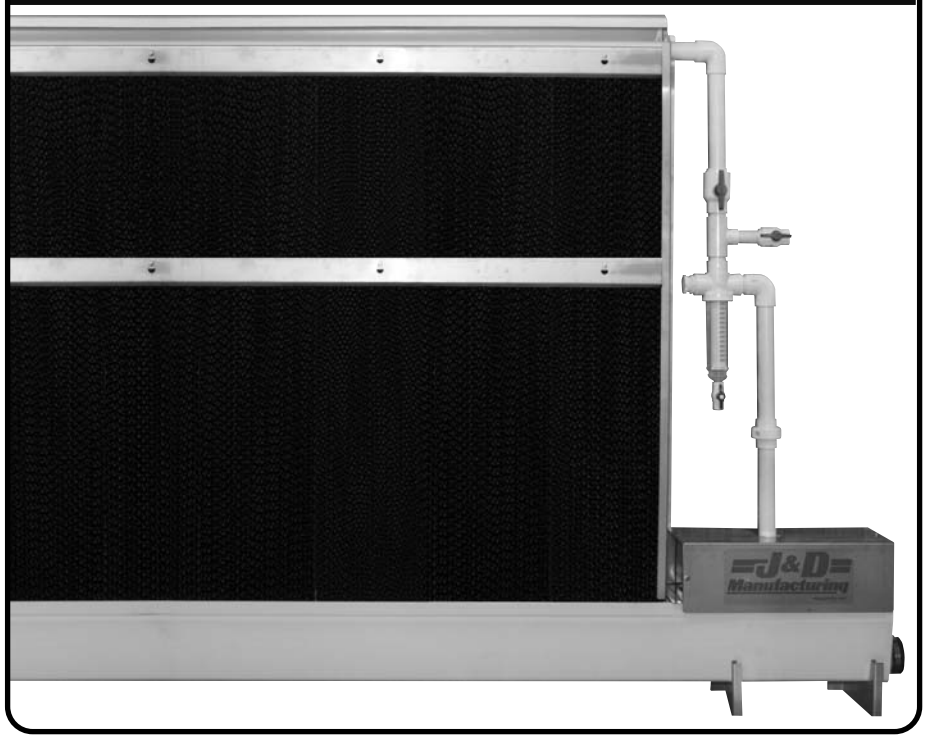
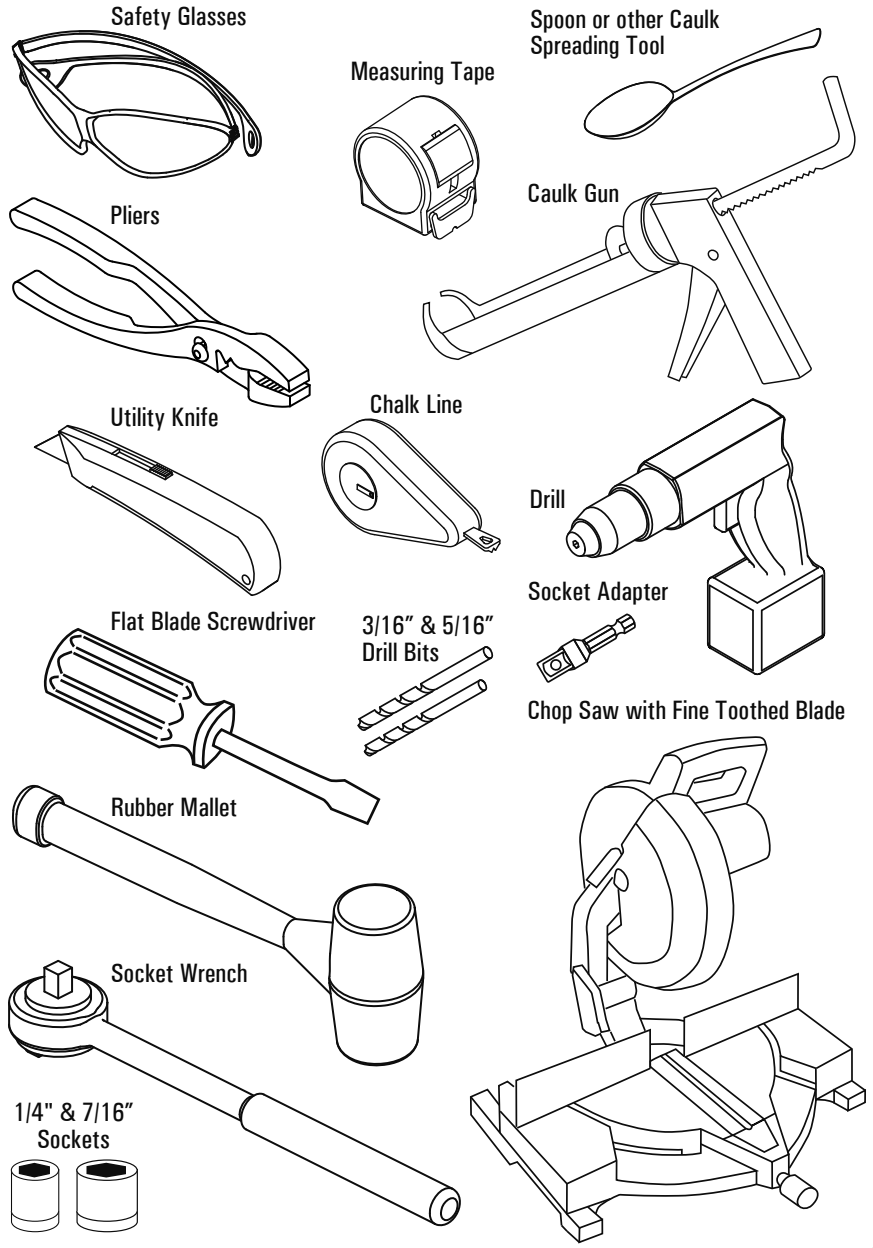
Stacked Pad Evaporative Cooling System



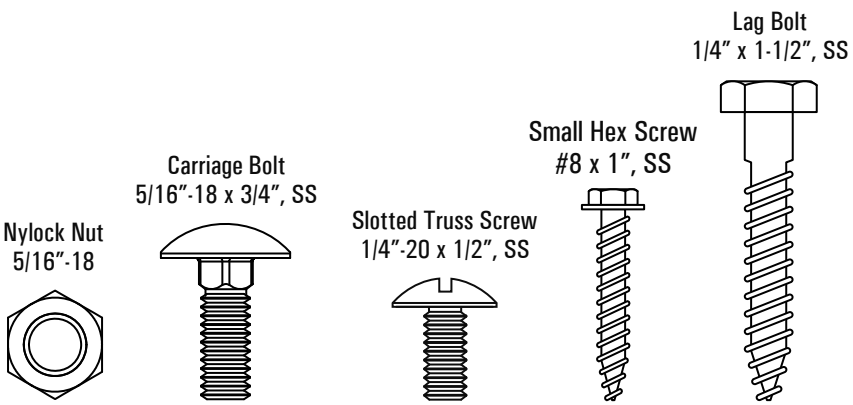
WARRANTY

J&D Manufacturing warrants all products are free from defects in materials and workmanship under normal use for the period of one year from date of purchase. Our warranty does not cover normal or regular wear and tear. J&D Manufacturing can repair or replace at our option, any product or part of the product that is found to be defective. Our warranty applies to materials only, and does not include return freight, delivery, loss or damage to personal property, cost of removal or installation, any incidental or consequential damages or labor. This warranty does not apply to products which are misused, abused, altered, improperly installed or subject to negligence. All warranties must be approved through our warranty department. The original purchaser must present a copy of the invoice for the defective product. One year is our standard warranty unless specified on our literature or in the installation instructions or user manuals.

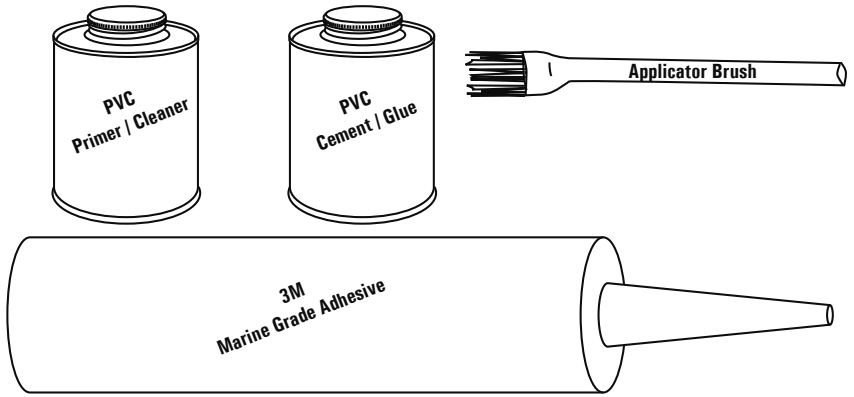
Recommended tools for installation and assembly (not provided)



Included Assembly Hardware - to scale



Included Assembly Material

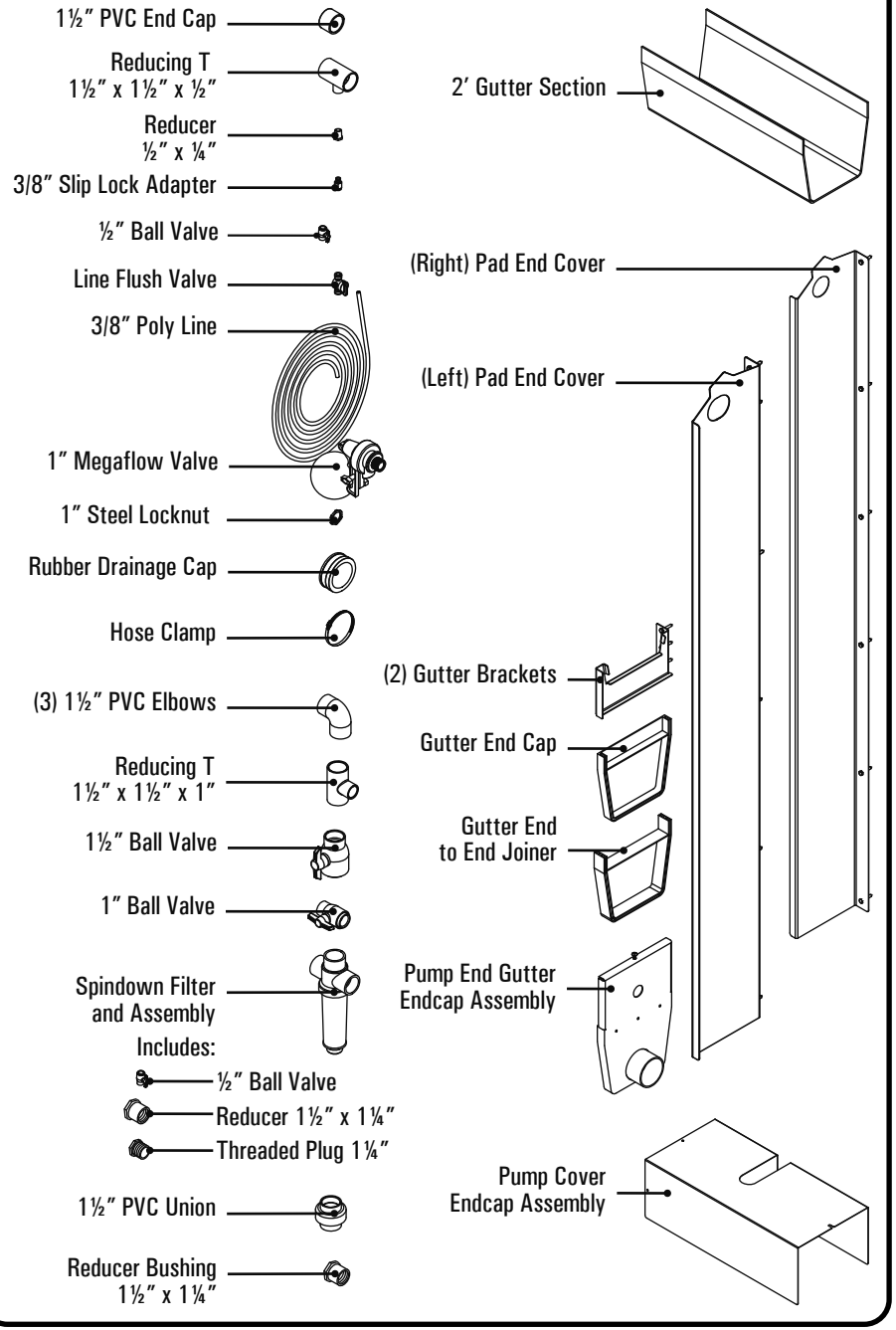


Additional Assembly Material - NOT Included

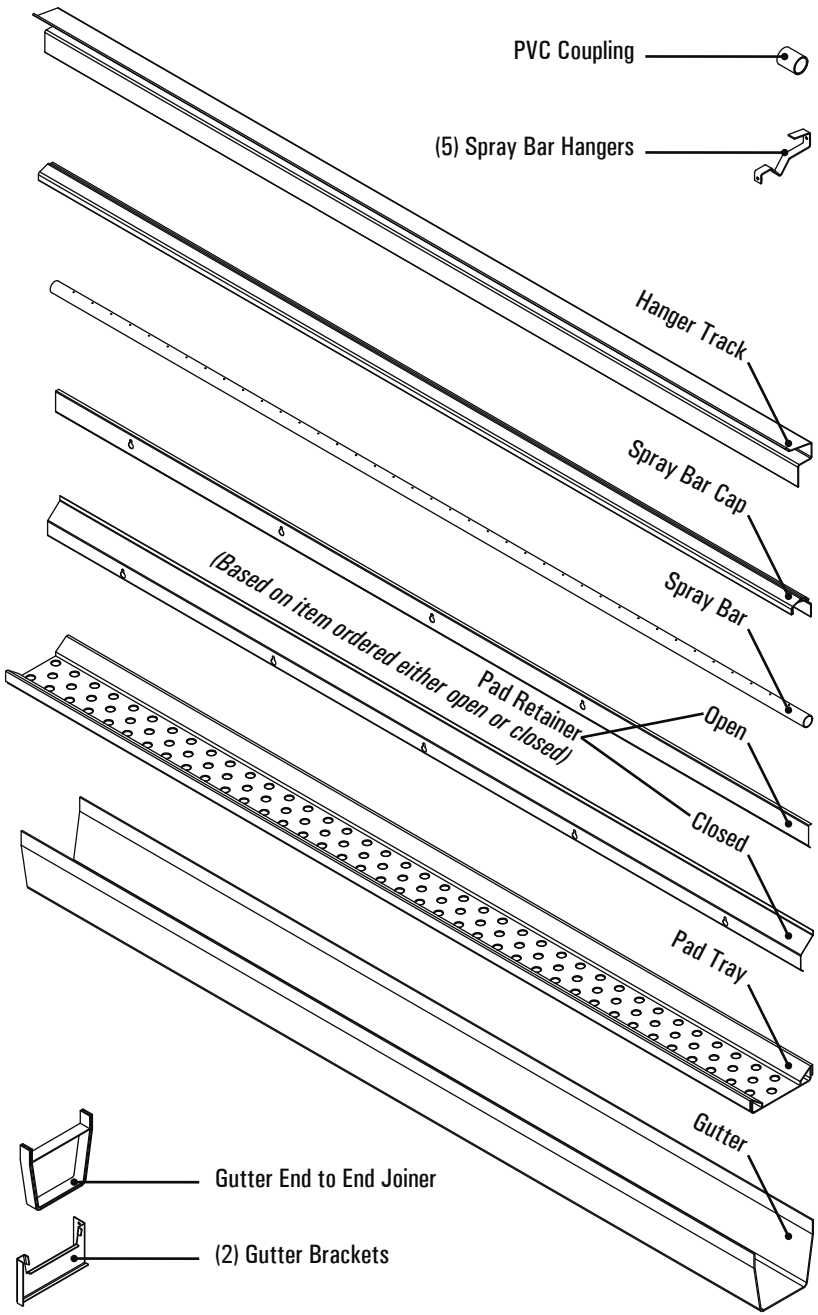
Amount of these materials is subject to your exact installation.
Review the entire instructions and use that information to assist in calculating your needs.

- 2" x 4" Construction grade pressure treated lumber
- 2" x 6" Construction grade pressure treated lumber
- 2" x 8" Construction grade pressure treated lumber
- 1" Schedule 40 PVC pipe
- 1.9" Schedule 40 PVC pipe
- Hardware suitable for securely attaching the lumber to your structure.

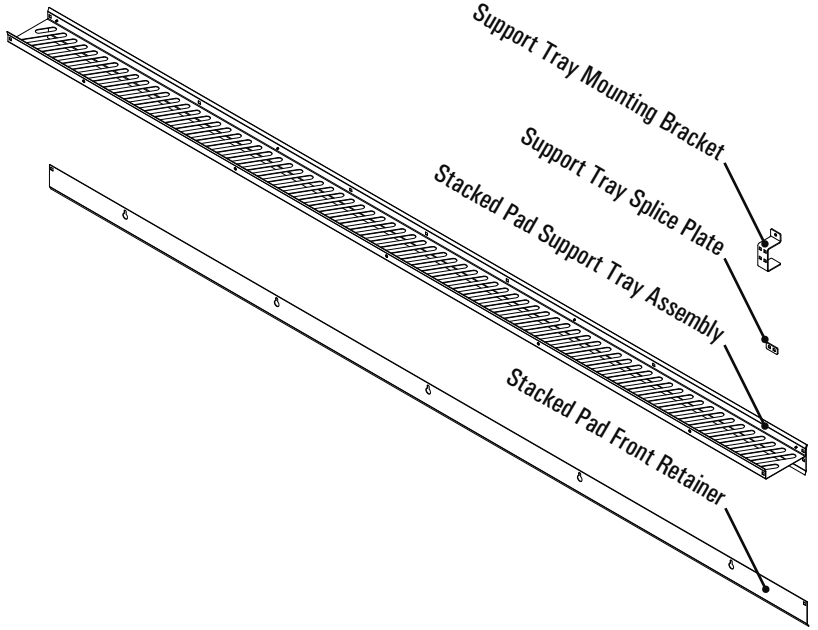
Header and End Kit Components



Distribution and Return Kit Components



Stacked System H-Channel Kit



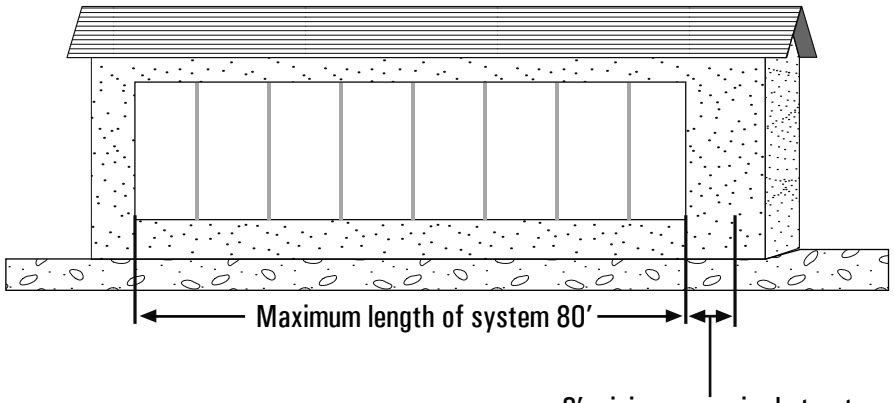
INSTALLATION

Please read over all instructions carefully before you begin. If you have any questions please call your local dealer, or contact J&D Manufacturing at 1-800-998-2398.

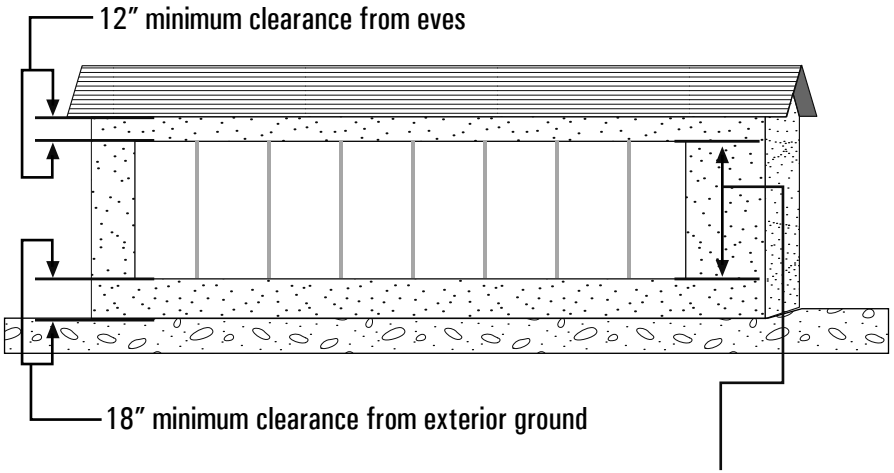
NOTE: To minimize warping, avoid working with PVC materials in direct exposure to the sun especially during the heat of the day.

Finished opening requirements

Horizontal requirements

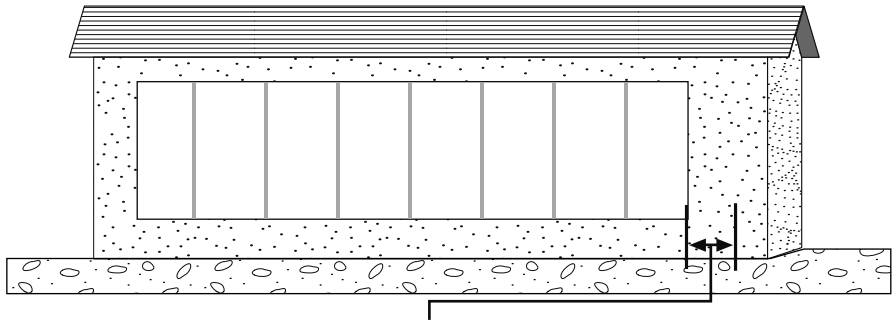


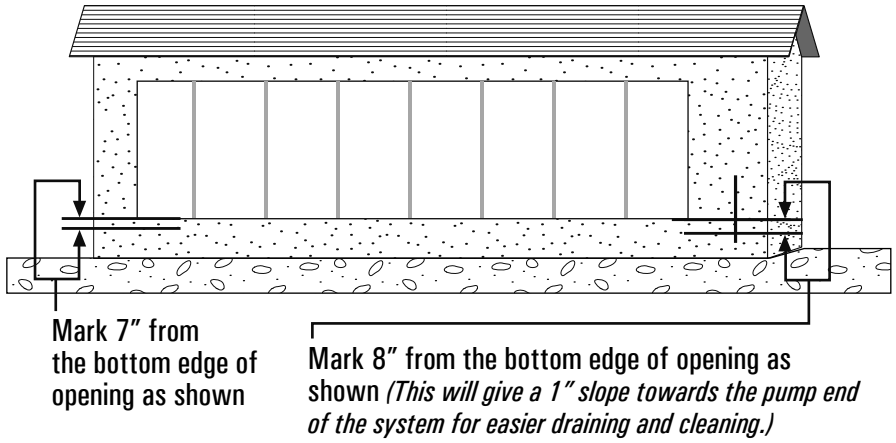
Vertical requirements

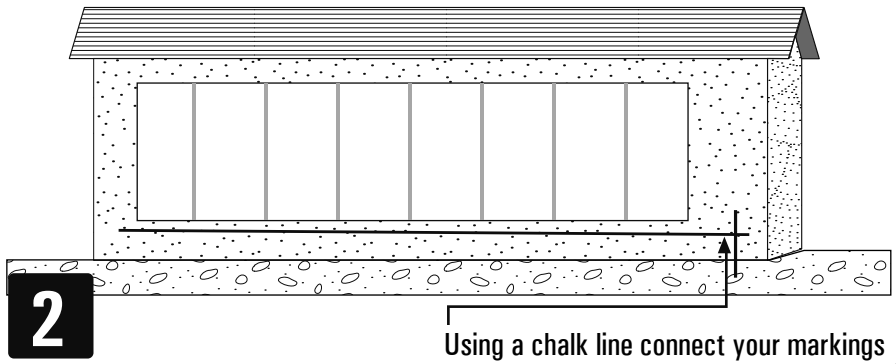


1

Measure and mark a line 2′ from the edge of the opening on the pump end. On the non-pump end of the opening, measure 7″ from the bottom edge of opening. Then on the pump end make a mark 8″ from the bottom edge of the opening. *(You want a 1″ slope towards the pump.)* Once all marks are made use a chalk line to connect the horizontal marks making sure to extend the mark to the 2′ mark past the opening as shown below.

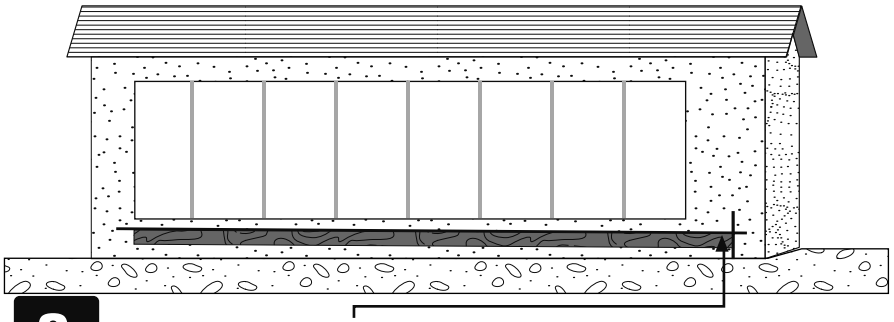




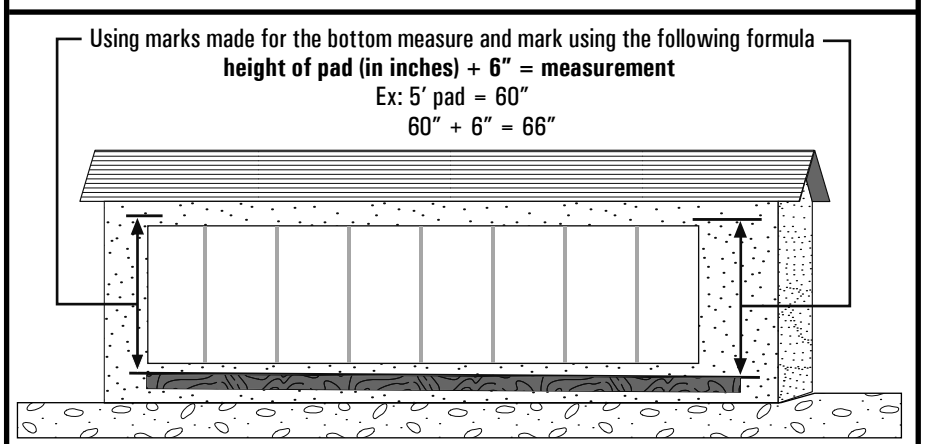


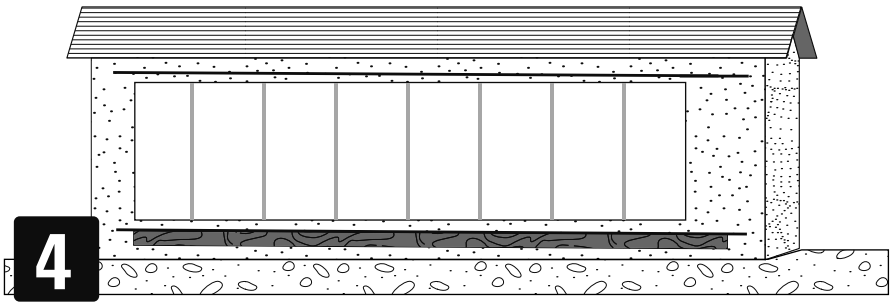
2

Using the chalk line as your guide, mount the required number of 2" x 8" treated boards underneath the opening, aligning the top edge of the 2" x 8"s with the chalk line, making sure to extend the 2' past the edge of the opening on the intended pump end of the system as shown below.

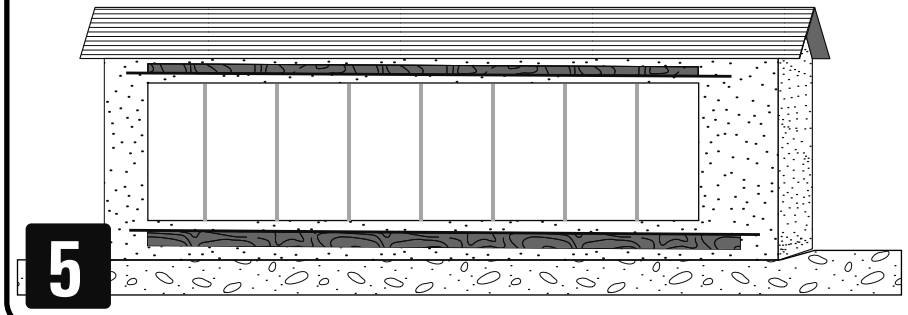


Make marks for upper support placement using formula below. Connect marks using chalk line.

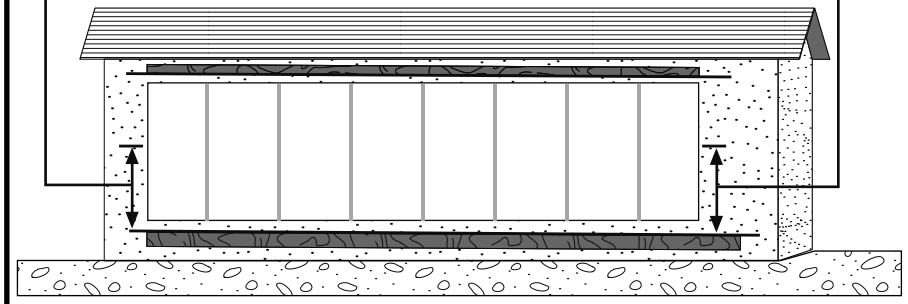


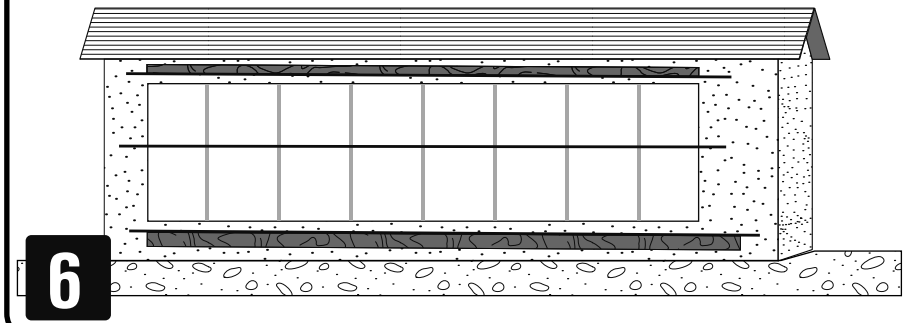


Using the chalk line as your guide, mount the required number of 2" x 4"s across the structure, aligning the bottom edge of the 2" x 4"s with the chalk line as shown below.

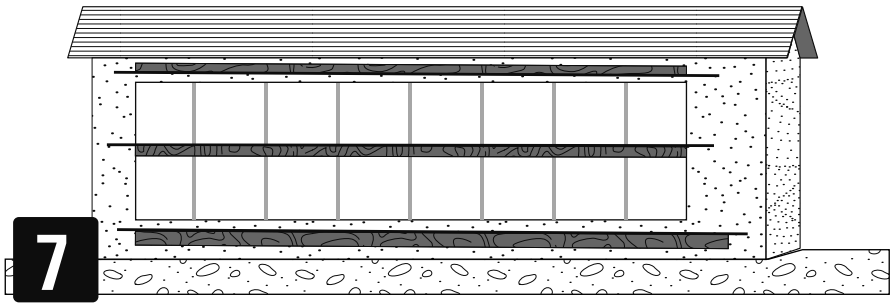


Make marks for middle support placement using formula below. Connect marks using chalk line.



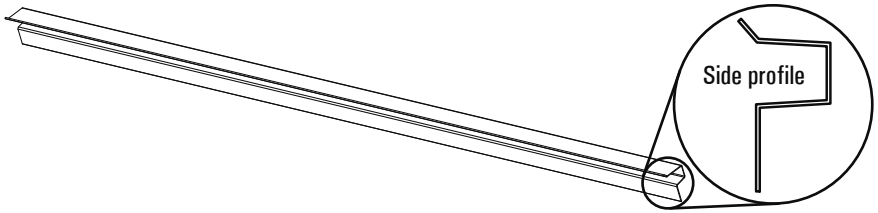


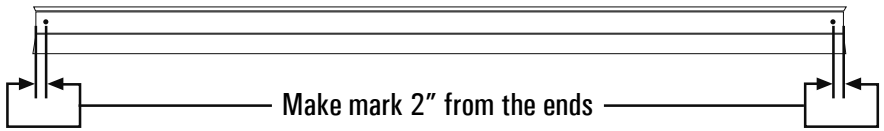
Using the chalk line as your guide, mount the required number of 2" x 6"s across the structure aligning the top edge of the 2" x 6"s with the chalk line as shown below.

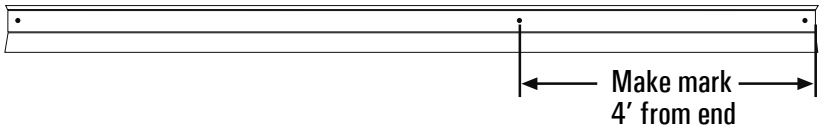


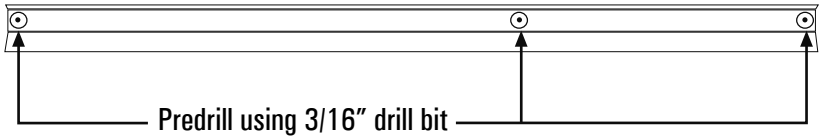
7

Prep each hanger track for installation. Measure 2" from each end and mark, then measure 4' from one end (either end is suitable) and mark. Using a 3/16" drill bit, predrill all 3 marks.



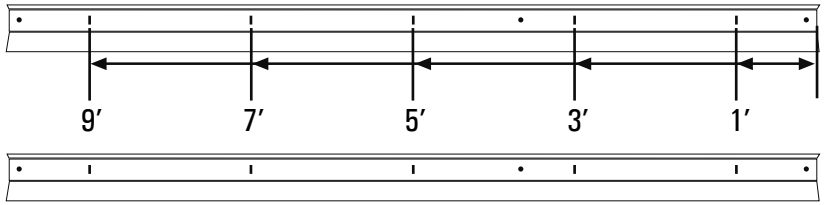






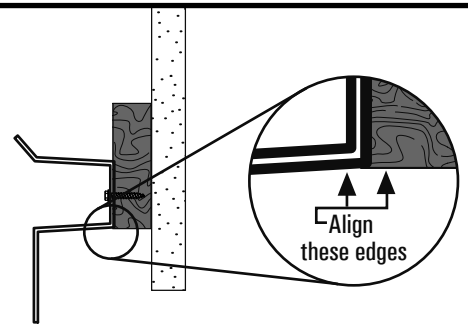
8

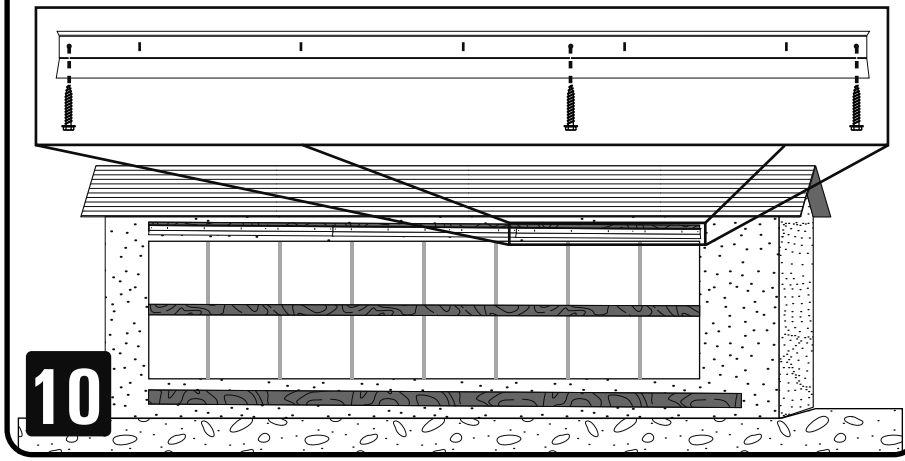
Now starting at one end of each hanger track make a vertical mark at the following measurements 1', 2', 5', 7', and 9' as shown below.



9

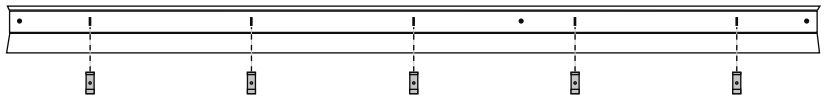
Install the hanger track to the 2" x 4", starting at the edge of the finished opening and aligning the bottom edge of the inset with the bottom edge of the 2" x 4" as shown below. Using the predrilled holes from step 8 as your guides and 1/4" socket, secure each hanger track to the 2" x 4"s with (3) #8 x 1", SS, Small Hex Screws.

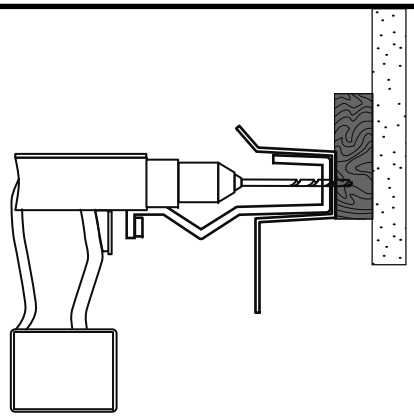


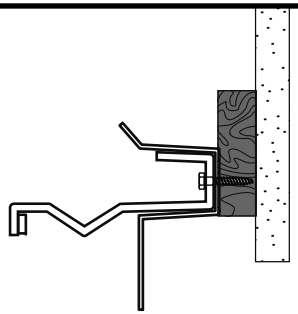


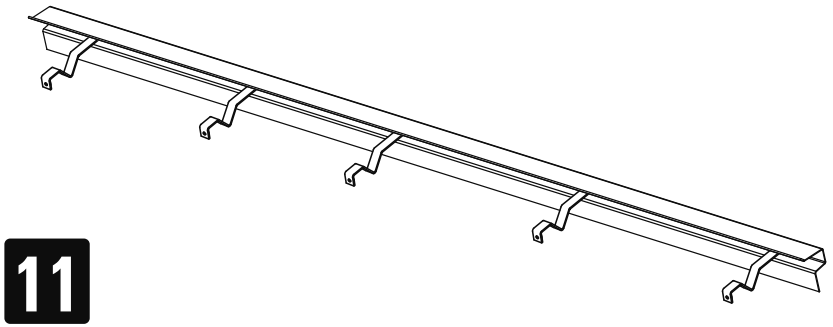
10

Align existing hole in the U-shaped end of the spray bar bracket with vertical markings made in step 3. Predrill holes for brackets with a 5/16" drill bit through the hanger bracket and into the 2" x 4" as shown below. Once hole has been predrilled, secure each spray bar brackets with (1) 1/4" x 1-1/2", SS, Lag Bolt per bracket. Install a total of 5 spray bar brackets per each 10' hanger bracket.







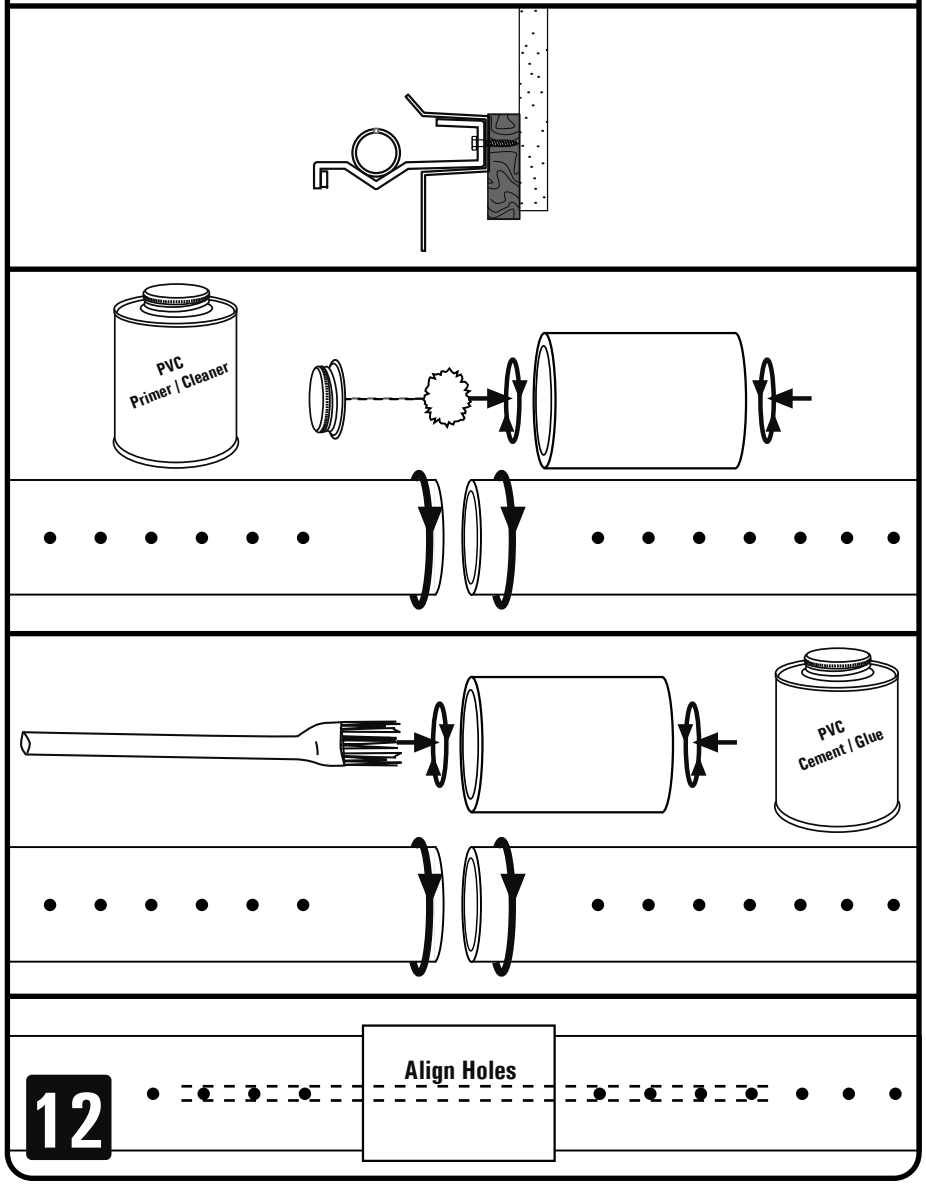


11

Set the spray bars into the "V" shape of the spray bar bracket as shown.

Following the PVC primer and PVC cement manufacturer's directions, swab the interior of the PVC coupling, then the exterior of the adjoining ends of the spray bars.

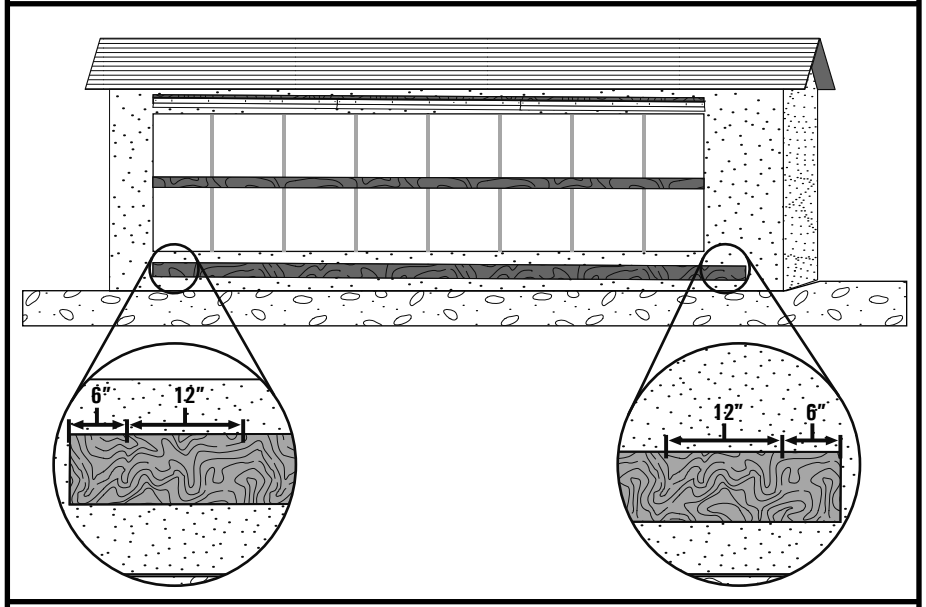
Slide the spray bar ends into the PVC coupler and align the spray bar holes and hold the joint for at least 30 seconds until set. Continue this all the way down the row of spray bars, making sure to keep each spray bar's holes aligned with each other.

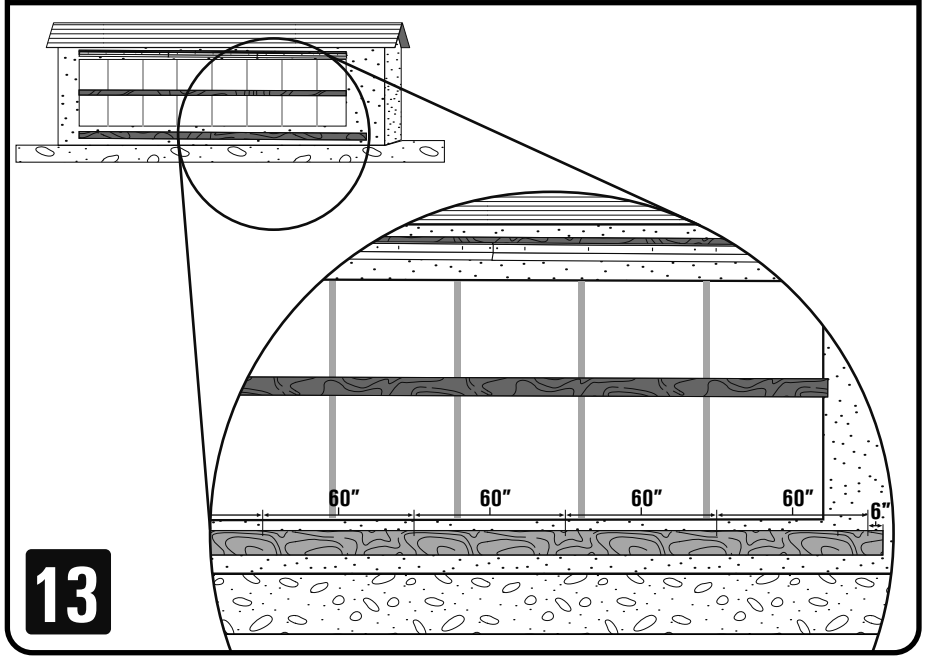


12

Prepare bottom 2" x 8" for mounting gutter brackets. On each end, make a mark 6" from end, then another mark 12" from that initial mark.

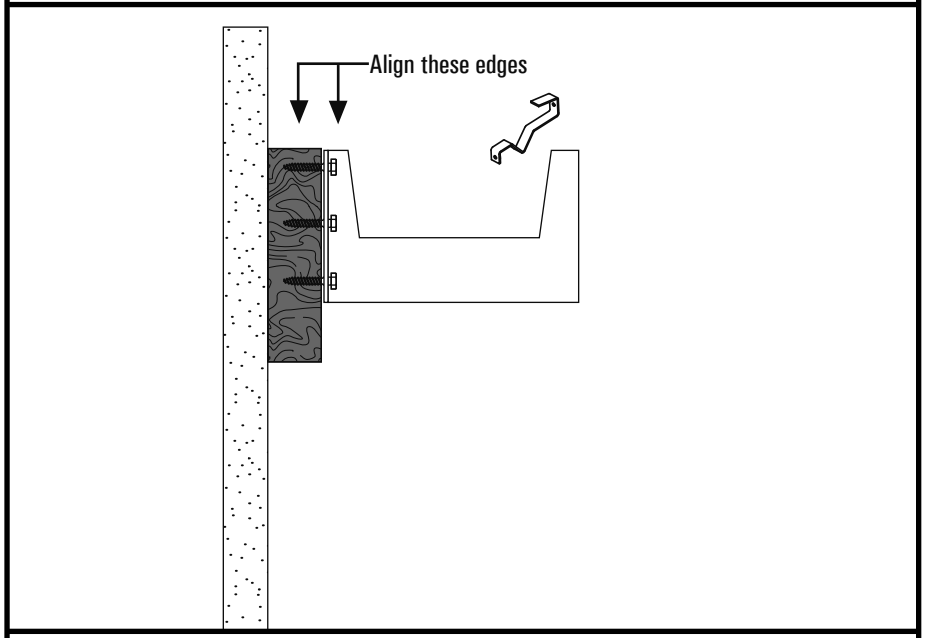
Once those marks have been made, starting at the pump end at the previously made 6" mark, start measuring and marking every 60" until you reach the markings on the other end.

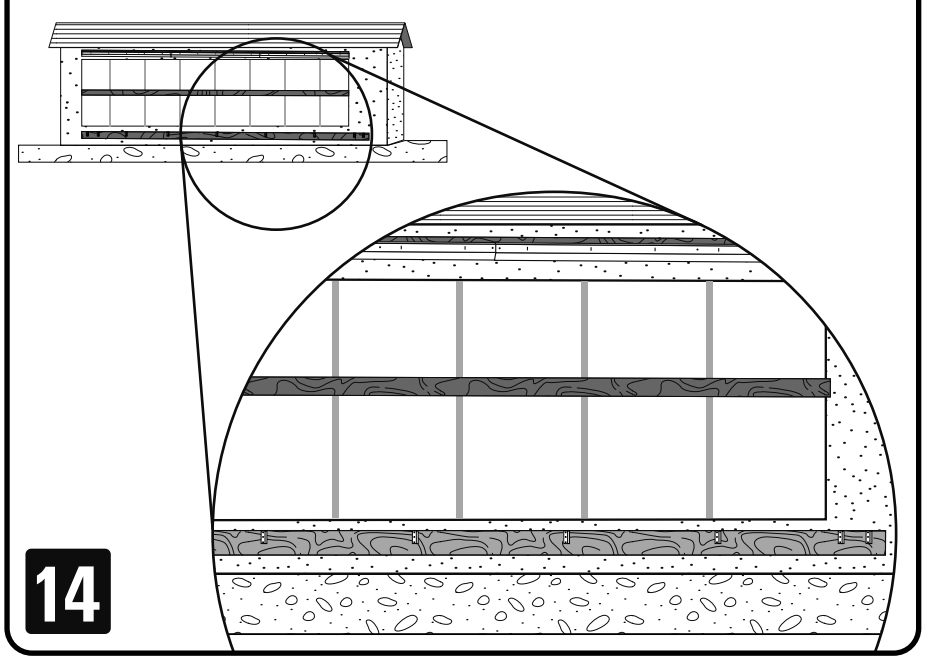




13

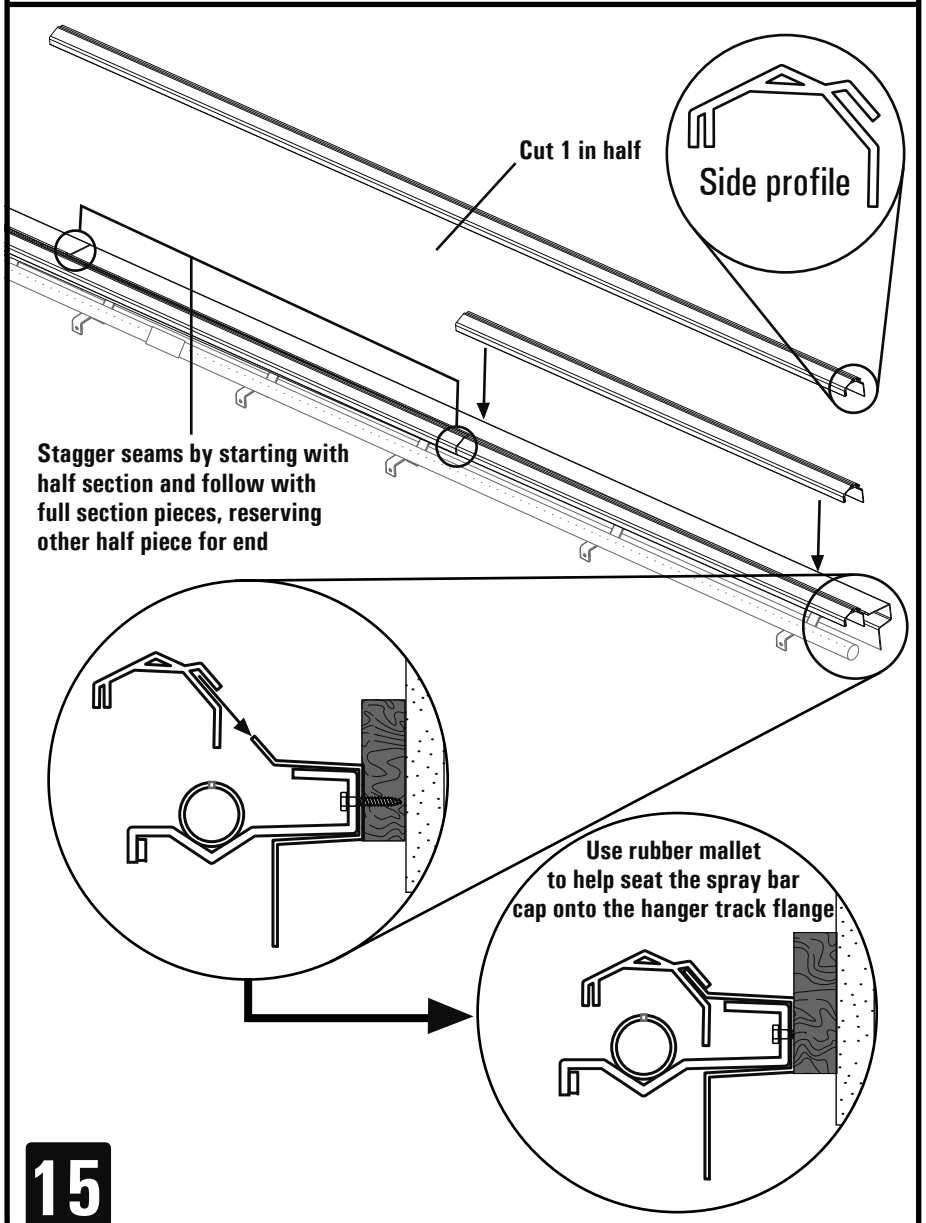
Install a gutter bracket at each mark made on the lower 2"x 8", align the top of the bracket with the top edge of the 2" x 8", and secure bracket with (3)1/4" x 1-1/2" stainless steel lag bolts.





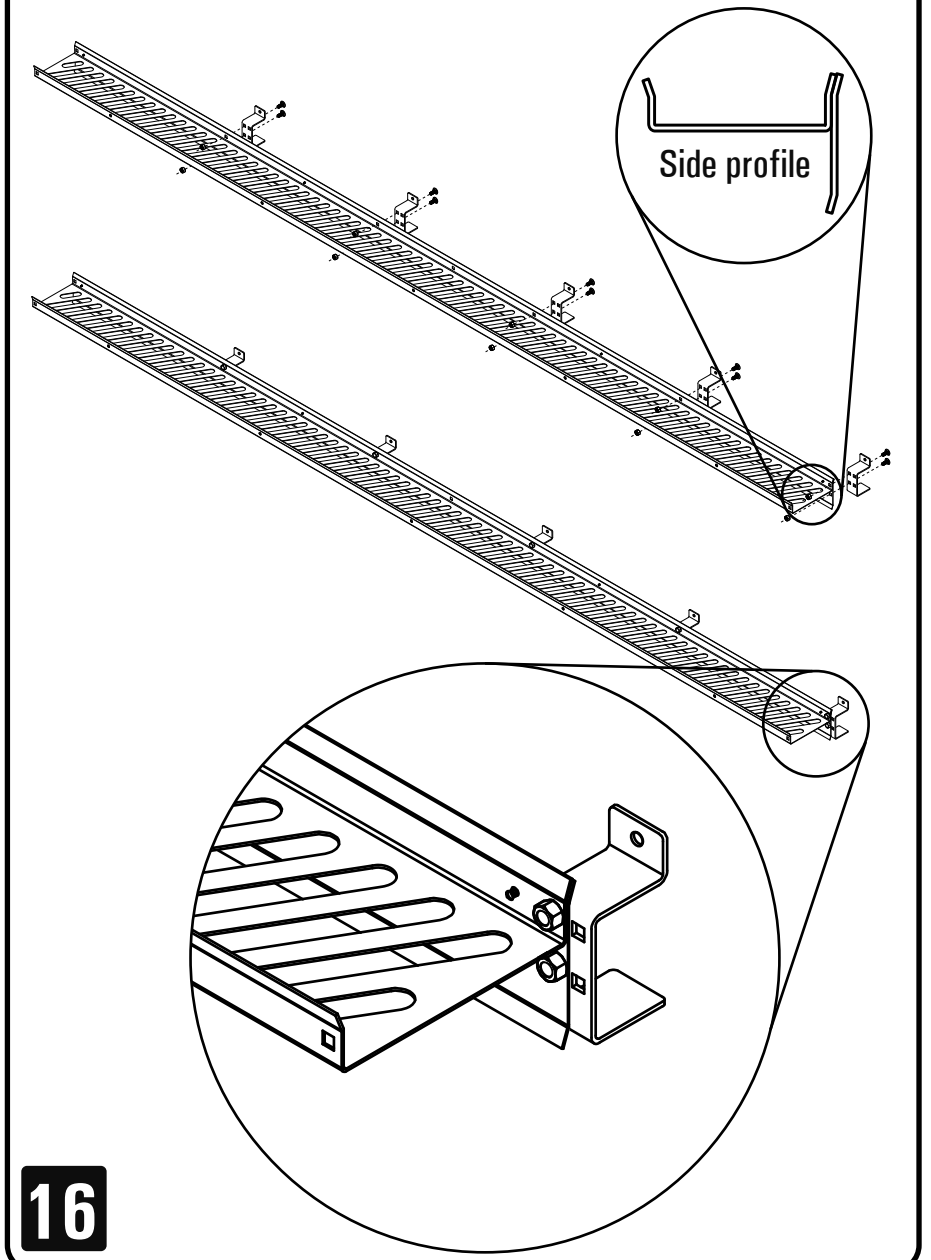
14

Cut one spray bar cap in half. Using one of the halves, start installing the spray bar cap to the top of the hanger track by inserting the top hanger track flange into the lip of the spray bar cap, using a rubber mallet to tap them together. Once you have the half section installed, follow with a whole section of spray bar cap. By starting with the half length, your cap seam and track seam will be staggered, increasing rigidity and strength.



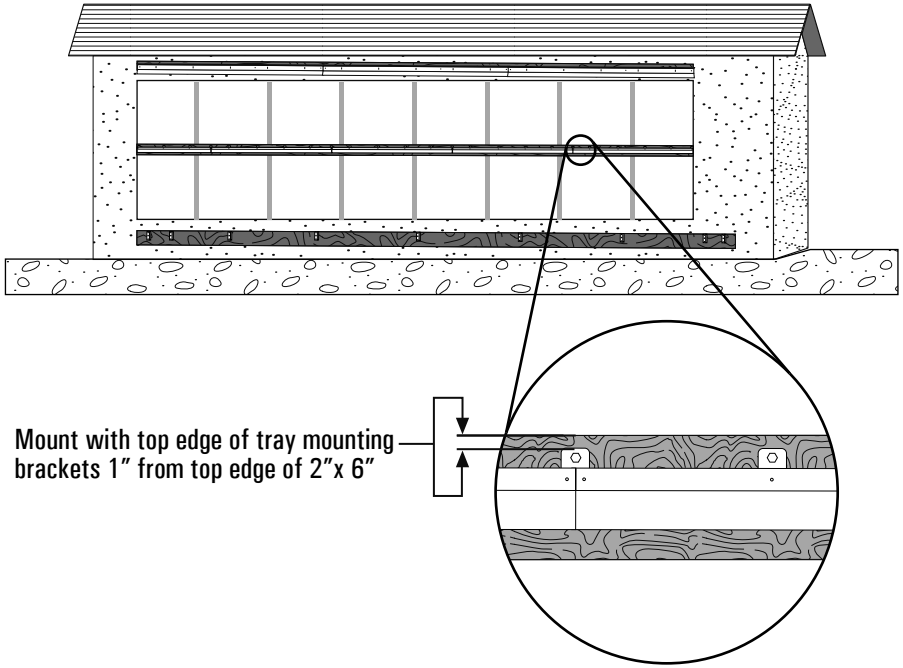
15

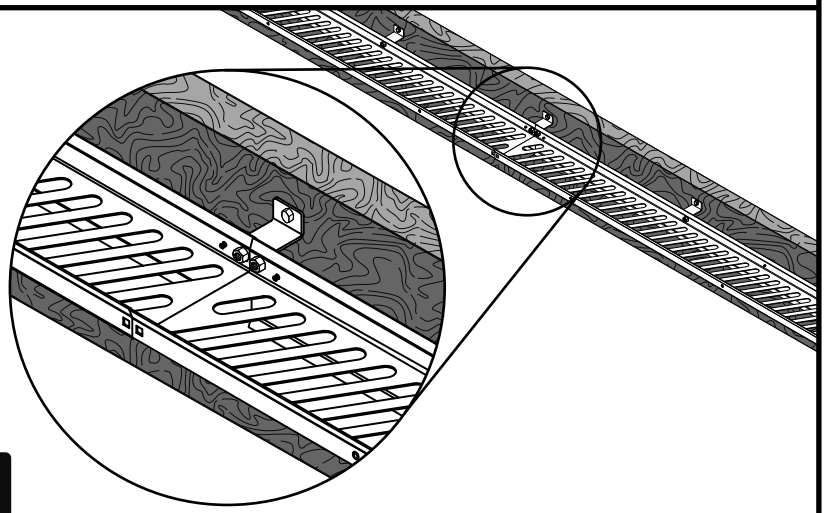
Preassemble the stacked pad support tray assembly with the support tray mounting brackets using (2) 5/16"-18 x 3/4" SS carriage bolts and (2) 5/16"-18 nylock nuts per mounting bracket. When assembling the first bracket to the pad support, leave the two left hardware holes available; these will be used to connect to the abutting pad support trays.



16

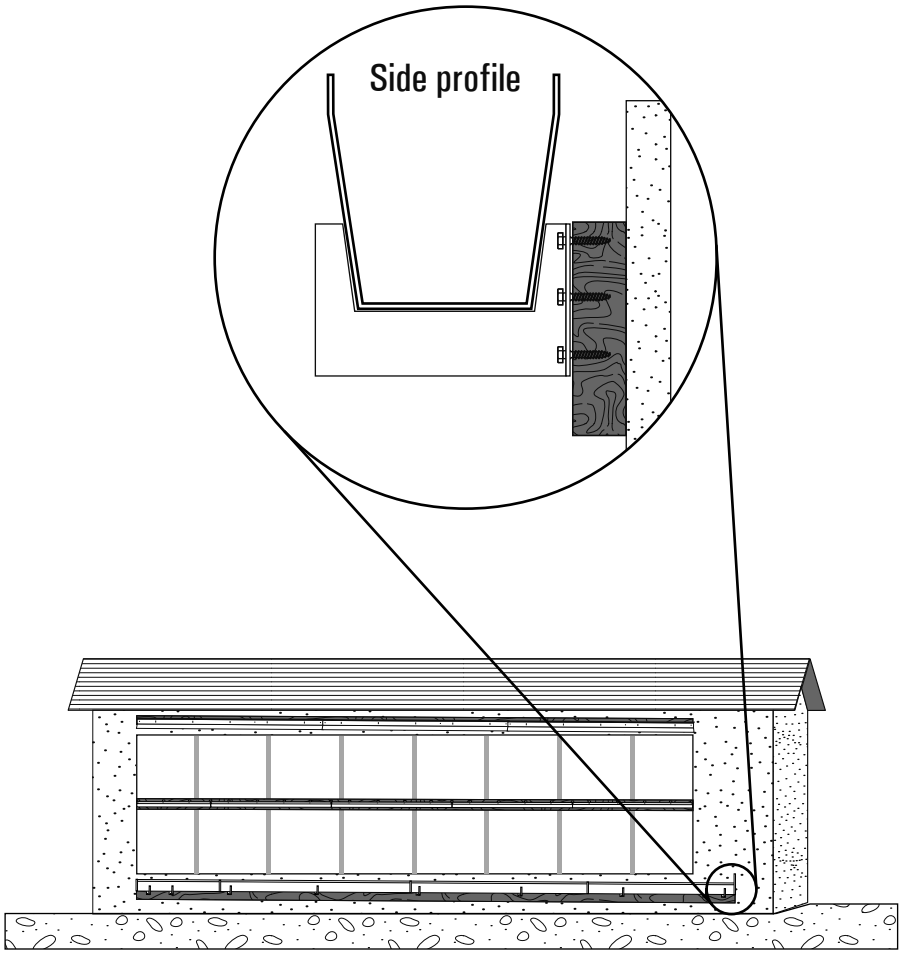
Using (1) 1/4" x 1-1/2" stainless steel lag bolt per bracket, install your previously assembled tray to the 2" x 6", leaving a 1" space between the top edge of the 2" x 6" and the top edge of the tray bracket as shown below. Abutting trays share a mounting bracket. Continue installing trays across opening.





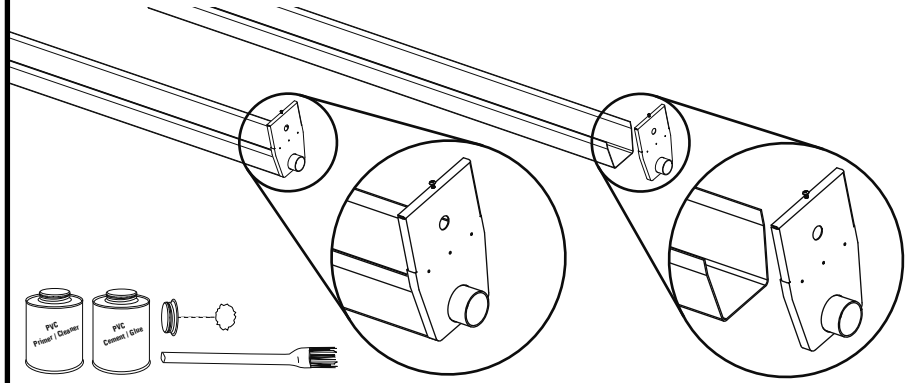
17

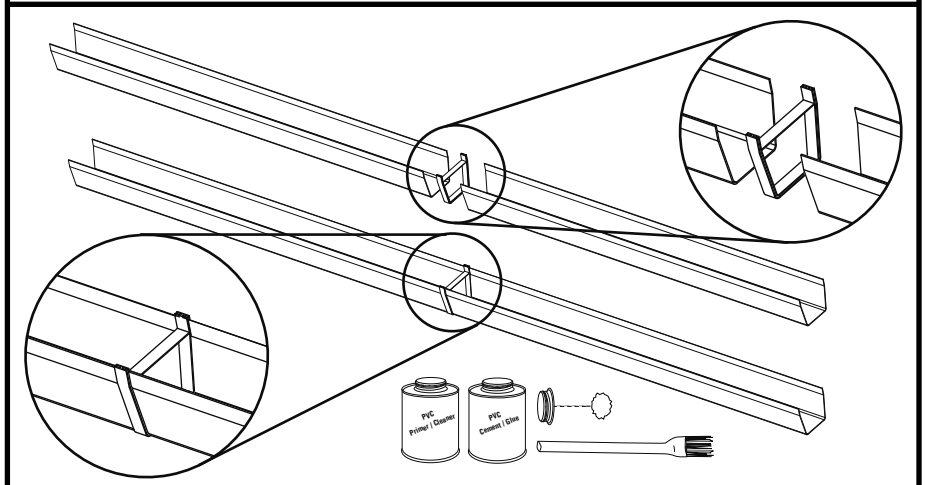
Starting on the pump end, 2' beyond the building opening and using a full length gutter, begin laying out gutter pieces. You will finish laying out the gutter and ending with the 2' piece of gutter included in the header and end kit components.

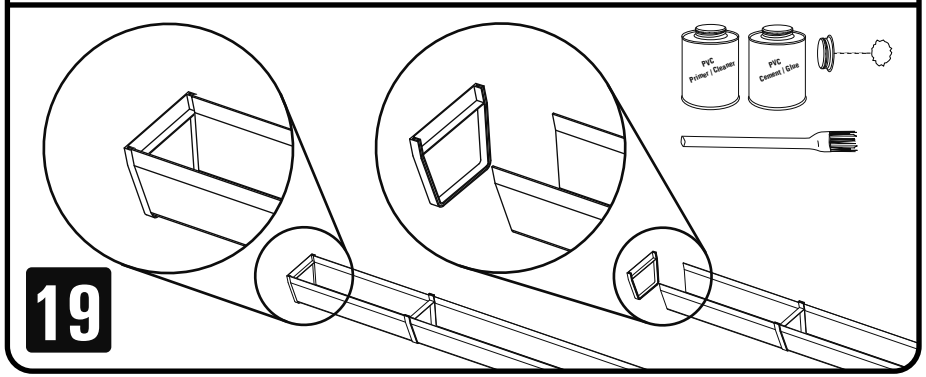


18

On the pump end of the first gutter, install the pump end gutter endcap assembly using the same technique and PVC primer and cement used in step 12. Once cemented, hold pieces together for 30 seconds until set. Once the endcap is assembled and set, begin connecting the lengths of gutter using the same technique and gutter end to end joiner. Once you reach the end gutter piece, attach the gutter end cap.

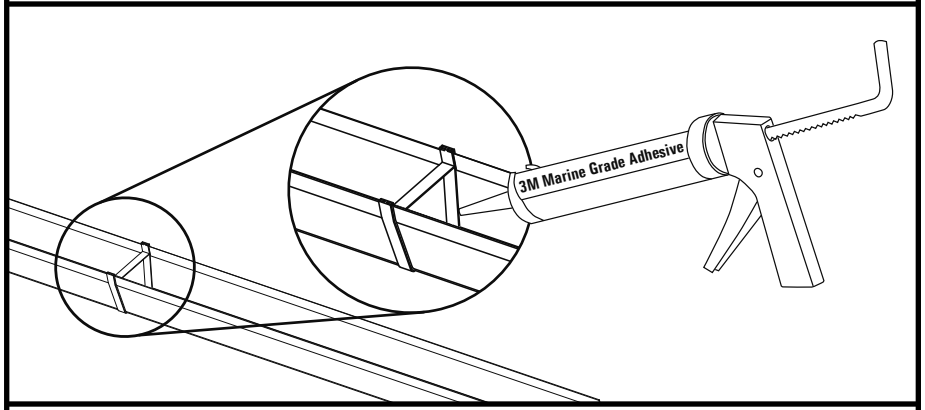


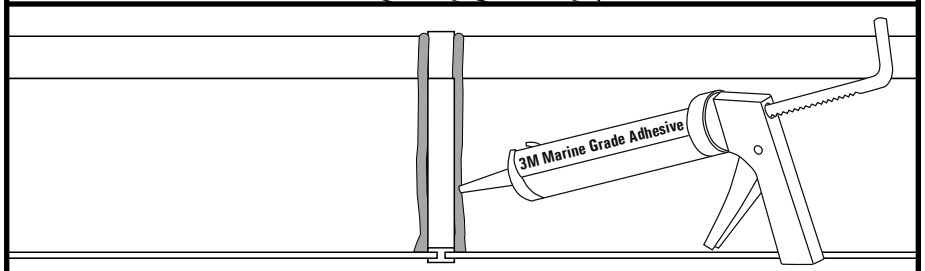


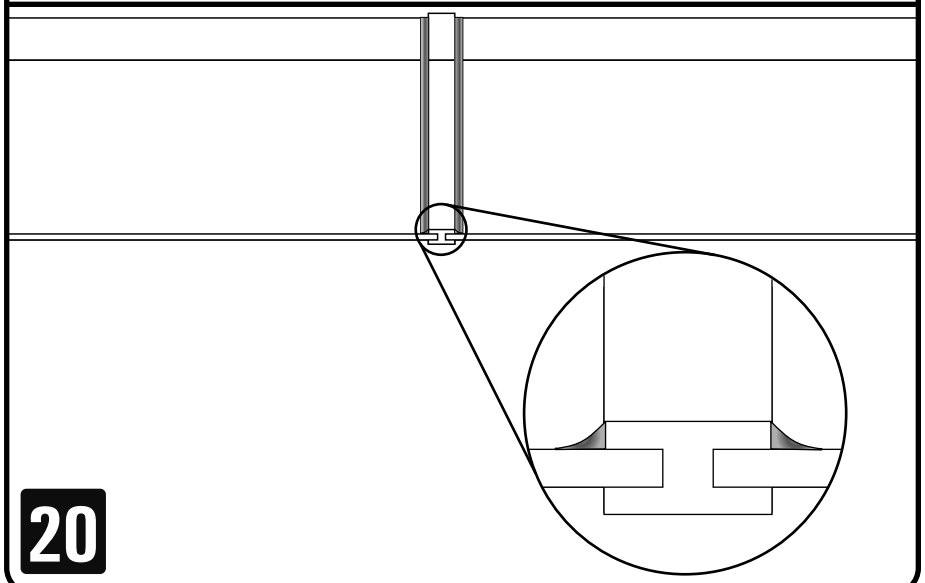


19

Once you have entire gutter assembled and cemented, begin applying a bead of 3M Marine Adhesive on each seam. Before adhesive starts forming a skin, use the back of a wet spoon or some other device for creating a smooth fillet radius. It is important to use plenty of adhesive and to create as uniform a radius as possible to avoid leaks and pooled sediment.



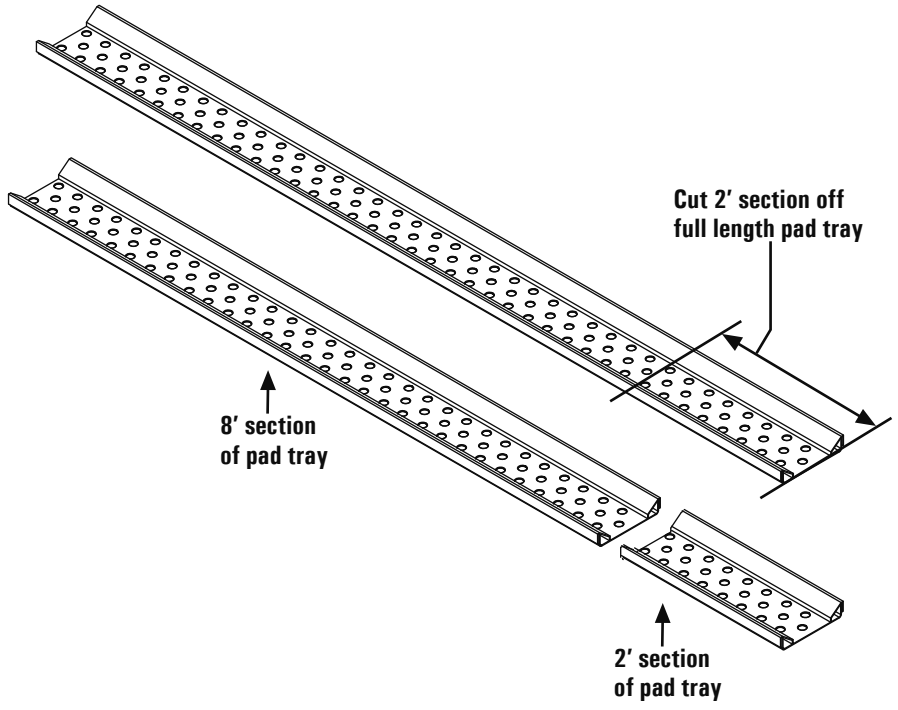


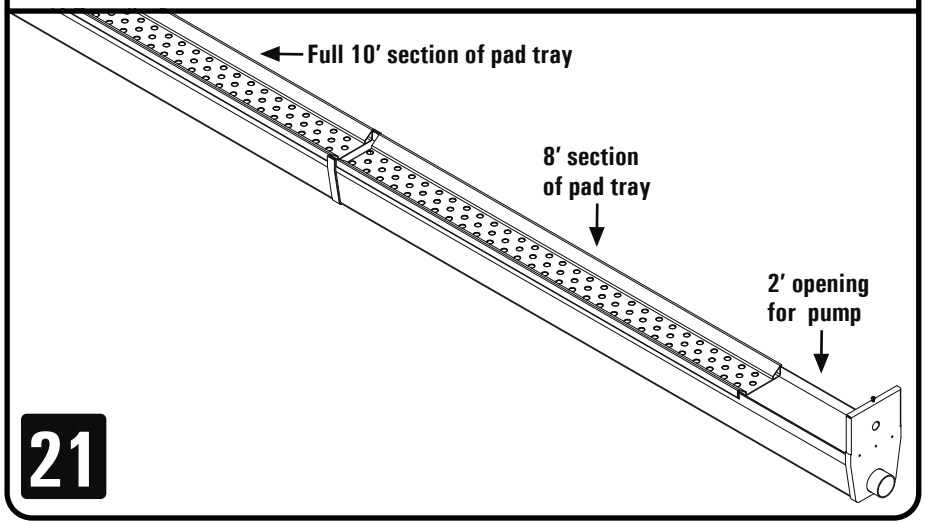


20

To begin installing pad trays, cut 2' off of a full length pad tray, retaining both pieces.

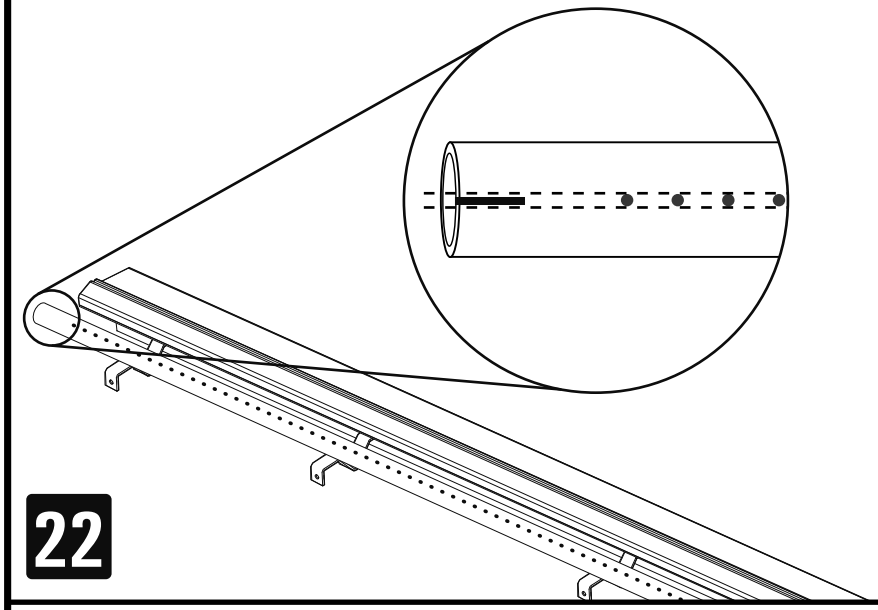
Use the newly created 8' section as the starting piece, leaving an open 2' section where the pump will be located. Continue installing pad trays, finishing with the 2' section. Use only hand pressure or tap with rubber mallet to fully seat the pad trays onto the gutter. DO NOT use adhesive or cement.





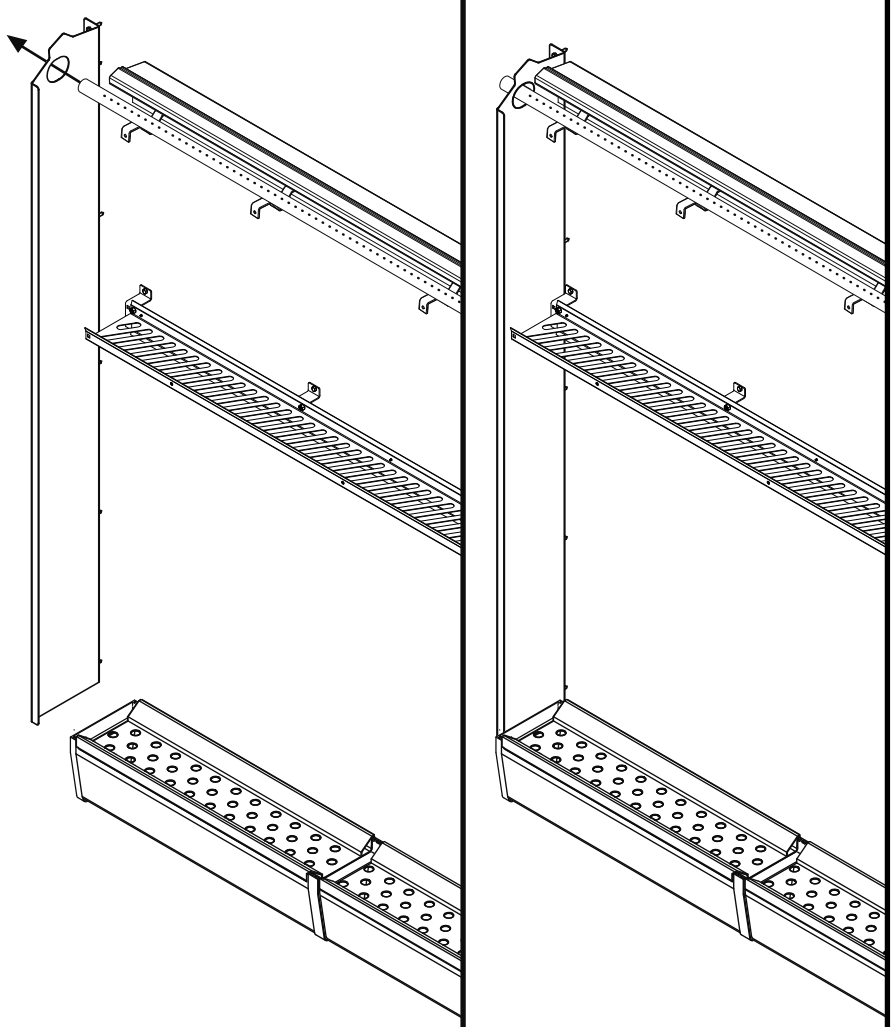
21

To ease installation of bleed valve, make mark on end of spray bar indicating spray hole placement.



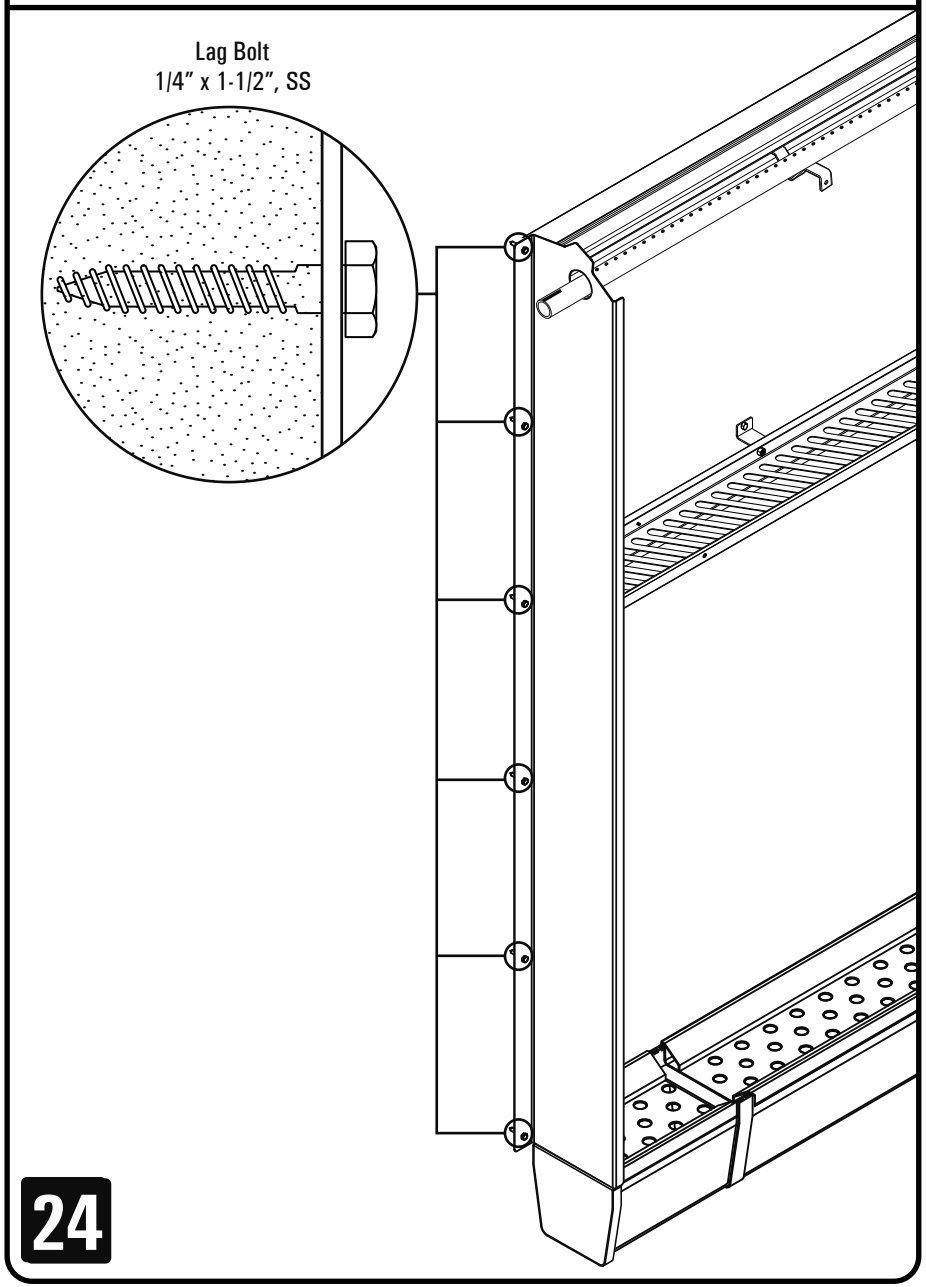
22

Install the left pad end cover by sliding spray bar through precut hole and abutting cover to end of stacked pad support tray and inside of gutter.



23

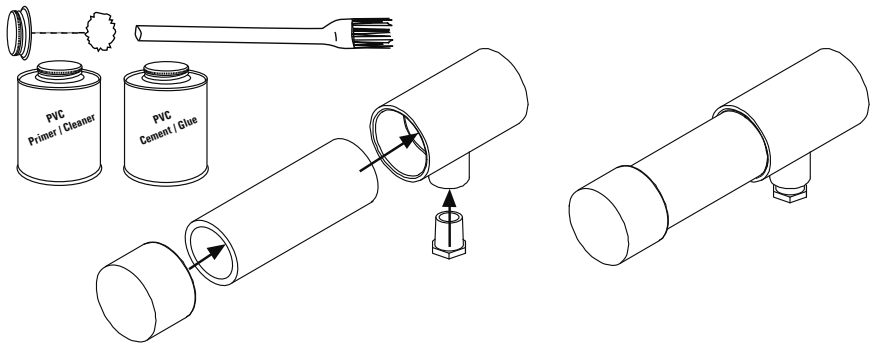
Once left pad end cover is properly placed, secure with provided 1/4" x 1-1/2" SS lag bolts. Exact number of lag bolts required is dependent on the height of the system purchased; to verify the number needed for your installation, refer to the predrilled holes in the mounting flange of the end cover.

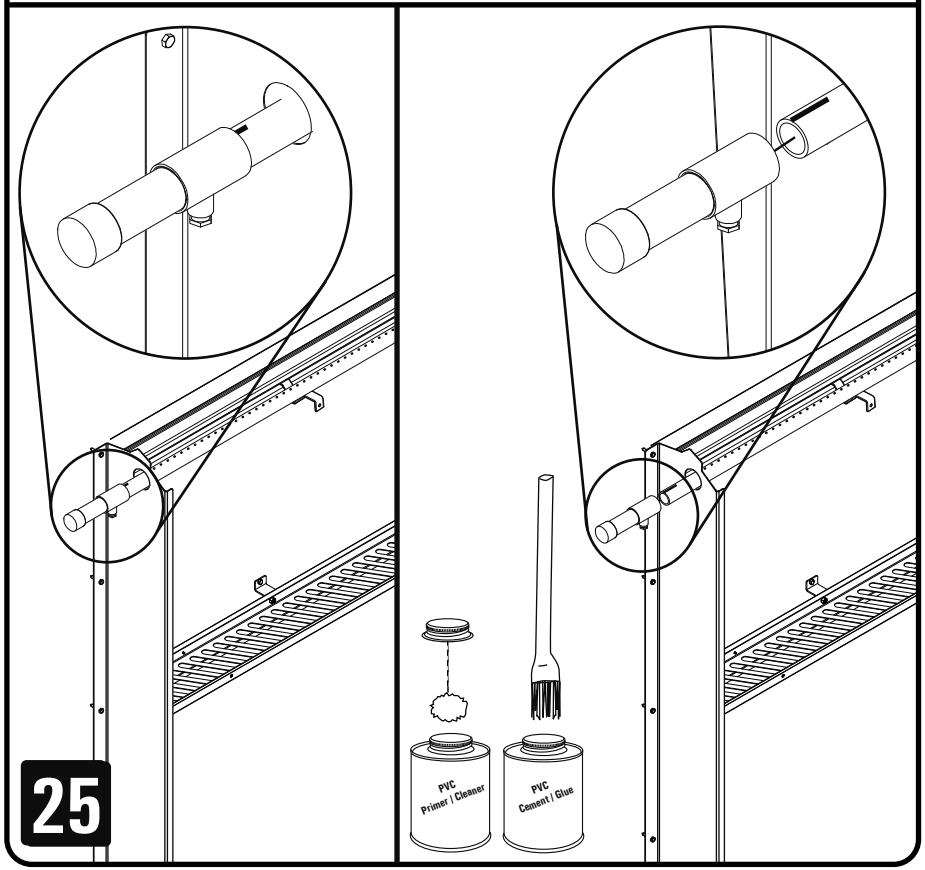


24

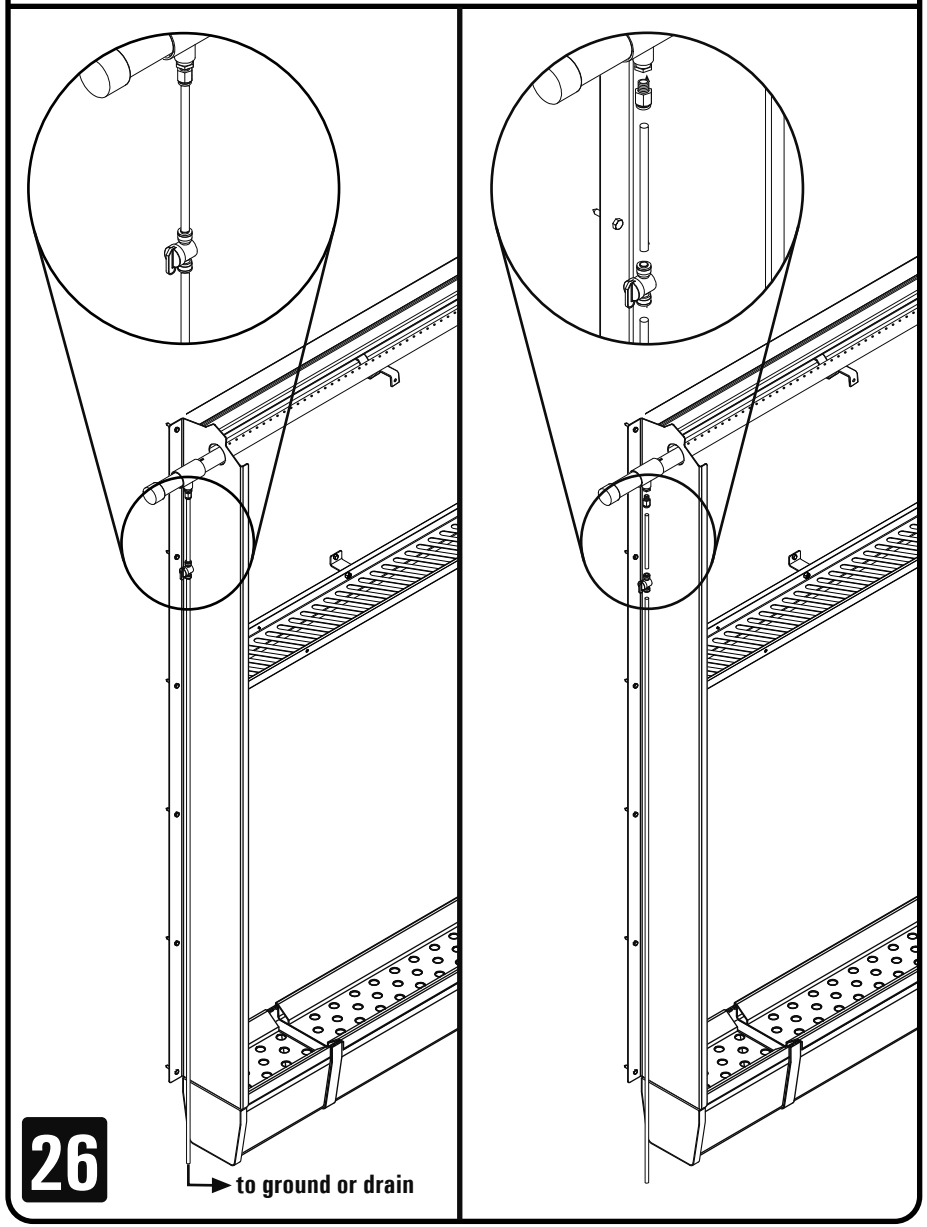
For this step you will need (not provided) a 3" section of 1-1/2" PVC pipe. Using the PVC primer and cement instructions used in step 12 as your guide, assemble the end cap, 3" section of 1-1/2" PVC pipe, 1-1/2" x 1-1/2" x 1/2" reducing T and 1/2" x 1/4" reducer.

Make note of mark made in step 25 indicating location of spray holes; this mark needs to be on top. Once installed, the bleed valve needs to be pointing down.

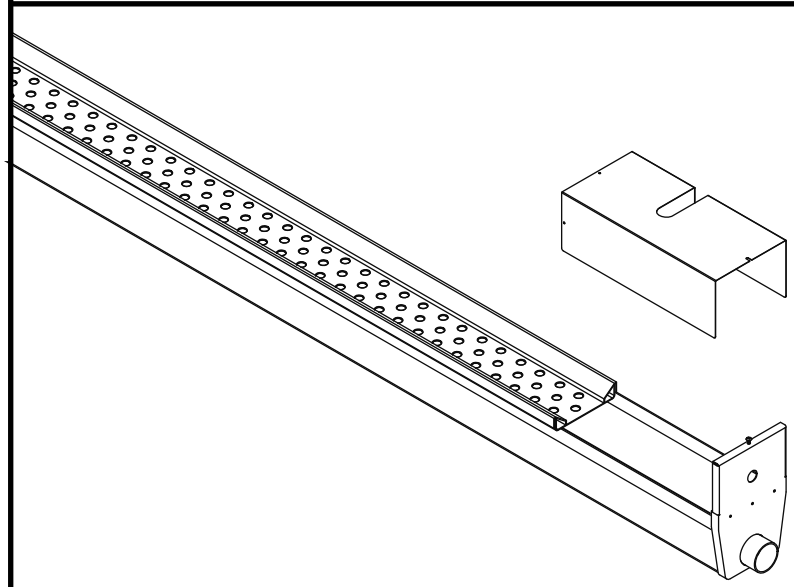


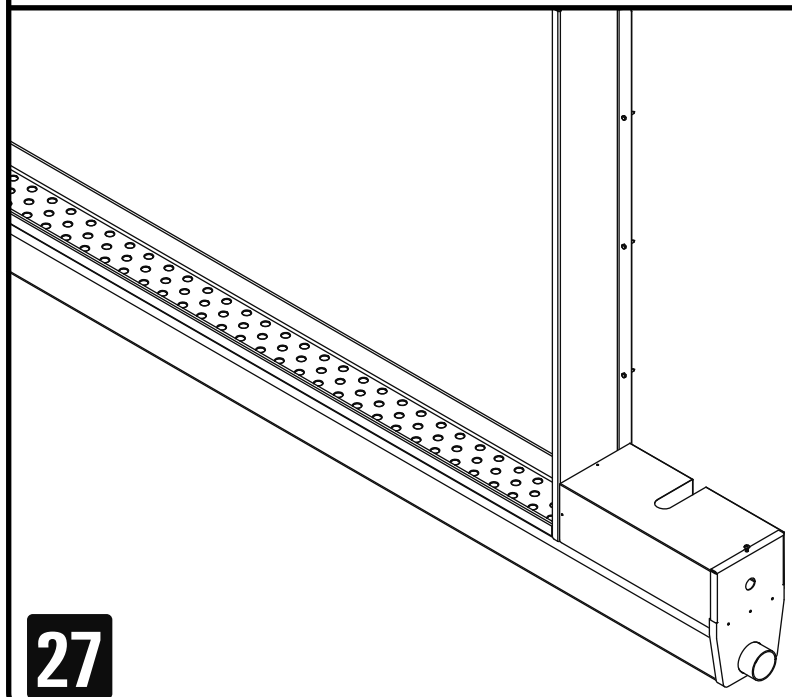


Finish installing flush line by threading the 3/8" slip lock adapter into the 1/2" x 1/4" reducer; using pliers, hand tighten until snug. Cut off a 6" or longer piece of the 3/8" poly line. Insert one end of the line into the slip lock adapter and the other end into the slip lock of either end of the 1/2" ball valve. Take the end of the remaining poly line and insert it into the slip lock on the other end of the ball valve. Use this line to direct water released from the flush valve either to the ground or to a drain. DO NOT drain back into pad system or gutter.



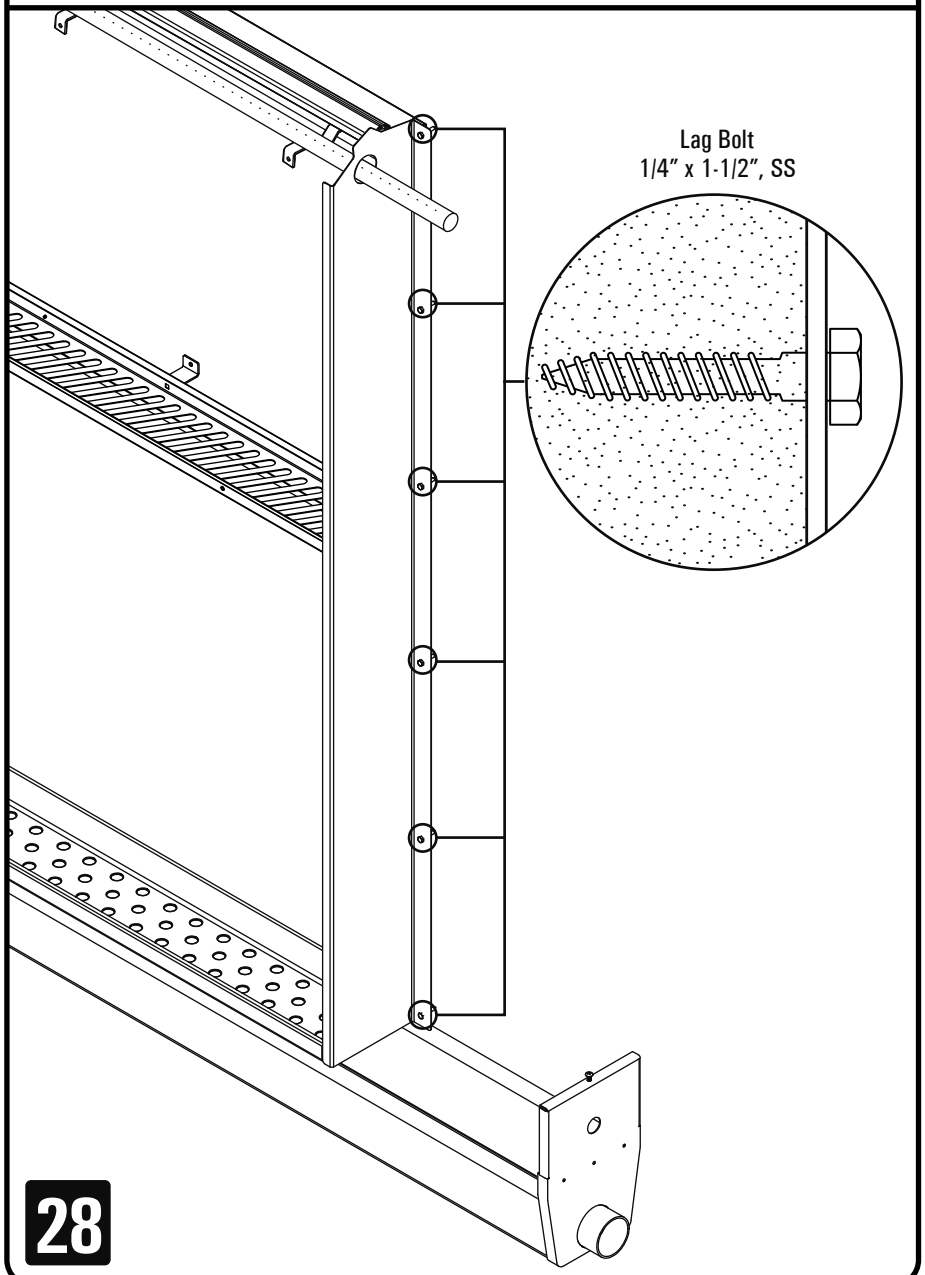
Install right pad end cover. To endure proper spacing, place pump cover endcap assembly over pump end as shown, then place right pad end cover abutting it.





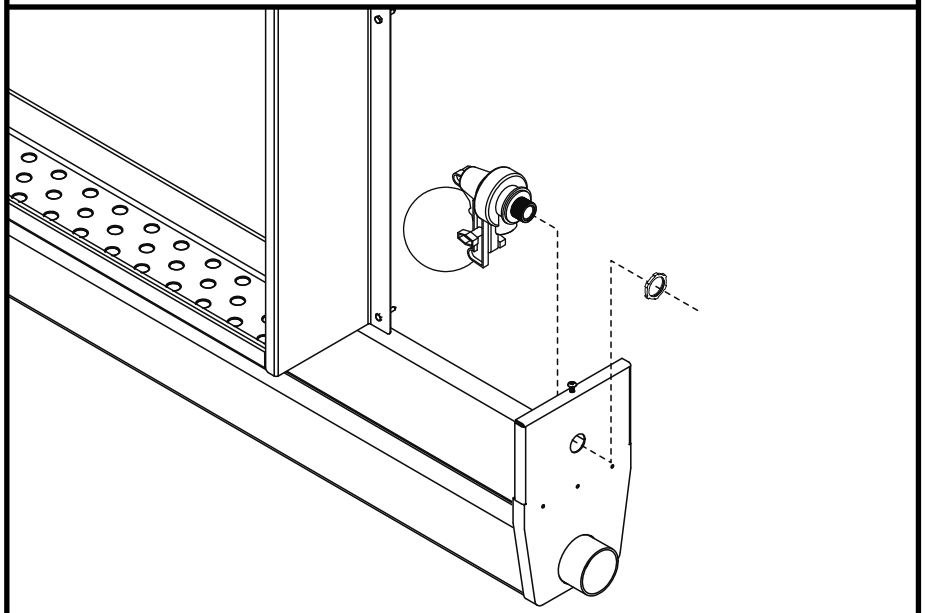
27

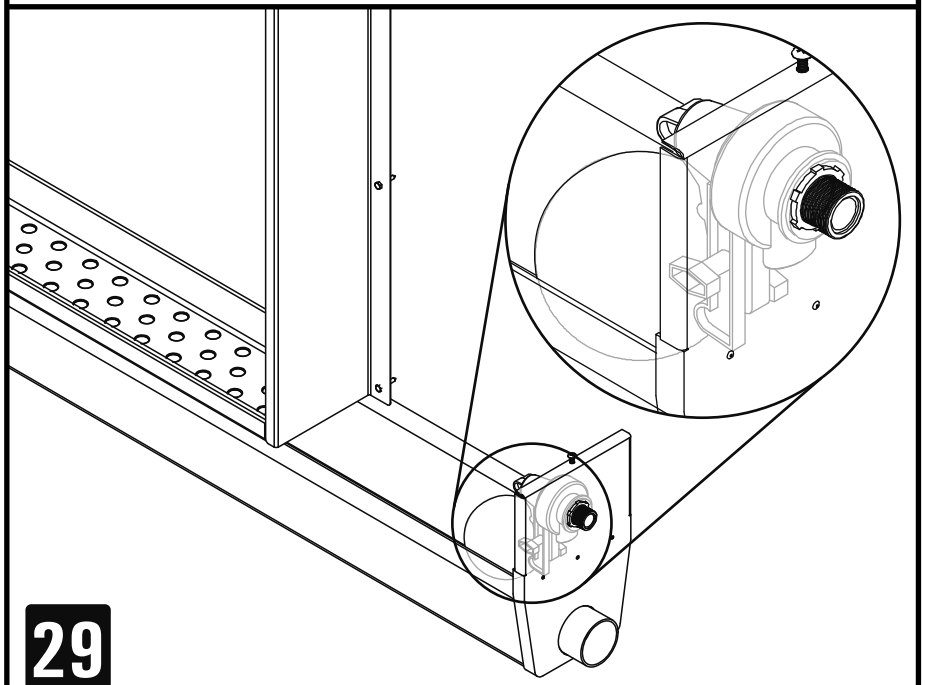
Once right pad end cover is properly placed, secure with provided 1/4" x 1-1/2" SS lag bolts. Exact number of lag bolts required is dependent on the height of the system purchased; to verify the number needed for your installation, refer to the predrilled holes in the mounting flange of the end cover.



28

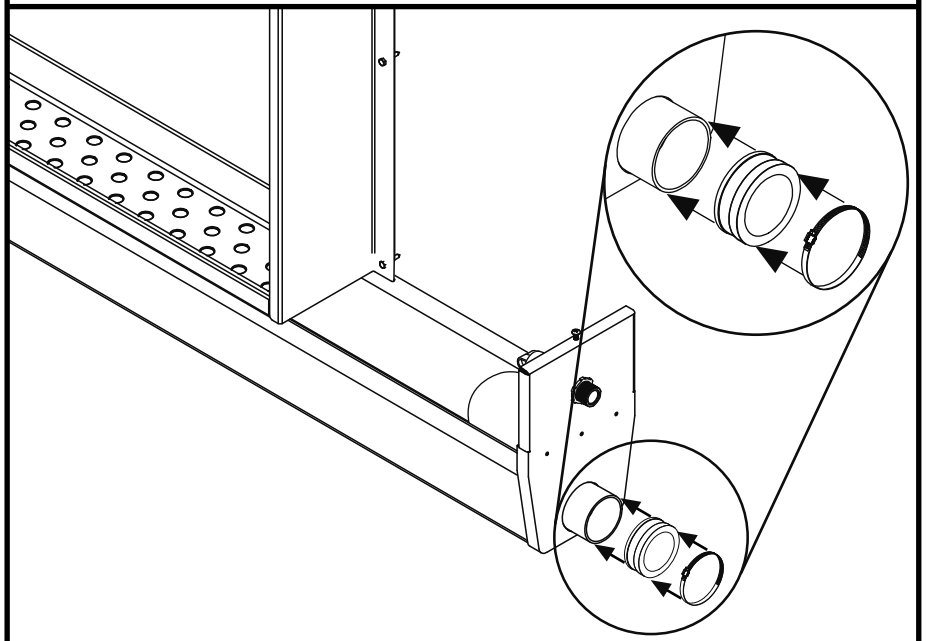
Remove the locknut from the mega flow valve neck, insert threaded neck through precut hole in pump end endcap, and secure by threading locknut back onto valve neck until snug.

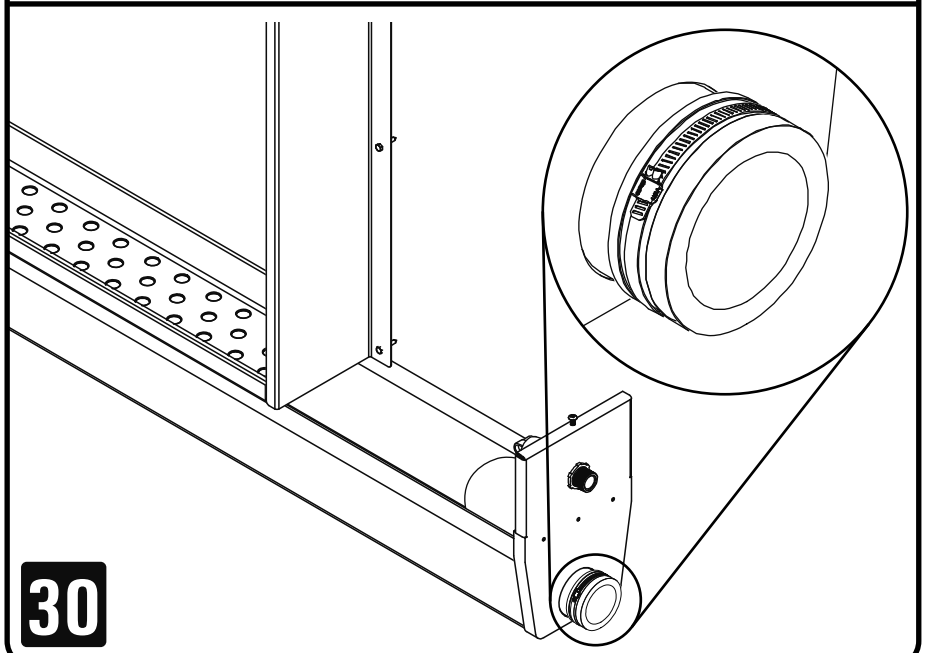




29

Slide rubber drainage cap as far as it will go over drain opening. To secure cap, slide hose clamp over cap until it rests in valley of cap. Using a flat blade screwdriver, hand tighten screw drive on hose clamp.

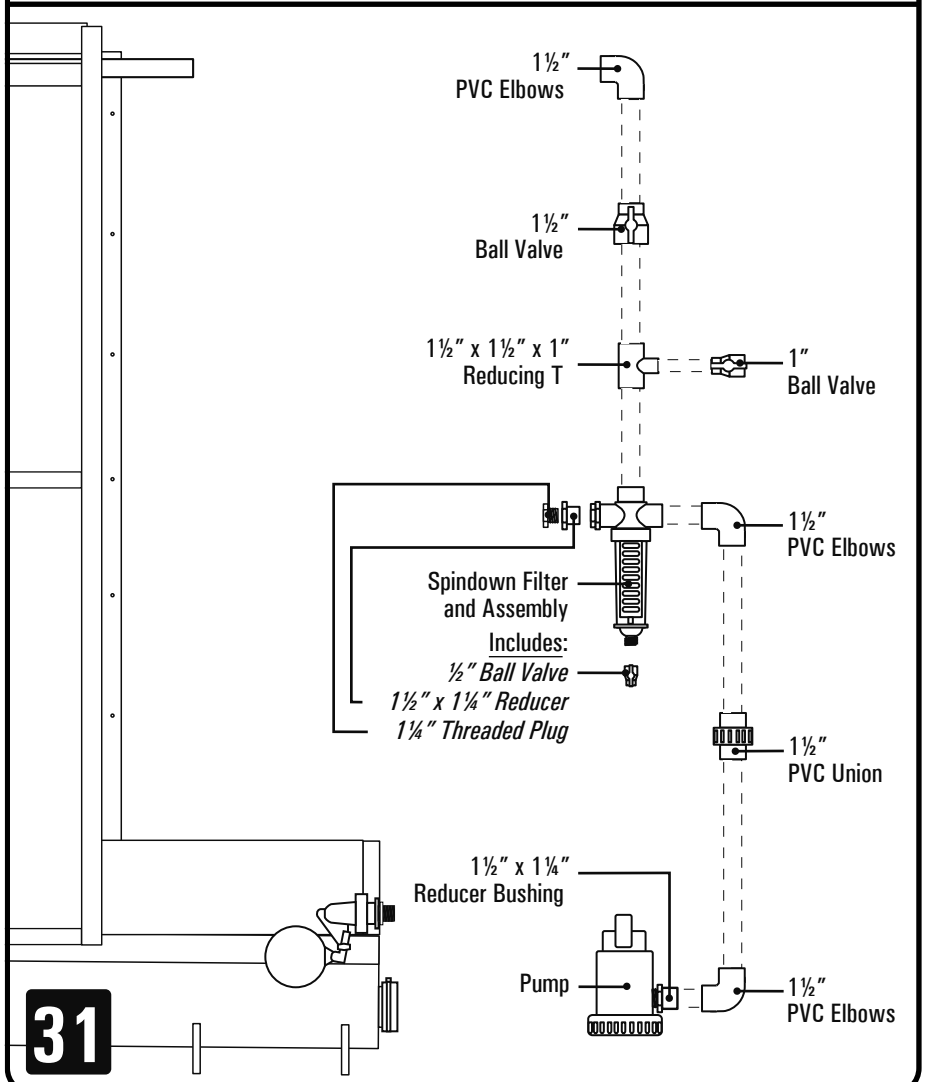




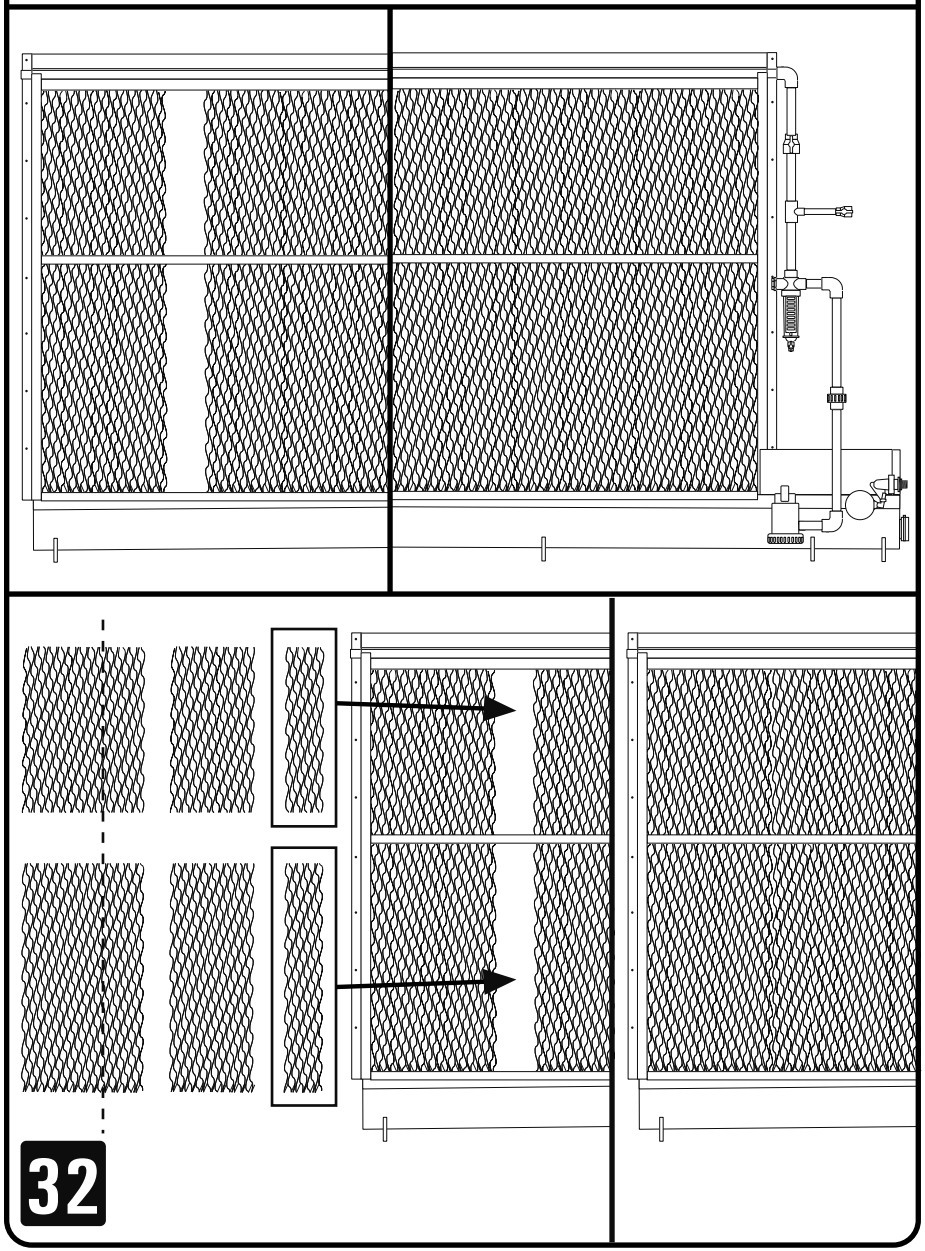
30

Assemble pump to spray bar plumbing. Schedule 40 1.9" and 1" pipe piece lengths will be dependent on the system you purchased and your preference on height and spacing.
Things to keep in mind:

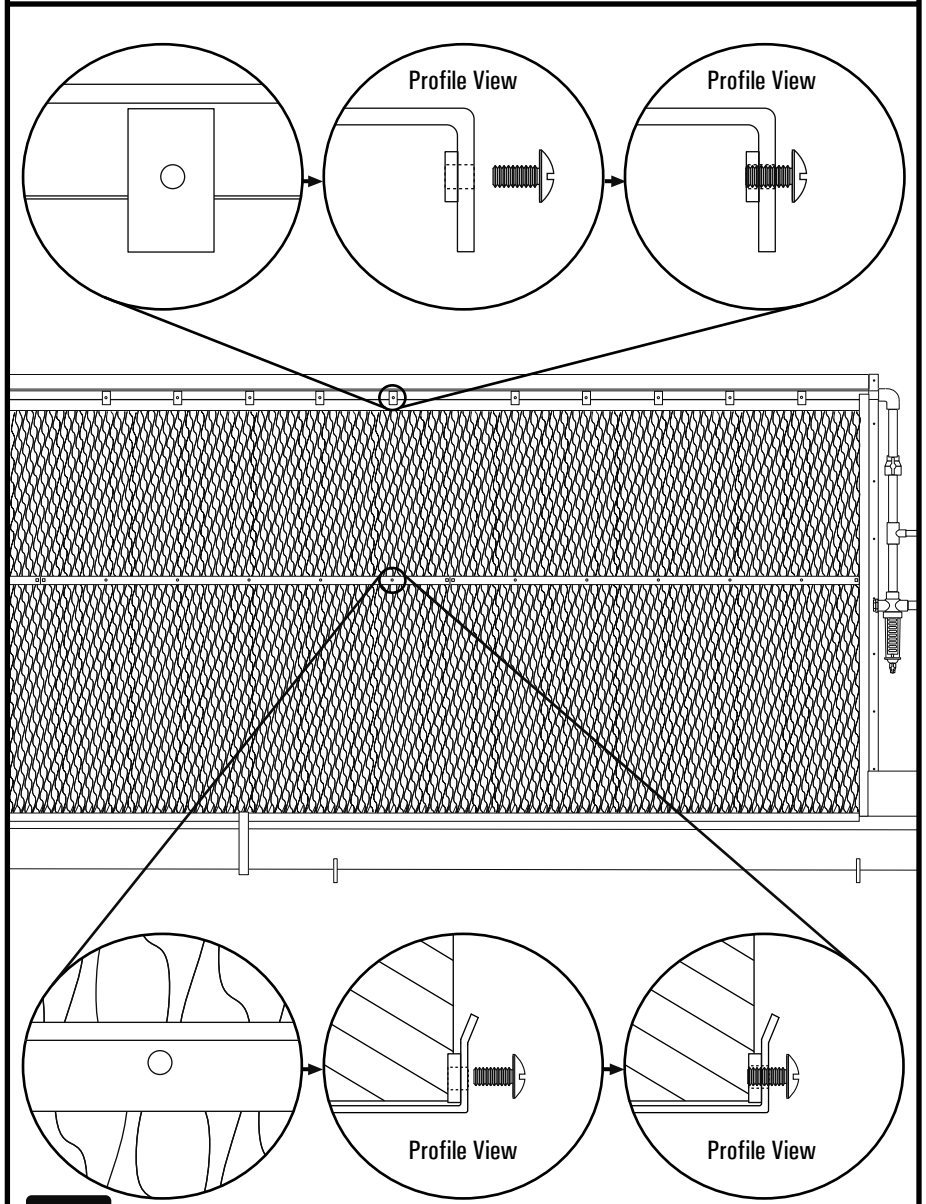
- Always dry fit entire arrangement BEFORE cementing together
- The pipe length from the pump to the elbow needs to allow the next section of pipe to align with the opening in the pump cover endcap assembly
- The space from the spindown filter ball valve to the top of the pump cover endcap assembly needs to allow a tube (not provided) to be connected or a bucket (not provided) to be positioned to defer or catch waste water when purging the filter
- Do not allow cement to come in contact with union threads



Starting on the pump end, begin placement of pads. Most pads have markings on the side indicating direction of required air movement. Make sure to adhere to those recommendations when placing pads. Do not allow gaps between pads as this will greatly reduce performance. Once there is no additional room for a full pad, shift gap away from pad end cover, measure gap, and trim piece to fit gap.

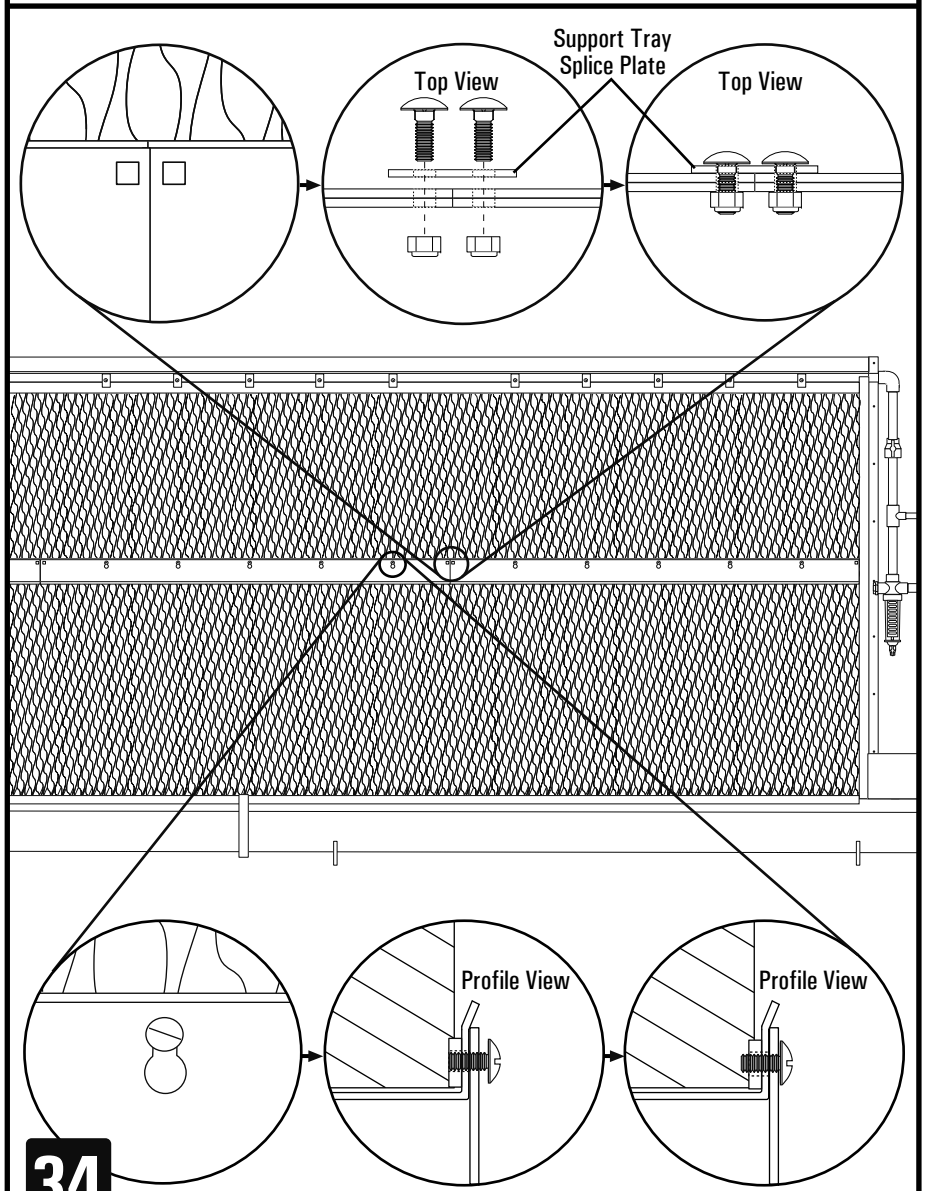


Prepare spray bar hangers and stacked pad support tray assembly for attaching pad retainers by inserting a 1/4"-20 x 1/2", SS, Slotted Truss Screw through hangers and trays into welded nut backed holes. Do not tighten; leave gap for retainers.



33

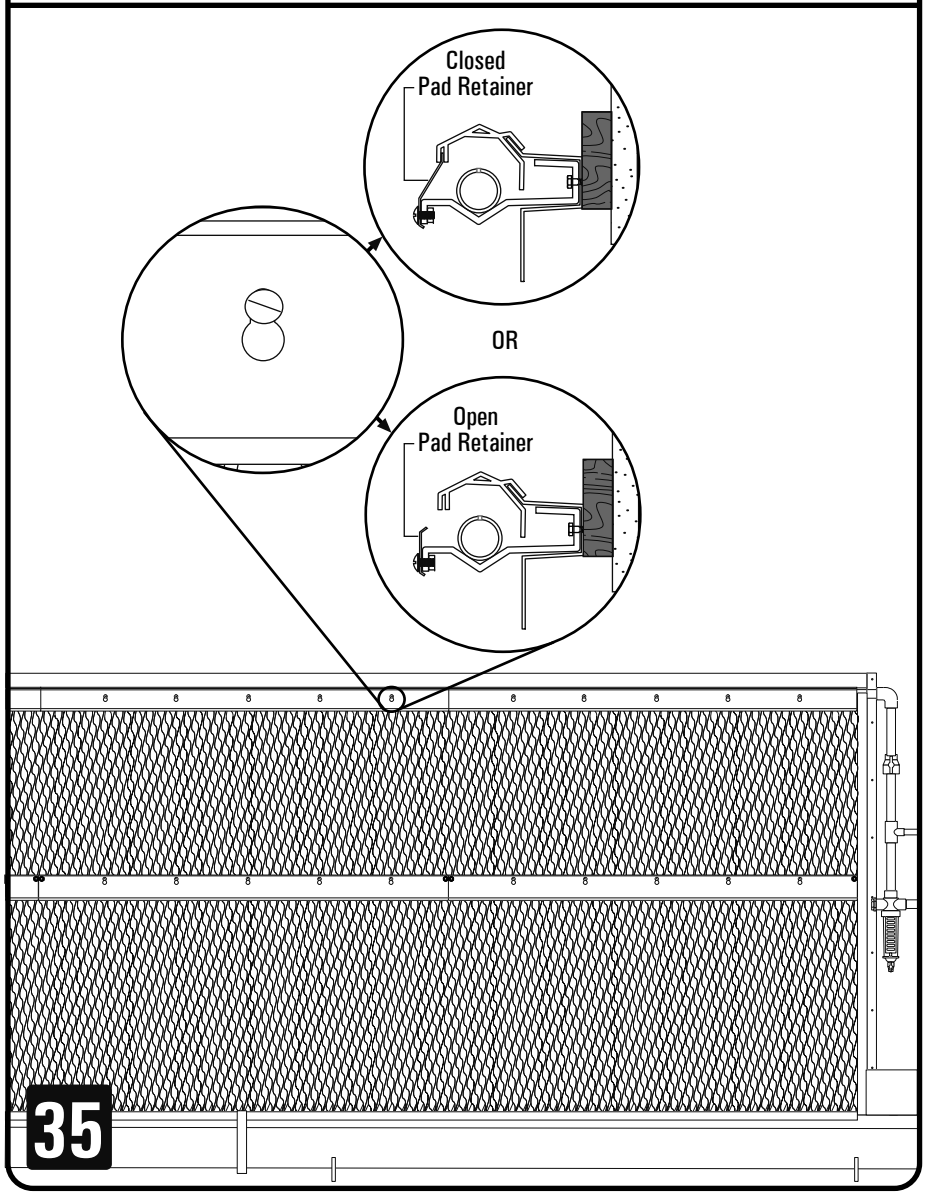
Install stacked pad front retainer by sliding keyhole slots over the heads of the slotted truss screws installed in previous step, then slide retainer down. Before tightening slotted truss screws, install support tray splice plates on the inside of the tray assembly using (2) 5/16"-18 x 3/4", SS Carriage Bolts and (2) 5/16"-18 Nylock Nuts as shown below. Tighten hardware for splice plates then tighten slotted truss screws down the rest of each retainer.



34

Installing closed pad retainers.
Insert the upper edge into the slot on the spray bar cap. Slide keyhole slots over the heads of the slotted truss screws installed in step 34, then slide retainer down and tighten slotted truss screws.

Installing open pad retainers.
Slide keyhole slots over the heads of the slotted truss screws installed in step 34, then slide retainer down and tighten slotted truss screws.



Initial Start-Up

- Fill trough with fresh, clean water approximately 5" deep.
- Start pump and run for 5-10 minutes, then shut off.
- Remove rubber drain cap and drain trough.
- Repeat 3-4 times, filling and draining the system to remove construction debris.
- During the flushing process, inspect trough and plumbing for leaks; repair as needed.
- Remove filter cartridge, rinse with clean water and reinstall.
- Adjust float arm to maintain trough water level to 3"- 5". Do not allow water to submerge the bottom of the pads, this will cause premature breakdown of the pad. *(Note: Water level will rise above setting when pump is shut down.)*
- Place and secure stainless pump cover.
- Check filter cartridge daily for the first week of operation and clean if necessary.
- Run system continuously for a 48 hours to open pad surface porosity for proper future wetting. *(New pads exhibit high surface tension that minimizes the absorption of water.)*
- Adjust bleed valve - see Adjusting Bleed Valve section below.

Adjusting Bleed Valve

- The amount of impurities and speed of evaporation will dictate the amount of water that needs to be bled off to maintain a fresh water system.
- Start by figuring out your evaporation rate using the following formula.

  Height of pad in feet x Length of pad in feet x Air Speed feet per minute = A
  Outdoor temperature in Fahrenheit – Indoor temperature in Fahrenheit = B
  A x B = C
  C/ 500,000 = gallons per minute evaporated

  For example:
  You have a stacked system that is 10' tall and 50' long, and an air speed that is 350' per minute. You are showing an outside temperature of 90°F and an inside temperature of 70°F.
  10 x 50 x 350 = 175,000
  90 – 70 = 20
  175,000 x 20 = 3,500,000
  3,500,000/500,000 = 7 gallons per minute evaporated
- Using the gallons per minute evaporated, consult the information on water hardness below, and adjust the amount of discharge required to maintain a healthy system.
  - Extremely hard water bleed rate should equal evaporative rate
  - Slightly hard water bleed rate should be 1/4-1/2 of the evaporation rate
  - Soft water with little or no dissolved solids bleed rate can be 1/10 to 1/4 of the evaporative rate
- Observe the clarity of your trough water and mineral deposits on the filter and pads and further adjust bleed valve as necessary.

Extending Pad Life

3 things that shorten the life of your pads are scale, algae and high pH.

- Scale on your pads comes from calcified minerals and other impurities carried in the water. Over a period of time, scale builds up into a hard, crusty material that cakes the surface of the pads, reducing porosity and therefore reducing performance.

  Short, frequent pump cycles cause pads to accumulate layers of scale more quickly than longer, less frequent cycles.

- Algae will reduce porosity, breakdown the pad fibers, and cause an environment for bacteria growth.

  Schedule a time once every 24 hours to run fans, but not the pump, to allow pads to completely dry. Its recommended to do this in the early evening before temperatures drop and humidity increases.

  If possible, create shade for pads and water and reduce contact by contaminants like dust, fertilizer, phosphates, etc., which provide nutrients for algae growth.

  Visually monitor your pads and system for algae growth. If necessary, treat system with commercial products containing one of the following chemicals:
  - Sodium hydrogen sulfate
  - Alkyl dimethyl benxyl ammonium chloride
  - Quaternary amine

  Follow chemical product instructions to avoid injury and/or pad damage.

High pH water will quickly weaken the pad materials, causing sagging and slumping. Optimal pH is 7 with a maintenance range of 6-9.

Daily

- Visually inspect pads for dry streaks and clogged holes
- Dry pads completely every day

Weekly

- Check pads for scale and algae
- Check water flow rate and adjust if necessary
- Check pump and clean any debris from pump inlet
- Inspect and flush spindown filter

Quarterly/End of Season/Winterizing

Clean/disinfect and flush entire system. Thoroughly drain system and remove rubber drain cap if moisture from weather is able to drain into system during off time. Fully open ALL ball valves and remove filter and pump. Clean and flush pump and store where it will not freeze.

If you plan on covering the system, pads must be COMPLETELY dry to avoid mold and mildew growth.

To bring system back to use after winterizing, follow ALL procedures under Initial Start Up.