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# RECOMMENDATION E

## Recommendation Against Mixing Hydronic Heating Water with Potable Water

Issued April 2016

Hydronic radiant heating is a comfortable and efficient technology for heating a wide range of buildings, from residential applications to large commercial and industrial facilities. In most projects, it is possible to meet the heat loss of buildings through a heated floor using relatively low-temperature heated fluid, often under 120˚F (48˚C). This gives radiant heating systems the flexibility to work with a wide variety of heating sources, such as low-temperature condensing boilers, geothermal water-to-water heat pumps, air-to-water heat pumps, thermal solar collection systems, and even wood-fired boilers.

In certain cases, domestic water heaters may be used as the source of warm water for radiant heating systems, subject to local code requirements. Typical applications of this type of heat source include special dual-purpose water heaters intended for supplying both hydronic heating and hot domestic water and designed so that the heating water and the domestic water do not mix.

Also, when allowed by local code regulations, a domestic water heater may be installed as a heat source with an approved backflow prevention device, pressure relief valve and pressure reducing valve, piped to produce warm water for supply to hydronic radiant heating or fan coil systems, for instance. This application of a domestic water heater provides a relatively low-cost source of warm-water for smaller radiant heating systems.

However, when combined hydronic and potable systems are constructed whereby the potable water travels through or otherwise contacts hydronic heating pipes and components such as fan coils, valves or manifolds, potential health and safety issues may be created.

These potential issues include:

1. Certain hydronic heating components are not intended and certified to be used for potable water. These include certain types of pipes, fan coils, mixing valves or distribution manifolds. If these components are installed so that domestic water flows through them, this type of installation may violate regulations regarding the approval of components for drinking water safety[1], or regulations requiring so-called lead-free[2] components intended to contact potable water, or both.

2. Stagnant water in heating systems is a potential breeding ground for dangerous bacteria such as Legionella[3]. In a system with a shared water heater, the stagnant water from the heating distribution system is likely to be mixed with domestic hot water when the heating system is reactivated. This situation has the potential to expose users of the domestic hot water to Legionella bacteria through showers and other hot-water uses, potentially leading to serious health risks.

**Therefore, it is the recommendation of the PPI that designers and installers not specify or build systems where the mixing of hydronic water with potable water may occur.**

[1] Water treatment or distribution products in North America are required to comply with NSF/ANSI Standard 61: Drinking Water System Components – Health Effects by most government agencies that regulate drinking water supplies. Developed by a team of scientists, industry experts and key industry stakeholders, NSF/ANSI 61 sets health effects criteria for many water system components.

[2] Congress enacted the Reduction of Lead in Drinking Water Act on January 4, 2011, to amend Section 1417 of the Safe Drinking Water Act (SDWA) regarding the use and introduction into commerce of lead pipes, plumbing fittings or fixtures, solder and flux. The Act established a prospective effective date of January 4, 2014.

[3] Legionnaires' disease is a severe, often lethal, form of pneumonia. It's caused by the bacterium *Legionella pneumophila* found in both potable and non-potable water systems. The disease was named in 1976, when American Legion members who attended a Philadelphia convention, suffered from an unusual pneumonia (lung infection).

Reference Publications:

1. http://legionella.org/ "Legionella.org provides educational resources for anyone who has been affected by Legionnaires' disease"
2. http://www.cdc.gov/legionella/about/ "Legionella (Legionnaires' Disease and Pontiac fever)"
3. http://www.legionella.org/100960699-1.pdf M.L. Pedro-Botet, J.E. Stout, V.L. Yu: "Legionnaires' Disease Contracted from Patient Homes: The Coming of the Third Plague?"
4. http://www.antimicrobe.org/b118-index.asp "*Legionella* species (Legionnaires' disease)"
5. http://contractormag.com/plumbing/cm_column_98 David Yates, *Contractor:* "Legionnaires' Disease"
6. http://contractormag.com/news/cm_newsarticle_266 Robert P. Mader, *Contractor:* "Legionella can be kept out of radiant heating systems"
7. http://legionella.org/media/28614/ashraeguideline12-2000.pdf "Minimizing the Risk of Legionellosis Associated with Building Water Systems"
8. http://www.hpacmag.com/issues/de.aspx Lance MacNevin, *HPAC Magazine:* "Mixing Hydronic Heating Water with Potable Water" page MH26 - MH27