

Friday, September 4, 2020

LEADING HVAC&R FOR 100 YEARS



Department of Health
Government of Western Australia

The Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH) appreciates the opportunity to provide input on the proposed legislative content for new regulations for air handling and water systems in WA.

AIRAH is Australia's peak membership body for professionals and practitioners working in the heating, ventilation, air conditioning and refrigeration (HVAC&R) industry.

Our primary aim is to develop the competence and skills of industry practitioners so that they can better meet society's evolving health, safety and environmental demands, and the challenges of a rapidly changing world. AIRAH encourages world's best practice within the industry through continuing professional development, accreditation programs and a wide range of technical publications. This includes many resources that focus on cooling towers, warm water systems, and control of legionella.

Please find attached our comments on the "Air-handling and water systems of commercial buildings review – Part 2".

AIRAH is willing to work with its members and partner organisations who have skills in water treatment and chemistry to establish competency requirements and manage training within their competent persons scheme.

We trust that this information will be useful for the consultation and invite the project team to contact us if you have any questions.

Regards,

A handwritten signature in black ink that reads 'Tony Gleeson'.

Tony Gleeson, M.AIRAH
AIRAH Chief Executive



Title of Document

In regard to the title “Air-handling and water systems of commercial buildings review” – please note that cooling towers and cooling tower systems are not “air handling systems”. Consider revising this title to “Cooling tower and other high-risk systems”.

4.1.1 Definitions

“Cooling tower” Systems are now more complex than those covered in the standard, and include hybrid cooling systems

“water system” Also include misting/fogging systems

Other facilities should be considered as “vulnerable facilities”. Expect these to be ranked from

- High (e.g., hospitals, aged care, healthcare)
- Medium (e.g., places accessed by immunocompromised persons, plus any facility with a cooling tower system within 200m of a vulnerable facility)
- low (e.g., healthy population and low risk of infection).

1. Do you agree that the proposed regulations apply to all cooling towers except those in Class 1, 4 or 10 buildings under the Building Code?

Yes. Also leased class 1 and 4 buildings should be required to ensure safety of their occupants.

2. Do you agree that a proposed risk rating matrix should be used by enforcement agencies to classify each type of system and/or building?

Yes.

3. Do you agree that the proposed regulations would apply to commercial car washes or other potentially high-risk businesses/facilities?

Yes, including mine sites and workshops.

4. Do you agree with the term ‘vulnerable facility’?

Consider a name change to: “Vulnerable Occupant Facility”.



5. Should the proposed regulations apply to any other building or facilities not mentioned?

Other facilities that should be considered because of the potential for susceptible persons to be in close proximity to water systems that may increase Legionella risk are:

- Detention or correction facilities
- Hotels (and other accommodation facilities)
- Office buildings
- End-of-trip facilities
- Shopping centres
- Public and private facilities (e.g., gyms, aquatic facilities and health spas) offering shower services

A part of the population who are exposed to these facilities may have characteristics that make them susceptible to contracting Legionella (i.e., >50 years of age, smoking current or history, chronic lung conditions, immune system disorders due to medication or disease, systemic malignancy, diabetes, renal or hepatic disease).

The design of the water distribution systems in these facilities will include long lengths of pipework and regulated water temperatures within the ideal range for Legionella proliferation, or the system may create an aerosol of a size that can be inhaled into the lungs.

Cooling tower systems in close proximity to “vulnerable facilities”

Legionella bacteria can travel on the wind and infect people up to 500m from the cooling tower.

Cooling tower systems within **close proximity** to “vulnerable facilities” represent as high risk as those within the facility. For this reason, the protocols associated with systems in vulnerable facilities should be extended to those **within 500m of a vulnerable facility**. This means any facility with a cooling tower within 500m of a nursing home, hospital or other vulnerable facility should be considered high risk.

It is generally accepted that any facility with a cooling tower in a central business district or area with heavy foot traffic or a densely populated area would automatically be deemed to be high risk and require a rigorous preventative maintenance program to manage the Legionella risk.

Evaporative Coolers

Buildings of any class should have a code of practice for evaporative coolers as the minimum. Other types and hybrids should be considered on a risk basis



6. Do you have any concerns or comments about this proposal?

Devices such as water fogging/misting devices as used in entertainment precincts, and fountains in public places should be considered in the risk assessment and registered.

4.2 Revised administration requirements and application of regulations

It is proposed that new air-handling regulations will require the landowner of a building or facility where an air-handling or water system (including a cooling tower) is located, to ensure that each system on that land is registered with the appropriate enforcement agency until decommissioned.

7. Do you agree that air-handling and water systems should be registered with the appropriate enforcement agency?

Yes.

We suggest a central register of cooling towers, warm water systems, misting/fogging systems and fountains in public areas is maintained by CHO, even if LGA as managers of registration then log all registrations into it.

We suggest that registration should be for each “system” rather than individual cooling towers. Some systems have multiple towers with multiple cells treated by a single chemical dosing system.

If buildings have multiple systems, each system should be separately registered. We suggest a requirement for the register to be in an identical format with each appropriate enforcement agency and a central register maintained by the Department of Health and updated by the enforcement agency will be efficacious in the event of an outbreak.

4.3 High risk systems and vulnerable facilities

It is proposed that all high risk or ‘vulnerable facilities’ are registered with the Department of Health.

8. Do you agree that warm water systems in ‘vulnerable’ facilities including hospitals and aged care facilities should be registered with the appropriate enforcement agency?

Yes. Water systems should be registered and should also include:

- Hybrid systems,
- Misting/fogging systems,
- Public fountains

There should be a code of practice for low risk (typically domestic) evaporative cooling systems.



9. Do you agree that the Chief Health Officer should be the principle enforcement agency for state hospitals and state aged care facilities?

Yes, warm water systems should be included, but vulnerable facilities should include a wider definition of high-risk facilities and systems and facilities in close proximity.

10. Do you agree that 6 months is an appropriate amount of time for owners to register a warm water system following the enactment of the proposed regulations?

Yes

11. Do you have any other ideas or comments to make about any of these proposals?

Education and information must be provided.

Persons in rental accommodation (boarding house, hotel, unit or house) are entitled to be safe from exposure to legionella from a cooling tower, warmwater systems, or other, such as a poorly maintained evaporative system.

Warm water systems inherently have a high Legionella risk and should be registered.

Other High-Risk Systems in Vulnerable Facilities

Other systems such as the cold drinking water can also be a substantial risk to susceptible patients or residents in vulnerable facilities. To determine the risk associated with individual systems as proposed, a risk assessment of all water distribution systems in any “vulnerable facility” should be mandatory. The risk assessment should be registered with the relevant enforcement agency. The systems that are identified as high-risk through this process should have a mandatory requirement to be registered with the same appropriate enforcement agency. This Legionella risk assessment may require a Legionella sampling program as part of the assessment of the risk.

Misting and Fogging Systems

There are substantial risks for Legionella outbreaks from other atypical systems that have not been considered in the Air handling Discussion Paper Part 2 – May 2020. For example, the misting or fogging systems/machines in supermarkets/ grocery facilities or outdoor/indoor public facilities should be listed as a high-risk system for Legionella and they should be registered at minimal cost.

Hybrid Cooling Systems

We note the definition of “Cooling Tower” in the discussion paper: “a cooling tower as defined in AS/NZS 3666.1 and also means any other liquid cooled heat rejection or liquid cooling equipment”.



It is important to consider the range of “hybrid cooling systems” that are currently available in the Australian market. Some of these systems are marketed as having the benefit of “not being considered cooling towers under Australian regulations” with the associated benefit of avoiding regulations associated with Legionella control. Notwithstanding, some of these systems do pose Legionnaires’ risks based on their water cooling and use of fan systems (which could disperse water droplets).

Careful consideration needs to be given to the drafting of the definition of “cooling tower” to include any cooling system that has the potential (including via any malfunction or maintenance issue) to mechanically disperse (e.g. by fan) water droplets or water vapour. At the same time, drafting should exclude systems commonly referred to as “evaporative coolers” that are commonly used in residential housing.

4.4 Revised approval requirement and risk management plan requirements

Compliance with the National Construction Code

The DOH proposes that new health regulations remove direct references to Australian Standards, instead requiring compliance with the NCC for the design, construction and installation of air-handling and water systems.

12. Do you agree with requiring compliance with the NCC for design, installation and maintenance of air-handling and water systems?

AS3666 is the accepted standard for the design, construction, installation and maintenance of cooling tower systems throughout Australia.

Compliance to NCC should be required, but a Water Risk Management Plan for the installed system should also be required (and lodged) as part of building commissioning.

Compliance with the NCC for maintenance of air handling and water systems alone will not provide sufficient guidance on the maintenance of air handling and water systems. However, the Discussion Paper states the intent to develop similar requirements to the Victorian guidelines and to use the enHealth Guidelines. This would be deemed acceptable.

4.5 Risk management plan requirements

It is proposed that Risk Management Plans (RMPs) will be mandatory for high risk and/or vulnerable facilities, while RMPs for lower risk premises will be optional.

13. Do you agree that Risk Management Plans should be mandatory as part of the registration process for high risk or vulnerable facilities? And optional for lower risk premises?



Ideally, all systems would have RMPs. RMPs should be mandatory for all buildings and should be created as a standard part of the Occupancy Certificate of the facility. The risk profile of the facility would determine the frequency the risk management plan should be reviewed.

- Vulnerable and high-risk facilities to have be reviewed annually
- Medium-risk facilities should be reviewed 5 yearly or whenever significant system modifications are made
- Low-risk facilities (incl Class 1,2 and 4) to be reviewed whenever significant system modifications are made.

Further comments

As noted above, a risk management plan of the water distribution systems in a high-risk or vulnerable facility should be mandatory. However, the definitions of “high risk or vulnerable facilities” needs to be reconsidered as detailed above.

Systems other than warm water, such as plumbed-in chilled drinking water outlets or misting/fogging systems, can also be a substantial risk because of their design. These systems can be a substantial risk to susceptible patients or residents in vulnerable facilities or for patrons and staff in facilities that may be deemed a lower risk (e.g., RSLs, restaurants or pubs/bars).

A part of the population who are exposed to these facilities may have characteristics that make them susceptible to contracting Legionella (i.e., >50 years of age, smoking current or history, chronic lung conditions, immune system disorders due to medication or disease, systemic malignancy, diabetes, renal or hepatic disease).

To determine the risk associated with individual systems, a risk assessment of all water distribution systems in any “vulnerable facility” and where the public or staff are exposed to potential high-risk systems should be mandatory and should be registered with the appropriate enforcement agency.

This Legionella risk assessment may require a Legionella sampling program as part of the assessment of the risk.

The cost to develop a cooling tower system RMP is minimal for operations large enough to require a cooling tower for heat rejection. Many building owners (around 25 per cent) already have risk management plans to ensure compliance with best practice as established in other parts of Australia.

A decision would need to be made whether the currently existing RMPs are required to be undertaken again, or whether submission of existing RMP is acceptable.



Monthly Maintenance Schedule

Unfortunately, AS3666.2 is rarely followed as it requires cleaning of the cooling tower fill, which is not possible in modern towers due to the circuitous water paths.

Regular testing for Legionella and HCC should not be an alternative to a good service and maintenance programme.

Monthly Legionella testing is a highly effective measure of the system safety and effectiveness of the chemical dosing of biocides and should be mandated.

Competency

AIRAH would work with its members and partner organisations who have skills in water treatment and chemistry to establish competency requirements and manage training within their competent persons scheme.

4.6 Independent auditors

New WA air-handling and water system regulations will include provisions for the approval of air-handling and water system auditors by the DOH.

14. Do you agree with the use of independent auditors to undertake regular inspections of systems and to report to the appropriate enforcement agency?

Yes. Independent auditors should have appropriate auditing competency.

The audit process should not require site inspection. Whether or not the facility owner requires their auditor to inspect the site is at their discretion.

Development of the RMP should require site inspection. In respect to competency see Appendix 2 “competent person”.

15. Do you have any other ideas or comments to make about any of these proposals? Please detail any costs or benefits of these proposals.

As above, competency should be aligned – RMPs should be developed by individuals with technical competency and audits should be undertaken by individuals with auditing competency. A large number of the issues are chemical and biological, so this should be the focus of the skill set for the personnel/companies.

We also need to consider other aerosol-creating systems, all of which present a health hazard as a result of legionella, such as:

- Fountains
- Hybrid cooling systems
- Misting/fogging cooling systems.



4.7 Revised monitoring, investigation and decontamination requirements

New regulations propose to allow compliance with monthly inspections and maintenance schedules or monthly water sampling and microbial testing or a combination of the two.

16. Do you agree with the proposal to replicate the Australian Standards requirements for either routine maintenance schedules or regular water sampling and testing?

No.

Maintenance does not substitute for testing. Regular Legionella testing is the primary measure of whether or not the system poses a Legionella risk. The risk can be caused by a number of factors outside design, installation or maintenance.

Conversely, mandated regular testing should not be seen as an alternative to good maintenance practices.

The only way for a water treatment provider to monitor whether the minimisation of the risk of Legionnaires' disease is successful is by measuring the main parameters: Legionella and HCC. Unfortunately, if this aspect is not mandatory, our experience in jurisdictions that do not require monthly testing is that a significant percentage of water treatment providers and building owners will not undertake microbial testing whatsoever (to minimise costs).

Monthly sampling for Legionella and HCC should be mandatory for high-risk systems such as cooling towers. This would follow the regulatory requirements in New South Wales, South Australian and the Victorian "Guide to developing risk management plans for cooling tower systems".

A monthly microbial testing program is essential for a cooling tower as conditions can rapidly deteriorate within a week. Examples of issues that can arise within a short period of time include:

- Failure of chemical dosing
- Chemical dosing containers running empty
- Water contamination (e.g., dead pigeon/rodent in the cooling tower)
- Legionella contamination via mains water or other cooling tower systems nearby
- Interruption of the chemical dosing system (e.g., power failure to the dosing system or an electrician disconnects the system to use his/her drill and fails to reconnect or only reconnects at the end of the job after a week of no treatment)

These issues may be rectified, and the water chemistry can be reported to be within parameter, however, only a microbial test will verify that the control parameters have been effective in overcoming microbial proliferation. A less frequent testing program risks missing these changes and therefore increases the risk of an outbreak.



Unfortunately, it is not possible for a water treatment provider to identify whether a cooling tower contains Legionella by simply attending and providing a monthly service. The only available verification method is by regular Legionella and HCC testing.

This is a very similar to public swimming pools. The service provider may attend and provide adequate services. However, verification testing is essential to confirm the successful operation of the equipment and chemicals. A cooling tower system should be deemed high risk in the same way as public swimming pools – which require monthly microbial sampling.

Auditors and Regulatory Authorities

Microbial testing is often the key indicator for auditors, regulatory authorities, and owners as to whether the design, installation and maintenance of their cooling tower is effective. Given auditors may not have high-level technical understanding, monthly sampling results provide an excellent verification of the efficacy of the water treatment program and the effectiveness of the implemented actions to mitigate risk. In addition, poor adverse microbial results are difficult for stakeholders to ignore and therefore provides the motivation for recommended actions and maintenance to be adhered to.

In the case of water distribution systems, the conditions that may lead to Legionella proliferation are not likely to change as rapidly. Therefore, a less frequent microbial testing program is appropriate.

Stakeholders associated with vulnerable facilities do need guidance on what is an appropriate number of samples and guidance on the frequency of sampling. It should be noted that an RMP should recommend this.

17. Do you have any other ideas or comments regarding this proposal?

The document is heavily based on AS3666 but does not adequately reference the national enHealth Guidelines. This is of particular interest as the limits for reporting and action differ substantially to AS3666.

Reviews of enHealth or appropriate Australian Standards should trigger a review of the WA regulations.

4.8 Testing results reporting

18. Do you agree with the proposed requirements for reporting of microbial testing and investigation if above a threshold?

Yes

CHO should be requested to comment on the appropriate level of Legionella and bacterial counts.



The issue of risk has to be addressed in determining thresholds; also, facilities that are technically not “vulnerable” but might be located next to, for example, a cancer clinic which is “vulnerable”. The risk in the general area near the potential source also needs to be considered and the separation or risk ranking process should be defined.

19. Do you have any other ideas or comments to make about any of these proposals?

The designation of threshold concentrations should be risk based.

Test Result	Required Control Strategy
Not detected (<10 cfu/ml)	Maintain monitoring at a frequency proportional to risk (see WRMP)
Detected as between 10-1000 cfu/ml (<1000 cfu/ml)	Review limits by CHO & determine risk for non-vulnerable facilities and separately “vulnerable facilities” or those in close proximity
Detected (>1000 cfu/ml)	Review limits by CHO & determine risk for non-vulnerable facilities and separately “vulnerable facilities” or those in close proximity

Final Comments

Estimated number of cooling towers

The discussion paper estimates there are 3,000 cooling towers in Western Australia. This is a two to threefold increase on our estimates.

It is important to consider the difference between a “cooling tower” and a “cooling tower system”. In practice, two or more cooling towers are often combined into a single cooling tower system. This system is then managed as an individual entity (even though it may combine two to 10 cooling towers). The system is treated as a whole from a water treatment and microbiological perspective because the water is common to all of the cooling towers. That is, the system pipework connects all the cooling towers together.

From a registration perspective, it is the “system” that should be registered and not the individual “cooling towers” that comprise the system. There will be one RMP per system and one set of microbiological results per system (each month).

“Competent Person”

No other Australian jurisdiction currently requires the competent person or duly qualified person have a tertiary qualification.



Please note the NSW Public Health Regulations 2012 have been superseded and the new regulation does not require the competent person have a tertiary qualification. The previous requirement for tertiary qualifications proved unworkable for several reasons:

- There is no tertiary qualification that fits the concept of developing RMPs for cooling tower systems. In reality, science and engineering can have some application. However, some science and engineering degrees are totally unrelated to cooling tower systems.
- Why should someone who has an electrical or civil engineering degree (or a computer science degree) be given priority to someone with 30 years' experience (but no degree)?
- Some of the most experienced and respected industry practitioners do not have tertiary science and/or engineering degrees. It does not make sense to exclude experienced practitioners from the process based on an arbitrary prerequisite requirement – especially when the prerequisite isn't directly relevant to the industry
- The listing of tertiary qualifications as a prerequisite will have a direct impact on increasing the cost of the services to industry.

The “competent person” should include individuals with significant (>5 years) industry experience (i.e., practical experience in cooling tower maintenance and an understanding of risk management).

Application of “Competent Person”

The concept of a “competent person” from a technical perspective should be applied to:

- The person who develops the risk management plan
- The person who manages an organisation that provides water treatment services.

The concept of “competent person” from a technician perspective does **not** have to be applied to:

- The auditor (discussed below)
- The individual services technician who provides the water treatment service to the facility
- Individuals starting out in the industry would need experience to gain the level of “competent person”. This experience can only be achieved through undertaking the work. As a consequence, the provision of the service cannot be a prerequisite or there would be no pathway to the career. In the long-run, it would also restrict the numbers of “competent persons” if there were none coming through the ranks.



Independence – Development of Risk Management Plans

All major Australian jurisdictions allow RMPs to be developed by persons associated with the facility. These persons have knowledge of the facility, applied water treatment and the cooling tower systems.

Allowing the persons associated with the facility to develop RMPs does not preclude consultants providing the service. It is then the facility owner who chooses the most appropriate and preferred for their circumstance.

Independence – Audit of Risk Management Plans

Most major Australian jurisdictions require that the auditor be independent of:

- The facility owner
- The water treatment provider
- The person who developed the risk management plan.

The purpose of the audit is to ensure compliance of the maintenance of the cooling tower system to the RMP.

Due to the nature of the audit process, the auditor does not need to be a “competent person” from a technical perspective. That is, they do not need to have a technical water treatment or cooling tower education and/or experience. However, they should be trained in how to conduct audits.

In NSW and Victoria, auditors are required to complete an auditor’s course which introduces them to the regulations and some of the concepts and terminology. Auditors come from a wide range of backgrounds including food and quality auditing.

Glossary

Add “Vulnerable Facilities” Facilities that have a high probability of occupation or visitation by persons who may be immuno-compromised or otherwise susceptible to water-borne diseases



Appendix 2 - Definitions

<p>Air-handling system</p>	<p><i>Ensure the document covers all of AS 3666; parts 1,2,3 &4.</i></p>
<p>Water distribution system</p>	<p>Preferred definition: water distribution system, of a prescribed facility— (a) means the infrastructure within the prescribed facility from every point where water enters the facility through the infrastructure to every point where the water is used; but (b) does not include a cooling tower.</p>
<p>Warm water system</p>	<p>Preferred definition: <u>South Australian Public Health (Legionella) Regulations 2013</u> <i>Preferred, except that the lower temperature should be 25°C to align with DoH Engineering guidelines for HCF</i></p>
<p>Vulnerable facility</p>	<p>Preferred definition: <u>Queensland Public Health Act 2005</u> Queensland introduced a number of mandatory requirements for health-related facilities. They define “prescribed facility” as:</p> <ul style="list-style-type: none"> a. a public sector hospital that provides treatment or care to inpatients; or b. a private health facility licensed under the Private Health Facilities Act 1999; or c. (c) a State aged care facility; or d. a residential aged care facility, other than a State aged care facility, prescribed by regulation. <i>Aged Care Act 1997</i> <p><i>Add to Vulnerable Facilities i.e., facilities that have a high probability of occupation or visitation by or in the vicinity of persons who may be immuno-compromised or otherwise susceptible to water-borne disease causing microorganisms.</i></p> <p><i>This would require risk ranking neighbouring facilities (i.e. table 4) if these had cooling towers, or other potential sources of water-borne disease causing microorganisms.</i></p> <p><i>I.e., not just health care, any high-risk facility.</i></p>



<p>Independent auditor</p>	<p><u>South Australian Public Health (Legionella) Regulations 2013</u></p> <p>People who conduct inspections can be referred to as independent compliance inspectors. Independent compliance inspectors play a crucial role in indirectly providing relevant authorities with clear, timely, thorough, accurate and unbiased information.</p> <p>They must not be the owner or responsible person</p> <p><i>Agreed but the auditor should be provided training.</i></p>
<p>Risk management plan</p>	<p><u>Queensland Public Health Act 2005</u></p> <p>Water risk management plan, for a prescribed facility, means a written plan to prevent or minimise the risks posed by hazards, hazard sources or hazardous events to individuals at the prescribed facility.</p> <p><i>Agreed; needs to include a supplementary risk-based review criteria.</i></p>
<p><i>Additional Term; inclusion recommended</i></p> <p>Disinfection of water systems (excluding cooling towers systems)</p>	<p>Add Disinfection of water systems which should follow AS3500.1 Appendix H & I.</p>