

Cooling Towers



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BAC offers the most comprehensive product line of factory assembled cooling towers globally. With our unprecedented experience in designing and manufacturing highly efficient and sustainable cooling towers, we have the solution for any application.

THE BEST STOP FOR...

- ✓ Over 75 years of innovating cutting edge technology
- ✓ Capacities ranging from 12 to 1,352 nominal tons in a single unit
- ✓ Factory assembled accessories that reduce field labor and ongoing maintenance
- ✓ The largest variety of motor horsepowers, footprints, and air intake configurations

THE ONE STOP FOR...

- ✓ Shake table tested units that meet wind and seismic requirements of the International Building Code, have OSHPD pre-approval, and guarantee operability after a seismic event
- ✓ Rugged material of construction: TriArmor® Corrosion Protection System
- ✓ XE-Series Cooling Towers provide the most extremely efficient cooling towers in the world

Unique Features

| | SERIES 3000 | SERIES 1500 | PT2 | | |
|--------------------------------|---|---|---|--|--|
| Model | | | | | |
| Flow and Fan System | Crossflow, Induced Draft, Axial Fan | Crossflow, Induced Draft, Axial Fan | Counterflow, Induced Draft, Axial Fan | | |
| Cataloged Capacity Range | 171 - 1,352 Nominal Tons* 513 - 4,056 USGPM at 95°F to 85°F at a 78°F | 128 - 428 Nominal Tons* 384 - 1,284 USGPM at 95°F to 85°F at a 78°F | 99 - 787 Nominal Tons* 297 - 2,361 USGPM at 95°F to 85°F at a 78°F | | |
| UNIQUE FEATURES | XE-Series Cooling Towers meet or exceed two times ASHRAE Standard 90.1 energy efficiency requirements, reducing energy and operating costs up to 37.5% Designed to meet wind and seismic requirements for the International Building Code (IBC) TriArmor® Corrosion Protection System and EVERTOUGH™ Construction offer cost effective, alternative to standard construction Basinless construction available Low sound options | Ideal replacement unit for existing counterflow and crossflow units Ideal for tight enclosures Single air intake maximizes layout flexibility Independent fan operation Single water inlet with integral strainer BALTIGUARD™ Fan System available for continuous operation Low sound options | Designed to meet wind and seismic requirements for the 2009 International Building Code (IBC) Meets or exceeds ASHRAE Standard 90.1 energy efficiency requirements Reduced footprint for low tonnage requirements TriArmor® Corrosion Protection System and EVERTOUGH™ Construction offers a cost effective, highly protective upgrade to conventional construction Single piece rigging Low sound options | | |

| VTO/VT1 | LOW PROFILE VTL | FXT | |
|--|---|---|---------------------------------|
| | | | Model |
| Counterflow, Forced Draft, Centrifugal Fan | Counterflow, Forced Draft, Centrifugal Fan | Crossflow, Forced Draft, Axial Fan | Flow and Fan System |
| 12 - 1,335 Nominal Tons* 36 - 4,005 USGPM at 95°F to 85°F at a 78°F | 16 - 272 Nominal Tons* 48 - 816 USGPM at 95°F to 85°F at a 78°F | 58 - 268 Nominal Tons* 174 - 804 USGPM at 95°F to 85°F at a 78°F | Catalogued Capacity Range |
| Centrifugal fan for indoor applications Suitable for sound sensitive applications High temperature industrial applications BALTIGUARD™ Fan System available for continuous operation Easy maintenance with motors and drives located outside the discharge airstream | Low profile to meet low height requirements Centrifugal fan for indoor applications Single piece shipping and rigging Suitable for sound sensitive applications High temperature industrial applications BALTIGUARD™ Fan System available for continuous operation | High efficient, low horsepower axial fans Single piece lift, shipping, and rigging Motor is located on the exterior of the unit for easy maintenance Forced draft design protects moving parts for a long service life Easy maintenance | UNIQUE FEATURES |

^{*}Nominal Tons 3 USGPM/ton of water cooled from 95°F to 85°F at a 78°F EWB

The NEW Series 3000 Cooling Towers

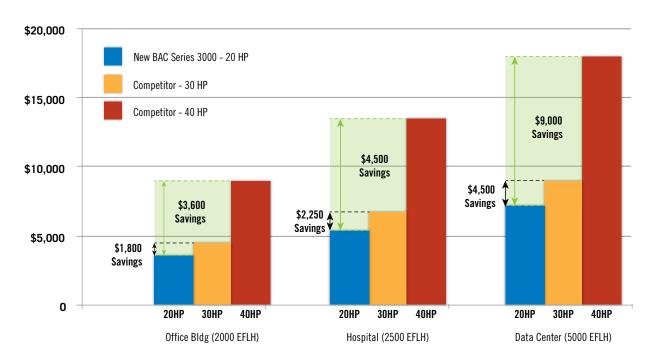
The NEW Series 3000 Cooling Tower continues its industry leading tradition. With expanded selection flexibility and a capacity increase of up to 16%, the Series 3000 Cooling Tower provides an extremely efficient solution for all your application needs.

Reduced Energy Consumption

- ✓ Most efficient cooling tower in the industry
- ✓ Up to a 16% increase in capacity
- Exceeds ASHRAE 90.1-2013 efficiency requirements

| 400-Ton Example: | Series 3000 | Competition | Competition | |
|-----------------------|------------------|------------------|------------------|--|
| Fan HP | 20 | 30 | 40 | |
| Footprint (L x W x H) | 8.5' x 18' x 12' | 8.5' x 18' x 12' | 8.5' x 18' x 12' | |
| Nominal Tons | 400 | 386 | 423 | |

400-Ton Example: Annual Operating Cost for a 20, 30, & 40 HP



Energy Cost Savings Based on a 400-Ton System (\$0.12 kWH)



Reliable Year-Round Operation

- ✓ Superior winter operating performance
- ✓ BALTIDRIVE® POWER TRAIN Fan System
- Rigid frame construction
- ✓ Meets wind and seismic requirements of the International Building Code (IBC)

More Selection Flexibility

- √ 31 new models
- √ 3 new box sizes
- √ 69 XE-Series 3000 Cooling Tower models are available in a full array of box sizes

Enhanced Payback Analysis

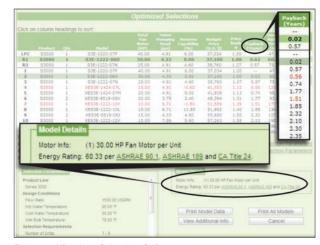
- Provides alternative selections based on energy savings and minimum payback
- ✓ User-defined life-cycle cost inputs
- ✓ XE-Series models featured in selection program

Easiest to Maintain

- Direct access to:
 - Cold water basin
 - Hot water basin
 - Drive system
- Patented hygienic cold water basin
- Factory assembled access options available for ease of maintenance



New Series 3000 Cooling Tower



Enhanced Product Selection Software



Factory Pre-Assembled Platforms

X=- Series 3000

The XE-Series 3000 Cooling Tower is the newest addition to BAC's cooling tower portfolio. These models are tailored for projects that require an extremely efficient unit to further minimize energy costs, reduce sound levels, and contribute to LEED® Certification Points. XE-Series 3000 Cooling Towers are at least two times more efficient than the minimum requirements established in ASHRAE Standard 90.1 - 2013.



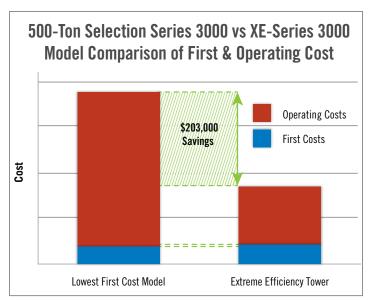
Lowest Operating Costs

- 37.5% reduction in operating costs for a 500-Ton system
- ✓ Payback typically 2 years or less



Reduced Sound Levels

- ✓ Sound reduction up to 50% (3dB)
- Fans optimized to minimize sound levels and maximize efficiency
- ✓ Additional sound reducing options available



Note: Operating costs based on fan kW x 0.12kWh x 2500EFLH (equivalent full load hours) x 20 years (2011 ASHRAE Handbook HVAC Applications) x 3% per year energy inflation factor.





Increased Operating Reliability

- ✓ BALTIDRIVE® POWER TRAIN Fan System
- \checkmark Extends the life of the mechanical drive components (minimum L_{10} bearing life 288,000 hours)
- √ 5-year motor and drive warranty

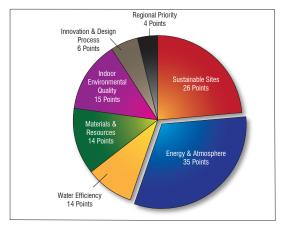


The XE-Series 3000 Cooling Tower



LEED® Certification Contributions

- ✓ Industry leading energy efficiencies
- Provides energy cost savings
- Contributes to Energy and Atmosphere LEED® Credit Points (EAc1)



LEED® Point Breakdown for New Construction



- **\$** Lowest Operating Costs
- **◄**))) Reduced Sounds Levels
 - Increased Operating Reliability
- Contributes to LEED® Certification

COMPARE > SELECT > SPECIFY >

Series 1500

With a single air inlet, BAC's Series 1500 is the ideal induced draft cooling tower for installations in tight enclosures and where sound management is a concern. This crossflow tower's serviceability, maintainability, and reliable winter operation make it a flexible option as a new installation and as a great energy saving replacement for existing counterflow unit installations.



Series 1500 Cooling Tower

LOW ENVIRONMENTAL IMPACT

- Energy efficient
 - All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements
 - Premium efficient/inverter duty fan motors
 - Independent fan operation (optional)
 - Gravity distribution system with low pump head requirements
 - BALTIGUARD™ Fan System provides redundancy and energy savings by providing a pony motor (optional)
- ✓ Sound Reduction Options
 - Standard fan is high efficiency and low sound
 - For further reduced sound levels, Low Sound Fans, Whisper Quiet Fans, and sound attenuation are available (optional)

RELIABLE YEAR-ROUND OPERATION

- Separate air inlet louvers allow for easy visual inspection of air-water interface
- ✓ BALTIDRIVE® Power Train fan system
 - No minimum fan speed is required
 - No gear oil heaters are needed
- Cooling tower duty motors designed for hostile environments

DURABLE CONSTRUCTION

 Enhanced longevity with a variety of durable materials of construction (see page 15 for details)

EASY MAINTENANCE

- Crossflow configuration provides direct access for easy maintenance to cold water basin, hot water basin, and drive system
- ✓ BALTIDRIVE® Power Train uses state-of-the-art technology to ease maintenance
- Dirt and debris are collected by an integral strainer before reaching the hot water basin, keeping nozzles clean
- Make-up, drain, overflow, and optional basin accessories are accessible from outside the unit
- ✓ Hinged access doors and standard internal walkway provide easy entry to the spacious plenum for routine drive maintenance
- ✓ The fill surface is elevated above the sloped cold water basin floor to facilitate flushing of dirt and debris from this critical area
- Factory assembled louver face platforms and internal service platforms facilitate maintenance (optional)

IDEAL REPLACEMENT UNIT

- Designed to mount directly on existing steel support
- ✓ Fan motor configurations can be supplied to match existing wiring
- ✓ Units fit in most existing enclosures with little or no modifications due to single side air inlet design
- ✓ Single air inlet allows units to be placed close to solid walls, reducing the size of the enclosure needed and allowing for more economical use of premium space
- ✓ Models ship in multiple sections to minimize the size and weight of the heaviest lift, allowing for use of smaller, less costly cranes



Note: Ideal replacement unit with the ability to use existing support steel and minimize piping and wiring changes.



Centrifugal Fan Units



Optimal Replacement Unit with Axial Fans to **Reduce Energy Costs**



Standard Internal Walkway





The PT2 Cooling Tower now has a capacity range from 99 to 787 nominal tons with the introduction of the new 12' x 18' box size. With a standard two fan mechanical, the PT2-1218 tower provides redundancy for critical applications and capacity control from the independent fans and motors. The PT2 is an ideal replacement unit that highlights BAC's commitment to easy maintenance and installation. The units also reduce energy consumption with premium efficient motors, are easy to install with a single piece lift and BAC's InterLok $^{\text{TM}}$ System, have a wind rating of 130 psf, and are seismically verified up to a S_{DS} of 2.93g at grade.



Two-cell PT2 Installation

LOW ENVIRONMENTAL IMPACT

- - All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements
 - Premium efficient/inverter duty fan motors
- Sound Reduction Options
 - Standard fan is high efficiency and low sound
 - · For further reduced sound levels, Low Sound Fans and sound attenuation are available (optional)

EASY MAINTENANCE

- External motor adjustment with included wrench
- ✓ Inward sliding access doors do not limit workspace
- External platforms and ladders improve accessibility (optional)
- ✓ BranchLok™ Removal System allows for tool-less spray branch removal
- Easily accessible cleanout port flushes water distribution debris to outside the unit
- ✓ Louvers are easily removed without tools
- Removable inspection panels allow for easy inspection and access to the fill (optional)

RELIABLE AND DURABLE CONSTRUCTION

- ✓ PT2-1218 models have a standard two fan mechanical which provides redundancy
 - Ideal for critical applications
- ✓ Seismically verified through dynamic shake table testing up to a S_{ns} of
- ✓ Meets wind and seismic requirements of the 2009 International Building Code (IBC)
- ✓ Listed on California's Office of Statewide Health Planning and Development (OSHPD) pre-approved equipment list
- ✓ Enhanced longevity with a variety of materials of construction (see page 15)

IDEAL REPLACEMENT UNIT

- ✓ Units are designed to mount directly on the existing support steel of both crossflow and counterflow cooling towers
- ✓ Fan motor configurations can be supplied to match existing wiring

LOW INSTALLED COST

- ✓ Single piece lift available on all models
- ✓ Models ship in multiple sections to minimize the size and weight of the heaviest lift, allowing for use of smaller, less costly cranes
- ✓ BAC's InterLok[™] System aligns the casing and the basin to expedite rigging and requires no sealer tape
- ✓ Factory pre-assembled platforms reduce installation time (optional)



Note: All NEW 12'x18' box size now available up to 787 tons. Featuring a two fan mechanical as standard, which offers critical redundancy.



Shake Table Testing

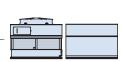


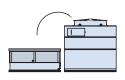
Single Piece Lift

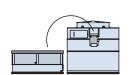


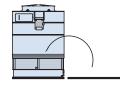
External Access Platform (Optional)











Easily Assembled Containerized Units

Series V

Series V Cooling Towers provide solutions to some of the most challenging cooling scenarios. Suitable for applications where external duct work and other sources of external static pressure exist, the VTL, VTO, and VT1 can be used in indoor and outdoor applications. With the addition of steel fill, Series V Cooling Towers are also ideal for high temperature applications.







VTL Installatio



Note: Series V Cooling Towers are equipped to withstand high temperature applications when supplied with steel fill.

FLEXIBLE INSTALLATION

- Centrifugal fans are suitable for applications where external duct work and other sources of external static pressure exist
- Can be located indoors
- ✓ Low profile VTL fits well into mechanical equipment rooms with low ceilings and is easily hidden behind louvered walls on buildings

LOW ENVIRONMENTAL IMPACT

- Energy efficient
 - All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements
 - Premium efficient/inverter duty fan motors
 - BALTIGUARD™ Fan System provides redundancy and energy savings by providing a pony motor (optional)
- ✓ Sound Reduction Options
 - · Centrifugal fans have inherently low sound characteristics
 - · Factory designed sound attenuation is available for both the air intake and discharge (optional)
 - · Particularly sound sensitive areas can be accommodated by facing the quiet blank-off panel to the sound sensitive direction

EASY MAINTENANCE

- ✓ Fans, motors, and drive system are located outside of the moist discharge air stream, protecting them from moisture, condensation, and icing while facilitating maintenance
- ✓ All moving parts are located near the base of the unit within easy reach for cleaning, lubrication, or adjustments
- ✓ Nozzles are non-clogging, reducing maintenance costs and ensuring efficient equipment operation
- Split fan housing for easy air moving component replacement



External Drive Access



BALTIGUARD™ Fan System (Optional)



Intake Sound Attenuation (Optional)



BAC's FXT was the first cooling tower to be certified by the Cooling Technology Institute (CTI) and still holds its certification to this day. The FXT's performance, maintainability, and low initial cost make it an industry standard for a wide range of projects.



Single Piece Lift

LOW ENERGY CONSUMPTION

- ✓ All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements
- ✓ Premium efficient/inverter duty fan motors
- ✓ High efficiency, low horsepower, axial fans

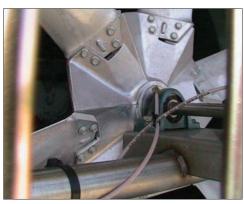
LOW INSTALLED COST

- ✓ Single piece lift
- Ships completely assembled, minimizing installation time and cost
 - No motors to mount
 - No sheaves to align
 - No belts to install
 - No make-up system to assemble

Easily Accessible Motor

EASY MAINTENANCE

- The fan motor is located on the exterior of the unit for easy maintenance and belt adjustment
- Basin covers are standard keeping debris from entering the hot water basin
- Extended lubrication lines are provided as standard on the exterior of the unit for bearing lubrication
- An access door makes access to the interior of the unit easy for adjusting the float valve, cleaning the strainer, or flushing the basin



Extended Lubrication Lines

BAC Materials of Construction



BAC offers a variety of materials to meet the corrosion resistance, unit operating life, and budgetary requirements of any project. Each of these materials underwent extensive testing in BAC's Corporate Technology Center and have been successfully operating in the field for at least ten years.

- ✓ Standard Construction Hot dip galvanized G-235 steel construction structural members.
- ✓ TriArmor® Corrosion Protection System Developed and available exclusively on BAC products, TriArmor® Corrosion Protection System is a three layered barrier that is proven to provide greater corrosion protection than stainless steel for cold water basins. It is completely impervious to cooling system water chemistries and operating conditions as well as pitting, chloride stress, crevice crack corrosion, and leaks.
 - G-235 galvanized structural steel is fully encapsulated with a thermosetting hybrid polymer, providing a second layer of protection and providing a base for the third layer. Once assembled, the interior of the basin receives a coating of an industrial grade polyurethane barrier, finalizing the seamless construction on the cold water basin. TriArmor® Corrosion Protection System comes with a 5-year leak and corrosion protection warranty.
- ✓ EVERTOUGHTM Construction For the ultimate in corrosion protection, BAC offers the original EVERTOUGH™ Construction. EVERTOUGH™ Construction builds on the benefits of the TriArmor® Corrosion Protection System, including three layers of protection in the cold water basin, and adds polymeric water distribution systems and all steel structural components protected by thermosetting hybrid polymer. Provided with a 5 year louver-to-louver warranty, EVERTOUGH™ Construction optimizes corrosion resistance for all water chemistries.





BAC testing and experience confirms that, when it comes to stainless steel, Type 304 stainless steel provides the best value for owners and operators. While some manufacturers are offering Type 301L stainless steel as an alternative, BAC has evaluated the lower cost alternative and determined it has a reduced level of corrosion protection, making it an unacceptable risk for owners and operators.



TriArmor® Corrosion Protection System



With its variety of material of construction options, BAC delivers units designed for long service life under any budgetary concern. For more information or selection assistance, please contact your local BAC Representative.

Product Comparison

ITEMS SHADED IN BLUE ARE BAC EXCLUSIVE FEATURES AND OPTIONS

| Standard Features | Series 3000 | Series 1500 | PT2 | VTO/VT1 | VTL | FXT |
|---|-------------|-------------|----------|------------|----------|----------|
| Axial Fan | • | • | • | | | • |
| Centrifugal Fan ^[1] | | | | • | • | |
| Large Plenum Area for Access | • | • | | | | |
| Capacity Range (Nominal Tons) | 171 - 1,352 | 128 - 428 | 99 - 787 | 12 - 1,335 | 16 - 272 | 58 - 268 |
| Shake Table Tested | 3.50g | | 2.93g | | | |
| Premium Efficient Fan Motors | • | • | • | • | • | • |
| BALTIDRIVE® Power Train | • | • | • | | | |
| Patented BAC Hygienic Cold Water Basin | • | | | | | |
| Separate Air Inlet Louvers | • | • | • | | | |
| Weir Dams | • | | | | | |
| Fully Assembled Containerized Units for Export ^[2] | | | • | • | • | |
| Construction Options | | | | | | |
| XE-Series Models | • | | | | | |
| TriArmor® Corrosion Protection System | • | • | • | | | |
| EVERTOUGH™ Construction | • | | • | | | |
| Welded Stainless Steel Cold Water Basin ^[3] | • | • | • | | | |
| Stainless Steel Construction ^[3] | • | • | • | • | • | |
| Options and Accessories | | | | | | |
| Independent Fan Operation | | • | | • | | |
| BALTIGUARD™ Fan System | • | • | | • | • | |
| Low Sound Fan | • | • | • | | | |
| Whisper Quiet Fan | • | • | | | | |
| Intake Sound Attenuation | • | • | | • | • | |
| Discharge Sound Attenuation | • | • | • | • | • | |
| Handrails with Ladder ^[4] | • | | | • | • | |
| Factory Assembled External Access Platform with Ladder ^[4] | • | • | • | | | |
| Internal Ladder and Service Platform | • | • | | | | |
| Internal Walkway | • | Standard | | | | |
| Gear Drive | • | | | | | |
| Basinless Unit Construction | • | | | | | |
| Indoor Applications | | | | • | • | |
| Low Ceiling Applications | | | | | • | |
| Motor Removal System | • | | • | | | |
| Single Point Wiring ⁽⁵⁾ | • | | • | | | |
| Steel Fill | | | | • | • | |
| VR Stacks | • | | | | | |
| Codes and Standards | | | | | | |
| CTI Standard 201 | • | • | • | • | • | • |
| ASHRAE 90.1 | • | • | • | • | • | • |
| OSHPD Pre-approved List | • | | • | | | |
| Factory Mutual (FM) | • | | • | | | |

Note 1: Centrifugal fan units can overcome ESP imposed by duct work or other restrictions. A larger fan motor may be required. Contact your local BAC Representative for selection and application assistance.

Note 2: Please contact your local BAC Representative to discuss containerization options for certain box sizes.

Note 3: Seams between the panels inside the cold water basin are welded for Series 3000, Series 1500, and PT2 models. The basin is leak tested at the factory and welded seams are provided with a five-year leak-proof warranty.

Note 4: Safety cages are available on ladders when required by local safety standards.

Note 5: Single point wiring is available for the fan motor and vibration cut out switch when ordered with BAC Controls.

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