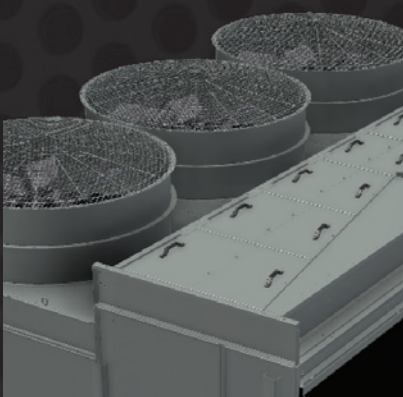




# Series 1500E and XE-Series Open Cooling Tower

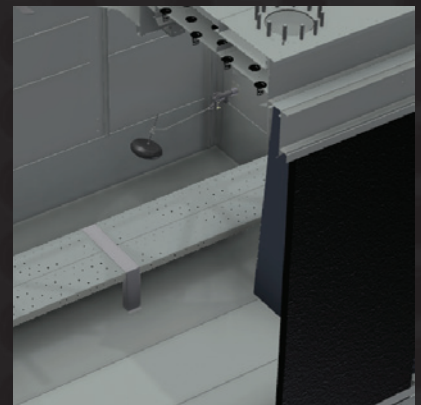
BAC's Series 1500 Cooling Tower parallels the technology and successes of BAC's Series 3000 Cooling Tower in a compact footprint. The Series 1500 Cooling Tower is the industry's most serviceable unit without compromising performance and fit. Newly redesigned, the Series 1500E Cooling Tower offers Extreme Efficiency (XE) models which are at least two times more efficient than the minimum requirements established in ASHRAE 90.1 and further reduce the unit's operating cost. Its serviceability, easy maintenance and superior winter operation, and single air intake make it an outstanding choice for new installations and an ideal replacement unit.



Easy Access to the  
Spray System



S1500E

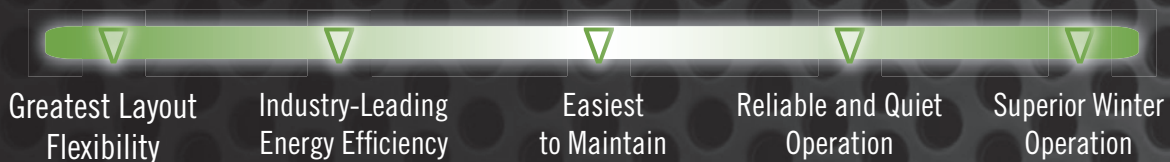


Spacious Plenum with  
Standard Internal Walkway



# BAC's Series 1500E: Greatest Layout Flexibility

Single Air Intake  
Crossflow Capacities, Independent Fan Drives  
467 to 3295 Kilowatts in a Single Cell





# Series 1500E Benefits

## > Layout Flexibility

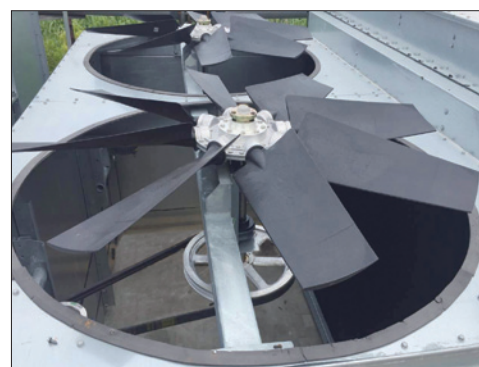
- ▶ Single Side Air Inlet design especially fits in narrow or compact footprint
- ▶ Numerous popular box sizes fit on existing support steel and wiring for replacement
- ▶ Positioning the blank-off panel towards the sound sensitive direction insulates sensitive areas from higher sound levels
- ▶ Single top water inlet allows for easy piping arrangements



Layout Flexibility

## > Low Environmental Impact

- ▶ **ENERGY EFFICIENT**
  - Units meet or exceed ASHRAE Standard 90.1 and BCA Section J energy efficient requirements
  - High efficient fan motors with VFD capabilities
  - Gravity distribution with low pump head requirements
  - Independent fan operation provides redundancy and energy savings
- ▶ **SOUND REDUCTION OPTIONS**
  - Standard fan(s) are high efficiency and low sound
  - Particularly sound sensitive installations can be accommodated by facing the quiet blank-off panel in the sound sensitive direction
  - For further reduced sound levels, Low Sound Fans, Whisper Quiet Fans and sound attenuation are available



Series 1500E Standard Fan

## > Easy Maintenance

- ▶ Crossflow configuration provides direct access for easy maintenance to the cold water basin, hot water basin and drive system
- ▶ BALTDRIIVE® Power Train is designed for ease of maintenance
- ▶ Combined Inlet Shields block sunlight, reducing the potential for algae growth in the cold water basin
- ▶ Optional external ladders, safety cages, handrails and safety gates provide easy entry for maintenance to hot water basin and water distribution system
- ▶ Large hinged access doors and standard internal walkway, optional internal service platforms and ladders provide easy entry to the spacious plenum for routine maintenance to water basin accessories, fills and drive system
- ▶ Motor removal system facilitates easy motor replacement (option)



Easy Maintenance



## > Reliable Year-Round Operation

### ▶ SUPERIOR WINTER OPERATION

- Independent fan drives provide flexible capacity control during winter operation
- Combined Inlet Shields(CIS) effectively reduce the freezing at air intake side
- Unique streamlined BAFFLES minimize the risk of freezing caused by splash
- Optimum designed WEIR DAMS guarantee even water distribution, minimize the possibility of freezing

### ▶ BALTIDRIVE® POWER TRAIN FAN SYSTEM

- Backed by BAC's comprehensive 5-year motor and drive warranty
- Corrosion resistant cast aluminum sheaves with specially designed powerband belts
- Cooling tower duty motors designed for hostile environments
- Independent fans and motors are standby for each other, further improve reliability

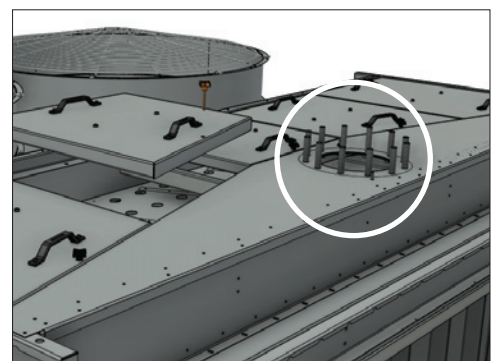


BALTIDRIVE® Power Train Fan System



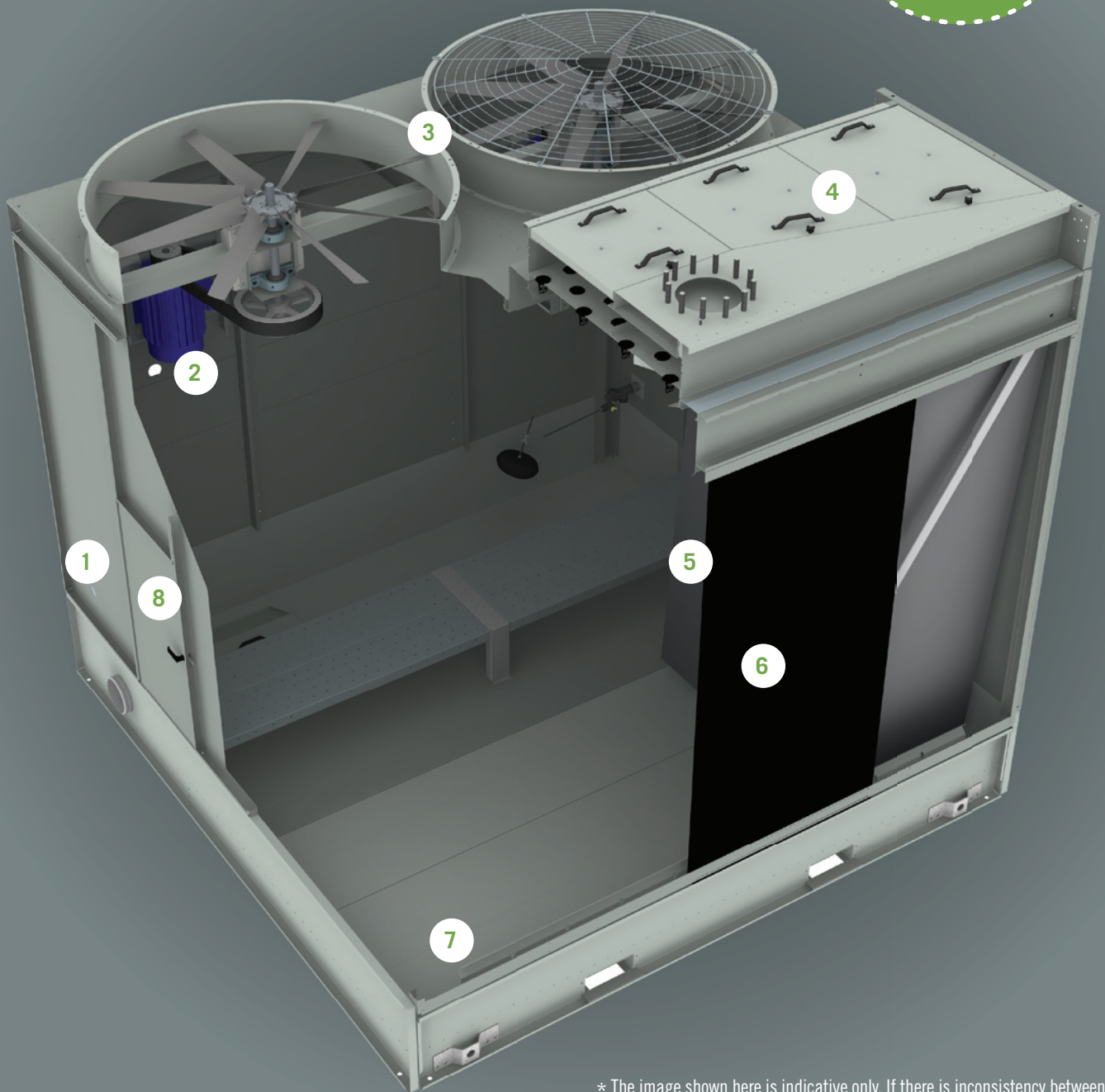
## > Low Installed Cost

- ▶ Assembled units are available to reduce field installed cost
- ▶ Single water inlet connection allows for easy piping arrangements
- ▶ Adaptable steel support configuration options, utilizing pre-existing support steel for replacement units
- ▶ Modular design minimizes installation time, weight, and crane costs
- ▶ All connections 4" (102mm) and larger are furnished with beveled for weld and grooved for mechanical couplings to simplify field piping



Single Water Inlet

# Series 1500E Construction Details



\* The image shown here is indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern.

## 1 Heavy-Duty Construction

- ▶ Heavy-gauge G-235 hot-dip galvanized steel frame
- ▶ Meets wind and seismic requirements of the International Building Code (IBC)
- ▶ Shake table tested and verified seismic ratings ensure operability after an event
- ▶ Tested per the California's Office of Statewide Health Planning and Development (OSHPD) requirements

## 2 BALTIDRIVE® Power Train

- ▶ Independent fan drives are standard, providing capacity control and redundancy
- ▶ Premium quality, solid backed, multi-groove belt to ensure reliable operation
- ▶ Corrosion resistant cast aluminum sheaves reduce drive maintenance compared to cast iron sheaves
- ▶ Heavy-duty bearings with a minimum L<sub>10</sub> of 150,000 hours (500,000 hour average life) ensures reliable drive operation
- ▶ High efficient/inverter duty fan motors as standard
- ▶ 5-year motor and drive warranty

## 3 Low Horsepower Axial Fans

- ▶ High efficiency fans maximize the capacity for each model
- ▶ Quiet operation to minimize sound levels from the discharge of the unit

## 4 Water Distribution System

- ▶ Steel hot water basin covers with handles for easy maintenance of distribution system
- ▶ Low pump head gravity distribution basins reduces system pump energy
- ▶ Large orifice, non-clog nozzles reduces maintenance of the distribution system
- ▶ Standard weir dams can accommodate a flow range of 50% to 100% ensures reliable operation

## 5 BACross III® Fill with Integral Drift Eliminators (not shown)

- ▶ High efficiency heat transfer surface optimizes thermal performance and energy efficiency
- ▶ Polyvinyl chloride (PVC) is impervious to rot, decay, and biological attack
- ▶ Flame spread rating of 5 per ASTM E84
- ▶ Elevated off of the cold water basin to reduce maintenance

## 6 Combined Inlet Shields

- ▶ Corrosion resistant
- ▶ Maintenance free
- ▶ UV-protected finish
- ▶ Reduces sunlight and algae growth
- ▶ Ideal for winter operation

## 7 Cold Water Basin

- ▶ Sloped cold water basin for easy cleaning
- ▶ Suction strainer with anti-vortex hood
- ▶ Adjustable water make-up assembly
- ▶ Internal walkway as standard to minimize maintenance

## 8 Hinged Access Doors

- ▶ Inward hinged door on each end wall allows easy access to the drive system
- ▶ Easy safe access to the interior of the unit



# Series 1500E

## Custom Features & Options

### ➤ Materials of Construction

Determining the appropriate material of construction for a project depends on several factors, including water quality, climate and environmental conditions, availability of time and manpower for maintenance, unit lifetime requirements, and budget. BAC provides the widest variety of material of construction options in the industry and has the ability to provide a solution to meet all conditions and budgets.



#### STANDARD CONSTRUCTION

G-235 mill galvanized steel is the heaviest commercially available galvanized steel, universally recognized for its strength and corrosion resistance. To assure long-life, G-235 mill galvanized steel is used as the standard material of construction for all Series 1500E units. With proper maintenance and water treatment, G-235 galvanized steel products will provide an excellent service life under the operating conditions normally encountered in comfort cooling and industrial applications.



Standard Construction Installation

#### ▶ STAINLESS STEEL (OPTION)

Several Type 304/316 stainless steel material of construction options are available.

- TYPE 304/316 STAINLESS STEEL COLD WATER BASIN

A Type 304/316 stainless steel cold water basin is available. All steel panels and structural members of the cold water basin are constructed from Type 304/316 stainless steel. For factory assembled units, seams between panels inside the cold water basin are welded, providing an advantage over bolted stainless steel cold water basins for minimizing susceptibility to leaks at basin seams. The basin is leak tested at the factory and welded seams are provided with a 5-year leak-proof warranty.

- STAINLESS STEEL HOT WATER BASIN

The hot water basin and basin covers are constructed of Type 304/316 stainless steel.

- ALL TYPE 304/316 STAINLESS STEEL CONSTRUCTION

All unit structural elements and the hot and cold water basins are constructed of Type 304/316 stainless steel. For factory assembled units, seams between panels inside the cold water basin are welded, providing an extreme advantage over bolted cold water basins for minimizing susceptibility to leaks at basin seams. The basin is leak tested at the factory and welded seams are provided with a 5-year leak-proof warranty.



Welded Type 304/316 Stainless Steel Cold Water Basin



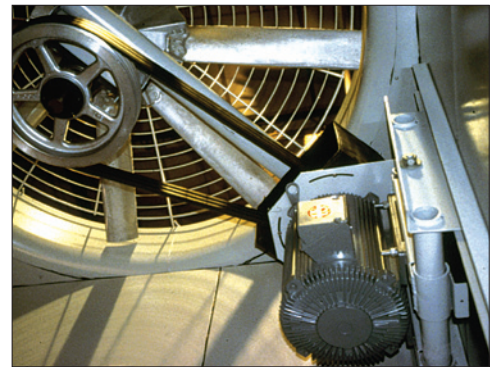
## ➤ Drive System Options

The fan drive system provides the cooling air necessary to reject unwanted heat from the system to the atmosphere. All BAC drive systems use high efficient cooling tower duty motors and include BAC's comprehensive 5-year motor and drive warranty. Cooling tower duty motors are specially designed for the harsh environment inside a cooling tower and have permanently lubricated bearings, drastically decreasing the maintenance requirement of the motor. BAC belt drive systems are the most durable and maintenance friendly drive systems on the market, including single nut adjustment for belt tensioning to make belt tensioning simple.



### STANDARD BALTIDRIVE® POWER TRAIN

The BALTIDRIVE® Power Train utilizes special corrosion resistant materials of construction and state-of-the-art technology to ensure ease of maintenance and reliable year-round performance. This BAC engineered drive system consists of a specially designed powerband and two cast aluminum sheaves located at minimal shaft centreline distances to maximize belt life. As compared to a gear drive system, this specially engineered belt drive system provides many advantages. The BALTIDRIVE® Power Train requires only periodic inspection of components and belt tensioning, which is simple with a single nut adjustment, and requires less downtime. Only fan bearing lubrication is required for routine maintenance. Belt drive systems also have the added advantage of being suitable for variable frequency drive (VFD) applications without requiring expensive optional accessories.



BALTIDRIVE® Power Train



### INDEPENDENT FAN OPERATION

The independent fan consists of one fan motor and drive assembly for each fan to allow independent operation, adding an additional step of fan cycling and capacity control. This ensures complete redundancy for the fan and motor system.

#### ▶ VIBRATION CUTOFF SWITCH (OPTION)

A factory mounted vibration cutoff switch is available to effectively protect against rotating equipment failure. BAC can provide either a mechanical or solid-state electronic vibration cutoff switch in a NEMA 4 enclosure to ensure reliable protection. Additional contacts can be provided on either switch type to activate an alarm. Remote reset capability is also available on either switch type.

#### ▶ EXTENDED LUBRICATION LINES (OPTION)

Extended lubrication lines are available for lubrication of the fan shaft bearings. Fittings are located on the exterior casing panel next to the access door.



Extended Lubrication Lines

# Series 1500E

## Custom Features & Options

### > Cold Water Basin

The cooling tower water collects in the cold water basin which provides the required head pressure for the cooling system pump. During operation the Series 1500E cold water basin eliminates any stagnant zones which are susceptible to biological growth. The Series 1500E cold water basin facilitates easy inspection and maintenance of basin accessories and connections.



#### STANDARD MECHANICAL WATER LEVEL CONTROL

Mechanical make-up valves must operate continuously in the moist and turbulent environment existing within evaporative cooling equipment. Due to this environment, the operation of the valve must be simple, and the valve must be durable. BAC's high quality mechanical water level control assembly is standard with all units, and has been specially designed to provide the most reliable operation while being easy to maintain. This accessory is omitted for remote sump applications.

#### ▶ ELECTRIC WATER LEVEL CONTROL (OPTION)

BAC's Electric Water Level Control (EWLC) is a state-of-the-art conductivity actuated, probe type liquid level control. The hermetically sealed EWLC is engineered and manufactured specifically for use in evaporative cooling systems and is equipped with an error code LED which illuminates to indicate status, including when the water and/or probes are dirty. The EWLC option replaces the standard mechanical make-up valve, and includes a slow closing, solenoid activated valve in the make-up water line to minimize water hammer. EWLC is recommended when more precise water level control is required and in areas that experience sub-freezing conditions.



#### BASIN HEATERS (OPTION)

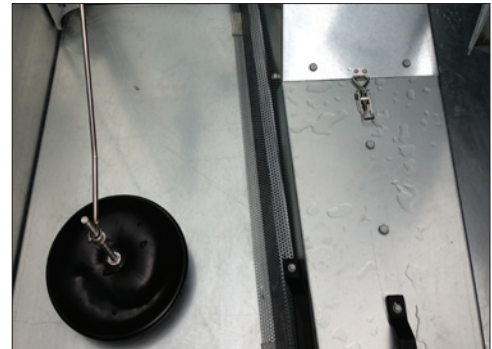
Evaporative cooling equipment exposed to below freezing ambient temperatures require protection to prevent freezing of the water in the cold water basin when the unit is idle. Factory-installed electric immersion heaters, which maintain 40°F (4.4°C) water temperature, are a simple and inexpensive way of providing such protection.

#### HEATER KW DATA

MODEL NUMBER	0°F (-17.8°C) AMBIENT HEATERS		-20°F (-28.9°C) AMBIENT HEATERS	
	NUMBER OF HEATERS	KW PER HEATER	NUMBER OF HEATERS	KW PER HEATER
S15E/XES15E-0809	1	6	1	8
S15E/XES15E-0812	1	8	1	12
S15E/XES15E-1012	1	10	1	14
S15E/XES15E-1018	1	16	2	10
S15E/XES15E-1212	1	12	1	16
S15E/XES15E-1218	2	10	2	12



NOTE: this table is based on 380v/3 phase/50 hz power.



Mechanical Water Level Control



Electric Water Level Control



Basin Heater



► LOW AND HIGH LEVEL ALARM FLOAT SWITCHES (OPTION)

Low and high level alarm float switches are available to provide added control to your equipment operation. Level alarms can alert operators to an abnormal operating condition to ensure the highest system efficiency with minimal water usage.

## ► Multi-Cell Unit Options

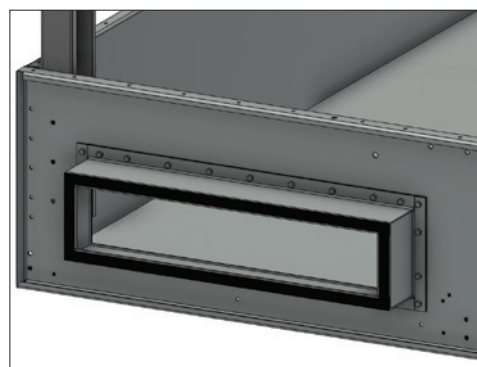
Special care must be taken for multi-cell installations to ensure balanced water levels in the cold water basins across cells. If measures are not put in place to ensure balanced basin water levels, a potential exists that one basin may overflow and dump water, while the water level in another tower goes low and requires make-up. This leads to unnecessary water waste. To prevent this from occurring, BAC provides two options for balancing water levels and recommends that the installation be designed to ensure balanced flows to and from each tower.

► FLUME BOX – STANDARD ON ALL MULTI-CELL UNITS

A flume box is provided as standard for multi-cell units to ensure balanced water levels in the cold water basins across all cells.

► EQUALIZER (OPTION)

Equalizer connections are available as an option for multi-cell cooling towers in lieu of a flume box. Use of an equalizer allows for easy isolation of a cell for winter operation, maintenance, or inspection while continuing system operation.



Flume Box

## ► Water Distribution System

The Series 1500E Cooling Tower utilizes a low pump head gravity distribution system with large orifice, non-clogging nozzles that requires less pump energy than a pressurized distribution system.

STANDARD SINGLE INLET CONNECTION



The Series 1500E comes standard with a single inlet connection. Basin covers match the material of construction of the hot water basin and come in easy to handle sections for access and inspection of the distribution system. The use of gravity distribution minimizes pump head requirements and allows for maintenance during unit operation. BAC's patented non-clog nozzles ensure even flow over the fill area and are simple to remove for maintenance.



Standard Single Inlet Connection

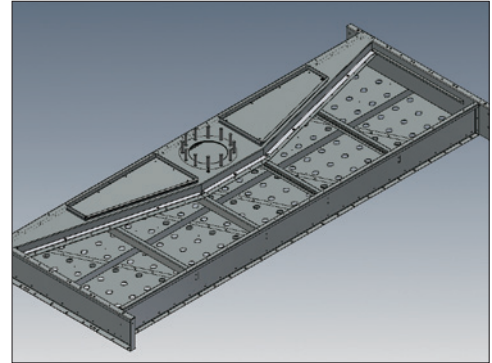


# Series 1500E

## Custom Features & Options

### ► STANDARD WEIR DAMS

Reducing water flow through a unit below the recommended level may potentially create uneven water distribution through the heat transfer section, causing scale build up, splash out/drift, and icing. The hot water basin can accommodate a flow range of 50% to 100% of the design flow.



Standard Weir Dams

### > Fill

BACross III® Fill, BAC's patented crossflow hanging fill, was developed after years of extensive research. BACross III® Fill is made of PVC and is optimized to provide the most efficient thermal capacity. PVC is virtually impervious to rot, decay, and biological attack. The fill is elevated above the cold water basin floor to facilitate cleaning and maintenance. The integral eliminators effectively strip entrained moisture from the leaving air stream with minimum pressure drop to prevent water loss with negligible impact on efficiency.



### STANDARD FILL

Standard fill can be used in applications with entering water temperature up to 130°F (54.4°C). The fill and drift eliminators are formed from self-extinguishing PVC having a flame spread rating of 5 per ASTM E84.

### ► HIGH TEMPERATURE FILL (OPTION)

An optional high temperature fill material is available which increases the maximum allowable entering water temperature to 140°F (60°C).



BACross III® Fill Manufacturing

### > Shipping and Rigging

BAC units are factory-assembled to ensure uniform quality with minimum field assembly. Each unit has been designed with rigging and assembly in mind and includes features to minimize the number of tools required and installation time.

### ► KNOCKDOWN UNITS (OPTION)

Knockdown units are available for jobs where access to the cooling tower location is limited by elevators, doorways, or similar obstacles, where lifting methods impose very strict weight limits, or where the shipping cost of a fully assembled tower is excessive. All materials of construction and design features are the same as those of a factory assembled unit. Welded Type 304/316 stainless steel cold water basins are excluded due to the need for in-plant assembly.



Single Piece Lift





## > Sound Options

Recognition of the importance of sound restriction is growing and can be a very important design criterion for any project. BAC maintains the widest selection of sound mitigating options in the market place and can provide the most cost effective option to meet any requirement.



### STANDARD FAN

The fan provided for all Series 1500E Cooling Towers is selected to optimize low sound levels and thermal performance.

#### ▶ LOW SOUND FAN (OPTION)

The Low Sound Fan option reduces sound up to 8 dBA. Adding a high solidity fan decreases sound levels by decreasing fan speed, which proportionally decreases sound levels. The thermal performance with the Low Sound Fan has been certified in accordance with CTI Standard STD-201.

#### ▶ WHISPER QUIET FAN (OPTION)

For the most extreme sound limitations, BAC's Whisper Quiet Fan reduces sound up to 14 dBA and is CTI Certified.

#### ▶ SOUND ATTENUATION (OPTION)

Factory designed, tested, and rated sound attenuation options are available for both the air intake and discharge. Consult your local BAC Representative regarding available options.



Low Sound Fan



Whisper Quiet Fan



**NOTE:** The panel opposite the air intake, called the blank-off panel, is inherently quiet. Positioning the blank-off panel towards the sound sensitive direction insulates sensitive areas from higher sound levels.

# Series 1500E

## Custom Features & Options

### > Air Intake

In a cooling tower, airborne debris can be entrained in the water through the unit's air intake. Reducing the amount of debris that enters the tower lowers maintenance requirements and helps to maintain thermal efficiency.



#### COMBINED INLET SHIELDS (CIS)

The Combined Inlet Shields' (CIS) bent flow path blocks sunlight from the cold water basin and fills, also acts as a screen to prevent debris from entering the unit. These benefits result in a significant reduction in algae growth, debris accumulation and scale build-up. CIS are constructed from corrosion and UV resistant PVC, and are CTI Certified. and are installed in easy to handle sections to facilitate removal, inspection, and replacement. The use of CIS results in lower maintenance costs and ease of maintenance over the life of the unit.



Combined Inlet Shield Inspection

### > Access Options

BAC provides a broad offering of access options. Our evaporative equipment is designed to be the most easily maintainable for sustaining capacity over a longer life. All BAC platforms and ladders are designed to be AS1657 compliant to ensure personnel safety and code compliance.

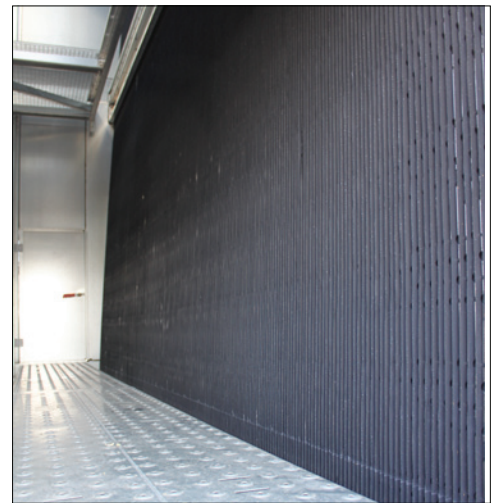


**NOTE:** Platforms, ladders, handrails, safety gates, and safety cages can be added at the time of order or as an aftermarket item.



#### STANDARD INTERNAL WALKWAY

An internal walkway is standard, allowing access to the spacious plenum area for maintenance and inspections of the basin, make-up, fill, and drive system.



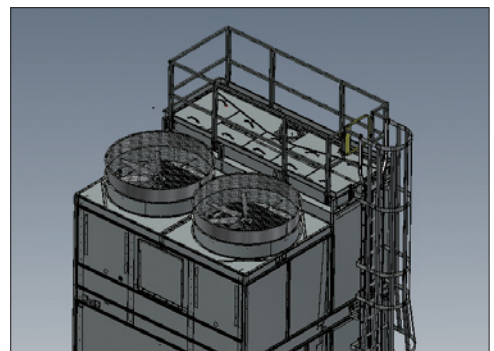
Internal Walkway

#### HANDRAIL AND EXTERNAL LADDER PACKAGE (OPTION)

Handrail and external ladder package are available to provide safe access to the top of the unit for maintenance of the distributions system. The design

INTERNAL SERVICE PLATFORM AND LADDER PACKAGES

(OPTION FOR TWO PIECE UNITS)



Handrail and External Ladder Package



**NOTE:** Site safety guidelines should dictate access packages selected for the project.



For access to the motor and drive assemblies, an internal ladder and upper service platform with handrails is available on larger units. Safety gates are standard for all handrail openings, and all components are designed to meet AS1657 requirements.

► INTERNAL LADDER (OPTION)

A moveable internal ladder is available, providing access to the motor and drive assemblies.

## ► Installation Flexibility

Years of operating experience and extensive R&D have resulted in a design that minimizes costs associated with enclosures, support requirements, electrical service, piping, and rigging, making the Series 1500E Cooling Towers the industry's most serviceable unit without compromising performance and fit.

► PIPING FLEXIBILITY

BAC offers a multitude of connection options and locations to ensure the proper fit for any application, potentially eliminating piping modifications and therefore reducing material and labor.

► SUPPORT STEEL FLEXIBILITY

Several support steel configurations are available, including the ability to utilize pre-existing support steel for replacement units, significantly reducing cost.

► SINGLE-SIDE AIR INTAKE

Single-side air intake units can be placed close to solid walls, reducing the size of enclosures and allowing for more profitable use of premium space. Also, the panel opposite the air intake, called the blank-off panel, is inherently quiet. Positioning the blank-off panel towards the sound sensitive direction insulates sensitive areas from higher sound levels.



Steel Support Flexibility



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