



AERATION

The Purpose of Aeration

Aeration is one of the most widely used tools for maintaining aquatic systems: wastewater treatment, improvement of number and health in fisheries, mosquito control, ice management, reduction of nutrient loading, sediment management, water clarity, and algae control. Naturally, water has the ability to hold adequate quantities of dissolved oxygen (D.O.) and nutrients. However, temperature, sunlight, run-off, and stocking densities can have a detrimental effect on water's ability to replenish itself. In many cases, artificial aeration and flow generation can aide in replenishing the levels of dissolved molecules in water, but can also raise these levels higher than what is naturally available. Without assistance, low dissolved oxygen levels and poor water quality can mean lower yields, reduced growth rate, and increased susceptibility to fish and plant stress and disease.

For many, the general rule is to aerate from dusk to dawn. Even in fairly clear/clean water just prior to dawn is the most critical time of day as far as fish and plant mortality is concerned. Most oxygen at this time has been consumed throughout the night by the fish and plant population. The second reason for low oxygen below the surface is that light cannot penetrate with enough intensity to cause photosynthesis. This is true at night and also if there is too much debris in the water. This condition of stratification may be easily corrected by mechanical destratification, as with The Power House, Inc. aerators. The aerator, in the process of moving water to the surface for aeration, also pulls water from lower depths, thereby destratifying the pond and making more of the available water useful for aquatic productivity. With The Power House, Inc. aerators this process is constant and continuously destratifies the water. When there is a problem of low dissolved oxygen, it is not surprising to see the fish breaking the surface frequently - as though gasping for air. In this instance, immediate action needs to be taken, and emergency aeration is required in order to save a fish crop. In commercial aquaculture, artificial aeration is standard. Most facilities have on hand emergency electric power, in the event there is a power failure. In addition, many also make provisions to have a spare aerator or two as backup in case of mechanical failure.

Seasonal fish kills are another important reason to make sure aerators are present in your waters. Often, warm summers are visited by cold rains. When this happens, the cold water falling on the pond surface may cause a sudden destratification which can bring deep dead water to the surface, making it unsuitable for sustaining aquatic life. The result may be an expensive and sudden fish kill. Using our aerators can prevent sudden thermal shock by constantly destratifying the pond. Since cool water retains oxygen better than warm water, it follows that the ability to cool your pond would be an advantage. Surface aeration performs the multi-purposes of raising the D.O. level, lowers the temperature level and helps normalize conditions throughout the pond. In tests with surface

GSEE

**ENVIRONMENTAL
CONSULTANTS**

The following table summarizes the results of the GSEE, Inc. analysis of the data obtained during the oxygen transfer testing on The Power House, Inc. aerators. Individual computer printouts of the data analysis including time versus D.O. plots for each test run using the specified data analysis method are contained in the Appendix.

Table 5-1 Summary of Test Results

Model	Ser#	Hz	Volts	Amps	kW	kVA	pf	Amps @			Pumpage GPM	SOTR Lb_O2/Hr	SAEwire Lb_O2/Hr-HPw	SAEmotor Lb_O2/Hr-HPm
								230V	HPwire	HPmotor				
F1000DP	7039	60	214.3	4.7	0.96	1.01	0.95	4.4	1.29	1.00	1109	2.35	1.93	2.36
F1000DP	7039	50	214.9	3.7	0.62	0.79	0.78	3.4	0.83	0.65	716	1.62	1.98	2.41
F1000F	5647	60	213.2	4.6	0.93	0.99	0.95	4.3	1.25					
F1000F	5647	50	214.4	3.8	0.63	0.81	0.78	3.5	0.84					
F250	550	60	214.4	1.5	0.32	0.33	1.00	1.4	0.43	0.25	316	0.60	1.49	2.37
F250	550	50	216.1	1.3	0.24	0.28	0.84	1.2	0.32	0.18	232	0.43	1.46	2.32
P1000	7147	60	213.0	4.5	0.92	0.97	0.96	4.2	1.23		1379			
P1000	7147	50	215.5	3.7	0.62	0.79	0.78	3.4	0.83		935			
P500	12363	60	213.7	3.9	0.76	0.83	0.92	3.6	1.02		1172			
P500	12363	50	215.7	2.6	0.53	0.57	0.94	2.5	0.71		817			



aeration, the temperature of a body of water has been lowered as much as 10°F, depending upon relative humidity. However, if the water gets too cold it cannot retain enough oxygen.

Here at The Power House, Inc., we strive to make energy efficient equipment. We have been able to manufacture aerators with some of the highest oxygen transfer rates per horsepower/hr available on the market. Our units help maintain cleaner water, provide gentle circulation, and prevent thermal stratification. Additional benefits include the ability to use the units as flow generators and to prevent winter fish kills. These units are also used to keep wildlife and livestock ponds open during freezing weather. If deep well water is used as a source of water, it may be very cold. This typically means water will be devoid of oxygen and could retain gases as Nitrogen, Carbon Dioxide, or Hydrogen Sulfide. These toxic gases may be readily scrubbed out with surface aeration. Rain water could be expected to contain high levels of D.O., but have fallen on fields that may have been fertilized. It may actually be a poor source of D.O. because the fertilizer is a nutrient and will consume oxygen at a rapid rate. This would again be solved by use of our aerators.

We feel that vertical lift, floating surface aerators are the most practical and efficient method of aeration. By agitating the water's surface, these units can expose high volumes of oxygen depleted water to fresh air and push it throughout a body of water. These aerators are electronically powered, and very popular in the United States as well as overseas. Our aerators are designed to withstand usage from commercial aquaculture, industrial applications, and wastewater treatment facilities. Surface water may be naturally saturated with D.O., but water only a few inches below the surface may be too low in oxygen to support aquatic life. Our aerators are designed to agitate high volumes of water at the surface to maximize exposure of water to the air. The closer to saturation water becomes, the slower oxygen can be added, but saturation is really not necessary. It is only necessary to aerate to the level required by the species being raised. Surface turbulence is a great advantage and can be increased by surface aeration.

It is important to consider the cost of the aeration in relation to the market price of the crop being raised. Over aerating is costly and wasteful. However, this is the very reason The Power House, Inc. aerators are the most energy efficient aerators on the market. When sized properly according to pond type and application, they are extremely cost effective. Roughly a ¼-hp is needed to aerate ¼ acre pond, but this can vary slightly depending on the depth and shape of your waterways. Our distributors and dealers are happy to work with you to ensure you choose the aerator(s) you need for your application.

Wait!... I need aeration and beauty
Is this the age old question of beauty over functionality?

To some degree, it is, because it boils down to what you really need. However, in some cases, the two can be equally matched. There are times when the appearance of your pond is as important as the need for aeration. Here at The Power House, Inc. we want you to have the best of both worlds whenever possible. We make the F500F, & the F1000F! We even have lighting packages to make these fountains come alive for nighttime visuals!

(see page 5 for details)

The Power House, Inc. aerators are unique in design, superior in construction and outlast competitors' models. They are suitable for continuous operation in both salt and fresh water. Our units are shipped complete with mooring/positioning line and power cords. They can be taken straight from the box and after insertion into the float, can be moored and plugged in. Each aerator is comprised of a sealed, submersible electric motor, mounted by support brackets in a PVC shroud, which sits on a float collar that has been custom designed. Attached to the motor shaft is a scientifically designed nylon axial propeller which propels the water at the high pumping rate. As the water flows through the bottom of the shroud and four additional holes, it is mixed and oxygenated by the propeller and forced to and above the surface.



Dual Propeller Aerators

The F750DP and F1000DP are unique to our aerator line. Although they carry the same Power House, Inc. staple of running under 9 Amps at 115V and 5 amps at 230V to ensure they save you as much as

possible on energy costs, they pump an amazing **25% more water** than their single propeller counterparts. On top of its production and efficiency, the dual prop assembly creates a unique umbrella flow pattern that makes it aesthetically pleasing, where most aerators just offer surface agitation. These aerators look great with lighting accents as well. The high pumping volume degasses the water of nitrogen, carbon dioxide, and hydrogen sulfide while raising dissolved oxygen levels. Degassing gets rid of nutrients which cause algae and weeds, resulting in both clearer water and decreased odor. Aeration also mixes the water, minimizing anaerobic zones in bottom water and bottom sediment surface. This stimulates the conversion of potentially toxic ammonia to nitrite (also toxic), and finally non-toxic nitrate. With our preassembled units, installation can be accomplished in just minutes! Because units are lightweight, they can easily be moved from one location to another by a single person.

F750DP Specifications:

- ¾-hp
- 7 amps (115V) / 3.5 amps (230V)
- 36" minimum depth
- 1050 GPM
- Pond Size: .75 - 1 acre
- Cord Length (ft): 50, 100, 150, 200
 - ◆ 200' cord is for 230 volt only

F1000DP Specifications:

- 1-hp
- 8.2 Amps (115V) / 4.1 amps (230V)
- 36" minimum depth
- 1150 GPM
- Pond Size: 1-1.5 Acres
- Cord Length (ft): 50, 100, 150, 200
 - ◆ 200' cord is for 230 volt only

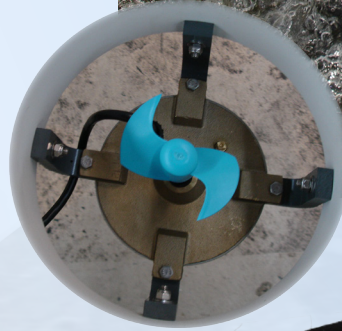
Don't let the size of our 1/4-hp surface aerator fool you....

our F250 packs a powerful punch.

Although small in stature, The Power House, Inc's F250 gets a 300 GPM rating. In addition, it's only running at 2.5 amps at 115V. Easily aerating up to 1/4-acre, this aerator is for smaller ponds and tanks as well.

Specifications:

- 1/4-hp
- 2.5 amps (115V) / 1.25 amps (230V)
- 14" minimum depth
- Average pond size: .1 - .25 acre
- Cord length (ft): 25, 50, 100, 150, 200
 - ◆ 200' cord is for 230 volt only



F500 Specifications:

- 1/2-hp
- 5 amps (115V) / 2.5 amps (230V)
- 21" minimum depth
- 884 GPM
- Average Pond Size: .1 - .5
- Cord Length (ft): 50, 100, 150, 200
 - ◆ 200' cord is for 230 volt only



F750 Specifications:

- 3/4-hp
- 6 amps (115V) / 3 amps (230V)
- 36" minimum depth
- 800 GPM
- Pond Size .5-.75
- Cord Length (ft): 50, 100, 150, 200
 - ◆ 200' cord is for 230 volt only

F1000 Specifications:

- 1-hp
- 7 amps (115V) / 3.5 amps (230V)
- 36" minimum depth
- 900 GPM
- Pond Size .5 - 1 acre
- Cord Length (ft): 50, 100, 150, 200
 - ◆ 200' cord is for 230 volt only

◆ Basic rule of thumb for aerators: 1/4-hp per 1/4 acre;
consult your local distributor about your specific situation for best results

Aerating Fountains

Keeping our principles for efficiency and sustainable aquatic life in place, The Power House, Inc. offers an alternative for those who prefer aesthetics in their pond as much as oxygenation. Minimal horsepower and low running amps combine to create a classic-looking, circular "V" pattern fountain. Throwing large goblets of oxygen depleted water as high as 6' up and as far as 21' out helps expose it to the air and transfers it to areas in the pond that are also low on oxygen. These aerating fountains look stunning with lighting accents and are a definite must for the pond owner looking for the best of both worlds in pond/lake equipment. For those keeping a close eye on operating costs, this fountain's lovely pattern is comparable to a handful of others on the market, but consumes about half of the energy.

F500F Specifications:

- ½-hp
 - 5 amps (115V) / 2.5 amps (230V)
 - 14" minimum depth
 - 106 GPM
 - Height of Spray: 4'
 - Width of Spray: 15'
 - Cord Lengths (ft): 50, 100, 150, 200
- ♦ 200' cord is for 230 volt only



F1000F Specifications:

- 1-hp
 - 7 amp (115V) / 3.75 amps (230V)
 - 17" minimum depth
 - 130 GPM
 - Height of Spray: 6'
 - Width of Spray: 21'
 - Cord Lengths (ft): 50, 100, 150, 200
- ♦ 200' cord is for 230 volt only

Lighting Accents are available for the F250, all dual propeller aerators, and aerating fountains. Halogen and LED lighting accents come completely assembled, mounted on the black float, and ready to install. Retrofitting lights on already existing units is available - send in your float for us to attach the lighting or have a 2nd float for when you wish to us the lighting.



Color LED

115V - (4) 3 watt LED lights with timer

7 dazzling colors - red, yellow, green, aqua, blue, purple, and white. They can be viewed as separate colors or as a color wheel.

*user friendly control at the power source

230V - GFI and additional transformer included.

White LED

115V /230V - (2) 18 watt white lights

Colored Lenses & Clips available: amber, dark blue, dark green, dark red, dark yellow, florescent blue, florescent red, & florescent yellow

Parts & Accessories



20000 Propeller - fits F500



20001 Propeller - fits F250



30000 Prop & Disc - fits F500F & F1000F



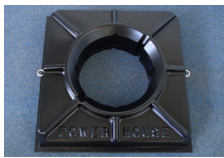
24500 Shackles - stainless steel (set of 2)



20100 Brackets (sets of 4)
Small - fits F250
20200 Large - fits F500, F750, F1000, F750DP, F1000DP, F500F, & F1000F



24010 Black Float - fits F250



34000 Black Float - fits F500, F750, F1000, F750DP, F1000DP, F500F & F1000F



26100 P1101 Timer (115V)



26200 T104P Timer (230V)



Shrouds
24700 10" x 6" - fits F250
24800 12" x 12" - fits F500, F750, F1000, F750DP & F1000DP
34700 12" x 7 3/8" - F500F & F1000F



26050 Down Tube - 23 1/2" shroud extension, which attaches to aerator unit to pull water up from deeper depths



20000 Propeller - fits F750, F750DP, F1000, F1000DP
♦ for dual propellers, this is the *Upper Propeller*



20004 Lower Propeller - fits F750DP & F1000FP (cotter pin included)



24500 Screen Kit (Turtle Guard) - fits F750, F1000, F750DP, F1000DP



Cages
24110 Compact - fits F250
24100 Square - fits F500, F750, F1000, F750DP, F1000DP, F500F & F1000F



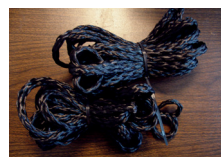
Alum. Brackets (sets of 4)
Large - fits PC P750 & PC P1000
♦ Fresh water only



24900 Zinc Anode ♦ allen wrench included (for use in salt water applications)



26000 Electrolysis Kit - for areas of high salinity, high electrical current and/or warm waters



Mooring Lines (3/8" thick)
34300 (2) 25' ropes
34310 (2) 50' ropes



	Gauge	Voltage	Cord Length (ft)
22025	16/3	115/230	25'
22050	16/3	115/230	50'
22100	16/3	115/230	100'
32100	14/3	115/230	100'
32150	14/3	115/230	150'
32200	14/3	230	200'

♦ 230 cords do not come with male plug



Motor Assemblies
(includes prop, zinc, brackets, & power cord)

- 22500** 1/4-hp single prop aerator
- 25000** 1/2-hp single prop aerator
- 27500** 3/4-hp single prop aerator
- 21000** 1-hp single prop aerator
- 27502** 3/4-hp dual prop aerator
- 21002** 1-hp dual prop aerator
- 35000** 1/2-hp aerating fountain
- 31000** 1-hp aerating fountain

♦ available cord lengths: 25' (1/4-hp only), 50', 100', 150' & 200' (230V only for 200')

Fountain/Aerator Specifications

- Unit shall be a ___hp, ___ volt, 50/60 cycle, ___ phase vertical pump type fountain/aerator.
- Unit shall consist of motor assembly, heavy-duty float with optional anti-fouling screen that surrounds the motor assembly.
- Motor assembly shall consist of motor housing, bronze endbell, electric motor, start/run components, seals, and dielectric fluid. The motor housing shall be constructed of 16 gauge #304 stainless steel and the endbell shall be cast bronze for
- corrosion free operation in either fresh or salt water. The electric motor, with matched necessary start/run components shall fit inside the motor housing, immersed in the dielectric lubricating fluid, with the shaft extending through the bronze endbell. The motor shall have stator windings with double impregnation of baked insulating varnish, and two heavy-duty ball bearings to provide support for the rotor. The motor shaft shall be #303/#304 stainless steel (not plated), with motor shaft flinger to prevent sand and dirt from accumulating around the endbell. The assembly shall also contain an internal heavy-duty, hard-faced mechanical seal with stainless steel components to keep assembly watertight, and an additional seal pressed into the bronze endbell at the shaft opening to protect against sand and dirt abrasions.
- Unit shall come complete with ___ ft. of water resistant power cord.
- Heavy-duty custom brackets will attach motor housing to shroud. All stainless bolts and locking aircraft nuts are to be used.
- PVC shroud may have side ports for maximum water flow.
- Motor housing and shroud assembly for ¼-hp through 2-hp units shall rest in opening of custom designed float assembly without need of further mechanical attachment, for ease of installation and removal.
- Float assembly (for ½-hp through 2-hp units) shall be formed of 15 year UV resistant ABS plastic with custom designed opening to support shroud and motor assembly. Assembly shall come complete with two (2) eye bolts and two (2) 25' length of 3/8" polypropylene rope.

Individuals should not enter water when unit is in operation.

*The Power House, Inc. is committed to providing the finest fountains/aerators available in the marketplace.
As a result, specifications are subject to change without notice.*



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