

Advisory Note

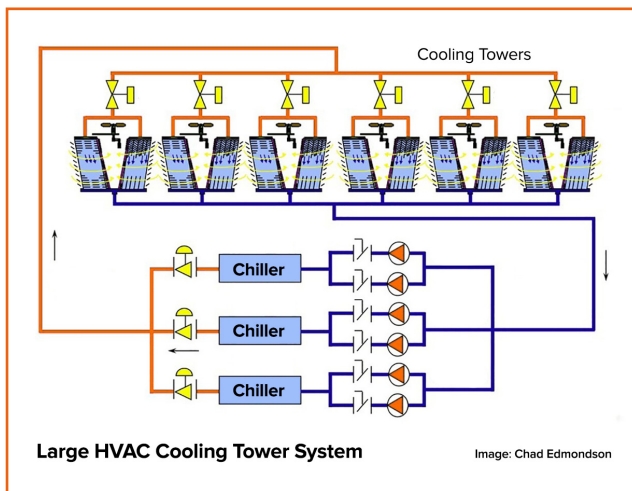
A Service to A.G. Coombs Group Clients.

Cooling Tower Systems During COVID-19

Many buildings are experiencing significantly reduced occupancy in the COVID-19 situation and building operators are seeking opportunities to minimise costs during this period. Reducing operation or shutting down HVAC systems is an option that is being considered. Many HVAC systems rely upon Cooling Tower Systems for heat rejection.

There are strict regulatory requirements for the ownership and operation of Cooling Tower Systems throughout Australia to protect public health from the risk of Legionnaires Disease. Completely shutting down Cooling Tower Systems for a protracted period and then restarting, particularly large and complex systems, can cause a number of serious problems. The cost and implications of shutting down and starting up may outweigh any advantages. It is important that the management and operation of cooling towers be carefully considered as part of an overall HVAC System COVID-19 plan.

Cooling Tower Systems are typically a pumped recirculating piped system taking heated water from air-conditioning chiller plant to cooling towers and may feature multiple piped circuits, multiple cooling towers and multiple pumps, valves, strainers and water treatment systems.



Cooling Tower Regulations

Regulatory requirements for the management of Cooling Tower Systems are different across Australian States and Territories. Australian Standard AS/NZS 3666-2011 (Parts 1 to 4) defines requirements for the design, installation, commissioning, operation and maintenance of water systems of buildings for the purposes of microbial control. State and Territory regulations detail the administrative requirements around the management of Cooling Tower Systems, and these vary in approach and in the extent of prescribed activities. In the absence of more detailed statutory requirements, it is recommended that building owners and their managers should consider a Risk Management Plan (RMP) approach to better identify and manage operational risks and help ensure the discharge of minimum general Duty of Care obligations.

Key risks in the management and operation of Cooling Tower Systems include:

Stagnant Water: Areas of stagnant water should be minimised. This involves the removal or activation of dead legs, or installation of circulating pumps or other arrangements for idle systems.

Nutrient Growth: Eliminate factors that stimulate microbial growth. These include exposure to sunlight, system corrosion, introduced contaminants, and elevated system water operating temperatures.

Poor Water Quality: Water quality should be managed through a structured treatment and testing program to deal with microbial growth, corrosion and contaminants.

See also: **A.G. Coombs Advisory Note - Managing Cooling Tower Risks in a Changing Environment** for a best practice risk management framework for these systems. [Read the Advisory Note →](#)

Options for Reduced Operation

If the building is experiencing a significantly reduced occupancy during COVID-19:

During periods of low occupancy, the thermal loads within the building will reduce and the operation of the HVAC system including Cooling Tower Systems will scale down. Energy consumption will reduce.

Even during periods of low occupancy, it is important to understand what plant the Cooling Tower System is supporting. This may include critical server or communications equipment rooms. A system survey and consultation with tenants is recommended.

The safe operation and maintenance of Cooling Tower Systems to prevent public health risk requires regular operation to circulate and treat water to manage and control microbial growth. Any changes to the operation, maintenance and testing of Cooling Tower Systems needs careful consideration to ensure that they comply with the Cooling Tower System's Risk Management plan and do not compromise the management and control of microbial growth.

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Bringing Buildings to Life

Advisory Note: Cooling Tower Systems During COVID-19

If the building is to be vacated for an extended period of time during COVID-19:

Completely shutting down mechanical and HVAC systems including Cooling Tower Systems for a protracted period and then restarting, particularly large and complex systems, can cause a number of serious problems. These include significant corrosion and other systems damage and risks to public health on start up. The cost and implications of shutting down and starting up may outweigh any advantages.

If required, the shutting down, emptying, de-commissioning and the subsequent re-commissioning of Cooling Tower Systems requires a carefully managed approach to ensure regulatory compliance, the avoidance of damage whilst shut down and on start up, and the protection of public health on recommissioning.

The following is general guidance for the de-commissioning and re-commissioning of cooling tower systems. These activities should be carried out in close consultation with the mechanical services maintenance and water treatment services providers.

De-commissioning:

1. Precondition the system with higher than normal concentrations of corrosion inhibitor and biocide, and circulate to all elements of the system for at least 30 minutes to 1 hour, to ensure thorough distribution throughout the system.
2. Electrically isolate Cooling Tower System plant components and tag.
3. Drain down the Cooling Tower System to the extent possible.
 - + Isolate cooling towers from condenser water system, water make up and any filtration side circuits. Isolate water treatment system and remove corrosion test coupons where installed.
 - + Drain basins and leave drain valve open to avoid rainwater collection. Drain other elements where possible including balance line(s).
 - + Thoroughly clean all wetted surfaces in cooling towers.
4. Isolate, tag and lock off any plant connected to the Condenser Water/Cooling Tower System including chillers, pumps etc. Amend the Building Management & Control System accordingly. This should also include any tenant or secondary plant that is connected to the Cooling Tower System.
5. Document and record the above process.
6. Notify local Cooling Tower System regulating authority that the system has been de-commissioned.

Re-commissioning:

1. Notify local Cooling Tower System regulating authority of the intention to re-commission the system.
2. Cooling towers should be cleaned and inspected prior to refilling.
3. Reinstate system components and fill system.
4. Reinstate any plant that was locked out as part of the de-commissioning process.
5. Upon refilling, the entire system must be thoroughly decontaminated using appropriate concentrations of biocide and corrosion inhibitor. Care must be taken to ensure that all elements of the system receive adequate flow for an appropriate period.
Note: Most Cooling Tower systems cannot practically be fully drained, this results in stagnant water pockets and ensuing microbial growth and corrosion. This can cause significant ongoing issues with both microbial control and system degradation.
6. A re-commissioning testing regime should be applied to ensure appropriate microbial management is in place and that all plant, including chillers, continue to operate normally. Care is to be taken to remove air from the condenser water pipework.
7. Document and record the above process.

For more information on Cooling Tower Systems during COVID-19, please contact:

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