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A.R.E.M.A. Air-conditioning and Refrigeration Equipment Manufacturers' Association of Australia.



# Evaporative Coolers

An Operation and Maintenance Guide for Owners

June 2001

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## Introduction

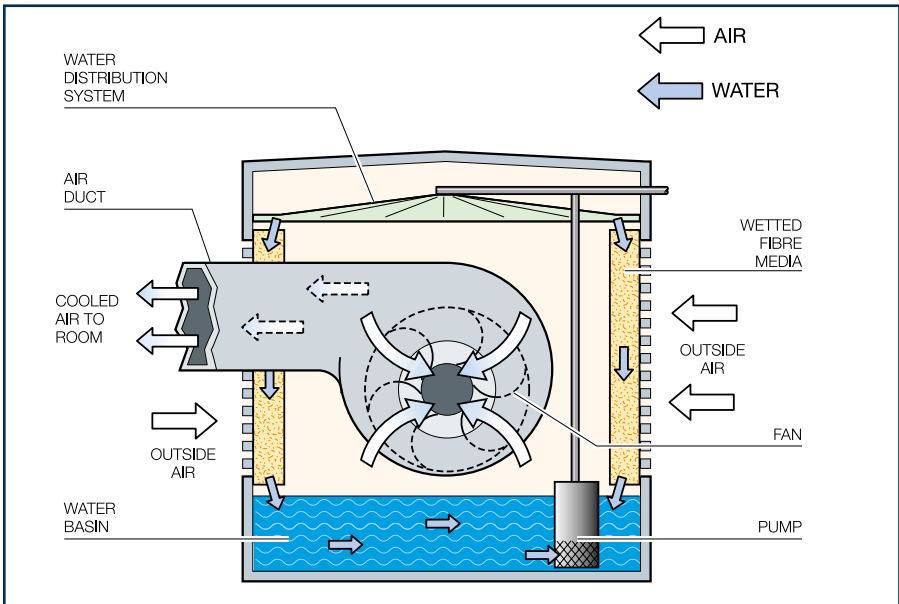
Evaporative coolers range from small portable units to large, fully ducted systems for home, business and industry. All have individual features, but share similar components and work in exactly the same way.

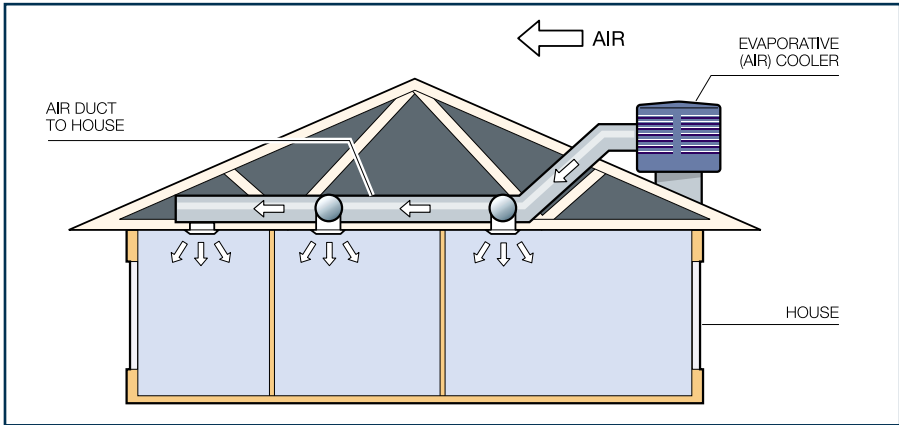
To do the job they are designed for, evaporative coolers must be installed, operated and maintained correctly. Following the guidelines in this booklet

will help you operate your cooler safely and efficiently.

## How Evaporative Coolers Work

Evaporative coolers work best in climates where the air is hot and dry and the humidity is low. Warm outside air is drawn into the unit through wetted filter pads. The cool, humidified air is discharged indoors, before leaving the indoor environment through open windows and doors.





Evaporative coolers ‘wash the air’, removing the pollen and dust that can trigger hay fever and asthma attacks. There is no evidence that evaporative coolers can cause Legionnaires’ disease. *Legionella* bacteria need a reservoir of warm water to grow in and the infection can only be transmitted by fine aerosol spray.

Dirty units containing moulds and bacteria can still pose a health risk, particularly if infants or people with allergies or respiratory problems are exposed to the air flow.

### Choosing the Right Location

It is better to put the cooler above a utility room such as a bathroom or laundry, rather than a bedroom or office, as this will limit any impact from noise.



It is also important to consider accessibility for maintenance and cleaning.

Evaporative coolers should not be installed in a location that could be contaminated by building exhausts, cooling towers, flues, chimneys or other sources of pollution.

### Using the Cooler

- Carefully read and follow the operating instructions supplied for your unit.

- When switching on an evaporative cooler with an exhaust function, first run it for three minutes in this mode, with the cooling on. This wets and cools the filter pads while hot, stale air is exhausted from the building.
- Improve circulation of cooled air by opening windows and doors. Completely open one window in each room that needs cool air.
- When switching off an evaporative cooler, let the fan run for ten minutes. This will dry the filter pads.

## Why Maintenance Is Important

Correct maintenance will make your cooler last longer and work more efficiently. Clean and disinfect the cooler every six months at least.

It is important to carefully follow any specific manufacturer's directions for maintaining the unit.

Prevent build-up of sediment, fungus and algae inside the unit to ensure good air hygiene. Where water is allowed to stagnate in the basin, the conditions may encourage fungi and bacteria to grow.

Windblown dust and pollen dirties the water and forms a sludge in the basin that can block the pump, filter pads or water distribution system. If sludge, foul water or other water quality

problems develop, the cooler will need to be cleaned more often.

## Disinfecting the Cooler

With the fan isolated and the pump circulating water around the unit, add 5 millilitres of household bleach (that has 4 per cent available chlorine), per 5 litres of circulating water. This will give you a concentration of approximately 20 ppm of 'free chlorine'.

- Allow the disinfected water to circulate for at least 30 minutes.
- Dump the water and refill with fresh water.
- Circulate for 5 minutes and again dump the water, to remove any chlorine residue.
- Repeat previous step.
- Refill with water and begin normal running.
- Check that the equipment is working correctly.

## Cleaning the Cooler

### Before Summer

- Disconnect all power to the unit.
- Remove external weatherproof covers.
- Remove filter pads and clean them thoroughly with a hose.
- Clean all waterways, including the bleed-off system and sump.

- If a fan belt is fitted, check for wear and correct tension. A one centimetre depression when pressed is about right. More tension than this can cause slippage, less will wear out the fan bearings. Check manufacturer's specifications and adjust if necessary.
- Refit filter pads, close drain valve and open water inlet valve to allow unit to fill with fresh water.
- Disinfect the unit.
- Wash your hands when you finish.

### After Summer

- Disconnect all power to the unit.
- Loosen all sediment and slime in the basin with a brush.
- Drain all water from the tank and pipes.
- Clean basin and water pump guard. Use a cloth soaked in diluted household disinfectant.
- Remove filter pads and clean them thoroughly clean them thoroughly with a hose. Refit when dry.
- Dry the internal components by running the fan only. If a drain valve is fitted, leave it open.
- Fit waterproof covers to external units.
- Wash your hands when you finish.

## Water Replacement

Most modern evaporative coolers, with the exception of portable units, will automatically 'bleed-off' (or drain) small amounts of water. Replacement with fresh make-up water reduces the amount of dissolved solids, suspended solids and salts in the recirculating cooling water.

### Bleed-off

A continuous bleed-off can be incorporated in the sump of the unit, or off the water distribution system. It can be adjusted to prevent a build-up of dissolved solids and other impurities.

In most evaporative coolers, the bleed-off rate is adjustable to allow for variations in water quality. If the water supply contains a high concentration of dissolved or suspended matter, more bleed-off may be required. As a general guide, two litres per hour bleed-off is required for each cubic metre per second of air supplied. Some modern evaporative coolers have a conductivity probe that automatically activates and drains the sump of water when the unit is switched off. Regularly check the operation of the bleed-off unit to ensure free flow of water when the unit is in use and to remove any potential growth sites for bacteria.

The safe disposal of bleed-off water is important. It should never be discharged into gutters which run into drinking water tanks, but should be connected to the sewer or stormwater.

### Electrically Operated Water Replacement Systems (Dump Valves)

If the evaporative cooler is supplied with automatic dump valves, the improved water quality will reduce the build up of slime and sediment. Water removed from the evaporative cooler is automatically replaced with fresh make-up water. Some dump valves will activate when the unit is switched off; others have a time-delay and will activate if the unit is still switched off after two days.

### Portable Evaporative Coolers

Portable evaporative coolers use a standard power outlet and water is added by hand. It is advisable to place the unit next to an open window or external door. Internal doors to the room should also be open, with openings on the opposite side of the room. This allows portable units draw in fresh air from outside. The air is drawn through the pad, cooled and filtered at the same time, and circulated into the room.

Stale, hot air is forced out through the open doors on the other side.

Portable units should be completely drained and cleaned at least once during the summer season, and left dry when not in use.

Older portable coolers don't have drain plugs, making it difficult to drain the water. When you drain and clean the unit, always protect yourself against electric shock by unplugging it from the wall socket.

### Filter Pads, Covers and Chemicals

#### Filter Pads

Older filters use 'wood wool' (Aspen fibre ) in the filter pads. Modern pads are either paper or plastic based, so water flows evenly throughout the pad. This increased contact between air and moisture on the pad gives more efficient cooling via the evaporative effect.

#### Weatherproof Covers

Weatherproof covers protect the filter pads and seal up the unit, preventing heat loss in winter. They also stop cold outside air coming in through the ducts. Modern evaporative coolers are mainly

plastic, so they don't rust, but covers can still help protect the unit. A baffle normally seals the ducts when not in use.

### Chemical Biocides or Disinfectants

If you maintain the cooler properly, you won't need to use a biocide except when cleaning (every six months). Follow the manufacturer's safety instructions and keep these chemicals away from children.

### Other Cooling Systems

Evaporative coolers are different to refrigerated air conditioners, cooling towers and evaporative condensers.

**Refrigerated air conditioners** include domestic refrigerated / reverse cycle integrated or split systems. They remove heat and moisture from air without using water. Indoor air is cooled by being blown over a refrigeration coil, then redirected. Water from the condensation of air moisture can often be seen dripping from these units. They do not cause Legionnaires' disease.



**Cooling towers** are used to remove heat from buildings or industrial processes.

Inside a cooling tower outdoor air is used to cool water that is bringing heat from the building or process.

Warm, humid air is discharged from the cooling tower to the outside air.

This discharge air contains aerosols that can carry *Legionella* bacteria, and therefore cooling towers are often associated with cases of Legionnaires' disease.



**Evaporative condensers** are usually part of a larger industrial refrigeration plant.

They are like cooling towers, but instead of piping the cool water to a refrigeration coil, the refrigeration coil is inside the actual cooling tower. Water wets the coil, removing heat. These units can also cause Legionnaires' disease.



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## More Information

If you have questions about cooling systems or Legionnaires' disease, please contact:

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