



## ANSI/ASHRAE standard creates multiple benefits in Legionella prevention

The domino effect of ASHRAE Standard 188.



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ASHRAE Standard 188 titled, “Legionellosis: Risk Management for Building Water Systems,” was developed over a 10-year period by a cross-functional team of experts from the fields of engineering, plumbing, equipment design, microbiology and public health.

ASHRAE Standard 188 lays out a cost-effective path for Legionella control in building water systems that will, in addition to controlling the risk of Legionnaires’ disease in building water systems, be a much-needed catalyst for change.

For a number of reasons, ASHRAE 188 will spur significant improvements in plumbing component and equipment product design and plumbing codes which will dramatically increase energy efficiency as well as reduce construction costs. ASHRAE 188 will be a driving force for change in the nation’s water quality.

First, ASHRAE 188 will dispel the myth that Legionella bacteria are ubiquitous in the environment so there is nothing that can be done about it.

Legionella, while commonly found in environmental sources such as municipal water, lakes, wells and streams, is almost never found at levels that will cause disease. Legionella typically is only found at pathogenic (disease causing) levels in building water systems that have habitat conducive to Legionella growth such as cooling towers, hot potable water systems, humidifiers and ornamental fountains.

Implementing an effective Legionella risk management plan as required in ASHRAE Standard 188 will give building owners a simple, safe and effective way to control these risks. Equally important, ASHRAE Standard 188 lays out a clear road map for public health officials who may have little knowledge of cooling towers, potable water systems and the factors conducive to Legionella growth.

### **Off the bottom line**

Secondly, ASHRAE 188 will save money.

The basic tenant of good public health policy is it should deliver the greatest public health risk reduction at the lowest possible cost. ASHRAE 188 accomplishes this goal. Throughout the ASHRAE 188 standard development process a key area of focus was keeping the standard as simple as possible to implement with the lowest possible cost and the highest possible public safety outcome. This is, by definition, exactly what public health policy should be.

Next, ASHRAE 188 will increase industry awareness. Last year was a record-setting year for Legionnaires' disease outbreaks in cooling towers as well as potable water systems. These high-profile outbreaks will increase awareness about the risks associated with Legionella in building water systems.

ASHRAE 188 will have tremendous carry over to all industries and sectors including the plumbing industry. The plumbing industry, like all industries, supplies products driven by customer demand. ASHRAE 188 will increase demand from all consumer building sectors for products and plumbing designs that help solve this problem. Legionella will be a topic of interest in plumbing code development never to be overlooked again.

Some plumbing industry manufacturers have been focused on water-quality issues for some time. Viega, for example, has designed a series of installations that will help minimize dead legs and promote flow through seldom-used fixtures up to the point of connection. The daisy-chain installation moves the tee closer to the fixture, reducing the point for stagnation in the supply line of unused fixtures.

By placing, for example, the low- to no-use hospital room patient shower in series with the sink next to it, every time the sink is used the shower drop leg is flushed, eliminating stagnation and the need to flush water down the drain. These simple and inexpensive new components are excellent examples of innovative technology that can reduce the risk of waterborne pathogens while reducing water consumption and increasing energy efficiency.

ASHRAE 188 will push others in the plumbing industry to develop new product technologies less likely to result in Legionella issues while reducing energy and water consumption.

### **Pressing the issue**

Next, ASHRAE 188 will act as a driving force to correct known plumbing code issues related to flow and velocity.

There are well-known and serious issues with plumbing codes that result in dramatically increasing the risk of Legionella in building water systems. Plumbing codes used for pipe sizing have been known to be outdated for more than two decades, and addressing this issue has been a common industry topic that has been studied and researched for some time.

These code issues increase risk of Legionella colonization by resulting in pipes that are oversized, yielding low water velocities, low turnover rates and high water retention times. Resolving this issue will produce plumbing system designs dramatically less conducive to Legionella growth.

In addition to reducing Legionella risk, smaller pipe sizes directly impact costs in the following areas: piping, components, installation, space lost, energy consumption and water consumption.

As an example, one hospital building flow study showed that based on peak demand velocities, pipe size could have been 4" rather than 6". These smaller pipes will result in higher velocities in the 3- to 5-ft. per-second range that have been recommended for decades.

These smaller pipes will mean the building's plumbing system will store less water, and the water that comes into the building will be used accordingly and turned over more frequently. This not only will reduce building costs and reduce potential for bacteria colonization, but will have a dramatic impact on energy efficiency and water consumption as well.

ASHRAE 188 will act as a driving force to change known plumbing code issues related to temperature.

State hospital codes across the U.S. restrict temperature of hot water to 120° F or less. Since 1987, only one state in the country, South Dakota, allows hospitals to maintain water temperatures up to 125° even though all Legionella guidelines recommend keeping hot water temperatures throughout the building water system at 124° or higher.

Maintaining water systems above 124°, even just above 120° at all sinks and showers, will greatly reduce the risk for Legionella colonization. Some hotel chains and hospitals have policies of maintaining hot water temperature at 125° to 130° at all sinks and showers. These temperatures result in very low scald risk increase but a huge risk reduction for Legionella.

## Healthy gains

ASHRAE 188 will have a dramatic impact in the health-care industry. Legionnaires' disease is a real and growing issue. Before this summer many did not know how really serious a problem Legionnaires' disease has become.

A Center for Disease Control paper published in August 2015 titled, "Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water — United States, 2011–2012," states 67% of Legionnaires' disease outbreaks associated with community water systems occurred in health-care facilities.

Hopefully, the increase in awareness will alert the health-care industry that major factors impacting the likelihood of Legionella colonization in a plumbing system including tepid water temperatures and complex plumbing systems often are issues in hospital design due to health-care construction codes. This increased awareness hopefully will result in dramatically reducing the risk of Legionella issues in the health-care industry.

Finally, ASHRAE 188 will act as a driving force to change known issues with the EPA's Safe

Drinking Water Act.

The SDWA states that adding a disinfectant to potable water can be considered a public-water system and consequently may be required to implement the requirements of a municipal water treatment system. In developing the SDWA, the EPA had no idea building owners were adding disinfectant to hot water systems for Legionella control that were already supplied with EPA-approved and -treated public water.

While it was not EPA's intention that this regulation apply to building systems already using EPA-approved public water, some states took it that way. Most states recognizing the SDWA was never intended to apply to this application do not enforce it. At this time only three states enforce the SDWA for this application, Ohio, Pennsylvania and Texas.

This issue will most likely only be addressed once states realize this unintended wording in the SDWA creates a huge obstacle for building owners trying to implement effective policy for Legionella control in potable water systems.

ASHRAE Standard 188 details several options for controlling the risk of Legionella in building water systems. One way of doing that may be adding disinfectant to the hot water. But in states such as Ohio, Pennsylvania and Texas, the state implementation of EPA SDWA makes treating water with disinfectant onerous, expensive and risky.

The EPA has been aware of this issue for some time. Hopefully, ASHRAE 188 will even act as a catalyst to improve unintended wording in EPA regulations that acts as a barrier to sensible policies for Legionella control.

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Tim Keane is an internationally recognized expert in building water system Legionella control who has investigated numerous Legionnaires' disease outbreaks in North America. He has been an original member of the ASHRAE 188 committee for the past 10 years, has authored numerous papers and presented at numerous scientific and industry meetings on the issue. He has provided training to engineers, plumbing designers and building operators for more than a decade on best practices

for controlling Legionella in building water systems  
in plumbing system design operation and  
maintenance.

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