



Rigging and Assembly Instructions



FORCED DRAFT EVAPORATIVE CONDENSERS, CLOSED CIRCUIT COOLERS AND COOLING TOWERS

FOR EVAPCO AUTHORIZED PARTS AND SERVICE, CONTACT YOUR LOCAL
MR. GOODTOWER SERVICE PROVIDER OR THE EVAPCO PLANT NEAREST YOU.

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Method of Shipment

Forced draft units are shipped either fully assembled (small units) or 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, self-tapping screws and any other required materials, are packaged and placed inside the pan for shipment.

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 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 required for supporting the unit. These beams should be located underneath the outer flanges of the unit. (See Figure 1)

Mounting holes, 19 mm diameter, are located in the bottom flange for bolting to the structural steel. Refer to the recommended structural steel support drawing and 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 13 mm. 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.

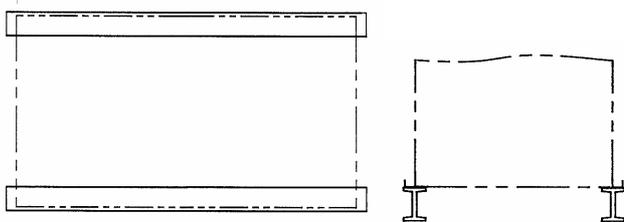


Figure 1 - Structural Steel Support

Rigging Pan-Fan Section

U-bolts or similar lifting points are located in the pan-fan section for lifting and final positioning purposes as shown below in Figures 2 and 3. Units with lengths up to 5,5 m have 4 total lift points. Units with lengths of 7,3 m and 11 m have either 6 or 8 lift points.

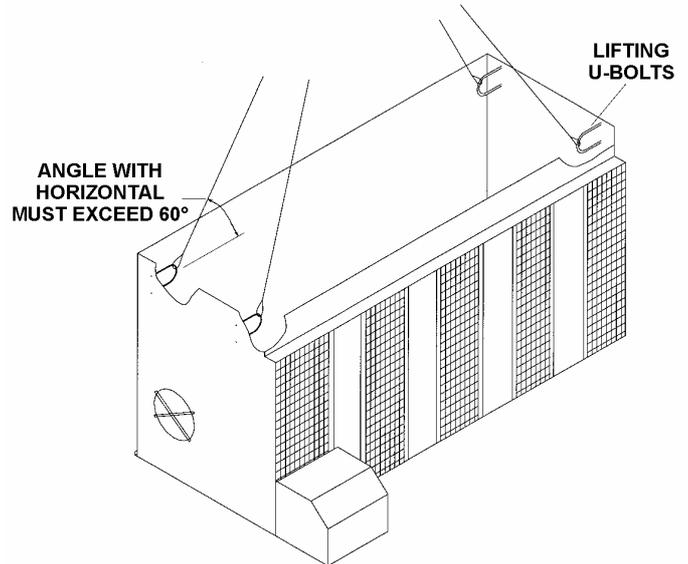


Figure 2 - Pan - Fan Section (up to 5,5 m Long)

Note: Use all of the U-bolts or lift points provided for lifting.

Always use safety slings for extended lifts or where any hazard exists. See the "Extended Lifts" section in this bulletin.

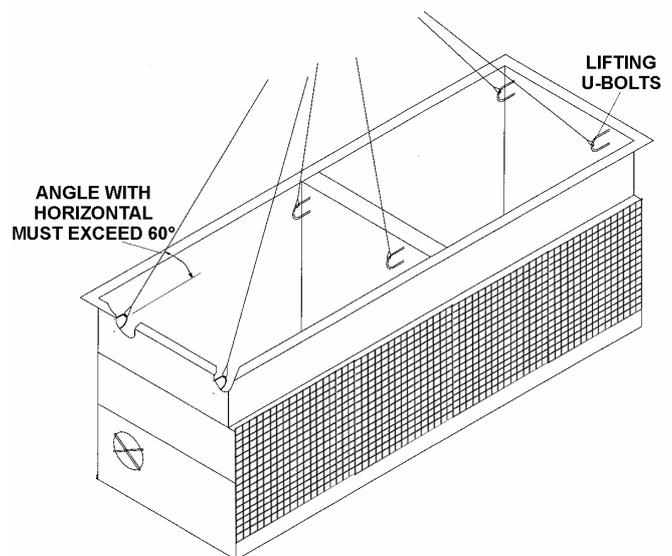


Figure 3 - Pan - Fan Section (7,3 m and 11 m Long - 6 lift points shown)

The hook of the lifting crane must be a minimum distance “H” above the top of the section being lifted to prevent undue strain on the lifting devices and on the section being lifted. See Table 1 for minimum “H” dimensions. **These lifting devices should not be used for extended lifts or where any potential safety hazard exists unless safety slings are employed under the section (See “Extended Lifts”).**

Extended Lifts

The recommended method for extended lifts is to use slings under the unit as shown in Figure 4. Spreader bars should always be used between the cables at the top of the section to prevent damage to the upper flanges. Safety slings, spreaders and skids should be removed before final positioning of the unit. The hook of the lifting crane must be a minimum distance “H” above the top of the section being lifted to prevent undue strain on the lifting devices and on the section being lifted. See Table 1 for minimum “H” dimensions.

Note: The U-bolts or other lifting points should be used for final positioning only and for lifting where no danger exists. If they are used with extended lifts, safety slings and spreader bars should be provided under the sections as shown.

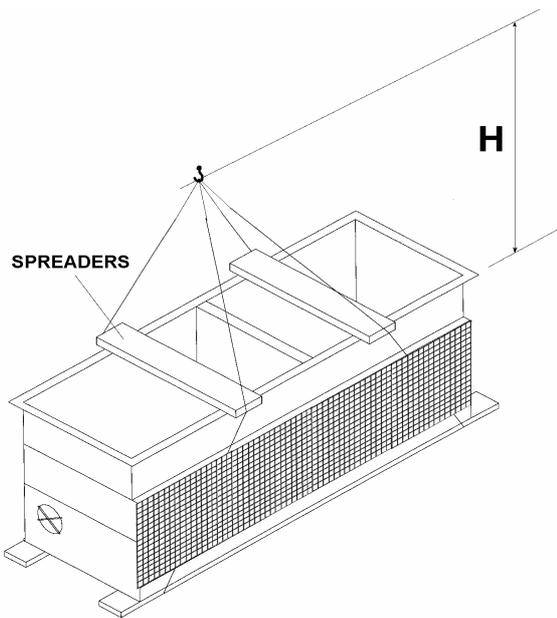


Figure 4 - Proper Rigging Method for Extended Lifts

UNIT LENGTH (m)		MIN. H (m)
Up to	1,8	1,7
Up to	2,7	2,4
Up to	3,6	3,3
Up to	5,5	4,8
Up to	7,3	6,3
Up to	11	9,6

Table 1 - Minimum H Dimensions for Unit Sections.

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 5. Do not splice the sealer tape along the end flanges. Do not splice the sealer tape on the side flanges if it can be avoided. **Always remove the paper backing from the sealer tape.**

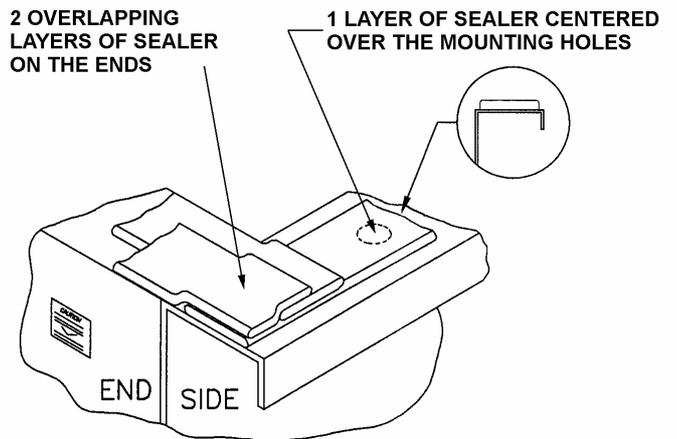


Figure 5 - Sealer on Flange of Bottom Section.

Units with two and three top sections.

On these units, sealer tape must be applied to all internal flanges. (See Figure 6).

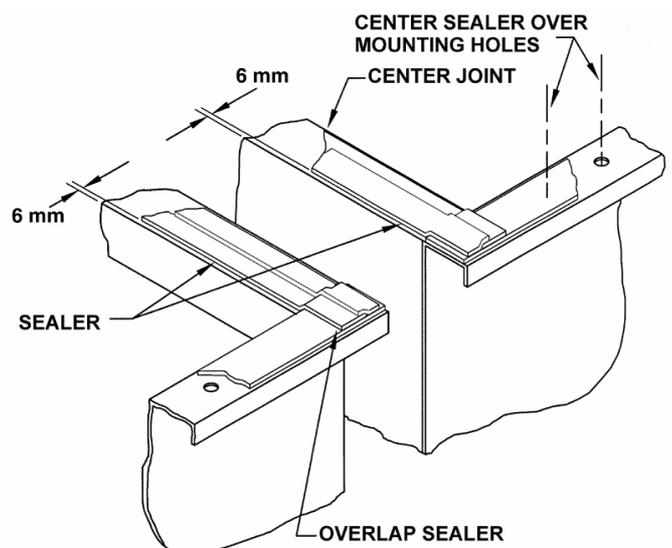


Figure 6 - Sealer Detail for Center Joint of Units with Two or More Top Sections.

Rigging Coil or Fill Section

Similar U-bolts or lift points are provided in the four corners of the coil (fill) section for lifting and final positioning (Figure 7). On larger coil sections which have 2 coils, there are additional lift points on the center (Figure 8).

For 3,6 m wide by 7,2 m long single connection end condensers, six lifting points are provided as shown in Figure 8. Refer to the certified drawing for the coil section weight.

Note: Use all of the U-bolts or lift points provided for lifting.

Always use safety slings for extended lifts or where any hazard exists. See the “Extended Lifts” section in this bulletin.

The end and center eliminator sections should be removed before lifting from the U-bolts or lift points. For proper installation of the eliminator sections, refer to the “Eliminators” section in this bulletin.

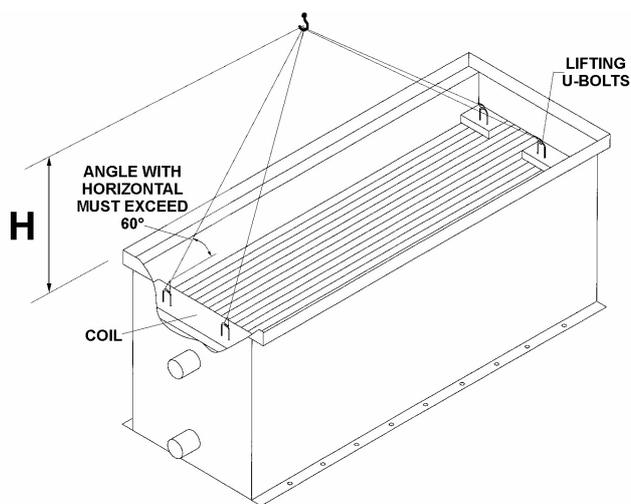


Figure 7 - Small Coil Section (All Fill Sections)

Caution: On units shipped as two separate sections, do not assemble sections and attempt to lift the entire unit. The U-bolts and lift points are designed to carry only the weight of their individual section.

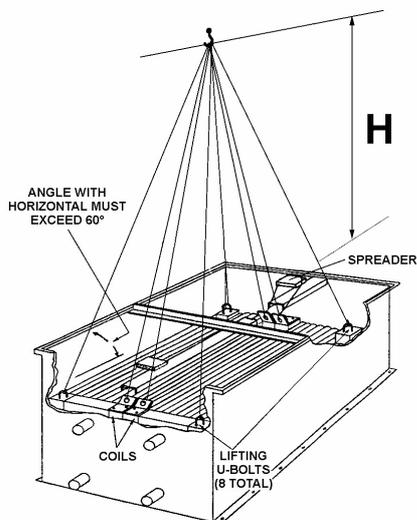


Figure 8 - Large Coil Section (2 Coils Wide)

The hook of the crane must be a minimum dimension “H” above the top of the section being lifted to prevent undue strain on the “U” bolts. See Table 1 for minimum “H” dimensions.

Assembly of the Coil (Fill) Section to the Pan-Fan Section

Before assembling the coil section to the basin section, remove any loose parts shipped in the pan. On small centrifugal fan units, the fan motor guard is normally shipped in the basin to avoid damage. It should be attached to the unit with the self-tapping screws provided. See the “Motor Installation” section in this bulletin.

Wipe the flanges on the bottom of the coil (fill) section. Check to see that the water distribution connection on the coil (fill) section is in the correct position relative to the pan-fan section (see certified print).

Lower the coil (fill) section to within several centimeters of the pan-fan section making sure the two sections do not touch and the sealer is not disturbed. Place drift pins (see Figure 14) in at least 3 of the corner mounting holes and gradually lower the coil (fill) section into place using the drift pins to guide the section down accurately onto the mating flange. On 2,4 m and 7,2 m long sections, drift pins should be used midway along the sides as well.

Place self-tapping screws in all four corner bolt holes and in the center holes (see Figure 9). Then continue to install the rest of the self-tapping screws working from the corners toward the center, using drift pins to align the holes. A self-tapper must be installed in every hole on the side flanges although none are required on the end flanges.

For units with two coils or fill sections, mount the first as described, and then follow the same procedure for the second section.

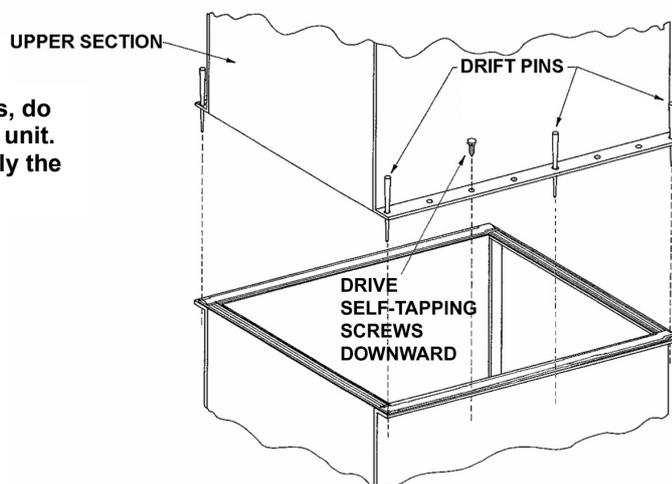


Figure 9 - Mating Upper Section to Basin Section

Rigging Complete Units

Units that are shipped with the pan-fan and coil (fill) sections assembled can be lifted into final position on the structural steel as a complete unit. U-bolts or lift points are provided in the coil (fill) section below the eliminators for lifting and final positioning (Figure 10). The hook of the lifting crane must be a minimum distance "H" above the top of the section being lifted to prevent undue strain on the lifting devices and on the section being lifted. See Table 1 for minimum "H" dimensions

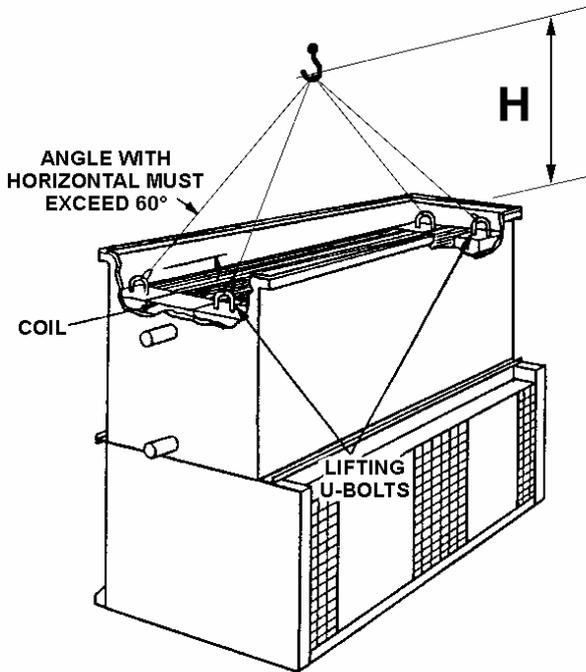


Figure 10 - 1,2 and 1,5 Wide Units

Rigging Discharge Hoods / Attenuators

Some units may be supplied with an optional discharge hood or discharge attenuator section. This section will either ship as a separate item or it will ship mounted on top of the pan/fan section to reduce freight charges. Each hood section is equipped with U-bolts located at the four corners for lifting and final positioning as shown in Figures 11 and 12. The hook of the lifting crane must be a minimum distance "H" above the top of the section being lifted to prevent undue strain on the lifting devices and on the section being lifted. See Table 1 for minimum "H" dimensions.

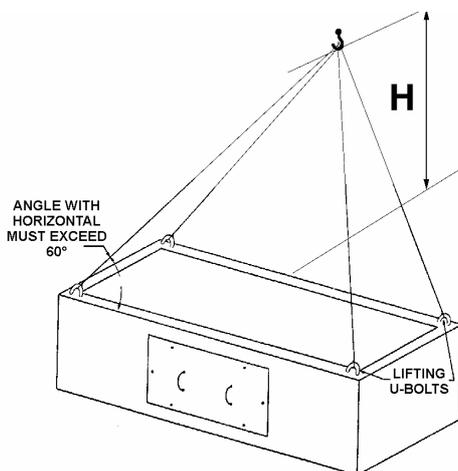


Figure 11 - Straight Sided Hood / Attenuator

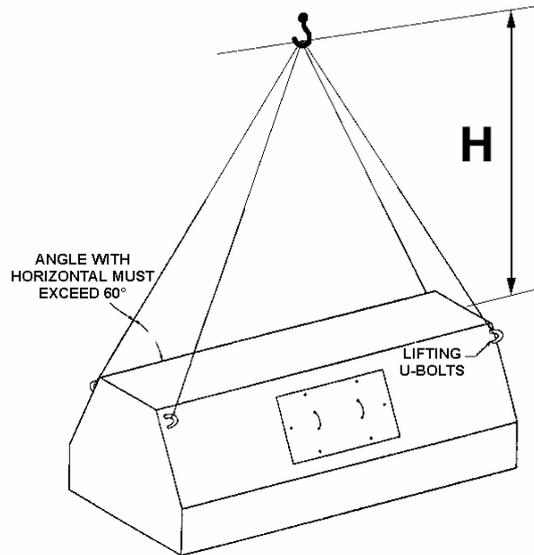


Figure 12 - Tapered Hood

Assembling Discharge Hood

Once the top section has been secured to the bottom section, inspect the top flange to ensure the sealer tape is in place and not damaged. Remove any shipping blocks or other obstructions. Lower the hood onto the top flange of the top section.

Install the retainer clips in all four corners as shown in Figure 13. For long hoods, two additional clips are provided and are to be fastened in the middle of each side.

Note: Always lift the hood separately and follow the rigging sequence shown.

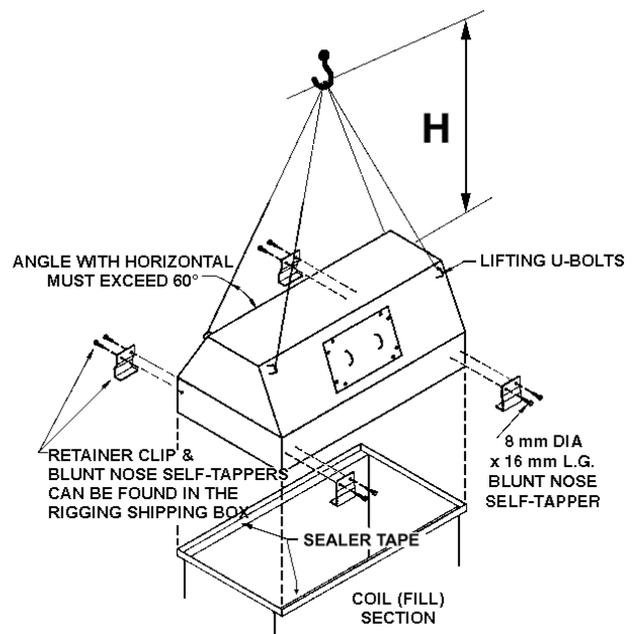


Figure 13 - Mating Hood Section to Upper Section

Rigging Intake Sound Attenuator

Some units may be supplied with an optional intake sound attenuator. These sections are shipped separately and must be rigged separately after the top section has been completely assembled to the bottom section.

All intake attenuator sections have four lifting points. These are located on top of the unit at each of the four corners as shown in Figure 14. The hook of the lifting crane must be a minimum distance "H" above the top of the section being lifted to prevent undue strain on either the lifting points or the section being lifted. See Table 1 for minimum "H" dimensions.

The air intake side of the unit has a mounting bracket running the length of the unit face near the top. Each of the attenuator sections has a mating flange running along the back face of the attenuator near the top. The attenuator section should be lowered beside the main unit so that the attenuator flange interlocks with the bracket. The attenuator section should be adjusted along the length of the bracket until the securing holes in the attenuator flange match those of the bracket. Drift pins may be used to assist with this alignment. Self-tapping screws or stainless steel nuts and bolts should be used to secure the attenuator flange to the bracket. See Figure 15.

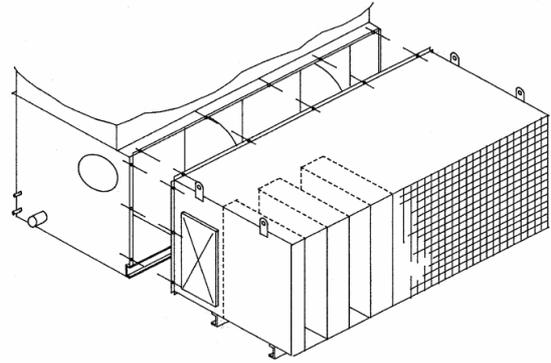


Figure 15 - Detail of Intake Attenuator Attachment

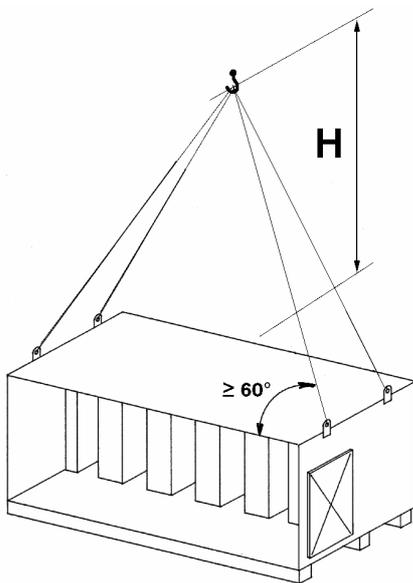


Figure 14 - Rigging Intake Sound Attenuator

Motor Installation (1,2 m and 1,5 m Wide)

The motor on these units is mounted externally. It usually ships mounted, but may require mounting or alignment in the field. The following instructions outline assembly and alignment of externally mounted motors.

1. Refer to Figure 16 before installing the motor base(s).
2. Insert the lifting device into the lifting hole **A** provided in the motor base
3. Lift the motor / motor base assembly and align holes **B** to **B1** and **C** to **C1**. Insert the 13 mm diameter pivot bolts with flat washer **D**. Install flat washer, nut and jam nut **E** on the pivot bolt. **DO NOT OVERTIGHTEN.**
4. Insert the J-bolts **F** into holes **G**. Install flat washers and cotter pins **H**. Place nuts, lock washers and flat washers **J** on the threaded portion of the J-bolts. These will be located behind the motor base.
5. Insert the J-bolts into the holes **K** in the motor base. Install flat washers, lock washers and nuts **L**. Remove the lifting device from the motor base and position the motor base toward the unit for belt installation.
6. Install the belts **M** around the fan sheave and motor sheave as Shown in Figure 17. Tighten belts by adjusting nuts on J-bolts. Do not over tighten the belts. When the belts are properly adjusted, the deflection at the center of the belt should be approximately 13 mm with moderate hand pressure.
7. Measure the distance from the motor base to the J-bolt mounting angles to ensure that both sides of the base are located the same distance from the unit. This should ensure that the sheaves are properly aligned since they were pre-set at the factory.
8. As a final check, lay a straight edge from sheave to sheave as shown in Figure 18. There should be 4-point contact. Adjust the position of the motor sheave if necessary.
9. To install the motor guard **N**, line up the holes and fasten with self-tapping screws or stainless steel nuts, bolts and washers (for stainless steel units) **P**. Check to ensure that the motor guard does not make contact with the drive sheave or belts.

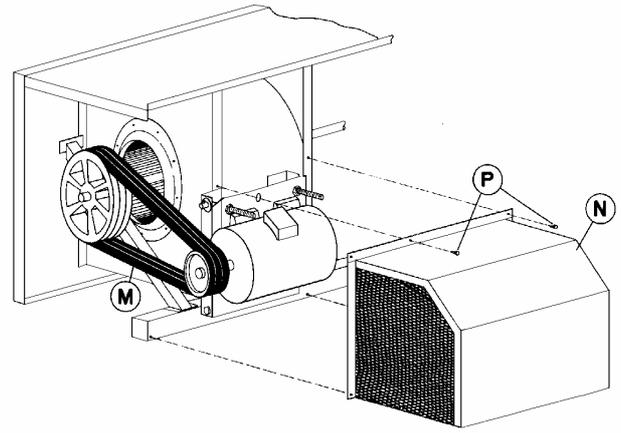


Figure 17 - Motor Guard and Powerband Belt Installation

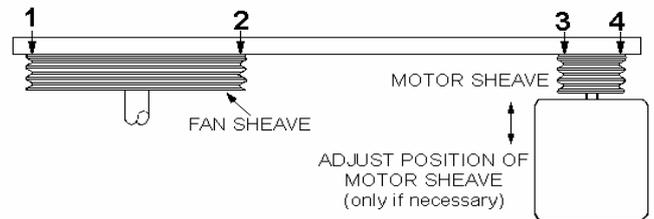


Figure 18 - Sheave Alignment Check (Top View)

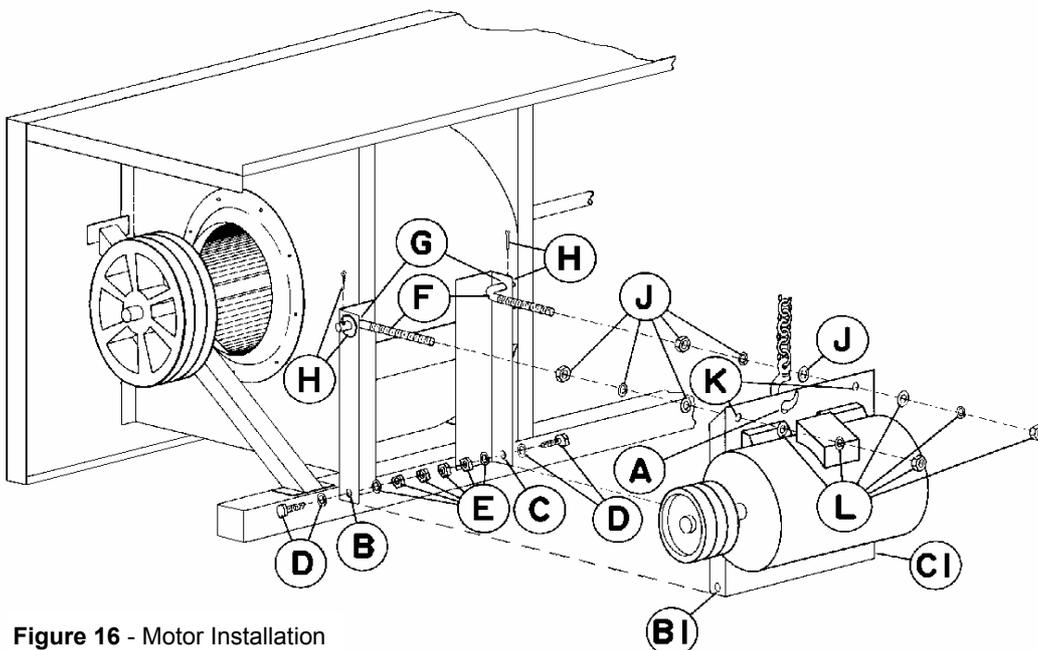


Figure 16 - Motor Installation

Final Assembly and Start-Up

Shipping Materials

Remove any wood chocks, spare parts or miscellaneous items that have been placed inside the unit for shipping purposes. Clean all debris from the basin.

Bleed-Off Line

A bleed-off line and valve are installed on the unit when shipped with a pump. On units shipped without a pump (cooling towers and remote sump applications) make sure a bleed-off line and valve are properly sized and installed on the discharge side of the pump and connected to a convenient drain. In either case, the bleed-off valve should be fully open.

Strainer

Check the basin strainer to ensure that it is in its proper location over the pump suction.

Screens

Protective air inlet screens are provided across the front of the fan section on all models. Screens are typically not provided on the bottom of the fan section since most units are mounted on steel beams, either on the ground or at roof level. If units are installed in an elevated position, bottom screens are recommended for safety reasons and should be installed by the installing contractor.

Float Valve Adjustment

The float valve is pre-set at the factory. However, adjustment should be checked after rigging. The float valve should be adjusted so that the center of the float is 25 mm below the center of the overflow connection when the valve is in the fully closed position. Raise or lower the float by using the wing nuts on the vertical threaded rod. Do not adjust the horizontal rod.

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 on the fan housing.

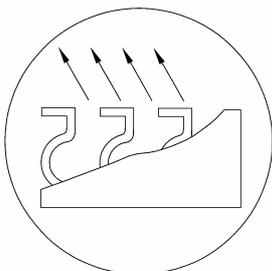


Figure 19 - Eliminator Detail

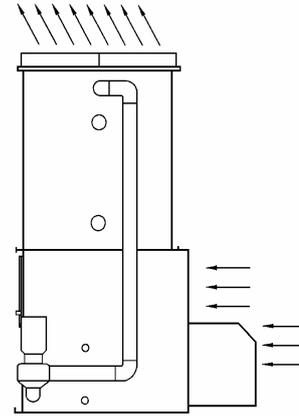


Figure 20 - Eliminator Orientation on 1,2 m and 1,5 m Wide Units

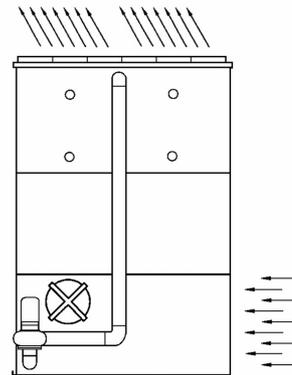


Figure 21 - Eliminator Orientation on 2,4 m and 3 m Wide Units

Eliminators

On 1,5 wide models, the eliminators should be placed so that the discharge air is directed away from the fan side. On 2,4 m and 3 m wide units, the eliminators should be placed so that the discharge air is directed toward the center of the unit. See Figures 19, 20 and 21.

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 performed regularly to assure full performance of the unit. Refer to the Maintenance Instructions Bulletin 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.

Note: Closed circuit coolers should be used on sealed, pressurized systems. Continual aeration of the water in an open system can cause corrosion inside the tubes of the cooler, leading to premature failure.

Rigging Hardware Parts are shipped together the unit(s) for field assembly