



Technical Information / Blower Sizing

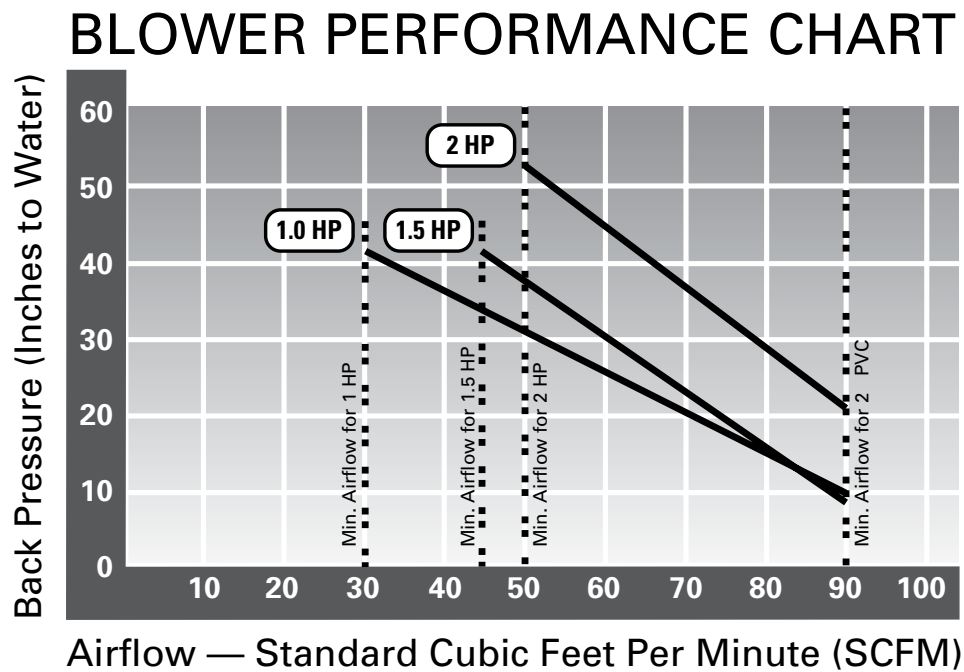
Friction loss of water in feet of head per 100 foot length of pipe.

1. Calculate water depth in inches:

A.	Actual water depth in injector	=	_____
B.	Add ½" of water per 90° elbow	=	_____
C.	Add 1/8" of water per 45° elbow	=	_____
D.	Add 1" of water per 10 feet of 2" pipe	=	_____
E.	Add 4" of water per ½" spring check valve	=	_____
TOTAL INCHES OF WATER		=	_____

2. Find the airflow or SCFM provided by your blower:

- On the **Blower Performance Chart**, find the number that corresponds to the **total inches of water** needed.
- Read across the chart until you **intersect the horsepower (HP)**, then go down for SCFM.
- Take total SCFM and divide by 10 to get corresponding hole sizes.



3. Calculate the number of holes by using the Air Hole Sizing Chart:

Air Hole Sizing Chart	
Air Hole Size	Number of Holes Needed per 10 SCFM
1/8"	24
5/32"	15
3/16"	11
¼"	6
5/16"	4
Jet	1



Hole Saw Sizes

STORM JETS

Jets - Adjustable Cluster Storm	1 1/2"
Jets - Mini Storm	
Flat Gasket	2 3/16"
Grommet Gasket	2 1/4"
Jets - Poly Storm	
Flat Gasket	2 5/8"
Grommet Gasket	2 11/16"
Jets - Power Storm	
Flat Gasket	3 3/4"
Grommet Gasket	3 7/8"
Jets - Mega Storm with Flat Gasket	4 3/4"

JETS

Jets - Euro	1 1/16"
Jets - Fog	9/16"
Jets - Jumbo	5 3/4"
Jets - Jumbo Storm	5 3/4"
Jets - Master Massage	5 3/4"
Jets - Old Faithful	4 3/4"
Jets - Ozone/Cluster	1"
Jets - Poly	2 5/8"
Jets - Turbo	3 1/4"

SUCTIONS

Suction - Lo-Pro and Hi-Flo/Ultra High Flo	
Flat Gasket	2 3/8"
Grommet Gasket	2 1/2"
Suction - Super Hi-Flo/Designer Pro/Ultra High Flo	
Flat Gasket	3 1/4"
Grommet Gasket	3 7/16"

AIR COMPONENTS

Air Bleed	1 5/16"
Air Button	1 1/2"
Air Control - Lo-Pro	1 5/8"
Air Injector - Button	3/8"
Air Injector - Lo-Pro	3/4"
Air Injector - Multi-Body	5/8"
Air Injector - Ozone	5/8"
Air Injector - Top Flow	1 3/16"

VALVES

Valves - Diverter - 1" Mini	2 1/16"
Valves - Diverter - 2" Top Access	3 1/4"
Valves - Spa Drain and Fill	1 5/8"
Valves - Turn On / Off	1 1/4"

LIGHTS

Light - 1/2"	3/8"
Light - 1"	5/8"
Light - 2 1/8"	1 5/8"
Light - 3"	2 5/8"
Light - 5" Jumbo	3 3/4"
Light - 7" XL Jumbo	5 3/4"
Cup Holder with hole saw size	2 5/8"

SKIMMERS / FILTERS

5 1/2" Top Load Filter	4 1/8"
Skim Filter - Dyna-Flo	6 7/8"
Grommet Gasket	7"
Skimmers - Strip	
Flat Gasket	2 3/8"
Grommet Gasket	2 1/2"
Filters - Top Load	6 7/8"
Grommet Gasket	7"
Teleweir Skim Filters	6 7/8"

SPECIALTY ITEMS

Aroma Therapy Canister	1 5/8"
Auto Vent	4"
Fittings - Thru Wall	1 5/16"
Return Fitting	2 5/16"
Thermosensor	1"
Thermowell - Mini	1 3/16"
Waterway Cascade	(2) x 7/8"



1. Write in the number of jets needed and jet type.
2. Write in jet orifice size.
3. Use the Jet Flow Chart & Performance Curve to determine GPM and PSI.

**Total GPM is water volume needed to make jets work at desired PSI.
This is your TARGET FLOW and TARGET PRESSURE.
Take this number to Hydraulic Worksheet (next page) and use in Line 2.
This is the total GPM needed at a desired PRESSURE.**



1. Determine required turnover rate for spa in gallons per minute (GPM).

$$\frac{\text{Total Gallons}}{\text{Desired Turnover Rate (30 min. spa)}} = \text{GPM}$$

2. Determine GPM and PSI needed for maximum jet performance (use Jet Performance Flow Curves from page 114).

$$\frac{\text{Target Flow (GPM)}}{\text{Target Pressure (PSI)}}$$

3. A. Figure resistance head of system:

From Friction Flow Chart on page 254 and Friction Loss in Fittings on page 255, convert fittings and pipe lengths into feet of head.

EXAMPLE:

A. (4) 2" 90° elbows = 4 x 8.6 = 34.4 feet of 2" pipe

B. 50 feet of 2" pipe = 50 feet

A + B: 34.4 feet + 50 feet = 84.4 feet

Looking at the Friction Flow Chart, 2" pipe at 10 feet per second gives us 100 GPM at 14.4 feet of head. This is figured in 100 foot length of pipe. We multiply .844 times 14.4 = 12.15 feet of head. Or to convert to PSI x .433 = 5.26 PSI loss.

$$\text{A } \frac{\text{Quantity}}{\text{Fitting Type (Friction Loss)}} = \text{Straight Length of Pipe}$$

$$\text{B } \frac{\text{Quantity}}{\text{Pipe}} = \text{Straight Length of Pipe}$$

$$\frac{\text{A}}{\text{B}} + \frac{\text{B}}{\text{Total Pipe Length}}$$

$$\frac{\text{Pipe Length}}{\text{Head of Loss for 100 ft. Length}} = \text{Feet of Head}$$

B. Figure Actual Head Loss of Components: (Refer to Head Loss Chart on Page 259)

EXAMPLE:

1) One 1 1/2" main drain at 50 GPM has 2 feet of head.

2) One 1 1/2" skimmer 50 GPM has 4 feet of head.

Total head loss of components is 6 feet of head.

Quantity	GPM	Head Loss

Total Head Loss of Components: _____

C. Add Head Loss from B and C for Total Resistance Head:

EXAMPLE:

12.15 feet of head (from system resistance) + 6 feet of head (from component head loss) = 18.15 feet of head

$$\frac{\text{Resistance of Head Fittings, etc.}}{\text{Component Head Loss}} = \text{TDH}$$

D. Total of B and C is TDH (total dynamic head) of system. Convert total head into PSI by multiplying by .433:

EXAMPLE:

18.15 feet of head x .433 = 7.86 PSI

(This is the amount of pressure lost in the system)

$$\frac{\text{TDH}}{\text{PSI}} \times .433 = \text{PSI}$$

E. Add Target PSI from Jet Worksheet (or Line #2) to Total Pressure Loss (PSI) Line D to find Total Pressure Required and Total Dynamic Head of System:

EXAMPLE:

14 PSI (Required for jets) + 7.86 PSI (Required for system) = 21.86

PSI

F. Match appropriate pump by looking at pump curves.

EXAMPLE:

At 22 PSI (or 50 feet of head) at 100 GPM, you can use The Executive 1 HP Pump or a 2 HP Hi-Flo Side Discharge Pump

$$\frac{\text{Jets PSI Required}}{\text{System PSI Required}} = \text{Total PSI Required}$$



Technical Information / Friction Flow Chart

Friction loss of water in feet of head per 100 foot length of pipe.

U.S. Gal. per Min.	3/4 PIPE			1 PIPE			1 1/4 PIPE			1 1/2 PIPE			2 PIPE			2 1/2 PIPE			3 PIPE		
	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI	Vel. Ft. per Sec.	Loss in Feet	Loss in PSI
1	.60	.25	.11	.37	.07	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	1.20	.90	.39	.74	.28	.12	.43	.07	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	1.80	1.92	.83	1.11	.60	.26	.64	.16	.07	.47	.07	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	2.41	3.28	1.42	1.48	1.02	.44	.86	.25	.11	.63	.12	.05	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	3.01	5.8	2.51	1.86	1.52	.65	1.07	.39	.17	.79	.18	.08	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	3.61	7.0	3.0	2.33	2.15	.93	1.29	.55	.24	.95	.25	.11	.57	.07	.03	.....	.....	.....	.....	.....	.....
8	4.81	11.8	5.1	2.97	3.6	1.56	1.72	.97	.42	1.25	.46	.2	.76	.14	.06	.54	.05	.02	.....	.....	.....
10	6.02	17.9	7.75	3.71	5.5	2.4	2.15	1.46	.63	1.58	.69	.3	.96	.21	.09	.67	.09	.04	.....	.....	.....
15	9.02	37.8	16.37	5.57	11.7	5.07	3.22	3.07	1.33	2.36	1.45	.63	1.43	.44	.19	1.01	.18	.08	.65	.07	.03
20	.....	.....	.....	7.42	19.9	8.62	4.29	4.2	1.82	3.15	2.47	1.07	1.91	.74	.32	1.34	.30	.13	.87	.12	.05
25	.....	.....	.....	9.28	30.0	13.0	5.36	7.9	3.42	3.94	3.8	1.6	2.39	1.11	.05	1.67	.46	.2	1.08	.16	.07
30	.....	.....	.....	11.14	42.0	18.19	6.43	11.1	4.8	4.73	5.2	2.3	2.87	1.55	.67	2.01	.65	.28	1.30	.23	.1
35	.....	.....	.....	.....	.....	.....	7.51	14.7	6.37	5.52	7.0	3.03	3.35	2.06	.89	2.35	.88	.38	1.52	.30	.13
40	.....	.....	.....	.....	.....	.....	8.58	18.9	8.2	6.30	8.9	3.9	3.82	2.63	1.14	2.64	1.11	.48	1.73	.39	.17
45	.....	.....	.....	.....	.....	.....	9.65	23.5	10.18	7.09	11.1	4.8	4.30	3.28	1.4	3.01	1.39	.6	1.95	.48	.21
50	.....	.....	.....	.....	.....	.....	10.72	28.5	12.3	7.88	13.5	5.8	4.78	4.0	1.7	3.35	1.69	.73	2.17	.58	.25
60	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.46	18.9	8.18	5.74	5.6	2.4	4.02	2.36	1.02	2.60	.81	.35
70	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.03	25.1	10.9	6.69	7.4	3.2	4.69	3.14	1.36	3.04	1.09	.47
80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.65	9.5	4.1	5.35	4.0	1.73	3.47	1.39	.6
90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.60	11.8	5.1	6.03	5.0	2.2	3.91	1.73	.75
100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.56	14.4	6.3	6.70	6.1	2.64	4.34	2.10	1.9
120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.95	21.8	9.4	8.38	9.2	4.0	5.42	3.19	1.38
150	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.05	12.8	5.5	6.51	4.5	1.95
175	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.59	5.9	2.55
200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.68	7.9	3.4
225	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.76	9.4	4.07
250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.85	11.5	4.99
275	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
325	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

AWG Wire Size													
Amps	14		12		10		8		6		4		
	115 Volts	230 Volts	115 Volts	230 Volts	115 Volts	230 Volts	115 Volts	230 Volts	115 Volts	230 Volts	115 Volts	230 Volts	
2	595	1190	946	1891	1479								
3	397	794	630	1261	986								
4	298	595	470	946	740	1479	1161		1808				
5	238	476	378	756	592	1184	926	1858	1447				
6	198	397	315	630	493	986	774	1548	1206	2411	1842		
7	170	340	270	540	423	845	663	1327	1033	2067	1579		
8	149	293	236	473	370	740	581	1161	904	1808	1381	2763	
9	132	265	210	420	329	658	516	1032	804	1607	1228	2456	
10	119	238	189	376	296	592	464	929	723	1447	1105	2210	
12	99	198	158	315	247	493	387	774	603	1206	921	1842	
14			135	270	211	423	332	663	517	1033	789	1579	
16			118	236	185	370	290	581	452	904	691	1381	
18					164	329	258	516	402	804	614	1228	
20					148	296	232	464	362	723	553	1105	
22					134	269	211	422		658		1005	
24					123	247	194	387		603		921	
26								357		556		850	
28								332		517		789	
30								310		482		737	
35								265		413		632	
40										362		553	
45										321		491	
50										239		442	



Friction Loss in Fittings

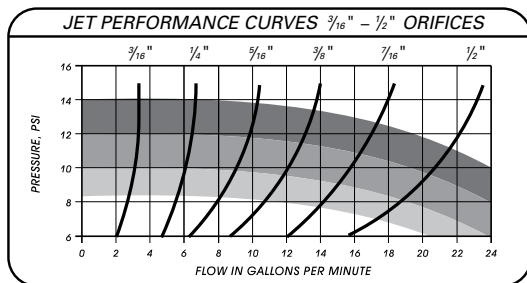
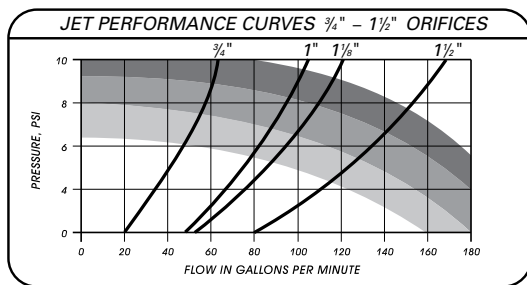
SIZE FITTING	½"	¾"	1"	1 ¼"	1 ½"	2"	2 ½"	3"	4"
Gate Valve (Full Open)	0.6	0.7	0.9	1.2	1.3	1.6	1.7	2.0	2.7
Elbow - 90°	3.6	4.5	5.3	6.7	7.5	8.6	9.3	11.1	13.1
Elbow - 45°	0.7	0.9	1.4	1.8	2.2	2.8	3.2	4.1	5.6
Tee (Straight Thru)	1.8	2.5	3.3	4.7	5.7	7.8	9.3	12.1	17.1
Tee (Thru Side)	4.3	5.4	6.7	8.8	10.0	12.1	13.0	17.1	21.2
Swing Check Valve	8.1	8.9	11.2	13.1	15.2	19.1	22.0	27.1	38.2

Head Loss Charts

Component	GPM	Head Loss (ft.)	Component	GPM	Head Loss (ft.)	Cartridge Filters	GPM (.75)	Head Loss (ft.)
Main Drain 1 ½" Outlet	20	0.5	Skimmer 1 ½" Outlet	20	1.0	25 sq. ft.	18.75	1.1
Main Drain 1 ½" Outlet	30	1.0	Skimmer 1 ½" Outlet	30	2.0	35 sq. ft.	26.25	2.0
Main Drain 1 ½" Outlet	40	1.5	Skimmer 1 ½" Outlet	40	3.0	50 sq. ft.	37.50	4.3
Main Drain 1 ½" Outlet	50	2.0	Skimmer 1 ½" Outlet	50	4.0	70 sq. ft.	52.50	7.5
Main Drain 1 ½" Outlet	60	2.5	Skimmer 1 ½" Outlet	60	5.5	75 sq. ft.	56.25	8.0
Main Drain 2" Outlet	40	1.0	Skimmer 2" Outlet	20	0.5	100 sq. ft.	75.00	17.5
Main Drain 2" Outlet	50	1.5	Skimmer 2" Outlet	30	1.0			
Main Drain 2" Outlet	60	2.0	Skimmer 2" Outlet	40	2.0			
Main Drain 2" Outlet	70	3.0	Skimmer 2" Outlet	50	3.0			
Main Drain 2" Outlet	80	4.0	Skimmer 2" Outlet	60	4.0			
Heater	--	7.0 avg.	Skimmer 2" Outlet	70	5.0			
			Skimmer 2" Outlet	80	6.0			

Jet Flow Data

Jet orifices sized from ¾" to 1 ½" work better at a lower PSI. Use legend to size properly.



LEGEND:

- WEAK
- MODERATE
- STRONG

JET FLOW CHART

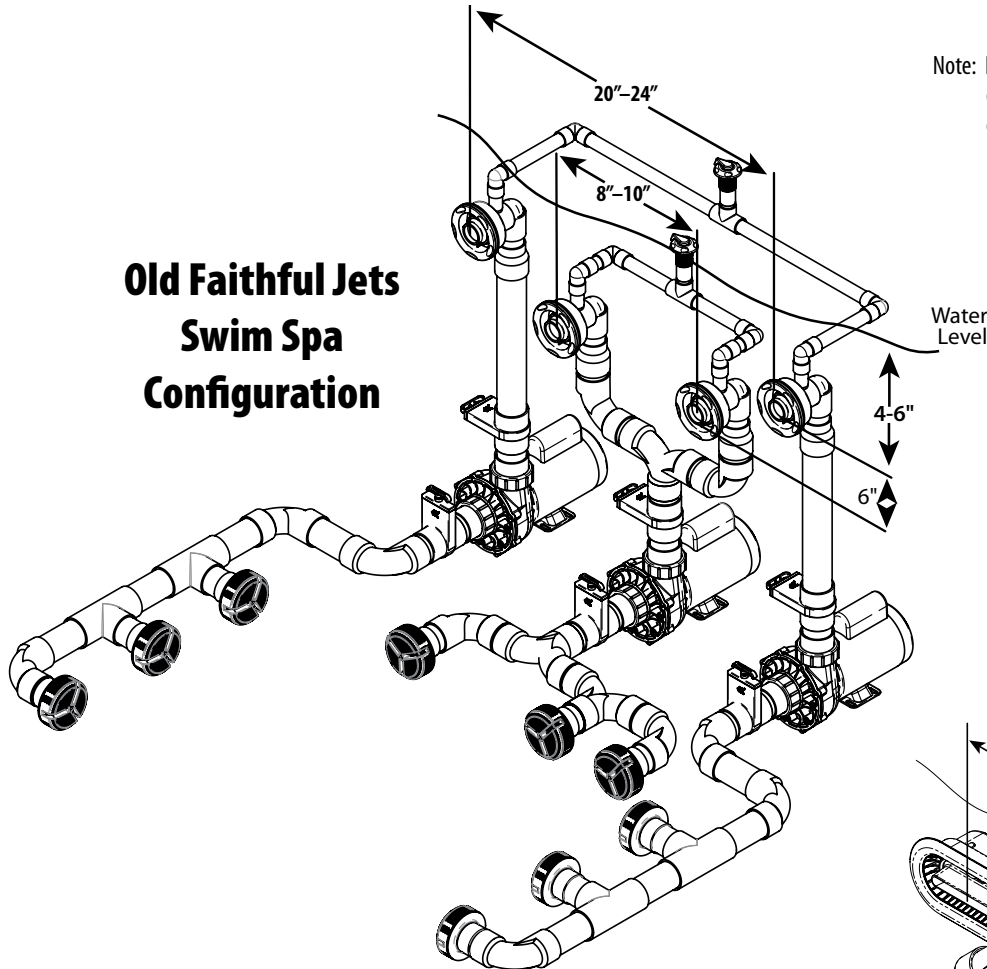
JETS				
NOZZLE ORIFICE SIZE	10 PSI	15 PSI	20 PSI	
⅜"	3	4	5	GPM
¼"	6	7	8	GPM
⅝"	9	10	12	GPM
⅞"	13	16	18	GPM
1"	17	19	22	GPM
1 ¼"	24	29	33	GPM
1 ½"	63	65	75	GPM
1	95	116	134	GPM
1 ⅞"	120	147	170	GPM
1 ½"	213	260	301	GPM



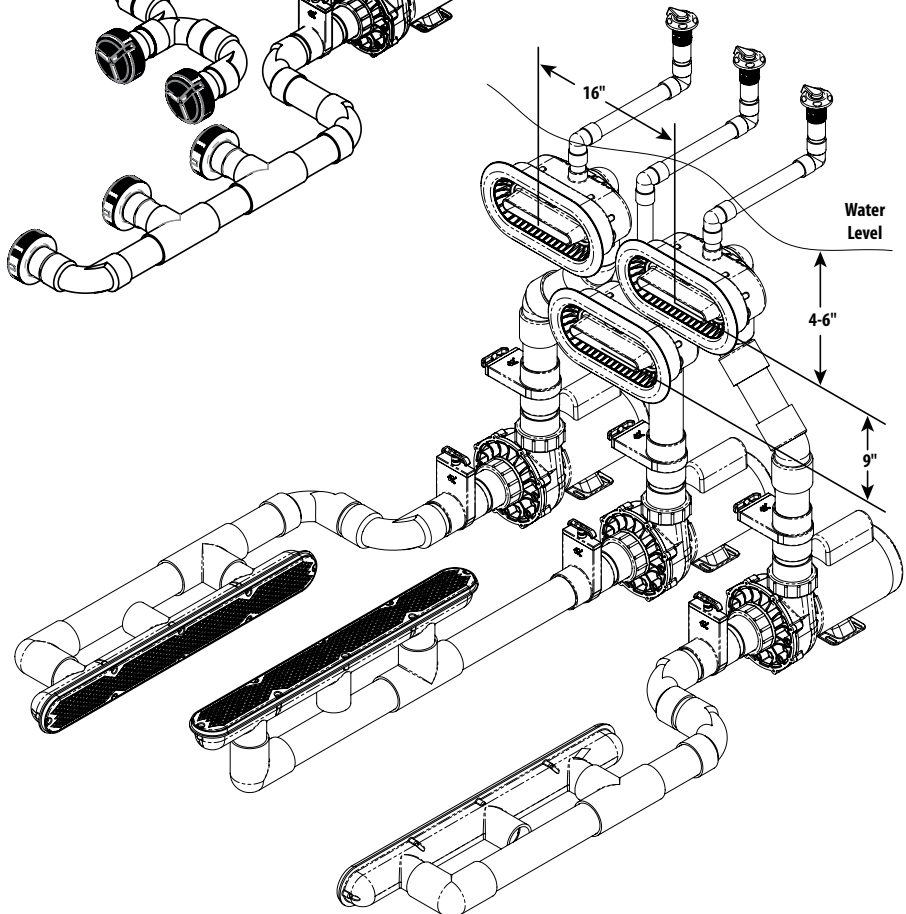
SWIM SPA CONFIGURATIONS

Note: Dimensions represent sample configuration only. Various custom configurations are possible.

Old Faithful Jets Swim Spa Configuration



River Jets Swim Spa Configuration





Displays

Part No.	Description
150-0020	Executive 56 Frame Pump Cutaway
150-0010	Vinyl Liner Builder's Pack
150-0030	Supreme Pump - 3 Ft. NEMA Cord
150-1030R	Supreme Pump - 90° Right, 3 Ft. NEMA Cord
150-1031	Supreme Pump - 3 Ft. Twist Lock Cord
150-1031R	Supreme Pump - 90° Right, 3 Ft. Twist Lock Cord
150-0045	150 Sq. Ft. Pro Clean Cartridge Cutaway
150-0050	SVL Cutaway
150-0130	TruSeal & Swing Valve Display
150-0110	Sweep Ell Display
150-0150	ClearWater II D.E. 125 Sq. Ft. Filter Cutaway
150-0151	Champion Pump Cutaway
150-0157	ClearWater II D.E. 125 Sq. Ft. Filter Cutaway - Gray
150-0160	Champion Pump With Valve - Assembly Cutaway
150-0180	River Swim Jet
150-0200	200 Sq. Ft. Pro Clean Cartridge Filter Cutaway
150-0237	Carefree Sand Filter 22" Cutaway
150-2047	ClearWater Sand Filter 19" Cutaway - Gray
150-0277	Carefree Sand Filter 26" Cutaway
150-2080R	High-Flo Pump - 90° Right, 3 Ft. NEMA Cord
150-0290	SMF Cutaway Display
150-0320	Poly Storm Gunite Jet Display with Tee Body Thread-in
150-0330	Power Storm Gunite Jet Display with Tee Body Thread-in
150-0340	Mini Storm Gunite Jet Display with Tee Body Thread-in
150-0360	Gunite Storm Jet Internal Display - Power, Poly & Mini Thread-in
150-0390	Pump Display Stand
150-0420	Carefree Oval Sand Filter 19" Cutaway w/Dummy Motor
150-0430	Carefree Oval Sand Filter 22" Cutaway, 1.5 HP, 3 Ft. Twist Lock Cord
150-0460	Carefree Oval Sand Filter 22" Cutaway, Sub Assembly
150-0730	Flex PVC Sample Kit
150-1000	Santanna Blower Display
150-1010	Santanna Blower - Working Display
150-1507	Clearwater 150 Sq. Ft. Cartridge Filter Cutaway - Gray
150-1527	Clearwater 150 Sq. Ft. Cartridge Filter, Supreme Motor, 3 Ft. NEMA Cord
150-1537	Clearwater 150 Sq. Ft. Cartridge Filter, Supreme Motor, 3 Ft. Twist Lock
150-1547	Clearwater 150 Sq. Ft. Cartridge Filter, Hi-Flo Motor, 3 Ft. NEMA Cord
150-1600	VGB Drains Display Board - 6" / 8" / 10" / 9"x9" / 12" x 12" / 18" x 18"
150-1610	VGB Drains Display Board - 32" Strip / Clover / 24" x 24"
150-2017	36 Sq. Ft. D.E. Crystal Water Cutaway Filter - Gray
150-2027	60 Sq. Ft. D.E. Crystal Water Cutaway Filter - Gray
150-2037	325 Sq. Ft. Cartridge Crystal Water Cutaway - Gray
150-2047	525 Sq. Ft. Cartridge Crystal Water Cutaway - Gray
150-2057	425 Sq. Ft. Cartridge Crystal Water Cutaway - Gray
150-2067	48 Sq. Ft. D.E. Crystal Water Cutaway Filter
150-3410-G	Gunite Jet, 3 Jet Manifold Straight Body Display
150-4000	Pipe Extender / Insider Coupler Display
150-8150	Smart Filtration 10VS 24 - 11 x 17
150-8160	Smart Filtration OP Cost 11 x 17
150-8170	Skimmer Display Stand
150-C012-W	Chlorinator In-Line Display - White
807-0205	2015 Rebate Program Brochure
150-0106	2015 Rebate Program Display Easel
150-0121	2015 Rebate Program Display Stand Pocket
150-8670	Waterway Pool & Spa - USA Banner 48 x 24

Brochures/Flyers

Part No.	Description
150-8010	SVL56 Pump
150-8010-S	SVL56 Pump - Spanish
150-8030	Tiny Might
150-8050	ClearWater Chlorinator
150-8050-S	ClearWater Chlorinator - Spanish
150-8050-F	ClearWater Chlorinator - French
150-8070	High-Flo Pump w/Trap
150-8120	ClearWater II Cartridge Deluxe Systems
150-8130	ClearWater Sand Deluxe Systems
807-0024	Crystal Water D.E. Filter
807-0024-S	Crystal Water D.E. Filter - Spanish
807-0025	Crystal Water Cartridge Filter
807-0025-S	Crystal Water Cartridge Filter - Spanish
807-0028	Carefree Sand Filter
807-0028-S	Carefree Sand Filter - Spanish
807-0036	Renegade Venturi Gunite Skimmer
807-0042	Champion Pump
807-0042-S	Champion Pump - Spanish
807-0042-F	Champion Pump - French
807-0044	ProClean Cartridge and D.E. Cartridge Filter
807-0044-S	ProClean Cartridge and D.E. Cartridge Filter - Spanish
807-0055	TWM Sand Systems
807-0056	ClearWater II D.E. Systems (Standard & Deluxe)
807-0057	TWM Cartridge Filter Systems
807-0059	Viper Pump
807-0060	UltraClean Pro Sand Filters
807-0062	ShurFlex Pool & Spa Hose
807-0067	TruSeal Diverter Values - TruSeal Check Valves
807-0068	EX2 Pump
807-0075	ClearWater Sand Standard Systems
807-0078	Renegade Gunite Skimmer
807-0089	Carefree Sand Filter Standard & Deluxe Systems
807-0095	ClearWater II Cartridge Standard Systems
807-0097	VGB Drains & Suctions
807-0100	SMF Pump
807-0100-FR	SMF Pump - French
807-0100-S	SMF Pump - Spanish
807-0107	TWM-30 Series Cartridge & Sand Systems
807-0116-A	Crystal Water Hang Tag Assembly (with tie)
807-0352	Spa Steps
807-1021	Econo Flo VSA, Econo Flo 2-Speed Hybrid & Econo Flo 2-Speed
807-1022	MMiniStorm, PolyStorm & PowerStorm Thread-in Gunite Jets
807-8410	Santanna II - Stealth II Blowers

Decals

Part No.	Description
808-0022	Waterway/USA Decal 10.375" x 4"



Fax Cover

To: **Waterway Customer Service**
Toll Free Fax: **888.772.5387 (888.SPA JETS)**

From:
Name: _____

Company: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Phone: _____ **Fax:** _____

☐ **Builder** ☐ **Mfr./OEM** ☐ **Sub Assembly** ☐ **Dealer** ☐ **Service Firm**

☐ **Swimming Pool** ☐ **Distributor** ☐ **Spa** ☐ **Whirlpool Bath**

Quantity	Part No.	Description	Price Each	Price Total