

**SPECIFICATIONS**  
**VOLCANO II FLOATING SURFACE AERATOR SYSTEM**

**1.0 GENERAL**

**1.1 DESCRIPTION**

- A. Manufacturer shall furnish a floating aerator system capable of pumping water from below the surface of a body of water and mixing it throughout the body of water.
- B. A submersible motor shall draw water into a propeller chamber where it shall be pumped into the atmosphere in the form of a random boil effect.
- C. The water droplets shall become oxygen enriched and return to the surface, therefore transferring oxygen from the atmosphere into the body of water.
- D. This repeated action shall effectively mix the body of water and distribute the dissolved oxygen continuously while creating more exposed surface area through wave creation thus enhancing atmospheric oxygen transfer.
- E. Aerator system shall include a motor in a housing, attached to a float. This assembly shall be connected to an electrical control panel by underwater power cable, all of which as specified in SECTION 1.2.

**1.2 AERATOR COMPONENTS DESCRIPTION**

- A. **Float** shall be made of linear low density polyethylene, with a minimum 14” (for 1.5-5.5HP) and 8” (for 1/2HP) discharge area. This area shall be protected by a series 300 stainless steel discharge guard. Four series 300 stainless steel brackets shall be attached to the float, around which a protective series 300 stainless steel intake screen shall be mounted. The motor housing shall be attached to the brackets during installation.
- B. **Propeller** shall be precision machined and formed using Series 300 Stainless Steel. It is connected to the motor shaft by a series 300 stainless steel bolt.
- C. **Propeller Chamber** shall be enclosed by a series 300 stainless steel intake screen. Screen shall be capable of keeping out any debris which may impede the propeller’s performance.
- D. **Motor Housing** shall be Series 300 Stainless Steel. 1.5-5.5HP shall have a permanent series 300 stainless steel electrical hub welded on the side of the housing to allow electrical cable entry. The 1/2HP shall have a series 300 stainless steel electrical hub welded on the bottom of the housing to allow electrical cable entry.
- E. **Motor** shall contain a Series 316 Stainless Steel shaft incorporating a permanent, split phase capacitor run on single phase and a polyphase induction on three phase. The rotor shall be dynamically balanced and run in a ball bearing supported system. The stator windings shall be double dipped and baked with a Class F insulation, designed for oil immersion operation. The oil shall be a highly refined mineral oil of food grade quality, specially formulated for lubrication. It shall meet FDA regulations. The oil shall provide continuous lubrication of bearings and internal seals and further function as an efficient heat transfer medium, allowing the motor to operate at 1725 RPM, at relatively low temperatures. The motor shall be contained in the motor housing by a series 300 stainless steel top plate.

- F. Seals** used to protect the motor against water or oil leakage shall be a mechanical, rotating type assembly, composed of silicon carbide and series 300 stainless steel. All elastomers shall meet UL 778 requirements. This assembly shall then be encapsulated and protected within a series 300 stainless steel cartridge assembly.
- G. Underwater Power Cable** shall be UL Listed and specifically designed for underwater use. The conductors are flexible, stranded copper wire sized for the amp draw and length of run. The conductors shall be resistant to oil, water and cracking. Power cable shall be fitted with a cable strain relief device, located within five feet of motor housing, capable of being attached to the latch mounted on the motor housing band clamp. This will ensure that no potential damage can occur to any cable connections, due to tension on the cable.
- H. Underwater Power Cable Disconnect** shall be located approximately three feet from the motor housing. It is a two piece molded assembly made of thermoplastics, meeting UL 778 requirements. The cap end shall be permanently connected to the underwater pin and socket connector (see Section 1.2 Item I.). The body end of the disconnect shall be permanently attached to the underwater power cable and sealed with an approved compound. This is intended to prevent water entry if damage should occur to the cable. The disconnect shall be sealed with an internal o-ring and by an external series 300 stainless steel clamp ring, which can be easily opened.
- I. Underwater Pin and Socket Connector (1.5-5.5HP)** shall consist of a Series 900 IP68 pin and socket connector. It shall be of a 4 pin configuration rated 32 amps at 600 volts AC. The pin end shall be potted into a series 300 stainless steel 90° adapter elbow with an approved ridged epoxy. This assembly shall be permanently attached to the series 300 stainless steel hub that is welded onto the side of the series 300 stainless steel motor housing. The socket end shall be attached to a 36” piece of UL Listed underwater power cable. It shall be permanently secured to the UL Listed power cable by means of an integrated clamp and series 300 stainless steel screws. It shall be completely epoxied to prevent entry of water or any other foreign matter. The other end of this assembly is permanently attached to the cap end of the underwater cable disconnect. It is sealed with a flexible potting compound.
- 1/2HP shall consist of a Series 900, IP68 pin and socket connector. It shall be of a 4 pin configuration rated 32 amps at 600 volts AC. The pin end shall be potted into a series 300 stainless steel straight bell-shaped adapter with an approved ridged epoxy. This assembly shall be permanently attached to a reinforced braided hose and a series 300 stainless steel elbow. This shall be attached to a series 300 stainless steel hub which is welded on the bottom of the motor housing. This complete assembly shall be sealed with an approved flexible potting compound. The socket end shall be attached to a 36” piece of UL Listed underwater power cable. It shall be permanently secured to the UL Listed power cable by means of an integrated clamp and series 300 stainless steel screws. It shall be completely epoxied to prevent entry of water or any other foreign matter. The other end of this assembly shall be permanently attached to the cap end of the underwater cable disconnect. It shall be sealed with an approved flexible potting compound.
- J. Fasteners and Anchor Connectors** shall be Series 300 Stainless Steel.
- K. Electrical control panel specifications** see SECTION 3.

- L. Intake screen** shall be made of 18 Gauge, Series 300 Stainless Steel. The screen hole size shall be 3/4" wide slots on 1/2HP and 1" wide slots on 1.5HP and larger. The screen shall have openings in a random configuration capable of keeping out any debris which may impede the propeller's performance.
- M. Large Custom Intake Screen** (optional) shall be made of 18 Gauge, Series 300 Stainless Steel. The large custom intake screen shall completely enclose the motor power unit assembly. Additional depth is required.
- N. HydroMax Series** (optional) shall produce a conical display pattern (Shasta-low, Etna-high). This is created by adding a throat assembly and diffuser to the Volcano II propeller chamber.
- O. Series 316 Stainless Steel Upgrade** (optional) is available for sites with salt or brackish water. This option will upgrade all series 300 stainless steel components to series 316.

## FLOATING SURFACE AERATOR DETAIL SPECIFICATIONS

### 2.0 DETAILED INFORMATION

- 2.1 This specification is intended to provide prospective bidders the necessary information pertaining to the floating surface aerator(s) specified for the \_\_\_\_\_ Project.
- 2.2 The MOTOR(S) shall be 1/2, 1.5, 3.5 or 5.5HP (circle choices), operating at \_\_\_\_\_ Volts, 60 Hertz, \_\_\_\_\_ Phase at 1725 RPM.
- 2.3 The MODEL specified shall be the \_\_\_\_\_. It shall come complete with an electrical control panel, protective intake screen attached to a float assembly and \_\_\_\_\_ feet \_\_\_\_\_ gauge, of 4 conductor underwater power cable.
- 2.4 The aerator shall produce a SPRAY PATTERN \_\_\_\_\_ feet in diameter and \_\_\_\_\_ feet in height with a GPM of \_\_\_\_\_.

Please refer to TABLES 1, 2 and 3 to assist in the completion of SECTION 2.0

## FLOATING SURFACE AERATOR DETAIL SPECIFICATIONS (cont.)

### 3.0 ELECTRICAL CONTROL PANEL COMPONENTS DESCRIPTION

- A. **Electrical Enclosure** shall be NEMA 3R type, gray in color. Panel shall be both lock and mount capable.
- B. **Ground Fault Protection**
  - 1. Single phase applications, a GFCI breaker shall provide overload and short circuit protection, combined with Class A ground fault protection.
  - 2. Three phase applications, a molded case breaker shall provide overload and short circuit protection, while a residual current device rated at 30 mA shall provide ground fault protection.
- C. **Control Breaker** shall provide overload protection and be capable of disconnecting all incoming electricity from the control panel.
- D. **Motor Contactor** shall provide a means for disconnection of all motor leads. It shall be a magnetic, across the line starter type.
- E. **Overload Relay** shall provide overload protection and phase loss protection by means of a bi-metallic overload relay. It is adjustable over the listed full load amperage draw of the motor. It shall have a visual trip indicator, test button and manual/automatic reset modes.
- F. **Digital Timer** shall be a single pole type, rated at 120 Volts, 16 Amps, capable of 8 ON / OFF functions per day for 7 days. Digital timer has a lithium battery to retain the programming when power is disconnected.

### 3.1 SAFETY TESTING CONTROL PANEL

The electrical control panel shall be tested and approved as a complete unit. It is inspected and listed by Underwriters Laboratories, Inc. under Category 508 Industrial Control Panels and Category 778 Submersible Aerators and Aerating Fountain Pump Systems.

### 3.2 ACCEPTABLE MANUFACTURER

This Volcano II Floating Surface Aerator electrical control panel, as specified in Section 3.0, shall be manufactured by AQUAMASTER® FOUNTAINS AND AERATORS, 16024 CTH X, Kiel, WI 53042, (800) 693-3144 or approved equal.

### 3.3 INSTALLATION

The electrical control panel must be installed in accordance with the installation instructions, in compliance with all local and National Electrical Code requirements. This should be done by a licensed electrical contractor. Any alterations to or substitution for items in this system, unless allowed by the installation instructions, will void the Underwriters Laboratories Listing and will void the product warranty. It may also create a hazardous installation. Read the instructions thoroughly before starting the installation and follow them carefully throughout.

### 3.4 ELECTRICAL CONTROL PANEL WARRANTY

All electrical panel and their components shall have a 3 year warranty on parts and labor.

## **FLOATING SURFACE AERATOR DETAIL SPECIFICATIONS (cont.)**

### **4.0 SAFETY TESTING**

The Volcano II Floating Surface Aeration system shall be tested and approved as a complete unit. This approval must meet Underwriters Laboratories Inc. requirements in compliance with Category 508: Industrial Control Panels and Category 778: Submersible Aerators and Aerating Fountain Pump Systems. Individual component testing and wet niche environment equipment approval are not acceptable.

### **4.1 ACCEPTABLE MANUFACTURER**

This Volcano II Floating Surface Aerator, as specified in Sections 2.2, 2.3 and 2.4, shall be manufactured by AQUAMASTER® FOUNTAINS AND AERATORS, 16024 CTH X, Kiel, WI 53042, (800) 693-3144, or approved equal.

### **4.2 INSTALLATION**

All AQUAMASTER® VOLCANO II FLOATING SURFACE AERATORS are designed and built to be installed with an AQUAMASTER® UL Listed control panel and to be operated as a complete system. Any alterations to or substitution for items in this system, unless allowed by the installation instructions, will void the UL Listing and will void the product warranty. It may also create a hazardous installation. Read the instructions thoroughly before starting the installation and follow them carefully throughout.

### **4.3 WARRANTY**

All 1.5HP and larger AQUAMASTER® VOLCANO II FLOATING SURFACE AERATORS motor, seal assembly, float and underwater power cable (referred to as in-water components) are covered under warranty at 100% replacement cost should it fail due to defects in materials or workmanship for a period of 5 years on parts and labor. This is in effect from the date of shipment, when given normal and proper usage as determined by The Seller upon examination, and when owned by the original user. All 1/2HP units have a similar 3 year warranty on parts and labor.

## FLOATING SURFACE AERATOR LIGHTING SYSTEMS AND OPTIONS SPECIFICATIONS

- 5.0 LIGHTING SYSTEM** shall be LED/RGBW \_\_\_\_\_ Volts/Watts, Model #(s)\_\_\_\_\_. There are \_\_\_\_\_ total fixtures, containing \_\_\_\_\_ (choose color(s) if applicable: amber, blue, red, green or turquoise) lenses.
- 5.1** A total length of \_\_\_\_\_ feet of \_\_\_\_\_(gauge) of 3(LED) or 5(RGBW) conductor underwater power cable is required.
- 5.2 DEEP WATER INTAKE SYSTEM** shall be capable of drawing water from further depths, in initial three foot length. Custom extensions available in one foot increments, additional \_\_\_\_\_ required. Total length should reach beyond 50% depth but not exceed 75%. This system provides the floating surface aerator the capability to de-stratify the pond very efficiently. Total \_\_\_\_\_ feet.
- 5.3 THE HYDROMAX SERIES** creates a uniform conical pattern by adding an optional assembly. Choose either SHASTA (low) or ETNA (high) patterns, Yes \_\_\_\_\_ No \_\_\_\_\_
- 5.4 LARGE CUSTOM INTAKE SCREEN** shall provide additional protected intake area if Fountain Aerator(s) will operate in a potentially high debris filled aquatic environment. Yes \_\_\_\_\_ No \_\_\_\_\_
- 5.5 SERIES 316 STAINLESS STEEL UPGRADE** is available for sites with salt or brackish water. Yes \_\_\_\_\_ No \_\_\_\_\_

Please refer to TABLES 3 and 4 to assist in the completion of SECTION 5.

## FLOATING FOUNTAIN LIGHTING SYSTEMS AND OPTIONS SPECIFICATIONS (cont.)

### 6.0 DESCRIPTION - LIGHTING

- A. **Light Set** shall consist of line voltage (120 VAC) 11W LED, 22W LED, 35W LED, 20W RGBW LED or 40W RGBW LED lighting system with either 2, 3, or 4 lights.
- B. **Lights** shall consist of a power supply/driver module with a 11W, 22W, 35W, 20W RGBW (5W red, 5W, green, 5W blue, 5W white), or 40W RGBW (10W red, 10W green, 10W blue, 10W white) LED light engine.
- C. **Light Fixture** shall be of Series 300 Stainless Steel construction. They shall have a permanent series 300 stainless steel electrical hub welded on the bottom of the housing to allow electrical cable entry and be mounted with series 300 stainless steel brackets and fasteners.
- D. **Light Fixture Assembly** shall consist of a lens made of tempered glass with a clear non-diffusing surface with a minimum of 5/32<sup>nd</sup> thickness and sealed with “V” shaped lens gasket made of silicon. Clamp ring shall be of series 300 stainless steel. Fasteners and mounting hardware shall be of series 300 stainless steel.
- E. **Underwater Pin and Socket Connector** shall consist of a Series 900, IP68 pin and socket connector. It shall be of a 3(LED) or 5(RGBW) pin configuration rated 32 Amps at 600 VAC. The pin and socket ends shall each be attached to a UL Listed underwater power cable rated at 600 Volts. They both shall be permanently secured to their UL Listed power cables by an integrated neoprene grommet and compression nut assembly. These assemblies shall be epoxy filled to prevent entry of water or any other foreign matter. The pin end assembly shall be permanently attached to the light fixture with a nonmetallic connector and potted using a flexible approved potting compound. The socket end assembly shall be permanently attached to the power cable. Both the pin end and socket end assemblies come with protector caps.
- F. **Underwater Power Cable** shall be UL Listed and specifically designed for underwater use. The conductors are flexible, stranded copper wire sized for the amp draw and length of run. The conductors shall be resistant to oil, water and cracking. Power cable shall be fitted with a cable strain relief device, located within five feet of the first light fixture. This will ensure that no potential damage can occur to any cable connections, due to tension on the cable.
- G. **Light Controls** shall consist of a GFCI (Ground Fault Circuit Interrupter), overcurrent protection (fuse), digital timer with battery back-up. The Sequencer (optional) shall be capable of cycling light fixtures on and off, up to 8 fixtures. The RGBW controller (optional) is pre-programmed with assorted color, shows and holiday themed selectable programs. The controller can also adjust program speed and brightness. The standard controller shall consist of a programmable controller with push button interface. An optional programmable WiFi controller is available with an Android or iOS app included. An Android tablet preloaded with the app and connected to the controller is also available as a WiFi option.
- H. **Safety Testing** shall be tested and approved as a complete assembly. This approval must meet Underwriters Laboratories Inc. requirements in compliance with UL category 676: Underwater Luminaires.
- I. **Warranty** on all AQUAMASTER LIGHTING SYSTEMS are covered under warranty at 100% replacement cost should it fail due to defects in materials or workmanship for a period of 3 years.



**TABLE 1: VOLCANO II FLOATING SURFACE AERATOR PERFORMANCE SPECIFICATIONS**

**TECHNICAL DATA  
REFERENCE MATERIAL FOR SECTION 2.0 DETAILED INFORMATION**

Model Number	HP	Voltage and Phase	Suggested Pond Size S.A. *	Minimum Operating Depth	Spray Height	Spray Diameter	Pumping Rate GPM	Ship Weight Lbs.
V5401-ESC	1/2	120V – 1PH	Up to 3/4	2'	1'	4'	420	70
V5402-ESC		208-240V – 1PH						
V5412-SC	1.5	208-240V – 1PH	Up to 1	3'	2.5'	7'	1298	250
V5412-3SC		208-240V – 3PH						
V5414-3SC		440-480V – 3PH						
V5432-SC	3.5	208-240V – 1PH	1+	3'	3.5'	12'	1975	300
V5432-3SC		208-240V – 3PH						
V5434-3SC		440-480V – 3PH						
V5452-SC	5.5	208-240V – 1PH	1+	3'	4.5'	14'	2680	300
V5452-3SC		208-240V – 3PH						
V5454-3SC		440-480V – 3PH						

\*A pond's surface acreage (S.A.) is determined by multiplying its length in feet by its width in feet then dividing by 43,560. A pond's actual shape and depth should all be considered when selecting Horsepower and unit size(s).

**TABLE 2: Cable Sizing Charts**

*Maximum recommended length (in feet) from aerator to control panel  
AquaMaster® recommends consulting a Licensed Electrician to properly size any underground cable from the main power source to our control panel. Cable runs to the panel located away from main power source requires recalculating voltage drop to insure proper cable sizing. Please contact AquaMaster® if assistance is required.*

4 conductor: Required on all 1/2 - 5.5HP Single Phase & Three Phase Volcano Series									
4 conductor			Copper Wire Gauge Size						
Unit	Volts	Approx Amps	#14	#12	#10	#8	#6	#4	#2
<b>Single Phase</b>									
1/2HP	120	7.0	138	214	357	549	875	1382	2143
1/2HP	208-240	3.5	479	743	1238	1905	3032	4793	7429
1.5HP	208-240	8.0	--	325	542	833	1327	2097	3250
3.5HP	208-240	16.0	--	163	271	417	663	1048	1625
5.5HP	208-240	26.0	--	--	167	256	408	645	1000
<b>Three Phase</b>									
1.5HP	208-240	6.0	--	500	834	1283	2042	3228	5004
1.5HP	440-480	3.0	--	2117	3528	5428	8641	13658	21170
3.5HP	208-240	11.0	--	273	455	700	1114	1761	2729
3.5HP	440-480	5.5	--	1155	1925	2961	4713	7450	11547
5.5HP	208-240	16.0	--	188	313	481	766	1211	1876
5.5HP	440-480	8.0	--	794	1323	2036	3240	5122	7939

Actual voltage to motor will affect your fountain's performance.

**TABLE 3: THE HYDROMAX SERIES CONICAL PATTERNS**

SHASTA					ETNA				
Part No.	HP	Height	Diameter	GPM	Part No.	HP	Height	Diameter	GPM
910042	1/2	1.5'	7'	324	N/A	1/2	4'	12'	258
910070	1.5	4'	10'	664	910080	1.5	5.5'	12'	517
910071	3.5	5'	16'	1070	910081	3.5	7.5'	22'	845
910072	5.5	7'	18'	1415	910082	5.5	10'	24'	1350

**TABLE 4: FOUNTAIN AERATOR LIGHTING SYSTEMS**

AQUAMASTER® FOUNTAIN AERATORS are even more dramatic at night, with the addition of a UL and cUL Listed NIGHT GLOW LIGHTING SYSTEM.

Any lighting system choice includes stainless steel lamp housings, sealed with clear tempered glass lenses in a stainless steel clamp ring. All lights remain water-cooled.

All necessary electrical controls, including timer, are pre-wired into the fountain’s existing UL Listed control panel. Color board assemblies (White, Red, Green, Blue, or Amber) must be selected for each light. An optional sequencer can complete your dramatic aquatic display.

**For uniformity of spray pattern coverage, 4 lights minimum is recommended.**

**LINE VOLTAGE:** 120 Volt LED Lighting Systems

<b>11 Watt Fixtures (1/2HP)</b>	<b>Each system includes:</b> <ul style="list-style-type: none"> <li>• 11, 22, or 35 Watt LED light engine</li> <li>• GFCI Protection</li> <li>• Digital Timer</li> <li>• Clear lenses</li> <li>• UL and cUL Listing</li> <li>• Choice of Red, Green, Blue, or Amber Light Engine</li> </ul>
2 light system: Model # 870733	
4 light system: Model # 870734	
<b>22 Watt Fixtures (1.5-5.5HP)</b>	
2 light system: Model # 870629	
4 light system: Model # 870630	
<b>35 Watt Fixtures (1.5-5.5HP)</b>	
2 light system: Model # 870806	
4 light system: Model # 870807	

**LINE VOLTAGE:** 120 Volt RGBW LED Lighting Systems

<b>20 Watt Fixtures (1/2HP)</b>	<b>Each system includes:</b> <ul style="list-style-type: none"> <li>• 20 or 40 Watt RGBW LED light engine</li> <li>• GFCI Protection</li> <li>• Digital Timer</li> <li>• Clear lenses</li> <li>• UL and cUL Listing</li> </ul>
2 light system: Model # 870774	
4 light system: Model # 870775	
<b>40 Watt Fixtures (1.5-5.5HP)</b>	
2 light system: Model # 870694	
4 light system: Model # 870695	

**CABLE SIZING CHART FOR LED LIGHTS**

*Maximum recommended length (in feet) from fountain lights to control panel.*

*AquaMaster® recommends consulting a Licensed Electrician to properly size any underground cable from the main power source to our control panel. Cable runs to the panel located away from main power source requires recalculating voltage drop to insure proper cable sizing. Please contact AquaMaster® if assistance is required.*

3 Conductor				Copper Wire Gauge Size		
Watts Per Fixture	# of Fixtures	Volts	Approx Amps	#14	#12	#10
11	2	120	0.183	5279	8182	13636
11	4	120	0.367	2639	4091	6818
22	2	120	0.283	3416	5294	8824
22	4	120	0.567	1708	2647	4412
35	2	120	0.583	1659	2571	4286
35	4	120	1.167	829	1286	2143

**Cable Sizing Chart for lights when ordered with a sequencer**

3 & 4 Conductor see notes below			Copper Wire Gauge Size		
Watts Per Fixture	# of Fixtures	Volts	#14	#12	#10
11	3 or 4	120	10558	16364	27272
22	3 or 4	120	6832	3227	17648
35	3 or 4	120	3318	1567	8572

*Lighting sequencer requires 2 runs of cable:*

- 1) Sequencer with 3 colors require (1) run of 3 conductor cable and (1) run of 4 conductor cable
- 2) Sequencer with 4 colors require (2) runs of 4 conductor cable

**CABLE SIZING CHART FOR RGBW LED LIGHTS**

5 Conductor				Copper Wire Gauge Size		
Watts Per Fixture	# of Fixtures	Volts	Approx Amps	#14	#12	#10
20	2	120	0.333	2903	4500	7500
20	4	120	0.667	1452	2250	3750
40	2	120	0.667	1452	2250	3750
40	4	120	1.333	726	1125	1875