



Rigging and Assembly Instructions

AT ATLAS

Induced Draft, Modular Counterflow Cooling Towers

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Introduction

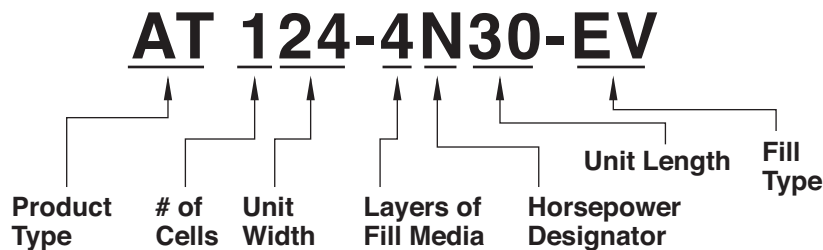
Thank you for purchasing your EVAPCO AT ATLAS, counterflow, induced draft cooling tower. This manual provides instructions and recommendations to safely and correctly install all AT ATLAS cooling towers. It is recommended that all instructions provided in this manual are reviewed prior to rigging and assembly. If at any point specific circumstances not covered by this manual arise please contact your local EVAPCO representative for assistance.

Proper care must be taken by all parties involved in handling and assembling the equipment to ensure that safe and thorough installation practices are implemented to prevent damage or injury to the equipment, persons and environment involved.

Shipping

Unless otherwise noted in the factory submittal, all EVAPCO AT ATLAS towers ship in seven (7) sections per cell plus the drive system, fan and fan cylinder. Any special shipping configurations will be listed in the factory submittal. Please contact your local EVAPCO representative for more information on alternate shipping configurations.

Nomenclature



Product Type

AT – Indicates an Advanced Technology (AT) tower.

of Cells

Determined by the number of inlet connections, can be 1 or 2 cells.

Unit Width

The total width of the unit, in feet, all cells included.

Layers of Fill Media

Determined by the number of 1 foot tall fill layers. Can be 4 or 5.

Horsepower Designator

Determined by the horsepower per fan motor. Available from N = 40 HP to T = 150 HP.

Unit Length

The total length of the unit, in feet, all cells included.

Fill Type

Indicated the style of heat transfer media in the tower.

Structural Steel Support

As standard, three structural "I" beams running the length of the unit are required for support of each cell. These beams should be located underneath the outer flanges of the unit (See Figure 1 and 1a). Transverse steel arrangements are also available (see Figures 1b and 1c). Mounting holes 3/4" (19mm) in diameter are located in the bottom flanges of the unit for bolting to the structural steel (See steel support print in unit submittal for exact bolt hole location). Bolt the bottom sections to the steel support before rigging the top sections.

Beams should be sized in accordance with accepted structural practices. Maximum deflection of the beam under the unit to be 1/360th of the unit length, not to exceed 1/2" (13mm). Deflection may be calculated by using 55% of the operating weight of the unit as a uniform load on each beam (See certified print in unit submittal for operating weight).

The supporting "I" beams should be level before setting the unit. Do not level the unit by shimming between the bottom flanges and the beams as this will not provide proper and continuous longitudinal support. Support beams and anchor bolts are to be furnished by others.

Please refer to the unit submittal for detailed, project specific steel support arrangement.

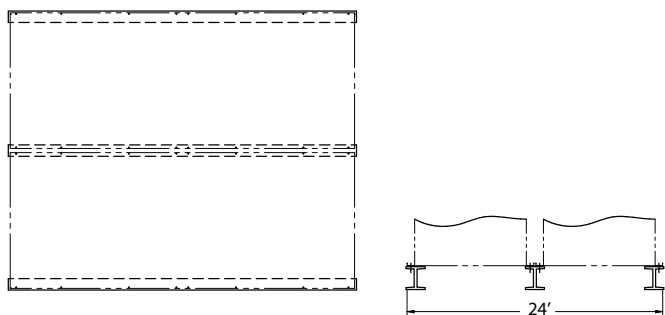


Figure 1 - Standard Longitudinal Steel Support Arrangement for 24' x 30' ATLAS

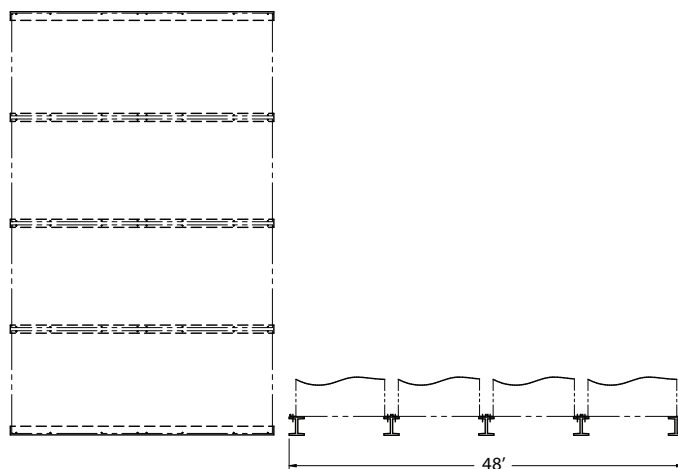


Figure 1a - Standard Longitudinal Steel Support Arrangement for 48' x 30' ATLAS

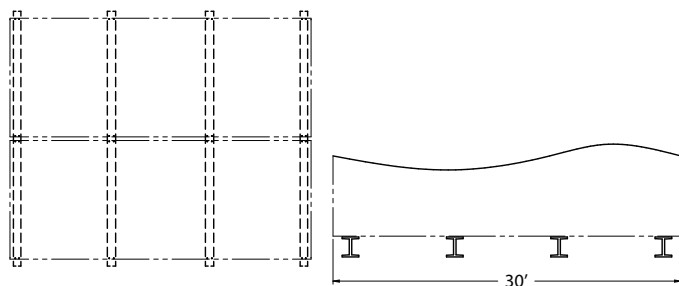


Figure 1b - Standard Transverse Steel Support Arrangement for 24' x 30' ATLAS

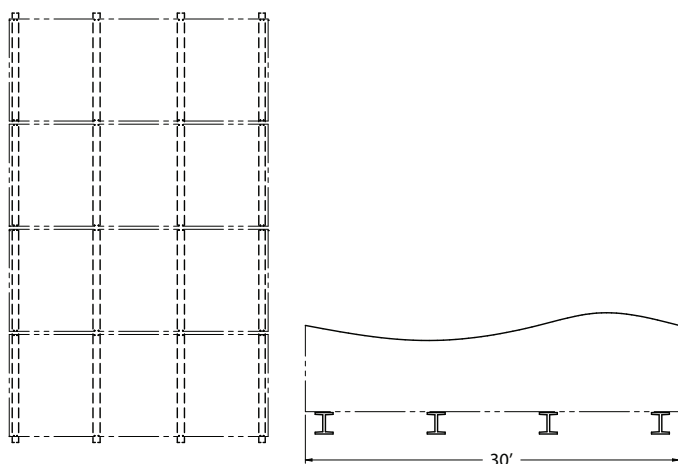


Figure 1c - Standard Transverse Steel Support Arrangement for 48' x 30' ATLAS

Rigging Basin Sections

Lifting devices are located along the inside edges 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 26' above the top of the basin section to prevent undue strain on the lifting devices. If applicable, see "Extended Lifts" on page 15 for proper arrangement.

Bolt the bottom sections to the steel support before rigging the top sections.

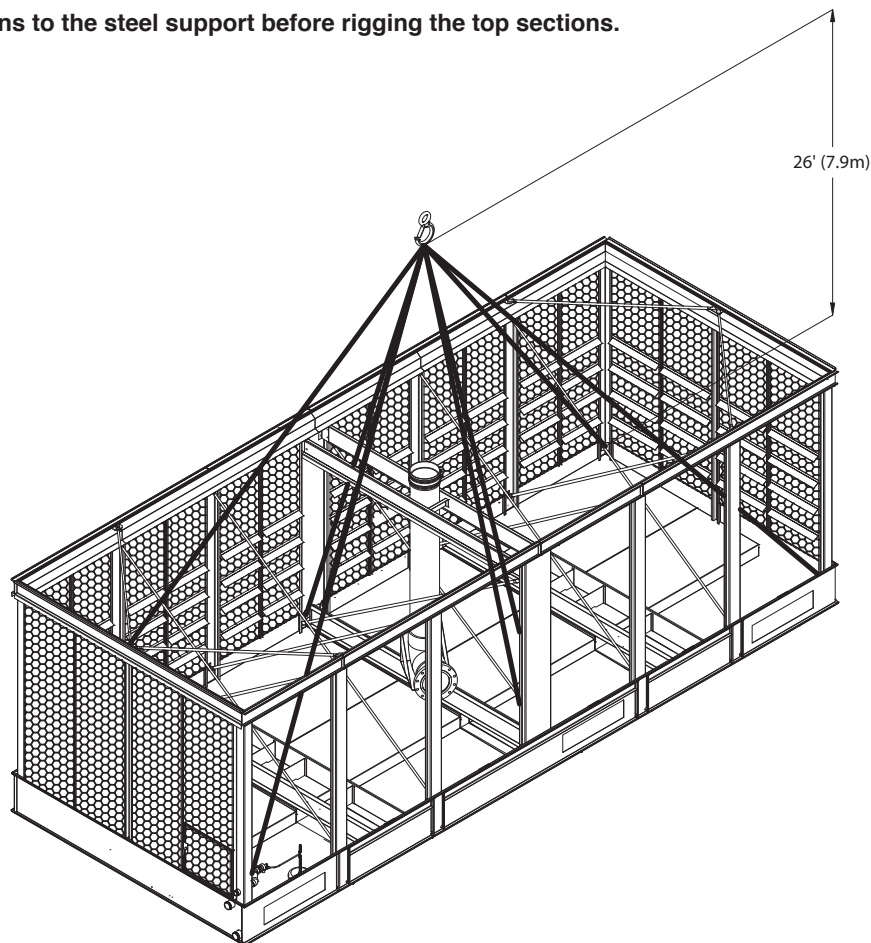


Figure 2 - Rigging Unit Bottom Section - 1 Basin

Joining Bottom Sections

Each 24' x 30' ATLAS basin is composed of two (2) 12' x 30' sections, connected by three (3) flume boxes for equalization.

In addition to the equalizer flumes, these units are provided with horizontal drip channels and vertical splash guards to keep water from splashing out from between the cells.

The equalizer flume boxes are shipped loose for field assembly. It is important to connect the equalizer flumes to balance the water level in the basins for proper pump suction operation. The procedures that follow should be performed in sequence.

ATLAS Flume Box Installation Instructions:

1. Rig one of the bottom sections of the cooling tower. Bolt to steel support.
2. One face of the flume box is provided with 3/8" (10mm) welded bolts. Clean the mating flume opening on the rigged bottom section and apply a layer of sealer tape on this surface, centered between the hole centers and the outside edge. Remove paper backing strip from sealer tape.
3. Align the bolt holes in the rigged bottom section with the welded 3/8" (10mm) bolts on the flume box.
4. Install 3/8" (10mm) nuts and washers on every bolt around the flume opening and tighten.

5. Repeat steps 2-4 for all 3 flume boxes.
6. Rig the second basin adjacent to the equalizer flume on the steel support as shown in Figure 3.
7. Clean the mating surfaces of the flume box and the surface of the flume opening on the adjacent section. Apply sealer tape to the flanged flume opening on the adjacent section.
8. Align the bolt holes in the flume box and flume opening with drift pins (by others) while drawing the second bottom section against the flume box.
9. Install 3/8" (10mm) bolts, nuts, and washers in every hole around the flume opening and tighten.
10. Bolt the second bottom section to the steel support.

Drip Channel and Splash Guard Installation Instructions (this may be completed after the unit is completely rigged):

1. Remove the 1/4" (6mm) hardware which holds the drip channel retaining clips to the side panel. Place the drip channel over the adjoining basin section flanges. Turn around the retaining clips and install them using the same hardware.
2. Apply a single layer of sealer tape to the mating flange of the drip channels (see Figure 3a). Fasten drip channels together end-to-end by driving a self-tapping 5/16" (8mm) screw through the section end with the larger hole into the mating end with the smaller hole. Stainless steel units will use 5/16" (8mm) stainless steel nuts and bolts.
3. Add sealer tape to bottom of vertical splash guard. Place the vertical splash guard in the bend of the vertical supports. On galvanized units, attach the vertical splash guard using 5/16" (8mm) self-tapping screws. On stainless steel units, attach the vertical splash guards using 5/16" (8mm) stainless steel nuts and bolts. (See Figure 3)
4. Once the bottom of the vertical splash guard has been attached to the drip channel, place the filler cap channel in the upper flanges of the basin as shown in Figure 3. Attach to vertical splash guards using 5/16" (8mm) tappers (for galvanized units) or stainless steel nuts and bolts (for stainless steel units).

Filler Cap Channel to be installed after the casing sections are rigged.

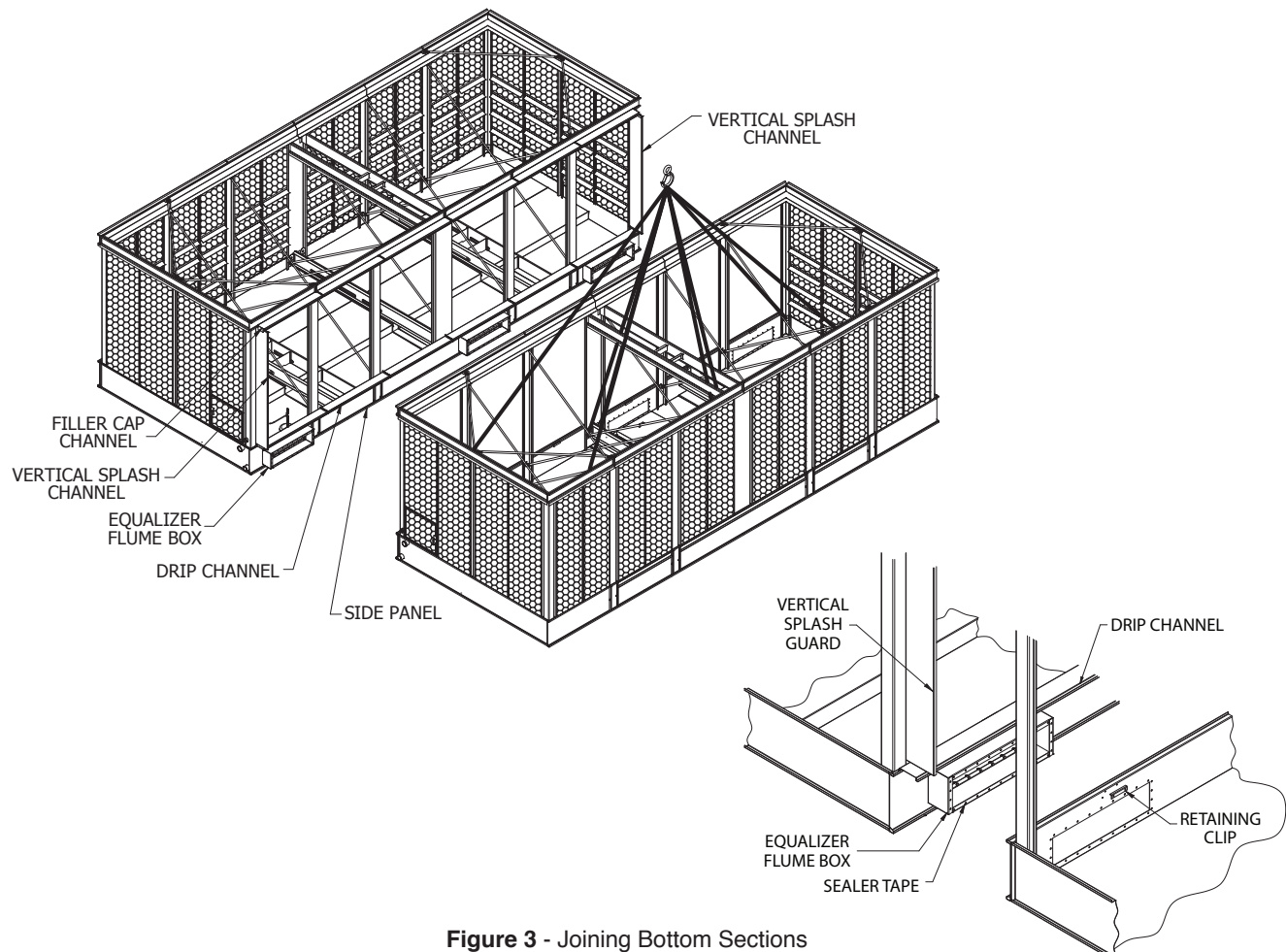


Figure 3 - Joining Bottom Sections

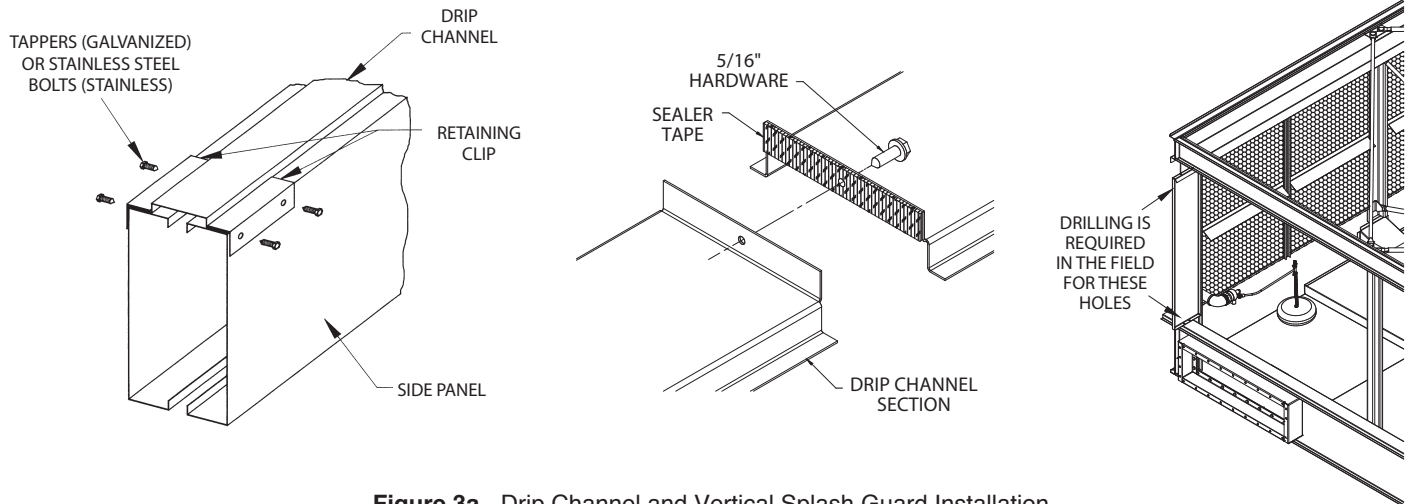


Figure 3a - Drip Channel and Vertical Splash Guard Installation

Application of Sealer Tape to Basin Sections

Once the basin sections have been set on the support steel and all fasteners are installed, the top flanges should be wiped down to remove any dirt or moisture. Apply one layer of sealer tape along the 12' and 30' sides, centered over the mounting hole (see Figure 4).

The sealer tape should overlap on the corners as shown in Figure 4. Do not splice the sealer tape along the 12' long end flanges. Sealer tape will need to be spliced and overlapped on the 30' sides.

Always remove the paper backing from the sealer tape.

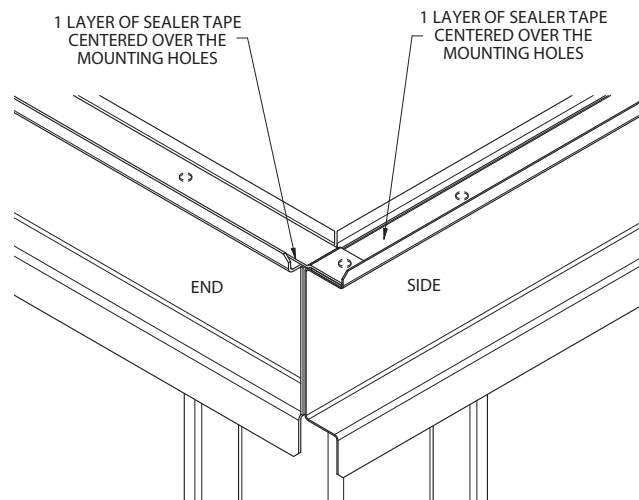


Figure 4 - Sealer Tape on Flange of Basin Section

Rigging Casing Sections

Lifting ears are provided in the corners of the casing sections and along the length (4 total lifting ears per side) for lifting and final positioning. The hook of the crane must be a minimum dimension 26' above the casing sections to prevent undue strain on the lifting ears.

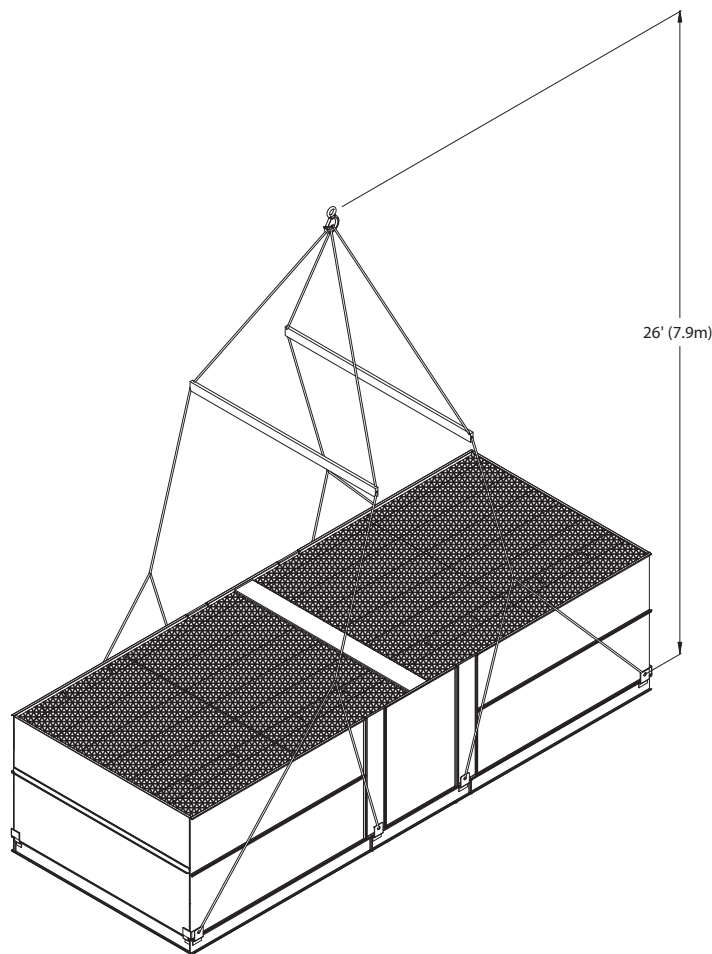


Figure 5 - Rigging a Unit Casing Section

Assembly of the Casing Sections to the Basin Sections

Before securing the casing sections to the basin sections, remove any loose parts shipped in the basin.

Wipe the flanges on the bottom of the casing sections. Units are also provided with match markings on each section (i.e. A1 of basin section should match up with A1 of casing section).

Lower the casing section to within several inches of the basin section making sure the two sections do not touch and the sealer tape is not disturbed. Lower the casing section the rest of the way and fasten all four corners. See Table 1 for recommended hardware. Make use of drift pins to simplify the final positioning process (see Drift Pin explanation below).

Install the remaining fasteners, working from the corners towards the center. Fasteners must be installed in every hole in the flanges.

Use of Drift Pins for Final Positioning

Drift pins are tools used to align holes in the flanges of the casing and basin sections of the unit prior to final fastening. They are occasionally used in the positioning of the basin section as well.

Once the sealer tape is applied and the casing section is hovering over the basin section, a drift pin should be driven into each of the corner bolt holes. Using drift pins in the corners (at minimum) is meant to restrict the sideways motion of the casing section relative to the basin section.

A drift pin should be used in intermediate bolt holes in the rigging seams as needed to maintain alignment.

Notes:

The side flanges located in between cells can be accessed from inside the unit.

Bolts can be driven upward through the mating flanges if access is restricted.

All rigging hardware is provided by EVAPCO. Drift pins are by others. The recommended drift pin is 3/16" punch size with 10" overall length.

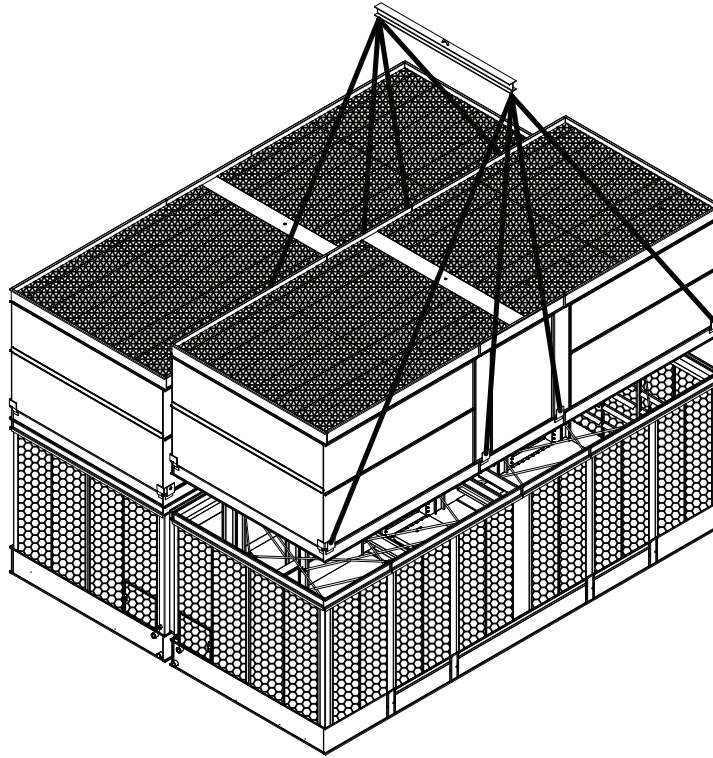


Figure 6 - Assembling Casing and Basin Sections

Units	Hardware Sizes
All ATLAS Units	3/8" (10mm) Nuts, Bolts & Washers (Galvanized or Stainless)

Table 1 - Hardware Sizes

Assembly of Bottom Inlet Piping

On the ATLAS tower, the inlet connection is located on the bottom as standard. Internal piping is provided that allows the process water to make its way to the hot water distribution system. Please follow the below steps to complete field installation of the bottom inlet after the unit is rigged.

1. On the ATLAS tower, the inlet connection is located on the bottom as standard.
2. Locate the bottom inlet assembly components, namely the riser pipes, two flexible reinforced pipe connectors per basin, four pipe clamps per basin and the lower pipe flanged spool. These components are fastened securely in the unit's basin prior to shipment.
- 2a. Remove shipping strap under pipe.
3. Align the riser pipe assembly with the upper pipe section in the bottom of the casing section. Loosen the pipe clamp and slip the pipe connector up over the upper pipe section.
4. Tighten all pipe clamps (4 per basin: 2 on the upper). A ratchet wrench is recommended (See Figure 7).
5. Repeat this process for each riser pipe.
6. After tower is fully installed, insert the lower pipe flanged spool with gaskets between flanges, as shown in Figure 8. Use hardware noted in Table 2

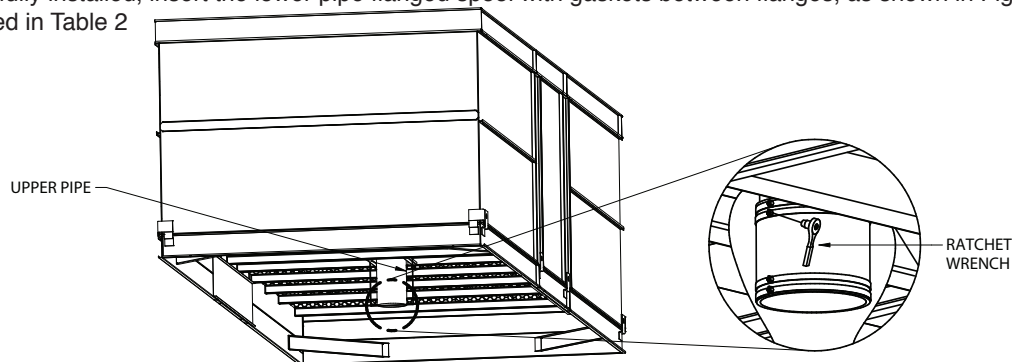


Figure 7 - Casing Bottom Inlet Piping

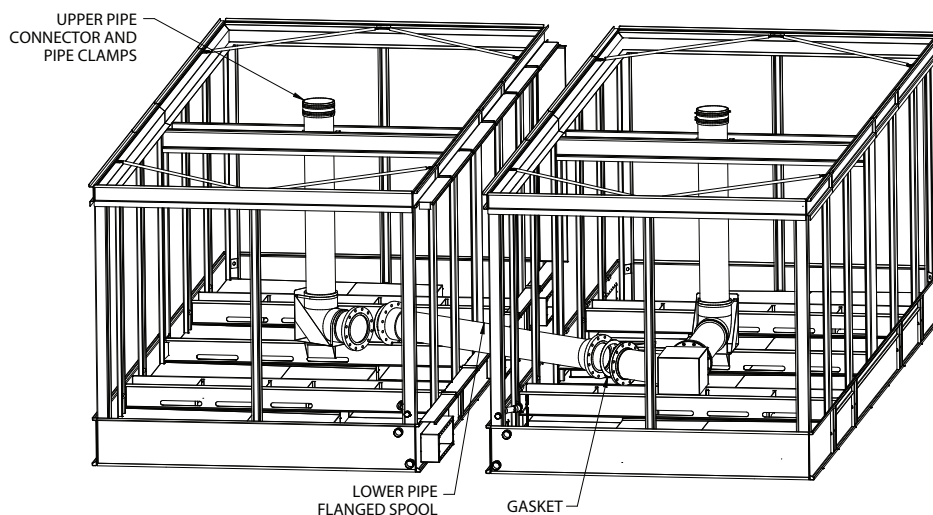


Figure 8 - Installation of Bottom Inlet Piping

Units	Hardware Sizes
All ATLAS Units	7/8" (22mm) Nuts, Bolts & Washers (Galvanized or Stainless)

Table 2 - Hardware Sizes

Application of Sealer Tape to Casing Sections

Once the casing sections have been rigged to the basin sections and all fasteners are installed, the top flanges should be wiped down to remove any dirt or moisture. Apply one layer of sealer tape, centered over the mounting holes (see Figure 9). On the flanges between casing sections, apply two strips of sealer tape, one partially overlapping the other on the entire length of the flanges. Apply sealer tape to the entire perimeter of the casing sections. Do not splice the sealer tape along the 12' long end flanges. Sealer tape will need to be spliced and overlapped on the 30' sides.

Always remove the paper backing from the sealer tape.

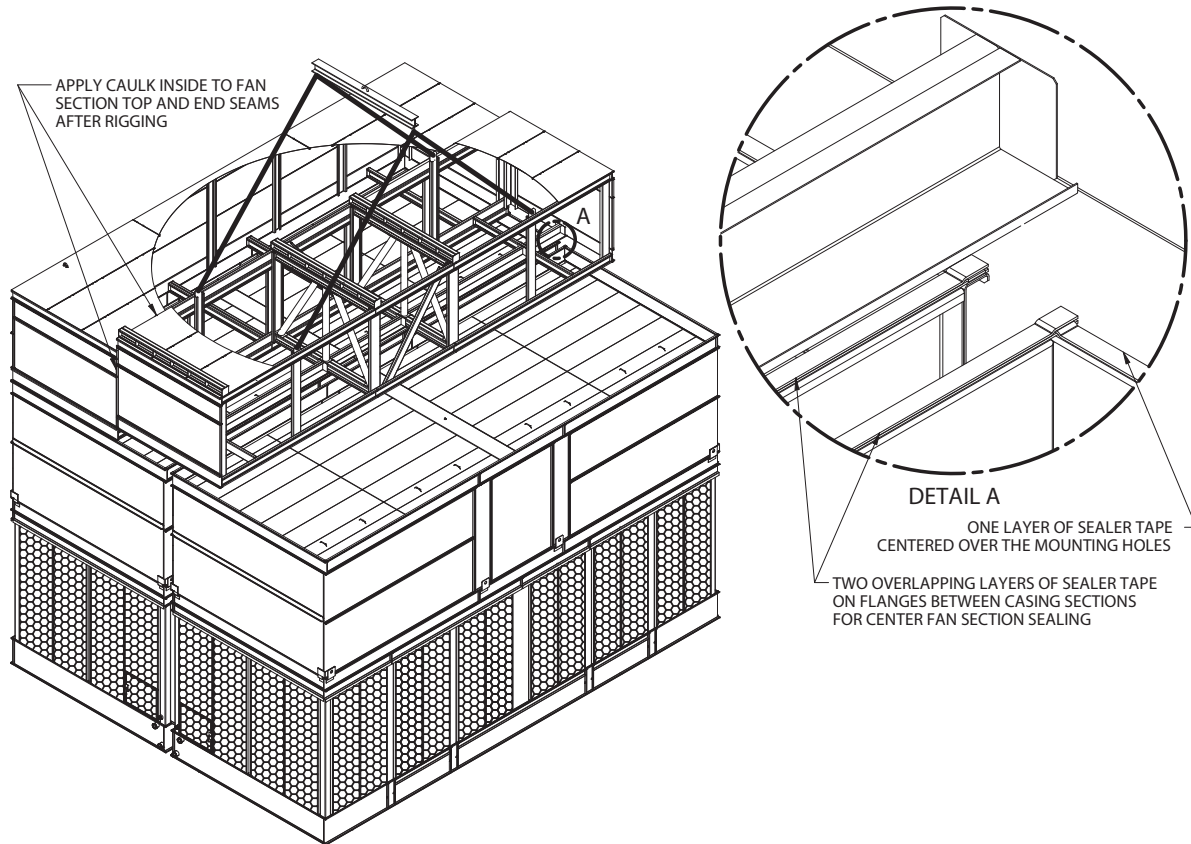


Figure 9 - Fan to Casing Section Sealing

Rigging Fan Sections

Each ATLAS unit has 3 fan sections: left, right and middle. On the middle section, lifting ears are provided for lifting and final positioning. For the left and right sections, "U" bolts are provided. The hook of the crane must be a minimum of 26' above the lifting device to prevent undue strain on the lifting ears and "U" bolts. See Figures 10A and 10B for the middle section and end sections, respectively.

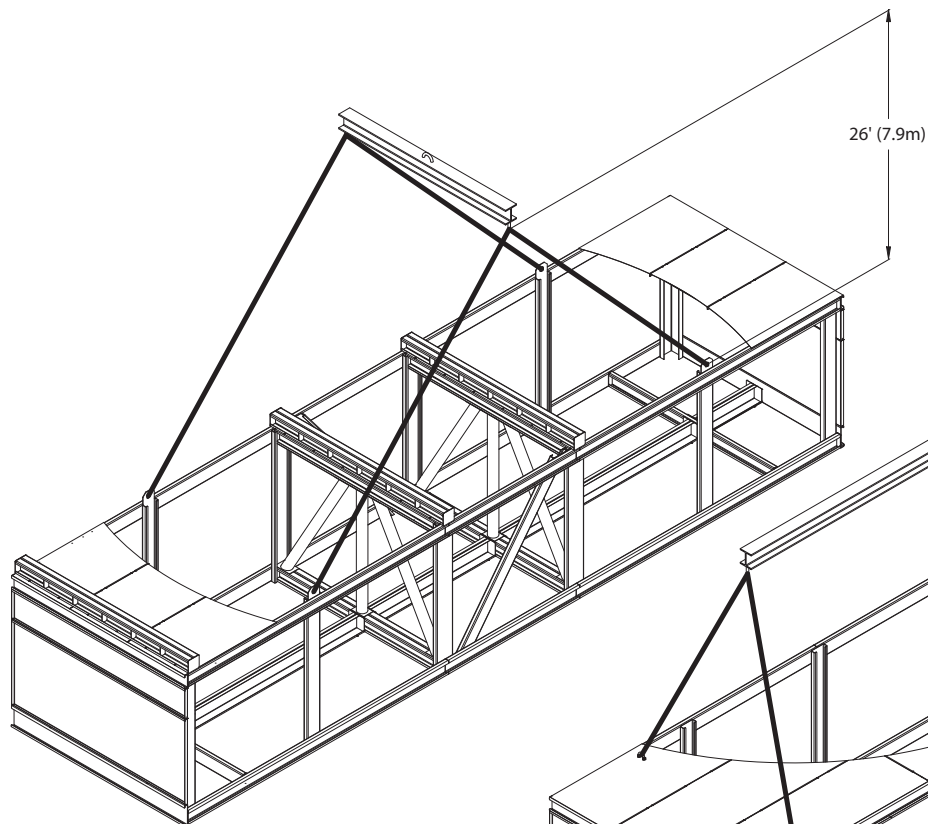


Figure 10A - Rigging of Middle Fan Module

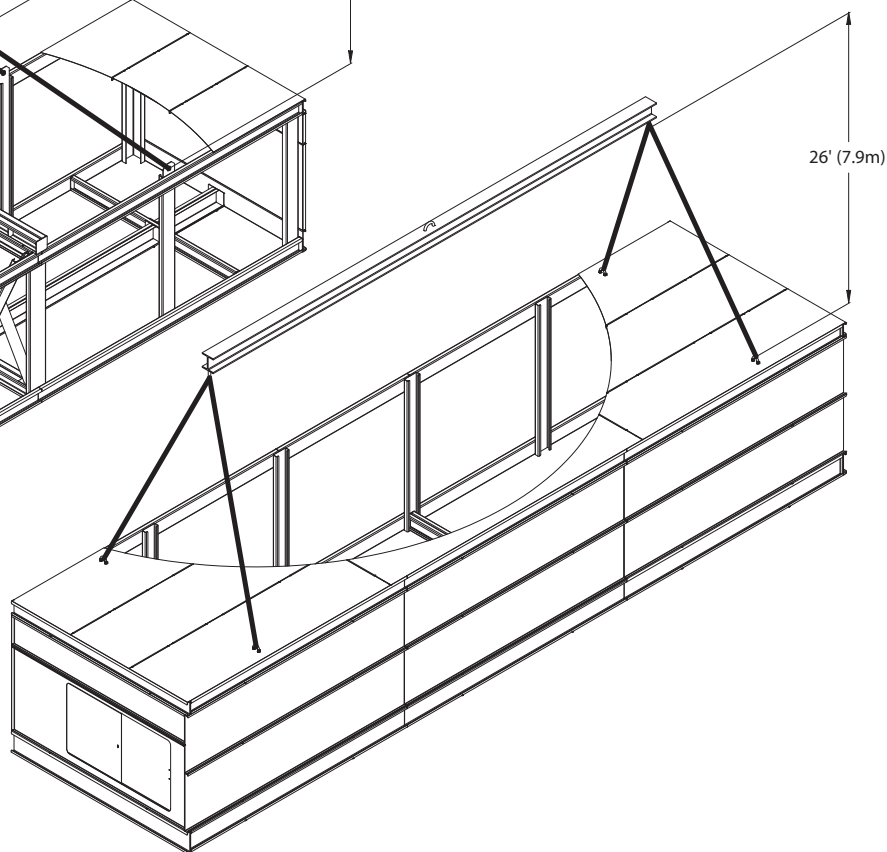


Figure 10B - Rigging of End Fan Module

Assembly of the Fan Sections to the Casing Sections

The fan sections rigging should begin with an end fan module, followed by the middle fan module and finally followed by the last end fan module.

Drift pins should be used to align the fan section with the casing section. The installer will need to attach the fan section end panels to the casing section end panels and the fan section side panels to the casing section side panels with 3/8" hardware.

Units are provided with match markings on each section to assist with arrangement (i.e. A1 of casing section should match up with A1 of fan section).

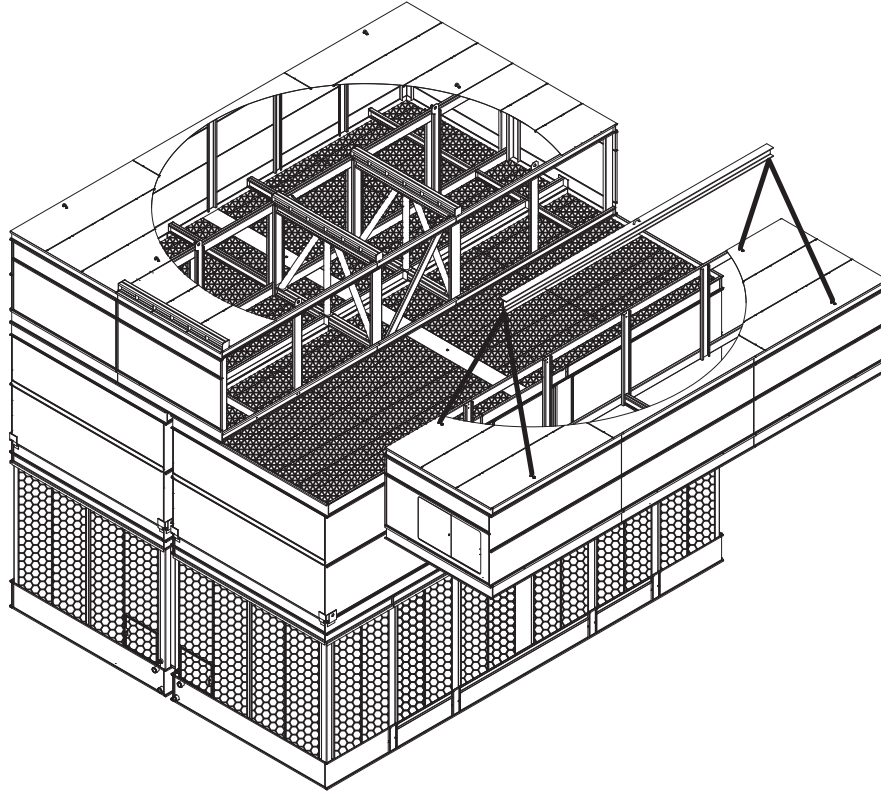


Figure 11 - Assembling Fan and Casing Sections

Rigging Fan Sections on Multicell Units

In multicell installations, placing multiple towers side-by-side will limit access between cells and make rigging more difficult. Therefore multicell rigging channels will come attached to the inside of the casing and fan section panels, as shown in Figure 12. Once the sections are mounted, the flanges of the rigging channels must be bolted from inside the unit. Use hardware noted in Table 3. The fasteners in the rigging channels are in addition to the fasteners required around the perimeter of the fan section.

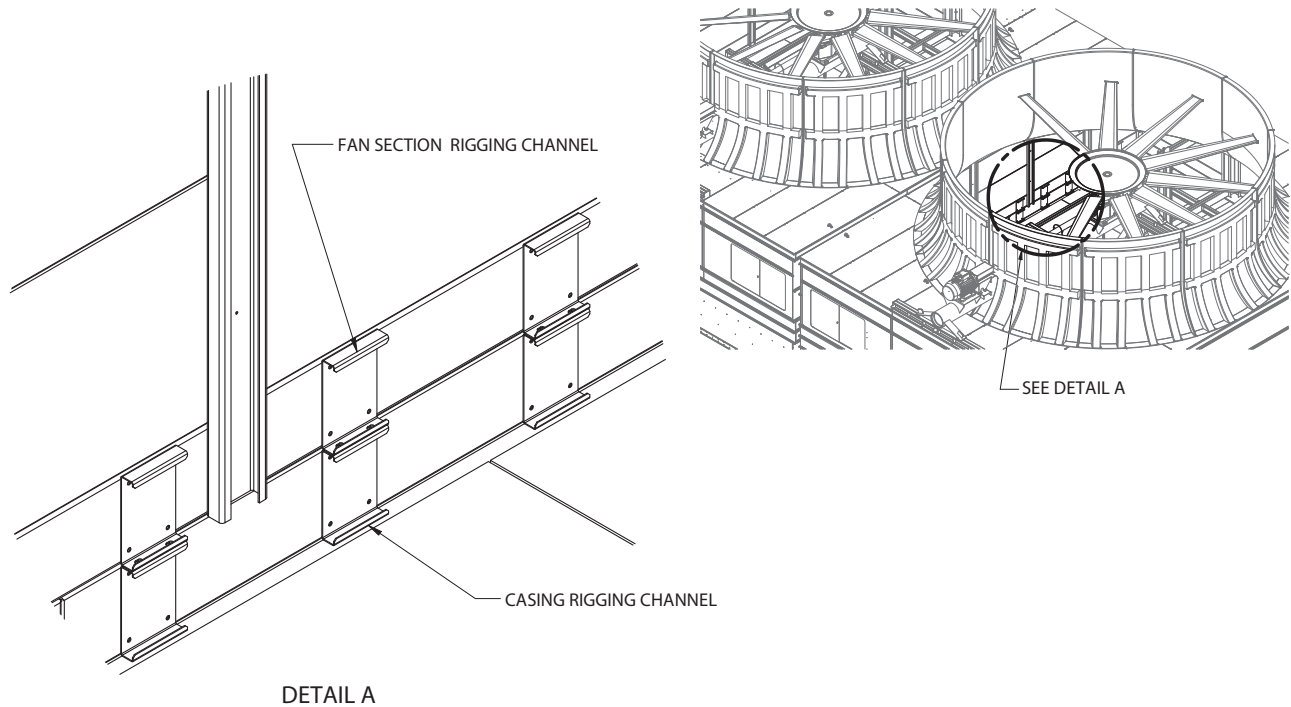


Figure 12 - Fan and Casing Rigging - Multicell

Units	Hardware Sizes
All ATLAS Units	3/8" (10mm) Nuts, Bolts & Washers (Galvanized or Stainless)

Table 3 - Hardware Sizes

Fan Sealing

After rigging, apply caulk to the top and end seams of the fan sections (Figure 13). This must be done from the inside of the unit.

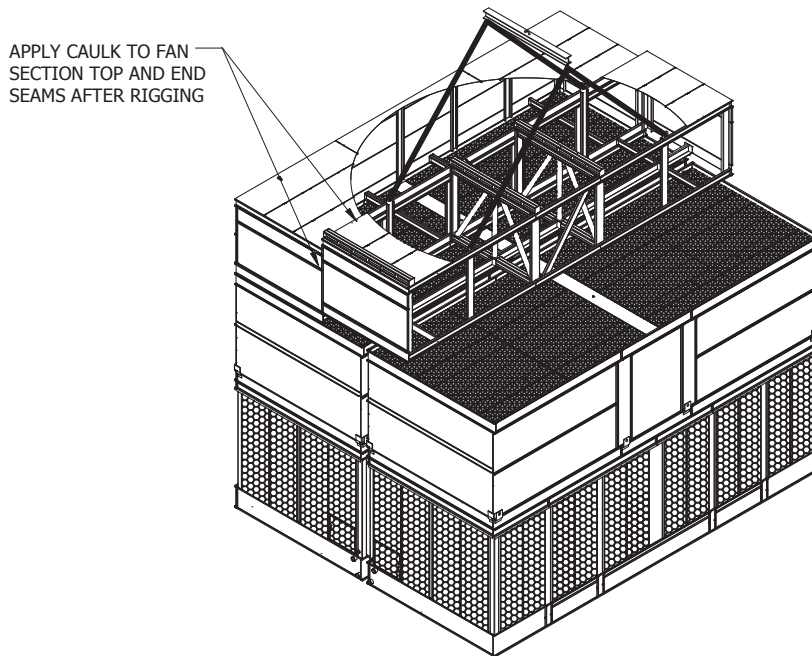


Figure 13 - Fan Section Sealing

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 must be removed before final positioning of the unit.

The preferred method for extended lifts is to use slings under the unit, as shown in Figure 14 below. Spreader bars should always be used between the cables at the top of the section to prevent damage to the upper flanges.

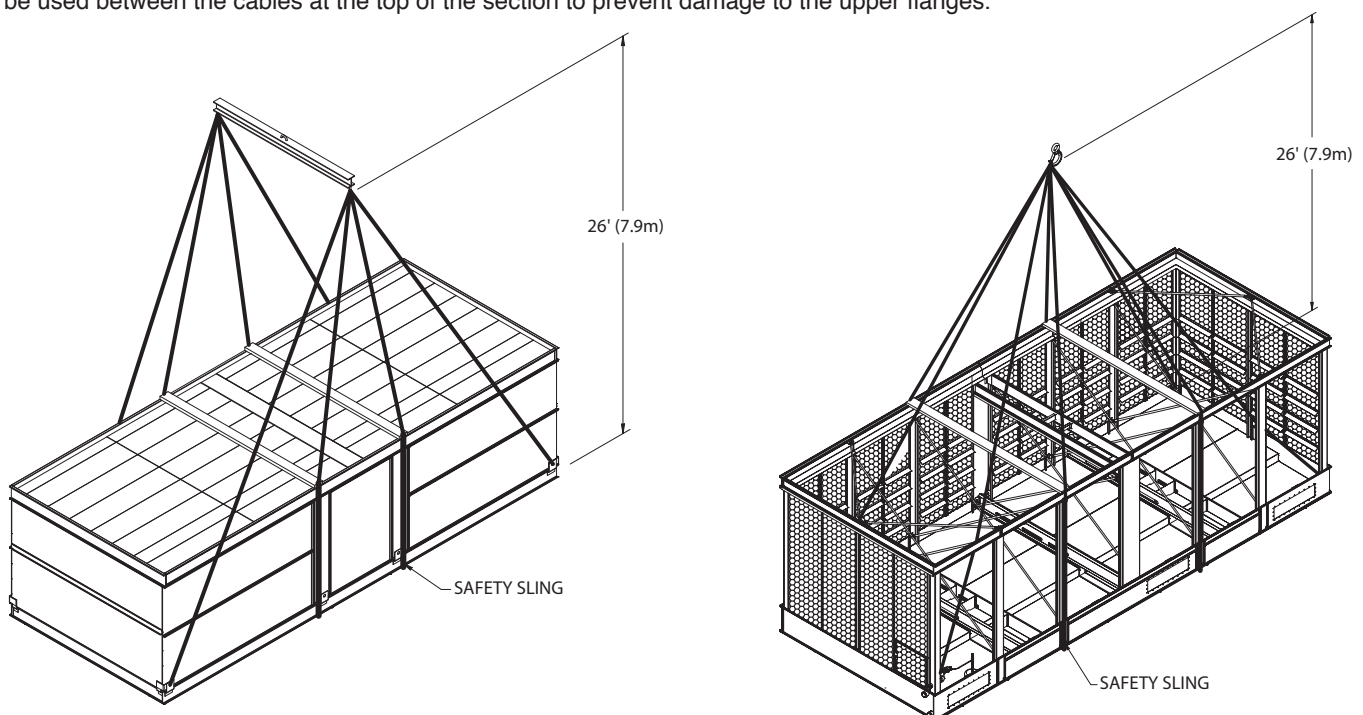


Figure 14 - Extended Lifts

Floating Shaft Installation & Alignment

The fan motor and gear reducer will ship mounted to the mechanical equipment support. The system will be prealigned in the factory, however alignment should be verified prior to rigging the mechanical equipment support to the fan section.

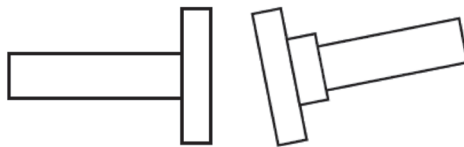
The steps for alignment of the floating shaft are:

1. Mount the drive shaft with the flexible element assembly on the gear drive input shaft using the supplied 3/8" (10mm) hardware. All bolts, lock washers and nuts are supplied with the drive shaft kit.
2. Insert steel bushings into the composite flexible elements on the motor side.
3. Mount the drive shaft with the flexible element assembly on the motor output shaft using the supplied 3/8" (10mm) hardware. All bolts, lock washers and nuts are supplied with the drive shaft kit.
4. Torque requirements for the bolts are listed in Table 4 (these values are dependent upon the shaft model). Use a torque wrench to properly torque all drive shaft bolts.

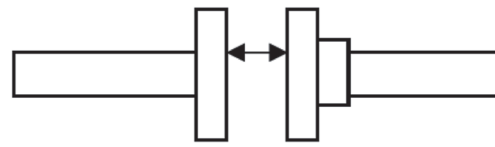
Shaft Model	Torque Requirement
LRR 350	400 in-lbs (33 ft-lb 45 Nm)
LRR 375	400 in-lbs (33 ft-lb 45 Nm)
LRR 450	145 in-lbs (12 ft-lb 16 Nm)
LRA 485	240 in-lbs (20 ft-lb 27 Nm)

Table 4 - Torque Requirements for Floating Shaft Assemblies

5. Check angular and axial misalignment between the drive shaft and both the motor and gear drive couplings.



Angular Misalignment



Axial Misalignment

6. Check angular misalignment with a dial indicator on gear drive side.
7. Attach the dial indicator support to the drive shaft and position the indicator tip to read off the opposite side flange.
8. With the dial indicator set to zero, rotate the shaft 360° and record the indicator readings at 90° increments.
9. The range between minimum and maximum values should be less than 0.010" (0.25mm). If alignment is out of tolerance, add shims (not exceeding 1/4").
10. When the angular alignment is within the acceptable ranges as mentioned in step 9, securely tighten all gear drive hardware.
11. Repeat steps 6 through 10 on the motor side of the drive shaft.
12. Check axial misalignment with a tape measure or dial caliper. Refer to Table 5 for axial alignment gap limits.

Shaft Model	Axial Alignment Gap Limits
LRR 350	0.42-0.44 in. (10.7mm-11.2mm)
LRR 375	0.53-0.55 in. (13.5mm-14.0mm)
LRR 450	0.42-0.44 in. (10.7mm-11.2mm)
LRA 485	0.58-0.62 in. (14.9mm-15.9mm)

Table 5 - Axial Alignment Gap Limits

Fan Assembly Instructions

Once the gear drive has been aligned the fan should be assembled onto the mechanical equipment assembly. This simplifies assembly by completing it at ground level and reducing the number of lifts required.

Hudson Fan:

Please see “Tuf-Lite® III Fans 4000KW Series Hub Installation Manual” and Figure 15.

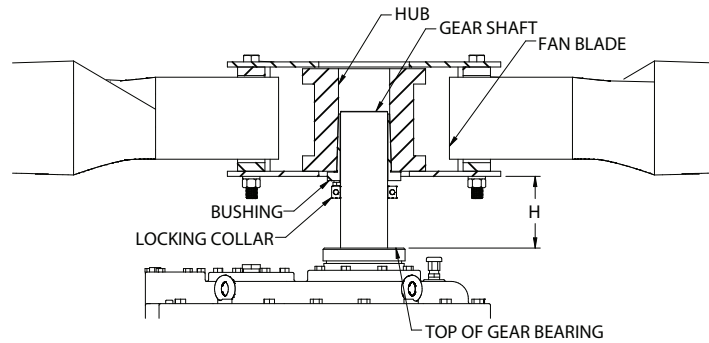


Figure 15 - Hudson Fan Mounting

Gear Drive	“H”
1008	8.5”
1110	7”
1311	6”

Table 6 -Hudson Fan Hub Distance

Moore Fan (Class 10000):

Please see “Moore Fans Class 10000 Fans Owners Manual” and Figure 16.

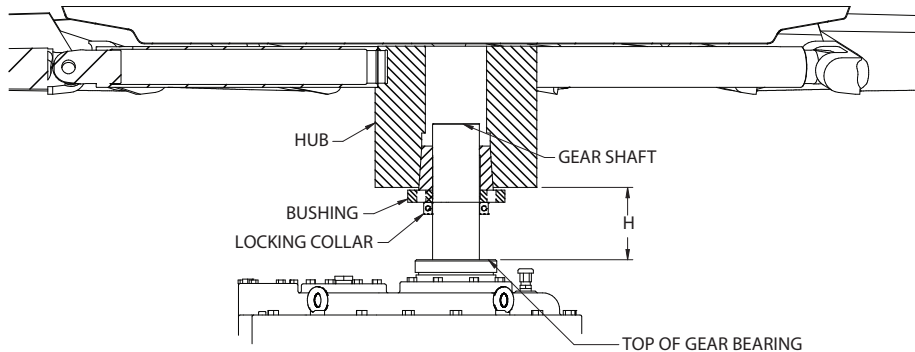


Figure 16 - Moore Fan Mounting

The relevant, above-mentioned manuals will be sent along with the tower.

Gear Drive	“H”
1008	7”
1110	6”
1311	5”

Table 7 -Moore Fan Hub Distance

Rigging Drive Assembly

Once the gear drive has been aligned and the fan assembled onto the gear output shaft, the entire assembly should be lifted onto the fan section (Figure 17). The hook of the crane must be a minimum of 17' above the lifting ears. See Table 8 for hardware required to attach the drive assembly to the fan deck. Be sure to position the lifting cables between fan blades so as not to damage the fan during the lift.

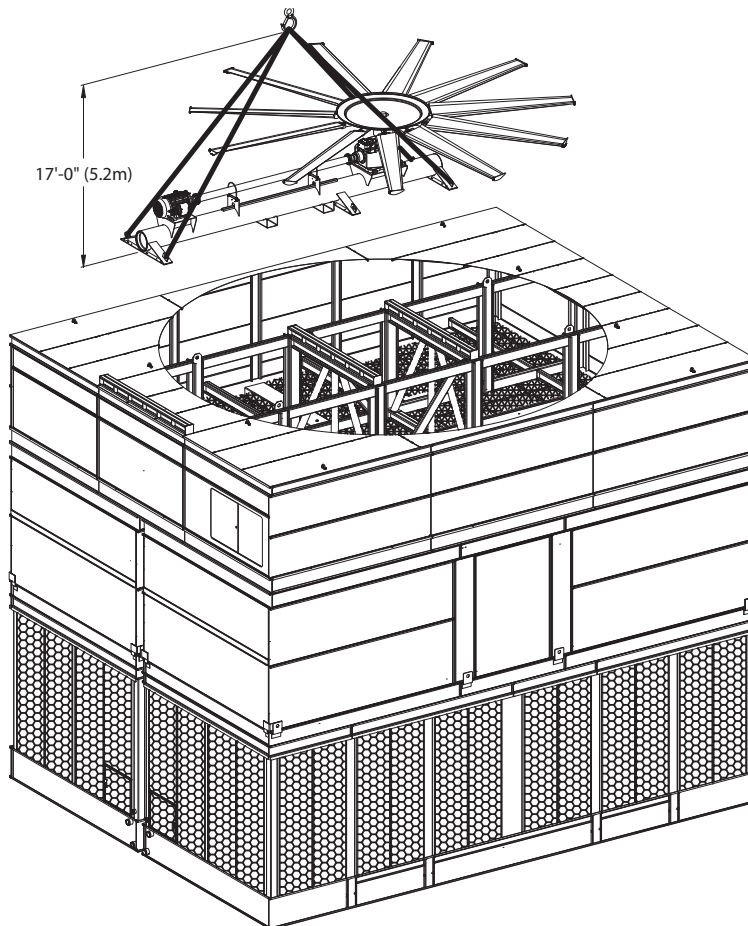


Figure 17 - Rigging Drive System

Units	Hardware Sizes
All ATLAS Units	1/2" (13mm) Nuts, Bolts & Washers (Galvanized or Stainless)

Table 8 - Hardware Sizes

Fan Cylinder Assembly

The fan cylinder will ship in 10 sections for assembly and installation in the field. Each section will be joined with a flange as shown in Figure 18. Fan cylinder assembly should be performed on the ground with one person holding the sections up until the assembly is able to stand alone. See Table 9 below for hardware required to assemble the fan cylinder.

Lifting devices to be installed in between cylinder sections during assembly. Remove lifting device after installing fan cylinder if the tower has a Super Low Sound Fan.

Flanges should be cleaned prior to assembly. Each cylinder should have 5 lifting devices total, installed in every other cylinder panel seam.

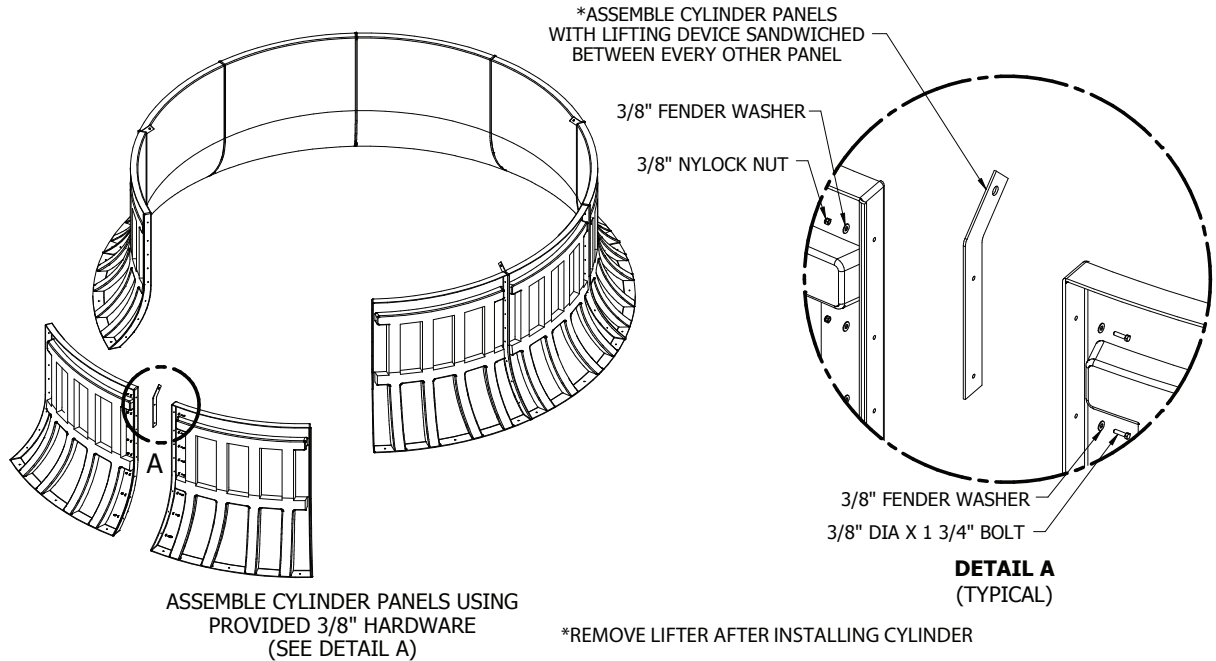


Figure 18 - Fan Cylinder Assembly

Units	Hardware Sizes
All ATLAS Units	3/8" (10mm) Nuts, Bolts & Washers

Table 9 - Hardware Sizes

Fan Cylinder Rigging

Lower cylinder carefully around fan and drive shaft using the provided lifting ears. The hook of the crane must be a minimum of 17' above the lifting ears. Make sure fan assembly is centered within the cylinder before attaching to fan section. Measure the clearance between each fan tip and the cylinder with a tape measure, making sure it is 7/8" (22mm) or less.

Fasten to fan deck using hardware in Table 10. Holes are to be drilled through the cylinder and fan deck in the field from outside the tower.

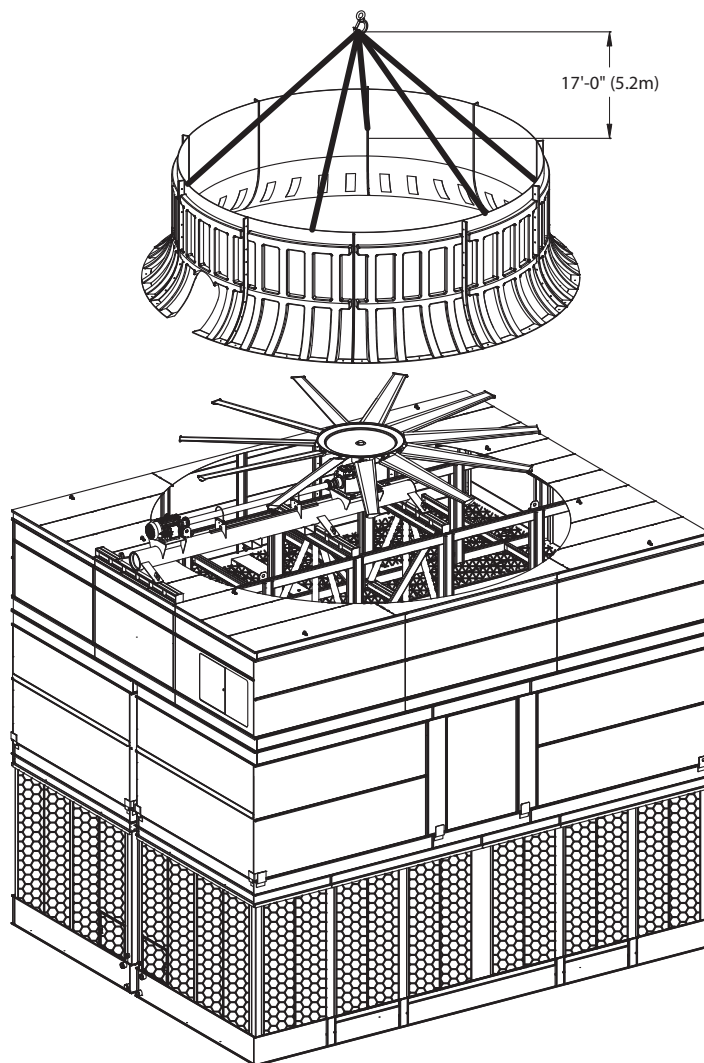


Figure 19 - Fan Cylinder Rigging

Units	Hardware Sizes
All ATLAS Units	3/8" (10mm) Nuts, Bolts & Washers (Galvanized or Stainless)

Table 10 - Hardware Sizes

Fan Cylinder Sealing

After the fan cylinder is assembled and secured on the fan deck, caulk the seams of the cylinder. This is to be done from inside the unit. Caulk sealant must also be applied between the fan cylinder and the fan sections as well as around the torque tube.

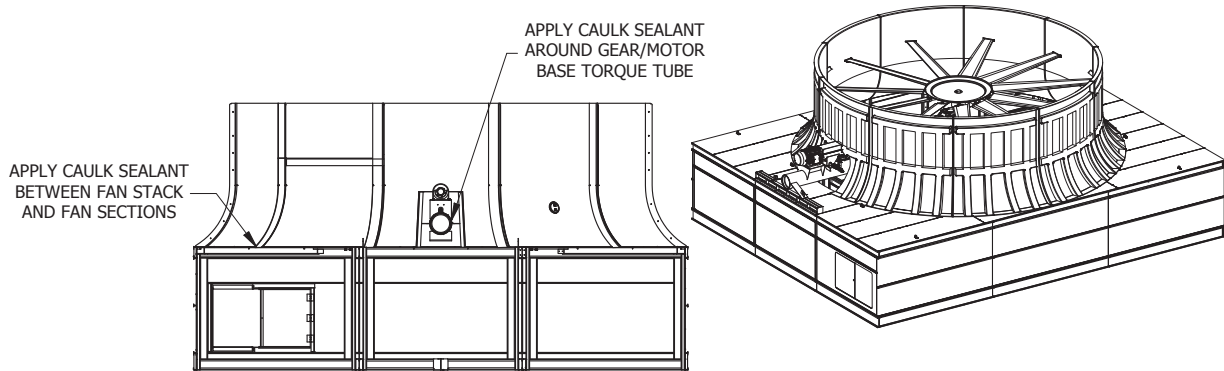


Figure 20 - Fan Cylinder Sealing

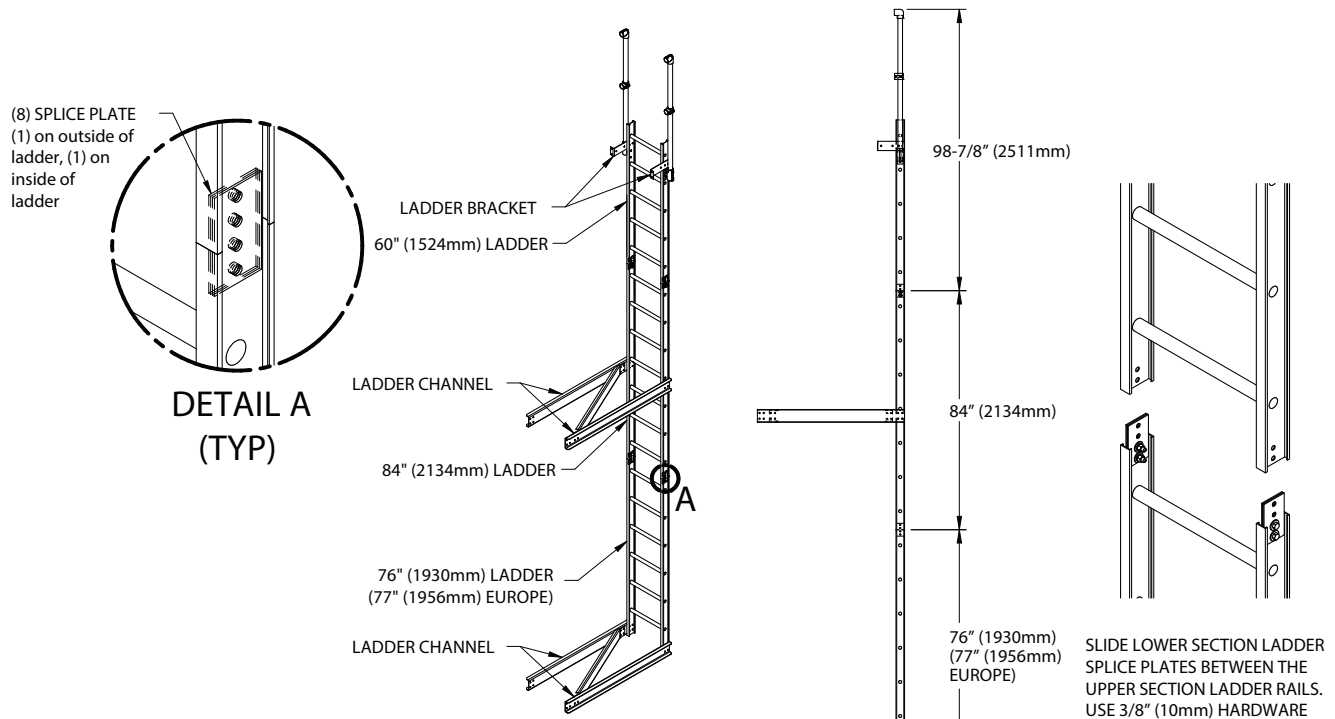
After fan, drive system and fan cylinder are entirely assembled, rigged and sealed, the fans must be balanced per the fan manufacturer's procedure. Contact your local EVAPCO representative for more information.



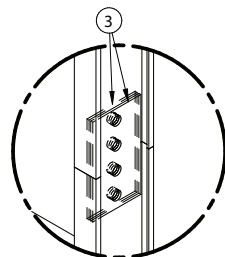
External Platform and Vertical Ladder Installation

If your unit is accessorized with an external service platform assembly with a vertical ladder, this equipment is shipped in the basin of your unit. In some cases, they are shipped separately due to other basin accessories that may interfere with storage. The platform is partially assembled prior to shipment to minimize field assembly.

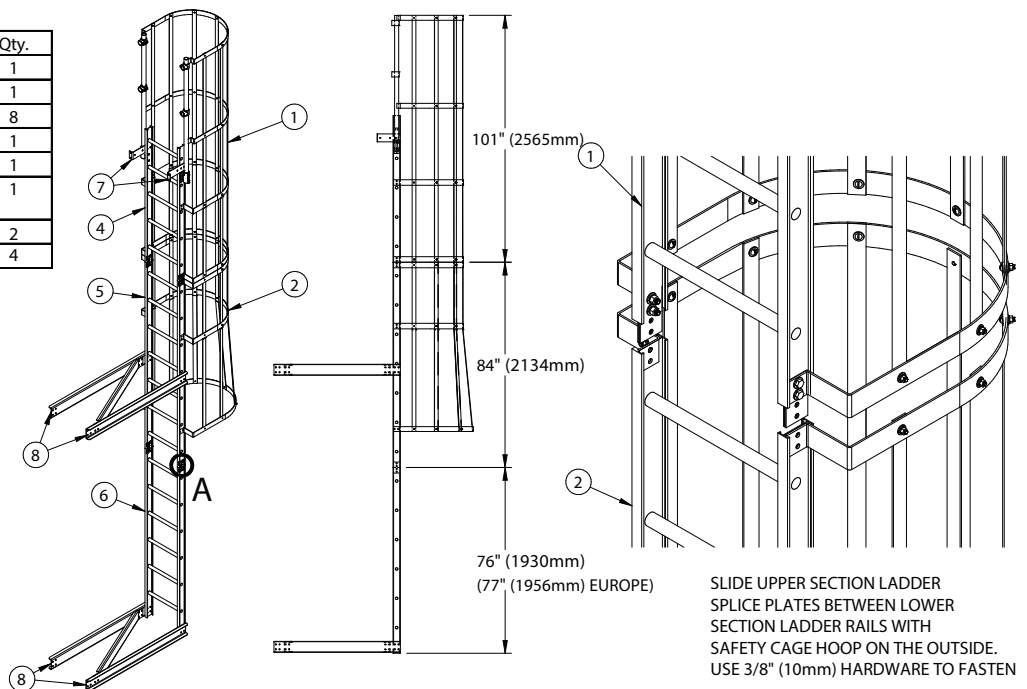
Typically, there is one working platform and ladder assembly per cell. Refer to your factory submittal for details.



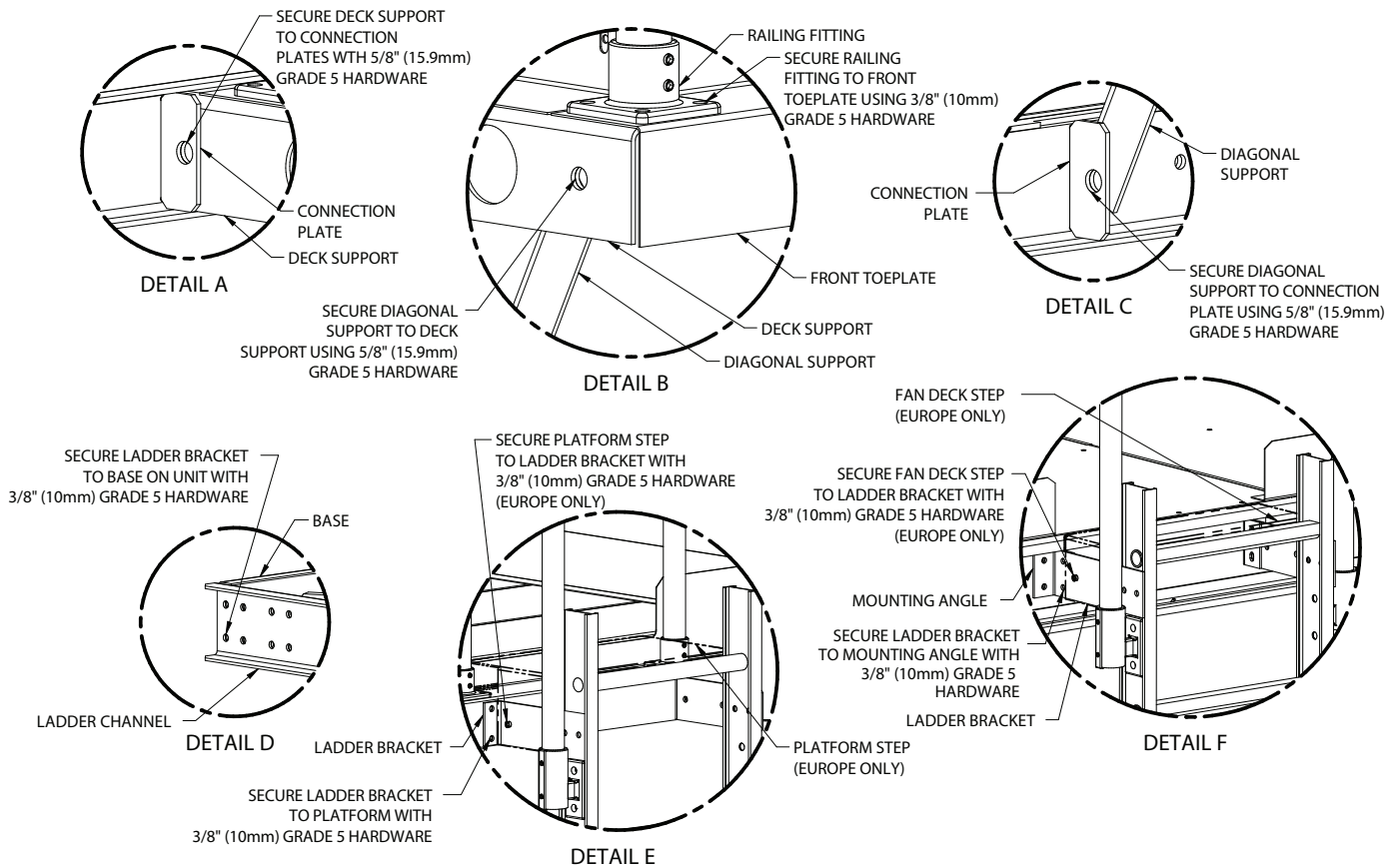
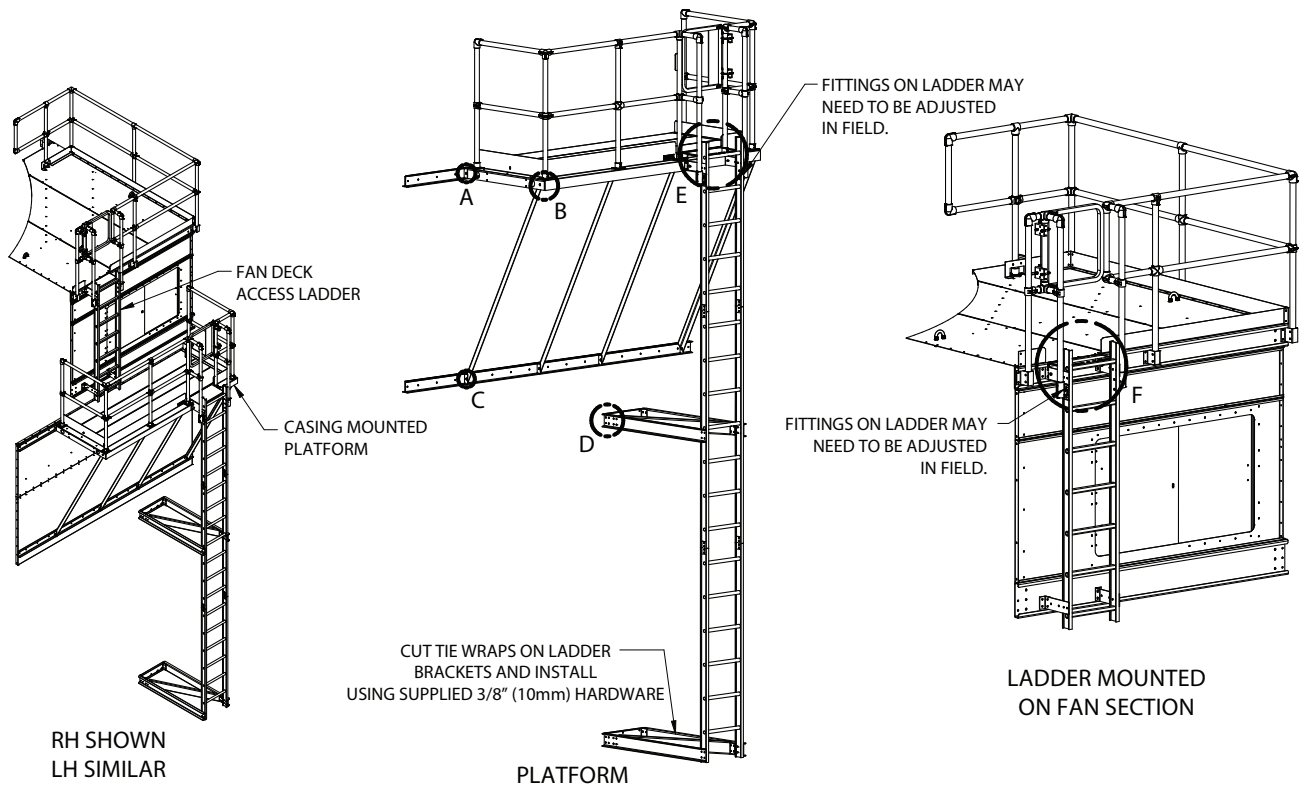
Item	Description	Qty.
1	Upper Safety Cage	1
2	Lower Safety Cage	1
3	Ladder Splice Plate	8
4	60" (1524mm) Ladder	1
5	84" (2134mm) Ladder	1
6	76" (1930mm) Ladder (77" (1956mm) EUROPE)	1
7	Ladder Bracket	2
8	Ladder Channel	4



DETAIL A (TYP)



NOTE: 1) ATTACH ITEMS AS SHOWN USING 3/8" (10mm) HARDWARE.





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