



Finance Technical Guideline

TG011 Legionella Pneumophila in Building Water Systems

1 Purpose

This document provides guidance for the design and control of building water systems to reduce the risk of Legionella pneumophila colonies developing - particularly in relation to truncated plumbing lines.

1.1 Disclaimer

The information contained in this publication is provided in good faith and believed to be reliable and accurate at the time of publication. However, the information is provided on the basis that the reader will be solely responsible for assessing the information and its veracity and usefulness.

The State shall in no way be liable, in negligence or howsoever, for any loss sustained or incurred by anyone relying on the information, even if such information is or turns out to be wrong, incomplete, out-of-date or misleading.

2 introduction

Legionella pneumophila is a bacterium found in cooling towers, air conditioners and other water systems. This organism can cause a lung infection known as Legionnaires disease (legionellosis) following inhalation of contaminated water droplets (aerosols).¹

Legionella pneumophila bacteria multiply in temperatures between 20°C to 45 °C, but most rapidly between 30°C and 43°C. The bacteria can survive freezing, but dies with increasing rapidity as temperatures rise above 45°C. At 70°C, it is killed almost instantly.

Water stagnation, the presence of nutrients and biofilms can stimulate *Legionella pneumophila* growth.

¹ Out of the handful of Legionella bacteria species which cause Legionellosis infections in humans, *Legionella pneumophila* is the second most common in Australia (following *Legionella longbeachae*, a species commonly found in potting mix).

2.1 Background

The role stagnant water in cooling towers plays in stimulating bacterial growth and the associated air handling systems spreading contaminated aerosols is well understood and not the subject of this guide. Perhaps not so well understood is the role that other building water systems can play.

Warm water environments, such as hot (or cold) water systems, showers, pools, spas, humidifiers and fountains can provide favourable conditions for Legionella bacteria to multiply and, along with taps and showerheads, may also contribute to the bacteria dispersal via contaminated spray or mist.

Where the use of building water systems is occasional or a shutdown of building water systems occurs, dead legs can be created.² These house soil, organic debris and biofilms that provide an ideal growth environment for a wide range of bacterial species, including Legionella.

There have been no reported cases of Legionnaires disease connected with domestic type evaporative air coolers.

3 Control Measures

Equipment design, installation, commissioning and operation of both hot and cold water systems will affect risk of multiplication and dispersal of the bacteria. Truncated pipe work, known as dead legs, are a particular risk.

The *Occupational Safety and Health Act 1984* (OSH Act) and the *Mines Safety and Inspection Act 1994* (MSH Act) place general duty obligations on employers and people in control of workplaces, including those in control of the building the workplace is within, to ensure a safe place of work. Manufacturers, designers, importers and suppliers must ensure that people who install, maintain or use plant are not exposed to hazards or risk of infection. The OSH Act is supported by the *Occupational Safety and Health Regulations 1996* (the OSH Regulations) and the MSI Act by the *Mines Safety and Inspection Regulations 1995* (the MSI Regulations).

This code has been produced to provide general guidance on the prevention of risks in relation to Legionnaires' disease and improve understanding on the associated responsibilities of duty holders.

These include people in control of workplaces with water systems, who have a general 'duty of care' to maintain these systems.

While these treatments are intensive they will not totally eliminate risk.

² A dead-leg is a pipe leading to an outlet through which water flows, but is unused/used rarely. For example, fittings such as showerheads and taps can act as dead legs.

The OSH Act places general duty obligations on manufacturers, designers, and suppliers to ensure that people who install, maintain or use plant are not exposed to hazards or risk of infection.

The OSH Act places general duty obligations on owners of commercial premises that have warm water systems, spa pools, or cooling towers (such as hospitals) to conduct regular maintenance of this equipment to reduce the risk of Legionella contamination. This includes regular cleaning and disinfection to prevent Legionella growth.

These mandatory treatment regimes aim to minimise bacterial multiplication and to minimise the production and release of aerosols.

To minimise the opportunity for Legionella contamination and size of consequential mandatory maintenance regimes, it is critical that close attention is paid to both equipment design, installation and commissioning prior to building occupation and at time of subsequent system modifications.

The OHS code of practice: Prevention and Control of Legionnaires' Disease provides practical guidance on safe work practices that can be used to reduce the risk of work-related injury and disease; and

Legionella growth favours stagnant water. Strategies to reduce risk of Legionella growth include:

- Keep pipework as short and direct as possible. Dead legs/dead ends should be avoided. The management of dead legs is often removal, irrigation or isolation. Access to these, however can be difficult, and disruptive to users.
- Regularly flush out infrequently used outlets.
- Storage tanks should be cleaned periodically. Water should be drained from hot water systems to check for debris and signs of corrosion.
- Ensure water can be switched off at the mains so no stagnant water remains.
- Ensure easy and safe access for cleaning, inspection and maintenance.
- Adequately insulate pipes and tanks.
- Prevent contamination through fitting tanks with lids and insect screens.

4 Green Star Requirements

The Green Building Council of Australia's Green Star rating tool encourages building systems which are designed to eliminate the risk of Legionnaire's disease, as far as is reasonably practicable.

Under the Design and As Built rating tool, 1 point is awarded where the project team can demonstrate at least one of the following requirements is met:

- a) The building is naturally ventilated, or

- b) The building has a waterless heat rejection system, or
- c) Any water-based heat rejection system includes measures for Legionella control and a Legionella Risk Management Plan has been provided for the system.

Refer to the GBCA Green Star rating tool for further information.

5 Standards and Codes of Practice

AS/NZS 3666.1-2011 Air-handling and water systems of buildings - Microbial control – Part 1 Design, installation and commissioning.

AS/NZS 3666.2-2011 Air-handling and water systems of buildings - Microbial control – Part 2 Operation and maintenance.

AS/NZS 3666.3-2011 Air Handling & Water Systems of Buildings – Microbial control – Part 3 Performance-based maintenance of cooling water systems.

Code of Practice: Prevention and Control of Legionnaires' Disease, 2010, Commission for Occupational Safety and Health under the provisions of the Occupational Safety and Health Act 1984 and the Mines Safety and Inspection Act 1994.

6 References

Legionnaires Disease Environmental Health Guide. Department of Health WA

Victorian Public Health and Wellbeing Act 2008

Australian Institute of Refrigeration Air Conditioning and Heating,
<http://www.airah.org.au/> accessed November, 2007.

7 Document Control

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8 Document Approval

This guideline was endorsed and approved for use on 6 July 2021 by:

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