

Emergency Central Plant Upgrades ADDENDUM #2 1/4/2018

- 1. The following are the limits of work for the Cooling Tower and the Chiller:
 - a. Chiller:
 - i. See the attached quote from Trane for more information.
 - Trane to provide the chiller and the VFD for the chiller. No other pumps, valves, actuators, etc. or major pieces of equipment will be provided by Trane
 - iii. Handling & Charging Chiller with Refrigerant to be provided by Trane.
 - iv. Startup (mechanical) by Trane.
 - v. Removal and Reinstallation of Compressor by Trane
 - vi. BACnet interface by Trane
 - vii. Contractor to provide controls commissioning
 - viii. Contractor to provide hydronic & electrical install and interconnection.
 - ix. Contractor to install remote mounted drive.
 - x. Contractor to provide commissioning.
 - xi. All other scope is with the Contractor.
 - b. Cooling Tower:
 - i. See the attached quote from Air Treatment Corp for more information.
 - ii. Air Treatment Corp to deliver the cooling tower to the jobsite. Contractor to unload from a flat bed and install.
 - iii. Air Treatment Corp to perform a regular start-up procedure.
 - iv. All other scope is with the Contractor.
- 2. The experience requirement listed in the Project Specifications and Pre-qualification Information is being changed to the following requirement:
 - a. Demonstrate that the proposed Superintendent and Project Manager employed by the General Contractor or the listed Mechanical Subcontractor for this project completed at least 2 similar OSHPD projects that involved an installation of a chiller and a Cooling Tower in the last 5 years.
- 3. RFIs deadline has been extended until end of day Monday 1/8/18.





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Prepared For: All Bidders

Date: January 03, 2018

Job Name: Tri City Medical Center Chiller Upgrade

Proposal Number: W3-81832-1

Trane U.S. Inc. dba Trane is pleased to provide the following scope for your review.

Tag Data - Centrifugal Water Chillers (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	CH-3 UM-VFD	1	Centrifugal Chiller (CTV)	CVHF0760

Product Data - Centrifugal Water Chillers

Item: A1 Qty: 1 Tag(s): CH-3 UM-VFD

Standard ship cycle CVHE, CVHF & CVHG North America region Centrifugal liquid chiller with 2 stage compressor Compressor size: 760 nominal tons Adaptiview controls Without enhanced electrical package Incoming line hertz: 60 Compressor motor hertz: 60 Incoming line voltage: 460 volt Compressor motor voltage: 460 volt 3 phase Startup Included - Trane Service must start equipment for warranty to be honored Compressor motor power: 513 kW Motor frame size: 440E Compressor impeller cutback: 281 Standard cooling Evaporator shell size: 080 long Evaporator bundle size: 740 nominal tons Evaporator tubes: 1.00 inch (25.4 mm) dia. micro intl enhanced cu low press tbg Evaporator tube wall: .025 inch (0.6 mm) thick Evaporator fluid type: Water Without variable evap flow test targets Evaporator waterbox type: Non-marine Evaporator waterbox construction: Standard Evaporator water box passes: Two pass Evaporator waterbox pressure: 150 psig (1034 kPa) Evaporator waterbox connection: Victaulic Evaporator waterbox arrangement: in LH end - out LH end Thermal dispersion flow switch (IFM) - Field Installed (Fld) Condenser shell size: 142 long Condenser bundle size: 1080 nominal tons Condenser tube: 1.00 inch (25.4 mm) internally enhanced copper Condenser tube wall: .025 inch (0.6 mm) thick Condenser shell construction: Standard Condenser fluid type: Water Without condenser variable flow Condenser waterbox type: non-marine Condenser waterbox construction: Standard Condenser water box passes: Two pass Condenser waterbox pressure: 150 psig (1034 kPa)

Condenser waterbox connection: Victaulic Condenser waterbox arrangement: in LH end - out LH end Standard tube sheet construction Thermal dispersion flow switch (IFM) - Field Installed (Fld) Orifice size: 1185 nominal tons Agency listing: U.L. listed unit (United States requirement) Factory performance test: Standard air run and vibration test Factory tolerance test: Standard air run and vibration test Don't apply special ton tolerance Don't apply special kW/ton tolerance No unit insulation package Compressor doweling Green Seal certified Certified Complies with ASHRAE 90.1 - 1999 Complies with ASHRAE 90.1 - 2007 Complies with ASHRAE 90.1 - 2007 Addendum M Complies with ASHRAE 90.1 - 2010 ASHRAE 90.1-2013 Complies with ASHRAE 90.1-2013 **Operating Status Generic BAS** Without enhanced protection **R123 Refrigerant** Trane Supplied Refrigerant Refrigerant Cooled AFD Unit mounted refrigerant cooled adaptive frequency drive Adaptive frequency drive maximum RLA: 608 amps Starter power connection: Circuit breaker Standard enclosure - Nema 1 No parts warranty unit No parts less motor & cmpr warranty No motor & compressor warranty 1st Year Labor Warranty Whole Unit with Trane Supplied Starter

For our bidders – Trane is covering:

- Handling & Charging Chiller w. Refrigerant
- Startup (mechanical)
- Removal & Reinstallation of Compressor
- o Contractor to handle moving chiller and setting in place
- o Optional ADD to Contractor: Trane to also handle moving chiller and setting in place, in addition to rigging
- BACnet interface

Contractor will need to provide

- Controls commissioning
- Hydronic & electrical install and interconnection
- Installation of remote mounted drive
- Commissioning

Sincerely,

Jeff Trattner - Trane U.S. Inc. dba Trane

3565 Corporate Court San Diego, CA 92123-6396 Phone: (858) 576-2500 Fax: (858) 576-2554









TOP VIEW







FRONT VIEW

GRAPHICS ON SUBMITTAL ARE SIMPLIFIED TO SHOW MAJOR ENVELOPE COMPONENTS. UNIT STRUCTURE AND SUBCOMPONENTS MAY BE REMOVED FOR CLARITY.

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE 4/-1/2". COOLING COND CONIS ARE STREIGHT OUT THE RND OF THE WATER BOX. WATER BOX DRAIN AND VENT LOCATIONS ARE SHOWN ON THE WATER BOX END PLATES. WATER CONNECTION GROOVES ARE NOT COMPATIBLE WITH AGS FITTINGS



FLD = Furnished by Trane U.S. Inc. dba Trane / Installed by Others







Weight, Clearance & Rigging Diagram - Centrifugal Water Chillers Item: A1 Qty: 1 Tag(s): CH-3 UM-VFD

WEIGHTS AND CENTER OF GRAVITY



SPRING ISOLATOR SELECTION								
LOCATION	ISOLATOR LOAD*	VENDOR P/N	TRANE P/N	ISOLATOR COLOR				
LEFT FRONT	7992.0 lb							
LEFT REAR	6301.0 lb							
RIGHT FRONT	9969.0 lb							
RIGHT REAR	8084.0 lb							
LEFT MIDDLE	N/A							
RIGHT MIDDLE	N/A							

	COMPONENT	WEIGHT*
	COMPRESSOR WEIGHT	6045.0 lb
	MOTOR WEIGHT	2672.0 lb
	STARTER WEIGHT	1680.0 lb
	SUCTION ELBOW WEIGHT	722.0 lb
	ECONOMIZER WEIGHT	878.0 lb
	EVAPORATOR WEIGHT	6396.0 lb
	EVAPORATOR WATERBOXES WEIGHT	1166.0 lb
	CONDENSER WEIGHT	6430.0 lb
	CONDENSER WATERBOXES WEIGHT	709.0 lb
	HEAT RECOVERY CONDENSER WEIGHT	N/A
н	EAT RECOVERY CONDENSER WATERBOXES WEIGHT	N/A
	AUXILIARY CONDENSER WEIGHT	N/A
	AUXILIARY CONDENSER WATERBOXES WEIGHT	N/A
	MISCELLANEOUS WEIGHT	1108.0 lb

UNIT CENTER OF GRAVITY	
CG Z (DIMENSION FROM RIGHT TO LEFT)	78.000 in
CG X (DIMENSION FROM FRONT TO REAR)	37.000 in
CG Y (HEIGHT DIMENSION FROM FLOOR)	56.000 in
RIGHT FRONT ISOLATOR MOUNTING HOLE – BOTTOM OF THIS HOLE IS 0,0,0 POINT FOR CENTER OF GRAVITY DIMENSIONS	

WEIGHTS							
SHIPPING	OPERATING						
27807.0 lb	32346.0 lb						

NAMEPLATE PRODUCT DESCRIPTION:

MODL CVHF	VOLT 460	PTON 800.00 tons	NTON 760
EVTM IMC1	CDTM IECU	CPKW 513	CPIM 281
CDBS 1080		EVSZ 080L	EVBS 740
		ORSZ 1185	CDSZ 142L

*ALL PUBLISHED WEIGHTS ACCURATE TO +/- 10 %

Weight, Clearance & Rigging Diagram - Centrifugal Water Chillers Item: A1 Qty: 1 Tag(s): CH-3 UM-VFD

A WARNING

- 1. HEAVY OBJECTS!
 - DO NOT USE CABLES (CHAINS OR SLINGS) EXCEPT AS SHOWN. EACH OF THE CABLES (CHAINS OR SLINGS) USED TO LIFT THE UNIT MUST BE CAPABLE OF SUPPORTING THE ENTIRE WEIGHT OF THE UNIT. LIFTING CABLES (CHAINS OR SLINGS) MAY NOT BE OF THE SAME LENGTH. ADJUST AS NECESSARY FOR EVEN UNIT LIFT. OTHER LIFTING ARRANGEMENTS MAY CAUSE EQUIPMENT OR PROPERTY-ONLY DAMAGE. FAILURE TO PROPERLY LIFT UNIT MAY RESULT IN DEATH OR SERIOUS INJURY. SEE DETAILS BELOW.
- 2. IMPROPER UNIT LIFT!
- TEST LIFT UNIT APPROXIMATELY 24 INCHES TO VERIFY PROPER CENTER OF GRAVITY LIFT POINT. TO AVOID DROPPING OF UNIT, REPOSITION LIFTING POINT IF UNIT IS NOT LEVEL. FAILURE TO PROPERLY LIFT UNIT COULD RESULT IN DEATH OR SERIOUS INJURY OR POSSIBLE EQUIPMENT OR PROPERTY-ONLY DAMAGE.
- 3. ATTACH SAFETY CHAIN OR CABLE AS SHOWN WITHOUT TENSION, NOT AS A LIFTING CHAIN OR CABLE, BUT TO PREVENT THE UNIT FROM ROLLING.
- 4. DO NOT FORKLIFT THE UNIT TO MOVE OR LIFT.
- LIFTING HOLES PROVIDED ON CHILLER TO ATTACH CABLES (CHAINS OR SLINGS).
 36" (900 MM) RECOMMENDED CLEARANCE ABOVE HIGHEST POINT OF COMPRESSOR.
- FOLLOW NEC SECTION 110 AND OTHER APPLICABLE LOCAL CODES FOR CLEARANCES IN FRONT OF ELECTRICAL ENCLOSURES.
- 8. SPECIFIC SHIPPING AND OPERATING WEIGHTS OF THE SUBMITTED CHILLER ARE PROVIDED IF THE CENTRIFUGAL CHILLER SELECTION WAS ENTERED IN TOPSS. DETAILED LOAD POINT AND SPRING ISOLATOR APPLICATION WEIGHTS ARE AVAILABLE FROM "CENTRAVAC ISOLATOR SELECTION REPORT" AVAILABLE FROM THE REPORT GENERATOR OF THE TRANE TOPSS CHILLER SELECTION PROGRAM. CONTACT YOUR LOCAL TRANE SALES ENGINEER IF THIS DATA IS REQUIRED.



HOLE DETAIL TYP



(SEE NOTE 8 ABOVE)					
MAXIMUM SHIPPING 27807.0 lb					
MAXIMUM OPERATING	32346.0 lb				





SCOPE

То:	Bidding Contra	ctor	Date:	December 20, 2017	
Attention:	Estimating			Quote #:	Q16DZ0329A1
From:	Dan Reeves	dreeves@airtreatment.com	858-569-5256 x150	Revision:	1
Project Name:	TCMC Cooling	Tower			

Cooling Tower Scope to Include:

	Item #1) Baltimore Aircoil Company (BAC) Cooling Tower(s), Quantity (1):					
Model:	S3E-1222-14P/S Open Circuit Cooling Tower (BASIS OF DESIGN)					
Certified Capacity:	2160.00 USGPM of water from 91.10°F to 80.00°F at 73.00°F entering air wet bulb.					
Fan Motor:	One (1) 40 HP fan motor: Totally Enclosed, Air Over (TEAO), 1 Speed/1 Winding - Premium Efficiency (Inverter Duty), suitable for 460 volt, 3 phase, 60 hertz electrical service. Drives are based on 0 inches ESP.					
	NOTE: Inverter Duty fan motors, furnished in accordance with NEMA Standard Mg.1 Part 31, are required for applications using variable frequency drives for fan motor control.					

Equipment Summary

- Induced Draft, Crossflow Cooling Tower
- California OSHPD Special Seismic Certification Pre-approval (OSP-0368-10) Cooling Tower Must be Rigidly Mounted to Structure for OSP to Remain Valid. Cooling Tower Shall not be Installed on Vibration Isolators.
- Quality Assurance ISO 9001 Certified
- CTI Certified Thermal Performance
- Steel Panels and Structural Members are Constructed of Galvanized Steel with a Thermosetting Hybrid Polymer and 304 Series Stainless Steel Hot Water Basins and Welded Steel Cold Water Basin
- Standard Fan Driven by BALTIDRIVE® Power Train with Galvanized Steel Fan Guard
- Fiberglass Reinforced Polyester (FRP) Casing Panels
- FRP Air Inlet Louvers
- PVC Fill & Drift Eliminators
- Bottom Inlet EASY CONNECT® Piping Arrangement
- Bottom Outlet Pump Suction Connection with Alternate End Outlet Pump Suction Connection
- Bottom Equalizer Connection
- Electric Water Level Control Package with High & Low Level Alarm (Field Wired by Others)
- Mechanical Vibration Cutout Switch (Field Wired by Others)
- Extended Bearing Lubrication Lines
- Hot Water Basin Weir Dams
- Aluminum Ladders Located on the End Front Left & End Front Right (Ships Loose for Field Mounting by Others) and Perimeter Handrails
- Self-Closing Safety Gate and Safety Cage is Provided for each Ladder to the Fan Deck (Ladder Extensions Not Included)
- Stainless Steel Internal Walkway
- Internal Ladder, Service Platform and Safety Gate with Galvanized Steel Supports with a Thermosetting Hybrid Polymer
- Includes Factory Authorized Start-Up
- Warranty: 5-Year Parts Only on Drivetrain / 1-Year Parts Only on Remainder of Cooling Tower
- Lead Time: 5-6 Weeks (Ships from Madera, CA)

Exclusions to BAC:

Installation of Any Kind, Unloading, Rigging, Storage, Structural/Support Steel or Concrete Pad, Water Treatment, Control-Balancing or Shut-Off Valves, Piping, Wiring, Spare Parts, Variable Frequency Drives, Control Panels, Isolation, Pumps, Seismic Calculations, Connections, Control Sensors, Control Transmitters, Training, Labor or Any Accessories/Materials Not Listed Above







include options and accessories.

2) Operating weight and weight loading are for units with water level in basin at overflow.

3) Unit support beams and anchor bolts to be designed and furnished by others.

4) Support beams must be flush and level at top.

5) Steel frame members perpendicular to the support beams and under the air inlet edges of unit

must be at least 2" below the top of the support beams.

6) Beams under the air inlet face should be designed, as a minimum, for the sum of the corner point loads applied as a uniformly distributed load.

Model Number	Shipping Weight	Operating Weight	Point "1"	Point "2"	Point "3"	Point "4"	Point "5"	Point "6"	Point "7"	Point "8"	Point "9"	Point "10"	
S3E-1222-14P/S	20105	40545	6648	6648	6648	6648	3490	3490	3490	3490	0	0	OSHPD
ORDER NO: Q16038948302 BALTIMORE								3000E Unit Support Standard Basins					
DATE: 3/29/2016 5:31:30 PM						AIRC	JOIL	CON	IPAN	1Y	DRAWING NUMBER: SS-016038948302		



3/29/2016 5:32:08 PM DATE:

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AIRCOIL COMPANY

BC-Q16038948302

Data Version 1.10 DWG Version 1.0



3000E Internal Access

DRAWING NUMBER: IA-Q16038948302







Series 3000 Cooling Tower

RIGGING & ASSEMBLY INSTRUCTIONS

Series 3000 Cooling Towers should be rigged and assembled as outlined in this bulletin.

These procedures should be thoroughly reviewed prior to the actual rigging and assembly of the equipment to acquaint all personnel with procedures to be followed and to assure that all necessary equipment will be available beforehand.



Be sure to have a copy of the certified drawing available for reference. If you do not have a copy of this drawing, or if you need additional information about this unit, contact your local BAC Representative whose name and telephone number are on a label adjacent to the access door. The model <u>number and</u> serial number of the unit are also located in this area.



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2 Unit Rigging & Assembly

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- 21 Factory Pre-Wired Terminal Box
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series 3000 cooling tower

WARNING: Failure to use lifting provisions can result in a dropped load causing severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following BAC published Rigging Instructions, and generally accepted lifting practices. The use of a supplemental safety sling may also be required if the lift circumstances warrant its use, as determined by the rigging contractor.

CAUTION: Only personnel qualified to do so should undertake operation, maintenance and repair of this equipment. Proper care, procedures and tools must be used in handling, lifting, installing, operating, maintaining and repairing this equipment to prevent personal injury and/or property damage.



Adequate precautions appropriate for the installation and location of these products should be taken to safeguard the equipment and the premises from damage and the public from possible injury. **The procedures in this manual must be thoroughly reviewed prior to rigging and assembly. Read all dangers, warnings, cautions, and notes detailed in the margins.**

When the fan speed of the unit is to be changed from the factory set speed, including the use of a variable speed device, steps must be taken to avoid operating at or near the fan's "critical speed" which could result in fan failure and possible injury or damage. Consult with your local BAC Representative on any such applications.

Shipping

BAC Cooling Towers are factory assembled to assure uniform quality and minimum field assembly. Models S3E/XES3E-8518-xxx, S3E/XES3E-1020-xxx, S3E/XES3E-1222-06x, S3E/XES3E-1222-07x, and S3E/XES3E-1424-07x ship in one section ship in one section. Models S3E/XES3E-1222-10x through S3E/XES3E-1222-14x and S3E/XES3E-1424-12x through S3E/XES3E-1424-14x ship in two sections. For the dimensions and weights of a specific unit or section, refer to the certified drawings.

Pre-Rigging Checks

When the unit is delivered to the jobsite, it should be checked thoroughly to ensure all required items have been received and are free of any shipping damage prior to signing the bill of lading.

The following parts should be inspected:

- Sheaves and Belts / Gearbox
- Bearings
- Bearing Supports
- □ Fan Motor(s)
- □ Fan(s) and Fan Shaft(s)
- □ Float Valve Assembly(s)
- □ Water Distribution System
- 🗅 Fill
- Cold Water Basin Accessories
- □ Interior Surfaces
- Exterior Surfaces
- Optional EASY CONNECT[®] Piping Arrangement (when provided)
- Louvers / Combined Inlet Shields

- Optional Air Inlet Screens (when provided)
- Mating Surfaces Between Sections / Modules
- Miscellaneous Items: All bolts, nuts, washers, and sealer tape required to assemble sections or component parts are furnished by BAC and shipped with the unit. A checklist inside the envelope marked "Customer Information Packet" indicates what miscellaneous parts are included with the shipment and where they are packed. This envelope will be attached to the side of the unit or located in a box inside the unit.



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Unit Weights

Before rigging any unit, the weight of each section should be verified from the unit certified drawing. Some accessories add additional weight as shown on the respective accessory drawings.

Anchoring

Seven-eighths (7/8") diameter holes are provided in the bottom flange of the basin section for bolting the unit to the support beams. Refer to the suggested support location drawing included in the submittal for location and quantity of the mounting holes. **The unit must be level for proper operation.** Anchor bolts must be provided by others. The IBC rating is only certified with standard anchorage locations. Using alternate anchorage locations or alternate steel supports will void any IBC wind or seismic ratings. Contact your local BAC Representative for details

Cold Weather Operation

These products must be protected by mechanical and operational methods against damage and/or reduced effectiveness due to possible freeze-up. Please refer to the *Series 3000 Operation & Maintenance Manual* on <u>www.BaltimoreAircoil.com</u>, or contact your local BAC Representative for recommended cold weather operation strategies.

Location

All evaporative cooling equipment must be located to ensure an adequate supply of fresh air to the unit air intakes. When units are located adjacent to walls or in enclosures, care must be taken to ensure the warm, saturated, discharge air is not deflected and recirculated back to the air intakes.

Each unit should be located and positioned to prevent the introduction of discharge air into the ventilation system of any building. For detailed recommendations on BAC equipment layout, see our website at <u>www.BaltimoreAircoil.com</u> or contact your local Representative.

Warranties

Please refer to the Limitation of Warranties (located in the submittal package) applicable to and in effect at the time of the sale/purchase of these products.

Unit Operation

Prior to start-up and unit operation, refer to the *Series 3000 Operation & Maintenance Manual* shipped with the unit and also available at <u>www.BaltimoreAircoil.com</u>.



Introduction

Safety

Shipping

Pre-Rigging Checks Unit Weights Anchoring

Cold Weather Operation Location Warranties Unit Operation

ATTENTION: Before an actual lift is undertaken, ensure no water, snow, ice, or debris has collected in the basin or elsewhere in the unit. Such accumulations will add substantially to the equipment's lifting weight.

NOTE: Each unit must be located and positioned to prevent the introduction of discharge air into the ventilation systems of the building on which the unit is located and of adjacent buildings.

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3

SERIES 3000 COOLING TOWER Unit Rigging & Assembly

WARNING: Failure to use lifting provisions can result in a dropped load causing severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following BAC published Rigging Instructions, and generally accepted lifting practices. The use of a supplemental safety sling may also be required if the lift circumstances warrant its use, as determined by the rigging contractor.

NOTE: For weight information refer to the submittal drawing package.

Rigging

Refer to **Table 1** and **Figures 1 and 2** for the required minimum spreader bar and the recommended vertical dimension "H" from the lifting device at the base of each unit or section to the spreader bar.

All single cell and multi cell units must be rigged one section at a time. Models S3E/XES3E-8518-x, 1020-x, 1222-06x, 1222-07x, and 1424-07x ship in one section per cell. All other models ship in two sections per cell.

	Dimensions (For Each Section)						
Model Number	Section	Min. H	Min. W1	Min W2			
S3E/XES3E-8518-x	One Section	15'	8'-6"	18'-1"			
S3E/XES3E-1020-x	One Section	17'	10'	20'-1"			
S3E/XES3E-1222-06x, 1222-07x	One Section	18'	12'	21'-7"			
S3E/XES3E-1424-07x	One Section	20'	14'	24'-1"			
S3E/XES3E-1222-10x through S3E/XES3E-1222-14x	Upper/Lower	18'/18'	12'/12'	21'-7"/21'-7"			
S3E/XES3E-1424-12x through S3E/XES3E-1424-14x	Upper/Lower	20'/20'	14'/14'	24'-1"/24'-1"			

Table 1. Minimum Vertical Dimension and Spreader Bar Length



Single-Cell Installation

Two Piece Section Assembly

- 1. Remove any accessories shipped in the cold water basin.
- 2. Position the lower section on the unit supports and bolt in place.
- 3. Wipe any moisture and dirt from the perimeter mating flanges of the lower section.
- 4. Install foam seal tape (BAC part # 270175) supplied with the unit, as illustrated in **Figure 3**, on the mating flanges of the lower section in a continuous line. At each corner, allow 1" overlap.
- 5. Complete assembly using the external bolt holes as guides for alignment:
 - Before lowering the upper section onto the lower section, be sure to line up the bolt holes using drift pins as illustrated in Figure 5, no fewer than one hole at each edge. Guide the upper section onto the lower section starting with a bolt hole at one corner and following down the flange.
 - Match marks must line up as shown in Figure 3.
 - Secure the upper section in place as shown in Figure 4 to ensure leakfree operation.



Unit Rigging & Assembly

Rigging

Single-Cell Installation Two Piece Section Assembly

1/2" Flat Washer 1/2" Bolt Tat Washer, and Nut Flat Washer, and Nut Fint Part 2 Upper and Longer Assembly for Spring 2000 Conting Towards



Figure 5. Drift Pin Alignment

NOTE: 1/2" bolts, flat washers, and lock washers are used.



Figure 4. Typical Bolting

Multi-Cell Installation

Refer to the submittal drawings for the proper orientation of each cell. The number and "face" are stenciled on the outer basin wall. Multi-cell cooling tower installations may employ flume boxes to equalize the water level in the basin of each cell. Follow directions in "Flume Box Installation" for details on their installation.

Multi-Cell Unit Assembly

- 1. First, position the lower section of all cells on the unit supports and bolt in place. Some units come furnished with a flume box. If they do, use the flume box assembly procedure outlined in "Flume Box Installation" to connect the basins of the multi-cell units.
- 2. Wipe any moisture and dirt from the perimeter mating flanges.
- Install foam seal tape (BAC part # 270175) supplied with the unit, as illustrated in Figure 3, on page 5 on the mating flanges of the lower sections in a continuous line. At each corner, allow 1" overlap.
- 4. Complete assembly using the internal drift pin alignment guides:
 - Using drift pins in the drift pin guides provided (**Figure 7**), guide the top section on to the bottom section.
 - Match marks must line up as shown in Figure 3 on page 5.
 - Bolt the top sections onto the bottom sections as shown in Figure 4 on page 5 using the bolting channels in Figure 6.





Figure 6. Upper and Lower Assembly - Drift Pin Guides

Figure 7. Bolting Channels

Flume Box Installation

- 1. Position Cell #1 on the unit support and bolt in place.
- 2. Wipe down the surface adjacent to the flume opening of Cell #1 to remove any dirt or moisture that may have accumulated during shipment.
- 3. Wipe down the flanges on both ends of the flume box. On one end, apply a layer of flat butyl sealer tape (BAC part # 554000) around the face of the flange over the centerline of the holes. Do not overlap or stretch too thinly at the corners. When it is necessary to splice the sealer tape, be sure to press the two ends together to form a smooth, continuous strip. Apply a second layer of flat butyl sealer tape over the first layer following the same procedure. Refer to **Figure 8, Detail A**.
- 4. Using drift pins to align the bolt holes, place the flume box over the opening in the basin of Cell #1.
- Fasten into place as shown in Figure 9. For basins with TriArmor[®] Corrosion Protection System, backing plates are to be installed inside the basin and flume box opening (see Figure 10, Detail A). Insert the 3/8" self-tapping screws or bolts in each hole from the flume box into the basin wall and backing strips (if applicable) as illustrated in Figure 10.

NOTE: Flume boxes furnished with units constructed with TriArmor® Corrosion Protection System or stainless steel basins are assembled with stainless steel bolts, washers and nuts in lieu of self tapping screws. Before installing the nuts, apply a lubricant to the bolts to reduce the potential for seizing.





Positive Closure Plate Installation

The optional positive closure plate and gasket can be furnished on multi-cell units to allow individual cells to be isolated for cleaning and routine maintenance. The plate ships loose inside the cold water basin.

- 1. Remove nuts and flat washer from the flume box.
- 2. Position the neoprene gasket and positive closure plate over the bolts and fasten in place with 3/8" wing nut and flat washers.
- 3. When the cooling tower operation does not require use of the positive closure plate, remove the closure plate and gasket. Retighten the flume box using the wing nuts and flat washers.





Figure 12. Elevation View

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Fan Guard Installation

Due to height limitations on truck shipments, the fan guard may ship unmounted. **Never step or walk on the fan guard when installed.** Refer to **Table 2** for the number of fan guard pieces Series 3000 Cooling Towers will have .

Model Number	Number of Fan Guard Pieces
S3E/XES3E-8518-xxx	1
S3E/XES3E-1020-xxx, 1222-xxx, 1424-07x	2
S3E/XES3E-1424-12x, 1424-13x, 1424-14x	4

 Table 2. Number of Fan Guard Pieces

One-Piece Fan Guard

Mount fan guard to unit as illustrated in Figure 13, Detail A.



Unit Rigging & Assembly

Multi-Cell Installation Optional Positive Closure Plate

Fan Guard Installation One-Piece Fan Guard

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DANGER: Fan guard must be securely in place before the cooling tower is placed in operation. Never step or walk on the fan guard. Failure to follow these instructions may result in serious injury or death.



DANGER: Fan guard must be securely in place before the cooling tower is placed in operation. Never step or walk on fan guard. Failure to follow these instructions may result in serious injury or death.

Two-Piece Fan Guard

- 1. Using six U-bolt assemblies, fasten the two halves of the fan guard together as illustrated in **Figure 14**, **Detail B**. Locate the U-bolt assemblies along the seam between the two guard halves per the X and Y dimension provided in **Table 3**, which are based on the diameter of the supplied fan.
- 2. Gradually tighten both nuts of the U-bolt assembly, alternating from one to the other, until 20-25 ft-lb of torque is achieved.
- 3. Mount the fan guard to the unit as illustrated in **Figure 14**, **Detail A** for the ends of the seam where the two guard halves join together, and **Detail C** for all other locations around the fan guard perimeter.

Fan Diameter	X	Y
9'	10"	17"
10'	10"	20"
11'	10"	23"





Four-Piece Fan Guard

- 1. Assemble fan guard supports as illustrated in Figure 15, Detail A.
- 2. Secure fan guard pieces to fan guard supports as shown in Figure 15, Detail B.
- 3. Mount fan guard assembly to unit as shown in Figure 15, Detail C.





Unit Rigging & Assembly

Fan Guard Installation Two-Piece Fan Guard Four-Piece Fan Guard

NOTES FOR FIGURE 16:

- All piping shown by dashed lines is to be furnished by others. Refer to the certified unit print for details on the cooling tower.
- 2. Field piping should be fabricated at the time of unit installation. Pre-fabrication of pipe work is not recommended.
- 3. Required static pumping head from base of cooling tower is indicated by static lift dimension and piping friction losses.
- 4. When tower is equipped with safety railing package, inlet piping should be designed to clear the railing. Adjust static lift as required.
- 5. For units installed on vibration isolation rails (provided by others), flexible connections should be installed in the piping just before the tower perimeter.
- **6.** All piping supports to be designed, furnished, and installed by others.
- Supply piping to cooling tower inlet connections may be supported from the tower structure only at the pipe support locations shown. Piping must not be supported by the tower inlet connections. Piping outside the perimeter of the tower must not be supported from the tower.
- 8. Supply piping supports must be designed to rest on the walls of the hot water distribution basins at locations indicated (see Figure 18, Detail A).
- **9.** Maximum diameter of inlet header piping that can be supported by the cooling tower distribution basins is 14".
- **10.** Provide adequate space between cooling tower and riser piping to allow for entry into the cooling tower access doors.

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Top Inlet Piping Installation

Use the following drawings, notes, and tables when installing top inlet piping. Drawings shown are for multi-cell installations. For single cell installations, simply ignore the additional cells and dimension "C" from **Table 4**.

Model Number	А	В	C	H
S3E/XES3E-8518-05x	10'-6 3/4"	4'-2 7/8"	8'-8 1/4"	8'-7 3/4"
S3E/XES3E-8518-06x	10'-6 3/4"	4'-2 7/8"	8'-8 1/4"	9'-11 3/4"
S3E/XES3E-8518-07x	10'-6 3/4"	4'-2 7/8"	8'-8 1/4"	11'-3 3/4"
S3E/XES3E-1020-06x	12'-6 3/4"	4'-10 5/8"	9'-11 3/4"	9'-11 3/4"
S3E/XES3E-1020-07x	12'-6 3/4"	4'-10 5/8"	9'-11 3/4"	11'-3 3/4"
S3E/XES3E-1222-06x	14'-0 3/4"	5'-10 7/8"	12'-0 1/4"	9'-11 3/4"
S3E/XES3E-1222-07x	14'-0 3/4"	5'-10 7/8"	12'-0 1/4"	11'-3 3/4"
S3E/XES3E-1222-10x	14'-0 3/4"	5'-10 7/8"	12'-0 1/4"	15'-5 1/2"
S3E/XES3E-1222-12x	14'-0 3/4"	5'-10 7/8"	12'-0 1/4"	18'-1 1/2"
S3E/XES3E-1222-13x	14'-0 3/4"	5'-10 7/8"	12'-0 1/4"	19'-5 3/4"
S3E/XES3E-1222-14x	14'-0 3/4"	5'-10 7/8"	12'-0 1/4"	20'-9 1/2"
S3E/XES3E-1424-07x	16'-6 3/4"	6'-11 9/16"	14'-1 5/8"	11'-3 3/4"
S3E/XES3E-1424-12x	16'-6 3/4"	6'-11 9/16"	14'-1 5/8"	18'-1 1/2"
S3E/XES3E-1424-13x	16'-6 3/4"	6'-11 9/16"	14'-1 5/8"	19'-5 3/4"
S3E/XES3E-1424-14x	16'-6 3/4"	6'-11 9/16"	14'-1 5/8"	20'-9 1/2"

Table 4. Dimensions for Series 3000 Piping Schematic

Size	Width
6"	2 1/4"
8"	2 1/2"
10"	2 13/16"





Elevation View







PIPE SUPPORT BETWEEN TOWER (SEE NOTES 7 & 8)

Piping by others. Flow control valves available by BAC or others, and always install ed by others.



Unit Rigging & Assembly

Top Inlet Piping Installation

NOTES FOR FIGURE 17:

- All piping shown by dashed lines is to be furnished by others. Refer to the certified unit print for details on the cooling tower.
- 2. Field piping should be fabricated at the time of unit installation. Pre-fabrication of pipe work is not recommended.
- 3. Required static pumping head from base of cooling tower is indicated by static lift dimension and piping friction losses.
- 4. When tower is equipped with safety railing package, inlet piping should be designed to clear the railing. Adjust static lift as required.
- 5. For units installed on vibration isolation rails (provided by others), flexible connections should be installed in the piping just before the tower perimeter.
- **6.** All piping supports to be designed, furnished, and installed by others.
- 7. Supply piping to the cooling tower inlet connections must not be supported from the tower.



NOTE:

 Weights given represent the additional weight when a 2-speed motor is ordered and should be added to the standard unit weight. _

 If the optional BALTIGUARD[™] Fan System is ordered, weights given are for each BALTIGUARD motor and should be added to the standard unit weight.

NOTES FOR FIGURES 19-21:

- Conduit must be water tight and pitched downward to allow condensation to drain away from fan motor conduit box. Therefore, do not run the conduit through fan deck.
- All wiring must conform to local and national electrical codes. Junction box/safety switch and all conduit from fan motor conduit box to be sized, provided, and installed by others.
- **3.** Rigid conduit outside casing panel must turn down to junction box.
- On multi-cell units, use separate conduit lines for each fan motor. Run conduit through adjacent cells to junction box and or disconnect switch on front/rear cell.

Number of Cells	Configuration	
1	CT-1	
2	CT-1 & CT-4	
3	CT-1, CT-2 & CT-4	
4	CT-1 through CT-4	

Motor Location and Conduit Installation

Use the following drawings and notes when installing electrical conduit for cooling towers supplied with the BALTIDRIVE[®] Power Train, BALTIGUARD[™] Fan System, gear drives, or the ENDURADRIVE[™] Fan System. Notice the table for weight adds for two-speed motors and the BALTIGUARD[™] Fan System.

2-Speed Motor Weight Add			
Motor HP	Weight (lbs)		
7.5	140		
10	185		
15	90		
20	80		
25	210		
30	170		
40	225		
50	300		
60	425		
75	340		
100 (gear only)	600		

BALTIGUARD™ Fan System Motor Weight Add			
Motor HP	Weight (lbs)		
3	100		
5	110		
7.5	160		
10	175		
15	300		
20	260		
25	390		
30	440		

Table 7. BALTIGUARD™ Fan System Motor Weight Add^[2]

Table 6. 2-Speed Motor Weight Add^[1]

Weights given in **Tables 6** and **7** represent the additional weight when an optional 2-speed motor or BALTIGUARD[™] Fan System is ordered. These weights should be added to the standard unit weight.



Plan View





Number of Cells	Configuration	
1	CT-1	
2	CT-1 & CT-4	
3	CT-1, CT-2 & CT-4	
4	CT-1 through CT-4	









satisfactory operation.

Figure 22. External Fan Motor Location for Gear Drive





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SERIES 3000 COOLING TOWER Optional Accessory Installation

ENDURADRIVE™ Fan System Installation (Optional)

The ENDURADRIVE[™] Fan System is an option for select Series 3000 Cooling Towers and is standard on S3E-1424-14U and S3E-1424-14W models. The ENDURADRIVE[™] Fan System variable frequency drive (VFD) is to be installed per the *ENDURADRIVE[™] Fan System ACH550-UH HVAC User's Manual*. The fan motor must be wired directly into the VFD and cannot be wired across the line. For wiring details, refer to the submittal drawings.



Warnings for the ENDURADRIVE™ Fan System

- WARNING: ENDURADRIVE[™] Fan System motors can induce voltage and current in the motor leads by rotating the motor shaft, even when the motor is completely disconnected from the power source. Electrical shock can cause severe personal injury or death. Therefore, mechanically lock or tie down the fan until all wiring has been completed and before servicing the drive system, or when performing any motor maintenance procedure. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.
- WARNING: Pacemaker danger Magnetic and electromagnetic fields in the vicinity of current carrying conductors and ENDURADRIVE[™] Fan System motors can result in a serious health hazard to persons with cardiac pacemakers, metal implants, and hearing aids. To avoid risk, stay away from the area surrounding the ENDURADRIVE[™] Fan System motor.
- WARNING: The VFD may apply hazardous voltages to the motor leads after power to the controller has been turned off. Verify that the controller is incapable of delivering hazardous voltages and that the voltage at the motor leads is zero before proceeding. Failure to comply with this warning may result in severe personal injury or death.

Attentions for the ENDURADRIVE™ Fan System

- VFD must be powered on at all times so that trickle current can remove moisture from motor when idle.
- Use only a shielded motor power cable with a complete circumferential braided or copper film/tape ground jacket around the power leads. This ground should be secured to the motor frame from within the motor terminal box and must return without interruption to the drive ground.

To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.

NOTE: Refer to the "Customer Information Packet" for additional instructions for the specific cooling tower model.

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The optional Whisper Quiet Fan will ship with blades assembled to the prescribed pitch and hardware torque. Depending on the model number, the fan will ship installed or crated. Refer to **Table 8** for more shipping methods and fan weights. If the whisper quiet fan is shipped installed, no additional steps are needed.

Model	Belt	Internal Motor	External Motor	Fan Weight (lbs)
1020-06J, -06L	Installed	Crated	Installed	390
1020-06K, -06M, -06N	Installed	Crated	Crated	390
1020-07x	Crated	Crated	Crated	390
1222-06x	Installed	Crated	Crated	410
1222-07x	Crated	Crated	Crated	410
1222-10x	Installed	Installed	Installed	560
1222-12x	Installed	Installed	Installed	560
1222-13x	Installed	Installed	Installed	560
1222-14x	Crated	Crated	Crated	560
1424-07x	Crated	Crated	Crated	450
1424-12x	Installed	Installed	Installed	620
1424-13x	Installed	Installed	Installed	620
1424-14x	Crated	Crated	Crated	620

Table 8. Whisper Quiet Fan Shipping Matrix

Crated Whisper Quiet Fan Installation

1. Remove fan seal disk (Figure 24).

- 2. Wrap or loop slings around blade shanks (Figure 25).
- 3. Remove bolt, PVC spacer, and plywood spacers from the shipping mount (Figure 26).
- 4. Lift the fan off the shipping crate. Be careful not to damage blades (Figure 27).
- 5. Position the fan over the top of the keyed fan shaft (Figure 28).
- 6. Line up the key with the slot. Slowly lower the fan onto the shaft until the fan hub is flush against the factory installed tangent locking collar (**Figure 29**).
- Gradually tighten the bushing bolts in several passes to evenly seat the tapered bushing into the hub flange, and lock the bushing to the shaft (Figure 30). Refer to Table 9 which lists the prescribed torques for the bushing bolts.
- 8. Replace fan seal disk, and tighten bolts until rubber seal washer compress to the diameter of the flat washers (**Figure 31**).

ATTENTION: Do not use power tools on the whisper quiet fan.



Optional Accessory Installation

Whisper Quiet Fan Installation



Figure 24. Remove Seal Disk



Figure 26. Remove Shipping Restraint Hardware



Figure 25. Attached to Blade Shanks

Figure 27. Lift Fan From Crate



Figure 28. Fan Positioning





Figure 29. Key Lineup



Figure 31. Replace Seal Disk

Model Number	Bushing Type	Bushing O.D.	Hex Key Size	Torque
1020-x	U	4"	10mm	50 Ft-Lb
1222-x, 1424-x	W	5.5"	14mm	90 Ft-Lb

Table 9. Bushing Torque

Side Outlet Depressed Sump Box Installation (Optional)

The optional side outlet depressed sump box allows a cooling tower water outlet connection to be piped from underneath the unit in four possible directions, 90° apart. The piping connection is a bolt circle designed to fit an ASME Class 150 flat face flange with a full-face gasket.

To install the side outlet depressed sump box, follow the steps below:

- 1. Wipe the edges around the opening inside the cold water basin to remove any dirt or moisture that may have accumulated during shipment.
- 2. Apply a layer of trapezoidal butyl sealer tape (BAC part #554009) around the opening in the basin over the centerline of the holes. Do not stretch the sealer tape too thinly or overlap at the corners. When it is necessary to splice the sealer tape, be sure to press the two ends together to form a smooth continuous strip. Apply a second layer of trapezoidal butyl sealer tape (BAC part #554009) over the first layer following the same procedure. Refer to Figure 32. The sealer tape needs to be positioned between the sump box and the inside basin bottom centered over the bolt holes.
- Insert the sump box assembly into the opening in the cold water basin and attach it to the basin with 3/8" x 1" bolts, flat washers, lock washers, and nuts as shown in Figure 32, Detail A.
- 4. Place the suction strainer over the opening.



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Factory Pre-Wired Terminal Box (Optional)

BAC offers an optional terminal box with factory pre-wiring for Series 3000 Cooling Towers. When this option is ordered, the cooling tower's fan motor(s) and vibration cutout switch are wired at the factory (through flexible conduit and the mechanical equipment support) and terminated on the outside face of the BAC unit in a clearly marked, 304 Stainless Steel, NEMA 3R terminal box (see **Figure 33** for the exterior location of the box on the cooling tower).

The box includes a cover plate, which once removed reveals an easy-to-follow wiring diagram and modular terminal blocks. Remove the cover plate, and install the collar (ships loose in the cooling tower's basin) which has prepunched conduit holes. Wiring from the terminal blocks to the unit controls is sized, provided and installed by others. After the controls are wired, reinstall the cover plate on the terminal box.



Figure 33. Factory Pre-Wired Terminal Box Location

Additional Optional Accessories and Equipment

All platforms, ladders, safety cages, and VR stacks will be factory assembled and will ship pre-assembled for field installation. **All optional accessories should be installed after the unit is rigged.** These pre-assembled options should be installed on the cooling tower as shown on the appropriate reference drawing in the "Customer Information Packet." Installation for additional optional accessories should also be installed as shown on the appropriate reference drawing in the "Customer Information Packet." Installation for additional optional accessories should also be installed as shown on the appropriate reference drawing in the "Customer Information Packet." This packet will be in an envelope attached to the side of the unit or located in a box inside the unit.



Optional Accessory Installation

Side Outlet Depressed Sump Box

Factory Pre-Wired Terminal Box

Additional Optional Accessories and Equipment

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