



Rigging and Assembly Instructions



8.5' WIDE AT/UT/USS INDUCED DRAFT COOLING TOWERS

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AT/UT/USS Cooling Towers

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 AT 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 Global Headquarters location.

International Building Code Provisions

The International Building Code (IBC) is a comprehensive set of regulations addressing the structural design and installation requirements for building systems – including HVAC and industrial refrigeration equipment. As of June 2008, all 50 states plus Washington D.C. have adopted the International Building Code. The code provisions require that evaporative cooling equipment and all other components permanently installed on a structure must meet the same seismic design criteria as the building. The AT/UT/USS Series of Open Cooling Towers are IBC 2006 compliant up to 1g with standard construction and up to 5.12g with additional structural modifications.

All items attached to the Evapco AT/UT/USS cooling tower must be independently reviewed and isolated to meet applicable wind and seismic loads. This includes piping, ductwork, conduit, and electrical connections. These items must be flexibly attached to the Evapco unit so as not to transmit additional loads to the equipment as a result of seismic or wind forces.

Method of Shipment

Models 19-56 through 39-942 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. A list of these items appears on page 10. For units consisting of multiple cells, drip channels and splash guards will ship loose in the basin for field installation. In most cases the motors and belts are also shipped inside the pan for mounting during installation.

Storage

Do not place tarps or other coverings over the top of the units if the units 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 (6) months, rotate the fan and fan motor shaft(s) monthly. The fan motor and fan shaft bearings should also be purged and regreased prior to start-up.**

Structural Steel Support

Two structural “I” beams running the length of the unit are 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.

Rigging Bottom Section

Lifting Bottom Section

Lifting Devices are located in the upper 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 top of the section being lifted 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 5 for proper arrangement.)** Bolt the bottom section to the steel support before rigging the top section.

UNIT NO.	MIN. H
19-56 to 19-96	9 Feet
19-28 to 19-98	10 Feet
19-59 to 19-99	10 Feet
19-111 to 19-911	11 Feet
19-412 to 19-912	12 Feet
19-114 to 19-914	15 Feet
212-59 to 212-99	9 Feet
215-29 to 215-99	10 Feet
26-517 to 26-917	9 Feet
28-217 to 28-917	10 Feet
29-318 to 29-918	19 Feet
29-121 to 29-921	22 Feet
29-024 to 29-924	12 Feet
29-228 to 29-928	15 Feet
39-336 to 39-936	12 Feet
39-242 to 39-942	15 Feet

Table 1 - Minimum H Dimension for Bottom Sections.

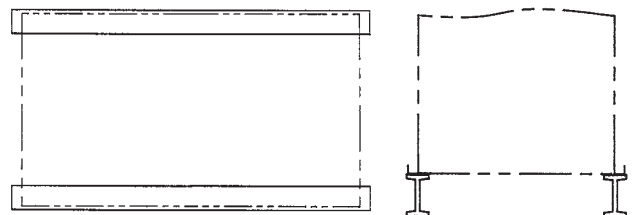


Figure 1 - Structural Steel Support

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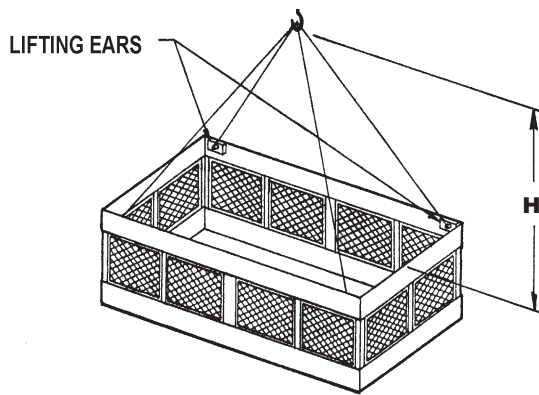


Figure 2 - AT/UT/USS Bottom Section.

Joining Multi-Cell Units Bottom Sections - Models 212-59 through 28-917 and 29-024 through 39-942

On models 212-59 through 28-917 and 29-024 through 29-928, the two bottom sections are shipped separately and are furnished with a connecting equalizer flume between them. On models 39-336 through 39-942 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 8.5' wide units have one horizontal drip channel and two vertical splash guards (one for each side) per flume. 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 earlier.
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.
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 3)

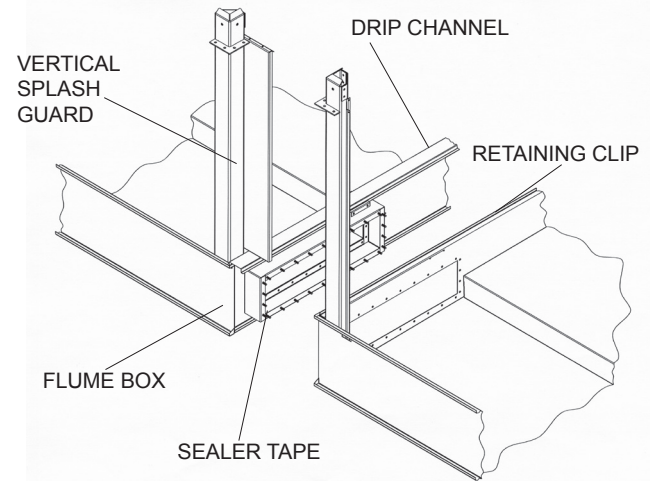


Figure 3 - Equalizer Flume Connection, Models 212-59 through 28-917 and 29-024 through 39-942.

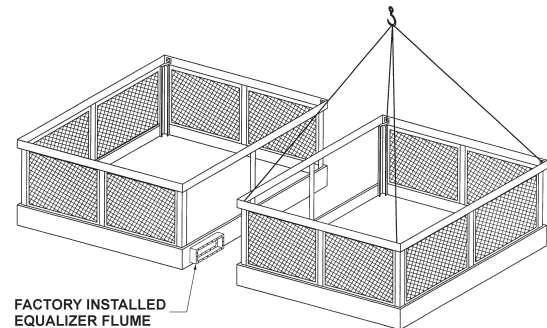


Figure 4 - Equalizer Flume Rigging Detail. Models 212-59 through 28-917 and 29-024 through 29-928 have two bottom sections and one equalizer flume. Models 39-336 through 39-942 have three bottom sections and two equalizer flumes.

Tappers (Galvanized) or Stainless Steel Bolts (Stainless)

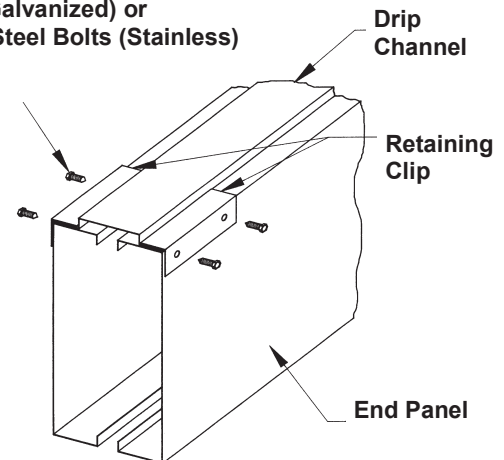


Figure 5 - Drip Channel Installation.

AT/UT/USS Cooling Towers

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.

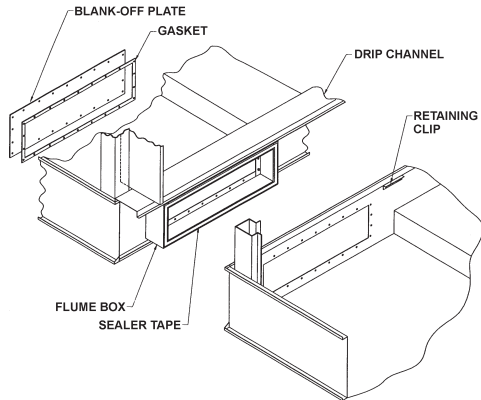


Figure 6 - Optional Blank-Off Plate on the Equalizer Flume

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. Apply two strips of sealer tape, one partially overlapping the other, on the end flanges.

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.

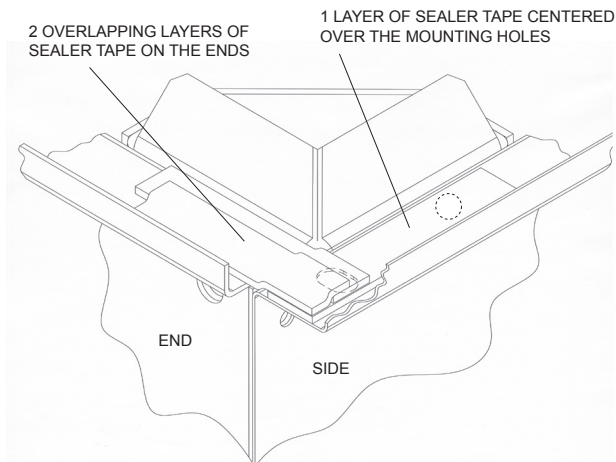


Figure 7 - Sealer Tape on flange of Bottom Section.

Models 212-59 through 39-942 have two or more top sections. In these cases, sealer tape must be applied to all internal flanges as shown in Figure 8.

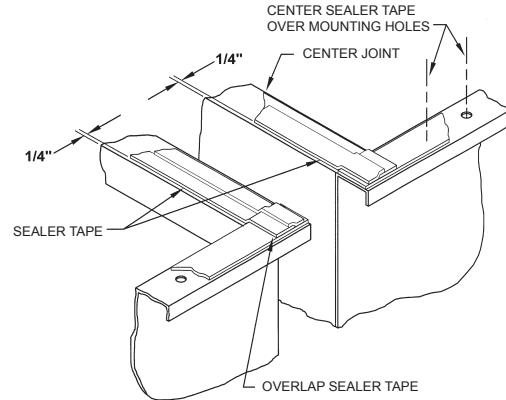


Figure 8 - Sealer Tape Detail for Center Joint of Units with two more Top Sections.

Note: Motors should be mounted prior to lifting the top section as shown in the “External Motor Installation” section, page 7.

Top Section

“U” bolts are provided in the four corners of the top section for lifting and final positioning (See Figure 9). On units with two fans per top section (models 29-318 through 29-921) spreader bars must always be used between the cables at the top of the unit to prevent damage to the fan cylinders. See Figure 10 for proper arrangement of cables on fan sections with dual fans. 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.

UNIT NO.	Standard Fan	Super Low Sound Fan
19-56 to 19-96	7 Feet	8 Feet
19-28 to 19-98	8 Feet	10 Feet
19-59 to 19-99	9 Feet	12 Feet
19-111 to 19-911	10 Feet	14 Feet
19-412 to 19-912	10 Feet	12 Feet
19-114 to 19-914	12 Feet	12 Feet
212-59 to 212-99	7 Feet	8 Feet
215-29 to 215-99	8 Feet	10 Feet
26-517 to 26-917	7 Feet	8 Feet
28-217 to 28-917	8 Feet	10 Feet
29-318 to 29-918	14 Feet	20 Feet
29-121 to 29-921	17 Feet	19 Feet
29-024 to 29-924	10 Feet	12 Feet
29-228 to 29-928	12 Feet	12 Feet
39-336 to 39-936	10 Feet	12 Feet
39-242 to 39-942	12 Feet	12 Feet

Table 2 - Minimum H Dimension for Top Sections.

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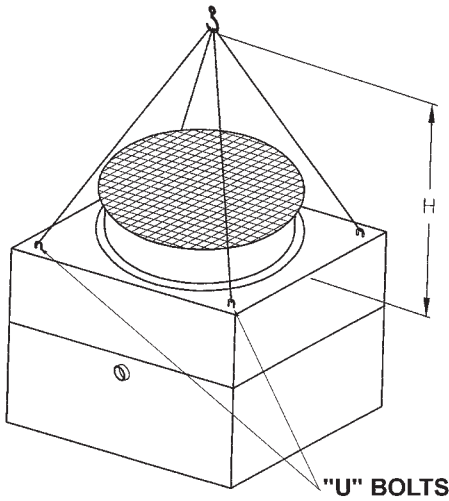


Figure 9 - Top Section(s), Except Models 29-318 through 29-921

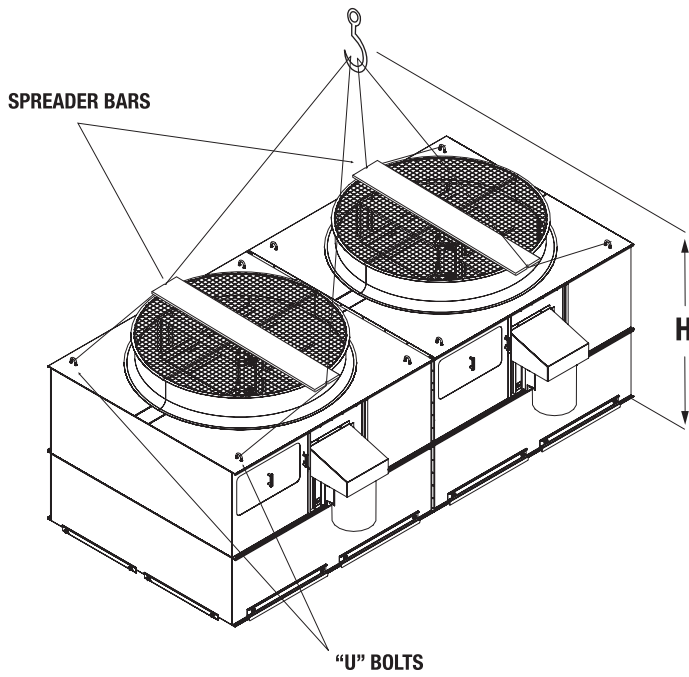


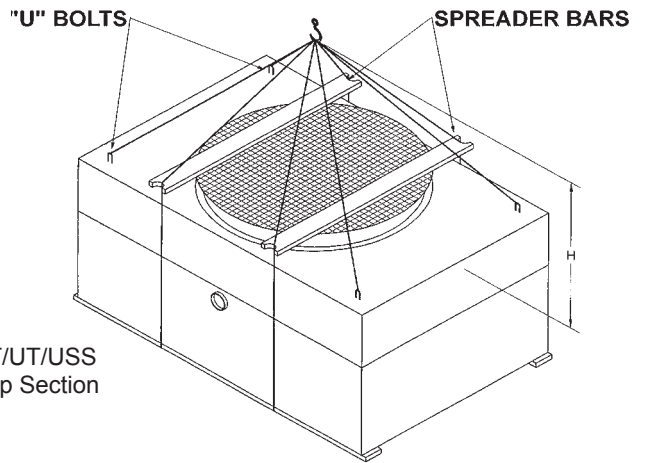
Figure 10 - Top Sections, Models 29-318 through 29-921.

Extended Lifts

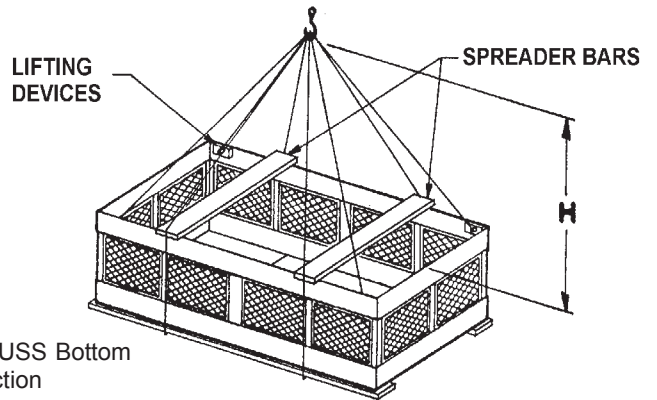
Important: The lifting devices and "U" bolts should be used for final positioning only and for lifting where no danger exists. If they are used for extended lifts, safety slings should be provided under the sections.

The preferred method for extended lifts is to use slings under the unit (see Figure 11). 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.

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



AT/UT/USS Top Section



AT/UT/USS Bottom Section

Figure 11 - Proper Rigging Method for Extended Lifts.

AT/UT/USS Cooling Towers

Assembly of the Top Section to the Bottom Section

Before assembling the top section to the bottom section, remove any loose parts shipped in the pan. The fan motor and protective cover are shipped loose to avoid damage.

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 print). Units are also provided with matched 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 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 1/2" nuts and bolts. See Figure 12.

Note: 1/2" stainless steel nuts and bolts are used on stainless steel models.

NOTE: Drift pins provided in rigging box to assist with alignment.

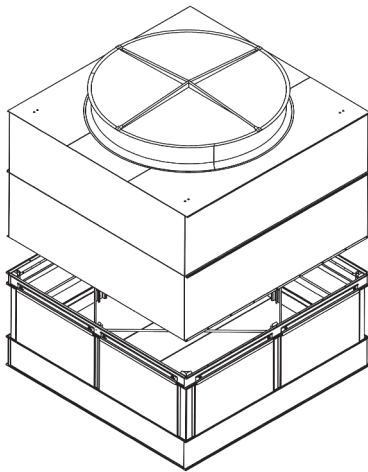


Figure 12 - Mating Upper Section to Bottom Section.

Rigging Fully Assembled Towers

Table 3 lists units which can be assembled prior to final positioning for rigging in one lift. The unit is assembled by the procedures described previously in the "Assembly of the Top Section to the Bottom" section.

Note: On models 19-56 through 19-914, the motor and cover should be installed prior to lifting the fully assembled unit as described in the "External Motor Installation" section on page 7.

All "U" bolts on the top section are to be used for lifting and final positioning of the unit as shown in Figure 13. The hook of the crane must be a minimum dimension of "H" above the top of the unit being lifted to prevent undue strain on the "U" bolts. See Table 3 for minimum "H" dimension.

The "U" bolts 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 5 for proper arrangement.)

Note: Fan Screens Ship Factory Mounted

UNIT NO.	Standard Fan	Super Low Sound Fan
19-56 to 19-96	7 Feet	8 Feet
19-28 to 19-98	8 Feet	10 Feet
19-59 to 19-99	9 Feet	12 Feet
19-111 to 19-911	10 Feet	14 Feet
19-412 to 19-912	10 Feet	12 Feet
19-114 to 19-914	12 Feet	12 Feet

Table 3 - Minimum H Dimension for Fully Assembled Units.

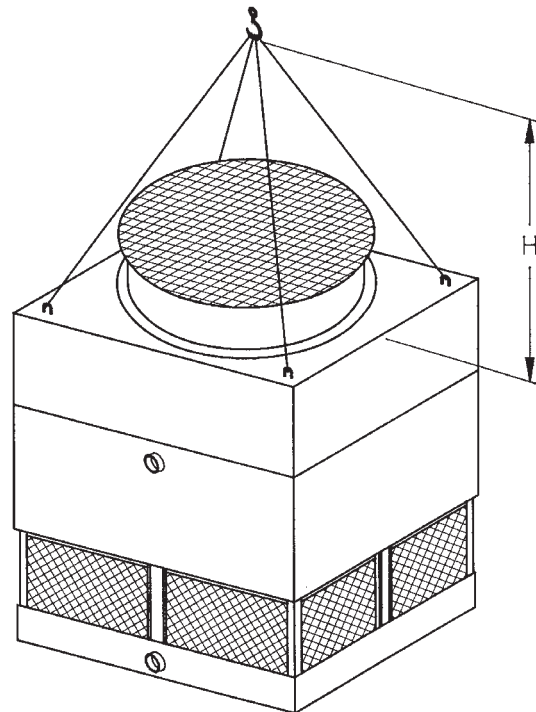


Figure 13 - Fully Assembled Unit, 19-56 through 19-914.

Caution: Remaining models not listed in Table 3 cannot be rigged fully assembled.

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External Motor Installation

1. Study Figure 14 before installing the motor base on the unit.
2. Insert the lifting device into "U" bolt **A** on motor base **B**.
3. Lift the motor base and insert the pivot pin **C** down into hole **E** and pivot pin **F** into hole **D**.
4. Install washer and nut (do not over tighten) on pivot pins. Install jam nut on pivot pin **C**.
5. Insert "J" bolts **G** into holes **H**. Install flat washers and cotter pins. Place nuts and washers on threaded portion of "J" bolts. These will be behind the motor base installed in the next step.
6. Insert "J" bolts into holes **J** in the motor base. Install flat washers, lock washer and nuts. Remove lifting device from the "U" bolt on the motor base. Position motor base toward casing of unit for belt installation.
7. Install Powerband belt **K** (Figure 15) around fan sheave and motor sheave. Tighten belt by adjusting nuts on "J" bolts. Do not over tighten the belts. The center of the belt should deflect approximately 1/2" with moderate hand pressure.
8. Measure to see that the top and bottom of the motor base are the same distance out from the casing of the unit. This should insure that the sheaves are properly aligned as they have been pre-set at the factory. As a final check, lay a straight edge from sheave to sheave. There should be four point contact (See Figure 16). Adjust the position of the motor sheave as necessary.
9. To install Motor Guard **L**, match up hinges and install hinge pins **M**. See Figure 15.
10. Close Motor Guard and install (2) wing bolts **N**.

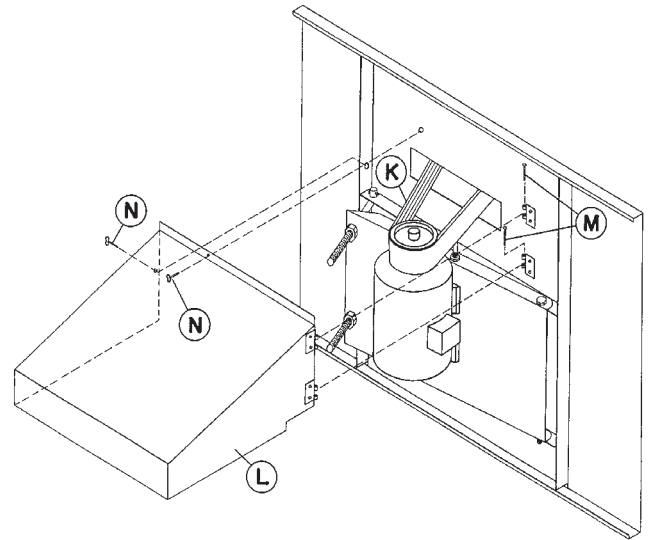


Figure 15 - Motor Guard and Powerband Belt Installation.

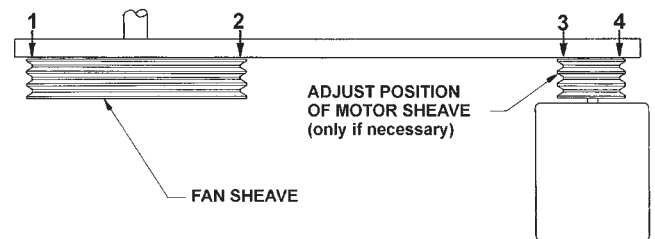


Figure 16 - Sheave Alignment Check.

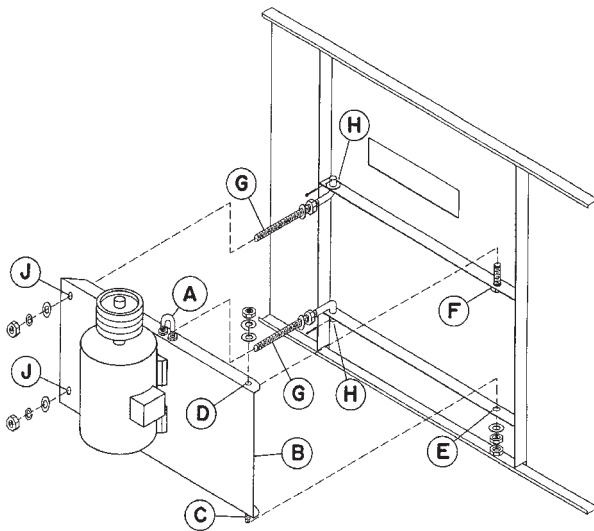


Figure 14 - External Motor Installation.

AT/UT/USS Cooling Towers

Optional Motor & Gearbox Davit

An accessory is available to aid in the removal of fan motors and gear boxes. The assembly consists of a davit and a mounting base that is to be attached to the side of the unit next to the access door. (Figure 17) 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 Figure 18).

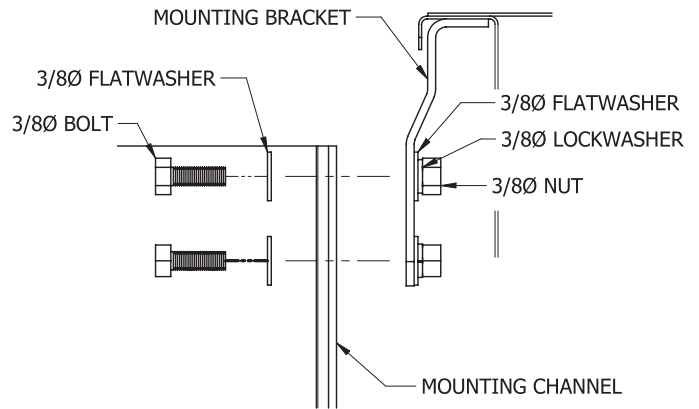


Figure 18 - Mounting Base Installation.

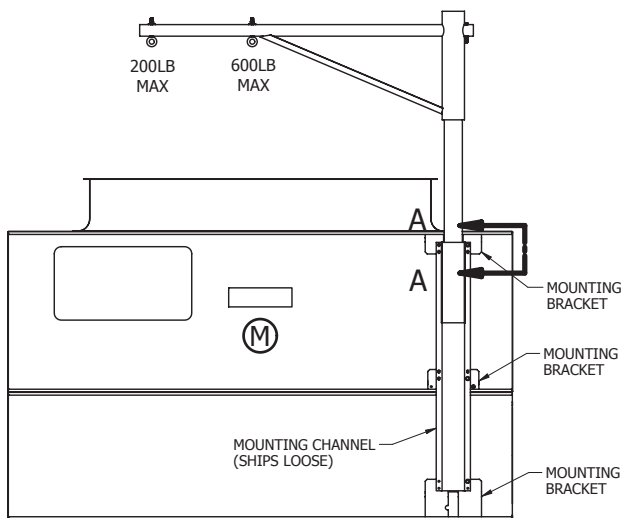


Figure 17 - Dual Point Davit Arrangement.

AT/UT/USS Cooling Towers

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. Taller units will be attached at four 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 19 below. 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 brackets are adjustable.

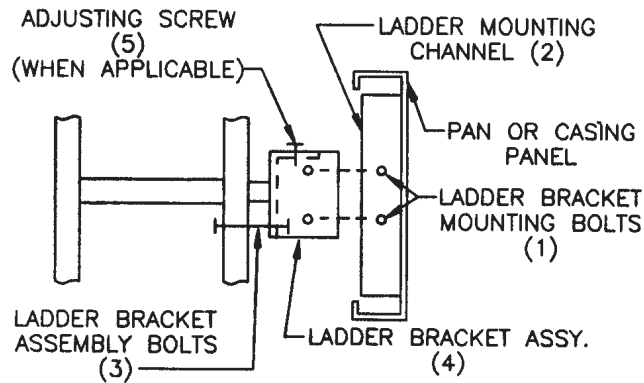


Figure 19 - Detail of Ladder, Ladder Bracket Assembly and Mounting Channel

To install the ladder assembly, follow the steps outlined below which refer to Figure 19:

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.

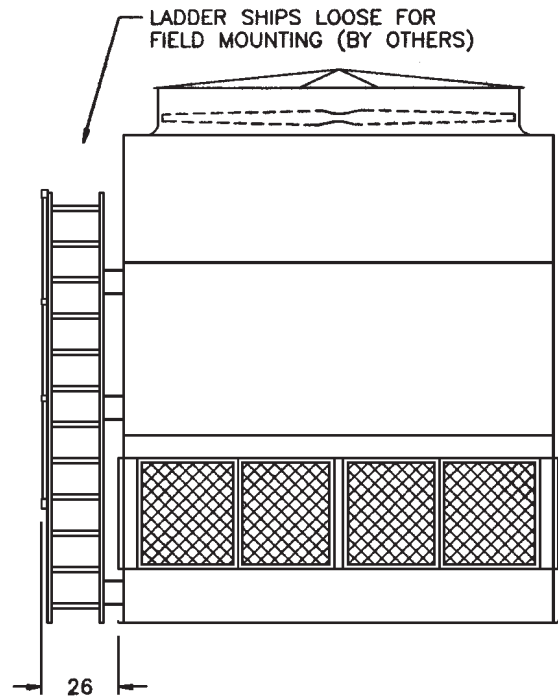


Figure 20A - End View of Ladder Assembly

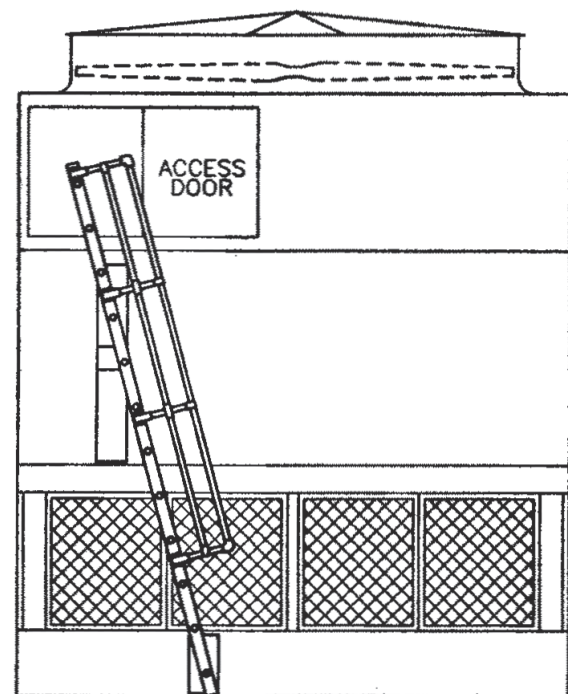


Figure 20B - Side View of Ladder Assembly

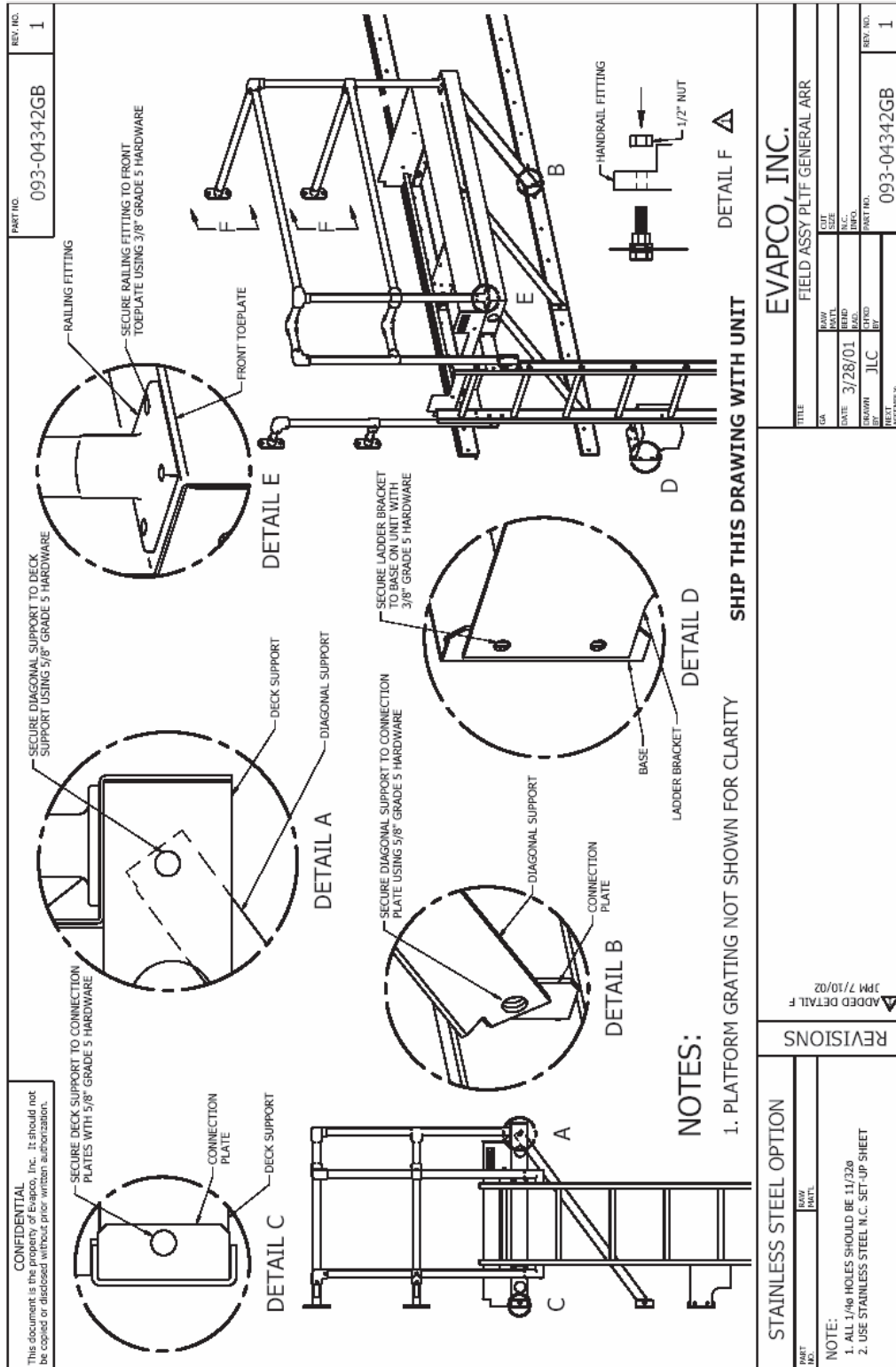
AT/UT/USS Cooling Towers

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 8.5' wide units, there will be one working platform/ladder assembly per fan section. Model 29-318 through 29-921 will have one working platform for both fan sections.

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



AT/UT/USS Cooling Towers

General Information - Start-up & Maintenance

Start-up Details

Shipping Chocks and Debris

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.

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 "Maintenance Instructions Bulletin."

Strainer

Check the strainer(s) in the pan to make sure they are in the proper location over the pump suction, alongside of the anticavitation hood. See Figure 21.

Screens

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

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 drop to 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.

Starting Sequence

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

1. Fill the pan to the overflow level.
2. Start the water pumps. 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 placed inside 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 water 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 supplied 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.

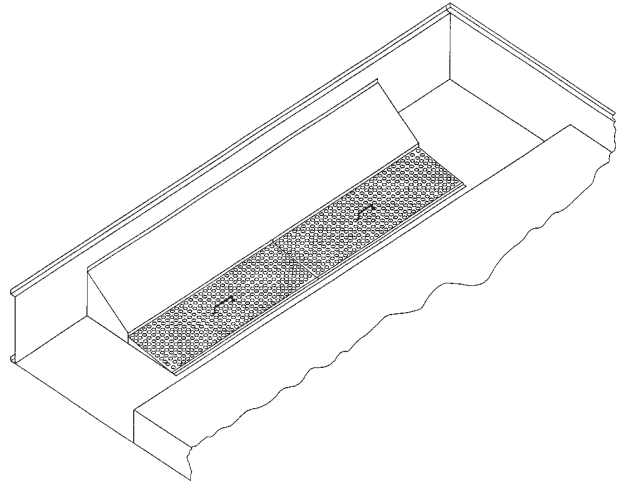


Figure 21 - Strainer Location.

Rigging Hardware Parts List

The following table lists those parts which are shipped together with the unit(s) for field assembly and/or spare parts.

UNIT NO.	Flume Hardware ¹	Rigging Hardware ²	Sealer Tape	Nozzels
19-56 to 19-96	0	10	3	0
19-28 to 19-98	0	12	4	0
19-59 to 19-99	0	14	4	0
19-111 to 19-911	0	16	4	0
19-412 to 19-912	0	18	5	0
19-114 to 19-914	0	22	5	0
212-59 to 212-99	26	20	3	0
215-29 to 215-99	26	24	4	0
26-517 to 26-917	26	20	6	0
28-217 to 28-917	26	24	8	0
29-318 to 29-918	0	26	5	0
29-121 to 29-921	0	30	6	0
29-024 to 29-924	22	36	10	0
29-228 to 29-928	22	44	10	0
39-336 to 39-936	44	54	15	0
39-242 to 39-942	44	66	15	0

Notes:

1. 3/8 x 1" bolt, hex nut, lockwasher and flat washer
2. 1/2 x 1" bolt, (2) flat washers, lock nut

