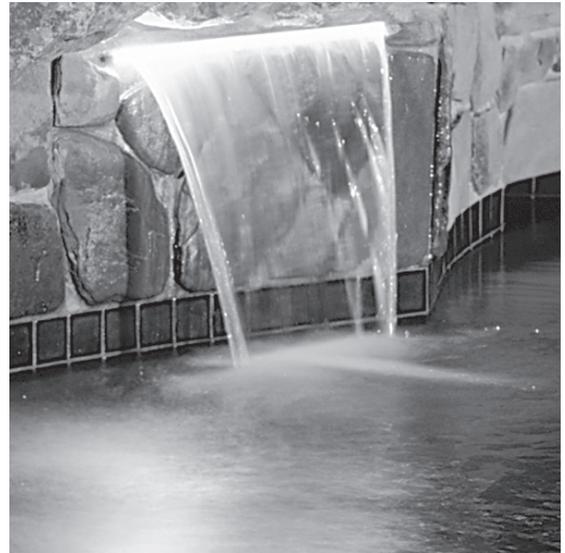




Installation and Operation Manual



Sheer Descent[®] and FiberFall[®] Water Features

This product is manufactured under the following
United States Patents: 5,738,280; 6,132,056 and 5,893,179

WARNING

FOR YOUR SAFETY - This product must be installed and serviced by a contractor who is licensed and qualified in pool equipment by the jurisdiction in which the product will be installed where such state or local requirements exist. In the event no such state or local requirement exists, the installer or maintainer must be a professional with sufficient experience in pool equipment installation and maintenance so that all of the instructions in this manual can be followed exactly. Before installing this product, read and follow all warning notices and instructions that accompany this product. Failure to follow warning notices and instructions may result in property damage, personal injury, or death. Improper installation and/or operation will void the warranty.

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Section 1. Important Safety Instructions

READ AND FOLLOW ALL INSTRUCTIONS

1.1 Safety Instructions

All work must be performed by a contractor who is licensed and qualified in pool equipment and conform to all national, state, and local codes. When installing and using this equipment, basic safety precautions should always be followed, including the following:

 **WARNING**

RISK OF SUCTION ENTRAPMENT HAZARD, WHICH, IF NOT AVOIDED CAN RESULT IN SERIOUS INJURY OR DEATH. Do not block pump suction as this can cause severe injury or death. Suction outlet (drain) covers must be certified to ANSI/ASME A112.19.8.

 **WARNING**

To reduce the risk of injury, do not permit children to use this product.

 **WARNING**

To reduce the risk of property damage or injury, do not attempt to change the backwash (multiport, slide, or full flow) valve position with the pump running.

 **WARNING**

Due to the potential risk of fire, electric shock, or injuries to persons, Zodiac Equipment must be installed in accordance with the National Electric Code, all local electrical and safety codes, and the Occupational Safety and Health Act (OSHA). Copies of the National Electrical Code may be ordered from the National Fire Protection Association (NFPA) online at www.nfpa.org or call 617-770-3000, or contact your local government inspection agency.

 **WARNING**

Incorrectly installed equipment may fail, causing severe injury or property damage.

 **WARNING**

- Do not connect system to an unregulated city water system or other external source of pressurized water producing pressures greater than 35 PSI.
- Trapped air in system can cause the pump and/or filter lid to be blown off which can result in death, serious personal injury, or property damage. Be sure all air is out of system before operating.

 **WARNING**

To minimize risk of severe injury or death the filter and/or pump should not be subjected to the piping system pressurization test.

Local codes may require the pool piping system to be subjected to a pressure test. These requirements are generally not intended to apply to the pool equipment such as filters or pumps.

Zodiac pool equipment is pressure tested at the factory.

If however the WARNING cannot be followed and pressure testing of the piping system must include the filter and/or pump **BE SURE TO COMPLY WITH THE FOLLOWING SAFETY INSTRUCTIONS:**

- Check all clamps, bolts, lids, lock rings and system accessories to ensure they are properly installed and secured before testing.
- **RELEASE ALL AIR** in the system before testing.
- Water pressure for test must **NOT EXCEED 35 PSI**.
- Water temperature for test must **NOT EXCEED 100°F (38°C)**.
- Limit test to 24 hours. After test, visually check system to be sure it is ready for operation.
- **Notice:** These parameters apply to Zodiac equipment only. For non-Zodiac equipment, consult equipment manufacturer.

 **WARNING**

Chemical spills and fumes can weaken pool/spa equipment. Corrosion can cause filters and other equipment to fail, resulting in severe injury or property damage. Do not store pool chemicals near your equipment.

**⚠ WARNING**

Pump suction is hazardous and can trap and drown or disembowel bathers. Do not use or operate swimming pools, spa, or hot tubs if a suction outlet cover is missing, broken, or loose. The following guidelines provide information for pump installation that minimizes risk of injury to users of pools, spas, and hot tubs:

Entrapment Protection - The pump suction system must provide protection against the hazards of suction entrapment.

Suction Outlet Covers - All suction outlets must have correctly installed, screw-fastened covers in place. All suction outlet (drain) covers must be maintained. Drain covers must be listed/certified to ANSI/ASME A112.19.8. They must be replaced if cracked, broken, or missing.

Number of Suction Outlets Per Pump - Provide at least two hydraulically balanced main drains, with covers, as suction outlets for each circulating pump suction line. The centers of the main drains (suction outlets) on any one suction line must be at least three feet apart, center to center. (See *Figure 1 on page 7.*)

The system **must** be built to include at least two suction outlets (drains) connected to the pump whenever the pump is running. However, if two main drains run into a single suction line, the single suction line may be equipped with a valve which will shut off both main drains from the pump. The system shall be constructed such that it shall not allow for separate or independent shutoff or isolation of each drain. (See *Figure 1 on page 7.*)

More than one pump can be connected to a single suction line as long as the requirements above are met.

Water Velocity - The maximum water velocity through the suction fitting or cover for any suction outlet must be 1.5 feet per second unless the outlet complies with the latest version of ANSI/ASME A112.19.8, the standard for *Suction Fittings For Use in Swimming and Wading Pools, Spas, and Hot Tubs*. In any case, do not exceed the suction fitting's maximum designed flow rate.

If 100% of the pump's flow comes from the main drain system, the maximum water velocity in the pump suction hydraulic system must be six feet per second or less even if one main drain (suction outlet) is completely blocked. The flow through the remaining main drain(s) must comply with the latest ANSI/ASME A112.19.8, the standard for *Suction Fittings For Use in Swimming and Wading Pools, Spas, and Hot Tubs*.

Testing and Certification - Suction outlet covers must have been tested by a nationally recognized testing laboratory and found to comply with the latest ANSI/ASME A112.19.8, the standard for *Suction Fittings For Use in Swimming and Wading Pools, Spas, and Hot Tubs*.

Fittings - Fittings restrict flow; for best efficiency use fewest possible fittings (but at least two suction outlets).

Avoid fittings which could cause an air trap.

Pool cleaner suction fittings must conform to applicable International Association of Plumbing and Mechanical Officials (IAPMO) standards.

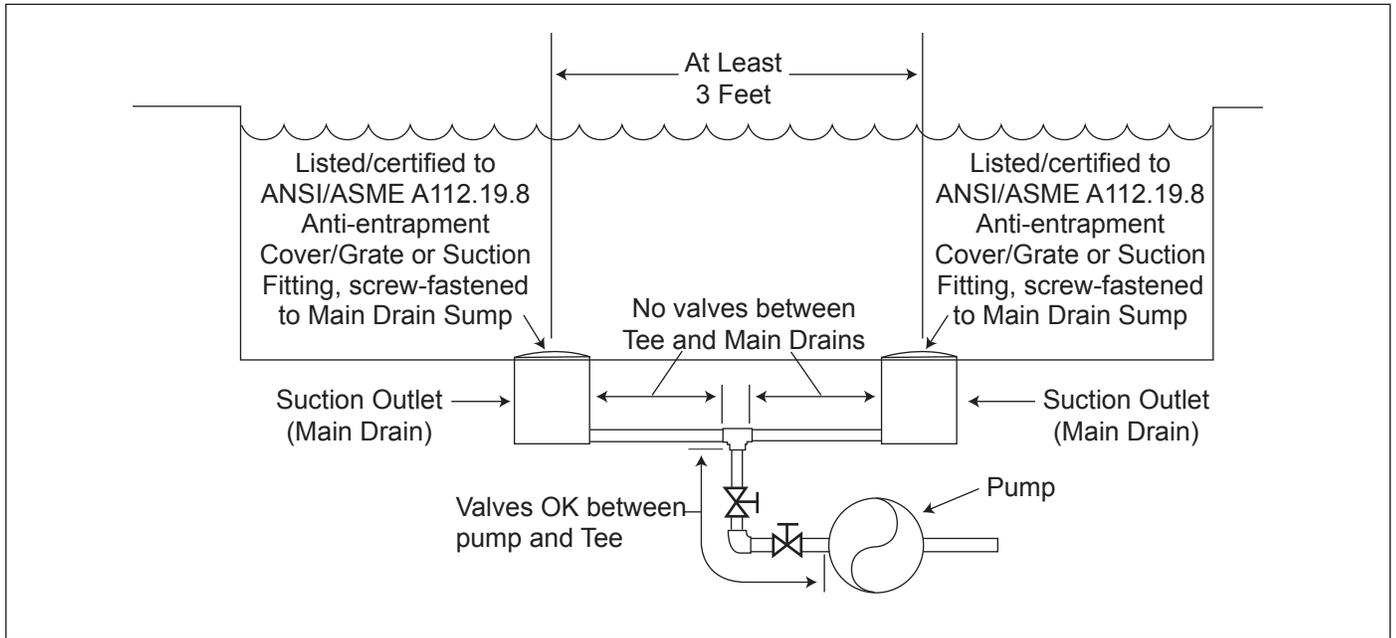


Figure 1. Number of Suction Outlets Per Pump

Section 2. General Installation Requirements

This document gives instructions for installing the Zodiac Sheer Descent and FiberFall water features. Read through the instructions completely before starting the procedure.

2.1 Preparation Instructions

During all phases of the installation, care should be taken not to damage the Sheer Descent waterfall. Keep the unit in the original packaging, laying on a flat surface and protected from sunlight until the site is prepared for permanent installation.

The Sheer Descent waterfall is available in standard sizes from 1 foot to 8 feet in length and is shipped complete with lip protector installed in the opening of the waterfall. See Figure 2. The lip protector keeps the spillway opening clean and damage free. **DO NOT REMOVE THE LIP PROTECTOR** until the startup of the pool equipment. The lip protector must be left in

the opening during the entire installation, or damage to the unit, which would effect its ability to perform, may occur.

To properly install this product please review the following installation and maintenance instructions.

2.2 Excavation and Steel Modifications

It is recommended that the area designated for the Sheer Descent waterfall be marked off with colored stakes, yellow construction ribbon, or similar material during the framing process, prior to excavation.

In preparation for the installation of the steel rebar, mark the EXACT area designated for the Sheer Descent waterfall. To allow room for notching the bond beam and installing the unit, offset the steel pattern by 4½ inches below the original form and 1 inch on both ends of the Sheer Descent waterfall. For example, if the Sheer Descent waterfall is 3 feet in length, offset the steel pattern to measure 4½ inches down from the top of the frame and 50 inches in length (this allows 1

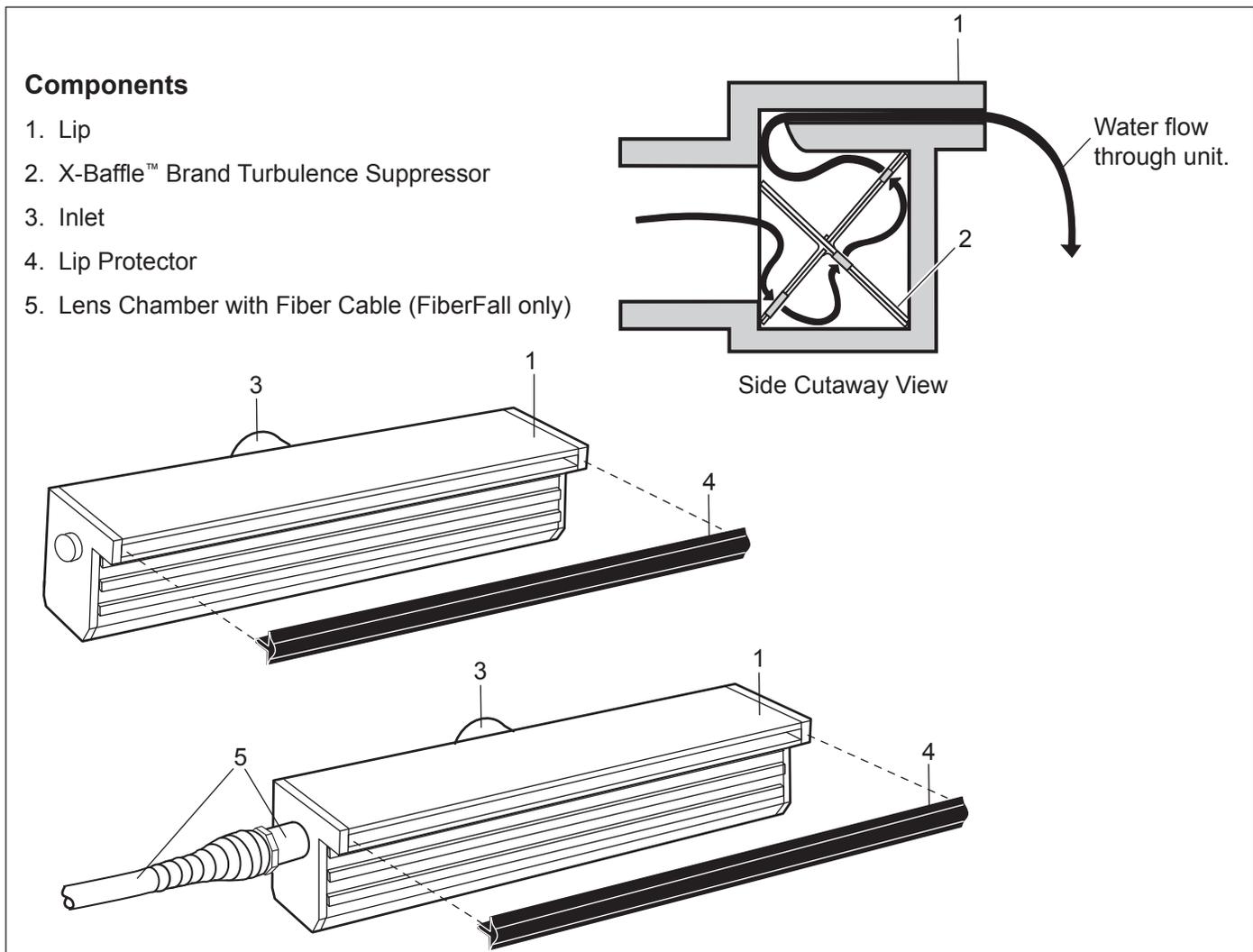


Figure 2. Sheer Descent and FiberFall Components

inch of space on each side of the Sheer Descent unit). For FiberFalls, offset the steel for the unit length plus 6 inches on the left to accommodate the lens chamber and fiber cable, or 6 inches on both sides for double-chambered units. See Figure 3.

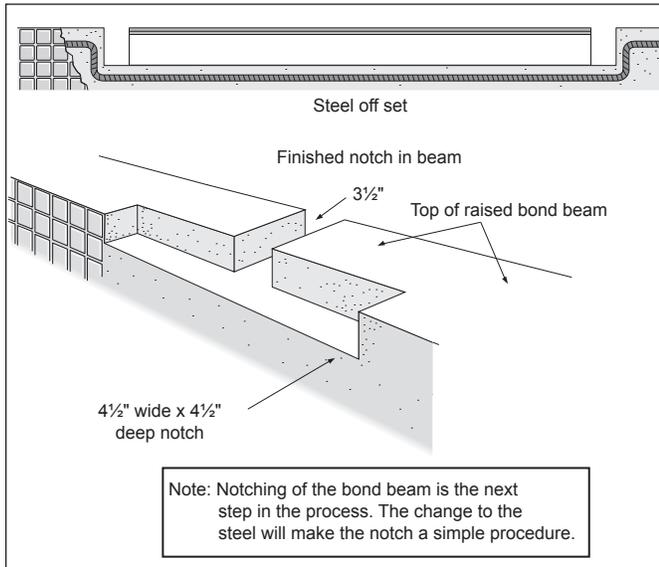


Figure 3. Excavation and Steel Installation

2.3 Concrete Installation and Modifications

For Sheer Descent, notch the bond beam 4-1/2 inches deep and 1 inch longer than the width of the unit. For FiberFalls, notch for unit length plus 6 inches on the left to accommodate the lens chamber and fiber cable, or 6 inches on both sides for double-chambered units. FiberFall also requires a 1 inch conduit stub-up in the beam for the fiber cable(s). See Figure 4.

For vinyl and fiberglass pools, configure block to match gunite beam installation.

After notching the beam (setting blocks), do the following steps: (Refer to Figure 5.)

1. Determine water fall installation level with bender board.
2. Tack bender board at notch 1-3/8 inches below bottom of coping.
3. Cement back of board.

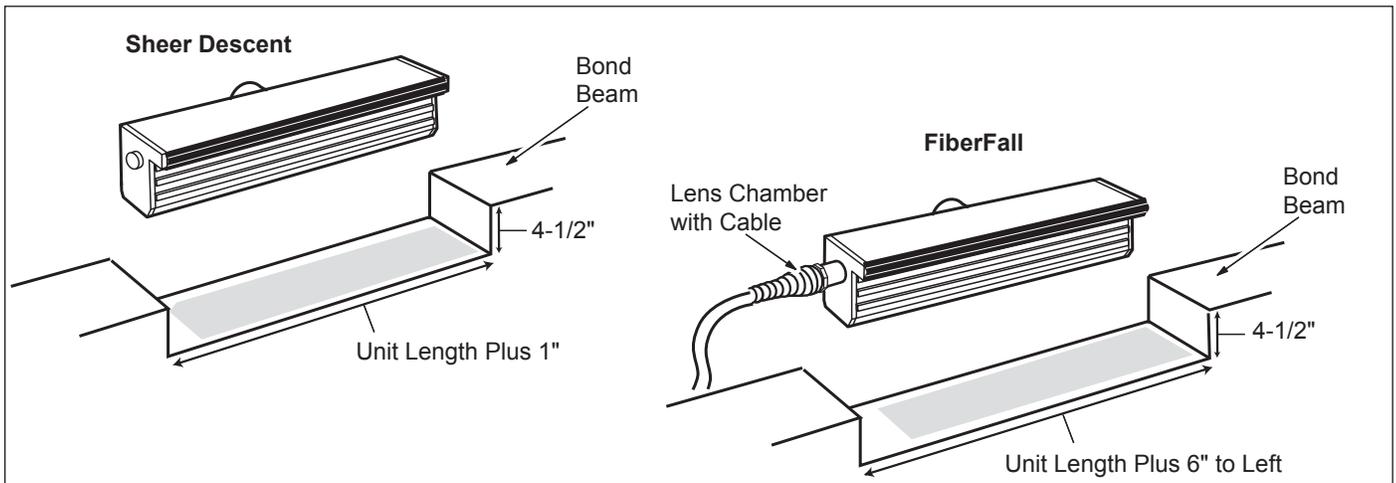


Figure 4. Concrete Installation

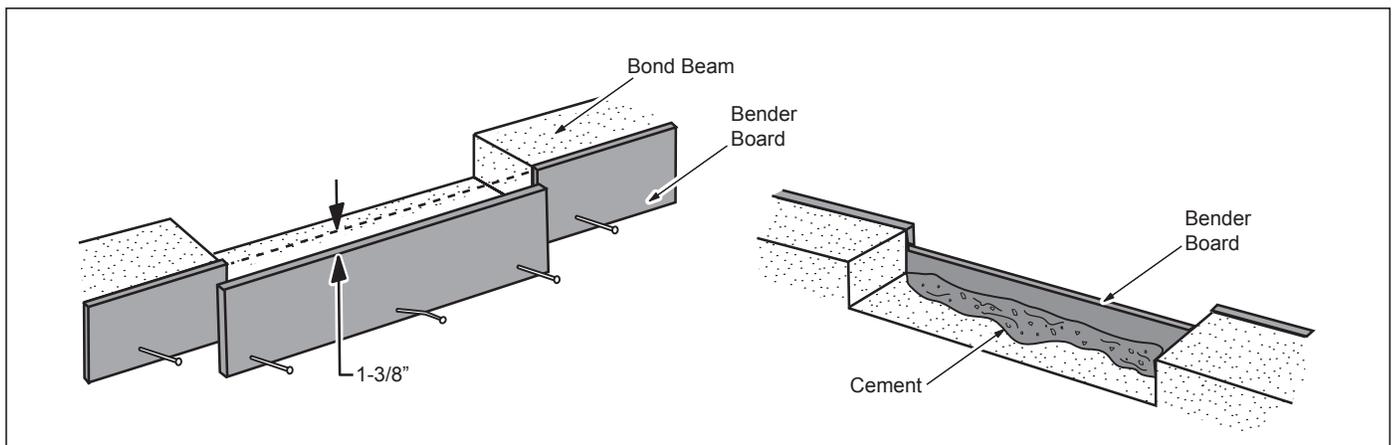


Figure 5. Install Bender Board

2.3.1 Positioning the Waterfall

CAUTION

Make sure that the waterfall is positioned correctly. Do not point the lip downwards. Refer to Figure 6.

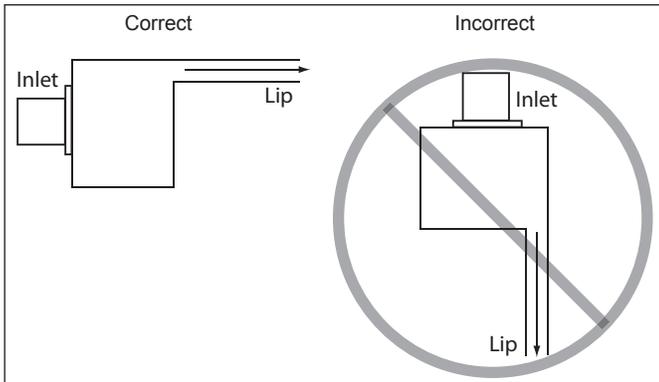


Figure 6. Position the Waterfall Correctly in the Notch

1. Create a bed of cement mortar in the notch to provide a solid base for the waterfall. Refer to Figure 7.
2. Set the unit into the mortar bed. The lip should extend 1 inch beyond gunite (or more for thicker

finishes like rock or brick) to ensure lip will be 1/4 inch past finished pool wall.

3. Tap in and level.
4. Apply 5/8 inches of cement finishing to top, sides and back of waterfall to encase unit. Slope top surface slightly towards back, 1/4 bubble on level. Refer to Figure 8.
5. Remove excess cement from front of waterfalls.

2.3.2 Finishing the Waterfall

1. Use thin-set to install coping material onto cement on top of waterfall. Tap in and level. Refer to Figure 9.
2. Remove bender board.

Section 3. Pump Sizing and Installation Options

NOTE Make sure the cuts in the beam are properly completed before proceeding.

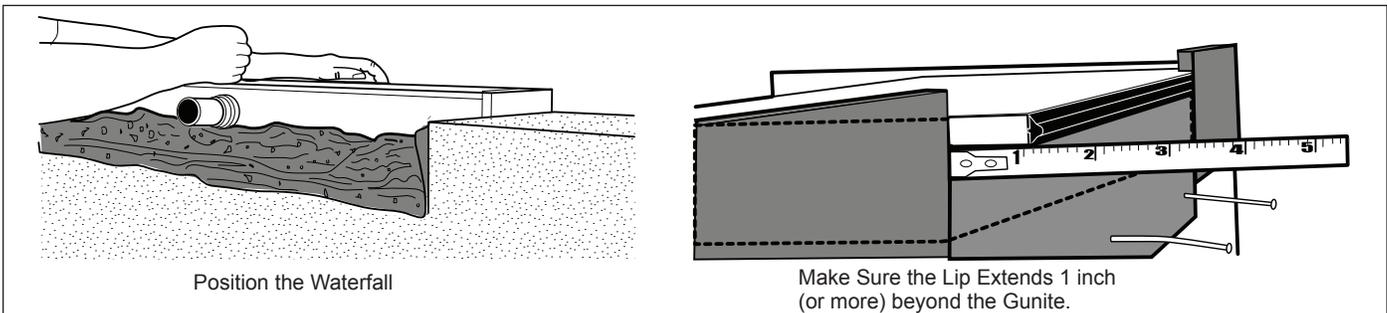


Figure 7. Positioning the Waterfall in Notch

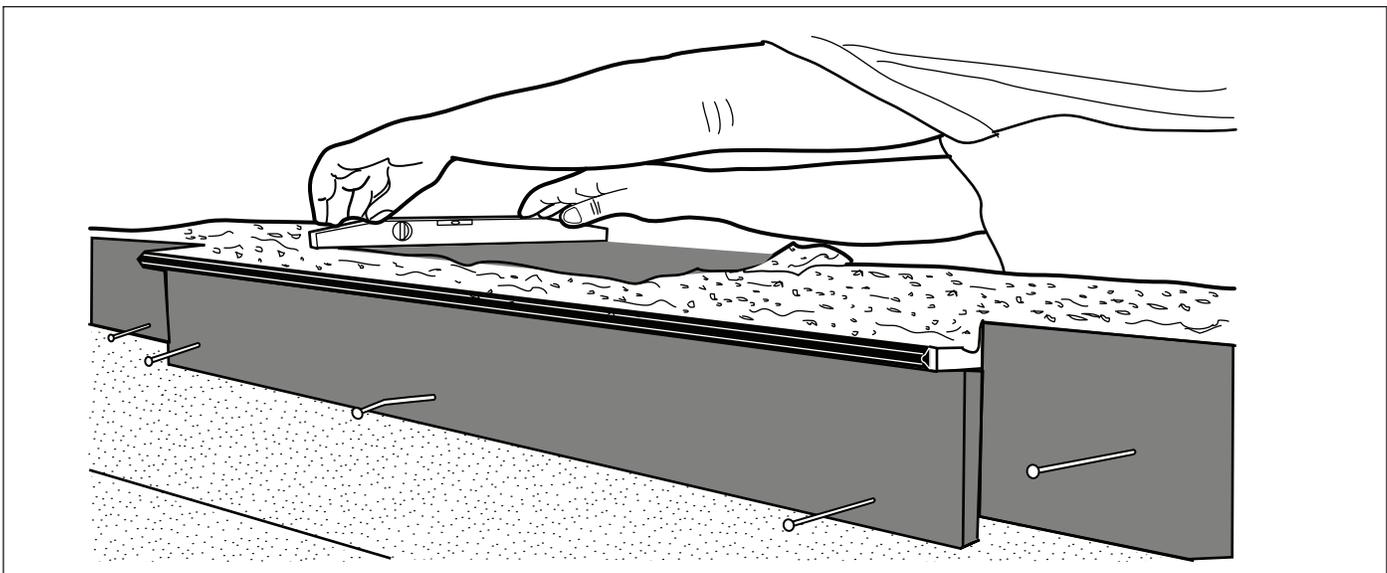


Figure 8. Slope Surface Towards Back of Waterfall

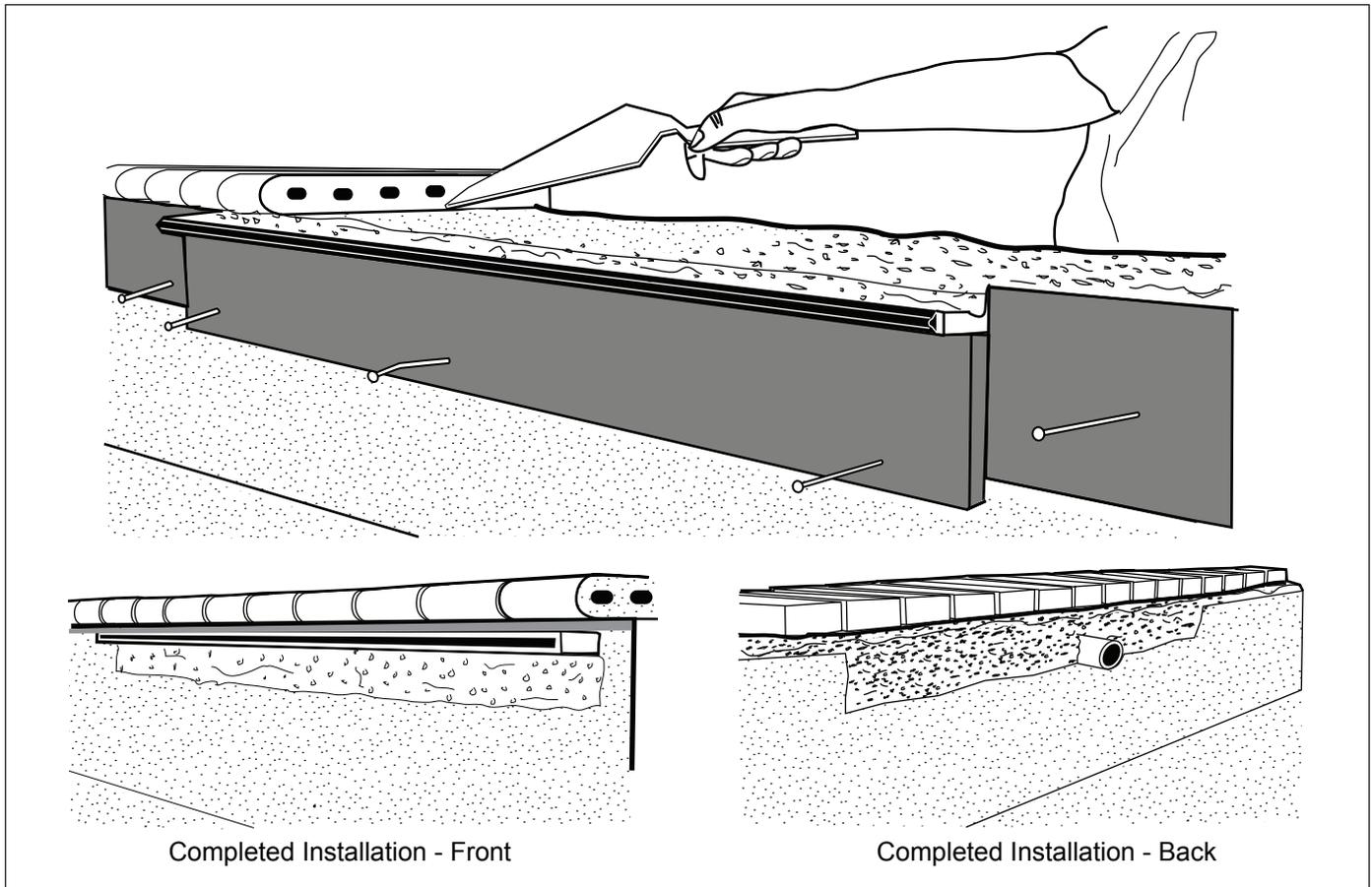


Figure 9. Finishing the WaterFall Installation

One of the advantages of the Sheer Descent waterfall is the ability to provide a continuous sheet of water with a minimum of water flow. A standard 4 foot model, for example, requires only 48 gallons per minute to operate. In order to size your pump properly, refer to the Water Flow Requirement Chart. In most cases, a properly sized standard swimming pool pump will operate the Sheer Descent waterfall and filter the pool with little loss of total water turnover. As a general rule of thumb, the Sheer Descent waterfall requires approximately 12 gallons per minute per foot with little head loss. For a more dramatic effect, more water gallonage can be applied to project the waterfall further away from the wall. Refer to Figure 10.

NOTE When plumbing multiple falls, add the total length of waterfalls together to determine GPM required. e.g. When plumbing two 6 foot units, you now have 12 feet of waterfall, which requires 144 gallons per minute.

3.1 Existing Pool Filter Pump Installation

The installation of the Sheer Descent waterfall using the main pool filter pump is the most common plumbing system, due to the unique low flow aspect of the waterfall system. Simply plumb a three way valve on the return line, after the filter, and plumb the waterfall

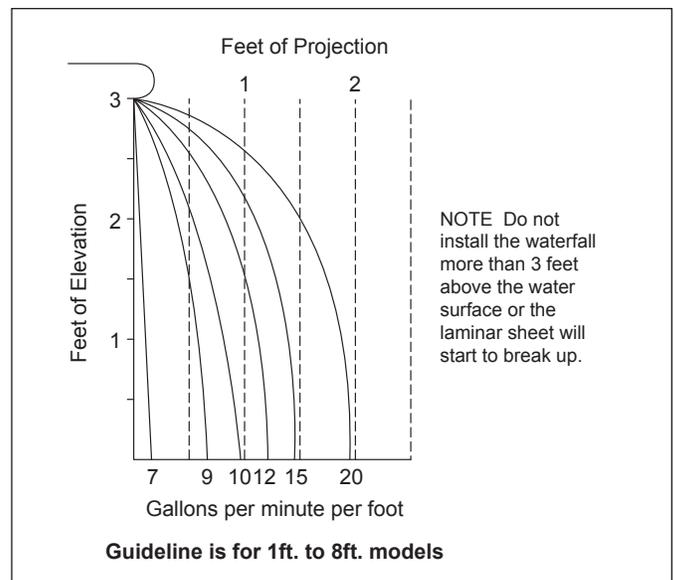


Figure 10. Water Flow Requirement Chart

feed line in a minimum of 1½ inches PVC schedule 40 pipe. Units above 5 feet in length need a minimum of 2 inch plumbing.

3.2 Separate Pump for the Sheer Descent Waterfall

If multiple waterfalls are being installed, or a Sheer Descent waterfall 6 feet or longer is being installed, we recommend installing a separate pump and filter.

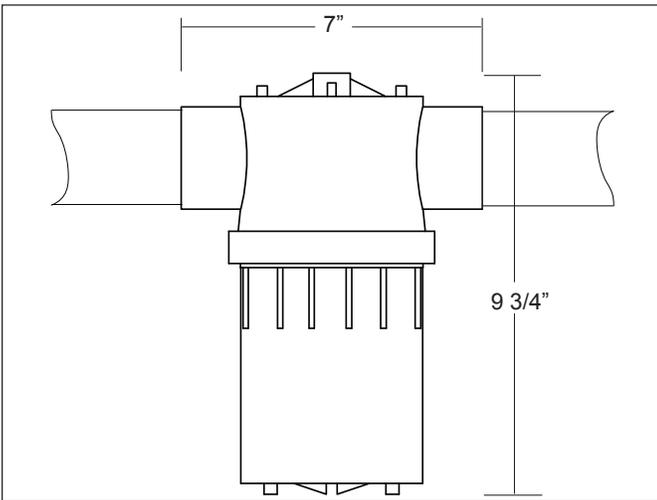


Figure 11. Sheer Descent Filter/Strainer (p/n 3456)

When plumbing a pump dedicated for use by the Sheer Descent, a separate suction line to the pool must be plumbed. This should be plumbed in a minimum of 2 inch schedule 40 pipe.

⚠ WARNING

For safety, at least two anti entrapment suction covers must be installed. It is recommended that they be 18 inches above the pool floor and must be at least 3 feet apart with no valves between the “Tee” and any of the suction covers.

A Sheer Descent filter/strainer (p/n 3456), or equivalent, must be installed on the return side of the pump, between the pump and the waterfall. Refer to Figure 11. FILTER IS REQUIRED for separate pump installations, as large debris must not be allowed to enter the waterfall unit. For installations requiring up to 60 gallons per minute, use one Sheer Descent filter/strainer. For higher water requirements, use two or more filters plumbed in parallel. A separate return line, with a three way valve plumbed in such a way that water can be balanced

between the waterfall and return back to the pool, is also required. See Figure 12.

Section 4. Plumbing the Sheer Descent Waterfall

4.1 Waterfall Return Line Plumbing

NOTE If the waterfall flow rate exceeds more that 40% of the filtration flow, a separate pump is recommended.

The waterfall feed line, from either the main filter pump or a separate pump, should be plumbed with a pipe size capable of handling the required flow rate of the waterfall. See Table 1.

NOTE Two inch plumbing or larger is suggested for waterfalls over 5 feet in total length. Refer to Hydraulic Guideline Chart, Table 1, for specifications. The feed line should end near the back of the bond beam near the center of the waterfall location.

Table 1. Hydraulic Guideline Chart

Suction (SUC) and Discharge (DIS) Water Flow Chart for PVC		
Pipe Size	Max SUC Flow*	Max DIS Flow**
1½"	37 GPM	50 GPM
2"	62 GPM	82 GPM
2½"	88 GPM	117 GPM
3"	136 GPM	180 GPM
4"	234 GPM	313 GPM

* Max SUC Flow based on 6 feet per second velocity.
** Mas DIS Flow based on 8 feet per second velocity.

It is important to have a valve located in a convenient location on the feed line to regulate the flow of water

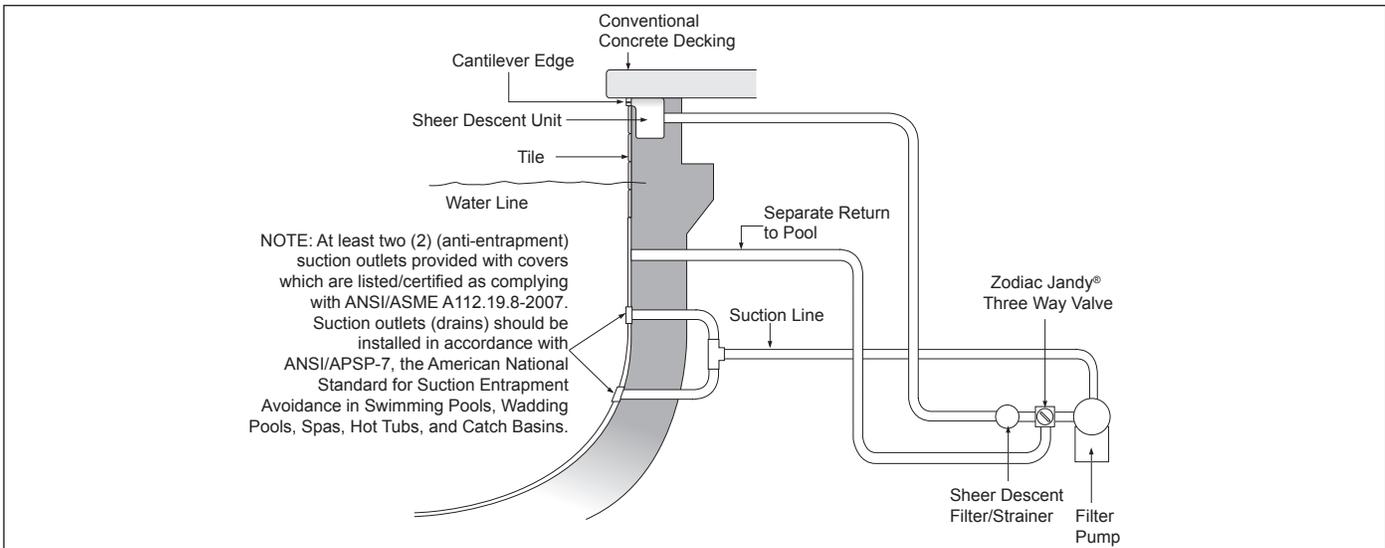


Figure 12. Filter Pump Installation

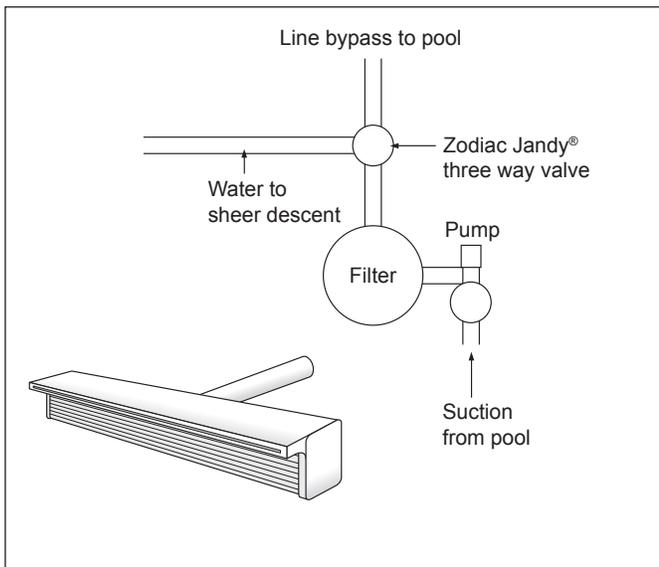


Figure 13. Three-Way Valve Plumbing Setup to the Sheer Descent waterfall. A Zodiac Jandy three-way valve is suggested to be used as the “T” from the return line of the pool to the Sheer Descent waterfall. A properly plumbed valve in that position will allow full control of the water to the Sheer Descent, as well as to the rest of the pool. In most cases, this valve can be located after the filter near the equipment pad. See Figure 13.

NOTE All water to the Sheer Descent must be filtered. Those systems using a separate pump must use our separate energy filter (p/n 3456) or equivalent to prevent debris from entering the Sheer Descent unit.

4.2 Plumbing a Single Unit

All back feed Sheer Descent waterfalls have the equivalent of standard 1½ inch inside and 2 inches outside pipe protruding from the back of the unit. For waterfalls 1 through 8 feet in length, this fitting is located in the center of the back of the waterfall.

Standard 1½ inch and 2 inch PVC fittings will glue in and over the 1½ inch slip by 2 inch insert fitting provided on all Sheer Descent waterfalls.

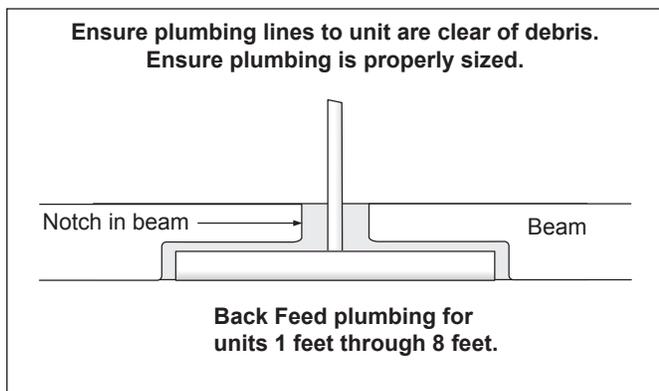


Figure 14. Single Sheer Descent Plumbing Setup

NOTE A flow control valve must be plumbed in a convenient location on the supply line for regulation of the water supply to the unit. See Figure 14.

4.3 Plumbing Multiple Units

Plumbing two or more Sheer Descent waterfalls together is done in exactly the same way as the installation procedure for a single unit, explained previously, with the exception that additional two-way valves are required for each Sheer Descent waterfall. See Figure 15. The loop plumbing option can also be used for two or more units. See Figure 16.

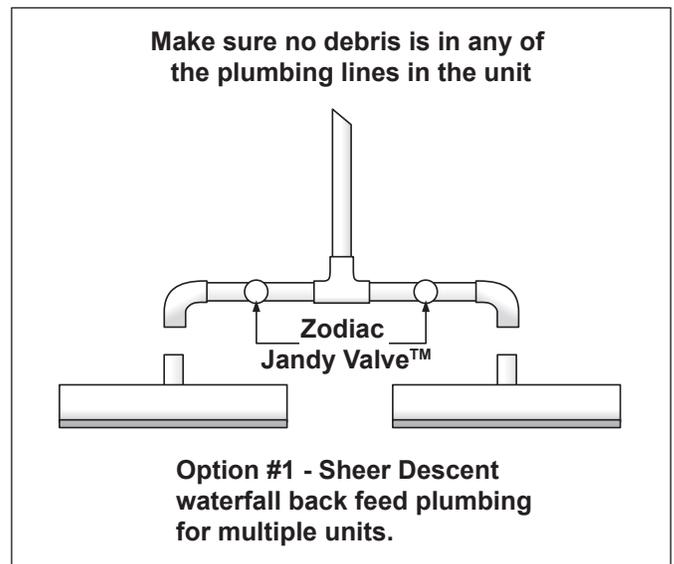


Figure 15. Multiple Sheer Descent Plumbing Setup

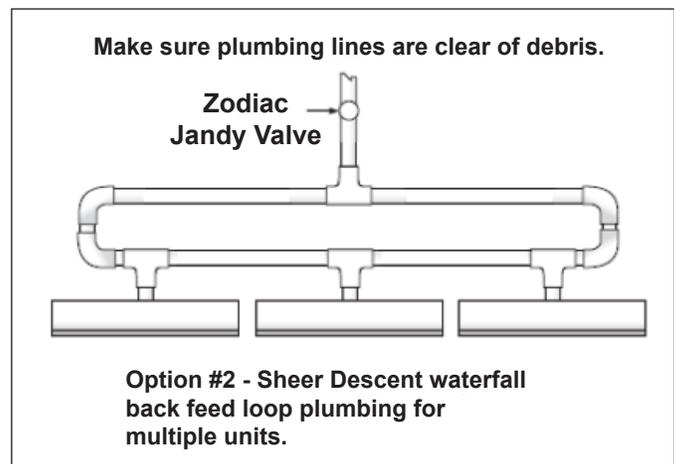


Figure 16. Multiple Sheer Descent Loop Plumbing Setup

4.4 Cutting the Lip for Radius or Custom Installations

The extended lip Sheer Descent waterfall can be custom cut in the field to meet specific needs, such as radius, irregular shapes, etc. In order to custom fit the waterfall,

carefully measure the amount of extended lip to be removed. Remember to leave enough room for tile and thin set, so the deepest edge of the radius cut will not be recessed from the tile line.

NOTE Never remove more than 4" of the extended lip, always leaving a minimum of 2" of lip. See Figure 17.

Remove the lip protector prior to cutting the waterfall. Remember to **REPLACE THE LIP PROTECTOR** after cutting the radius to protect the fall from construction debris.

The waterfall must be cut with a coarse tooth saw blade. Caution must be taken to make the cut as smooth as possible to avoid a jagged edge. After cutting the waterfall, insert the spacer removal tool (included in product packaging) 1 inch into the waterfall opening. Move the tool around the opening. If the tool hits a support, use the notch in the tool to remove the support. See Figure 18. Make sure all supports within 1 inch of lip opening are removed. **DO NOT LEAVE THE LOOSE SUPPORT SECTION IN THE WATERFALL.**

After removing sections of the supports, use a 1/8 inch flat file and coarse grade sandpaper to smooth the edges of the waterfall, follow with a fine grade of sandpaper to get the edge as smooth as possible. A sanding block is recommended to avoid rounding the edges of the waterfall.

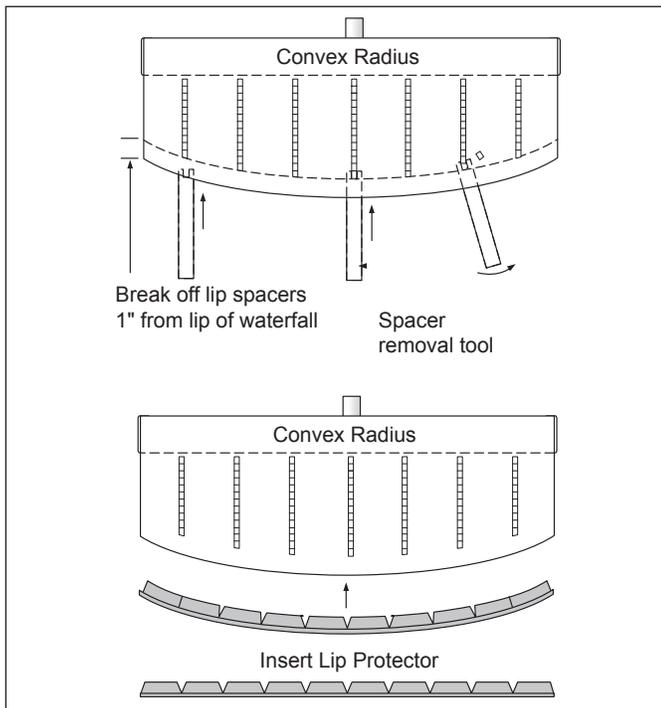


Figure 17. Custom Installations - Convex Radius

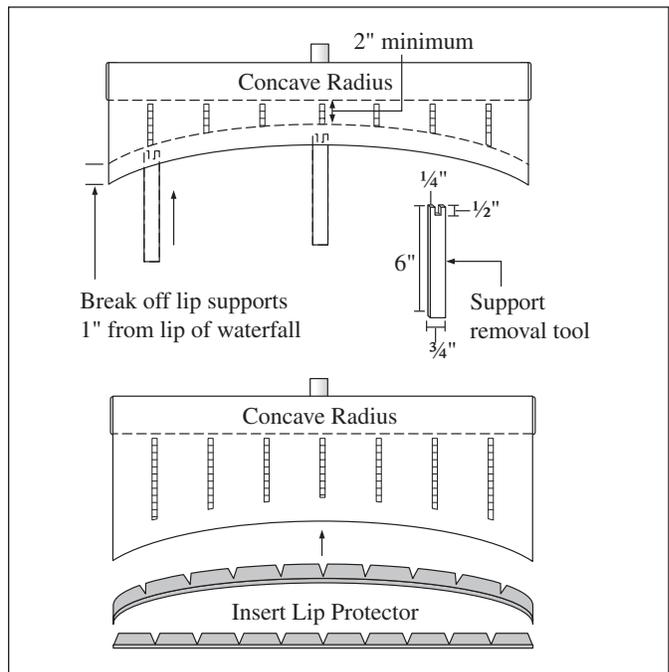


Figure 18. Custom Installations - Concave Radius

Insert the lip protector back into the opening and continue installation, following the installation instructions for the standard Sheer Descent waterfall.

4.5 Sheer Descent Waterfall Radius Cut Guideline

NOTE Never remove more than 4" of the extended lip, always leaving a minimum of 2" of lip. The top of the beam, where the Sheer Descent unit is to be installed, should be a minimum of 9" thick. When designing custom curves for the Sheer Descent Extended Lip models, please refer to Table 2, for radius guidelines to select the correct Sheer Descent model. Super Radius models accommodate very tight radius curves and are available by special order. Refer to Figure 19.

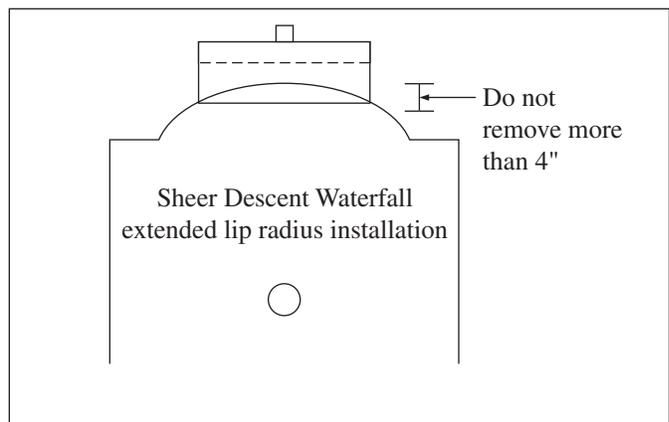


Figure 19. Extended Lip Radius Installation

Table 2. Sheer Descent Radius Chart

Use the chart below to ensure the Sheer Descent length, lip and radius are available.

		S h e e r D e s c e n t L e n g t h								
		12"	18"	24"	36"	48"	60"	72"	84"	96"
R a d i u s S i z e	1'	6" Lip	6" Lip	Custom	Custom	N/A	N/A	N/A	N/A	N/A
	1.5'	6" Lip	6" Lip	6" Lip	Custom	Custom	N/A	N/A	N/A	N/A
	2'	6" Lip	6" Lip	6" Lip	12" Lip	Custom	Custom	N/A	N/A	N/A
	2.5'	6" Lip	6" Lip	6" Lip	12" Lip	Custom	Custom	Custom	N/A	N/A
	3'	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	Custom	Custom	Custom	N/A
	3.5'	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	Custom	Custom	Custom	Custom
	4'	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom	Custom
	4.5'	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom	Custom
	5'	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom	Custom
	5.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom
	6'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom
	6.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom
	7'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom
	7.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom	Custom
	8'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom
	8.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom
	9'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	Custom
	9.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	12" Lip
	10'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	12" Lip
	10.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	12" Lip
11'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	
11.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	
12'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	
12.5'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	
13'	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	6" Lip	12" Lip	12" Lip	

Section 5. Start Up

5.1 Start Up Instructions

After the swimming pool is completed and filled with water, the Sheer Descent waterfall is ready to be activated.

1. REMOVE THE LIP PROTECTOR NOW. This must be done before water is diverted to the waterfall. Also, ensure the opening is clean and clear of any debris.
2. Turn the pump on. If the waterfall is plumbed with the main pool filter pump, allow the pump to run a few minutes to clear the lines of debris.
3. Slowly open the regulating valve and supply water to the Sheer Descent unit. Adjust the flow of water until the sheet of water extends out onto the pool surface.
4. Allow for air to clear the lines. This should only take a few minutes. The Sheer Descent waterfall unit should now provide a clear, continuous sheet of water.
5. If a separate pump was installed, make sure all valves are open prior to starting the pump. ENSURE ALL LINES ARE CLEAR OF DEBRIS BEFORE STARTING. Start the pump and allow water to circulate through the separate filter system and return line. Slowly open the valve to the waterfall and regulate to the desired setting. Allow a few minutes to purge all air from the lines.

Section 6. General Maintenance and Troubleshooting

Before proceeding, make sure the pump system is fully functional and activated. Also, ensure all air is purged from plumbing lines.

6.1 Troubleshooting

Problem	Cause	Solution
The waterfall is not completely smooth. A gap or gaps in the sheet of the waterfall is present.	Debris has lodged in the opening of the waterfall.	Use a credit card or similar object and gently position it inside the opening while the waterfall is on. Slide it along the opening to the point where the debris is located and gently pull the debris through the opening. Do not use a metal tool.
	Dirty filter, pump basket or both has slowed down the flow to below proper standards.	Clean filter, pump basket or both.
	Waterfall flow valve(s) are out of adjustment.	Adjust water flow valve(s).
	Waterfall radius was field cut and spacers were not removed.	Refer to Section 4.4 for proper spacer removal instructions.
Where multiple waterfalls are installed, one of the waterfalls is stronger than the other(s).	The water supplied to the units is not properly balanced.	Adjust the valves for each waterfall until the proper effect and balance is achieved. See Figure 15 for valve location.
	Improper loop plumbing installation.	Correct loop plumbing installation. Refer to Figure 16 for proper loop plumbing setup.

6.2 Freeze Protection and Winterizing

In order to prevent freeze damage to the system, the plumbing to the unit must be installed so water drains easily from the system. The Sheer Descent and Fiber Fall waterfalls have been engineered to allow only a minimum of water to stay in the unit as long as the plumbing is installed properly. Blow out all water from the pipes and Sheer Descent or Fiber Fall unit. Follow the normal procedures for winterizing.

* Trademarks used herein are the property of their respective owners.