ADVISORY NOTE

A service to A.G. Coombs Group Clients

Legionella and Warm Water Systems

Legionnaires' disease is a sometimes fatal form of pneumonia contracted by inhaling fine droplets of water containing the Legionella bacteria. These droplets can be emitted by infected cooling towers and also domestic warm or hot water systems. In water systems the source of the droplets is usually from shower outlets or tap aerators. Correct design and careful operation and maintenance of these systems are required to ensure they do not pose a health risk.

Legionella is a common organism in the environment and can be found in very low concentrations in the drinking water supply. Legionella survival and growth is temperature dependant and the bacteria will multiply when in a suitable environment to an extent that it can become dangerous.

Above 70°C	- *Legionella* dies almost instantly
At 60°C	- 90% die in 2 minutes
At 50°C	- 90% die in 80–124 minutes, strain dependant
48 to 50°C	- Can survive but do not multiply
32 to 42°C	- Ideal growth range
25 to 45°C	- Growth range
Below 20°C	- Can survive (dormant), even below freezing

Ref: Legionella and the Prevention of Legionellosis, World Health Organisation 2007

Warm water systems are designated by legislation in some jurisdictions. They are water systems that are designed to emit water at a safe temperature for personal hygiene; washing and showering. Definitions vary slightly across jurisdictions however they are generally systems that contain water between 25 and 60°C and deliver water not above 45°C. Hot water systems are typically defined as systems that contain water between the temperatures of 50 and 70°C, store water at not less than 60°C and deliver water not above 50°C.

Operational Risks

The temperature at which these systems operate puts them at particular risk with respect to Legionella. To limit operational concerns these systems are usually designed to generate, store and circulate water at higher temperatures (50-60°C), and to mix with cold water at point of use to provide a safe delivery temperature. Problems arise if the water in these systems cools to temperatures where Legionella bacteria can multiply (25-45°C). This may occur for a number of reasons including equipment degradation or failure, inadequate maintenance, poor original design, system modifications, and the existence of physical or operational 'dead legs' such as unused or infrequently used pipe work. A focus on energy efficiency may sometimes result in systems being adjusted to run at lower temperatures, or for circulating pumps to run only as required, to reduce energy consumption. This can result in dangerous bacterial growth.

Hot water systems if poorly designed, badly maintained or wrongly operated can also pose a Legionella risk.

Regulatory Requirements

In some jurisdictions, systems designated as warm water systems and installed in higher risk circumstances (including health care, aged care, correctional facilities, car washes and hotels) have legislated requirements relating to their design, registration, operation, maintenance and testing. State or Territory Health authorities should be contacted for further information on local regulatory requirements governing warm and hot water systems and Legionella management. General technical requirements for the design of these systems are set out in Australian Standard *AS/NZS 3500.4 Plumbing and drainage - Heated water services*.

Risk Management

The following is a suggested approach to manage the Legionella risks associated with warm and hot water systems:

1. Review local regulations to determine mandated registration, operational, maintenance, testing and reporting requirements.
2. Audit systems to identify components, pipe runs, outlets, operating temperatures, potential dead legs or redundant pipe work, and the operational regime.
3. Undertake a risk assessment of the system, prioritise the risks and then develop a plan to mitigate the identified risks.
4. Ensure there is an adequate maintenance regime in place to support correct system operation. This should include accurate record keeping.
5. Develop a water sampling strategy and commence regular sampling and testing for *Legionella*.
6. Develop a clear plan on what to do should Legionella be detected in the system and communicate this plan with key stakeholders.

References

- Plumbing Industry Commission Technical Solution 6.11 Warm Water Systems: vba.vic.gov.au.
- NSW Code of Practice for the Control of Legionnaires' Disease – 2nd edition – June 2004: health.nsw.gov.au.
- Australian Standard AS/NZS 3500.4 Plumbing and drainage - Heated water services.

For further advice or assistance contact:

Bart Taylor, General Manager
A.G. Coombs Advisory
T: +61 3 9248 2700
E: btaylor@agcoombs.com.au

Published June 2013 | © A.G. Coombs Group Pty Ltd