASHRAE Standing Standard Project Committee (SSPC) 188 is responsible for Guideline 12. The committee is grateful to all who have participated in the development and continuing maintenance of the guideline, especially those who have participated in public review.

The 2023 edition of Guideline 12 includes updates to definitions, new and important guidance on temperature control, and updates to supplemental disinfection.

1. PURPOSE

The purpose of this guideline is to provide information and guidance for control of legionellosis associated with building water systems.

2. SCOPE

2.1 This guideline applies to new and existing centralized hot and cold potable building water systems and to nonpotable building water systems in human-occupied commercial, institutional, multiunit residential, and industrial buildings, including hotels, office buildings, hospitals and other health care facilities, assisted

1. www.cdc.gov/legionella/fastfacts.html

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living facilities, schools, universities, commercial buildings, industrial buildings, and centralized systems in multifamily residential buildings. While buildings with noncentralized building water systems and single-family residential buildings are not included, some of the information may be useful for such building water systems.

2.2 This guideline is intended for use by building owners and those involved in the design, construction, installation, commissioning, management, operation, maintenance, and service of centralized building water systems, and by manufacturers of associated equipment.

2.3 This guideline is also intended for use in the implementation of ANSI/ASHRAE Standard 188, *Legionellosis: Risk Management for Building Water Systems* [1], and does not require previous training or certification in any hazard analysis, risk assessment, or risk management methodologies.

3. DEFINITIONS

Terms, abbreviations, and acronyms in this section are defined concisely within the context of their use in this guideline. Terms not defined in this section have their ordinary accepted meanings based on Standard American English language usage as found in an unabridged dictionary.

3.1 Terminology

aerosol: a fine spray of microscopic water droplets that may contain *Legionella* bacteria, which can be deeply inhaled into the lungs.

AHJ: see *authority having jurisdiction*.

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

aspiration: the unintended entry of liquids into the lungs, generally while eating or drinking.

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

authority having jurisdiction (AHJ): an organization, office, or individual responsible for enforcing the requirements of a code or standard or for approving equipment, materials, an installation, or a procedure.

backflow: unwanted flow of water in the direction opposite from that intended.

biocide: see *disinfectant*.

biofilm: a group of microorganisms, embedded in slime, that adhere to a moist surface.

bleed: see *blowdown*.

blowdown (bleed): the intentional discharge of system water and replacement with supply water to maintain a desired water quality.

building water systems: hot and cold potable water systems 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.

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

control limit: a maximum value, a minimum value, or a range of values to which a chemical or physical parameter associated with a control measure must be monitored and maintained in order to reduce the occurrence of a hazardous condition to an acceptable level.

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

control measure: the disinfection, heating, cooling, filtering, flushing, or other means 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.

cross connection: a physical connection between potable and nonpotable water systems, or between hot and cold potable water systems.

cycles of concentration: the ratio of the concentration of dissolved solids, such as chloride, in the evaporative cooling system to the concentration of dissolved solids in the make-up water.

dead leg: a section of pipe, a component, or a vessel that contains water but has no flow or is infrequently used.

disinfectant (biocide): chemical agent or physical treatments used to kill or inactivate microorganisms.

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(This appendix is not part of this guideline. It is merely informative and does not contain requirements necessary for conformance to the guideline.)

INFORMATIVE APPENDIX E
ADDENDA DESCRIPTION INFORMATION

ASHRAE Guideline 12-2023 incorporates ASHRAE Guideline 12-2020 and Addenda a, b, and c to ASHRAE Guideline 12-2020. Table E-1 lists each addendum and describes the way in which the guideline is affected by the changes. It also lists the ASHRAE approval dates for each addendum.

Table E-1 Addenda to ASHRAE Guideline 12-2020

Addendum	Section(s) Affected	Description of Changes *	ASHRAE Approval Dates
a	3	Addendum *a* revises the definition of "siphoning" to match current theories of siphon operation.	September 30, 2020
b	5.3.1, Appendix A	Addendum *b* includes reference to the potential use of alternate heat sources, such as electric heat trace, alone or as a supplement to recirculation, to maintain hot water throughout the building hot-water system at or above the recommended minimum temperature. The addendum also updates the reference for the Cooling Technology Institute Guideline from the old designation of WTB-148 to the new designation, GDL-159.	April 8, 2021
c	5.3.2.1, Table 2, 5.3.2.2, 5.3.2.3, 7	Addendum *c* expands the explanation of supplemental disinfection alternatives used to treat building water systems in Section 5, "Potable Water Systems," and renumbers Table 2 in Section 7, "Heated Whirlpool Spas/Hot Tubs."	August 9, 2021

* These descriptions may not be complete and are provided for information only.

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