

AAT

COOLING TOWERS



ADVANCED **T**ECHNOLOGY IN
INDUCED DRAFT, COUNTERFLOW COOLING TOWERS

**109 TO 4075 NOMINAL TONS
(479 TO 17,916 kW)**

EASY SOLUTIONS... BETTER CHOICES!



Printed on recycled paper
using soy-based inks





THE ADVANCED TECHNOLOGY DESIGN

EVAPCO, Inc., continues its dedication to advancements in induced draft, counterflow cooling tower technology and easy maintenance with the Advanced Technology Cooling Tower...The EVAPCO AT!

The AT is the result of a decade of engineering success based on easy maintenance, durable construction and a highly efficient design. The AT brings marquee features that make it the better choice in cooling towers. These features are presented in this exclusive AT Marketing brochure.



Since its founding in 1976, EVAPCO, Inc. has become a world-wide leader in supplying quality cooling equipment for thousands of customers in both the commercial and industrial markets.

EVAPCO's success has been the result of a continual commitment to product improvement, quality workmanship and a dedication to providing unparalleled service.



Our emphasis on research and development has led to many product innovations – a hallmark of EVAPCO through the years.

The ongoing R & D Program enables EVAPCO to provide the most advanced products in the industry – technology for the future, available today.

With 13 facilities in seven countries and over 160 sales offices in 42 countries world-wide, EVAPCO is ready to assist in all your equipment needs.



Totally Enclosed Fan Motors

- Motors positioned for external access.
- Assures long life.
- Motor location allows for easy accessibility and serviceability.
- Five (5) Year motor warranty.

EVAPCO Power-Band Drive System

- The AT Cooling Tower features the highly successful, easy maintenance, heavy duty Power-Band Drive System.
- Standard heavy-duty pillow block bearings with a minimum L10 life of 75,000 hours.
- Extended lube lines.
- External motor/belt adjustment.
- Aluminum Alloy Sheaves, Solid-Back Multi-Groove Power-Band Belts and Totally Enclosed motors are standard.
- Five (5) Year Motor and Drive Warranty.
- Optional Gear Drive System available on most models.



Exclusive 5 Year Warranty

- Covers the complete drive system, including the motor.
- Covers all drive components on belt or gear drive units.
- Standard on all AT Models.
- Exclusive 5 year complete product warranty on models with optional stainless steel construction.

Clean Pan Sloped Basin Design

- Designed to completely drain the cold water basin.
- Helps prevent buildup of sediment and biological film.
- Eliminates standing water after drain down.
(See details of design on page 6)



EVAPCOAT Corrosion Protection System

- G-235 Galvanized Steel Construction and Stainless Steel Strainers–EVAPCO set the standard with 2.35oz. of zinc per square foot of surface area.
- Another EVAPCO standard–the stainless steel suction strainer eliminates excessive wear and corrosion.
- Non-corrosive PVC Water Distribution System, Drift Eliminators and Inlet Louvers.
- This system provides maximum corrosion protection as standard.

PROVIDING EASIER SOLUTIONS AND BETTER CHOICES

Available in 32 Cross Sections and a capacity range of 109 to 4075 Nominal Tons (479 to 17,916 kW)! The AT has a model for every application.

- Consult the AT Engineering Manual Bulletin 350 and the iES Equipment Selection Program for Selections and Technical Assistance including Applications, Layout, and Structural Steel Support.
- If there is an application for which the standard catalog product line does not work, EVAPCO will make a cooling tower that will fit your requirement! Consult the REP Catalog Bulletin 380 for Alternate Cooling Tower Selections or contact the factory.



Optional Motor Davit and Working Platform

Motor Davit

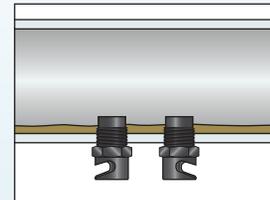
- Motor davit and bracket option for easy motor removal.
- Also available for Gearbox removal.

Platform

- Platform and ladder arrangement available as an option.
- Provides additional working surface for the service mechanic.



EVAPCO unequivocally guarantees the thermal performance of the AT cooling tower product line.



Water Distribution System

- Non-corrosive PVC construction with ABS nozzles.
- Large orifice nozzles prevent clogging and are threaded for easy removal.
- "Anti-Sludge" ring prevents sediment from clogging the diffuser opening.
- System branches have threaded end caps to assist with debris removal.



Certified-Standard 201

- Independent Certification.
- No costly field performance tests required.



Quick Connect Piping System

- All inlet and outlet piping connections are beveled for welding and grooved to accept a mechanical coupling device as standard.
- Facilitates easy pipe connections for quick installation.
- Flanged connections are available as an option. (See page 10 Optional Equipment)



Clean Pan Sloped Basin Design

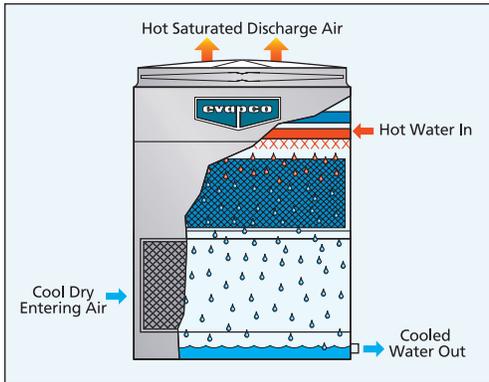
- Designed to completely drain the cold water basin.
- Helps prevent buildup of sediment and biological film.
- Eliminates standing water after drain down. (See details of design on page 6)



AT DESIGN ADVANTAGES

The Advanced Technology Design

The AT Cooling Tower product line is an Advanced Technology design which utilizes induced draft, counterflow technology—the most efficient in the industry and the best design for operation in a freezing climate. The counterflow design provides the AT Cooling Tower with inherently better operational and maintenance features. These features are described below.



Principle of Operation

Warm water from the heat source is pumped to the water distribution system at the top of the tower. The water is distributed over the wet deck fill by means of large orifice nozzles. Simultaneously, air is drawn in through the air inlet louvers at the base of the tower and travels upward through the wet deck fill opposite the water flow. A small portion of the water is evaporated which removes the heat from the remaining water. The warm moist air is drawn to the top of the cooling tower by the fan and discharged to the atmosphere. The cooled water drains to the basin at the bottom of the tower and is returned to the heat source.

The vertical air discharge of the AT design and the distance between the discharge air and fresh air intakes, reduces the chance of air recirculation, since the warm humid air is directed up and away from the unit. For detailed layout information please consult EVAPCO's Equipment Layout Guidelines Bulletin 311.

Patented** Efficient Drift Eliminators

An extremely efficient drift eliminator system is standard on the AT Cooling Tower. The system removes entrained water droplets from the air stream to limit the drift rate to less than 0.001% of the recirculating water rate.

With a low drift rate, the AT Cooling Tower saves valuable water and water treatment chemicals. The AT can be located in areas where minimum water carryover is critical, such as parking lots.

The drift eliminators are constructed of an inert polyvinyl chloride (PVC) plastic material which effectively eliminates corrosion of these vital components. They are assembled in sections to facilitate easy removal for inspection of the water distribution system.

Patented* EVAPAK Fill

The patented EVAPAK® fill design used in the AT Cooling Tower is specially designed to induce highly turbulent mixing of the air and water for superior heat transfer. Special drainage tips allow high water loadings without excessive pressure drop. The fill is constructed of inert polyvinyl chloride, (PVC). It will not rot or decay and is formulated to withstand water temperatures of 130°F (55°C). Because of the unique way in which the crossfluted sheets are bonded together, and the bottom support of the fill section, the structural integrity of the fill is greatly enhanced, making the fill usable as a working platform.

The fill selected for the AT Cooling Tower has excellent fire resistant qualities. AT Cooling Tower fill has a flame spread rating of 5 per ASTM-E84-81a.

A higher temperature fill is available for water temperatures exceeding 130°F (55°C). Consult your EVAPCO representative for further details.

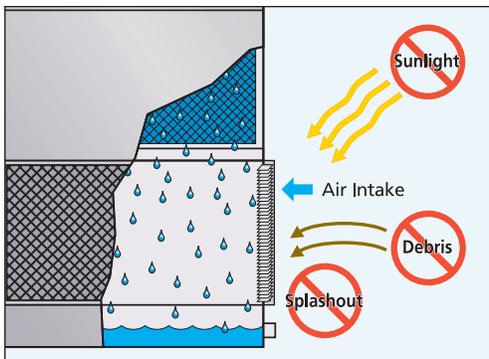
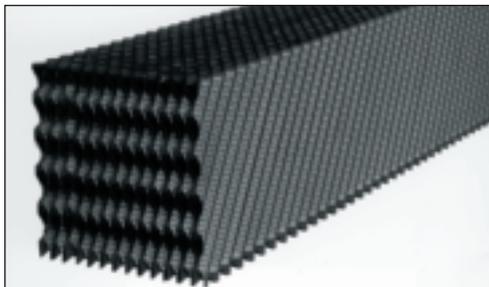
Superior Air Inlet Louver and Screen Design

The air inlet louver screens on the AT are constructed of corrosion-free PVC. They are a two pass design that minimizes splashout and reduces the potential for algae formation inside the tower.

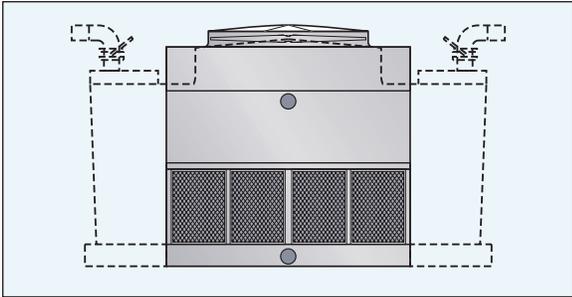
In single pass louver systems used by other manufacturers, circulating water droplets tend to splashout, especially when the fans are shut off. With the two pass louver system, the water droplets are captured on the inward sloping pass, minimizing splashout problems.

EVAPCO's patented louver design completely encloses the basin area. In addition to eliminating splash out, EVAPCO's inlet louver screens are of a 'Sight Tight' design. Direct sunlight is blocked from the water inside the cooling tower, thereby reducing the potential of algae formation. Water treatment and maintenance costs are substantially reduced.

While effectively containing the recirculating water and blocking sunlight, the louver design has a low pressure drop. The low pressure drop results in lower fan energy consumption, which reduces the operating costs of the cooling tower.

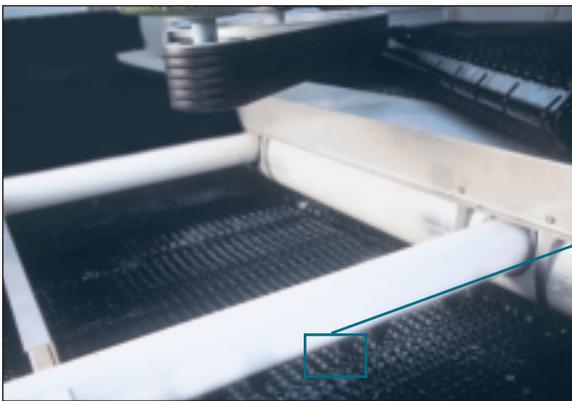


DESIGN ADVANTAGES **AT**



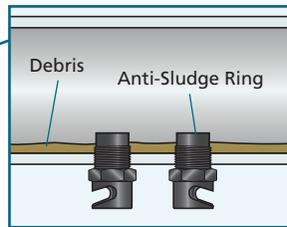
Reduced Piping Costs

Each cell of the AT Cooling Tower is furnished with one inlet and one outlet piping connection. This design reduces the amount of external piping and thereby lowers the installed cost of the cooling tower. The water distribution system is pressurized and self balancing. Since field balancing is not required on the AT, the need for flow balancing valves is eliminated, further reducing the cost of tower installation. The wide orifice nozzles with anti-sludge ring used in the AT water distribution system helps prevent clogging, reducing the maintenance costs of the water distribution system.

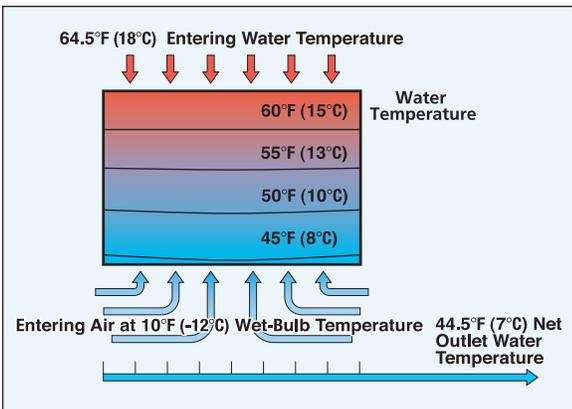


Pressurized Water Distribution System

The water distribution system is made of schedule 40 PVC pipe and ABS plastic water diffusers for corrosion protection in this key area. The piping is easily removable for cleaning. The water diffusers have a minimum opening of 3/8 by 1 inch (10mm by 25mm) and are practically impossible to clog. They also have an anti-sludge ring extending into the headers to prevent sediment from building up in the diffuser opening. In addition, the spray branches have threaded end caps to allow easy debris removal.



The spray pressure for all AT Cooling Towers is between 1 and 6 psig (7 and 42 kPa) at the inlet header. The actual spray pressure will be shown on the certified drawings which are prepared for each unit.



Optimum Design for Freezing Climates

The counterflow fill design used in the AT Cooling Tower is well suited for winter operation. The wet deck surface is totally encased, and protected from freezing winds thus inhibiting ice formation on the fill section.

The even temperature gradient of the counterflow fill design makes the AT Cooling Tower the ideal unit for operation in freezing climates.

The counterflow design of the AT Cooling Tower fill section reduces the chance of ice formation and with bottom support, eliminates fill collapse should ice form.



Fast, On-Time Shipments

The AT is a completely factory assembled cooling tower manufactured by a dedicated professional workforce, expert in building cooling towers. Factory trained mechanics and EVAPCO's strict quality control and inspection procedures guarantee the quality of every unit shipped.

EVAPCO's controlled factory environment ensures fast on-time shipments, allowing the AT to be available **WHEN THE CUSTOMER WANTS IT!**



AT MAINTENANCE ADVANTAGES

The Advanced Technology Easy Maintenance Basin Design

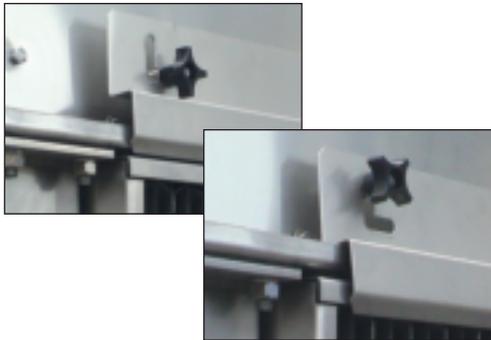
The cold water basin is the most important area of a cooling tower to maintain. As a result of the evaporation process in a cooling tower, dirt and debris will collect in the basin and must be cleaned out on a regular basis. EVAPCO's AT basin section is designed to allow quick and easy access—promoting maintenance of the cold water basin. The basin features the following:



Easy Access

The cold water basin section is easily accessible from ground level by simply loosening the (2) two Quick Release Fasteners on the inlet louver assemblies surrounding the cooling tower and lifting out the lightweight louver.

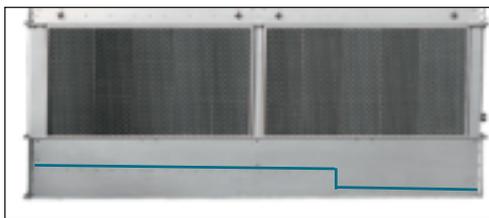
The basin can be accessed from all (4) four sides of the cooling tower. The bottom of the fill section is a minimum of four (4) feet (1.2m) above the basin floor. This open basin design enables the AT basin to be easily cleaned.



Easy, Removable Air Inlet Louvers with Quick Release Fasteners

The AT features a Quick Release Fastener design consisting of (2) two large thumbscrews and a retaining bracket system. By loosening the thumbscrews, the retaining bracket lifts away from the louver frame, allowing the louver to be removed while the retaining bracket and thumbscrews stay on the cooling tower.

- Design allows quick removal of louvers.
- Louver fastener is large and easy to release.
- Louver fastener remains on the unit—eliminating the possibility of missing hardware.



Clean Pan Basin Design

The AT features a completely sloped basin from the upper to lower pan section. This "Clean Pan" design allows the water to be completely drained from the basin. The cooling tower water will drain from the upper section to the depressed lower pan section where the dirt and debris can be easily flushed out through the drain. This design helps prevent buildup of sedimentary deposits, biological films and minimizes standing water.



Stainless Steel Strainers

The EVAPCO standard for many years, the stainless steel strainer is one component of the cooling tower subject to excessive wear and corrosion. With stainless steel construction, this component will last the life of the cooling tower.

MAINTENANCE ADVANTAGES **AT**

The Advanced Technology Easy Maintenance Drive System

The EVAPCO POWER-BAND drive system utilized on the AT Cooling Tower is the *easiest* belt drive system to maintain in the industry. There is no need to stand inside the cold water basin to service the bearings, belts or electrical equipment. In addition, there is no need for fan deck handrails or safety cages, since all periodic maintenance can be safely performed from the side of the AT. The most important features of this design are listed below.

Models AT 19-56 through AT 39-942

Motor Mount, Power Band Belt Adjustment and Bearing Lubrication

The fan motor and drive assembly are designed to allow easy servicing of the motor and adjustment of the belt tension from the exterior of the unit. The T.E.F.C. fan motor is mounted on the outside on these models and is protected from the weather by a cover which swings away for maintenance.

A large hinged access door is located on the side of the unit for easy access to the fan drive system. The belt can be adjusted by tightening the J-Bolts on the motor base and the tension can be checked easily through the access door, all while standing at the side of the unit. The bearings can also be lubricated from the side of the unit. The bearing lubrication lines have been



extended to the exterior casing and are located by the access door, thus making bearing lubrication easy.

Sloped access ladders and working platforms are available as an option to facilitate maintenance. See page 9 Optional Equipment for details.



Models AT 112-012 through AT 428-1248

Motor Mount, Power Band Belt Adjustment and Bearing Lubrication



The T.E.A.O. fan motor is located inside the fan casing on the large AT Cooling Tower, and is mounted on a rugged heavy duty motor base. The motor base is designed to swing completely to the outside of the unit through a very large hinged (14 square feet) (1.3 square meters) access door greatly simplifying motor maintenance.

The unique swinging motor mount designed for these models features easy belt adjustment from the exterior of the unit. The T.E.A.O. fan motor is mounted on an adjustable base which is supported by two heavy duty galvanized steel pipes. The belt is adjusted by tightening an all-thread which runs through the motor base.

The innovative motor base features a unique locking mechanism for a positive belt adjustment and is also used to adjust the belt tension if a wrench is not available.

Bearing lubrication fittings are extended to the side of the unit inside the access door to allow easy application of the bearing lubricant. This external location allows for easy servicing of the bearings and is another important advantage of EVAPCO equipment.

To facilitate motor removal, an optional motor davit is available. See Optional Equipment page 9 of this brochure.



AT DRIVE SYSTEM DESIGN

The Advanced Technology POWER-BAND Drive System Design

The AT Cooling Tower features the highly successful EVAPCO POWER-BAND Belt Drive System engineered for heavy-duty operation. The POWER-BAND Drive System has consistently provided trouble-free operation in the most severe duty cooling tower applications. In addition, the complete drive system including the fan motor is standard with a (5) Five Year Warranty.



On Models AT 19-56 through 39-942



Fan Motors

All AT Cooling Tower models utilize heavy duty totally enclosed (T.E.F.C. or T.E.A.O.) fan motors designed specifically for cooling tower applications. In addition to the standard motors offered on each cooling tower, EVAPCO offers many optional motors to meet your specific needs, including:

- Premium Efficiency Motors
- Multi-Speed Motors
- Inverter-Duty Motors for VFD Applications

The T.E.F.C. motors are located on the outside of the unit on Models AT 19-56 through AT 39-942 and are protected by a hinged, swing away cover.

Models AT 112-012 through 428-1248 have T.E.A.O. motors located inside the fan section on a heavy duty motor base which swings to the outside for repair or removal.

On Models AT 112-012 through 428-1248



Power-Band Belt Drive

The Power-Band drive is a solid-back multigroove belt system that has high lateral rigidity. The belt is designed for cooling tower service, and is constructed of neoprene with polyester cords. The drive belt is sized for 150 percent of the motor nameplate horsepower ensuring long and trouble free operation.

Drive System Sheaves

Drive system sheaves located in the warm, moist atmosphere inside the cooling tower are constructed of an aluminum alloy. Those located externally are protected by a hinged protective cover.

Fan Shaft Bearings

The fan shaft bearings on the AT cooling tower are specially selected to provide long life, minimizing costly downtime. They are rated for an L-10 life of 75,000 to 135,000 hours, making them the heaviest duty pillow block bearing in the industry used for cooling tower duty.

Five Year Drive Warranty

EVAPCO provides a standard 5 year motor and drive warranty on all Power-Band belt drive and optional gear drive AT Cooling Towers. This unique warranty is designed to offer the end user optimum protection against fan drive and motor failure. It is a comprehensive plan which includes the fan, fan shaft, belts, sheaves, fan bearings, gear box, flexible coupling, driveshaft and the motor.



OPTIONAL EQUIPMENT

Optional Equipment

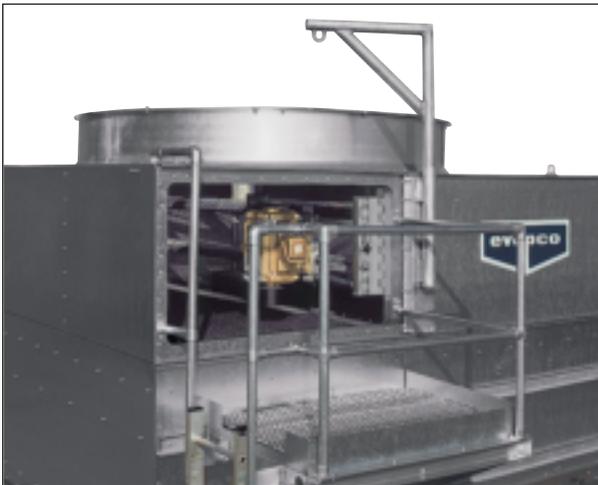
The standard design of the EVAPCO AT provides the customer with the *easiest* cooling tower to maintain in the industry. There are additional options which can make maintenance easier and extend the life of the cooling tower. These options are listed below.



Sloped Access Ladders

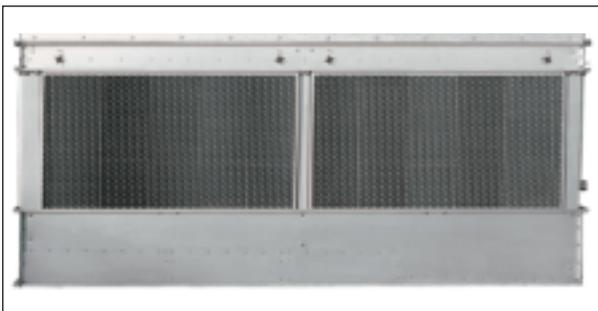
The EVAPCO designed access ladder features a sloped "ships type" ladder arrangement which provides fast and easy access to the water distribution system and drive components. A grab bar is attached to the sloped ladder for safe and easy ascent and descent. There is no need for safety cages or railings with this design. The ladder(s) will ship loose and must be field mounted. Meets all applicable OSHA requirements.

Note: The sloped access ladder is available on all models AT 19-56 through AT 428-1248.



Working Platform & Ladder with Davit

AT Cooling Towers are available with an external working platform and ladder to allow easy servicing of the fan motor and water distribution system. Providing a convenient platform to perform work, the heavy duty galvanized steel platform is self-supporting-which eliminates the need for any external support. A less expensive alternative to field erected catwalks, the working platform option uses a straight ladder as standard and ships in sections for easy installation. The davit option eliminates crane rentals and facilitates the removal of motors and gear drives. The davit and bracket are constructed of heavy duty galvanized steel and are mounted on the side of the unit. The optional fan motor and gear davit ships loose and is installed in the field. (The working platform and ladder meet all applicable OSHA requirements.)

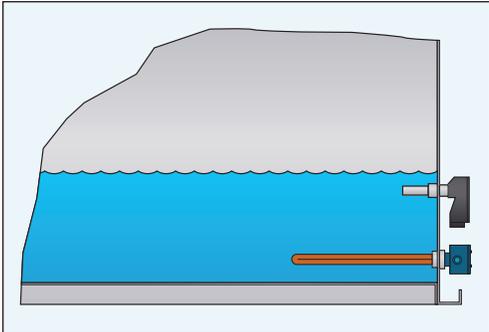


Stainless Steel Water Touch Basin

The AT Cooling Tower has a modular design which allows specific areas to be enhanced for increased corrosion protection. The basin area of the cooling tower experiences turbulent mixing of air and water, in addition to silt build-up. In conjunction with the EVAPCOAT Corrosion Protection System, EVAPCO offers an optional Stainless Steel Water Touch Basin. This option provides Type 304 or Type 316 stainless steel for the entire basin area including the support columns of the cooling tower and the louver frames.

The basin section provides the structural support for the unit and is the most important part of the cooling tower. The Stainless Steel Water Touch Basin provides maximum corrosion protection.

AT OPTIONAL EQUIPMENT



Electric Heaters

Electric immersion heaters are available as an option and are located in the basin of the tower. They are sized to maintain a +40° F (4.5°C) pan water temperature at 0°F (-18°C) ambient with the fans off*. They are furnished with a combination thermostat/low water protection device to cycle the heater on when required and to prevent the heater elements from energizing unless they are completely submerged. All components are enclosed in rugged, weather proof enclosures for outdoor use. Heater control packages that include contactor, transformer or disconnects are available, consult your local EVAPCO representative.

(*) - Electric heater selection based on 0°F (-18°C) ambient temperature. For alternate low ambient heater selections, consult factory. Refer to the factory certified heater drawing for quantity and sizing of heaters.



Electric Water Level Control

EVAPCO cooling towers are available with an optional electric water level control system in place of the standard mechanical makeup valve and float assembly. This package provides very accurate control for the basin water level and does not require field adjustment, even under varying operating conditions.

The control was designed by EVAPCO and is manufactured exclusively for EVAPCO. It consists of multiple heavy duty stainless steel electrodes. These electrodes are mounted external to the unit in a vertical stand pipe. For winter operation, the stand pipe must be wrapped with electric heating cable and insulated to protect it from freezing.

The weather protected slow closing solenoid valve(s) for the makeup water connection is factory supplied and is ready for piping to a water supply with a pressure between 25 and 50 psig (172 and 345 kPa).



Flanged Connections



Bypass Connections with Diffuser Hood



Equalizers and Flume Plates

Other Options

- Heater Control Packages
- Hot Water or Steam Coils
- Steam Injectors
- Bottom Suction Connections
- Vibration Isolators (single cell only)
- Vibration Switches
- Remote Sump Connections
- Motors—Energy Efficient / Inverter Duty / 2S/1W and 2S/2W / Mill and Chem Duty Automotive Duty and Many More, Consult the Factory

Technical Support Services

Internet Equipment Solution

iES is a Web based computer selection program which allows the design engineer to choose EVAPCO models and optimize unit selections. The program allows the engineer to evaluate the equipment's thermal performance, space and energy requirements. Once the model is selected and optional equipment features are inserted, the engineer may output a complete specification **AND** a unit drawing from this program. The software is designed to provide the user with maximum flexibility in analyzing the various selection parameters while in a friendly and familiar Windows format.

The iES software is available to all consulting engineering offices and design-build contractors. The programs are distributed through the local EVAPCO sales representative or the EVAPCO corporate office in Taneytown, MD.

EVAPCO's Website

Log on to EVAPCO's new and improved website (<http://www.evapco.com>) for expanded product information. Users can view and download unit certified and steel support drawings in a .pdf format readable using Adobe Acrobat. In addition, scaled isometric views of our equipment in CAD (.dwg format) are also available. Product Literature, Rigging and Maintenance Instructions and EVAPCO logo apparel and merchandise are all accessible online from your computer.

The iES Equipment Selection Software program may be accessed using Microsoft Internet Explorer after contacting your local EVAPCO sales representative. Users may make Requests for Quotation through the website or by e-mailing EVAPCO at this address: marketing@evapco.com.

With the Internet Equipment Solution program, equipment selections, written specifications, unit drawing files and EVAPCO on-line information are readily available from the comfort of your own office!



MECHANICAL SPECIFICATIONS

FOR POWER-BAND DRIVE AT COOLING TOWERS

Furnish and install as shown on the plans an EVAPCO Model _____ induced draft counterflow cooling tower. Each unit shall have the capacity to cool _____ GPM (lps) of water from _____ °F (°C) to _____ °F (°C) with a _____ °F (°C) entering wet bulb temperature.

Pan

The pan shall be constructed of G-235 hot-dip galvanized steel for long life and durability. G-235 hot-dip galvanized steel designates an average coating thickness of 2.35 ounces of zinc per square foot on the steel. Standard pan accessories shall include overflow, drain, anti-vortexing hood, Type 304 Stainless Steel strainers, and brass make-up valve with plastic float. The entire pan area shall incorporate a stepped configuration for reduced water volume, lower operating weight and easier pan maintenance. The upper and lower pan bottoms shall be sloped to provide positive drainage of the complete basin section. Depressed side outlet sumps which are not an integral part of the basin shall not be acceptable.

Casing

The casing shall be constructed of G-235 hot-dip galvanized steel. The casing panels shall totally encase the sides of the fill section to protect the surface from direct atmospheric contact. *The casing shall not be constructed of flammable materials such as fiberglass.*

Models AT 19-56 to AT 39-942

Fan Motor(s)

_____ HP (kW) totally enclosed fan cooled (T.E.F.C.) ball bearing fan motor(s) with 1.15 service factor shall be furnished suitable for cooling tower service on _____ volts, _____ hertz, and _____ phase. Motor(s) shall be mounted on an adjustable base which is mounted on the side of the unit for service. A hinged protective cover shall shield the motor and sheave from the weather.

Drive

The fan drive shall be a multigroove, solid back V-belt type with taper lock sheaves designed for 1.5 service factor of the motor nameplate horsepower (kW). The belt material shall be neoprene reinforced with polyester cord and specifically designed for cooling tower service. A hinged protective cover shall shield the motor and sheave from the weather. Belt adjustment shall be accomplished from the exterior of the unit. Bearing lube lines shall be extended to the exterior of the unit for easy maintenance. All sheaves located in the airstream shall be constructed of aluminum alloy, vented guards shall not be acceptable. If internal belt adjustment is necessary, an internal working platform and ladder is required to access the drive system.

Models AT 112-012 to AT 428-1248

Fan Motor(s)

_____ HP (kW) totally enclosed air over (T.E.A.O.) ball bearing fan motor(s) with 1.15 service factor shall be furnished suitable for cooling tower service on _____ volts, _____ hertz, and _____ phase. Motor(s) shall be mounted on an adjustable base which allows the motor to swing to the outside of the unit for servicing.

Drive

The fan drive shall be a multigroove, solid back V-belt type with taper lock sheaves designed for 1.5 service factor of the motor nameplate horsepower (kW). The belt material shall be neoprene reinforced with polyester cord and specifically designed for cooling tower service. Fan and motor sheaves shall be aluminum alloy construction. Belt adjustment shall be accomplished from the exterior of the unit. Bearing lube lines shall be extended to the exterior of the unit for easy maintenance. *All sheaves located in the airstream shall be constructed of aluminum alloy, vented guards shall not be acceptable. If internal belt adjustment is necessary, an internal working platform and ladder is required to access the drive system.*

Axial Propeller Fans

Fans shall be heavy duty axial propeller type statically balanced. The fans shall be fabricated by the cooling tower manufacturer for single source responsibility and reliability. The fans shall be constructed of extruded aluminum alloy blades, installed in a closely fitted cowl with venturi air inlet for maximum fan efficiency. Each fan blade shall be individually adjustable. Fan cowl shall be covered with a heavy gauge hot dip galvanized wire fan guard.

Fan Shaft Bearings

Fan shaft bearings shall be heavy duty self-aligning ball type with self locking collars and grease fittings extended to the outside of the unit. Bearings shall be designed for a minimum L-10 life of 75,000 hours.

Fan Drive Warranty

Cooling tower fan drive components shall be covered by a five year manufacturer's plan. Drive components protected by this warranty shall include the fans, bearings, fan shafts, belts, drive sheaves and fan motors.

Fill

The cooling tower fill shall be PVC (Polyvinyl Chloride) of cross-fluted design for optimum heat transfer efficiency. The cross-fluted sheets shall be bonded together for strength and durability. The fill shall be fabricated, formed and installed by the cooling tower manufacturer and shall be elevated a minimum of 4 feet (1220 mm) above the floor of the cold water basin to facilitate cleaning. *The fill shall be suitable for use as a working platform.* The PVC fill shall be self-extinguishing for fire resistance with a flame spread rating of 5 per ASTM E84-81a. It shall also be resistant to rot, decay and biological attack. The fill shall be able to withstand a water temperature of 130°F (55°C).

Non-Corrosive Water Distribution System

Each cell of the cooling tower shall have one (1) hot water return inlet connected to a main spray header. The spray header and branches shall be constructed of Schedule 40 polyvinyl chloride (PVC) pipe for corrosion resistance and shall have a steel connection which is beveled for weld/grooved for a mechanical coupling to attach the external piping. The spray header and branches shall be removable for cleaning purposes and have threaded end caps to allow debris to be removed. The water shall be distributed over the fill by precision molded ABS spray nozzles with large 3/8 by 1 inch (10 by 25mm) orifice openings and integral sludge ring to eliminate clogging. The nozzles shall be threaded into the water distribution piping to assure positive positioning. If open type gravity distribution pans are used, they shall be constructed of non-corrosive materials (stainless steel, FRP or PVC).

If two (2) gravity distribution pans are required, pipework to convert to a single inlet per cell must be included and top perimeter handrailing with a ladder to the top of the tower must also be provided for servicing the pans.

Eliminators

The eliminators shall be constructed entirely of inert polyvinyl chloride (PVC) in easily handled sections and be completely separate from the fill section for maximum efficiency. The eliminator design shall incorporate three changes in air direction to assure removal of all entrained moisture from the discharge air stream. Maximum drift rate shall be less than .001% of the circulating water rate.

Air Inlet Louver Screens

The louvers screens shall be constructed of polyvinyl chloride (PVC) and mounted in easily removable frames on all four sides of the cooling tower for access to the entire basin area for maintenance. The louvers shall have a minimum of two changes in air direction to prevent splashout, block direct sunlight from entering the basin, and have a 3/4" (19 mm) opening to prevent debris from entering the basin.

Finish

All pan and casing material shall be constructed of G-235 heavy gauge mill hot-dip galvanized steel for maximum protection against corrosion. During fabrication, all panel edges shall be coated with a 95% pure zinc-rich compound.



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