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LEGIONELLA AND A HEALTHY WORKPLACE

As states look forward to reopening, businesses are actively establishing procedures and preparing healthy workplace environments. **Nona L. Rudd**, CPD®, one of Altieri's senior plumbing designers, discusses Legionella and what businesses, building owners, and facilities managers should know about their domestic water systems before staff are welcomed back on site.

What is Legionella?

Legionella is a very common bacterium found naturally in freshwater environments. In these natural conditions, the small concentration is not harmful. It can, however, become a serious health concern when it finds favorable conditions in which to grow and multiply.

What conditions are favorable to Legionella bacterium?

The bacterium enjoys stagnant water, temperatures of 70°-115°F, and feeding on biofilm (a naturally-occurring microorganism). The Legionella bacterium is prevalent in hot water systems in which system turnover is low, as well as in systems without recirculation to the end of the pipe run (often older systems). It can be found in both the hot water and cold water piping depending on building and climate conditions. It can enter the airstream through aeration of water droplets when a sink faucet or shower head is turned on.

What is the health concern?

With favorable conditions, the bacteria multiply quickly, needing as little as 48 hours to reach dangerous levels. Large concentrations have the potential to cause Legionnaires' disease, a serious and potentially fatal disease contracted by inhaling airborne water molecules (aerosols) containing the Legionellae bacteria.

Why are we talking about Legionella now?

Many commercial offices, museums, libraries, college and university buildings have been empty for nearly 12 weeks. Building systems have not been used, or have been lightly used. Faucets may not have not been activated. Water may have been stagnating in piping systems.

What can and should we do?

Fortunately, there are remedies that can aid in minimizing the danger posed by Legionella, both immediately and longer term. Whether seeking a short- or long-term remedy, it is important to seek advice from a qualified engineering consultant prior to implementing any of the following measures.

- **Short-term remedy.** Turn the building's domestic hot water heater(s) up to 140-180°F and open hot and cold water faucets – sink and shower – to flush the system. At each outlet, allow hot water to run for approximately 30 minutes and cold water to run for 10-15 minutes. *It is imperative that the hot and cold water be run separately.* Be sure to wear a mask when turning on the sink and shower faucets so as not to inhale airborne bacteria. Note: While running water for an extended period is not the greenest option, it is the most immediate and economical in terms of building maintenance.

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- **Technology and mechanical means available for longer-term more permanent remedy.** Options for retrofitting a building system include:
 - *Tankless water heaters.* These pose minimal risk of Legionella because no water is stored – hot water is being produced only when the water is flowing. Tankless water heaters eliminate the possibility of stagnation due to low usage.
 - *Special thermostatic mixing valves.* Heater source mixing valves enable critical environments such as hospitals and university buildings to program temperatures at certain times to allow high temperature water to flush through the piping system. Care should be taken with this option due to the risk of scalding. A carefully designed and executable plan should be developed or be in place prior to pursuing this option.
 - *Systems that introduce chlorine dioxide gas injection, hyperchlorination, ozone, halogenation, ultraviolet radiation, and copper-silver ionization into the waterflow.* While effective, these systems are expensive to install and can be detrimental to the piping system.
 - *Removing dead legs of piping system.* Mechanically, dead legs of a piping system can be removed by extending the recirculation loop and putting in place a schedule to run water through the fixture on this leg. Heavily scaled shower heads should be replaced with new ones and older galvanized steel piping (still found in older buildings and facilities) should be replaced with copper. If the building is 60 years or older and has not had any major renovations, it is advisable to consider replacement of galvanized steel piping.

In sum, flush the system before re-opening your facility. Set a reminder to reset the water heater thermometer to its regular setting upon completion to prevent accidental scalding; it takes only a second or two for a serious injury to occur at 140°F water temperature. Looking ahead, consider longer-range options to ensure the ongoing health of your systems.

Altieri's engineers implement design standards and practices to help reduce the possibility of Legionella growth in hot and cold water systems through pipe design and water heater selection. We understand how these systems work and are mindful of the importance of designing a domestic water system that not only takes into account the health of a building, but prioritizes occupant health as well. Mitigating Legionella in plumbing systems should be done in concert with a properly designed and planned approach to whole building wellness. While the recommendations above are based on sound engineering principles, each building is different. Consult with a qualified engineer prior to implementing any measure that is designed to limit the effects of Legionella. Stay safe and well.

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