



Rigging and Assembly Instructions

AXS INDUCED DRAFT CROSSFLOW COOLING TOWERS

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Introduction

Thank you for purchasing your EVAPCO induced draft crossflow cooling tower. This manual will provide detailed instructions for rigging and installation of the cooling tower. If any questions arise during the installation, please contact your local EVAPCO representative.

Method of Shipment

EVAPCO's AXS cooling towers are available in single stack and double stack configurations. The single stack AXS towers will ship as a single section, and will require little to no assembly on site, except for external piping, electrical connections, and optional accessories selected.

The double stack AXS cooling towers will ship in two sections, each of which will have mating flanges that will join together when sealed and bolted as described in the instructions that follow.

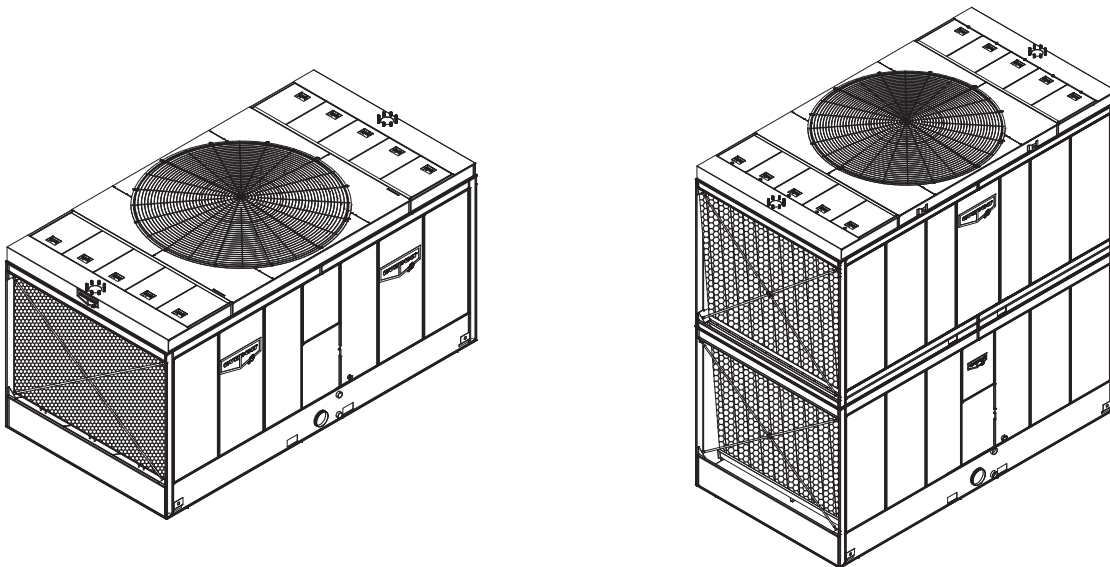


Figure 1 – Single Stack (Left) & Double Stack (Right) AXS Cooling Towers

Miscellaneous items, such as sealer tape, self-tapping screws and other required materials and hardware, are packaged in a rigging box which is placed inside the basin for shipment. EVAPCO recommends thoroughly inspecting the unit(s) and their related accessories upon receipt. Reviewing the most recent copy of the unit's submittal along with the rigging instructions before the unit arrives on site is also recommended.

The AXS cooling towers are available in belt and gear driven configurations. Belt driven units will come with motors and belts mounted from the factory. Checks for alignment and tensioning once the unit(s) are on site are recommended (this applies for gear driven units as well). Gear driven units with internally mounted motors will come with the motor, close coupling and gearbox mounted from the factory. For gear driven units with externally mounted motors, the motor(s) and shaft(s) ship loose in the basin, and will have to be assembled and aligned in the field.



Storage

Do not place tarps or other coverings over the top of the units if they are to be stored before installation. Excessive heat build-up can occur if the units are covered, causing possible damage to the PVC eliminators, louvers or fill media. **For extended storage beyond six months, rotate the fan and fan motor shaft(s) monthly. Also, the fan shaft bearings should be purged and re-greased prior to start-up.**

Structural Steel Support

Support beams and anchor bolts are to be furnished and sized by others. Always refer to the submittal packet or unit certified print for unit weights, dimensions and technical data.

Two structural “I” beams running the length of the unit are required to support the unit in its longitudinal configuration (Figure 2). These beams should be located underneath the outer flanges of the unit. Mounting holes are located in the bottom flange of the unit to facilitate bolting to the structural steel. Exact bolt-hole locations are provided on the structural steel print included in the submittal packet. The structural steel support arrangement will be the same for single and double stack units.

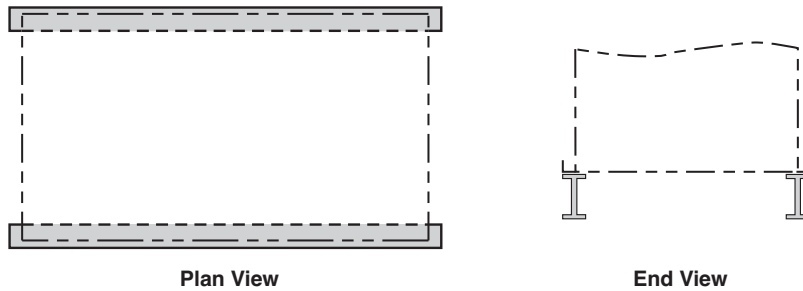


Figure 2 – Longitudinal Steel Support Arrangement

In addition to the longitudinal steel support arrangement, transverse arrangements are also possible, as shown below in Figure 3. For acceptable overhang limits in the transverse arrangement, please refer to EVAPCO’s Equipment Layout Manual which details transverse steel arrangements, or contact your local EVAPCO representative.

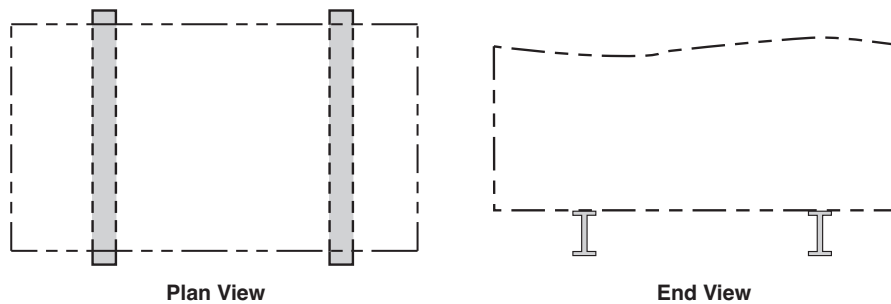


Figure 3 – Transverse Steel Support Arrangement

Beams should be sized in accordance with accepted structural practices. Maximum deflection of the beam under the unit should be $1/360$ of the unit length, not to exceed $1/2$ ". Deflection may be calculated by using 55% of the **operating** weight as a uniform load on each beam. Operating weights can be found on the unit certified print, included in the submittal packet.

The supporting “I” beams should be level before setting the unit. **Do not level the unit by shimming between the bottom flange of the unit and the beams, as this will not provide proper support.**

Rigging AXS Single Stack

Lifting devices are located on the bottom corners of the long sides of the AXS cooling towers. The spreader bar to which the hook of the crane attaches, must be a minimum dimension of "H" above the lifting ears.

Minimum "H" Dimension

12' Wide AXS = 19'

14' Wide AXS = 20'

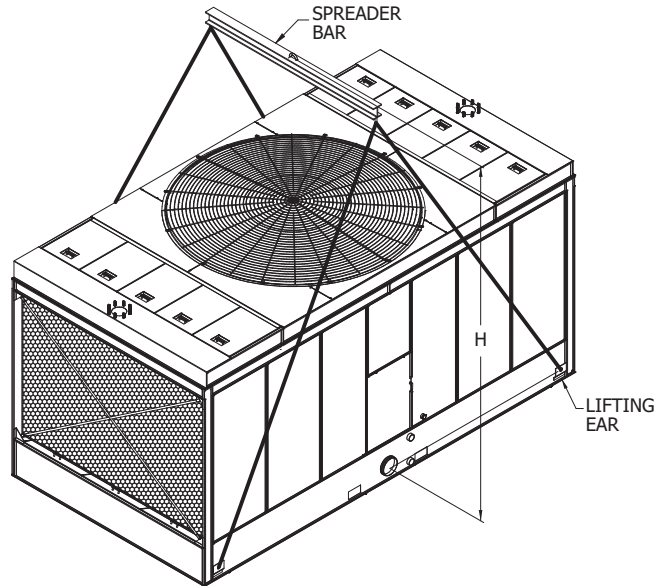


Figure 4 – AXS Single Stack Min. "H" Dimension

Rigging AXS Double Stack

The AXS double stack ships in two sections, and therefore individual rigging of each section is required. Figures 5 and 6 show the lifting ear location, and the same rules in terms of minimum "H" dimension as the AXS single stack cooling tower apply.

Minimum "H" Dimension

12' Wide AXS = 19'

14' Wide AXS = 20'

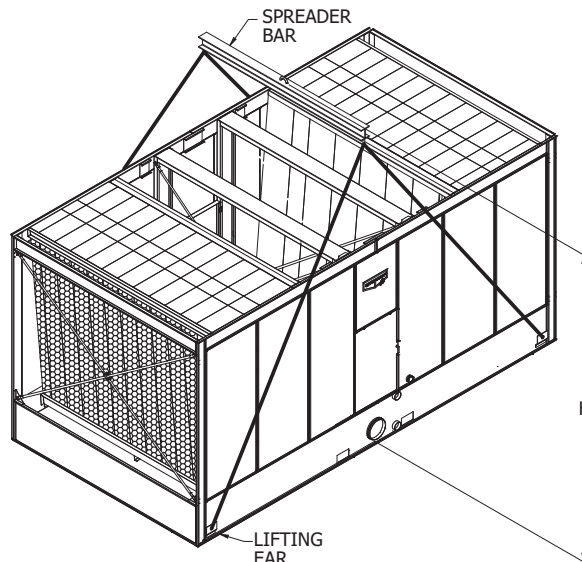


Figure 5 – AXS Double Stack Bottom Section Min. "H" Dimension



After bottom section is in place, refer to Figure 6 for instructions to rig top section. The lifting ears are located toward the top of the unit, as shown below. The spreader bar to which the hook of the crane attaches, must be a minimum dimension of "H" above the lifting ears.

Minimum "H" Dimension

- 12' Wide AXS = 8'
- 14' Wide AXS = 10'

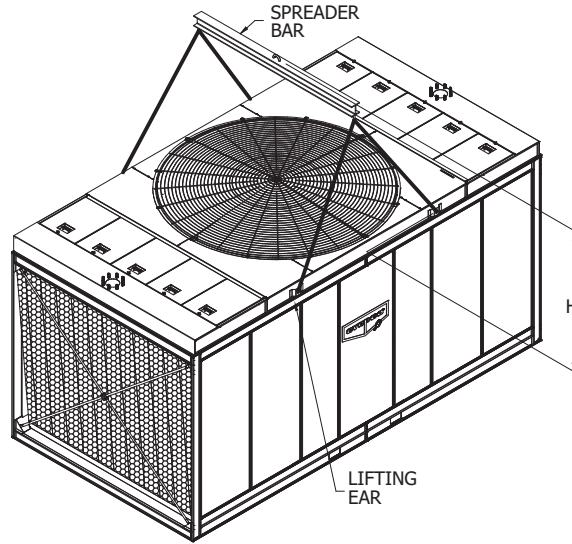


Figure 6 – AXS Double Stack Top Section Min. "H" Dimension

Joining Top and Bottom Sections of the AXS Double Stack

Once the bottom section of the AXS double stack has been set and bolted onto the structural steel support, sealer tape application must be completed before the top section is lifted and rigged.

Sealer tape must be laid on the flanges of both long sides, such that it is centered over the mounting holes. See "Detail A" of Figure 7 below. The fill supports will also need to have a layer of sealer tape, as shown in "Detail B" of Figure 7 below.

At the points where the fill supports meet the flanges on the long sides, the sealer tape must overlap, and a small piece of sealer tape must be applied perpendicular to the tape from the fill support to ensure a watertight seal.

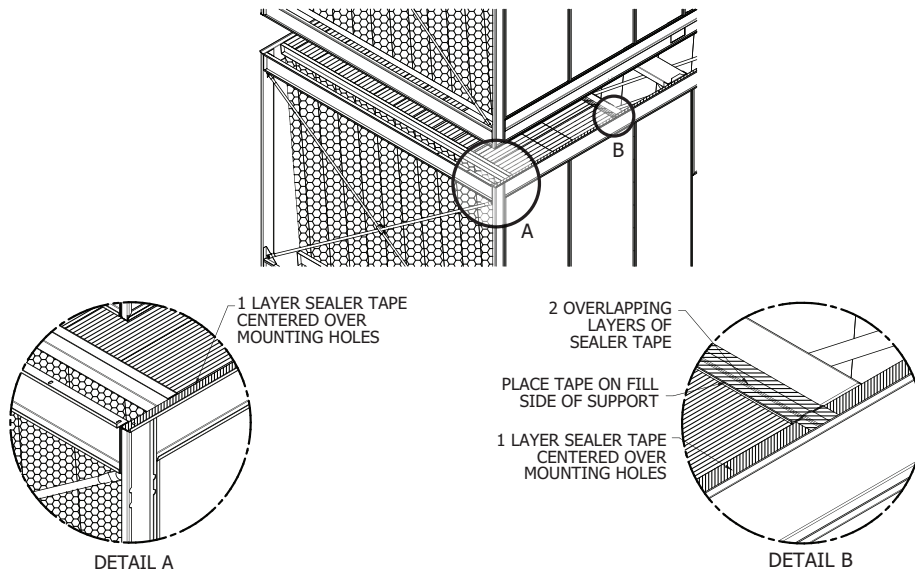


Figure 7 – AXS Double Stack Sealer Tape and Bolting Detail

Once sealer tape has been applied to the appropriate locations on the bottom section, proceed to rig the top section.

Bolting is required at the center attachments on the long sides (See “Detail B” of Figure 8), and at the unit corners.

In addition to the alignment aids provided (see “Detail A” of Figure B), the use of drift pins to align bolt holes on the air intake sides is encouraged.

Holes in the mating flanges are 3/4” in diameter, and the top section can be fastened to the bottom using the 3/8” hardware provided, as depicted in “Detail C” of Figure 8.

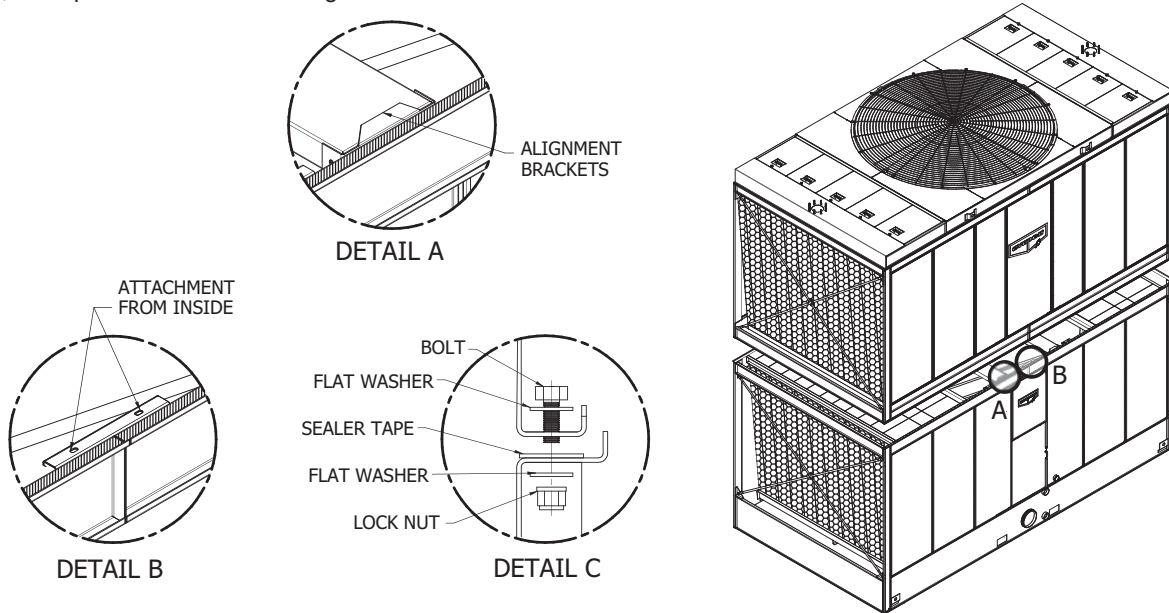


Figure 8 – Rigging Top Section

Joining Multi-Cell AXS Single and Double Stack

AXS towers selected in multi-cell configurations may come with a connecting equalizer flume between them. The number of flume boxes in the total arrangement will depend on the number of towers selected. For example, a dual cell arrangement calls for one flume box, three cell arrangements call for two flume boxes, with the center cell having one flume box on either side, and so on. The equalizing flume always ships loose in the basin(s). It is important to connect the flume box to balance the water level in the pans for proper pump suction operation. Flume boxes are not required if the towers are being provided with equalizer connections (piping by others).

1. Install the AXS single stack, or bottom section of the double stack as described in the rigging instructions.
2. Clean the flanges of the equalizer flume openings on all cells. Apply a layer of sealer tape around the flume openings on all cells, centered over the bolt holes. Remove paper backing strip from the sealer tape.
3. Clean the mating flange on the equalizer flume opening of any dirt, grease or moisture.

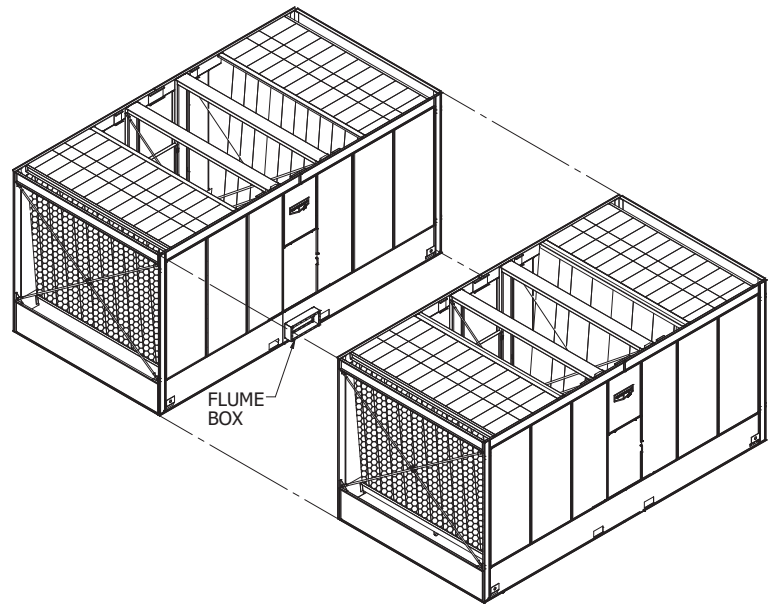


Figure 9 – Flume Box to Equalize Multi-Cell Arrangements

4. The side of the flume box which has the studs installed in it should now be connected to the side panel. The studs are pushed through the sealer tape and holes of the side panel and are secured by washers, lock washers and nuts.
5. Rig the second AXS single stack, or bottom section of the double stack adjacent to the equalizer flume on the steel support.
6. Align the bolt holes in the equalizer flume and the equalizer opening with drift pins, while drawing the second bottom section against the flanged connection (Figure 10).
7. Install 3/8" bolts, nuts and washers in every hole around the equalizer flume opening and tighten.
8. Bolt the second AXS single stack, or bottom section of AXS double stack to the steel support.
9. Continue this process for all additional cells.

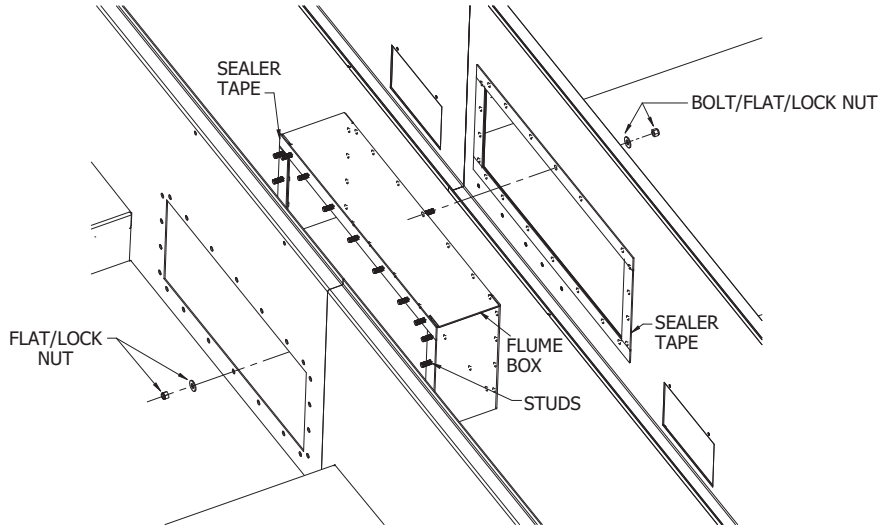


Figure 10 – Flume Box Detail

Optional Flume Box Blank-Off Plate for All Multi-Cell Units

An accessory is available to isolate the bottom sections for individual cell operation, periodic cleaning or maintenance. This optional blank-off plate is secured to the flume box with nuts and ships in the basin.

For applications not requiring the blank-off plate, remove the nuts, washers and plate. Reinstall washers and nuts for proper leak free operation of the flume box.

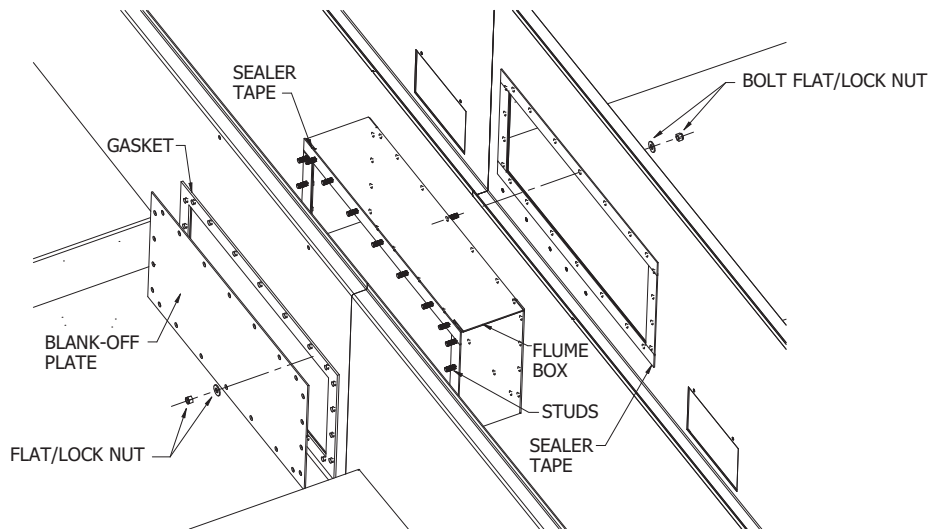


Figure 11 – Optional Blank-Off Plate on the Flume Box

Mounting Fan Screens and Fan Screen Supports

Fan screen(s) and fan screen support(s) ship loose in the basin for field assembly. Please follow the below instructions to complete the assembly:

1. Secure the fan screen support as depicted in "Detail A" of Figure 12.
2. Place both halves of the fan screen on top of the fan screen support frame. Each half will be tagged to match markings on the cylinder. Align the eyelets on the fan screen with the holes on the cylinder perimeter.
3. Join the two screen halves with U-bolt wire clips, spaced evenly, as shown in "Detail B" of Figure 12.
4. At each hole, attach the fan screen to the discharge cylinder as shown in "Detail D" of Figure 12. At the four points where the fan screen support frame meets the cylinder, bolt the support frame to the cylinder together with the fan screen.

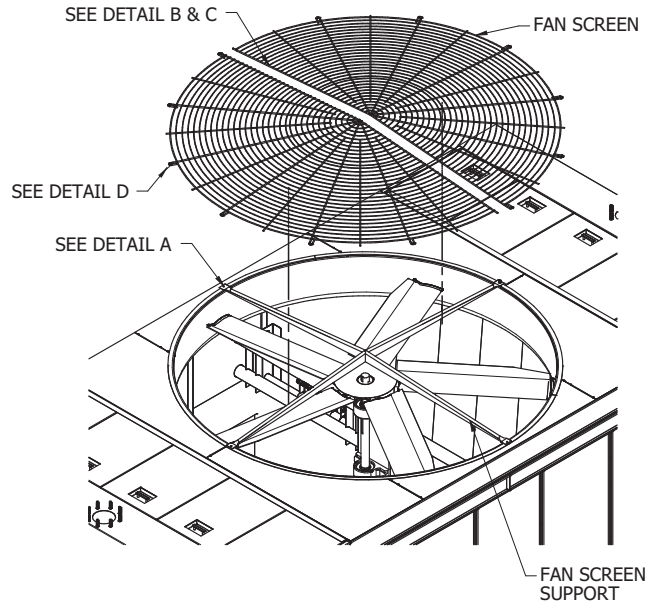
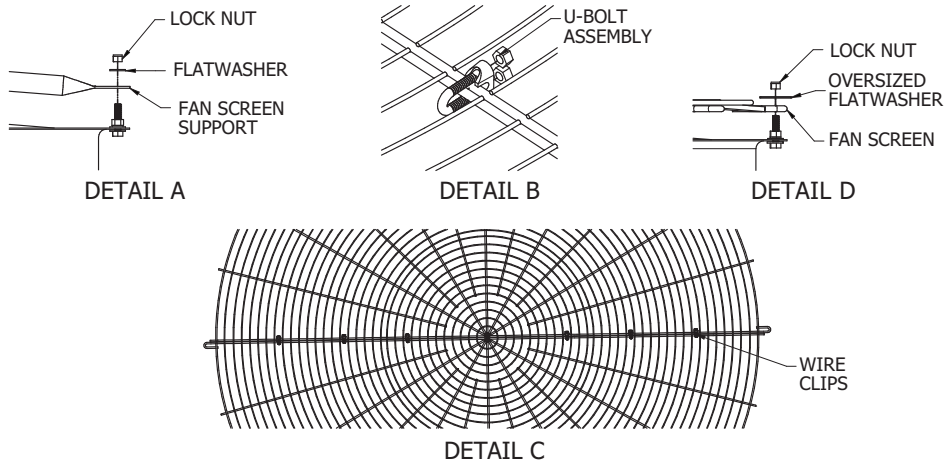


Figure 12 – Fan Screen and Fan Screen Support Frame

CAUTION: DO NOT WALK ON THE FAN SCREENS AT ANY TIME!





Super Low Sound Fan and Fan Cylinder Extension Installation

Due to shipping restrictions, the super low sound fan and fan cylinder extension will ship crated for field assembly on 11' and 22' tall units. Please follow the instructions below for proper fan installation.

Remove locking collar and retaining plate, as shown in "Detail A" of Figure 13 below.

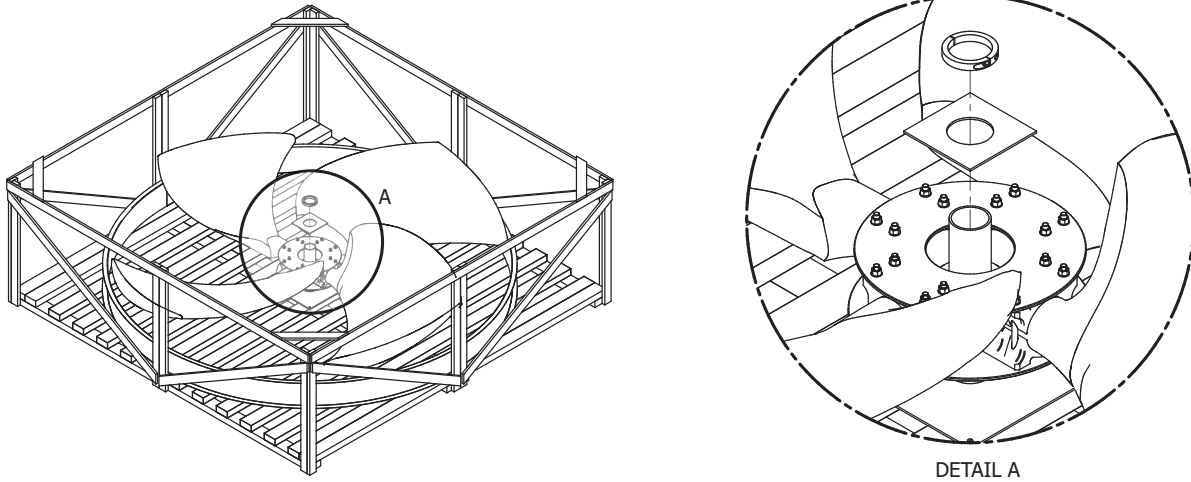


Figure 13 – Crated SLSF

Wrap slings around the blade shanks and lift fan from the crate, as shown in "Detail A" of Figure 14 below.

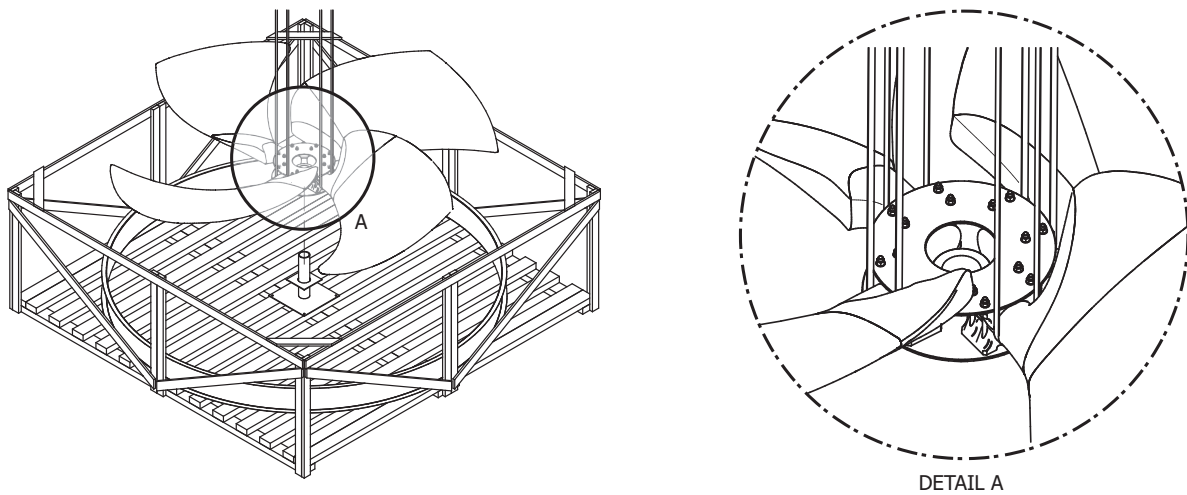


Figure 14 – Removing Fan from Crate

Slowly lower the fan onto the shaft, until the bottom of the hub is flush with the factory installed locking collar.

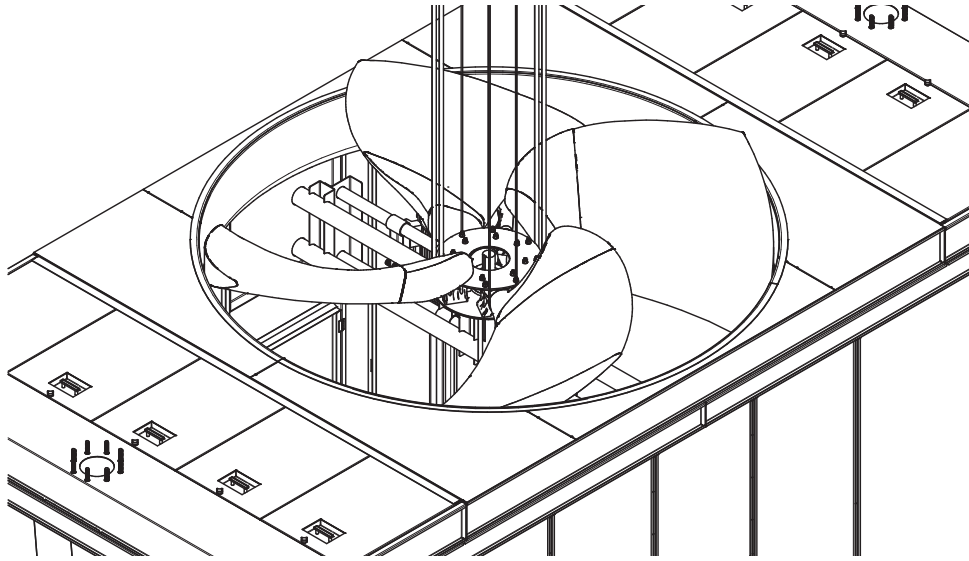
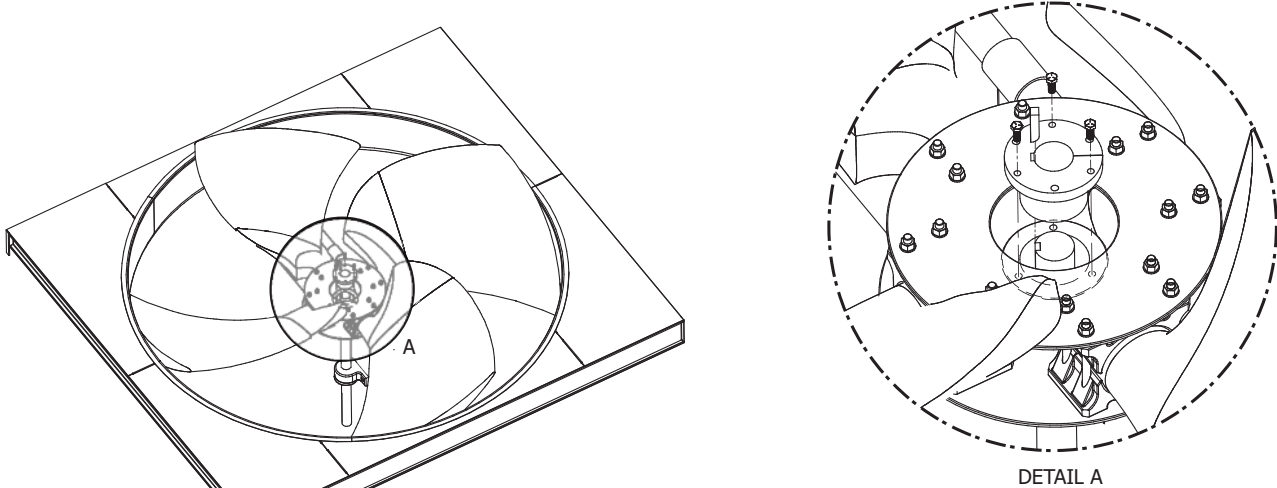


Figure 15 – Lowering Fan onto Shaft

Line up key slots and gradually tighten the three bushing bolts on the taper-lock bushing such that it locks onto the shaft and sits evenly in the hub flange. See “Detail A” of Figure 16 below



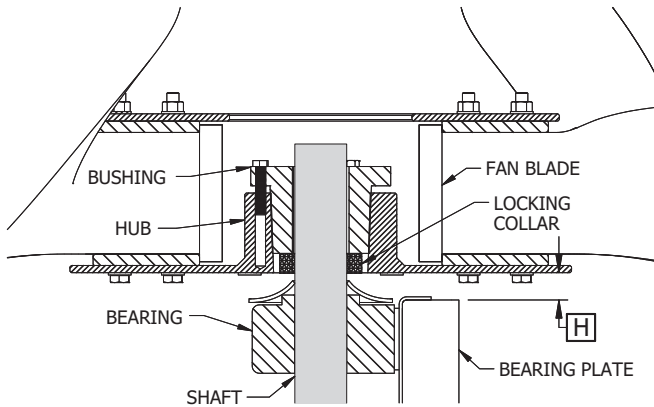
Bushing	Torque	Bolt
J	135 ft-lb. 180 N.m	5/8 – 11 x 4-1/2”

Figure 16 – Installing Taper Lock Bushing



AXS Induced Draft Crossflow Cooling Towers

Once the taper lock bushing has been installed, please verify "H" dimension per Figure 17 below, to ensure proper fan placement with respect to the bearing plate.



Fan Diameter (In.)	Unit Size	"H" Height (in)	"H" Height (mm)
132	12 x 22	1	25
156	14 x 24	1-1/4	35

Figure 17 – Verifying Fan Placement

Install fan cylinder per below, using "Detail A" and "Detail B" for reference. Please ensure that the fan screen supports have been installed along with the fan screen prior to installing the cylinder.

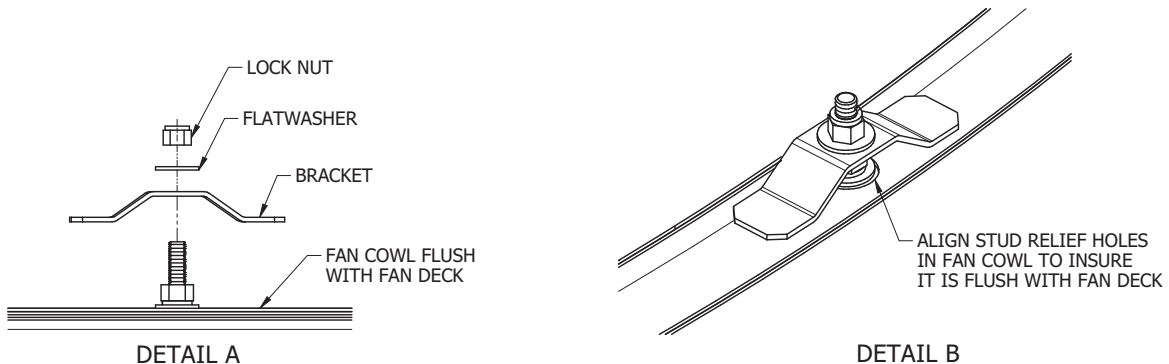
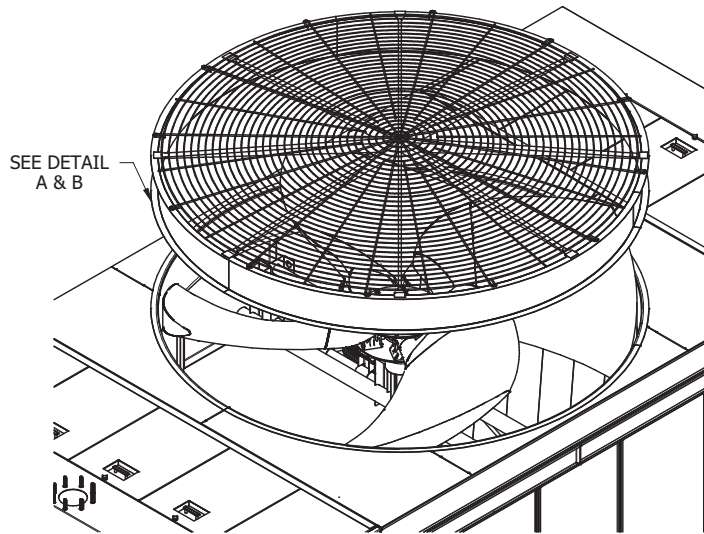


Figure 18 – Installing Fan Cylinder

Inlet Piping

The AXS cooling towers have three possible piping configurations. A single side inlet, a single bottom inlet, or dual top inlets. The single side and bottom inlets have their internal piping configured such that the flow to both hot water basins, which are located on the fan deck, is balanced. Single side inlets are available in single or dual cell configurations. In multiple cell configurations, bottom inlets or dual top inlets are typical.

If EVAPCO provides a unit with a side inlet, the two connecting pieces of pipe which are located on the fan deck, as shown in Figure 19, are provided. They must, however, be piped in the field.

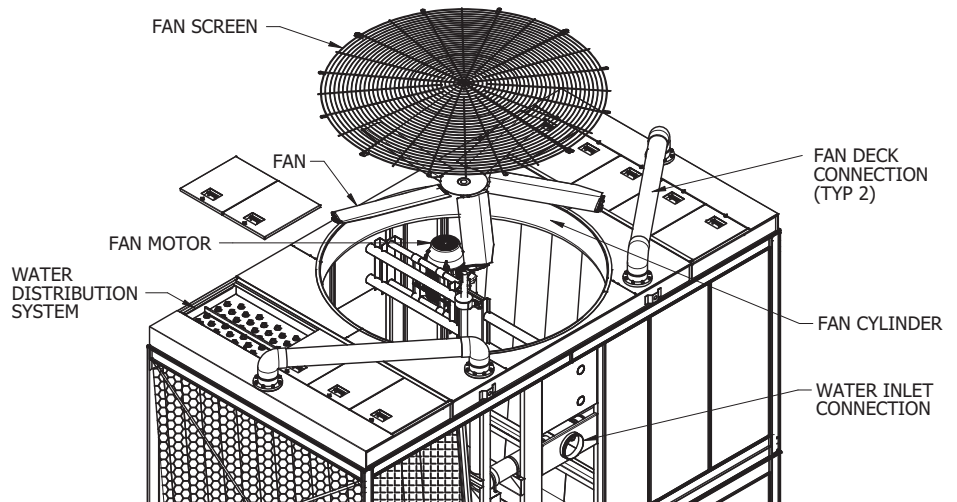


Figure 19 – Single Side Inlet

If a unit with a bottom inlet is provided, as shown in Figure 20, the internal riser pipe, pipe connector and clamps, and the two connecting pieces of pipe which are located on the fan deck are provided. If units are provided with dual top inlets, no piping is provided from the factory.

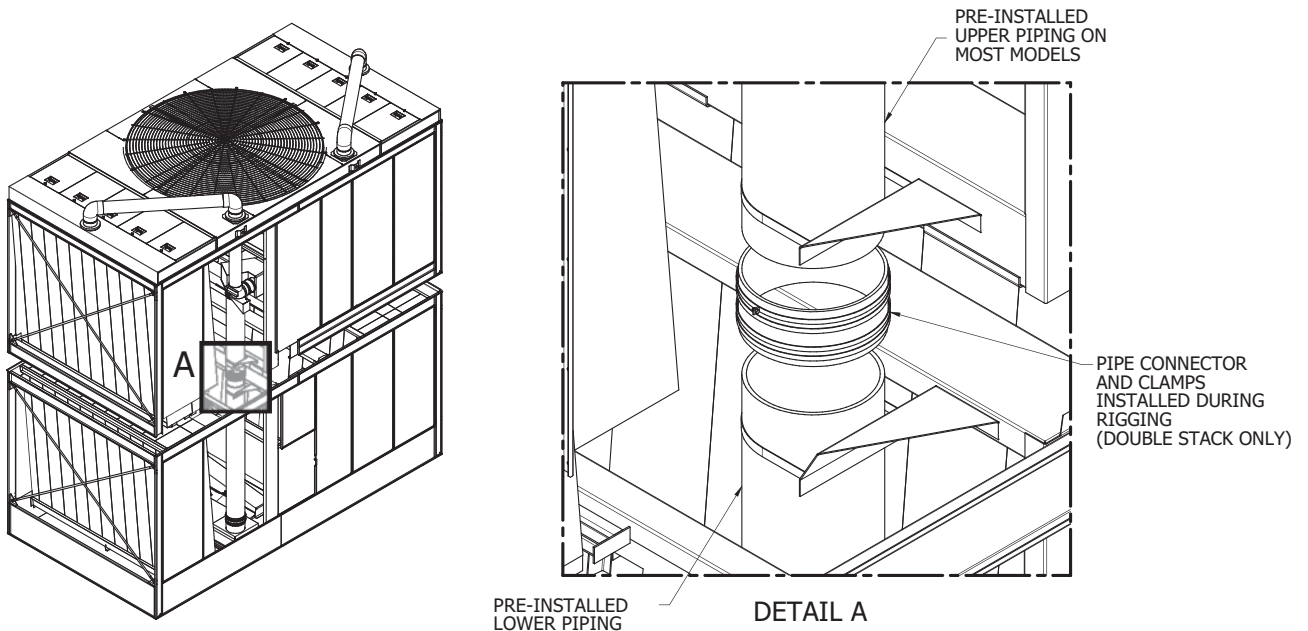


Figure 20 – Bottom Inlet

Due to shipping restrictions, the ASME 150 bolt flange pattern plates on the fan deck are recessed. To bring the connections to the surface, the two 3/8" bolts which sit on either end of each plate must be tightened. Figure 21 below, provides a transparent explanation.

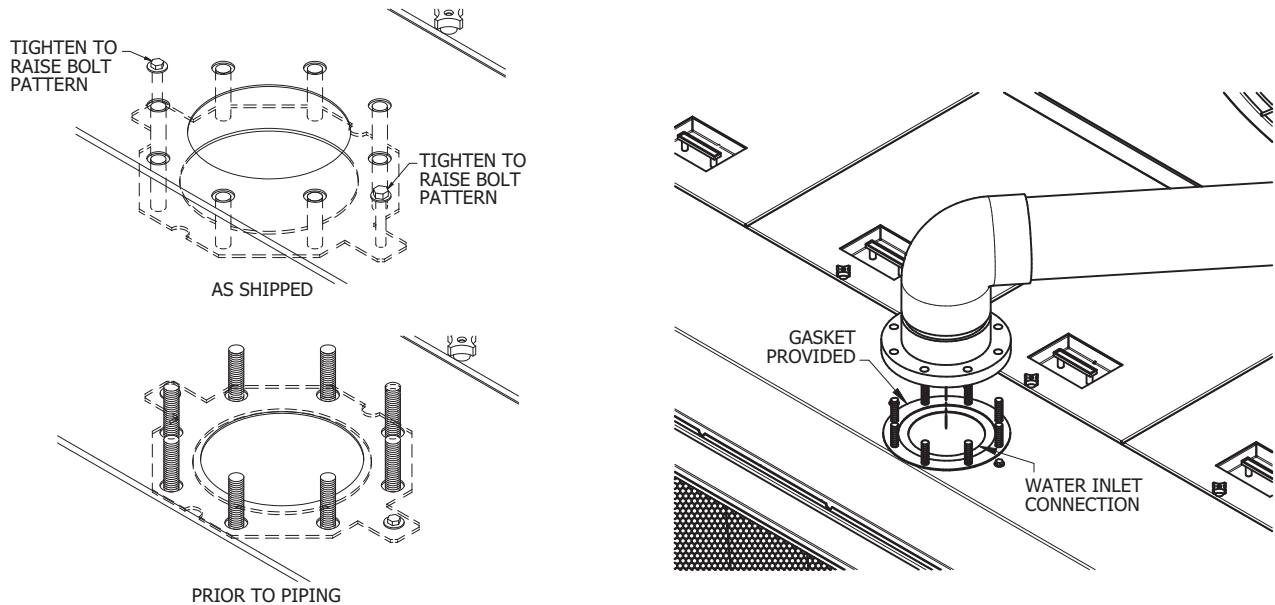


Figure 21 – Recessed ASME 150 Bolt Flange Pattern Plate Setup

Outlet Piping

The AXS cooling towers have three possible outlet piping configurations. A side outlet, a bottom outlet, or a side outlet depressed sump box. Side outlets are provided as standard in single or dual-cell configurations. In situations where more than two cells are to be installed side-by-side, bottom outlets or side outlet depressed sump boxes can be provided. Side and bottom outlets require no assembly in field, with the exception of connection to external piping. Side outlet depressed sump boxes ship loose in the basin, and require installation in field. Please follow below instructions to complete installation of the side outlet depressed sump box:

1. Locate square opening in the deepest part of the towers basin. Apply sealer tape over the bolt holes surrounding the opening, as shown in Figure 22.
2. Lower the side outlet depressed sump box through the opening such that the bolt holes on its flanges match up with the holes surrounding the opening.
3. Complete installation using provided hardware, as shown in "Detail A" and "Detail B."

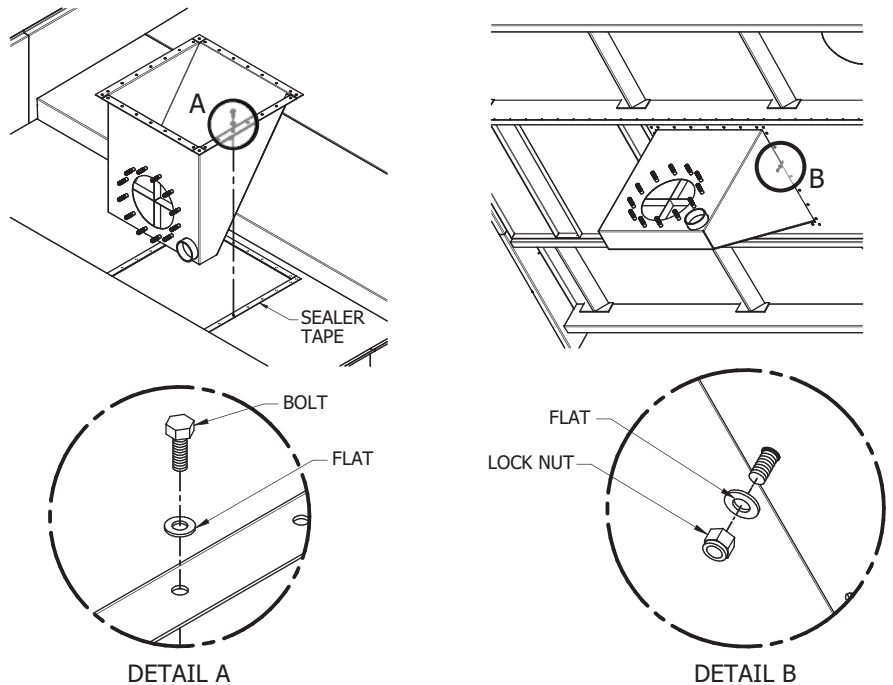


Figure 22 – Side Outlet Depressed Sump Box Installation

Perimeter Handrail and Ladder Installation

The perimeter handrail and ladder assemblies are shipped in the basin of the unit. In some cases they are shipped separately due to basin accessories that interfere with storage. The perimeter handrails and toeboards are partially assembled prior to shipment for minimal field assembly. If a safety cage is provided with the ladder, it ships along with the ladder.

Perimeter handrail mounting brackets are factory installed, and are located along the edges of the unit, as shown in "Detail A." The ladder mounting brackets are also factory installed to facilitate mounting the ladder in the field.

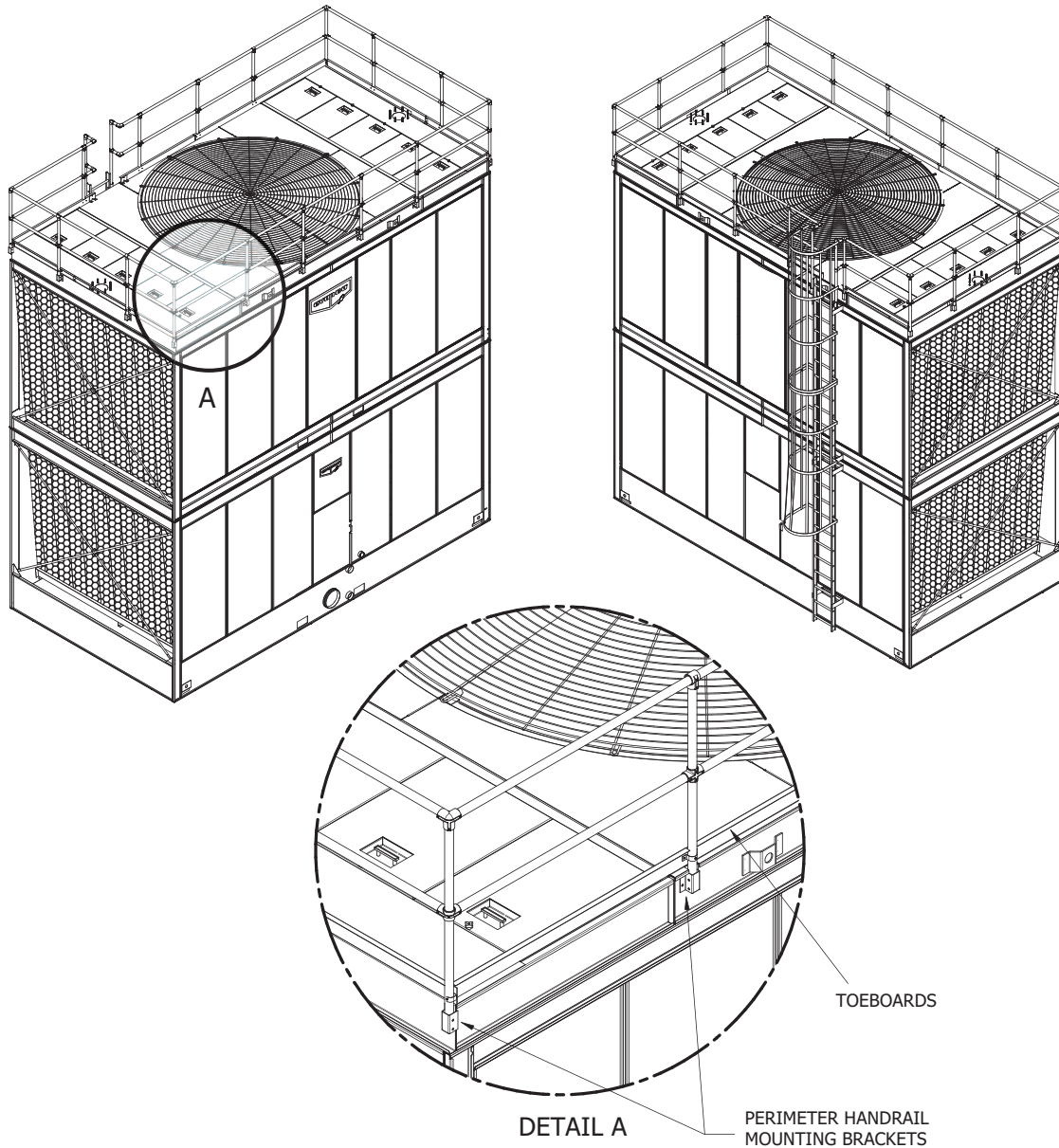


Figure 23 – Perimeter Handrails and Ladder Assembly



General Information – Start-up & Maintenance

Remove any chocks that have been placed inside the unit for shipping purposes. Clean all debris from the pan prior to start-up. Close and secure all access doors.

Belt Tensioning and Sheave Alignment

All AXS towers which come equipped with Belt Drive systems, have factory mounted motors and belts. The motor is fastened to a sliding base, which facilitates belt tensioning. Check the belt tension by applying moderate hand pressure to the center of the belt, which should deflect approximately 1/2".

As a final check, confirm the sheave alignment by laying a straight edge sheave to sheave. See Figure 24 for drive system layout.

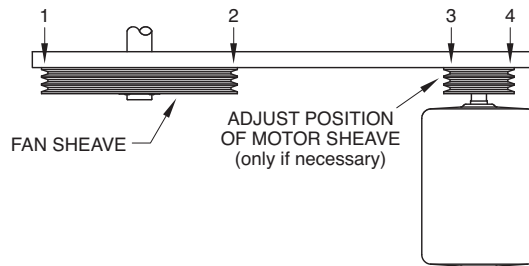


Figure 24 – Sheave Alignment Check

Bleed-off Line

Make sure a bleed line and valve are installed on the pump discharge side of the system piping to a convenient drain. The bleed-off valve should be open.

Adjustment of Float Valve

The float valve should be adjusted to maintain the proper water level as specified in the maintenance instructions. At start-up, the pan should be filled to the overflow level.

Strainer

Check the strainer(s) in the pan to make sure they are in the proper location over the pump suction, alongside the anti-vortex hood. Refer to Figure 25, which delineates a typical arrangement.

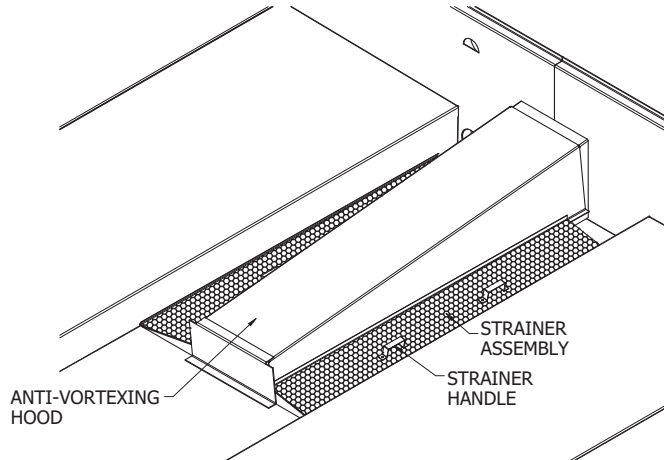


Figure 25 – Strainer Location

Screens

Protective fan screens and fan screen supports are provided across the top of the fan cylinders of all models. Check and tighten all bolts.

Maintenance

Once the installation is complete and the unit is turned on, it is important that it be properly maintained. Maintenance is not difficult or time-consuming but must be done regularly to assure full performance of the unit. Refer to the “Operation and Maintenance Instructions” enclosed with the unit for proper maintenance procedures.

Freeze Protection

Proper freeze protection must be provided if the unit is located in a cold climate. Refer to “Operation and Maintenance Instructions” as well as product bulletins for further information.



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