



Mr. GoodTower®



WINTER MAINTENANCE

**Prepare your Cooling Tower for Summer
by Identifying and Replacing Worn or
Damaged Components**



Mr. GoodTower®



Proactive Maintenance

Winter is often the only time of year where ambient temperatures are low enough to facilitate shutdown of evaporative cooling equipment for routine inspections and repairs. For proactive equipment owners it is also the perfect time to prepare evaporative equipment for the summer months ahead. A proactive approach to equipment maintenance rewards owners by reducing the possibility of a summer breakdown thereby, keeping buildings cool and processes online. Building a site specific maintenance plan also minimizes the possibility of catastrophic failures that can cause further consequential damage within the unit or damage to downstream machinery. Your local Mr. GoodTower® service centre offers free cooling tower inspections and can make recommendations to keep your cooling tower operating at 100% performance.

Cooling Towers

Although cooling towers are a critical component in the air conditioning system and for process cooling, they are often forgotten and / or neglected in terms of maintenance. Well maintained cooling towers ensure optimum system performance and reduced downtime. A proactive inspection regime shall include the components highlighted below, inspection frequency intervals shall be determined with consideration given to site specific operating conditions.



A Fan Motors

Fan motors are a critical component that should be regularly inspected and maintained. Fan motors can be located internal or external to the equipment depending on equipment brand and design. When inspecting fan motors look for common problems such as excessive motor housing corrosion, bearing wear and fan cowl corrosion. A proactive approach toward motor maintenance can reduce the chances of failure and afford owners the opportunity to replace older motors when convenient shutdown periods can be scheduled.



Isolate the motor and turn the fan by hand, check for any noise or vibration that may indicate the early signs of motor bearing failure.



B Belts and Pulleys

The environment inside a cooling tower is very unforgiving for fan belts and pulley systems. Raw cast iron pulleys can exhibit signs of corrosion in a very short period of time leading to premature belt wear and significantly reducing belt life. Pulleys over time can also develop cracks in the hubs and spokes. It is important to check periodically for cracks in rotating equipment before the components fail and cause large scale equipment damage. EVAPCO Aluminium pulleys are resistant to corrosion and are the recommended upgrade for installations where premature belt wear is a continual problem.



Check pulleys for cracks.

Regularly inspect and replace corroded taper lock screws before they fail.

Corroded pulleys reduce belt life, Aluminium pulleys and banded belts can resolve this problem.

Maintain belt tension, loose belts can overheat and weaken, Do not over tension as this can damage shaft and motor bearings.



C Bearings

Cooling tower bearings are commonly subjected to overloading, fatigue failure, lubricant failure and corrosion. Internally mounted bearings are exposed to water drift, condensation and high temperatures which contribute to reduce bearing service life. To prolong bearing operation it is important that bearings are regularly inspected and greased.

When inspecting bearings it is important to remove the fan shaft belts to reduce the load on the bearings. Rotate the fan shaft and listen for any noises while checking for any vibration in the bearings. Noise or vibration are early warning signs of failure. If the equipment application is a critical process it is recommended that the installation site maintain an inventory of replacement fan bearings to reduce unit downtime should the bearings fail outside of planned replacement schedules.



TIP

If the unit has remote lubrication lines, check that they are not blocked and that lubricant is reaching the bearings. Vibration and Noise are the first warning signs of failure.

Bearing flingers help keep water out of the bearings and increase service life.

In winter it is important to operate the unit at least once a day to keep water from pooling in bearings.

Excessive belt tension can reduce bearing service life.

D Axial Fans

Axial fans drive a cooling tower's performance and are subject to extremely high stress during system operation. As a rotating "high speed" piece of equipment it is critical that fan components are regularly inspected for cracks, fatigue, corrosion and operational damage. If a fan failure occurs it can be extremely dangerous with the possibility that fragments of fan components could cause damage to external equipment or personal injury. Fan failures can also cause large amounts of damage internally to drift eliminators, fan cowls and distribution components. Periodical inspections of axial fans are essential and can identify the early stages of potential failure.

TIP

Check fan hubs and blades for cracks - if cracked replace immediately.

Replace corroded fan bolts and hardware to prevent failure.



E Drift Eliminators

Drift eliminators are one of the most important components in a cooling tower they serve to reduce the drift loss of equipment. The higher the driftloss rating the less water and treatment chemicals will be lost through operational drift. Drift eliminators also eliminate sunlight from entering the tower which reduces algae and biofilm growth. It is important to inspect drift eliminators for any holes, cracks, gaps or blade damage. If the eliminators are damaged it is important to replace them immediately.



*Replacement drift eliminators must comply with the drift loss rate of 0.002% per AS3666.1 - 2011
EVAPCO EDE-001 drift eliminators are rated at 0.001% drift loss and can be easily retrofit to competitors equipment.*

F Spray Nozzles

Spray nozzles should be regularly inspected to make sure they have not fallen out, become blocked or damaged. If the site water treatment regime is not working properly it can be common for nozzles to scale up and block, which can result in a loss of equipment performance. Blocked nozzles or scaled nozzles can also change the characteristics of the spray pattern of the nozzle which can translate into dry spots on the fill which can lead to the fill scaling up and loss of heat rejection capability. Severely blocked nozzles can cause line pressures within the branch arms to increase to a level where nozzles can dislodge from the branch arm thread or grommet sending un-diffused high pressure jets of water directly into the PVC fill pack. The jet of water can be powerful enough to cut a hole straight through the fill which leads to water bypass and loss of heat rejection capability. If this happens the fill blocks will need to be replaced.



Blocked nozzles can lead to costly fill block damage and loss of unit performance.



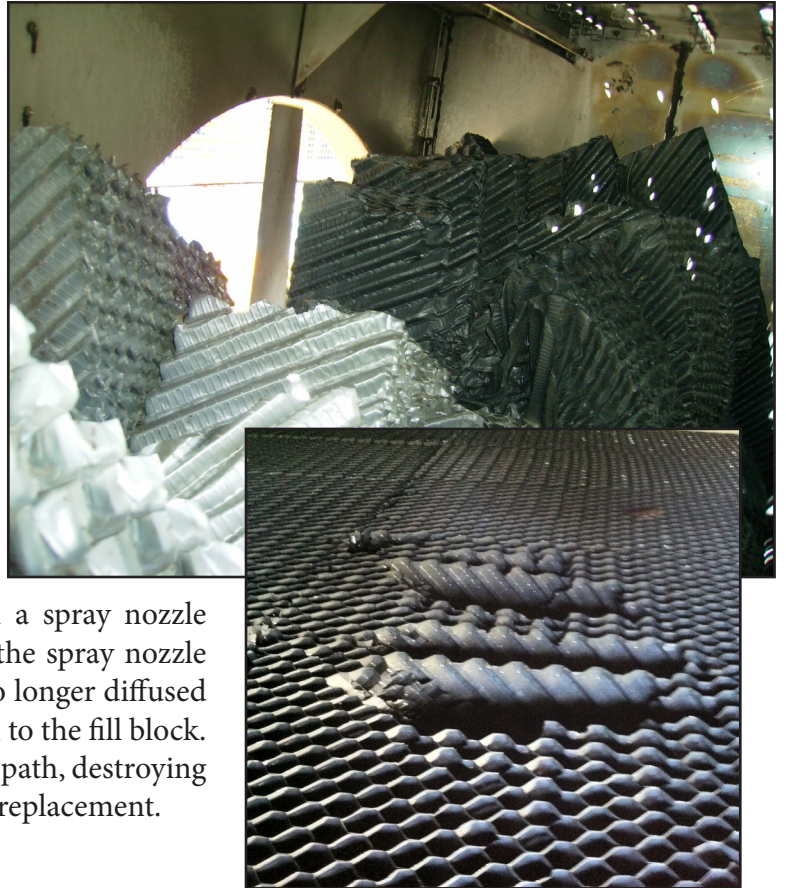
G Fill Blocks

Cooling towers are very efficient at scrubbing air drawn in from the surrounding environment. Scrubbed airborne particles become suspended in the cooling tower re circulating water and can accumulate in the cooling tower fill flutes, blocking the fill and adding significant weight to the fill and fill support system. Severely blocked or scaled fill can lead to fill support failure and a costly repair bill. Industrial and mining sites are more susceptible to fill clogging and should schedule inspections of the fill to avoid problems.

It is also common for fill to become damaged when a spray nozzle becomes dislodged from the spray branch arm. With the spray nozzle missing the high pressure water in the branch arm is no longer diffused allowing a high pressure jet of water to spray directly on to the fill block. The water jet can cut a hole through all layers of fill in its path, destroying the fill - leading to unit performance loss and costly fill replacement.



Scaled or blocked fill can cause fill supports to collapse and damage to the cooling tower casing. Fill blocked with contaminants or scale should be replaced to prevent fill support failure and restore thermal performance.



H Inlet Louvers

Inlet louvers are easy to inspect and clean and can usually be easily removed from the cooling tower without the use of tools. Inlet louvers stop water from splashing out of the cooling towers rain zone and stop

sunlight exposure of the basin water. High quality inlet louvers like EVAPCO's WST stop water and expensive chemicals from splashing out of the tower, which if left unchecked can cause damage to equipment and pipework external to the cooling tower. WST inlet louvers also stop sunlight from penetrating the basin limiting algae growth and biofilm development. Algae and biofilms are a common food source for bacteria and can assist the sustainability of bacteria supporting environments.



Inlet louvers should be cleaned as required to reduce scale buildup. Replace inlet louvers that are cracked or damaged to maintain performance.



I Make-Up Valve

Water within the cooling tower is continually removed from the system via evaporation, drift and bleed. The mechanical make-up valve returns fresh water to the system preventing the system from running dry.

The make-up valve should be inspected regularly and adjusted as needed to maintain the correct operating water level. During inspection ensure the valve can open and close freely. If the make up valve sticks closed the system can run dry, if the make up valve sticks open fresh water will be lost to overflow.

TIP

A float valve that releases water when closed indicates the rubber seal inside is damaged and the seal or the entire valve needs to be replaced.



J Strainer

Cooling tower strainers are designed to keep large debris from being drawn into downstream strainers or pumps. Strainers should be checked regularly to make sure they are not blocked or displaced from the suction opening. Many competitors cooling towers utilize galvanized suction strainers that can corrode allowing corroded pieces of the strainer to be drawn into the pipe system. Corroded or damaged strainers should be replaced to prevent a reduction in water flow or damage to downstream equipment.

TIP

Corroded strainers can break apart and damage down stream equipment. Strainers are the first line of defence in keeping debris out of the system.



Common Issues

Beyond regular maintenance items listed in (A) to (J) it can be common for equipment designs or materials of construction to prematurely fail. The primary cause can be design, incorrect material selection, poor maintenance or improper water treatment. Mr. GoodTower® Australia field service technicians are factory trained to diagnose and repair equipment from multiple manufacturers including BAC, Marley-Temcel, Superchill and others. During site inspections our technicians will also review know common issue areas such as centrifugal fan wheel arrangements, galvanized panels and improper fibreglass designs.

Centrifugal Fan Wheels

Centrifugal fan wheels are utilized in forced draft equipment and are commonly manufactured from galvanized steel, or epoxy painted steel. Centrifugal wheels are exposed to water spray and humid condensation. Without maintenance galvanized and epoxy painted wheels will eventually develop rust and the blades could fail causing the wheel to break apart. Mr. GoodTower® can supply and install stainless steel fan wheels that meet or exceed competitors unit requirements and will last the lifetime of the equipment.



Corroded Panels

Inspect steel equipment panels inside and out for signs of corrosion. It is common for steel force draft equipment to corrode at the fan wheel housings and internal snouts, if corrosion is found on these components it should be treated and repaired immediately before leaks or damage to the fan wheel occurs. Check between the fill and casing panels on crossflow steel cooling towers as this is often a common location for rust to develop.



Fibreglass Construction

EVAPCO Australia has the largest offering of fibreglass cooling towers, evaporative condensers, fluid coolers and bulk air coolers in the world and the experience to manufacture fibreglass equipment for long trouble free service. Not all equipment manufacturers possess the fibreglass manufacturing capability or experience that EVAPCO has developed. This is evident in the failures of competitors fibreglass equipment that Mr. GoodTower® service technicians are regularly called to repair. Inspect equipment fibreglass for cracks, imperfections or leaks, if found contact Mr. GoodTower® immediately for diagnosis and repair.



Cracked casing panel on competitors RCT cooling tower.



Collapsed fibreglass fan cylinder on competitors IL cooling tower.

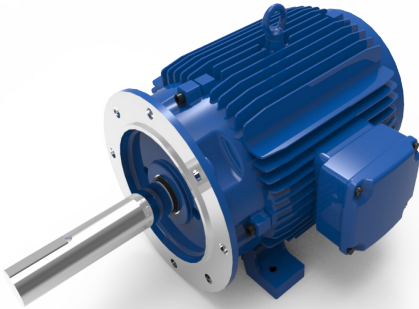


Cracked basin on RCT cooling tower.

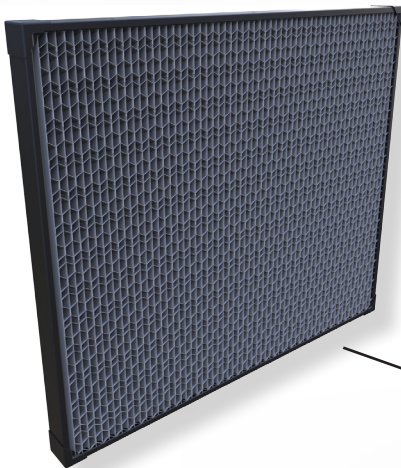


Mr. GoodTower Spare Parts

EVAPCO Australia inventory an extensive array of evaporative equipment spare parts for EVAPCO and competitors equipment. All EVAPCO spare parts are engineered and tested for performance and reliability. EVAPCO Australia spare parts are warranted for two years when installed in competitors equipment.



Cooling Tower spec motors in stock for direct and belt drive applications.

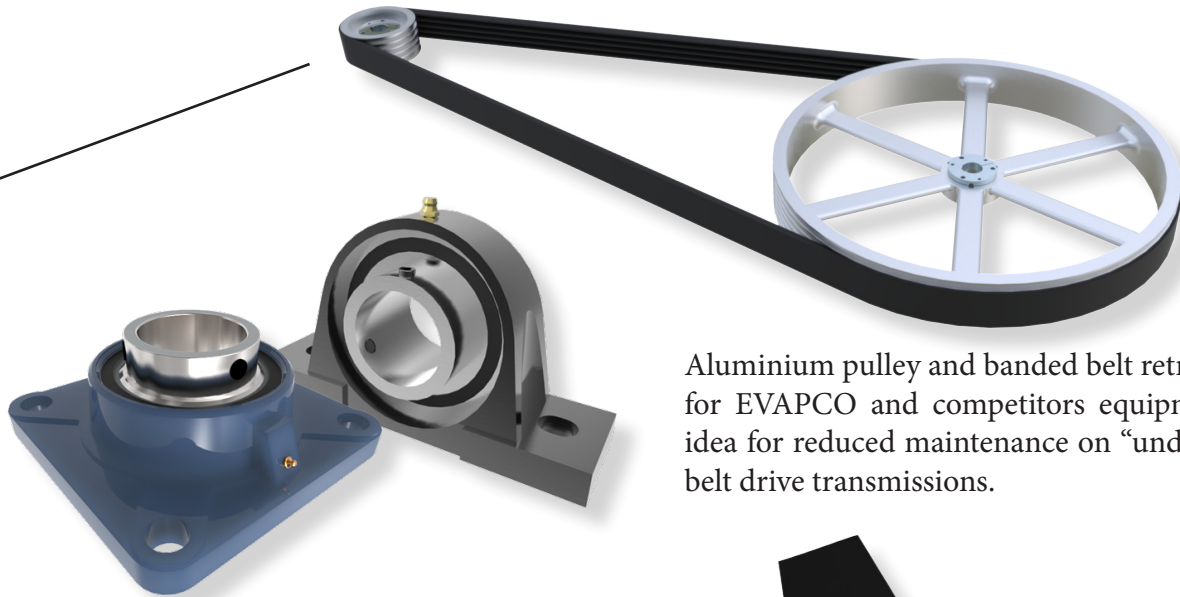


EVAPCO Industry leading WST inlet louvers are available with PVC or stainless steel frames and can be manufactured to suit custom applications.



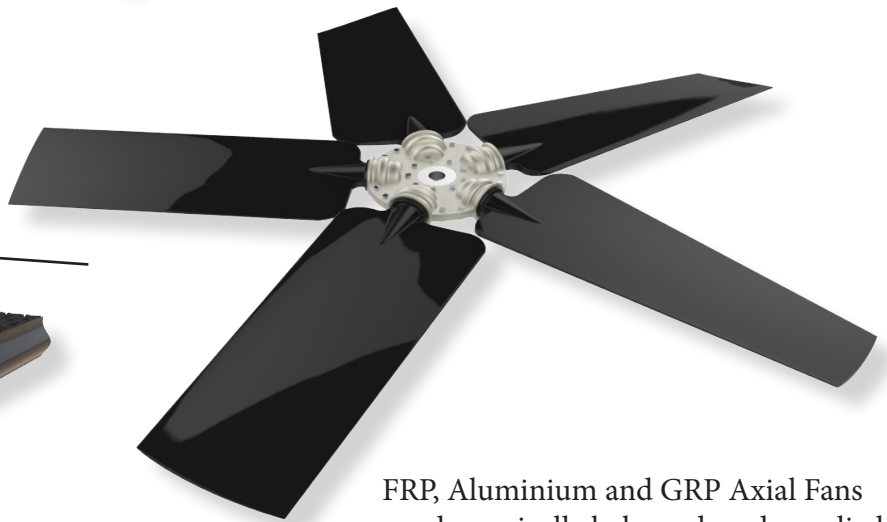
EVAPCO Australia warehouse inventory of spare parts for all makes and models of equipment.





Aluminium pulley and banded belt retrofit kits for EVAPCO and competitors equipment are idea for reduced maintenance on “underslung” belt drive transmissions.

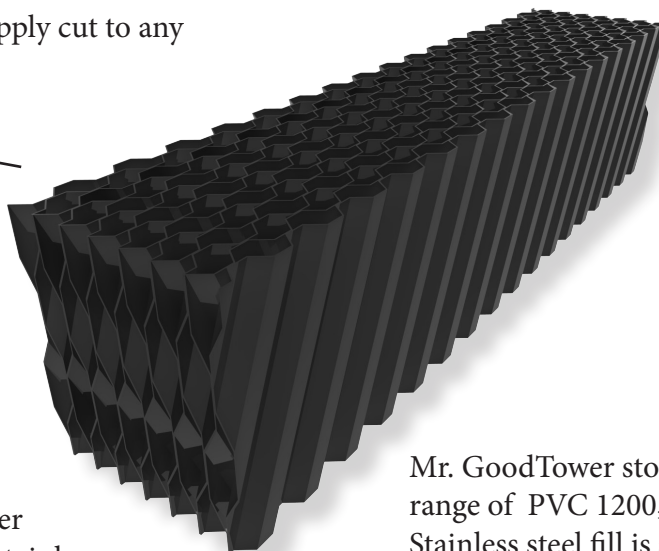
Heavy Duty Cooling tower grade bearings available with triple seals for increased protection.



FRP, Aluminium and GRP Axial Fans are dynamically balanced, and supplied with installation hardware and instructions.



EDE-001 Drift eliminators exceed the requirements of Australian Standards. Mr. GoodTower can supply cut to any dimensions



Mr. GoodTower stock a huge range of PVC 1200, 1900 and splash fill. Stainless steel fill is also available for high temp applications.

EVAPCO Make-Up valves are designed for the turbulent cooling tower basin environment. Feature brass and stainless steel components for extreme conditions.

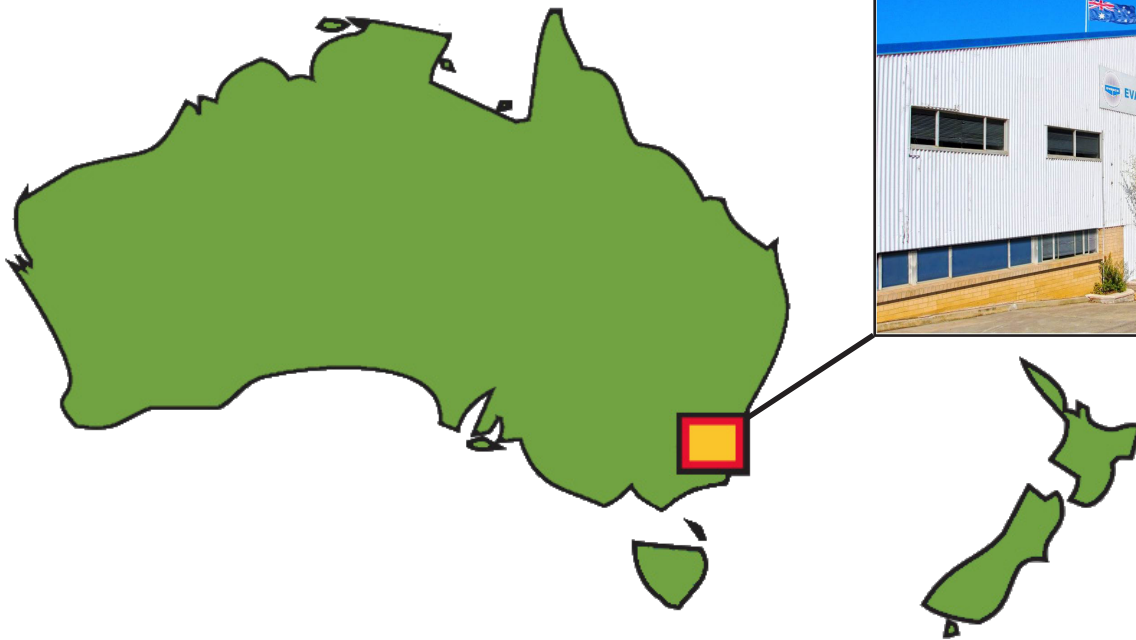


Mr. GoodTower® Service Centres

Mr. GoodTower® Service Centres proudly offer free unit inspections for all makes and models of cooling tower, fluid cooler or evaporative condenser. Mr. GoodTower® Service Centres are located in all major capital cities across Australia and New Zealand and specialize in assisting equipment owners with preventative maintenance plans that continue efficient system performance.

- **Extend Equipment Life!**
- **Maintain Thermal Performance!**
- **Eliminate Problems!**
- **Reduce Maintenance Costs!**

Take a proactive approach to equipment service and maintenance, Contact EVAPCO Australia today for contact information of all local Mr. GoodTower® Service Centres supporting Australia and New Zealand.



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