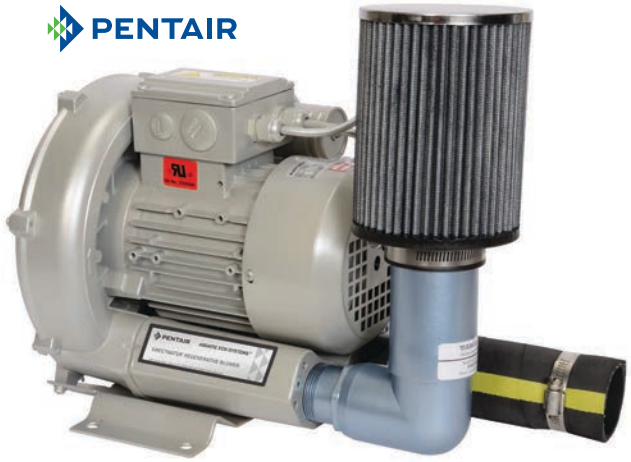
AERATION PRODUCTS



SST10

HIGH EFFICIENCY REGENERATIVE BLOWERS

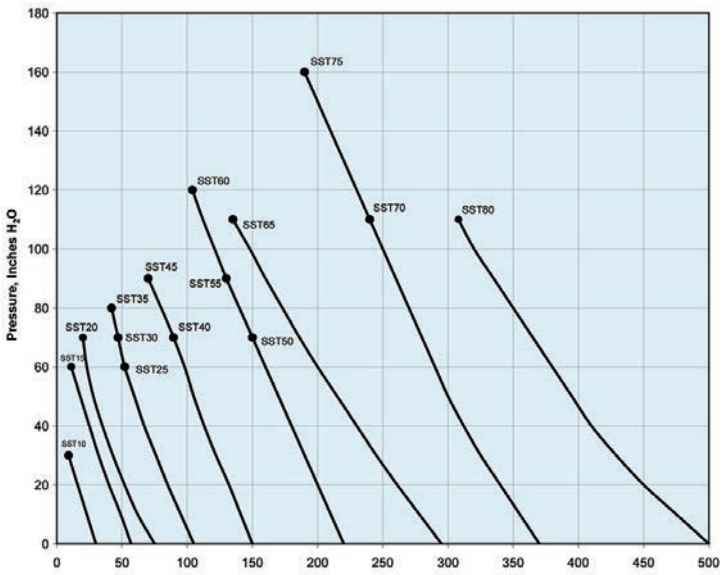
AQUACULTURE DUTY

The Pentair Aquatic Eco-Systems Sweetwater® Series 2 Regenerative Blowers operate at a higher efficiency than traditional regenerative blowers. The cool-running outboard bearing design allows these units to achieve higher differential pressures, provide more cfm per horsepower and extend service life. The rugged die-cast aluminum build is lightweight, compact and extremely quiet. Easy-to-install, close-coupled design means you can quickly add them to your system. And their internal silencers, washable inlet filter and outlet flex hose further simplify installation. Oilless and virtually maintenance-free. CE compliant and UL recognized. TEFC motors operate at both 50 and 60 Hz. Three-year warranty. **SST45** and larger ship motor freight.

3-YEAR WARRANTY

MODEL	CFM FREE AIR @ INCHES WATER 20"	30"	40"	50"	MAX DUTY	HP	PHASE	VOLTAGE	RATED FULL LOAD AMPS	HEIGHT W/O FILTERS	WIDTH	OUTLET HOSE SIZE	SHIP WT (LBS)	EACH
SST10*	16	9	—	—	32"	.3	1	115/230	2.6/1.3	8.4"	7.8"	1"	13	**$473.15**
SST15*	40	33	26	20	56"	.6	1	115/230	6.0/3.0	9.8"	9.6"	1.25"	22	**533.51**
SST20	50	43	35	28	64"	.67	3	230/460	2.6/1.5	9.8"	9.6"	1.25"	23	**646.92**
SST25	85	76	67	60	64"	1.3	3	230/460	4.0/2.3	11.9"	11.3"	1.5"	33	**715.96**
SST30*	85	76	67	60	76"	1.75	1	115/230	14.0/7.0	11.9"	11.3"	1.5"	35	**700.15**
SST35	85	76	67	60	88"	2	3	230/460	5.5/3.2	11.9"	11.3"	1.5"	35	**746.73**
SST40-230	132	122	112	105	72"	2.35	1	230	12.0	11.9"	11.3"	1.5"	35	**986.77**
SST45	132	122	112	105	84"	2.75	3	230/460	7.5/4.4	13.3"	13.1"	2"	46	**967.17**
SST50	200	190	180	170	76"	3.4	3	230/460	9.0/5.3	16.6"	15"	2"	64	**1,417.72**
SST55	200	190	180	170	92"	4.6	3	230/460	12.0/6.5	16.6"	15"	2"	75	**1,514.13**
SST60	200	190	180	170	124"	6.2	3	230/460	15.2/8.5	16.6"	15"	2"	93	**1,569.72**
SST65	260	245	230	215	112"	6.2	3	230/460	15.2/8.5	16.6"	15"	2"	95	**1,836.95**
SST70	340	327	312	300	112"	8.4	3	230/460	20.0/11.2	20.1"	17.6"	2.5"	143	**2,653.94**
SST75	340	327	312	300	161"	11.5	3	230/460	27.5/15.0	20.1"	17.6"	2.5"	150	**2,686.55**
SST80	450	430	410	395	104"	11.5	3	230/460	27.5/15.0	20.1"	17.6"	2.5"	160	**3,318.28**

*Add "-230" to model number for 230V.



TECH TALK 11

Motor Too Hot?

"My motor is running too hot to touch. Is this a problem?"

The old "Too-Hot-To-Touch" test no longer applies due to the improved materials now used in motor manufacturing.

The best way to determine if a motor is operating properly is to check the ampere (amp) draw. Each motor has a nameplate listing full-load amps (FLA). If the tested amp draw does not exceed the nameplate rating, its internal or external cooling fan is working (if so equipped) and the ambient air temperature around the motor is below 104°F (40°C), the motor is probably not running hot, even though it is too hot to touch.

REGENERATIVE BLOWERS

AQUACULTURE DUTY

The Pentair Aquatic Eco-Systems Sweetwater® Regenerative Blowers reach higher pressures, operate in more corrosive environments and operate at lower noise levels than industry standard commercial blowers. They are inexpensive to operate, and the air they deliver is oil-free. They are extremely energy-efficient and quiet.

Sweetwater® blowers are simple. And simplicity means reliability. They have only one moving part: a dynamically balanced impeller that is attached directly to the motor shaft. The rotating impeller doesn't touch a thing, so there's no wear, no vibration, no seals and no lubrication. Just wash the inlet air filters as needed and replace the motor bearings after three years of continuous operation.

All Sweetwater® blowers come with internal mufflers and low- restriction, washable inlet filters as standard equipment. Outlet flex hoses, which simplify installation, are also standard equipment.

The Sweetwater® blower's electric motor is a high-efficiency type motor that will run cool and handle a wide range of power variations so often found in rural locations. All models will operate on both 50 and 60 cycle (Hz) power except **S631** and **S651**, which are 60 Hz only. 60-Hz curves shown (pressure and volume at 50 Hz will be about 30% less).

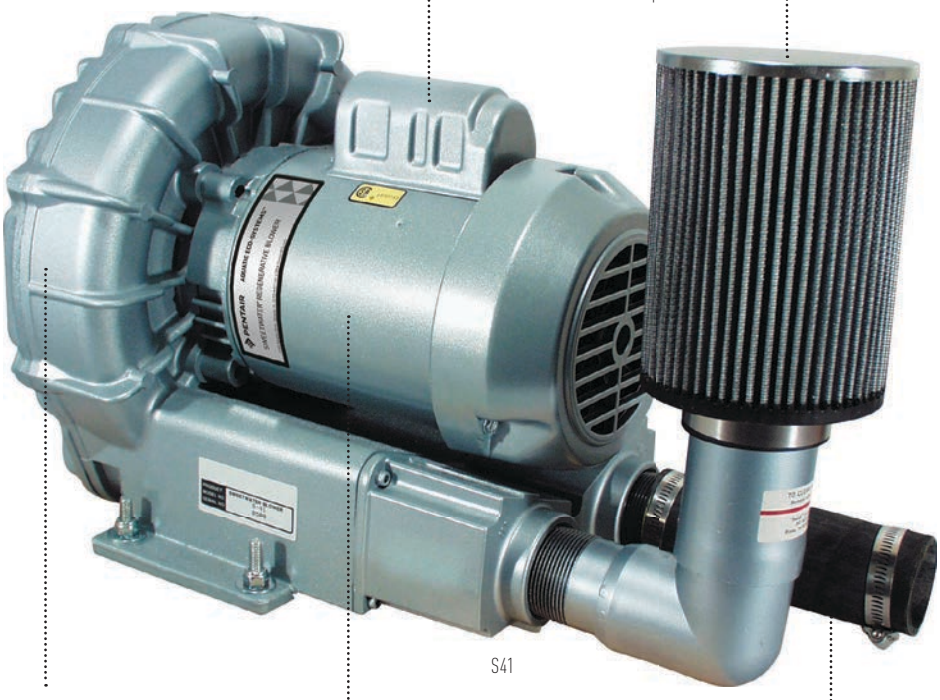
Automatic thermal overload protection is standard (except **S631**). Should a power brownout occur and trip the motor, the Sweetwater® blower will restart automatically after cooling. Motors are completely enclosed and fan cooled for the highest reliability in a humid aquaculture environment. Each blower is assembled with antiseize compound, performance tested prior to shipment and guaranteed for three years! CSA-certified and CE-compliant.

High altitude will affect blower performance. Deduct 4% of volume and pressure for every 1,000' (300 m) above sea level. The 3,450-rpm motors used on these regenerative blowers require about ten seconds to reach full speed. Use starting watts to size generators and use full load amps to size breakers.

PENTAIR

Automatic Thermal Overload Protection*
Should a power brownout occur and trip the motor, the Sweetwater® blower will automatically restart after cooling (*except **S631**).

Air Filter
Low-restriction inlet, washable filter that removes particulates to 50 microns included in price.

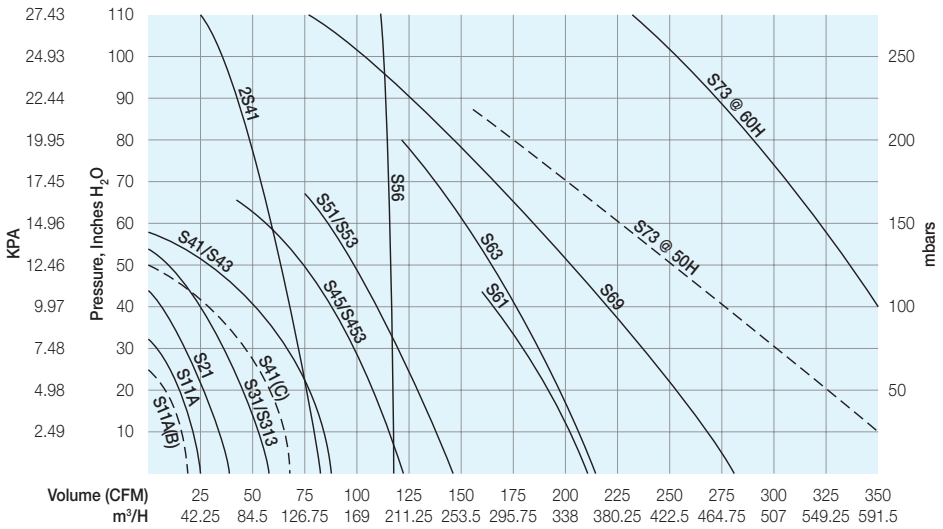


S41

Antiseize Compound
Sweetwater® is assembled with antiseize compound to ensure easy disassembly when it becomes necessary years down the road.

High-Efficiency Premium Motor
Runs cool, is completely enclosed and fan cooled for the utmost reliability in humid environments. Universal 50/60 Hz, UL-, CSA- and CE-compliant.

Flexible outlet hose
simplifies installation.



3-Phase Equipment:

We highly recommend using protective devices with all 3-phase equipment. Motor starters, phase monitors and phase protectors are not included in the sale and should be sourced locally. Failure to install protective devices will void most warranties. We also recommend that a certified electrician perform the installation.

Combination starters are not included with Sweetwater® blowers, but are strongly recommended. NEC and local electrical codes prevail.

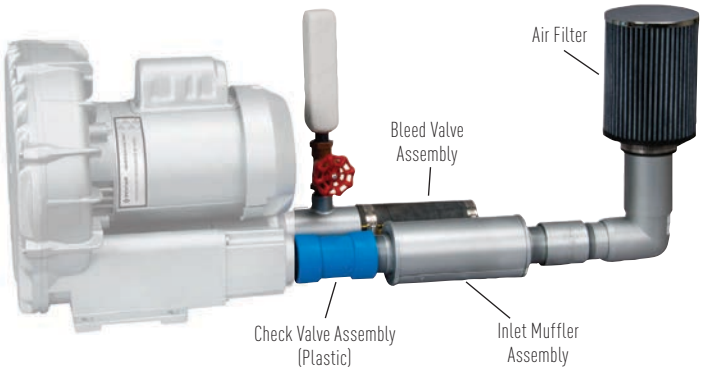
SWEETWATER® REGENERATIVE BLOWERS AQUACULTURE DUTY

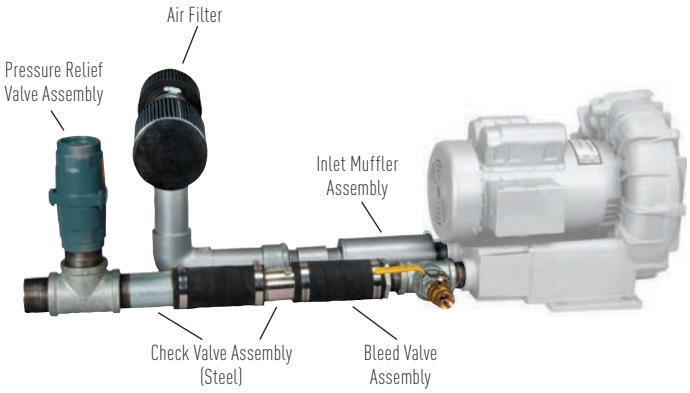
3-YEAR WARRANTY

Blower Specifications (at Sea Level, 68°F, 60 Hz)

MODEL	CFM FREE AIR @ INCHES WATER 20"	30"	40"	50"	MAX DUTY	HP	PHASE	NO. FILTERS	RUNNING WATTS INPUT @ INCHES WATER	STARTING WATTS	MAX VOLTAGE	RATED FULL LOAD AMPS	W/O FILTER HEIGHT	W/O FILTER WIDTH	OUTLET HOSE PIPE SIZE	SHIP WT (LBS)	EACH*
S11A [1 2]	13	3	—	—	34"	⅛	1	1	198/20"	900	115/230	2.0/115	10"	8"	1"	23	**$528.40**
S21 [1 2]	27	19	7	—	43"	⅓	1	1	377/30"	1,800	115/230	3.8/115	10"	9"	1"	28	**589.19**
S31 [1 2]	34	28	21	16	56"	½	1	1	471/30"	2,000	115/230	5.6/115	10"	10"	1½"	36	**625.81**
S313 [1]	34	28	21	16	56"	½	3	1	410/30"	4,000	230/460	2.0/230	10"	10"	1½"	36	**645.90**
S41 [1 2]	70	65	53	36	58"	1	1	1	971/40"	4,000	115/230	9.8/115	12"	12"	1½"	50	**762.06**
S43 [2]	70	65	53	36	58"	1	3	1	860/40"	5,000	230/460	3.2/230	12"	12"	1½"	50	**764.37**
S45 [2]	110	100	90	80	65"	1½	1	2	1,430/40"	9,000	115/230	10.4/230	14"	15"	2"	77	**1,021.86**
S453-AQ [2]	110	100	90	80	65"	1½	3	2	1,500/40"	12,000	230/460	4.9/230	14"	15"	2"	85	**1,042.30**
S51 [1 2]	135	120	110	100	65"	2½	1	2	1,760/40"	14,000	115/230	11.9/230	14"	15"	2"	87	**1,106.46**
S53-AQ [2]	135	120	110	100	65"	2½	3	2	1,750/40"	17,000	230/460	6.9/230	14"	15"	2"	100	**1,063.63**
S61-AQ [3]	190	180	165	—	45"	2½	1	2	2,600/40"	14,000	115/230	11.8/230	16"	17"	3"	100	**1,492.83**
S63 [3]	190	180	165	160	80"	3½	3	2	3,260/60"	28,000	230/460	8.8/230	16"	17"	3"	115	**1,394.48**
S631 [3 4]	190	180	165	160	75"	3½	1	2	3,400/60"	21,000	230	19.0/230	16"	17"	3"	115	**1,516.29**
S651 [3]	190	180	165	160	100"	5	1	2	3,710/80"	29,000	230	22.3/230	16"	17"	3"	150	**1,554.26**
S653 [3]	190	180	165	160	110"	5	3	2	3,520/80"	36,000	230/460	12.0/230	16"	17"	3"	150	**1,562.03**
S56 [3]	120	120	118	117	280"	6	3	2	4,000/150"	38,000	230/460	18.2/230	19"	22"	3"	215	**2,917.40**
S69 [3]	250	245	230	210	110"	5½	3	2	4,190/60"	48,000	230/460	18.2/230	22"	22"	3"	250	**2,185.43**
S73 [3]	390	375	350	330	125"	10	3	4	7,640/80"	75,000	230/460	25.0/230	24"	22"	3"	245	**2,647.51**
S15	650	640	630	610	125"	15	3	1	11,000/80"	70,000	230/460	50/230	23"	21"	3"	452	**5,677.21**
S18P	720	710	690	650	105"	18	3	2	12,000/80"	90,000	230/460	52/230	20"	28"	4"	438	**5,230.66**
S18S	410	405	400	395	200"	18	3	1	12,000/80"	90,000	230/460	52/230	22"	28"	4"	431	**5,230.66**
S30P	1,275	1,230	1,200	1,190	125"	30	3	2	20,000/80"	140,000	230/460	98/230	23"	32"	5"	630	**11,823.49**
S30S	650	640	630	625	225"	30	3	1	20,000/80"	140,000	230/460	98/230	23"	33"	5"	606	**11,823.49**

[1] Standard with 115V or 230V 8' power cord (230V models are also rated for 208V). Add "**230**" to part number for **230V**.
[2] S453 and smaller ship Ground. [3] S51 and larger ship via motor freight only. [4] No thermal overload protection.
*Prices include filter





CHECK VALVE ASSEMBLIES

For Multiple Blower Assemblies

Inlet check valves can be plastic, but outlet check valves are subject to high temperatures requiring steel.

MODEL	TYPE	FITS BLOWER MODEL	EACH
BCVA1	INLET (PLASTIC)	**S11, S21**	**$16.77**
BCVA2	INLET (PLASTIC)	**S31**	**22.66**
BCVA3	INLET (PLASTIC)	**S41**	**25.38**
BCVA4	INLET/OUTLET (STEEL)	**S5** SERIES	**149.61**
BCVA5	INLET/OUTLET (STEEL)	**S6** SERIES	**208.20**
BCVA6	INLET/OUTLET (STEEL)	**S7** SERIES	**216.21**

AIR FILTERS

If you're not getting the air you need out of your blower, perhaps a dirty air filter is keeping air from getting into the blower. Keep a spare on hand, change out as needed, then wash and dry the dirty one when you have time. Both filters have 2⅜" I.D.

MODEL	SIZE	FITS BLOWER MODEL	EACH	4+
BF4	4"	**S11, S21**	**$18.25**	**$16.25**
BF6	6"	**S31** AND LARGER	**22.98**	**20.51**

Note: 2 or more BF6 filters required for S45 and larger blowers.

PRESSURE RELIEF VALVE ASSEMBLIES

Designed for low-pressure blowers, these valves will automatically protect blowers from over-pressurization by discharging air to the outside. The valve assembly is easy to install and calibrate. Pressure relief valves can be noisy when dumping air, so add a muffler assembly if you plan to use it as a normally open bleed valve. Both sides are FNTP. One-year warranty.

MODEL	SIZE	FITS BLOWER MODEL	EACH
PRV20	2"	**S45, S453, S51, S553, SD5**	**$236.11**
PRV30	3"	**S61, S63, S631, S651, S653, S56, S69, S73, S15, SD6, SD69**	**358.89**

INLET MUFFLER ASSEMBLIES

For Blower Inlet

MODEL	INLET/OUTLET (NPT)	FITS BLOWER MODEL	EACH
BM20	1"	**S11, S21**	**$28.07**
BM30	1 1/4"	**S31, S313**	**29.39**
BM40-2	1 1/2"	**S41, S43, S45, S453-AQ, S51, S53-AQ, SD4, SD5**	**99.84**
BM60-2	2"	**S61-AQ, S63, S631, S651, S56, S69, SD6**	**107.54**
BM70-2	3"	**S15, S18P, S18S, S73**	**352.57**

BLEED VALVE ASSEMBLIES

Regenerative blowers are quieter, run cooler and use less power when excess air is vented or "bled off." Weighs 3 lbs.

MODEL	FITS BLOWER MODEL	EACH
BV1	**S11**, **S21** WITH **ALR15** SILENCER	**$28.52**
BV2	**S31** WITH **ALR15** SILENCER	**43.24**
BV3	**S41** WITH **ALR15** SILENCER	**44.67**
BV4	**S45** AND **S51**	**60.55**
BV5	**S6** SERIES	**87.58**

PRESSURE GAUGES

Pressure gauges perfect for use in aquaculture aeration. Recommended for all blowers.

MODEL	TYPE	NPT	EACH
BG60	0 - 60" H_2O	¼"	**$63.62**
BG100	0 - 100" H_2O	¼"	**68.33**
BG15	0 - 15 PSI	¼"	**16.37**
VF2	0 - 35 PSI	¼"	**12.49**
BG61	0 - 60 PSI	¼"	**12.29**

BG60

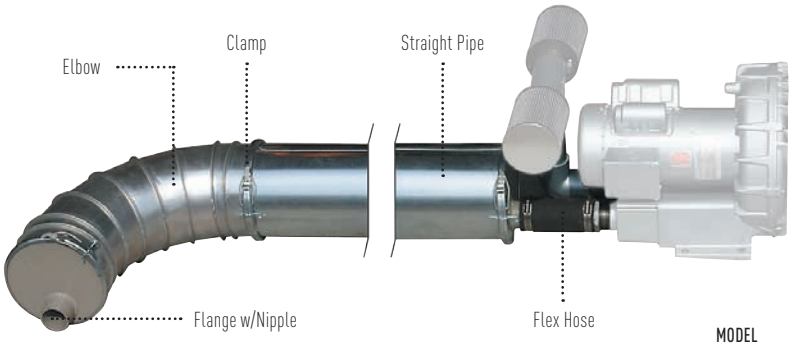
ECONOMICAL REGENERATIVE BLOWERS

The Pentair Aquatic Eco-Systems Whitewater® blowers are a very good value for aquariums, pet stores, bait systems and seafood holding systems. They are smaller, lighter and quieter than most blowers and very energy-efficient. They feature a "cupped" impeller for reduced noise. The specially designed motor is low in power consumption and excellent in performance. Blowers are 115V/60 Hz and include a 6' power cord. One-year warranty. Pricing includes filter, filter connections and a flexible outlet.

All Whitewater® blowers include:

- Inlet air filter
- Filter connections
- Flexible outlet hose
- Power cord

MODEL	CFM @ INCHES WATER 10"	20"	30"	40"	50"	AQUARIUM OUTLETS @ 10" DEPTH	MAX DUTY	NOISE, DB	RUNNING WATTS	OUTLET HOSE FOR PIPE SIZE	SHIP WT (LBS)	EACH
WW10	4	2	—	—	—	40	25"	48	170	¾"	15	**$227.27**
WW18	8	3	—	—	—	60	28"	48	190	¾"	16	**252.34**
WW29	15	8	2	—	—	100	35"	52	260	¾"	18	**280.45**
WW39	25	15	6	—	—	300	40"	54	330	¾"	19	**282.36**
WW60	33	21	13	3.5	—	460	43"	60	410	1"	21	**318.86**
WW80	55	43	31	20	6	860	56"	64	687	1¼"	23	**366.09**
BF4WW	REPLACEMENT AIR FILTER FOR WHITEWATER BLOWERS										0.4	**14.90**



HEAT DISSIPATING PIPE

When air is compressed it gives off heat. This heat of compression, plus the heat from friction, can make a blower's outlet air temperature high enough to fry an egg. When the inlet air is 100°F and the blower pressure is just 55" H_2O (2 psi), the resulting 150°F discharge air can soften plastic PVC pipe.

This 8" diameter thin wall galvanized steel pipe can be used to cool the compressed air before it reaches the plastic pipe. Rated to 4 psi (110"). Each clamp includes one gasket. Flex hoses are listed by pipe size and include clamps. Seal connections with silicone to prevent air leaks. Made in USA.

MODEL		SHIP WT	EACH	4+
DH8	STRAIGHT PIPE, 58"	13	**$82.91**	**$78.76**
DH45	ELBOW, 45°	3	**128.18**	**121.77**
DH90	ELBOW, 90°	6	**237.80**	**225.91**
DH19	CLAMP W/GASKET, 190°F	1	**28.30**	**26.89**
DH20	CLAMP W/GASKET, 1,100°F	1	**52.00**	**49.40**
PFG1	FLANGE WITH 11/2" NIPPLE	2	**65.80**	**60.55**
PFG2	FLANGE WITH 2" NIPPLE	3	**77.45**	**67.27**
PFG3	FLANGE WITH 3" NIPPLE	4	**87.35**	**80.34**
FH1	FLEX HOSE, 11/2" X 8"	1	**11.62**	**10.92**
FH2	FLEX HOSE, 2" X 8"	1	**14.96**	**14.06**
FH3	FLEX HOSE, 3" X 8"	1	**28.27**	**26.57**
FH4	FLEX HOSE, 4" X 12"	1	**39.59**	**37.21**
FH5	FLEX HOSE, 5" X 16"	1	**83.48**	**78.47**

TECHNICIAN PROFILE

Constance Beaulaton

Constance received a bachelor's degree in biological sciences & aquaculture from Florida Institute of Technology. She has worked in commercial aquaculture on recirculating systems, water chemistry and farm management. Constance has extensive knowledge in sturgeon, larval rearing, husbandry duties, gender differentiation with ultrasound, fish purging and harvesting.

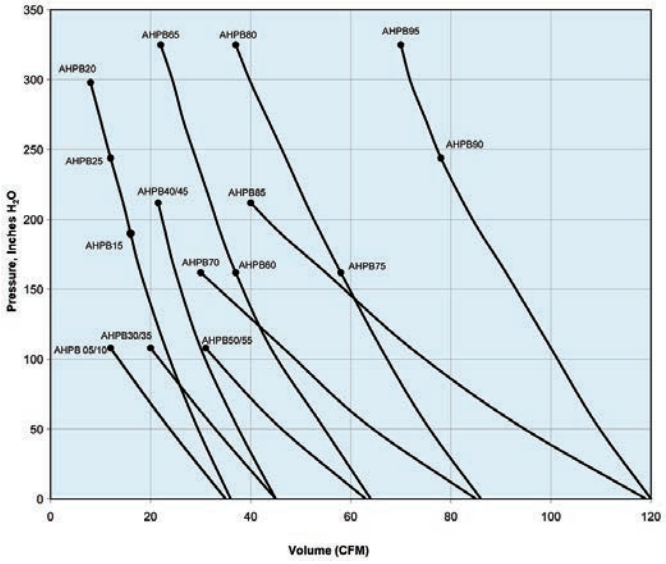
HIGH-PRESSURE REGENERATIVE BLOWERS

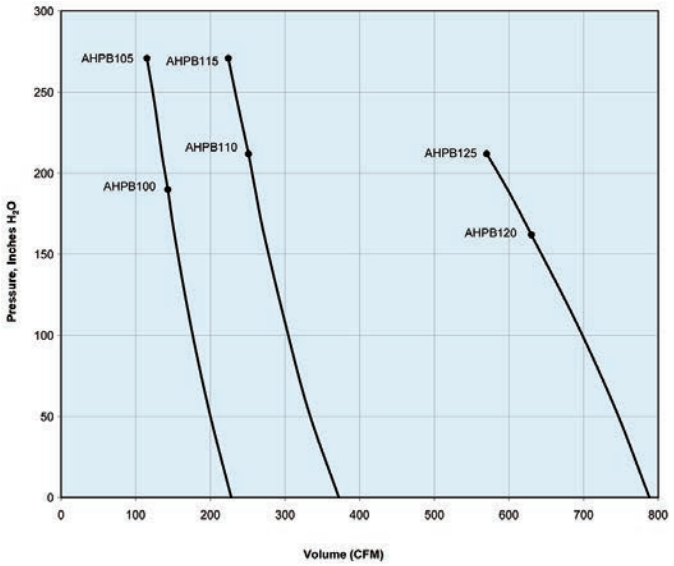
The ideal replacement for rotary lobe blowers and dry rotary vane vacuum pumps. While delivering comparable (or better) air pressure, these high-pressure blowers do not require the maintenance typically associated with traditional types of blowers and vacuum pumps.

The cool-running outboard bearing design allows these units to achieve higher differential pressures and extend service life. The rugged die-cast aluminum build is lightweight, compact and super quiet. Easy-to-install, close-coupled design means you can quickly add them to your system. And their internal silencers, washable inlet filter and outlet flex hose further simplify installation. Virtually maintenance-free. Fin-cooled TEFC motors operate at 50 and 60 Hz. Three-year warranty.

AHPB05

3-YEAR WARRANTY





MODEL	CFM FREE AIR @ INCHES WATER* 54"	108"	162"	190"	212"	244"	271"	298"	325"	MAX DUTY	HP	PHASE	VOLTAGE	RATED FULL LOAD AMPS	HEIGHT W/O FILTERS	WIDTH	OUTLET HOSE SIZE	SHIP WT (LBS)	EACH
AHPB05	23	12	—	—	—	—	—	—	—	128"	1.1	3	230/460	3.8/2.2	12.5"	11.6"	1.25"	35	**$1,008.41**
AHPB15	28	20	17	15	—	—	—	—	—	193"	1.25	3	230/460	4.0/2.3	12.8"	11.6"	1.25"	53	**1,540.61**
AHPB20	28	20	17	15	13	11	9	7	—	298"	2.75	3	230/460	7.5/4.4	12.8"	11.6"	1.25"	62	**1,622.04**
AHPB25-230	28	20	17	15	13	11	—	—	—	265"	2.35	1	230	10.3	12.8"	11.6"	1.25"	66	**1,764.70**
AHPB30	32	20	—	—	—	—	—	—	—	145"	1.25	3	230/460	4.0/2.3	13.4"	12.3"	1.25"	37	**1,839.80**
AHPB35	32	20	—	—	—	—	—	—	—	157"	1.47	1	115/230	18.0/9.0	13.4"	12.3"	1.25"	40	**1,380.95**
AHPB40	37	30	25	21	20	—	—	—	—	241"	2.75	3	230/460	7.5/4.4	13.6"	12.3"	1.25"	66	**1,914.90**
AHPB50	41	30	—	—	—	—	—	—	—	149"	2	3	230/460	5.5/3.2	14.8"	13.6"	1.25"	51	**1,600.61**
AHPB60	52	42	35	—	—	—	—	—	—	165"	2.75	3	230/460	7.5/4.4	14.9"	13.6"	1.25"	73	**2,087.76**
AHPB65	52	42	35	32	30	28	25	23	20	341"	5.1	3	230/460	13.5/7.8	14.9"	13.6"	1.25"	86	**2,249.19**
AHPB70	63	48	30	—	—	—	—	—	—	193"	3.4	3	230/460	9.0/5.3	15.6"	14.4"	1.25"	64	**2,084.90**
AHPB75	72	65	56	—	—	—	—	—	—	181"	3.4	3	230/460	9.0/5.3	15.7"	14.4"	1.25"	88	**2,361.84**
AHPB80	72	65	56	52	49	46	42	38	35	325"	6.2	3	230/460	16.5/9.5	15.7"	14.4"	1.25"	112	**2,661.84**
AHPB85	90	72	55	46	40	—	—	—	—	213"	5.1	3	230/460	13.5/7.8	17.9"	16.4"	1.25"	77	**2,353.26**
AHPB90	110	90	80	76	72	68	—	—	—	260"	6.2	3	230/460	16.3/9.5	17.9"	16.4"	1.25"	129	**3,046.11**
AHPB95	110	90	80	76	72	68	65	60	55	337"	8.8	3	230/460	22.5/12.6	17.9"	16.4"	1.25"	143	**3,478.19**
AHPB100	195	170	150	142	—	—	—	—	—	201"	8.4	3	230/460	20.0/11.2	16.3"	25.1"	2"	154	**3,564.71**
AHPB105	195	170	150	142	135	123	110	—	—	265"	11.5	3	230/460	27.5/15.0	16.3"	25.1"	2"	170	**3,951.43**
AHPB110	320	290	260	250	240	—	—	—	—	241"	16.8	3	230/460	50.2/29.0	20.1"	31.4"	2.5"	316	**6,088.57**
AHPB115	320	290	260	250	240	225	210	—	—	301"	23.2	3	230/460	60.0/34.5	20.1"	31.4"	2.5"	341	**6,774.29**
AHPB120	730	680	610	—	—	—	—	—	—	173"	31	3	230/460	72.0/42.0	24.6"	42.4"	4"	455	**11,754.29**
AHPB125	730	680	610	580	550	—	—	—	—	217"	39	3	230/460	90.0/52.0	24.6"	42.4"	4"	500	**12,185.71**

*For complete CFM Air @ Inches Water specs see PentairAES.com.

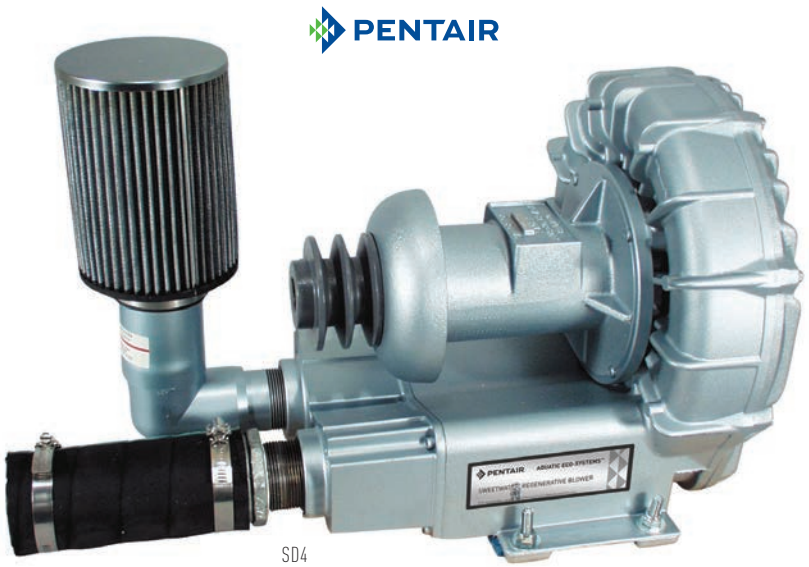
REMOTE-DRIVE REGENERATIVE BLOWERS

The Pentair Aquatic Eco-Systems Sweetwater® remote-drive regenerative blowers are as reliable as Sweetwater® motor-mounted electric blowers, and they offer the added benefits of variable performance and nonelectric drives. They are designed to be bolted to a base and driven by belts.

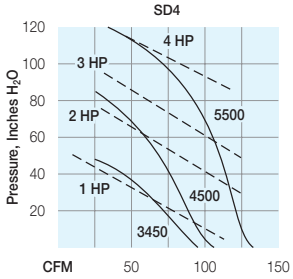
The power source can be an electric motor, gasoline engine, diesel engine or even hydro power. They are perfect for use in electrical emergencies or anywhere electric power is not available. Remote-drive blowers allow the user to vary performance by simply changing the engine speed or the pulley size. Rotation is clockwise as you face the blower shaft. One-year warranty. Made in USA.

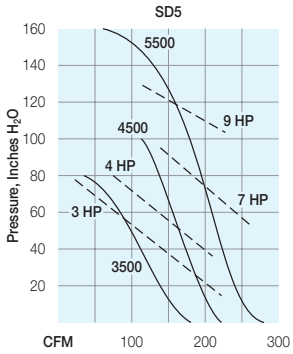
Sweetwater Blowers include:

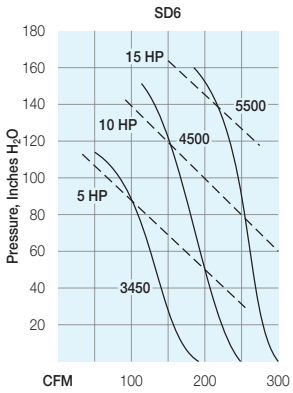
- Inlet air filter
- Flexible outlet hose
- Double groove pulley (sheave)



SD4

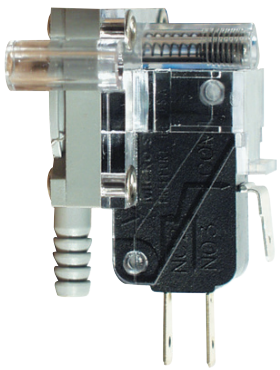






MODEL		PULLEY DIA.**	NO. OF FILTERS	OUTLET HOSE FOR PIPE SIZE	SHIP WT (LBS)	EACH
SD4	BELT-DRIVE BLOWER	2.4"	1	1½"	30	**$782.41**
SD5	BELT-DRIVE BLOWER	3.0"	2	2"	40	**1,103.78**
SD6*	BELT-DRIVE BLOWER	4.0"	3	3"	80	**1,292.62**
BF6	REPLACEMENT INLET AIR FILTER FOR SWEETWATER B-D BLOWERS				0.6	**22.98**

*Ships motor freight. **Pulley diameters are pitch diameters using "A" section belts. Shaft diameter is ⅞" (.875") on all models.



PRESSURE SWITCH

A simple and reliable method of starting backup equipment or tripping an alarm. Airwater line hose barb is ⅛". Can be used for either normally open or normally closed. Will carry up to 3 amps at 115V. Moistureproof. Preset to switch on/off at 30" H_2O, but is adjustable from 27" to 33" H_2O.

MODEL	LENGTH	HEIGHT	EACH
B601	2"	1½"	**$ 31.15**

TECH TALK 84

AES Number

AES stands for aeration efficiency standard. AES Numbers (AES) indicate how many pounds of fish an aeration device can support. They are a quick reference for sizing aeration systems. If your system parameters differ significantly from the AES Number standard conditions listed below or if you are designing an aeration system for a commercial facility, call our Customer Service at 407-886-3939 for assistance.

Numbers may seem overly conservative because they are based on heavy oxygen demand conditions. AES Numbers assume the following conditions: half-pound catfish or tilapia in tanks (nonsoil bottoms) at 80°F (27°C) at sea level, stocking densities from .1 to .7 pounds of fish per gallon of water (12 to 84 kg/m3), recirculating system with a .82 alpha factor, 5.2 mg/L (67 percent of saturation) dissolved oxygen (D.O.) concentration, feeding rate at 3 percent of standing crop weight per day, pelleted feed at 40 percent protein, continuous solids removal, under 3 ppt salinity and a low algal population. If you stock at or below the rate indicated by the AES Number, your D.O. level will remain above 5.2 mg/L under these water quality conditions.

We've chosen warm water for our AES Number standard conditions because the oxygen consumption rate goes up with the water temperature. Keeping your fish weight below the AES Number value will ensure a D.O. above 67 percent of saturation, which is generally considered adequate (while being very cost effective) for most species raised in recirculating systems. If 50 percent of saturation were acceptable, you could support about 50 percent more fish with your aerator than the AES Number indicates. At 82 percent of saturation, you could support about 50 percent less (see aeration Tech Talks for details). AES Numbers are not practical to use where heavy algal populations are present because algae oxygen consumption (plant respiration) at night has not been taken into account.

Air and Oxygen Diffusers

Submerged diffuser AES Numbers assume diffuser placement at a depth of 3' and that air or oxygen flows to the diffuser at the average recommended rate. Oxygen transfer is proportional to bubble size and contact time. Small bubbles have a greater air-to-water contact surface area than the same volume of gas in fewer large bubbles. Although fine pore diffusers may produce finer bubbles, they will require more pressure and they must be cleaned much more frequently.

Regenerative blowers work best with medium pore diffusers. Medium-sized bubbles (1–3 mm diameter) rise at about one foot per second in water, which means that a bubble released at a depth of 3' will exchange gas with the water for 3 seconds. So, if you are operating your diffusers at 1.5' instead of 3', divide the AES number by 2—your diffusion system can only support half as many fish. If your diffusers are 4' deep, you can support 33 percent more than the AES Number shown. When using air with a diffuser that is rated for pure oxygen, divide the pure oxygen AES Number by twelve.

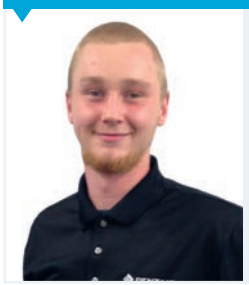
Pure Oxygen

Pure oxygen AES Numbers are rated at 100 percent saturation (7.9 mg/L D.O.) rather than 5.2 mg/L (67 percent saturation). Oxygen purity near 100 percent, as you would get from a liquid or gas oxygen cylinder, is also assumed. For oxygen generators, multiply the AES Number by the oxygen content of your generator gas output. For example, if your oxygen generator delivers 90 percent pure oxygen, multiply the AES number by .90. If you are using pure oxygen with diffusers that are rated for air, multiply the AES Number by twelve.

Splash Type Aerators

Surface aerator AES Numbers assume that the water is being circulated efficiently from the point of aeration to where the fish are located and back to the aeration device; that is, the device is not re-aerating the same water.

TECHNICIAN PROFILE



Reymond Janssen

Reymond graduated from North Island College in Campbell River B.C., receiving a diploma in industrial automation and an Electronics Technician Certificate. Prior to attending school his work experience was installing, maintaining and repairing pools and spas. He is currently working to become a Journeyman Industrial Instrumentation Technician.

TECH TALK 35

How much oxygen will aeration devices deliver?

None at all if the oxygen level in your water is at saturation!

Many commercially made aerators have been tested for their standard oxygen transfer rate, but that much oxygen can almost never be expected. Because the rate of oxygen transfer is concentration- and temperature-dependent, an aerator will only provide its measured (advertised maximum) oxygen transfer rate when the oxygen level in the water is close to zero. Use this chart to estimate the oxygen transfer an aerator will give when there is already oxygen in the water. Example: if the water temperature is 68°F and the oxygen level is 5 mg/L, an aerator that is rated at 3 lbs of oxygen per hour will really only provide under 1.3 lbs per hour (3 lbs x 41% = 1.23 lbs).

Actual Oxygen Transfer Rate As a Percentage of the Maximum Advertised Transfer Rate*

D.O. LEVEL IN WATER BEING AERATED	50°F (10°C)	59°F (15°C)	68°F (20°C)	77°F (25°C)	86°F (30°C)
0	89%	90%	91%	92%	96%
1	82%	82%	82%	82%	82%
2	75%	73%	72%	72%	67%
3	67%	64%	62%	58%	56%
4	58%	55%	51%	47%	44%
5	52%	46%	41%	35%	31%
6	41%	36%	30%	24%	17%
7	34%	27%	19%	10%	3%
8	25%	17%	8%	2%	0
9	17%	8%	0	0	0
10	9%	0	0	0	0

*These percentages are approximate for fresh water at sea level.

TECH TALK 39

208V vs 230V Motors

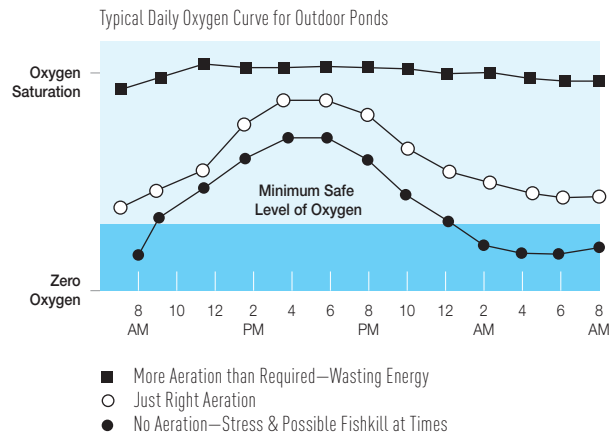
A motor that is rated for 230 or 240 volts is not compatible with 208V power. The motor will fail and will not be covered by warranty. When it fails depends on how well the motor was built, how hard it is working and the actual voltage that is getting to the motor. If you only have 208V power and can't find a motor that is rated for it, you can install a "buck-boost transformer" to raise your voltage.

Most—but not all—AC motors are built to tolerate a 10% up or down voltage variation from what is shown on the motor nameplate. A motor labeled as 120V can operate reliably between 108 and 132V. The range for 208V motor is 187 to 229V. The range for 230V is 207 to 253V. After reading these ranges you might think, "A 230V motor can work at 208V." That would be true if your service always gave a minimum of 208V. But it will not because of "voltage variation." For instance, if your service is 208V, you will experience normal voltage variations as low as 187. This is why some 230V motors operate on 208V service for a while, then, when other equipment starts up, the voltage drops below 207 and the motor draws more amps, overheats and fails.

Buck-boost transformers reduce (buck) or raise (boost) supply voltage to the required level. A common application is boosting 208V to 230V.

If your motor is a long distance from your power meter you will also incur "line losses." These will show as lower voltage and higher amperage at the motor. To be sure your installation is correct, always measure the volts and amps at the motor location, while it and everything else on that line is operating. Both must be within the motor label's specifications. See Tech Talks 5, 10, and 11 for more information.

TECH TALK 1



Dissolved Oxygen in Aquaculture

The First Limiting Factor of Water Quality

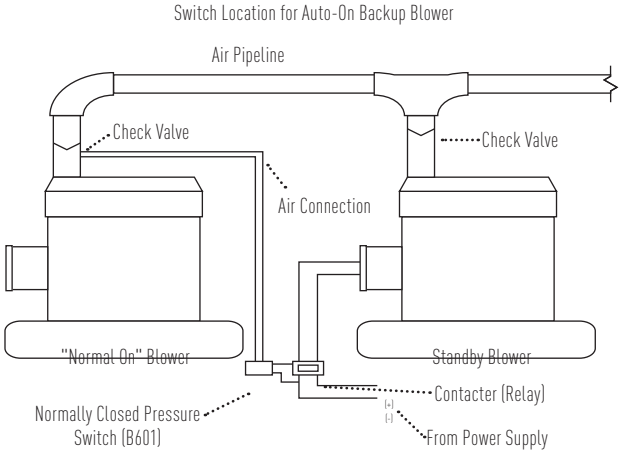
Air breathing animals are used to air containing about 21 percent oxygen, whereas aquaculture is conducted in water containing less than .0001 percent oxygen (10 mg/L). With so little oxygen available in the best of conditions, it is apparent that knowledge of dissolved oxygen (D.O.), oxygen measuring and aeration equipment is very important to the aquaculturist.

If the oxygen level is too high, oxygen supersaturation can cause gas embolism, depress metabolism and inhibit respiratory enzymes, all of which can kill fish. If it is too low, the fish may not eat and may expend additional energy seeking oxygen. If lower yet, they can experience severe stress and, of course, death.

The diurnal oxygen cycle in outdoor ponds is show below. The delicate balance of dissolved oxygen vs the rate of oxygen consumption can shift rapidly with changing algal, temperature and wind conditions. In outdoor ponds, lower D.O. levels will occur in the summer because the rate of oxygen consumption increases as the temperature increases. Oxygen is THE MOST IMPORTANT thing to monitor. Monitoring and record-keeping will provide predictive knowledge.

Measure oxygen after altering water flowrates, feed rates, etc., and when developing new growing systems. No one can just look at the water and know the oxygen level. Oxygen can only be measured with a test kit or, more conveniently, with an oxygen meter.

TECH TALK 3



The two blowers on this system work off of different circuit breakers.
In the event that the "normal on" blower shuts down, the standby blower will start.
For illustration only. Not to be used for wiring or plumbing.

Backup Blower Setup

Anyone who has worked with fish for a while knows that if you don't plan ahead, you won't be in business for long. When it comes to life support, a backup blower could save your business.

The most crucial of life support requirements is maintaining an adequate oxygen level because it can be used up so quickly.

We always recommend having a second blower attached to the main air supply line, wired to come on if the primary blower fails for any reason. Both blowers must have check valves on them. A pressure switch is located between the primary blower and its check valve. When this pressure switch senses a loss of air pressure, it closes, causing an electric relay to start the backup blower (see diagram). The check valves keep air from being lost through the nonrunning unit.

Check valves must be able to tolerate high temperatures. Be sure the stand-by unit is on a different electrical circuit breaker.

TECH TALK 82

Blowers, Air Pumps or Compressors

Blowers

Blowers are designed to provide large volumes of air at low pressure (under 4 psi). They are commonly used in conjunction with air diffusers and airlifts. This combination adds oxygen and removes carbon dioxide with low power consumption. Typical applications include recirculating fish tank and aquarium systems, bait fish and lobster holding facilities and shallow pond aeration. Regenerative blowers are preferred in the aquaculture industry because they are the most reliable and economical in this pressure range.

Compressors

Sweetwater® oilless rotary vane and piston compressors are used in applications where water depths are greater, such as with lake aeration, algae culture and lobster pounds. These compressors allow air lines to be run thousands of feet when electricity is not near the water. A compressor with as little as ¾ hp can be used to aerate and destratify a 10-acre lake. Compressors used for aquaculture should always be "oilless."

Air Pumps

Fractional horsepower Sweetwater® Linear Piston Air Pumps fill the gap between aquarium air pumps and blowers. These units supply up to 4 cfm at depths to 8 feet. Air pumps provide long service life, very quiet operation and very low energy use. They are a perfect fit for koi ponds, bait shop tanks, classrooms, laboratories, etc.

System Sizing

To size a system, first determine the pressure required. Enough pressure is needed to overcome the water pressure at the diffuser's depth, the piping friction loss and the diffuser's resistance to airflow.

Example: For a water depth of 36", a low-restriction piping system of 4" of water and a low-resistance air diffuser of 10" of water (just prior to cleaning) will require an air pressure of at least 50" of water (36" + 4" + 10"). This is equal to about 2 psi.

The next consideration is the volume of air needed to accomplish the job. If there is only one fish room, one linear air pump compressor with an additional one for emergency back up may be sufficient. In a larger facility, two or more primary blowers or compressors and one emergency back up may be required. When using low-pressure air, it's important that the air piping system and diffusers offer little resistance to air flow (request our bulletin "Air Distribution Systems for Sweetwater® Blowers").

Performance charts and tables are available for all of our blowers and compressors. Selecting the right system for your application is accomplished simply by comparing your pressure and airflow requirements with manufacturer's performance charts.

If you need help, call a Pentair AES technician at 407-886-3939.

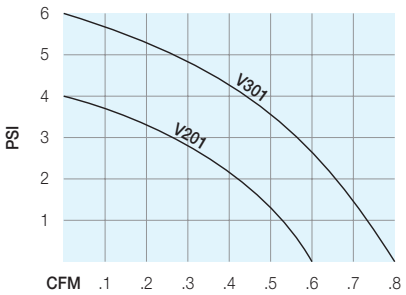
PENTAIR

V201

SILENT AIR PUMPS

The Pentair Aquatic Eco-Systems Whitewater air pumps work well in deep applications. They are virtually silent and feature a rugged, weatherproof, aluminum housing. Pumps have a ⅜" outlet and a 4' power cord. 115V/60 Hz. Not UL-listed. Six-month warranty.

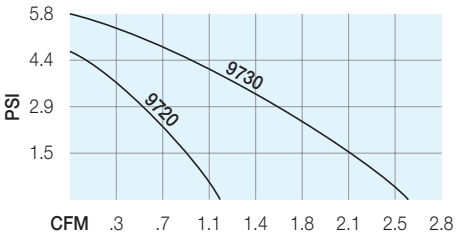
MODEL	VOLTS	HZ	WATTS	L	W	H	SHIP WT (LBS)	EACH	4+
V201	115	60	15	9"	7¼"	7"	7	**$70.25**	**$64.30**
V301	115	60	25	9⅝"	8"	8"	9	**82.12**	**74.98**



OUTDOOR AIR PUMPS

These air pumps have aluminum covers and internal noise-absorbers. Although the pump housings are waterproof and designed for outdoor use, the pump is not UL-listed. Pumps include 6' power cord, ⅜" hose barb, flexible outlet adapter, and outlet adapter to aquarium tubing (3/16").

9720



MODEL	VOLTS	HZ	WATTS	W/ADAPTER	L	W	H	SHIP WT (LBS)	EACH
9720	115	60	25	6-OUTLET	7½"	6"	7"	10	**$71.00**
9730	115	60	50	10-OUTLET	9"	7"	8"	12	**105.04**
9720D	REPL. DIAPHRAGMS FOR 9720 (SET OF 2)							1	**8.19**
9730D	REPL. DIAPHRAGMS FOR 9730 (SET OF 2)							1	**10.92**

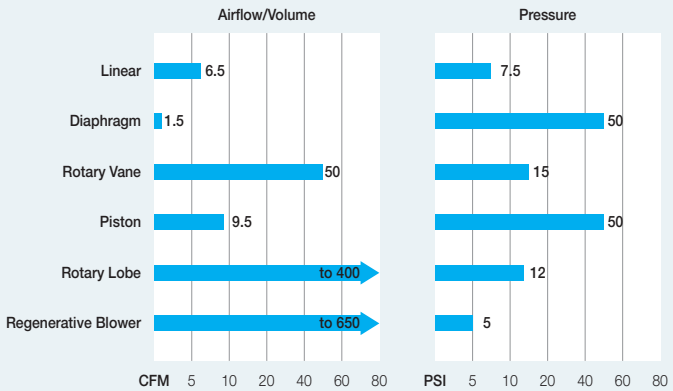
TECH TALK 64

Air Pump/Compressor Comparison

For the safety of our aquaculture customers we only offer oilless type air pumps and compressors. To select the one that is right for you first determine the volume of air you require in cubic feet per minute (cfm) and the pressure in pounds per square inch (psi) to get it there (Hint: It takes 1 psi to push an air bubble 28" below the surface of the water).

These quick guides will help you decide what type of air pump for which to look. Consider the cost, physical size, noise level, etc., then pick the type most efficient for your situation.

cfm x 1.699 = m^3h
m^3h x .588 = cfm
inches H_2O x .036 = psi
inches H_2O x .074 = 1" Hg
inches H_2O x 1.868 = mmHg
inches H_2O x 2.49 = mbar
mbar x .40 = "H_2O
psi x 27.68 = "H_2O
inches Hg x 13.59 = "H_2O
cfm x 28.32 = Lpm



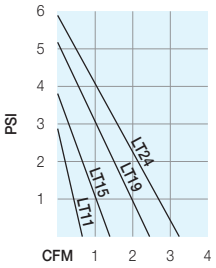
LINEAR DIAPHRAGM AIR PUMPS

Indoor rated

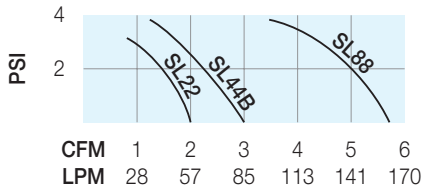
The Pentair Aquatic Eco-Systems Whitewater® air compressors are designed for indoor use only. Outlet is ⅜" barb; 6' power cord. Diaphragms typically last one year at the highest pressures, longer at lower pressures. See replacement diaphragms below. Six-month warranty.

FOR INDOOR USE ONLY

MODEL	VOLTS	HZ	WATTS @2PSI	L	W	H	SHIP WT (LBS)	EACH	REPL. DIAPHRAGMS (SET OF 2) MODEL	EACH
LT11	115	60	16	5½"	3½"	3¾"	4	**$74.90**	**LT11D**	**$5.94**
LT15	115	60	34	7"	3¾"	4¾"	7	**107.00**	**LT15D**	**7.12**
LT19	115	60	51	10"	5¼"	6¾"	14	**144.45**	**LT19D**	**7.70**
LT24	115	60	60	10"	5¼"	7"	16	**200.09**	**LT24D**	**8.24**
LT26A	115	60	190	12"	6⅛"	7½"	18	**236.47**	**LT26D**	**8.93**
LT28A	115	60	200	13¼"	6¾"	8"	19	**291.04**	**LT28D**	**9.42**



60-Hz performance at sea level is shown.
50-Hz performance is the same ±10%.



LINEAR PISTON AIR PUMPS

These are true linear "piston" type pumps. Since the only moving part— the piston—floats on a bed of air, a exceptionally long service life can be expected (8 years of continuous life is not uncommon). These pumps will provide exceptionally quiet, energy efficient operation and clean, oil-free air. An outdoor-rated housing, a grounded power cord, 3/4" hose barb are all standard. UL-approved for outdoor use. One-year warranty.

- Extremely quiet
- Outdoor-rated housing
- No lubrication required
- Exceptionally long service life
- Outstanding energy efficiency

Note: To power any linear air pumps with inverters (square wave), oversize the inverter at least 200%.

MAX DEPTH (IN.)	WATTS	(L X W X H)	SHIP WT (LBS)	115V 60 HZ MODEL	EACH	230V 50 HZ MODEL	EACH
81	48	7" X 7" X 8"	9	**SL22**	**$272.65**	**SL22H**	**$272.65**
100	92	11" X 8" X 8"	16	**SL44B**	**244.44**	**SL44HB**	**362.83**
100	162	15" X 8" X 9"	23.5	**SL88**	**508.99**	**SL88H**	**508.99**

REPAIR KITS

MODEL	FOR AIR PUMP MODELS	SHIP WT (LBS)	EACH
SL22RK	SL22 AND SL22H	0.5	**$48.00**
SL44RK	SL44B AND SL44HB	0.7	**91.45**
SL88RK	SL88 AND SL88H	1.7	**140.00**

Q: Do I need an expensive air pump?

A: Maybe not. It all depends on your need for reliability. If an air pump failure will cause a significant disruption and/or jeopardize the health of your fish, you not only need a reliable air pump (i.e., expensive) but also a redundant system and a backup. Every air pump will fail eventually and when it does you will want something in place to automatically prevent catastrophe. It could be two air pumps installed on separate breakers so that when one failed the other would do the job.

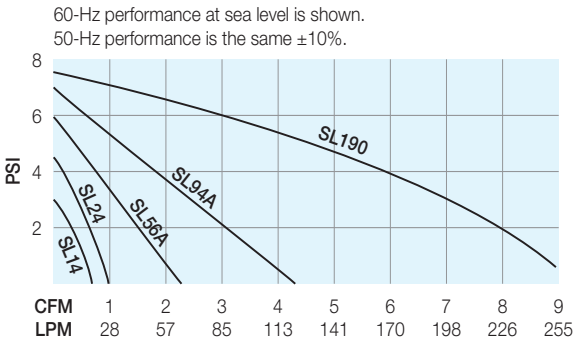
An inexpensive air pump will do for low-value, low-risk and/or temporary applications of less than 9 months duration; for instance, summer aeration in a koi pond where a water pump/splash is the primary aerator. They can also be used as economical backup air pumps.

LINEAR DIAPHRAGM AIR PUMPS

These Pentair Aquatic Eco-Systems Sweetwater® Linear II Air Pumps are designed for maximum efficiency, permit continuous operation, and are quiet. Applications include school rooms, pet stores and laboratories. Heavy-duty cast-aluminum housing, 6 ft. power cords. Models SL56A, SL94A and SL190 include reset safety switches. UL listed and CE approved. Made in USA. Three-year warranty (does not include filters nor diaphragms).

Standard features include:

- Oilless compressors require no lubrication
- Operate at 40-104°F (4.4-40C)
- Low noise level
- Available in 60 and 50 HZ models



PENTAIR

3-YEAR PUMP WARRANTY

MAX DEPTH (IN)	WATTS	OUTLET (IN)	60HZ* CFM@1 PSI	60HZ* CFM@2 PSI	SOUND (DB)	DIMENSIONS (L x W x H)	SHIP WT (LBS)	115V 60HZ MODEL	115V 60HZ EACH	230V 50HZ MODEL	230V 50HZ EACH
AIR PUMPS FOR INDOOR USE											
85	9	1/4	0.5	0.2	40	6" X 5" X 5"	7	**SL14**	**$223.68**	**SL14H**	**$223.68**
120	15	1/4	0.85	0.56	40	6" X 5" X 5"	7	**SL24**	**244.68**	**SL24H**	**244.44**
AIR PUMPS FOR OUTDOOR USE											
150	50	3/4	2	1.5	40	8" X 5" X 9"	15	**SL56A**	**$351.84**	**SL56A-H**	**$351.84**
180	90	3/4	3.7	3	50	8" X 5" X 9"	16	**SL94A**	**437.12**	**SL94A-H**	**437.12**
190	190	3/4	8.8	8.1	48	11" X 8.5" X 10"	30	**SL190**	**991.48**	**SL190-H**	**991.48**

*For 50 HZ performance, deduct 17% from CFM ratings.

REPAIR KITS

Includes diaphragms, heads and valves.

MODEL	FOR AIR PUMP MODELS	EACH
SL1424RK	**SL14, SL24**	**$46.81**
SL56RK	**SL56**	**82.90**
SL56ARK	**SL56A**	**84.48**
SL94RK	**SL94**	**86.94**
SL94ARK	**SL94A**	**132.92**
SL170RK	**SL170**	**165.85**
SL190RK	**SL190**	**230.35**

REPLACEMENT AIR FILTERS

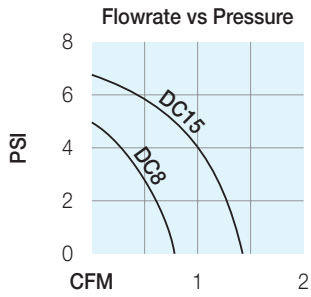
MODEL	FOR AIR PUMP MODELS	EACH
SL5694A	**SL14, SL24, SL56, SL94**	**$6.10**
SL56AA	**SL56A**	**5.62**
SL94AA	**SL94A**	**5.62**
SL170A	**SL170**	**13.38**
SL190A	**SL190**	**12.84**

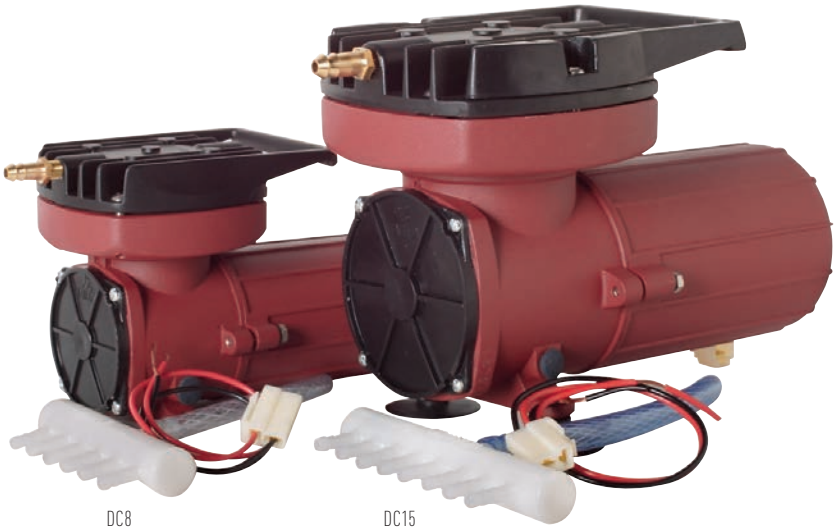
SEE OUR YouTube CHANNEL TO LEARN HOW TO REPLACE THE DIAPHRAGMS IN THESE PUMPS!

12V AIR PUMPS

Each pump comes with 12" pigtails, 6" of ¼" I.D. outlet hose and a plastic manifold for aquarium tubing. Manifold outlets are 3/16" designed without an air inlet filter. *Not recommended for saltwater environment.* Three-month warranty.

MODEL	WATTS	SHIP WT (LBS)	EACH	3+
DC8	25	8	**$101.65**	**$91.49**
DC15	80	9	**128.40**	**118.00**





DC8 DC15

DC20

12V DIAPHRAGM COMPRESSOR

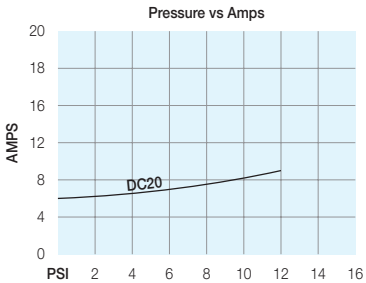
Specially designed for aquaculture, providing high volume at low pressure (10 psi max). Oilless operation, ball bearing construction and low amp draw with replaceable diaphragms and brushes for extended life. Runs for over six hours on a typical car battery. Comes with 9" pigtail wires, two feet of 3/8" I.D. outlet hose and inlet filter. We recommend additional housing for outdoor use. Six-month warranty.

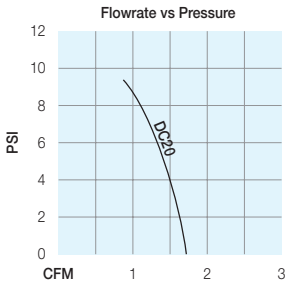
MODEL	L	W	H	SHIP WT (LBS)	EACH	3+
DC20	11"	7"	7"	9	**$327.75**	**$311.36**

TECHNICIAN PROFILE

Kevin Quinn

Kevin received both his Bachelor of Science and master's degrees in zoology from Eastern Illinois University. He has experience in mushroom cultivation and as an aquaculture technician. His specialties include aeration, diffusers and the control of zebra mussels.





SMALL TANK AERATION SYSTEM ✓ DESIGNED HERE

Offered in three different sizes; this complete system consists of nearly everything needed to aerate three tanks (except ½" PVC pipe; which must be sourced locally.) The system includes three air diffusers that go into the water; and air is delivered to each diffuser via included flexible ¼" air supply lines. Each of the ¼" flexible air supply lines is connected to customer-provided ½" PVC pipe which is installed overhead or along the tank wall. The PVC pipe connects to a single, quiet Sweetwater® linear air pump which is included with the system. Select from three sizes of complete, ready-to-install systems. Each system is designed to aerate three tanks (or compartments) with one diffuser in each. If divider screens are used, one diffuser per compartment is needed. Air flow to each diffuser is controlled with included individual valves. These systems are commonly utilized in bait shops, seafood markets and other holding systems where a simple, quiet, reliable aeration system is desired. For bait shop applications, a smaller diffuser is included with each system; this small remote diffuser can be temporarily deployed to aerate a customer's bait bucket while waiting.

Examples:

CBS10 Supports up to 10 lbs of minnows per diffuser (3" long). Air pump is for indoor use only.

CBS20 Supports up to 20 lbs of minnows per diffuser (6" long).

CBS3 Supports up to 30 lbs of fish per diffuser (9" long).

CBS10

MODEL		SHIP WT (LBS)	EACH
CBS10	30-LB SYSTEM	16	**$305.89**
CBS20	60-LB SYSTEM	23	**415.43**
CBS3	90-LB SYSTEM	30	**450.03**

BAIT BUCKET AERATOR

This high-quality air pump is designed for 5-gallon buckets and insulated chests. Output is .03 cfm at 12"—that's enough for ½ lb of minnows. Its low amp draw provides over 100 hours of operation on two alkaline D cell batteries (not included). This great little aerator comes with an air diffuser, 30" of tubing and a clip for attachment to a bucket. Six-month warranty.

MODEL	EACH	12+
DC5	**$29.98**	**$27.88**

VERTICAL PUMP AERATORS

The design uses a propeller inside the lift tube, increasing the pumping efficiency. Low-restriction slots spray the lifted water, providing excellent aeration. Models **V1** and **V1S** are very popular for live fish transport. Power cords not included. Models **V1S** and **V2S** use a stainless steel bearing, tube, propeller and fasteners for salt water compatibility. One-year warranty. Made in USA.

MODEL		PUMPING RATE (GPM)	VOLTS	AMPS	TUBE LENGTH	SHIP WT (LBS)	EACH
V1	AERATOR	75	12	10@12V	20"	17	**$541.13**
V1S	AERATOR (SALTWATER)	75	12	10@12V	20"	17	**613.39**
V2S	AERATOR (SALTWATER)	115	115/230	3.2@115V	20"	35	**693.32**

V1

V2S

TECH TALK 85

Bait Counts Per Pound

To estimate the carrying capacity of a bait aeration system, approximate the total weight of fish based on length and body depth of species. The following numbers are based on the average condition factor of the fish. The carrying capacity of aerators is rated in lbs of fish.

MINNOW	SIZE	QUANTITY PER LB
Small Fathead	1.5–2.5"	25–30 Dozen
Large Fathead	2–3"	12–15 Dozen
X-Large Fathead	2.5–3.5"	9–12 Dozen
Small Shiner	1.5–3"	25–30 Dozen
Large Shiner	2.5–4"	9–15 Dozen
Rosy	1.5–2.5"	25–30 Dozen
Large Rosy	2–3.5"	10–15 Dozen

A5

A7

AGITATORS AND ASPIRATORS

We offer both the traditional agitators and the bubble aspirator style. Each has a high-impact nylon basket and continuous-duty motor.

A5 This heavy-duty agitator draws is often used on hauling trucks by installing it in a 4" hole in the tank top. A shaft spinner on the top shows the driver it's working. The **A5** is also available in the bubble aspirating style (**A6**).

A7 This agitator is normally suspended above the water by its hanging ring. It's a heavy-duty unit with automatic thermal overload protection and an 8' power cord. **A9** uses the same motor but is the aspirator style. One-year warranty. Made in USA.

MODEL		VOLTS	AMPS	OVERALL HEIGHT	LBS OF FISH	SHIP WT (LBS)	EACH	3+
A5	AGITATOR	12V	5.0	9"	90	9	**$207.49**	**$197.12**
A6	BUBBLE ASPIRATOR	12V	4.0	15"	50	6	**281.34**	**267.27**
A7	AGITATOR*	115V	1.5	16¼"	90	10	**207.49**	**197.12**
A9	BUBBLE ASPIRATOR	115V	1.5	14¾"	45	7	**281.34**	**267.27**

*Use of a GFCI is recommended with 115V models.

TECH TALK 8

Aspirators vs Agitators

Aspirators and agitators are the aeration devices most commonly used on hauling tanks when the stocking densities do not require the use of pure oxygen. Agitators use a small motor (normally 12V) to spin a paddle that is in the water. The paddle splashes the water, which adds oxygen and removes carbon dioxide. Aspirators also use a small motor, which spins a small venturi device. Air is pulled down through the shaft and exits the venturi underwater, causing a draft of bubbles. Agitators are the best choice for heavy stocking loads because they transfer more oxygen than aspirators. Aspirators are a good choice for smaller stocking densities, and they are much quieter than agitators.

TECH TALK 50

Aeration Requirements

Bait Tanks

It is best to hold and transport bait at lower water temperatures, if possible, and at a minimum of 6 ppm dissolved oxygen (D.O.) to minimize stress. The fish consume less oxygen when they are cold, and cold water holds more oxygen than warm water. Oxygen consumption rates of fish at 80°F (27°C) can be double those at 63°F (17°C). Twice the lbs of fish can be supported in 63°F water than at 80°F with the same aeration system. Note that aeration systems cannot bring D.O. concentrations above saturation (9.65 ppm at 63°F). If the oxygen level were higher than saturation, an aeration system would drive oxygen out of the water, bringing it down to the saturation point.

How many lbs of fish will a bait aeration system support?

The following chart is based on test results with minnows in 63°F (17°C) fresh water. Note that the tests were done at two depths—one foot and two feet—and that air induced at greater depths will result in greater oxygen transfer. However, low-pressure compressors give less air deeper in the water, resulting in less oxygen transfer. Air by itself (20.9% oxygen) cannot get the D.O. above the saturation point.

PPM DISSOLVED OXYGEN TO BE MAINTAINED	TEST DEPTH	TEST DEPTH
6	1 foot 2 feet	4.1 5.1
8	1 foot 2 feet	2.2 3.1
10	1 foot 2 feet	Not Possible
12	1 foot 2 feet	Not Possible

Note: Reduce lbs of fish supported by 50% for a 18°F (10°C) increase in water temperature.

SURFACE AERATORS FW SW

Kasco® aerators are ideal for aquaculture and waste-water applications. They are lightweight, easy to install, simple to operate and backed by a two-year warranty, 3-year on 2HP and larger. Made in USA.

- High oxygen transfer at an affordable price
- Water circulation with little or no bottom turbulence
- Portable for fast response to emergencies
- Excellent shallow water operation
- Ideal for supplemental aeration
- Salt water compatible and fitted with a zinc anode
- SAE rating of 3.0 (see Tech Talk 4)
- Two mooring ropes, 50' each, are include

Call Pentair for help with sizing aeration devices.

Kasco® motors are specially designed, energy-efficient, permanent-split capacitor type, continuous duty and single-phase with automatic reset, thermal overload protection. They are fitted in an oil-filled, stainless steel housing with a stainless steel prop guard. ETL-approved to UL and CSA standards.

Testing at Pentair Aquatic Eco-Systems' R&D facility

Dock Mount Kit (KD)

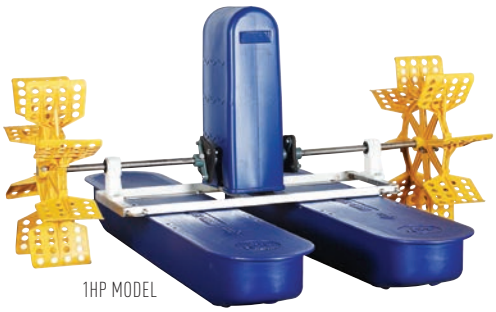
Easy to install—just 4 bolts!

2-YEAR WARRANTY (3-YEAR ON 2 HP MODELS AND LARGER)

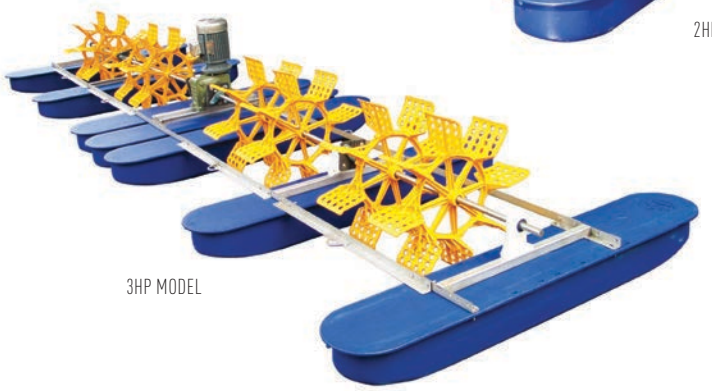
MODEL		AES	RUNNING AMPS	VOLTAGE	SHIP WT (LBS)	EACH
KA501-50	½ HP W/50' CORD	600	5	115	32+30*	**$747.90**
KA501-100	½ HP W/100' CORD	600	5	115	38+30*	**851.85**
KA501-150	½ HP W/150' CORD	600	5	115	27+24+30*	**1,179.90**
KA501-200	½ HP W/200' CORD	600	5	115	27+30+30*	**1,288.35**
KA751-50	¾ HP W/50' CORD	800	6.7	115	40+30*	**818.10**
KA751-100	¾ HP W/100' CORD	800	6.7	115	45+30*	**920.25**
KA751-150	¾ HP W/150' CORD	800	6.7	115	36+24+30*	**1,228.95**
KA751-200	¾ HP W/200' CORD	800	6.7	115	36+30+30*	**1,330.20**
KA752-50	¾ HP W/50' CORD	800	3.3	230	40+30*	**854.55**
KA752-100	¾ HP W/100' CORD	800	3.3	230	45+30*	**923.40**
KA752-150	¾ HP W/150' CORD	800	3.3	230	36+30+30*	**1,251.00**
KA752-200	¾ HP W/200' CORD	800	3.3	230	36+38+30*	**1,348.20**
KA101-50	1 HP W/50' CORD	1,100	11.3	115	45+55*	**1,179.00**
KA101-100	1 HP W/100' CORD	1,100	11.3	115	38+17+55*	**1,456.20**
KA101-150	1 HP W/150' CORD	1,100	11.3	115	38+38+55*	**1,872.90**
KA101-200	1 HP W/200' CORD	1,100	11.3	115	38+49+55*	**2,063.70**
KA102-50	1 HP W/50' CORD	1,100	5.7	230	45+55*	**1,190.70**
KA102-100	1 HP W/100' CORD	1,100	5.7	230	38+20+55*	**1,256.40**
KA102-150	1 HP W/150' CORD	1,100	5.7	230	38+32+55*	**1,574.55**
KA102-200	1 HP W/200' CORD	1,100	5.7	230	38+55+55*	**1,676.70**
KA202-50	2 HP W/50' CORD	2,100	9	230	56+55*	**1,963.80**
KA202-100	2 HP W/100' CORD	2,100	9	230	53+20+55*	**2,286.22**
KA202-150	2 HP W/150' CORD	2,100	9	230	53+35+55*	**2,364.30**
KA202-200	2 HP W/200' CORD	2,100	9	230	53+42+55*	**2,475.90**
KA303-50	3 HP W/50' CORD	3,200	10.7	230	76+60*	**2,438.55**
KA303-100	3 HP W/100' CORD	3,200	10.7	230	70+17+60*	**2,749.50**
KA303-150	3 HP W/150' CORD	3,200	10.7	230	70+34+60*	**2,839.05**
KA303-200	3 HP W/200' CORD	3,200	10.7	230	70+53+60*	**3,015.00**
KD	DOCK MOUNT KIT, (1" DIA. STEEL PIPE NOT INCLUDED)		—	—	22	**207.00**
KM501-50	MOTOR ONLY, ½ HP W/50' CORD		5	115	22	**605.70**
KM751-50	MOTOR ONLY, ¾ HP W/50' CORD		6.7	115	33	**667.80**
KM752-50	MOTOR ONLY, ¾ HP W/50' CORD		3.3	230	33	**701.55**
KM202-50	MOTOR ONLY, 2 HP W/50' CORD		10	230	46	**1,395.90**
KPROP12	REPL. PROP FOR ½ HP		—	—	1	**28.50**
KPROP34	REPL. PROP FOR ¾ HP		—	—	1	**29.00**
KPROP2	REPL. PROP FOR 2 HP		—	—	1	**101.14**
KF34	REPL. FLOAT FOR ½ AND ¾ HP		—	—	23	**249.25**
KF2	REPL. FLOAT FOR 2 HP		—	—	49	**828.28**
RC-15	AERATOR TIMER CONTROL W/GFCI		—	115	2	**211.05**

*Aerators ship Ground in multiple boxes. Other cord lengths available. Kasco® is a registered trademark of Kasco Marine, Inc.

AES This is the lbs of fish supported. See Tech Talk Index for Tech Talk 84.


1HP MODEL


2HP MODEL


3HP MODEL

PADDLE WHEEL AERATORS, FOR AQUACULTURE & WASTE WATER FW SW

Excellent oxygen transfer and circulation.

These high-quality paddle wheels feature high-efficiency 60 HZ motors and high-quality gear reducers to ensure a long service life. The frame, drive shaft and hardware are 304 stainless steel—all compatible with salt water. Power cable not included. The Standard Aeration Efficiency (SAE) is approximately 4.1 on all models (see Tech Talk 4). Paddle wheel aerators are an excellent choice for medium and large ponds where movement of oxygenated water away from the aerator is most important.

The entire unit, including gear reducer and motor, has a one-year warranty (warranty requires the gear oil be changed after the first 3 months - use SAE 90 oil). Ships motor freight only.

Motor

- High efficiency TEFC design
- Stainless steel fan cover and T-box
- Meets CE standards

Motor Cover

- Made of high density, water-proof polyethylene
- Impact and high wind resistant

Gear Reducer

- High quality ALBC 3 wheel gear and S45C carbon steel worm shaft

Frame, Drive Shaft & Hardware

- 304 Stainless steel to provide rust resistance and longer life

Paddle Wheels

- Eight blade, fiber-reinforced nylon

Floats

- One-piece, blow molded, leak proof polyethylene floats
- Strong but lightweight for easy handling

PADDLE WHEEL AERATORS

MODEL	HP	VOLTAGE	HZ*	PHASE	RUNNING AMPS	AES	SHIP WT (LBS)	EACH
PW11-AQ	1	115/230	60	1	11.05	1,450	400	**$1,059.00**
PW21	2	230	60	1	9.98	2,900	430	**1,259.00**
PW23	2	230/460	60	3	5.85/2.93	2,900	430	**899.00**
PW333	3	230/460	60	3	9.14/4.57	4,350	460	**1,349.00**

*50HZ models are available in quantity by special order.

REPLACEMENT PARTS

MODEL		FITS AERATOR MODELS	SHIP WT (LBS)	EACH
PW11M	MOTOR, 1HP 1PH	**PW11-AQ**	56.0	**$389.00**
PW21M	MOTOR, 2HP 1PH	**PW21**	61.0	**459.00**
PW23M	MOTOR, 2HP 3PH	**PW23**	54.0	**359.00**
PW33M	MOTOR, 3HP 3PH	**PW333**	86.0	**399.00**
PW11G	GEARBOX	**PW11-AQ,PW21,PW23**	47.0	**249.00**
PW33G	GEARBOX	**PW333**	53.0	**249.00**
PW23-5	PILLOW BLOCK	ALL MODELS	1.0	**14.95**
PW23-3	MOTOR COVER	ALL MODELS	13.0	**24.95**
PW11-5	PADDLE WHEEL	ALL MODELS	25.5	**49.95**
PW23-8	FLOAT	ALL MODELS	16.3	**44.95**

AEROBOOST™ CT AIRLIFT PUMP NEW!

AeroBoost Airlift Pumps provide a low-cost, decentralized approach to water reuse for aquaculture systems. AeroBoost uses air injection to circulate and aerate the water, allowing for increased fish production with less influent water. Mounted directly inside the culture tank, AeroBoost can be easily installed into existing systems or integrated into new designs.

Benefits

- Reduces influent water use and effluent volumes
- Reduces energy use relative to traditional water pumps
- Increases rearing capacity without increased water use
- Increases dissolved O_2 and reduces dissolved CO_2
- Improves tank circulation and fish fitness
- Reduces labour required to clean tanks
- Increases production flexibility (unit may be moved to highest density tank)
- Ideal for direct installation into new or existing circular tanks

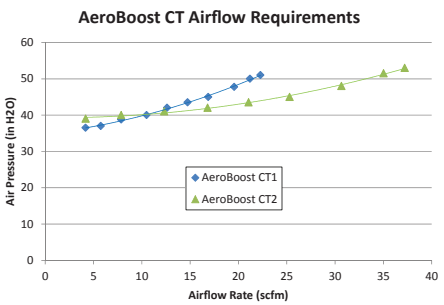
Features

- Fish friendly design; no moving parts, noise, or vibration
- Mounts from tank wall without tank modification
- Internal components are easy to access and clean
- Durable aluminum construction
- Screened intake and adjustable discharge vane
- Configurable to suit tank rotation direction
- May be operated from a centralized air supply
- Multiple units may be used in larger tanks to fit production needs
- Manufactured in North America with factory-direct service and support

Description of operation

An airlift is a simple device which uses pressurized air injected in a column of water to pump water. Air is injected with a diffuser below the water surface. The bubbles generated reduce the density of the water, causing the water to rise with the bubbles. Higher density water rushes in from underneath to fill the void, effectively pumping water from high density to low density. While the primary purpose of an airlift is to generate flow, a secondary benefit is that the water is aerated in the process, adding oxygen and driving off carbon dioxide.

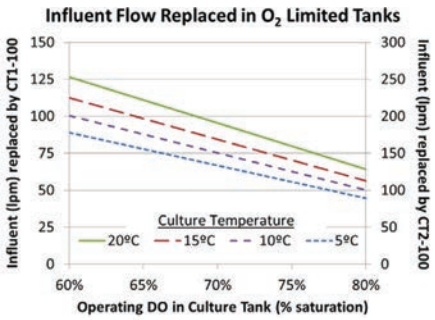
CALL FOR MORE INFORMATION AND PRICING.

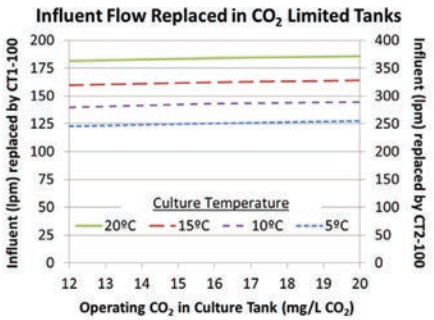


PENTAIR

Performance

The AeroBoost CT effectively replaces influent water by aerating and mixing the water in a circular tank. Its effectiveness increases the further the tank is operated from the saturation DO and DCO_2 levels.

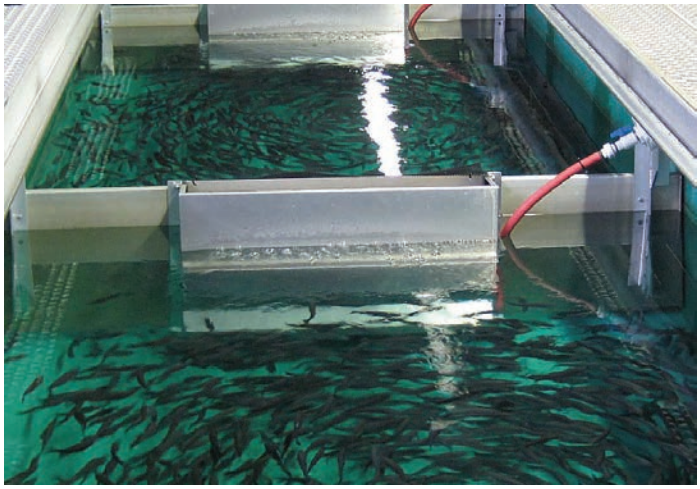




Notes:
1. Performance data assumes design air flow: CT1-100 at 14scfm and CT2-100 operating at 28scfm, 0m elevation.
2. Influent water DO and CO_2 assumed to be at saturation with air (21% O_2, 400 ppm CO_2) for each temperature curve. Improved performance may be expected when influent DO is below saturation or influent CO_2 is above saturation.
3. Influent water temperature assumed to be equal to culture temperature.

PRODUCT INFORMATION	CT1-100 SINGLE DIFFUSER AIRLIFT	CT2-100 DOUBLE DIFFUSER AIRLIFT
INSTALLATION		
Mounting method	Mounting bracket included; hangs from tank wall without tank modification	
Tank freeboard	Adjustable in height for use in tanks with up to 24" freeboard	
Tank flange width	Suitable for tank flange widths of up to 8"	
Weight	25 kg (55 lbs)	36 kg (80 lbs)
MATERIALS OF CONSTRUCTION		
Body and Mounting Bracket	Aluminum (5052 and 6061)	
Internals	PVC, polyurethane, and EPDM	
PROCESS AIR SUPPLY		
Air inlet	¾" FNPT	1¼" FNPT
Air flow range	13.6–34.0 m³/hr (8–20 scfm)	27.2–68.0 m³/hr (16–40 scfm)

PENTAIR



AEROBOOST™ RC AIRLIFT PUMPS NEW!

AeroBoost Airlift Pumps provide a low-cost, decentralized approach to water reuse for aquaculture systems. AeroBoost uses air injection to circulate and aerate the water, allowing for increased fish production with less Tinfluent water. The AeroBoost RC is designed specifically for raceway applications.

Benefits

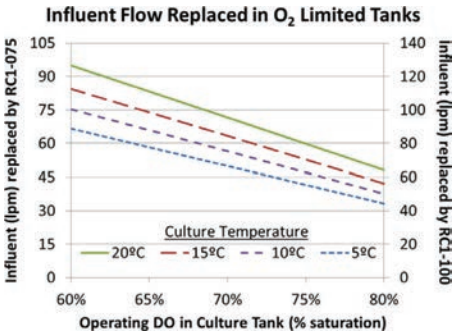
- Reduces influent water use and effluent volumes
- Increases rearing capacity without increased water use
- Increases dissolved O_2 and reduces dissolved CO_2
- Improves mixing for even water quality and better fish distribution
- Makes raceways self-cleaning; reduces labour
- Reduces energy use relative to traditional water pumps
- No reduction in raceway water level or rearing volume
- Ideal for direct installation into new or existing raceway tanks

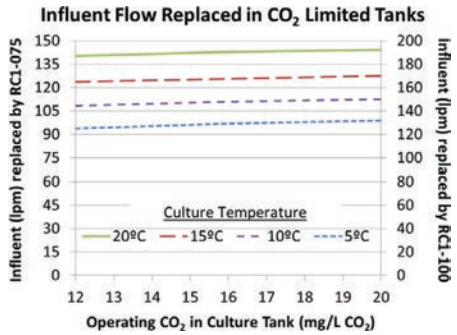
Features

- Fish friendly design; no moving parts, noise, or vibration
- Durable aluminum construction
- Both pump and baffle are easily removable to minimize impact to fish handling
- Internal components are easy to access and clean
- Standard and custom baffle mounting available to fit any raceway
- Adjustable spacing and baffle height to fit application needs
- Uses centralized air supply for multiple raceways
- Manufactured in North America with factory-direct service and support

Performance

The AeroBoost RC system effectively replaces influent water by aerating and mixing the water in a raceway tank. The system improves mixing and increases flows rate in all installations. However, the gas transfer effectiveness increases the further the tank is operated from the saturation DO and DCO_2 levels.





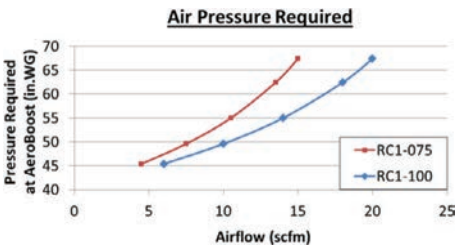
Notes:
1. Performance data assumes design air flow: RC1-075 at 10.5scfm and RC1-100 at 14scfm, 0m elevation.
2. Influent water DO and DCO_2 assumed to be at saturation with air (21% O_2, 400 ppm CO_2) for each temperature curve. Improved performance may be expected when influent DO is below saturation or influent DCO_2 is above saturation.
3. Influent water temperature assumed to be equal to culture temperature.

PRODUCT INFORMATION	RC1-075	RC1-100
INSTALLATION		
Baffle mounting method	Clamped to top of raceway wall (standard); Custom designed mounting also available	
AeroBoost mounting method	Mounted directly to baffle; independently removable	
Raceway dimensions accommodated	Baffle design is customizable for each installation	
Number/spacing of AeroBoost units	Application dependant	
Weight (airlift only, without baffle)	14.5 kg (32 lbs) Dry	18 kg (40 lbs) Dry
MATERIALS OF CONSTRUCTION		
Body and Mounting Bracket	Aluminum (5052 and 6061)	
Internals	PVC, polyurethane, and EPDM	
PROCESS AIR SUPPLY		
Air inlet	¾" FNPT	1¼" FNPT
Air flow range	10.2–27.0 m³/hr (6–15 scfm)	13.6–34.0 m³/hr (8–20 scfm)

Description of operation

An airlift is a simple device which uses pressurized air injected in a column of water to pump water. Air is injected with a diffuser below the water surface. The bubbles generated reduce the density of the water, causing the water to rise with the bubbles. Higher density water rushes in from underneath to fill the void, effectively pumping water from high density to low density. While the primary purpose of an airlift is to generate flow, a secondary benefit is that the water is aerated in the process, adding oxygen and driving off carbon dioxide. When used in a raceway with a baffle, the airlift pump provides improved flow dynamics, dissolved gas levels, and solids removal.

CALL FOR MORE INFORMATION AND PRICING.



THE AIRE-02® SERIES II AERATORS

FW SW

For aeration and circulation

The AIRE-02® Series II Aquaculture Aerators are lightweight, portable and can be adjusted from 25 to 45 degrees for optimal mixing, oxygen dispersion and destratification. They are suitable for all species and pond depths. It operates by creating a partial vacuum under the water, drawing air through the shaft and dispersing it into the water in a horizontal direction. As the propeller rotates, it induces a flow of atmospheric air through the air intake ports on the shaft located above the water surface. This air is then drawn through the shaft, past the propeller, and exits in a high velocity stream of fine bubbles (less than 2.2 mm in diameter) as it is diffused into the water. This is critical to both oxygen dispersion and oxygen transfer. The smaller the bubble from an aerator, the longer this bubble stays in the water. And the longer the bubble can stay in the water, the greater the opportunity this bubble has to become dissolved oxygen.

The Unifloat design features a pontoon made of molded polyethylene with a UV inhibitor. The shaft housing is nonmetallic, noncorroding and flanged for mounting to the aerator. It forms a guard around the 316 stainless steel hollow shaft and supports a field replaceable, water-lubricated bearing press-fitted into the housing's lower end. The propeller/diffuser can be replaced easily in the field. The premium quality TEFC motor is designed for tough environments and years of trouble-free operation.

Ideal for saltwater shrimp, freshwater prawn, tilapia, catfish, trout, salmon, lobster and eel. Each aerator arrives fully assembled, ready for attachment to the floatation assembly. Underwater power cable and mooring cable not included. Ships motor freight. One-year warranty. Made in USA.

- For fresh and saltwater applications
- Adjustable from 25° to 45° for optimal mixing, oxygen dispersion and destratification
- Complete rapid pond destratification reduces energy consumption
- Low maintenance - only one moving part
- Water lubricated bearing – no risk of pond contamination
- Lightweight, portable, easy to install

The Aire-02® units supply dependable aeration to this intensive shrimp pond in the Mexican desert.

All models are salt water compatible.

Underwater view of the fine bubble oxygenation and mixing capabilities

AERATORS - 60HZ

MODEL	HP	VOLTAGE	HZ	PHASE	L	W	H	SHIP WT (LBS)	EACH
5101226	2	208/230	60	1	63"	36"	13"	110	**$1,269.00**
5101379 NEW	2	220/380	60	3	63"	36"	13"	110	**1,189.00**
5101377	2	230/460	60	3	63"	36"	13"	110	**1,099.00**
5101227	3	208/230	60	1	63"	36"	13"	110	**1,369.00**
5101382 NEW	3	220/380	60	3	63"	36"	13"	110	**1,219.00**
5101380	3	230/460	60	3	63"	36"	13"	110	**1,169.00**
5101324 NEW	5	230/460	60	3	63"	36"	13"	160	**2,869.00**

AERATORS - 50HZ NEW!

MODEL	HP	VOLTAGE	HZ	PHASE	L	W	H	SHIP WT (LBS)	EACH
5101257	2	208/220	50	1	63"	36"	13"	110	**$1,369.00**
5101378	2	230/380	50	3	63"	36"	13"	110	**1,189.00**
5101228	2	240/415	50	3	63"	36"	13"	110	**1,189.00**
5101335	3	208/220	50	1	63"	36"	13"	110	**1,529.00**
5101381	3	220/380	50	3	63"	36"	13"	110	**1,219.00**
5101318	3	240/415	50	3	63"	36"	13"	110	**1,219.00**

*NOTE: 60HZ and 50HZ aerators are for aquaculture use only-NOT intended for wastewater.

OPTIONAL ACCESSORY

MODEL			SHIP WT (LBS)	EACH
510904	NEW	PROPELLER PROTECTION GUARD	4	**$95.00**

TECH TALK 62

Diffuser Comparison Chart

	GAS USED	DIFFUSER DEPTH (FT WATER*)	FISH SUPPORTED BY SYSTEM (LBS)	DIFFUSER SPECIFICATIONS	
Algae Tank Circulation					
Linear Compressor (**SL44B**), Pipe: 8 holes/LF	Air	8	45	Flowrate:	.015 cfm/hole
3/4-hp Vane Compressor (**AQ7**), Pipe: 8 holes/LF	Air	8	299	Hole Size:	1/16"
1-hp Regenerative Blower (**S41**), Pipe: 8 holes/LF	Air	3	560	Pressure Loss:	<6"
De-Icing					
¾-hp Vane Compressor (**AQ7** w/**WD50** diffuser)	Air	10	962	Flowrate:	.01–.1 cfm/ft
Hauling: Algae Tanks					
¼-hp Rocking Piston Compressor (**AQ101C**)	Air	10	225	Flowrate:	.2–.6 cfm/ft
¾-hp Vane Compressor (**AQ7**)	Air	10	1,864	Pressure Loss:	20"
3½-hp Regenerative Blower (**S63**)	Air	3	8,736		
Oxygen Generator (**SOG84**)	O_2, 90%	3	734		
Pure Gas (Oxygen), Hauling Tanks, Degassing Towers, Protein Skimmers					
¼-hp Rocking Piston Compressor (**AQ101C**)	Air	3	48	Flowrate:	1 cfm/ft
Oxygen Generator (**SOG84**)	O_2, 90%	3	615	Pressure Loss:	15"
Pure Gas (Oxygen), Hauling Tanks, Aquariums, Hatcheries, Back-Up Aeration					
¾-hp Vane Compressor (**AQ7** w/fine-pore diffuser)	Air	10	2,457	Flowrate:	.01–.2 cfm/ft
Oxygen Generator (**SOG84** w/fine-pore diffuser)	O_2, 90%	3	1,025	Pressure Loss:	30"
Pure Gas (Oxygen, Carbon Dioxide), High-Density Hauling, Holding/Grow-Out Tanks, Emergency Aeration					
Oxygen Generator (**SOG84** w/**1DMBDC100** diffusers)	O_2, 90%	3	3,624	Flowrate:	.1 Lpm/sq.in.
				Pressure Loss:	25 psi

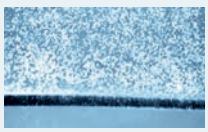
Note: Values reflect efficient farming practices, but should be used for comparison rather than budgetary purposes.

Drilled PVC (DIY)

WD50

BWD10

AS230



DT12R

1DMBDC600

*For depths greater than 4 feet there is a risk of gas bubble disease in intensive systems.

SWEETWATER® AIR DIFFUSERS ✓ DESIGNED HERE

Pentair Aquatic Eco-Systems Sweetwater® diffusers are the highest-quality ceramic-type air diffusers on the market today. They're machined from a solid block of glass-bonded silica. Because dust and dirt particles up to 30 microns in size will pass right through these diffusers, there's no need for expensive air filters. And with an air resistance of less than .25 psi, Sweetwater® glass-bonded diffusers are compatible with economical low-pressure blowers.

They produce a uniform medium/fine bubble and are very resistant to clogging. And when cleaning does become necessary because of a buildup of calcium precipitate or bacteria, an acid bath restores them to like-new performance.

Note that water pH in excess of 9.0 will shorten the diffuser life. Self-weighting when used with typical tubing lengths.

Beware of imitations.

Sweetwater® diffusers are the original 2,000°F glass-bonded silica diffusers introduced by us in 1984. You may come across other diffusers that copy our sizes, descriptions and even our photos, but it takes more than flattering imitation to compete with the best. Look for the name and the two-year warranty. Made in USA.

AES This is the lbs of fish supported. See Tech Talk Index for Tech Talk 84.

SWEETWATER® MEDIUM PORE DIFFUSER SPECIFICATIONS

BODY	2,000°F GLASS-BONDED SILICA
MAXIMUM PORE SIZE	140 MICRONS (.0055 INCHES)
BUBBLE SIZE	1–3 MM (.04–.15 INCHES)
NOMINAL PARTICLE RETENTION	50 MICRONS
SERVICE LIFE AT PH BELOW 8.0	UNLIMITED
FLEXURAL STRENGTH	2,500 PSI

2-YEAR WARRANTY

MODEL	LENGTH* IN	LENGTH* CM	WIDTH IN	WIDTH CM	SUGGESTED CFM	AES	AIR SUPPLY CONNECTION	SHIP WT (LBS)	EACH		
AS1	1.5	4	.50	1.3	.05	1.5	3/16" O.D. (4 MM), ABS	.03	**$1.80**	**$1.62/20+**	**$1.26/100+**
AS2	1.5	4	.75	2	.10	3	3/16" O.D. (4 MM), ABS	.06	**2.53**	**2.28/20+**	**1.77/100+**
AS3	2.0	5	1.0	2.5	.20	5	3/16" O.D. (4 MM), PE	.10	**3.51**	**3.16/20+**	**2.46/100+**
ALS3	2.0	5	1.0	2.5	.20	5	1/4" NPT, PE	.10	**4.27**	**3.63/20+**	**2.99/100+**
AS4	1.5	4	1.5	4	.25	7	3/16" O.D. (4 MM), PE	.21	**4.01**	**3.41/20+**	**2.81/100+**
AS5S	3.0	8	1.0	2.5	.30	8	3/16" O.D. (4 MM), PE	.16	**5.16**	**4.64/20+**	**3.61/100+**
AS5L	3.0	8	1.0	2.5	.30	8	1/4" O.D. (6 MM), PE	.16	**5.16**	**4.64/20+**	**3.61/100+**
ALS5	3.0	8	1.0	2.5	.30	8	1/4" NPT, PE	.16	**5.36**	**4.82/20+**	**3.75/100+**
AS8S	3.0	8	1.5	4	.35	10	3/16" O.D. (4 MM), PE	.39	**6.76**	**6.08/10+**	**5.41/50+**
AS8L	3.0	8	1.5	4	.35	10	1/4" O.D. (6 MM), PE	.39	**6.76**	**6.08/10+**	**5.41/50+**
ALS8	3.0	8	1.5	4	.35	10	1/4" NPT, PE	.39	**7.56**	**6.80/10+**	**6.43/50+**
ALR8	3.0	8	1.5	4	.35	10	1/2" NPT, PE	.39	**7.86**	**7.07/10+**	**6.68/50+**
AS15S	6.0	15	1.5	4	.50	14	1/4" O.D. (6 MM), PE	.75	**11.29**	**10.16/20+**	**9.60/50+**
AS15L	6.0	15	1.5	4	.50	14	3/8" O.D. (9 MM), PE	.75	**11.29**	**10.16/20+**	**9.60/50+**
ALR15	6.0	15	1.5	4	.50	14	1/2" NPT, PE	.75	**13.50**	**12.15/10+**	**11.48/50+**
AS23S	9.0	23	1.5	4	.75	20	1/4" O.D. (6 MM), PE	1.35	**15.80**	**14.22/10+**	**13.43/25+**
AS23L	9.0	23	1.5	4	.75	20	3/8" O.D. (9 MM), PE	1.35	**15.80**	**14.22/10+**	**13.43/25+**
ALR23	9.0	23	1.5	4	.75	20	1/2" NPT, PE	1.35	**19.24**	**17.32/10+**	**16.35/25+**
AS30S	12.0	30	1.5	4	1.00	27	1/4" O.D. (6 MM), PE	1.50	**19.06**	**17.15/10+**	**16.20/25+**
AS30L	12.0	30	1.5	4	1.00	27	3/8" O.D. (9 MM), PE	1.50	**19.06**	**17.15/10+**	**16.20/25+**
ALR30	12.0	30	1.5	4	1.00	27	1/2" NPT, PE	1.50	**22.77**	**20.49/10+**	**19.35/25+**
ASW88S**	3.0	8	3.0	8	.70	19	1/4" O.D. (6 MM), PE	.70	**22.62**	**20.36/10+**	**19.23/25+**
ASW88L**	3.0	8	3.0	8	.70	19	3/8" O.D. (6 MM), PE	.70	**22.62**	**20.36/10+**	**19.23/25+**

*Dimensions of length and width are ±1/8" (3 mm). **Fitting is in center of 3" x 3" dimension. The suggested cfm shown above is typical for aquaculture; higher cfm amounts will create larger bubbles. Nonstandard fittings are available on request. PE is high-density linear polyethylene. ABS is green plastic.

AES This is the lbs of fish supported. See Tech Talk Index for Tech Talk 84.

SWEETWATER® GENERATION II DIFFUSERS ✓ DESIGNED HERE

Sweetwater® diffusers manufactured by Pentair AES quickly became and still remain the standard of the aquaculture industry for diffused air aeration. The Generation II series is the same glass-bonded diffuser that is so resistant to clogging. Generation II diffusers give the added flexibility of changing the air diffuser fittings in the field. All diffusers have ⅛" FNPT threads that accept MNPT fittings, either straight or elbows.

Use tubing with a smaller I.D. to act as a valve, restricting the volume of air delivered to the diffuser. Use a larger I.D. tubing in applications where the tubing is long and/or too restrictive. To make the diffuser lie flat in deep water, use an elbow fitting and put a weight on the tubing to counteract its buoyancy.

MODEL	LENGTH IN	LENGTH CM	WIDTH IN	WIDTH CM	FNPT	CFM	SUGGESTED AES	EACH	20+	100+
ASI-3	2	5	1	2.5	⅛"	.2	5	**$3.31**	**$2.98**	**$2.48**
ASI-5	3	7.6	1	2.5	⅛"	.3	8	**4.51**	**4.06**	**3.38**
ASI-8	3	7.6	1.5	3.8	⅛"	.35	10	**6.45**	**5.81**	**4.84**
ASI-15	6	15	1.5	3.8	⅛"	.5	14	**11.20**	**10.08**	**8.40**
ASI-23	9	23	1.5	3.8	⅛"	.75	20	**15.75**	**14.18**	**11.81**
ASI-30	12	30	1.5	3.8	⅛"	1.0	27	**21.72**	**19.55**	**16.29**

All above do not include air supply connections, which must be ordered separately.

DIFFUSER BUMPERS

Protect diffusers from abrasives or protect a tank from abrasive diffusers. Use two bumpers for each diffuser. Made of Buna 70 for an easy stretch over 1½" square diffusers. Sold in packs of 10.

MODEL	EACH	5+	10+
DB10	**$4.92**	**$4.43/PK**	**$3.94/PK**

ALR8 with Bumpers

TECH TALK 53

Cleaning Diffusers

Sweetwater® air diffusers, made of glass-bonded silica, are virtually indestructible and will give many years of service.

The only maintenance normally required is periodic cleaning. The frequency of cleaning will be determined by the mineral and organic content of the water in which the air diffusers are used. In clean, cold, soft water, cleaning may only be necessary every 2 or 3 years. In very hard water or water high in organics, it could be necessary as often as every 2 months.

1. Remove from service and blow out excess water. If fouled with barnacles or other gross foreign material, scrape or hose off.
2. If you have a ½" NPT white fitting on the end of your diffuser, immerse the diffuser portion, not the fitting, completely in undiluted muriatic acid for a sufficient time to dissolve the clogging material. This may take from one minute to eight hours in the most extreme cases. Be very careful when using acid! Wear eye, face and hand protection and have clean water available for rinsing and acid diluting in the case of an acid splash or spill.
3. After the clogging material has been dissolved, rinse thoroughly before reuse.
4. Discard the used acid after reducing its strength to a neutral pH by diluting with at least ten times as much water as acid. Add acid to water; never add water to acid.

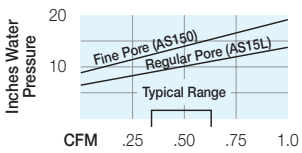
SWEETWATER® FINE-PORE DIFFUSERS FOR OZONE AND PURE OXYGEN ✓ DESIGNED HERE

Sweetwater® fine-pore diffusers are the same high quality as our regular Sweetwater® diffusers. The difference is in the smaller pore size, which produces finer bubbles. Sweetwater® fine-pore diffusers do require higher pressure (about 5" H_2O more) and more frequent cleaning than our regular pore diffusers, so they are not typically recommended for regular aeration. The bubble uniformity is excellent.

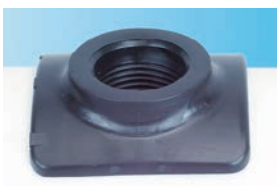
The **CP** part numbers are fitted with CPVC for use with mild ozone concentrations. The **SS** part numbers are fitted with stainless steel for use with the strongest ozone and carry a 1-year warranty. Made in USA.

SWEETWATER® FINE-PORE DIFFUSER SPECIFICATIONS

BODY	2,000° HEAT-BONDED SILICA
MAXIMUM PORE SIZE	80 MICRONS
BUBBLE SIZE	0.5–2 MM
NOMINAL PARTICLE RETENTION	25 MICRONS
SERVICE LIFE AT PH BELOW 8.0	UNLIMITED
FLEXURAL STRENGTH	3,500 PSI



MODEL	LENGTH (IN.)	LENGTH (CM)	WIDTH (IN.)	WIDTH (CM)	SUGGESTED CFM	AES	AIR SUPPLY CONNECTION	SHIP WT (LBS)	EACH	
AS10	1.5	4	.50	1.3	.05	15	3/16" O.D., ABS	.03	**$2.40**	**$2.04/20+**
AS20-AQ	1.5	4	.75	2.0	.10	30	3/16" O.D., ABS	.06	**2.91**	**2.47/20+**
AS3F	2	5	1	2.5	.20	60	3/16" O.D., PE	.10	**4.17**	**3.75/20+**
AS40	1.5	4	1.5	4	.25	75	3/16" O.D., PE	.21	**6.62**	**5.96/20+**
AS50	3	8	1	2.5	.30	90	1/4" O.D., PE	.16	**5.72**	**5.15/10+**
AS80	3	8	1	4	.35	100	1/4" O.D., PE	.39	**8.07**	**7.26/10+**
ALR80	3	8	1.5	4	.35	100	1/2" NPT, PE	.39	**10.45**	**9.41/10+**
ALR80SS	3	8	1.5	4	.35	100	1/2" NPT, SS	.39	**29.30**	**26.37/10+**
ALR80SS4	3	8	1.5	4	.35	100	1/4" NPT, SS	.39	**25.13**	**22.62/10+**
AS150	6	15	1.5	4	.50	150	1/4" O.D., PE	.75	**13.84**	**12.46/10+**
ALR150	6	15	1.5	4	.50	150	1/2" NPT, PE	.75	**15.62**	**14.06/10+**
ALR150CP	6	15	1.5	4	.50	150	1/2" NPT, CPVC	.78	**18.81**	**16.93/10+**
ALR150SS	6	15	1.5	4	.50	150	1/2" NPT, SS	.875	**47.15**	**42.44/10+**
AS230	9	23	1.5	4	.75	220	1/4" O.D., PE	1.35	**21.95**	**19.76/10+**
ALR230	9	23	1.5	4	.75	220	1/2" NPT, PE	1.35	**22.55**	**20.30/10+**
ALR230CP	9	23	1.5	4	.75	220	1/2" NPT, CPVC	1.38	**25.63**	**23.07/10+**
ALR230SS	9	23	1.5	4	.75	220	1/2" NPT SS	1.48	**50.20**	**45.18/10+**
AS300	12	30	1.5	4	1.00	300	1/4" O.D., PE	1.50	**24.78**	**22.30/10+**
ALR300CP	12	30	1.5	4	1.00	300	1/2" NPT, CPVC	1.56	**30.86**	**27.77/10+**
ALR300SS	12	30	1.5	4	1.00	300	1/2" NPT, SS	1.68	**58.91**	**53.02/10+**



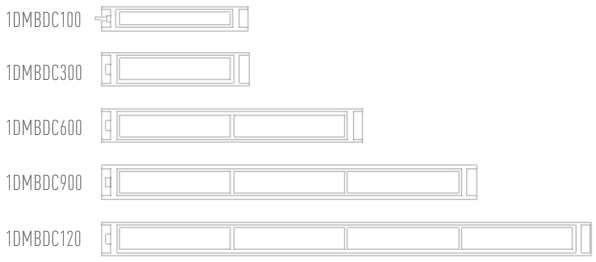
MODEL	EACH	10+
ED328	**$ 4.70**	**$4.23**

UNIVERSAL DIFFUSER MOUNT

- Provides 3/4" FNPT threaded connection
- Engineered for 2–8" metal or plastic, thick or thin wall pipe
- Can be glued to PVC or ABS pipe
- Easy to install

The universal diffuser mount for disc diffusers is designed to accept a 3/4" MNPT diffuser connection. Installation simply requires drilling a 1 1/4" diameter hole, deburring the hole, installing the diffuser mount and screwing in the diffuser. The universal diffuser mount may be used for mounting on the top or bottom of the lateral but is not recommended for sidewall diffuser mounting.

PENTAIR



POINT FOUR™ MICRO BUBBLE OXYGEN DIFFUSERS (MBD)

AQUACULTURE DUTY

The original, since 1988.

These aquaculture-duty diffusers are among the most efficient diffusers available, allowing you to increase yield while controlling the cost of expensive gases. Made from premium materials and subject to rigorous testing, MBD diffusers provide the kind of performance and reliability our reputation is built on.

Point Four diffusers use a specially developed, ultra fine pore ceramic plate that produces a cloud of extremely fine bubbles of approximately 100–500 microns; far superior to airstones, porous hose or membrane type designs. The flat plate design ensures uniform bubbles across the entire surface and minimizes bubble coalescence to achieve an absorption rate in excess of 80%, depending on depth and flowrate. Bubbling Pressure is 25 to 35 psi. (1.7 to 2.4 bar).

- Robust construction—ceramic plates set in a rigid aluminum base with solidbrass connection fittings
- Easy to install and use—trouble-free operation
- Flexible, modular design lets you easily add or subtract diffusers as your needs change

SEE OUR YouTube CHANNEL TO LEARN MORE!

MODEL	BASE	DIFFUSING AREA L	DIFFUSING AREA W	REC. OPERATING RANGE (LPM/SCFH)	MAX FLOWRATE @ 50 PSI (3.5 BAR) LPM	MAX FLOWRATE @ 50 PSI (3.5 BAR) SCFH	GAS INLET CONNECTION	SHIP WT (LBS)	EACH
1DMBDC100	ALUMINUM	14½"	1¾"	UP TO 1.5/3.2	4.5	9.5	¼" HOSE BARB	1.2	**$65.00**
1DMBDC300	ALUMINUM	15¼"	3¼"	UP TO 3/6.5	9	19	¼" FEMALE	2.8	**149.00**
1DMBDC600	ALUMINUM	27½"	3¼"	UP TO 6/12.7	18	38	¼" FEMALE	5.0	**229.00**
1DMBDC900	ALUMINUM	39¾"	3¼"	UP TO 9/19.5	27	58	¼" FEMALE	7.3	**390.00**
1DMBDC120	ALUMINUM	52"	3¼"	UP TO 12/26	36	78	¼" FEMALE	9.5	**512.00**

SWEETWATER® MICRO BUBBLE OXYGEN DIFFUSERS

These ultra-fine pore diffusers are ideal for pure gas applications (oxygen, carbon dioxide), high-density hauling, holding/growout tanks and emergency aeration. Choose from aluminum or nylon 6/glass composite (plastic) base. Aluminum models are best for long-term, heavy-duty use. Plastic models are tested at -20°C to ensure performance and integrity. They also give you the convenience of two 1/4" barb positions to choose from, and their preinstalled check valve prevents damage. Dual barb position feature only available with plastic base diffusers.

PENTAIR

DYFP16

Dual Position Barb

MODEL	BASE	DIFFUSING AREA L	DIFFUSING AREA W	MAX FLOWRATE LPM	MAX FLOWRATE CFM	GAS INLET CONNECTION	SHIP WT (LBS)	EACH	
DYPFP4	PLASTIC	4"	2½"	1.13	0.04	¼" HOSE BARB	1.0	**$34.01**	**$30.61/10+**
DYPFP8	PLASTIC	8"	2½"	2.25	0.08	¼" HOSE BARB	1.8	**48.61**	**43.75/10+**
DYPFP12	PLASTIC	12"	2½"	3.5	0.13	¼" HOSE BARB	2.2	**63.18**	**56.86/6+**
DYPFP24	PLASTIC	24"	2½"	7	0.25	¼" HOSE BARB	4.4	**104.79**	**94.31/6+**
DYFP12	ALUMINUM	12"	2½"	3.5	0.13	¼" HOSE BARB	2.2	**94.43**	**84.99/10+**
DYFP16	ALUMINUM	16"	2½"	5	0.18	¼" HOSE BARB	3.1	**112.62**	**101.36/6+**
DYFP24	ALUMINUM	24"	2½"	7	0.25	¼" HOSE BARB	4.9	**152.46**	**137.21 /6+**

POINT FOUR™ MICRO BUBBLE OXYGEN DIFFUSERS

AQUACULTURE DUTY

Point Four Plastic Micro Bubble Diffusers (PMBD) are one of the most efficient diffusers available, allowing you to increase yield while controlling the cost of expensive gases. Made from premium materials and subject to rigorous testing, PMBDs provide the kind of performance and reliability our reputation is built on.

Point Four diffusers use a specially developed, ultra fine pore ceramic plate that produces a cloud of extremely fine bubbles of approximately 100–500 microns; far superior to airstones, porous hose or membrane type designs. The flat plate design ensures uniform bubbles across the entire surface and minimizes bubble coalescence to achieve an absorption rate in excess of 80%, depending on depth and flowrate. Bubbling pressure is 25 to 35 psi (1.7 to 2.4 bar).

- Robust construction—ceramic plates set in an injection molded plastic base with solid brass connection fittings.
- Flexible, modular design lets you easily add or subtract diffusers as your needs change.

MODEL	BASE	DIFFUSING AREA L	DIFFUSING AREA W	REC. OPERATING RANGE (LPM/SCFH)	MAX FLOWRATE @ 50 PSI (3.5 BAR) LPM	MAX FLOWRATE @ 50 PSI (3.5 BAR) SCFH	GAS INLET CONNECTION	SHIP WT (LBS)	EACH
1PMBD075	PLASTIC	8⅝"	2¾"	UP TO 0.75/1.6	2.2	9.5	¼" HOSE BARB	1.2	**$54.00**

TECH TALK 7

Pure Oxygen vs Diffused Air

Cost is one of the biggest considerations. This generalized chart should help to quantify the difference between using an air blower with diffusers and using pure oxygen with a water pump and oxygen saturator (oxygen cone). Also see Tech Talk 80.

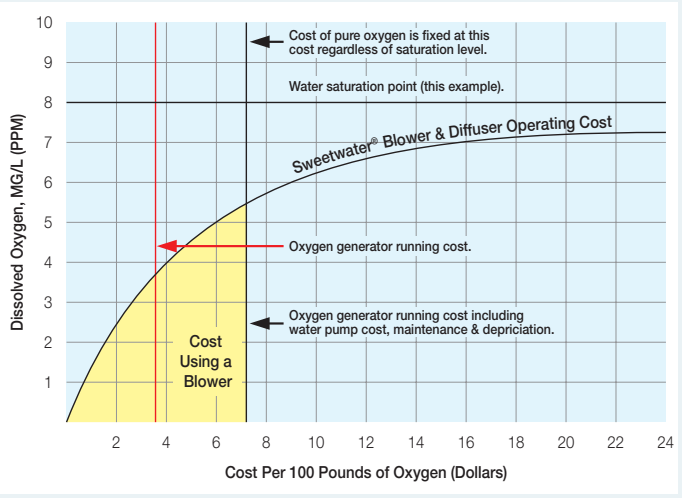
This generalized chart is based on:

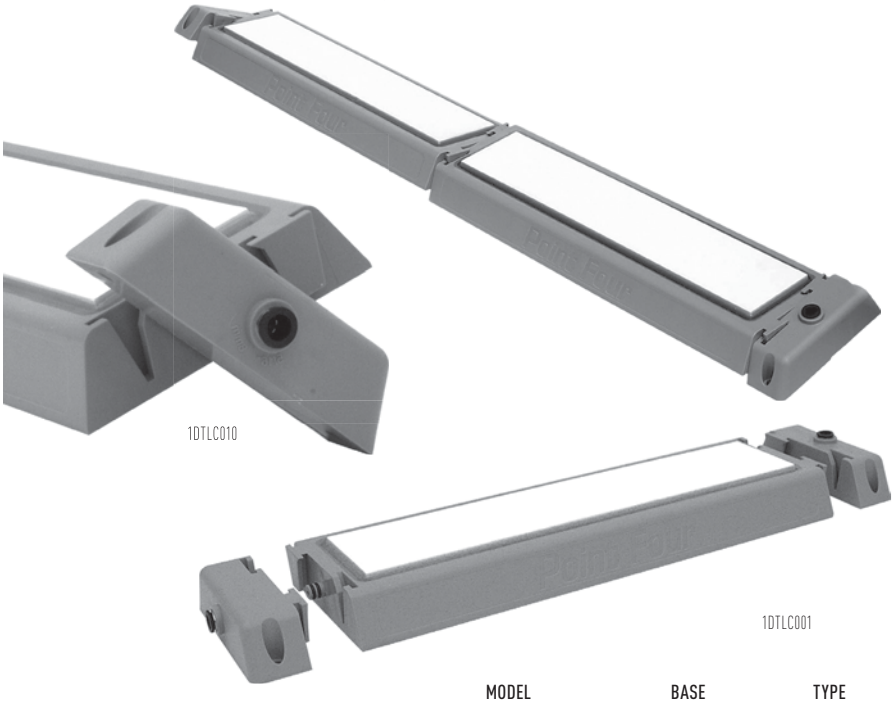
- Electric cost of 8¢ per kWh.
- Sweetwater® standard diffusers at 40" H2O.
- Water temperature 80°F (27°C), sea level.
- Fresh water @ 24 lbs/day oxygen concentrator.
- 40-gpm pump using 5 amps @ 115V.

Example: cost/100 lbs

	AERATION	OXYGEN
1 ppm	$1	$7
5 ppm	$7	$7
7 ppm	$18	$7
10 ppm	No Way	$7

This cost comparison illustrates that blowers are more efficient at lower D.O. saturation values and pure oxygen is more efficient at higher D.O. saturation values. Note that the cost of adding pure oxygen remains almost the same until reaching higher supersaturation levels. Pumping





POINT FOUR™ TRAC-LOCK MICRO BUBBLE OXYGEN DIFFUSER AQUACULTURE DUTY

Point Four Trac-Lock Diffusers are an economical alternative to the Point Four Micro Bubble Diffusers (MDBs). Like the MDBs, they are good for use with pure oxygen and/or carbon dioxide.

A Simple Design

The ceramic flat plate design ensures bubbles across the entire surface. The slim design will not hinder fish netting and will accommodate most fish transportation systems. The "twist and lock" design allows for easy diffusing area adjustment, or for simple removal of sections for cleaning/ servicing. We recommend using a support when locking three or more bases together.

High Absorption Efficiency

Depends on submerged depth, flowrate and dissolved oxygen concentration. Typically 40% to 50% at 1 m depth; can be as high as 80% or even 100% at depths of 6 m or more.

Features and Benefits

- Plastic frame will not rust or degrade over time.
- Easy to install and use—trouble-free operation.
- Efficient design minimizes rising air bubble coalescence.

MODEL	BASE	TYPE	DIFFUSING AREA L	DIFFUSING AREA W	MAX FLOW LPM	MAX FLOW CFH	SHIP WT (LBS)	EACH
1DTLC001	PLASTIC	BASE	12¼"	21"	3	6.5	4.0	**$99.00**
1DTLC010	PLASTIC	END SET	---	---	---	---	1.0	**28.00**

POINT FOUR™ WEDGE-LOCK™ MICRO BUBBLE OXYGEN DIFFUSER AQUACULTURE DUTY

WEDGE-LOCK™ is a modular system of diffusers and end sets that fit together to form a bank of up to eight units. Oxygenation capacity can be increased (or decreased) as your needs demand by simply changing the number of diffusers used for greater flexibility and minimal downtime.

Designed for total ease of use, WEDGE-LOCK™ modules "twist and lock" together to form an airtight seal without the use of tools. Hose with push-in fittings connects the diffuser banks to the gas supply, significantly reducing set-up time and effort. The diffuser's streamlined wedge shape improves stability in tanks with high water flow and offers less resistance in self-cleaning tank systems.

Single base (unassembled) diffusers measure 5.4" x 6.6" x 1.25". Recommended flow 1.6 cfh (.75 Lpm), Recommended operating pressure is 22–35 psi, maximum pressure is 50 psi*. Inlet is ¼" barb fitting. One-year warranty.

Features and Benefits

- Flexible, modular design lets you easily add or subtract diffusers to match your changing needs.
- Simple "twist and lock" installation—diffuser modules and hose connect in minutes without the use of tools.
- Rugged thermoplastic build is corrosion-free and UV-resistant.
- Streamlined wedge shape improves stability in tanks with high water velocity.

*Above 50 psi (3.4 bars) the diffuser can break.

MODEL	BASE	TYPE	DIFFUSING AREA L	DIFFUSING AREA W	MAX FLOW LPM	MAX FLOW CFH	SHIP WT (LBS)	EACH
1DWLC001	PLASTIC	BASE	4½"	4½"	1.6	3.4	2.0	**$74.00**
1DWLC010	PLASTIC	END SET	—	—	—	—	1.0	**30.00**

CONNECTOR BLOCK

ALUMINUM OXIDE

FOUR ALUMINUM DIFFUSERS & CONNECTOR BLOCK

CERAMIC

CERAMIC AND ALUMINUM OXIDE AIR DIFFUSERS

Keep any system aerated with this line of air diffusers. These offer great efficiency at an affordable price, and with our wide selection, you'll find the right fit for any application. Bubble sizes from 3 mm down to 100 microns. One-year limited warranty.

Two different styles:

- Ceramic diffusers are ideal for pure gas applications (oxygen, carbon dioxide), high-density hauling, holding/growout tanks and emergency aeration
- Aluminum diffusers are intended for general aeration: hatchery, growout, bait, ponds, lakes, wastewater and low-density hauling

See PentairAES.com for complete specs!

MODEL		EACH
DYCBB	HDPE CONNECTOR BLOCK, 1/4" FNPT	**$22.54**
DYCD7SM	ALUMINUM OXIDE, 6.7" X 1.6" (X 4) + **DYCBB**	**82.56**
DYCD9SM	ALUMINUM OXIDE, 8.7" X 1.6" (X 4) + **DYCBB**	**95.19**
DYCHP4	CYLINDER, CERAMIC, 4" X 2"	**41.06**
DYCHP6	CYLINDER, CERAMIC, 6" X 2"	**47.70**
DYCHP8	CYLINDER, CERAMIC, 8" X 2"	**53.52**
DYCHP12	CYLINDER, CERAMIC, 12" X 2"	**69.39**

Can't find what you're looking for? See it all at PentairAES.com.

RUBBER AIR DIFFUSERS

Keep any system aerated with this line of air diffusers. These offer great efficiency at an affordable price, and with our wide selection, you'll find the right fit for any application. Bubble sizes from 3 mm down to 100 microns. One-year limited warranty.

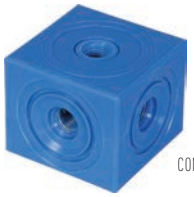
Two different styles:

- Rubber poly (EPDM) diffusers perform best in pure gas applications (oxygen), hauling tanks, aquariums, hatcheries and backup aeration
- Rubber diffusers are best employed in wastewater treatment

MODEL		EACH
DYCBB	HDPE CONNECTOR BLOCK, ¼" FNPT	**$22.54**
DYMD15	EPDM MEMBRANE, 15" X 1"	**18.55**
DYMD20	EPDM MEMBRANE, 20" X 1"	**24.94**
DYMD20M	EPDM MEMBRANE, 20" X 1" (X 4)	**117.55**
DYRD8	RUBBER POLY, 8" X 1.5"	**13.18**
DYRD12	RUBBER POLY, 12" X 1.5"	**18.79**
DYRD16	RUBBER POLY, 16" X 1.5"	**24.45**
DYRD20	RUBBER POLY, 20" X 1.5"	**29.83**

EPDM MEMBRANE

RUBBER POLY



HDPE CONNECTOR BLOCK

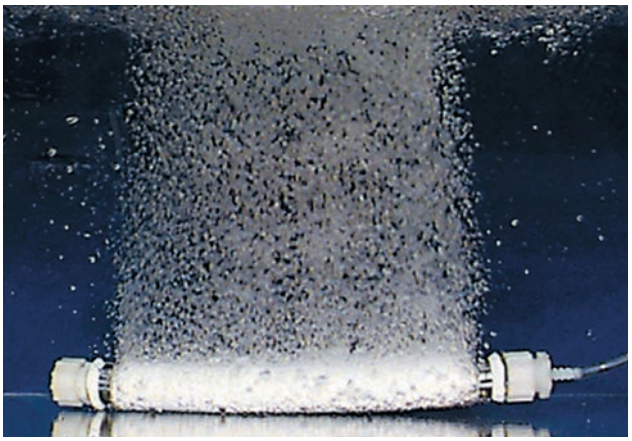
DIFFUSER HOSE ✓ DESIGNED HERE

Self-weighted Bio-Weave diffuser hose is for introducing air and oxygen into hauling tanks, culture tanks, lakes or wherever long flexible diffusion is needed. It's made of a strong, woven polyester fiber material that will last for years. Operating range is .2–.6 cfm per foot.

The diffuser surface is a soft fiber that flexes easily. Because Bio-Weave is self-weighted, placement and removal of these large diffusers is simple. We make these medium-bubble diffusers with ¾" garden hose fittings (a cap on the male end and a ¼" male barb adapter on the female fitting). Bio-Weave has about a 20" H_2O resistance to air flow, so it is marginally compatible with regenerative blowers. Ship weight is about 1 lb/foot. One-year limited warranty. Made in USA.

See pg. 400 for garden hose adapters.

MODEL	LENGTH	AES	EACH	6+	24+
BWD10	1'	15	**$37.00**	**$33.30**	**$29.02**
BWD20	2'	29	**41.13**	**37.02**	**32.41**
BWD30	3'	44	**56.98**	**51.28**	**45.11**
BWD40	4'	58	**70.76**	**63.68**	**56.61**
BWD50	5'	73	**86.52**	**77.87**	**69.93**
BWD60	6'	87	**98.99**	**89.09**	**80.13**
BWD100	10'	146	**155.52**	**139.97**	**123.59**
BWD150	15'	218	**220.43**	**198.39**	**178.00**
BSS38	BRASS ⅜" BARB X MGHT		**4.08**	**3.76**	**3.55**

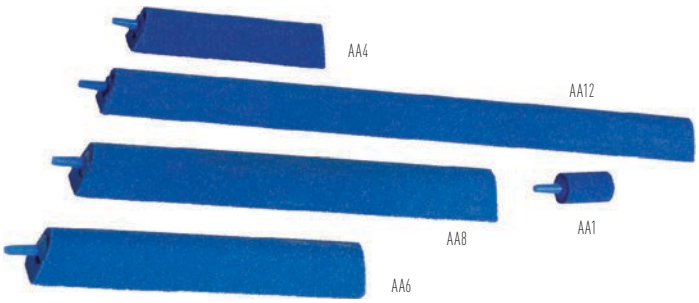


BWD10

AIR DIFFUSERS, BULK QUANTITY

These inexpensive molded diffusers are sold in bulk quantity only, by the pack. 3/16" barb inlets. Made for hobbyists and aquarium use.

MODEL	LENGTH	CFM	AES	PACK QTY	EACH PK	12+
AA1	1"	.05	1	120	**$20.93**	**$17.94**
AA4	4"	.2	3	24	**15.01**	**12.76**
AA6	6"	.3	4	24	**21.29**	**18.45**
AA8	8"	.4	6	24	**26.31**	**23.54**
AA12	12"	.6	8	24	**37.68**	**31.67**



AD32 AD42 AD52

DIFFUSERS, CYLINDRICAL

These diffusers are made from fused alumina. They produce a bubble size of 1–2 mm and require a higher pressure than Sweetwater® medium-pore diffusers. They have a molded square rubber support on each end that supports and protects them from tank bottoms and protects the tank or liner from the diffuser. They fit both 3/16" and ¼" tubing and are 1.2" in diameter.

MODEL	LENGTH	CFM	AES	EACH	12+
AD32	3.2"	.3	5.0	**$4.51**	**$4.28**
AD42	4.2"	.4	6.5	**8.57**	**8.14**
AD52	5.2"	.5	8.2	**9.41**	**8.94**

TEE ELIMINATORS

Here is a hard-to-find, cost-saving fitting. A PVC 3" x ¾" reducing tee costs about $10. These tee eliminators can do the same thing for under a buck! Just drill a hole, press in a tee eliminator, then thread in the connection. Made of flexible PVC with female pipe threads. Work in all rigid pipe materials with pipe walls between ⅛" and ¼" thick. Made in USA.

MODEL	FNPT SIZE	MIN PIPE DIAMETER	HOLE SIZE	EACH	50+
FC32	½"	1"	1"	**$ 0.70**	**$0.63**
FC34	¾"	1¼"	13/16"	**0.84**	**0.76**
FC36	1"	1½"	1 7/16"–1½"	**1.09**	**0.98**

FC32

FC36

TECH TALK 80

Pure Oxygen or Aeration?

Aerators that spray water through the air or put bubbles in the water can typically compete with the economics of pure oxygen up to about 70% of saturation. Pure oxygen becomes more economical when raising oxygen to levels above 70%.

Pure oxygen can be a very cost-effective tool for raising fish. It can unclutter the culture tank, reduce suspended solids, improve feed-conversion ratios and reduce stress. When used in large intensive culture systems, liquid oxygen can be purchased at a low price. It's especially cost-effective when used to raise the ambient dissolved oxygen a few parts per million to or above the saturation level.

But a high-tech approach is not necessary if a low-tech one will do. Simple old-fashioned aeration (done correctly) will provide 1 lb of dissolved oxygen (at 75% of saturation) for about one kilowatt of energy. That's about 10 cents per lb. Can you buy pure oxygen that cheap? If you can buy it that cheap, will 100% of it be absorbed, or will you lose some through escaping bubbles, leaks, etc.?

Is a water pump or other energy source required? A 1-horsepower water pump by itself can burn another 10 cents per hour. However, if your operation is large enough or intensive enough to warrant aerating with pure oxygen, it can be a great tool when used wisely. Here are a few tips:

- Be sure to total all pure oxygen costs when figuring cost effectiveness, including storage vessel rent, water pumping cost and oxygen loss. If you're thinking about making your own oxygen, include the actual cost of compressed air, back-up compressor and increased generator size, plus repairs.
- Use a saturation technique that is at least 80% efficient.
- Inject supersaturated water over a wide area to prevent large oxygen gradients in the fish tank.
- In a recirculating system you will need to "aerate" (de-gas), in addition to oxygenation, to remove carbon dioxide.

TECH TALK 4

Choosing an Aerator

Efficiency Versus Type ... Select the right type of aerator for the application

An aerator's standard aeration efficiency (SAE) is an important consideration when comparing one aerator with another.

The SAE can be calculated by measuring the aerator's oxygen transfer and the amount of energy used per horsepower, per hour, under standard conditions.

An SAE of 2.1, for example, means that 2.1 lbs of oxygen per horsepower, per hour, are transferred to the water under standard conditions. The higher the SAE, the higher the oxygen transfer, the higher the efficiency.

However, SAE numbers are a fair comparison only when comparing aeration equipment of the same exact type. You cannot use the SAE as your only tool in the selection of an aeration system. Before looking at the SAE numbers, choose the right type aerator or oxygenator for the job.

Here are some examples (analyze the differences):

- A surface aerator like the Kasco® ¾ hp aerator (with an SAE rating of 2.9) may be a good choice where the volume of water is small and the stocking density is high, such as in a culture tank or small pond. It may be a poor choice, however, if cold water temperatures are required when air temperatures are warm (summer trout culture), because both the motor and the airborne water droplets will add unwanted heat.
- A surface aerator would be a poor choice for a large or deep pond. Without moving water away from the aerator, it will continue to pump the same water over and over again, adding no oxygen where it is needed.
- A surface aerator may be excellent in emergencies because it quickly raises the oxygen level in a small area. If trained, the fish will move to that location. Again, it will not be a good choice for full-time aeration because it will not disperse oxygen throughout the pond.
- A diffused air system (with an SAE rating of 2.7) may be the best choice for multiple tanks and ponds because the energy source (blower) can be centralized and just the right amount of energy (compressed air) can be easily directed where it is needed. What appears to be lower SAE efficiency (2.7) is more than offset by comparative application efficiency.
- Water-moving aeration devices like the AIRE-02® Series II aerator and paddle wheel type aerators are excellent choices for medium and large ponds where movement of oxygenated water away from the aerator is most important.
- If destratification alone will solve a bottom oxygen problem, only a few air diffusers may be needed to accomplish this. For instance, a 10-acre lake, 15' deep, may need only ¾ hp. Only 1 cfm of air may be needed to aerate a 1/20-acre pool when raising tropical fish, compared to 6 cfm per pool using airlifts.
- A destratification system, such as our Great Lakes® aeration system, should not be used as an emergency aerator because it very quickly mixes the water. Its rate of oxygen transfer is excellent; however, it cannot raise the oxygen level of such a large volume quickly enough to avoid a fishkill. It can actually aggravate the problem.
- Even noise is a consideration above and below the water surface. Pentair AES diffused air systems are preferred over agitators in bait stores, improving conditions for both the fish and the employees. As more of our research is conducted under water, we are increasingly aware of underwater noise produced by devices such as paddle wheels, agitators, airlifts and drilled pipe spargers (our Sweetwater® air diffusers have a barely audible hiss). Some fish breeders have reported that diffused air is the only aeration method they can use that will not disrupt breeding.

The situations and considerations are virtually endless, so take some time to research the best aeration method for your particular application. Through a phone call, you can discuss your application with an aquaculture technician and get an expert opinion (877-347-4788).

Standard aeration efficiency tests conducted at Auburn University showed that the Pentair AES Sweetwater® diffuser and 1-hp blower combination yielded a 2.71 SAE. Prior to rating our diffusers, Auburn gave air diffusers in general an SAE rating of only 1.6. That 70% increase illustrates how much efficiency can change when the right combination is used.

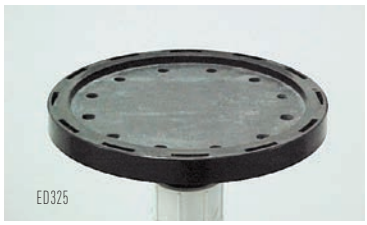
Kasco® is a registered trademark of Kasco Marine, Inc.
AIRE-02® is a registered trademark of Aeration Industries International, LLC.

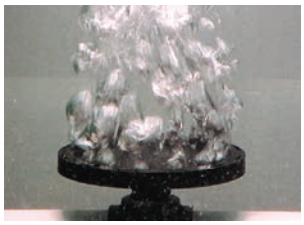
COARSE BUBBLE DIFFUSERS

- 5" diameter coarse bubble diffusers
- Upgrade for smaller diameter diffusers
- Designed to prevent blowout
- High-capacity airflow ranges to 20 cfm

Environmental Dynamics PermaCap 5 diffuser design offers greater unit capacity over small diameter diaphragm, coarse bubble diffusers. The body is ABS, and diffusers are available with both ¾" and ⅜" MNPT connections. The EPDM membrane is mechanically locked in place to prevent blowout. Airflow range is 0–20 cfm. Made in USA.

MODEL	MNPT	EACH	10+
ED325	¾"	**$11.05**	**$9.95**
ED501	⅜"	**11.05**	**9.95**



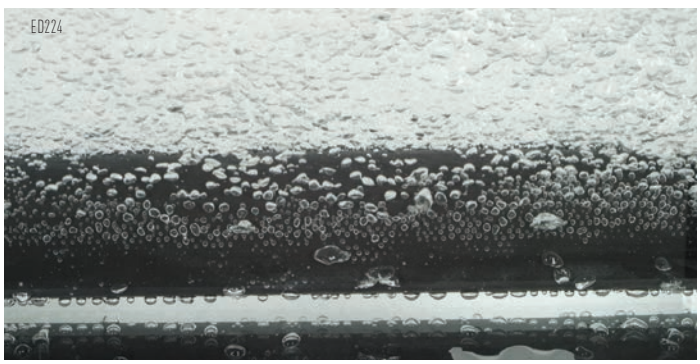


EDI FLEXAIR® DIFFUSERS

- Airflow ranges from 0–40 cfm
- Largest capacity airflow with greatest membrane area for fewer units required
- ¾" MNPT 304 SS thread connection

EDI FlexAir® diffusers are durable. The special inlet is molded from high-strength ABS and is permanently bonded to a PVC membrane support tube to create an integral diffuser body. Manufactured utilizing the most advanced technology, tests have shown that EDI membrane diffusers deliver increases of 15 to 50% over competitive products. EPDM elastomer membrane was specifically developed for municipal and industrial applications. For applications with high concentrations of oils and solvents, specially engineered urethane membranes are available (please inquire).

MODEL	LENGTH	DIAMETER	AIRFLOW (CFM)	SHIP WT (LBS)	EACH	6+
ED224	24"	2.44"	0–8	4	**$41.42**	**$37.28**
ED226	26"	2.44"	0–8	5	**40.31**	**36.28**
ED220	20"	3.5"	0–20	6	**43.40**	**39.06**
ED230	30"	3.5"	0–30	7	**55.20**	**49.68**
ED240	40"	3.5"	0–40	8	**61.38**	**55.24**



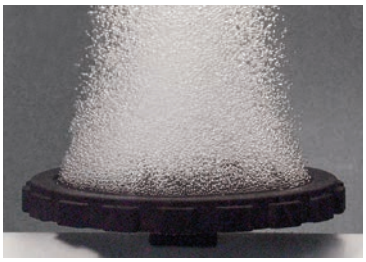
FlexAir® is a registered trademark of Environmental Dynamics International, Inc.

DISC DIFFUSER, 9"

Engineered for maximum performance.

FlexAir® disc diffuser bodies are made of high-strength polypropylene with ¾" MNPT connections. Each diffuser has a minimum of 6,600 engineered air release orifices, which is up to 20% more than comparable models. The special design of the EPDM membrane, with its engineered thickness taper, results in full utilization of the membrane surface, even at low airflow operations. This results in improved oxygen transfer efficiency, along with maximum operational flexibility. The disc diffuser has an integral "triple" check valve to prevent fluid backflow. Normal airflow range is 0–5 cfm. Resistance is about 10" H_2O when clean. FlexAir® disc diffusers in stock have EPDM membranes installed and weigh 2 lbs. Made in USA.

MODEL	EACH	10+
ED327	**$24.73**	**$22.26**



SNAP-CAP DIFFUSER, 3"

This coarse bubble diffuser is very clog resistant. It uses a snap-on flexible diaphragm with built-in check valve. Handles flowrates up to 10 cfm @ 12" H_2O loss. About 2" high x 3⁵⁄₃₂" diameter with a ⅜" MNPT and a ½" MNPT adapter included.

MODEL	EACH	6+
AD15	**$ 20.23**	**$18.21**

HIGH-EFFICIENCY DIFFUSER TUBING

Perfect for high-psi or oxygen uses

This low-pressure, high-efficiency rubber diffuser hose is made for aquaculture. Diffuser lengths of up to 20' per inlet are possible at low airflow rates. Tubing has a good oxygen transfer rate (average 2.5% per foot of water depth) with a head loss of only about 1 psi. This tubing is compatible with both regenerative blowers and linear air pumps. The gas flowrate is an average of .1–.6 cfm/ft; higher and lower flows are possible. Produces a strong volume of medium-size bubbles (approximately 3 mm). For connections, use barb fittings with clamps. Hose ends may be heat-sealed or fitted with a plug and clamp. To counteract buoyancy, hold-downs or weights are required. No warranty due to individual clogging and fouling possibilities. Sold by the foot (**F**) or 50-m roll (**R**).

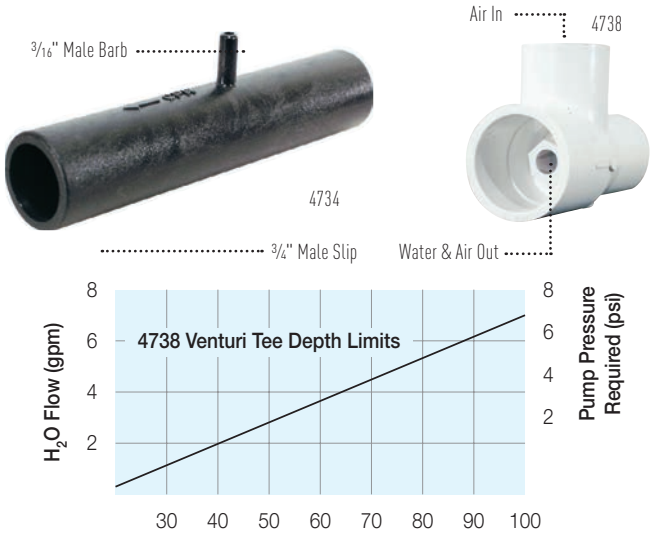
MODEL	I.D.	O.D.	EACH-F	EACH-R
DT12	½" I.D.	1" O.D.	**$1.64**	**$271.81**
DT14	¼" I.D.	1" O.D.	**1.89**	**289.78**

MAZZEI® VENTURI INJECTORS

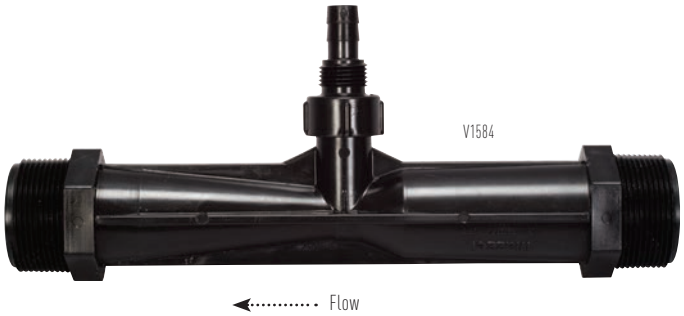
Widely used for the injection of air, oxygen, and ozone. Also compatible with liquids. Tests have shown that when installed properly, injectors can transfer ozone into water with efficiencies as high as 99%. These are constructed of PVDF Kynar® and are ozone compatible. Mazzei® venturis have no moving parts and provide trouble-free operation. All except V514 include a ¼" barbed ozone-safe check valve. Maximum operating pressure at 100°F (38°C) is 400 psi. Made in USA.

MODEL	INLET/OUTLET MNPT	FLOW THRU INJECTOR @15 PSI IN/5 PSI OUT	AIR SUCTION @15 PSI IN/5 PSI OUT	EACH	4+
V384	½" MNPT	1 GPM	1 CFH	**$67.00**	**$60.00**
V584	¾" BARB	4 GPM	5 CFH	**54.00**	**48.60**
V978	1" MNPT	7 GPM	9 CFH	**129.00**	**115.00**
V1584	1½" MNPT	31 GPM	72 CFH	**177.00**	**159.00**
V514	2" MNPT	57 GPM	394 CFH	**370.00**	**348.00**

Mazzei® is a registered trademark of Mazzei Injector Corp.



*This is the greatest depth at which the Venturi may be located. The shallower the depth, the greater the air volume.



Venturis offer an efficient and reliable way to inject virtually any gas or liquid into water.

VENTURI, ECONOMY

Our venturi fittings were engineered to entrain the greatest amount of air with the least resistance to water pressure. When pumping water, these may be used to draw in liquids or gases, including low-strength ozone. **4738** and **4732** are made of PVC with standard slip connections. Venturi **4734** is fiber-reinforced plastic and has female slip ends. Made in USA.

4738: ¾" in x 1" out
4732: 1½" in and out
Both are female slip with ¾" air inlet.

MODEL		EACH
4738	VENTURI, PVC	**$9.03**
4732	VENTURI, PVC	**11.57**
4734	VENTURI, PLASTIC	**14.57**

TECH TALK 63

Venturis

A well-designed venturi working in shallow water to aspirate air may cause as little as 15% additional head pressure and as little as 10% reduction in volume pumped. Therefore, a venturi can be a very economical device to operate, especially when it completely eliminates another piece of equipment, such as a chemical metering pump, an air pump or an ozone unit's air pump. They are particularly useful when injecting chemicals and gases that are aggressive in nature and would require special materials for the pumping device.

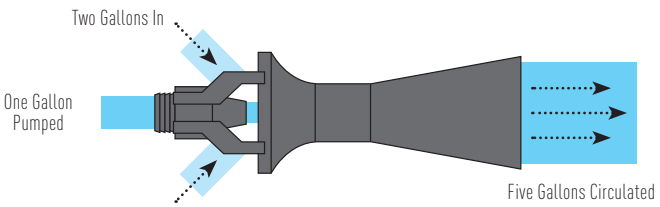
As a venturi draws air into a depth of about 2 feet, there will be increased water pressure resistance and a reduction in volume pumped. When used with low-pressure pumps, the increase in head causes such a large reduction in volume that the venturi application becomes impractical. When sucking air the deeper the depth, the greater the pressure needed.

When installed properly, venturi injectors can transfer ozone into water with efficiencies as high as 99%. Venturis have no moving parts and provide trouble-free operation.

MIXING EDUCTORS

It's easy to multiply the mixing force of pumped water. This nozzle requires as little as 7.5 gpm to draw in five times more. Molded of glass-filled polypropylene with smooth surfaces. Recommended flowrates shown are for between 10 and 50 psi.

MODEL	MNPT	OAL	GPM	EACH	10+
ED2	⅜"	4.5"	7–17	**$34.20**	**$31.81**
ED1	¾"	4.5"	13–30	**25.13**	**23.37**
ED3	1½"	10"	33–75	**68.29**	**63.51**



POINT FOUR PRESSURIZED COLUMN (PPC)

High-performance gas injection system—flexible with low operating costs

The Pentair Aquatic Eco-Systems Point Four Pressurized Column has applications in aquaculture, horticulture, wastewater and effluent treatment, and mining. In a typical system, pressurized water is side-streamed to the column, where it is supersaturated with dissolved gas and then re-integrated to the mainstream.

The system can be controlled manually, semi-automatically, or automatically. An automatic system consists of a level or oxygen controller, water flow meters, pressure gauge, and control valves.

FEATURES AND BENEFITS

100% gas utilization

- No gas losses from the system. 100% of the oxygen is dissolved into the water with no bubbles.

High absorption capacity

- Packs the most gas into a given volume of water; e.g., 200 mg/L of dissolved oxygen at 60 psi and 15°C.

Custom engineered system

- Each system is designed to meet your specific needs.

Low operating costs

- Only a small side-stream is required (typically 5% of the main flow) to achieve desired D.O. levels. If the system has adequate line pressure, integrating the column into the main flow requires no additional pumping.

Optional automatic control

- Simply enter the desired oxygen level into the controller. Oxygen concentration, and column water level are continuously monitored and controlled.

Flexibility

- The system is designed to accommodate varying water flows.

Retrofit

- The system is easily installed into any pre-existing facility with minimal disruption or down time.

CALL FOR MORE INFORMATION AND PRICING.

SYSTEM SPECS

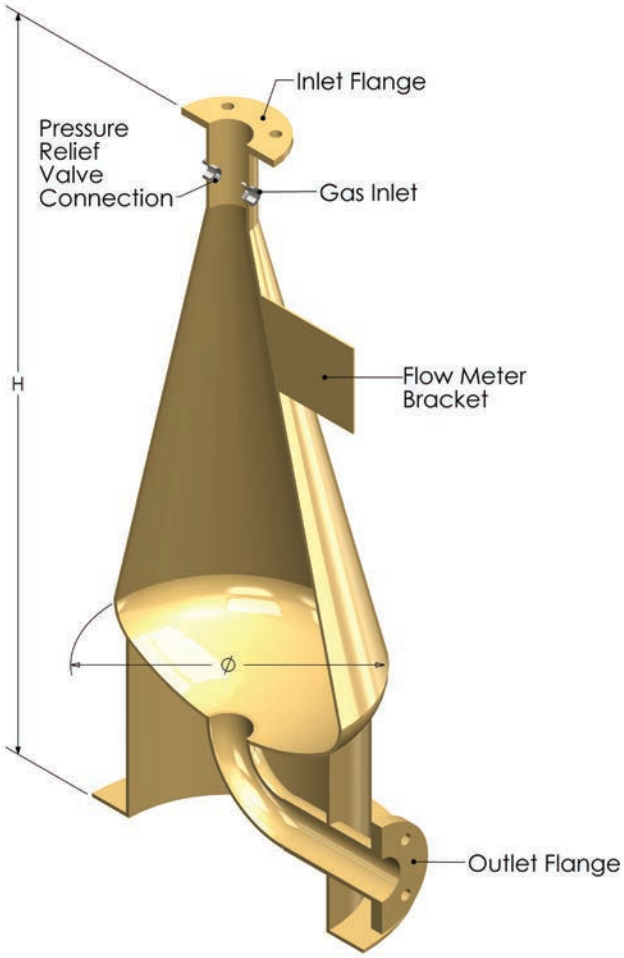
COLUMN HEIGHT
109" (2.8 M)
COLUMN DIAMETER
6" TO 42" (0.15 TO 1.05 M)
MAXIMUM OUTLET OXYGEN CONCENTRATION
230 MG/L @ 60 PSI AND 10°C
OPERATING PRESSURE
UP TO 45 PSI (3.0 BAR) WITH A PSA OXYGEN GENERATOR AS THE GAS SOURCE.
UP TO 100 PSI (6.9 BAR) WITH LIQUID OR HIGH-PRESSURE GAS AS THE SOURCE.
OPTIONAL CONTROL SYSTEM
PT4 MONITOR WITH FULLY AUTOMATED PID CONTROL OF OXYGEN CONCENTRATION.

Point Four PPC System

OXYGEN/OZONE CONTACT CONES

Pentair Aquatic-Eco Systems (Formerly a product of HE Group)

- 100% Utilization of gas
- Designed for maximum utilization of gas transfer area
- 25 or 50 psi pressure relief valves are optional
- Available in many sizes for various flow requirements
- Designed for containerized shipping anywhere in the world



OXYGEN CONES - 25 PSI

MODEL	DIAMETER (IN.)	HEIGHT (IN.)	SHIP WEIGHT (LBS)	EACH
02C-025-012	12	38.0	54	**$1,137.00**
02C-025-018	18	52.0	71	**1,197.00**
02C-025-024	24	66.0	106	**1,422.00**
02C-025-030	30	80.5	142	**1,775.00**
02C-025-036	36	94.0	219	**2,392.00**
02C-025-042	42	108.0	309	**3,103.00**
02C-025-048	48	122.0	414	**3,932.00**
02C-025-054	54	136.5	462	**4,618.00**
02C-025-060	60	150.0	695	**5,648.00**
02C-025-072	72	178.5	1,110	**8,206.00**

OZONE CONES - 25 PSI

03C-025-012	12	38.0	54	**$1,172.00**
03C-025-018	18	52.0	71	**1,243.00**
03C-025-024	24	66.0	106	**1,515.00**
03C-025-030	30	80.5	142	**1,894.00**
03C-025-036	36	94.0	219	**2,534.00**
03C-025-042	42	108.0	309	**3,268.00**
03C-025-048	48	122.0	414	**4,169.00**
03C-025-054	54	136.5	462	**4,891.00**
03C-025-060	60	150.0	695	**5,992.00**
03C-025-072	72	178.5	1,110	**8,703.00**

OXYGEN CONES - 50 PSI

MODEL	DIAMETER (IN.)	HEIGHT (IN.)	SHIP WEIGHT (LBS)	EACH
02C-050-012	12	38.0	63	**$1,409.00**
02C-050-018	18	52.0	88	**1,505.00**
02C-050-024	24	66.0	139	**1,729.00**
02C-050-030	30	80.5	211	**2,382.00**
02C-050-036	36	94.0	331	**3,138.00**
02C-050-042	42	108.0	473	**4,169.00**
02C-050-048	48	122.0	684	**5,554.00**
02C-050-054	54	136.5	885	**7,425.00**
02C-050-060	60	150.0	1,198	**8,549.00**
02C-050-072	72	178.5	1,912	**12,374.00**

OZONE CONES - 50 PSI

03C-050-012	12	38.0	63	**$1,446.00**
03C-050-018	18	52.0	88	**1,565.00**
03C-050-024	24	66.0	139	**1,825.00**
03C-050-030	30	80.5	211	**2,523.00**
03C-050-036	36	94.0	331	**3,292.00**
03C-050-042	42	108.0	473	**4,369.00**
03C-050-048	48	122.0	684	**5,838.00**
03C-050-054	54	136.5	885	**7,626.00**
03C-050-060	60	150.0	1,198	**8,986.00**
03C-050-072	72	178.5	1,912	**13,025.00**

25 psi Oxygen and Ozone Contact Cones - Technical Data

Model Number			O2C-025-012 / O3C-025-012	O2C-025-018 / O3C-025-018	O2C-025-024 / O3C-025-024	O2C-025-030 / O3C-025-030	O2C-025-036 / O3C-025-036	O2C-025-042 / O3C-025-042	O2C-025-048 / O3C-025-048	O2C-025-054 / O3C-025-054	O2C-025-060 / O3C-025-060	O2C-025-072 / O3C-025-072
Diameter	**in**	**D**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**72**
Overall Height	in	**H**	38.0	52.0	66.0	80.5	94.0	108.0	122.0	136.5	150.0	178.5
Inlet / Outlet Ø	in	**LI/LO**	1.5	3.0	3.0	4.0	6.0	6.0	6.0	8.0	8.0	10.0
Liquid Flow - Max	gpm		46	103	186	289	412	565	742	933	1,157	1,664
	lpm		176	390	702	1,095	1,561	2,140	2,809	3,533	4,380	6,297
Contact Cones include [1] ¾"x¼" 316SS bushings for pressurized O² / O³ inlet and [2] ¾"x½" 316SS bushings for optional Pressure Gauge and Pressure Relief Valve.												
Oxygen Absorption - Freshwater - 100% Saturation - kg/hr @ 10psi												
5°C			0.28	0.62	1.12	1.75	2.49	3.41	4.48	5.63	6.98	10.04
10°C			0.25	0.55	0.99	1.54	2.20	3.01	3.96	4.97	6.17	8.87
15°C			0.22	0.49	0.88	1.38	1.96	2.69	3.53	4.44	5.50	7.91
20°C			0.20	0.44	0.79	1.24	1.77	2.42	3.18	4.00	4.95	7.12
25°C			0.18	0.40	0.72	1.12	1.60	2.20	2.88	3.63	4.49	6.46
Oxygen Absorption - Freshwater - 100% Saturation - kg/hr @ 25psi												
5°C			0.60	1.34	2.42	3.77	5.37	7.36	9.66	12.15	15.06	21.66
10°C			0.53	1.19	2.14	3.33	4.75	6.52	8.55	10.75	13.33	19.17
15°C			0.48	1.06	1.91	2.98	4.25	5.83	7.65	9.62	11.93	17.16
20°C			0.43	0.96	1.73	2.70	3.84	5.27	6.92	8.70	10.78	15.50
25°C			0.39	0.88	1.58	2.46	3.50	4.80	6.31	7.93	9.83	14.14

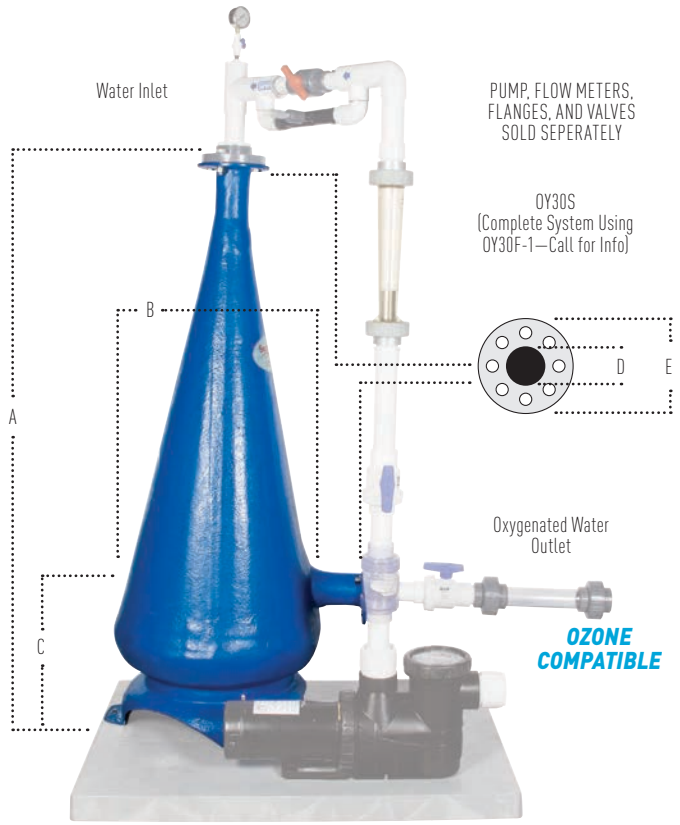
CAUTION! MAXIMUM OPERATING PRESSURE IS 25 PSI. All weights and loadings are estimated; actual may vary slightly. Absorption based upon 100% min. concentration of Oxygen. Final total dissolved gas pressure (TDGP) values need to be considered for any aquaculture gas injection system.

50 psi Oxygen and Ozone Contact Cones - Technical Data

Model Number			O2C-050-012 / O3C-050-012	O2C-050-018 / O3C-050-018	O2C-050-024 / O3C-050-024	O2C-050-030 / O3C-050-030	O2C-050-036 / O3C-050-036	O2C-050-042 / O3C-050-042	O2C-050-048 / O3C-050-048	O2C-050-054 / O3C-050-054	O2C-050-060 / O3C-050-060	O2C-050-072 / O3C-050-072
Diameter	**in**	**D**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**	**72**
Overall Height	in	**H**	38.0	52.0	66.0	80.5	94.0	108.0	122.0	136.5	150.0	178.5
Inlet / Outlet Ø	in	**LI/LO**	1.5	3.0	3.0	4.0	6.0	6.0	6.0	8.0	8.0	10.0
Liquid Flow - Max	gpm		46	103	186	289	412	565	742	933	1,157	1,664
	lpm		176	390	702	1,095	1,561	2,140	2,809	3,533	4,380	6,297
Contact Cones include [1] ¾"x¼" 316SS bushings for pressurized O² / O³ inlet and [2] ¾"x½" 316SS bushings for optional Pressure Gauge and Pressure Relief Valve.												
Oxygen Absorption - Freshwater - 100% Saturation - kg/hr @35psi												
5°C			0.82	1.82	3.28	5.11	7.29	9.99	13.12	16.49	20.45	29.40
10°C			0.73	1.61	2.90	4.53	6.45	8.85	11.62	14.61	18.11	26.04
15°C			0.65	1.44	2.60	4.05	5.78	7.93	10.40	13.08	16.22	23.32
20°C			0.59	1.31	2.35	3.67	5.23	7.17	9.41	11.83	14.67	21.09
25°C			0.54	1.19	2.15	3.35	4.77	6.54	8.59	10.80	13.39	19.25
Oxygen Absorption - Freshwater - 100% Saturation - kg/hr @50psi												
5°C			1.14	2.54	4.58	7.13	10.17	13.94	18.30	23.01	28.53	41.02
10°C			1.01	2.25	4.05	6.32	9.01	12.35	16.21	20.39	25.28	36.35
15°C			0.91	2.02	3.63	5.66	8.07	11.07	14.53	18.27	22.65	32.56
20°C			0.82	1.83	3.29	5.12	7.30	10.02	13.15	16.53	20.50	29.47
25°C			0.75	1.67	3.00	4.68	6.67	9.15	12.01	15.10	18.73	26.93

CAUTION! MAXIMUM OPERATING PRESSURE IS 50 PSI. All weights and loadings are estimated; actual may vary slightly. Absorption based upon 100% min. concentration of Oxygen. Final total dissolved gas pressure (TDGP) values need to be considered for any aquaculture gas injection system.

Notes: Ozone Contact Cones require an ozone resistant liner. Oxygen and Ozone Contact Cones are built for indoor use only. All valves, piping and anchoring mechanisms are to be supported independently. Standard units are provided with non-rated Base Flange or (4) non-rated Hold Down Brackets. Anchor requirements and design for wind and seismic loads are by others, including: Reinforced Flange thickness, Number of and Type of Anchor points, and any additional hold down requirements.



OXYGEN/OZONE CONTACT CONES

Pentair Aquatic Eco-Systems Sweetwater cones are designed to optimize the saturation of gases in water, and gas transfer efficiencies of up to 100% are possible. Operation of the cone is simple: as water and gas (either pure oxygen, ozone or other gas) enter from the top at a relatively high velocity, the water shears and moves the bubbles downward. As the cone widens the velocity is reduced. The undissolved bubbles keep returning to the top, so only water without bubbles can exit the bottom. At higher pressures, the dissolved oxygen concentration may be increased significantly above saturation. For example, a Sweetwater cone operating at only 10 psi can deliver water with a dissolved oxygen concentration above 25 mg/L. Sweetwater cones may be operated at a pressure of up to 21 psi. No matter what concentration of dissolved oxygen is needed, Pentair AES has the right cone for your application. Please contact a Pentair AES technician for assistance with sizing and complete skid systems.

*See Index for flow meters, flanges and valves. **Two required.

MODEL	FLOW RANGE	GALLONS (APPROX.)	INLET/ OUTLET	SHIP WT (LBS)	EACH	SUGGESTED FLOW METER*
OY30F-1	73–130	45	3"	65	**$1,421.00**	**MFR440**
OY60F-1	150–260	110	4"	100	**1,849.35**	**MFR4150**
OY110F-1	280–480	195	5"	245	**2,920.72**	**MFR4150****
OY140F-1	350–600	335	6"	290	**3,672.55**	**MFR4150****

DIMENSIONS

	OY30F-1	OY60F-1	OY110F-1	OY140F-1
A	68"	85"	107"	129"
B	24"	34"	40"	48"
C	16"	16.5"	19.5"	22"
D	3.5"	4"	5.5"	6"
E	8"	9"	10"	11.5"

OXYGEN CAPACITY AT MAXIMUM FLOWRATES, VARIOUS TEMPERATURES AND PRESSURES, SALINITY 0, SEA LEVEL, INFLOW SAT. 100%, CONTACTOR SAT. 60%

			TEMP 50ºF (10º)			TEMP 68ºF (20º)			TEMP 86ºF (30º)		
	Gauge Pressure		Oxygen Capacity		D.O.	Oxygen Capacity		D.O.	Oxygen Capacity		D.O.
	psi	bars	lbs/hr	kg/hr	mg/L	lbs/hr	kg/hr	mg/L	lbs/hr	kg/hr	mg/L
OY30F-1 130 gpm	10	0.7	3.2	1.5	61	2.6	1.2	49	2.1	1.0	39
	15	1.0	3.8	1.7	70	3.1	1.4	56	2.5	1.1	45
	20	1.4	4.4	2.0	80	3.5	1.6	64	2.8	1.3	51
OY60F-1 260 gpm	10	0.7	6.6	3.0	62	5.3	2.4	50	4.2	1.9	40
	15	1.0	7.8	3.6	72	6.3	2.8	57	5.0	2.3	46
	20	1.4	9.1	4.1	81	7.3	3.3	65	5.8	2.6	52
OY110F-1 480 gpm	10	0.7	12.3	5.6	63	9.8	4.5	50	7.9	3.6	40
	15	1.0	14.6	6.6	72	11.7	5.3	58	9.3	4.2	47
	20	1.4	16.9	7.7	82	13.5	6.1	65	10.8	4.9	53
OY140F-1 600 gpm	10	0.7	15.4	7.0	63	12.3	5.6	50	9.9	4.5	40
	15	1.0	18.3	8.3	72	14.6	6.6	58	11.7	5.3	47
	20	1.4	21.2	9.6	82	17.0	7.7	66	13.6	6.1	53
OY10 12 gpm	10	0.7	0.17	0.08	39	0.13	0.06	31	0.11	0.05	25
	15	1.0	0.20	0.09	44	0.16	0.07	35	0.13	0.06	29
	20	1.4	0.23	0.10	49	0.18	0.08	40	0.15	0.07	32
OY18 25 gpm	10	0.7	0.50	0.23	52	0.40	0.18	41	0.32	0.15	33
	15	1.0	0.60	0.27	59	0.48	0.22	47	0.38	0.17	38
	20	1.4	0.69	0.31	67	0.55	0.25	53	0.44	0.20	43
OY35 65 gpm	10	0.7	1.5	0.7	59	1.2	0.6	47	1.0	0.4	39
	15	1.0	1.8	0.8	68	1.5	0.7	54	1.2	0.5	44
	20	1.4	2.1	1.0	76	1.7	0.8	61	1.4	0.6	49

			TEMP 50ºF (10º)			TEMP 68ºF (20º)			TEMP 86ºF (30º)		
	Gauge Pressure		Oxygen Capacity		D.O.	Oxygen Capacity		D.O.	Oxygen Capacity		D.O.
	psi	bars	lbs/hr	kg/hr	mg/L	lbs/hr	kg/hr	mg/L	lbs/hr	kg/hr	mg/L
OY35P 65 gpm	10	0.7	1.5	0.7	59	1.2	0.6	47	1.0	0.4	38
	15	1.0	1.8	0.8	68	1.5	0.7	54	1.2	0.5	44
	20	1.4	2.1	1.0	76	1.7	0.8	61	1.4	0.6	49
OY75 90 gpm	10	0.7	2.2	1.0	60	1.8	0.8	48	1.4	0.6	39
	15	1.0	2.6	1.2	69	2.1	0.9	55	1.7	0.8	45
	20	1.4	3.0	1.4	78	2.4	1.1	63	1.9	0.9	50
OY110 130 gpm	10	0.7	3.2	1.5	61	2.6	1.2	49	2.1	0.9	39
	15	1.0	3.8	1.7	70	3.1	1.4	56	2.5	1.1	45
	20	1.4	4.4	2.0	80	3.5	1.6	64	2.8	1.3	51
OY160 200 gpm	10	0.7	5.0	2.3	62	4.0	1.8	49	3.2	1.5	40
	15	1.0	6.0	2.7	71	4.8	2.2	57	3.8	1.7	46
	20	1.4	6.9	3.1	81	5.5	2.5	65	4.4	2.0	52
OY250 300 gpm	10	0.7	7.6	3.5	62	6.1	2.8	50	4.9	2.2	40
	15	1.0	9.1	4.1	72	7.3	3.3	57	5.8	2.6	46
	20	1.4	10.5	4.8	81	8.4	3.8	65	6.7	3.0	52
OY400 500 gpm	10	0.7	12.8	5.8	63	10.3	4.7	50	8.2	3.7	40
	15	1.0	15.2	6.9	72	12.2	5.5	57	9.7	4.4	47
	20	1.4	17.6	8.0	82	14.1	6.4	65	11.3	5.1	53

AES Multiply lbs/hr D.O. by 1,500 to estimate the lbs of fish that can be supported at 3% bodyweight (bw) feed per day (assumes oxygen/feed ratio of 0.5). 1 lb O_2= 12.08 ft^3 @ STP; 28 liters = 1 cubic foot; 1 kPa= .145 psi

OZONE COMPATIBLE

OXYGEN SATURATORS ✓ DESIGNED HERE

In 1989, we developed the 3-part oxygen saturator, which performs like an oxygen cone, but with these added benefits:

- Comes apart for cleaning.
- Has a smaller footprint.
- Top half bolts inside the bottom half for Ground shipment (small units).

Like the oxygen cones, our saturators feature 100 percent oxygen absorbing capability. The water and oxygen enter the top of the column, where agitation and shear occurs. As the water and oxygen move downward, their velocity is reduced by the increasing diameters. This allows time and space for any oxygen bubbles that have not dissolved to float. No bubbles escape from the saturator. These saturators are made of thick, high-density, black, linear polyethylene with fusion-bonded flanges, except **OY35P**, which is a low-priced PVC model that features two clear sections so the bubbles can be observed.

A valve (not included) is required on the outlet side of all cones and saturators to control the pressure within. When assembling the center flange, we suggest using either a bead of silicone or a Neoprene gasket. Center flange bolts and pressure gauge (0–30 psi) are included. Inlet and outlet fittings and flow meters not included. Overall height is to flange face. Two-year guarantee. **OY110** and smaller ship Ground. Made in USA. Please contact a Pentair AES technician for assistance with sizing and complete skid systems.

MODEL	FLOW RANGE (GPM)*	CENTER FLANGE SIZE	RECOMMENDED FLOW METER*	OVERALL HEIGHT	INLET/ OUTLET	SHIP WT (LBS)	EACH
OY10	8–12	2½"	MFR410	56"	½" MNPT	12	**$835.00**
OY18	15–25	3"	MFR410	62"	¾" MNPT	15	**934.00**
OY35	35–65	4"	MFR410	86"	1¼" MNPT	35	**987.00**
OY35P	35–65	6"	MFR410	88"	1¼" MNPT	55	**839.00**
OY75	65–90	6"	MFR440	90"	1½" MNPT	50	**2,646.00**
OY110	90–130	8"	MFR440	90"	2" FLANGE	65	**2,585.00**
OY160	130–200	12"	MFR4150	90"	3" FLANGE	80	**3,500.00**
OY250	220–300	12"	MFR4150	90"	3" FLANGE	105	**3,667.00**
OY400	300–500	14"	MFR4150**	90"	4" FLANGE	125	**5,850.00**

Note: To convert pounds of oxygen per hour to grams, multiply pounds x 454.
*See Index for flow meters, flanges and valves. **Two required.

OXYGEN GENERATORS, PORTABLE

AIRSEP® Onyx PSA Oxygen Generators are specifically designed for reliability, energy efficiency, and ease-of-use. There are thousands currently in use throughout the world. The Onyx's reliability, low noise level, and ability to deliver up to 95.5% oxygen concentration make it a perfect fit for many aquaculture applications such as fish farming, laboratory experiments, aquaponics and hydroponics. Sound Level: 49db @ 1 meter (open field conditions). 1 year parts and factory labor warranty.

NOTE: An unprotected or inadequately ventilated environment, or improper control power may cause damage to the oxygen generator not covered under warranty.

- Self-contained (internal air compressor)
- Transportable roller base design
- Easy to install and maintain
- Low operating cost
- High-impact polystyrene enclosure
- Advanced engineering
- Time-proven reliability

Onyx

PORTABLE MODELS

MODEL	SERIES	ENCLOSURE	VOLTS	HZ	AMPS	PRODUCT FLOW (LPM*/SCFH)	PRODUCT PRESSURE (PSIG)	PRODUCT CONCENTRATION	DIMENSIONS W	D	H	SHIP WT (LBS)	EACH
AS016-1	ONYX	ABS PLASTIC	120	60	5.0	6/12	9	93%	16"	15"	29"	60	**$1,349.00**
AS016-2	ONYX	ABS PLASTIC	220	50	2.5	6/12	9	93%	16"	15"	29"	60	**1,363.00**
AS016-6	ONYX	ABS PLASTIC	220	60	2.3	6/12	9	93%	16"	15"	29"	60	**1,367.00**
AS017-1	ONYX PLUS	ABS PLASTIC	120	60	5.5	8/17	20	93%	16"	15"	29"	63	**2,017.00**
AS017-2	ONYX PLUS	ABS PLASTIC	220	50	2.8	8/17	20	93%	16"	15"	29"	63	**2,139.00**
AS017-6	ONYX PLUS	ABS PLASTIC	220	60	2.5	8/17	20	93%	16"	15"	29"	63	**2,018.00**
AS121-1	ONYX ULTRA	ABS PLASTIC	120	60	6.0	10/21	20	93%	16"	15"	29"	66	**2,117.00**
AS121-2	ONYX ULTRA	ABS PLASTIC	220	50	3.0	10/21	20	93%	16"	15"	29"	66	**2,192.00**

*LPM (Liters per minute) gas measured at 1 atmosphere and 21°C / SCF (Standard cubic foot) gas measured at 1 atmosphere and 70°F. Product Dew Point: -100°F (-73°C). Physical Connection Product Gas Outlet: 1/4" FNPT JIC-8. Ambient Operating Conditions: Locate the oxygen generator in a well-ventilated area that is protected from weather elements and remains between 40°F (4°C) and 112°F (44°C). All performance ratings based on an ambient temperature up to 100°F (38°C), up to 1,000 feet elevation, and 80% relative humidity.


Wall-Mounted

AirSep® A Chart Industries Company


Tank-Mounted

OXYGEN GENERATORS, WALL OR TANK-MOUNTED

AIRSEP® Topaz PSA Oxygen Generators are specifically designed for reliability, energy efficiency, and ease-of-use. There are thousands currently in use throughout the world. The Topaz's ability to deliver up to 95.5% oxygen concentration make it a great fit for a wide range of commercial aquaculture applications. Sound Level: 55db @ 1 meter (open field conditions). 1 year parts and factory labor warranty.

NOTE: An unprotected or inadequately ventilated environment, or improper control power may cause damage to the oxygen generator not covered under warranty.

- Self-contained (internal air compressor)
- Heavy duty Aluminum or Stainless Steel enclosure
- Wall or tank-mount designs
- Ozone resistant/high temperature process tubing
- Quick release fittings for ease of maintenance
- Five models include oxygen concentration monitors
- Advanced engineering

WALL-MOUNTED MODELS

MODEL	SERIES	PRODUCT FLOW ENCLOSURE	VOLTS	HZ	AMPS	PRODUCT PRESSURE (LPM*/SCFH)	(PSIG)	PRODUCT CONCENTRATION	DIMENSIONS W	D	H	SHIP WT (LBS)	EACH
AS013-105	TOPAZ	ALUMINUM	120	60	5.0	6/12	9	93%	19"	10"	27"	61	**$1,834.00**
AS013-106 NEW	TOPAZ	ALUMINUM	220	50	2.5	6/12	9	93%	19"	10"	27"	65	**1,921.00**
AS013-107	TOPAZ	ALUMINUM	220	60	2.5	6/12	9	93%	19"	10"	27"	65	**1,932.00**
AS013-115	TOPAZ	STAINLESS STEEL	120	60	5.0	6/12	9	93%	19"	10"	27"	81	**2,086.00**
AS013-120	TOPAZ	STAINLESS STEEL	220	50	2.5	6/12	9	93%	19"	10"	27"	85	**2,174.00**
AS013-124	TOPAZ*	ALUMINUM	120	60	5.0	6/12	9	93%	19"	10"	27"	61	**1,999.00**
AS013-125	TOPAZ*	ALUMINUM	220	50	2.5	6/12	9	93%	19"	10"	27"	65	**2,024.00**
AS018-101	TOPAZ PLUS	ALUMINUM	120	60	5.0	8/17	20	93%	19"	10"	27"	64	**2,889.00**
AS018-102	TOPAZ PLUS	ALUMINUM	220	50	2.5	8/17	20	93%	19"	10"	27"	68	**3,001.00**
AS018-110	TOPAZ PLUS	ALUMINUM	220	60	2.5	8/17	20	93%	19"	10"	27"	68	**3,001.00**
AS018-115	TOPAZ PLUS	STAINLESS STEEL	220	60	2.5	8/17	20	93%	19"	10"	27"	88	**3,342.00**
AS018-111	TOPAZ PLUS*	ALUMINUM	120	60	5.0	8/17	20	93%	19"	10"	27"	64	**3,114.00**
AS123-7 NEW	TOPAZ ULTRA	ALUMINUM	120	60	6.0	10/21	20	90%	19"	10"	27"	66	**3,218.00**
AS123-2	TOPAZ ULTRA	ALUMINUM	220	50	3.0	10/21	20	90%	19"	10"	27"	70	**3,313.00**
AS123-9 NEW	TOPAZ ULTRA	STAINLESS STEEL	120	60	6.0	10/21	20	90%	19"	10"	27"	86	**3,559.00**
AS123-3	TOPAZ ULTRA	STAINLESS STEEL	220	50	3.0	10/21	20	90%	19"	10"	27"	90	**3,654.00**
AS123-8 NEW	TOPAZ ULTRA*	ALUMINUM	120	60	6.0	10/21	20	90%	19"	10"	27"	66	**3,468.00**
AS123-10 NEW	TOPAZ ULTRA*	STAINLESS STEEL	120	60	6.0	10/21	20	90%	19"	10"	27"	86	**3,809.00**

*Includes Oxygen Concentration Monitor

TANK-MOUNTED MODELS

AS116-1	DUAL TOPAZ PLUS	ALUMINUM	120	60	10.0	18/38	20	93%	40"	19"	47"	318	**7,370.00**
AS116-2	DUAL TOPAZ PLUS	ALUMINUM	220	50	5.0	18/38	20	93%	40"	19"	47"	318	**7,503.00**

*LPM (Liters per minute) gas measured at 1 atmosphere and 21°C / SCF (Standard cubic foot) gas measured at 1 atmosphere and 70°F. Product Dew Point: -100°F (-73°C). Physical Connection Product Gas Outlet: 1/4" FNPT JIC-8. Ambient Operating Conditions: Locate the oxygen generator in a well-ventilated area that is protected from weather elements and remains between 40°F (4°C) and 112°F (44°C). All performance ratings based on an ambient temperature up to 100°F (38°C), up to 1,000 feet elevation, and 80% relative humidity.

DOCS 80-55 (Deployable Oxygen Concentration System) is capable of producing 80 liters per minute of 93% oxygen at 10-100.

PCI DEPLOYABLE OXYGEN CONCENTRATION SYSTEMS

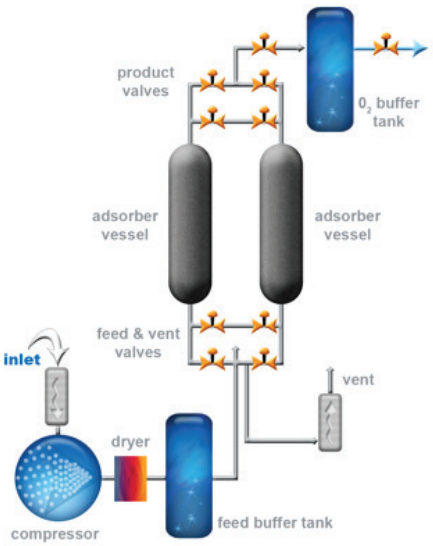
PCI is a manufacturer of on-site oxygen generation systems using a proprietary reversible blower Vacuum Swing Absorption (VSA) technology. The DOCS (Deployable Oxygen Concentrator System) uses half the power of equivalent Pressure Swing Absorption (PSA) systems along with a significant reduction in footprint. Superior turndown and load following characteristics further enhance energy efficiencies not provided by PSAs.

- Uses an oilless blower.
- Lower operating pressure minimizes the potential for water condensation.
- Not as susceptible to humid environments.
- Single-bed process eliminates all process valves and required manifolds.
- Low operating pressure minimizes sieve dusting because the pressure swing is an order of magnitude lower.
- VSA adsorber vessel has a much longer service life than PSA vessels.
- Shows significantly less degradation of performance at high altitudes.
- Needs no feed air compressor (> 50% saving vs. conventional systems)
- Meets the USP 93% standard and can be as high as 95%.
- Turnkey integrated solution—no need to size and source air compressors, dryer systems and product or feed buffer tanks.

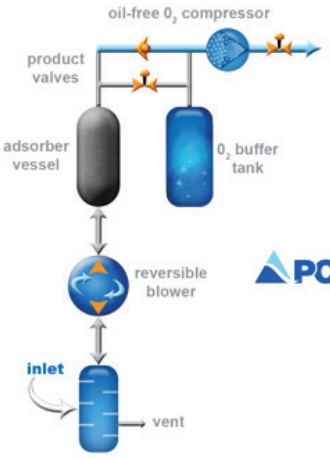
CALL FOR MORE INFORMATION AND PRICING.

DOCS 500-55 (Deployable Oxygen Concentration System) is capable of producing 500 liters per minute of 93% oxygen at 10-100 psig

COMPLEX **PSA** TECHNOLOGY



SIMPLIFIED **VSA** TECHNOLOGY



Keeping Track	PSA	VSA
Power (kWh / m³):	1.6	0.8
Number of Main Components:	6	4
Number of Process Valves:	10	3

MODEL	PURITY	FLOW RATE (LPM)	FLOW RATE (SCFH)	FLOW RATE (M^3/HR)	OUTPUT PRESSURE (PSIG)	AVERAGE POWER USE (KW)	OPERATING POWER	BASE DIMENSIONS	BASE UNIT WEIGHT (LBS)
DOCS 80-55	93%	80	170	4.8	10 TO 100	4.2	460V OR 380V	52"L X 42"W X 56"H	1,500
DOCS 200-55	93%	200	435	12	10 TO 100	9.5	460V OR 380V	74"L X 74"W X 72"H	3,050
DOCS 500-5	93%	500	1,060	30	5 TO 8	18	460V OR 380V	114"L X 72" W X 83"H	5,400
DOCS 500-55	93%	500	1,060	30	10 TO 100	21	460V OR 380V	114"L X 72" W X 83"H	5,700

MODEL	FLOW RANGE (CFH)	LENGTH	SHIP WT (LBS)	EACH
MFR1	.1 - 1.0	4½"	0.5	**$66.00**
MFR5	.5 - 5.0	4½"	0.5	**66.00**
MFR410	1 - 10	6½"	0.7	**79.00**
MFR440	4 - 40	6½"	0.7	**79.00**
MFR4150	15 - 150	6½"	0.7	**79.00**
MFR4200	20 - 200	6½"	0.7	**79.00**


MFR5 MFR4200

AIR/OXYGEN FLOW METERS

These acrylic, block style flow meters are clear and one piece, with built-in, brass, flow-regulating valves suitable for air or oxygen. The scale reads in cubic feet per hour at standard pressure (sea level) and temperature (68°F, 20°C). Connections are 1/8" FNPT. Includes 1/4" inlet/outlet barb brass fittings. Calibrated at 0 psi. See Tech Talk 13. One-year warranty.

OXYGEN FLOW METER MANIFOLDS

These flow meter manifold assemblies are constructed from stainless steel and are easily mounted to hauling tanks or trucks and can be connected to form larger configurations. Manifolds are fully assembled, leak tested and include inlet/outlet barb fittings. One-year warranty.

MODEL		FLOW RANGE (LPM)	SHIP WT (LBS)	EACH
MFR228A	3-METER MANIFOLD	.125 - 3.5	3.6	**$455.00**
MFR228B	3-METER MANIFOLD	.25 - 8.0	3.6	**455.00**
MFR228C	3-METER MANIFOLD	.5 - 15	3.6	**455.00**

MODEL		FLOW RANGE (LPM)	SHIP WT (LBS)	EACH
1FMM222 NEW	5-METER MANIFOLD	0.0 - 15	6	**$420.00**

OXYGEN FLOW METER MANIFOLD

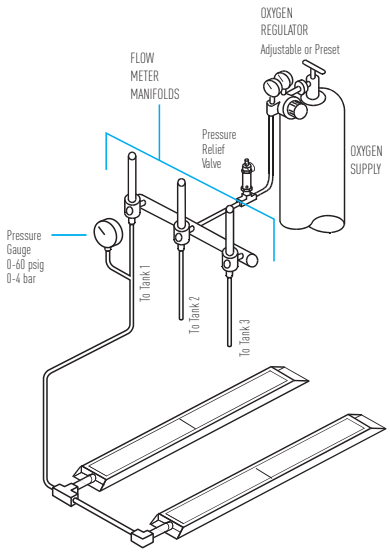
Aquaculture-duty flow meter manifold assembly for use with pure oxygen. Five (0-15 LPM), 3.5 Bar calibrated oxygen flowmeters with 1/4" brass barb swivel nut outlets. Each flowmeter is connected to the manifold with an Oxy B fitting, allowing easy removal for maintenance. Main inlet shut off valve with 3/8" brass barb swivel nut inlet. 60 PSI manifold pressure gauge included. Ideal for use with Point Four Micro Bubble Diffusers (see page 67). One-year warranty.

OXYGEN FLOW METER MANIFOLDS

These flow meter manifold assemblies are designed for use with pure oxygen. The manifolds and adjustable valves are chrome-plated. Manifolds include 3/8" inlet/outlet barb fittings and pressure gauge. Not recommended for use with ultra-fine bubble diffusers. One-year warranty.


MFM3

MODEL		FLOW RANGE (LPM)	SHIP WT (LBS)	EACH
MFM2	2-METER MANIFOLD	0.0 - 6	2	**$73.00**
MFM3	3-METER MANIFOLD	0.0 - 6	3	**109.00**
MFM4	4-METER MANIFOLD	0.0 - 6	4	**139.00**
MFM5	5-METER MANIFOLD	0.0 - 6	5	**169.00**



Flow Meters

We carry both the solid acrylic block style flow meters and the polycarbonate resin thermoplastic round tube style. Both have a precision flow-adjusting valve with positive shut-off and a 100-psi maximum rating (when used in high-pressure systems, a pressure regulator is required).

TECH TALK 13

Flow Meters

Most flow meters, including all Pentair AES meters, are calibrated with no back pressure on the outlet side (unless specified). Rarely, however, are flow meters used without some back pressure. Because pressure compresses the gas being measured, the measured volume will change depending on the pressure at which it is being used. At high pressure, the meter may read 5 cfh, but the flow may actually be 10 cfh. When used in vacuum applications, flow meters are off even further. Therefore, you should never expect the meter to provide an accurate reading, unless it has been calibrated for the same gas at the pressure and back pressure at which it is to be used. As inaccurate as these meters may be, they are good tools for "relative" flow adjustments and for resetting the same flow used in the past.

OXYGEN REGULATOR

A single-stage, medium-duty regulator rated at 0–100 psi with 540 CGA connections. Use where slight pressure changes won't affect the job.

MODEL	EACH
OX3	**$86.97**

OXYGEN HOSE

Single-braid construction for conveying low pressure (to 200 psi) oxygen. Sold with or without brass female oxygen threaded connections (flared is standard for oxygen connections). Made in USA.

MODEL		INSIDE DIA.	L	EACH
OX4	W/ BRASS CONNECTIONS	¼"	10'	**$21.63**
OX4F	W/O BRASS CONNECTIONS	¼"	-	**1.50/FT**

OXYGEN ACCESSORIES

MODEL		EACH
OX5	"Y" W/O VALVES	**$29.87**
OX6	"Y" WITH VALVES	**46.35**
OX7	COUPLER FXF	**1.34**
OX8	¼" BARB FXF	**3.04**


OX5


OX6


OX7


OX8

SAFETY CAP

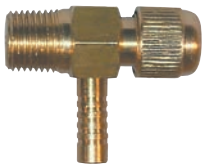
Safety cap protects high-pressure oxygen cylinders even when in use. Rugged heavy-duty construction meets DOT, OSHA and MSHA requirements. Lockable design protects against theft (key lock included). Cap fits US standard oxygen bottles. UL-listed. 4-lb ship weight.

MODEL	EACH
OX10	**$85.80**

BRASS VALVE

For use with 5/32" I.D. tubing, ⅛" MNPT. Max 10 psi.

MODEL	EACH	50+
VBR12	**$2.89**	**$2.46**



SCREW CLAMPS

These autoclavable screw clamps provide fine control that can replace stopcocks. Hinged sides allow for installation without disconnecting the tubing. Accepts air line up to ½" (13 mm) O.D.

MODEL	EACH
SC212	**$7.50**

PLASTIC VALVE

An inexpensive valve that will not corrode. For use with 3/16" I.D. tubing, ⅛" MNPT. Max 5 psi.

MODEL	EACH	10+
VPL12-B	**$1.07**	**$.96**

DRIP EMITTER

Can be used in almost any flow application. They have an infinite adjustment up to 2 gph and will screw into a 10-32 thread, 3/16" tubing or into the open end of a riser tube.

MODEL	EACH	25+
42115-AQ	**$1.60**	**$1.44**

OZONE-SAFE CHECK VALVES

These clear, duckbill check valves work great for preventing water from back siphoning into ozone generators. Cracking pressure is 2½" H_2O. Inlet/outlet accepts ⅛" and 3/16" I.D. tubing.

MODEL		EACH	10+
CKV55	3/16" TUBING	**$9.99**	**$8.99**
CKV60	¼" TUBING	**11.99**	**10.79**


CKV60

OXYGEN MANIFOLDS

These manifolds can be used for hauling tanks, bait stores, hatcheries, etc. Brass mount is powder-coated to prevent rusting and has smooth-turning knobs and ¼" barbed inlet/outlets. Knobs and barbs are plastic. One-year warranty.


MFV3

MODEL		EACH	5+
MFV3	3-VALVE MANIFOLD	**$33.05**	**$29.75**
MFV4	4-VALVE MANIFOLD	**36.92**	**33.23**
MFV5	5-VALVE MANIFOLD	**45.02**	**40.52**

MINIATURE STOPCOCKS

For low-pressure air and water.

MODEL	FOR TUBING	EACH	10+
MSK558	5/16"	**$2.03**	**$1.73**
MSK610	3/8"	**2.07**	**1.76**
MSK714	1/2"	**2.44**	**2.07**
MSK816	5/8"	**2.44**	**2.07**

MSK558 MSK610 MSK714 MSK816

HOSE VALVE

This all-plastic hose valve fits ½" and ¾" I.D. tubing. Handle turns easily.

MODEL	EACH	12+
70012	**$6.75**	**$6.07**

TUBING VALVES, CLAMP TYPE

Manufactured of tough plastic without sharp edges. **DC9** is an "on/off" valve only. The **DC10** and **DC11** have a 12-position ratchet control.

MODEL		EACH	25+
DC9	UP TO 1/4"	**$.22**	**$.20**
DC10	1/8" TO 3/8"	**.87**	**.78**
DC11	UP TO 3/4"	**2.69**	**2.42**

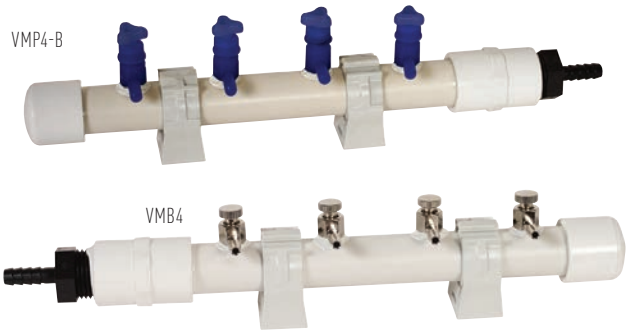
DC9

VALVE MANIFOLDS, SMALL

These ½" PVC air manifolds are made with your choice of valves. The air supply inlet is a ½" FNPT with ¼" barb (**62014**) which fits ¼" I.D. tubing. Type P is made with plastic (**VPL12-B**), B with brass (**VBR12**), which fit 3/16" I.D. tubing. Each manifold includes two ½" Clic fittings for mounting to a flat surface.

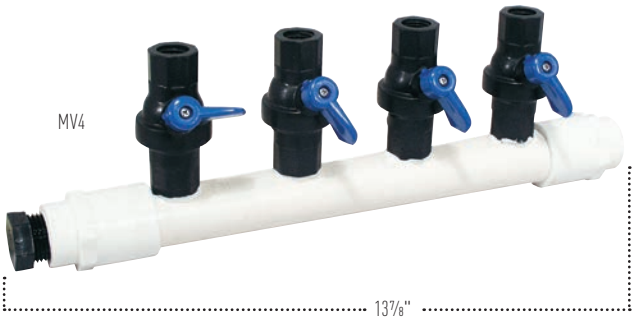
MODEL	# VALVES	VALVE TYPE	APPROX. OVERALL LENGTH (OAL)	EACH	4+
VMP4-B	4	VPL12-B*	11"	**$20.23**	**$19.22**
VMB4	4	VBR12**	11"	**20.75**	**19.71**
VMP6-B	6	VPL12-B*	13"	**28.89**	**27.45**
VMB6	6	VBR12**	13"	**30.20**	**28.69**
VMP8-B	8	VPL12-B*	15"	**32.44**	**30.82**
VMB8	8	VBR12**	15"	**41.00**	**38.95**

*Plastic **Brass



VMP4-B

VMB4



MV4

13 7/8"

VALVE MANIFOLDS, MEDIUM

Our valve manifolds will save you time and aggravation. They are made with quarter-turn valves (**BV25**). The manifold ports are ½" FNPT and a ½" FNPT plug is included. Each valve is ¼" FNPT (see Index for tubing adapters).

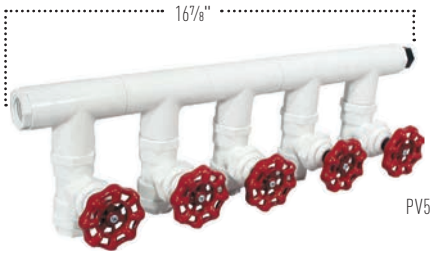
Each valve will pass .5 gpm with less than 1 psi pressure loss. They also make excellent manifolds for air distribution. The ½" threaded plug may be removed for another connection.

MODEL		OAL	EACH	4+
MV2	2-VALVE	8 1/4"	**$24.74**	**$22.27**
MV3	3-VALVE	10 1/2"	**28.73**	**25.86**
MV4	4-VALVE	13 7/8"	**35.68**	**32.11**
MV5	5-VALVE	15 1/4"	**45.35**	**40.82**
MV6	6-VALVE	15 1/4"	**52.36**	**47.12**

VALVE MANIFOLDS, LARGE

These PVC globe valves are glued together as manifolds to save time. Each valve will pass 2 gpm with less than 1 psi pressure loss. The valves have ½" FNPT outlets. The manifold ports are ½" FNPT and a threaded plug is included (see Index for tubing adapters). Made in USA.

MODEL		OAL	EACH	4+
PV2	2-VALVE	7 1/2"	**$27.49**	**$25.57**
PV3	3-VALVE	10 1/2"	**42.52**	**39.54**
PV4	4-VALVE	13 5/8"	**48.26**	**44.88**
PV5	5-VALVE	16 7/8"	**58.92**	**54.80**
PV6	6-VALVE	20"	**71.09**	**66.11**



16 7/8"

PV5

ROUND MANIFOLDS

We make these solid PVC manifolds for use as top inlet air diffuser manifolds, but you'll find many other applications for them. The center port is ¾" NPT. The side holes are ½" NPT and have ⅛" diameter flow restrictors that can be easily drilled as needed for higher flow applications. **M6B** has 6 side holes, **M08** has 8. Weighs ½ lb. Made in USA.

M6B

MODEL	EACH
M6B	**$49.23**
M08	**25.00**

NONMETALLIC CHECK VALVES

These polymer check valves have no springs. Use for fresh water, salt water or air. Make excellent foot valves with low pressure loss. ½-lb stainless steel springs (about 20" H_2O resistance) available for more positive closure for 25¢ more per valve. Add "**85**" to end of part number. Made in USA.

CV1

MODEL	NPT	EACH	10+
CV1	¾"	**$10.09**	**$9.08**
CV2	1"	**10.35**	**9.30**
CV3	1¼"	**15.36**	**13.79**
CV4	1½"	**18.27**	**16.45**
CV5	2"	**22.33**	**20.10**

CHECK VALVES

Quick and positive action in any position. Polypropylene valve is highly resistant to chemicals and temperatures up to 100°C (212°F). Use for any pressure or vacuum system. **228225** will fit tubing 8/9/10 mm (¼"–⅜" I.D.). Overall length 2½". **228215** fits tubing 11/13/15 mm (7⁄16"–⅝" I.D.). Overall length 2¾".

228225

MODEL	OVERALL LENGTH	EACH	50+
228225	2 ¾"	**$3.88**	**$3.49**
228215	2 ¾"	**5.07**	**4.56**

TECH TALK 2

Pipe Sizing, Air

Incorrect pipe sizing all too often causes unsatisfactory performance. Friction is the culprit. As the volume of air passing through the piping increases, the pressure required to deliver the air also increases due to friction (think of it as wind resistance). Since most aquaculture type aeration systems utilize low-pressure blowers, it is critical that nonrestrictive piping be used.

Pressure loss in air systems can be measured in inches of water ("H_2O). The resistance to airflow caused by friction will decrease both the pressure to the air outlet (typically an air diffuser) and the volume of air delivered.

When designing the air system, it is important to add together all of the following: the maximum water depth to which the air is driven, the resistance in the air piping system and the resistance caused by the air diffuser. Our simplified chart can be used as a guide in determining the pressure loss caused by the piping. The blower pressure and air diffuser resistances are published in this catalog. If you are confused, don't worry. Call a Pentair AES technician at 877-347-4788 for help.

Example: 4 cfm need to be delivered a distance of 200 feet from a rotary lobe blower. The average line pressure is 3 psi. There are no odd twists or elbows that need to be considered. The minimum diameter of plastic pipe will be ¾", causing 7.4" H2O resistance or pressure loss. The smaller ½" pipe would cause 24.6" of loss, which would probably be unacceptable. A 1" pipe, costing little more than the ¾", might be an even better choice if there is the possibility of using more air in the future.

FRICTION LOSSES FOR AIR AS A FUNCTION OF FLOW AND PIPE SIZE (LOSS EXPRESSED IN INCHES H2O PER 100' OF PIPE)

		SCHEDULE 40 PIPE									
		NOMINAL DIAMETER (INCHES)									
		.25	.5	.75	1	1.25	1.5	2	3	4	6
		ACTUAL INSIDE DIAMETER (INCHES)									
		.25	.62	.80	1.03	1.36	1.59	2.05	3.04	4.00	6.03
		INSIDE DIAMETER (MM)									
		6.3	15.8	20.4	26.1	34.5	40.4	52.0	77.3	101.5	153.2
Cubic Feet Per Minute	.25	8.3									
	.50	25.0	.39								
	1.0		1.2								
	2.0		3.8								
	3.0		7.6	2.3							
	4.0		12.3	3.7							
	5.0		19.0	5.0	1.7						
	10.0			17.0	5.3	1.5					
	15.0			32.0	11.0	3.0	1.4				
	20.0				19.0	5.0	2.2				
	30.0				39.0	10.0	4.7	1.4			
	50.0					25.0	12.0	3.6	.54		
	75.0						25.0	7.5	1.1		
	100.0						43.0	13.0	1.8	.5	
	125.0							19.0	2.7	.7	
	150.0							26.0	3.8	1.0	
	200.0							45.0	6.3	1.7	.25
	250.0								9.3	2.5	.35

Calculations based on average pressure of 3 psi, average air temperature of 90°F and an air kinematic viscosity of 1.7 x 10-4 ft^2/sec. Under this temperature and pressure, the scfm (standard cubic feet per minute) volume is 13% greater than actual.

TECH TALK 101

Lake Destratification System Evaluation

Over the years, we have seen a lot of lake aeration companies come and go. One thing they had in common was that they all exaggerated their performance. It is no different today! We see others with superior claims who have not measured or don't know how to measure their performance. It's not easy, but the following is the background you will need to evaluate manufacturers' claims.

Lakes have a very low BOD to volume ratio, as opposed to aquaculture or wastewater. This difference makes the standard aeration techniques ineffective or impractical. Realizing this problem early on, we developed the air-driven, unconfined, destratification technique, which is very efficient at moving bottom water to the surface. The goal of our technique is to move enough water to keep the lake bottom above 5 mg/L dissolved oxygen, in keeping with the US Clean Water Act of 1972.

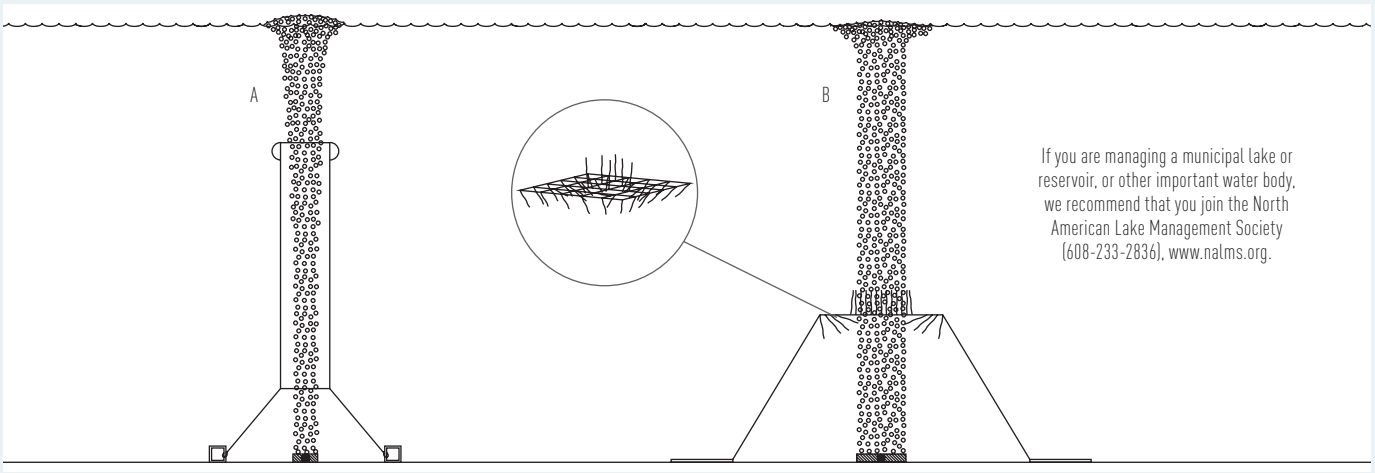
During our research and development, we naturally began with a draft tube because of its "chimney effect," high efficiency and lack of a requirement for a sophisticated air diffuser (for an explanation of how ducted airlifts work, see Tech Talk 68—Airlift Notes). The draft tubes worked very well; however, we had to discontinue their use for most lake destratification jobs because of their high capital, installation and maintenance costs. Pentair AES then developed the synergistic airlifts as the best nonducted or unconfined airlifts. We estimate their efficiency at 90%.

Measuring Performance

The performance of systems can be quantified, either by measuring the time required to destratify a large lake-like impoundment or by taking direct measurements of their flowrate. You can use either a dye or a flow grid (along with a diver and underwater camera) for in-place measurements. The goal is to identify and measure the uprising column of water's minimum diameter and speed, then estimate and subtract losses due to eddy currents (dye will provide a good visual).

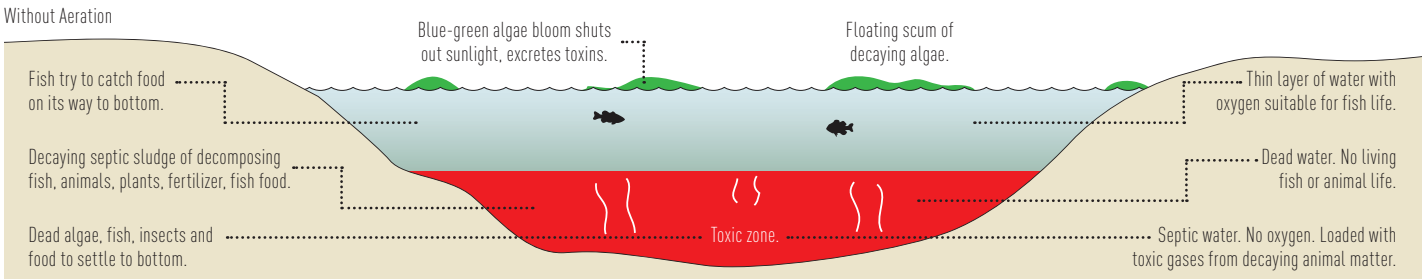
Unfortunately, you cannot use a draft tube measuring device (A), as the confining tube will increase the velocity and flowrate ("chimney effect"). It will also cause all of the tested devices that have the same airflow rate to have the same water flowrate, making comparisons impossible. That would be like comparing the rise rate of free-floating helium balloons to that of a chimney full of helium balloons.

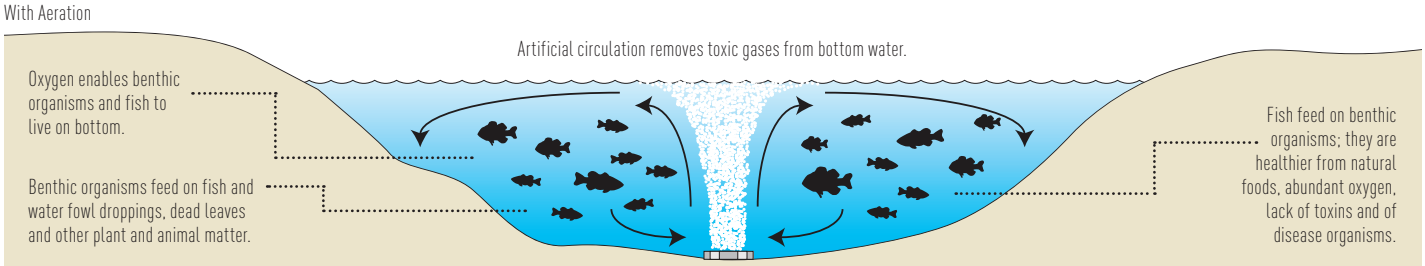
The method we used in our R&D, and the one that we feel is the most accurate, is the flow grid, as illustrated by drawing B. It can be used for diffused air, propeller or venturi type destratification devices. It will require a wire rack with 2" x 2" grid, with 12" long negatively buoyant ribbons attached at each intersection and adjustable legs. It is important that this be done in a large lake-like impoundment with very clear water (much of our testing was done in clear ocean waters). The flow rack should be fixed at the minimum column diameter in the upwelling stream, measurements recorded, then flows calculated by the diameter of the current and rise rate. Subtract losses from eddy currents and express results in gallons per minute per kilowatt hour.



If you are managing a municipal lake or reservoir, or other important water body, we recommend that you join the North American Lake Management Society (608-233-2836), www.nalms.org.

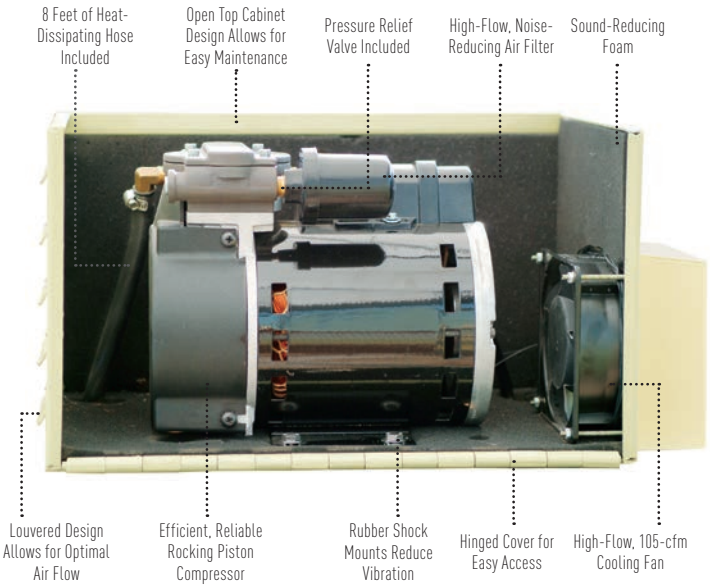
HOW AERATION WORKS



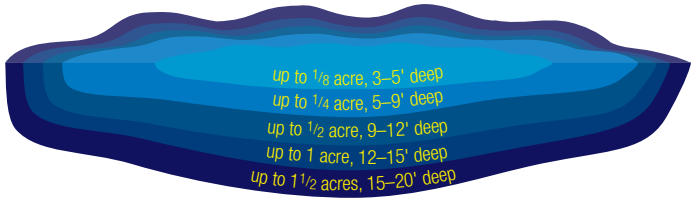


GREAT LAKES® AERATION SYSTEMS ✓ DESIGNED HERE ★ TECH FAV

The Pentair Aquatic Eco-Systems Great Lakes® Aeration Systems are complete and ready-to-go packages that include everything you need: efficient rocking piston air compressor, synergistic diffuser manifolds, and easy-to-install weighted or unweighted tubing. These systems are offered with or without a heavy-duty aluminum cabinet. These cabinets are lockable, all-weather, ventilated, sound-reducing, and are easily installed on a post, pier or boathouse, or on the ground with an optional base (model **DABASE**). Systems with weighted tubing do not require bricks or ties and install much easier and faster than systems with unweighted tubing. To keep from bringing electricity to the lake, the compressor can be located up to 1,000' away with additional **P200S** tubing. The entire system can be shipped Ground. One-year warranty.

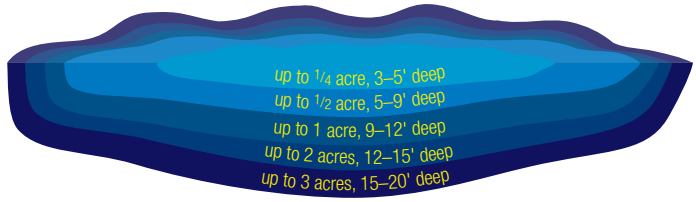


DA1 Systems include ¼HP, 115/230V 50/60Hz compressor, one 4-diffuser manifold, choice of 100' weighted or unweighted tubing, and offered with or without cabinet. For use in lakes ⅛ up to 1½ acres in size and from 3 – 20' deep.



MODEL	ONE 4 DIFFUSER MANIFOLD	UNWEIGHTED TUBING (½" x 100')	WEIGHTED TUBING (⅜" x 100')	SHIP WT (LBS)	EACH
DA1 Systems with Cabinet					
DA1C	✓	✓		57	**$1,160.00**
DA1CW	✓		✓	71	**1,205.00**
DA1 Systems without Cabinet					
DA1CNC	✓	✓		36	**890.00**
DA1CWNC	✓		✓	50	**935.00**

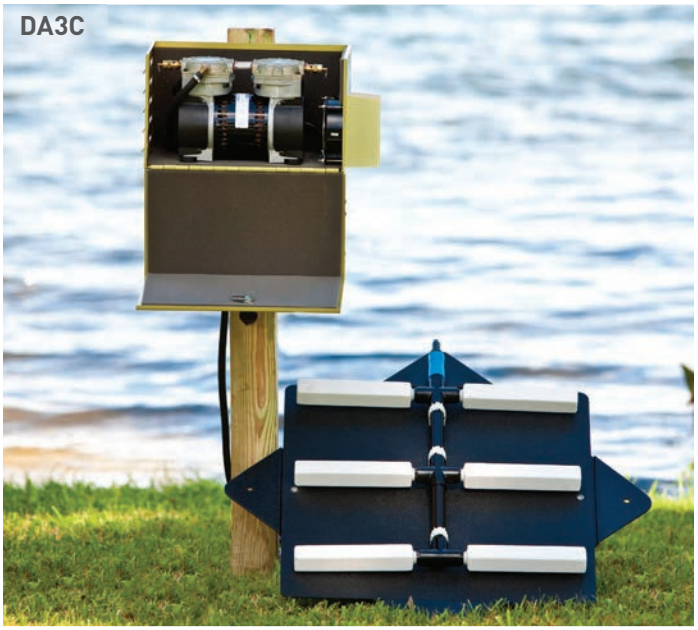
DA2 Systems include ½HP, 115/230V 50/60Hz compressor, two 4-diffuser manifolds, choice of 200' weighted or unweighted tubing, and offered with or without cabinet. For use in lakes ¼ up to 3 acres in size and from 3 – 20' deep.



MODEL	TWO 4 DIFFUSER MANIFOLDS	UNWEIGHTED TUBING (½" x 200')	WEIGHTED TUBING (⅜" x 200')	SHIP WT (LBS)	EACH
DA2 Systems with Cabinet					
DA2C	✓	✓		80	**$1,350.00**
DA2CW	✓		✓	109	**1,395.00**
DA2 Systems without Cabinet					
DA2CNC	✓	✓		59	**1,175.00**
DA2CWNC	✓		✓	87	**1,220.00**

GREAT LAKES® AERATION SYSTEMS ✓ DESIGNED HERE ★ TECH FAV

DA3 Systems include ½HP, 115 or 230V 50/60Hz compressor, one 6-diffuser manifold, and offered with or without cabinet. Weighted 5/8" tubing, **WD1R**, is sold separately and required for DA3C systems. For use in lakes ¾ up to 4 acres in size and from 5 – 20' deep.



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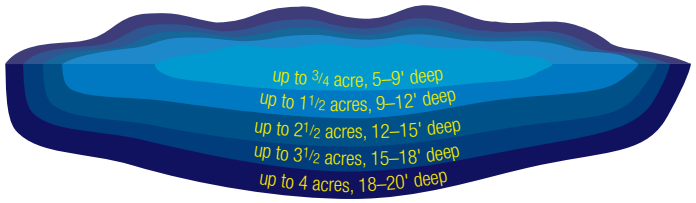
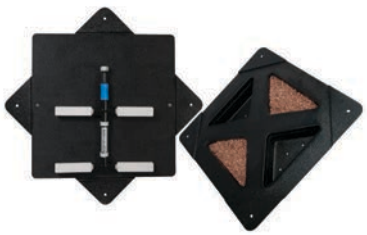


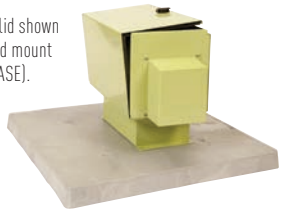
MODEL	COMPRESSOR	ONE 6 DIFFUSER MANIFOLD	SHIP WT (LBS)	EACH
DA3 Systems with Cabinet				
DA3C	½HP 115V	✓	67	**$1,550.00**
DA3C-2*	½HP 230V	✓	67	**1,580.00**
DA3 Systems without Cabinet				
DA3CNC	½HP 115V	✓	46	**1,400.00**
DA3CNC-2*	½HP 230V	✓	46	**1,450.00**

*Require additional lead time.

MODEL		EACH	
Replacement parts			
WD2R-100	⅜" x 100' WEIGHTED AIR TUBING	**$91.39**	**$86.02/4+**
P200S	½" x 100' WEIGHTED AIR TUBING	**37.80**	**34.02/4+**
DFAN	COOLING FAN	**41.51**	—
AB300A	AIR FILTER MUFFLER	**21.35**	—
AB300B	AIR FILTER FOR AB300A	**1.39**	**1.32/10+**
ALR15MB	6" DIFFUSER	**13.32**	**12.52/10+**
ALR23MB	9" DIFFUSER	**19.00**	**17.86/10+**
CABKEY	CABINET KEY (FITS ALL)	**6.95**	—
62071	⅜" x ⅜" ADAPTER, BARB X BARB	**0.52**	**.47/10+**
101A	⅝" COUPLING FOR WD1 AND P200-AQ	**0.88**	**.93/10+**
ZB3858	⅜" x ⅝" BRASS ADAPTER, BARB X BARB	**4.05**	**3.65/10+**
AQK965A	COMPRESSOR REPAIR KIT - DA1C SYSTEMS	**75.00**	—
AQK965	COMPRESSOR REPAIR KIT - DA2C & DA3C SYSTEMS	**125.00**	—
Accessories			
WD2R	⅜" x 50' WEIGHTED AIR TUBING	**45.69**	**43.01/4+**
WD1R	⅝" x 50' WEIGHTED AIR TUBING	**75.26**	**69.99/4+**
DABASE	GROUND MOUNT W/24" X 24" PAD	**121.15**	—



For easiest installation, remove the lid from underlay and fill it with gravel or other weighting material.



Lockable lid shown on ground mount (DABASE).

GREAT LAKES® AERATION SYSTEMS ✓ DESIGNED HERE

The Pentair Aquatic Eco-Systems Great Lakes® aeration/destratification system is guaranteed to be the lowest cost method of inducing circulation to remove stratification, add oxygen and deliver the many benefits that result from sufficient bottom oxygen. These systems feature Sweetwater® unconfined synergistic airlift (USA) diffusers that have proven their effectiveness in over 500,000 acres of lakes worldwide. Install a Great Lakes® system and be confident that you have the most efficient and effective system available. We have more experience than anybody. For system sizing see the Average Sizing Guides, then contact Pentair AES to double-check before ordering. One-year warranty. Installation available.

FOR SHALLOW LAKES:

Systems come factory wired for either 115V or 230V single-phase (add "**-230**" after part number for 230V). Three-phase models, not wired, are also available. Great Lakes® systems feature Sweetwater® oilless rotary vane compressors that include a muffler, inlet check valve, control valves, 0–30 psi liquid-filled pressure gauge and pressure relief valve. Our shallow lake systems, which use the **ALA4GLB** diffuser manifold(s), are recommended when the majority of the lake is 4–15 feet deep. Tubing is not included; we recommend **P200S** polyethylene tubing on the land and **WD1** weighted tubing underwater. Maintenance kits include four sacrificial carbon vanes, gasket and two inlet filter elements.

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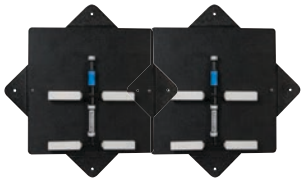
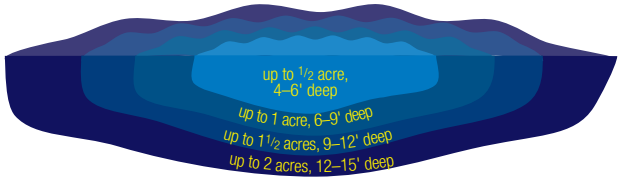
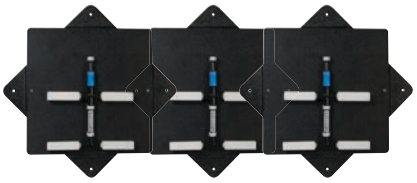


4GL32

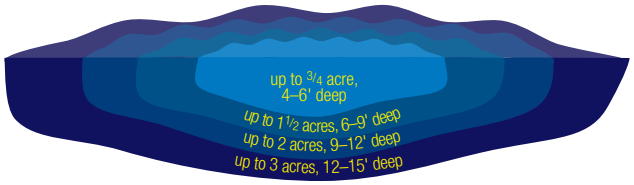
FOR SHALLOW LAKES



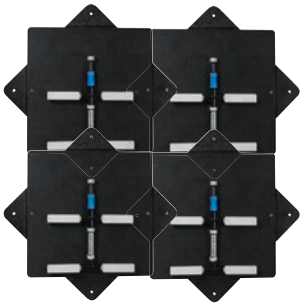
MODEL		SHIP WT (LBS)	EACH
4GL32	¼-HP AERATION SYSTEM + 2 DIFFUSERS W/CABINET	127	**$2,400.13**
4GL32NC	SAME, W/O CABINET	67	**1,604.06**
SL3MK	MAINTENANCE KIT FOR ¼-HP SYSTEM	2	**104.50**



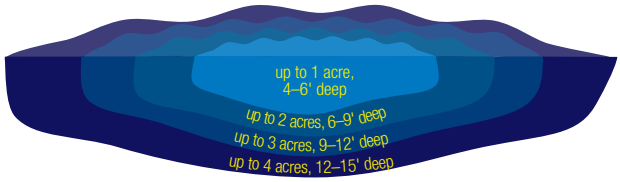
4GL53



MODEL		SHIP WT (LBS)	EACH
4GL53	¾-HP AERATION SYSTEM + 3 DIFFUSERS W/CABINET	147	**$2,489.57**
4GL53NC	SAME, W/O CABINET	87	**1,818.08**
SL5MK	MAINTENANCE KIT FOR ¾-HP SYSTEM	2	**122.62**



4GL54

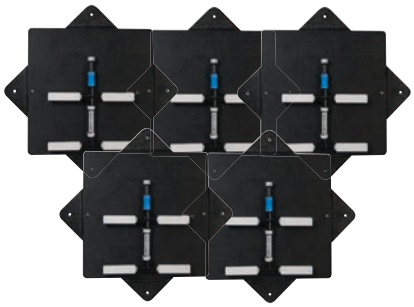


MODEL		SHIP WT (LBS)	EACH
4GL54	¾-HP AERATION SYSTEM + 4 DIFFUSERS W/CABINET	150	**$2,924.88**
4GL54NC	SAME, W/O CABINET	90	**2,132.09**
SL5MK	MAINTENANCE KIT FOR ¾-HP SYSTEM	2	**122.62**

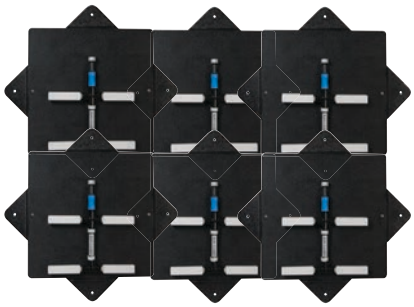
Note: Maintenance kits include four sacrificial carbon vanes, gasket and two inlet filter elements.

PENTAIR

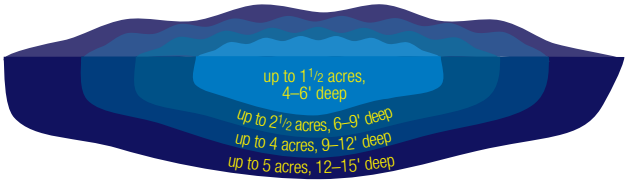
4GL75

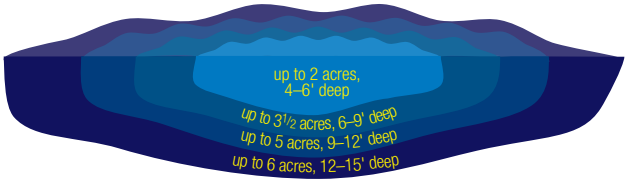


4GL96



FOR SHALLOW LAKES





MODEL		SHIP WT (LBS)	EACH
4GL75	¾-HP AERATION SYSTEM + 5 DIFFUSERS W/CABINET	157	**$3,089.72**
4GL75NC	SAME, W/O CABINET	97	**2,298.59**
SL5MK	MAINTENANCE KIT FOR ¾-HP SYSTEM	2	**122.62**

MODEL		SHIP WT (LBS)	EACH
4GL96	1-HP AERATION SYSTEM + 6 DIFFUSERS W/CABINET	165	**$3,458.00**
4GL96NC	SAME, W/O CABINET	105	**2,707.93**
SL9MK	MAINTENANCE KIT FOR 1-HP SYSTEM	2	**247.02**

Note: Maintenance kits include four sacrificial carbon vanes, gasket and two inlet filter elements.

TECH TALK 121

Diffuser Maintenance

Just as maintenance is important for your home and your car, your aeration system requires some upkeep. Your diffusers are constantly exposed to an organically rich environment and are going to have buildup or growth known as biofouling. Unfortunately, they can't be expected to clean themselves. The good news: An annual inspection plan is all it takes for you to rest assured your system is running optimally.

Rubber diffuser membranes consist of many tiny holes that open as air passes through and close when airflow ceases. This process prevents water from entering the unit. However, when compressed air is introduced into water, as in aeration, calcium carbonate (CaCO3) forms a hard crust on the diffuser surface. The calcium buildup on these small openings forces the rubber to stretch in order to continue to diffuse air, leading to an inability to go back to its original size for the rubber (called memory loss). This results in larger bubble size and a less efficient diffuser.

Glass-bonded silica diffusers may become infused with bacteria, other organics and mineral deposits such as calcium carbonate, causing unnecessary back pressure on the compressor or blower over time. If this back pressure persists, it can dramatically increase wear and tear and, in turn, shorten the life of the compressor.

Whether or not a diffuser is operating unobstructed is impossible to tell by simply looking at the bubble plume. It may be apparent if the rising bubbles are noticeably larger, but this is not always the case. There is only one way to be sure the diffusers are free of obstructions—remove them from the water and take a look. Whether you use glass-bonded silica or rubber membranes, it is imperative they are checked at least once a year to determine if cleaning is necessary. If needed, undiluted muriatic acid can be used for both kinds of diffusers. See Tech Talk 53 for more information.

Rubber membrane diffusers need help too.

Principal Scientist and Engineer
Dr. Thomas M. Losordo

Dr. Losordo received his M.S. in agricultural engineering from the University of Hawaii and his Ph.D. in agricultural engineering from the University of California, Davis. As a professor and extension aquaculture specialist at North Carolina State University, he provided state-wide technical assistance to the agribusiness community in the area of aquaculture and aquacultural engineering. This included traveling to over 490 farms and providing solutions to problems in aquaculture associated with these and other aquaculture sites. He has provided consulting services on aquaculture projects around the world for over 20 years, and is a past president of both the World Aquaculture Society and the Aquacultural Engineering Society.

FOR DEEP LAKES

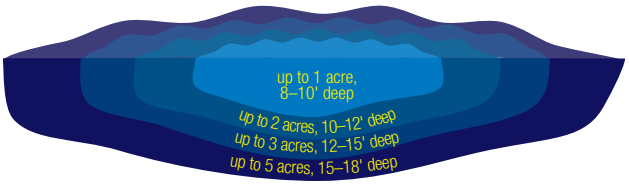
Pentair Aquatic Eco-Systems compressors are factory wired for either 115V or 230V single-phase (add "**-230**" after part number for 230V). Three-phase models, not wired, are also available. Deep lake systems use our **ALA6GLB** diffuser manifold(s) intended for lakes deeper than 8'. The compressors can be mounted in an optional vandalproof, lockable cabinet. The cabinet is made of ⅛" thick galvanized steel and powder-coated avocado green to blend into the landscape. Cabinets include built-in cooling fan(s), lock(s) and soundproofing that keeps the noise level below 55 dB (normal conversation) at 10' and virtually inaudible at 50'. Cabinets come mounted on a lightweight equipment pad that is suitable for private installations. The cabinet can be bolted to a concrete base (for public installations). Tubing sold separately due to the variation in lake sizes.

Choose either a 100' (**P200S**) or 400' (**P200-AQ**) roll of unweighted tubing on land. If used in the water, the unweighted tubing requires tie wraps (**T120R**) and three-hole bricks (purchased locally) attached every 5–8' for weight. Self-weighted tubing (**WD1**) takes much less time to install and eliminates the bricks and tie wraps. Both types of tubing can be connected using couplings (**101A**) and clamps (use **SSA** for **P200-AQ** tubing and **SSB** for **WD1** tubing). One coupling and two clamps per connection will be needed. Cabinets can be located a long distance from the lake shore (call and ask us for guidance or see the friction loss chart with HeavySet® tubing). See page 110 for tubing.

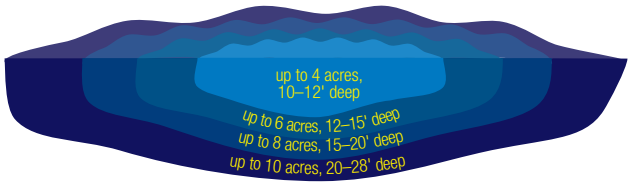
PENTAIR

FOR DEEP LAKES

SL3



SL5



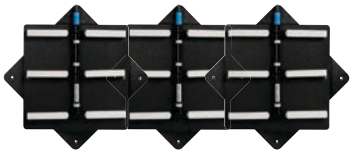
MODEL		SHIP WT (LBS)	EACH
SL3	¼-HP AERATION SYSTEM (**AQ3**) + DIFFUSERS W/CABINET	120	**$2,049.10**
SL3NC	SAME, W/O CABINET	60	**1,293.94**
SL3MK	MAINTENANCE KIT FOR ¼-HP SYSTEM	2	**104.50**

MODEL		SHIP WT (LBS)	EACH
SL5	¾-HP AERATION SYSTEM (**AQ5**) + 2 DIFFUSERS W/CABINET	140	**$2,527.16**
SL5NC	SAME, W/O CABINET	80	**1,745.28**
SL5MK	MAINTENANCE KIT FOR ¾-HP SYSTEM	2	**122.62**

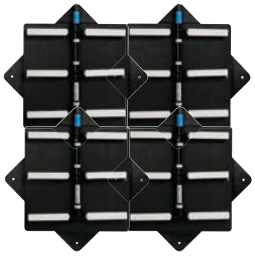
Note: Maintenance kits include four sacrificial carbon vanes, gasket and two inlet filter elements.

PENTAIR

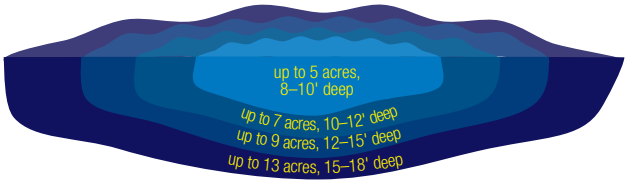
FOR DEEP LAKES

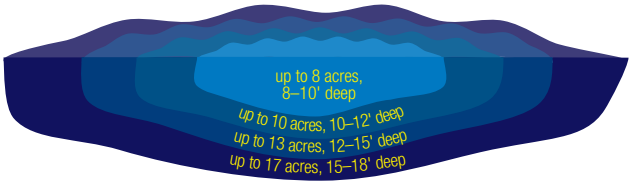


SL7



SL9





MODEL		SHIP WT (LBS)	EACH
SL7	¾-HP AERATION SYSTEM (**AQ7**) + 3 DIFFUSERS W/CABINET	142	**$2,858.47**
SL7NC	SAME, W/O CABINET	82	**2,090.92**
SL5MK	MAINTENANCE KIT FOR ¾-HP SYSTEM	2	**122.62**

MODEL		SHIP WT (LBS)	EACH
SL9	1-HP AERATION SYSTEM (**AQ9**) + 4 DIFFUSERS W/CABINET	150	**$3,216.05**
SL9NC	SAME, W/O CABINET	90	**2,811.95**
SL9MK	MAINTENANCE KIT FOR 1-HP SYSTEM	2	**247.02**

Note: Maintenance kits include four sacrificial carbon vanes, gasket and two inlet filter elements.

THIRD-PARTY COMPARISON OF LAKE DIFFUSERS

This experiment was performed in a 21' Dia. x 30' H tank. Diffusers were placed in 7' of water but raised 3.5' off the bottom.

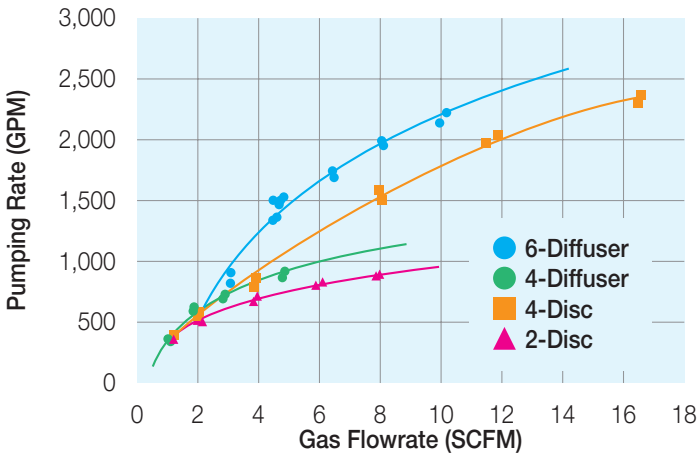
The results show that, when tested in the same environment, the Sweetwater® synergistic airlift diffuser manifold has a greater pumping rate as airflow increases than that of the rubber membrane-based competition. After testing was completed, the following conclusions were offered:

1. Pumping rates increase as airflow increases.
2. The 6" x 9" glass-bonded silica 6-diffuser manifold (**ALA6GLB**) configuration produces the maximum pumping rate at flowrates over 2.2 cfm, while the 4-diffuser manifold (**ALA4GLB**) produces the maximum pumping rate at flowrates below 2.2 cfm.

Synergistic lift occurs when individual air diffusers arranged in an array create a bubble plume that renders the whole diffuser assembly greater than the sum of its individual air diffusers. This phenomenon is depicted in the graph. At flowrates up to 2.2 cfm, the 4-diffuser manifold is the most efficient method of aeration; however, flowrates greater than 2.2 cfm indicate the 6-diffuser manifold is most efficient. It is important to note these differences in efficiency are a direct result of air diffuser size and proven arrangements.

Study by Gerald L. Shell @ GSEE, Inc.

"Evaluation of Fine Bubble Diffuser Pumping Rates"



POND AERATION SYSTEMS KOI

Perfect for large koi ponds

This Pentair Aquatic Eco-Systems aeraton system is the best way to aerate a pond! It is the most economical, energy-efficient way to circulate, destratify and aerate because so much water is moved by so little energy. And there is no noise or electricity in the water. You can read about the method in Tech Talk 101.

These aeration systems use all-weather linear compressors that deliver air via easy-to-install self-weighted tubing to the diffuser assembly. Systems are complete with the appropriate couplings, valves (on larger system), self-weighted tubing (dark blue for low visibility) and diffuser(s). Just drop the tubing and diffuser in the water and plug into a 115V power source.

The small system will provide oxygen for up to 100 lbs of fish (when diffuser is at a 48" water depth; less fish weight at a shallower depth) and circulate water in ponds of up to 8,000 gallons while using only 50 watts! The compressors and air diffusers have two-year warranties. See Index for poly tubing (use part no. **P200**) in order to pipe air up to 1,000' from the compressor in place of running electricity to the pond.

KPA3-A

MODEL	SYSTEM SIZE	MAX DIFFUSER DEPTH	WATTS	MAX POND SIZE	DIFFUSER ASSEMBLIES	WEIGHTED TUBING	EACH
KPA3-A	SMALL	8 FT	50	8,000 GAL	1	25'	**$343.30**
KPA4	LARGE	10 FT	90	11,000 GAL	2	50'	**578.00**

SPAS

SOLAR AERATION SYSTEMS

Pentair Aquatic Eco-Systems solar-powered aeration systems utilize the sun's energy to add oxygen to your pond. It's an environmentally friendly way to take care of your pond and save money on electricity! The solar panels convert photons from sunlight into usable energy, which is then stored in a battery and used to power a highly efficient air compressor. Systems can be retrofitted to power LED pond or landscaping lights, small decorative fountains and 12V water pumps. All systems include photovoltaic solar panel(s); industrial battery(s) enclosed in a weatherproof, ventilated steel cabinet; linear air compressor; bottom-mounted air diffuser assemblies; tubing; and stainless steel clamps. **SPAS** includes 100' of ⅜" tubing; **SPAM** and **SPAL** include 200' of ⅝".

MODEL	PANELS	BATTERIES	KW	EACH
SPAS	2	2	1	**$4,502.28**
SPAM	2	2	1	**5,062.91**
SPAL	4	4	2	**8,270.77**

COMPRESSOR COMPARISON

COMPRESSOR	TYPE	HP	PHASE	VOLTAGE 60/50 HZ	MAX PSI	5 PSI 60/50 HZ	10 PSI 60/50 HZ	15 PSI	20 PSI	25 PSI	30 PSI	SHIP WT (LBS)	REPAIR KIT/VANE SET
AQ101	Rocking Piston	1/3	1	115V, 60 Hz	20	1.85	1.8	1.7	1.6	—	—	19	**AQ101RK**
AQ201	Rocking Piston	1/3	1	115V, 60 Hz	20	3.3	3.2	3	2.9	—	—	21	**AQ201RK-2**
AQ401	Rocking Piston	1/3	1	115/230V, 60 Hz	20	4.75	4.6	4.5	4.2	—	—	17	**AQ201RK-2**
AQ501	Rocking Piston	1/3	1	115/230V, 60 Hz	30	4.4	4.2	4.1	4	3.9	3.8	17	**AQ201RK-2**
AQ3-2	Rotary Vane	1/4	1	115–230V/100–240V	10	4.0/3.5	3.6/3.0	—	—	—	—	34	**SL3MK**
AQ5	Rotary Vane	3/4	1	115–230V/100–240V	15	7.2/6.2	6.8/5.7	6.2	—	—	—	53	**SL5MK**
AQ5-2*	Rotary Vane	3/4	1	115–230V/100–240V	15	7.5/6.0	6.8/5.5	6.2	—	—	—	58	**SL5MK**
AQ7	Rotary Vane	3/4	1	115–230V/100–240V	10	9.5/7.8	8.8/7.6	—	—	—	—	53	**SL5MK**
AQ73	Rotary Vane	3/4	3	208–440V/208–440V	10	9.5/7.8	8.8/7.6	—	—	—	—	60	**SL5MK**
AQ9	Rotary Vane	1	1	115–230V/100–240V	10	11.8/10.2	10.1/8.8	—	—	—	—	62	**SL9MK**
AQ93	Rotary Vane	1	3	208–440V/208–440V	10	11.8/10.2	10.1/8.8	—	—	—	—	62	**SL9MK**
AQ21	Rotary Vane	1 1/2	1	230V, 60 Hz	8	19.5	—	—	—	—	—	90	**AQ2V**
AQ23	Rotary Vane	1 1/2	3	208/230/460V, 60 Hz	8	19.5	—	—	—	—	—	85	**AQ2V**
AQ31-2	Rotary Vane	2	1	230V, 60 Hz	10	19.5	17.9	—	—	—	—	95	**AQ2V**
AQ33	Rotary Vane	2	3	208/230/460V, 60 Hz	10	19.5	17.9	—	—	—	—	90	**AQ2V**
AQ61	Rotary Vane	5	1	208/230/460V, 50/60 Hz	10	53	50.5	—	—	—	—	175	**AQ6V**
AQ63	Rotary Vane	5	3	208/230/460V, 50/60 Hz	10	53	50.5	—	—	—	—	155	**AQ6V**

Standard frequency in the US is 60 Hz. *High-efficiency, energy-saving model.

REPLACEMENT VANE REFERENCE LIST

COMPRESSOR MODEL	VANE SET	COMPRESSOR MODEL	VANE SET	COMPRESSOR MODEL	VANE SET
0522	AF109C	1022	AB992B	AQ93	AQ9V
0522Q	AQ3V	1022Q	AQ5V	AQ20	AQ2V
0523	AQ3V	1022Q3	AQ5V	AQ21	AQ2V
0822	AB992B	1023	AQ5V	AQ23	AQ2V
0822Q	AQ5V	AQ3	AQ3V	AQ31	AQ2V
0822HP	AB992B	AQ5	AQ5V	AQ33	AQ2V
0822HPQ	AQ5V	AQ7	AQ5V	AQ60	AQ6V
0823	AQ5V	AQ73	AQ5V	AQ61	AQ6V
0823HP	AQ5V	AQ9	AQ9V		

Great product! The Sweetwater Rotary Vane Compressor has been running 24/7, except for power outages, since 1995 with only one minor repair and regular maintenance. Most products do not last 20 years.

Thank you for your assistance and reliable products!

Ramona Langston

October 2015

COMPRESSOR CABINETS ✓ DESIGNED HERE

Soundproofing included with all cabinets

The most durable cabinets in the industry. These heavy steel cabinets are almost ⅛" thick and virtually vandalproof. They're equipped with cooling fan(s), soundproofing, electric receptacles, built-in locks and bottom outlet holes (air compressors and valve outlets not included). The sound level is typically below 55 dB at 10' and inaudible at 50'. Add "**-230**" for cabinets with 230V receptacles. **CABS2Q** ships Ground, others ship by motor freight.

CABS2Q

Protects one compressor up to 1 hp with up to 6 diffusers. One cooling fan. 24" x 15" x 16" H. Weighs 70 lbs.

CABL2

Protects two vane compressors up to 1 hp each. 8 diffuser outlets. Two cooling fans. 24" x 24" x 18" H. Weighs 105 lbs.

CABXL

Protects up to four vane compressors up to 1 hp. 16 diffuser outlets. Three cooling fans. 44" x 24" x 22" H. Weighs 245 lbs.

MODEL		SHIP WT (LBS)	EACH
CABS2Q	24" X 15" X 16" H CABINET	70	**$744.37**
CABL2	24" X 24" X 18" H CABINET	120	**947.98**
CABXL	44" X 24" X 22" H CABINET	205	**2,149.61**
Fans and Equipment Pads			
CF1	115V, REPLACEMENT FAN	6	**$123.03**
CF2	230V, REPLACEMENT FAN	6	**133.90**
CF3	115V, REPLACEMENT FAN	4	**72.10**
CF4	230V, REPLACEMENT FAN	4	**74.91**
PAD24	24" X 24" X 2" EQUIPMENT PAD	5	**55.49**
PAD36	24" X 36" X 2" EQUIPMENT PAD	8	**71.00**
PAD3648-3	36" X 48" X 3" EQUIPMENT PAD	10	**161.00**

Compare picture with your fan to ensure you order the correct style.

CF1/CF2

CF3/CF4

SWEETWATER® ROCKING PISTON AIR COMPRESSORS

The Pentair Aquatic Eco-Systems Sweetwater continuous-duty, oil-free, rocking piston air compressors are the perfect choice for aerating small ponds or deep water applications. They come equipped with noise reducing intake air filter, pressure relief valve, 6-foot power cord with a 3-prong plug (AQ202C and AQ402C are equipped with a Europlug) and thermal overload protection. 20 psi max continuous duty, ¼" FNPT outlets. AQ201C has dual outlets. One-year warranty on compressors.

Clean air filters quarterly and replace the piston cup seals and valves every two years. Repair kits, models AQK965A and AQK965, include O-rings, piston cup seals, leaf valves, retainer valve, cylinder and hardware. Optional outlet hose assembly, model HA109, is 2 feet long with brass 5/8" barb (compatible with 1/2" nominal tubing); two are required for model AQ201C.

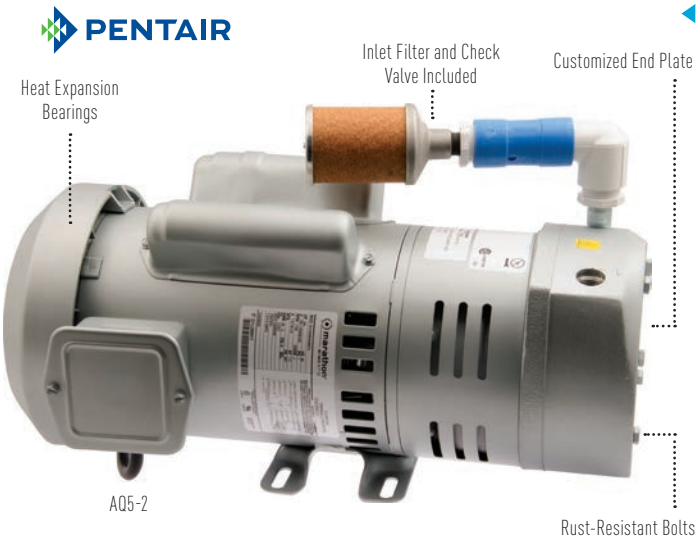
See pages 88-96 for complete pond aeration systems, and page 102 for de-icing system.

MODEL	HP	VOLTAGE	HZ	CFM@ 20PSI	FULL LOAD AMPS	SHIP WT (LBS)	EACH
AQ101C	¼	115/230	50/60	1.8	3.2	16	**$409.00**
AQ201C	½	115	60	1.7	4.7	20	**569.00**
AQ401C	½	115	60	3.7	6.2	20	**589.00**
AQ202C*	½	230	50	1.4	3.5	20	**589.00**
AQ402C*	½	230	50	3.2	2.6	20	**589.00**

*Equipped with 6-foot power cord with Europlug.

REPAIR KITS & OPTIONAL OUTLET HOSE

AQK965A	REPAIR KIT FOR AQ101C	**75.00**
AQK965	REPAIR KIT FOR AQ201C, AQ401C, AQ202C, AQ402C	**125.00**
HA109	OPTIONAL OUTLET HOSE ASSEMBLY	**13.54**



ROTARY VANE COMPRESSORS, ¼-1 HP

The Pentair Aquatic Eco-Systems Sweetwater® motor-mounted, oilless vane compressors are compact, easy-to-service and excellent for moderate-pressure, continuous-duty applications. They more than double the air output of reciprocating compressors with better longevity. Sacrificial oilless carbon vanes automatically adjust as they wear to maintain efficiency.

Thermal overload protection, air filter, inlet check valve and 8' power cord are included on single-phase units. Ten-psi models work to a water depth of 18 feet and 15-psi models work to 27 feet, depending on tubing diameter and distance. The only wearing parts are carbon vanes, which can be replaced in about 15 minutes using common tools. In continuous operation, vanes last 9–18 months, depending on pressure.

All Sweetwater® compressors are performance tested before shipping and covered by a one-year warranty (not including air filters, vanes, water or lightning damage). Check valves are recommended where air tubing can fill with water when the compressor is off.

Three-phase models ship with vanes removed. Three-phase compressors do not have a power cord and must be wired by an electrician. Pentair AES highly recommends using protective devices with all 3-phase equipment. Failure to install protective devices will void most warranties.

THE ONLY COMPRESSOR MADE FOR THE AQUATIC INDUSTRY

MODEL	HP	VOLTAGE 60HZ	PHASE	WIRED FOR	MAX PSI	CFM @ 5PSI 60 HZ/50HZ	CFM @ 10PSI 60HZ/50HZ	RUNNING AMP @ 10 PSI, 115V 60HZ	50HZ	SHIP WT (LBS)	EACH	REPL. VANE SET MODEL	EACH
Single Phase Models (Includes 8' power cord)													
AQ3-2*	¼	115-230/100-240	1	115V	10	4.0/3.5	3.6/3.0	5.0	4.4	34	**$602.20**	**AQ3V**	**$80.00**
AQ3-2-230*	¼	115-230/100-240	1	230V	10	4.0/3.5	3.6/3.0	2.5	2.2	34	**602.20**	**AQ3V**	**80.00**
AQ5-2*	¾	115-230/208-240	1	115V	15	7.5/6.0	6.8/5.5	8.2	7.6	58	**1001.29**	**AQ5V**	**104.00**
AQ5-2-230*	¾	115-230/208-240	1	230V	15	7.5/6.0	6.8/5.5	4.1	3.8	58	**1001.29**	**AQ5V**	**104.00**
AQ5	¾	115-230/100-240	1	115V	15	7.2/6.2	6.8/5.7	10.2	9.6	53	**857.49**	**AQ5V**	**104.00**
AQ5-230	¾	115-230/100-240	1	230V	15	7.2/6.2	6.8/5.7	5.1	4.8	53	**857.49**	**AQ5V**	**104.00**
AQ7	¾	115-230/100-240	1	115V	10	9.5/7.8	8.8/7.6	10.7	10.1	53	**895.85**	**AQ5V**	**104.00**
AQ7-230	¾	115-230/100-240	1	230V	10	9.5/7.8	8.8/7.6	5.35	5.05	53	**895.85**	**AQ5V**	**104.00**
AQ9	1	115-230/100-240	1	115V	10	11.8/10.2	10.1/8.8	11.2	10.6	62	**997.16**	**AQ9V**	**219.96**
AQ9-230	1	115-230/100-240	1	230V	10	11.8/10.2	10.1/8.8	5.6	5.3	62	**997.16**	**AQ9V**	**219.96**
Three Phase Models (Does not include power cord)													
AQ73	¾	208-440/208-440	3	**	10	9.5/7.8	8.8/7.6	2.1 @ 230V	1.7 @ 230V	60	**$919.95**	**AQ5V**	**$104.00**
AQ93	1	208-440/208-440	3	**	10	11.8/10.2	10.1/8.8	2.2 @ 230V	1.9 @ 230V	62	**1,011.43**	**AQ9V**	**219.96**

*High-efficiency, energy-saving models. Note: See compressor comparison table on page 95 for more info. **Must be wired by an electrician.

ROTARY VANE COMPRESSORS, 2 HP

This Pentair Aquatic Eco-Systems Sweetwater® oilless vane compressor can be powered by an electric motor (as shown) or by belts and pulleys. The vane life is 9 to 18 months, depending on rpm and pressure. The shaft is ⅞" diameter, 4½" H and rotates counter clockwise (facing shaft).

Operating range is 800–1,800 rpm. Motor horsepower depends on rpm and pressure. All vane compressors are equipped with an inlet muffler and ¾" NPT ports. 1,725 rpm ODP motor, but others are available. Power cords are not included. These vane compressors are guaranteed for one year (not including vanes [**AQ2V**] or filters [**AQ14**]). Three-phase vane compressors ship with the motor coupling removed. One-year warranty. Made in USA.

MODEL	HP	VOLTAGE 60HZ	PHASE	WIRED FOR	MAX PSI	CFM @ 1725 RPM 5 PSI	10 PSI	RUNNING AMPS @ 8 PSI (230V, 60HZ)	SHIP WT (LBS)	EACH	REPL. VANE SET MODEL	EACH
AQ33*	2	208/220/440	3	**	15	19.5	17.9	5.5	50 + 40	**$1,194.79**	**AQ2V**	**$171.60**
AQ20	COMPRESSOR HEAD ONLY				15	19.5	17.9	—	50	**888.09**	**AQ2V**	**171.60**

*Compressor with motor shipped in two boxes when shipping Ground. **Must be wired by an electrician.

ROTARY VANE COMPRESSOR ACCESSORIES

Miscellaneous Parts

MODEL		SHIP WT (LBS)	EACH
AQ3V	VANE SET FOR AQ3-2	1	**$80.00**
AQ5V	VANE SET FOR AQ5, AQ7, AQ73	1	**104.44**
AQ9V	VANE SET FOR AQ9 AND AQ93	1	**219.96**
AQ11	END CAP, FELT HOLDER FOR ALL QUIET MODELS	1	**7.19**
AQ14	FILTER ELEMENT, ¼–1 HP MODELS	1	**12.84**
AQ255	FLUSHING SOLVENT, 16-OZ AEROSOL HAZMAT A	1	**31.01**
AQ16	MUFFLER ASSEMBLY (FITS ¼, ¾ OR 1 HP)	2	**77.78**
AQ13	PRESSURE RELIEF, ¾" NPT (1¼–2 HP)	1	**59.95**
AQ1301	PRESSURE RELIEF, 1" NPT (2–5 HP)	1	**96.67**
AQ130R	REPLACEMENT O-RING FOR AQ13		**1.95**
ZBN54	BRASS MALE ADAPTER ½" NPT X ⅝" BARB	1	**3.35**

Gauges

BG15	GAUGE, 0–15 PSI, ¼" NPT	1	**$16.37**
LPG30	GAUGE, 0–30 PSI, ¼" NPT, LIQUID-FILLED	1	**27.14**
BG61	GAUGE, 0–60 PSI, ¼" NPT	1	**12.29**

Outlet Valve Assemblies

AOV1	SINGLE OUTLET FOR ⅝" I.D. HOSE	2	**$31.65**
AOV1PR*	SINGLE-VALVE OUTLET W/PRESSURE RELIEF	3	**62.65**
AOV2	TWO-VALVE OUTLET	3	**73.78**
AM2PR-G*	TWO-VALVE OUTLET W/PRESSURE RELIEF	4	**155.27**
AM3PR-G*	THREE-VALVE OUTLET W/PRESSURE RELIEF	5	**191.04**
AM4PR-G*	FOUR-VALVE OUTLET W/PRESSURE RELIEF	6	**216.67**
AM5PR-G*	FIVE-VALVE OUTLET W/PRESSURE RELIEF	7	**253.34**
AM6PR-G*	SIX-VALVE OUTLET W/PRESSURE RELIEF	8	**273.00**

*All include gauge.
Brass hose barb adapters are supplied on all outlet assemblies, together with galvanized steel fittings and 2' of heat-resistant flexible hose, clamps and a hose barb fitting for ⅝" hose.


AQ3V (Vane sets include gaskets.)


AQ14


AQ16


AQ13


ZBN54


LPG30


AM5PR-G

TECH TALK 6

Carbon Vane Replacement

Sweetwater® models **AQ3-2**, **AQ5**, **AQ7**, **AQ73**, **AQ9** & **AQ93**

DO NOT REMOVE THE ROTOR OR LOOSEN ANY OF THE ELECTRIC MOTOR-THROUGH BOLTS.

We recommend carbon vane replacement at nine-month intervals to ensure trouble-free operation of your compressor. The following tools are required: ⅜" or 7/16" socket/wrench, small hammer and antiseize compound.

1. Remove the two end caps from the front of the muffler box (if applicable) and the five muffler box bolts, being careful not to damage the gasket. If the gasket is torn, scrape it off with a sharp knife and replace.
2. Tap the box with a small hammer to loosen it. Do not pry with a screwdriver.
3. Remove the six bolts holding the end plate to the body. Remove the end plate. Do not remove the rotor or loosen any of the electric motor through bolts.
4. Check that vanes are moving freely in and out of vane slots. Replace any vane if more than 50% extends past the vane slot. Top clearance (between rotor and body) may be adjusted by loosening body bolts and lightly tapping on the compressor body while turning the rotor. About 0.004 inch—the thickness of a sheet of paper—works well.
5. Remove vanes and clean both sides with fine emery cloth. Clean the end plate with fine emery cloth.
6. Flush vanes, body, rotor and end plate with solvent (part no. **AQ255**), and remove all solvent from each part.
7. Check the body, rotor and end plate for scoring. If each part is clean and shows no signs of scoring, reinstall parts. If scoring is present, replace with new part(s) or contact Pentair Aquatic Eco-Systems for service.
8. Insert new vanes.

Reassemble by reversing the previous directions. We always recommend using an antiseize lubricant on each bolt to ensure its easy removal for the next vane replacement. Bolts should be reinstalled and tightened in a similar manner to replacing the lug nuts on a vehicle wheel. Start with one bolt and move to the right, skipping one and tightening the next.

When reinstalling the muffler box (if applicable), be certain to install the center bolt first to ensure proper gasket alignment. Before replacing the muffler box, plug your compressor in for a quick sound check of the valve rotation. If an unusual sound or stopping of the rotor takes place, disconnect and recheck the vane replacement.

If you have any problems, contact Pentair Aquatic Eco-Systems at 877-347-4788 for assistance.

WD55

WD50

THE BEST FOR DE-ICING

WEIGHTED DIFFUSER TUBING

This ½" I.D. weighted diffuser tubing is useful in applications where long lengths are required. Equal bubble distribution is possible with lengths as long as 25' for **WD50** and 200' for **WD55**. On the **WD50**, unique die cut slits—located in sets of three every 1½"—flex open with air pressure and close when air is stopped. On the **WD55** ice-melting diffuser tubing, single die cuts are located every 24". The feeder tubing (**WD0**) has no slits. See Index for less expensive, HeavySet® feeder tubing.

This weighted tubing requires **WD** fittings. Full rolls are 250' long (60 meters). This diffuser tubing is not compatible with most regenerative blowers as 2–5 psi is required. Also note that this coarse bubble diffuser tubing will only provide about ⅓ as much oxygen transfer per cfm of air when used for aeration with diffusers.

WD FITTINGS

These black plastic fittings are required for the weighted diffuser tubing. The **PIOU** couples ½" tubing. The **PIOM** is a ½" male adapter. The tee union (**PIOT**) connects two lengths of tubing to a ½" MNPT male adapter. Tube insert supports included. Made in USA.

PIOM PIOT

MODEL		AES	I.D.	O.D.	CFM/FT	SHIP WT (LBS)	EACH	10+
WD50	DIFFUSER, WEIGHTED, 3 CUT	2	½"	⅝"	.1	24/100'	**$ 4.25/FT**	**—**
WD55	DIFFUSER, WEIGHTED, DE-ICE	.04	½"	⅝"	.01	24/100'	**4.00/FT**	**—**
WD0	FEEDER TUBING, WEIGHTED	—	½"	⅝"	—	24/100'	**3.40/FT**	**—**
PIOU	WD COUPLING	—	—	—	—	—	**4.15**	**3.75**
PIOM	WD MALE ADAPTER, ½" MNPT	—	—	—	—	—	**2.95**	**2.66**
PIOT	WD TEE UNION, ½" MNPT	—	—	—	—	—	**6.75**	**6.06**

TECH TALK 36

Lake Aeration

It takes a lot more than bubbles to do it right...

It takes know-how and a properly-sized Great Lakes® aeration/destratification system.

Most lakes cover vast areas and contain millions of gallons of water with a biochemical oxygen demand (BOD) of 10 mg/l or less. So a few random air bubbles rising from the bottom just aren't enough to satisfy a lake's need for oxygen. But, use that same small volume of air to induce a significant rising current, and you have an extremely efficient lake aerator!

Pentair AES synergistic airlift diffusers are designed to lift and circulate huge volumes of water, bringing life-giving oxygen from the surface to the bottom. These unique air diffusers were specifically engineered to cause an upwelling current without turbulence or bottom erosion.

The 4-sq.ft. diffuser assembly creates a vertical current using the rising force of air, moving low oxygen water up from the bottom and eliminating stratification. Hundreds of man-hours have gone into the development of this technique, including underwater dye-flow studies and destratification experiments.

The system is simple, safe and virtually maintenance free. It's the most effective lake aerator made! As little as ¾ horsepower can be used to properly aerate a eutrophic 10-acre lake!

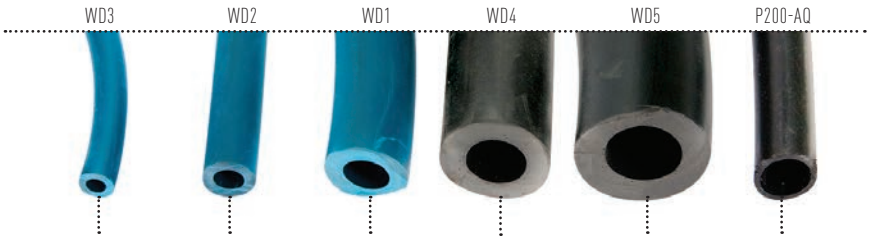
Technically Speaking

- When oxygen levels are low, you can expect transfer performance of more than 10 lbs of dissolved oxygen per horsepower per hour! (Pumps, fountains and "air bubblers" are typically less than 2 lbs per horsepower per hour.)
- Bubbles expand and spread out as they rise. The column of water entrained within the bubbles from a synergistic diffuser rises at about a foot per second, moving 2,000 gpm from the area above the diffuser (a drilled pipe diffuser with the same air volume would move only about 200 gpm).
- The surface boil—created by the kinetic energy of the rising water—rises approximately two inches above the surrounding water level. From there, the water rushes outward until its energy has dissipated, sometimes traveling more than 100 feet, depending upon temperature, surface tension and wind.
- The lake surface tension is ruptured in the boil area. Supersaturated gases, including carbon dioxide and hydrogen sulfide, escape from the bottom water, and oxygen is absorbed.
- There's no danger to swimmers, boaters or aquatic life—even a marking buoy is unnecessary. And, like hundreds of others, you'll enjoy watching the surface "spring" boils. There is no electricity in the water.
- It's best to install the system prior to stratification. If the volume of anaerobic bottom water is greater than ⅛ of the lake's total volume, contact Pentair AES for start-up instructions.
- Every lake is different. A Pentair AES aeration specialist will be happy to assist with equipment selection and system design. We'll need to know the lake's shape, size, depths, history, bottom type, water source, flow, etc. Call for a sizing form or you'll find one online at PentairAES.com.

HEAVYSET® WEIGHTED AIR TUBING ✓ DESIGNED HERE

Our HeavySet® tubing remains on the bottom when filled with air. The dark blue color makes it easy to hide. Installation is fast, clean and neat. For long distances and large bodies of water use ¾" or 1". Use ¼" or ⅜" for smaller volumes of air, shorter distances or where line loss is not important. Compatible with ½" "nominal" insert fittings and "shoreside" tubing. Requires clamps (or solvent weld the couplings). Call for large quantity discounts. Ships exposed. Made in USA.

MODEL		I.D.	SHIP WT (LBS)	EACH	
WD1	PER FOOT	⅝"	1	**$1.61/FT**	—
WD1R	50' COIL	⅝"	27	**75.26**	**69.99/4+**
WD1R-100	100' COIL	⅝"	54	**150.53**	**140.00/4+**
WD2	PER FOOT	⅜"	1	**1.07/FT**	—
WD2R	50' COIL	⅜"	10	**45.69**	**42.50/4+**
WD2R-100	100' COIL	⅜"	20	**91.39**	**86.02/4+**
WD3	PER FOOT	¼"	1	**.80/FT**	—
WD3R	50' COIL	¼"	6.5	**37.63**	**35.00/4+**
WD4	PER FOOT	¾"	1	**2.98/FT**	—
WD4R	50' COIL	¾"	39	**119.60**	**111.23/4+**
WD5	PER FOOT	1"	2	**3.71/FT**	—
WD5R	50' COIL	1"	59	**145.88**	**135.67/4+**
101A	COUPLING, ⅝" FOR WD1, P200-AQ			**.88**	**.79/10+**
101B	COUPLING, ¾" FOR WD4			**1.06**	**.95/10+**
ZBBS3838	BRASS COUPLING, ⅜" FOR WD2			**1.25**	—
SSA	½" SS CLAMPS FOR WD2, P250-AQ			**1.25**	**1.16/10+**
SSB	¾" SS CLAMPS FOR WD1, P250-AQ			**1.30**	**1.22/10+**
SSC	1" SS CLAMPS FOR WD4			**1.40**	**1.34/10+**
SSE	1½" SS CLAMPS FOR WD5			**1.45**	**1.37/10+**
T120R	TIE WRAPS, 50/PKG, 15" LONG			**12.24**	—
KT100	TUBING CUTTER			**16.67**	—
N516	5/16" NUT DRIVER FOR CLAMPS			**14.30**	—



HEAVY-DUTY POLYETHYLENE TUBING

This heavy-duty, high-density polyethylene tubing is kink-resistant and durable. Each coil of this unique tubing has sealed ends and is factory pressurized at 10 psi. Contains 2% carbon black for UV protection. Uses insert fittings with hose clamps. Note: Actual I.D. differs from nominal size. **P300-AQ** ships by motor freight. 20-year warranty. Made in USA.

MODEL	SHIPS GROUND	NOMINAL I.D.	ACTUAL I.D.	WALL	COIL LENGTH	MAX PSI @73.4°F	WEIGHT PER 100'	EACH	4+
P200S	YES	⅝"	.625"	.060"	100'	100	6 LBS	**$37.80**	**$34.02**
P200-AQ	YES	⅝"	.625"	.060"	400'	100	6 LBS	**132.11**	**118.90**
P250-AQ	YES	¾"	.824"	.060"	400'	100	7 LBS	**130.34**	**117.30**
P300-AQ	NO	1"	1.049"	.070"	300'	100	11 LBS	**148.44**	**133.60**

20-YEAR WARRANTY

HEAVYSET® ⅜" TUBING AIR FRICTION LOSS

CFM	DISTANCE	INCHES H_2O	PSI
1	100'	18	.63
1.5	100'	35	1.26
2	100'	57	2.06
3	100'	115	4.15
4	100'	190	6.85
5	100'	280	10.12

HEAVYSET® ⅝" TUBING AIR FRICTION LOSS

CFM	DISTANCE	INCHES H_2O	PSI
2	100'	4	.29
3	100'	8	.47
4	100'	13	.63
5	100'	19	.70
6	100'	27	.96
8	100'	44	1.58

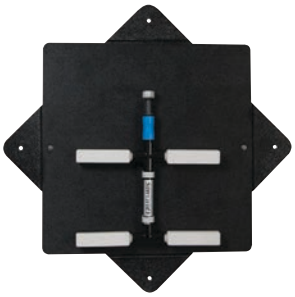
PENTAIR

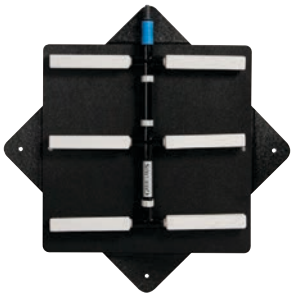
GREAT LAKES® AERATION SYNERGISTIC AIRLIFT DIFFUSERS ✓ DESIGNED HERE

All are self-weighted and include a plastic underlay that prevents sediment erosion

MODEL		SHIP WT (LBS)	EACH	
ALP4	SMALL POND DIFFUSER MANIFOLD, 1.2 CFM, 3/8" BARB	3	**$57.73**	—
ALR8MB	3" REPLACEMENT DIFFUSER	1	**7.74**	**7.28/10+**
ALP4MU	REPL. UNDERLAY	1	**3.50**	—
ALA4GLB	4-DIFFUSER MANIFOLD, 1.5–2.4 CFM, 5/8" BARB	12*	**149.86**	—
ALR15MB	6" REPL. DIFFUSER	1	**13.32**	**12.52/10+**
ALA6GLB	6-DIFFUSER MANIFOLD, 3–7 CFM, 5/8" BARB	16*	**198.36**	—
S1B	REPL. UNDERLAY	3	**26.18**	—
S2	BASE FOR MANIFOLD UNDERLAY	6	**53.55**	—
ALA8GL	8-DIFFUSER MANIFOLD, 6–10 CFM, 5/8" BARB	16*	**252.28**	—
ALR23MB	9" REPL. DIFFUSER	2	**19.00**	**17.86/10+**
AD11GL	DE-ICING DIFFUSER, 2 CFM, 5/8" BARB	9	**159.36**	—
CV1	CHECK VALVE, 3/4" FNPT	1	**10.09**	**9.08/6+**

*Ships in 2 boxes.
Note: See the third party diffuser comparison study on page 93.


ALA4GLB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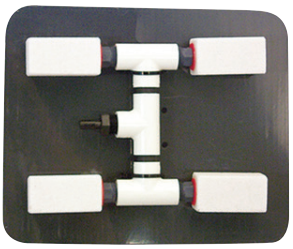

ALP4


AD11GL

DIFFUSER COMPARISON

DIFFUSER	TYPE	RECOMMENDED CFM	INLET FITTING	SHIP WT (LBS)	REPLACEMENT DIFFUSER	APPLICATION
ALP4	4 x 3" Medium-Pore	1.2	3/8" barb	3	**ALR8M**	Koi Pond
ALA4GLB	4 x 6" Medium-Pore	1.5–2.4	5/8" barb	10	**ALR15M**	Lakes <11' Deep
ALA6GLB	6 x 9" Medium-Pore	3.0–7.0	5/8" barb	13	**ALR23M**	Lakes >11' Deep
ALA8GL	8 x 9" Medium-Pore	6.0–10.0	5/8" barb	16	**ALR23M**	Very Large, Deep Lakes
AFM4GL	4 x 6" EPDM Membrane	1.5–2.4	5/8" barb	10	**DYMD6**	Organically Rich Water*
AFM6GL	6 x 10" EPDM Membrane	3.0–7.0	5/8" barb	13	**DYMD10**	Organically Rich Water*
AD11GL	Rubber Membrane	2.0	5/8" barb	9	**AD11**	De-Icing
WBT2-105	Perforated Weighted Tubing 10' Section	.15-.6	5/8" barb	5	**WBT2**	De-Icing/Bubblewall
WBT2-205	Perforated Weighted Tubing 20' Section	15-.6	5/8" barb	10	**WBT2**	De-Icing/Bubblewall

*EPDM rubber membrane diffusers are designed for lakes with high levels of organics and/or salinity as well as wastewater lagoons.
Use item number 62021 for 3/4" NPT x 3/8" barbed male adapter if using 3/8" I.D. tubing.

GREAT LAKES® AERATION DE-ICING SYSTEM

DESIGNED HERE

This Pentair Aquatic Eco-Systems aerator will do a fine job keeping water open. The heart of the aerator is the reliable Sweetwater® compressor, which uses only 253 watts at 115V. The compressor is mounted in a cabinet with an exhaust fan to provide cool compressor operation. Air is delivered from the shore-mounted compressor to the air diffuser assembly. This is done via 100' of HeavySet® self-weighted tubing (included) to ensure that the tubing and the diffuser assembly stay securely on the bottom (HeavySet® tubing does not contain lead or other metals).

The special de-icing diffuser assembly (**AD11GL**) is a 10" diameter flexible membrane that moves less water than our standard diffuser and is ideal for de-icing applications. The diffuser is mounted on a weighted plastic support. To prevent any possible bottom erosion and to give the assembly a stable platform, a 24" x 24" polyethylene underlay is included. Weighs 78 lbs. One-year warranty on all parts, five-year warranty on diffuser.

MODEL	EACH
LPAC3-2	**$959.00**

Note: If used for summer aeration/destratification, switch to our standard diffuser assembly (not included).

PENTAIR

DIFFUSER ASSEMBLY

100 FOOT WEIGHTED TUBING

Suitable for ponds from ¼ to 5 acres. Call for placement suggestions.

FLOATING POND DE-ICER

Perfect for small fish ponds

This 1,250-watt floating heater is designed to prevent your pond surface from freezing over during the winter months. The heater turns on/off automatically during times of freezing temperatures (approximately 40°F water temperature), and it can be safely positioned around plants or other objects in the pond. 115V/60 Hz, 10' power cord, UL-listed. Ship weight 4 lbs. Three-year warranty.

MODEL	EACH
P418	**$42.49**

TECH TALK 56

De-Icing Lakes

Most of us are aware that aeration systems are primarily required in summer, when the oxygen consumption rate is highest and stratification is most severe. In some lakes and ponds, winter fishkills are also quite common.

When ice covers a lake, oxygen transfer from the atmosphere is eliminated. If there is a significant accumulation of snow on top of the ice, the photosynthetic oxygen production can also be virtually eliminated. If the ice and snow cover persists long enough and the oxygen consumption rate underneath the ice is great enough, there will be a fishkill. Clean lakes—those with a low trophic state index—may not require winter aeration.

During the summer, thermal stratification occurs when warmer water floats above cooler, heavier water. Near freezing, the situation is reversed. As water approaches the freezing point, it expands and floats on top of warmer water.

The oxygen consumption that takes place in a lake is the result of biological and chemical reactions. Since the rate of these reactions is related to temperature, the winter aeration system needs to be only about 20% of the size of a summer aeration system.

If it is acceptable to have an open hole in the ice, the simplest way to prevent a winter fishkill is to keep a small area ice free, either by using air or an electric de-icer. The electric de-icer may work best at the shoreline, perhaps mounted on a dock, while air-powered systems seem to be preferred where longer distances are involved.

When the air compressor is mounted on the shore, the air line is buried below the frost line into the lake and directed to the area that is to remain ice-free. Caution must be taken due to the hazards of open water in the winter, where people or animals may be on the ice. Also, be careful not to open too large a hole in the ice, which can result in the loss of too much of the lake's heat.

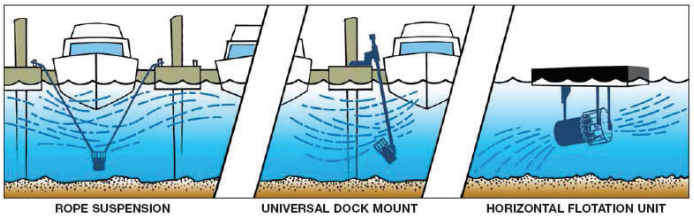
Experience is necessary when designing de-icing systems, so we recommend contacting the Pentair AES Lakes Department for assistance.

De-Icer


C20 timer.


Dock mount kit (KD) With D100.


Horizontal float (HF) with D100



DE-ICERS FW SW

Kasco® De-Icers are designed to be suspended from a dock or boat, or attached to an optional horizontal float or universal dock mount (sold separately). Mounted either vertically or horizontally, the de-icer circulates water to the surface, causing turbulence that reduces or eliminates ice formation. The motor assembly is sealed in an oil bath for long life and has ball bearings for smooth operation. The guard and motor case are made of stainless steel. Each unit includes a motor, propeller, two 20' suspension ropes, guard assembly, zinc anode and low-temperature-rated power cable. ETL-approved to UL standards. Two-year warranty.

Thermostat Control is an economical way to control the operation of your De-Icer. It uses air temperature only to turn it on when the temperature drops below as set point that you decide. One C10 Control will control one 120V De-Icer.

Time & Temperature Control is designed for maximum energy conservation. Controls how long the De-Icer will operate when temperatures demand. By utilizing both time and temperature features, you can save power by only having the De-Icer running while it is cold enough and in set time intervals. One C20 Control will control one 120V De-Icer.

Universal Dock Mount allows the de-icer to be mounted in a vertical position or several other angles. The de-icer can be adjusted to a maximum depth of 10' from the above water mounting brackets and can be moved 360°. Ideal for marina applications, gas piers, wharfs, water towers, water storage areas, or areas where rope suspension is not an option, such as pilings or where boat traffic may interfere with the ropes.

Industrial Dock Mount has all the same operating features of the Universal Dock Mount but is constructed of heavier, stronger components including stainless steel. It also allows for the option of longer than a 10' pipe for deeper applications.

Horizontal Float Kit produces an elongated pattern of agitated water. Well suited for shallow water or where water/ice levels may fluctuate, like tidal waters, or where elongated open water areas are desired such as around long docks. The De-Icer unit is mounted horizontally to the surface of the water, just below the flotation block. The De-Icer can be angled in several positions; horizontal and above and below horizontal.

DE-ICERS

HP	VOLTS 60HZ	AMPS	THRUST (LBS)	TYPICAL OPEN AREA* (DIA. CIRCLE)	WITH 25' CORD MODEL	SHIP WT	EACH	WITH 50' CORD MODEL	SHIP WT	EACH	WITH 100' CORD MODEL	SHIP WT	EACH
1/2	120	5.0	26	UP TO 50'	**D100**	28	**$495.00**	**D100-50**	29	**$517.13**	**D100-100**	35	**$630.38**
3/4	120	6.7	34	UP TO 75'	**D101**	32	**561.75**	**D101-50**	34	**581.63**	**D101-100**	37	**693.38**
3/4	240	3.4	34	UP TO 75'	—	—	—	**D102-50**	34	**601.50**	**D102-100**	37	**693.00**
1	120	11.2	52	UP TO 90'	**D103** NEW	35	**637.88**	**D103-50** NEW	37	**667.50**	**D103-100** NEW	40	**886.50**
1	240	5.7	52	UP TO 90'	—	—	—	**D104-50**	37	**667.13**	**D104-100**	40	**801.00**

* Small bodies of water, the Great Lakes, and extreme northern climates may see less open water areas.

ACCESSORIES

MODEL		SHIP WT (LBS)	EACH
C10 NEW	THERMOSTAT CONTROLLER	2	**$118.00**
C20	TIME & TEMPERATURE CONTROLLER	3	**195.00**
KD	UNIVERSAL DOCK MOUNT	11	**230.00**
KDI NEW	INDUSTRIAL DOCK MOUNT	15	**344.00**
HF	HORIZONTAL FLOATATION KIT	19	**238.50**

REPLACEMENT PARTS

MODEL		SHIP WT (LBS)	EACH
T10	30 AMP TWIST LOCK ELECTRIC PLUG	1	**$37.00**
RP50 NEW	REPLACEMENT PROPELLER FOR 1/2HP DE-ICERS	1	**29.00**
RP75 NEW	REPLACEMENT PROPELLER FOR 3/4HP DE-ICERS	1	**29.00**
RP100 NEW	REPLACEMENT PROPELLER FOR 1HP DE-ICERS	1	**79.00**

A vibrant centerpiece for your community.

DESERT RAIN® FLOATING FOUNTAINS

We like to do things differently, and it shows in our fountains as well as our name. We offer fountain designs you won't find anywhere else, and our level of service is unmatched. Desert Rain is your oasis for affordable, easy to maintain fountains that are sure to provide a vibrant centerpiece for your community.

Whether you'd like to create a majestic new focal point for your lake or enhance its existing natural beauty, a floating fountain is the perfect solution. Desert Rain fountains are built to last in the USA using the finest materials and workmanship available. We use durable components, including stainless steel motors and pumps, rotocast polyethylene float assemblies and solid brass nozzles. Cast bronze submersible light fixtures are also available. Your investment will be rewarded with years of service from a reliable, beautiful fountain display.

PENTAIR

Enhance existing natural beauty.

2-YEAR WARRANTY

Customize your ideal Desert Rain fountain in four easy steps. Just select your system type, nozzle, lighting assembly and cable length, and we'll build your fountain for you.

DESERT RAIN® FLOATING FOUNTAINS

Available in Three Different Operating Systems

1. CLASSIC FOUNTAINS

The Classic floating fountain is a stainless steel submersible pump mounted on the float frame. This system offers simple installation and the most display options.

Classic fountains include a prewired control panel, mooring rope, float system, display nozzle, submersible pump, stainless steel frame and 100' of PVC double-jacketed power cable.

Optional light kits are matched to fountain size. Light kits include stainless steel brackets, submersible cast bronze fixtures with clear lenses and 250- or 500-watt quartz lamps, timer and GFCI. Photo cell controls are prewired into control panel if lights are ordered with the fountain.

Several nozzle options are available, and additional power cords for pumps and lights are also available in even 50' increments starting at 100 feet. Add nozzle suffix and power cord length to part number (e.g., **TFF1SC-100**). Nozzles are on page 107. Please allow 2–6 weeks for delivery. All fountains ship motor freight, FOB Orlando.

MODEL	HP	AMPS@230V	BASE PRICE*
TFF1	1	7	**$5,274.22**
TFF2	2	10.5	**5,891.67**
TFF3	3	16.3	**6,419.00**
TFF5	5		**6,824.32**
TLK2250	500-WATT LIGHT KIT FOR 1 HP		**1,227.33**
TLK2500	1,000-WATT LIGHT KIT FOR 2 & 3 HP		**1,656.57**
TLK4500	2,000-WATT LIGHT KIT FOR 3 & 5 HP		**2,380.00**

*Base price includes 100-ft power cord.

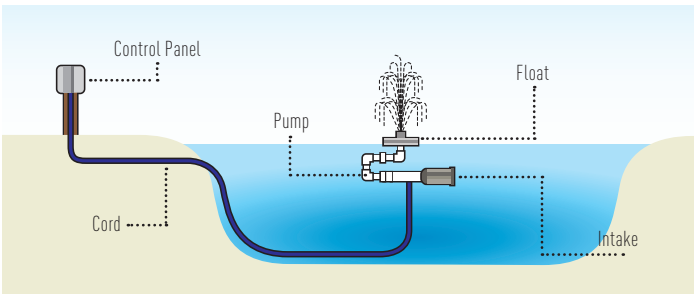


Diagram of Classic fountain system.

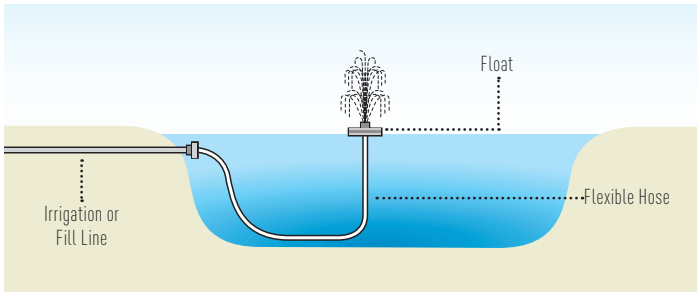


Diagram of StreamLine fountain system.

2. STREAMLINE FOUNTAINS

The StreamLine fountain is used on irrigation or fill lines and is a cost effective way to add an aesthetic improvement to your lake. There is no need for a control panel or electrical cable. Simply connect the supplied 2" hose to your existing pump's discharge. Install and anchor the float and nozzle assembly in your pond and enjoy the beauty of your new fountain.

StreamLine fountains include a dual compartment float, stainless steel hardware and nozzle holder, display nozzle, mooring rope and 100' of 2" fire hose. Add nozzle suffix to part number (e.g., **DLF1SC**).

These systems usually ship in 5 to 10 business days. All fountains ship motor freight, FOB Orlando.

MODEL	REQUIRED FLOW	BASE PRICE
DLF1	30–130 GPM @ 5–10 PSI	**$1,217.13**

LIGHTING KITS

Lighting assemblies are sold individually and in pairs. Composed of versatile, low-profile and energy-efficient underwater fixtures. A parabolic reflector provides a controlled beam projection.

CALL FOR PRICING AND MORE INFORMATION

PENTAIR

Operate up to three fountains with one pump.

DESERT RAIN® FLOATING FOUNTAINS

Available in Three Different Operating Systems

3. DESERT ONSHORE FOUNTAINS

The Onshore fountain system is a good choice for fishing lakes, brackish water or any body of water in need of both circulation and aeration. The pump is mounted on dry land close to the shoreline, allowing for easy installation and maintenance. The intake for the pump can be placed anywhere in the pond but is usually located at the deepest point. Water drawn from the bottom of the pond is then aerated as it is discharged through the fountain. No electricity is in the water unless the optional light kit is installed.

Onshore systems include a prewired control panel, dual compartment float, pump, brass display nozzle, mooring rope, stainless steel intake frame, 100' of fire hose for discharge, and 25' of suction hose for intake.

Optional light kits are matched to fountain size. Light kits include stainless steel adjustable brackets, two or four submersible cast bronze fixtures with clear lenses and 250-watt or 500-watt quartz lamps, timer and GFCI. Photo cell controls are prewired into control panel if lights are ordered with the fountain.

Please specify your nozzle choice and desired cable/hose length when ordering. Add nozzle suffix to part number for fountains (e.g., **OSF1T**). Nozzles are on page 108. Lighting power cords are available in even 50' increments starting at 100 feet. Add the power cord length to the end of the part number (e.g., **LK2250-150**). Additional power cable for lights and additional suction and discharge hose also available.

Allow 10–14 days for delivery. All fountains ship motor freight, FOB Orlando.

MODEL	HP	AMPS @230V	BASE PRICE
OSF1	1.5	7	**$3,847.83**
OSF2	2	10.5	**4,039.87**
OSF3	3	16.3	**4,757.98**
OSF5	5		**6,890.00**
LK2250	500-WATT LIGHT KIT FOR 1 HP		**1,170.00**
LK2500	1,000-WATT LIGHT KIT 2 & 3 HP		**1,470.00**
LK4500	2,000-WATT LIGHT KIT FOR 3 & 5 HP		**2,690.00**

SELECT NOZZLES ON PAGE 107

DUO AND TRIO

Custom fountains

Duo and Trio fountain packages offer the flexibility to run multiple fountains off one pump. Duos incorporate two nozzle heads, while the Trio package can power up to three nozzles. You can use any combination of nozzles. Since these multinozzle packages use our Onshore fountain technology, all pump maintenance can be performed on dry land. Unless a light kit is incorporated, no electrical parts are installed in the pond. Due to the potential improvement in water quality and additional atmosphere that fountains provide, Duo and Trio fountains can even add value to your property.

MODEL	HP	V	NOZZLE	DISPLAY CONFIG.	SPRAY H	SPRAY W
OSF5TT-TWIN	5	230	BLAZING STAR	DUO	21'	16'
OSF5C-TWIN	5	230	CIRRUS	DUO	9'	5'
OSF5SC-TWIN	5	230	ALTO	DUO	15'	3'
OSF5TT-TRIP	5	230	BLAZING STAR	TRIO	15'	12'
OSF5C-TRIP	5	230	CIRRUS	TRIO	7'	4'

All Duo and Trio fountains are fully adjustable since each nozzle runs on its own discharge line. A valve connects to each individual discharge line at the pump and can increase or decrease flow to each nozzle.

CALL FOR PRICING AND MORE INFORMATION

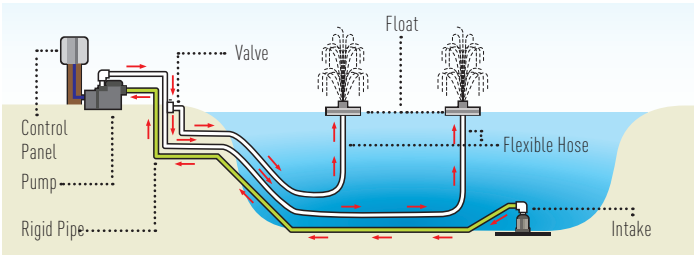


Diagram of Duo Onshore fountain system.

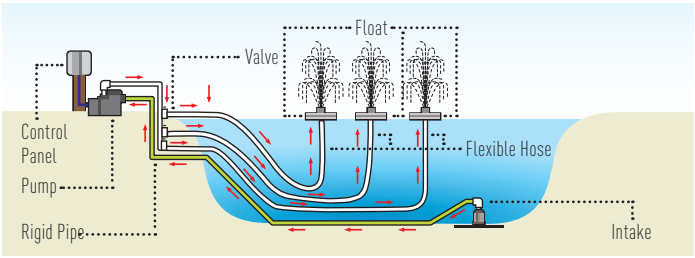


Diagram of Trio Onshore fountain system.

DESERT RAIN® FOUNTAIN NOZZLES

PENTAIR

STAR-VINE PATTERN

Customize your own majestic fountain spray with our tallest, most awe-inspiring option! What better way to improve the look of your large lake? The Star-Vine gives you two individual nozzles for fully adjustable spray heights and widths.

MODEL	
SRJ	STAR-VINE NOZZLE

HP	HEIGHT (FT)	DIAMETER (FT)	MINIMUM DEPTH (IN)
5	30	50	36

SUN SHOWER PATTERN

As tranquil as the light rain it's named for. Detailed and sophisticated, it will add a touch of class to any setting. Reaches heights of up to 26 feet before falling in a wide mist.

MODEL	
A	SUN SHOWER NOZZLE

HP	HEIGHT (FT)	DIAMETER (FT)	MINIMUM DEPTH (IN)
1	18	24	29
2	22	28	29
3	26	32	29
5	34	40	29

CIRRUS PATTERN

A low-flying cousin of the Alto. Its gushing flow has the aural effect of a waterfall. A soothing, noise-canceling centerpiece for public parks and other areas where relaxation is a primary pastime.

MODEL	
C	CIRRUS NOZZLE

HP	HEIGHT (FT)	DIAMETER (FT)	MINIMUM DEPTH (IN)
1	8	4	29
2	10	6	29
3	15	6	29
5	25	12	29

ALTO PATTERN

Rockets into the sky with a burst of intense beauty, creating a dramatic landmark in your lake. Its towering height is perfect for municipal lakes, golf courses and residential communities.

MODEL	
SC	ALTO NOZZLE

HP	HEIGHT (FT)	DIAMETER (FT)	MINIMUM DEPTH (IN)
1	18	4	29
2	25	4	29
3	35	4	29
5	55	4	29

BLAZING STAR PATTERN

Flickers and dances in a multilayered display. Our most popular nozzle and a welcome embellishment to any body of water. Its center spray reaches up to three stories high.

MODEL	
TT	BLAZING STAR NOZZLE

HP	HEIGHT (FT)	DIAMETER (FT)	MINIMUM DEPTH (IN)
1	10	12	29
2	20	15	29
3	30	20	29
5	50	30	29

ZEPHYR PATTERN

The quintessential fountain pattern. A sensible, stylish option for covering an expansive area without attracting too much attention. Subtle yet effective.

MODEL	
T	ZEPHYR NOZZLE

HP	HEIGHT (FT)	DIAMETER (FT)	MINIMUM DEPTH (IN)
1	3	10	29
2	6	15	29
3	26	20	29
5	14	30	29

FLOATING FOUNTAINS FW SW

These Kasco® fountains are built for larger ponds and more decorative applications. Look under the pictures to see what nozzles are included with different models (except Cypress, which is ¾-hp only). Each fountain includes float with screens, power control center with GFCI and 50' mooring ropes. Three-year warranty for 2 hp and up, 2-year warranty otherwise. ETL-approved to UL and CSA standards. Made in USA.

MODEL	HP	VOLTAGE	RUNNING AMPS	CORD LENGTH*	EACH
KFJ751-100	¾ HP	115	6.5	100'	**$1,414.35**
KFJ751-200	¾ HP	115	6.5	200'	**1,919.25**
KFJ752-100	¾ HP	230	2.9	100'	**2,326.50**
KFJ752-200	¾ HP	230	2.9	200'	**2,782.35**
KF202-100	2 HP	230	10	100'	**4,026.15**
KF202-200	2 HP	230	10	200'	**4,203.90**
KF303-100	3 HP	230	13.4	100'	**4,567.05**
KF303-200	3 HP	230	13.4	200'	**5,023.35**
KF505-100	5 HP	230	20	100'	**5,079.15**
KF505-200	5 HP	230	20	200'	**5,663.70**

*Other power cord lengths available; call for more information.

Redwood
2 hp (22' H x 7' W)
3 hp (24' H x 8' W)
5 hp (26' H x 8' W)

Sequoia
3/4 hp (7' H x 4' W)
5 hp (21' H x 10' W)

Willow
3/4 hp (4.5' H x 15' W)
2 hp (12.5' H x 28' W)
3 hp (13' H x 35' W)
5 hp (14' H x 36' W)

Juniper
3/4 hp (3' H x 20' W)
2 hp (8' H x 46' W)
3 hp (9' H x 48' W)
5 hp (10' H x 50' W)

Birch
2 hp (12' H x 11' W)
3 hp (14.5' H x 10' W)
5 hp (14' H x 12' W)

Spruce
2 hp (19' H x 10' W)
3 hp (21' H x 13' W)
5 hp (24' H x 15' W)

Cypress
3/4 hp (6' H x 16' W)

Linden
3/4 hp (6' H x 18' W)
2 hp (18' H x 30' W)
3 hp (19' H x 35' W)
5 hp (20' H x 35' W)

KASCO® XSTREAM FOUNTAIN

The Kasco® xStream™ Fountain, Model 2400SF, provides over 30 beautiful and unique laminar displays, including a V-shape pattern, all with a single nozzle! With a maximum height of 8.5', this fountain is perfect for virtually any small decorative pond. The innovative design allows for quick and easy customization of the display simply by plugging holes in the nozzle with the included plugs, allowing you to design your own display. The elegant displays are beautiful day or night (LED lights are optional). ETL-listed to UL and CSA safety standards. 1-year warranty.

- Includes multiple-pattern nozzle, dual debris screening, GFCI-protected control box, 115V control with timer, photo eye for lights, and three 50' braided nylon mooring ropes.
- Easy to install - electrician not required for installation if an existing 115V, 15-amp receptacle is available.

MODEL	HP	VOLTAGE	RUNNING AMPS*	CORD LENGTH	EACH
2400SF-50	½	115	6.6 - 7.3	50'	**$1,282.05**
2400SF-100	½	115	6.6 - 7.3	100'	**1,393.65**
2400SF-150	½	115	6.6 - 7.3	150'	**1,756.35**
2400SF-200	½	115	6.6 - 7.3	200'	**1,896.75**
LED3125-100	OPTIONAL 3-LIGHT LED KIT W/100' CORD				**693.00**

* Depending on pattern

ECONOMICAL FLOATING FOUNTAINS

Floating fountains offering very good quality at a low price and delivering an effective mix of aeration and display. These models have a V-shaped display. Include float with screening, power control center with GFCI protection and two 50' mooring ropes. Contact us for other power cord lengths. Three-year warranty for 2 hp and up, 2-year warranty otherwise.

MODEL	HP	VOLTAGE	RUNNING AMPS	CORD LENGTH*	DISPLAY DIMENSIONS	EACH
KFX501-50	½ HP	115	5.6	50'	5.5' H X 15' W	**$1,084.95**
KFX501-100	½ HP	115	5.6	100'	5' H X 15' W	**1,191.15**
KFX751-50	¾ HP	115	7.3	50'	6' H X 21' W	**1,174.05**
KFX751-100	¾ HP	115	7.3	100'	6' H X 21' W	**1,284.75**
KFX752-50	¾ HP	230	3.7	50'	6' H X 21' W	**2,062.35**
KFX752-100	¾ HP	230	3.7	100'	6' H X 21' W	**2,133.00**
4400VX-100	1 HP	115	11.3	100'	8' H X 26' W	**1,886.40**
4400VXH-100	1 HP	230	5.7	100'	8' H X 26' W	**2,450.70**
8400VX-100	2 HP	230	11	100'	8' H X 32' W	**3,931.20**
5100VX-100	5 HP	230	20	100'	9' H X 34' W	**4,956.30**

***Other cord lengths available.

Kasco

2-YEAR WARRANTY
(1/2-1 HP MODELS)

3-YEAR WARRANTY
(2 & 5 HP MODELS)

SACRIFICIAL ANODE, ZINC

These zinc anodes are cheap insurance that will reduce or eliminate corrosion of underwater equipment. Simply attach this ¾-lb zinc anode to a submerged metal part of the equipment and electrolysis will corrode the zinc first. Each unit has two wires molded in to make attachment easy. Anodes should be changed when they have reduced to ¼ their original size. 1" x 5". Useful in both fresh and salt water and wet earth.

MODEL	EACH	6+
ZA34	**$7.45**	**$6.71**

FLOATING FOUNTAINS

The Evolution series fountain is shipped fully assembled and includes a ½ HP, 120V single phase floating fountain with suction screen, motor cord, float, controller, 24 hour mechanical timer, photo sensor for optional lighting, Tornado spray pattern, 100' mooring rope and two mooring stakes. Optional stainless steel LED light sets are .01 amp and includes four cool white bulbs. CSA-listed controller is housed in a weatherproof enclosure, 15 amp Class A Human Rated GFCI, 24 hour mechanical timer, photo sensor for optional lighting. 15-amp circuit breaker is required for proper fountain operation. 2-year warranty. Made in USA.

- Simple plug-in and go operation
- Low operating costs
- One person installation
- Operates in 20" of water
- Aerates up to ½ acre ponds
- Stainless steel motor is maintenance free

2-YEAR WARRANTY

½ HP, 120V FOUNTAINS

MODEL		EACH
EV650	FOUNTAIN W/50' CORD	**$1,310.00**
EV6100	FOUNTAIN W/100' CORD	**1,415.00**
EV6175	FOUNTAIN W/175' CORD	**1,675.00**

OPTIONAL 3W LIGHTING SETS (COOL WHIITE BULBS STANDARD)

EV6LED50	4 LIGHT 120V SET W/50' CORD	**787.00**
EV6LED100	4 LIGHT 120V SET W/100' CORD	**839.00**
EV6LED175	4 LIGHT 120V SET W/175' CORD	**999.00**

OPTIONAL SPRAY NOZZLES

EV6ARU	ARUM SPR AY PATTERN	**104.00**
EV6CL A	CLUSTER ARCH SPR AY PATTERN	**104.00**
EV6FLE	FLEUR DE LIS SPR AY PATTERN	**104.00**
EV6SAR	SPIDER & ARCH SPR AY PATTERN	**104.00**
EV6TIA	TIARA SPRAY PATTERN	**104.00**

REPLACEMENT BULBS

EV6RED	RED	**30.00**
EV6BLU	BLUE	**30.00**
EV6GRE	GREEN	**30.00**
EV6YEL	YELLOW	**30.00**

I must tell you, I deal with a lot of suppliers of pond and koi equipment, and you are by far the most prompt in shipping and customer service.

Stephen Scott
Hampstead, KY

Arum
Height: 6'
Width: 21'

Cluster Arch
Height: 6'
Width: 16'

Fleur de Lis
Height: 7'
Width: 18'

Spider & Arch
Height: 5.5'
Width: 18'

Tiara
Height: 7'
Width: 15'

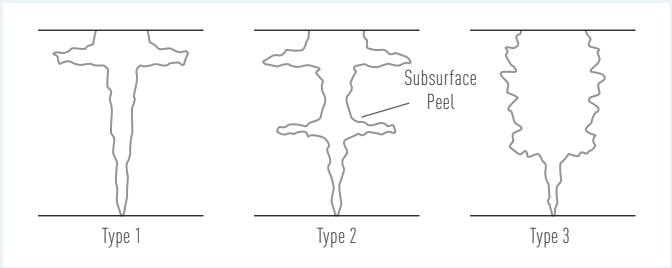
TECH TALK 122

Water Flow and Turnover Rates in Bubble Plume Aeration Systems

Bubble plumes, unconfined airlifts or non-ducted aeration systems have been studied for many years in a variety of applications. These systems have been used for lake and reservoir destratification, gas transfer and reaeration, bubble curtains for prevention of ice formation, containment of water quality contaminants (phytoplankton and suspended solids) and ocean sequestration of carbon dioxide.

Common to all of these applications is the difficulty in predicting water flowrates and lake or pond turnover rates. This is because of the complex interaction of limnological and climatological conditions. Weakly stratified conditions will affect water flow differently than strongly stratified conditions. The temperature, solar radiation and wind speed also affect the water flow patterns in bubble plumes.

The flowrate of unconfined systems can be quantified, either by measuring the time required to destratify a large lake-like impoundment or by taking direct measurements of their flowrate. Researchers have shown that water flowrates in bubble plumes will vary depending on gas flowrate, lake stratification and weather conditions. There are several types of flow patterns generated, which can be described as Types 1, 2 and 3. The figure below shows the three flow patterns.



In unconfined bubble columns, air is forced through diffusers at the lake bottom. As the bubbles rise to the water surface, water is entrained (carried with the bubbles) in a mixture of bubbles and water. This rising bubble plume carries deeper water that is colder and heavier than the water above. The plume will rise until the negatively buoyant water is no longer entrained. At this level, water within the bubble plume is detrained (ejected) or peels off. The bubbles continue to rise and entrain more water. The detrained water will sink to a level of neutral density and then spread out horizontally away from the bubble plume.

In the case of a stratified lake, the buoyant plume will rise to different levels before water is detrained and moves out horizontally. This will vary depending on the degree of stratification as shown in the figure.

Because of these complications, it is difficult to describe water flowrates from bubble plumes without complex limnological and climatological input data. Several researchers have used sophisticated water quality models to describe bubble plume behavior in different applications.

Some manufacturers have placed their diffusers in a draft tube to determine the water flowrate. However, using a confining tube will affect the velocity and flowrate (causing a "chimney effect"), making the diffuser appear to perform better than it does. Others have completed flowrate testing in tanks or containers where walls and boundaries affect the results. These methods of testing are so unlike the actual conditions of unconfined bubble plumes that the results should not be used to predict flowrates in an open water body and should not be used in making comparisons between diffuser systems.

At present, there is no way to accurately compare different unconfined bubble systems because there is no standardized method of testing to evaluate water flowrates. Turnover rates are especially difficult to calculate and, until a standard measurement is established, should never be used as a basis for system sizing. Without a standard method, there is no way of comparing water flow and turnover rates for competing systems. What is clear is using confined flow or flow in a ducted system is not an accurate method of describing flowrates in unconfined bubble plume systems.

TECH TALK 94

Lake Aeration Diffusers

The air diffusers used will determine the overall efficiency of a lake aeration/ destratification system. The two most common styles are the synergistic airlift assembly (developed by Pentair AES) and the rubber membrane diffuser. Each was designed for different tasks. The synergistic airlift assembly (SAM) is made to lift a large volume of bottom water, thus removing stratification. The rubber membrane type (RM) was designed to aerate waste water.

Destratification is the most economical form of lake aeration. This is only accomplished by moving large volumes of water. SAMs were developed through extensive underwater flow testing to lift the maximum amount of water from above the diffuser to the surface of the lake with a minimum amount of air (8,000 gpm/hp). This technique requires a specific spacing of the individual diffuser fingers to provide nonturbulent entrainment of the bottom water into the column of rising bubbles. For that reason, they must take on the odd shape of the **ALA4GLB**, **6GLB** and **8GL** diffuser manifolds. Each is optimized for a specific depth range.

The smaller **ALA4GLB** manifold is designed for shallow lakes from 4 to 8 feet in depth. These shallow depths cause short circuiting of the lifted water back to the diffuser, which limits their effectiveness. Therefore, more diffuser manifolds per surface acre of water are required than for a deeper lake of the same size.

The **ALA6GLB** diffuser manifolds are best used in water 8 to 40 feet deep. The deeper the water, however, the greater volume of air that needs to be used by each diffuser. This is true for all diffusers. The **ALA8GLB** diffuser manifold is typically used in water deeper than 30 feet.

RM diffusers are not designed to lift water for destratification, so they are not recommended for lake aeration. If used for lake aeration, many more of them must be used to achieve the same result as a single synergistic airlift assembly.

When the rubber membrane diffusers are used in salt water or waste water, they may operate for as long as one year without excessive clogging. After that, remote cleaning can be accomplished by doubling or tripling the amount of air delivered to a diffuser. This will blow up the rubber, as in a balloon, dislodging the fouling matter. Wastewater treatment plants are designed for this, but it may be impractical for lake applications where there is only one compressor.

Sometimes, RM diffusers will tear, greatly reducing their oxygen transfer ability. If detected, retrieve the diffuser and replace the rubber membrane.

The ceramic diffusers used on SAMs should be inspected every year. Clogging can be detected by recording the air pressure when new, then annually checking the pressure to see if it has increased. Diffusers can be cleaned by pouring muriatic acid into the air lines and turning on the compressor. The original pressure will be quickly restored and the small amount of acid will be diluted with no effect on the lake.

All diffusers need maintenance, even ones with rubber membranes.

SEA PEN AERATION SYSTEM (SPA) ✓ DESIGNED HERE NEW!

Sea Pen Aeration System Overview

The Pentair sea pen plankton mitigation system is a fully balanced air flow system to evenly distribute compressed air among all the pens at one site. The main reason for the aeration system on a sea pen site is to promote greater water upwelling and movement across all the net pens on one site. Moving low density algae/plankton water from below helps dilute the algae/plankton density in the water inhabited by the fish within the pens to a reduced level.

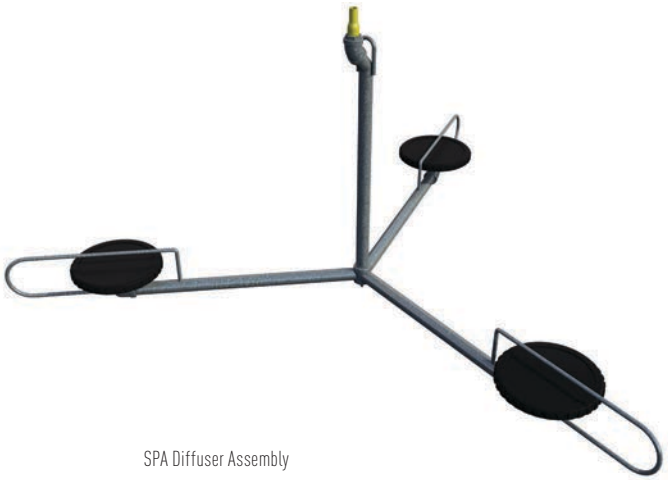
There are many different strains of algae/plankton that pose different threat levels to the wellbeing of the fish. As such, different air flows can be dialed into the flowmeters to control the delivery of air within each pen's diffuser assemblies. This air control allows the site operator to mitigate different harmful plankton species, for each pen, based on the plankton's unique motility.

How Does A Pentair Sea Pen Aeration System Work?

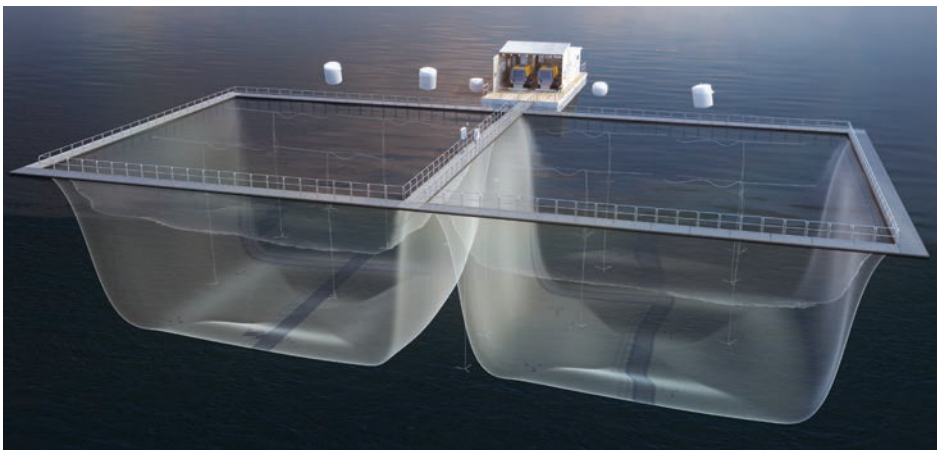
There will always be currents flowing through the sea pen, local currents caused by the fish's movements, thermal stratifications within the ocean, upward movement of seawater by ocean upwelling, or by the platform's aeration upwell action. Initially the main goal is to balance the flow of air at each site so that distribution is even throughout the sea pen. The even distribution of the air flow to each of these injection sites is accomplished using back pressure compensated flowmeters. Once balance has been achieved site specific air flow adjustments can be made, as each site's water hydraulics is unique. Changes in water quality parameters can be tracked using the Point Four RIU3 and LC3 line of monitoring and control equipment.

CALL FOR SYSTEM CONFIGURATION, INFORMATION, AND PRICING.
MORE INFORMATION ALSO AVAILABLE AT PENTAIRAES.COM/SEA-PEN

PENTAIR



SPA Diffuser Assembly



Square Pen Configuration

TYPICAL SQUARE PEN SYSTEM

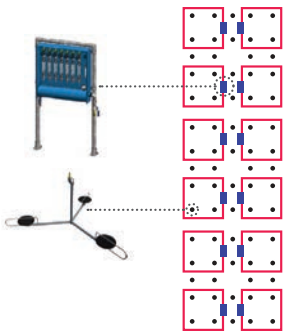
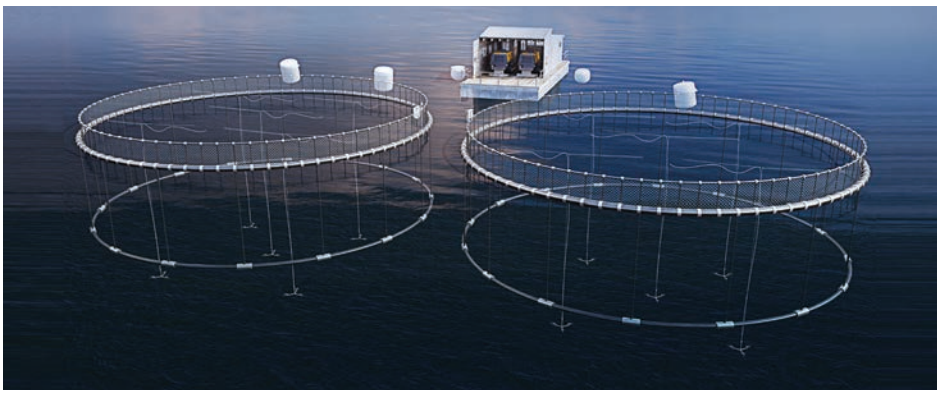


Illustration shows twelve pens, with four diffusers per pen, and one manifold per pen.
(NOTE: Additional diffusers are deployed under walkways.)



Round Pen Configuration

TYPICAL ROUND PEN SYSTEM

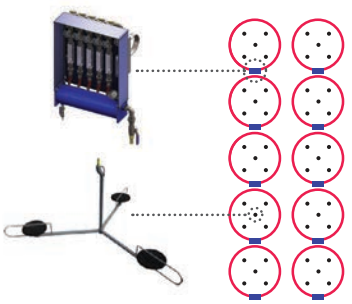


Illustration shows ten pens, with five diffusers per pen, and one manifold per pen

SYSTEM CONFIGURATION

Flowmeter Assembly Panel

Flowmeter assemblies come in 4 variations; 7 flowmeter, 6 flowmeter, 5 flowmeter and 4 flowmeter versions. An oversized manifold with pressure gauge and air control panel ship with sturdy mounting assemblies to bolt to the pen walkways, for a stand-alone unit. The 5 flowmeter variation is for circular pens, and bolts directly to the large pipe handrails of the circular pens. The flowmeter units are spread evenly among the net pens, usually one panel per pen. Each flowmeter panel fully controls air entering each site's sea pen.

System Performance

2 compressors are used to operate the system – producing 850 SCFM.

70.8 SCFM is then distributed evenly to each pen in a 12 pen system 4 SPA units per pen consisting of 12 – (9") discs in total.

Each disc is rated at 0–10 SCFM and operated at 4 SCFM.

Data has shown (at a depth of 30 ft (9 m) above the diffuser disc): 4 SPA units (12 discs) installed at 50 ft (15 m) in a square pen will move 1100 gallons of water per minute flowing upwards.

FLOWMETERS	
Accuracy	±3% F.S.
Press	100 PSGI/6.9 Bar MAX
SCFM	3–12

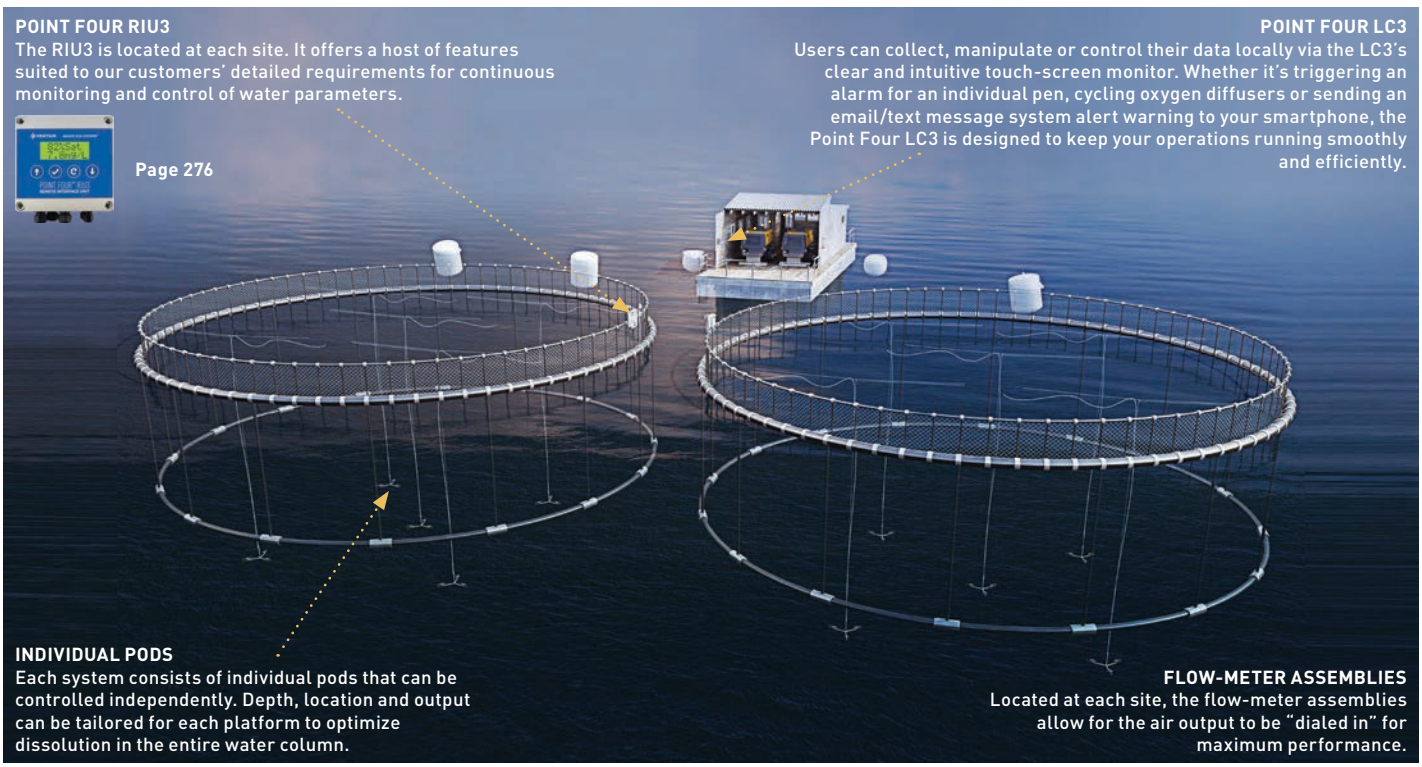
AERATION PLATFORM	
Material of Construction	Powder Coated Steel
Diameter	78" (2 m)
Diffuser Size	3x: 9" or 12" Rubber Membrane Disc Diffuser
Design Airflow—9"	0–10 scfm
Design Airflow—12"	0–18 scfm
Height (hanging)	48" (1.2 m)
Weight	41 lbs (18.6 kg)

- Reduce mortality caused by algae/plankton
- Dilute the algae/plankton density in the water inhabited by the fish within the pens
- Creates water movement and upwelling across the entire net pen site
- Results show that use of the Pentair SPA system has greatly improved plankton mitigation
- An airflow of 4 CFM per disc has shown to help remove harmful plankton inside pens
- Customers have reported > 50% improvement in removal of harmful plankton from the usage of the SPA units
- Consult with Pentair Engineering for site specific design & performance

POINT FOUR RIU3
The RIU3 is located at each site. It offers a host of features suited to our customers' detailed requirements for continuous monitoring and control of water parameters.

Page 276

POINT FOUR LC3
Users can collect, manipulate or control their data locally via the LC3's clear and intuitive touch-screen monitor. Whether it's triggering an alarm for an individual pen, cycling oxygen diffusers or sending an email/text message system alert warning to your smartphone, the Point Four LC3 is designed to keep your operations running smoothly and efficiently.



INDIVIDUAL PODS
Each system consists of individual pods that can be controlled independently. Depth, location and output can be tailored for each platform to optimize dissolution in the entire water column.

FLOW-METER ASSEMBLIES
Located at each site, the flow-meter assemblies allow for the air output to be "dialed in" for maximum performance.

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CONNECT WITH US

PENTAIR AT A GLANCE

EMPLOYEES

x300 = 30,000 Pentair employees

60% of employees are outside the US

Product availability on all **7 continents**

SALES ACROSS THE GLOBE

2014 SALES BY REGION

50% US & Canada

19% Western Europe

31% Fast growth and other developed countries

ROBUST GROWTH

63 The percentage sales grew from **2012 to 2014**

PRODUCTION

5 SECONDS
The number of seconds it takes to fill an Olympic size swimming pool with water by one of Pentair's custom-made flood protection pumps

250 MILLION
The number of liters of freshwater per day Pentair provides the residents of Sydney, Australia

350,000
The number of people in Colon, Honduras who receive clean water each day through Pentair's Project Safewater initiative

100+ Pentair manufacturing facilities

200,000+ Following Pentair AES on Social Media

INSPIRED SOLUTIONS. IMPROVING LIVES.

75% of our solutions relate to food, water and energy

PENTAIR AES 5 PILLARS

SOLE PARTNER

SINGLE-SOURCE PARTNER

A single-source provider of equipment, expertise and accountability for virtually all water-related applications

VALUE

A TEAM WITH DEEP, REAL-WORLD EXPERTISE

Former curators/operators bringing valuable expertise and experience

INNOVATION

PRODUCT AND SOLUTION INNOVATION

An innovator that consistently brings value to the industry and its business via new ideas, equipment and solutions for every challenge

PERFORMANCE

COMMITMENT ACROSS THE ENTIRE SYSTEM LIFE CYCLE

From system commissioning and start-up through maintenance and troubleshooting

WIN RIGHT

A COMPANY THAT WINS RIGHT

We are committed to absolute integrity, respect and performance excellence in everything we do