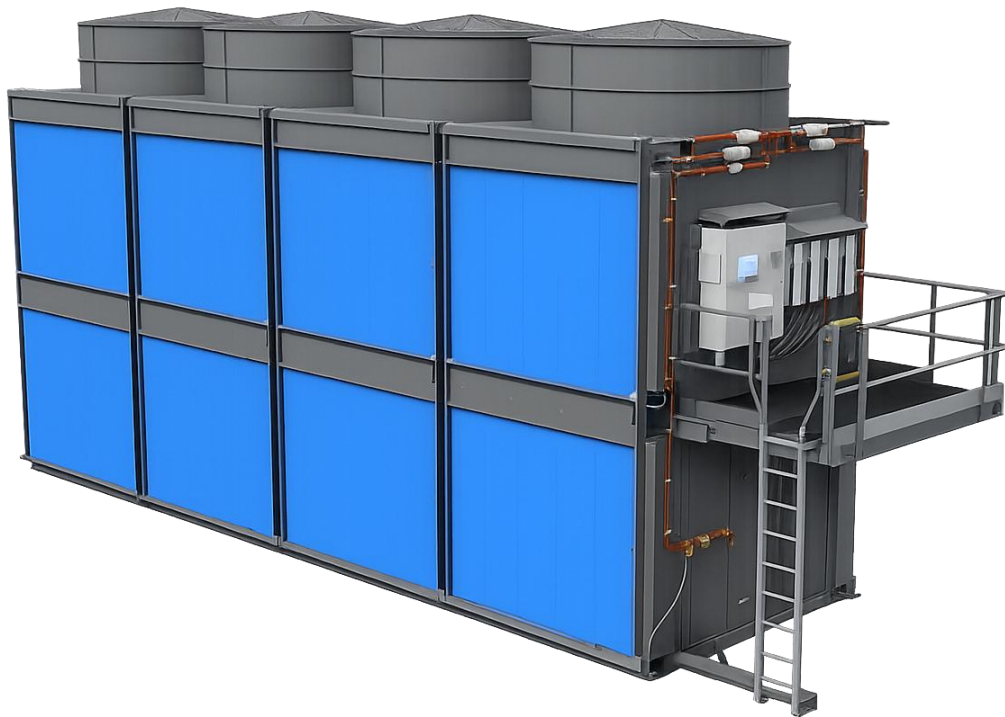




# Trillium™ Adiabatic Cooler TRFS

## RIGGING & ASSEMBLY INSTRUCTIONS



## IMPORTANT NOTICE

**The Trillium™ Adiabatic Cooler TRFS should be rigged and assembled as outlined in this instruction manual.**

Only qualified personnel should undertake the rigging and assembly of the equipment covered by this manual.

This manual should be thoroughly reviewed prior to the actual rigging and assembly of the equipment to ensure proper procedures are followed and that all necessary equipment is available.

Proper care, procedures, and tools must be used in handling, lifting, installing, operating, maintaining, and repairing this equipment to prevent personal injury and/or property damage.

Be sure to have a copy of the equipment submittal package available for reference. If you do not have a copy or if you need additional information about your unit, contact your local **BAC Representative**, whose name and telephone number are on a label adjacent to the unit's access door. The model number and serial number of the unit are also located in this area.

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# 1. Safety Warnings

**⚠ DANGER** Failure to use designated lifting points can result in a dropped load and cause severe personal injury, death, and/or property damage. Lifts must be performed by qualified riggers following these Rigging & Assembly Instructions and generally accepted lifting practices. The use of supplemental safety slings may also be required as determined by the qualified rigger.

**⚠ DANGER** Failing to properly anchor equipment before operation begins can result in serious personal injury, death, or property damage from the movement of an unstable unit. Ensure unit is properly anchored before operation begins.

**⚠ DANGER** This unit has rotating fan equipment that can cause severe personal injury or death upon contact. Never step or walk on the fan guard. Always disconnect, lock out, and tag out all power sources to the fan motor(s) before performing any inspection or maintenance.

**⚠ DANGER** This unit must be installed in locations not accessible to the general public. Adequate safeguards (including the use of protective enclosures where necessary) should be taken with this equipment to safeguard the public from injury and to prevent property damage.

**⚠ DANGER** Performing work on an energized unit poses a risk of electrocution, which can cause severe personal injury, death, and/or property damage. Do not perform any service on or near the unit without first ensuring the unit is de-energized and all lockout / tagout procedures have been followed. Wait five minutes after disconnecting the voltage at all poles before opening the fan and motor assembly.

**⚠ WARNING** To prevent bodily injury or property damage, only qualified personnel should undertake the installation, operation, maintenance, and repair of this equipment. Proper care, procedures, and tools must be used in handling, lifting, installing, operating, maintaining, and repairing this equipment.

**⚠ WARNING** The pre-cooler pads are made of flammable material and should be removed when performing hot work on or near the unit.

**⚠ WARNING** Before lifting the unit, open the access hatch(es) and clear any water, snow, ice, or debris that has collected or accumulated in the unit. Such accumulations substantially add to the equipment's lifting weight and, if not cleared or otherwise accounted for, could pose a risk of severe personal injury, death, or property damage during lifting.

**NOTICE** If the unit is to be stored for a prolonged period before installation or remain in an unused state for a prolonged period after installation, certain precautions should be observed. Refer to Prolonged Outdoor Storage details in Section 2.6.

**NOTICE** Do not use steam, high-pressure water, or high-pressure air to clean the unit or any component to prevent equipment damage.

**NOTICE** Field piping must not be supported by the unit inlet or outlet connections to prevent equipment damage.

**NOTICE** All connections, including those installed by others, must be leak-free and tested accordingly.

**NOTICE** The installer must ensure a proper air purging of the system prior to operation. Entrained air can restrict the capacity of the cooler, resulting in higher process temperatures.

**NOTICE** When connecting power to the unit, do not penetrate the control panel. Doing so may allow moisture to enter the panel. All cable and conduit should be supported separately from the unit.

**NOTICE** Do not penetrate the unit for supports or other connections.

**NOTICE** Each unit must be located and positioned to prevent the introduction of discharge air into the ventilation systems of the building on which the unit is located and of adjacent buildings.

**NOTICE** For weight information, refer to the unit submittal drawings. Any accessories shipped in the unit must be removed prior to installation.

**NOTICE** Do not use power tools on the Whisper Quiet™ fan to avoid damaging mounting components and damage to the fans.

**NOTICE** To prevent possible contamination of the make-up water supply, install a backflow prevention method in accordance with applicable local and national codes.

**NOTICE** To prevent excessive degradation do not attempt to remove the pre-cooler pads while wet.

**NOTICE** Allowing coils to passively drain of liquid via gravity is insufficient to protect the coils from damage due to freezing. Use compressed air or an air dryer to ensure all fluid is removed from the coils.

## 2. Introduction

### 2.1 Safety

Adequate precautions appropriate for the installation and location of these products should be taken to safeguard the equipment and the premises from damage and the public from possible injury. **The procedures listed in this manual must be thoroughly reviewed prior to rigging and assembly. Read all warnings, cautions, and notes.**

**⚠ WARNING** To prevent bodily injury or property damage, only qualified personnel should undertake the installation, operation, maintenance, and repair of this equipment. Proper care, procedures, and tools must be used in handling, lifting, installing, operating, maintaining, and repairing this equipment.

### 2.2 Pre-Rigging Checks

**⚠ DANGER** Failure to use designated lifting points can result in a dropped load and cause severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following these Rigging & Assembly Instructions and generally accepted lifting practices. The use of supplemental safety slings may also be required, as determined by the qualified rigger.

When the unit is delivered to the jobsite, it should be checked thoroughly to ensure all required items have been received and are free of any shipping damage prior to signing the bill of lading.

The following parts should be inspected (if applicable to the unit configuration):

- |                                                           |                                                                                                                                                                               |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Sheaves and Belts                | <input type="checkbox"/> Control Panel - HMI screen, door gasket, external temperature probe                                                                                  |
| <input type="checkbox"/> Bearings                         | <input type="checkbox"/> Wiring                                                                                                                                               |
| <input type="checkbox"/> Bearing Supports                 | <input type="checkbox"/> Electronic Vibration Cutout Switch                                                                                                                   |
| <input type="checkbox"/> Fan Motor(s)                     | <input type="checkbox"/> Miscellaneous Items: All bolts, nuts, washers, and sealer tape required to assemble sections or parts are furnished by BAC and shipped with the unit |
| <input type="checkbox"/> Fan Guard(s)                     | <input type="checkbox"/> Adiabatic pre-cooler pads                                                                                                                            |
| <input type="checkbox"/> Fan(s) and Fan Shaft(s)          | <input type="checkbox"/> Water connection piping                                                                                                                              |
| <input type="checkbox"/> Coil Surface                     | <input type="checkbox"/> Water distribution system                                                                                                                            |
| <input type="checkbox"/> Interior Surfaces                | <input type="checkbox"/> External platform                                                                                                                                    |
| <input type="checkbox"/> Exterior Surfaces                | <input type="checkbox"/> Access door platform                                                                                                                                 |
| <input type="checkbox"/> Mating Surfaces Between Sections | <input type="checkbox"/> Ladders                                                                                                                                              |
| <input type="checkbox"/> Fan cowls                        |                                                                                                                                                                               |

The leaving fluid temperature sensor is shipped loose and stored inside the electrical cabinet for installation on site. Refer to section **Installation of Leaving Temperature Sensor**.

**⚠ WARNING** Before lifting the unit, open the access hatch(es) and clear any water, snow, ice, or debris that has collected or accumulated in the unit. Such accumulations substantially add to the equipment's lifting weight and, if not cleared or otherwise accounted for, could pose a risk of severe personal injury, death, or property damage during lifting.

## Unit Weights

Before rigging any unit, the weight of each section should be verified from the unit submittal. In the event of extended lifts or where hazards exist, the lifting devices should be used in conjunction with safety slings placed under the unit.

## Anchoring

**⚠ DANGER** Failing to properly anchor equipment before operation begins, can result in serious personal injury, death, or property damage from the movement of an unstable unit. Ensure unit is properly anchored before operation begins.

Refer to the suggested support drawing included in the unit submittal for the location of the mounting holes.

Units have been configured to be installed on concrete or on structural steel. For project-specific configurations and anchoring details, refer to the unit's submittal package.

Support beams should be selected in accordance with accepted structural engineering practices. Supporting steel must be greater than or equal to the length of the unit's base, and the unit must not be point supported.

When a unit is anchored directly to concrete on grade without steel supports, the support concrete must be flush and level at top. Any concrete surfaces for unit support and anchors must be in accordance with accepted structural practices.

## Shipping and Removal of Shipping Protection

Model TRFS is factory-assembled to ensure uniform quality with minimum field assembly. The unit ships in two sections per cell (one lower and one upper section) to minimize rigging and freight costs. For the dimensions and weights of a specific unit or section, refer to the unit submittal drawings.

### 2.3 Placement and Layout Guidelines

The equipment must be placed in a location that ensures an adequate supply of fresh air into the air intakes. When units are located adjacent to walls or within enclosures, care must be taken to ensure the warm, discharge air is not redirected back to the unit's air intakes. Each unit must be positioned to prevent the introduction of discharge air into the ventilation systems of the building on which the unit is located and of adjacent buildings. Refer to the [layout guidelines](#) on BAC's website for spacing requirements.

**NOTICE** Each unit must be located and positioned to prevent the introduction of discharge air into the ventilation systems of the building on which the unit is located and of adjacent buildings.

### 2.4 Unit Operation

Prior to start-up and unit operation, refer to the **Trillium™ Adiabatic Cooler TRFS, Operation & Maintenance Manual**.

### 2.5 Cold Weather Operation

For information about the unit operation in cold weather, refer to the **Trillium™ Adiabatic Cooler TRFS, Operation & Maintenance Manual**.

## 3. Unit Rigging & Assembly

### 3.1 Rigging

This section details the general rigging for the upper and lower sections of the unit. Refer to the unit submittal for job-specific rigging details and the additional information on weights and dimensions.

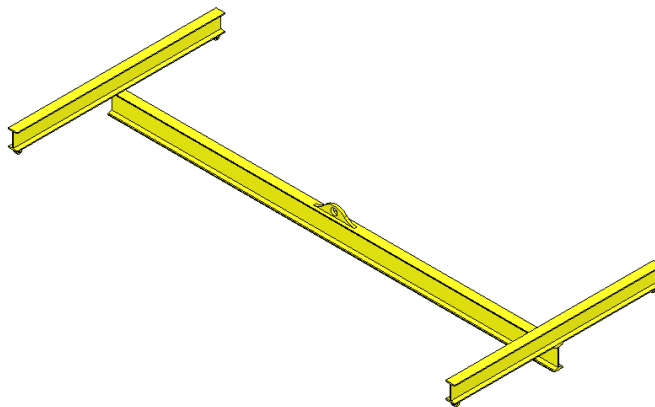
**⚠ DANGER** Failure to use designated lifting points can result in a dropped load and cause severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following these Rigging & Assembly Instructions and generally accepted lifting practices. The use of supplemental safety slings may also be required, as determined by the qualified rigger.

**NOTICE** For unit weight information, refer to the submittal.

### Lower Section

A proper lifting fixture, such as an H-beam (illustrated in **Figure 1**) is strongly recommended for lifting the lower section.

Lifting should occur from the four specified internal lifting ears (see **Figure 3**). Do not lift from lower tiedowns (see **Figure 2**). Follow the instructions of the chain positioning in **Figure 2**, **Figure 3**, and **Figure 4**. **Do not lift with the chains angled outward.**



*Figure 1. H-Beam Illustration*

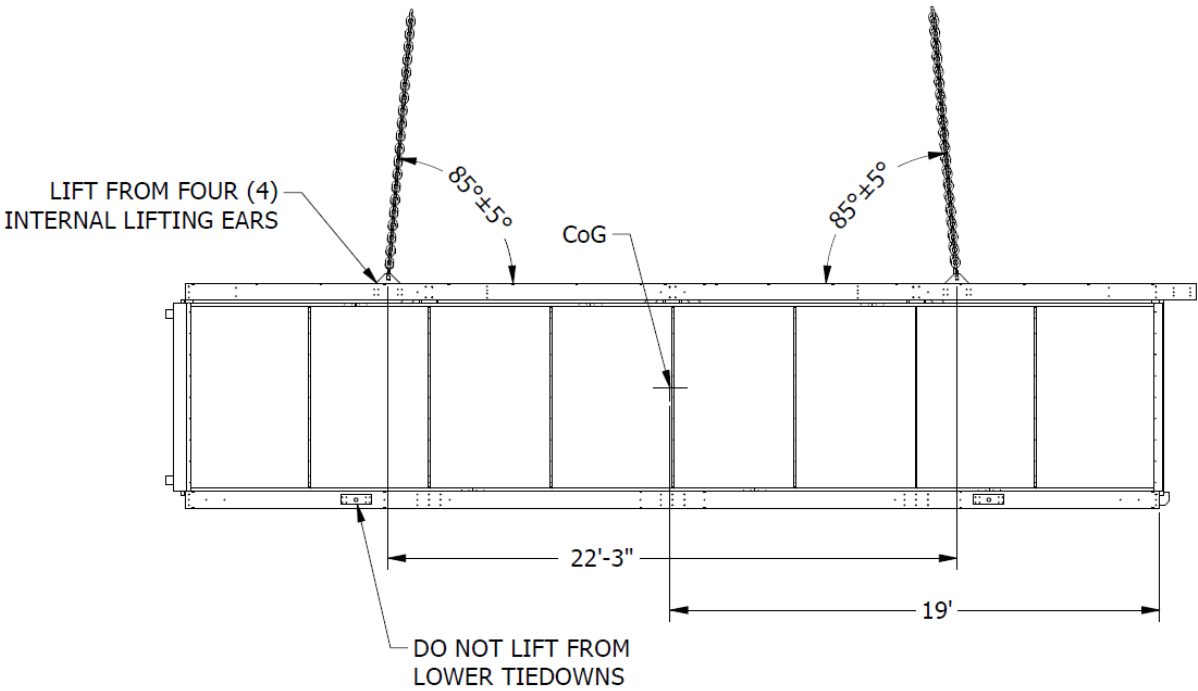


Figure 2. Lower Section Rigging Dimension

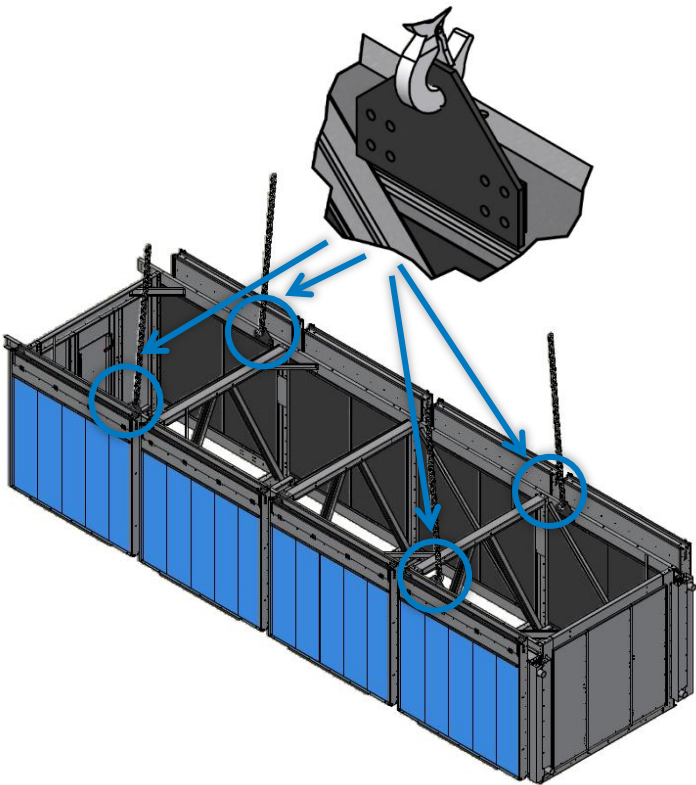


Figure 3. Lower Section Lifting Points

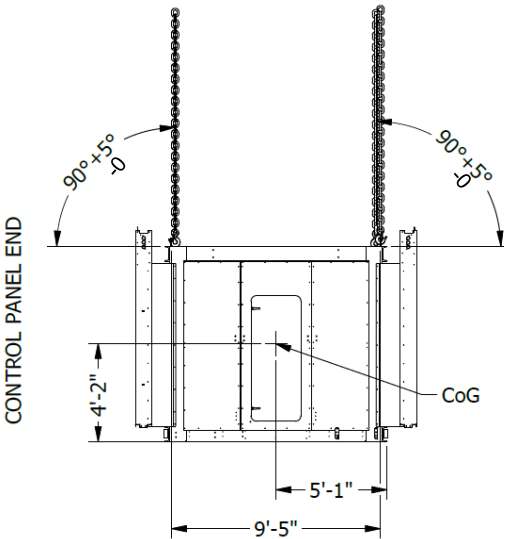


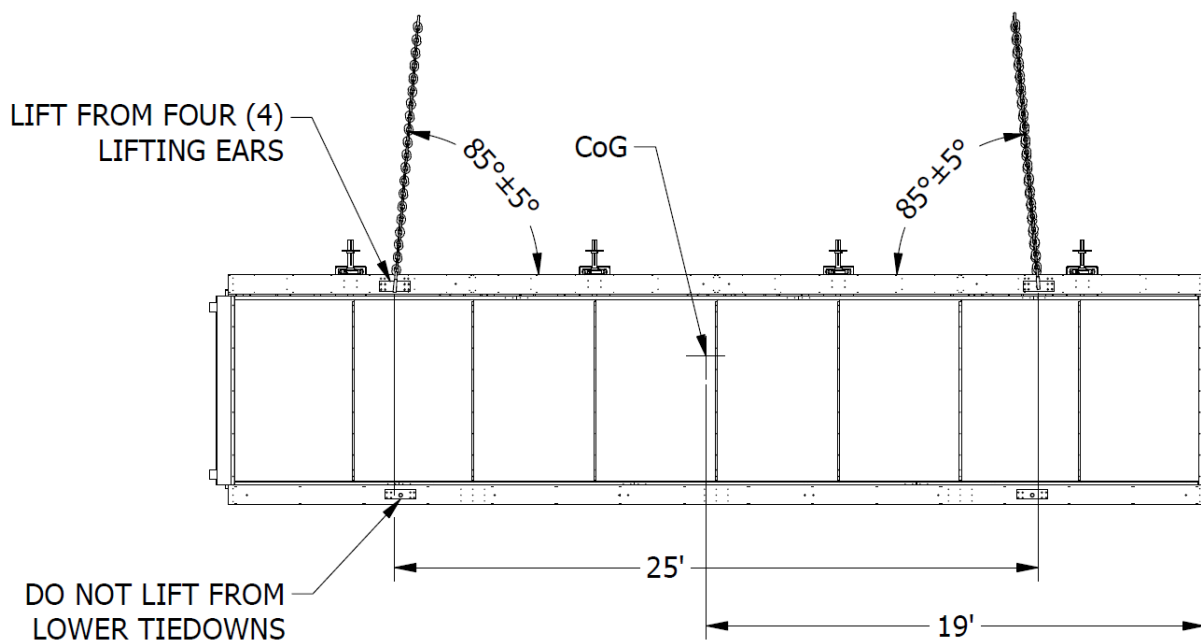
Figure 4. Lower Section Rigging Dimensions

## Upper Section

Note that the fans and cowls ship loose for field installation.

A proper lifting fixture, such as an H-beam (illustrated in **Figure 1**) is strongly recommended for lifting the upper section.

The upper section should be lifted from the four specified lifting ears shown in **Figure 6**. Do not lift from lower tiedowns (also shown in **Figure 5**). Follow the instructions of the chain positioning in **Figure 5**, **Figure 6**, and **Figure 7**. Refer to the unit submittal for job-specific rigging details.



**Figure 5.** Upper Section Rigging Dimensions

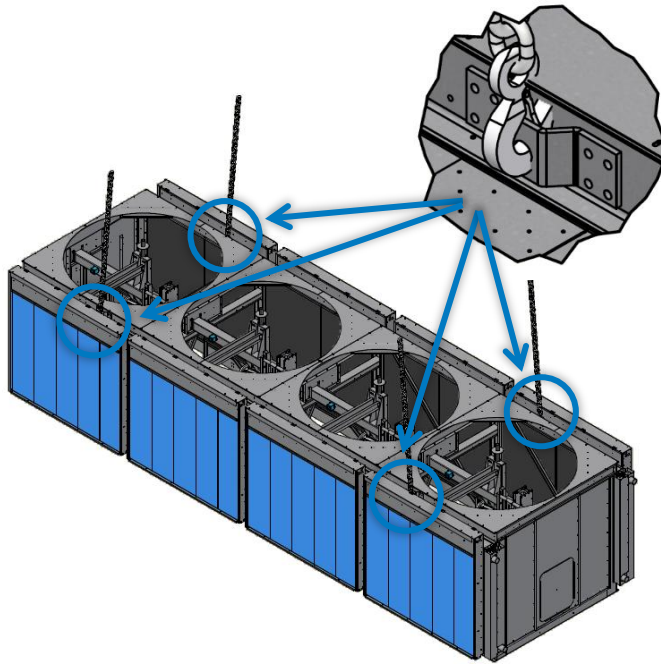
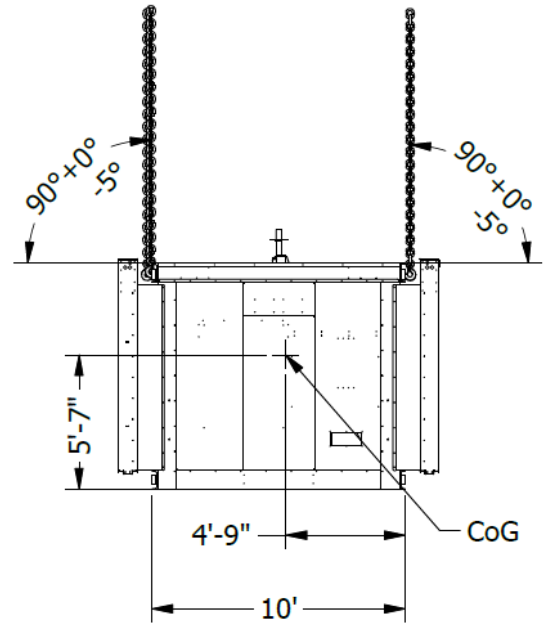


Figure 6. Upper Section Lifting Points



**Do not lift with the chains angled inward**

Figure 7. Upper Section Rigging Dimensions

## 3.2 Section Assembly

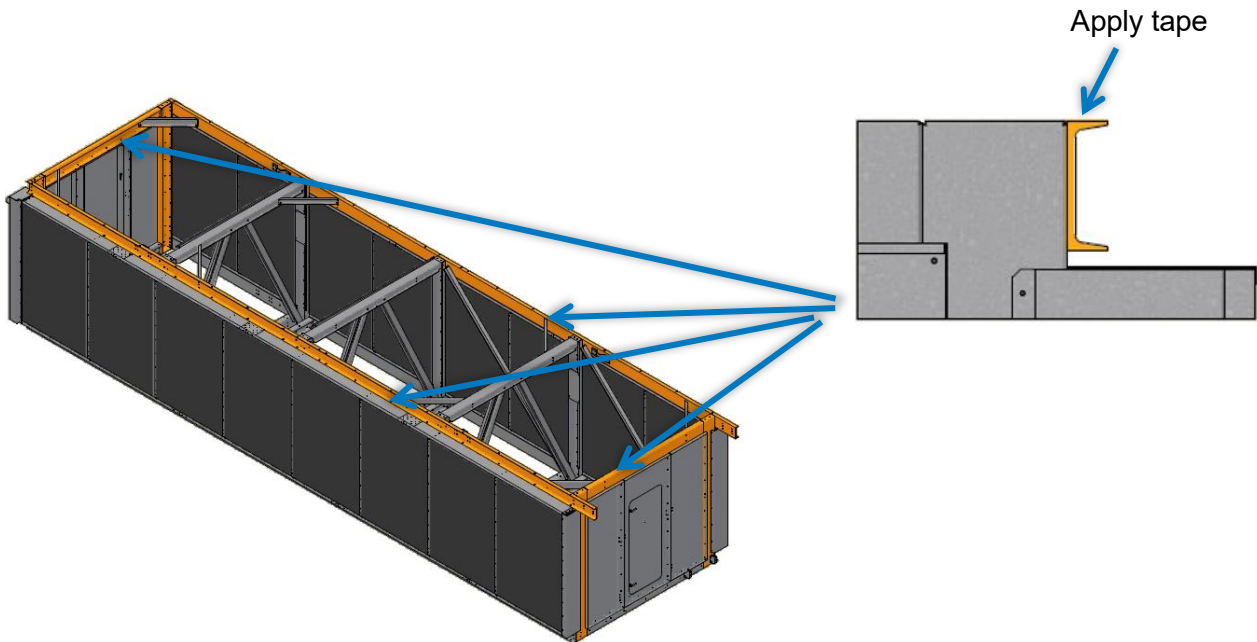
This section describes how the lower and upper sections of the unit are assembled together.

**NOTICE** For weight information, refer to the submittal. Any accessories shipped in the unit must be removed prior to installation.

**WARNING** Equipment damage may occur if the unit is not properly anchored before operation begins. Equipment damage could result in death or serious injury. Ensure unit is properly anchored before operation begins.

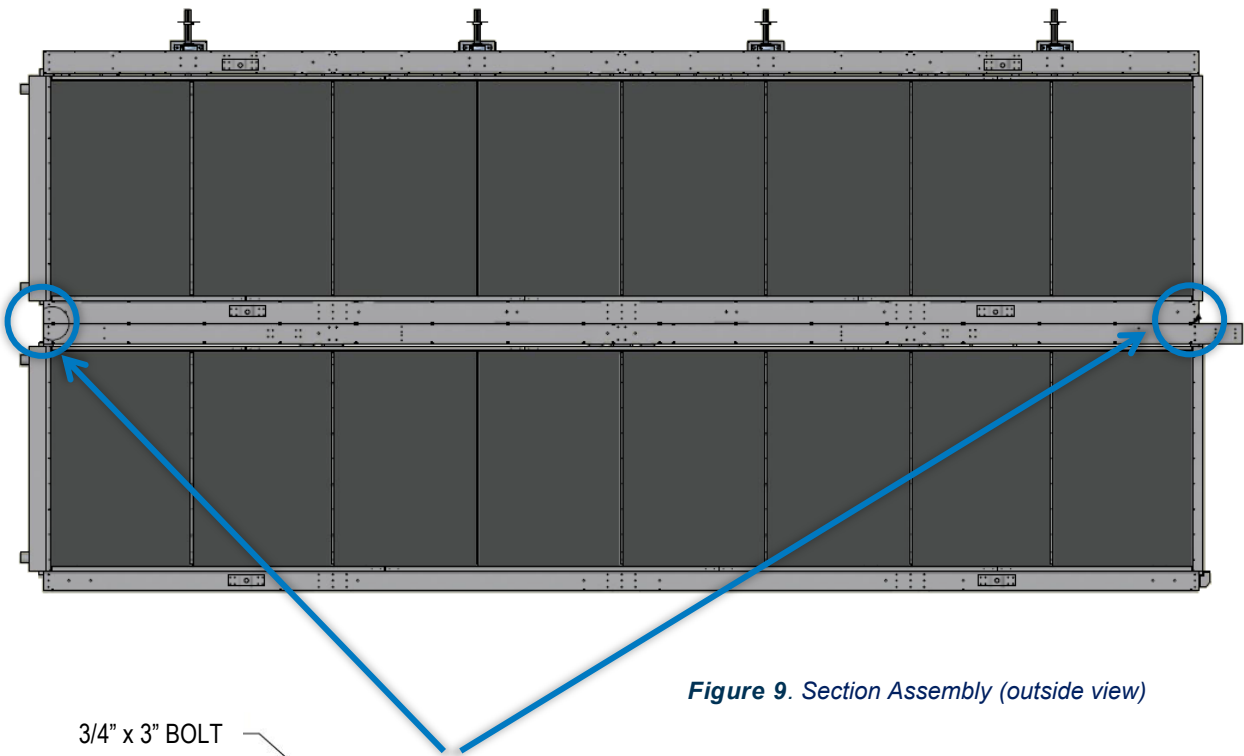
1. Remove any accessories shipped loose on or in the unit.
2. Position the lower section on concrete slab or unit supports and then bolt in place. If the unit is to be mounted on steel supports, bottom panels must be installed. Refer to **Anchoring** on **Page 8** and **Lower Section** on **Page 10**.

3. Wipe moisture and dirt from the C-shaped flange that runs along the full perimeter of the unit as shown in **Figure 8**.

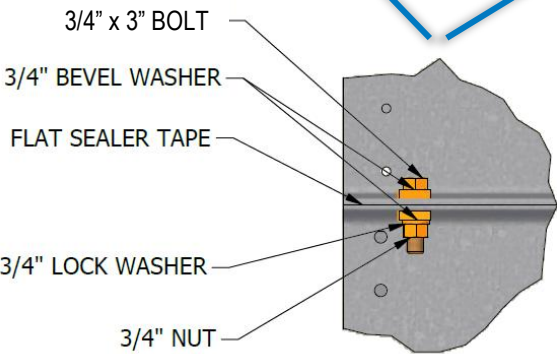


*Figure 8. Perimeter Flange*

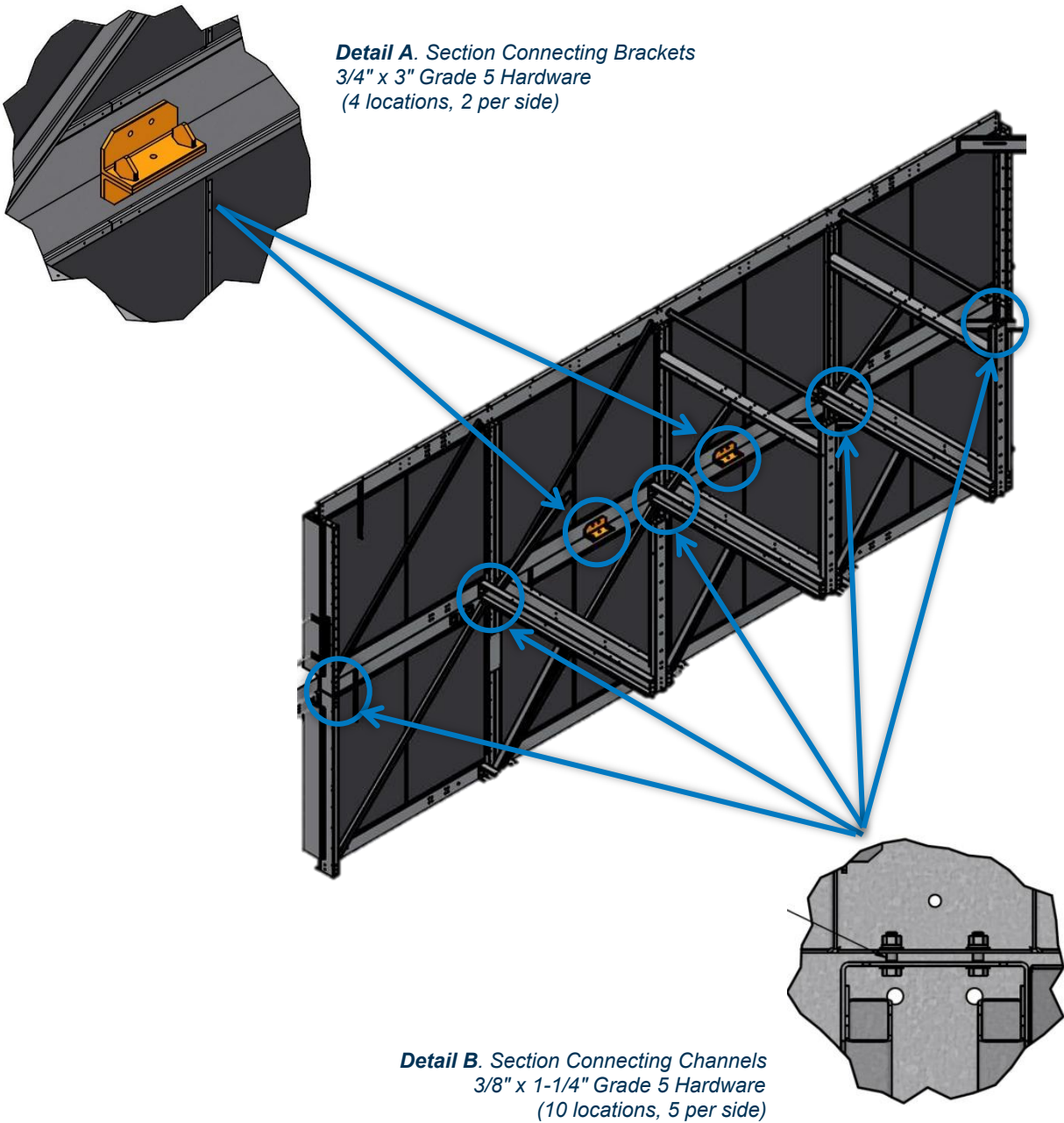
4. Apply flat butyl sealer tape (**BAC part #554000**) around the entire perimeter of the lower section as shown in **Figure 8**.
5. Lift and set the upper section.
6. Bolt the upper section in place both outside and inside the unit. Refer to **Figure 9**, **Figure 10** and **Figure 11**, **details A** and **B**, for bolting locations and hardware type.



**Figure 9.** Section Assembly (outside view)



**Figure 10.** Section Assembly Hardware (Outside View)  
Grade 5 Hardware (2 locations, 2 per side)



**Figure 11.** Section Assembly (Inside View)

## 4. Field-installed Components

### 4.1 Piping Guidelines

When piping the unit, route the water pipes down or to the side so that there is a clear landing area in back of the unit.

#### **NOTICE**

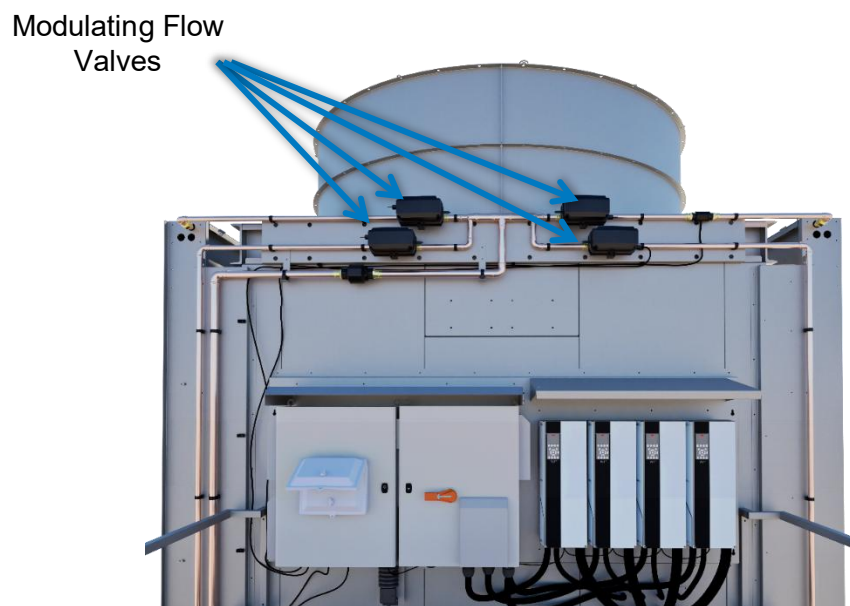
Field piping must not be supported by the unit inlet or outlet connections to prevent equipment damage.

#### **NOTICE**

The installer must ensure a proper air purging of the system prior to operation. Entrained air can restrict the capacity of the cooler, resulting in higher process temperatures.

### 4.2 Water Connection

Refer to **Figure 12** for typical water connection location and detail. The Trillium™ Adiabatic Cooler TRFS requires a water supply between 30 and 100 psi. See **Table 1** for nominal pipe size of water line connection based on the number of units installed. Refer to the unit submittal package for specific water main line connection type, size, and location. To prevent possible contamination of the make-up water supply, install a backflow prevention method in accordance with applicable codes.



**Figure 12.** Water Connection Location & Detail

| Number of Units | Nominal Pipe Size of Main Water Line (Inches) |
|-----------------|-----------------------------------------------|
| 1               | 1-1/2"                                        |
| 2               | 2"                                            |
| 3               | 2-1/2"                                        |
| 4               | 3"                                            |
| 5               | 3"                                            |
| 6               | 4"                                            |
| 7               | 4"                                            |
| 8               | 4"                                            |
| 9               | 4"                                            |
| 10              | 5"                                            |

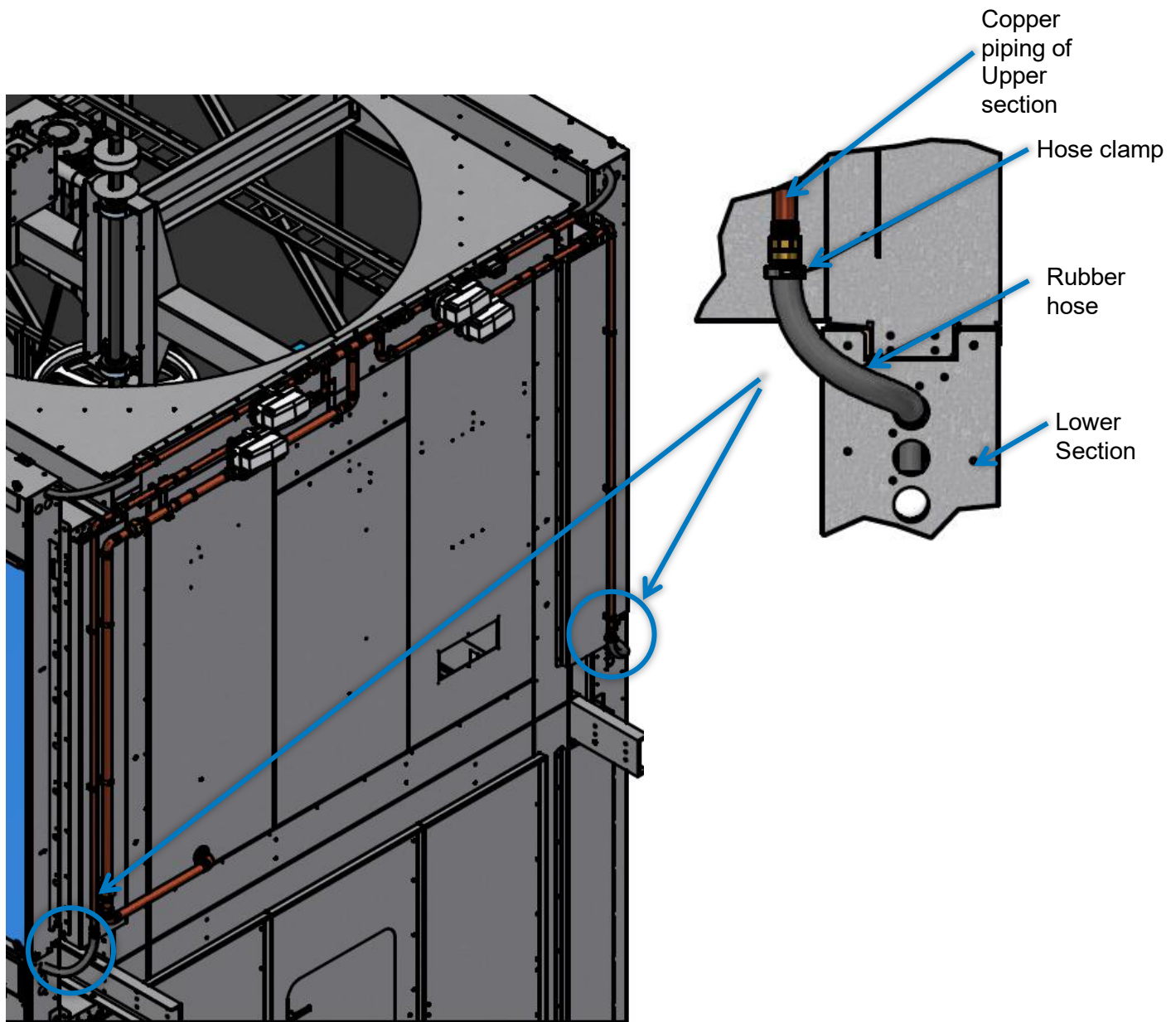
*Table 1. Water Connection Size for TRFS Units*

## 4.3 Field Piping

### External Field Connections

After stacking the unit and attaching the lower and the upper sections, connect the piping between those two sections as it is described below.

Connect the pre-installed rubber hoses on the lower section to the copper piping on both sides of the upper section as shown in **Figure 13** and secure them with the hose clamps (**BAC part #260058**).

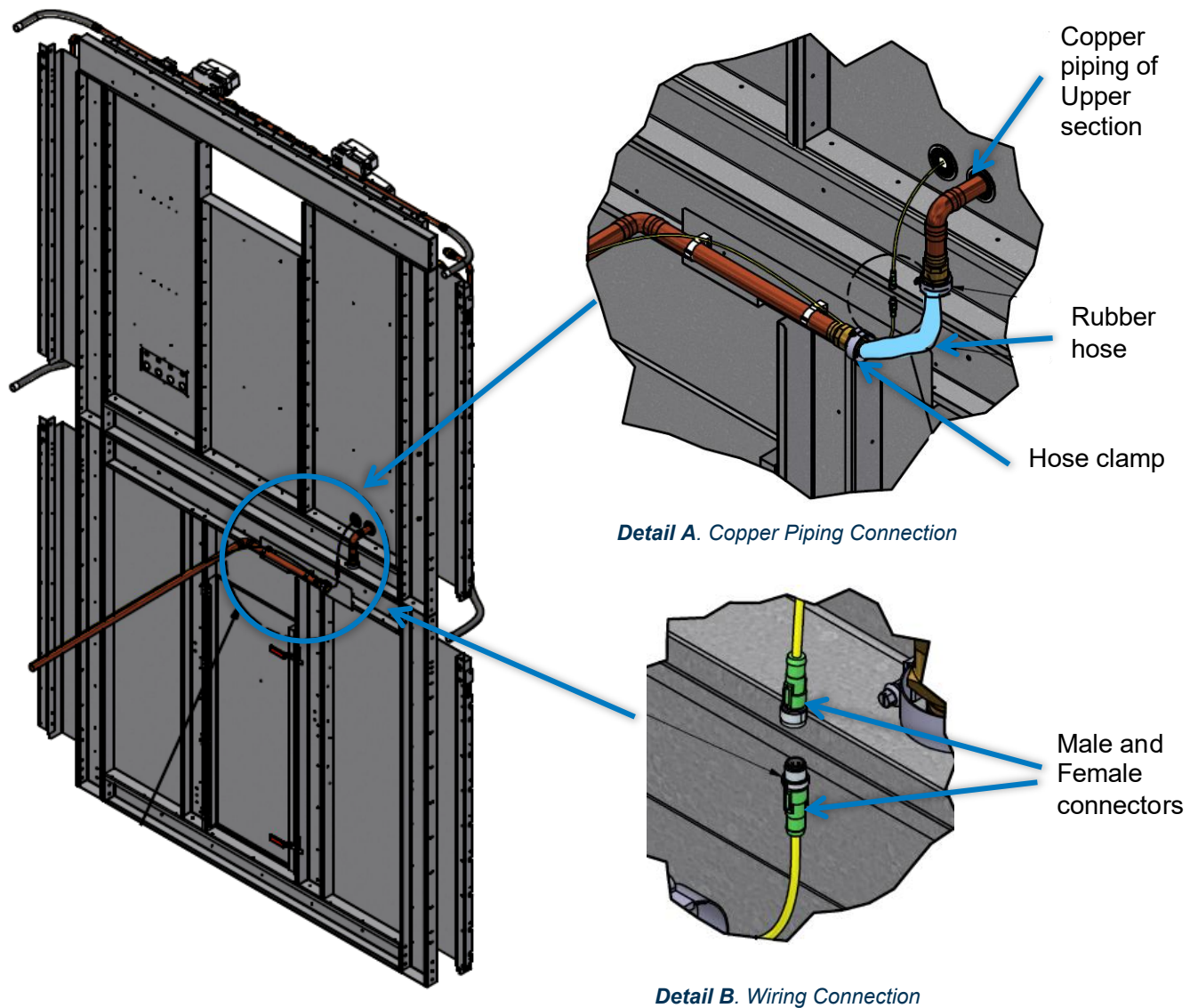


*Figure 13. Field Piping Installation Between Upper and Lower Sections  
(2 locations)*

## Internal Field Connections

1. On the inside of the unit, connect the pre-installed rubber hose on the lower section to the copper piping of the upper section as shown in **Figure 14, Detail A** and secure it with the hose clamp (**BAC part #260058**).

2. Connect the male and the female connector of the wiring between the lower and the upper sections as shown in **Figure 14, Detail B**.

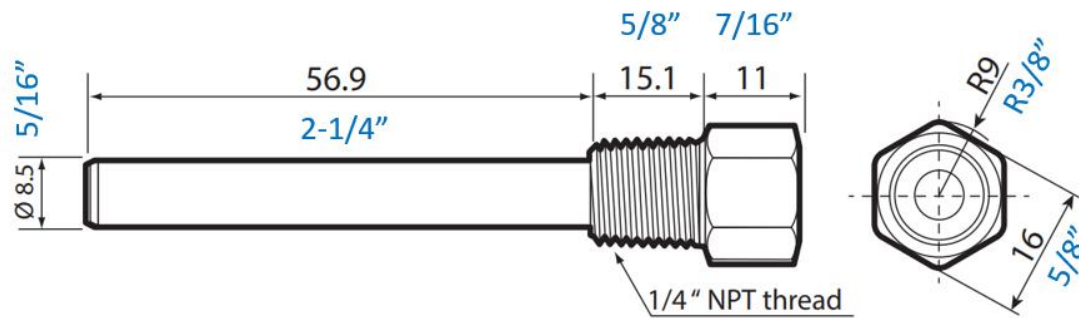


**Figure 14.** Internal Field Connections

## 4.4 Installation of Leaving Fluid Temperature Sensor

A leaving fluid temperature sensor is supplied on units configured as self-contained. It is shipped inside the electrical panel together with a socket used for installation of the sensor in the return pipe. **Figure 15** shows the dimensions of the socket. The socket is equipped with a PG7 - IP68 cable gland applied to the hexagonal end to secure the cable. The socket needs to be installed behind the manifold connecting the coil connections from both sides. The minimum

distance between the manifold and the socket should be +/- 39-3/8" (1 m) to ensure the flow from both sides is well mixed and that the correct temperature is relayed to the PLC.



**Figure 15.** Leaving Fluid Temperature Sensor Socket (Metric/Inches)

## 4.5 Whisper Quiet™ Fan Installation (Optional)

**⚠ DANGER** This unit has rotating fan equipment that can cause severe personal injury or death upon contact. Never step or walk on the fan guard. Always disconnect, lock out, and tag out all power sources to the fan motor(s) before performing any inspection or maintenance.

**⚠ DANGER** Performing work on an energized unit poses a risk of electrocution, which can cause severe personal injury, death, and/or property damage. Do not perform any service on or near the unit without first ensuring the unit is de-energized and all lockout / tagout procedures have been followed. Wait five minutes after disconnecting the voltage at all poles before opening the fan and motor assembly.

**Standard fans ship installed in the factory with no additional field installation is required.**

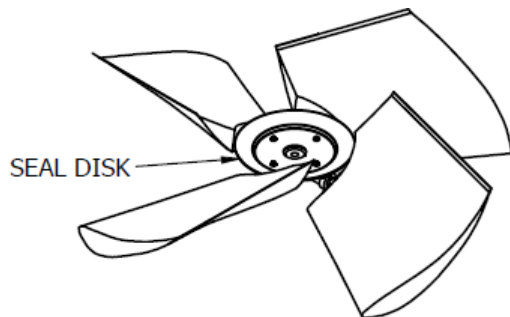
If the unit includes the Whisper Quiet fan option (refer to the submittal package), the fans ship loose and will require field installation as set forth in this section. For belt tensioning instructions before equipment startup, refer to **Trillium™ Adiabatic Cooler TRFS, Operation & Maintenance Manual**.

## Remove Fans from Shipping Crate and Prepare for Lifting

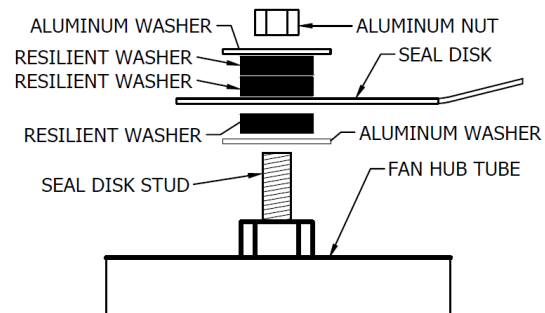
**NOTICE** Do not use power tools on the Whisper Quiet™ fan to avoid damaging mounting components or damage to the fan.

Install the fan following the instructions below prior to installing the fan cowl extensions.

1. The center seal disk, shown in **Figure 16**, must be removed before the lifting slings are attached to fan blade shanks. Note the assembly orientation of the seal disk hardware for reassembly and remove it according to the seal disk hardware detail in **Figure 17**. If there is not enough clearance on the seal disk stud or not enough resilient or aluminum washers, the resilient washer can sit directly on the bottom nut without an aluminum washer in between. One resilient washer above the seal disk is acceptable.

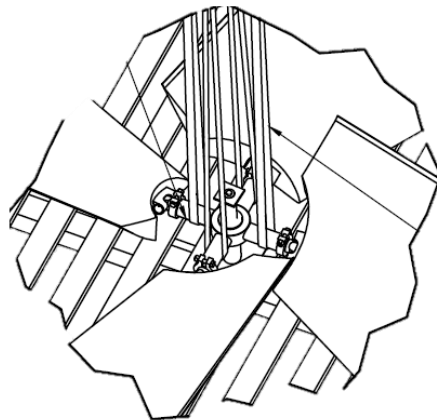


**Figure 16.** Seal Disk



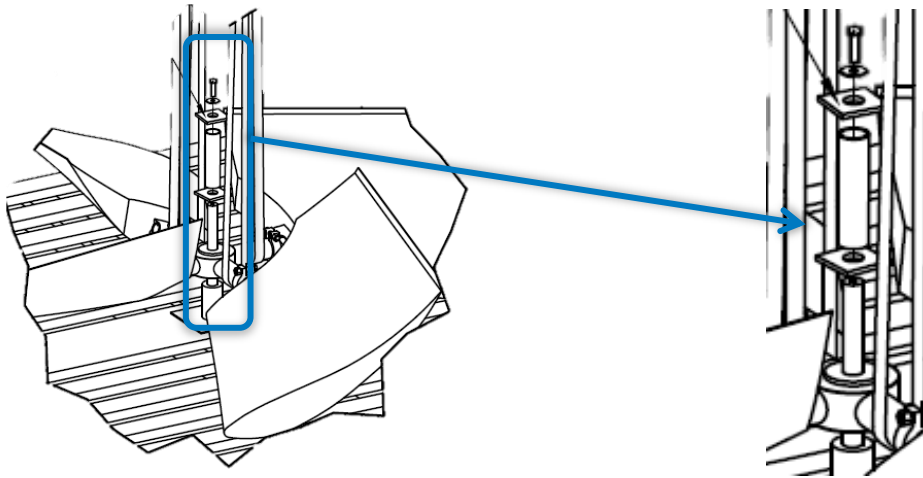
**Figure 17.** Seal Disk Hardware Details

2. Wrap or loop slings suitable for lifting the fan around the blade shanks as shown in **Figure 18**.



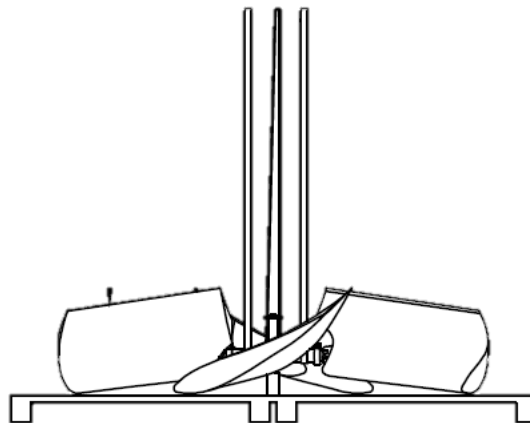
**Figure 18.** Attaching Slings

3. Remove the disposable bolt, PVC spacer, and plywood spacers from the shipping mount per **Figure 19**.



**Figure 19.** Shipping Mount Hardware Details

4. Lift the fan out of the shipping crate per **Figure 20** being careful not to damage the blades.

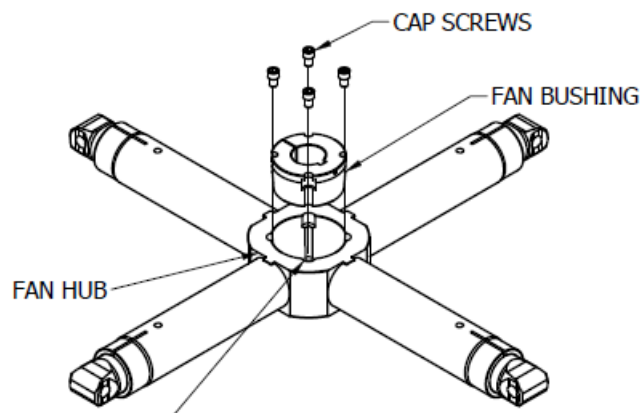


**Figure 20.** Lifting Fan from Shipping Mount

## Installing the Fan(s)

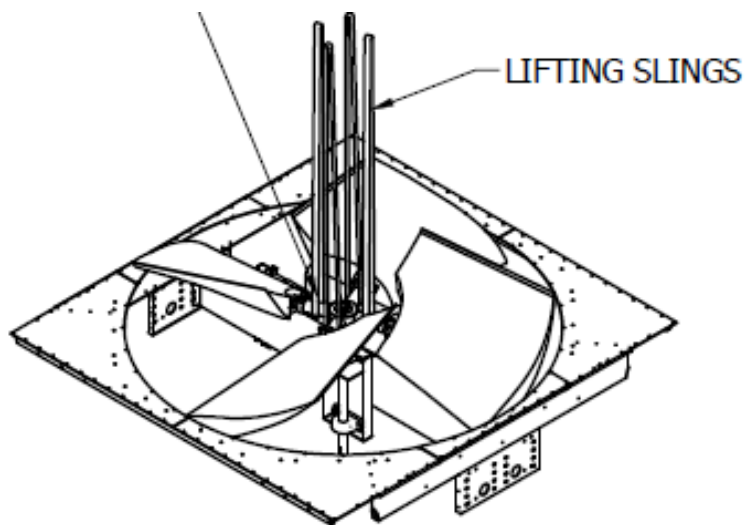
Confirm that the bushing is installed on the fan hub per **Figure 21**. If it is not installed, then install it as follows:

1. Align the threaded holes on the inner diameter of the hub to the slots on the outer diameter of the bushing with the cap screws between the hub and the bushing.
2. Insert the bushing into the hub.
3. Tighten the cap screws until the bushing is almost fully engaged in the hub, leaving slight play between the bushing and the hub to facilitate installation on the shaft.



*Figure 21. Installing fan bushing*

4. Position the fan over the keyed fan shaft per **Figure 22**.



*Figure 22. Positioning Over Fan Shaft*

5. Lower the hub and bushing onto the shaft until the hub contacts the locking collar as shown in **Figure 23**.

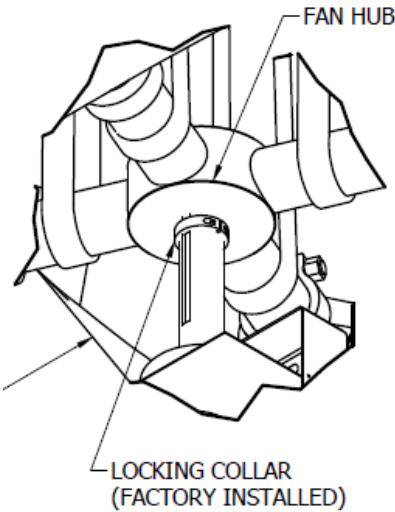


Figure 23. Hub Detail

6. Align the bushing keyway with the shaft keyway as shown in **Figure 24**.



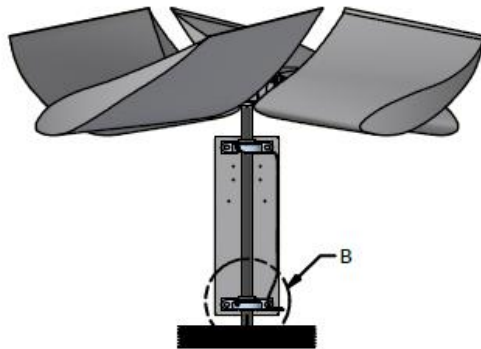
Figure 24. Bushing Keyway

7. Insert the shaft key from the top of the hub assembly.
8. Sequentially tighten the cap screws to firmly engage the bushing in the hub and then tighten the cap screws to the torque specified in **Table 2**.

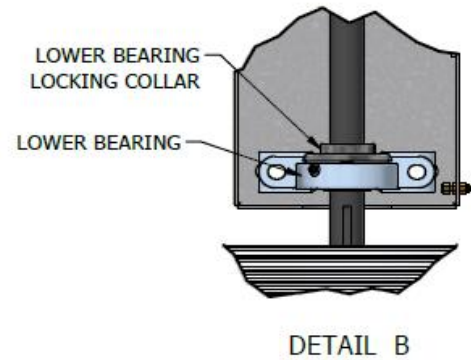
| Bushing Type | Bushing O.D. | Hex Key Size | Torque   |
|--------------|--------------|--------------|----------|
| U            | 4"           | 10mm         | 50 ft-lb |

Table 2. Bushing Torque Values

9. If tightening the fan hub bushing caused the fan to lift away from the locking collar, raise the locking collar to contact the hub and tighten the locking collar screw to 50 ft-lbs (67.79 Nm) as shown in **Figure 23**.
10. Once the fan is installed, lock the lower bearing locking collar shown in **Figure 25** and **26**.



**Figure 25.** Lower Bearing Locking Collar



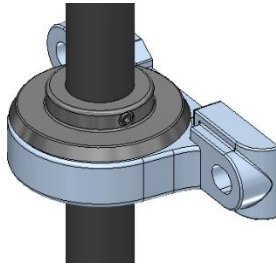
**Figure 26.** Lower Bearing Locking Collar Detail

11. Slide the cam of the bearing locking collar over the cam on the inner ring of the lower bearing per **Figure 27**.



**Figure 27.** Bearing Assembly

12. Press the locking collar against the inner ring and turn clockwise (when viewed from above) until they are tightly engaged.
13. Place a drift pin in the hole of the lower bearing locking collar as shown in **Figure 28**. Tap the drift pin with a hammer in the direction of shaft rotation.
14. In the same hole where the drift pin was placed, tighten the lower bearing locking collar set screw to 23 ft-lbs (31 Nm).

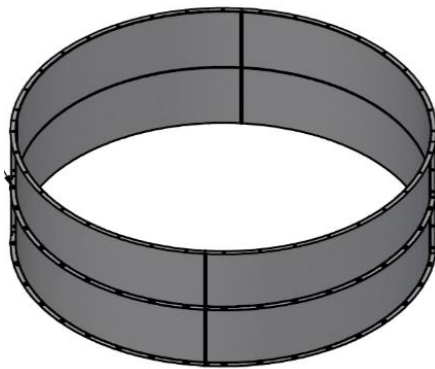


*Figure 28. Locking Collar Detail*

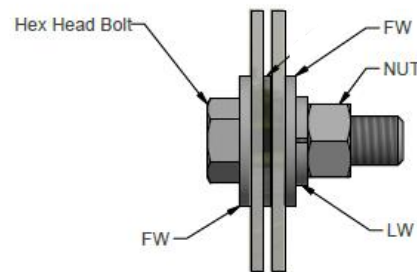
## Assemble Fan Cowls

Install the fan cowl segments together as shown in **Figure 29** using 3/8" x 1" Grade 5 bolts with 2 flat washers, 1 lock washer, and 1 nut per bolt as shown in **Figure 30**.

Sealer tape is not required between the cowl segments; however, it is needed between the fan deck and assembled fan cowls as described in **Fan Cowl Extension Installation** on **Page 27**.



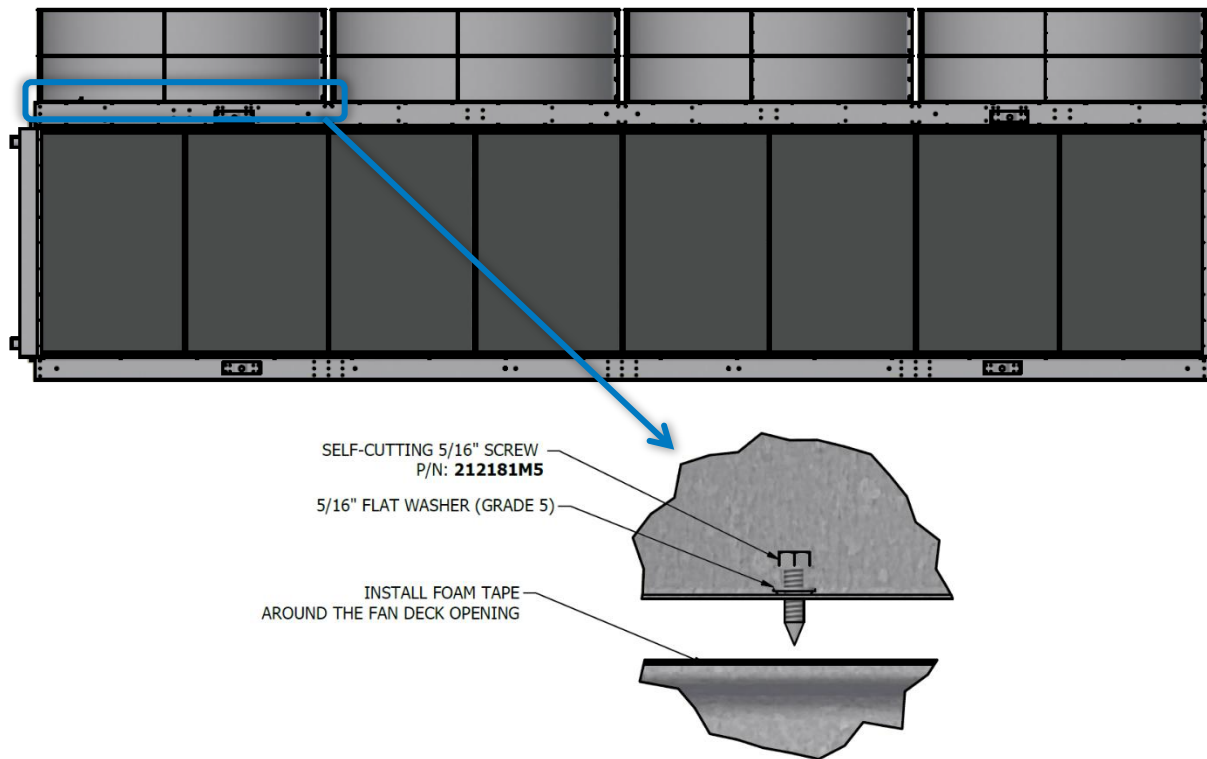
*Figure 29. Fan Cowl Assembly*



*Figure 30. Fan Cowl Hardware Detail*

## Fan Cowl Extension Installation

Install the fans and assemble the fan cowls according to the instructions in this section before installing the fan cowl extensions. Affix assembled fan cowl extensions to unit using the specified hardware shown in **Figure 31**.



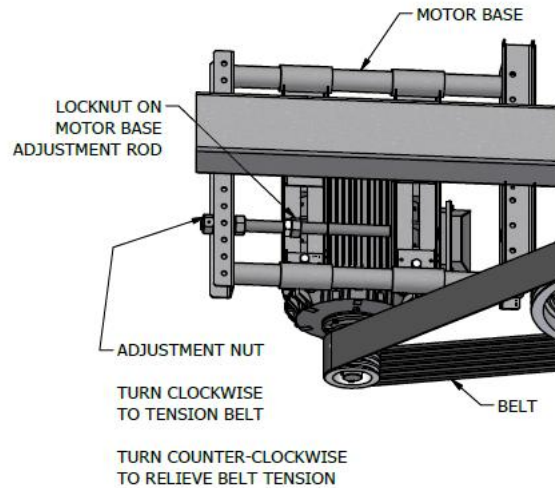
**Figure 31. Fan Cowl Extension Installation**  
5/16" self-cutting screws, Qty. 36 per Cowl

## Installing and Tensioning the Belt

The fan belt ships loose for field installation. Install all fans following the directions in **Whisper Quiet™ Fan Installation section**, then install the belt onto the driver and driven sheaves.

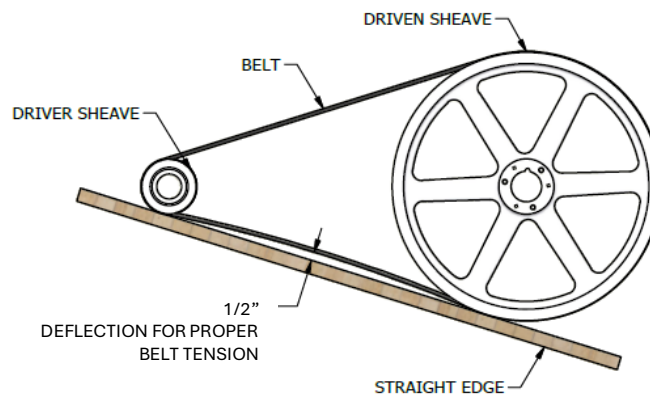
An over-tensioned belt will create a high radial load on the lower bearing, and a loose belt will create slippage at the driver sheave, either of which increases belt wear. To ensure proper belt tensioning:

1. Tension the belt by turning the adjustment nut clockwise to move the motor base away from the fan shaft as shown in **Figure 32**.



**Figure 32. Belt Tensioning**

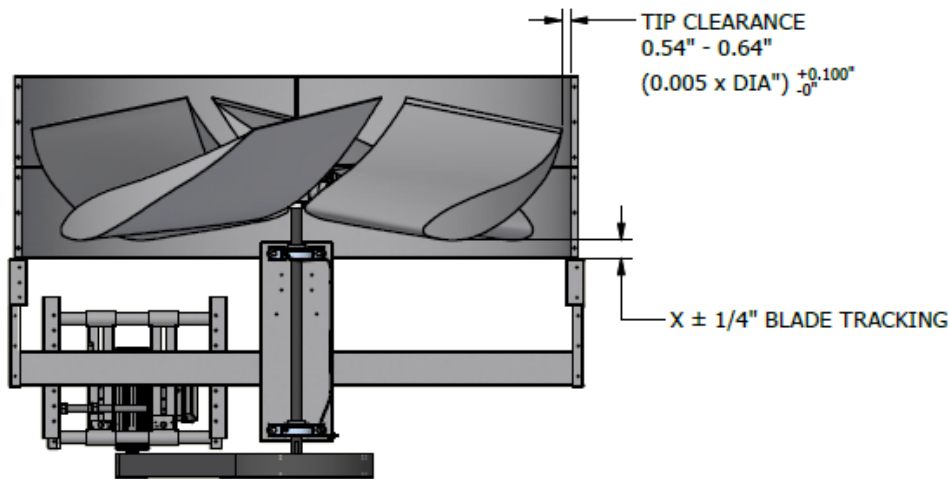
2. Rotate the drive system by hand while tensioning to evenly distribute the tension throughout the belt.
3. Using your hand, apply a moderate force of approximately 16-20 lbf (71-89 N) evenly across the width of the belt in the center of the belt span between the sheaves. If the belt deflects 1/2" (13 mm) as shown in **Figure 33**, then the belt tension is adequate. Belt tension may also be verified using a sonic belt tension meter with the recommended belt tension frequency range at 15–18 Hz.
4. Once the proper tension has been achieved, tighten the locknut against the motor base.



**Figure 33. Belt Deflection**

## Check Fan Blade Tip Clearance

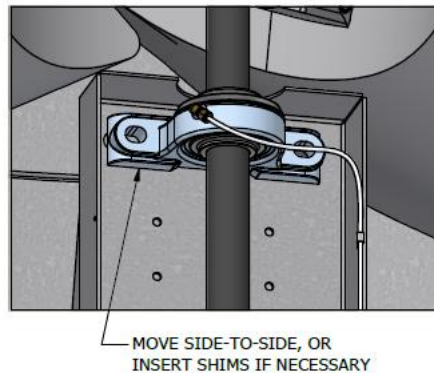
1. Rotate the fan by hand and check the tracking and tip clearance per **Figure 34**.



**Figure 34.** *Tip Clearance and Tracking*

2. Blade tracking should be within  $\pm 1/4"$  (6.5 mm).
3. Clearance between fan blade tips and cowls should be equal around the circumference of the cowl.
4. If blade tracking or tip clearance are not within the acceptable range, then adjust the fan shaft as follows:
  - a. Support the fan with slings.
  - b. Relieve tension in the belt. Refer to **Figure 32** on **Page 29** for information on belt tensioning.
  - c. Loosen the bearing locking collars.
  - d. Loosen the bearing mounting bolts.
  - e. The bearings can be shifted left or right within the hardware slots.
  - f. The shaft can be tilted forward or backward by inserting shims between the bearing and the support plate, either on top or bottom as shown in **Figure 35**.
  - g. Re-tighten the bearing bolts to 80 ft-lbs (108.5 Nm).
  - h. Tighten upper locking collar.
  - i. Remove the slings.
  - j. Tighten the lower locking collar after the weight of the fan is supported by the upper locking collar.

- k. Apply rust preventative such as Rust-Veto® to the exposed areas of the shaft above and below the fan bushing.

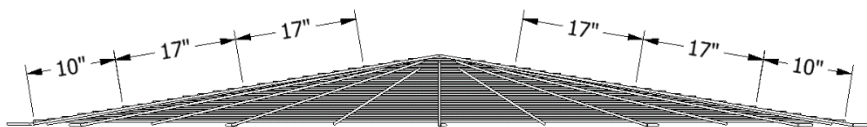


*Figure 35. Adjustments to Correct Tip Clearance*

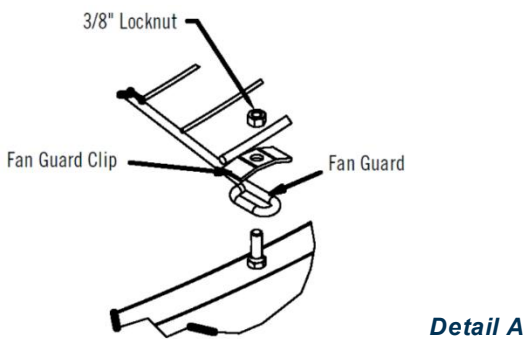
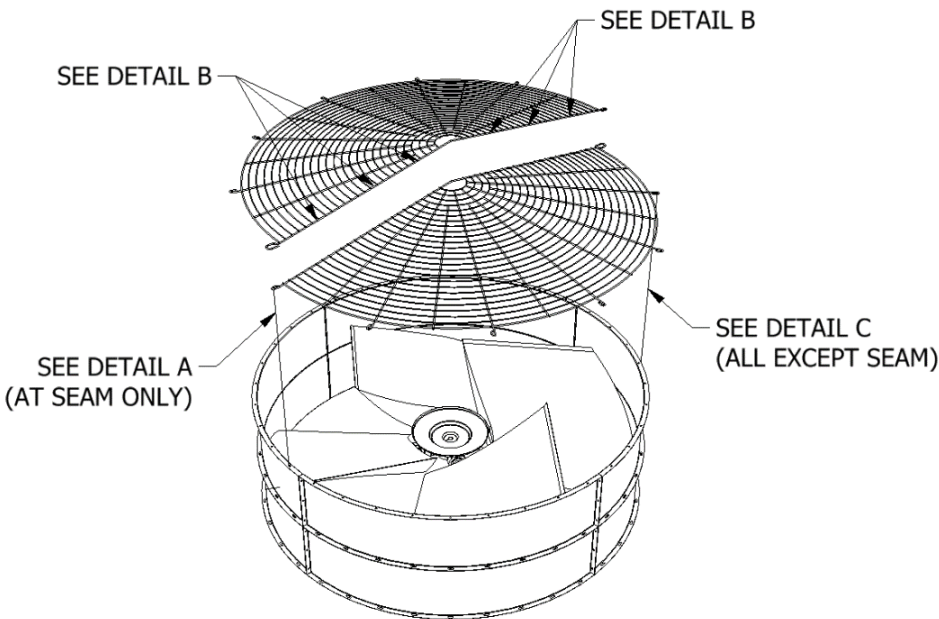
## Fan Guard Installation

Fan guards for all fan models ship loose and require installation according to the steps below.

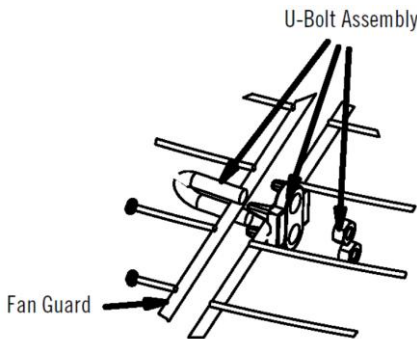
1. Using six U-bolt assemblies, fasten the two halves of the fan guard together as illustrated in **Figure 36, Detail B**. Locate the U-bolt assemblies along the seam between the two guard halves per “U-bolt spacing on fan guards” in **Figure 36**.
2. Gradually tighten both nuts of the U-bolt assembly, alternating from one to the other, until 20-25 ft-lbs (27-39 Nm) of torque is achieved.
3. Using 3/8" x 1-1/2" long bolts, mount the fan guard to the top of fan cowl extension(s). Mount the fan guard as illustrated in **Figure 36, Detail A** for the ends of the seam where the two guard halves join together, and as illustrated in **Figure 36, Detail C** for all other locations around the fan guard perimeter.



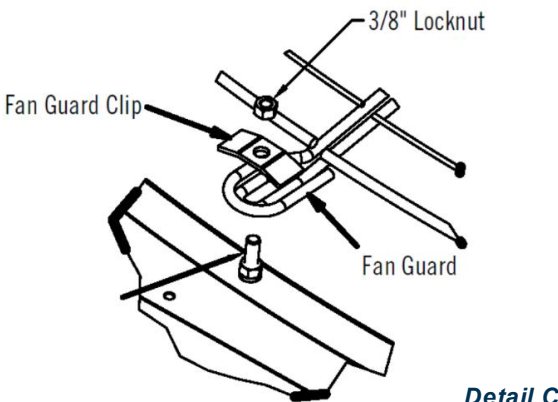
U-BOLT SPACING ON FAN GUARDS



Detail A



Detail B



Detail C

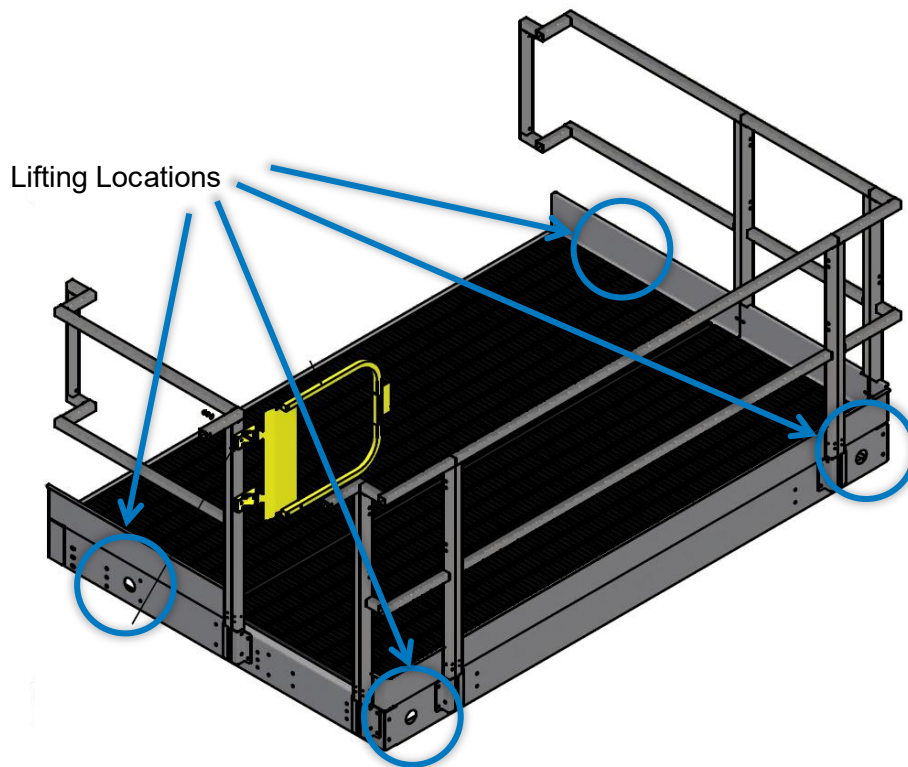
Figure 36. Fan Guard Assembly Details

## 4.6 External Platform Installation

This section sets forth the procedures for external platform installation.

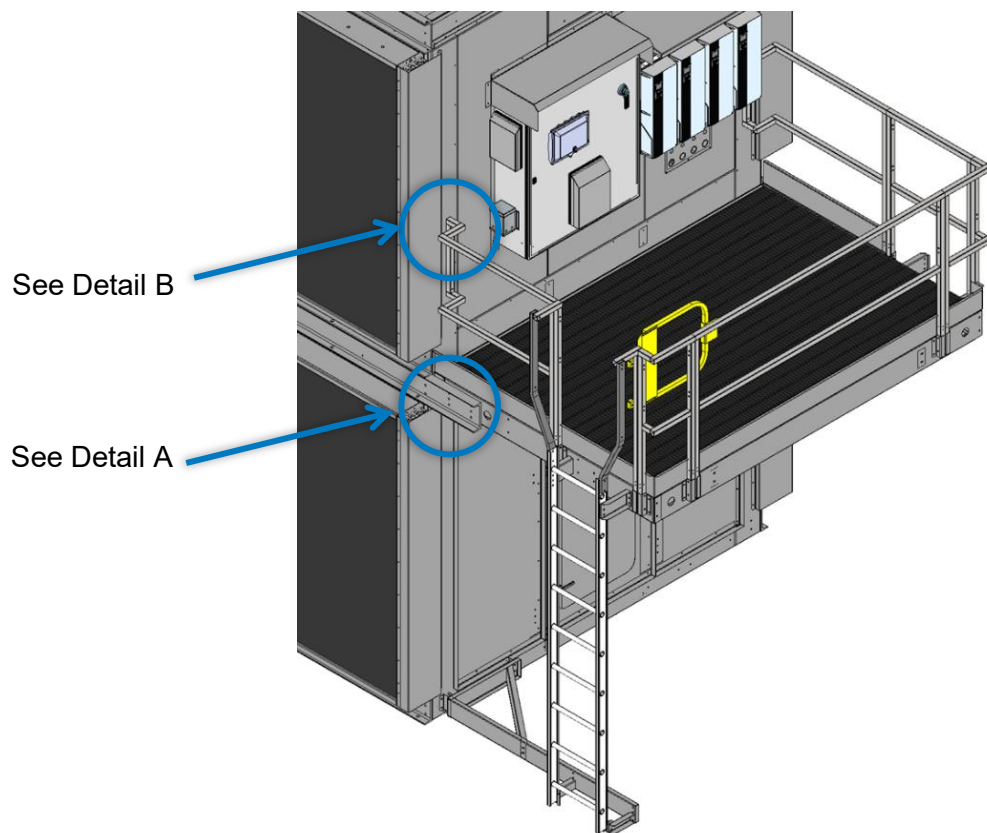
1. Lift the factory assembled external platform using the four lifting cutouts shown in **Figure 37**.

**⚠ DANGER** Failure to use designated lifting points can result in a dropped load and cause severe injury, death, and/or property damage. Lifts must be performed by qualified riggers following these Rigging & Assembly Instructions and generally accepted lifting practices. The use of supplemental safety slings may also be required, as determined by the qualified rigger.



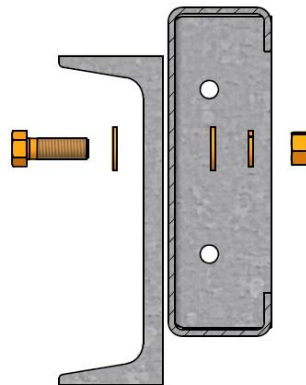
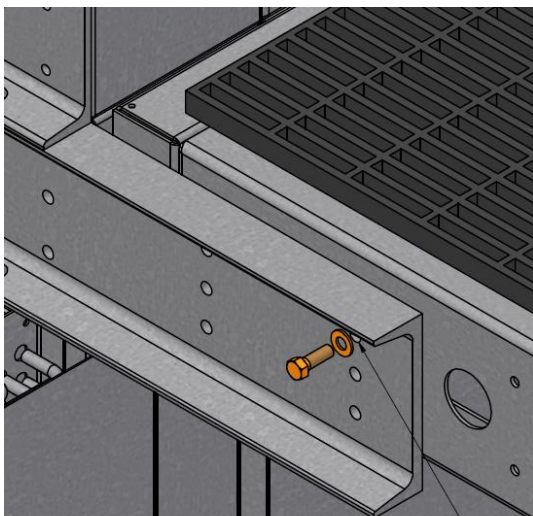
*Figure 37. External Platform – Lifting Locations*

2. Lift external platform to the extended c-channels on the lower section shown on **Detail A** in **Figure 38**.



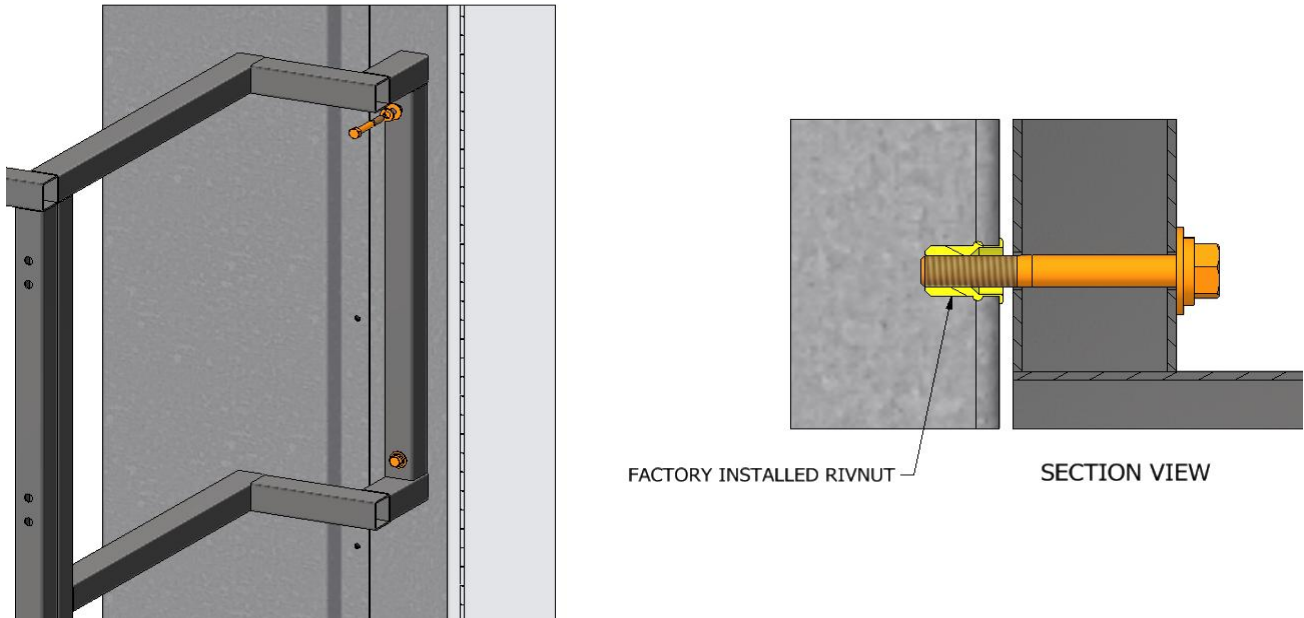
**Figure 38. External Platform and Ladder**

3. Bolt the external platform to the extended c-channels using 1/2" Grade 5 hardware as shown in **Detail A**.



**Detail A: External Platform Installation on C-channels**  
1/2" x 1-1/2" Hardware Qty 6 (2 Locations)

4. Bolt the external platform railing to the unit using 5/16" hardware as shown in **Detail B**.

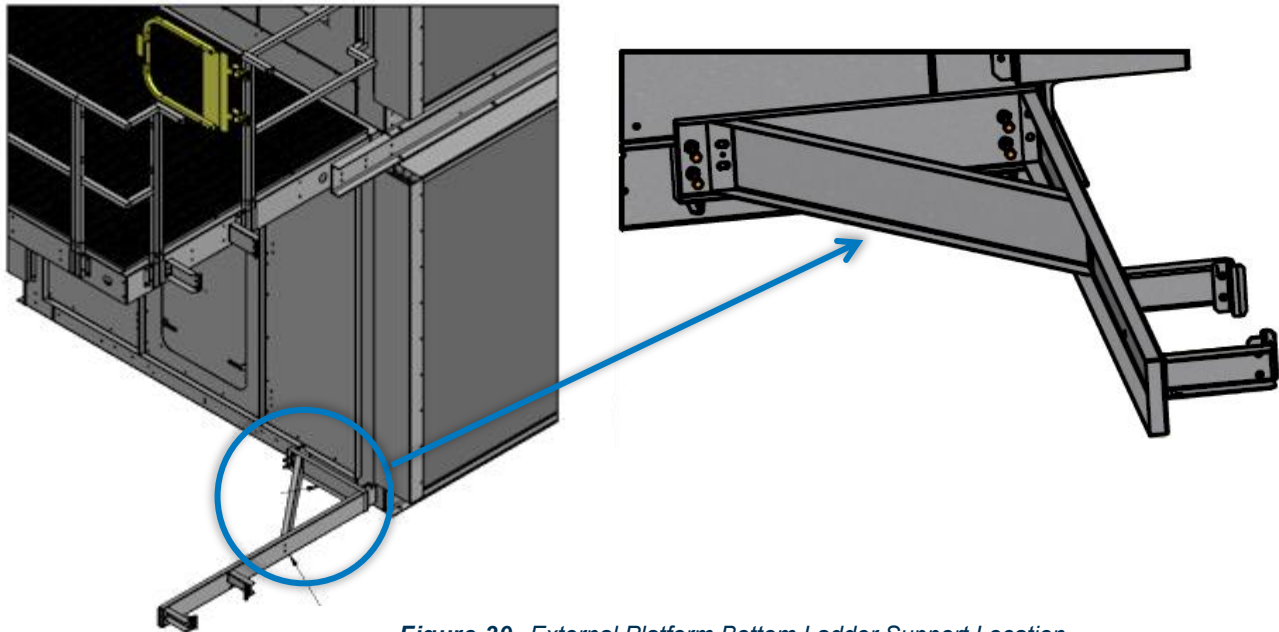


**Detail B:** External Platform Handrail to Unit Connection  
5/16" x 2-1/2" Hardware Qty 2 (2 Locations)

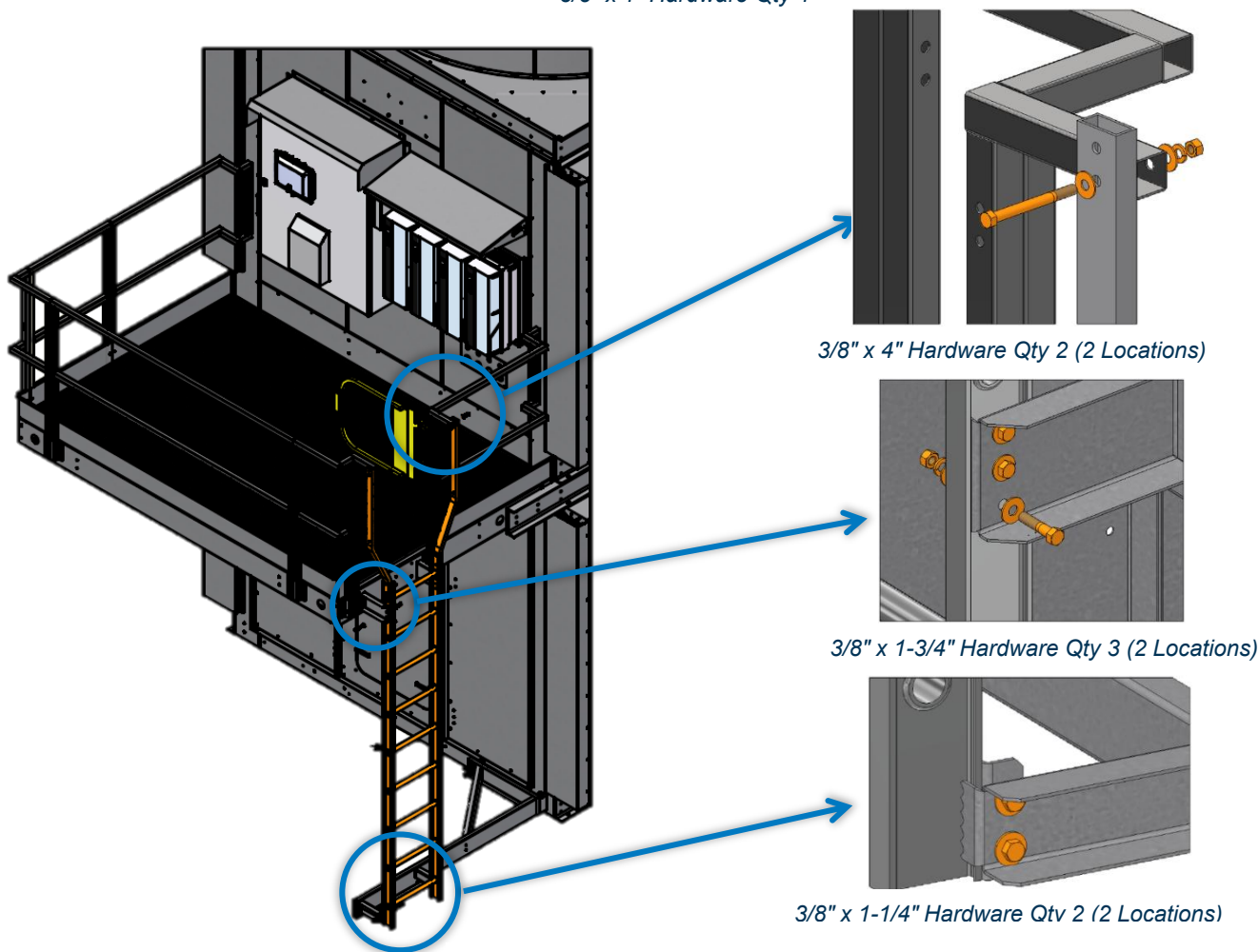
## 4.7 External Platform Ladder Installation

An image of an installed external platform ladder is shown in **Figure 40**.

1. Install the external platform bottom ladder supports as shown in **Figure 39**.
2. Install the external platform ladder as shown in **Figure 40**. The ladder can be installed on either side of platform. See submittal for details regarding external platform ladder installation location.



**Figure 39.** External Platform Bottom Ladder Support Location  
3/8" x 1" Hardware Qty 4

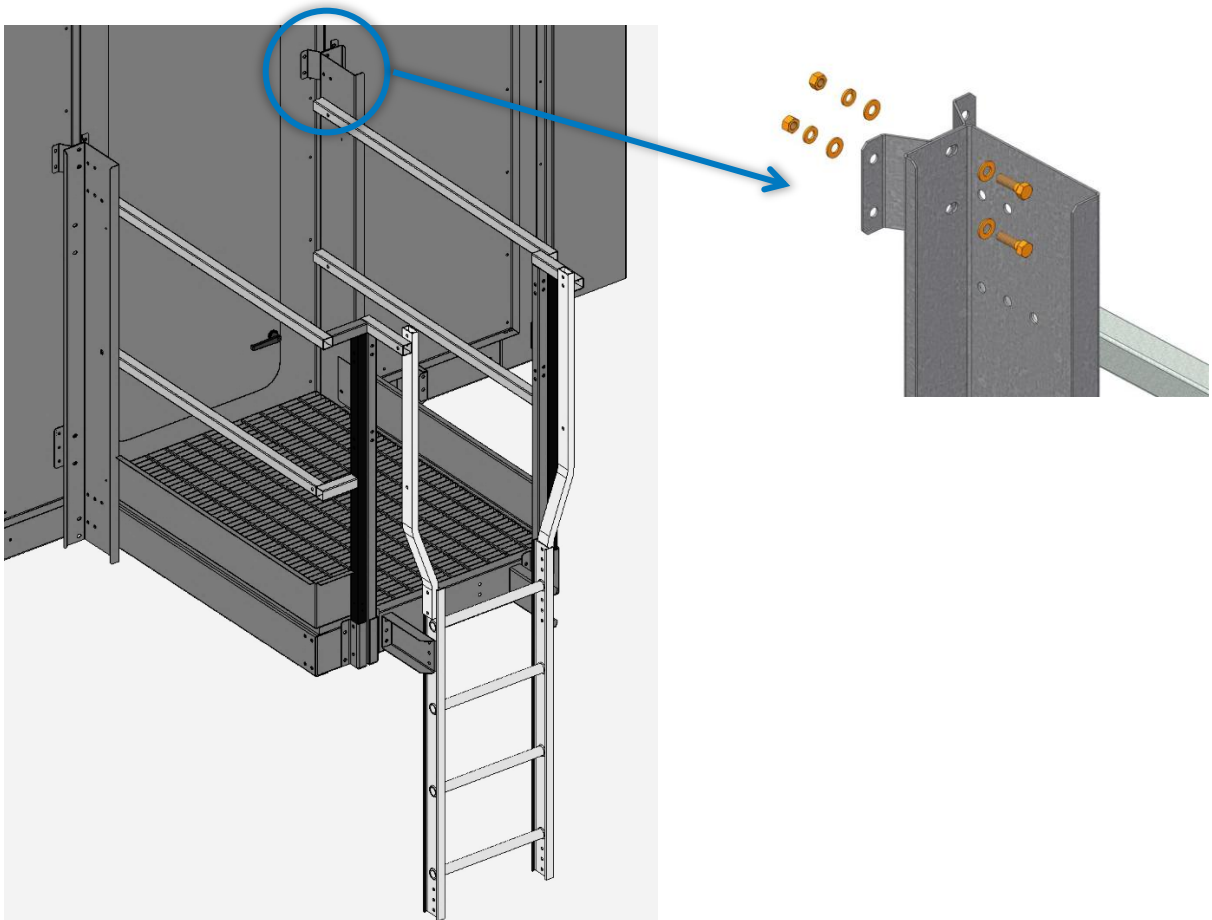


**Figure 40.** External Platform Ladder Installation

## 4.8 Access Door Platform Installation

This section sets forth the procedures for installing the access door platform. An image of the installed platform appears in **Figure 41**. The platform can be on either side of the unit; its placement may depend on site specifications. Handrails and toeboards are pre-assembled to the access door platform. See submittal for job-specific details.

1. Starting with the factory assembled access door platform shown in **Figure 41** align the platform railings and platform with the factory-installed brackets on the customer-specified platform installation location in the submittal.
2. Mount access door platform and railings to factory-installed brackets with eight (8) 3/8" x 1-1/4" bolts as shown in **Figure 41**.

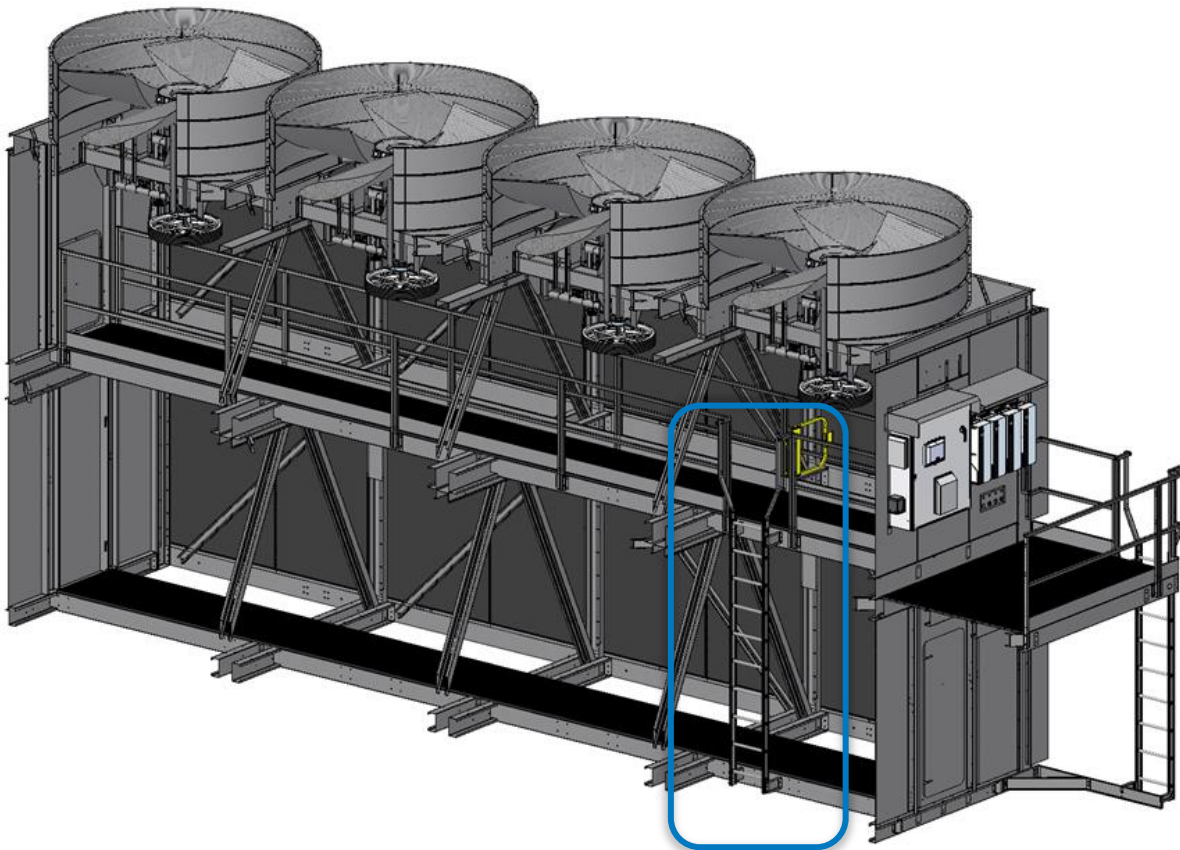


**Figure 41. Access Door Platform Installation**  
3/8" x 1-1/4" Hardware Qty 4 (2 locations)

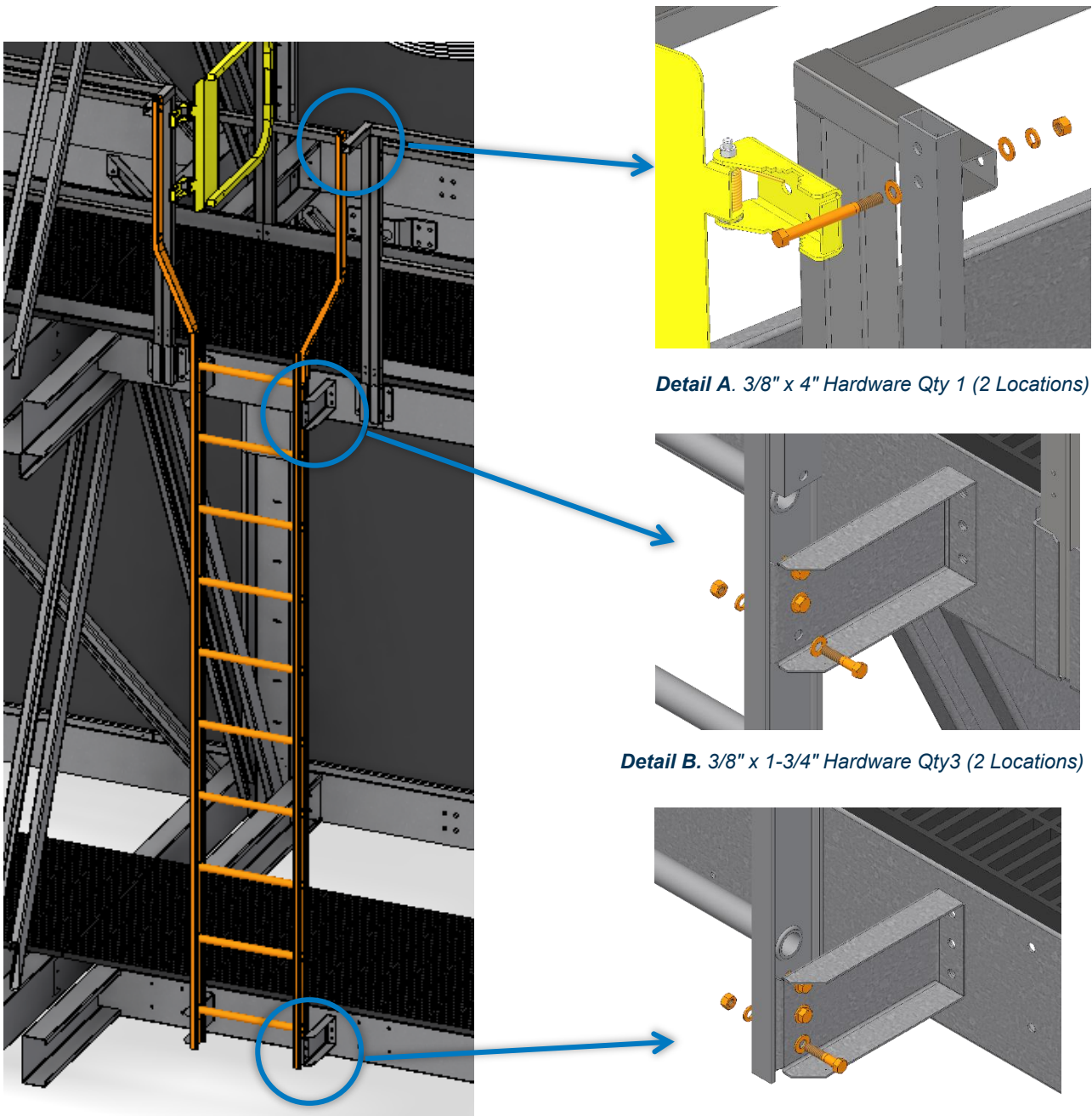
## 4.9 Internal Service Platform Ladder Installation

This section sets forth the steps for installation of the internal service platform ladder. Images of the installed internal service platform, internal service platform ladder, and safety gate are shown in **Figure 42**.

1. Attach the ladder to the upper ladder brackets as shown in **Figure 43, Detail B** on units with lower platform and **Figure 44, Detail A** on units with floor (optional).
2. Attach the ladder to the lower ladder brackets as shown in **Figure 43, Detail C**.
3. Secure the ladder flares to the platform railing posts as shown in **Figure 43, Detail A**.



**Figure 42.** Internal Service Platform, Ladder & Safety Gate

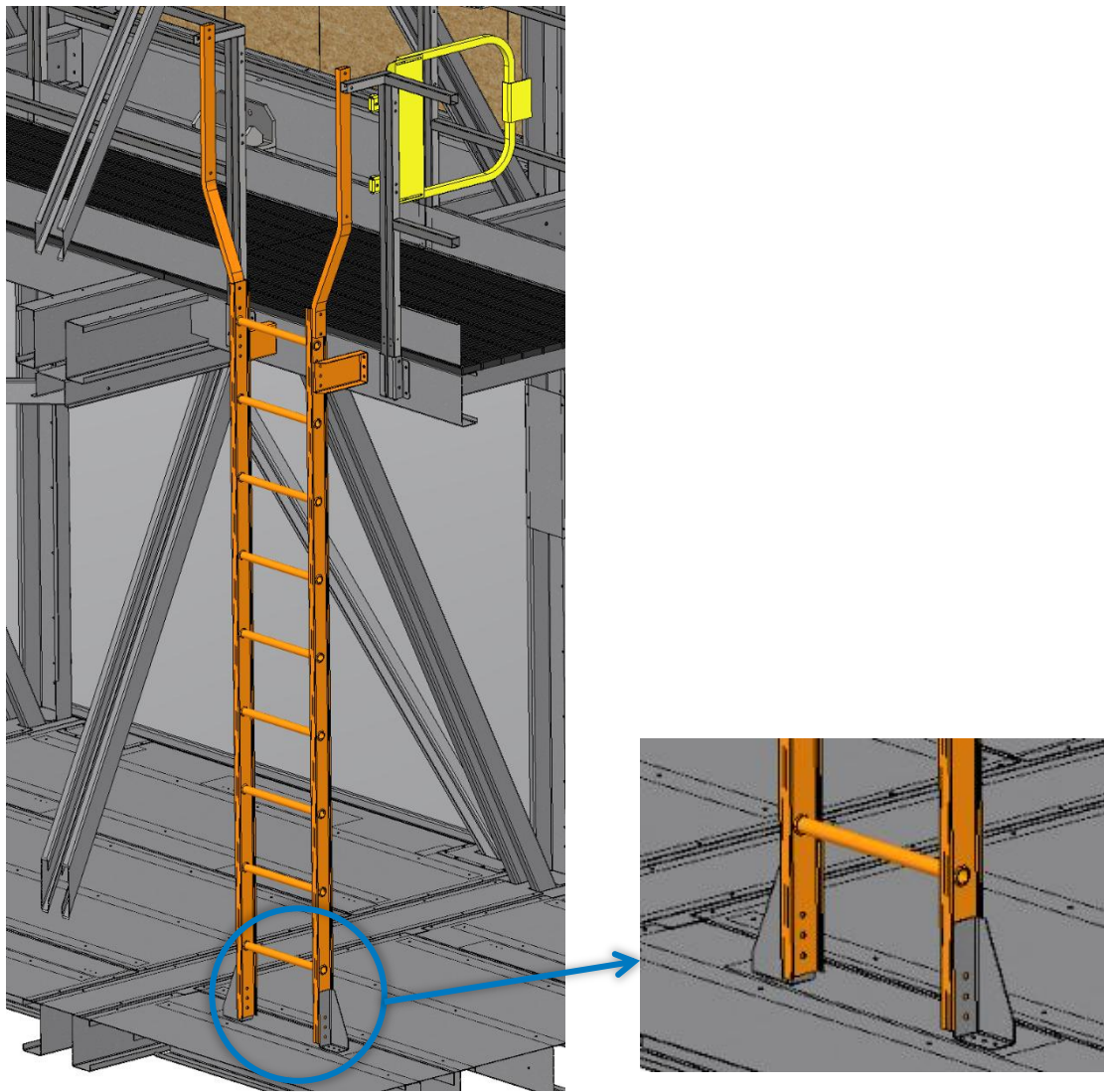


**Detail A.** 3/8" x 4" Hardware Qty 1 (2 Locations)

**Detail B.** 3/8" x 1-3/4" Hardware Qty3 (2 Locations)

**Detail C.** 3/8" x 1-3/4" Hardware Qty 3 (2 Locations)

**Figure 43.** Internal Service Platform  
Ladder Installation



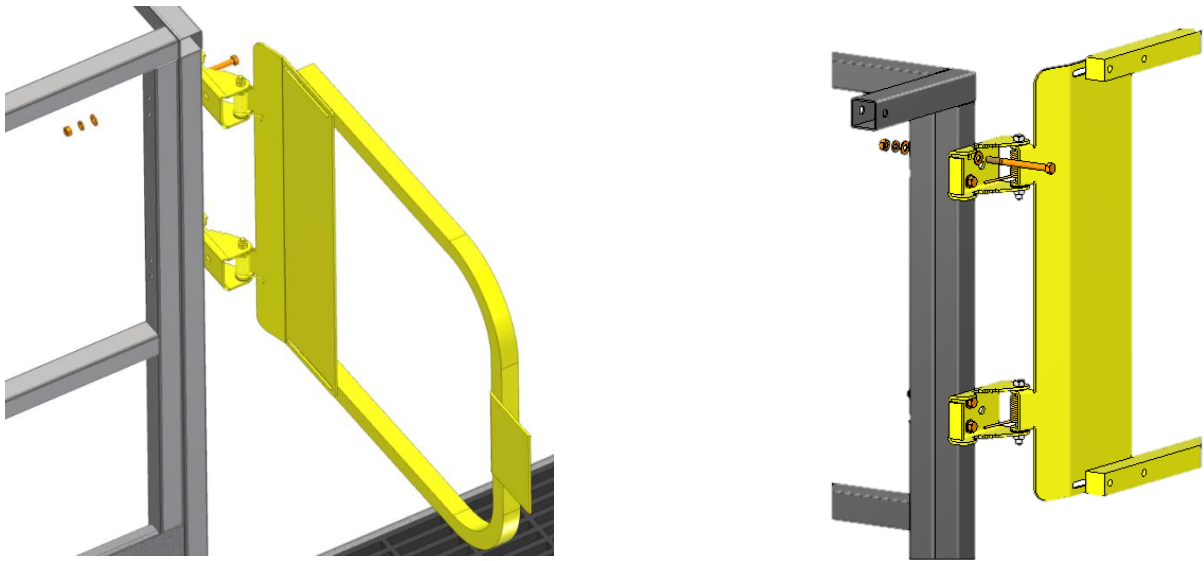
**Detail A.** 3/8" x 1-3/4" Hardware Qty3 (2 Locations)

**Figure 44.** Internal Service Platform Ladder Installation on Floor (optional)

## 4.9 Internal Service Ladder Safety Gate Installation

This section sets forth the steps for installing the internal service platform safety gate as it is shown in **Figure 45**.

1. Align safety gate with railing.
2. Secure safety gate in two locations using two (2) 5/16" x 3-3/4" bolts for each location.



**Figure 45.** Access Door Safety Gate Installation  
5/16" x 3-3/4" Hardware Qty 2 (2 Locations)

## 5. Other Installation Matters

### 5.1 Equipment Wiring

The equipment includes either a factory-wired control panel with separate VFDs or a factory-wired terminal box. Wiring and electrical installation must be compliant with NFPA 70 (NEC) and applicable state and local codes for your location. For details on job-specific configurations and wiring, refer to the submittal.

### 5.2 Flange Coil Connections

Units configured with flange coil connections are supplied with class 150 floating flanges. For shipment, sheet metal blanks are zip tied to floating flanges to secure flanges and to seal off the coil connection. Remove the zip ties and sheet metal blanks prior to installation. Install flanges according to [ASTM B16.5 Pipe Flanges and Flanged Fittings](#), which addresses pressure-temperature ratings, materials, dimensions, tolerances, marking, testing, and methods of designating openings for pipe flanges and flanged fittings.

The coil connections come with the rust preventative coating Rust Veto®, and it must be removed from flange mating faces prior to flange installation. Rust inhibitor can be removed with mineral spirits, paint thinner, Cosmoline remover, or over-the-counter petroleum solvents. Only remove rust inhibitor from flange mating faces. Leave as much inhibitor as possible on the steel connection and weld while ensuring a seal.

### 5.3 Beveled for Weld and Threaded Coil Connections

Units configured with beveled for weld, grooved, and threaded coil connections are supplied with male pipe thread rated for 150 psi (1034 kPa). Refer to submittal for connection size.

The coil connections come with the rust preventative coating Rust Veto®, refer to section **5.2 Flange Coil Connections** for removal instructions.

## 5.4 Plain Pipe Stub Coil Connections Nitrogen Charge Removal (Optional)

To protect the inside coil surface from corrosion, coils supplied with a plain pipe stub coil connection are capped and charged with nitrogen at the factory. Plain pipe stub coil connections must be field cut and beveled before welding. Prior to cutting the pipe stub, relieve the pressure inside each coil using the factory-installed Schrader valve. The plain pipe stub coil connection is a specialized option. Refer to sales representative for more information.

**NOTICE** The pre-cooler pads are made of flammable material and should be removed when performing hot work on or near the unit. No actions that can generate sparks should be performed on or near the unit.

**NOTICE** To prevent excessive degradation do not attempt to remove the pre-cooler pads while wet.

# Trillium™ Adiabatic Cooler TRFS

## RIGGING & ASSEMBLY INSTRUCTIONS



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