

Aerosols

Microscopic droplets or particles suspended in the air, eg. fog, smoke, or fine sprays.

Air conditioner

Or “refrigerated air conditioner” is a system that removes heat from air without the use of water. Indoor air is cooled by being blown over a refrigeration coil and redirected indoors. The refrigeration coil is then cooled externally by a fan or by natural convection using outdoor air. Examples of air conditioners are domestic refrigerated/reverse cycle integrated or split systems. Refrigerated air conditioners are not associated with cases of Legionnaires’ disease.

Algae

Multicellular plants, occurring in water or moist ground, that contain chlorophyll but lack true stems, roots and leaves.

Amoebae

Protozoa able to change shape because of the movements of cell processes. They live in fresh water or soil or as parasites in humans and animals. Some amoebae can ingest *Legionella* and allow them to replicate whilst being shielded from the outside environment.

Anti corrosive agent

A chemical designed to inhibit or prevent corrosion in a cooling tower system.

AS/NZS 3666

Australian/New Zealand Standard 3666: Air handling and water systems of buildings – Microbial Control. At present there are three parts to this standard:

- Part 1: Design, installation and commissioning
- Part 2: Operation and maintenance
- Part 3: Performance-based maintenance of cooling water systems.

Audit

An inspection and verification of a Risk Management Plan.

Approved Auditor

A person qualified to audit Risk Management Programs for cooling tower systems. Under the *Building (Legionella) Act 2000* definition, this means a person holding a current certificate issued under section 75GB of the Act.

Automated biocide dosing device

An automated device that automatically discharges a measured amount of biocide to the water in a cooling tower system.



Automated bleed off systems

Automatic discharge of a portion of the re-circulating water in a Cooling Tower system due to a build up of salts and other matter.

Bacterial testing

Laboratory based testing to establish the concentration of bacteria in water. This type of testing will mainly utilize heterotrophic colony counts and does not include *Legionella* in total bacteria count.

BCC

Building Control Commission.

Biocide

A physical or chemical agent that is capable of killing microorganisms including *Legionella*.

Biodispersant

A chemical compound added to recirculating water within a cooling tower system to penetrate and break down biofilm (see "Biofilm"), which may be present on the wetted surfaces of the cooling tower system.

Biofilm

A surface layer of microorganisms and other organic matter. It is usually combined with particulate matter, scale and products of corrosion.

CFU/mL

A unit of measurement used in microbiology to gauge the number of microorganisms present in a water sample. It is measured by the number of colony forming units (CFU) present in a millilitre of the water sample.

Chlorine compatible biodispersant

A biodispersant that does not react with or neutralise the chlorine that may be present in the water of a cooling tower system.

Clean

Means to render free from visible sludge, foam, slime (including algae and fungi), rust, scale, dirt, and any deposit or accumulation of impurities or other foreign material.

Cooling tower

A device for lowering –

- a) The temperature of recirculated water by bringing the water into contact with fan forced or fan induced atmospheric air; or
- b) The temperature of water, a refrigerant or other fluid in a pipe or other container by bringing recirculated water and fan forced or fan induced atmospheric air into contact with the pipe or container.

This term does not include evaporative coolers.



Cooling tower system

A “cooling tower system” is –

- a) A cooling tower or a number of interconnected cooling towers that use the same recirculating water; and
- b) Any machinery that is used to operate the tower or towers; and
- c) Any associated tanks, pipes, valves, pumps or controls.

Counter flow

Involves the air being pushed in the opposite direction of the water falling in a cooling tower.

Cross flow

Involves the air being pushed in at right angles to the water falling in the cooling tower.

Dead legs

Lengths of pipe ending at a fitting through which water flows only when the fitting is opened. These extra areas of the cooling tower contain stagnant water, which can cause a build up of bacteria and sludge in a recirculating system, and can then contaminate the system.

Decontamination

A process that removes or neutralises pathogenic bacteria particularly *Legionella*.

DHS

Victorian Department of Human Services.

Disinfection

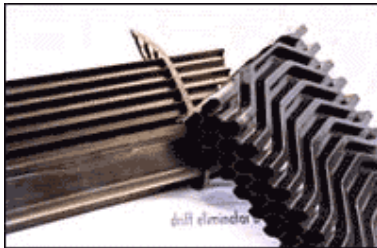
Application of a chemical agent or physical process that destroys pathogenic microorganisms but not their spores.

DOI

Victorian Department of Infrastructure.

Drift eliminator

A grid or grill-like arrangement of physical barriers located before the cooling tower exhaust designed to minimize the drift emanating from a tower. Efficient eliminators should restrict the drift loss to less than 0.02 per cent of cooling tower recirculating water.



Evaporative condenser

These units are similar in principle and in operation to cooling towers. Water is distributed directly over a bank of pipes, which contain circulating refrigerant or other fluids, but there is no fill as in cooling towers. These systems will have to be registered under the *Building (Legionella) Act 2000* as cooling towers.

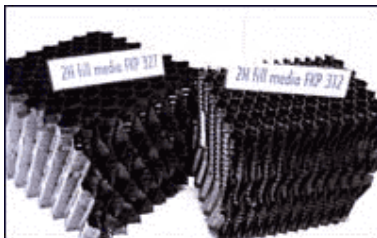
Evaporative cooler

Evaporative coolers are also known as evaporative air conditioners, evaporative air coolers, and “swampies”. They use water to cool outdoor air for use indoors. Evaporative cooling is based on the same principle that the human body uses to cool itself down, with perspiration being evaporated from the skin by circulating air. Warm outside air is drawn into the unit through a series of wetted filter pads. Energy is removed from the air by the water causing a drop in temperature. The energy consumed by the water turns the water into vapour causing increased humidity in the air. The cool, humidified air is discharged indoors (where it is blown over the body causing additional evaporation or drying of perspiration from the skin and lowering of the body temperature). Doors/windows must be open to permit the forcing of this cooled air through the building.



Fill

The structure located at the top of a cooling tower that is designed to create an extensive wetted surface area through which air passes.



Flushing

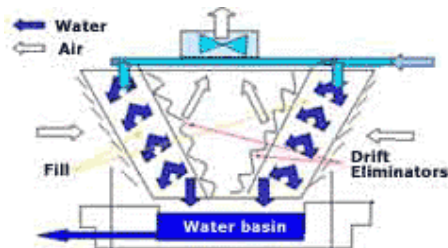
The process of draining a cooling tower, cleaning the basin, associated pipework and other parts of the tower.

Heterotrophic colony count

Or "HCC" means an estimate of the number of viable units of bacteria per millilitre of sample water, using a laboratory based method such as the pour plate, spread plate or membrane filter test (also known as total bacteria count, total plate count or viable bacteria count test) method.

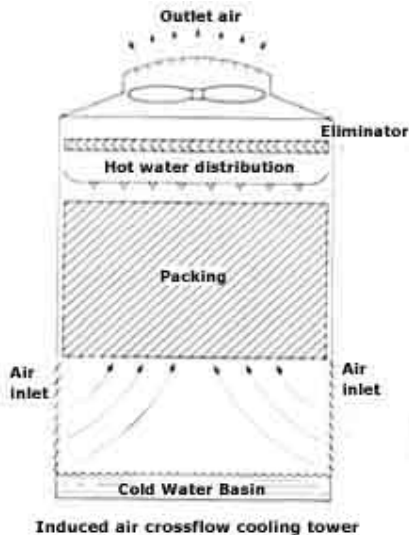
Induced air crossflow cooling tower

This type of cooling tower has the fan mounted on one side of the tower. Air is induced through the fill; with the air passing in a cross flow manner past the falling water.



Induced air counterflow cooling tower

This is the most commonly used type of cooling tower, where air is drawn through the tower fill by a fan located at the discharge of the cooling tower. Air enters the tower through louvres located above the basin perimeter and is drawn vertically through the tower in the opposite direction to the tower water flow.



Legionnaires' disease

A rare form of pneumonia caused by the *Legionella* species of bacteria. Early symptoms of the disease resemble those of the flu, and include headache, fever, chills, muscle aches and pains and generally a dry cough, followed by shortness of breath. Other systems in the body can be sometimes affected resulting in diarrhoea, mental confusion and kidney failure.

Legionella

The bacterium responsible for causing Legionnaires' disease. They are a water-associated bacteria and infection is acquired through inhalation of infected aerosols. *Legionella* is

widespread in the environment. It has been found in lakes, rivers, creeks, hot springs and other bodies of waters and soils.

***Legionella* count**

Refers to the number of *Legionella* colony-forming units (CFU's) found in one millilitre of the water sample. The minimum level of detection is deemed to be 10 CFU/mL as per Australian/New Zealand Standard 3666: Air handling and water systems of buildings – Microbial Control. *A count of less than 10 CFU/mL is regarded as not detected.*

Legionellosis

Legionellosis (infection by any *Legionella* species) is an acute bacterial infection that can present as -

Legionnaires' disease:

- This is the pneumonic form of the illness where the patient typically presents with severe pneumonia that frequently culminates in respiratory failure.
- Early symptoms are anorexia, malaise, myalgia and fever (flu-like).
- There is usually multi-system involvement with diarrhoea, vomiting, mental confusion, delirium and renal failure.
- All cases of Legionnaires' disease must be notified to the Victorian Department of Human Services.

or -

Pontiac fever:

- The non-pneumonic form, presents mainly as a flu-like illness with spontaneous recovery and no reported deaths.
- It has a high attack rate (95 per cent) and outbreaks have been reported overseas.
- Pontiac fever has not been reported in Australia.
- It is not notifiable.

LRMP

Legionella Risk Management Project.

RMP

Risk Management Plan.

Nutrients

Any food source providing sustenance to an organism.

pH

A term used to describe the hydrogen-ion activity of a system that provides a measure of the acidity or alkalinity of the water on a scale between 0 and 14. Pure water has a pH of 7, acid solutions have a pH less than 7, and alkaline solutions have a solution greater than 7. For effective use of chlorine as a disinfectant pH should be maintained in a range of 7.0 – 7.8. Above this, and up to pH 8.5, bromine should be used if the pH cannot be easily adjusted.

PIC

Victorian Plumbing Industry Commission.

Plume

The visible discharge of air and moisture from a cooling tower. This can include condensation and aerosols. Usually most visible on cool mornings as steam emanating from the top of a system.

PPE

Personal Protective Equipment.

Recirculating water

Water that is recirculated through the cooling tower system.

Recycled water

Water that is reused from another process. This can involve wastewater reuse.

Refrigerated Air Conditioner

Another descriptive term used meaning “air conditioner”. (See “Air conditioner”)

Risk management plan (RMP)

A risk management plan is described in the Australian and New Zealand Standard 4360: 1999 Risk Management (AS/NZ 4360) as a working document that:

- Establishes the context of what type of risk is to be managed
- Identifies the risks
- Analyses the risks
- Evaluates the risks
- Sets out measures for controlling or treating the risk
- Monitors and reviews the control measures; and
- Incorporates easy communication and consultation into its structure

Scale

A crystalline deposit that can form on surfaces or pipework within the cooling tower system due to a build up of minerals (usually calcium carbonate). The water of the cooling tower system must be alkaline for scale formation to occur.

Scouring

The process of cleaning the internal piping of a cooling tower system.

Scum

A film of impurities that rises to or is formed on the surface of a liquid or is formed upon the surface of a solid object (such as the structure of a cooling tower).

Sludge

A build up of sediment that can be found in the basin or pipework of a cooling tower system.

Stagnant water

Pockets of motionless water within the cooling tower system that can allow microorganisms to grow.

Spray drift

Aerosol emissions from cooling towers due to the fan forced or extracted air exiting the cooling tower.

Sterilisation

An act or process of destroying all forms of microbial life on or in an object.

Surfactant

A soluble surface acting agent that reduces surface tension between particulate matter and water.

Swampy

Commonly used term meaning “evaporative cooler”. (See “Evaporative cooler”)

Thermostatic mixing valves

Valves that mix the hot and cold water of the system to provide water at a predetermined temperature. These valves can overcome the necessity for long-term storage of tepid water and should be located close to the point of use.

Total Bacteria Count (TBC)

An estimate of the number of viable units of bacteria per millilitre of water under the conditions of testing (refer to “Heterotrophic Colony Count”). Note that a TBC does not test for the presence of *Legionella*.

Warm water system

These systems are commonly used in hospitals, aged care and residential facilities as well as children’s services’ centres. The water is stored in thermostatically controlled tanks at approximately 42°C in order to prevent scalding.

VWA

Victorian WorkCover Authority.