Series 1500
Cooling Towers

Product Detail

Series 1500
Spotlight

(Before)

(After)

- TriArmor® Corrosion Protection System
- Ideal Replacement Unit
- Easy Maintenance Features
- Sound Sensitive Applications
- Independent Fans

TriArmor® Corrosion Protection System

CTI CERTIFIED

ARITH

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Benefits

Ideal Replacement Unit

- **Support Steel –** Units are designed to mount directly on existing support steel of many cooling towers (both crossflow and counterflow).
- **Electrical Service –** Fan motor configurations can be supplied to match existing wiring.
- **Enclosures –** Units fit in most existing enclosures with little or no modifications due to the single side air inlet design.

Single Side Air Inlet Provides Installation Flexibility in Tight Layouts

Counterflow Cooling Tower Replacement

Low Energy Consumption

- Evaporative cooling equipment minimizes the energy consumption of the entire system because it provides lower condenser water temperatures. Owners save money while conserving natural resources and reducing environmental impact.

- Series 1500 Cooling Towers provide the heat rejection required at the lowest possible energy input via:
    - High efficiency, low horsepower axial fans
    - High efficiency BACross® Fill, which provides maximum air/water contact time at low air pressure drops
    - Premium efficient/VFD duty motors as standard
    - Independent fan motors (optional, see page D40 for details)
    - Variable frequency drives (optional, see page K1 for details)
    - BALTIGUARD™ Fan System (optional, see page D40 for details)
    - BALTIGUARD PLUS™ Fan System (optional, see page D40 for details)
- All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements.

Low Installed Cost

- **Single Side Air Inlet –** Units can be placed close to solid walls, reducing the size of enclosures and allowing for more profitable use of premium space.
- **Modular Design –** The modular design minimizes the size and weight of the heaviest lift, allowing for the use of smaller, less costly cranes.

The Unit Shown Ships in Two Pieces to Minimize Shipping and Rigging Costs

Series 1500 with Optional External Service Platform

Easy Maintenance

- **Easy Cleaning –** The fill surface is elevated above the sloped cold water basin floor to facilitate flushing of dirt and debris from this critical area.
- **Hinged Access Doors and Standard Internal Walkway –** Provide easy entry to the spacious plenum for routine drive maintenance.
- **Accessibility –** Make-up, drain, overflow and optional basin accessories are accessible from outside the unit.
- **Inlet Strainer –** Dirt and debris are collected by an integral strainer before reaching the hot water basin, keeping nozzles clean.

Access to Strainer, Make-up and Basin Accessories from Outside the Tower

Reliable Year-Round Operation

- **BALTIDRIVE® Power Train –** Backed by a 5-year fan motor and drive warranty, 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.
- **Separate Air Inlet Louvers –** Reduce the potential for excessive scale build-up and damaging ice formations at the air/water interface by providing a line of sight from the outside the unit into the fill.

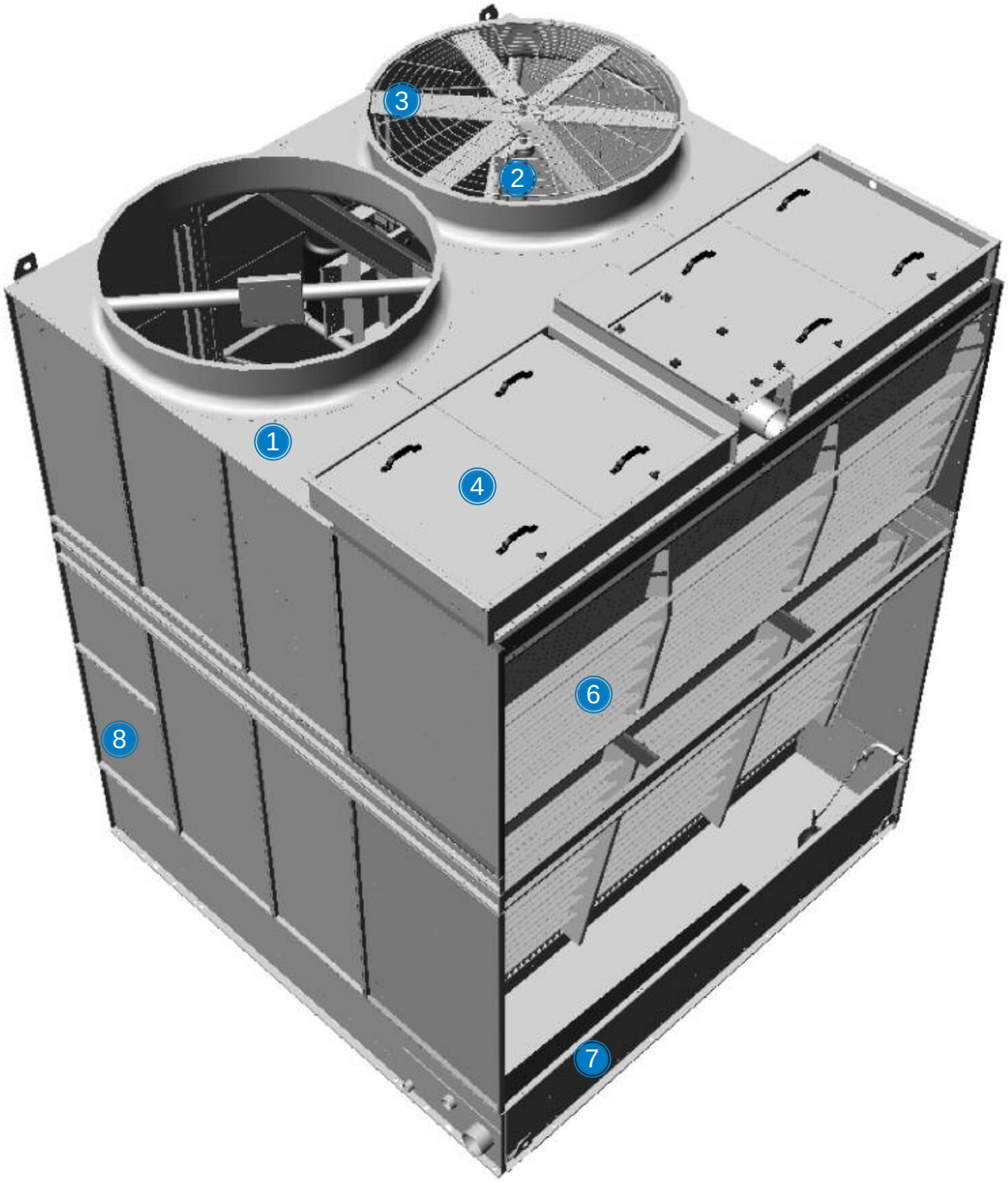
Standard Inlet Strainer

Long Service Life

- **Materials of Construction –** Various materials are available to meet the corrosion resistance, unit operating life, and budgetary requirements of any project (see page D39 for construction options).

Construction Details

Series 1500



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1 Heavy-Duty Construction

- G-235 (Z700 metric) hot-dip galvanized steel panels

2 BALTIDRIVE® Power Train

- Premium quality, solid-backed, multi-groove belt
- Corrosion resistant cast aluminum sheaves
- Heavy-duty bearings L_{10} 40,000 hours (280,000 hour average life)
- Premium efficient/VFD duty motors as standard
- 5-year motor and drive warranty

B.A.C. FAN DRIVE 5 YEAR WARRANTY

3 Low Horsepower Axial Fan

- High efficiency
- Quiet operation
- Corrosion resistant

4 Water Distribution System

- Large orifice non-clog nozzles
- Steel covers in easy to remove sections
- Low pump head gravity distribution basin
- Integral strainer

5 BACross® Fill with Integral Drift Eliminators (Not Shown)

- High efficiency heat transfer surface
- Polyvinyl chloride (PVC)
- Impervious to rot, decay and biological attack
- Flame spread rating of 5 per ASTM E84

6 FRP Air Inlet Louvers

- Corrosion resistant
- Maintenance free
- UV-protected finish

7 Cold Water Basin

- Sloped cold water basin for easy cleaning
- Suction strainer with anti-vortex hood
- Adjustable water make-up assembly
- Integral internal walkway as standard

8 Hinged Access Doors

- Inward swinging door on each end wall

Custom Features and Options

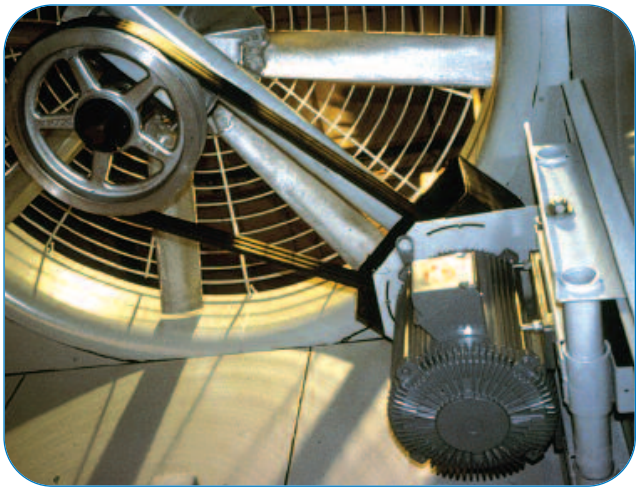
Construction Options

- **Standard Construction:**
  Steel panels and structural elements are constructed of heavy-gauge G-235 (Z700) hot-dip galvanized steel.
- **Optional Thermosetting Hybrid Polymer:**
  A thermosetting hybrid polymer coating used to extend equipment life, is applied to select hot-dip galvanized steel components of the cooling tower. The thermosetting hybrid polymer has been tested to withstand 6000 hours in a 5% salt spray without blistering, chipping, or loss of adhesion.
- **Optional TriArmor® Corrosion Protection System:**
  The cold water basin is constructed of the TriArmor® Corrosion Protection System. The system consists of a heavy-gauge G-235 galvanized steel substrate fully encapsulated by a thermosetting hybrid polymer further protected by a polyurethane barrier applied to all submerged surfaces of the cold water basin. The basin is leak tested at the factory and warranted against leaks and corrosion for 5 years.
- **Optional Stainless Steel Cold Water Basin:**
  A Type 304 stainless steel cold water basin is available. Seams between panels inside the cold water basin are welded. The basin is leak tested at the factory and welded seams are provided with a 5-year leak-proof warranty.
- **Optional Stainless Steel Hot and Cold Water Basins:**
  Type 304 stainless steel hot water basins are provided in addition to the cold water basin.
- **Optional Stainless Steel Construction:**
  Steel panels and structural elements are constructed of Type 304 stainless steel. Seams between panels inside the cold water basin are welded. The basin is leak tested at the factory and welded seams are provided with a 5-year leak-proof warranty.

See page M20 for more details on the materials described above.

Fan Drive System

The fan drive system provides the cooling air necessary to reject unwanted heat from the system to the atmosphere. The standard fan drive system on the Series 1500 is the BALTIDRIVE® Power Train. This BAC engineered drive system consists of a specially designed powerband and cast aluminum sheaves located on minimum shaft centerline distances to maximize belt life. A premium efficient cooling tower duty fan motor provides maximum performance for cooling tower service and is backed by BAC's comprehensive 5-year motor and fan drive warranty.



BALTIDRIVE® Power Train System

Independent Fan Operation

Models 15296 through 15425 are provided with one fan motor driving two fans as standard. The independent fan option 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.

BALTIGUARD™ Fan System

BALTIGUARD™ Fan System

The BALTIGUARD™ Fan System consists of two standard single-speed fan motor and drive assemblies. One drive assembly is sized for full speed and load, and the other is sized approximately 2/3 speed and consumes only 1/3 the design horsepower. This configuration allows the reserve capacity of a standby motor in the event of failure. As a minimum, approximately 70% capacity will be available from the low horsepower motor, even on a design wet-bulb day. Controls and wiring are the same as those required for a two-speed, two-winding motor. On some units the standby fan motor can be increased to the size of the main motor for 100% redundancy.

BALTIGUARD PLUS™ Fan System

The BALTIGUARD PLUS™ Fan System builds on the advantages of the BALTIGUARD™ Fan System by adding a VFD to one motor. For more information on the BALTIGUARD PLUS™ Fan System refer to page K1.

Low Sound Alternatives

The low sound levels generated by Series 1500 Cooling Towers make them suitable for installation in most environments.

- For situations when one direction is sound sensitive, the unit can be oriented so that the side opposite the air inlet faces the sound-sensitive direction.
- The Series 1500 is also available with a low sound fan or a Whisper Quiet Fan. The thermal performance with either fan option has been certified in accordance with CTI Standard STD-201.

Whisper Quiet Fans

- For extremely sound sensitive installations, factory designed, tested and rated sound attenuation is available for both the air intake and discharge.

Equipment Controls

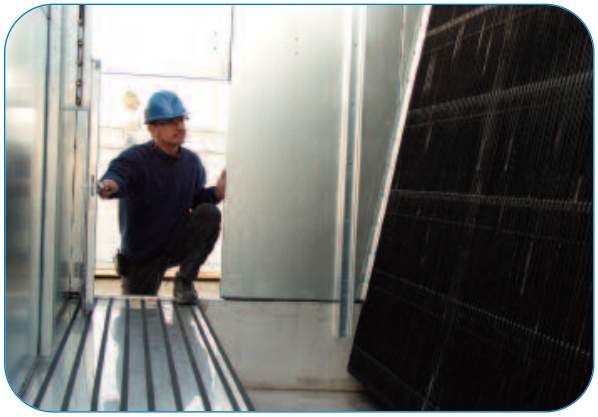
BAC control panels are specifically designed to work seamlessly with all BAC units and engineered to meet you particular application. For more on BAC Equipment Controls, see section K.

Accessories

Service Platforms

For access to the motor and drive assemblies on Models 15296 through 15425, an internal ladder with or without upper service platform with handrails is available. For external service, louver face platforms and access door platforms are options that can be added to the cooling tower either when the unit is purchased or as an aftermarket item. Safety gates are available for all handrail openings supplied by BAC. All components are designed to meet OSHA requirements.

External Platform at Louver Face



Standard Internal Walkway

Internal Ladder and Service Platform

Vibration Cutout Switch

A factory mounted vibration cutout switch is available to effectively protect against rotating equipment failure. BAC can provide either a mechanical or solid-state electronic vibration cutout 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.

Basin Heaters

Cooling towers 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	Number of Heaters	0ºF (-17.8ºC) Ambient Heaters (kW)	Number of Heaters	-20ºF (-28.9ºC) Ambient Heaters (kW)
15146 to 15282	1	8	1	12
15296 to 15425	1	12	1	16

Factory Mutual Approval construction is available as an option.

Electric Water Level Control Package

The electric water level control replaces the standard mechanical make-up valve when a more precise water level control is required. This package consists of a conductance-actuated level control mounted in the basin and a solenoid activated valve in the make-up water line. The valve is slow closing to minimize water hammer.

Electric Water Level Control Package

Extended Lubrication Lines

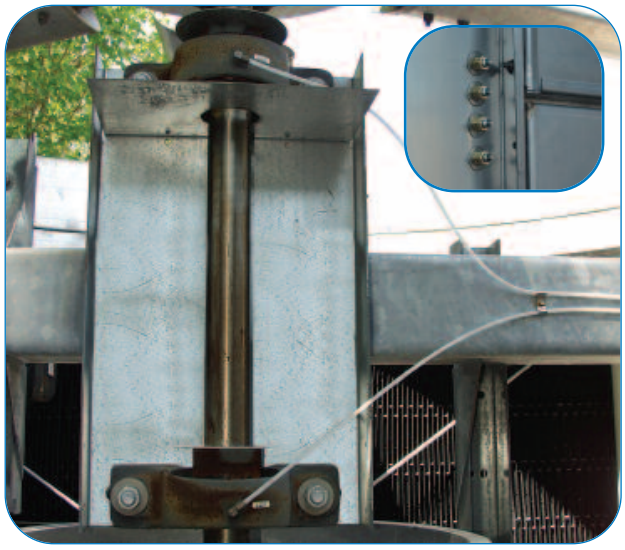
Extended lubrication lines are available for lubrication of the fan shaft bearings. Fittings are located inside the plenum area next to the access door.

High Temperature Fill

If operation above 120°F (48.9°C) is anticipated, an optional high temperature fill material is available which increases the maximum allowable entering water temperature to 135°F (57.2°C).

Air Inlet Screens

Wire mesh screens are available factory-installed over the air inlet louvers to prevent debris from entering the tower.



Grease Fittings at the Access Door (inset) and Bearings with the Extended Lubrication Line Option

Basin Sweeper Piping

Basin sweeper piping is an effective method of eliminating sediment that may collect in the cold water basin of the tower. A complete piping system, including nozzles, is provided in the tower basin to connect to side stream filtration equipment (by others). For more information on filtration systems, see page M163.

Basin Sweeper Piping

Side Outlet Depressed Sump Box

A side outlet depressed sump box is available for field installation below the base of the tower to facilitate jobsite piping. The outlet connection is designed to mate with an ASME Class 150 Flat Face flange. See the Connection Guide (page M60) for more information on standard and optional unit connection types.

Engineering Data

Do not use for construction. Refer to factory certified dimensions. This handbook includes data current at the time of publication, which should be reconfirmed at the time of purchase. Up-to-date engineering data, free product selection software, and more can be found at **www.BaltimoreAircoil.com**.

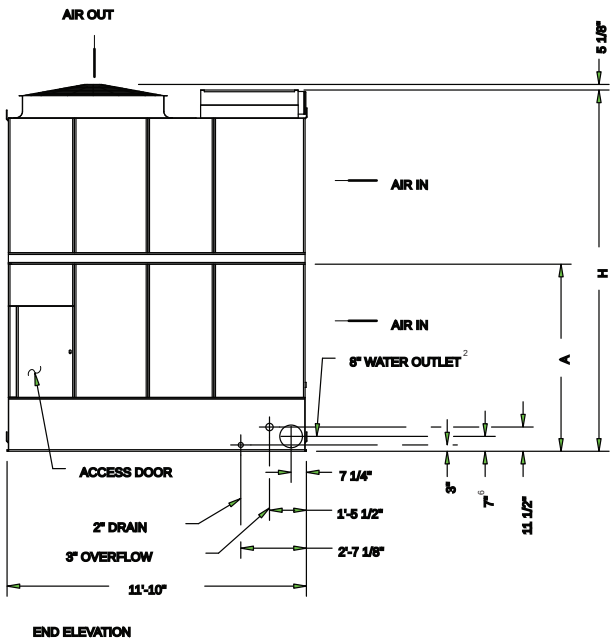
Single Cell Unit

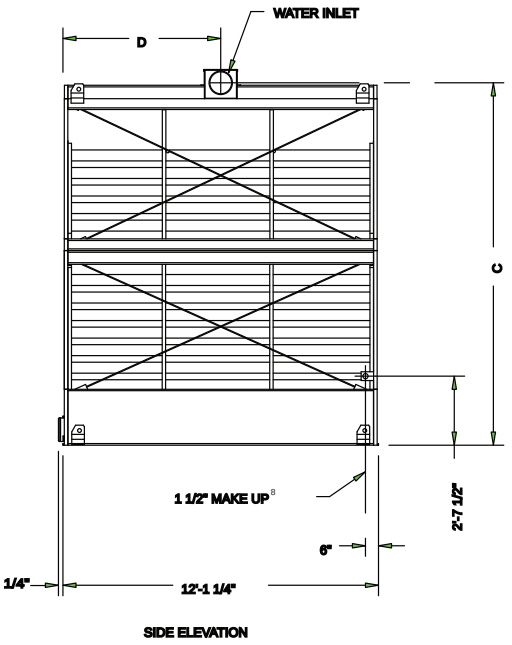
Model Number	Nominal Tonnage[3]	Motor HP	Ind. Fan Motor Option	Fan (CFM)	Weights (lbs)			Dimensions					Inlet Conn.[2]
					Operating[1]	Shipping	Heaviest Section	L	H	A	C	D	
15146	146	7.5	N/A	40,320	7,920	3,940	3,940	8' 5-3/4"	10' 2-7/8"	N/A	9' 8-5/8"	4' 2-7/8"	6"
15160	160	10	N/A	44,190	7,940	3,960	3,960						
15176	176	15	N/A	48,160	7,990	4,010	4,010						
15162	162	7.5	N/A	43,080	8,610	4,200	4,200	8' 5-3/4"	11' 6-7/8"	N/A	11' 0-5/8"	4' 2-7/8"	6"
15177	177	10	N/A	47,070	8,630	4,220	4,220						
15201	201	15	N/A	53,540	8,690	4,280	4,280						
15219	219	20	N/A	58,240	8,710	4,300	4,300						
15200	200	10	N/A	52,320	11,430	5,350	2,770	8' 5-3/4"	14' 3-3/8"	7' 4-3/4"	13' 9-1/4"	4' 2-7/8"	6"
15227	227	15	N/A	59,380	11,490	5,410	2,780						
15250	250	20	N/A	65,400	11,510	5,430	2,800						
15214	214	10	N/A	56,610	12,450	5,640	2,920	8' 5-3/4"	15' 7-3/8"	8' 8-3/4"	15' 1-1/4"	4' 2-7/8"	6"
15245	245	15	N/A	64,810	12,510	5,700	2,920						
15270	270	20	N/A	71,420	12,530	5,720	2,920						
15282	282	25	N/A	74,600	12,610	5,800	2,920						
15296	296	15	(2) 7.5	77,440	15,540	6,750	3,540	12' 1-1/4"	14' 3-3/8"	7' 4-3/4"	13' 9-1/4"	6' 0-5/8"	8"
15325	325	20	(2) 10	85,030	15,590	6,800	3,590						
15350	350	25	(2) 15	91,560	15,640	6,850	3,640						
15368	368	30	(2) 15	96,280	15,660	6,870	3,660						
15310	310	15	(2) 7.5	82,000	17,050	7,070	3,540	12' 1-1/4"	15' 7-3/8"	8' 8-3/4"	15' 1-1/4"	6' 0-5/8"	8"
15340	340	20	(2) 10	89,940	17,100	7,120	3,590						
15365	365	25	(2) 15	96,550	17,150	7,170	3,640						
15385	387	30	(2) 15	101,840	17,180	7,200	3,670						
15425	428	40	(2) 20	112,340	17,450	7,470	3,940						

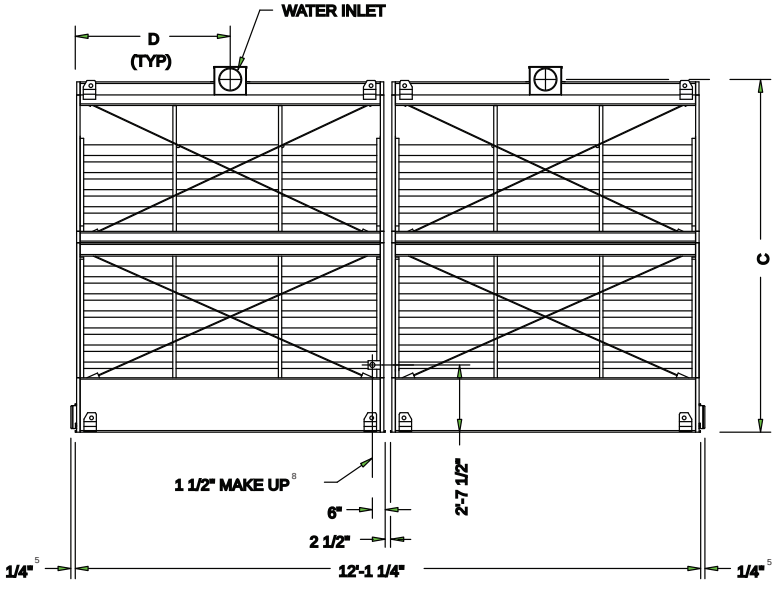
Multi-Cell Units

15146-2	292	(2) 7.5	N/A	80,640	15,840	7,880	3,940	17' 2"	10' 2-7/8"	N/A	9' 8-5/8"	4' 2-7/8"	(2) 6"
15160-2	320	(2) 10	N/A	88,380	15,880	7,920	3,960						
15176-2	352	(2) 15	N/A	96,320	15,890	8,020	4,010						
15162-2	324	(2) 7.5	N/A	86,160	17,220	8,400	4,200	17' 2"	11' 6-7/8"	N/A	11' 0-5/8"	4' 2-7/8"	(2) 6"
15177-2	354	(2) 10	N/A	94,140	17,260	8,440	4,220						
15201-2	402	(2) 15	N/A	106,900	17,380	8,560	4,280						
15219-2	438	(2) 20	N/A	116,480	17,420	8,600	4,300						
15200-2	400	(2) 10	N/A	104,640	22,860	10,700	2,770	17' 2"	14' 3-3/8"	7' 4-3/4"	13' 9-1/4"	4' 2-7/8"	(2) 6"
15227-2	454	(2) 15	N/A	118,760	22,980	10,820	2,780						
15250-2	500	(2) 20	N/A	130,800	23,020	10,860	2,800						
15214-2	428	(2) 10	N/A	113,220	24,900	11,280	2,920	17' 2"	15' 7-3/8"	8' 8-3/4"	15' 1-1/4"	4' 2-7/8"	(2) 6"
15245-2	490	(2) 15	N/A	129,620	25,020	11,400	2,920						
15270-2	540	(2) 20	N/A	142,840	25,060	11,440	2,920						
15282-2	564	(2) 25	N/A	149,200	25,220	11,600	2,920						
15296-2	592	(2) 15	(4) 7.5	154,880	31,080	13,500	3,540	24' 5"	14' 3-3/8"	7' 4-3/4"	13' 9-1/4"	6' 0-5/8"	(2) 8"
15325-2	650	(2) 20	(4) 10	170,060	31,180	13,600	3,590						
15350-2	700	(2) 25	(4) 15	183,120	31,280	13,700	3,640						
15368-2	736	(2) 30	(4) 15	192,560	31,320	13,740	3,660						
15310-2	620	(2) 15	(4) 7.5	164,000	34,100	14,140	3,540	24' 5"	15' 7-3/8"	8' 8-3/4"	15' 1-1/4"	6' 0-5/8"	(2) 8"
15340-2	680	(2) 20	(4) 10	179,880	34,200	14,240	3,590						
15365-2	730	(2) 25	(4) 15	193,100	34,300	14,340	3,640						
15385-2	774	(2) 30	(4) 15	203,680	34,360	14,400	3,670						
15425-2	856	(2) 40	(4) 20	224,680	34,900	14,940	3,940						

See page D105
for Engineering
Considerations.







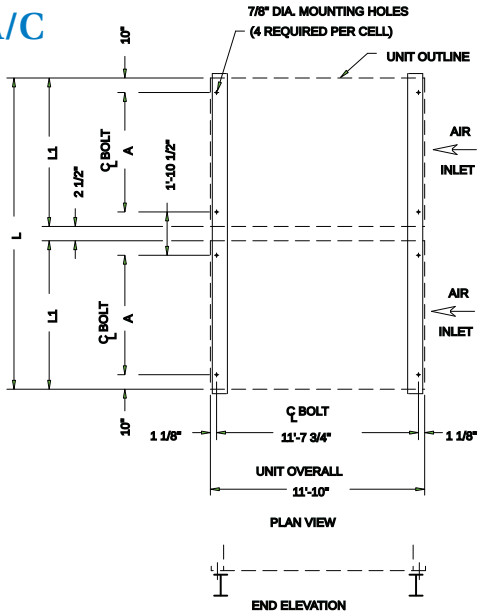
Notes:

1. Operating weight is for tower with water level in the cold water basin at overflow. If a lower operating weight is needed to meet design requirements, your local BAC Representative can provide additional assistance.
2. The specific size of the inlet and outlet connection may vary with the cooling water design flow rate. Consult unit print for dimensions.
3. Unless otherwise indicated, all connections 3" and smaller are MPT. Connections 4" and larger are beveled for welding and mechanically grooved.
4. The heaviest section for all models except 15214 through 15282 is the upper section. Models 15146 to 15219 ship in one piece.
5. Models 15296 through 15425 – 2 1/8”
6. Models 15296 through 15425 – 8”
7. Models 15146 through 15219 and 15296 through 15425 – 2 3/4”
8. Models 15296 through 15425 – 1 1/2”
9. Nominal tons of cooling represents 3 GPM of water cooled from 95ºF to an 85ºF at a 78ºF entering wet-bulb temperature.

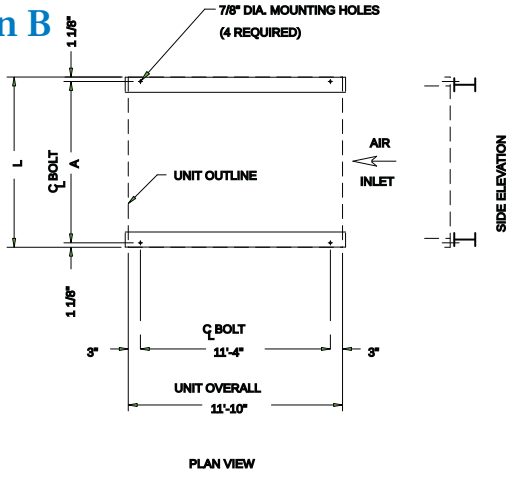
Structural Support

The recommended support arrangement for the Series 1500 Cooling Tower consists of parallel I-beams positioned as shown in the following drawings. Besides providing adequate support, the steel also serves to raise the unit above any solid foundation to ensure access to the bottom of the tower. The Series 1500 may also be supported on columns at the anchor bolt locations shown in Plan A/C or Plan B. A minimum 12”x12” (304.8mm x 304.8mm) bearing surface must be provided under each of the concentrated load points (See Note 5). To support a Series 1500 Cooling Tower on columns or in an alternate steel support arrangement, consult your local BAC Representative.

Plan A/C



Plan B



Plan A/C: Single-Cell and Multi-Cell Units

Model Number	A	L1	L
15146 to 15282	6’ 9-3/4”	8’ 5-3/4”	-
15296 to 15425	10’ 5-1/4”	12’ 1-1/4”	-
15146-2 to 15282-2	6’ 9-3/4”	8’ 5-3/4”	17’ 2”
15296-2 to 15425-2	10’ 5-1/4”	12’ 1-1/4”	24’ 5”

Plan B: Single-Cell Units Only

Model Number	A	L
15146 to 15282	8’ 3-1/2”	8’ 5-3/4”
15296 to 15425	11’ 11”	12’ 1-1/4”

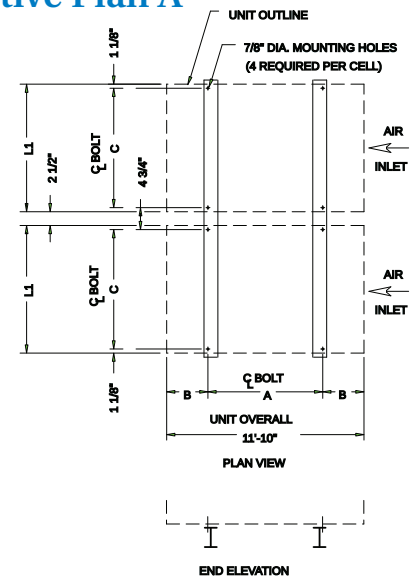
Notes:

1. Support beams and anchor bolts are to be selected and installed by others.
2. All supporting steel must be level at the top.
3. Beams must be selected in accordance with accepted structural practice. Maximum deflection of beam under unit to be 1/360 of span, not to exceed 1/2 inch.
4. All units can be furnished with an optional vibration isolation package, if required, to be installed between the tower and supporting steel. The BAC vibration isolation package is designed for units on support Plan A/C. When determining the length of steel beams, allow for the length of vibration isolation rails, as they may be longer than the tower length shown above.
5. If point vibration isolation is used with multi-cell towers, the isolators must be located under the supporting steel, not between the support steel and the cooling towers.
6. If existing vibration isolator rails are being reused on a replacement project, springs/elastomers must be resized to match the new cooling tower weight distribution. Consult your local BAC Representative for details.
7. When using Alternative Plan A support arrangements with optional bottom water outlet, size and location restrictions will apply to water outlet piping. Consider the Cantilevered Plan A support arrangement or consult your local BAC Representative for details.

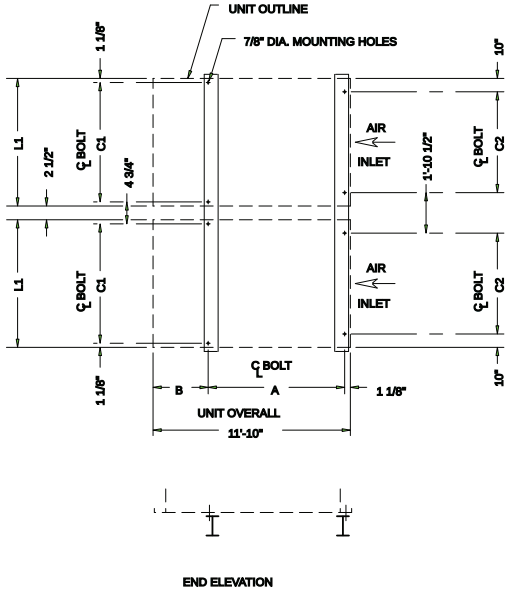
Structural Support Alternatives

For replacement installations, the Series 1500 Cooling Tower has been designed to match the supporting steel of most existing counterflow and crossflow cooling towers without modifications. Shown below are the most common steel support arrangements which can be accommodated by the Series 1500. If individual point support is required, or if steel arrangement is not as shown below, consult your local BAC Representative for assistance.

Alternative Plan A



Cantilevered Plan A



Alternative Plan A: Typical Dimensions for Single-Cell and Multi-Cell Units

Model Number	Unit Replaced	A	B	C	L1
15146 to 15282	VLT/VST	8' 9-1/8"	1' 6-7/16"	8' 3-1/2"	8' 5-3/4"
15296 to 15425	VLT/VST/VXT	8' 11-1/4"	1' 5-3/8"	11' 11"	12' 1-1/4"
	VXT/VXMT	9' 7-1/2"	1' 1-1/4"	11' 11"	12' 1-1/4"
15146 to 15282	CFT	8' 0"	1' 11"	8' 3-1/2"	8' 5-3/4"
	Series 3000	8' 3-1/4"	1' 9-3/8"	8' 3-1/2"	8' 5-3/4"
15296 to 15425	CFT	8' 0"	1' 11"	11' 11"	12' 1-1/4"
	Series 3000	9' 6"	1' 2"	11' 11"	12' 1-1/4"

Cantilevered Plan A: Typical Dimensions for Single-Cell and Multi-Cell Units

Model Number	Unit Replaced	A	B	C1	C2	L1
15146 to 15282	VLT/VST	8' 9-1/8"	2' 11-3/4"	8' 3-1/2"	6' 9-3/4"	8' 5-3/4"
15296 to 15425	VLT/VST/VXT	8' 11-1/4"	2' 9-5/8"	11' 11"	10' 5-1/4"	12' 1-1/4"
	VXT/VXMT	9' 7-1/2"	2' 1-3/8"	11' 11"	10' 5-1/4"	12' 1-1/4"
15146 to 15282	CFT	8' 0"	3' 8-7/8"	8' 3-1/2"	6' 9-3/4"	8' 5-3/4"
	Series 3000	8' 3-1/4"	3' 5-5/8"	8' 3-1/2"	6' 9-3/4"	8' 5-3/4"
15296 to 15425	CFT	8' 0"	3' 8-7/8"	11' 11"	10' 5-1/4"	12' 1-1/4"
	Series 3000	9' 6"	2' 2-7/8"	11' 11"	10' 5-1/4"	12' 1-1/4"

See Notes on previous page.

Engineering Specifications

See our website at www.BaltimoreAircoil.com for an electronic copy of product engineering specifications.

Series 1500

1.0 Cooling Tower

1.1 General: Furnish and install _____ factory-assembled, induced draft, crossflow cooling tower(s) with vertical air discharge conforming in all aspects to the specifications, schedules and as shown on the plans. Overall dimensions shall not exceed approximately _____ft (mm) long x _____ ft (mm) wide x _____ ft (mm) high. The total connected fan horsepower shall not exceed _____ HP (kW). The cooling tower(s) shall be Baltimore Aircoil Company Model _____.

1.2 Thermal Capacity: The cooling tower(s) shall be warranted by the manufacturer to cool _____ USGPM (l/s) of water from ___ °F(°C) to ___ °F(°C) at ___ °F(°C) entering wet bulb temperature. Additionally, the thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Lacking such certification, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105, by the Cooling Technology Institute or other qualified independent third party testing agency. Manufacturer's performance guarantees or performance bonds without CTI Certification or independent field thermal performance test shall not be accepted. The cooling tower shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.

1.3 Construction: All steel panels and structural members shall be constructed of heavy-gauge G-235 (Z700 metric) galvanized steel. In addition, the cold water basin shall be protected with the TriArmor® Corrosion Protection System. The system shall consist of G-235 galvanized steel encapsulated with a thermosetting hybrid polymer further protected by a polyurethane barrier applied to all submerged surfaces exposed to a circulating system water. The polyurethane barrier shall seal all factory seams in the cold water basin to ensure a corrosion resistant and water tight construction, and shall be warranted against leaks and corrosion for five (5) years. Standard basin accessories shall include: a corrosion resistant make-up valve with large diameter polystyrene filled plastic float for easy adjustment of the operating water level, removable anti-vortexing device to prevent air entrainment, and large area lift out strainers with perforated openings sized smaller than the water distribution system nozzles. The strainer and anti-vortexing device shall be constructed from Type 304 stainless steel to prevent corrosion. A welded Type 304 or 316 stainless steel basin shall be an acceptable alternative; provided the basin is warranted against leaks and corrosion for a period of at least 5 years. A bolted basin shall not be an acceptable alternative. Type 301 stainless steel is not acceptable. The hot water basins shall be constructed of G-235 (Z700 metric) galvanized steel.

1.4 Quality Assurance: The cooling tower manufacturer shall have a Management System certified by an accredited registrar as complying with the requirements of ISO-9001:2000 to ensure consistent quality of products and services.

1.5 Wind and Seismic Forces: When supported as recommended, the unit shall be suitable for applications requiring equipment anchorage to resist wind loads up to ___ psf, and an S_{DS} of ___ with an Importance factor of 1.0.

2.0 Construction Details

2.1 Structure: The cooling tower casing and structural members shall be constructed with heavy-gauge G-235 (Z700 metric) galvanized steel.

2.2 Cold Water Basin: The cold water basin shall be protected with the TriArmor® Corrosion Protection System. The system shall consist of G-235 galvanized steel encapsulated with a thermosetting hybrid polymer further protected by a polyurethane liner factory applied to all submerged surfaces. The polyurethane barrier shall seal all factory seams in the cold water basin to ensure a corrosion resistant and water tight construction, and shall be warranted against leaks and corrosion for five (5) years. Field applied polyurethane or polyurethane applied directly to galvanized steel is not an acceptable alternative. Standard basin accessories shall include: a corrosion resistant make-up valve with large diameter polystyrene filled plastic float for easy adjustment of the operating water level, removable anti-vortexing device to prevent air entrainment, and large area lift out strainers with perforated openings sized smaller than the water distribution system nozzles. The strainer and anti-vortexing device shall be constructed from Type 304 stainless steel to prevent corrosion. A welded Type 304 or 316 stainless steel basin shall be an acceptable alternative; provided the basin is warranted against leaks and corrosion for a period of at least 5 years. A bolted basin shall not be an acceptable alternative. Type 301 stainless steel is not acceptable.

2.3 Water Outlet: The water outlet connection shall be beveled for welding and grooved for mechanical coupling or bolt hole circle designed to accept an ASME Class 150 Flat Face Flange. The outlet shall be provided with large-area lift out strainers with perforated openings sized smaller than the water nozzles and an anti-vortexing device to prevent air entrainment.

2.4 Water Distribution System: The distribution system shall be furnished with a single water inlet. The pipe stub connection shall be beveled for welding and grooved for mechanical coupling. The hot water distribution system shall consist of an integral strainer that feeds to an open gravity type basin, for easy cleaning, and constructed of heavy-gauge G-235 (Z700 metric) hot-dip galvanized steel. The basins must be accessible from outside the unit and serviceable during tower operation. Basin weirs and plastic metering orifices shall be provided to assure even distribution of the water over the fill. Lift-off distribution covers shall be constructed of heavy-gauge G-235 (Z700) hot-dip galvanized steel. Gravity flow nozzles shall be snap-in type for easy removal. Should pressurized nozzles be used, they shall utilize grommets, which ensure easy removal.

3.0 Mechanical Equipment

3.1 Fan(s): Fan(s) shall be axial flow with aluminum alloy blades selected to provide optimum cooling tower thermal performance with minimal sound levels. Air shall discharge through a fan cylinder designed for streamlined air entry and minimum tip clearance for maximum fan efficiency. The top of the fan cylinder shall be equipped with a conical, non-sagging removable fan guard.

3.2 Bearings: Fan(s) and shaft(s) shall be supported by heavy-duty, self-aligning, grease packed ball bearings with moisture proof seals and integral slinger collars, designed for a minimum L_{10} life of 40,000 hours (280,000 Hr. Avg. Life).

3.3 Fan Drive: The fan(s) shall be driven by a one-piece, multi-groove, solid back V-type powerband with taper lock sheaves designed for 150% of the motor nameplate horsepower. The powerband shall be constructed of neoprene reinforced polyester cord and be specifically designed for cooling tower service.

3.4 Sheaves: Fan and motor sheave(s) shall be fabricated from corrosion-resistant materials to minimize maintenance and ensure maximum drive and powerband operating life.

3.5 Fan Motor: Fan motor(s) shall be totally enclosed, reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. The motor shall be furnished with special moisture protection on winding, shafts, and bearings and appropriately labeled for “cooling tower duty.” Fan motors shall be premium efficient/inverter duty type designed per NEMA Standard MG1, Section IV Part 31.

3.6 Mechanical Equipment Warranty: The fan(s), fan shaft(s), bearings, mechanical equipment support, and fan motor shall be warranted against defects in materials and workmanship for a period of five (5) years from date of shipment.

4.0 Fill and Drift Eliminators

4.1 Fill and Drift Eliminators: The fill and integral drift eliminators shall be formed from self-extinguishing (per ASTM-568) polyvinyl chloride (PVC) having a flame spread rating of 5 per ASTM E84 and shall be impervious to rot, decay, fungus and biological attack. The fill shall be suitable for entering water temperatures up to and including 120°F (48.8°C). The fill shall be manufactured, tested and rated by the cooling tower manufacturer and shall be elevated above the cold water basin to facilitate cleaning.

5.0 Air Inlet Louvers

5.1 Air Inlet Louvers: Air inlet louvers shall be separate from the fill and be removable to provide easy access for inspection of the air/water interface at the louver surface. Louvers shall prevent water splash-out during fan cycling and be constructed of maintenance free, corrosion resistant, UV-Resistant, fiberglass reinforced polyester (FRP).

6.0 Access

6.1 Plenum Access: Hinged access doors shall be provided on two sides of the tower for access into plenum section.

7.0 Sound

7.1 Sound Level: To maintain the quality of the local environment, the maximum sound pressure levels (dB) measured 50 ft (15240 mm) from the cooling tower operating at full fan speed shall not exceed the sound levels detailed below. If the tower exceeds these conditions the tower must be either oversized and reduced in horsepower, provided with a low sound fan, or provided with sound attenuation.

Location	63	125	250	500	1000	2000	4000	8000	dB(A)
Discharge									
Air Inlet									
Side wall									
Back wall									

8.0 Accessories:

8.1 Basin Heater(s): The cooling tower cold water basin shall be provided with electric heater(s) to prevent freezing in low ambient conditions. The heater(s) shall be selected to maintain 40°F (4.4°C) basin water temperatures at _____°F (°C) ambient. The heater(s) shall be ____V/ ____ phase / ___Hz electric and shall be provided with low water cutout and thermostat.

8.2 Vibration Cutout Switch: Provide mechanical local reset vibration switch. The mechanical vibration cut out switch will be guaranteed to trip at a point so as not to cause damage to the cooling tower. To ensure this, the trip point will be a frequency range of 0 to 3,600 RPM and a trip point of 0.2 to 2.0 g’s.

8.3 Internal Platform: An internal platform shall be provided in the plenum section to provide for inspection and maintenance. All working surfaces shall be able to withstand 50 psf (244 kg/m^2) live load or 200 pound (90.7 kg) concentrated load. Other components of the cooling tower, i.e. basin and fill/drift eliminators, shall not be considered an internal working surface. Cooling tower manufacturers that require that these surfaces be used as a working platform shall provide a 5-year extended warranty to the Owner to repair any damage to these surfaces caused by routine maintenance.