COOLING TOWERS

AT | UT | USS
Advanced Technology (AT) Series

The Industry's Smartest Induced Draft, Counterflow Cooling Towers

evapco® for LIFE

5 Year MOTOR AND DRIVE WARRANTY

CTI CERTIFIED

*Mark owned by the Cooling Technology Institute

Get to Know EVAPCO

- The global innovator in heat transfer solutions
- Serving the commercial HVAC, industrial refrigeration, power generation, and industrial processing markets
- Founded in 1976
- Employee-owned
- 20 facilities in 10 countries
- More than 170 sales offices in 51 countries

Learn More Now.

Visit evapco.com to view complete product specs, download product catalogs, and more.

EVAPCO is more than a name.

It's a pledge to make everyday life easier, more comfortable, more reliable, and more sustainable for people everywhere. How do we fulfill on that promise? It's simple.

We never stop innovating.

At EVAPCO, we don't just talk about innovation. It's ingrained in our workflow. Guided by our annually developed R&D plans, we set out every day to find groundbreaking solutions that transform the way the world works for the better. It's why we have more than 25 patents worldwide in the last 10 years alone.

We craft exceptionally built solutions.

As an employee-owned company, we are loyal. We demand excellence of one another. And we take pride in our work. Together, we make up one of the most experienced teams of engineers and craftsmen in the industry. This translates into solutions that are always exceptionally built. No one will deliver higher quality for you.

We guarantee performance.

Every EVAPCO solution is put through rigorous research and testing to deliver maximum efficiency and reliability. But we don't stop there. We also lead the industry in independent, third-party performance certifications. These certifications guarantee our performance metrics—so that you can plan your projects with complete peace of mind.

We protect the environment.

Innovation and environmental sustainability go hand-in-hand at EVAPCO. From sound reduction to water conservation to chemical elimination, we are constantly developing new technologies that deliver the ultimate operating advantages for our clients—and protect the planet for every generation that comes after us.

We are EVAPCO—the team you can count on for life.

The Advanced Technology Series: The Industry's Smartest Cooling Towers

Crafted from decades of engineering know-how, the Advanced Technology (AT) cooling tower series from EVAPCO features state-of-the-art induced draft, counterflow technology to deliver superior operating advantages in any climate. From performance to maintenance, they simply work smarter.

3 Advanced Technology Options. More Possibilities.

Available in 60 cross sections and a capacity range of 33 to 5,141 nominal tons (144 to 22,596 kW).
See page 23 for model-by-model dimensions.

AT The original compact, low-horsepower, induced draft, axial fan solution for all outdoor applications.

UT All of the benefits of the AT design, built with EVAPCO's Super-Low-Sound Fan for sound-sensitive applications. See page 18 to learn more.

USS All-stainless-steel AT construction for maximum corrosion resistance, ideal for coastal and other corrosive environments. See page 18 to learn more.

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 opening EvapJet™ 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.

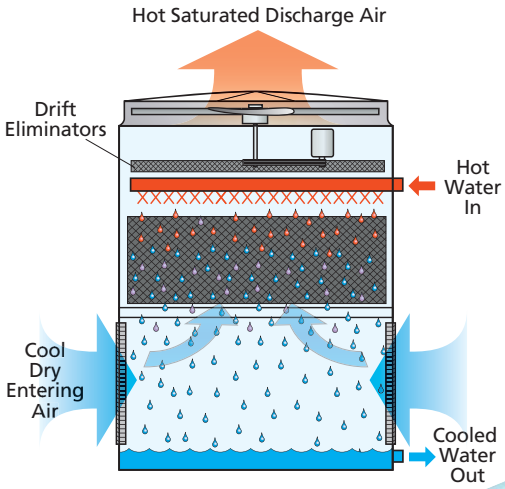
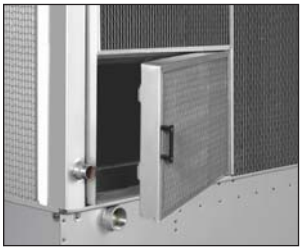


Table of Contents

The Advanced Technology Series at a Glance

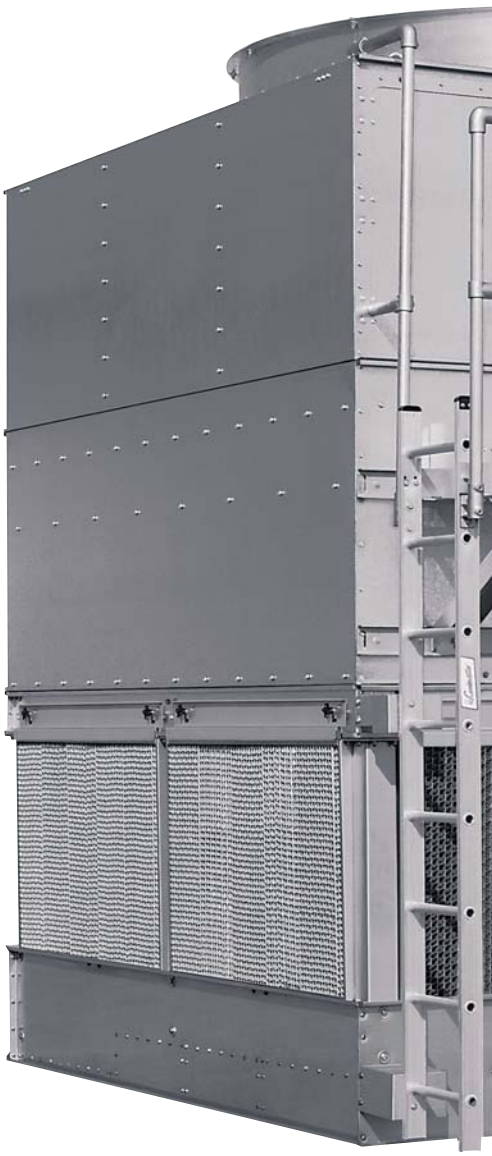
Totally Enclosed Fan Motors

- Motors positioned for easy accessibility and extended serviceability
- Assures long life
- Energy efficient/inverter capable motors supplied as standard
- Optional space heaters available to eliminate condensation while idle



Louver Access Door

- Hinged access panel with quick release mechanism
- Allows easy access to perform routine maintenance and inspection of the makeup assembly, strainer screen, and basin
- Standard on models with louvers 5 feet and taller



US Patent No. 7,927,196

WST Air Inlet Louvers *(Water and Sight Tight)*

- Easily removable for access
- Framed in same material as tower basin
- Improved design to keep sunlight out–preventing biological growth
- Keeps water in while keeping dirt and debris out

EVAPCO POWER-BAND Drive System

- Easy-maintenance, heavy-duty drive system
- Standard heavy-duty pillow-block bearings with a minimum L10 life of 75,000 hours
- Extended lube lines
- External motor/belt adjustment
- Solid-back multigroove belts and totally enclosed motors are standard

**International Building Code*

***Office of Statewide Health Planning and Development*

****Mark owned by the Cooling Technology Institute*

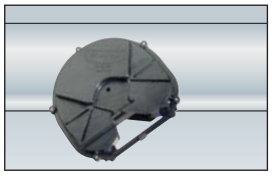
IBC* & OSHPD** Designs

- All standard models meet IBC requirements
- Upgraded designs for high seismic and wind load areas
- Upgraded designs can also be used for projects requiring OSHPD approval

US Patent Nos.7,938,373 and 7,963,492

Optional Motor Davit & Working Platform

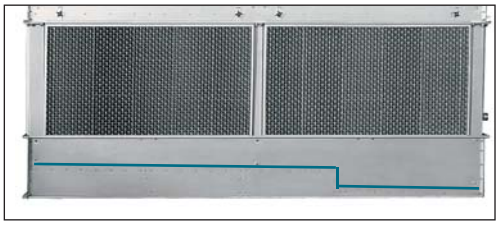
- Motor davit and bracket option for easy motor and fan removal
- Also available for gearbox removal
- Platform and ladder arrangement available as an option
- Provides a robust self-supporting working surface for the service mechanic



EvapJet™ nozzle

Water Distribution System

- EvapJet™ nozzles provides thermal performance gain
- Non-corrosive PVC construction
- Large orifice nozzles prevent clogging and are threaded for easy removal and positive positioning
- Each nozzle provides a large uniform spray pattern



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 9)*

*** CTI CERTIFIED

The EVAPCO Performance Guarantee
CTI Certified | IBC Compliant | ASHRAE 90.1 Compliant

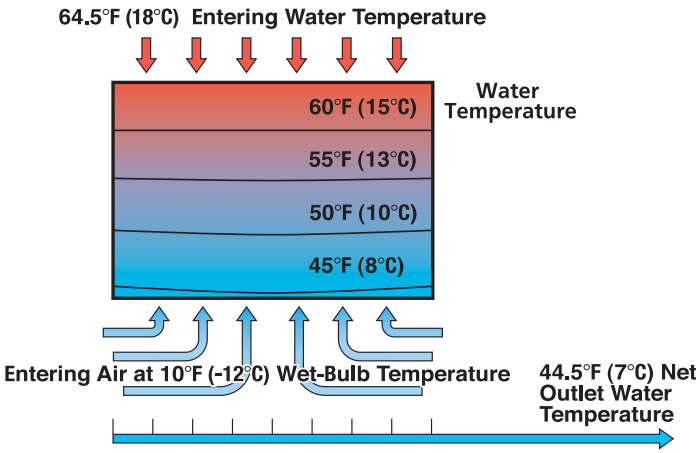
Every Advanced Technology product is rigorously thermal performance tested by EVAPCO and then independently certified by the Cooling Technology Institute (CTI) so you know you're getting a solution that's guaranteed to get the job done.

Innovative Design Features

With EVAPCO, you get a partner you can count on to keep you at the cutting edge of your field. That's because we build innovation into every HVAC solution that we deliver to you. Here are just some of the game-changing features you'll find in the Advanced Technology cooling tower series.

Optimum Design for Freezing Climates

The Advanced Technology cooling tower series features a totally encased wet-deck fill which inhibits direct exposure to the elements, as well as a bonded-block structure with bottom supports to provide additional support should ice form. On top of that, the counterflow design's even-temperature gradient ensures all water is cooled to the same temperature. Together, these smarter design elements make the Advanced Technology series the ideal solution for severe climates.



EVAPAK® Fill *(US Patent 5,124,087)*

EVAPAK® fill is specially designed to induce a highly turbulent mix of air and water for superior heat transfer. Special drainage tips allow high water loadings without excessive pressure drops.

EVAPAK is constructed of inert polyvinyl chloride (PVC), so it will not rot or decay. It can also withstand water temperatures of 130° F/55° C. (An option for higher water temperatures is also available. Consult your EVAPCO representative to learn more.)

The bottom support of the fill section, combined with the unique way in which EVAPAK's cross-fluted sheets are bonded together, greatly enhances the fill's structural integrity, making it usable as a working platform for internal access to the fan and drive system.

EVAPAK is also self-extinguishing with a flame spread rating of 5 per ASTM-E84-81a.

High-Efficiency Drift Eliminators *(US Patent 6,315,804)*

EVAPCO's extremely efficient drift eliminator system removes entrained water droplets from the air stream, limiting the drift rate to less than 0.001% of the recirculating water rate in most instances. This saves valuable water and enables you to place your cooling tower in areas where minimum water carryover is critical, such as parking lots.

The drift eliminators are constructed of inert PVC, which effectively eliminates corrosion of these vital components. They are assembled in sections to facilitate easy removal for inspection of the water distribution system.

Smooth Flow Fans

Smooth flow axial propeller fans come standard on all Advanced Technology series cooling towers. Fan construction is dependent on unit size:

- 4-foot-wide: Fiberglass-reinforced polypropylene (PPG) wide chord blades with die-cast aluminum hub
- Over 4 feet: 100% aluminum alloy

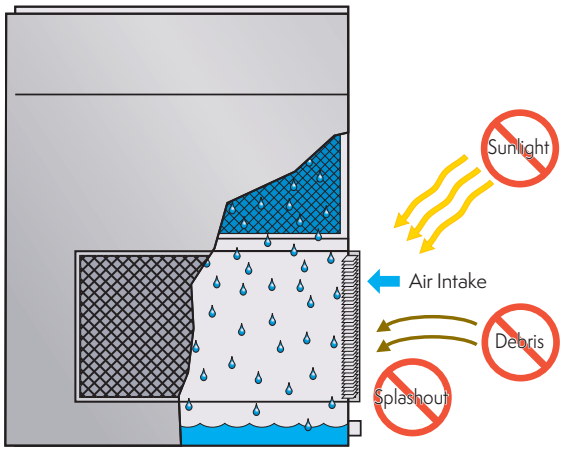
All fans are statically balanced and installed in a closely fitted cowl with venturi air inlet for maximum efficiency. Fan screens are constructed of galvanized steel or optional type 304 stainless steel, and have steel frames bolted to the fan cowl.

Low sound and super low sound fan options are also available. See page 15 to learn more.

Pressurized Water Distribution System

The Advanced Technology series' water distribution system is made of schedule 40 PVC pipe and EvapJet™ ABS plastic water nozzles for critical corrosion protection. The piping is easily removable for cleaning. The water nozzles have a 1-inch diameter (25 mm) opening to help eliminate costly clogging. In addition, the spray branches have threaded end caps to allow easy debris removal.

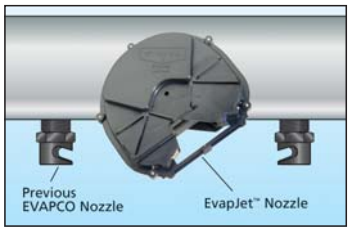
The spray pressure for all Advanced Technology series cooling towers is between 1 and 6 psig (7 and 41 kPa) at the inlet header. (Actual spray pressure will be provided on the submittal prepared for your unit.)



Superior Air Inlet Louver and Screen Design

(US Patent 7,927,196)

EVAPCO's water and sight tight (WST) inlet louver keeps water in and sunlight out of your Advanced Technology series cooling tower. The unique, non-planar design is made from lightweight, framed PVC sections which have no loose hardware, enabling easy unit access. The louver's air channels are optimized to maintain fluid dynamic and thermodynamic efficiency and block all line-of-sight paths into the basin, eliminating splash-out even when the fans are off. And because all sunlight is blocked, algae growth is minimized. The end result: reduced maintenance hours, water consumption, and water treatment costs.



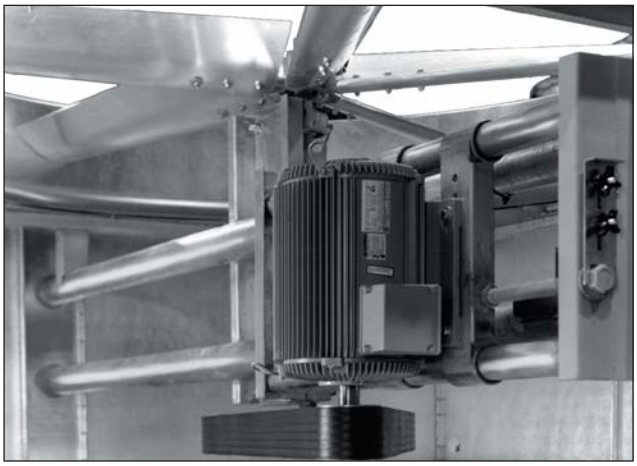
EvapJet™ nozzle compared to previous EVAPCO nozzles

The POWER-BAND Belt Drive System

At the heart of every Advanced Technology series cooling tower is EVAPCO's POWER-BAND Belt Drive System. Tough enough to handle the most heavy-duty cooling tower applications, it's also the easiest drive system to maintain in the industry.

Fan Motors

POWER-BAND uses premium efficiency, inverter capable, totally enclosed fan motors that are designed specifically for cooling tower applications. A broad range of additional motors, including multi-speed motors, space heaters, thermistors, and shaft grounding rings, are also available to meet your specific needs.



Belt Drive

Specifically designed for cooling tower service, the POWER-BAND drive is a solid-back multigroove belt system with high lateral rigidity. The belt is constructed of neoprene with polyester cords, and sized for 150% of the motor nameplate horsepower to ensure long, trouble-free operation.

Drive System Sheaves

POWER-BAND's drive system sheaves are constructed of aluminum alloy for durability inside the cooling tower's warm, moist atmosphere. Models with totally enclosed fan cooled (TEFC) motors have a steel driver sheave protected by a hinged cover.

Fan Shaft Bearings

Rated for a minimum L10 life of 75,000 hours, POWER-BAND's fan shaft bearings are the cooling tower industry's most heavy-duty pillow-block bearings. That means longer operating life and less risk of costly downtime.

5-Year Motor and Drive Warranty

All POWER-BAND belt drives and optional gear drives come with EVAPCO's unique 5-year motor and drive warranty. The comprehensive plan covers fans, fan shaft, belts, sheaves, fan bearings, gear box, flexible coupling, driveshaft, and motors to give you total protection.

The Industry's Easiest Drive-System Maintenance

With POWER-BAND, all periodic maintenance can be safely performed from the side of your Advanced Technology series cooling tower. No standing inside the cold water basin—and no need for fan deck handrails or safety cages.

Standard Towers (8.5 Feet Wide or Less)

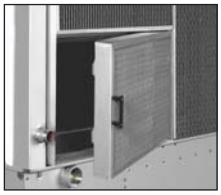
The totally enclosed fan cooled (TEFC) motor is mounted on the outside and protected from the weather by a cover that swings away for maintenance. A large, hinged access door is located on the side of the unit for easy access to the fan drive system. The belt can be adjusted by tightening the j-bolts on the motor base, and tension can be checked easily through the access door. The bearing lubrication lines have been extended to the exterior casing and are located by the access door, thus making bearing lubrication easy. Sloped maintenance ladders and working platforms are available to make maintenance even easier. See page 10 for details.

Large Towers (Over 8.5 Feet Wide)

The totally enclosed air over (TEAO) motor is located inside the fan casing and mounted on a unique, heavy-duty adjustable motor base that's designed to swing completely to the outside of the unit through a large, hinged access door (14 square feet/1.3 square meters). The belt can be easily adjusted from outside the unit via an all-thread that runs through the motor base, or via the motor base's unique locking mechanism if a wrench is not available. Bearing lubrication fittings are extended to the side of the unit inside the access door to allow for easy application of the bearing lubricant. To facilitate motor removal, an optional motor davit is available. See page 10 for details.

Worry-Free Maintenance Basin Design

The cold water basin is the most important area of a cooling tower to maintain. Dirt and debris naturally collect there as a result of the evaporation process and must be cleaned out on a regular basis. The basin section of every Advanced Technology series cooling tower is designed to allow quick and easy access—promoting routine maintenance of the cold water basin.



Easy Access

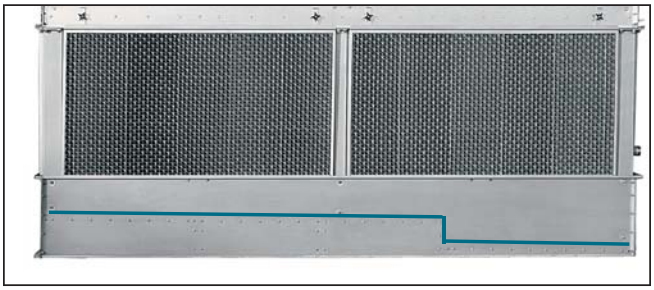
The cold water basin section is easily accessible from ground level by simply loosening the two quick release fasteners on the inlet louver assemblies and lifting out the lightweight louver. The basin can be accessed from all four sides of the cooling tower, and the bottom of the fill section is a minimum of 4 feet (1.2 m) above the basin floor. This open design enables the basin to be easily cleaned. *Note: 4-foot-wide models are accessible on only two sides.*

Louver Access Door

To aid in basin maintenance, most Advanced Technology models can be equipped with an optional louver access door. This allows easy access to perform routine maintenance and inspection of the makeup assembly, strainer screen, and basin without removing an entire inlet louver. *Note: This feature is standard on models with louvers 5 feet and taller and optional on models with 4-foot-tall louvers.*

Stainless Steel Strainers

For most cooling towers, the strainer is subject to excessive wear and corrosion. Not so with EVAPCO's cooling towers. Our strainers are constructed with stainless steel—a long-standing EVAPCO standard—ensuring that yours will last the life of your cooling tower.



Clean Pan Design

The Advanced Technology series also 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 and biological films, and minimizes standing water. *Note: On 4-foot-wide units, the pan is sloped without the step.*

Optional Equipment

The standard design of the EVAPCO Advanced Technology series makes it the easiest cooling tower to maintain in the industry. Take your tower to the next level with a host of options that can make maintenance even easier and extend the life of your cooling tower even longer.

Sloped Maintenance Ladders

Designed by EVAPCO and OSHA-compliant, this sloped "ships type" ladder enables visual inspection of the water distribution system and drive components. What's more, all standard drive system maintenance can be performed from the ladder. A handrail is attached to the sloped ladder for safe and easy ascent and descent—no need for safety cages. *Note: Available on all models wider than 4 feet. A vertical ladder is available for smaller models. Ladder ships loose and must be field mounted.*

Working Platform & Ladder with Davit

Make it easy to service the fan motor and water distribution system with this heavy-duty, self-supporting working platform and standard ladder. A less expensive alternative to field erected catwalks, the system is OSHA compliant and ships in sections for easy installation. *Note: The working platform is not available on 4-foot-wide models.*

Plus! Eliminate crane rentals with an optional davit that facilitates the easy removal of motors, gear drives, and fans. The davit is constructed of aluminum and is mounted on the side of the unit with a galvanized steel bracket. *Note: Davit ships loose and is installed in the field.*

Stainless Steel Basin

The basin provides the structural support for the unit and is the most important part of you cooling tower. Maximize its protection against corrosion with EVAPCO's optional stainless steel water touch basin, which uses type 304 or type 316 stainless steel for the entire basin area, including the support columns and plenum of the cooling tower and the louver frames.

Basin-Level Platform & Ladder

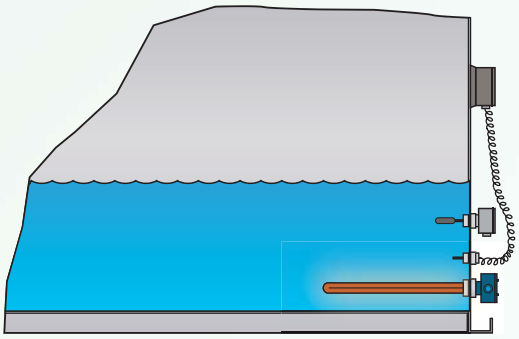
Available on select above-ground cooling tower models, the basin-level platform and ladder facilitates easy basin inspections and maintenance, including float assembly adjustment and basin/suction strainer cleaning. The platform and ladder ship in modules for easy installation. *Note: Ladder requires field support.*

Optional Equipment: **Electric Basin Heaters**

Electric immersion heaters can be added to the basin of your Advanced Technology series cooling tower. They are sized to maintain a +40° F (4.5° C) pan water temperature with the fans and system pumps off. A thermostat and low-water protection device cycle the heater on when required and prevent the heater elements from energizing unless they are completely submerged. All components are protected by rugged, weatherproof enclosures for outdoor use.

AT/UT/USS Heater Sizes *

	Model No.	0°F kW	-20°F kW	-40°F kW
1-CELL	14-2E4 to 14-3F4 14-2F6 to 14-3G6 14-2E9 to 14-3F9 14-2F12 to 14-3G12	2 3 4 5	3 4 5 7	4 5 7 9
	19-2G6 to 19-4J6 19-2G8 to 19-4J8 19-3I9 to 19-4K9 19-2H11 to 19-4L11 19-2K12 to 19-4M12 19-2I14 to 19-4M14	5 6 7 8 (2) 4 (2) 5	7 8 10 12 (2) 7 (2) 7	9 12 15 15 (2) 9 (2) 10
	110-3J12 to 110-4N12 110-2K18 to 110-4N18	(2) 5 (2) 7	(2) 8 (2) 12	(2) 10 (2) 15
	112-2J12 to 112-4N12 112-2M14 to 112-4N14 112-2L18 to 112-94P18 112-52O20 to 112-4P20	(2) 6 (2) 7 (2) 9 (2) 10	(2) 9 (2) 10 (2) 15 (2) 15	(2) 12 (2) 15 (2) 18 (3) 15
	114-2M24 to114-4R24 114-5K26 to 114-5O26	(2) 16 (2) 16	(3) 16 (3) 16	(3) 20 (3) 20
2-CELL	26-2G17 to 26-4J17	(2) 5	(2) 7	(2) 9
	28-2G17 to 28-4J17	(2) 6	(2) 8	(2) 12
	29-2H18 to 29-4K18 29-2H21 to 29-4L21 29-3I24 to 29-4M24 29-3J28 to 29-4M28	(2) 6 (2) 7 (4) 4 (4) 5	(2) 9 (2) 12 (4) 7 (4) 7	(2) 12 (2) 15 (4) 9 (4) 10
	210-3J24 to 210-4N24 210-2K36 to 210-4N36	(4) 5 (4) 7	(4) 8 (4) 12	(4) 10 (4) 15
	212-2G9 to 212-4J9 212-2K24 to 212-4N24 212-2L28 to 212-4N28 212-3K36 to 212-4P36 212-2K40 to 212-4P40	(2) 5 (4) 6 (4) 7 (4) 9 (4) 10	(2) 7 (4) 9 (4) 10 (4) 15 (4) 15	(2) 9 (4) 12 (4) 15 (4) 18 (4) 20
	214-2M48 to 214-4R48 214-5K52 to 214-5O52	(4) 16 (4) 16	** **	** **
	215-2G9 to 215-4J9	(2) 6	(2) 8	(2) 12
	217-3I9 to 217-4K9 217-2H11 to 217-4L11 217-2K12 to 217-4M12 217-3J14 to 217-4M14	(2) 7 (2) 8 (4) 4 (4) 5	(2) 10 (2) 12 (4) 7 (4) 7	(2) 15 (2) 15 (4) 9 (4) 10
	220-3J12 to 220-4N12 220-2K18 to 220-4N18	(4) 5 (4) 7	(4) 8 (4) 12	(4) 10 (4) 15
	224-2L18 to 224-4P18 224-4N20 to 224-4P20	(4) 9 (4) 10	(4) 15 (4) 15	(4) 18 (4) 20
	228-2N24 to 228-4R24 228-5K26 to 228-5O26	(4) 16 (4) 16	** **	** **



Note: Heater control packages that include contactor, transformer or disconnects are also available; speak to your local EVAPCO representative to learn more about these options.

AT/UT/USS Heater Sizes *

	Model No.	0°F kW	-20°F kW	-40°F kW
3-CELL	39-2I36 to 39-4M36 39-2I42 to 39-4M42	(6) 4 (6) 5	(6) 7 (6) 7	(6) 9 (6) 10
	310-3J36 to 310-4N36	(6) 5	(6) 8	(6) 10
	312-2K36 to 312-4N36 312-3J42 to 312-4N42 312-2M54 to 312-4P54 312-3L60 to 312-4P60	(6) 6 (6) 7 (6) 9 (6) 10	(6) 9 (6) 10 (6) 15 (6) 15	(6) 12 (6) 15 (6) 18 (9) 15
	314-2M72 to 314-4Q72 314-5K78 to 314-5O78 342-5K26 to 342-5O26	(6) 16 (6) 16 (6) 16	** ** **	** ** **
4-CELL	424-2J24 to 424-4N24 424-2K28 to 424-4N28 424-2K36 to 424-4P36 424-2K40 to 424-4P40	(4) 12 (4) 15 (4) 18 (4) 20	(4) 18 (4) 20 (6) 18 (6) 20	(6) 15 (6) 18 (8) 18 (8) 20
	428-2M48 to 428-4R48 428-5K52 to 428-5O52 456-5K26 to 456-5O26	(8) 16 (8) 16 (8) 16	** ** **	** ** **

** Electric heater selection based on ambient air temperature shown.* *** Consult factory*

Optional Equipment

Electronic Water Level Control (EWLC)

Designed by and manufactured exclusively for EVAPCO, the electronic water level control system provides precision control for the basin water level and eliminates the need for field adjustment, even under varying operating conditions. The system uses heavy-duty stainless steel electrodes, which are mounted outside the unit in a vertical stand pipe that acts as a stilling chamber. (For winter operation, the stand pipe must be wrapped with electric heating cable and insulated to protect it from freezing.) Three-probe and five-probe packages are available. The five-probe package provides high- and low-level alarms. The weather-protected, slow-closing solenoid valve for the makeup water connection is factory-supplied and ready for piping to a water supply with a pressure between 5 and 125 psig (34 and 862 kPa).

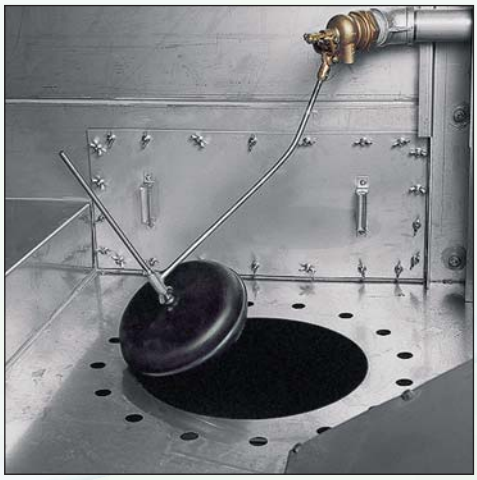
Flanged Connections

Even More Options

Ask your EVAPCO representative about:

- Vibration switches
- Sump sweeper piping
- FM approval
- Bottom inlet and bottom suction connections
- Remote sump connections (see page 85 for more information)
- Materials for higher temperature applications
- TITAN PAK stainless steel fill
- WIDE-PAK for dirty water applications where TSS is less than 100 PPM
- VERTICLEAN for dirty water applications where TSS is between 75 and 500 PPM

Bypass Connections with Diffuser Hood



Equalizers and Flume Plates

Optional Equipment: **Water Treatment Systems**

EVAPCO has dramatically changed the water treatment game with the introduction of Pulse~Pure® and Smart Shield®. Available as a complete water treatment system for coil products and open evaporative cooling applications. Water treatment has never been easier or more dependable.

Pulse~Pure®

Pulse~Pure® Non-Chemical Water Treatment System

Pulse~Pure® from EVAPCO uses pulsed electric field technology to treat your water without chemicals. It's the environmentally responsible solution that also packs a powerful water-treating punch:

- Emits short, high frequency bursts of low energy electromagnetic fields to recirculating water
- Forms seed crystals to attract and destroy scale-causing precipitants and bacteria
- Delivers a guaranteed maximum bacterial count of 10,000 CFU/ml in the cooling water—well below most chemical water treatment solutions
- Operates in an alkaline environment, allowing calcium carbonate to act as a natural cathodic corrosion inhibitor, and yielding corrosion rates equivalent to most chemical alternatives
- Operates at higher cycles of concentration to save water
- Compact design eliminates moving parts and ensures low energy consumption

Front

Learn more about *Pulse*~Pure® at **evapco.com.**

Optional Equipment: **Water Treatment Systems**

Warranty & Service Included

Each EVAPCO water treatment system is warranted by EVAPCO and comes standard with a one-year performance monitoring and service program provided by a factory-trained EVAPCO representative.

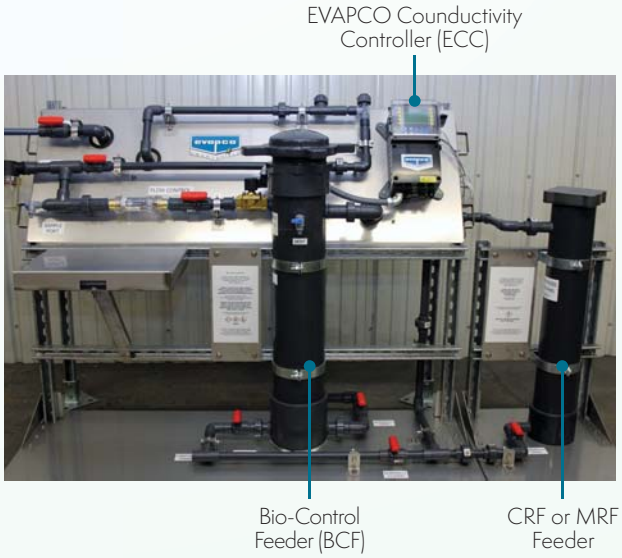
Smart Shield®Solid Chemical Water Treatment System

Proven solid chemistry. A revolutionary feed system. Together, these make Smart Shield®, the easiest and safest chemical water treatment system available today, featuring:

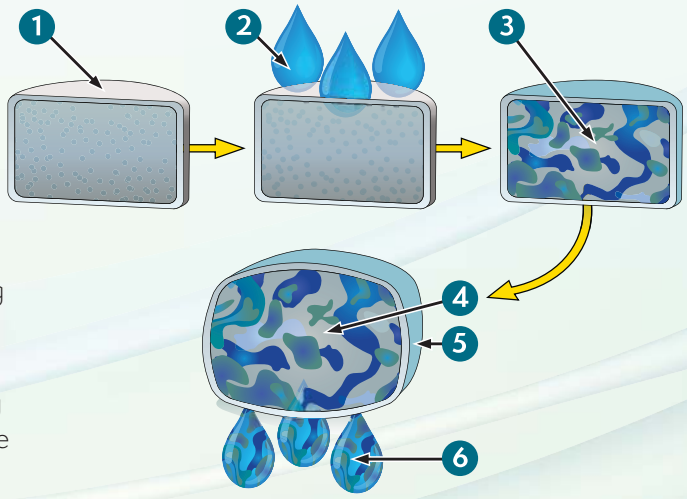
- A solid chemistry design that eliminates liquid chemical hazards — including spills — and the need for expensive feed pumps
- Reduced packaging, shipping and handling for lower costs and a lower carbon footprint than liquid chemicals

Smart Shield® is available in two unique systems to protect a broad range of evaporative cooling water applications:

- Controlled release system (shown at right) uses scale and corrosion inhibitors utilizing polymer coated no-touch chemical replenishments for easier, safer reloads
- Monitored release systems are applicable for larger systems or those with higher inhibitor demand. Monitored release scale and corrosion inhibitors utilize uncoated tablets and a direct detect probe for precise control of active ingredients



Watch a short product video at **smartshield.evapco.com.**



Inhibitor Operation

1. Polymer coated inhibitor tablet
2. Recirculated water permeates the polymer coating
3. Solid chemistry becomes a slurry inside the tablet
4. Osmotic pressure causes the tablet to swell, forcing the chemistry out through the polymer coating
5. Polymer coating controls the treatment release rate
6. Treated water returns to the basin

Optional Equipment: **Low Sound Solutions**

Super Low Sound Fan – 9-15 dB(A) Reduction

When you're tasked with achieving the lowest sound levels possible, there's only one choice: the EVAPCO super low sound fan, the quietest, most noise efficient fan in the industry—capable of reducing sound pressure level by 9 to 15 dB(A)! The super low sound fan comes standard with all UT models in the Advanced Technology series. See page 17 for more information. *Note: Not available on 4-foot-wide models.*

Water Silencer – Reduces Water Noise up to 7 dB(A)

Located in the cold water basin, EVAPCO's water silencer reduces the high frequency noise associated with falling water and is capable of lowering overall sound levels 4 to 7 dB(A) when measured at 5 feet from the side or end of the unit. When water is circulated with fans off, the results are even greater: as much as 9 to 12 dB(A) lower at the same measured distance (depending on water loading and louver height). Constructed of lightweight PVC sections, the silencer can be easily removed for access to the basin area. It will have no impact on thermal performance and is CTI certified. *Note: Not available on 4-foot-wide models.*

Offset Sound Attenuation Walls

Add EVAPCO's CTI-certified offset sound attenuation walls to your super low sound fan and water silencer options for the ultimate sound control. Constructed of G-235 galvanized steel and lined inside with acoustical padding, the walls will typically reduce the 50-foot free-field sound level by an additional 3 dB(A). Stainless steel construction also available. Requires external support by others. *Note: Available only in combination with super low sound fan and water silencer.*

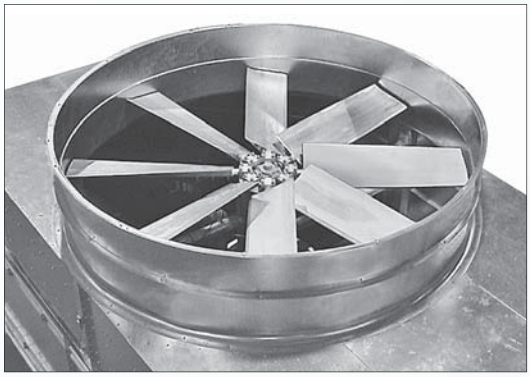
See page 21 for more information on EVAPCO's science of low sound.

Optional Equipment: **Low Sound Solutions**

Low Sound Fan – 4-7 dB(A) Reduction

Ideal for sound-sensitive applications, EVAPCO's low sound fan features a wide chord blade and a unique soft-connect blade-to-hub design that is compatible with variable speed drives. Since the blades are not rigidly connected to the fan hub, no vertical vibration forces are transmitted to the unit structure. This reduces sound pressure levels by 4 to 7 dB(A), depending on specific unit selection and measurement location.

The fan is a high efficiency axial propeller and is CTI certified on Advanced Technology series cooling towers. It has a thermal performance derate of up to 3.5%. Consult your EVAPCO representative for actual thermal performance. *Note: Available on AT and USS models only.*

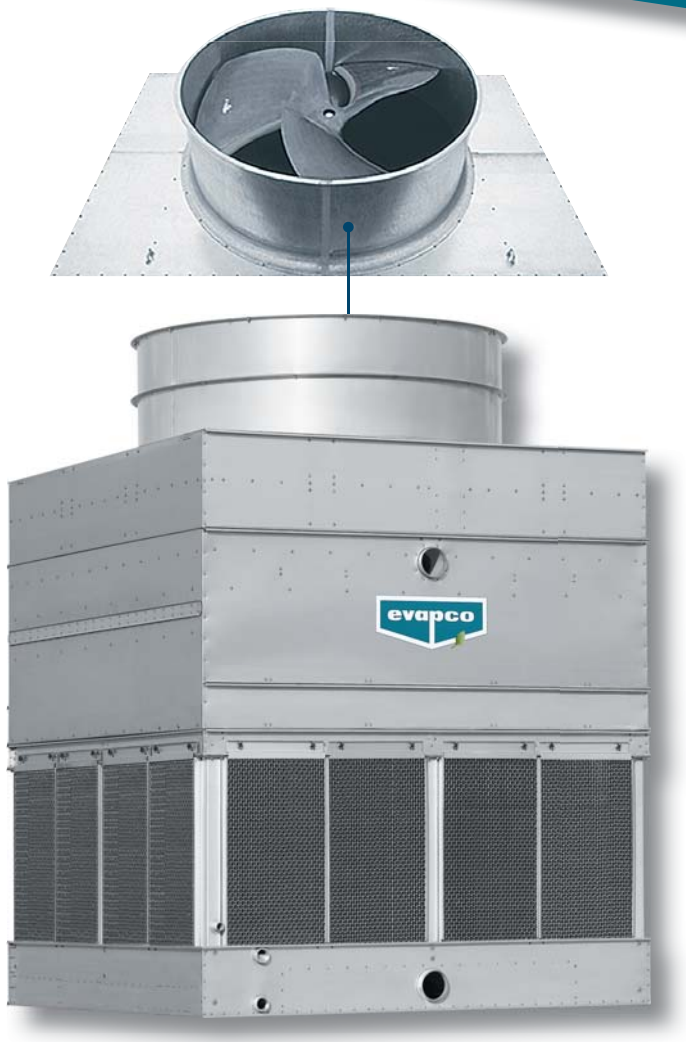


Additional Height & Operating Weight Additions

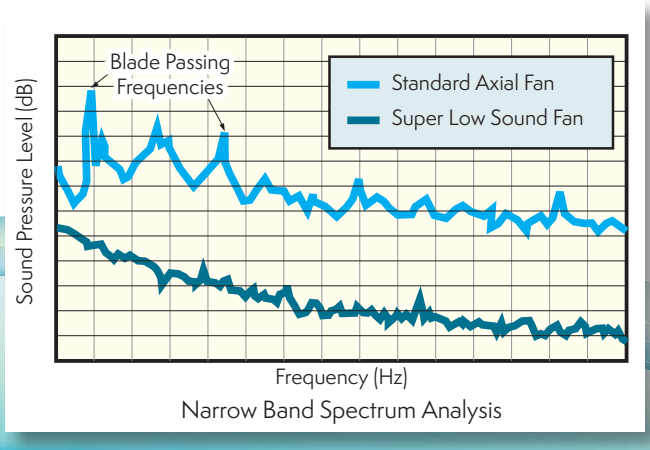
	Model No.	Height Addition for Low Sound Fan (in.)	Operating Weight Addition for Low Sound Fan (lbs.)
1-CELL	14-2E4 to 14-3F4	0	0
	14-2F6 to 14-3G6	0	0
	14-2E9 to 14-3F9	0	0
	14-2F12 to 14-3G12	0	0
	19-2G6 to 19-4J6	4	0
	19-2G8 to 19-4J8	4	0
	19-3I9 to 19-4K9	4	0
	19-2H11 to 19-4L11	4	0
	19-2K12 to 19-4M12	4	0
	19-2I14 to 19-4M14	4	0
	110-3J12 to 110-4N12	0	0
	110-2K18 to 110-4N18	0	0
	112-2J12 to 112-4N12	0	0
	112-2M14 to 112-4N14	0	0
	112-2L18 to 112-94P18	7	225
	112-52O20 to 112-4P20	7	225
	114-2M24 to114-4R24	5	450
	114-5K26 to 114-5O26	7	450
2-CELL	26-2G17 to 26-4J17	4	0
	28-2G17 to 28-4J17	4	0
	29-2H18 to 29-4K18	4	0
	29-2H21 to 29-4L21	4	0
	29-3I24 to 29-4M24	4	0
	29-3J28 to 29-4M28	4	0
	210-3J24 to 210-4N24	0	0
	210-2K36 to 210-4N36	0	0
	212-2G9 to 212-4J9	4	0
	212-2K24 to 212-4N24	0	0
	212-2L28 to 212-4N28	0	0
	212-3K36 to 212-4P36	7	450
	212-2K40 to 212-4P40	7	450
	214-2M48 to 214-4R48	5	900
	214-5K52 to 214-5O52	7	900

	Model No.	Height Addition for Low Sound Fan (in.)	Operating Weight Addition for Low Sound Fan (lbs.)
2-CELL	215-2G9 to 215-4J9	4	0
	217-3I9 to 217-4K9	4	0
	217-2H11 to 217-4L11	4	0
	217-2K12 to 217-4M12	4	0
	217-3J14 to 217-4M14	4	0
	220-3J12 to 220-4N12	0	0
	220-2K18 to 220-4N18	0	0
	224-2L18 to 224-4P18	7	450
	224-4N20 to 224-4P20	7	450
	228-2N24 to 228-4R24	5	900
	228-5K26 to 228-5O26	7	900
3-CELL	39-2I36 to 39-4M36	4	0
	39-2I42 to 39-4M42	4	0
	310-3J36 to 310-4N36	0	0
	312-2K36 to 312-4N36	0	0
	312-3J42 to 312-4N42	0	0
	312-2M54 to 312-4P54	7	675
	312-3L60 to 312-4P60	7	675
	314-2M72 to 314-4Q72	5	1,350
	314-5K78 to 314-5O78	7	1,350
	342-5K26 to 342-5O26	7	1,350
4-CELL	424-2J24 to 424-4N24	0	0
	424-2K28 to 424-4N28	0	0
	424-2K36 to 424-4P36	7	900
	424-2K40 to 424-4P40	7	900
	428-2M48 to 428-4R48	5	1,800
	428-5K52 to 428-5O52	7	1,800
	456-5K26 to 456-5O26	7	1,800

UT: Ultra-QuieT Cooling Tower
Reduces Noise Pollution by More Than 50%



Note: UT towers are only available in sizes over 4 feet wide. For additional height and operating weight additions, see the dimensional data table for each model, starting on page 23.



Narrow Band Spectrum Analysis

The Ultra-QuieT® Cooling Tower delivers all the innovative design and maintenance features of the original Advanced Technology tower, with the added power of the industry's quietest and most efficient fan: the EVAPCO super low sound fan.

Reduced Sound Levels

Made of heavy-duty reinforced polyester, the fan's ultra-wide chord blades have a forward swept design and rounded edges to minimize the sound caused by flow separation and vortex shedding. The end result is a sound pressure level that's 9 to 15 dB(A) lower—more than 50% lower—than standard fans (depending on specific unit selection and measurement location). Best of all, the super low sound fan has zero impact on thermal performance.

Improved Sound Quality

The super low sound fan eliminates audible blade passing frequencies typical of straight-bladed axial type fans. The narrow band spectrum graph below shows how straight-bladed axial fans produce blade-passing frequencies—the same phenomena that produce a helicopter's signature pulsating noise. The blade-passing frequencies are audible spikes in sound pressure levels, but are not apparent in the octave band sound spectrum.

More Options for Even Greater Sound Control

The Ultra-QuieT® cooling tower can be used in combination with EVAPCO's water silencers and offset sound attenuation walls to produce the lowest sound levels commercially available. See page 16 for details.

Consult EVAPCO's evap*Select*® selection software for unit sound levels (see page 23). If a detailed analysis or full octave band datasheet is required for your application, please consult your EVAPCO sales representative.

CTI Certified-Standard 201

- Independently certified for guaranteed performance
- No costly field performance tests required

*CTI CERTIFIED

USS: Ultra Stainless Steel
Complete Stainless Steel Construction for Maximum Corrosion Resistance

What do you get when you combine the easy maintenance and superior operation of the Advanced Technology series with the industry's most durable construction? The Ultra Stainless Steel (USS) from EVAPCO—the finest factory assembled cooling tower ever offered.

The Industry's Highest Quality Cold Water Basin

Your cold water basin provides the structural support for your cooling tower—and yet it's the area most susceptible to corrosion. That's why the Ultra Stainless Steel tower is the only tower in the industry that comes standard with a type 316 stainless steel cold water basin—the highest quality basin available today. No other cooling tower in the industry offers this level of protection as standard.

Premium Components		
Type 316 Stainless Steel	***Type 304 Stainless Steel****	***PVC***
Cold water basin	Upper casing and structure	EVAPAK fill
Vertical support columns	Mechanical equipment support	Water distribution system
Air inlet louver frames	Fan cowl and fan guard	Patented air inlet louvers
Plenum		Patented drift eliminators

**Complete 316 stainless steel construction available for a minimal cost upgrade*

Exclusive 5-Year Complete Product Warranty

- Covers the complete drive system, including the motor, on belt or gear drive units
- Covers the complete cooling tower from the cold water basin to the fan discharge screen
- Standard on all Ultra Stainless Steel models

CTI Certified-Standard 201

- Independently certified for guaranteed performance
- No costly field performance tests required

**Mark owned by the Cooling Technology Institute*

Sound

Sound is the alteration in pressure, stress, particle displacement and particle velocity, which is propagated in an elastic material. Audible sound is the sensation produced at the ear by very small pressure fluctuations in the air.

Sound Pressure

Sound pressure is the intensity of sound. Sound pressure (Lp) in decibels is the ratio of measured pressure (P) in the air to a reference sound pressure, $P_O=2 \times 10^{-5}$ Pascal based on the following formula:

$$L_P\ (dB) = 10 \log_{10} (\triangle P^2/\triangle P_O^2)$$

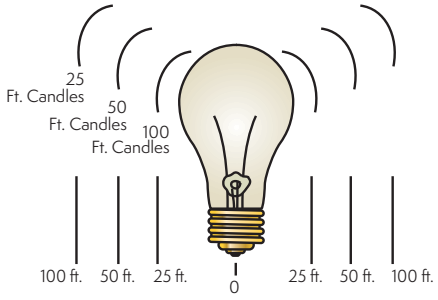
Sound pressure level is what is actually being measured when sound data is recorded. Microphones that measure sound are pressure-sensitive devices that are calibrated to convert the sound pressure waves into decibels. Similar to the intensity coming from a light bulb which gets dimmer as one gets further and further away, sound pressure decreases in decibels as your ear gets further from the sound source.

Sound Power

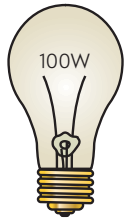
Sound power is the energy of sound. Sound power (Lw) in decibels is the ratio of the calculated sound power, (W) to a reference power, Wo=1 picowatt, according to the following formula:

$$L_W\ (dB) = 10 \log_{10} (W/W_O)$$

Sound power level is not a measured value, but is calculated based on the measured sound pressure. Similar to the wattage of a light bulb that does not change the farther one is away from the light bulb, sound power does not vary with distance.



"SOUND PRESSURE"

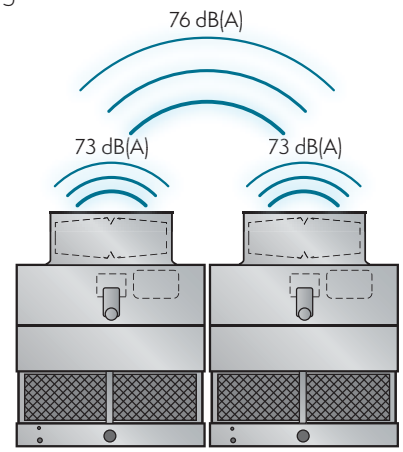


"SOUND POWER"

Adding Multiple Sound Sources

Since the decibel is a logarithmic function, the numbers are not added linearly. Therefore, two 73 dB sound sources added together do not equal 146 dB. The resultant sound would actually be 76 dB. The following table shows how to add decibels from two sound sources.

Difference in dB Level	Add to the higher dB Level
0 to 1	3
2 to 3	2
4 to 8	1
9 or greater	0



Sound Pressure – The A-Weighted Scale

The A-weighted scale, dB(A) is a means to translate what a sound microphone measures to how the human ear perceives the sound. Use the following formula and conversions:

$$dB(A) = 10 \log_{10} \sum_{f=63}^{f=8000} 10^{((dB+C_f)/10)}$$

where: C_f = correction factor per band let: $Z_f = (dB + C_f)/10$
dB = measured sound pressure

Band	Center Frequency (Hz)	Frequency Range (Hz)	Sample (Hz)	C_f (dB)	Z_f
1	63	44-88	68	-26.2	4.18
2	125	89-175	76	-16.1	5.99
3	250	176-350	77	-8.6	6.84
4	500	351-700	73	-3.2	6.98
5	1000	701-1400	70	0	7.00
6	2000	1401-2800	68	+1.2	6.92
7	4000	2801-5600	71	+1.0	7.20
8	8000	5601-11200	73	-1.1	7.19

Example calculation of the dB(A) formula using the sample data.
$dB(A) = 10 \log_{10} \sum 10^{(Z1)} + 10^{(Z2)} + 10^{(Z3)} + 10^{(Z4)} + 10^{(Z5)} + 10^{(Z6)} + 10^{(Z7)} + 10^{(Z8)}$
$= 10 \log_{10} (67114245.2) = 78.3$ dB(A)

Specifying Sound

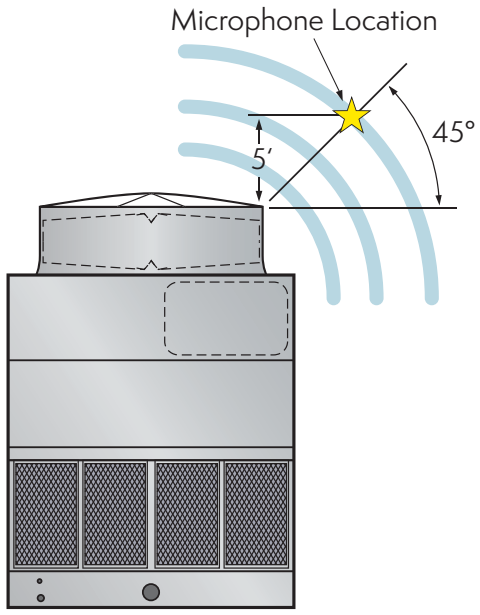
Specify sound pressure in dB(A) measured 5 feet above the fan discharge during full speed operation.

- All manufacturers can meet a performance specification with low sound options
- Fan noise is what matters. 5 feet above the fan is where it matters.

Measurement Location

Per Cooling Technology Institute Standard ATC-128

A sound microphone should be located 5 feet above the cooling tower fan cowl edge at a 45° angle. This position assures accurate sound measurements and eliminates a source of uncertainty by taking the microphone out of the high velocity fan discharge air.

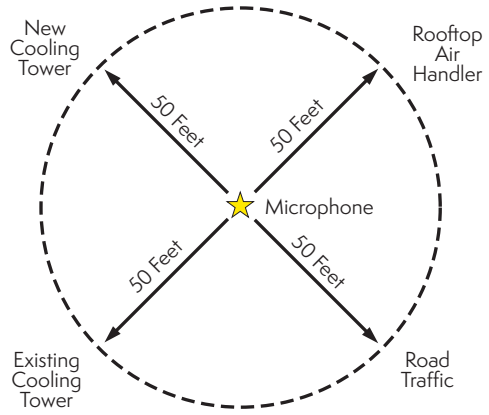


Typical Sound Pressure Levels of Well Known Noises:

Jet Airplane, 150 feet away	140 dB(A)
Circular Saw	110 dB(A)
Nightclub	100 dB(A)
Semi Truck	90 dB(A)
Sidewalk of a Busy Road	80 dB(A)
Household Vacuum, 3 feet away	70 dB(A)
Normal Conversation	60 dB(A)
Quiet Library	40 dB(A)

Notable Facts about Sound:

- +/- 1 dB(A) is inaudible to the human ear
- Decreasing a noise source by 10 dB(A) sounds half as loud to the human ear



Easy Verification

At 5 feet from the cooling tower, a sound meter records only cooling tower noise. You can easily verify the actual noise coming from the cooling tower against the specified sound data with good certainty.

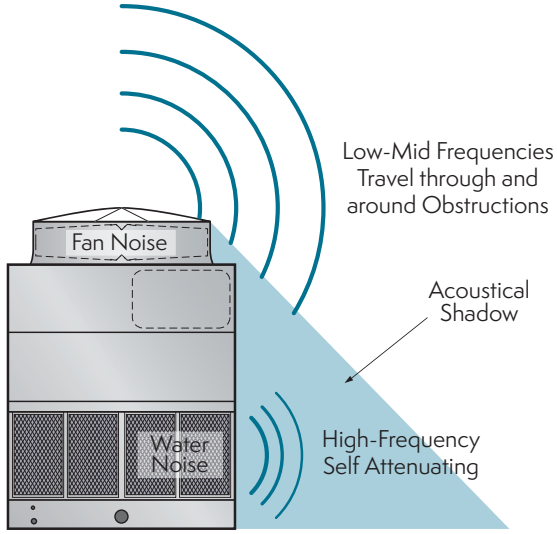
If sound were specified at 50 feet or some greater distance from the sound-sensitive location, there is increased uncertainty in the measured data due to other possible sound sources within the 50 foot radius of the sound microphone.

Sound Quality

Sound coming from the top of the cooling tower is comprised of low- and mid-frequency fan noise. Low- and mid-frequency fan "rumble" is very difficult to attenuate. Fan rumble travels through everything and around everything and is what is audible at any sound-sensitive location.

Sound coming from the sides of the cooling tower is comprised of high-frequency water noise, is much less objectionable than fan noise, and attenuates naturally with distance.

Sound measured at the side of a cooling tower is inside the acoustical shadow of the noise emitted from the top. Outside the acoustical shadow, the low- and mid-frequency fan noise completely masks the high-frequency water noise.



EVAPCO Technical Support Services

EVAPCO Representatives

Your EVAPCO representative is the local expert you can count on to help you with all your commercial HVAC needs—from getting quotes to answering questions to helping you manage your projects and orders. Simply contact him or her whenever you need help; we'll get the job done. To find your local representative, visit evapco.com now.

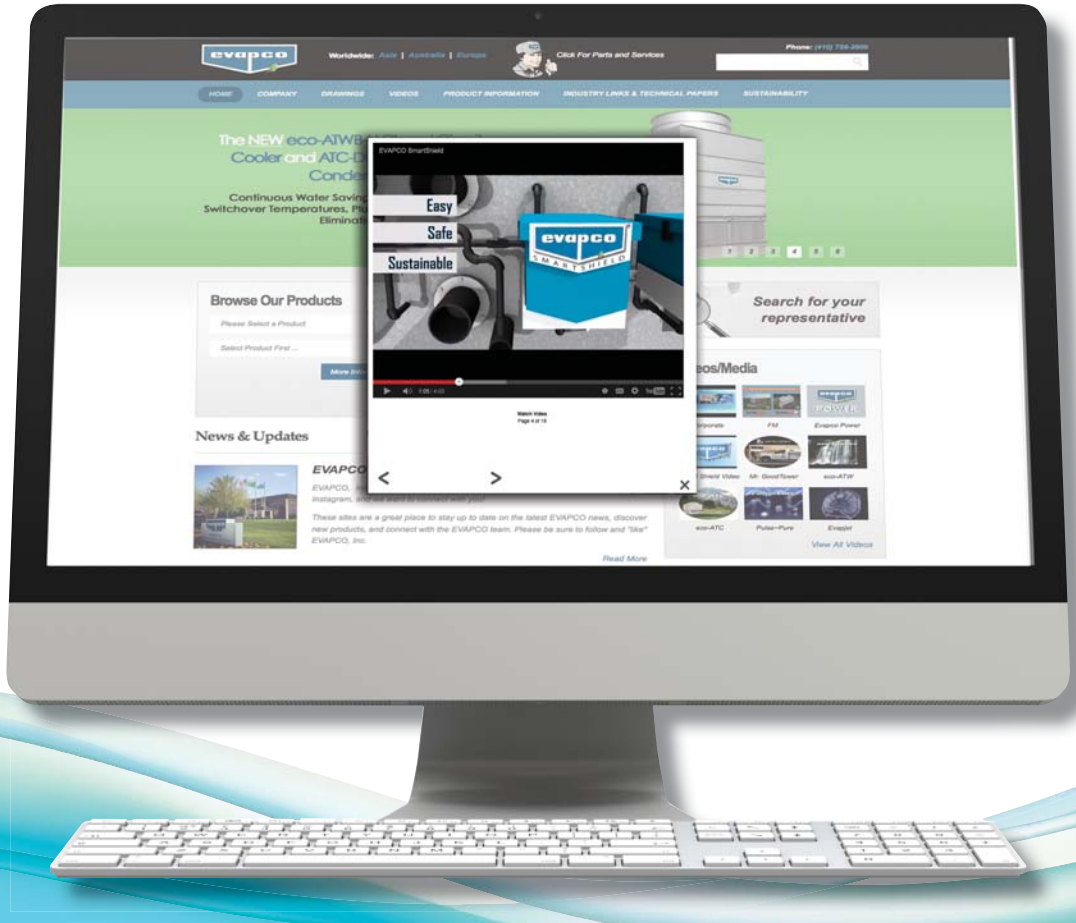
evap*Select*®

evap*Select*® is a computer selection program that makes it easy for you to find and optimize the right EVAPCO solutions for every project. Evaluate thermal performance, space, and energy requirements across units; analyze optional equipment features; and generate complete specifications and unit drawings—all within a friendly and familiar Windows format. Contact your EVAPCO representative to access evap*Select*® now.

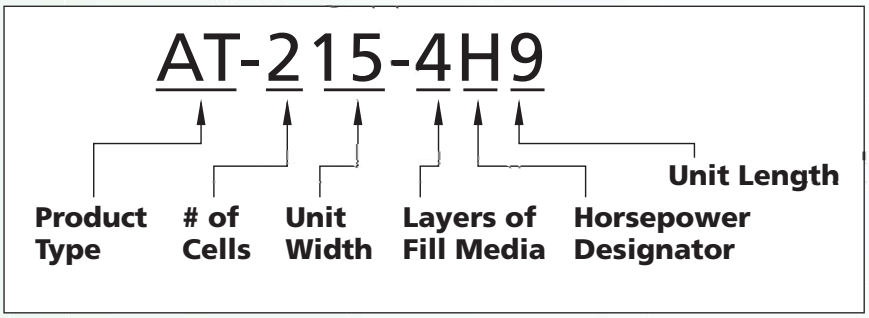
evapco.com

Bookmark evapco.com for the latest and most complete product information. The website contains a multitude of information and resources including:

- Unit certified drawings (.pdf format)
- Steel support drawings (.pdf format)
- Scaled isometric views of towers in CAD (.dwg format)
- 3-D models of towers in Revit (.rfa format)
- Product catalogs
- Rigging instructions
- Operation and maintenance instructions
- Videos
- Logo apparel and merchandise



Nomenclature



Product Type
AT – Indicates an Advanced Technology (AT) tower
UT – An AT tower with a super low sound fan
USS - An AT tower with stainless steel construction, 304, 316 or a combination. A USS tower may also include a Super Low Sound Fan.

# of Cells
Determined by the number of inlet connections, can be 1, 2, 3, or 4

Unit Width
The total width of the unit in feet, all cells included. The value is rounded up to the next whole number.

Unit Length
The total length of the unit in feet, all cells included. The value is rounded up to the next whole number.

OUR PRODUCTS ARE MANUFACTURED WORLDWIDE.

EVAPCO, Inc. — World Headquarters & Research / Development Center

P.O. Box 1300 • Westminster, MD 21158 USA
410-756-2600 p • 410-756-6450 f • marketing@evapco.com

North America

EVAPCO, Inc.
World Headquarters
P.O. Box 1300
Westminster, MD 21158 USA
410-756-2600 p | 410-756-6450 f
marketing@evapco.com

EVAPCO East
5151 Allendale Lane
Taneytown, MD 21787 USA
410-756-2600 p | 410-756-6450 f
marketing@evapco.com

EVAPCO Midwest
1723 York Road
Greenup, IL 62428 USA
217-923-3431 p | 217-923-3300 f
evapcomw@evapcomw.com

EVAPCO West
1900 West Almond Avenue
Madera, CA 93637 USA
559-673-2207 p | 559-673-2378 f
contact@evapcowest.com

EVAPCO Iowa
925 Quality Drive
Lake View, IA 51450 USA
712-657-3223 p | 712-657-3226 f

EVAPCO Iowa
Sales & Engineering
215 1st Street, NE
P.O. Box 88
Medford, MN 55049 USA
507-446-8005 p | 507-446-8239 f
evapcomn@evapcomn.com

EVAPCO Newton
701 East Jourdan Street
Newton, IL 62448 USA
618-783-3433 | 618-783-3499 f
evapcomw@evapcomw.com

EVAPCOLD
521 Evapco Drive
Greenup, IL USA
217-923-3431 p
evapcomw@evapcomw.com

EVAPCO-Dry Cooling, Inc.
981 US Highway 22 West
Bridgewater, New Jersey 08807 USA
908-379-2665 p
info@evapco-blct.com

Refrigeration Valves &
Systems Corporation
A wholly owned subsidiary of EVAPCO, Inc.
1520 Crosswind Dr.
Bryan, TX 77808 USA
979-778-0095 p | 979-778-0030 f
rvs@rvscorp.com

EVAPCO Northwest
5775 S.W. Jean Road, Suite 210
Lake Oswego, Oregon 97035 USA
503-639-2137 p | 503-639-1800 f

EvapTech, Inc.
A wholly owned subsidiary of EVAPCO, Inc.
8331 Nieman Road
Lenexa, KS 66214 USA
913-322-5165 p | 913-322-5166 f
marketing@evaptech.com

Tower Components, Inc.
A wholly owned subsidiary of EVAPCO, Inc.
5960 US HWY 64E
Ramseur, NC 27316
336-824-2102 p | 336-824-2190 f
mail@towercomponentsinc.com

South America

EVAPCO Brasil
Equipamentos Industriais Ltda
Rua Alexandre Dumas, 1601
Conj. 13, 14, 15 - Edifício Stelvio Mazza
04717-004 São Paulo, Brazil
(55) 19-5681-2000 p

Europe

EVAPCO Europe BVBA
European Headquarters
Heersteveldweg 19
Industrieterrein Oost
3700 Tongeren, Belgium
(32) 12-395029 p | (32) 12-238527 f
evapco.europe@evapco.be

EVAPCO Europe, S.r.l.
Via Ciro Menotti 10
I-20017 Passirana di Rho
Milan, Italy
(39) 02-939-9041 p | (39) 02-935-00840 f
evapcoeurope@evapco.it

EVAPCO Europe, S.r.l.
Via Dosso 2
23020 Piateda Sondrio, Italy

EVAPCO Europe GmbH
Insterburger Straße 18
40670 Meerbusch, Germany
(49) 2159-695618 p | (49) 2159-695611 f
info@evapco.de

flex coil a/s
A wholly owned subsidiary of EVAPCO, Inc.
Knøsgårdvej 115
DK-9440 Aabybro Denmark
(45) 9824 4999 p | (45) 9824 4990 f
info@flexcoil.dk

EVAPCO S.A. (Pty.) Ltd.
A licensed manufacturer of EVAPCO, Inc.
18 Quality Road
Isando 1600
Republic of South Africa
(27) 11-392-6630 p | (27) 11-392-6615 f
evapco@evapco.co.za

Evap Egypt Engineering Industries Co.
A licensed manufacturer of EVAPCO, Inc.
5 El Nasr Road
Nasr City, Cairo, Egypt
2 02 24022866 / 2 02 24044997 p
2 02 24044667 / 2 02 24044668 f
Primacool@link.net / Shady@primacool.net

Asia/Pacific

EVAPCO Asia/Pacific Headquarters
1159 Luoning Rd. Baoshan Industrial Zone
Shanghai 200949, P.R. China
(86) 21-6687-7786 p | (86) 21-6687-7008 f
marketing@evapcochina.com

EVAPCO (Shanghai) Refrigeration
Equipment Co., Ltd.
1159 Luoning Rd., Baoshan Industrial Zone
Shanghai 200949, P.R. China
(86) 21-6687-7786 p | (86) 21-6687-7008 f
marketing@evapcochina.com

Beijing EVAPCO Refrigeration
Equipment Co., Ltd.
No. 66 the 4th Block, Yanxi Economic
Developmental Zone
Huairou District
Beijing 101407, P.R. China
(86) 10 6166-7238 p | (86) 10 6166-7395 f
evapcobj@evapcochina.com

EVAPCO Australia (Pty.) Ltd.
34-42 Melbourne Road
P.O. Box 436
Riverstone, N.S.W. Australia 2765
(61) 2 9627-3322 p | (61) 2 9627-1715 f
E-mail: sales@evapco.com.au

EVAPCO Composites Sdn. Bhd
No. 70 (Lot 1289) Jalan Industri 2/3
Rawang Integrated Industrial Park
48000 Rawang, Selangor, Malaysia
60 3 6092-2209 p | 60 3 6092-2210 f

EvapTech Asia Pacific Sdn. Bhd
A wholly owned subsidiary of EvapTech, Inc.
B-6-1, IOI Boulevard
Jalan Kenari 5, Bandar Puchong Jaya
47170 Puchong, Selangor, Malaysia
(60-3) 8070-7255 p | (60-3) 8070-5731 f
E-mail: marketing-ap@evaptech.com

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