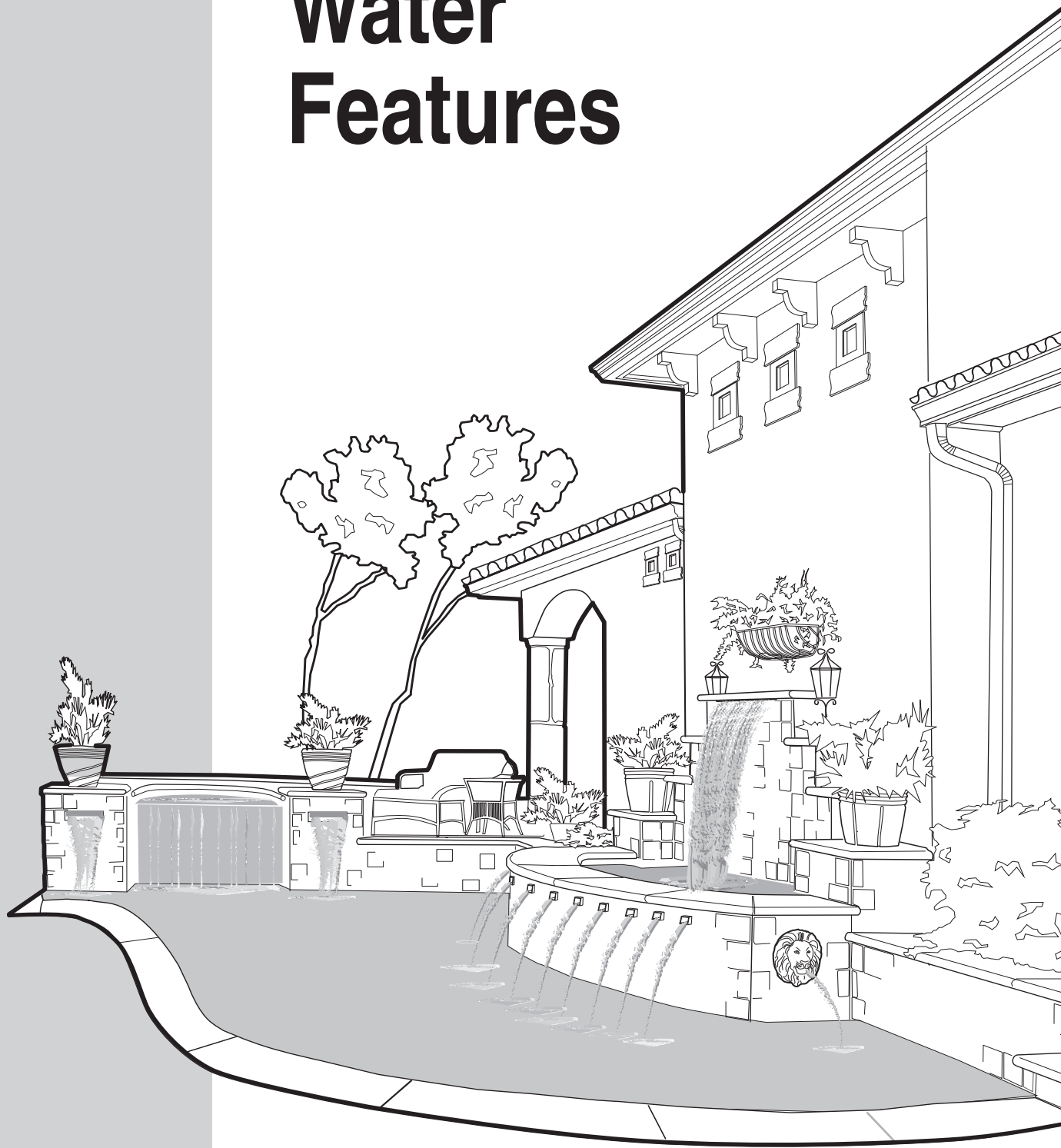




Building Water Features



B U I L D E R ' S G U I D E

For Customer Service, Design Service or Installation Support:

- Please return Warranty Card immediately.
- For online information: www.polarispool.com
- To contact Polaris: US and Canada
2620 Commerce Way
Vista, CA 92081-8431
1-800-822-7933

Specifications

PowerFall®

Dimensions: 2-5/8" W x 3-1/8" H
Unit Lengths: 12", 18", 24", 36", 48" and 60" with one 1-1/2" inlet. 72", 84" and 96" with one 2" inlet.
Nozzle Lengths: Standard 1", Extended 6", 9" and 12". Custom and radius cuts available.

PowerStreams™

Dimensions: 2-5/8" W x 3-1/8" H
Unit Lengths: 12", 18", 24", 36", 48", and 60" with one 1-1/2" inlet. 72", 84" and 96" with one 2" inlet.
Nozzle Lengths: Standard 1". Extended 6" and 9", Super-extended 12". Custom and radius cuts available.

FiberFall®

Dimensions: 2-5/8" W x 3-1/8" H
Unit Lengths: 12", 18", 24", 36", 48" and 60" with one 1-1/2" inlet. 72" with one 2" inlet.
Nozzle Lengths: Standard 1", Extended 3" and 6". Radius cuts available for 6" at factory.
Lamp: Polaris AfterDark® light driver recommended.
Optic Colors: Nine colors (including white), rotating or fixed.
Fiber Cables: Single 150-strand equivalent cable on 12", 18", and 24"; standard 1" nozzle units. Left connection.
Two 150-strand equivalent cables on 36" and 48"; standard 1" nozzle units. 2-sided connection.
Two 225-strand equivalent cables on 60" and 72"; standard 1" nozzle units. 2-sided connection.
Single 225-strand equivalent cable on 12", 18" and 24"; 3" and 6" nozzle units. Left connection.
Two 225-strand equivalent cables on 36", 48", 60" and 72"; 3" and 6" nozzle units. 2-sided connection.

PC Spillways®

Dimensions: 2" W x 2" H x 8" L
Construction: Stainless Steel, with 1" threaded fitting.
Dimensions: 2" W x 2" H x 12" L
Construction: Stainless Steel, with 1/4" flange for non-plumbed, simple spillway.

PS Scuppers®

Dimensions: 8.5" D x 8" W x 4" H
Construction: Stainless Steel or Copper, with 1" threaded fitting. Special order 3/4" bottom-feed fitting also available.

MiniJet®

Dimensions: 3" W x 3" H
Construction: Brass nozzle. Adaptable to gunite or vinyl.

FlowControl MiniJet® Patent pending.

Dimensions: 3" W x 3" H
Construction: Brass nozzle. Adaptable to gunite or vinyl. Flow control at nozzle.



12' radius RainFall uses a 2 row nozzle, 8 inlets,

Building A Custom Water Feature

Building custom water features requires more than the basic construction techniques used in most pools and spas. Without careful design and the proper amount of water flow, water features will not achieve optimum performance. With this in mind, Polaris has created this guide with helpful tips for designing, building and plumbing custom water features.

Styles of Water Features

Waterfalls

- PowerFall: Waterfall forms a smooth sheet from a height of up to 3.5 feet
- PowerStreams: Nozzle inserts create individual streams of water from a height of up to 15 feet
- FiberFall: Waterfalls that include fiber optics to light the nozzle of the waterfall

Designer Sconces Handcrafted designer fountain covers

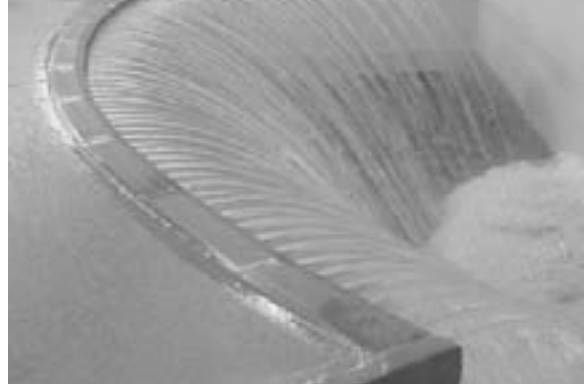
Spillways

- PC Spillways: Stainless steel plumbed or non-plumbed tubes create 2" spillways
- PS Scupper: Copper or stainless steel, plumbed 8" wide scuppers create a distinctive water feature for pool and deck overhangs

Jets

- MiniJet: Standard wall or deck mounted jets
- Flow Control MiniJet: Wall or deck mounted jets with complete flow adjustment capability at the nozzle, no valving required

Waterfalls

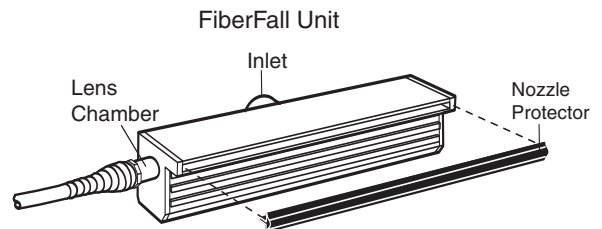
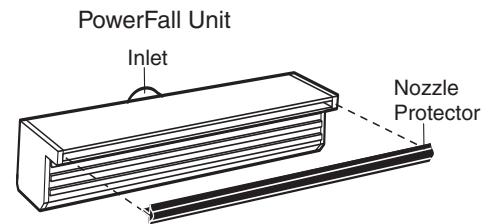


8' concave radius cut multi-unit PowerStream, 3 inlets

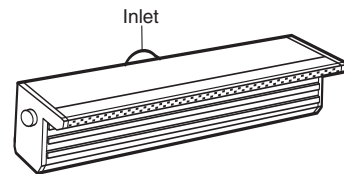
Polaris Waterfall Standard Features

(no extra upcharges)

- Compact size for a variety of applications
- Patented X-Baffle™ brand turbulence suppressor provides maximum internal support and ensures flow through the full length of falls
- Standard waterfall lengths from 12 inches to 96 inches (72 inch max. for FiberFalls)
- Low water flow demands of 1 gallon per minute per inch, even less for the PowerStreams units (see chart)
- One back-side inlet for all standard falls up to 96 inches
- Nozzle lengths of 1, 6, 9 or 12 inches
- Colors in white, black, gray or tan
- Factory radius cuts
- Sonic welded components ensure no leaks
- Factory tested for quality water flow



PowerStreams Unit - 2 Row
(Note: There is no nozzle protector with this style)

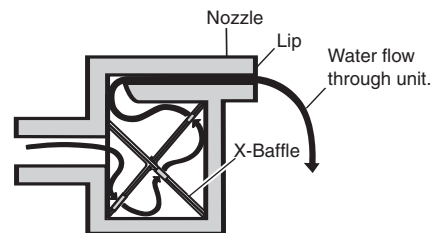


Polaris CustomFalls® Features

(Requires special order and upcharges)

- PowerFalls over 96 inches in length
- Custom concave or convex radius cuts
- Customized deflector or nozzle profile
- Bottom or side feed inlet
- Custom crating freight

For assistance with design on CustomFalls, contact Polaris.



Side Cutaway View



12' concave radius cut multi-unit PowerFall 6 inlets

Pumps and Pipe Sizing

Optimum Flow Rate

The plumbing standard for the optimum flow rate is 1 Gallon Per Minute Per Inch (GPM/IN). Minimum flow rate is .5 GPM/IN. With the proper water flow, a standard PowerFall or FiberFall will retain an unbroken sheet of water to a maximum drop of 3.5 feet.

For water features set at higher elevations, up to 15 feet, use the PowerStreams to create a shower of individual water streams.

Pipe Sizing

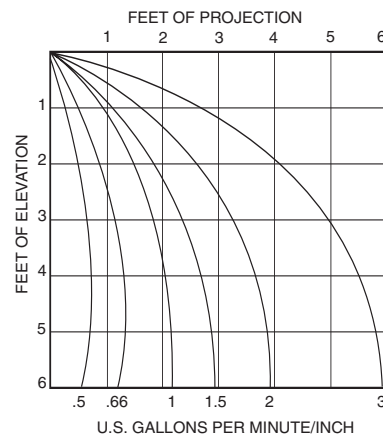
The pipe size must be large enough to handle the rate of water flow.

- Use a minimum of 1-1/2" pipe with units 12"- 60" in length
- Use 2" pipe in units exceeding 60" in length
- Use dedicated plumbing lines on units over 36" in length

Pump Sizing

If the waterfall flow requirement exceeds 40% of the output of the circulation pump, a dedicated pump must be used for the waterfall to operate correctly.

Approximate Sheet Projection For A PowerFall with a 1/8" Thick Sheet of Water



STANDARD SIZE POWERFALL, METAL POWERFALLS, FIBERFALL

SIZE IN FEET	SIZE OF UNIT	GPM REQUIRED	MINIMUM PUMP	MINIMUM FALL FEED	MINIMUM PUMP SUCTION
1	12"	12 GPM	1/2 HP	1.5" Pipe	1.5" Pipe
1.5	18"	18 GPM	1/2 HP	1.5" Pipe	1.5" Pipe
2	24"	24 GPM	1/2 HP	1.5" Pipe	1.5" Pipe
3	36"	36 GPM	3/4 HP	1.5" Pipe	1.5" Pipe
4	48"	48 GPM	3/4 HP	1.5" Pipe	1.5" Pipe
5	60"	60 GPM	1 HP	1.5" Pipe	1.5" Pipe
6	72"	72 GPM	1.5 HP	2" Pipe	2" Pipe
7	84"	84 GPM	1.5 HP	2" Pipe	2" Pipe
8	96"	96 GPM	2 HP	2" Pipe	2" Pipe

CUSTOM SIZE POWERFALL

9	108"	108 GPM	3 HP	2.5" Pipe	2.5" Pipe
10	120"	120 GPM	3 HP	2.5" Pipe	2.5" Pipe
11	132"	132 GPM	3 HP	2.5" Pipe	2.5" Pipe
12	144"	144 GPM	2.5 HP(2)	3" Pipe	3" Pipe
13	156"	156 GPM	2.5 HP(2)	3" Pipe	3" Pipe
14	168"	168 GPM	2.5 HP(2)	3" Pipe	3" Pipe
15	180"	180 GPM	2.5 HP(2)	3" Pipe	3" Pipe
16	192"	192 GPM	2 HP(2)	3" Pipe	4" Pipe
17	204"	204 GPM	2 HP(2)	3" Pipe	4" Pipe
18	216"	216 GPM	3 HP(2)	3" Pipe	4" Pipe
19	228"	228 GPM	3 HP(2)	4" Pipe	4" Pipe
20	240"	240 GPM	3 HP(2)	4" Pipe	4" Pipe

Pumps and Pipe Sizing



Installation of circle radius design

STANDARD SIZE POWERSTREAMS								
1 ROW			2 ROW			3 ROW		
SIZE IN FEET	SIZE OF UNIT	GPM REQUIRED	SIZE IN FEET	SIZE OF UNIT	GPM REQUIRED	SIZE IN FEET	SIZE OF UNIT	GPM REQUIRED
1	12"	4 GPM	1	12"	8 GPM	1	12"	12 GPM
1.5	24"	6 GPM	1.5	24"	12 GPM	1.5	24"	18 GPM
2	24"	8 GPM	2	24"	16 GPM	2	24"	24 GPM
3	36"	12 GPM	3	36"	24 GPM	3	36"	36 GPM
4	48"	16 GPM	4	48"	32 GPM	4	48"	48 GPM
5	60"	20 GPM	5	60"	40 GPM	5	60"	60 GPM
6	72"	24 GPM	6	72"	48 GPM	6	72"	72 GPM
7	84"	28 GPM	7	84"	56 GPM	7	84"	84 GPM
8	96"	32 GPM	8	96"	64 GPM	8	96"	96 GPM

Many pumps are up-rated, which is indicated by a 1.0 service factor. Verify flow specifications at 50' head with the pump manufacturer's recommendations. Also check the suction and discharge water flow for pipe size.

Typical Pump Performance At 50' of Head		
1/2 HP	=	26 GPM
3/4 HP	=	58 GPM
1 HP	=	68 GPM
1-1/2HP	=	93 GPM
2 HP	=	106 GPM
3 HP	=	140 GPM

Suction (SUC) and Discharge (DIS) Water Flow Chart for PVC		
Pipe Size	Max SUC Flow*	Max DIS Flow**
1-1/2"	48 GPM	60 GPM
2"	80 GPM	100 GPM
2-1/2"	112 GPM	140 GPM
3"	180 GPM	225 GPM
4"	312 GPM	390 GPM
6"	700 GPM	900 GPM
8"	1248 GPM	1560 GPM

* Based on 8' per second velocity. ** Based on 10' per second velocity.

For longer plumbing runs, check this chart for increased pump requirements.

POWERFALL UNIT SIZE										
LENGTH OF PLUMBING RUN	12"	18"	24"	36"	48"	60"	72"	84"	96"	
	50'					48 GPM 3/4 HP			96 GPM 2 HP	
	100'		18 GPM 1/2 HP		36 GPM 3/4 HP	1-1/2" SUC 1-1/2" DIS	60 GPM 1 HP	72 GPM 1-1/2 HP	84 GPM 1-1/2 HP	2-1/2" SUC 2" DIS
	150'	12 GPM 1/2 HP	1-1/2" SUC 1-1/2" DIS	24 GPM 3/4 HP	1-1/2" SUC 1-1/2" DIS		2" SUC 1-1/2" DIS	2" SUC 2" DIS	2-1/2" SUC 2" DIS	
	200'	1-1/2" SUC 1-1/2" DIS		1-1/2" SUC 1-1/2" DIS						
	250'					48 GPM 3/4 HP				96 GPM 2 HP
	300'		18 GPM 3/4 HP		36 GPM 3/4 HP	2" SUC 1-1/2" DIS	60 GPM 1-1/2 HP	72 GPM 1-1/2 HP	84 GPM 2 HP	3" SUC 2-1/2" DIS
	350'		1-1/2" SUC 1-1/2" DIS		1-1/2" SUC 1-1/2" DIS		2-1/2" SUC 2" DIS	2-1/2" SUC 2" DIS	2-1/2" SUC 2" DIS	

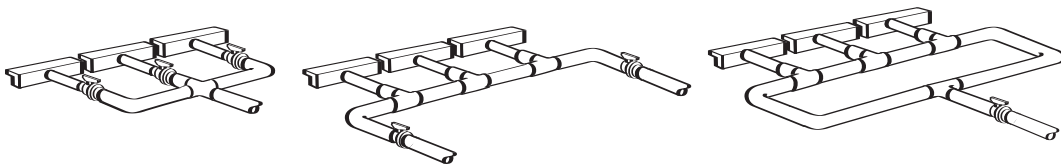


Multiple 18' PowerStreams using a 2 row nozzle

Plumbing, Pipes and Pressure

Additional Plumbing Considerations

- Use an in-line filter with PowerStreams to maintain water flow through the outlet holes.
- Two or more lines plumbed to the same water feature should be the same length.
- Valve each unit separately or, if units are the same size and set at the same elevation, plumb a loop to equalize water flow to all units.



- Run plumbing line(s) to waterfall at grade to properly support inlet pipe.
- Always pressure test plumbing lines before connected to the waterfall.
- Cap or tape open ends of the pipe to keep debris out of the plumbing lines.

Adjustable for Performance

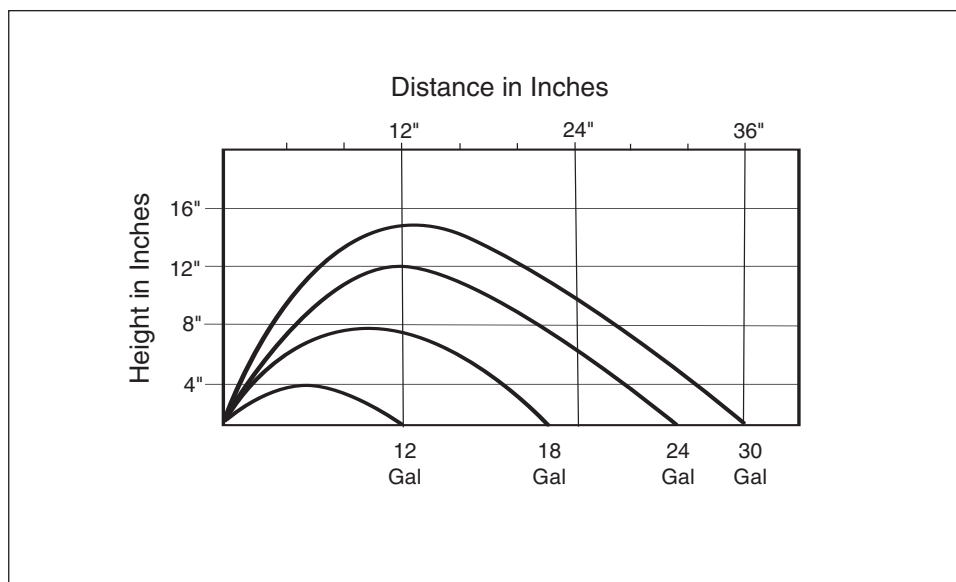


Convex radius cut unit

Optimum Flow Rate for Up Deflectors

The amount of flow determines the height and distance of the waterfall projection. A valve is used to adjust the rate of flow.

The chart below shows the amount of flow required to achieve various projections.



FLOW RATE IN GALLONS PER FOOT FOR UP DEFLECTORS		
GAL/FT	PROJECTION UP	PROJECTION OUT
12 GAL.	4"	12"
18 GAL.	8"	22"
24 GAL.	12"	31"
30 GAL.	15"	36"

All up deflectors are manufactured with a 2" water inlet. Maximum flow for 2" pipe is 100 GPM. So, the maximum size fall with a 36" projection is FFWS-36.



16' convex radius cut multi-unit PowerFall, 6 inlets

Custom Cuts for Style

Radius Cuts

Polaris provides radius cuts on PowerFall and PowerStreams units at the factory **free of charge**. Arrange for the cut when ordering.

To radius cut a waterfall in the field:

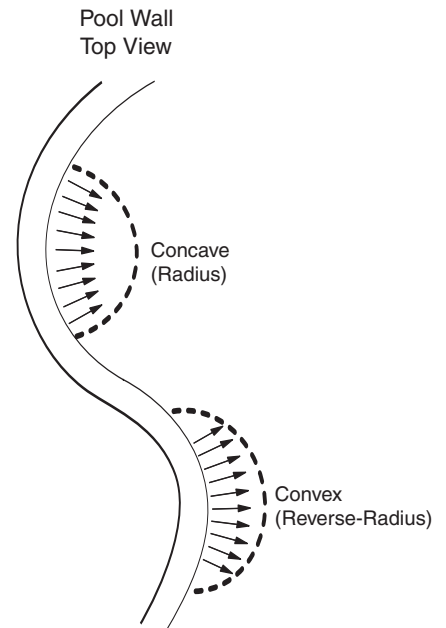
- Mark the underside of the PowerFall.
- Cut using a variable speed jigsaw with a coarse blade.
- Sand the finish smooth.
- Use the spacer tool, included with the fall, to remove the spacer to a distance of 1" from the front lip.
- Install the nozzle protector until construction is complete.

Refer to the chart below to order the correct PowerFall model for the radius size requirements. If the requirements fall into the Custom Nozzle area, the waterfall must be special ordered. Call Polaris at 1-800-822-7933 for ordering information.

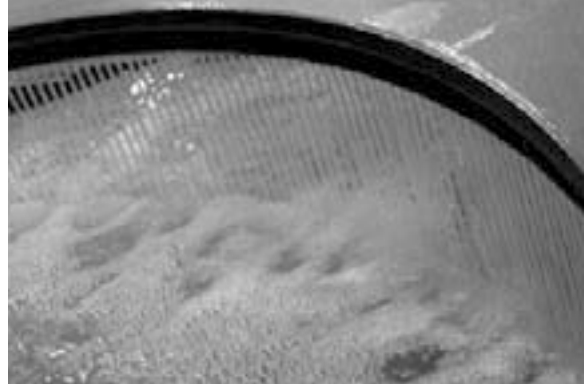


		PowerFall Length								
		12"	18"	24"	36"	48"	60"	72"	84"	96"
Radius Size	1'									
	1.5'									
	2'				6" Nozzle					
	2.5'				6" Nozzle					
	3'									
	3.5'									
	4'									
	4.5'				6" Nozzle					
	5'									
	5.5'									
	6'									
	6.5'									
	7'									
	7.5'									
	8'									
	8.5'									
	9'									
	9.5'									
	10'									
10.5'										
11'										
11.5'										
12'										
12.5'										
13'										

6" Nozzle	9" Nozzle	12" Nozzle	Custom Nozzle	Not available



Easy Installation



8' concave radius cut multi-unit RainFall with down deflector

Refer to the installation guide for complete, detailed information on the easy four-step installation process.

The fall is plumbed following the specified requirements to ensure proper flow and optimum performance.

The bond beam is notched to accommodate the specific waterfall unit.

Bender board is used to determine the water level and frame the niche.

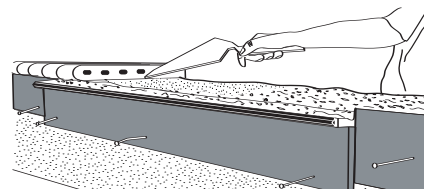
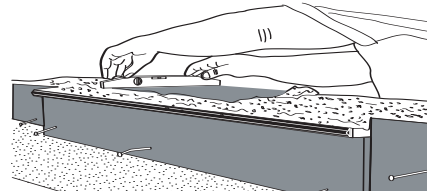
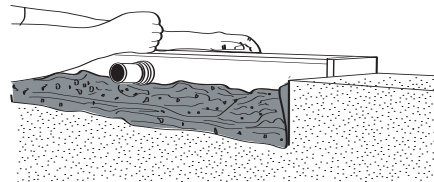
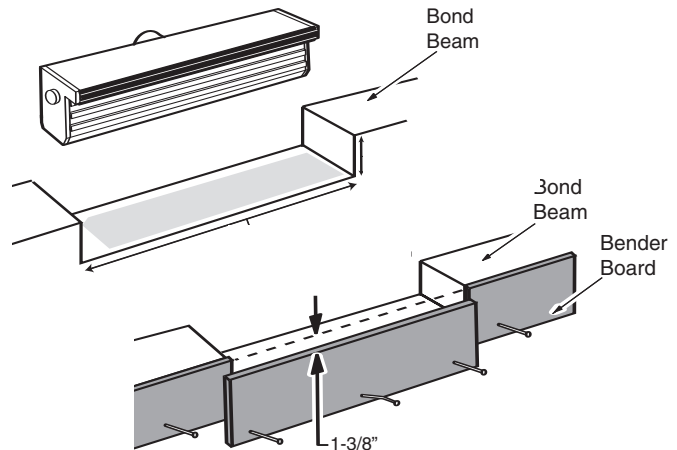
A bed of cement mortar is created in the niche.

The unit is then set into the mortar with the nozzle extended into the pool so that the nozzle lip will be 1/4" past finished pool wall.

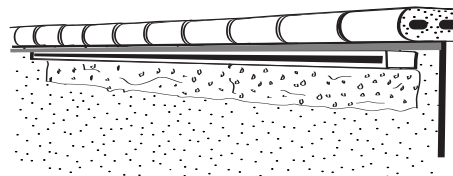
Cement is applied to encase the unit.

Thin-set is used to install the coping material and the bender board is removed.

After system inspection, the waterfall inlet is connected to the plumbing lines and the valve to the falls is opened.



Completed Installation - Front





Line of plumbed PC Spillways.

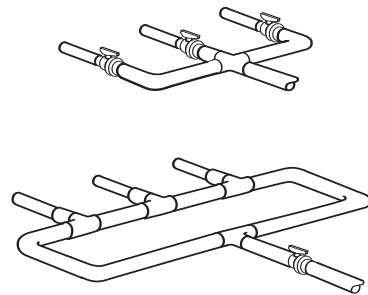
Spillways and Scuppers

Spillways and scuppers are perhaps the easiest way to bring visual interest and the soothing sound of falling water to a pool.

The flanged spillway provides a simple, flow-through with no plumbing required. These units are for spillways from one body of water to another, like a fountain to the pool.

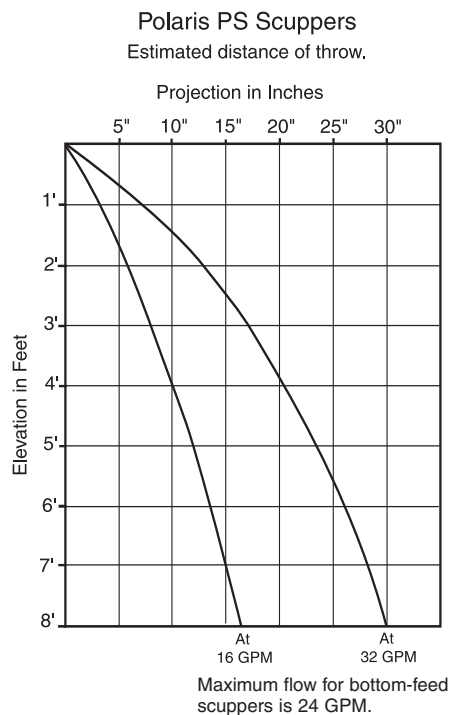
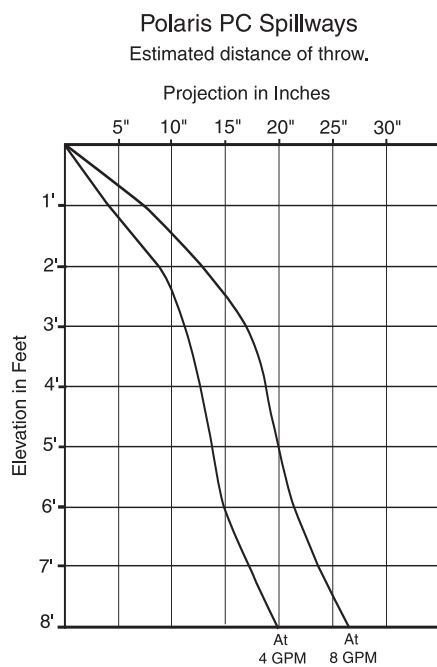
The threaded units are for plumbed applications where flow control is desired. Install the spillways on raised bond beams in the pool wall, patio deck or a planter. Install scuppers anywhere on the pool or patio overhangs.

- Use 1" PVC piping for spillway feed lines.
- Valve each line to regulate the water flow.
- If two or more spillways are connected to the same feed line, plumb a loop to equalize water flow to all units or valve each unit individually.
- Always pressure test plumbing lines before connecting to the water feature.
- Cap or tape open ends of the pipe to keep debris out of the plumbing lines.



Plumbing the Unit

1. Apply pipe tape or pipe dope to the threads of a 1" male pipe fitting.
2. Thread spillway onto fitting.



Jets



A line of MiniJets mounted in the pool wall.

The Polaris MiniJet projects a stream of water from the deck or pool wall. The jet can project up to 13 feet and the solid brass nozzle can be adjusted up to a 45° angle. With a reasonably low water flow requirement, it is a versatile, low cost option with big effects.

- Set MiniJets in a line along the pool wall
- Set pairs of opposing water streams to form arches meeting in the center of a pool
- Create a blossom feature with multiple MiniJets positioned to converge in a round spa

Plumbing Considerations

Flow and pressure control the projection of the water. As a rule, 4.4 GPM per nozzle will provide adequate water flow.

The pipe size requirement for the manifold or plumbing loop is determined by the number of MiniJets being installed.

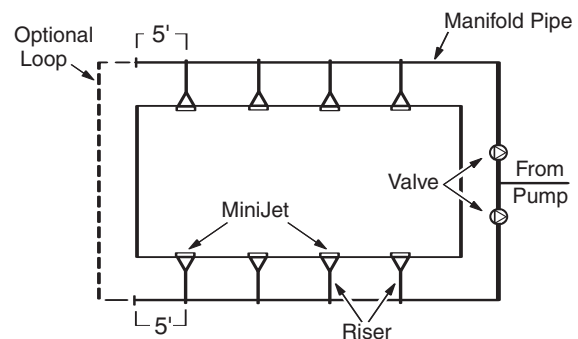
MiniJet Performance Data Chart				
Height of Spray	3.3'	6.6'	9.8'	13.1'
Feet of Head	3.9'	7.9'	11.9'	16.0'
GPM	2.1	3.0	3.7	4.4

MiniJet Pipe Sizing		
Max. MiniJets	Return Pipe Size	Suction Pipe Size
8	1-1/2"	1-1/2"
12	2"	2"
16	2-1/2"	2-1/2"
26	3"	3"

Standard MiniJets

The manifold pipe should be as close to the beam as possible and should extend 5 ft. past the last MiniJet. Use 1/2" PVC pipe to connect the MiniJet(s) to the manifold.

If the MiniJets are lined up to project water streams of equal distance, cut the risers to equal lengths. If they are not set in lines parallel to the pool edge, valve them separately.



FlowControl MiniJets

The manifold pipe should extend 2 ft. past the last MiniJet. Use 1/2" PVC pipe to connect the MiniJet(s) to the manifold.

Since flow is controlled at the jet, there are **no restrictions on the length or configuration of the risers, and no valves** are needed.



Deck mounted MiniJets.

Sparkle and Splash

Mounting the Jet

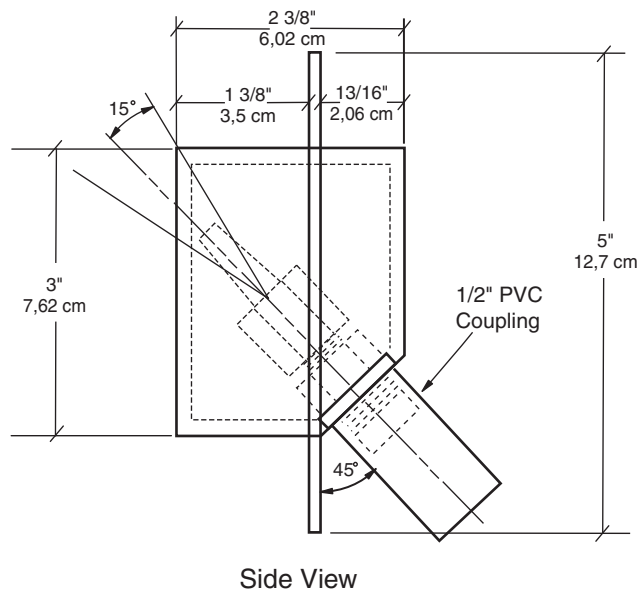
The MiniJet can be mounted vertically in a pool wall slightly above water level or horizontally in the pool deck, wall cap, planter, etc. Do not install the MiniJet in the pool wall if an automatic pool cover track is being used.

To mount in a pool wall:

1. Determine the water level of the pool and position the jet to optimize performance.

If water covers the nozzle the projection will be affected. If mounted too high, the coping may interfere with jet performance.

2. Establish the vertical center line of each MiniJet and layout the center lines to coordinate with the tile pattern.
3. Cut or block out a 6" x 6" notch through the beam.
4. Attach the feed pipe to the MiniJet. The pipe must extend past the back of the beam.



To mount horizontally:

1. Attach the 1/2" feed pipe to the MiniJet.
2. Level and anchor the MiniJet into place.



Your pool. Our reputation.

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