



Rigging and Assembly Instructions

10' & 12' WIDE AT/UT/USS INDUCED DRAFT COOLING TOWERS

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Introduction

Thank you for purchasing your EVAPCO cooling tower. This manual will provide instructions for installation of the cooling tower. If you have purchased a model UT cooling tower or USS with the Super Low Sound Fan option, please be sure to pay attention to the proper rigging instructions for that special option enclosed herein. If any questions arise during the installation, please contact your local EVAPCO representative or us directly at our World Headquarters location.

Method of Shipment

All 10' and 12' wide units are shipped with the top section(s) separate from the bottom section(s). These sections have mating flanges and will join together in a waterproof joint when sealed and bolted together as described in the following instructions. Miscellaneous items, such as sealer tape, self-tapping screws and any other required materials, are packaged and placed inside the pan for shipment. For units consisting of multiple cells, drip channels and splash guards will ship loose in the basin for field installation.

Storage

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

Structural Steel Support

Two structural "I" beams running the length of the unit are all that is required for support of the units. These beams should be located underneath the outer flanges of the unit (see Figure 1). Mounting holes, 3/4" in diameter, are located in the bottom flange of the unit to provide for bolting it to the structural steel (see certified print for exact bolt hole location). Bolt the bottom section to the steel support before rigging the top section.

Beams should be sized in accordance with accepted structural practices. Maximum deflection of the beam under the unit to 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 (see certified print for operating weight).

The supporting "I" beams should be level before setting the unit. Do not level the unit by shimming between the bottom flange and the beams as this will not provide proper longitudinal support.

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

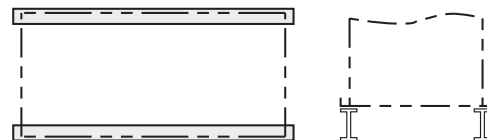


Figure 1 – Structural Steel Support

Lifting Bottom Section

Lifting devices are located in the inside corners of the bottom section for lifting and final positioning purposes as shown in Figure 2. The hook of the crane must be a minimum dimension of “H” above the lifting device to prevent undue strain on the lifting devices. See Table 1 for the minimum “H” dimension. These lifting devices should not be used for extended lifts or where any hazard exists unless safety slings are employed under the section. **(See “Extended Lifts” on page 6 for proper arrangement.) Bolt the bottom section to the steel support before rigging the top section.**

Table 1 – Minimum “H” Dimension for Bottom Sections

Model No.	Min. “H” Dim.
All 10’x12’ and 12’x12’ Cells	15 Feet
All 12’x14’ Cells	17 Feet
All 10’x18’ and 12’x18’ Cells	19 Feet
All 12’x20’ Cells	21 Feet

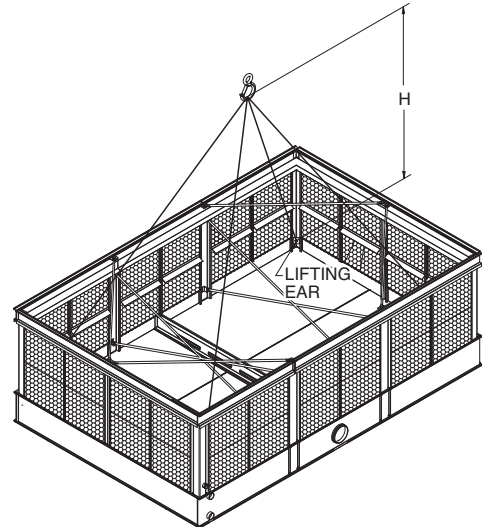


Figure 2 – Bottom Section

Joining Multi-Cell Units Bottom Sections

On all 2 cell models, the two bottom sections are shipped separately and are furnished with a connecting equalizer flume between them. On all 3 cell models, the three bottom sections are shipped separately and are furnished with two connecting equalizer flumes between them. In addition to the equalizer flumes, these units are provided with drip channels and splash guards to keep water from exiting between the cells. All units have one horizontal drip channel and two vertical splash guards (one for each side) per flume box. The equalizer flume is factory installed on one section for field connection to the other. It is important to connect the equalizer flume to balance the water level in the pans for proper pump suction operation. The following procedures are to be performed in sequence.

1. Install the bottom section with the factory installed flume box on it as described above.
2. Clean the flanges on the equalizer flume on the end to be field connected. Apply a layer of sealer tape on the flange centered between the hole centers and the outside edge. Remove paper backing strip from the sealer tape (see Figure 3).
3. Clean the mating surface of the equalizer flume opening of any dirt, grease or moisture.

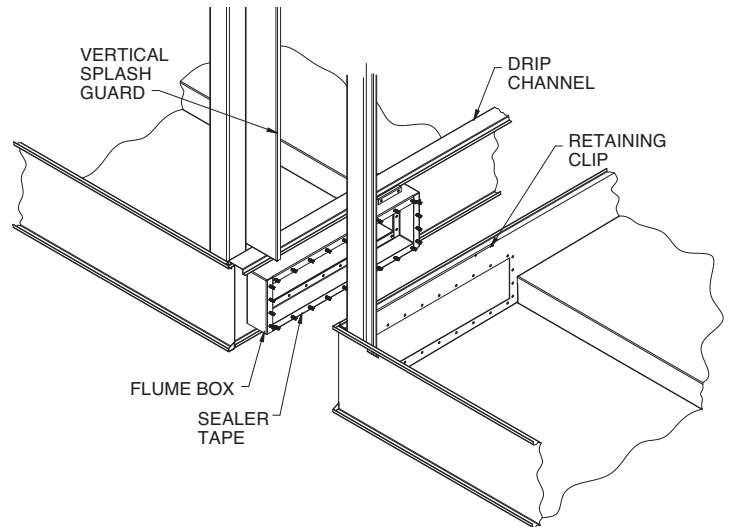


Figure 3 – Equalizer Flume Connection,



4. Rig the second bottom section adjacent to the equalizer flume on the steel support as shown in Figure 4.
5. Align the bolt holes in the equalizer flume and equalizer opening with drift pins (drift pins shall be provided by others) while drawing the second bottom section against the flanged connection.
6. Install 3/8" bolts, nuts and washers in every hole around the equalizer opening and tighten.
7. Bolt the second bottom section to the steel support.
8. Remove the 1/4" bolts which hold the drip channel retaining clips to the end panel. Place the drip channel over the adjoining pan section flanges. Turn around the retaining clips and re-install them using the same hardware. (See Figure 5)
9. Place the vertical splash guard in the bend of the vertical supports. On galvanized units, attach the vertical splash guard using 5/16" self-tapping screws. On stainless steel units, attach the vertical splash guard using 5/16" stainless steel nuts and bolts. (See Figure 5)

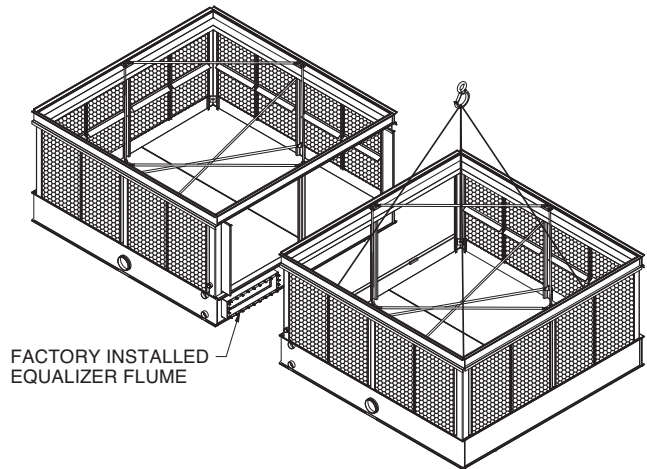


Figure 4 – Equalizer Flume Rigging Detail.

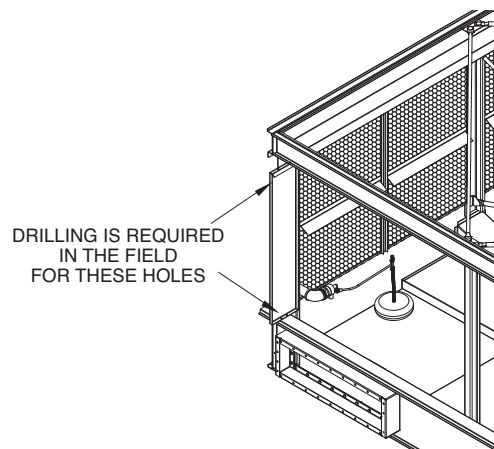


Figure 5 – Drip Channel and Vertical Splash Guard Installation

Optional Equalizer 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 equalizer blank-off plate is factory installed on the equalizer flume inside of the pan and secured by wing nuts. See Figure 6.

For units not requiring the blank-off plate under normal operating conditions, remove the wing nuts, washers, plate and gasket. Reinstall washers and wing nuts for proper leak-free operation of the flume.

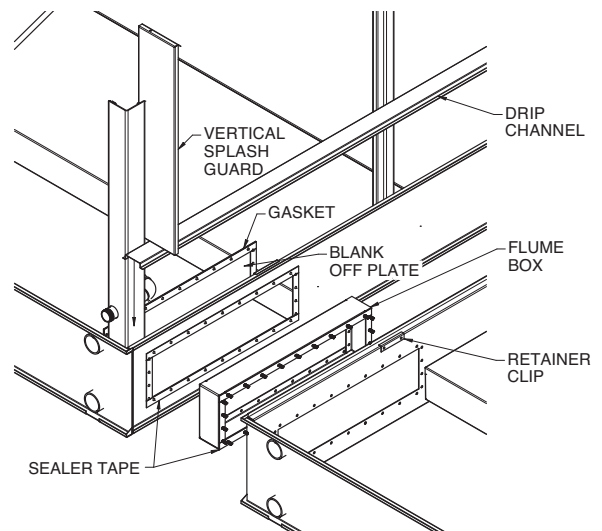


Figure 6 – Optional Blank-Off Plate on the Equalizer Flume

Application of Sealer Tape

Once the bottom section has been set on the supporting steel and bolted in place, the top flanges should be wiped down to remove any dirt or moisture. Sealer tape should be placed over the mounting hole centerline on the side flanges along the entire length of all sides. Apply two strips of sealer tape, one partially overlapping the other, on the entire length of the end flanges (flanges with no bolt holes).

The sealer tape should overlap on the corners as shown in Figure 7. Do not splice the sealer tape along the end flanges and preferably not on the side flanges if it can be avoided. **Always remove the paper backing from the sealer tape.**

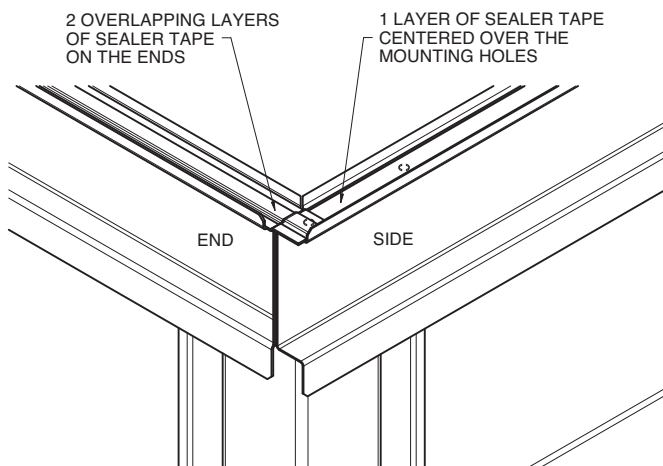


Figure 7 – Sealer Tape on Flange of Bottom Section

All models with two or more top sections must have sealer tape applied along the entire length of all internal flanges as shown in Figure 8.

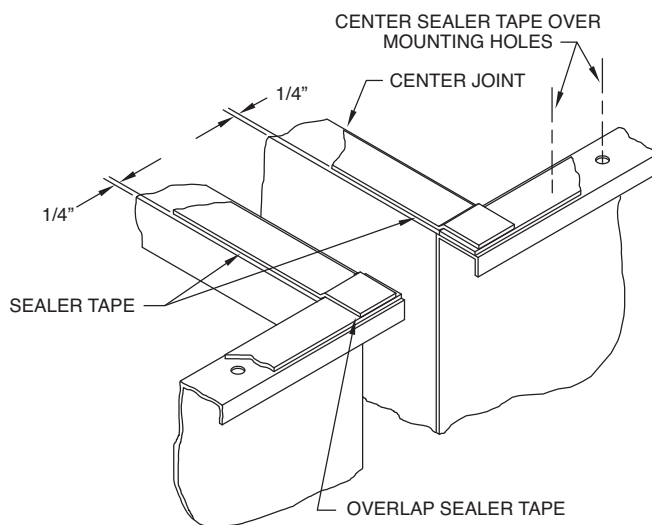


Figure 8 – Sealer Tape Detail for Center Joint of Units with Two or more Top Sections.

Rigging Top Section

“U” bolts are provided in the four corners of the top section for lifting and final positioning (See Figure 9). The hook of the crane must be a minimum dimension “H” above the top section being lifted to prevent undue strain on the “U” bolts. See Table 2 for the minimum “H” dimension.

Table 2 – Minimum “H” Dimension for Top Sections

Model No.	Standard Fan	Super Low Sound Fan
All 10'x12' and 12'x12' Cells	12 Feet	15 Feet
All 12'x14' Cells	13 Feet	17 Feet
All 10'x18' and 12'x18' Cells	14 Feet	19 Feet
All 12'x20' Cells	15 Feet	21 Feet

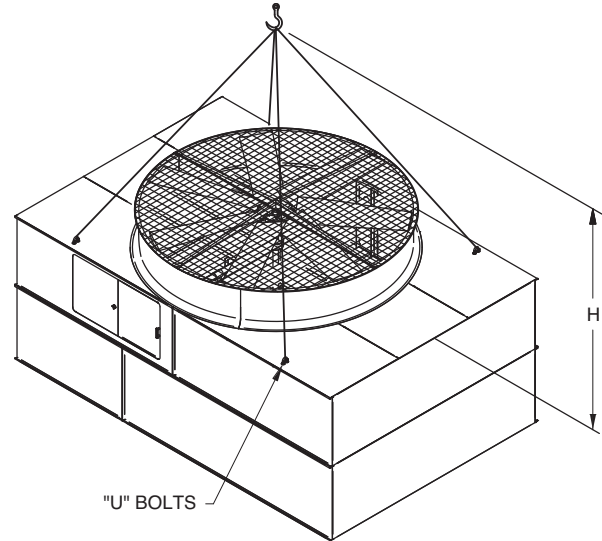


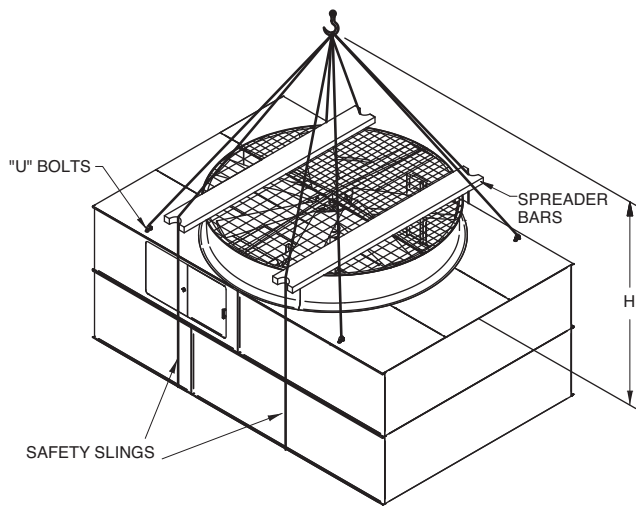
Figure 9 – Top Section(s)

Extended Lifts

Important: The lifting devices and “U” bolts should be used for final positioning only and for lifting where no danger exists. If they are used for extended lifts, safety slings should be provided under the sections.

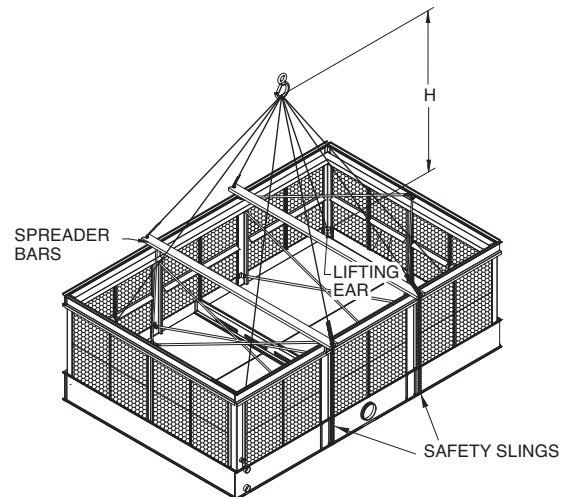
Safety slings and skids should be removed before final positioning of the unit.

The preferred method for extended lifts is to use slings under the unit (see Figure 10a and 10b). Spreader bars should always be used between the cables at the top of the section to prevent damage to the upper flanges or fan cylinders.



AT/UT/USS Top Section

Figure 10a – Proper Rigging Method for Extended Lifts (top section)



AT/UT/USS Bottom Section

Figure 10b – Proper Rigging Method for Extended Lifts (bottom section)

Fan Sections Shipped Separate From Casing Sections

If fan sections are designed to be rigged as a three-point lift, two pick points are the U-bolts on the fan deck and the third is the lifting ear on the mechanical equipment support (see Figure 11). The hook of the crane must be a minimum dimension “H” above the top section being lifted to prevent undue strain on the “U” bolts. See Table 3 for the minimum “H” dimension.

Casing sections will be rigged as a four-point lift. The pick points will be the four lifting points as shown on Figure 12. The hook of the crane must be a minimum dimension “H” above the top section being lifted to prevent undue strain on the “U” bolts. See Table 4 for the minimum “H” dimension.

After rigging, the installer will have to taper or bolt the end panels of the fan section to the end panels of the casing sections as well as all the side panel flanges. The fan screen will also have to be replaced and secured after rigging.

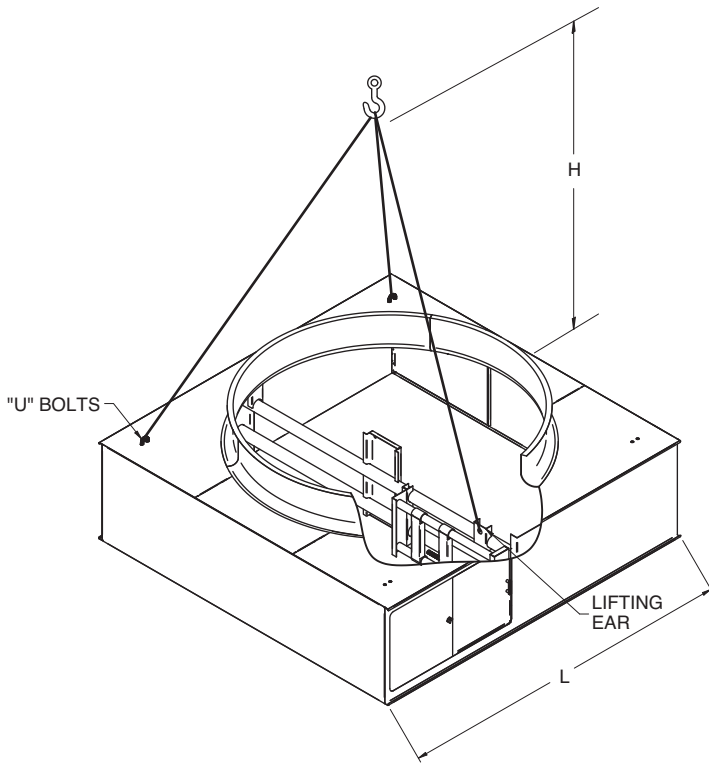


Figure 11 – Three Point Rigging of the Fan Section

Table 3 – Minimum “H” Dimension for Top Sections

Length (L)	“H” Standard Fan	“H” Super Low Sound Fan
12’	12’	15’
14’	13’	17’
18’	14’	19’
20’	15’	21’

Table 4 – Minimum “H” Dimension for Casing Sections

Length (L)	“H”
12’	12’
14’	13’
18’	14’
20’	15’

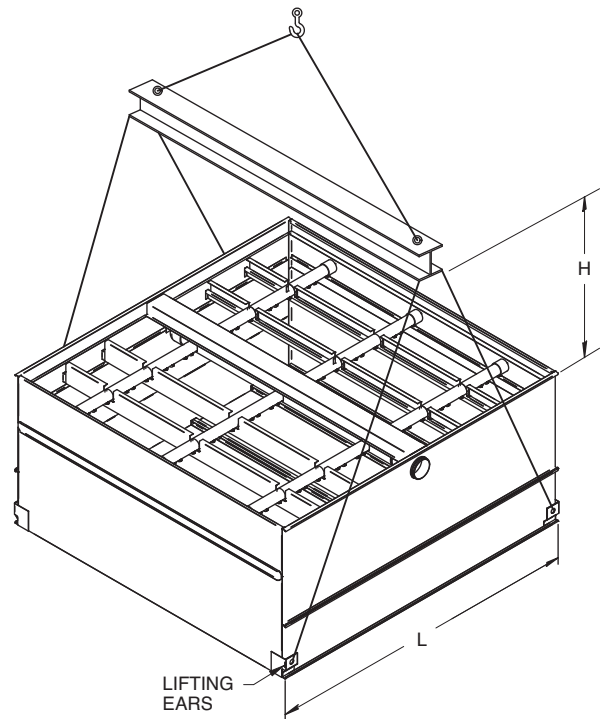


Figure 12 – Four Point Rigging of the Tower Casing Section with Added Lifting Ears



Assembly of the Top Section to the Bottom Section

Before securing the top section to the bottom section, remove any loose parts shipped in the pan.

Wipe the flanges on the bottom of the top section. Check to see that the water distribution connection on the top section is in the correct position relative to the bottom section (see certified unit drawing). Units are also provided with match markings on each section (i.e. A1 of bottom section should match up with A1 of top section).

Lower the top section to within several inches of the bottom section making sure the two sections do not touch and the sealer tape is not disturbed. Fasten all four corners. Install the remaining fasteners, working from the corners toward the center. Fasteners must be installed in every hole on the side flange. None are required on the end flanges. Galvanized and stainless steel units will use 3/8" nuts and bolts. See Figure 13.

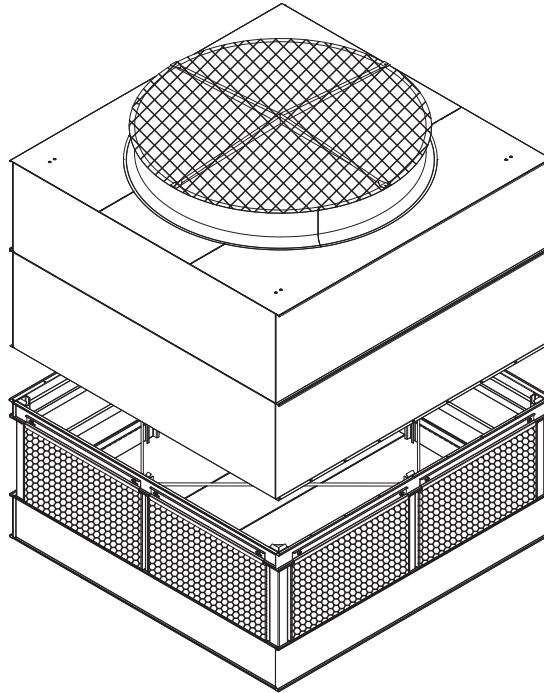


Figure 13 – Mating Upper Section to Bottom Section

Caution: 10' and 12' wide units cannot be rigged fully assembled.

Mounting Fan Screens

In certain situations some units may be shipped with the fan screens in the basin. Under these circumstances use the following procedures to mount the fan screen on the discharge cylinder.

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

1. Set the fan screen support frame across the top of the discharge cylinder. (See Figure 14).
2. Place both halves of the fan screen on top of the support frame. Each half will be tagged to match markings on the cylinder. Align the eyelets of the fan screen with the holes on the cylinder perimeter.
3. Join the two screen halves with wire clips (See Figure 15). There should be 4 clips on either side of the fan screen. Space them evenly as shown in Figure 16.
4. At each hole, attach the fan screen to the discharge cylinder as shown in Figure 17. At the four points where the support frame meets the cylinder, bolt the support frame to the cylinder together with the fan screen.

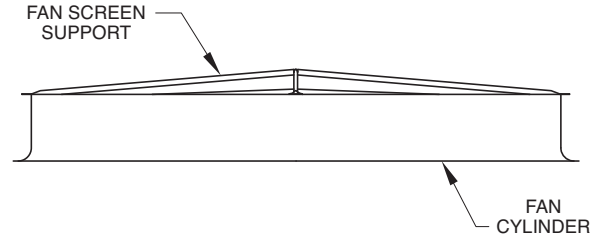


Figure 14 – Fan Screen Support Frame Installation

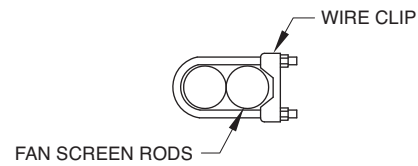


Figure 15 – Wire Clip Arrangement

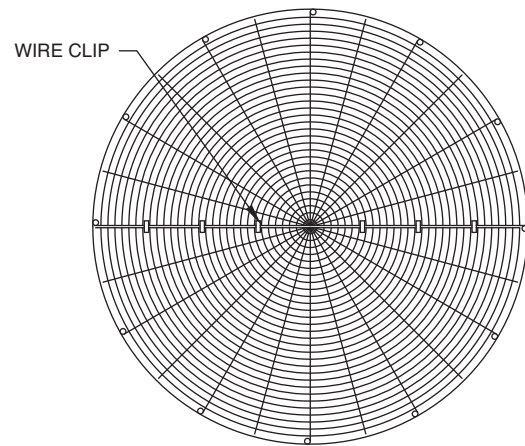


Figure 16 – Wire Clip Spacing

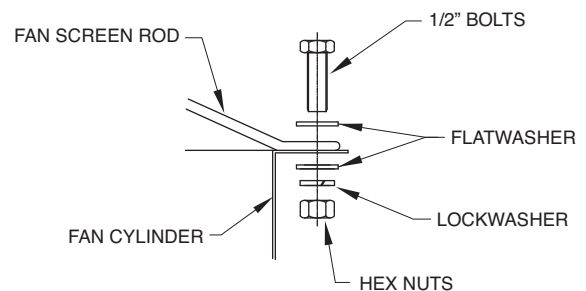


Figure 17 – Attachment of Fan Screen to Discharge Cylinder

Optional Motor & Gear Box Davit

An accessory is available to aid the removal of fan motors and gear boxes. The dual point davit arrangement consists of a davit and a mounting base that is to be attached to the side of the unit next to the access door (See Figure 18). Both of these items will ship in the unit's basin. On multiple cell units, there will be a mounting base on each cell. Use the following procedure to install the mounting base.

1. Align the mounting channel with 3/8" bolts and flat washers to the mounting bracket (factory mounted).
2. Use 3/8" flat washers, lock washer and nuts to secure the mounting channel to the bracket (See Detail A).

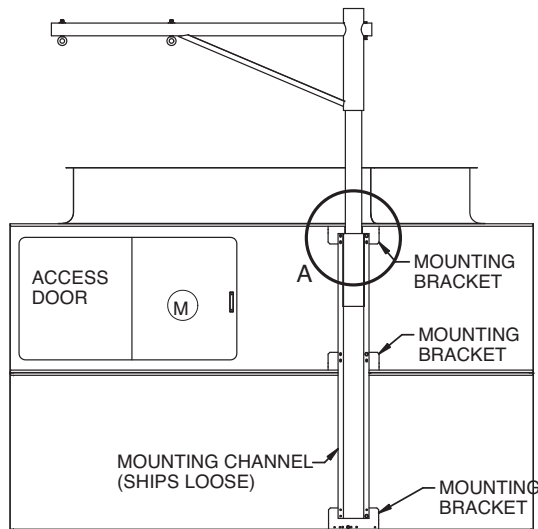
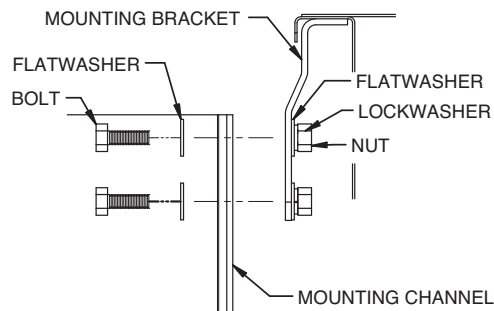


Figure 18 – Dual Point Davit Arrangement



Detail A – Mounting Base Installation

Assembly of Sloped Ladders

When sloped ladders are supplied with a unit, they are shipped in the basin of the unit. One sloped ladder will be provided for each cell. Assembly is identical for each cell.

Sloped ladders are attached at a minimum of three points. At each point of attachment, the ladder will be fitted with a ladder bracket assembly. The ladder bracket assembly looks like a metal box and is shown in detail (component #4) in Figure 20. The upper two assembly brackets will be rigidly mounted to the ladder and are not adjustable. These two brackets define the slope of the ladder. The lower bracket(s) are adjustable.

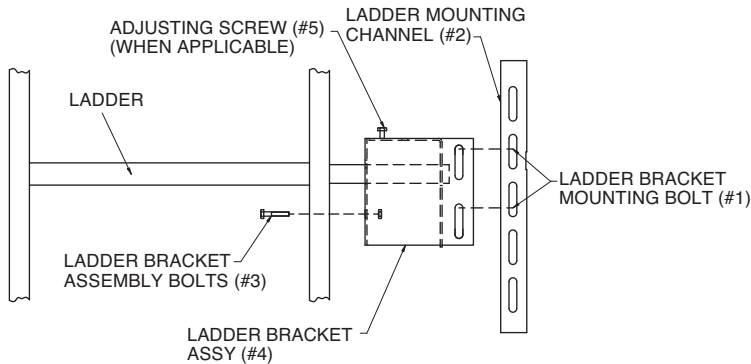


Figure 20 – Detail of Ladder, Ladder Bracket Assembly and Mounting Channel

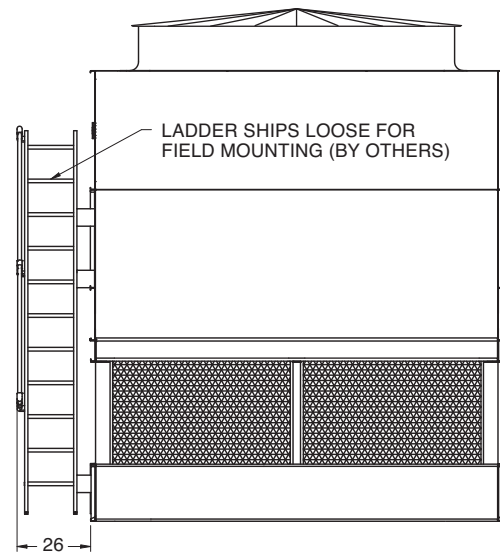


Figure 21a – End View of Ladder Assembly

To install the ladder assembly, follow the steps outlined below which refer to Figure 20:

1. Remove the ladder bracket mounting bolts (#1) from the ladder mounting channels (#2) on pan and casing sections.
2. Loosen, but do not remove, the ladder bracket and assembly bolts (#3).
3. Slide the ladder bracket assembly (#4) over the ladder mounting channels (#2) located on the pan and casing sections. Do not remove the ladder bracket assembly (#4) from the ladder.
4. Align the bolt holes and reinstall the ladder bracket mounting bolts (#1) through the ladder bracket assembly and the ladder mounting channels (#2).
5. Tighten all bolts.
6. Tighten the adjusting screw (#5) in the adjustable mounting bracket where applicable.

Note: Upper Section of Unit Must Be Properly Oriented with Respect to Lower Section. All Mounting Brackets Must be on Same Side of Unit. Refer to Certified Print For Proper Orientation.

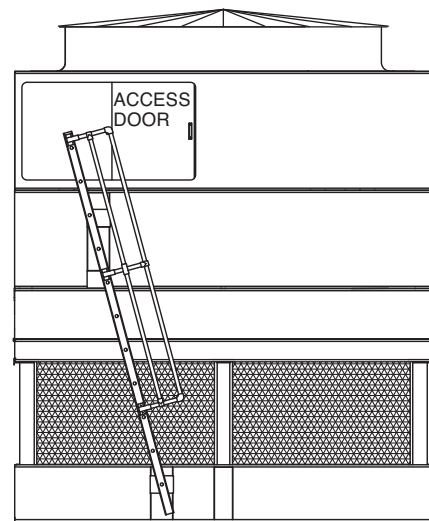


Figure 21b – Side View of Ladder Assembly



Field Assembly of Working Platform and Ladder

The working platform/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 platform is partially assembled prior to shipment for minimal field assembly.

For 10' and 12' wide units, there will be one working platform and ladder assembly per fan section.

The platform and ladder assembly should be attached after the unit is fully rigged following the instructions below.

Specific platform installation instructions are supplied in the rigging box shipped with the unit.

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Field Assembly of the Bottom Inlet Option

An option is available which locates the hot water inlet connection on the bottom of the unit. There is a bottom inlet connection assembly that ships loose and requires field installation. Follow these assembly instructions to complete the bottom inlet connection installation.

Assembly Instructions (Refer to Figure 22.)

(Read all instructions before proceeding)

1. Assemble the cooling tower in accordance with the unit Rigging & Assembly Instructions.
2. Find the bottom inlet connection assembly. The assembly, consisting of one pipe spool, two flexible reinforced pipe connectors and four pipe clamps per cell, comes uninstalled, fastened securely inside the basin section.
3. Position the bottom inlet connection assembly over the lower pipe nipple on the basin section. (see Figure 22.)
4. Loosen the pipe clamps and slip the pipe connector down over the lower pipe nipple.
5. Align the bottom inlet connection assembly with the upper pipe nipple on the unit fill section, loosen the pipe clamps and slip the connector up over the upper pipe nipple.
6. Tighten all pipe clamps. A ratchet wrench is recommended.
7. Repeat for multi-cell units.

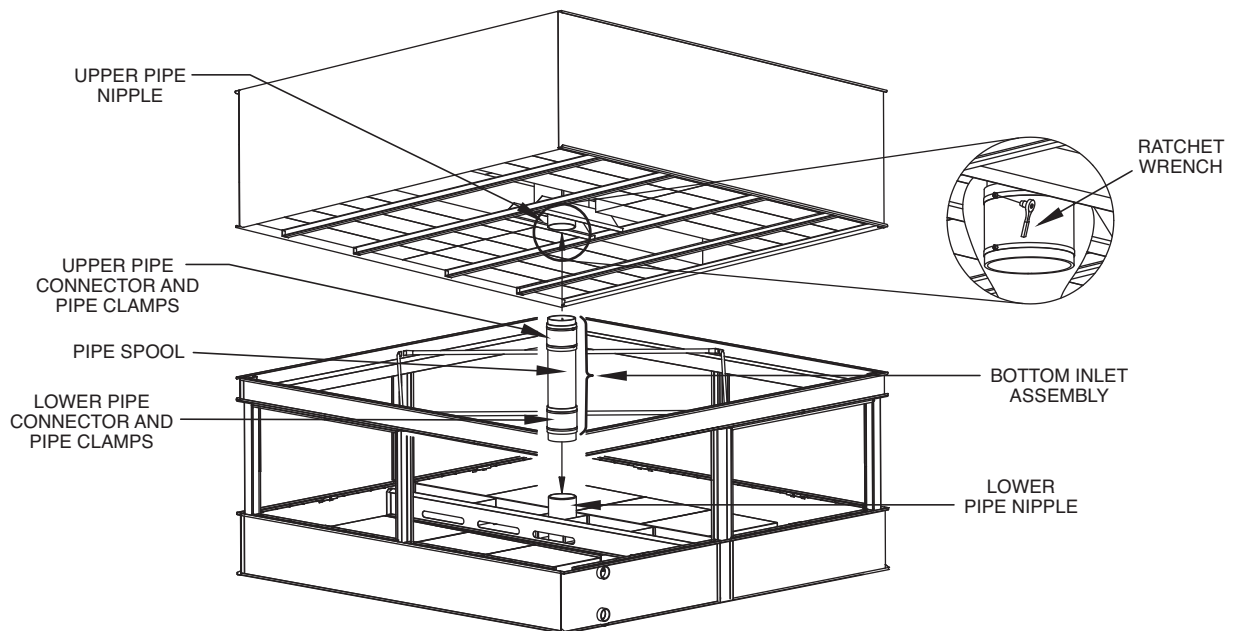


Figure 22 – Bottom Inlet Pipe Spool Installation

General Information - Start-up & Maintenance Details

Shipping Chocks and Debris

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

Belt Tensioning and Sheave Alignment

AT/UT/USS units are equipped with a factory mounted motor on a sliding base with single bolt adjustment on each motor. Check the belt tension by applying moderate hand pressure to the center of the belt, it should deflect approximately 1/2". As a final check, confirm the sheave alignment by laying a straight edge from sheave to sheave. There should be four point contact (see Figure 23).

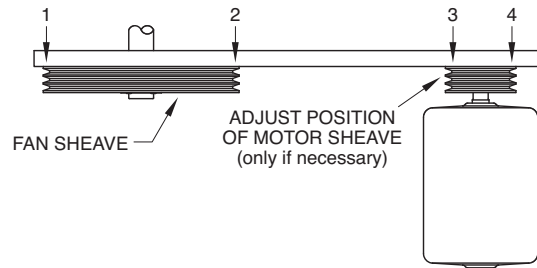


Figure 23 – Sheave Alignment Check

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. For installation details, see the "Operation and Maintenance Instructions, Bulletin 113 (latest edition).

Strainer

Check the strainer(s) in the pan to make sure they are in the proper location over the pump suction, alongside of the anti-vortex hood. (see Figure 24)

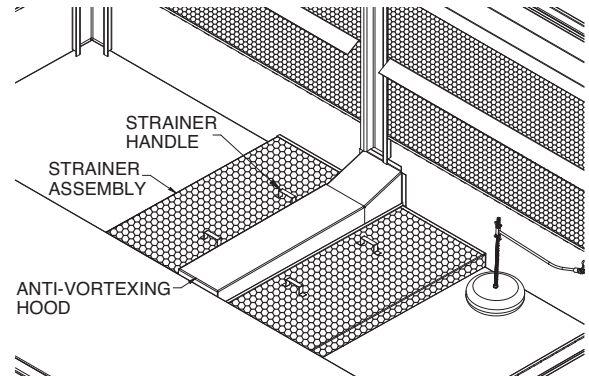


Figure 24 – Strainer Location

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.

During operation, the water level will be no more than 5" below the overflow. The water level can be checked during operation by opening the removable louver section at the valve while the pump is running and the fans are off.



Screens

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

Starting Sequence

Before starting the unit, check that all access openings, safety screens and covers are in place. Start the unit as outlined below:

1. Fill the pan to the overflow level.
2. Start the cooling tower pumps (by others). Check the water flow to the unit by checking the spray water pressure at the water inlet. It should be the same as the pressure indicated on the certified drawing.
3. Start the fans. Check the fans for proper rotation. Directional arrows are on the side of the fan cylinder.

NOTE: DO NOT OPERATE THE FANS WHILE THE PUMP IS OFF. DAMAGE TO THE PVC FILL CAN RESULT DURING DRY OPERATION. ALWAYS START THE COOLING TOWER PUMPS FIRST, WITH THE FAN MOTORS FOLLOWING.

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 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 maintenance instructions as well as product bulletins for further information.



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