

M-Series Industrial Coolers and Condensers



- Superior thermal performance combined with ease of maintenance
- Modular design for flexibility
- Shell designed to last the life of the plant
- Designed to meet requirements of AS/NZS3666.1:1995

Licensed to Manufacture



Thermal-Pak Coils,
Fluid Coolers,
Condensers & Towers

Designed for ease of cleaning using rugged fibreglass—a long-term investment



► *Providing significant energy savings over conventional forced draft units*

which may begin to corrode after only a few years of service.

Aqua-Cool Towers is the established leader in fibreglass cooling tower technology. Our expertise in fibreglass technology allows us to guarantee the structure of each unit for five years. This is another assurance that your investment in an Aqua-Cool unit is a long term investment that will serve well and effectively.

Our product offering now includes the MEC range of evaporative condensers and the MFC range of evaporative fluid coolers. These additions to our MSS range of towers provide you with excellent thermal performance, ease of maintenance and long life never before seen in the industry.

Our cooling units have a drift loss of less than **0.001%**, in accordance with AS 4180.1—surpassing the requirements of AS/NZS 3666.1. and providing an environmental benefit of reduced water and chemical loss. Our commercial steel coil design is designed, constructed and approved to AS 1210.

So, in the end, the most economical unit is the one which does not need continual replacement of steel components, provides you with large coil heat transfer surface area and is designed for ease of cleaning and access: an Aqua-Cool Towers M-Series Evaporative Cooler or Condenser.

The choice of the right evaporative condenser or fluid cooler, like the choice of any capital equipment has to be looked at on a long term basis. The initial cost of purchase may only be the start of the cost of owning evaporative or cooler equipment. If regular maintenance is required, or worse, if rusting of the exterior shell or internal parts means replacement, the original investment is only the starting cost of a very expensive piece of equipment.

Buying for the long term means the user has to look at the cost of ownership as part of the original purchasing consideration. Here's where the prospective purchaser cannot go past an Aqua-Cool evaporative condenser or fluid cooler.

Built from the ground up to comply with AS/NZS 3666.1:1995, Aqua-Cool Towers, coolers and condensers are made of robust fibre reinforced polyester (FRP) for several reasons. FRP makes cleaning easier. The gel coat forms the interior of each tower. This, plus the use of rounded corners and width, full height access panels, make for superior ease of cleaning.

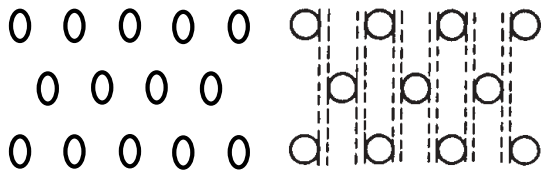
The company's expertise in the use of fibreglass means that the FRP shell is made to last. Unlike steel, FRP will not corrode. This, plus the use of non-corrosive material in the interior of each tower means that corrosion of the tower is not a problem that the user will expect to encounter—unlike steel-shelled alternatives



▲ *Testing drift loss to AS 4180.1*

The Evapco connection

Aqua-Cool Towers is the licensee for Evapco, Inc. in Australia and New Zealand. We are authorised to manufacture Evapco Thermal-Pak coils, fluid coolers, condensers and towers.



▲ *The Thermal-Pak coil design (left) has an elliptical tube design compared to the round tube coils (right) of other manufacturers which equates to far more surface area of coil.*

Thermal-Pak coil design

Aqua-Cool's MEC range of evaporative condensers and MFC range of evaporative fluid coolers use the advanced Evapco Thermal-Pak coil design. This assures greater operating efficiency.

The elliptical tube design allows for closer tube spacing, resulting in greater surface area per plan area than round tube design. In addition, the Thermal-Pak design has lower resistance to airflow and permits greater water loading. This makes Thermal-Pak coil the most effective design available.

Airflow through the coil is counterflow to the refrigerant flow, providing the most efficient heat transfer process. This special coil design is utilised to reduce the air pressure drop through the unit while maximising tube surface area and increasing its heat transfer capabilities.

The uniquely-shaped tubes of the coil area are staggered in the direction of the air flow to obtain a high film coefficient. As well, all tubes are pitched in the direction of refrigerant flow to give good drainage of liquid refrigerant.

The coils are manufactured from high quality copper

Evapco is a leading international manufacturer of cooling towers, fluid coolers and condensers. Based in Maryland, USA, the company has strong emphasis on research and quality products, which works in well with our manufacturing and marketing policy at Aqua-Cool.

Evapco's dedication to research has resulted in many fluid cooler and condenser innovations. This includes the patented Thermal-Pak coils, a major advancement in heat transfer efficiency.

> Some typical applications:

Steel mills: quenching tanks, rolling mills, blast furnaces

Manufacturing: air compressors, injection moulding, transformers, plating equipment

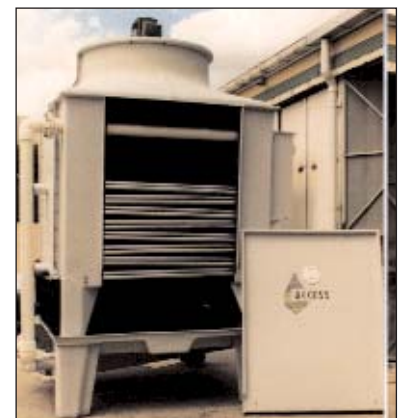
Industrial fluids: debensonified oils, hydraulic oils, plating solutions

Refrigeration: Ammonia condensers/scrubbers, HCFC condensers



▲ Coils are available in steel or copper

or steel tubing following the most stringent quality control procedures. Each circuit is inspected to assure material quality and then tested before being assembled into a coil. Finally, the assembled coil is tested at 2400 kPa air pressure under water to make sure that it is leak free.



▲ No direct sunlight on heat transfer surfaces or water distribution system = no algae problems = low maintenance = low overall operating costs.

Features and benefits of M-series industrial coolers and condensers

▼ All patterns and moulds manufactured in-house by Aqua-Cool tradesmen.



cleaning is quick and easy.

B Five year warranty on fibreglass shell.

UV-stabilised materials are designed for constant water contact, sun, hot/cold air temperature extremes. Thick wall sections assure structural integrity and long service life.

C Pumps are easy to access and clean, with good positive suction heads.

D Access panel and anti-splash louvres are easy to remove.

E **Low operating costs** due to the M-series condensers and coolers efficient design. For example, fan cylinder inlet and large plan area keep internal static down, ensuring low operational power consumption. Motors are rated to IP56 for outdoor, moist air extremes found in cooling tower applications.

F **Superior air inlet louvres** help prevent "splash out". Louvres are removable for access to basin for cleaning purposes and also prevent larger air-borne debris from entering the system. The air inlet louvres are constructed of corrosion resistant PVC. and they enclose the basin.

With the reduction of sunlight into the cold water basin, the potential for algae growth is substantially reduced, helping keep water treatment and maintenance costs to a minimum.

A **Fibreglass interior** for easy cleaning. The internal surfaces of the tower including basin, cased wall and the fan cylinder are moulded gel-coat. This gives a glass type finish to help ensure that

G **Attractive aesthetic design.** Careful attention is paid to the external appearance of our units, recognising that most installations are highly visible. The unit's clean, orderly design fit into almost any manufacturing, industrial or air conditioning location. Optional custom colours are also available!

H **Structural tower base** is suitable for mounting and bolting down and is rated for various earthquake zones.

I **Eliminators are easy to access.**

J **The water distribution system** is PVC and is easy to inspect and, if required, the laterals can be removed for cleaning. With positive threaded nozzles, no problems will be encountered with these being dislodged due to poor maintenance and ensure that high pressure surges do not displace the nozzle. Low inlet pressure is all that is required for efficient water coverage.



▲ **Checking water distribution and nozzles operation is easy**



▲ **Quick and easy cleaning of sumps in large units**



More features and benefits

▶ **Designed around the Australian and New Zealand Standard.** MEC evaporative condensers and MFC fluid coolers were designed and built to conform to AS/NZS 3666

▶ **On-going maintenance costs are reduced.**

▶ **Basin edges are rounded** and sloped to drain, to ensure easy sludge removal.

▶ **High efficiency fans and blades.** M-Series evaporative condensers and coolers utilise all aluminium or fibreglass low noise fans, with low kilowatt requirement. The majority of the models are furnished with adjustable pitch blades.

▶ **Mechanical equipment.** Where they are utilised, mechanical components, such as bearings and belts are designed for heavy and continuous industrial duty to assure long life. All belt drive units are supplied with extended lubrication lines as standard. Gearbox drives are available as an optional feature.

▶ **Thermal guarantee.** All products produced by Aqua-Cool Towers are thermally guaranteed to perform in their selected field environment. Selection of our M-series condensers and coolers is based on many years of extensive field experience.

Our design engineers have sized all units with consideration to varying operating conditions which can have significant effect on thermal performance.

▶ **Eliminators.** Constructed from PVC, the efficient

drift eliminators remove entrained water droplets from the air stream to limit drift rate to less than **0.001%** (confirmed by tests to AS 4180.1).

With the advantage of efficient drift eliminators, our towers can be installed near sensitive areas. The eliminators are light and easy to remove. Eliminator shape and structural integrity is maintained due to the utilisation of a unique end cap design.

▶ **Basin is easily accessible** for cleaning, no need for personnel to enter confined space to clean basin.

▶ **Positive thread nozzles** are easy to remove for cleaning.

▶ **Water loss minimised.** Highly engineered drift eliminators and air inlet louvres combine to save water.

▶ **Easy site installation.** The plan area requirements of the range are generally less than that needed by comparable units. The efficient counter-flow design which introduces air from all four sides provides greater heat transfer within a given plan area—minimising space requirements. Units can be transported either partially factory assembled or be fully site assembled.

▶ **Interior protected from sunlight. Interior areas such as the coil surface area are protected from exposure to direct sunlight. This helps prevent algae growth and on-going maintenance problems.**

Effective water coverage

The water distribution system is an important part of any evaporative condenser and fluid cooler. To provide the maximum heat transfer and minimise scaling, the coil must be drenched with water at all times. Utilising the Evapco system, approximately four litres a second is circulated over every square metre of coil face area.

MEC range of evaporative condensers and MFC range of evaporative fluid coolers have greatly simplified water distribution systems, with the largest non-clog water diffusers available for each unit. The diffusers are threaded into the water distribution header to ensure correct positioning. A collar on the diffuser extends into

Proven technologies give owner advantages

Aqua-Cool Towers and Evapco are committed to providing the highest quality products at the lowest possible cost. In order to achieve this goal, a major program of research and development is on-going. This program has resulted in a number of advancements in evaporative cooling equipment design which provides our customers with the highest quality equipment, affordably priced. These include accurate thermal ratings, a new more efficient Thermal-Pak coil design, PVC drift eliminators, type 304 stainless steel strainers and simplified water distribution system as standard equipment.

Evapco is committed to continual product improvements through its extensive research and development program. Evapco's state-of-the-art 2,000 m² Research Centre located at its Maryland headquarters has enabled the company to remain industry leader in technology and product innovation. This facility is among the largest of its type in the evaporative cooling industry—and is the most advanced.

With this commitment to constant product improvement and quality, the customer can be assured of obtaining the best product possible.



▲ Large access panels make servicing easy

the header and acts as an anti-sludge ring to reduce the need for maintenance. Excellent flooding of the coil is maintained at all times without numerous small orifice nozzles.

For corrosion protection, the diffusers are made of ABS plastic and the distributor pipes are made of PVC.



▲ Evapco's refrigerant test centre.



▲ No need to enter confined spaces to clean basins.



▲ Motors, drives, pumps are all located externally for ease of operator access. No need to enter confined spaces to adjust belts and so on.

Meeting Standards

MEC and MFC modular units are designed and constructed to meet the following standards:



▲ *Checking dimensional correctness.*

AS/NZS 3666.1-1995 Air-Handling and Water Systems of Buildings - Microbial Control.

AS 4180.1 Drift Test.

AS 1170 Part 2 - 1989 SAA Loading Code - Wind Loads.

AS 1470-1986 Health and Safety at Work - Principles and Practices.

AS 1657-1985 SAA Code for

Fixed Platforms, Walkways, Stairways and Ladders.

AS 3500-1900 Australian Plumbing Code.
AS1210 SAA Code for unfired pressure vessels.

Fibreglass engineering capabilities

Our expertise in fibreglass design and manufacturing has seen us involved in diverse projects. Some unusual ones include the construction of fibreglass storage tanks for holding sulphuric acid (in temperatures up to 95°C) and a 30 m diameter fibreglass dome in an odour control plant. The dome was self supporting and built in 27 sections, with each one weighing 600 kg.



▲ *Aqua-Cool MSS series open cooling towers designed for use in heavy industrial and mining applications (top and top right).*

Optional Accessories

The following are accessories to the MEC and MFC range of coil products:

Two-speed Motors. Fan motors are available in two speed options for additional capacity or reduced power consumption.

Gear Box. As an optional feature, gear boxes can be fitted to larger models.

Balance Line Connections are available for multi-cell configurations.

Stainless Steel. Stainless steel hardware, mechanical supports and fan guards can be supplied if required in lieu of our standard hot dipped galvanised constructions.

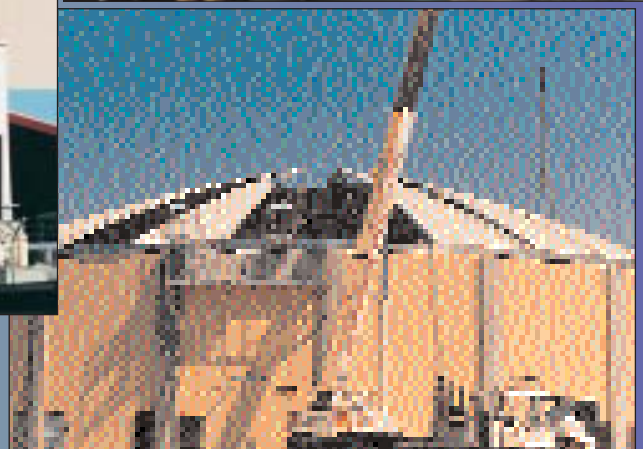
Sump Heaters. These are also available as an optional feature.

External Colour. Different colour finishes are available, if required.

Vibration Isolation can be offered to conform to any standard.

Super Low Noise. Models are available to suit all applications.

Ladders, Safety and Perimeter Handrails are available when required. These and other safety items may be required by government or industry standards on certain sites. Installation would be at the site.



▲ *Installing a 30 m self-supporting fibreglass dome for odour control plant.*

Engineering Specification: M-series Industrial Coolers & Condensers

A. GENERAL: Evaporative Condenser Specification

Furnish and install as shown on plans an Aqua-Cool Towers 'MEC' Evapco Model _____ Evaporative Condenser. Each unit shall have condensing capacity of _____ kW heat rejection, operating with _____ refrigerant at _____ °C condensing temperature and _____ °C entering wet bulb temperature.

A. GENERAL: Industrial Fluid Cooler Specification

Furnish and install as shown on plans an Aqua-Cool Towers 'MFC' Evapco Model _____ Closed Circuit Cooler. Each unit shall have the capacity to cool _____ of _____ from _____ to _____ with a _____ entering wet bulb temperature.

COMMON SPECIFICATIONS

B. UNIT STRUCTURE

The unit shall be manufactured from fibreglass, with all interior surfaces, including fan cylinder, having moulded gel coat finish to ensure ease of cleaning.

Unit design shall include a removable full height, full width side panel for complete cleanability and access, and to enable service personnel to be clearly visible inside the structure.

All units shall have a small access port fitted to allow inspection of the distribution system. This will eliminate the need for removing eliminators or access doors for inspection. All water connections shall be fibreglass or PVC. Cold water basin shall have edges rounded and sloped to drain as per AS/NZS 3666.

Exterior surfaces shall be flow coated with UV-stabilised material. Tower support legs shall be moulded from fibreglass.

(Note: Normal colour is grey, as an optional extra, tower may be supplied in any colour to suit needs.)

C. HEAT TRANSFER SECTION

Coil: Shall only be steel or copper, manufactured to Evapco Thermal-Pak coil design. Coils shall be located under fan and eliminator sections and only elliptical tube design shall be used in steel coil

Water Distribution System: Each inlet shall deliver water to the distribution system by means of a _____ transverse header pipe with longitudinal pipe laterals _____ and low pressure plastic spray nozzles.

Drift Eliminators: Drift eliminators shall be designed _____ utilising a series of sinusoidal-shaped blades. _____ Eliminators shall be installed in easy to clean and _____ handle modules limiting drift to less than 0.001%, in _____ compliance with AS4180.1. Eliminator blades shall be _____

secured in end-caps to help prevent distortion and located in a horizontal position.

D. MECHANICAL EQUIPMENT

Fan: Fan shall be multi-blade axial flow with variable or fixed pitch manufactured from aluminium, fibreglass or polypropylene. Fan shall be direct or belt driven.

Mechanical Support: The mechanical support equipment shall be of a steel construction, hot dipped galvanised after fabrication and designed to maintain alignment of rotating parts.

Mechanical support will be installed at top of fan cylinder for easy maintenance and be supported by the fan cylinder only. Easily removable fan guards shall be fitted.

Motor: Electric motor shall be to IP56 D Standard totally enclosed, tropic proofed, with shaft down located outside of unit's confines

E. INLET LOUVRES

Inlet louvres shall be vacuum formed from PVC designed to prevent splash-out and help inhibit sunlight to tower interior. Air-inlet louvres shall be of two pass configuration installed at 90 degrees, removable and be located in PVC or optional stainless steel frames.

F. TOWER CONFIGURATION

Tower shall be a counter flow design so as to minimise sunlight penetration of interior wetted area. Eliminators shall be installed in horizontal configuration. Access to clean basin shall be available from all four sides.

E. OTHER NOTES

No direct sunlight is permitted on any heat transfer surface.



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