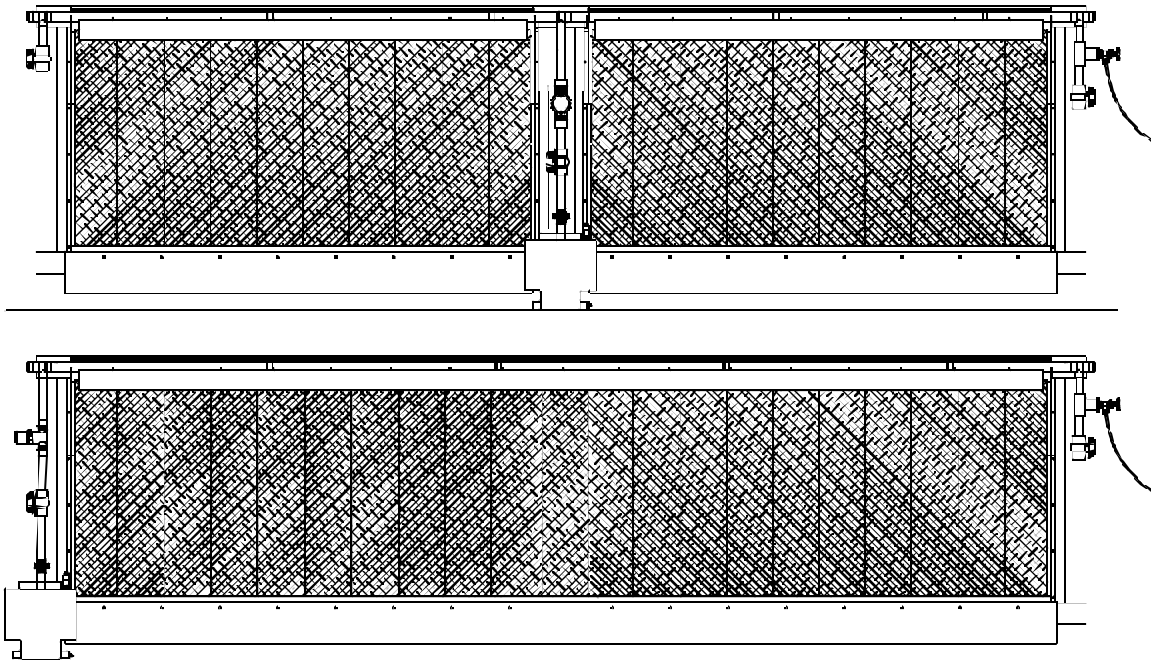


# **Turbo-Cool™ Stand-Off With Open Top 6" Recirculating Evaporative Cooling Installation & Operator's Instruction Manual**



Mv1669-018 04/01

## Chore-Time Warranty

**Chore-Time Equipment** ("Chore-Time") warrants each new Chore-Time product manufactured by it to be free from defects in material or workmanship for one year from and after the date of initial installation by or for the original purchaser. If such a defect is found by the Manufacturer to exist within the one-year period, the Manufacturer will, at its option, (a) repair or replace such product free of charge, F.O.B. the factory of manufacture, or (b) refund to the original purchaser the original purchase price, in lieu of such repair or replacement. Labor costs associated with the replacement or repair of the product are not covered by the Manufacturer.

### Conditions and Limitations

1. The product must be installed by and operated in accordance with the instructions published by the **Manufacturer or Warranty will be void.**
2. Warranty is void if **all components** of the system are not original equipment supplied by the **Manufacturer.**
3. This product must be purchased from and installed by an authorized distributor or certified representative thereof or the Warranty will be void.
4. Malfunctions or failure resulting from misuse, abuse, negligence, alteration, accident, or lack of proper maintenance shall not be considered defects under the Warranty.
5. This Warranty applies only to systems for the care of poultry and livestock. Other applications in industry or commerce are not covered by this Warranty.

The **Manufacturer** shall not be liable for any **Consequential or Special Damage** which any purchaser may suffer or claim to suffer as a result of any defect in the product. "**Consequential**" or "**Special Damages**" as used herein include, but are not limited to, lost or damaged products or goods, costs of transportation, lost sales, lost orders, lost income, increased overhead, labor and incidental costs and operational inefficiencies.

THIS WARRANTY CONSTITUTES THE MANUFACTURER'S ENTIRE AND SOLE WARRANTY AND THIS MANUFACTURER EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, EXPRESS AND IMPLIED WARRANTIES AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSES SOLD AND DESCRIPTION OR QUALITY OF THE PRODUCT FURNISHED HEREUNDER.

Chore-Time Distributors are not authorized to modify or extend the terms and conditions of this Warranty in any manner or to offer or grant any other warranties for Chore-Time products in addition to those terms expressly stated above. An officer of CTB, Inc. must authorize any exceptions to this Warranty in writing. The Manufacturer reserves the right to change models and specifications at any time without notice or obligation to improve previous models.

Effective: **August 2003**

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### Thank You

The employees of Chore-Time Equipment would like to thank you for your recent Chore-Time purchase. If a problem should arise, your Chore-Time distributor can supply the necessary information to help you.

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## General

### Support Information

The Turbo-Cool™ Stand-Off With Open Top 6" Recirculating Evaporative Cooling System is designed to help cool livestock and poultry houses. The system is shipped unassembled. Using this equipment for any other purpose or in a way not within the operating recommendations specified in this manual will void the warranty and may cause personal injury.

This manual is designed to provide installation, operation, and parts listing information. The Table of Contents provides a convenient overview of the information in this manual. The Table of Contents also specifies which pages contain information for the sales personnel, installer, and consumer (end user).

## Safety Information

### **DANGER: Electrical Hazard**

Ground all electrical equipment for safety.

All electrical wiring must be done by a qualified electrician in accordance with local and national electric codes.

Disconnect electrical power before inspecting or servicing equipment unless maintenance instructions specifically state otherwise.

## Technical Information

### Materials and Tools Required for Installation

Socket Wrench · 5/16" 3/8", and 7/16" Sockets · Teflon Tape  
 PVC Cement · Utility Knife · Saw · Tape Measure · Chalk-Line · Caulking  
 · Pressure Treated Lumber for Framing See **Figure 2**

### Required fresh water supply

Outside Air		Water Required in Gallons/Minute Per 100 sq. ft. of Pad * (l/min/m <sup>2</sup> )
Temp in °F (°C)	% Relative Humidity	
110 (43)	10	2.9 (1.18)
110 (43)	20	2.4 (.97)
100 (38)	20	2.2 (0.90)
100 (38)	30	1.8 (0.73)
100 (38)	40	1.5 (0.61)
95 (35)	40	1.4 (0.57)

\*Assumes 80% pad efficiency and 425 fpm (2.2 m/s) air velocity through pad. For air velocities less than 425 fpm, the water requirement should be reduced by the ratio of the actual pad air velocity to 425 fpm. For example: given outside air conditions of 100° F, 40% RH, two 5' x 60' pads/house, and ten 48" fans producing 22,000 cfm @ .10" w.c., the total air flow is 10 x 22,000 = 220,000. The pad area is 2 x 5 x 60 = 600 sq. ft. The air velocity through the pads is the airflow divided by the pad area; 220,000 ÷ 600 = 367 fpm. From the chart 1.5 gpm is required per 100 sq. ft. of pad. Because the air velocity is less than 425 fpm the actual water requirement is 1.5 x 367 ÷ 425 = 1.3 gpm per 100 sq. ft. of pad. The total water required for the house is 1.3 x 600 ÷ 100 = 7.8 gpm.

Supply water pressure: 10 psi minimum for 5 gpm flowrate  
 20 psi minimum for 7 gpm flowrate  
 100 psi maximum

Water Quality: 6 - 9 PH, salt concentration less than 40,000 ppm

Submersible Pump Options								
Pump Part No.	Model	HP	Electrical Specifications					Maximum Pad Length
			Volts	HZ	PH	Start Amps	Run Amps	
44060	6E-CIM	1/3	230	60	1	8.7	5.7	50
42986	9E-CIM	4/10	230	60	1	9	6	60
42987	10E-CIM	1/2	208/240	60	1	20	5	70
42987	10E-CIM	1/2	208/240	50	1	20	5	50

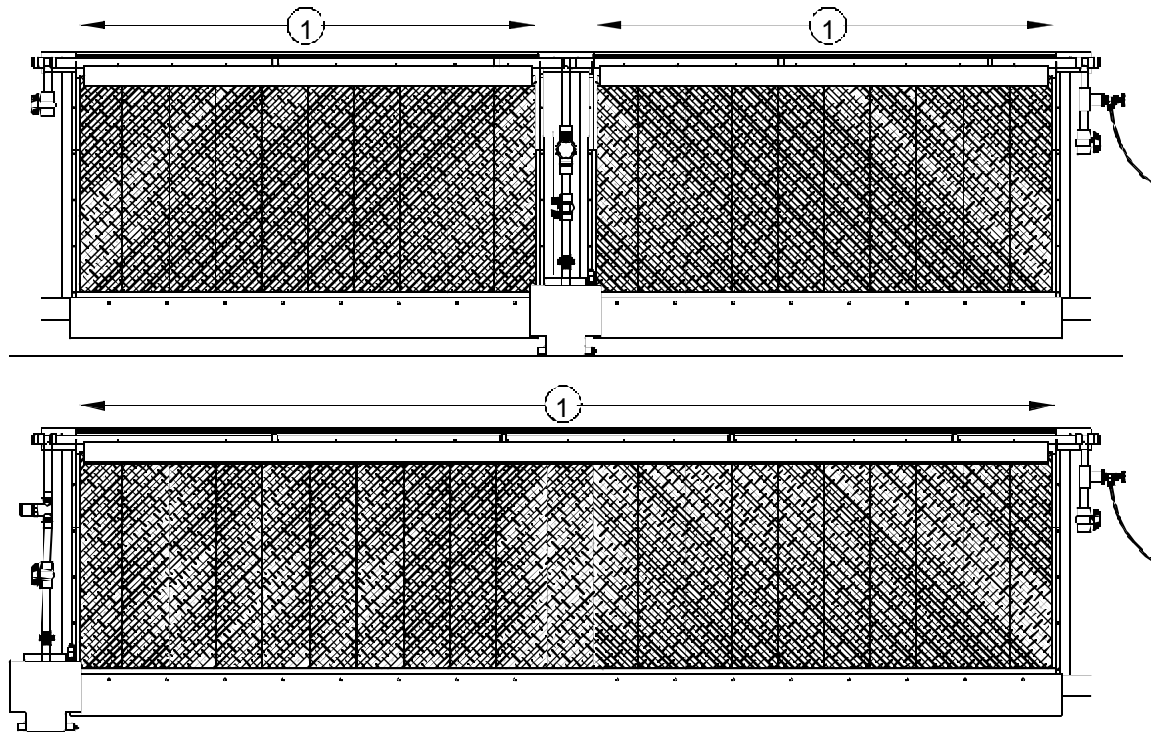
**Important!** Chore-Time Equipment strongly recommends that a good alarm system should be installed in confinement buildings to warn of power failure and high temperature.

Chore-Time Equipment also recommends that an alternate power source be available for confinement buildings in case of power failure.

## Planning Information

### System Layout:

The Sump Assembly may be installed at either end of the system or in the middle.



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Item	Description
1	Maximum length = 70'

**Figure 1. Optional Sump locations**

The maximum length of Cooling Pad on either side of the Sump Assembly is 70', if the cooling system is longer than 70' the Sump must be installed in the middle of the system.

The maximum amount of slope is 1-1/2" [38 mm] per system. The Sump end must be level with, or lower than the rest of the trough.

## Framing Information

**Figure 2** shows the installation of the cooling pad relative to the tunnel curtain and provides information for the Evaporative Cooling System opening with Sump on either end. See **Figure 3** for opening information for Evaporative Cooling System with Sump in the middle

It is recommended to frame the Pad opening using treated lumber.

1. Determine the location of the bottom stringer. See **Figure 2, Item 9**.

**Use Bolts or Lag Screws to secure the Bottom Stringer to the Studs.**

The Lower Stringer must be capable of supporting 35 lbs/ft [45 kg/m] plus 3 lbs/ft [4 kg/m] for each foot of Cooling Pad Height.

**Example:** A 6' Cooling Pad requires a Stringer capable of supporting 35 lbs/ft + (3 lbs/ft x 6') = 53 lbs/ft.

The face of the Lower Stringer must be flat and sloped less than 1/8" from vertical.

2. Determine the location of the top stringer. See **Figure 2, Item 8**. The distance between the top and bottom stringers should be approximately the height of the Evaporative Cooling Pads minus 3/4" [19 mm].

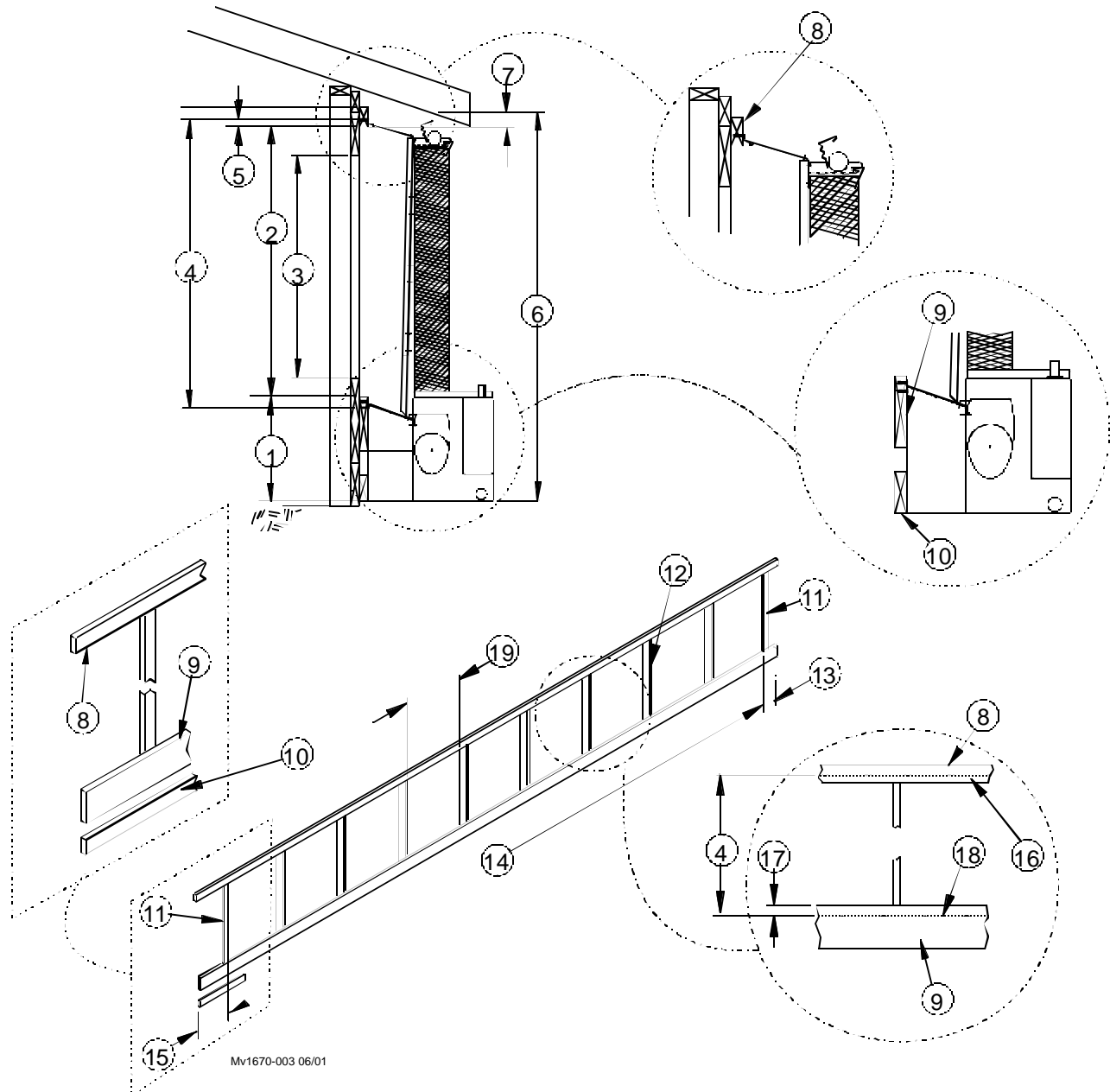
**Example:** For a 60" [1524 mm] tall Evaporative Cooling Pad the distance between the stringers would be 60" [1524 mm] - 3/4" [19 mm] = 59-1/4" [1505 mm].

**Note:** Both the Top and Bottom Stringer should be Level.

3. Snap a Chalk-Line on the lower stringer at the locations specified in **Figure 2, Item 17**. This Chalk-Line will determine the location of the lag screws for the Bottom Covers.
4. Snap a Chalk-Line on the top stringer at the locations specified in **Figure 2**. This Chalk-Line will determine the location of the End Panels, and Top Covers.
5. A 2 x 4 (**Figure 2, Item 10**) is required beneath the Bottom Stringer for mounting the Sump Support Brackets.



## Framing Diagrams for Systems with Sump at the End.

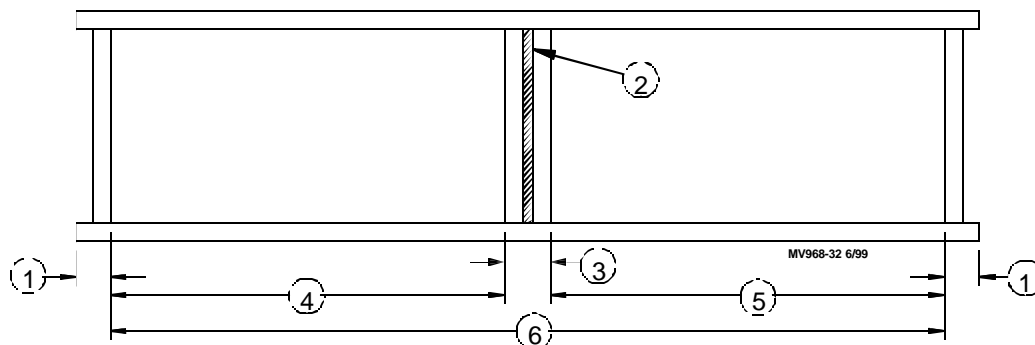


Item	Description
1	18.3" [465 mm]
2	Pad Height minus .75" [19 mm]
3	Pad height minus 12" [305 mm] Minimum
4	Pad height plus 2.5" [64 mm]
5	1.25" [32 mm]
6	Minimum Clearance (Pad height +20" [508 mm])
7	2.5" [64 mm] Minimum
8	2 x 4 Top Stringer
9	2 x 10 Bottom Stringer
10	Sump Bottom Support Stringer

Item	Description
11	End Framing
12	Wall Studs
13	6" [152 mm] for Trough End Insert
14	Width of Pad Bank
15	19" [482 mm] for Sump Assembly
16	Top Stringer Chalk-Line
17	2" [51 mm]
18	Bottom Stringer Chalk-Line
19	60" [1.524 m] Minimum Stud Spacing

Figure 2. Framing overview diagram (Sump at either end)

## Framing for System with Sump in the Middle



Item	Description
1	6" [152.4 mm] Minimum Clearance for Trough End Insert
2	Cover this opening
3	18" [458 mm]
4	1/2 Total System Length rounded to nearest 5' increment
5	Remainder of Total System Length
6	Total System Length plus 18" [458 mm]

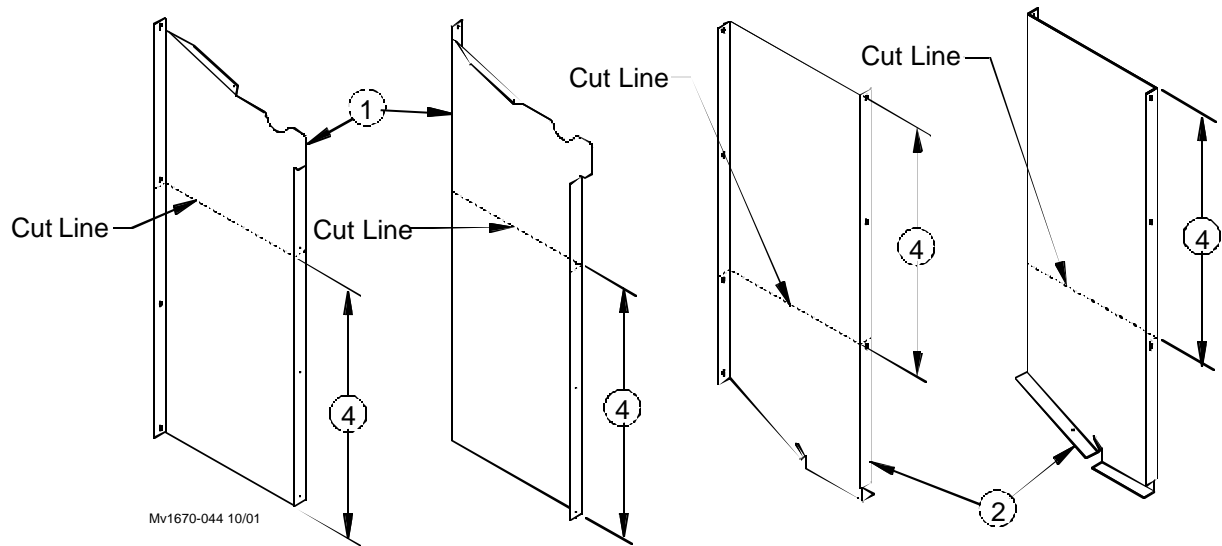
**Note:** See Figure 2 for all other framing information

**Figure 3. Frame opening dimensions for Sump in middle**

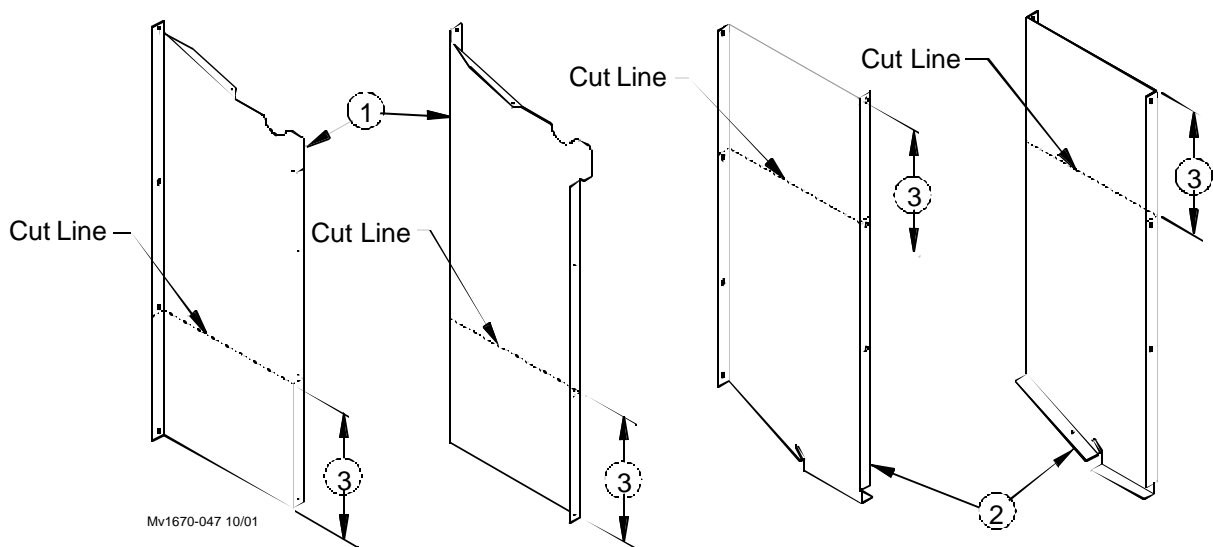
# Evaporative Cooling System Installation

## End Panels at Sump end Installation

If you have a 2 foot, or 3 foot system the End Panels need to be cut down as shown in **Figure 4** below; then assembled as shown in **Figure 5**. For all other systems go straight to **Figure 5** for installation.



Cut Line for 2 foot System



Cut Line for 3 foot System

Item	Description
1	Upper End Panels
2	Lower End Panels
3	12" [304.8 mm]
4	24" [609.6 mm]

Figure 4. Cutting End Panels for 2 and 3 foot systems

End Panels at Sump end Installation Continued.....

First install the End Panels at the Sump end. Install the End Panels opposite the Sump end after installing the Top Covers (next step); this makes the system assemble easier due to small variations in system length.

Install the End Panels flush with the inside of the framed opening. (Figure 5 below)

- 1. Locate the top mounting hole (in the flange of the Upper End Panel) on the Chalk-Line (Figure 5). Start a 1/4 x 1-1/2" Lag Screw in the Top hole but do not tighten it down completely at this time.
- 2. Place the Lower End Panel on the outside of the Upper End Panel and align the holes in the End Panel mounting flanges so the bottom of the Lower End Panel is just above the Bottom Stringer. Use a level to vertically align the End Panels. Use 1/4 x 1-1/2 Lag Screws to attach the End Panels to the End Frame.
- 3. Join the front flanges of the End Panels together with #10 x 1/2 Screws.

**Note: Careful tightening the #10 x 1/2 Screws; They strip out easily.**

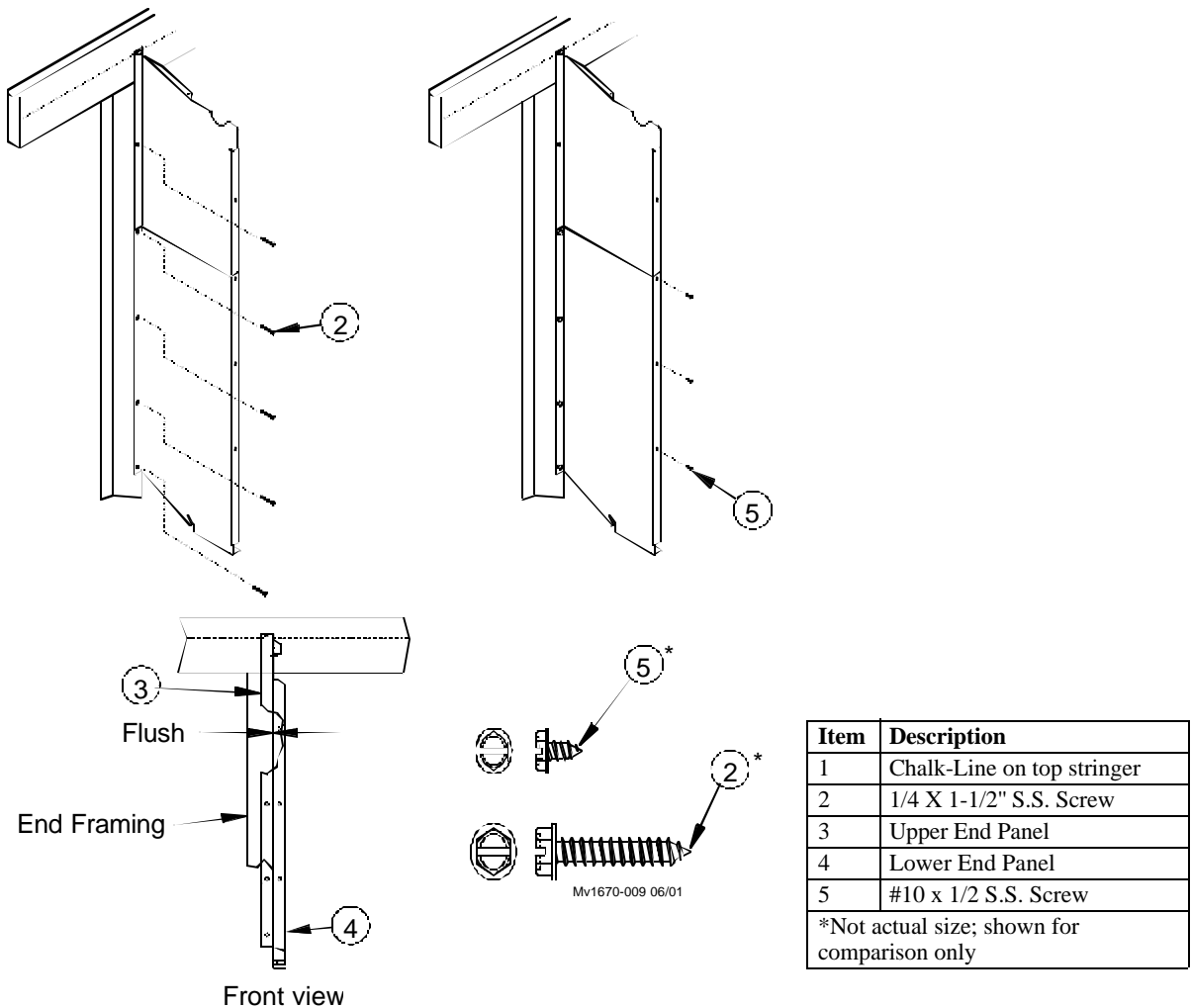
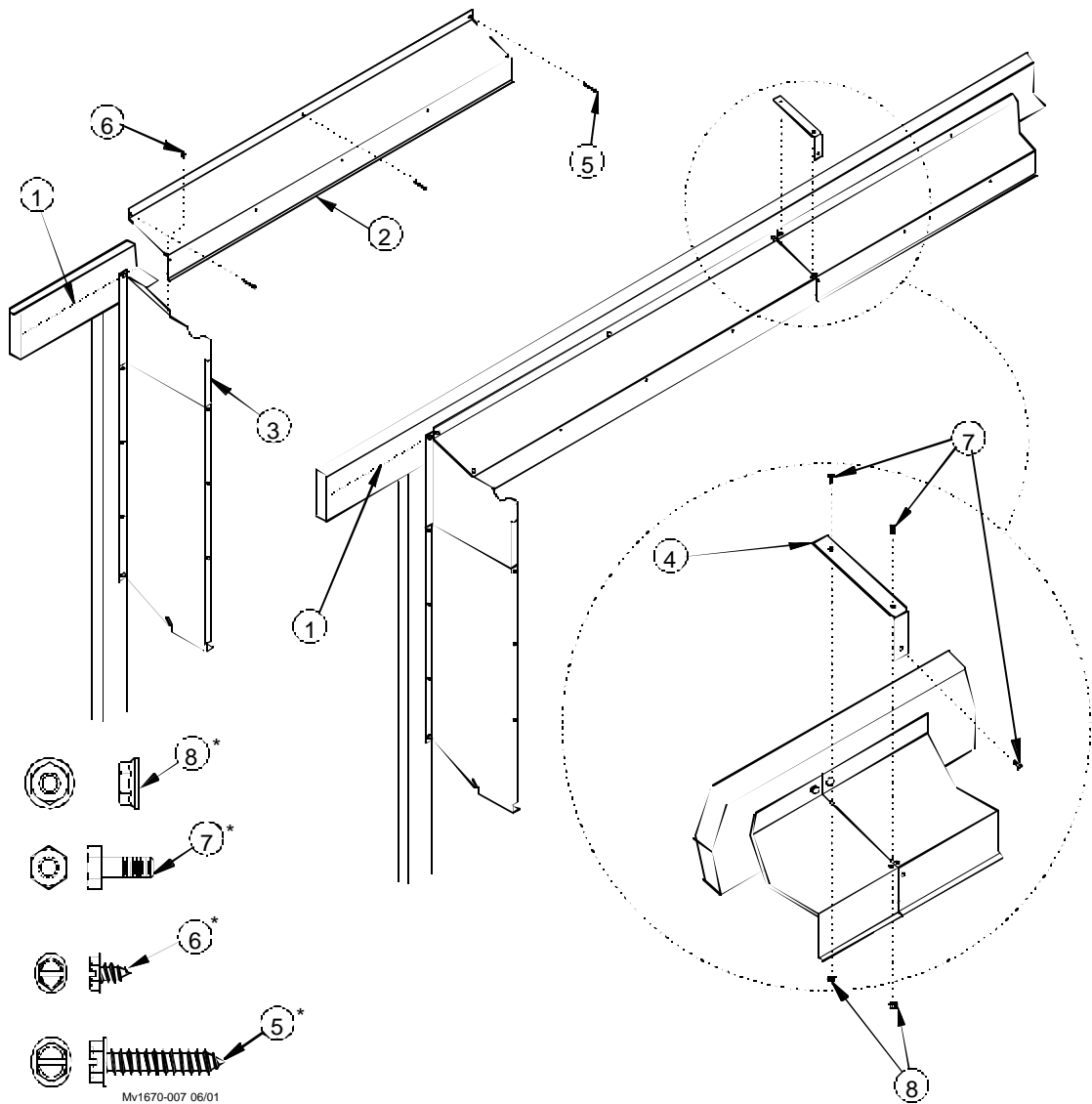


Figure 5. End Panel Installation

Top Cover Installation

Align the holes in the first Top Cover with the Upper End Panel (See Figure 6). The Flange in the Top Cover should be on top of the End Panel for water shed. Attach the Top Cover to the End Panel with a #10 x 1/2 Screw as shown in Figure 6. Lining up the holes in the Top Cover with the Chalk-Line Fasten it to the Top Stringer with 1/4 x 1-1/2 Lag Screws. (See Figure 6) Mount the remaining Top Covers Butted end to end. Bend the Top Cover Couplers to match the bend in the Top Covers and cover the joint between them and fasten them with 1/4-20 Bolts and 1/4-20 Flange Nuts as shown in Figure 6 below.

Once all the Top Covers are fastened, install the second set of End Panels.



Item	Description
1	Top Stringer Chalk-Line
2	Top Cover
3	Upper End Panel
4	Top Cover Coupler
*Not actual size; shown for comparison only	

Item	Description
5	1/4 x 1-1/2 Lag Screw
6	#10 x 1/2 Screw
7	1/4-20 x 5/8 Bolt
8	1/4-20 Flange Nut

Figure 6. Top Cover Installation

Stand-Off Support Bracket Installation

Mark the locations for the Stand-Off Support Brackets beginning at the Sump end.

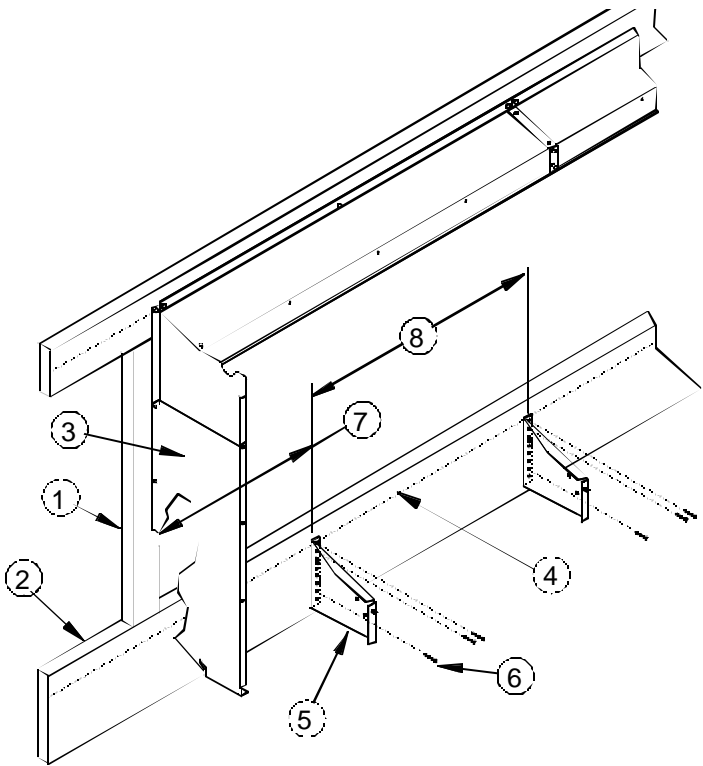
For a system with the Sump to the right of the Trough; mark a line for the first Stand-Off Support Bracket on the Chalk-Line 11-1/2" (292 mm) from the inside of the End Panel (See Figure 7B).

For a system with the Sump left of the Trough; mark a line for the first Stand-Off Support Bracket 9-1/2" (241 mm) from the inside of the End Panel (See Figure 7A).

Space the remaining Stand-Off Support Brackets every 20" (Figure 7A, Item 8). It is very critical to properly space the Brackets. If in doubt, use the Trough as a template by laying the Trough against the Stringer and making a mark on the Chalk-line at every hole in the Trough.

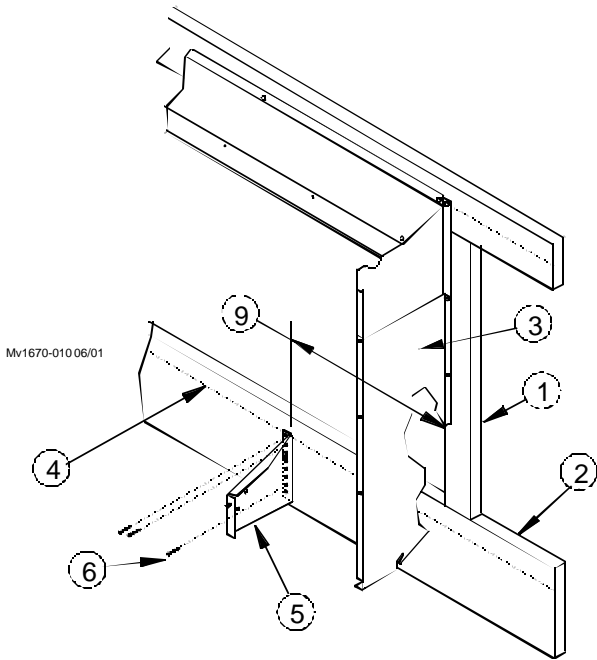
Fasten the Stand-Off Support Brackets with 1/4 x 1-1/2 Lag Screws placing the Top hole on the marks on the Chalk-line. Use a level to check that each Bracket is vertical and then use two more 1/4 x 1-1/2 Lag Screws to attach them to the Bottom Stringer, one screw near the top of the Bracket and one near the bottom.

Check that the Studs on the Stand-Off Support Brackets are aligned within 1/4". Place shims between the Stand-Off Support Brackets and the Bottom Stringer if out of alignment.



Item	Description
1	End Framing
2	Bottom Stringer
3	End Panel
4	Chalk-Line

Figure 7A. Stand-Off Support Brackets Installation; System with Sump (Left) of Trough

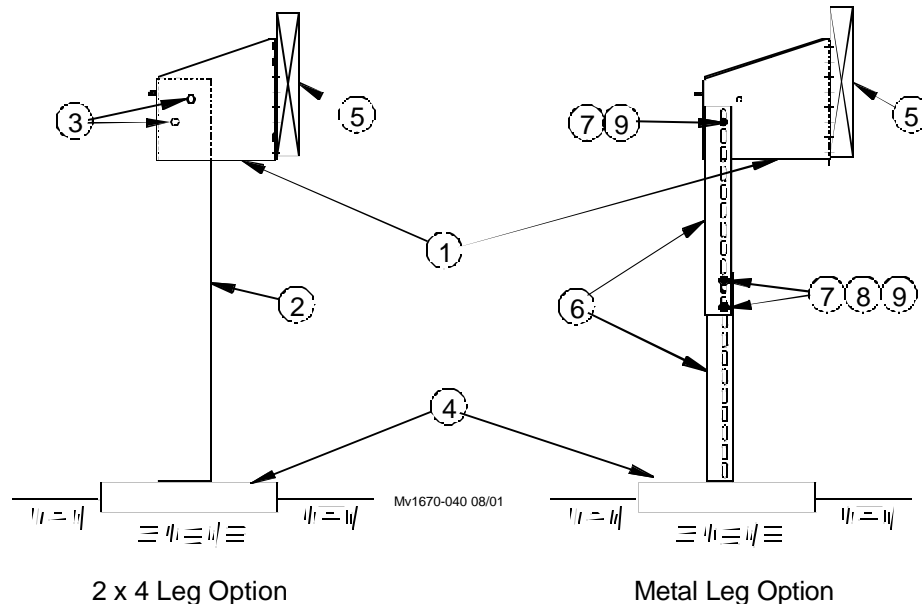


Item	Description
5	First Stand-Off Support Bracket
6	1/4 x 1-1/2 Lag Bolt
7	9-1/2" [241 mm]
8	20" [508 mm]
9	11-1/2" [292 mm]

Figure 7B. Stand-Off Support Brackets Installation; System with Sump (Right) of Trough

## Stand-Off Support Bracket Legs (Optional)

To provide extra support for the Stand-Off system Support Legs can be attached to the Stand-Off Support Brackets. We offer a kit (46917-XX) that includes Metal Legs and hardware or you can use 2 x 4's and your own hardware (See **Figure 8 below**). A solid base should be placed on the ground to support the legs. Use two 1/4 x 1-1/2 Lag Screws to attach the legs to the Stand-Off Support Bracket. (**Figure 8**)



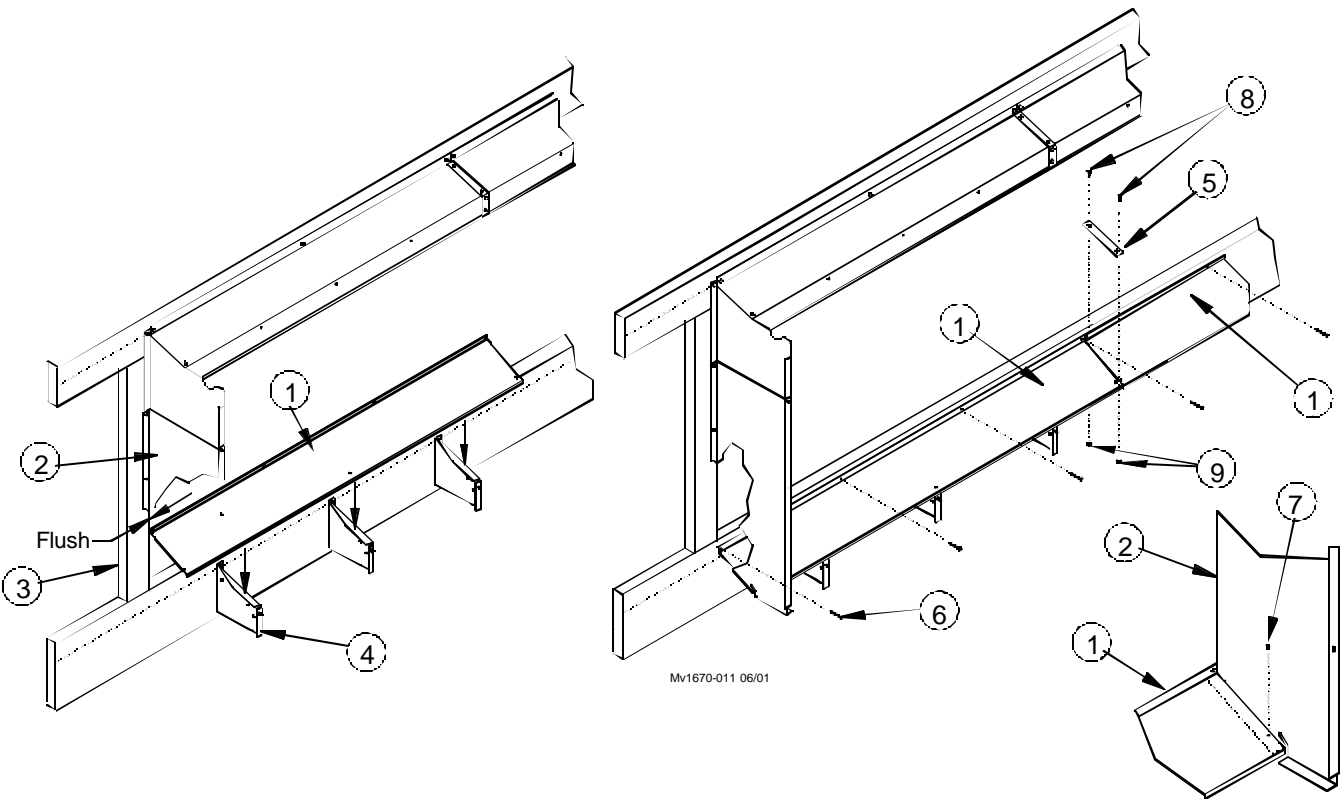
Item	Description
1	Stand-Off Support Bracket
2	2 x 4 Treated Stand-Off Support Leg
3	1/4 x 1-1/2 Lag Bolt
4	Solid Base
5	Bottom Stringer
6	Metal Stand-Off Support Legs
7	1/4-20 x .5 Bolt
8	1/4 Washer
9	1/4 Flange Serrated Nut

**Figure 8. Stand-Off Support Bracket Legs**

### Installing the Bottom Covers

Start installing the Bottom Covers (**Figure 9, Item 1**) at the Sump end. The first Cover should be against the End Panel and rest on top of the Stand-Off Support Brackets as shown in **Figure 9**. Secure the Bottom Cover to the Bottom Stringer with 1/4 x 1-1/2 Lag Screws as shown.

Install the remaining Bottom Covers butted end to end as shown in **Figure 9**. Cover the joints between the Bottom Covers with Bottom Cover Couplers (**Figure 9, Item 5**) and fasten the Couplers to the Covers with 1/4-20 x 5/8 Bolts and Flange Nuts as shown. Use a #10 x 1/2 Screw to fasten the End Bottom Covers to the lower end panels at each end (**Figure 9**).



Item	Description
1	Bottom Cover
2	End Panel
3	End Framing
4	Stand-Off Support Bracket

Item	Description
5	Bottom Cover Coupler
6	1/4 x 1-1/2 Lag Bolt
7	#10 x 1/2 Screw
8	1/4-20x 5/8 Bolt
9	1/4-20 Flange Nut

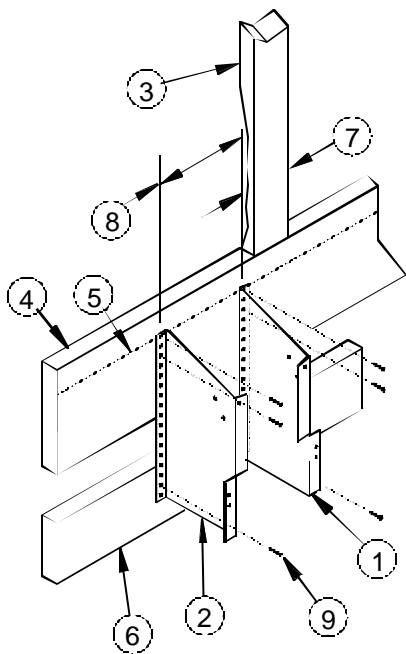
Figure 9. Bottom Cover Installation



**Note:** If installing a large tank, refer to Chore-Time Instruction MV1723 (24" Trough Plumbing Kit).

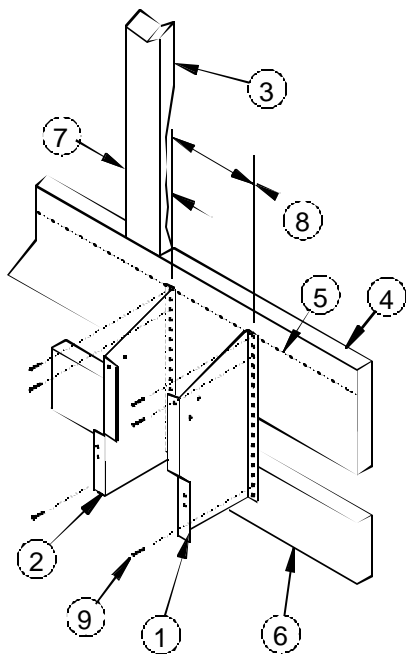
**Installing Sump Support Brackets**

Locate the top mounting hole in the first Sump Support Bracket 4.75" (121 mm) from the inside of the framed opening and on the Chalk-Line as shown in **Figure 10**. below. Attach the Bracket to the Bottom Stringer with a 1/4 x 1-1/2 Lag Screw. Level the Bottom Bracket and put a second Lag Screw in the second or third hole down, and also one in a bottom hole attaching it to the Sump Bottom Support Stringer as shown in **Figure 10** below. Attach the second Sump Support Bracket the same way 8.5" (216 mm) away as shown in **Figure 10**. Note the **(Left)** and **(Right)** Sump Support orientation shown below in **Figure 10**.



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**Sump Support Bracket Installation;**



**Sump Support Bracket Installation;  
Sump (Right) of Trough**

Item	Description
1	Right Sump Support Bracket
2	Left Sump Support Bracket
3	End Framing
4	Bottom Stringer

Item	Description
5	Chalk-Line
6	Sump Bottom Support Stringer
7	4.75" [121 mm]
8	8.5" [216 mm]
9	1/4 x 1-1/2" Lag Screw

**Figure 10. Sump Support Bracket Installation**

### Installing the Sump Support

Fasten the Sump Support to the Sump Brackets with 1/4 x 1/2" Bolts and Flange Nuts as shown in **Figure 11** below..

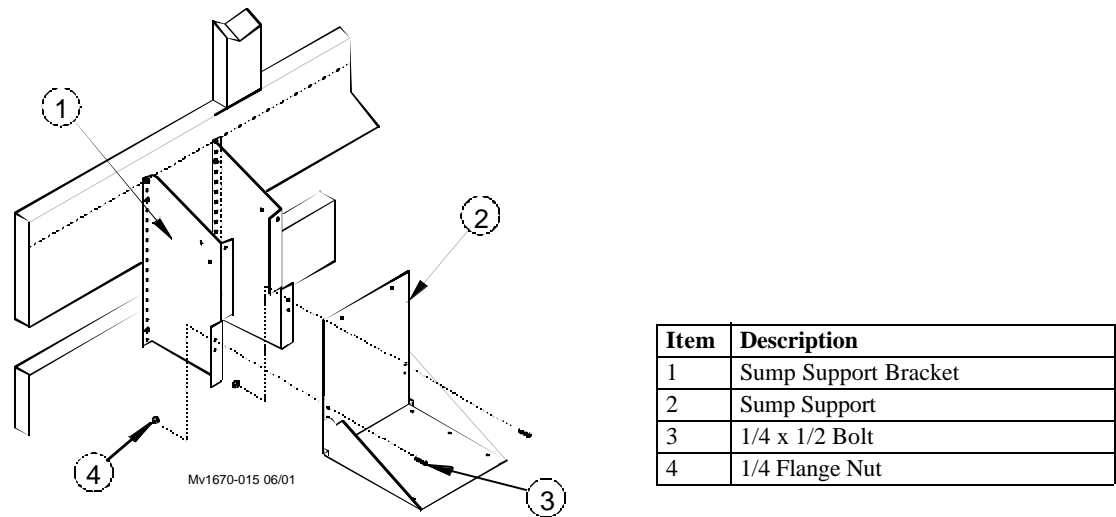


Figure 11. Sump Support Installation

### Sump Preparation

Determine which side of the Sump will need to be modified before installation. If the Sump is to be installed to the right of the Trough, the left side of the Sump will need to be cut at the indicated cut line. If the Sump is to be installed to the left of the Trough, the right side of the Sump will need to be cut at the indicated cut line. To install the Sump in the middle of the system, cut both 1/2" Sump End Caps off the Sump. A short hand saw works nicely for this. **See Figure 12.**

Decide which side of the Sump will be used for the drain and cut off that end (**Figure 12, Item 5**). **Make cut for one drain only.** Install and lightly tighten the 1-1/2" Rubber Pipe Cap.

Decide which side of the Sump to install the Overflow Fitting. Using the dimples on either side of the Sump as a guide, drill a 3/4" hole and thread the hole with a 1/2-14 NPT tap. Install the 1/2" PVC Overflow Fitting in the hole. 1/2" PVC pipe can be attached to this fitting to channel overflow water to a drain.

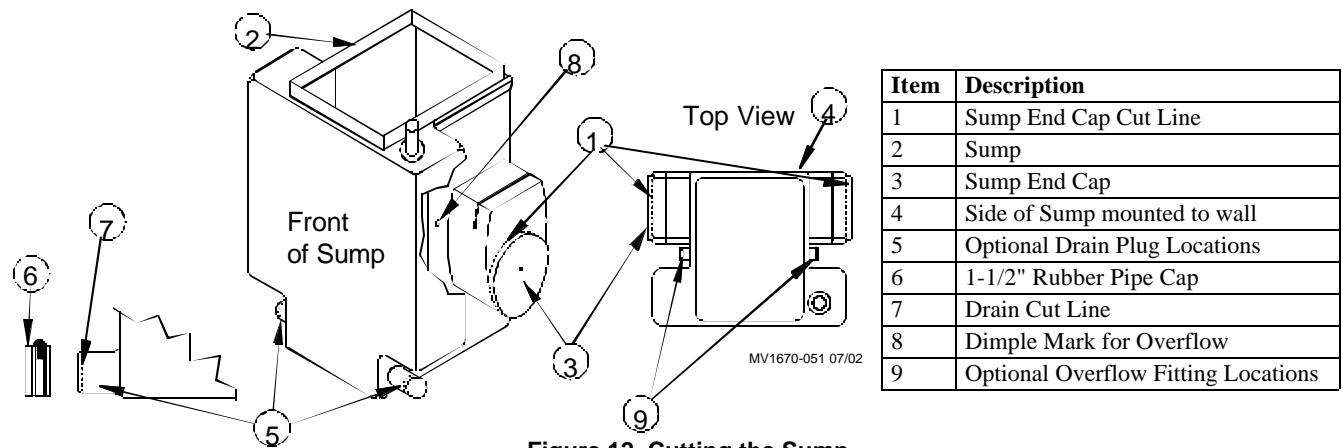
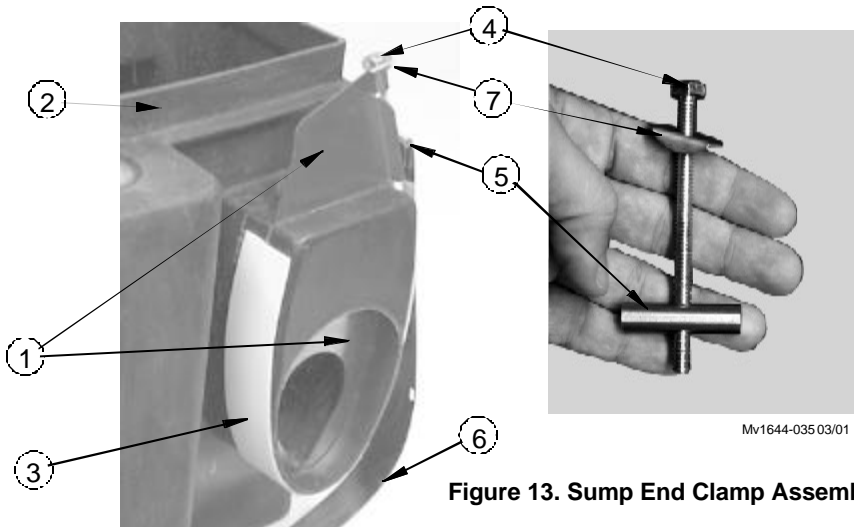


Figure 12. Cutting the Sump

Sump End Clamp Assembly

Place the 2" x 24" self adhesive tape around the Sump End as shown in **Figure 13** below. Slide the Sump-End (The one with the hole in it) Insert into place. Note: the direction of the Insert bolt for easier access later with a Screw gun. Assemble the Clamp with the Insert as shown leaving the Clamp Strap hang loose. The Strap will be used to attach the trough later in the assembly process. (See **Figure 13** below).

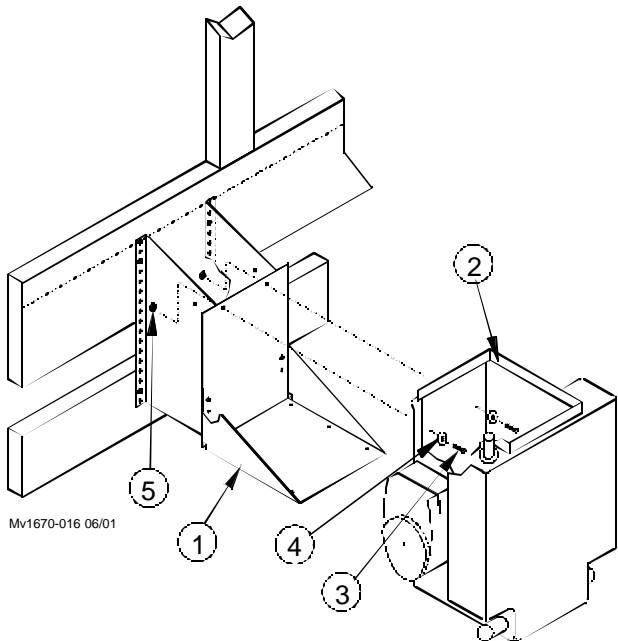


Item	Description
1	Sump End Insert
2	Sump
3	Self Adhesive foam tape
4	1/4" x 3-1/2" Clamp Bolt
5	1-1/2" Clamp Nut
6	Clamp Strap
7	Insert Washer

Figure 13. Sump End Clamp Assembly

Attaching the Sump

Align the two 1/4" holes in the rear of the Sump with the top two 1/4" holes in the Sump Support Assembly as shown in **Figure 14** below. Attach the Sump and Sump Support to the Sump Support Brackets with two 1/4 x 1/2 Bolts, Fender Washers, and Flange Nuts.

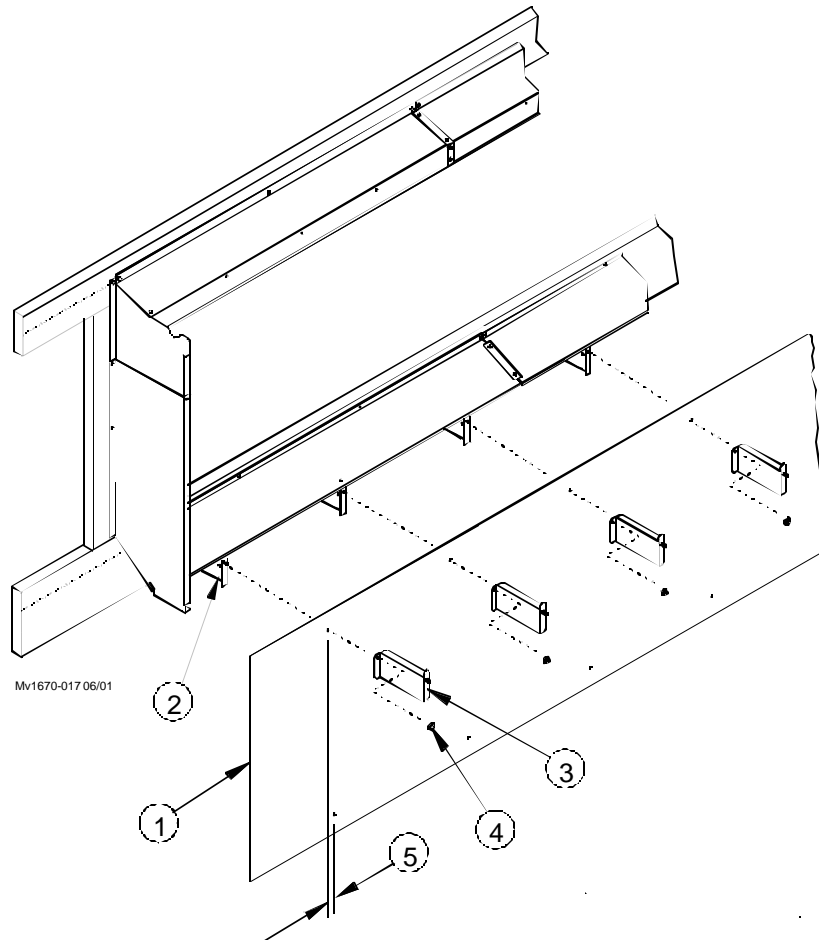


Item	Description
1	Sump Support Assembly
2	Sump
3	1/4 x 1/2 Bolt
4	Fender Washer
5	Flange Nut

Figure 14. Attaching the Sump to the Sump Bracket

## Trough Installation

1. Orient the Trough so that the Pattern of holes on top are offset to the left of the holes across the bottom (See **Figure 15, Item 5**).
2. Hang the Trough from the Studs in the Stand-Off Support Brackets beginning at the Sump End. The end of the Trough material should be against the Sump. Slide the Trough Support Brackets onto the Studs in the Stand-Off Support Brackets and while holding the Trough Support level, fasten with the 1/4 Flange Nuts (**Figure 15, Item 4**).



Item	Description
1	Trough Material
2	Stand-Off Support Brackets
3	Trough Support
4	Flange Nut
5	Top Hole Offset to left of Bottom Hole

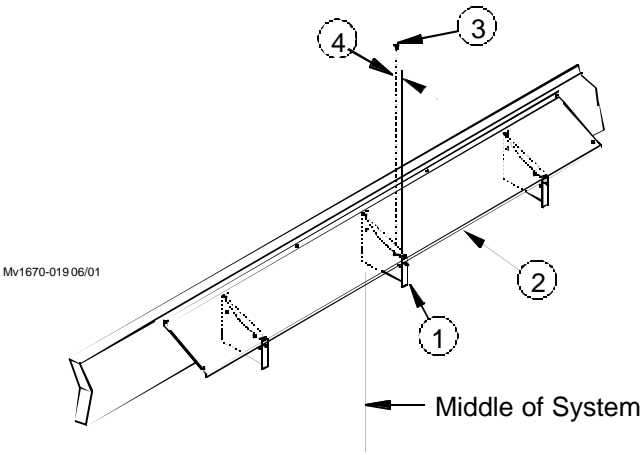
**Figure 15. Installing the Trough**

Trough Installation Continued.....

Starting at the middle of the system, use a #10 x 1/2 Self Drilling Screw to attach the Bottom Cover to the upper flange on a Stand-Off Support Bracket (**Figure 16**). The Screw should be about 1-1/2" from the front edge of the Bottom Cover. Note there are no predrilled holes for this screw.

Pull on the Trough Support Bracket to remove most of the slack from the Trough Material and use a #10 x 1/2 self drilling Screw to fasten the adjacent Stand-Off Bracket to the Bottom Cover as was done in the previous step. (**Figure 17**)

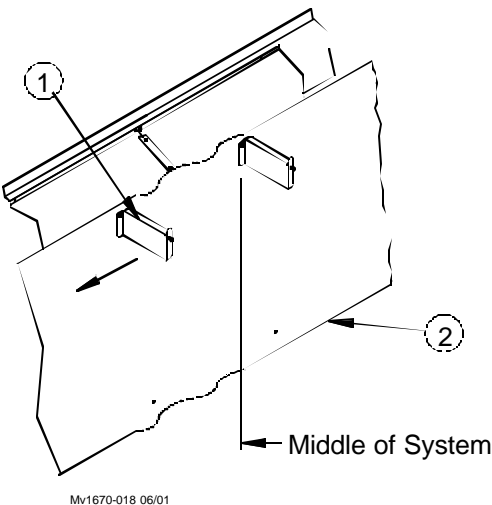
Repeat this process at each successive Stand-Off Support Bracket.



(Trough and Trough Support Brackets not shown here for Clarity)

Item	Description
1	Stand-Off Support Brackets
2	Bottom Cover
3	#10 x 1/2 Screw
4	1-1/2" [38 mm]

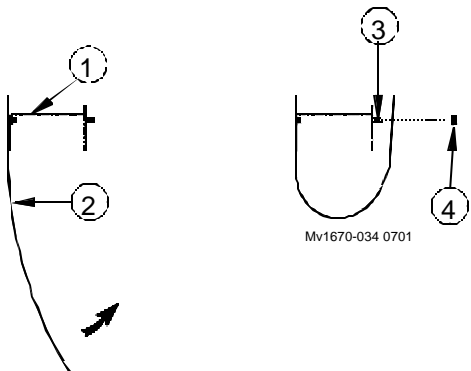
Figure 16. Fastening Bottom Covers to Trough Supports



Item	Description
1	Trough Support Bracket
2	Trough Material

Figure 17. Slack in Trough

Form the Trough into a "U" shape and hang the Trough material on the Trough Hanger Studs and attach with 1/4 x 1/2 Flange Nuts as shown in **Figure 18**. Repeat the process for each Trough Support. Wipe the inside of the Trough at each end to remove debris that may prevent sealing.

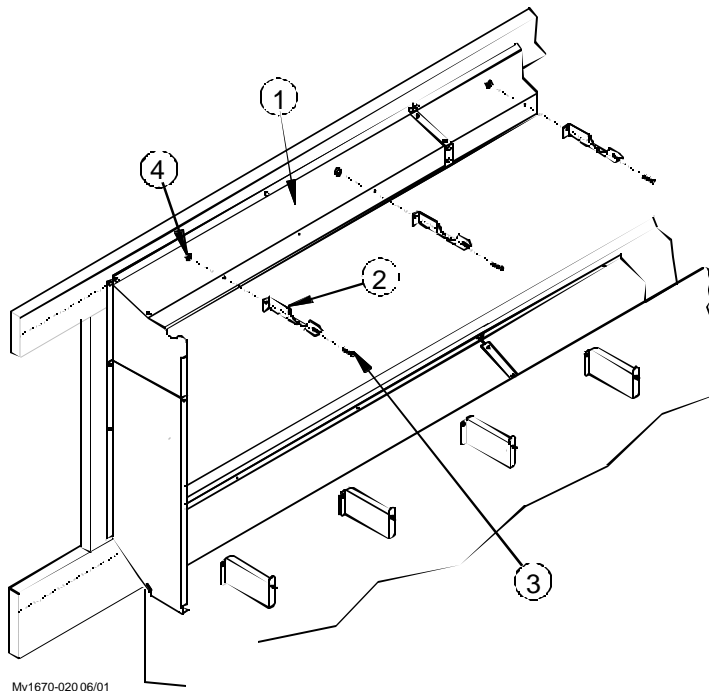


Item	Description
1	Trough Support Bracket
2	Trough Material
3	Trough Support Bracket Stud
4	1/4 Flange Nut

Figure 18. Forming the Trough

## Installing the Pipe Supports

Attach the Pipe Supports to the Top Covers with 1/4 x 1/2 Bolts and Flange Nuts as shown in **Figure 19** below. The Pipe Supports attach to the holes in the end of the Top Covers; the hole in the center of the Top Covers will be used to Install Stand-Off Support Posts in the next step.

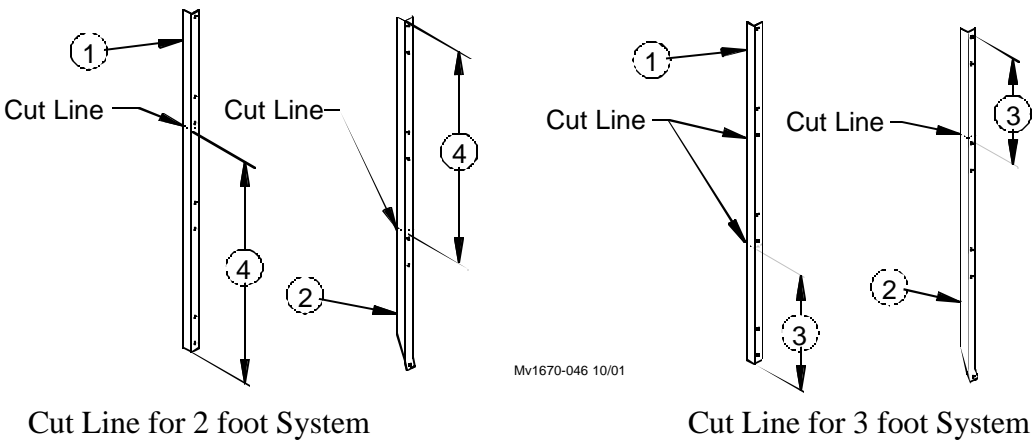


Item	Description
1	Top Cover
2	Pipe Support
3	1/4 x 1/2" Bolt
4	1/4 Flange Nut

**Figure 19. Installing Pipe Supports**

### Installing the Stand-Off Support Posts

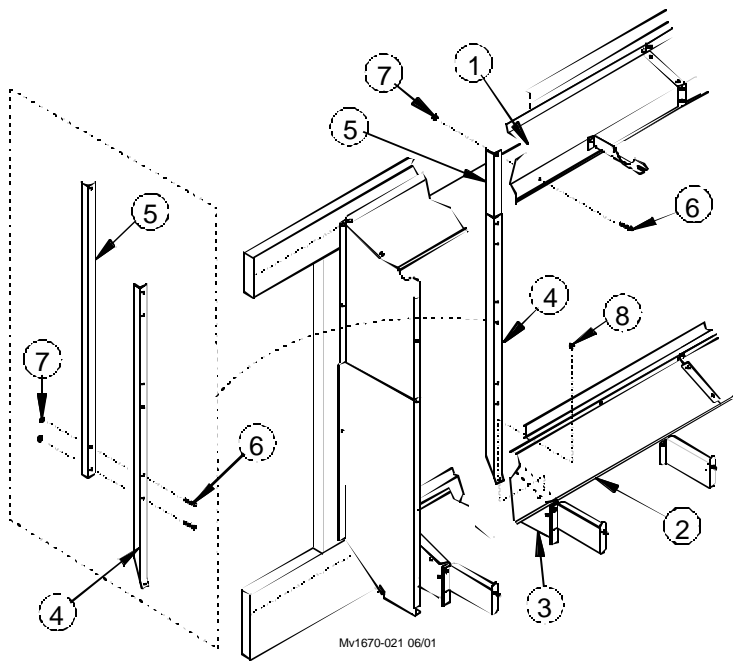
If you have a 2 foot, or 3 foot system the Stand-Off Support Posts need to be cut down as shown in **Figure 20** below and then assembled as shown in **Figure 21**. For all other systems go straight to **Figure 21** for installation.



Item	Description
1	Top Support Post
2	Bottom Support Post
3	12" [304.8 mm]
4	24" [609.6 mm]

Figure 20. Cutting Stand-Off Support Posts for 2 and 3 foot Systems

Fasten the Upper Stand-Off Support Post to the Lower Support Post lining up the appropriate holes depending on the system Height with 1/4 x 1/2 Bolts and Flange Nuts as shown in **Figure 21** below. Then attach the Support Posts to the Center hole in the Top Cover with 1/4 x 1/2 Bolts and Flange Nuts. Finally, using a #10 x 1/2 Self Drilling Screw attach the Lower Stand-Off Support Post to the Bottom Cover using its pilot hole and drilling through the Stand-Off Support Bracket (**Figure 21**). Install the remaining Support Posts down the entire system the same way.

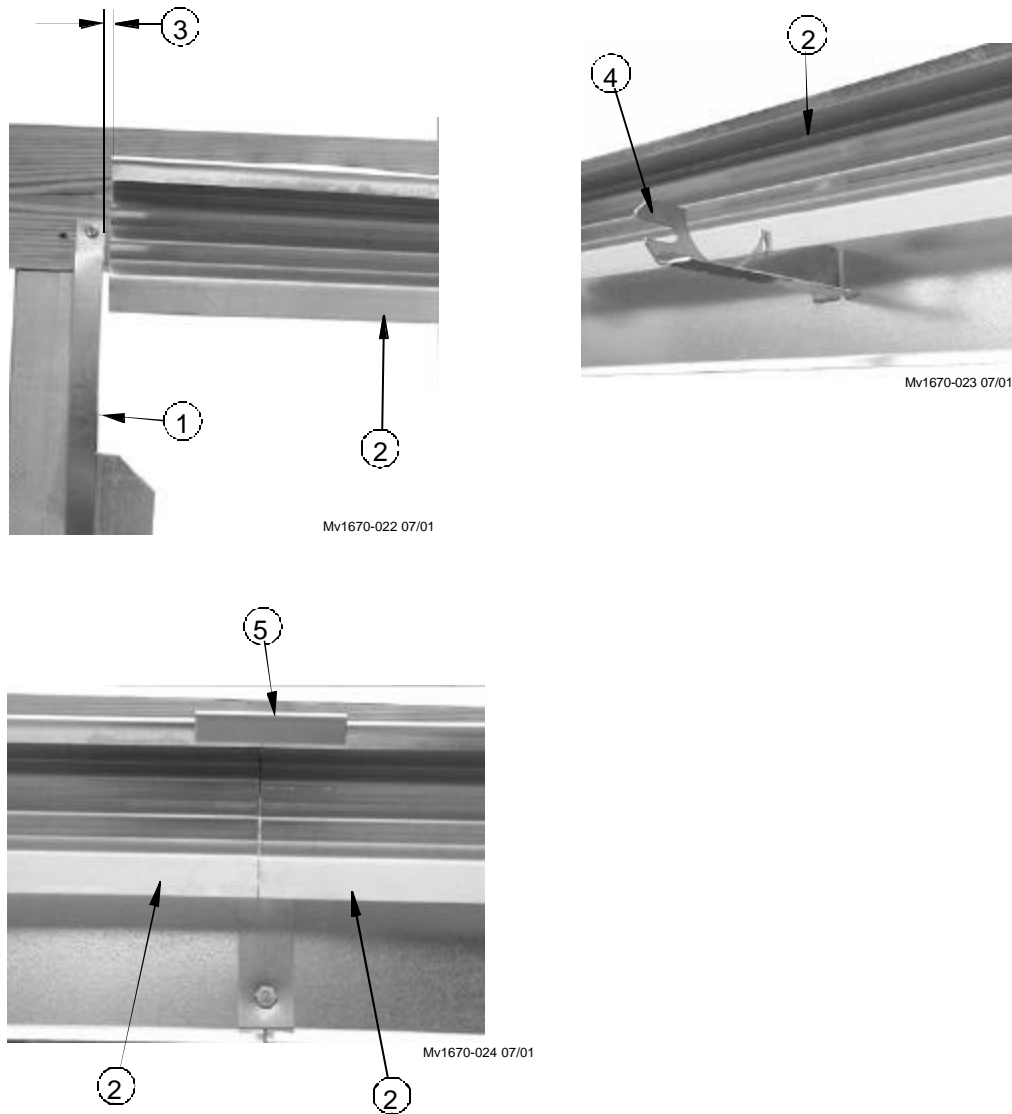


Item	Description
1	Top Cover
2	Bottom Cover
3	Stand-Off Support Bracket
4	Lower Stand-Off Support Post
5	Upper Stand-Off Support Post
6	1/4 x 1/2 Bolt
7	1/4 Flange Nut
8	#10 x 1/2 Self Tapping Screw

Figure 21. Installing the Stand-Off Support Posts

## Installing Water Deflectors

Slide the first Deflector into place starting at one end leaving a 1/8" gap between it and the End Panel as shown in **Figure 22** below. Butt the remaining Deflectors against one another and join together with Deflector Couplers (**Figure 22, Item 5**). It may be necessary to trim off the end of the last Deflector to leave a 1/8" (3.2 mm) gap between it and the End Panel.



Item	Description
1	End Panel
2	Water Deflector
3	1/8" [3.2 mm]
4	Pipe Support
5	Water Deflector Coupler

**Figure 22. Installing Water Deflectors**



## Distribution Pipe Installation

1. Set the Distribution Pipe on the Pipe Hangers above the Sump end of the Trough.

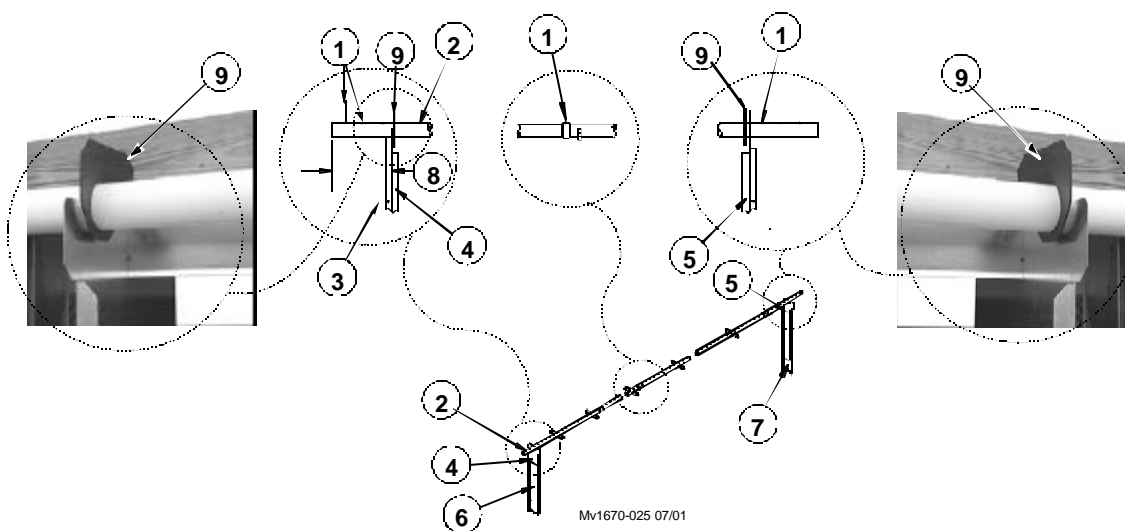
**Note: The belled end must be away from the Sump end. See Figure 23.**

2. Assemble the remaining Distribution Pipes by inserting the straight end of one pipe into the belled end of another. Align a hole in the belled end with the hole in the straight end and join the pipes using a 1/4 x 1/2" Screw through these holes. It is not necessary to glue the distribution pipes together.
3. At the Sump End of the system the Distribution Pipe should extend 8" [20.32 cm] beyond the edge of the End Panel. (See **Figure 23, Item 8**)

The Pipe should extend at least 6" past the opposite End Panel.

4. Install a 1/4 x 1/2" Screw in each spray hole that falls outside the End Panels at either end.
5. Install Distribution Pipe Gasket inside the End Panels at the both ends of the system as shown below in **Figure 23**.

**Note: Some Parts and Detail have been left out of Figure 23. for Clarity.**



Item	Description
1	1/4 x 1/2" S.S. Screw
2	5' Distribution Pipe
3	Framing @ Sump End
4	Upper End Panel (L.H.)
5	Upper End Panel (R.H.)
6	Lower End Panel (L.H.)
7	Lower End Panel (R.H.)
8	8" [20.32 cm] Approximately at Sump end
9	Distribution Pipe Gasket

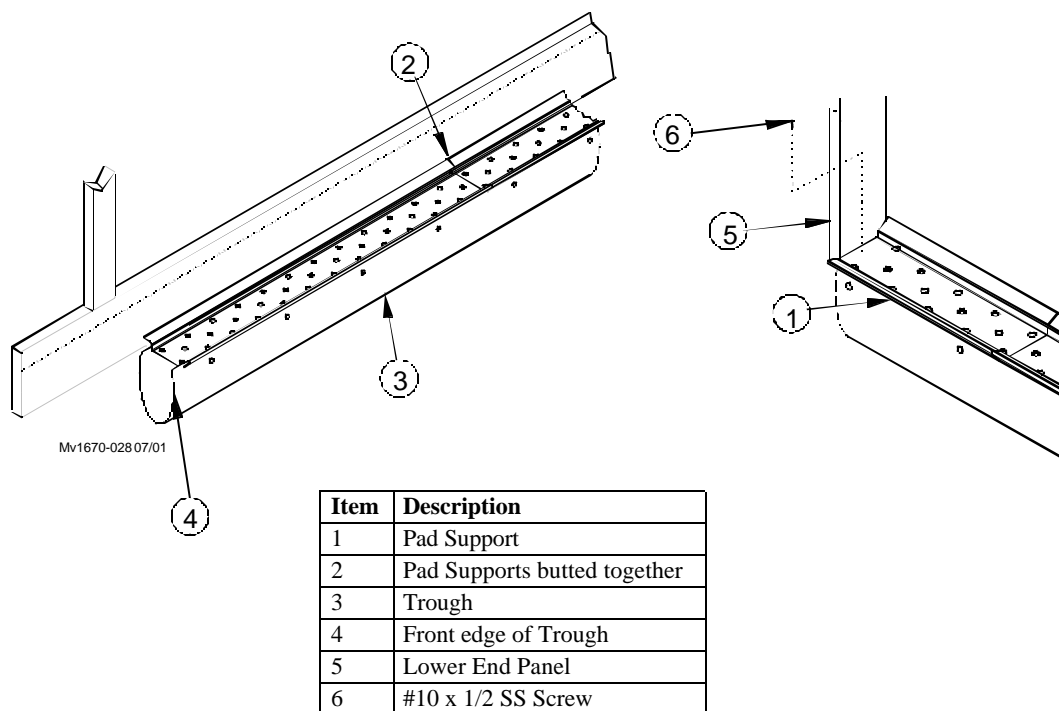
**Figure 23. Distribution Pipe Installation**

## Pad Support Installation

Set the Pad Supports on the Trough Supports, as shown in **Figure 24**. The front edge of the Trough should be captured inside the cavity on the front of the Pad Support.

Butt the Pad Supports end to end, beginning at the Sump End, End Panels. The length of the last Pad Support can be trimmed if it is too long to fit in the remaining space. Attach the Pad Support at either end to the flange in the Lower End Panel with a #10 x 1/2" SS Screw. (See **Figure 24**)

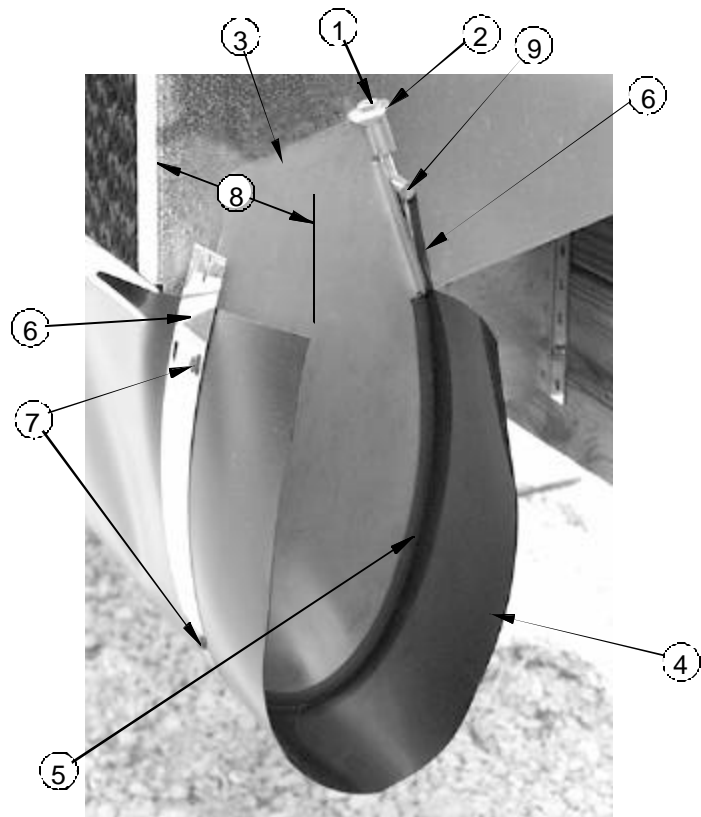
**Note:** Sump components, Bottom Covers and End Panels not shown for clarity.



**Figure 24. Pad Support Installation**

### Trough End Insert Installation

On the Trough end opposite the Sump, cut off the Trough leaving 4"- 6" of Trough extending beyond the End Panel. Assemble the Trough End Insert assembly as shown in **Figure 25** below. Be sure the Insert is centered on the Clamp Strap before tightening the Clamp Bolt. Install two #10 x 1/2" Screws through the Clamp Strap into the Trough as shown in **Figure 25, Item 7**. Be sure the Screws are on the exterior side of the Trough End Insert.



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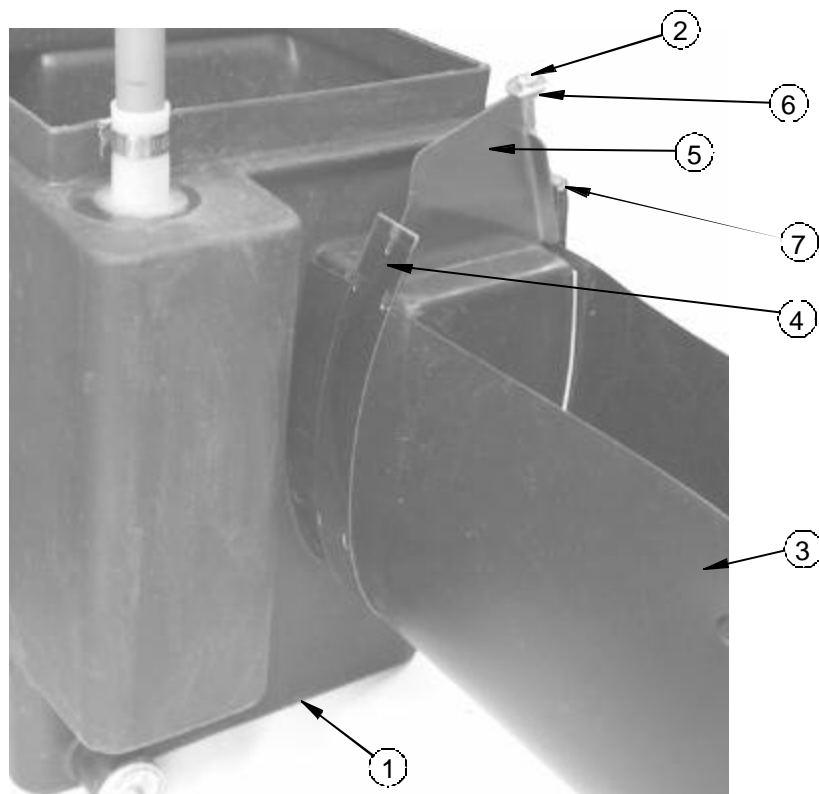
Item	Description
1	1/4" x 3-1/2" Clamp Bolt
2	Insert Washer
3	Trough End Insert
4	Trough
5	1/8" Rubber Edge Trim
6	Clamp Strap
7	#10 x 1/2" Screws
8	4"-6" Trough beyond End Panel
9	1-1/2" Clamp Nut

Figure 25. Trough End Insert Installation

## Attaching the Trough to the Sump

At the Sump end hook the free end of the Clamp Strap to the Sump End Insert and tighten the 1/4" clamp bolt to seal the joint between the Trough and the Sump as shown in **Figure 26** below. There should be no more than 3/4" Clearance between the end of the Sump and the end of the Trough.

**Note:** Figure shown without End Panels for Clarity.

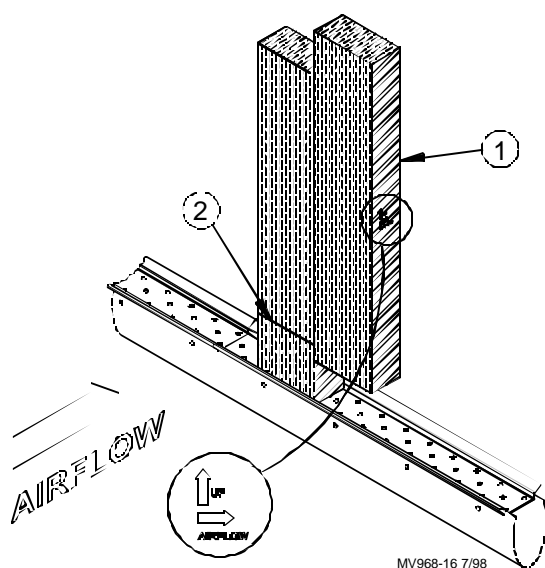


Item	Description
1	Sump
2	1/4" Clamp Bolt
3	Trough
4	Clamp Strap
5	Sump End Insert
6	Insert Washer
7	Clamp Nut

**Figure 26. Sump End Insert Assembly**

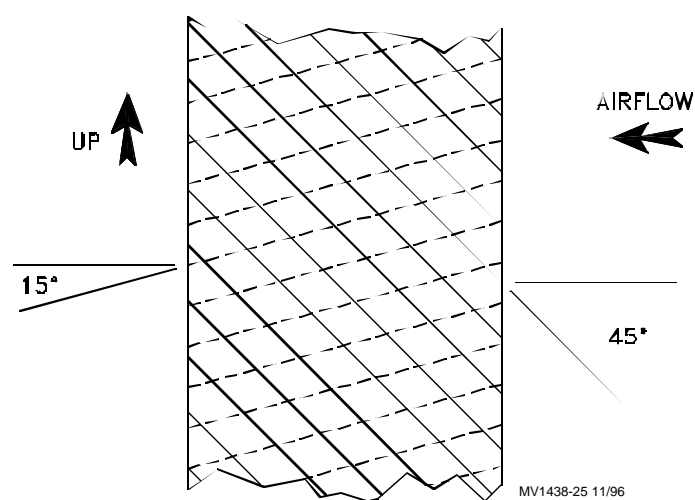
## Evaporative Cooling Pad Installation

- Beginning at one end, set the Evaporative Cooling Pads on the Pad Supports. (See **Figure 27**). The top of the Pads should be against the Top Stringer and directly below the Distribution Pipe.
- Make sure the Pads are properly oriented.
- **MUNTERS and GENERAL SHELTERS Pads:** Refer to the directional arrows on the side of the pads.
- **GLACIER COR Pads:** May have a black stripe which indicates the bottom end of pads and the air inlet side of the pads. If no stripe is present, refer to **Figure 28** to determine the proper pad orientation based on the direction of the pad flutes vs. direction of incoming air flow.
- Make sure the first pad is against the End Panels.
- Push Pads tightly together and keep as vertical as possible.
- It may be necessary to use a hand-saw to trim the last Pad to fit the remaining opening.



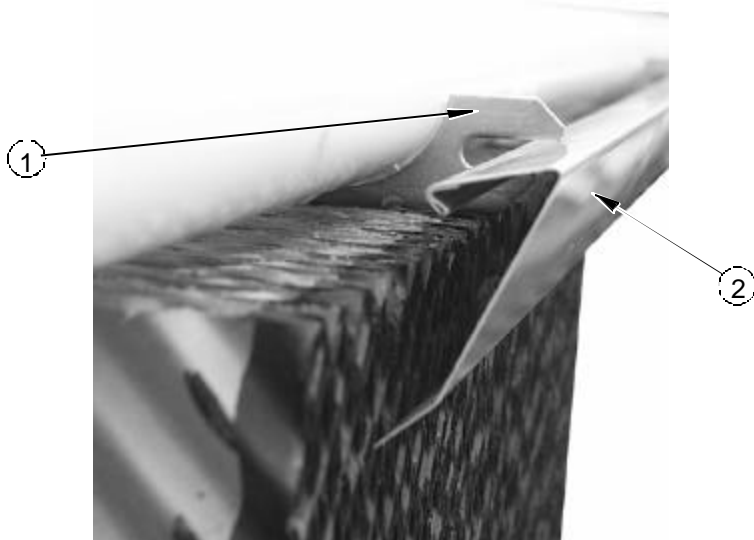
Item	Description
1	Munters Pad and General Shelters
2	Glacier Cor Pad

**Figure 27. Pad Installation**



Pad Retainer Installation

Install the Pad Retainer as shown in **Figure 29** below. Lock the Pad Retainer in place by tapping it with the heel of your hand (**Figure 30**). Cover the joint between adjacent Pad Retainers with the Pad Retainer Couplers.

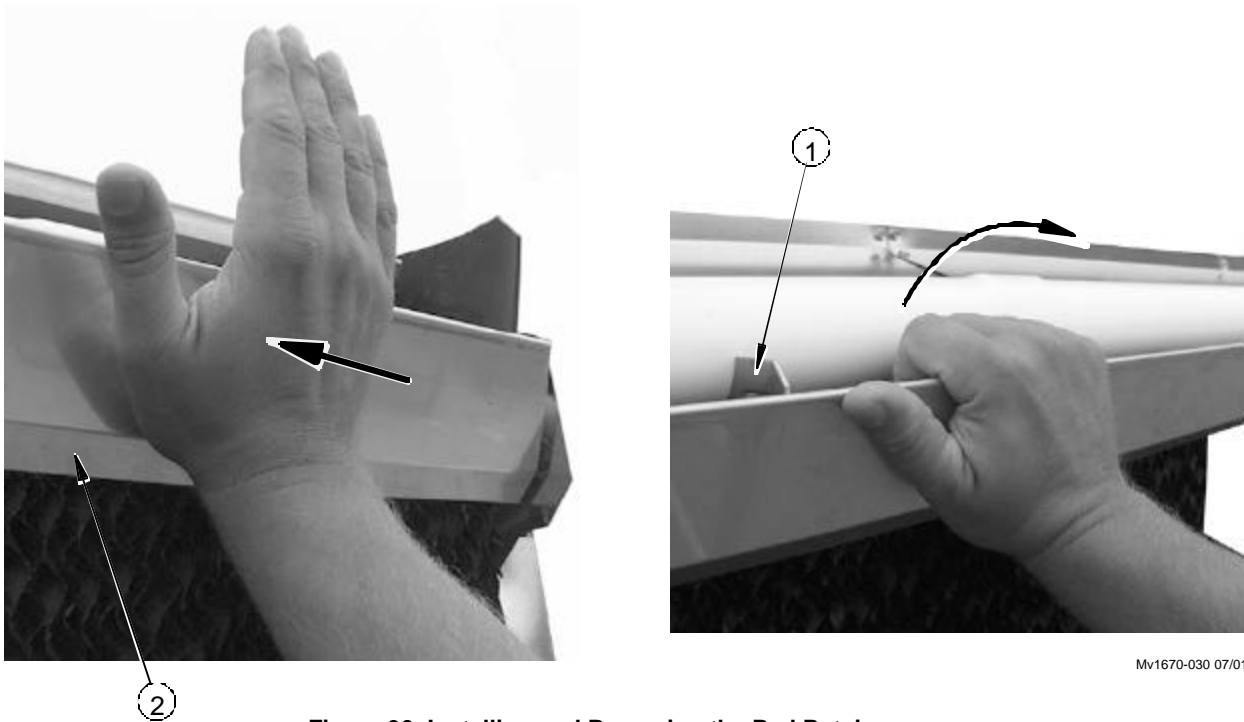


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Item	Description
1	Pipe Support
2	Pad Retainer

Figure 29. Pad Retainer Installation

For future reference, to remove the Pad Retainers, grasp and twist the Pad Retainers as shown in **Figure 30**. below.



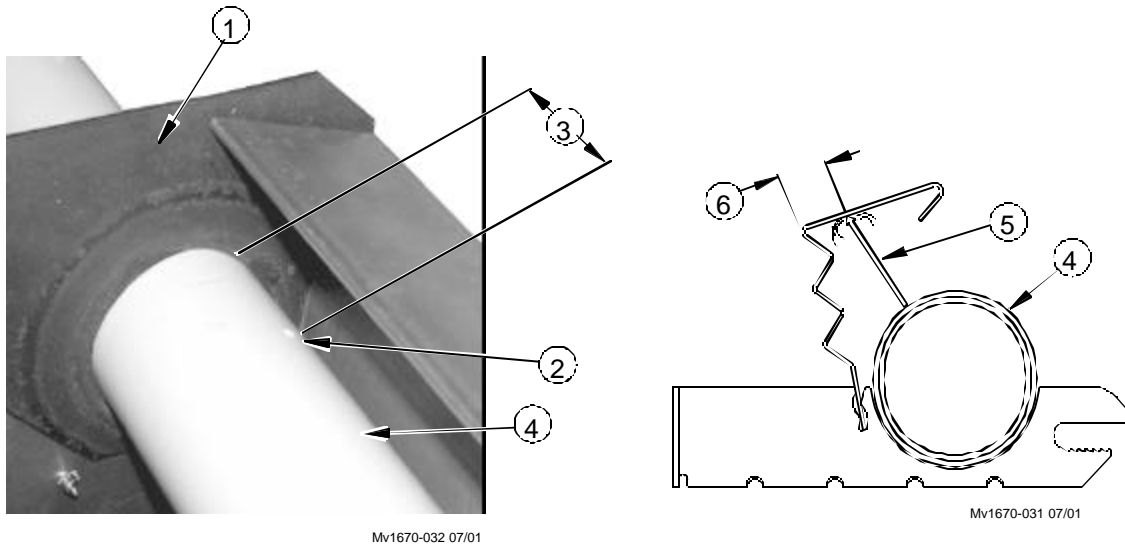
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Figure 30. Installing and Removing the Pad Retainer

## Distribution Pipe Orientation

Orient the Distribution Pipe so there is approximately 2" from the Distribution Pipe Gasket to the first hole in the Distribution Pipe at the Sump End of the system as shown in **Figure 31** below.

Rotate the Distribution Pipe so the water jet spraying from the holes will hit the deflector about 3/4" from the rear of the Deflector as shown in **Figure 31** below. Maintain this orientation of the Distribution Pipe while gluing the pvc fittings on to both ends of the Distribution Pipe.



Item	Description
1	Distribution Pipe Gasket
2	1st Hole in Dist. Pipe
3	2"
4	Distribution Pipe
5	Water Jet
6	3/4"

**Figure 31. Orientating the Distribution Pipe**

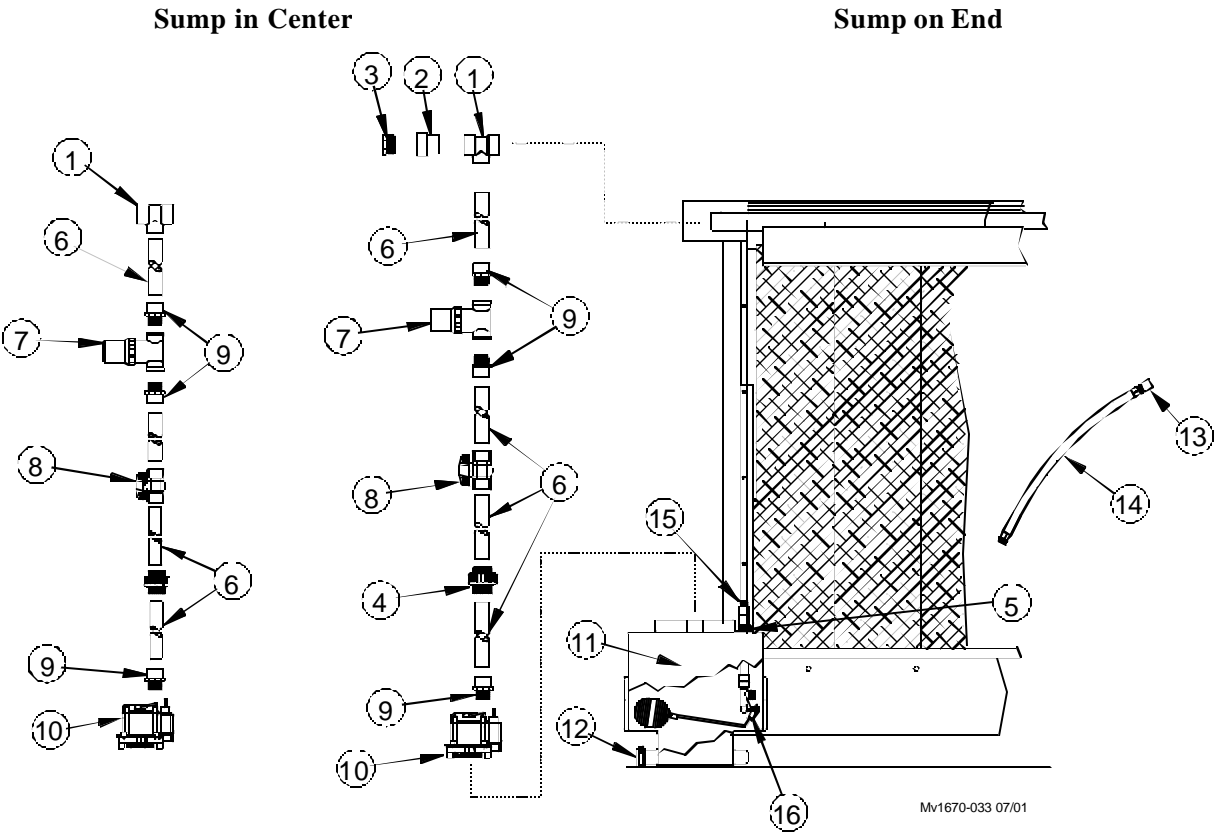
### Sump Components Installation

Assemble the Sump Components as shown in **Figure 32**, beginning at the Pump. The lengths of 1-1/2" PVC Pipe **Item 6** will vary depending on desired Valve height, Pad height, etc.

Use teflon tape on threads as required. Use PVC glue on slip connections.

Attach an electrical plug (if not supplied) to the Sump Pump electrical cord.

Flush all dirt from the water supply lines. Install the Garden Hose to the water supply and connect to the inlet on the Sump.



Item	Description
1	1-1/2 x 2 x 2" PVC Tee
2	Adapter, 2" PVC
3	Plug 2" PVC Pipe MPT
4	1-1/2" Union
5	Water Level Adj. Hose Clamp
6	1-1/2" PVC Pipe
7	Strainer
8	1-1/2" Ball Valve

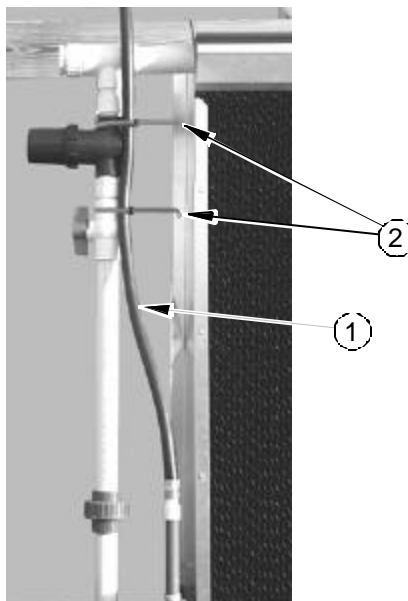
Item	Description
9	1-1/2" PVC Adapter
10	Sump Pump
11	Sump
12	1-1/2" Rubber Pipe Cap
13	Garden Hose to 3/4" Pipe Adapter
14	Water Supply Inlet Hose
15	Sump Water Inlet
16	Float Valve

Figure 32. Sump Component Installation



## Securing Water Supply Inlet Hose

Secure the Water Supply Inlet Hose (**Figure 33, Item 1**) with Cable Ties as shown to keep it from moving around. Movement of the Hose could cause the Float Valve to operate incorrectly.



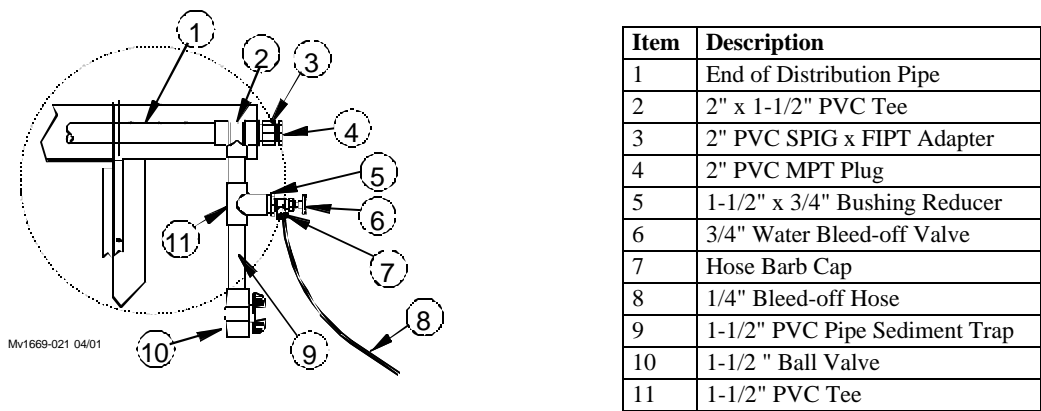
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Item	Description
1	Water Supply Inlet Hose
2	Cable Tie with UV Stabilizer

**Figure 33. Securing the Water Supply Inlet Hose**

### Sediment Trap Installation

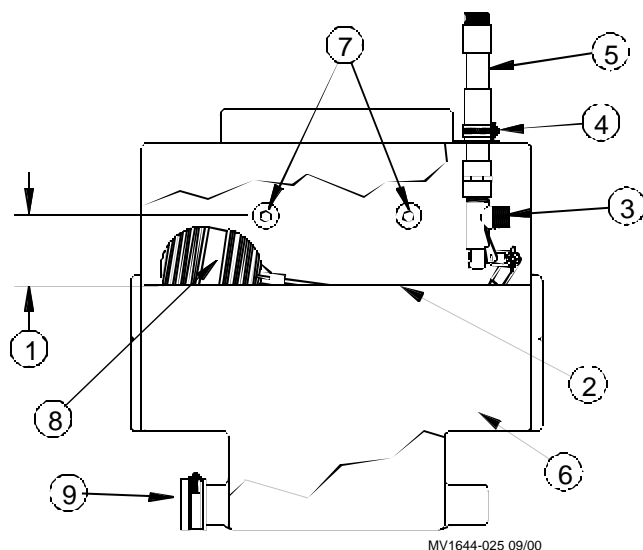
Install Sediment Trap Parts as shown below in **Figure 34**.



**Figure 34. Sediment Trap Installation**

## System Start-Up

1. Partially fill Trough with water.
2. Flush dirt and debris from the Trough by removing the Sump Drain Cap (**Item 9, Figure 35**).
3. Refill system with water. With the Hose Clamp loose, raise/lower the 3/4" Pipe to adjust the Initial Water Level. Check that the Float Ball is not rubbing against the side of the Sump. The Initial Water Level should be 2" - 3" **below** the Mounting Screws in the back of the Sump. Retighten the Hose Clamp. (See **Figure 35** below)



Item	Description
1	2"-3" [51mm-76mm]
2	Initial Water Level
3	PVC Float Valve
4	Hose Clamp
5	3/4" PVC Pipe
6	Sump
7	Sump Mounting Screws
8	Float Ball
9	1-1/2" Rubber Pipe Cap

Figure 35. Adjusting Initial Water Level

**After the system runs for a while and turns off, the water level will rise 1.5-3.0" above the level it was initially set at.**

4. Open the valve in the pump discharge pipe.
5. Flush dirt and debris out of the Distribution Pipe by running the Pump with the 1-1/2" Ball Valves opened. After flushing the pipe out, close the 1-1/2" Ball Valve at the end opposite the Sump.
6. With the Pump running, open the Ball Valve above the pump as wide as possible without excess water splashing out of the system.
7. If bleed-off is to be used, Adjust the Bleed Off Valve to a flow rate of 0.25 gpm per 100 sq ft. of Evaporative Cooling Pad.

The correct amount of bleed-off depends on the amount of minerals and chemicals in the water.

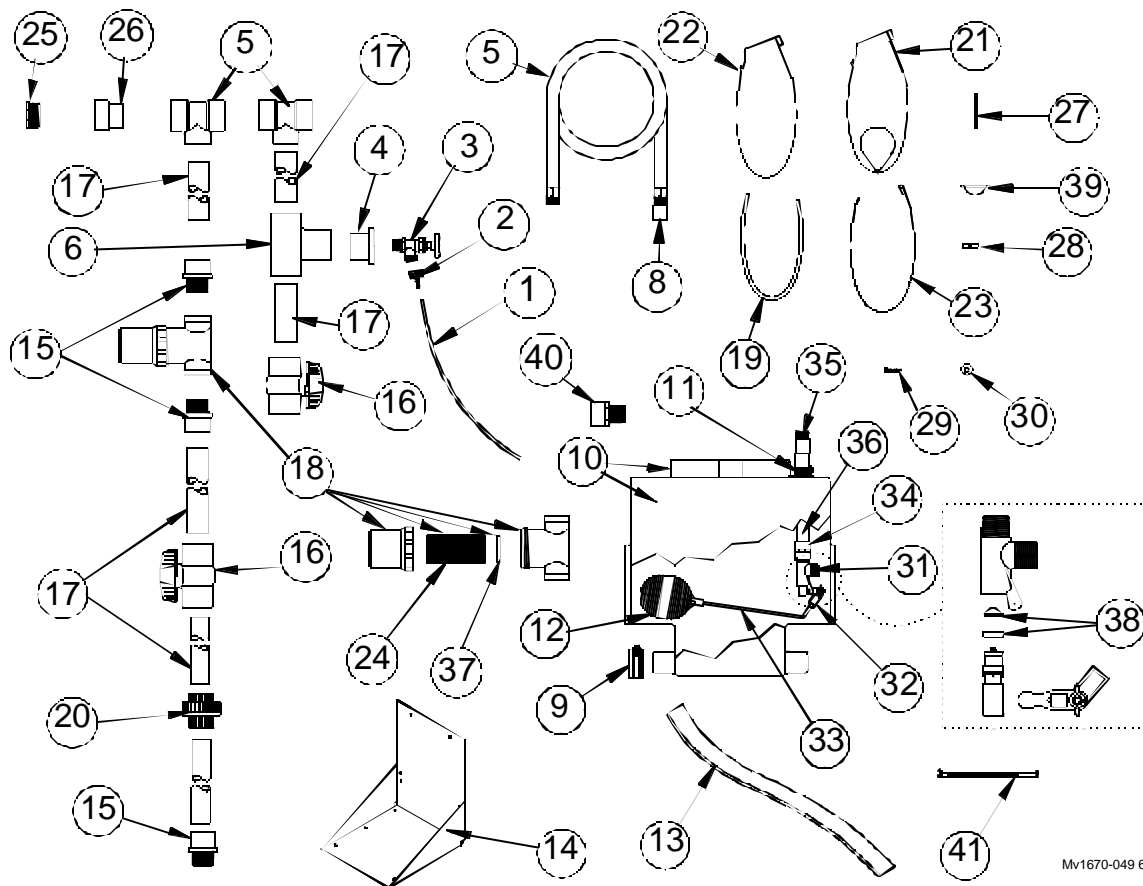
The bleed off rate can be adjusted over time, but should be maintained high enough to prevent mineral deposits from accumulating on the face of the Evaporative Cooling Pad.

## System Operation & Maintenance

1. Reduce the mineral and chemical build-up in water by;
  - a). Bleeding water off the system. Begin by adjusting the Bleed-Off Valve to drain .25 gpm/100 sq ft. of Cooling Pad while the Pump is running. Increase the bleed-off rate if minerals build up on the face of the Cooling Pad
  - b). Draining all the water from the system once a week during operating season. Increase the frequency if minerals build up on the face of the Cooling Pad.
2. Shade the pads as much as possible to minimize algae growth.
3. Allow the pads to dry out completely once every 24 hours to kill algae.
4. Reduce the number of times the pad is wetted and dried out each day to maximize pad life.
5. Clean the strainer regularly to maintain a sufficient supply of water to the pads.
6. Periodically check the jets of water from the top of the Distribution Pipe.
7. Keep the Distribution Pipe holes free of debris. A 5/32" drill bit may be used to clean the holes or a large round brush may be attached to 3/4" pvc pipe and pushed through the Distribution Pipe to clean out the holes. The 2" Pipe Plugs at either end of the Distribution Pipe can be removed to allow cleaning brush access. Clogged holes may cause dry streaks and lead to clogging of the pad.
8. Regularly flush the Distribution Pipe by opening the 1-1/2" Ball Valve at the end of the sediment trap (**See Figure 34, Item 9**) and allowing the pump to run.
9. Periodically, gently hose and brush deposits from the face of the pads.
10. Completely drain the system for winter storage. Remove the Sump Drain Cap (**See Figure 26, Item 9**). Remove the Pump.
11. Avoid contaminants such as dust, fertilizers, and harsh cleaners.
12. The pH of the water being circulated through the system should be maintained at between 6 and 9 to prevent premature pad softening.
13. Check that Cooling Pads are installed correctly. **See Figure 27, and 28.**
14. The water holding capacity of pads increases as pads age. This extra water raises the Sump water level when the system shuts down. To prevent overflow at shut down, slightly lower the float level.

## Parts Lists and Kits

### Sump Kit Part No. 46340



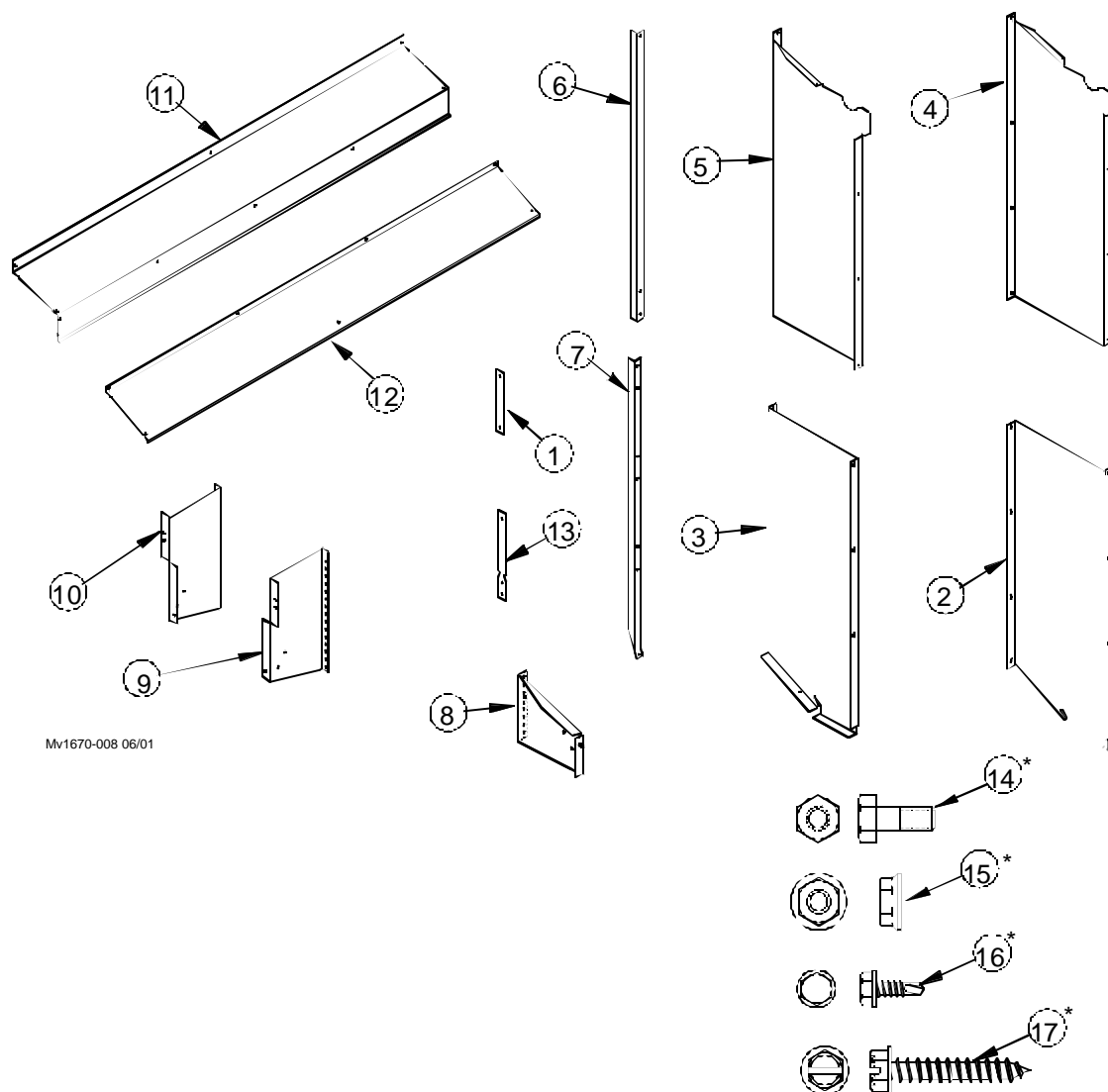
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Item	Description	Part No.	Qty
1	1/4" Black Bleed Off Hose	14454-144	1
2	Hose Barb Cap	24111	1
3	3/4" Bleed-off Valve	9255	1
4	1-1/2" x 3/4" Reducer Bushing	38672	1
5	1-1/2 x 2" x 2" PVC Tee	41427	2
6	1-1/2" PVC Tee	38618	1
7	Hose	36654	1
8	Garden Hose to 3/4" Pipe Adp.	14605	1
9	1-1/2" Rubber Pipe Cap	47939	1
10	Turbo Cool Sump	46339	1
11	1-1/2" SS Hose Clamp	3651	1
12	Ball, Float	45985	1
13	1-1/2 x 24" Foam Tape	41708-2	1
14	Sump Support Bracket Assembly	46448	1
15	1-1/2" PVC Adapter	38627	3
16	1-1/2" PVC Valve	44039	2
17*	1-1/2 x 5' PVC Pipe	38677	2
18	Strainer Assembly	38731	1
19	Trim, 1/8" Rubber Edge	46310-1	1
20	1-1/2" Union	44040	1
21	Insert, Sump End	46033	1

Item	Description	Part No.	Qty
22	Insert, Trough End	46309	1
23	Strap, Insert Clamp	46100	2
24	SS 20 Mesh Screen	46426	-
25	Plug 2" PVC MPT	45749	2
26	Adapter 2" PVC Spig x FIPT	45748	2
27	Bolt, 1/4-20 x 3-1/2	4404-15	2
28	1-1/2" Clamp Nut	46192	2
29	Screw, 1/4 x 1-1/2 Lag	41561	3
30	Washer, 1/4 x 1	2955-52	3
31	Valve, PVC Float	45989	1
32	Nut, 1/4-20 S.S.	7145	1
33	Rod, Float 12" 65°	46202	1
34	Adapter, 3/4" PVC Female	8160	1
35	Adapter, 3/4" FS x MGHT	14605	1
36	Pipe, 3/4" x 9-1/2" PVC	7514-11	1
37	Strainer O-Ring	46427	-
38	PVC Valve Seal Kit	46428	-
39	Washer Insert	46504	2
40	Overflow fitting	9067	1
41	Cable Tie with UV Stabilizer	48103	2
--	Maintenance Card	Mv1672	1

\* The 5' PVC Pipe is not supplied with the Sump Kit (Part No. 46340). It is included with the End Panel Kit (Part No. 41482) or the 44979-xx Pad Frame Kit.

## 46781-XX Kit, TURBO-COOL™ STAND-OFF Open Top



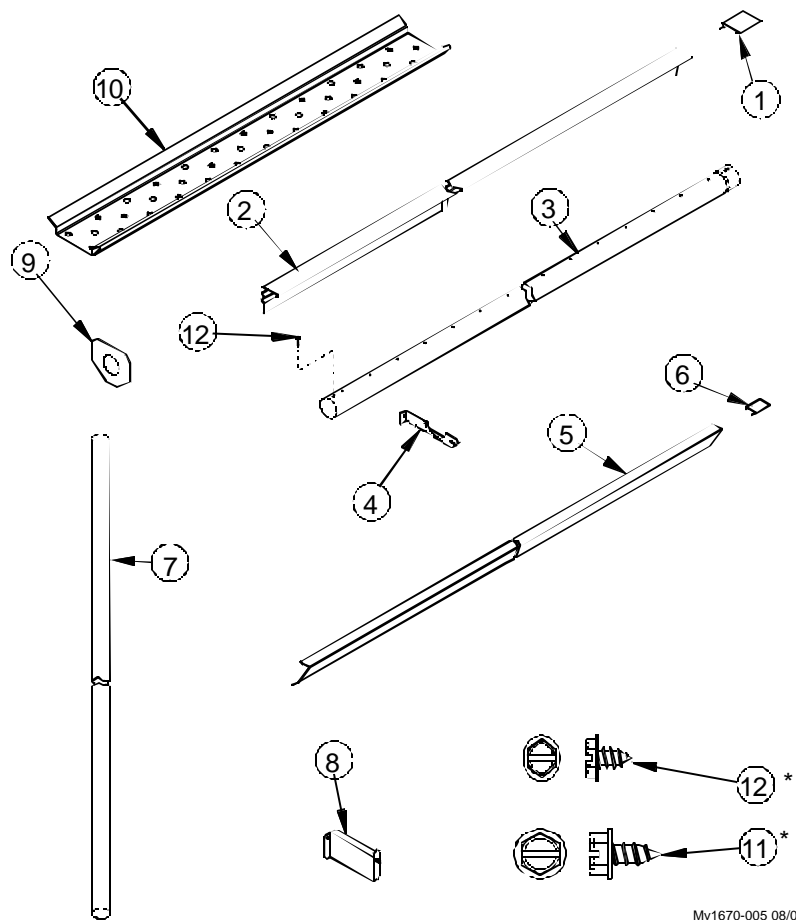
Item	Description	Part No.
1	Bottom Cover Coupler	46785
2	Stand-Off Lower RH End Panel	46542-1
3	Stand-Off Lower LH End Panel	46542-2
4	Stand-Off Upper RH End Panel	46543-1
5	Stand-Off Upper LH End Panel	46543-2
6	Stand-Off Upper Post	46547
7	Stand-Off Lower Post	46548
8	Stand-Off Bottom Bracket	46552
9	RH Stand-Off Sump Back Bracket	46573-1
10	LH Stand-Off Sump Back Bracket	46573-2

Item	Description	Part No.
11	Stand-Off Top Cover	46775
12	Stand-Off Bottom Cover	46776
13	Top Cover Coupler	46780
14	1/4-20x5/8 SS Bolt	4404-7
15	1/4-20 HXWH SS Nut	46298
16	#10 x 1/2SD Screw	3037
17	1/4 x 1-1/2 Lag Screw	41561

XX = System Length 5'-70' in Increments of 5

\*Not exact size; shown for comparison purposes only

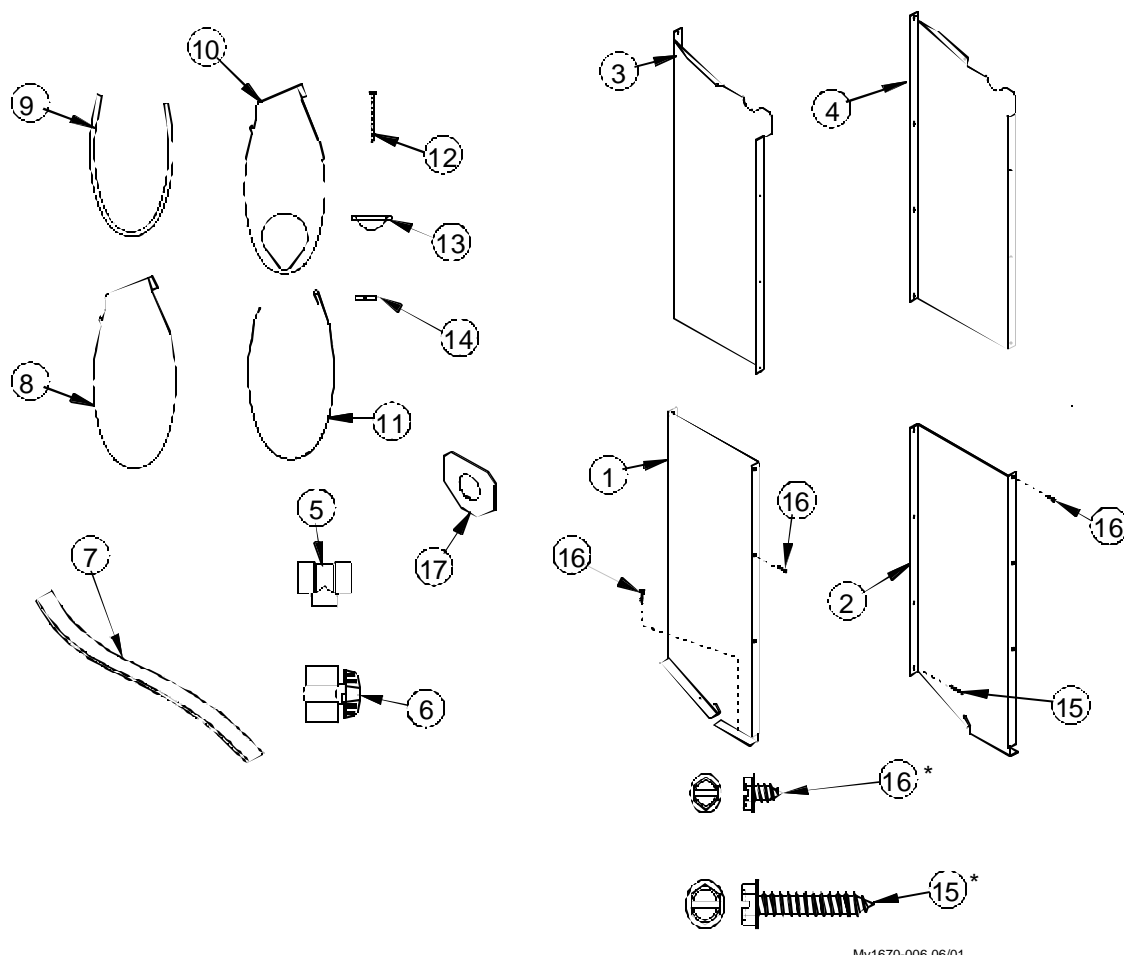
## 46782-XX Kit, TURBO-COOL™ STAND-OFF Frame w/ Open Top



Mv1670-005 08/01

Item	Description	Part No.
1	Deflector Coupler	46558
2	Deflector	46557
3	Distribution Pipe PVC 2"	41333
4	Pipe Support	46551
5	Pad Retainer	46550
6	Pad Retainer Coupler	46669
7	1.5 x 5ft. PVC Sch40 Pipe	38677
8	TURBO COOL™ Trough Hanger	46180
9	Dist. Pipe End Gasket	46585
10	Pad Support	41344
11	1/4 x 1/2 SS HXWH Screw	46689
12	#10 x 1/2 SS HH SM Screw	38613
XX = System Length 5' - 70' in Increments of 5		
*Not exact size; shown for comparison purposes only		

## 46723 Center Panel STAND-OFF Kit (to install Sump in center of a system)



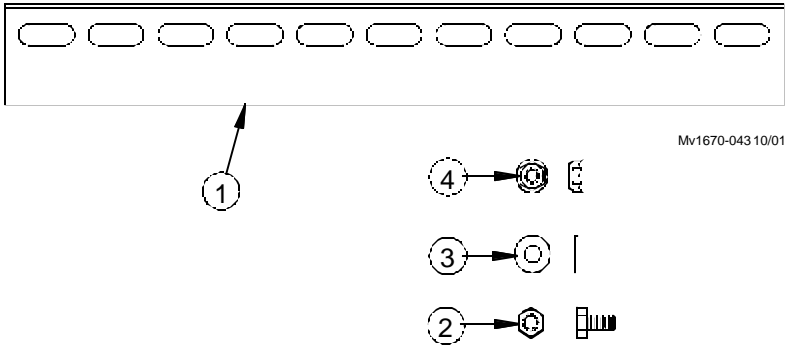
Item	Description	Part No.
1	RH Lower End Panel	46542-1
2	LH Lower End Panel	46542-2
3	RH Upper End Panel	46543-1
4	LH Upper End Panel	46543-2
5	2x2x1.5 PVC Tee	41427
6	1.5 PVC Ball Valve	44039
7	2" x 2' Foam Tape	41708-2
8	Trough Insert	46309

Item	Description	Part No.
9	1/8 Round Rubber Trim	46310-1
10	Sump Insert	46033
11	Clamp Strap	46100
12	1/4-20 x 3.5 HH Bolt	4404-15
13	.25 x 1 Insert Washer	46504
14	1/4-20 x .38 Special Nut	46192
15	1/4 x 1-1/2 Lag Screw	41561
16	#10-16 x .5 HH SS Screw	38613
17	Pipe Gasket	46585

\*Not exact size; shown for comparison purposes only

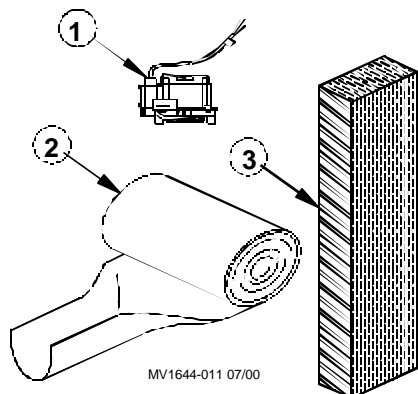


46917-XX Stand-Off Leg Support Kit (20" Spacing)



Item	Description
1	Metal Stand-Off Support Legs
2	1/4-20 x .5 Bolt
3	1/4 Washer
4	1/4 Flange Serrated Nut
XX = System Length 5' - 70' in Increments of 5	

## Miscellaneous Components



Item	Description	Part No. **
1	Pump (see chart on page 6)	-----
2*	Trough 24" wide, 20" hole spacing	46578-XX
3**	Cooling Pads: Munters Celdek 45°/15°	
	6" x 12" x 3 foot	38624-3
	6" x 12" x 4 foot	38624-4
	6" x 12" x 5 foot	38624-5
	6" x 12" x 6 foot	38624-6
3**	Cooling Pads: Glacier Cor 45°/15°	
	6" x 12" x 3 foot	38752-3
	6" x 12" x 4 foot	38752-4
	6" x 12" x 5 foot	38752-5
	6" x 12" x 6 foot	38752-6
3**	Cooling Pads: General Shelters 45°/15°	
	6" x 12" x 3 foot	46389-3
	6" x 12" x 4 foot	46389-4
	6" x 12" x 5 foot	46389-5
	6" x 12" x 6 foot	46389-6
3	Cooling Pads: Munters Mi-T Cool 45°/15°	
	6" x 12" x 3 foot	38751-3
	6" x 12" x 4 foot	38751-4
	6" x 12" x 5 foot	38751-5
	6" x 12" x 6 foot	38751-6
3**	Cooling Pads: General Shelters 45°/15°	
	6" x 24" x 3 foot	46593-3
	6" x 24" x 4 foot	46593-4
	6" x 24" x 5 foot	46593-5
	6" x 24" x 6 foot	46593-6

Part Numbers listed are for pads with coating on inlet side, shipped from Milford

\*Round up to the nearest 5'. Trough lengths are available from 5' to 140' Example: 46578-100 is a 101' roll of Trough, 46578-50 is a 51' roll of trough.

\*\*Add a "D" to the *part number* (xxxxx-3D) for drop shipped pads

Add a "N" to the *part number* (xxxxx-3N) for pads without coating on the inlet side

Add a "B" to the *part number* (xxxxx-3B) for pads with coating on the inlet and bottom side of the pad

**Page Left Blank for Notes.....**



**Made to work.  
Built to last.**

### **Revisions to this Manual**

<b>Page No.</b>	<b>Description of Change</b>
37	Changed Part No. 46103 to 48103

**Contact your nearby Chore-Time distributor or representative for additional parts and information.**

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