SPECIFICATIONS
VOLCANO III 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" 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 and shall have a permanent series 300 stainless steel electrical hub welded on the side 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 single 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** 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.

J. **Fasteners** 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 1” wide slots. 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. This is created by adding a throat assembly and diffuser to the Volcano III 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 1.5, 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 III 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.

4.0 SAFETY TESTING

The Volcano III 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 III 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 III 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 AQUAMASTER® VOLCANO III 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.

5.0 **LIGHTING SYSTEM** shall be LED/RGBW _____ Volts/Watts, Model #(s)_____. There are _____ total fixtures, containing _____
(choose color(s): white, warm white, amber, blue, red, or green) color board assemblies.

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. 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.

6.0 DESCRIPTION - LIGHTING

A. **Light Set** shall consist of line voltage (120 VAC) 22W LED, 35W LED, or 40W RGBW LED lighting system with either 2 or 4 lights.

B. **Lights** shall consist of a power supply/driver module with a 22W, 35W, 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 5/32nd 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 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.

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 III 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.
V5312-SC	1.5	208-240V – 1PH	Up to 1	3’	3'	8.5'	1324	250
V5312-3SC		208-240V – 3PH						
V5314-3SC		440-480V – 3PH						
V5332-SC	3.5	208-240V – 1PH	1+	3’	4'	12'	2130	300
V5332-3SC		208-240V – 3PH						
V5334-3SC		440-480V – 3PH						
V5352-SC	5.5	208-240V – 1PH	1+	3’	5’	14’	2734	300
V5352-3SC		208-240V – 3PH						
V5354-3SC		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 1.5 - 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
Single Phase									
1.5HP	208-240	8.0	--	325	542	833	1327	2097	3282
3.5HP	208-240	16.0	--	163	271	417	663	1048	1641
5.5HP	208-240	26.0	--	--	--	256	408	645	1000
Three Phase									
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	--	790	1320	2035	3240	5120	7935

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

TABLE 3: THE ETNA SERIES CONICAL PATTERNS

PART No.	HP	Height	Diameter	GPM
3000050	1.5	5’	12’	527
3000055	3.5	7.5’	20’	862
3000059	5.5	9’	28’	1377

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

22 Watt Fixtures (1.5-5.5HP)	**Each system includes:**
2 light system: Model # 870629	• 22 or 35 Watt LED light engine • GFCI Protection • Digital Timer • Clear lenses • UL and cUL Listing • Choice of White, Warm White, Red, Green, Blue, or Amber Light Engine
4 light system: Model # 870630	
35 Watt Fixtures (1.5-5.5HP)	
2 light system: Model # 870806	
4 light system: Model # 870807	

LINE VOLTAGE: 120 Volt RGBW LED Lighting Systems

40 Watt Fixtures (1.5-5.5HP)	**Each system includes:**
2 light system: Model # 870694	• 40 Watt RGBW LED light engine • GFCI Protection • Digital Timer • Clear lenses • UL and cUL Listing
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**
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 RGBW LED LIGHTS

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