INTRODUCING

B.A.C.®

THE NEW

Series 3000 & PT2 Cooling Towers

Supplement to:

Product & Application Handbook

VOLUME II – PRODUCT SUPPLEMENT

Quantities are limited. BAC is a registered trademark of Baltimore Aircoil Company

BAC Product & Application Handbook Volume II - 2007

BIGGER IS BETTER

- Increased to over 650 pages
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- Expanded Technical Reference Section
- Expanded Refrigeration Section
- A "Must Have" Reference Tool

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...because temperature matters™

Series 3000
Open Cooling Towers

Product Detail

Series 3000 Open Cooling Towers

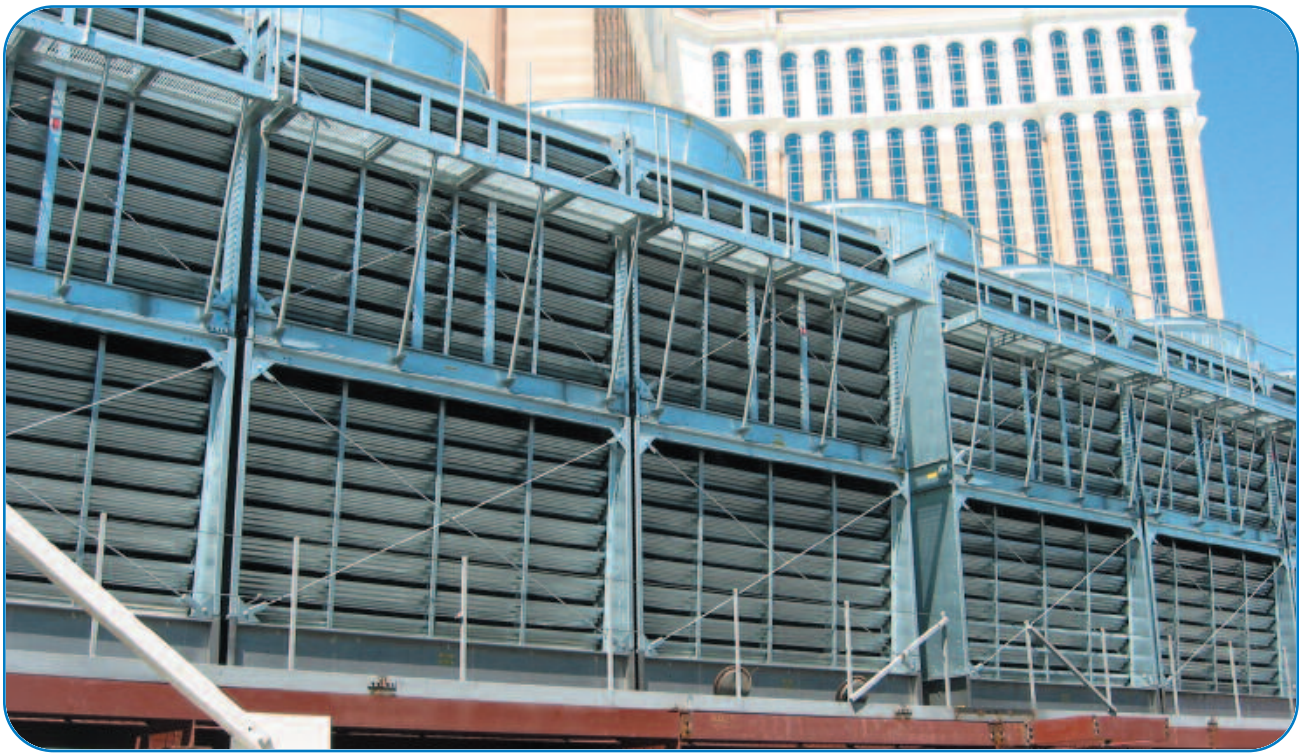
Single Cell Capacity:
220 – 1,350 Nominal Tons

Series 3000 Cooling Towers deliver independently verified, fully rated thermal performance over a wide range of flow and temperature requirements. Standard design features satisfy today's environmental concerns, minimize installation costs, maximize year-round operating reliability and simplify maintenance requirements.

Series 3000 Cooling Towers

- **Low energy consumption**
- **Low installed cost**
- **Easy maintenance**
- **Reliable year-round operation**
- **Long service life**
- **ASHRAE Standard 90.1 compliant**
- **5-year warranty on mechanical equipment**

CTI CERTIFIED



Benefits

Low Energy Consumption

- Evaporative cooling equipment minimizes the energy consumption of the entire system because it provides lower operating temperatures. The owner saves money while conserving natural resources and reducing environmental impact.
- The Series 3000 provides 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
    - Variable Frequency Drives (Optional) (For more information, refer to the BAC Product and Application Handbook)
    - ENERGY-MISER® Fan System (Optional) (See page D9 for details)
    - BALTIGUARD PLUS™ Fan System (Optional) (See page D9 for details)
- All units meet or exceed ASHRAE Standard 90.1 energy efficiency requirements.

Low Installed Cost

- **Support –** All models mount directly on two parallel I-beams and ship complete with motors and drives factory-installed and aligned.
- **Modular Design –** Models 3728C through 31056C and 31132C through 31301C ship in two sections to minimize the size and weight of the heaviest lift, allowing for the use of smaller, less costly cranes.
- **Piping –** The optional EASY CONNECT® Piping Arrangement further reduces installation costs by eliminating overhead piping and piping support requirements (see page D10 for details).

Easy Maintenance

- **Easy Cleaning –** The fill surface is elevated above the sloped cold water basin to facilitate flushing of dirt and debris from this critical area.
- **Hinged Access Doors –** Provide easy access to the unit interior to adjust the make-up float valve, clean the cold water basin and strainer, and service the fan drive system.
- **Hygienic Cold Water Basin –** The cold water basin is sloped at the air inlet faces to eliminate stagnant water and reduce biological growth. Additionally, the suction strainer has an easily removable section to simplify maintenance.

Easy access to hot water basin

Reliable Year-Round Operation

- **Drive System –** 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.

BALTIDRIVE® Power Train

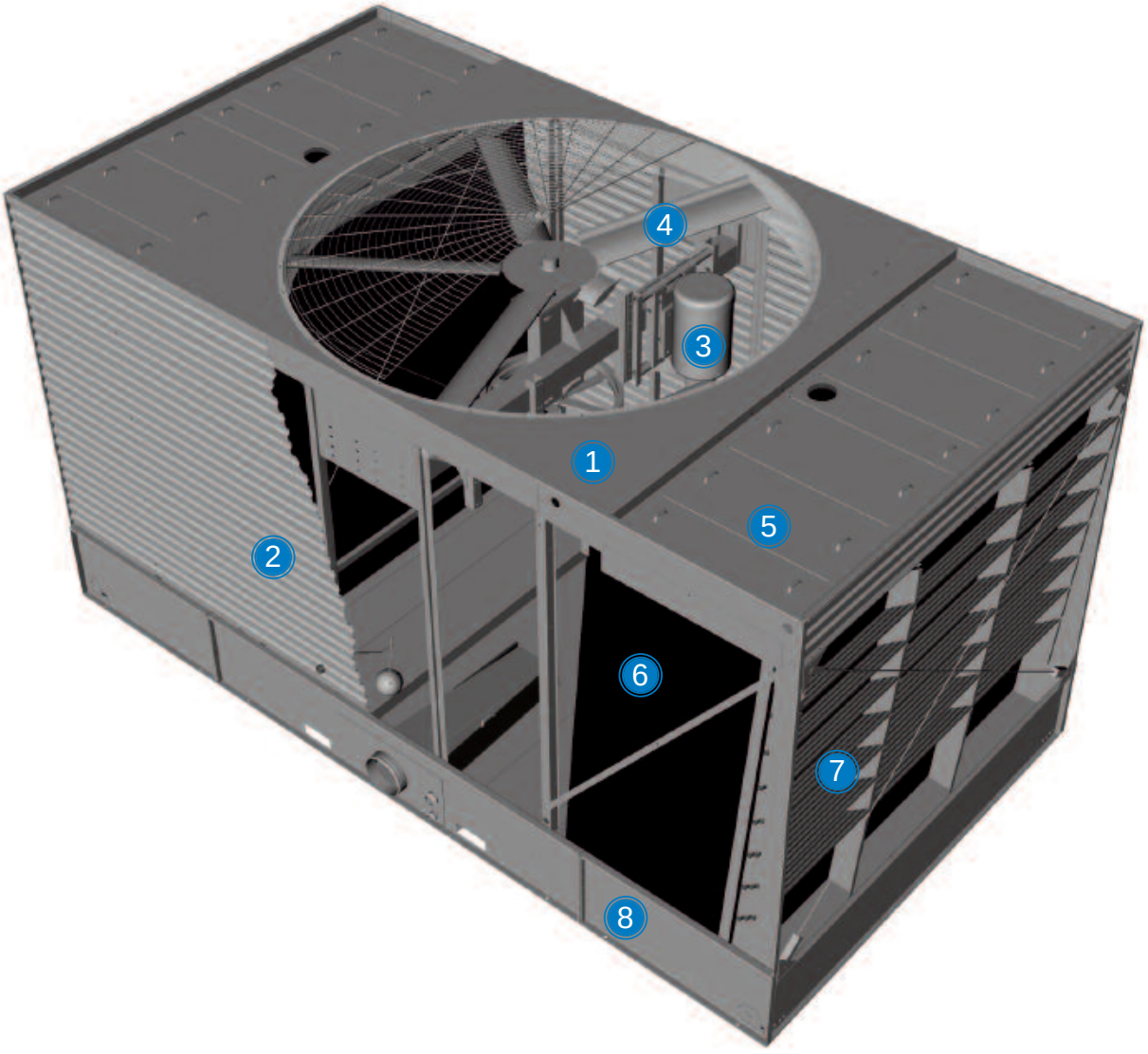
- **Separate Air Inlet Louvers –** Reduce the potential for scale build-up and damaging ice formations at the air/water interface by providing a line of sight from the outside of the unit into the fill.

Long Service Life

- **Frame Construction –** Enables casing panels, critical links for long service life, to be constructed of corrosion-resistant, fiberglass reinforced polyester (FRP).
- **Materials of Construction –** Various materials are available to meet the corrosion resistance, unit operating life, and budgetary requirements of any project (see page D8 for construction options).

Series 3000 Cooling Tower (FRP casing panels removed to show frame construction)

Construction Details



1 Heavy-Duty Construction

- Heavy-gauge G-235 (Z700 Metric) hot-dip galvanized steel frame
- Designed to meet anchorage requirements of UBC 1997, Importance Factor 1.0, Seismic Zone 2B conditions and 30 psf wind loads

2 FRP Casing Panels

- Corrosion resistant
- Maintenance free
- UV resistant finish

3 BALTIDRIVE® Power Train

- Premium quality, solid backed, multi-groove belt
- Corrosion resistant cast aluminum sheaves
- Heavy-duty bearings (280,000 hour average life)
- Cooling tower duty fan motor
- 5-year motor and drive warranty

B.A.C. FAN DRIVE 5 YEAR WARRANTY

4 Low HP Axial Fan

- High efficiency
- Quiet operation
- Corrosion resistant

5 Water Distribution System

- Steel covers in easy to remove sections
- Low pump head gravity distribution basins
- Large orifice, 360º non-clog nozzles

6 BACross® Fill with Integral Drift Eliminators

- High efficiency heat transfer surface
- Polyvinyl chloride (PVC)
- Impervious to rot, decay and biological attack
- Flame spread rating of 5 per ASTM E84-77a

7 FRP Air Inlet Louvers

- Corrosion resistant
- Maintenance free
- UV resistant finish

8 Hygienic Cold Water Basin

- Sloped at the air inlet face to eliminate stagnant water
- Sloped for easy cleaning
- Suction strainer with anti-vortex hood
- Adjustable water make-up assembly

9 Hinged Access Doors (Not Shown)

- 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 metric) hot-dip galvanized steel. Casing panels and air inlet louvers are constructed of UV-resistant, fiberglass reinforced polyester (FRP).

- **Optional Thermosetting Hybrid Polymer:**
  A thermosetting hybrid polymer coating used to extend equipment life, is applied to selected 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 Stainless Steel Cold Water Basin:**
  A Series 300 stainless steel cold water basin is provided. 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 TriArmor™ Corrosion Protection System:**
  The cold water basin can be constructed of the TriArmor™ Corrosion Protection System. The system consists of a heavy-gauge G-235 galvanized steel substrate fully encapsulated by a special thermosetting hybrid polymer finish 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 EVERTOUGH™ Construction:**
  The EVERTOUGH™ Construction option combines BAC's exclusive thermosetting hybrid polymer and TriArmor™ Corrosion Protection System to provide the best value in corrosion protection for most water chemistries. All steel panels and structural members are constructed of heavy-gauge G-235 galvanized steel. Designated steel components above the cold water basin are protected with the thermosetting hybrid polymer. The cold water basin is constructed with the TriArmor™ Corrosion Protection System. The basin is leak tested at the factory and warranted for against leaks and corrosion for 5 years. The hot water basins are constructed of pultruded fiberglass reinforced polyester (PFRP) with Series 300 basin covers. The casing panels and air inlet louvers are constructed of corrosion and UV resistant FRP. Each cooling tower provided with EVERTOUGH™ Construction is backed by a comprehensive Louver-to-Louver℠ 5-Year Warranty, which covers ALL components from the fan to the cold water basin, from louver to louver, including the motor.

- **Optional Stainless Steel Hot and Cold Water Basins:**
  Series 300 stainless steel hot water basins are provided in addition to the cold water basin described above.

- **Optional JE PREMIER SERIES® Construction:**
  Steel panels and structural elements are constructed of Series 300 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. Casing panels and air inlet louvers are constructed of corrosion and UV resistant fiberglass reinforced polyester (FRP). Each cooling tower provided with the JE PREMIER SERIES® Construction is backed by a comprehensive Louver-to-Louver℠ 5-Year Warranty, which covers ALL components from the fan to the cold water basin, from louver to louver, including the motor.

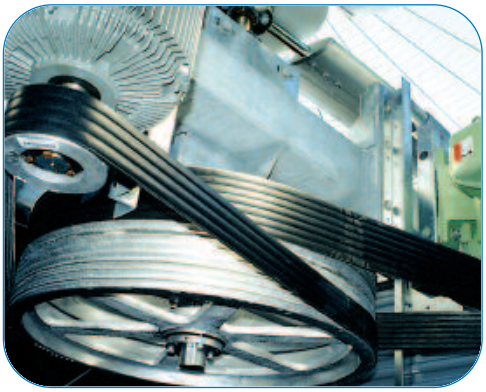
- **Optional Seismic and Wind Rated Unit**
  All steel panels and structure elements have been upgraded to resist seismic forces of Seismic Zone 4 per the 1997 Uniform Building Code and wind load in accordance with ASCE 7-98 for roof top installations with an Importance factor of 1.0.

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 3000 is the exclusive BALTIDRIVE® Power Train. This BAC engineered drive system consists of a specially designed powerband and two cast aluminum sheaves located on minimum shaft centerline distances to maximize belt life. A TEAO cooling tower duty fan motor, custom engineered for BAC to provide maximum performance for cooling tower service, is provided and backed by BAC's comprehensive 5-year motor and fan drive warranty.

ENERGY-MISER® Fan System

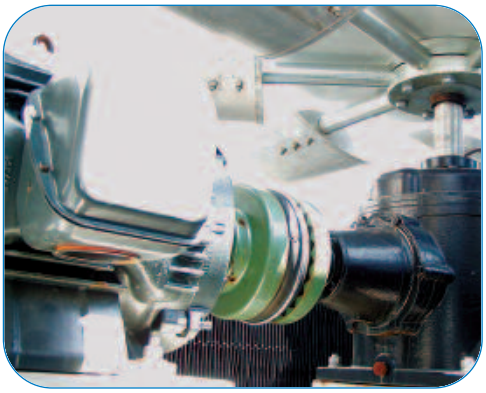
The ENERGY-MISER® Fan System consists of two standard single-speed fan motors and drive assemblies. One drive assembly is sized for full speed and load, and the other is sized for approximately 2/3 speed and consumes only 1/3 the design horsepower. This configuration allows the system to be operated like a two-speed motor, but with 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. Significant energy savings are achieved when operating at low speed during periods of reduced load and/or low wet-bulb temperatures.



ENERGY-MISER® Fan System

BALTIGUARD PLUS™ Fan System

The BALTIGUARD PLUS™ Fan System builds on the advantages of the ENERGY-MISER® Fan System by adding a VFD to the smaller motor. Using the VFD on the smaller fan motor, as opposed to the larger motor, reduces the cost of the VFD, and wiring for the motor. For more information on the BALTIGUARD PLUS™ Fan System, refer to the BAC Product and Application Handbook.



Gear drive system,
close-coupled motor

Gear Drive System, Close-Coupled Motor

A gear drive system is available as a fan drive option on Series 3000 Cooling Towers. Both the gear drive and couplings are selected with a 2.0 service factor. Gear construction includes a nickel-alloy steel shaft, casehardened gears, self lubrication, and a single piece, gray iron housing. This drive system ships completely installed and aligned.

Gear Drive System, Externally Mounted Motor

A gear drive system with a TEFC motor mounted outside the airstream is also available on Series 3000 Cooling Towers. A non-corrosive carbon-fiber composite drive shaft with stainless steel hubs is selected with a 2.0 service factor. The motor and drive shaft ship separately for easy field installation.

Gear drive system,
externally mounted motor

Custom Features and Options

Low Sound Operation

The low sound levels generated by Series 3000 Cooling Towers make them suitable for installation in most environments. For very sound sensitive installations, the Series 3000 is available with a low sound fan option that significantly reduces the sound levels generated from the tower with minimal impact on thermal performance. The cooling tower thermal performance with the low sound fan has been certified in accordance with CTI Standard STD-201.

Unit with intake and discharge sound attenuation

For extremely sound sensitive installations, factory designed, tested and rated sound attenuation is available for both the air intake and discharge of Series 3000 Cooling Towers. For more information on sound, refer to the BAC Product and Application Handbook.

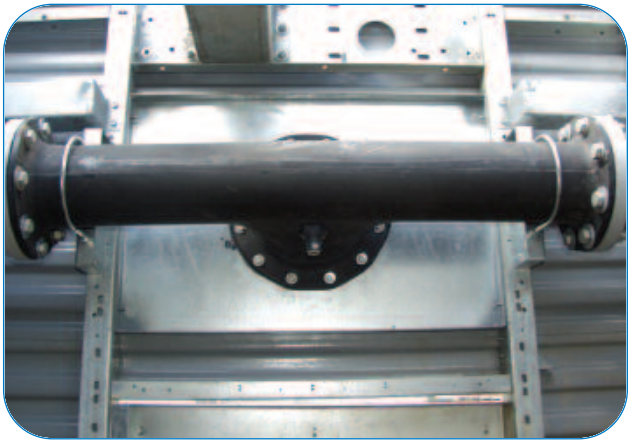
Basinless Series 3000 Cooling Tower on a concrete basin

Basinless Unit Construction

The basinless unit construction option enables Series 3000 Cooling Towers to be directly installed on new or existing concrete cold water basins. This custom feature reduces maintenance costs by eliminating the integral basin from traditional units. It simplifies piping and pumping requirements of multi-cell installations and provides a cost-effective solution for many field-erected cooling tower replacement projects.

EASY CONNECT® Piping Arrangement

This BAC option simplifies water inlet piping on the Series 3000 Cooling Tower. This piping arrangement automatically balances flow within each cell, eliminating the need for flow balancing valves. A single water inlet connection, located on the side or bottom of each unit, eliminates the need for overhead piping and piping supports.



EASY CONNECT® Piping Arrangement

Accessories

Ladder, Safety Cage, Gate and Handrails

In the event the owner requires easy access to the cooling tower fan deck, the Series 3000 Cooling Tower can be furnished with ladders extending from the top of the unit to the base, as well as safety cages, safety gates, and handrail packages. All components are designed to meet OSHA requirements. All access to the top of the equipment must be made in accordance with applicable governmental occupational safety standards.

External platform at louver face

External Service Platforms

For external service, louver face platforms, access door platforms and fan deck extensions can be added to the cooling tower when the unit is purchased or as an aftermarket item. Safety cages and safety gates are also available. All components are designed to meet OSHA requirements.

Internal walkway

Internal Walkway and Service Platform

A galvanized steel internal walkway is available to provide a permanent working surface for easy access to the strainer, outlet, and make-up water assembly. For access to the motor and drive assemblies on two-piece units, an internal ladder and upper service platform with handrails is available. Safety gates are available for all handrail openings. All components are designed to meet OSHA requirements.

Internal ladder and service platform

Vibration Cutout Switch

A factory mounted vibration cutout switch is available to effectively protect against equipment failure due to excessive vibration of the mechanical equipment system. 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 to either switch type to activate an alarm.

Accessories

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 Sizing Data

Model Numbers	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
3240C to 3379C	2	6	2	9
3412C to 3527C	2	8	2	12
3473C to 3672C	2	10	2	14
3728C to 31056C	2	12	2	15
3583C to 3725C	2	14	2	18
31132C to 31301C	2	14	2	20

Note: The table data is based on 460v/3 phase/60Hz power and standard, single-cell unit configuration

Electric Water Level Control Package

The electric water level control replaces the standard mechanical make-up valve when 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 & basin heater

Extended Lubrication Lines

Extended lubrication lines with grease fittings 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 130°F (54.4°C) is anticipated, an optional high temperature fill material is available which increases the maximum allowable entering water temperature to 140˚F (60.0˚C).

Factory Mutual Approval

All multi-cell Series 3000 Cooling Towers are available with Factory Mutual (FM) Approved construction as an option.

Externally mounted terminal box

Equipment Controls

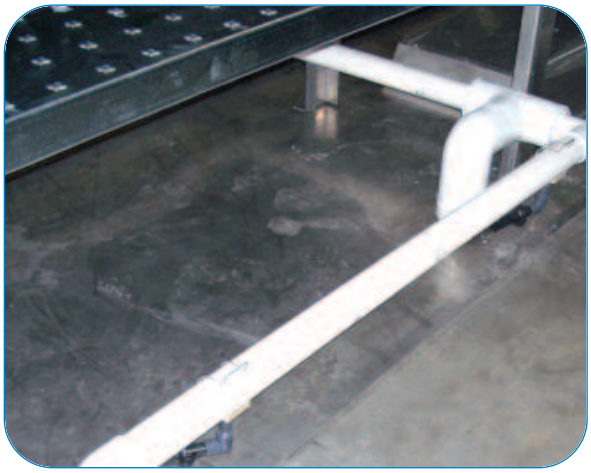
BAC control panels are specifically designed to work seamlessly with all BAC units and engineered to meet your particular application. A terminal box available only on Series 3000 Cooling Towers includes a factory-mounted enclosure, factory wiring to terminal blocks for the fan motors and vibration cut-out switch, and grounding lugs. For more information on BAC Equipment Controls, refer to the BAC Product and Application Handbook.

Combined Inlet Shields

Corrosion resistant PVC screens can be factory-installed over the air inlet. These inlet shields protect the cold water basin from sunlight and reduce the potential for algae growth. The screens also prevent debris from entering the tower.

Basin Sweeper Piping

Basin sweeper piping provides an effective method of preventing sediment from collecting in the cold water basin of the tower. A complete piping system, including nozzles, is provided in the tower basin for connection to side stream filtration equipment (by others). For more information on filtration systems, refer to the BAC Product and Application Handbook.



Basin sweeper piping

Side Outlet Depressed Sump

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, in the BAC Product and Application Handbook, for more information on standard and optional unit connection types.

Velocity recovery stacks

Velocity Recovery Stacks

Velocity recovery stacks are available on the Series 3000 Cooling Tower for increased incremental thermal performance. This accessory can be used to gain extra capacity in tight layouts, while maintaining the same footprint and unit horsepower, as well as maintaining CTI certification. Field assembly is required.

Engineering Data

Do not use for construction. Refer to factory certified dimensions. This suplement 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[5]	MOTOR HP	FAN (CFM)	WEIGHTS (lbs)			DIMENSIONS[4]			
				OPERATING[1]	SHIPPING	HEAVIEST SECTION	L	W	H[3]	A
3240C	240	10	62,790	15,200	7,610	7,610	8' 5-3/4"	18' 0-1/2"	9' 3-5/8"	8' 7-3/4"
3272C	272	15	71,340	15,320	7,730	7,730				
3299C	299	20	78,110	15,380	7,790	7,790				
3333C	333	20	85,720	16,190	8,060	8,060	8' 5-3/4"	18' 0-1/2"	10' 7-5/8"	9' 11-3/4"
3358C	358	25	91,960	16,220	8,090	8,090				
3379C	379	30	97,400	16,270	8,140	8,140				
3412C	412	25	103,700	19,000	9,390	9,390	9' 9-1/4"	20' 0-1/2"	10' 9-1/8"	9' 11-3/4"
3436C	436	30	109,830	19,050	9,440	9,440				
3455C	455	25	112,250	19,770	9,710	9,710	9' 9-1/4"	20' 0-1/2"	12' 1-1/8"	11' 3-3/4"
3482C	482	30	118,880	19,820	9,760	9,760				
3527C	527	40	130,160	19,980	9,920	9,920				
3473C	473	25	118,870	22,730	10,900	10,900	11' 9-3/4"	21' 6-1/2"	10' 10-1/8"	9' 11-3/4"
3501C	501	30	125,900	22,780	10,950	10,950				
3552C	552	30	136,170	25,150	11,510	11,510	11' 9-3/4"	21' 6-1/2"	12' 2-1/8"	11' 3-3/4"
3604C	604	40	149,090	25,310	11,670	11,670				
3648C	648	50	159,950	25,320	11,680	11,680				
3672C	672	60	166,020	26,080	12,440	12,440				
3728C	728	40	178,860	30,700	14,460	8,430	11' 9-3/4"	21' 6-1/2"	16' 4-7/8"	15' 5-1/2"
3781C	781	50	191,890	30,860	14,620	8,590				
3828C	828	60	203,230	30,870	14,630	8,600				
3872C	872	50	206,630	33,700	15,380	8,600	11' 9-3/4"	21' 6-1/2"	19' 0-7/8"	18' 1-1/2"
3923C	923	60	218,840	33,910	15,590	8,810				
3970C	970	75	230,080	34,870	16,550	9,770				
3985C	985	60	229,950	36,500	16,360	9,210	11' 9-3/4"	21' 6-1/2"	21' 8-7/8"	20' 9-1/2"
31056C	1056	75	246,700	36,590	16,440	9,290				
3583C	583	25	143,950	32,890	15,650	15,650	13' 11-1/8"	24' 0-1/2"	12' 3-1/8"	11' 3-3/4"
3618C	618	30	152,460	32,940	15,700	15,700				
3676C	676	40	166,920	33,100	15,860	15,860				
3725C	725	50	179,080	33,110	15,870	15,870				
31132C	1132	75	267,880	43,080	20,830	11,430	13' 11-1/8"	24' 0-1/2"	19' 2-7/8"	18' 1-1/2"
31213C	1213	75	282,010	45,760	21,530	12,140	13' 11-1/8"	24' 0-1/2"	21' 10-7/8"	22' 4-7/8"
31301C[2]	1301	100	302,580	47,680	23,450	13,230				

Notes:

1. Operating weight is based on the water level in the cold water basin at overflow height. If a lower operating weight is needed to meet design requirements, your local BAC Representative can provide additional assistance.
2. 31301C is supplied with a gear fan drive system as standard.
3. Models shipped with an optional gear drive or low sound fan may have heights up to 10.5" greater than shown.
4. Refer to page D17 for dimensional reference drawings.
5. Nominal tons of cooling represents 3 GPM of water from a 95ºF to 85ºF at a 78ºF entering wet-bulb temperature.

Double Cell Units

MODEL NUMBER	NOMINAL TONNAGE[5]	MOTOR HP	FAN (CFM)	WEIGHTS (lbs)			DIMENSIONS[4]			
				OPERATING[1]	SHIPPING	HEAVIEST SECTION	L	W	H[3]	A
3240C-2	480	(2) 10	125,580	30,400	15,200	7,610	17’ 2”	18’ 0-1/2”	9’ 3-5/8”	8’ 7-3/4”
3272C-2	544	(2) 15	142,680	30,640	15,460	7,730				
3299C-2	598	(2) 20	156,220	30,760	15,580	7,790				
3333C-2	666	(2) 20	171,440	32,380	16,120	8,060	17’ 2”	18’ 0-1/2”	10’ 7-5/8”	9’ 11-3/4”
3358C-2	716	(2) 25	183,920	32,440	16,180	8,090				
3379C-2	758	(2) 30	194,800	32,540	16,280	8,140				
3412C-2	824	(2) 25	207,400	38,000	18,780	9,390	19’ 9”	20’ 0-1/2”	10’ 9-1/8”	9’ 11-3/4”
3436C-2	872	(2) 30	219,660	38,100	18,880	9,440				
3455C-2	910	(2) 25	224,500	39,540	19,420	9,710	19’ 9”	20’ 0-1/2”	12’ 1-1/8”	11’ 3-3/4”
3482C-2	964	(2) 30	237,760	39,640	19,520	9,760				
3527C-2	1,054	(2) 40	260,320	39,960	19,840	9,920				
3473C-2	946	(2) 25	237,740	45,460	21,800	10,900	23’ 10”	21’ 6-1/2”	10’ 10-1/8”	9’ 11-3/4”
3501C-2	1,002	(2) 30	251,800	45,560	21,900	10,950				
3552C-2	1,104	(2) 30	272,340	50,300	23,020	11,510	23’ 10”	21’ 6-1/2”	12’ 2-1/8”	11’ 3-3/4”
3604C-2	1,208	(2) 40	298,180	50,620	23,340	11,670				
3648C-2	1,296	(2) 50	319,900	50,640	23,360	11,680				
3672C-2	1,344	(2) 60	332,040	52,160	24,880	12,440				
3728C-2	1,456	(2) 40	357,720	61,400	28,920	8,430	23’ 10”	21’ 6-1/2”	16’ 4-7/8”	15’ 5-1/2”
3781C-2	1,562	(2) 50	383,780	61,720	29,240	8,590				
3828C-2	1,656	(2) 60	406,460	61,740	29,260	8,600				
3872C-2	1,744	(2) 50	413,260	67,400	30,760	8,600	23’ 10”	21’ 6-1/2”	19’ 0-7/8”	18’ 1-1/2”
3923C-2	1,846	(2) 60	437,680	67,820	31,180	8,810				
3970C-2	1,940	(2) 75	460,160	69,740	33,100	9,770				
3985C-2	1,970	(2) 60	459,900	73,000	32,720	9,210	23’ 10”	21’ 6-1/2”	21’ 8-7/8”	20’ 9-1/2”
31056C-2	2,112	(2) 75	493,400	73,180	32,880	9,290				
3583C-2	1,166	(2) 25	287,900	65,780	31,300	15,650	28’ 0-3/4”	24’ 0-1/2”	12’ 3-1/8”	11’ 3-3/4”
3618C-2	1,236	(2) 30	304,920	65,880	31,400	15,700				
3676C-2	1,352	(2) 40	333,840	66,200	31,720	15,860				
3725C-2	1,450	(2) 50	358,160	66,220	31,740	15,870				
31132C-2	2,264	(2) 75	535,760	86,160	41,660	11,430	28’ 0-3/4”	24’ 0-1/2”	19’ 2-7/8”	18’ 1-1/2”
31213C-2	2,426	(2) 75	564,020	91,520	43,060	12,140	28’ 0-3/4”	24’ 0-1/2”	21’ 10-7/8”	22’ 4-7/8”
31301C-2[2]	2,602	(2) 100	605,160	95,360	46,900	13,230				

Notes:

1. Operating weight is based on the water level in the cold water basin at overflow height. If a lower operating weight is needed to meet design requirements, your local BAC Representative can provide additional assistance.
2. 31301C-2 is supplied with a gear fan drive system as standard.
3. Models shipped with an optional gear drive or low sound fan may have heights up to 10.5" greater than shown.
4. Refer to page D17 for dimensional reference drawings.
5. Nominal tons of cooling represents 3 GPM of water from a 95ºF to 85ºF at a 78ºF entering wet-bulb temperature.

Engineering Data

Do not use for construction. Refer to factory certified dimensions. This supplement 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**.

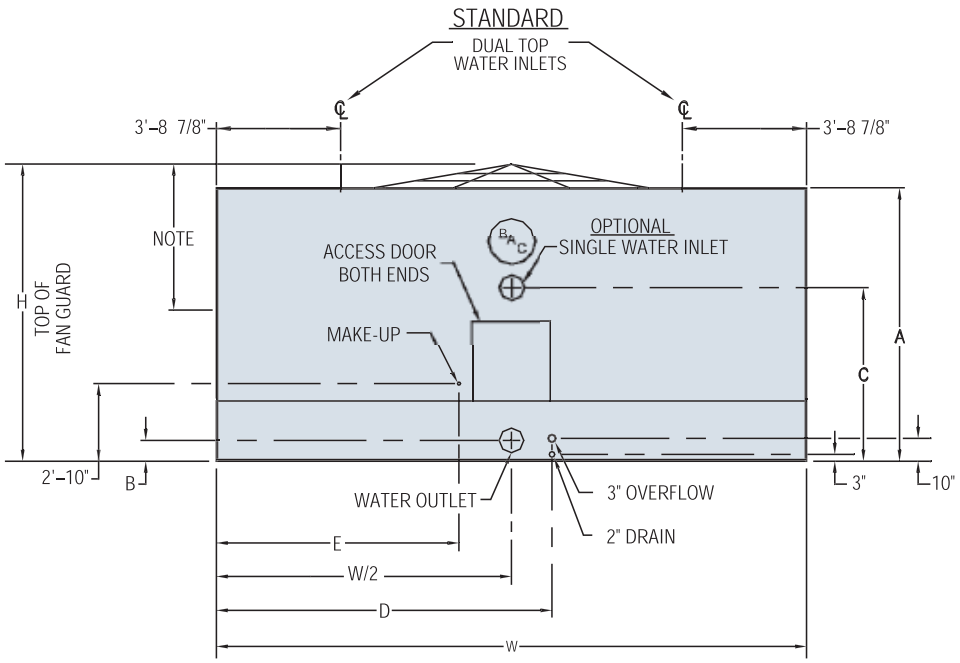
MODEL NUMBER	DIMENSIONS							CONNECTION SIZES [1,3]			
	B	C	D	E	F	G	J	MAKE-UP WATER	TOP INLET	SINGLE INLET	OUTLET
3240C 3272C 3299C	8-1/16”	5’ 8-1/4”	10’ 4-1/2”	7’ 1-1/4”	1/4”	4’ 2-7/8”	8’ 8-1/4”	1-0”	(2) 6”	8”	8”
3333C 3358C 3379C	8-1/16”	6’ 1-1/4”	10’ 4-1/2”	7’ 1-1/4”	1/4”	4’ 2-7/8”	8’ 8-1/4”	1-0”	(2) 6”	8”	8”
3412C 3436C	8-1/16”	6’-1 1/4”	11’ 4-1/2”	8’ 1-1/4”	1-1/4”	4’ 10-5/8”	9’ 11-3/4”	1-1/2”	(2) 6”	8”	8”
3455C 3482C 3527C	9-1/8”	6’-6 3/4”	11’ 4-1/2”	8’ 1-1/4”	1-1/4”	4’ 10-5/8”	9’ 11-3/4”	1-1/2”	(2) 6”	10”	10”
3473C 3501C	9-1/8”	6’ 6-3/4”	12’ 1-1/2”	8’ 10-1/4”	1-1/4”	5’ 10-7/8”	12’ 0-1/4”	1-1/2”	(2) 8”	10”	10”
3552C 3604C 3648C 3672C	9-1/8”	6’ 6-3/4”	12’ 1-1/2”	8’ 10-1/4”	1-1/4”	5’ 10-7/8”	12’ 0-1/4”	1-1/2”	(2) 8”	10”	10”
3728C 3781C 3828C	9-1/8”	10’ 4-1/2”	12’ 1-1/2”	8’ 10-1/4”	1-1/4”	5’ 10-7/8”	12’ 0-1/4”	1-1/2”	(2) 8”	12”	12”
3872C 3923C 3970C	9-1/8”	13’ 0-1/2”	12 1-1/2”	8’ 10-1/4”	1-1/4”	5’ 10-7/8”	12’ 0-1/4”	1-1/2”	(2) 8”	12”	12”
3985C 31056C	9-1/8”	15’ 8-1/2”	12’ 1-1/2”	8’ 10-1/4”	1-1/4”	5’ 10-7/8”	12’ 0-1/4”	1-1/2”	(2) 8”	12”	12”
3583C 3618C 3676C 3725C	9-1/8”	6’ 6-3/4”	13’ 4-1/2”	10’ 1-1/4”	5/8”	6’ 11-5/16”	14’ 1-5/8”	1-1/2”	(2) 8”	10”	10”
31132C	9-5/8”	13’ 4-1/2”	13’ 4-1/2”	10’ 1-1/4”	5/8”	6’ 11-5/16”	14’ 1-5/8”	2”	(2) 10”	14”	14”
31213C 31301C	9-5/8”	15’ 8-1/2”	13’ 4-1/2”	10’ 1-1/4”	5/8”	6’ 11-9/16”	14’ 1-5/8”	2”	(2) 10”	14”	14”

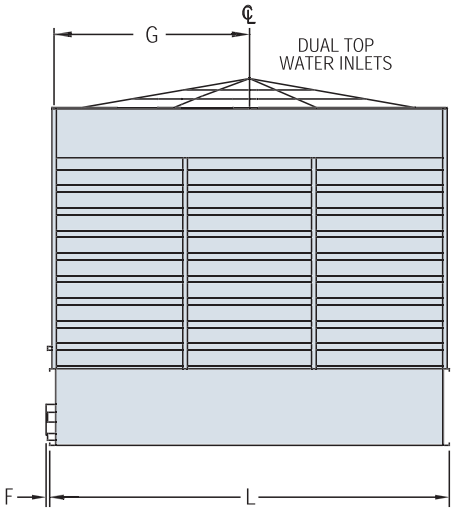
Notes:

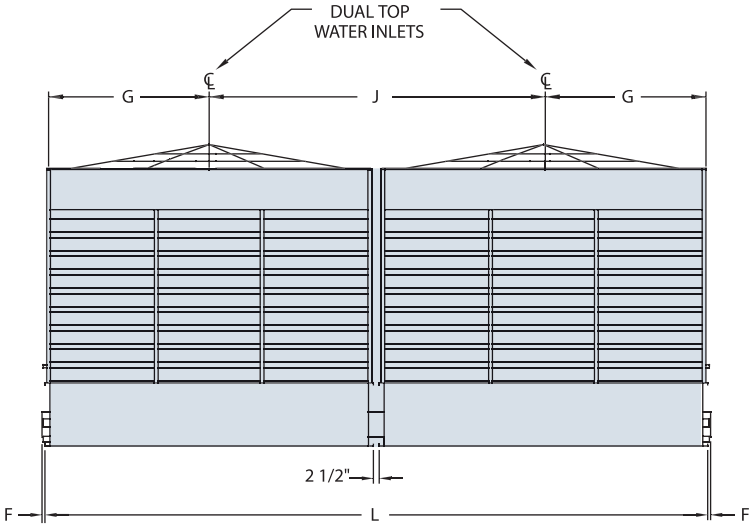
1. The specific size of the inlet and outlet connection may vary with the design cooling water flow rate.

2. Unless otherwise indicated, all connections 3” and smaller are male pipe thread, and connections 4” and larger are beveled for welding and grooved to suit a mechanical coupling.

3. On double cell units, connections are the same size but are located on both ends of the unit.







Single Cell Unit

Double Cell Unit

Notes:

3728C thru 31056C and 31132C thru 31301C ship in two sections per cell.

The top section is the heaviest and tallest.

Top section heights are:

- 3728C thru 3970C: 10' 3-1⁄8"
- 31132C: 10' 11-1⁄8"
- 3985C thru 31056C: 11' 7-1⁄8"
- 31213C: 12' 3-1⁄8"
- 31301C: 12' 6-1⁄2"

Concrete Basin Engineering Data for Optional Basinless Units

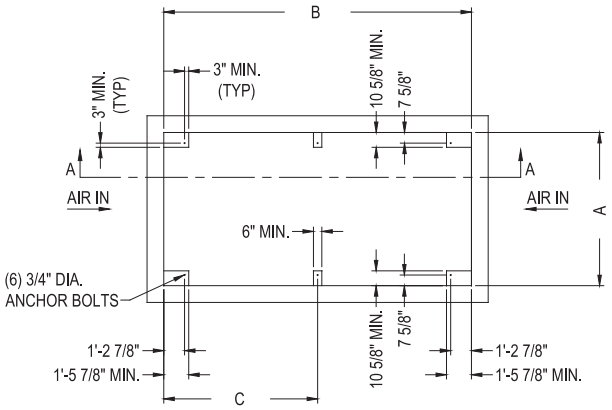
Do not use for construction. Refer to factory certified dimensions. This supplement includes data current at the time of publication, which should be reconfirmed at the time of purchase. Up-to-date engineering data, and more can be found at **www.BaltimoreAircoil.com**.

Single Cell Unit

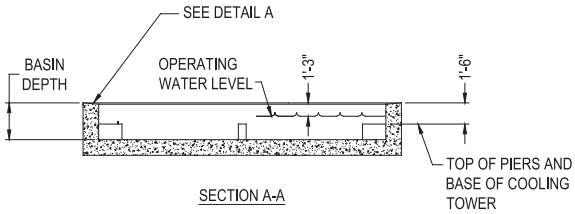
MODEL NUMBER	OPERATING LOAD VERTICAL (LBS)	MAXIMUM OPERATING WEIGHT (LBS)	A	B	C	D
3240C	2,530	10,120	9’ 1-3/4”	18’ 4-1/2”	9’ 2-1/4”	N/A
3272C	2,560	10,240				
3299C	2,575	10,300				
3333C	2,778	11,110	9’ 1-3/4”	18’ 4-1/2”	9’ 2-1/4”	N/A
3358C	2,785	11,140				
3379C	2,798	11,190				
3412C	3,233	12,930	10’ 5-1/4”	20’ 4-1/2”	10’ 2-1/4”	N/A
3436C	3,245	12,980				
3455C	3,425	13,700	10’ 5-1/4”	20’ 4-1/2”	10’ 2-1/4”	N/A
3482C	3,438	13,750				
3527C	3,478	13,910				
3473C	3,678	14,710	12’ 5-3/4”	21’ 10-1/2”	10’ 11-1/4”	N/A
3501C	3,690	14,760				
3552C	3,968	15,870	12’ 5-3/4”	21’ 10-1/2”	10’ 11-1/4”	N/A
3604C	4,008	16,030				
3648C	4,010	16,040				
3672C	4,200	16,800				
3728C	5,303	21,210	12’ 5-3/4”	21’ 10-1/2”	10’ 11-1/4”	N/A
3781C	5,343	21,370				
3828C	5,345	21,380				
3872C	6,053	24,210	12’ 5-3/4”	21’ 10-1/2”	10’ 11-1/4”	N/A
3923C	6,105	24,420				
3970C	6,345	25,380				
3985C	6,753	27,010	12’ 5-3/4”	21’ 10-1/2”	10’ 11-1/4”	N/A
31056C	6,775	27,100				
3583C	5,305	21,220	14’ 7-1/8”	24’ 4-1/2”	7’ 8-1/4”	9’-0”
3618C	5,318	21,270				
3676C	5,358	21,430				
3725C	5,360	21,440				
31132C	7,853	31,410	14’ 7-1/8”	24’ 4-1/2”	7’ 8-1/4”	9’ 0”
31213C	8,523	34,090	14’ 7-1/8”	24’ 4-1/2”	7’ 8-1/4”	9’ 0”
31301C	9,003	36,010				

Notes:

1. Purchaser to design, construct and furnish basin (including anchor bolts) in accordance with requirements given. Purchaser must also supply sump, overflow, drain, cleanout and water make-up to suit requirements.
2. All anchor bolts shall be 3/4” diameter, 1-1/2” projection (+/- 1/4”), fully threaded. Bolt to have one nut and washer. Anchor bolt and column bearing point locations and elevations must be maintained +/- 1/8”.
3. Pier dimensions shown are minimum bearing surfaces required for the tower structure and do not include corner chamfers on the concrete piers.
4. Fill to be located below the operating water level. (see section A-A, next page)
5. Maximum operating weight does not include concrete basin or water retained in the basin.

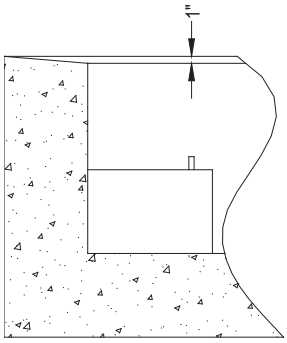


PLAN VIEW OF BASIN



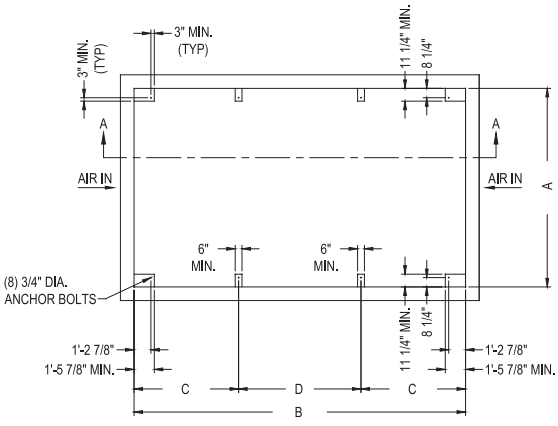
SECTION A-A

Models 3240C thru Models 31056C

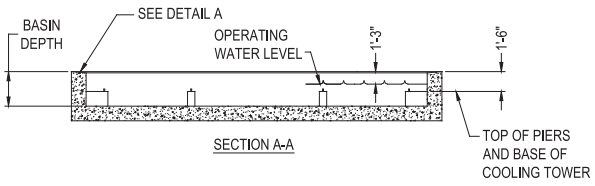


DETAIL A
CONCRETE BASIN WALL SLOPE

All Models



PLAN VIEW OF BASIN



SECTION A-A

Models 3583C thru Models 31301C

Structural Support

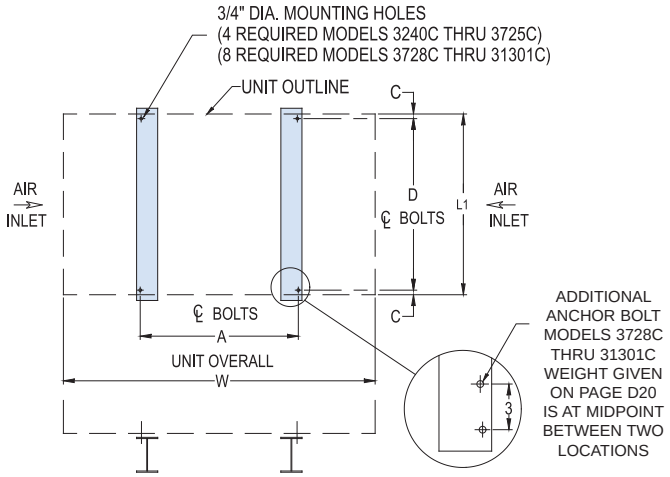
The recommended support arrangement for the Series 3000 Cooling Tower consists of parallel I-beams positioned as shown on the drawings. Besides providing adequate support, the steel also serves to raise the unit above any solid foundation to assure access to the bottom of the tower. The Series 3000 Cooling Tower may also be supported on columns at the anchor bolt locations shown in Plan A or Plan C.

A minimum bearing surface of 12 in^2 (77,742 mm^2) must be provided under each of the concentrated load points (See Note 7, next page). To support a Series 3000 Cooling Tower on columns, with an alternate steel support arrangement, or the optional seismic and rated unit, consult your local BAC Representative.

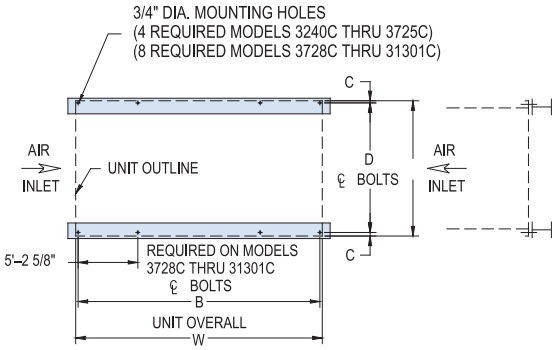
MODEL NUMBER	WEIGHTS (lbs)			DIMENSIONS							
	OPERATING[1]	SHIPPING[1,2]	WT. AT BOLT HOLE LOCATIONS	L1	L2	W	A	B	C	D	E
3240C	15,200	7,610	3,800	8' 5-3/4"	17' 2"	18' 0-1/2"	9' 4"	16' 4-1/2"	1-1/8"	8' 3-1/2"	4-3/4"
3272C	15,320	7,730	3,830								
3299C	15,380	7,790	3,845								
3333C	16,190	8,060	4,048	8' 5-3/4"	17' 2"	18' 0-1/2"	9' 4"	16' 4-1/2"	1-1/8"	8' 3-1/2"	4-3/4"
3358C	16,220	8,090	4,055								
3379C	16,270	8,140	4,068								
3412C	19,000	9,390	4,750	9' 9-1/4"	19' 9"	20' 0-1/2"	11' 4"	18' 4-1/2"	1-1/8"	9' 7"	4-3/4"
3436C	19,050	9,440	4,763								
3455C	19,770	9,710	4,943	9' 9 -/4"	19' 9"	20' 0-1/2"	11' 4"	18' 4-1/2"	1-1/8"	9' 7"	4-3/4"
3482C	19,820	9,760	4,955								
3527C	19,980	9,920	4,995								
3473C	22,730	10,900	5,683	11' 9-3/4"	23' 10"	21' 6-1/2"	12' 10"	19' 10-1/2"	1-1/8"	11' 7-1/2"	4-3/4"
3501C	22,780	10,950	5,695								
3552C	25,150	11,510	6,288	11' 9-3/4"	23' 10"	21' 6-1/2"	12' 10"	19' 10-1/2"	1-1/8"	11' 7-1/2"	4-3/4"
3604C	25,310	11,670	6,328								
3648C	25,320	11,680	6,330								
3672C	26,080	12,440	6,520								
3728C	30,700	14,460	7,675	11' 9-3/4"	23' 10"	21' 6-1/2"	12' 10"	19' 10-1/2"	1-1/8"	11' 7-1/2"	4-3/4"
3781C	30,860	14,620	7,715								
3828C	30,870	14,630	7,718								
3872C	33,700	15,380	8,425	11' 9-3/4"	23' 10"	21' 6-1/2"	12' 10"	19' 10-1/2"	1-1/8"	11' 7-1/2"	4-3/4"
3923C	33,910	15,590	8,478								
3970C	34,870	16,550	8,718								
3985C	36,500	16,360	9,125	11' 9-3/4"	23' 10"	21' 6-1/2"	12' 10"	19' 10-1/2"	1-1/8"	11' 7-1/2"	4-3/4"
31056C	36,590	16,440	9,148								
3583C	32,890	15,650	8,223	13' 11-1/8"	28' 0-3/4"	24' 0-1/2"	15' 4"	22' 4-1/2"	1-7/16"	13' 8-1/4"	5-3/8"
3618C	32,940	15,700	8,235								
3676C	33,100	15,860	8,275								
3725C	33,110	15,870	8,278								
31132C	43,080	20,830	10,770	13' 11-1/8"	28' 0-3/4"	24' 0-1/2"	15' 4"	22' 4-1/2"	1-7/16"	13' 8-1/4"	5-3/8"
31213C	45,760	21,530	11,440	13' 11-1/8"	28' 0-3/4"	24' 0-1/2"	15' 4"	22' 4-1/2"	1-7/16"	13' 8-1/4"	5-3/8"
31301C	47,680	23,450	11,920								

See notes, next page.

Single Cell Unit



Plan A

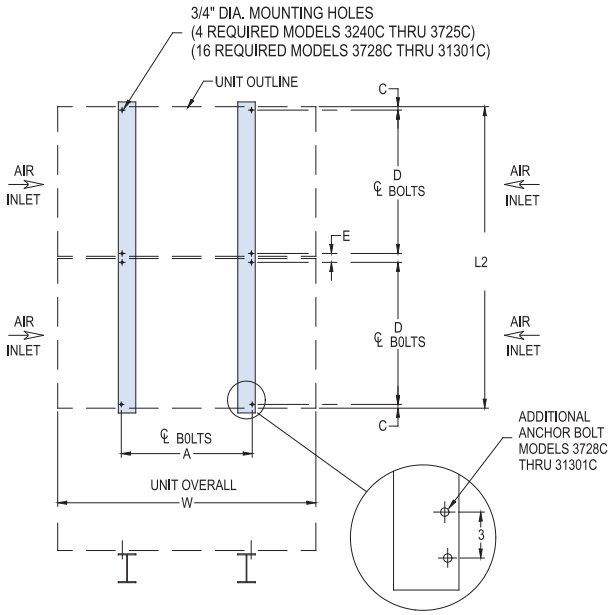


Plan B

Notes:

1. Weights are for a single cell. To obtain weights for multi-cell units, multiply by the number of cells.
2. Operating weight and weight loading are for a single cell tower with water at overflow level in the cold water basin.
3. Support beams and anchor bolts to be selected and installed by others.
4. All support steel must be level at the top.
5. 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".
6. All single and double cell units can be furnished with optional vibration isolation rail packages, when required, to be installed between the tower and supporting steel. The BAC standard vibration isolation rail package is designed for support Plan A for single cell units and support Plan C for double cell units. Plan B rails are available upon request. When determining the length of the supporting steel, allow for the length of the vibration rails, as they are sometimes longer than the cooling tower dimensions shown.
7. If point vibration isolation is used with multi-cell towers, the isolators must be located under the support steel, not between the support steel and the cooling towers.

Double Cell Unit



Plan C

Engineering Specifications

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

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 (lps) of water from _____ ºF(°C) to _____ ºF(°C) at _____ ºF(°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. Manufacturers' performance guarantees or performance bonds without CTI Certification or independent field thermal performance test shall not be accepted. The cooling tower(s) shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.

1.3 Corrosion Resistant Construction (standard): Unless otherwise noted in this specification, all steel basin panels and structural members shall be constructed of heavy-gauge G-235 (Z700 metric) hot-dip galvanized steel with all edges given a protective coating of zinc-rich compound.

(Alternate) 1.3 Unless otherwise noted in this specification, all steel panels and structural members shall be protected with a thermosetting hybrid polymer. The system shall consist of G-235 (Z700 metric) hot-dip galvanized steel prepared in a four-step (clean, pre-treat, rinse, dry) process with an electrostatically sprayed, thermosetting, hybrid polymer fuse-bonded to the substrate during a thermally activated curing stage and monitored by a 23-step quality assurance program. Other coatings must be submitted to the engineer for pre-approval. Approved equals must have undergone testing, resulting in the following results as a minimum:

1. When X-scribed to the steel substrate it shall be able to withstand 6000 hours of 5% salt spray per ASTM B117 without blistering, chipping, or loss of adhesion;

2. When X-scribed to the steel substrate it shall be able to withstand 6000 hours of exposure to acidic (pH=4.0) and alkaline (pH=11.0) water solutions at 95ºF (35˚C) without signs of chemical attack;

3. Shall withstand impact of 160 in-lbs per ASTM D2794 without fracture or delamination of the polymer layer;

4. Shall withstand 6000 hours of ultraviolet radiation equivalent to 120,000 hours of noontime sun exposure without loss of functional properties;

5. Shall withstand 200 thermal shock cycles between -25ºF and +180ºF (-32˚C and 82˚C) without loss of adhesion or other deterioration;

6. Shall withstand 6000 hours of exposure to 60 psi (42,184 kg/m^2) water jet without signs of wear or erosion.

Series 300 stainless steel shall be considered an acceptable alternative. Uncoated G-235 galvanized steel shall not be considered an acceptable alternative.

(Alternate) 1.3 EVERTOUGH™ Construction: All steel panels and structural members shall be protected with a thermosetting hybrid polymer. 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 brass 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 Series 300 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 Series 300 basin shall not be an acceptable alternative. The hot water basins shall be constructed of UV and corrosion resistant pultruded fiberglass reinforced polyester (PFRP) with Series 300 covers. A welded type 304 or 316 stainless steel basin shall be an acceptable alternative. The entire cooling tower, including fan motor, drive system, bearings, and structure, shall be backed by a comprehensive Louver-to-Louver℠ Five-Year warranty.

(Alternate) 1.3 JE PREMIER SERIES® Construction: All steel panels and structural members, including the structural frame, hot and cold water basins, distribution covers, fan deck and fan cylinder shall be constructed of Series 300 stainless steel and assembled with Series 300 stainless steel nut and bolt fasteners. All factory seams in the cold water basin shall be welded to ensure watertight assembly and welded seams shall be warranted against leaks for five (5) years. Stainless steel basins with bolted seams are not acceptable.

The entire cooling tower, including fan motor, drive system, bearings, and structure, shall be backed by a comprehensive Louver-to-Louver℠ Five-Year warranty.

1.4 Quality Assurance: The cooling tower manufacturer shall have a Management System certified by an accredited registrar as complying with the requirements of ISO9001:2000 to ensure consistent quality of products and services. Manufacturers that are not ISO9001 Certified shall not be acceptable.

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 30 psf (146.6 kg/m^2) acting on the full vertical projected area with

16 psf (78.1kg/m^2) acting simultaneously on the full horizontal weight acting in the horizontal direction, and 24% of the operating weight acting in the vertical direction applied at the center of gravity. Loads are appropriate for Seismic Zone 4 assuming an Importance Factor of 1.0, and soil profile SD, and rigid mounting to the supporting structure per the 1997 Uniform Building Code.

2.0 Construction Details

2.1 Structure: The cooling tower shall be constructed with a sturdy structural frame designed to transmit all wind, seismic and mechanical loads to the equipment anchorage. The frame shall be constructed of heavy-gauge steel angles and channels.

2.2 Casing Panels: Casing panels shall be constructed of corrosion and UV-resistant fiberglass reinforced polyester (FRP) to minimize maintenance requirements and prolong equipment life. Casing panels shall not provide structural support, since the sturdy, structural frame of the tower accurately transfers all loads to the equipment anchorage. Corrosion resistant Series 300 stainless steel casing panels may be used in lieu of FRP panels.

(Alternate) 2.2 Casing Panels: Casing panels shall be constructed of galvanized steel protected with a thermosetting hybrid polymer. Corrosion resistant Series 300 stainless steel casing panels are an acceptable alternative.

(Alternate) 2.2 FM approval (Multi-cell): The cooling towers shall be constructed with galvanized steel casing panels and louvers that shall meet the requirements of FM.

(Alternate) 2.2 FM Approval (Multi-cell): The cooling towers shall be constructed with Series 300 stainless steel casing panels and louvers that shall meet the requirements of FM.

2.3 Cold Water Basin: The cold water basin shall be constructed of heavy-gauge steel panels and structural members. Basin shall include a depressed center section with drain/clean-out connection. The basin area under the fill shall be sloped toward the depressed center section to facilitate cleaning. Standard basin accessories shall include a brass make-up valve with large diameter plastic float for easy adjustment of the operating water level.

(Alternate) 2.3 Cold Water Basin: Protected with TriArmor™ Corrosion Protection System: 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 brass 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 Series 300 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 Series 300 basin shall not be an acceptable alternative.

(Alternate) 2.3 Cold Water Basin: The cold water basin shall be constructed of heavy-gauge Series 300 stainless steel panels and structural members. All factory seams shall be welded to ensure watertight construction and welded seams shall be warranted against leaks for a period of five (5) years from date of shipment. Stainless steel basins with bolted seams are not acceptable. Basin shall include a depressed center section with drain/clean-out connection. The basin area under the fill shall be sloped toward the depressed center section to facilitate cleaning. Standard basin accessories shall include a brass make-up valve with large diameter plastic float for easy adjustment of the operating water level.

(Alternate) 2.3 Cold Water Basin: The unit shall be provided without an integral cold water basin. The unit shall be mounted on a separate concrete cold water basin provided by others, to allow cooling water to pass directly from the fill into the basin.

2.4 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 distribution nozzles and an anti-vortexing device to prevent air entrainment. The strainer and vortex device shall be constructed of the same materials as the cold water basin to prevent dissimilar metal corrosion.

2.5 Water Distribution System: The hot water distribution basins shall be the open gravity type for easy cleaning, and constructed of heavy-gauge, G-235 (Z700) 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 and designed to withstand a 50 psf (244 kg/m^2) live load or 200 pound (90.7 kg) concentrated load. Gravity flow nozzles shall be snap-in type for easy removal. Should pressurized nozzles be used, they shall utilize grommets, which ensure easy removal.

(Alternate) 2.5 Water Distribution System: The hot water distribution basins shall be open gravity type for easy cleaning, and constructed of pultruded fiberglass reinforced polyester (PFRP) or type 304 or 316 stainless steel. The basins must be accessible from outside the unit and serviceable during tower operation. Basin weirs and plastic metering devices shall be provided to assure the even distribution of water over the fill. Lift-off distribution covers shall be constructed of heavy-gauge Series 300 stainless steel and designed to withstand 50 psf (244 kg/m^2) live load or a 200 pound (90.7 kg) concentrated load. Gravity flow nozzles shall be snap-in type for easy removal. Should pressurized nozzles be used, they shall utilize grommets, which ensure easy removal.

2.6 EASY CONNECT® Piping Arrangement (optional): Each tower cell shall be furnished with a single water inlet connection complete with the means to automatically balance flow rates to the hot water basins.

3.0 Mechanical Equipment

3.1 Fan(s): Fan(s) shall be heavy-duty, 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.

(Alternate 3.2, 3.3 & 3.4) Fan Drive: Fan(s) are driven by a (Close-Coupled (internal) TEAO fan motor gear drive) (gear drive with the TEFC fan motor mounted outside the airstream). The gear shall be a right angle, industrial duty, oil-lubricated, geared speed reducer. Spiral bevel or spiral bevel/helical gears are designed in accordance with the Cooling Technology Institute STD-111, "Gear Speed Reducers". All gears have a minimum service factor of 2.0 based on design fan horsepower and are suitable for both forward and reverse operation. An oil level fill port and sight glass are located on the gear drive to facilitate routine inspection and maintenance. The gear is doweled in position after alignment of the mechanical equipment.

3.5 Fan Motor: Fan motor(s) shall be totally enclosed air over (TEAO), reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. The motor shall be furnished with special moisture protection on windings, shafts and bearings and labeled appropriately for cooling tower duty.

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

(Alternate) 3.5 Fan Motor: Fan motor(s) shall be totally enclosed fan cooled (TEFC) and mounted outside the airstream.

(Alternate) 3.5 Fan Motor: Fan motor(s) shall be totally enclosed fan cooled (TEFC) and mounted outside the airstream. Fan motors shall be inverter duty type designed per NEMA Standard MG1, Section IV, Part 31.

3.6 Mechanical Equipment Warranty: The fan(s), fan shaft(s), sheaves, 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.

3.7 ENERGY-MISER® Fan System (optional): Two single-speed fan motors, one sized for full speed and load, the other sized for 2/3 speed and approximately 1/3 the full load horsepower shall be provided in each cell for capacity control and stand-by protection from drive or motor failure. Two-speed motor(s) are not an acceptable alternative.

3.8 BALTIGUARD PLUS™ Fan System: Two single speed fan motors, one sized for load, the other sized for 1/3 of the full load horsepower shall be provided in each cell for capacity control and standby protection from drive or motor failure. The manufacturer of the equipment shall supply controls for the larger motor, a VFD for the smaller motor and factory programmed logic controller to maximize energy saving for off peak load and wet-bulb conditions.

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 130°F (54.4°C). The fill shall be manufactured, tested and rated by the cooling tower manufacturer and shall be elevated above the cold water floor to facilitate cleaning. Spacing between fill sheets shall be a minimum of 3/4 inches (19.1 mm) to reduce the tendency for fouling and ensure proper airflow for maximum cooling capacity.

(Alternate) 4.1 Fill and Drift Eliminators: The high temperature 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 high temperature fill shall be suitable for entering water temperatures up to and including 140°F (60.0°C). The fill shall be manufactured, tested and rated by the cooling tower manufacturer and shall be elevated above the cold water floor to facilitate cleaning. Spacing between fill sheets shall be a minimum of 3/4 inches (19.1 mm) to reduce the tendency for fouling and scaling, and to ensure proper airflow for maximum cooling capacity.

5.0 Air Inlet Louvers

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

(Alternate) 5.1 Air Inlet Louvers: Air inlet louvers shall be separate from the fill and removable to provide easy access for inspection of the air/water interface at the louver face.

Louvers shall prevent water splash out during fan cycling and be constructed of galvanized steel.

(Alternate) 5.1 Air Inlet Louvers: Air inlet louvers shall be separate from the fill and removable to provide easy access for inspection of the air/water interface at the louver face. Louvers shall prevent water splash out during fan cycling and be constructed of galvanized steel protected a thermosetting hybrid polyme. Corrosion resistant Series 300 stainless steel is an acceptable alternative.

(Alternate) 5.1 Air Inlet Louvers: Air inlet louvers shall be separate from the fill and removable to provide easy access for inspection of the air/water interface at the louver face. Louvers shall prevent water splash out during fan cycling and be constructed of corrosion resistant Series 300 stainless steel.

6.0 Access

6.1 Plenum Access: Two hinged access doors shall be provided for access into the 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									
Cased Face									

8.0 Accessories

8.1 Balancing Valves: Heavy-duty butterfly valves shall be provided at the hot water inlet connections. These valves shall include cast iron bodies, elastomer seat and steel operating stems. There shall be a locking handle to maintain the valve setting in any position. Wafer type field supplied spool piece is required between the inlet connection and the valve.

8.2 Vibration Isolation Rails: Spring-type vibration isolation rails, constructed of steel channels and base plates, painted with a rust-resistant primer shall be provided to minimize vibration transmission from the tower to the building structure. The isolators shall be designed for a static deflection of 1" (25.4 mm) and a maximum wind speed of 50 mph (80 km/h).

(Alternate) 8.2 Vibration Isolation Rails: Spring-type vibration isolation rails, constructed of steel channels and base plates, coated with a 0.003" (.076 mm) layer of zinc after fabrication shall be provided to minimize vibration transmission from the tower to the building structure. The isolators shall be designed for a static deflection of 1" (25.4 mm) and a maximum wind speed of 50 mph (80 km/h).

8.3 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 (4.44°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.

(Alternate) 8.3 Basin Heaters: A steam coil shall be factory installed in the depressed section of the cold water basin to prevent freezing during cold water shutdown. The steam coil shall be capable of maintaining 40°F (4.44°C) basin water temperature at a –20°F (-28.89°C) ambient temperature given 5 psig (34 Kpa) at the coil inlet connection.

(Alternate) 8.3 Basin Heaters: A steam injector shall be factory installed in the cold water basin section to prevent freezing during cold water shutdown. Steam injector shall be capable of maintaining 40°F (4.44°C) basin water temperature at a ___°F (°C) ambient temperature given 10 psig (68 Kpa) at the inlet connection.

8.4 Basin Water Level Control: The cooling tower manufacturer shall provide an electric water level control (EWLC) system. The system shall consist of water level sensing and control units in quantities and locations as indicated on the drawings. Each water level sensing and control unit shall consist of the following: NEMA 4 enclosure with gasketed access cover; solid state controls including all necessary relays and contacts to achieve the specified sequence of operation; stainless steel water level sensing electrodes with brass holder; Schedule 40 PVC standpipe assembly with vent holes, and all necessary stainless steel mounting hardware. Provide PVC union directly below the control enclosure to facilitate the removal and access of electrodes and control enclosure.

The number and position of water level sensing electrodes shall be provided to sense the following: high water level, low water level, high water alarm level, low water alarm level, and heater safety cutout.

8.5 Vibration Cutout Switch: Provide a mechanical local reset vibration switch. The mechanical vibration cutout 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 set in a frequency range of 0 to 3,600 RPM and a trip point of 0.2 to 2.0 g's.

(Alternate) 8.5 Vibration Cutout Switch: Provide an electronic remote reset vibration switch with contact for BAS monitoring. Wiring shall be by the installing contractor. The electronic vibration cutout switch shall be set to trip at a point so as not to cause damage to the cooling tower. To ensure this, the trip point will be set in a frequency range of 2 to 1000 Hertz and a trip point of 0.45 in/sec (0.0114 m/sec).

8.6 Basin Sweeper Piping: The cold water basin of the cooling tower shall be equipped with PVC sump sweeper piping with plastic eductor nozzles.

8.7 Air intake Option: Provide removable hot dip galvanized steel 1"x1" (25.4 mm x 25.4 mm) mesh air intake screens.

(Alternate) 8.7 Air intake Option: Provide removable Series 300 stainless steel 1"x1" (25.4 mm x 25.4 mm) mesh air intake screens.

(Alternate) 8.7 Air intake Option: Provide removable UV and corrosion resistant PVC air intake screens. The screens shall shield the air inlet from sunlight. Series 300 stainless steel mesh screens are an acceptable alternative.

8.8 Ladder: An aluminum ladder (with galvanized steel safety cage) shall be provided for access to the fan deck. Access door or service platforms are not acceptable.

8.9 Handrails: 1-1/4" (31.75 mm) galvanized steel pipe handrail shall be provided around the perimeter of the cooling tower cells. The handrails shall be provided with knee and toe rails and shall conform to the requirements of OSHA applicable at the time of shipment.

8.10 Access Door Platform: A galvanized steel platform and aluminum ladder to grade shall be provided at all access doors to access the plenum section of the cooling tower. All working surfaces shall be able to withstand 50 psf (244 kg/m^2) live load or 200 pound (90.72 kg) concentrated load.

8.11 Platform to Access External Motor (available on gear drives equipped with TEFC external motors only): A galvanized steel platform and ladder to grade shall be provided for access to the external fan motor. All working surfaces shall be able to withstand 50 psf (244 kg/m^2) live load or 200 pound (90.72 kg) concentrated load.

8.12 Internal Walkway: An internal walkway 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 promote these surfaces to be used as a working platform shall provide a two-year extended warranty to the Owner to repair any damage to these surfaces caused during routine maintenance.

8.13 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 live load or 200 pound concentrated load. Other components of the cooling tower, i.e. basin floor and fill/drift eliminators, shall not be considered an internal working surface. Cooling tower manufacturers that promote these surfaces to be used as a working platform shall provide a two-year extended warranty to the Owner to repair any damage to these surfaces caused during routine maintenance.

8.14 Louver Face Platform: Easy access to the hot water basins for inspection and maintenance of the basins, even during tower operation, shall be provided by louver face platforms. Fan deck ladders and handrails, which add to the overall height of the tower, are not acceptable.

8.15 Fan Cylinder Extension: To extend the height of the tower equal to the surrounding enclosure, the cooling tower shall be provided with _____ft (mm) of fan cylinder extension. The fan cylinder extension shall match the construction of the fan deck.

8.16 Mechanical Equipment Removal Davit: Provide the mechanical equipment removal option to aid in motor removal or gear drive. The davit shall be portable from cell to cell and the heaviest piece shall weigh 60 lbs. The davit shall lower the motor or gear drive from the mechanical equipment supports down to an internal metal working surface.

8.17 Externally Mounted Pre-wired Terminal Box: The cooling tower shall ship from the factory with the fan motor(s) (and vibration cutout switch) wired to terminal blocks encased in a 304 stainless steel NEMA 3R enclosure, mounted on the outside of the tower. No casing penetrations shall be permitted in the field.

8.18 Velocity Recovery Stack: To increase the capacity of the tower, a 5ft tall velocity recovery stack shall be provided. Fan guards are not required.

9.0 Equipment Controls (Optional)

9.1 Variable Frequency Drive(s): A variable frequency drive (VFD) shall be provided for each fan motor. The supplier of the VFD shall be the manufacturer of the evaporative cooling equipment. The VFD shall have a 3-contactor bypass, 3% input line reactor, a removable keypad, an RS232 terminal for PC connection, and a circuit breaker disconnect. Fuse protection will not be accepted. Control voltage shall be 24V to minimize the size of the enclosure which should not exceed _____ ft x _____ ft x ____ ft and the weight should not exceed ____ lbs. VFD shall be provided in a NEMA (1)(3R)(12) enclosure. The VFD shall be compatible with a (ModBus) (LonWorks) (Johnson N2) Building Automation System.

OR

9.1 Enclosed Controls: An enclosed control panel shall be provided for each cell of the evaporative cooling equipment. The panel shall include full voltage, non-reversing (FVNR) fan motor and pump motor (if applicable) starters in a common enclosure. The panel shall be provided with a main a circuit breaker disconnect and a separate circuit breaker for each motor or speed. Fuse protection will not be accepted. Panels containing basin heaters shall have an EarthLeakage Breaker containing ground fault protection. Starters above 25 A shall be NEMA rated. IEC starters will be accepted for motors below 25 A. Panel shall include a 120V/60Hz control power transformer, Hand-Off-Auto switches for each starter or contactor, and pilot lights for each component. Enclosed controls shall be provided in a NEMA (1)(3R)(4)(4X)(12) enclosure.

Optional enclosed control features: (A temperature sensor shall be provided with the enclosed controls.)(A temperature controller shall be provided with the enclosed controls.) (A basin heater contactor with circuit breaker shall be provided.)(A vibration cutout switch input shall be provided.)

9.2 Safety Switch(es): A heavy-duty, non-fusible safety disconnect switch shall be provided by the manufacturer of the evaporative cooling equipment. Switch shall be single-throw, 3-pole design, rated up to 600 VAC. Switch shall have triple padlocking capability, a visible double break rotary blade mechanism, a clearly visible On/Off handle, an interlocking mechanism to prevent door opening with handle in On position, and a clear line shield. Safety switch shall be provided in a NEMA (1)(3R)(12) enclosure.

For Engineering Considerations, refer to the BAC Product and Application Handbook.

PT2
Open Cooling Towers

Product Detail

PT2 Open Cooling Towers

Single Cell Capacity:
100 - 500 Nominal Tons

PT2 Cooling Towers deliver independently verified, fully rated thermal performance over a wide range of flow and temperature requirements. Standard design features satisfy today's environmental concerns, minimize installation costs, maximize year-round operating reliability and simplify maintenance requirements.

PT2 Cooling Towers

- **Optimal footprint for low tonnage applications**
- **Low energy consumption**
- **Low installed cost**
- **Easy maintenance**
- **Reliable year-round operation**
- **Long service life**
- **ASHRAE Standard 90.1 Compliant**
- **IBC 2006 compliant**
- **5-year warranty on mechanical equipment**

CTI CERTIFIED

Benefits

Optimal Footprint For Low Tonnage Applications

- Induced draft counterflow technology
- High efficiency PVC fill
- Ideal for replacement applications

Low Energy Consumption

- Evaporative cooling equipment minimizes the energy consumption of the entire system because it provides lower operating temperatures. The owner saves money while conserving natural resources and reducing environmental impact.

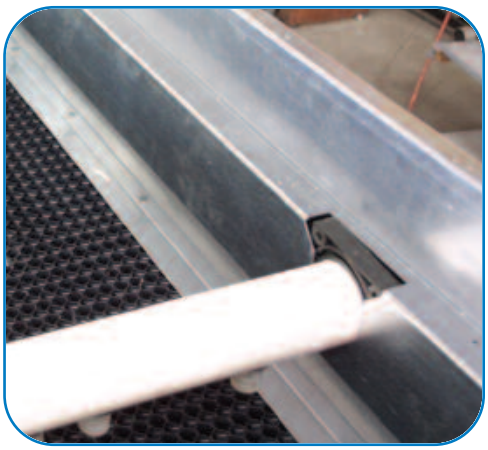
Low Installed Cost

- **Modular Design** – All PT2 models ship in multiple sections to minimize the size and weight of the heaviest lift, allowing for the use of smaller, less costly cranes
- **InterLok™ System** – Upper section self aligns with lower section for quick field assembly
- **Platforms** – Optional platform and ladder systems are factory-assembled and ready to install
- **Packaging** – All motors are pre-installed and aligned at the factory (See “Externally mounted motor” section on page D34 for details)
- **Support Steel** – Units are designed to mount directly on the existing support steel of many cooling towers (both crossflow and counterflow)
- **Containerized for Export** – Specially designed to fit in standard shipping containers

External Motor Adjustment

Easy Maintenance

- **Inward Sliding Access Door** – Provides safe and easy access to the water distribution and fan drive systems
- **External Motor Adjustment** – All belt-drive PT2 models have externally accessible motor adjustors with built in locking wrench for easy motor alignment and belt tensioning
- **BranchLok™ System** – Branch removal system that requires no tools



BranchLok™ System

Easy Maintenance

- **External Header Cleanout** – Easily accessible cleanout port flushes any water distribution debris to the outside of the unit
- **Sectional Louvers** – Each louver section is easily removed without tools, offering quick access to any part of the cold water basin
- **Exterior Platform** – *Optional* exterior platforms and ladders are available for improved tower accessibility
- **Fill Inspection Panel** – *Optional* removable inspection panels allow for easy inspection and access to the fill

Long Service Life

- **Materials of Construction** – Multiple materials, including the revolutionary TriArmor™ Corrosion Protection System and exclusive EVERTOUGH™ Construction are available to meet the corrosion resistance, unit operating life and budgetary requirements of any project
- **InterLok™ System** – Alleviates the need for butyl tape during installation, providing a permanent leak-free joint between the upper and lower sections
- **Bearing Life** – L_{10} 80,000 hour rated bearings

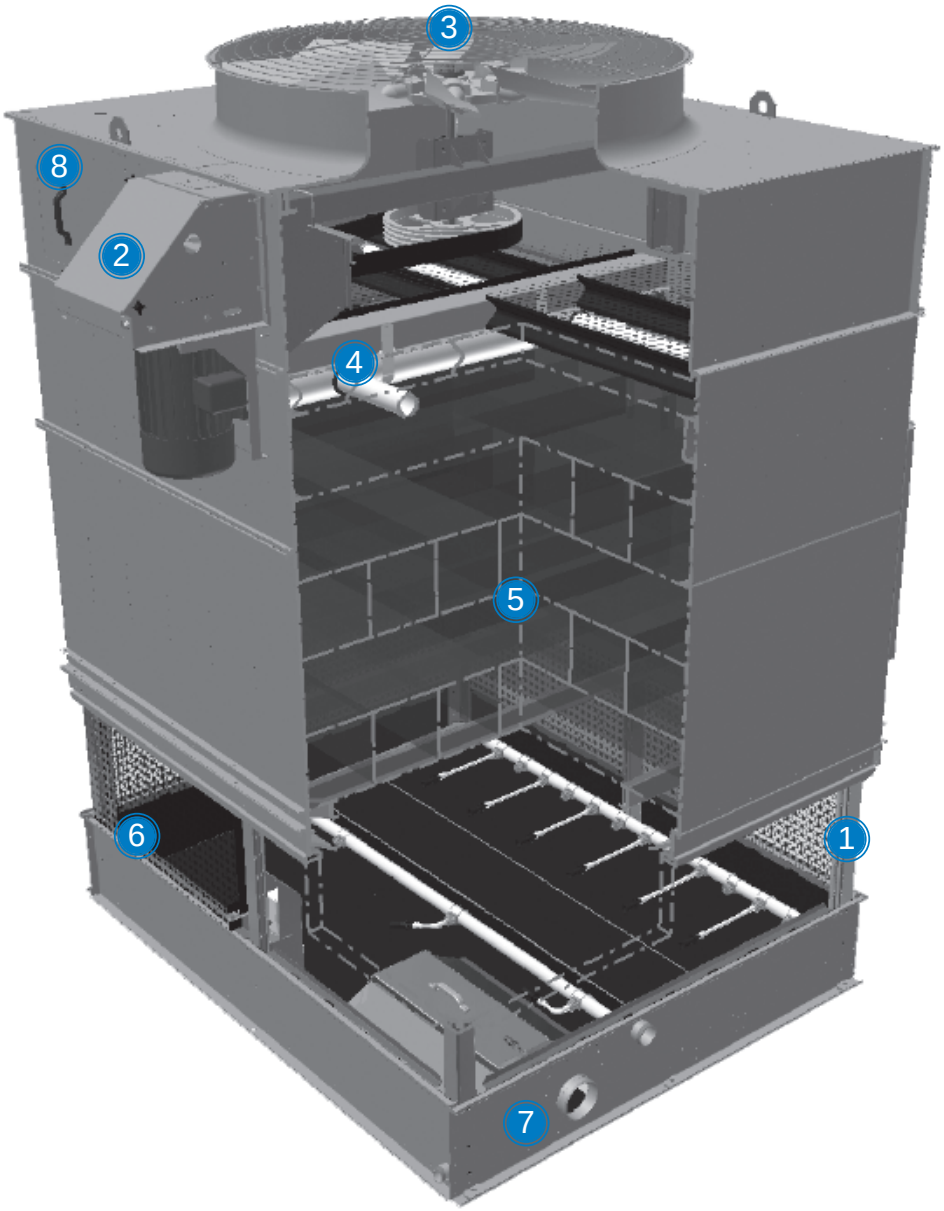
Fill Inspection Panel

PT2 Cooling Tower Seismic Testing

IBC 2006 Compliant

- Designed to meet requirements of 2006 International Building Code (IBC) covering most US seismic applications in addition to withstanding wind loads up to 130 psf
- Product verified using seismic testing at certified independent dynamic testing laboratory to meet stringent 2006 IBC requirements

Construction Details



1 Heavy-Duty Construction

- Heavy-gauge G-235 (Z700 Metric) hot-dip galvanized steel construction
- Designed to meet requirements of 2006 International Building Code (IBC)
- Base structure withstands higher seismic loading than any other induced draft counter flow tower on the market

2 BALTIDRIVE® Power Train

(except direct drive model PT2-0412)

- Premium quality, solid backed, multi-groove belt
- Corrosion resistant cast aluminum sheaves
- Heavy-duty bearings (L_{10} 80,000 hour rating)
- Cooling tower duty fan motor
- 5-year motor and drive warranty
- Extended lubrication lines

3 Low HP Axial Fan

- High efficiency
- Quiet operation
- Corrosion resistant

4 Water Distribution System

- Exclusive BranchLok™ System for tool free branch removal
- External header cleanout ports
- Schedule 40 PVC spray header and branches
- Large orifice, non-clog nozzles
- Nozzles grommetted for easy removal

5 140°F Standard Fill

- Highest rated standard fill for all induced draft counterflow products on the market
- Polyvinyl Chloride (PVC)
- Impervious to rot, decay and biological attack
- Flame spread rating of 5 per ASTM E84

6 Sectional Air Inlet Louver System

- Corrosion resistant
- Maintenance free
- UV resistant finish
- Easy to remove louver sections

7 Cold Water Basin

- Sloped for easy cleaning
- Suction strainer with removable anti-vortex hood
- Adjustable water make-up assembly

8 Access

- Inward sliding access door
- Permanently attached to unit
- Provides safe and easy access

Fan Drive Configurations

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 PT2 (except direct drive model PT2-0412) is the exclusive BALTIDRIVE® Power Train. This BAC engineered drive system consists of a specially designed powerband and two cast aluminum sheaves located on minimum shaft centerline distances to maximize belt life. A cooling tower duty fan motor, custom engineered for BAC to provide maximum performance for cooling tower service, is provided and backed by BAC's comprehensive 5-year motor and fan drive warranty.

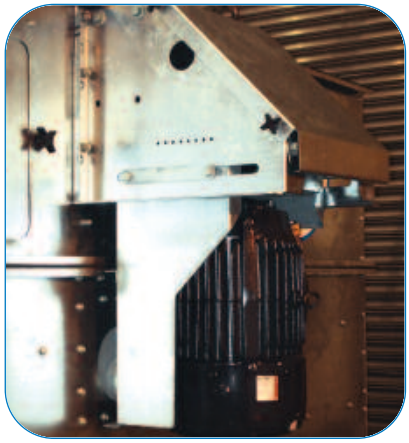
Direct Drive Dual Motors
(model PT2-0412)

A direct drive dual motor system with TEAO motors is provided on this cooling tower. The motors are shipped factory mounted, alleviating the need for field installation.

Direct Drive Motor

Externally Mounted Motor
(models model PT2-0709, PT2-0809 and PT2-0812)

The BALTIDRIVE® Power Train System with a TEFC motor is provided on these cooling towers. The motor is pre-installed to the base and aligned at the factory. The assembly is shipped inside the cold water basin, for fast field installation.



Externally Mounted Motor

Internally Mounted Motor
(models PT2-1009, PT2-1012 and PT2-1212)

The BALTIDRIVE® Power Train System with a TEAO motor is provided on these cooling towers. The motor ships factory mounted, aligned and tensioned, alleviating the need for field installation.

Internally Mounted Motor

Custom Features and Options

Construction Options

- **TriArmor™ Corrosion Protection System:**

  The cold water basin can be constructed with the TriArmor™ Corrosion Protection System. The system consists of a heavy-gauge G-235 hot-dip galvanized steel substrate encapsulated in a special thermosetting hybrid polymer finish further protected by a polyurethane liner 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.

- **EVERTOUGH™ Construction:**

  The EVERTOUGH™ Construction option combines BAC's exclusive thermosetting hybrid polymer and TriArmor™ Corrosion Protection Systems to provide the best value in corrosion protection for most water chemistries. All heavy-gauge G-235 galvanized steel panels and structural members are protected with a thermosetting hybrid polymer. The cold water basin is constructed with the TriArmor™ Corrosion Protection System. The basin is leak tested at the factory and warranted against leaks and corrosion for 5 years. Each cooling tower provided with EVERTOUGH™ Construction is backed by a comprehensive Louver-to-Louver℠ five-year warranty, which covers ALL components from the fan to the cold waterbasin, from louver to louver, including the motor.

- **Thermosetting Hybrid Polymer:**

  The thermosetting hybrid polymer coating used to extend equipment life is applied to selected hot-dip galvanized steel components of the cooling tower. This finish has been tested to withstand 6000 hours in a 5% salt spray without blistering, chipping, or loss of adhesion.

- **Stainless Steel Cold Water Basin:**

  The cold water basin can be constructed of heavy gauge Series 300 stainless steel. All factory seams in the cold water basin are welded to ensure watertight construction and warranted against leaks for 5 years.

- **All Stainless Steel Construction:**

  All steel panels and structural elements are constructed of heavy gauge series 300 stainless steel. All factory seams in the cold water basin are welded to ensure watertight assembly and warranted against leaks. The basin is leak tested at the factory and all factory seams are warranted against leaks for 5 years.

- **Rated in accordance with IBC regulations to meet Seismic and Wind Loadings:**

  Standard construction and optional construction with structural bracing is designed to meet requirements of International Building Code covering most US seismic applications in addition to withstanding wind loads up to 130 psf.

Custom Features and Options

Low Sound Operation

The low sound levels generated by PT2 Cooling Towers make them suitable for installation in most environments. For sound sensitive installations, the PT2 is available with a low sound fan that significantly reduces the sound levels generated from the tower with minimal impact on thermal performance (low sound fan not available on Model PT2-0412). The cooling tower thermal performance with the low sound fan has been certified in accordance with CTI Standard STD-201. For extremely sound sensitive installations, factory designed, tested and rated water silencers and discharge sound attenuation are also available for PT2 Cooling Towers. For more information on sound, see the BAC Product and Application Handbook.

Accessories

Inclined Ladder

In the event the owner requires access to the mechanical plenum, but does not require a working surface, the PT2 can be furnished with an inclined ladder – a 75º angled ladder – extending from grade to the access door, providing safe access with minimal space requirements. All components are designed to meet OSHA requirements.

Inclined Ladder

External Service Platform, Ladder, Safety Cage and Gate

For external service, an access door platform can be added to the cooling tower when the unit is purchased or as an aftermarket upgrade. Ladders, safety cages and safety gates are also available. All components meet OSHA requirements.

External Platform

Vibration Cutout Switch

A factory mounted vibration cutout switch is available to effectively protect against equipment failure due to excessive vibration of the mechanical equipment system. 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 to either switch type to activate an alarm.

Vibration Cutout Switch

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 Sizing Data

PT2 Model Numbers	0°F (-17.8°C) Ambient Heaters kW per Heater	-20°F(-28.9°C) Ambient Heaters kW per Heater
0412	6	6
0709	6	8
0809	8	10
1009	8	10
0812	10	12
1012	10	14
1212	12	16

Note: The table data is based on 460v/3 phase/60Hz power and standard, single-cell unit configuration

Electric Water Level Control Package

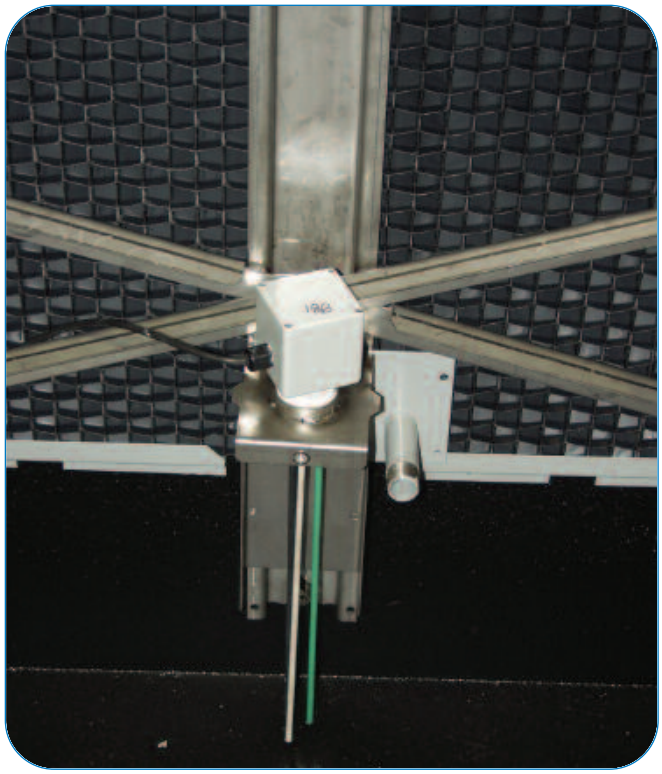
The electric water level control replaces the standard mechanical make-up valve when more precise water level control is required. This package consists of a conductance-actuated level control mounted in the basin and a solenoid activated valve in the make-up water line. The valve is slow closing to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

High Temperature Fill

If operation above 140°F (60.0°C) is anticipated, an optional high temperature fill material is available which increases the maximum allowable entering water temperature to 150°F (65.6°C).

Factory Mutual Approval

PT2 Cooling Towers are available with Factory Mutual (FM) Approved construction as an option.



Electronic Water Level Control

Accessories

Equipment Controls

BAC control panels are specifically designed to work seamlessly with all BAC units and engineered to meet your particular application. A terminal box is available on all internal motor PT2 Cooling Towers (not available on models PT2-0709, 0809, 0812) and includes a factory-mounted enclosure, factory wiring to terminal blocks for the fan motors and vibration cut-out switch, and grounding lugs. For more information on BAC Equipment Controls, refer to the BAC Product and Application Handbook.

Variable Frequency Drives (VFDs)

VFDs allow precise fluid temperature control, providing a more efficient method to vary airflow compared to fan cycling, dampers or mechanical speed changers. VFDs also prolong the mechanical system life by offering quiet soft-starts, stops and smooth accelerations. A 3-contactor bypass, circuit breaker protection and multi-monitor digital display/keypad are all standard on BAC VFDs, in addition to the BAC custom programming and startup wizard. All BAC VFDs are UL 508C listed and CUL certified and are provided with a standard two year warranty. For more information on BAC VFDs, refer to the BAC Product and Application Handbook.

Basin Sweeper Piping

Basin sweeper piping provides an effective method of preventing sediment from collecting in the cold water basin of the tower. A complete piping system, including nozzles, is provided in the tower basin for connection to side stream filtration equipment (by others). For more information on filtration systems, refer to the BAC Product and Application Handbook.

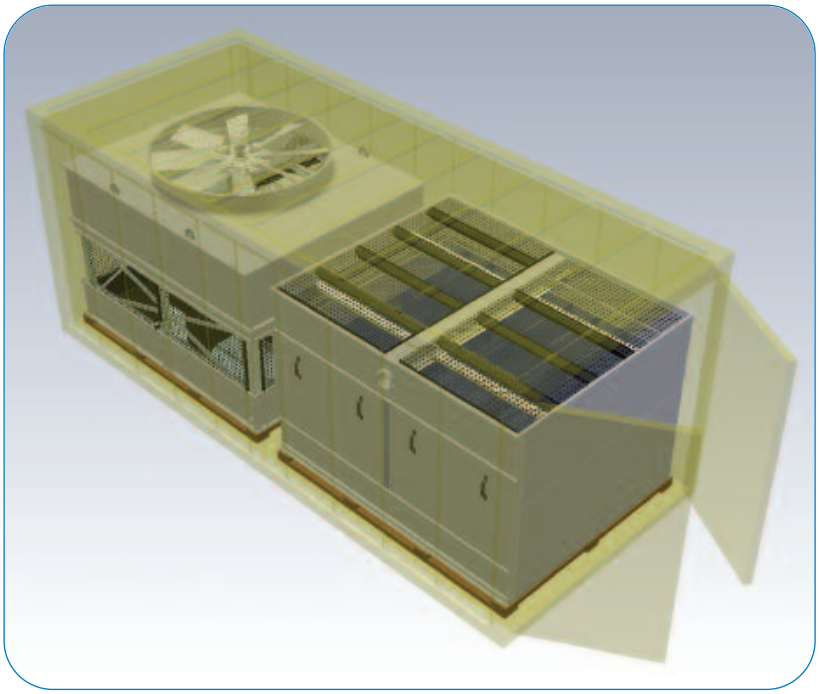
Basin Sweeper Piping

Containerized PT2 Cooling Towers for Export

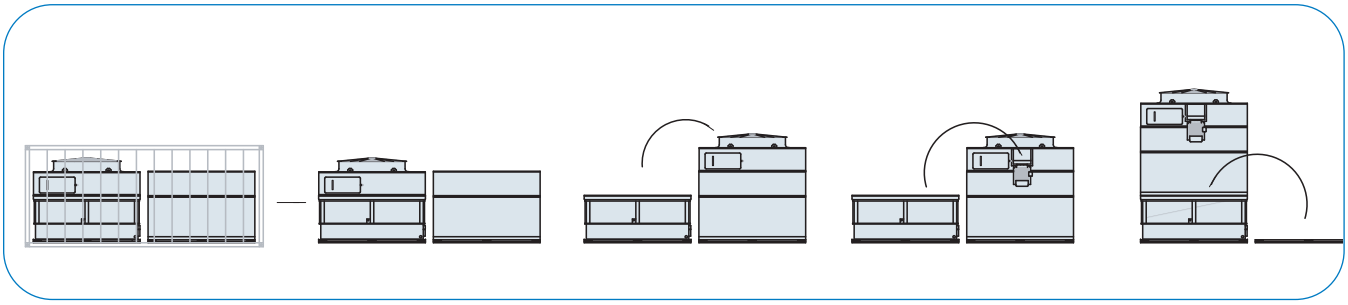
Over 400 Tons in a single 40' Shipping Container

- **Engineered for:**
  - The Worldwide Export Market
  - Maximum Capacity
  - Designed to fit a single unit in a 20' container
  - Designed to fit two units in a 40' container
  - Ease of Maintenance
  - Reliability
  - Lowest Shipping Costs!

Units are factory assembled and require only minimal assembly and rigging!



Single Container (20')



Easy Removal and Assembly

Engineering Data

Do not use for construction. Refer to factory certified dimensions. This supplement 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**.

Performance Data

Model Number	Airflow Per Cell (CFM)	1		2		3		4	
		Nominal Tonnage[1]	Motor - Quantity and HP	Nominal Tonnage[1]	Motor - Quantity and HP	Nominal Tonnage[1]	Motor - Quantity and HP	Nominal Tonnage[1]	Motor - Quantity and HP
PT2-0412A-1H* PT2-0412A-2J*	30,750 33,520	117 149	(2) 5 (2) 7.5	- -	- -	- -	- -	- -	- -
PT2-0709A-1K* PT2-0709A-2L* PT2-0709A-3L*	43,910 46,500 43,520	157 199 210	(1) 10 (1) 15 (1) 15	316 400 423	(2) 10 (2) 15 (2) 20	481 606 640	(3) 10 (3) 15 (3) 20	- - -	- - -
PT2-0809A-1K* PT2-0809A-2L* PT2-0809A-3M*	47,000 50,340 51,820	168 215 250	(1) 10 (1) 15 (1) 20	338 433 503	(2) 10 (2) 15 (2) 20	514 656 761	(3) 10 (3) 15 (3) 20	- - -	- - -
PT2-0812A-1M* PT2-0812A-2N* PT2-0812A-3O*	74,360 73,720 72,490	265 315 350	(1) 20 (1) 25 (1) 30	536 635 704	(2) 20 (2) 25 (2) 30	816 963 1,066	(3) 20 (3) 25 (3) 30	- - -	- - -
PT2-1009A-1L* PT2-1009A-2M* PT2-1009A-3N*	62,510 62,860 76,360	223 268 301	(1) 15 (1) 20 (1) 25	446 537 602	(2) 15 (2) 20 (2) 25	679 814 911	(3) 15 (3) 20 (3) 25	901 1,082 1,211	(4) 15 (4) 20 (4) 25
PT2-1012A-1M* PT2-1012A-2O* PT2-1012A-3O*	81,730 86,260 80,690	292 368 389	(1) 20 (1) 30 (1) 30	586 740 781	(2) 20 (2) 30 (2) 30	890 1,120 1,182	(3) 20 (3) 30 (3) 30	1,173 1,481 1,564	(4) 20 (4) 30 (4) 30
PT2-1212A-1N* PT2-1212A-2O* PT2-1212A-3P*	101,160 101,190 104,080	361 432 502	(1) 25 (1) 30 (1) 40	721 863 1,004	(2) 25 (2) 30 (2) 40	1,092 1,305 1,515	(3) 25 (3) 30 (3) 40	1,441 1,726 2,007	(4) 25 (4) 30 (4) 40

Notes

1: * Indicates number of cells

2: Nominal tons of cooling represents 3 GPM of water from 95°F to 85°F at a 78°F entering wet-bulb temperature.

Dimensional Data

Model Number[1]	Nominal Weights (lbs)			Dimensions			
	Operating[2]	Shipping	Heaviest Section	L	W	H	A
PT2-0412A-1*1	4,980	2,570	1,800	11' 11-3/4"	4' 0"	10' 3-1/2"	3' 2-3/8"
PT2-0412A-2*1	5,230	2,810	2,040	11' 11-3/4"	4' 0"	11' 3-1/2"	3' 2-3/8"
PT2-0709A-1*1	6,020	3,270	2,330	8' 11-3/4"	7' 3-1/4"	10' 7-7/8"	3' 8-7/8"
PT2-0709A-2*1	6,310	3,560	2,620	8' 11-3/4"	7' 3-1/4"	11' 7-7/8"	3' 8-7/8"
PT2-0709A-3*1	6,610	3,850	2,920	8' 11-3/4"	7' 3-1/4"	12' 7-7/8"	3' 8-7/8"
PT2-0709A-1*2	12,170	6,660	4,670	18' 0-1/2"	7' 3-1/4"	11' 7-7/8"	4' 8-7/8"
PT2-0709A-2*2	12,760	7,240	5,250	18' 0-1/2"	7' 3-1/4"	12' 7-7/8"	4' 8-7/8"
PT2-0709A-3*2	13,340	7,830	5,830	18' 0-1/2"	7' 3-1/4"	13' 7-7/8"	4' 8-7/8"
PT2-0709A-1*3	18,450	10,180	7,000	27' 1-3/4"	7' 3-1/4"	12' 7-7/8"	5' 8-7/8"
PT2-0709A-2*3	19,320	11,060	7,870	27' 1-3/4"	7' 3-1/4"	13' 7-7/8"	5' 8-7/8"
PT2-0709A-3*3	20,580	12,310	8,750	27' 1-3/4"	7' 3-1/4"	14' 7-7/8"	5' 8-7/8"
PT2-0809A-1*1	6,700	3,510	2,570	8' 11-3/4"	8' 5-3/4"	10' 9-3/8"	3' 8-7/8"
PT2-0809A-2*1	7,000	3,810	2,870	8' 11-3/4"	8' 5-3/4"	11' 9-3/8"	3' 8-7/8"
PT2-0809A-3*1	7,300	4,110	3,150	8' 11-3/4"	8' 5-3/4"	12' 9-3/8"	3' 8-7/8"
PT2-0809A-1*2	13,540	7,170	5,130	18' 0-1/2"	8' 5-3/4"	11' 9-3/8"	4' 8-7/8"
PT2-0809A-2*2	14,140	7,770	5,710	18' 0-1/2"	8' 5-3/4"	12' 9-3/8"	4' 8-7/8"
PT2-0809A-3*2	14,730	8,370	6,290	18' 0-1/2"	8' 5-3/4"	13' 9-3/8"	4' 8-7/8"
PT2-0809A-1*3	20,520	10,970	7,690	27' 1-3/4"	8' 5-3/4"	12' 9-3/8"	5' 8-7/8"
PT2-0809A-2*3	21,420	11,870	8,570	27' 1-3/4"	8' 5-3/4"	13' 9-3/8"	5' 8-7/8"
PT2-0809A-3*3	22,700	13,150	9,440	27' 1-3/4"	8' 5-3/4"	14' 9-3/8"	5' 8-7/8"
PT2-0812A-1*1	8,410	4,160	2,890	11' 11-3/4"	8' 5-3/4"	11' 1-7/8"	4' 1-3/8"
PT2-0812A-2*1	8,730	4,480	3,180	11' 11-3/4"	8' 5-3/4"	12' 1-7/8"	4' 1-3/8"
PT2-0812A-3*1	9,050	4,800	3,480	11' 11-3/4"	8' 5-3/4"	13' 1-7/8"	4' 1-3/8"
PT2-0812A-1*2	17,000	8,510	5,790	24' 0-1/2"	8' 5-3/4"	12' 1-7/8"	5' 1-3/8"
PT2-0812A-2*2	17,640	9,150	6,370	24' 0-1/2"	8' 5-3/4"	13' 1-7/8"	5' 1-3/8"
PT2-0812A-3*2	18,290	9,790	6,950	24' 0-1/2"	8' 5-3/4"	14' 1-7/8"	5' 1-3/8"
PT2-0812A-1*3	25,780	13,040	8,680	36' 1-3/4"	8' 5-3/4"	13' 1-7/8"	6' 1-3/8"
PT2-0812A-2*3	26,740	14,010	9,550	36' 1-3/4"	8' 5-3/4"	14' 1-7/8"	6' 1-3/8"
PT2-0812A-3*3	28,080	15,350	10,430	36' 1-3/4"	8' 5-3/4"	15' 1-7/8"	6' 1-3/8"
PT2-1009A-1*1	7,780	4,090	3,110	8' 11-3/4"	9' 10"	12' 11-5/8"	4' 1-3/8"
PT2-1009A-2*1	8,090	4,400	3,400	8' 11-3/4"	9' 10"	13' 11-5/8"	4' 1-3/8"
PT2-1009A-3*1	8,400	4,710	3,690	8' 11-3/4"	9' 10"	14' 11-5/8"	4' 1-3/8"
PT2-1009A-1*2	15,730	8,350	6,220	18' 0-1/2"	9' 10"	13' 11-5/8"	5' 1-3/8"
PT2-1009A-2*2	16,350	8,970	6,800	18' 0-1/2"	9' 10"	14' 11-5/8"	5' 1-3/8"
PT2-1009A-3*2	16,970	9,580	7,380	18' 0-1/2"	9' 10"	15' 11-5/8"	5' 1-3/8"
PT2-1009A-1*3	23,840	12,760	9,320	27' 1-3/4"	9' 10"	14' 11-5/8"	6' 1-3/8"
PT2-1009A-2*3	24,760	13,690	10,200	27' 1-3/4"	9' 10"	15' 11-5/8"	6' 1-3/8"
PT2-1009A-3*3	26,070	15,000	11,070	27' 1-3/4"	9' 10"	16' 11-5/8"	6' 1-3/8"
PT2-1009A-1*4	31,980	17,210	12,430	18' 0-1/2"	19' 9"	15' 11-5/8"	7' 1-3/8"
PT2-1009A-2*4	33,340	18,580	13,600	18' 0-1/2"	19' 9"	16' 11-5/8"	7' 1-3/8"
PT2-1009A-3*4	35,090	20,320	14,760	18' 0-1/2"	19' 9"	17' 11-5/8"	7' 1-3/8"
PT2-1012A-1*1	10,120	5,320	4,040	11' 11-3/4"	9' 10"	13' 2-5/8"	4' 4-3/8"
PT2-1012A-2*1	10,520	5,720	4,140	11' 11-3/4"	9' 10"	14' 2-5/8"	4' 4-3/8"
PT2-1012A-3*1	10,920	6,120	4,800	11' 11-3/4"	9' 10"	15' 2-5/8"	4' 4-3/8"
PT2-1012A-1*2	20,450	8,350	8,080	24' 0-1/2"	9' 10"	14' 2-5/8"	5' 4-3/8"
PT2-1012A-2*2	21,250	8,970	8,280	24' 0-1/2"	9' 10"	15' 2-5/8"	5' 4-3/8"
PT2-1012A-3*2	22,050	9,580	9,600	24' 0-1/2"	9' 10"	16' 2-5/8"	5' 4-3/8"
PT2-1012A-1*3	30,990	16,590	12,120	36' 1-3/4"	9' 10"	15' 2-5/8"	6' 4-3/8"
PT2-1012A-2*3	32,190	17,800	12,420	36' 1-3/4"	9' 10"	16' 2-5/8"	6' 4-3/8"
PT2-1012A-3*3	33,890	19,500	14,390	36' 1-3/4"	9' 10"	17' 2-5/8"	6' 4-3/8"
PT2-1012A-1*4	41,570	22,380	16,160	24' 0-1/2"	19' 9"	16' 2-5/8"	7' 4-3/8"
PT2-1012A-2*4	43,350	24,160	27,380	24' 0-1/2"	19' 9"	17' 2-5/8"	7' 4-3/8"
PT2-1012A-3*4	45,610	26,420	19,190	24' 0-1/2"	19' 9"	18' 2-5/8"	7' 4-3/8"
PT2-1212A-1*1	11,200	5,960	4,160	11' 11-3/4"	11' 10"	13' 10-3/8"	4' 10-3/8"
PT2-1212A-2*1	11,750	6,510	4,710	11' 11-3/4"	11' 10"	14' 10-3/8"	4' 10-3/8"
PT2-1212A-3*1	12,310	7,060	5,270	11' 11-3/4"	11' 10"	15' 10-3/8"	4' 10-3/8"
PT2-1212A-1*2	22,550	12,060	8,320	24' 0-1/2"	11' 10"	14' 10-3/8"	5' 10-3/8"
PT2-1212A-2*2	23,650	13,170	9,420	24' 0-1/2"	11' 10"	15' 10-3/8"	5' 10-3/8"
PT2-1212A-3*2	24,760	14,280	10,530	24' 0-1/2"	11' 10"	16' 10-3/8"	5' 10-3/8"
PT2-1212A-1*3	34,040	18,320	12,480	36' 1-3/4"	11' 10"	15' 10-3/8"	6' 10-3/8"
PT2-1212A-2*3	35,700	19,980	14,140	36' 1-3/4"	11' 10"	16' 10-3/8"	6' 10-3/8"
PT2-1212A-3*3	37,360	21,640	15,800	36' 1-3/4"	11' 10"	17' 10-3/8"	6' 10-3/8"
PT2-1212A-1*4	45,540	24,570	16,640	24' 0-1/2"	23' 9"	16' 10-3/8"	7' 10-3/8"
PT2-1212A-2*4	47,750	26,790	18,850	24' 0-1/2"	23' 9"	17' 10-3/8"	7' 10-3/8"
PT2-1212A-3*4	49,970	29,000	21,060	24' 0-1/2"	23' 9"	18' 10-3/8"	7' 10-3/8"

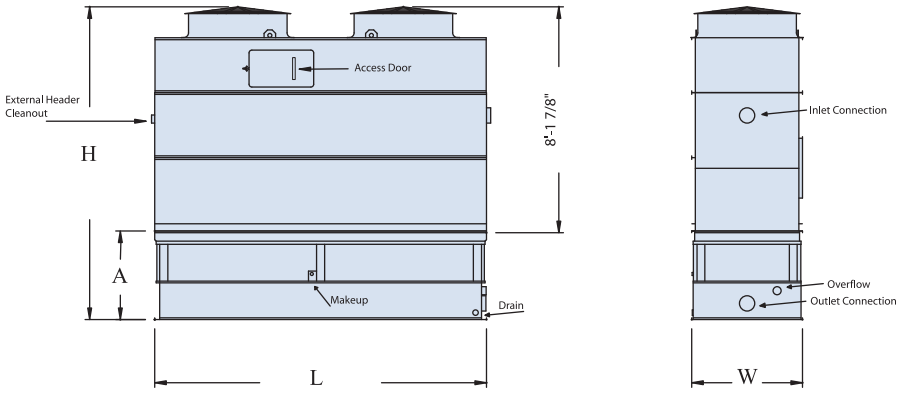
Notes:

1: *Data corresponds to all available motors for this model

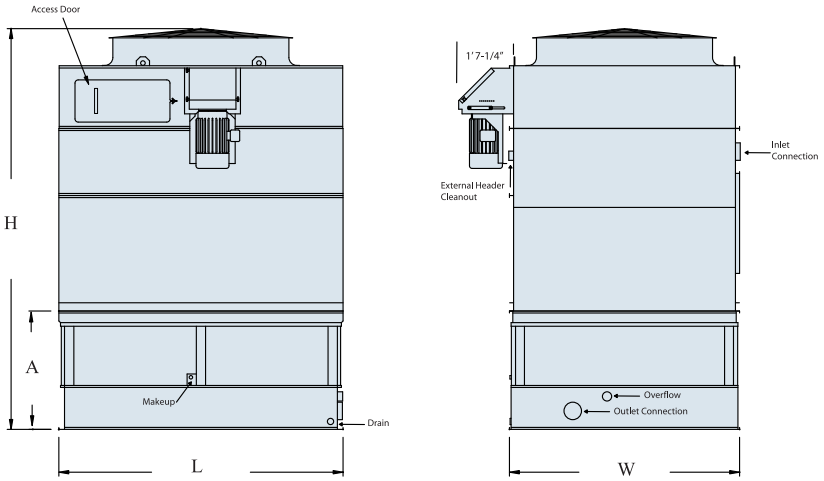
2: Operating weight is based on the water level in the cold water basin at overflow height. If a lower operating weight is needed to meet design requirements, your local BAC Representative can provide additional assistance.

Engineering Data

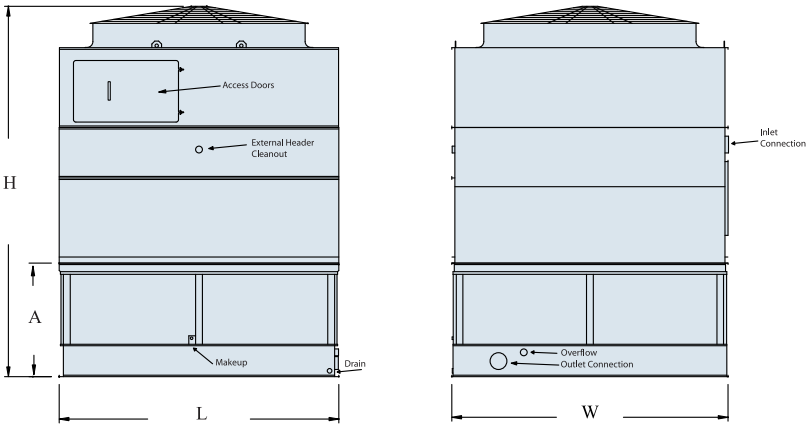
Do not use for construction. Refer to factory certified dimensions. This supplement includes data current at the time of publication, which should be reconfirmed at the time of purchase. Up-to-date engineering data, free product selection software, and more can be found at **www.BaltimoreAircoil.com**.



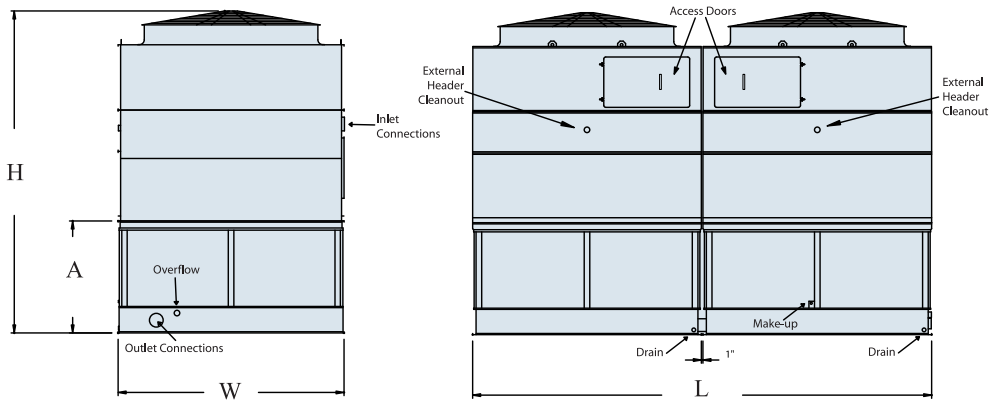
Models PT2-0412



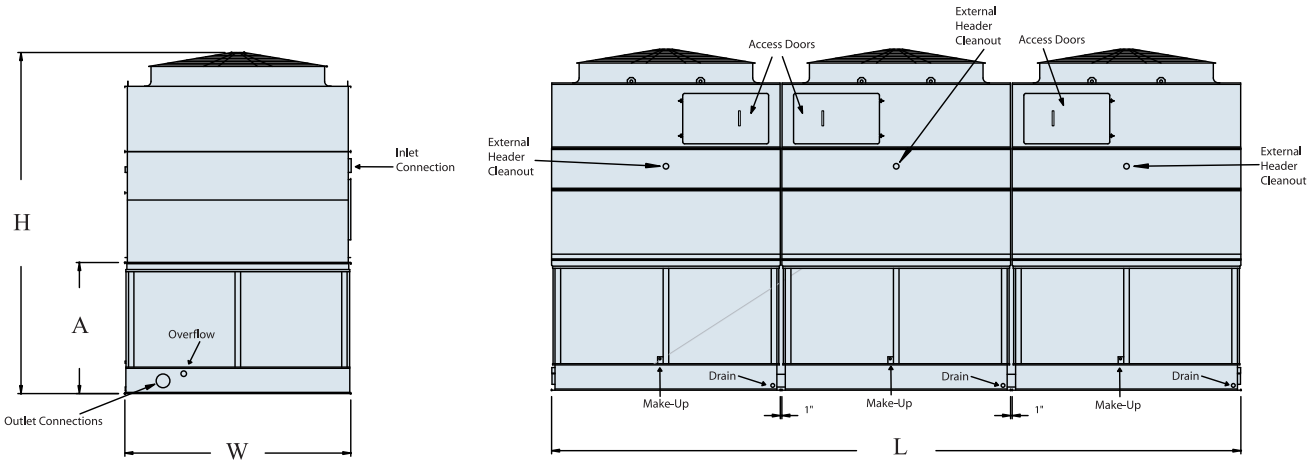
Models PT2-0709, PT2-0809, PT2-0812



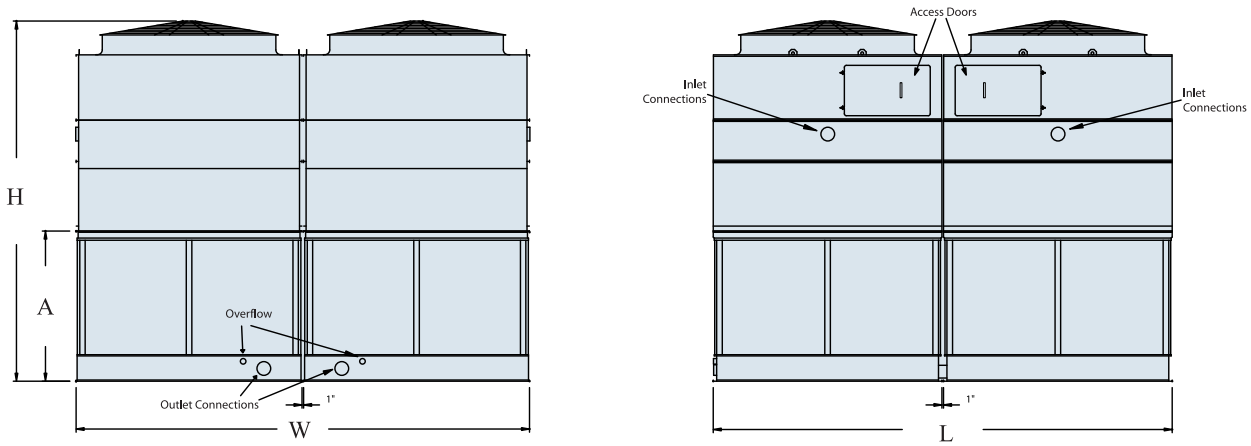
Models PT2-1009, PT2-1012, PT2-1212



Typical 2-Cell Configuration for models PT2-1009, PT2-1012, PT21212



Typical 3-Cell Configuration for models PT2-1009, PT2-1012, PT2-1212

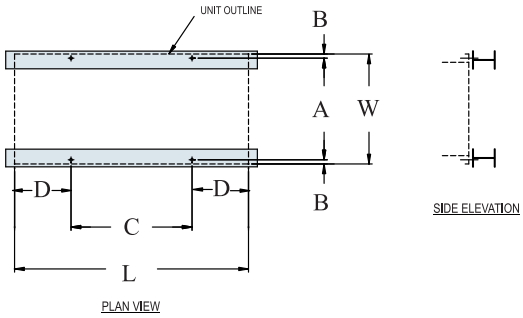


Typical Quad Configuration for models PT2-1009, PT2-1012, PT2-1212

Structural Support

The recommended support arrangement for the PT2 Cooling Tower consists of parallel I-beams positioned as shown on the drawing. Besides providing adequate support, the steel also serves to raise the unit above any solid foundation to assure access to the bottom of the tower. The PT2 Cooling Tower may also be supported on columns at the anchor bolt locations shown in Plan A.

A minimum bearing surface of 12 in^2 (77,742mm^2) must be provided under each of the concentrated load points (See Note 7). To support a PT2 Cooling Tower on columns with an alternate steel support arrangement, or the optional structurally upgraded unit, consult your local BAC Representative.



Plan A: Single-Cell Standard[1] Units Only

Model Number	L	W	A	B	C	D
PT2-0412	11’ 11-3/4”	4’ 0”	3’ 9-3/4”	1-1/8”	10’ 5-1/4”	9-1/4”
PT2-0709	8’ 11-3/4”	7’ 3-1/4”	7’ 1”	1-1/8”	7’ 5-1/4”	9-1/4”
PT2-0809	8’ 11-3/4”	8’ 5-3/4”	8’ 3-1/2”	1-1/8”	7’ 5-1/4”	9-1/4”
PT2-0812	11’ 11-3/4”	8’ 5-3/4”	8’ 3-1/2”	1-1/8”	10’ 5-1/4”	9-1/4”
PT2-1009	8’ 11-3/4”	9’ 10”	9’ 7-3/4”	1-1/8”	7’ 5-1/4”	9-1/4”
PT2-1012	11’ 11-3/4”	9’ 10”	9’ 7-3/4”	1-1/8”	10’ 5-1/4”	9-1/4”
PT2-1212	11’ 11-3/4”	11’ 10”	11’ 7-3/4”	1-1/8”	10’ 5-1/4”	9-1/4”

Plan B: Single-Cell Standard[2] Units Only

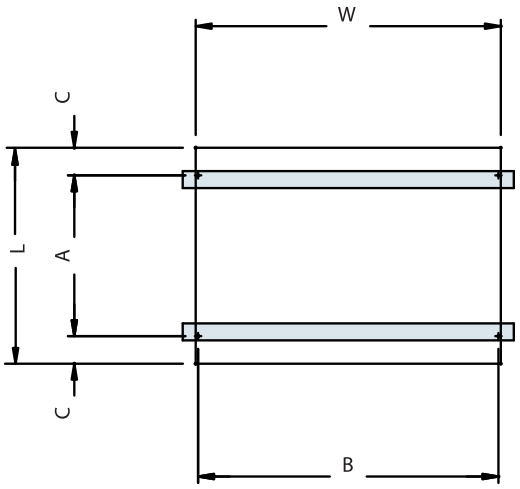
Model Number	L	W	A	B	C	D
PT2-0412	11’ 11-3/4”	4’ 0”	3’ 4”	4”	11’ 9-1/2”	1-1/8”
PT2-0709	8’ 11-3/4”	7’ 3-1/4”	6’ 7-1/4”	4”	8’ 9-1/2”	1-1/8”
PT2-0809	8’ 11-3/4”	8’ 5-3/4”	7’ 9-3/4”	4”	8’ 9-1/2”	1-1/8”
PT2-0812	11’ 11-3/4”	8’ 5-3/4”	7’ 9-3/4”	4”	11’ 9-1/2”	1-1/8”
PT2-1009	8’ 11-3/4”	9’ 10”	9’ 2”	4”	8’ 9-1/2”	1-1/8”
PT2-1012	11’ 11-3/4”	9’ 10”	9’ 2”	4”	11’ 9-1/2”	1-1/8”
PT2-1212	11’ 11-3/4”	11’ 10”	11’ 2”	4”	11’ 9-1/2”	1-1/8”

Notes:

1. Contact your local BAC Representative for multi-cell or structurally upgraded unit steel support
2. Contact your local BAC Representative for structurally upgraded unit steel arrangements
3. Support beams and anchor bolts to be selected and installed by others.
4. All support steel must be level at the top.
5. 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”.
6. All one, two and three cell units can be furnished with optional vibration isolation rail packages, when required, to be installed between the tower and supporting steel. The BAC standard vibration isolation rail package is designed for support Plan A. When determining the length of the supporting steel, allow for the length of the vibration rails, as they are sometimes longer than the cooling tower dimensions shown.
7. If point vibration isolation is used with multi-cell towers, the isolators must be located under the support steel, not between the support steel and the cooling towers.

Structural Support Alternatives

For replacement installations, the PT2 Cooling Tower has been designed to match the supporting steel of many existing counterflow and crossflow cooling towers without modifications. Shown below are the most common steel support arrangements which can be accommodated by the PT2. IBC wind and seismic load ratings are not available on alternate steel support arrangements. If individual point support is required, or if then steel arrangement is not shown as below, consult your local BAC Representative for assistance.



Plan View

Model Number	Unit Replaced	A	B	C	L	W
PT2-0412	VT0 - 102 thru 116	3’ 9-3/8”	11’ 5-1/2”	1-5/16”	4’ 0”	11’ 11-3/4”
	VTL - 103 thru 137	3’ 11”	13’ 11-1/2”	1/2”	4’ 0”	11’ 11-3/4”
PT2-0709	FXT - 115 thru 142	7’ 1-7/8”	8’ 0”	11/16”	7’ 3-1/4”	8’ 11-3/4”
PT2-0809	VT1 - N209 thru N270	7’ 7-5/8”	10’ 5-1/4”	5-1/16”	8’ 5-3/4”	8’ 11-3/4”
PT2-0812	VT1 - N209 thru N270	7’ 7-5/8”	10’ 5-1/4”	5-1/16”	8’ 5-3/4”	11’ 11-3/4”
	Series 15146 thru 15282	6’ 9-3/4”	11’ 7-3/4”	10”	8’ 5-3/4”	11’ 11-3/4”
	VTL/VST	8’ 3-1/2”	8’ 9-1/8”	1-1/8”	8’ 5-3/4”	11’ 11-3/4”
	CFT	8’ 0”	8’ 3-1/2”	2-7/8”	8’ 5-3/4”	11’ 11-3/4”
	VXT - N215 thru N265	7’ 11-1/2”	11’ 7-3/4”	3-1/8”	8’ 5-3/4”	11’ 11-3/4”
	Series 3000	8’ 3-1/4”	8’ 3-1/2”	1-1/8”	8’ 5-3/4”	11’ 11-3/4”
PT2-1012	VXT - 315 thru 400	9’ 10-1/8”	11’ 7-3/4”	(0-1/16”)	9’ 10”	11’ 11-3/4”
PT2-1212	Series 1500	11’ 7-3/4”	10’ 5-1/4”	1-1/8”	11’ 10”	11’ 11-3/4”
	Series 3000	9’ 6”	11’ 11”	1’ 2”	11’ 10”	11’ 11-3/4”
	VXT, VLT, VST	8’ 11-1/4”	11’ 11”	1’ 5-3/8”	11’ 10”	11’ 11-3/4”
	VXT, VXMT	9’ 7-1/2”	11’ 11”	1’ 1-1/4”	11’ 10”	11’ 11-3/4”
	CFT	8’ 0”	11’ 11”	1’ 11”	11’ 10”	11’ 11-3/4”

See Notes on previous page.

Mechanical Specifications

1.0 Open Cooling Tower

1.1 General: Furnish and install ____factory assembled, induced draft counterflow, axial fan, open cooling tower(s) with vertical air discharge, conforming in all aspects to the specifications and schedules as shown on the plans. Overall dimensions shall not exceed approximately ____ft (m) long x ____ft (m) wide x ____ft (m) high. The total connected fan horsepower shall not exceed ____HP (kW), _____ RPM and be suitable for _____ volt, ____ hertz, and ___ phase electrical service. Furnish motors. The cooling tower(s) shall be Baltimore Aircoil Company Model(s) _____.

1.2 Thermal Capacity: The open 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. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Manufacturers' performance guarantees or performance bonds without CTI Certification or independent field thermal performance test shall not be accepted. The cooling tower(s) shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.

1.3 Quality Assurance: The cooling tower manufacturer shall have a Management System certified by an accredited registrar as complying with the requirements of ISO9001:2000 to ensure consistent quality of products and services. Manufacturers that are not ISO9001 certified shall not be acceptable.

1.4 Warranty: Unless otherwise noted, the manufacturer's standard equipment warranty shall be for a period of not less than one year from date of startup or eighteen months from date of shipment, whichever occurs first. In addition, the manufacturer shall warrant the rotating mechanical equipment, including fans, fan motors, fan shafts, bearings, sheaves and associated supports for not less than five (5) years from date of shipment.

2.0 Construction Details

Casing

2.1 Corrosion Resistant Standard Construction: All steel panels and structural members shall be constructed of heavy-gauge G-235 (Z700 metric) hot-dip galvanized steel with all edges given a protective coating of zinc-rich compound.

(Alternate 2.1) Thermosetting hybrid polymer: All steel panels and structural members shall be protected with the thermosetting hybrid polymer for superior corrosion protection. G-235 (Z700 metric) hot-dip galvanized steel shall be prepared in a four-step (clean, pre-treat, rinse, dry) process with an electrostatically sprayed, thermosetting hybrid polymer fuse-bonded to the substrate during a thermally activated curing stage and monitored by a 23-step quality assurance program. Finish shall withstand 6000 hours of 5% salt spray test per ASTM B117 without blistering, chipping or loss of adhesion. Series 300 stainless steel shall be considered an acceptable alternative. Uncoated G-235 galvanized steel shall not be considered an acceptable alternative.

(Alternate 2.1) Series 300 Construction: All steel panels and structural members shall be constructed of Series 300 stainless steel and assembled with Series 300 stainless steel nut and bolt fasteners.

Cold Water Basin

2.2 Cold Water Basin: The cold water basin shall be constructed of heavy-gauge G-235 (Z700 metric) hot-dip galvanized steel panels and structural members. Standard basin accessories shall include: a brass 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.

(Alternate 2.2) Cold Water Basin: The cold water basin shall be constructed of heavy-gauge series 300 stainless steel panels and structural members up to the heat transfer section/basin joint. All factory seams in the cold water basin shall be welded to ensure watertight assembly and welded seams shall be warranted against leaks for five (5) years. Standard basin accessories shall include: a brass 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. A bolted type series 300 stainless steel basin shall not be an acceptable alternative.

(Alternate 2.2) Cold Water Basin protected with TriArmor™ Corrosion Protection System: 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 brass 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 Series 300 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 Series 300 stainless steel basin shall not be an acceptable alternative.

EVERTOUGH™ Construction

(Alternate 2.1 AND 2.2) Thermosetting hybrid polymer: All steel panels and structural members shall be protected with the thermosetting hybrid polymer for superior corrosion protection. G-235 (Z700 metric) hot-dip galvanized steel shall be prepared in a four-step (clean, pre-treat, rinse, dry) process with an electrostatically sprayed, thermosetting hybrid polymer fuse-bonded to the substrate during a thermally activated curing stage and monitored by a 23-step quality assurance program. Finish shall withstand 6000 hours of 5% salt spray test per ASTM B117 without blistering, chipping or loss of adhesion. Series 300 stainless steel shall be considered an

EVERTOUGH™ Construction - continued
acceptable alternative. Uncoated G-235 galvanized steel shall not be considered an acceptable alternative.

Cold Water Basin protected with TriArmor™ Corrosion Protection System: 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 brass 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 Series 300 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 Series 300 stainless steel basin shall not be an acceptable alternative. The entire cooling tower, including fan motor, drive system, bearings, and structure, shall be backed by a comprehensive Louver-to-Louver℠ Five-Year warranty.

2.3 Air Inlet Louver Screens: All louvers shall be constructed from PVC. Louver sections shall be individually removable in 12” wide (maximum) sections, allowing for quick and easy access to any part of the cold water basin, without the need for tools. Louvers shall prevent debris from entering the cold water basin as well as preventing splashout. Louvers which are greater than 12” wide or require tools for removal shall not be an acceptable alternate.

2.4 Wind and Seismic Rating: The cooling tower shall be constructed of heavy-gauge steel utilizing double-brake flanges for maximum strength and rigidity and reliable sealing of watertight joints. The structure shall be designed, tested and certified in accordance with IBC 2006 regulations to meet a seismic load S_{DS}= ___ g and a wind load of ___ psf. Units not provided with a certificate of IBC 2006 compliance shall not be an acceptable alternative.

2.5 Rigging: The cooling tower shall be designed and constructed to withstand rigging of the casing and cold water basin as a single piece.

2.6 Casing Field Joint: The heat transfer section shall be joined to the lower section without the use of a gasket or sealer. The field joint shall be self aligning and require a minimum number of fasteners.

2.7 Heat Transfer Section: The heat transfer section(s) shall consist of fill, a non-corrosive spray water distribution system and drift eliminators arranged for optimal thermal performance with minimal drift.

2.8 Fill: The fill shall be formed from self-extinguishing polyvinyl chloride (PVC) having a flame spread rating of 5 per ASTM E84 and shall be impervious to rot, decay, and fungus or biological attack. The fill shall be suitable for use as a working platform, and shall be provided and performance tested by the cooling tower manufacturer to assure single source responsibility and control of the final product. The fill shall be able to withstand a water temperature of 140°F (60.0º C).

(Alternate 2.8) Fill: The fill shall be formed from self-extinguishing high temperature polyvinyl chloride (HPVC) having a flame spread rating of 5 per ASTM E84 and shall be impervious to rot, decay, and fungus or biological attack. The fill shall be provided and performance tested by the cooling tower manufacturer to assure single source responsibility and control of the final product. The fill shall be able to withstand a water temperature of 150°F (65.6º C).

2.9 Water Distribution System: Water shall be distributed evenly over the fill by a water distribution system consisting of a header and spray branches of non-corrosive Schedule 40 PVC pipe with large orifice, non-clog plastic distribution nozzles. The headers shall have a removable cap facilitating quick header cleanout without removal. The spray nozzles shall be held in place by snap-in rubber grommets and the branches should be removable without tools or removal of branch supports, allowing quick removal of individual nozzles or complete branches for cleaning or flushing. Branches that require tools for removal or removal of branch supports shall not be an acceptable alternative.

2.10 Drift Eliminators: Eliminators shall be constructed of specially formulated PVC and be removable in easily handled sections. They shall have a minimum of three changes in air direction.

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. The fan(s) and fan drive system, including the fan motor, shall be factory test-mounted and aligned to ensure reliable operation and ease of maintenance.

(Alternate 3.1) Fan(s): Fan(s) shall be low sound, axial flow with aluminum alloy blades selected to provide optimum cooling tower thermal performance with reduced 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. The fan(s) and fan drive system, including the fan motor, shall be factory test-mounted and aligned to ensure reliable operation and ease of maintenance.

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 L_{10} 80,000 hour Life. Extended bearing lube lines shall be terminated at the access door for ease of maintenance, and shall require opening the access door for visual inspection and to verify proper lubrication.

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.

3.0 Mechanical Equipment-continued

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 Motors on model PT2-0412: Fan motors shall be totally enclosed air over (TEAO), direct drive, reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. The motors shall be furnished with special moisture protection on winding, shafts, and bearings and appropriately labeled for “cooling tower duty.” (Alternate 3.5) Fan Motor on models PT2-0709, PT2-0809 and PT2-0812: Fan motor(s) shall be totally enclosed fan cooled (TEFC), reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. The motor(s) shall be furnished with special moisture protection on winding, shafts, and bearings and appropriately labeled for “cooling tower duty.” Motor(s) shall be mounted on an adjustable, removable base, exterior to the unit. A hinged protective cover shall protect the motor from the elements, and the motor shall be accessible without the use of tools. A mechanical equipment removal davit mounting channel shall be included and integral to the motor base design. The motor base shall be removable without upsetting the drive alignment. Motor adjustments shall be made from the exterior of the unit with the included tool; internally mounted motors or motor bases that are not removable shall not be an acceptable alternative.

(Alternate 3.5) Fan Motor on models PT2-1009, PT2-1012 and PT2-1212: Fan motor(s) shall be totally enclosed air over (TEAO), reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. The motor(s) shall be furnished with special moisture protection on winding, shafts, and bearings and appropriately labeled for “cooling tower duty.” Motor(s) shall be mounted on an interior, adjustable base which allows the motor to slide to the exterior of the unit for servicing. Motor adjustments shall be made from the exterior of the unit; internally adjustable motor bases shall not be an acceptable alternative.

(Alternate 3.5) VFD Type Fan Motor: Fan motor(s) for inverter duty shall be either totally enclosed air over (TEAO) or totally enclosed fan cooled (TEFC), reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. The motor(s) shall be furnished with special moisture protection on winding, shafts, and bearings and appropriately labeled for “cooling tower duty.” Fan motor(s) shall be inverter duty type designed per NEMA Standard MG1, Section IV Part 31, Section IV, and 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 Access

4.1 Tower Access: Permanently mounted, inward sliding access doors are provided for safe and easy access to the spray branch and fan drive system for routine maintenance. Removable access doors are not acceptable.

5.0 Sound

5.1 Sound Level: To maintain the quality of the local environment, the maximum sound pressure levels (dB) measured 50 ft from the cooling tower operating at full fan speed shall not exceed the sound levels detailed below.

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

6.0 Accessories

6.1 Vibration Isolation Rails: Spring-type vibration isolation rails, constructed of steel channels and base plates, painted with a rust-resistant primer shall be provided to minimize vibration transmission from the tower to the building structure. The isolators shall be designed for a static deflection of 1” (25.4 mm) and a maximum wind speed of 50 mph (80 km/h).

(Alternate) 6.1 Vibration Isolation Rails: Spring-type vibration isolation rails, constructed of steel channels and base plates, coated with a 0.003” (.076 mm) layer of zinc after fabrication shall be provided to minimize vibration transmission from the tower to the building structure. The isolators shall be designed for a static deflection of 1” (25.4 mm) and a maximum wind speed of 50 mph (80 km/h).

6.2 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 ambient. The heater(s) shall be _____V/____phase/___Hz electric and shall be provided with low water cutout and thermostat.

6.3 Basin Water Level Control: The cooling tower manufacturer shall provide an electric water level control (EWLC) system. The system shall consist of water level sensing and control units in quantities and locations as indicated on the drawings. Each water level sensing and control unit shall consist of the following: NEMA 4 enclosure with gasketed access cover; solid state controls including all necessary relays and contacts to achieve the specified sequence of operation; stainless steel water level sensing electrodes with brass holder. Provide PVC union directly below the control enclosure to facilitate the removal and access of electrodes and control enclosure.

The number and position of water level sensing electrodes shall be provided to sense the following: high water level, low water level, high water alarm level, low water alarm, and heater safety cutout.

6.4 Vibration Cutout Switch: Provide mechanical local reset vibration switch. 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 2.0g.

(Alternate) 6.4 Vibration Cutout Switch: Provide electronic remote reset vibration switch with contact for BAS monitoring. Wiring shall be by the installing contractor. The electronic vibration cut out switch shall be set to trip at a point so as not to cause damage to the cooling tower. The trip point will be 0.45 in/sec (0.0114 m/sec).

6.0 Accessories-continued

6.5 Basin Sweeper Piping: The cold water basin of the cooling tower shall be equipped with PVC basin sweeper piping for a filter orseparator (supplied by others).

6.6 Discharge Sound Attenuation: The unit shall be equipped with a hood lined with sound absorbing fiberglass acoustical baffles to reduce sound levels from the top of the unit.

6.7 Water Silencers: The unit shall be equipped with PVC water silencers in the cold water basin to reduce falling water sound emissions.6.8 Fill Inspection Panel: The unit shall be equipped with a removable access panel in the upper casing to easily inspect and remove the fill bundles. Contractor shall be responsible for installing an access panel if it is not provided from the manufacturer.

7.0 Equipment Controls

7.1 Variable Frequency Drive(s): A variable frequency drive (VFD) shall be provided for each fan motor. The supplier of the VFD shall be the manufacturer of the evaporative cooling equipment. The VFD shall have a 3-contactor bypass, 3% input line reactor, a removable keypad, an RS232 terminal for PC connection, and a circuit breaker disconnect. Fuse protection will not be accepted. Control voltage shall be 24V to minimize the size of the enclosure which should not exceed _____ ft x _____ ft x ____ ft and the weight should not exceed ____ lbs. VFD shall be provided in a NEMA (1)(3R)(12) enclosure. The VFD shall be compatible with a (ModBus) (LonWorks) (Johnson N2) Building Automation System.

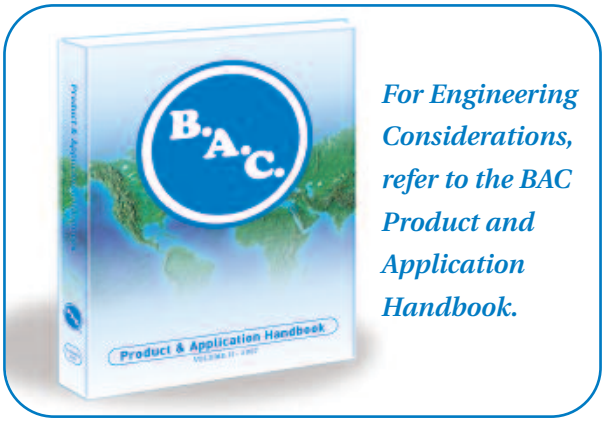
OR

7.1 Enclosed Controls: An enclosed control panel shall be provided for each cell of the evaporative cooling equipment. The panel shall include full voltage, non-reversing (FVNR) fan motor and pump motor (if applicable) starters in a common enclosure. The panel shall be provided with a main circuit breaker disconnect and a separate circuit breaker for each motor or speed. Fuse protection will not be accepted. Panels containing basin heaters shall have an Earth Leakage Breaker containing ground fault protection. Starters above 25 A shall be NEMA rated. IEC starters will be accepted for motors below 25 A. Panel shall include a 120V/60Hz control power transformer, Hand-Off-Auto switches for each starter or contactor, and pilot lights for each component. Enclosed controls shall be provided in a NEMA (1)(3R)(4)(4X)(12) enclosure.

Optional enclosed control features: (A temperature sensor shall be provided with the enclosed controls.)(A temperature controller shall be provided with the enclosed controls.) (A basin heater contactor with circuit breaker shall be provided.)(A vibration cutout switch input shall be provided.)

7.2 Safety Switch(es): A heavy-duty, non-fusible safety disconnect switch shall be provided by the manufacturer of the evaporative cooling equipment. Switch shall be single-throw, 3-pole design, rated up to 600 VAC. Switch shall have triple padlocking capability, a visible double break rotary blade mechanism, a clearly visible On/Off handle, an interlocking mechanism to prevent door opening with handle in On position, and a clear line shield. Safety switch shall be provided in a NEMA (1)(3R)(12) enclosure.

7.3 Terminal Box (Not available on externally mounted motor models PT2-0709, 0809 and 0812): A heavy-duty externally mounted terminal box shall be provided by the manufacturer of the evaporative cooling equipment. All wiring for the fan motor(s) and vibration cutout switch(s) shall be pre-wired from the factory and terminated on the outside face of the BAC unit in a clearly marked terminal box. The terminal boxes shall be UL 1773 listed and CSA certified. The terminal boxes shall be provided with a standard five year warranty. The Terminal Box shall include a factory-mounted enclosure, factory wiring to terminal blocks for the fan motors and vibration cutout switches, and grounding lugs. Field mounted terminal boxes shall not be an acceptable alternative.



For Engineering Considerations, refer to the BAC Product and Application Handbook.

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