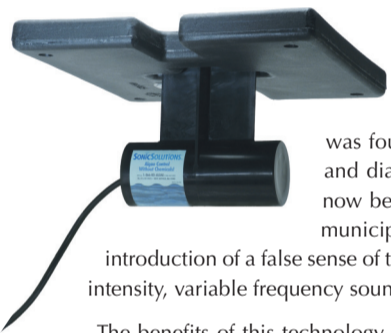




Ultrasonic Algae Control Without Chemicals

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In the 1890's it was discovered that loud sounds could stop a blue-green algae bloom in its tracks. However, even then most people thought that dynamite was a little extreme for algae control! Then in the early 1920's during the experimentation that produced sonar, Paul Langevin discovered that these same types of algae were disabled by ultrasound, though most likely due to the very powerful nature of the sonar pulse that created cavitation.



Then in the 1970's it was discovered that gas vesicles could be broken by a sharp change in pressure past a limit called the blue-green algae's turgor pressure. It wasn't until the 1990's that lower intensity ultrasound was found capable of disabling blue-green algae, green algae and diatoms by use of sound resonance. The latest innovation, now being successfully used in potable water and waste water municipal applications, is the control of biofilm growth by the introduction of a false sense of turbulence to facultative anaerobic bacteria from the high intensity, variable frequency sound waves.

The benefits of this technology include the reduction of chemical algacides, cleaning chemicals, cleaning operation man-power, lower disinfection chemical costs, and reduction of cooling water biological chemical control costs. Reducing the level of disinfection chemicals has the added benefit of reducing THMs (tri-halo methanes) and HAAs (halo acetic acids), two key carcinogens produced by disinfection that must be maintained in part per billion levels. The units are simple to install, use very little power, and require very little equipment maintenance.

Sonic Solutions LLC currently offers five models of varying intensity levels from a small backyard pond to lake size applications. Of them, the Sonic Solutions SS600 model is the most powerful. Of ultrasonic algae control units available on the world market today, the SS600 ranks number one for output power, effective range, bandwidth coverage and number of generated frequencies. It has a range and area capability greater than 50% more than the nearest competitor. Its success is a result of biological and electronics experts who made it their goal to set the performance standard for this technology. It is powerful enough to cover a 6.5 acre pond for all roaming algae types and more than 20 acres for blue-green algae under ideal conditions.

Both the piezo transducer and the power supply box are waterproof. The power supply is UL

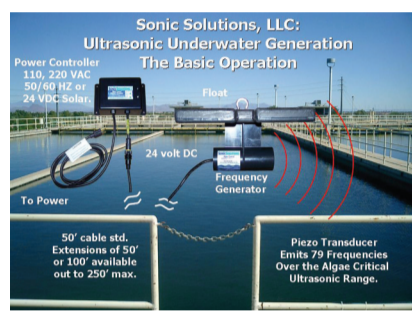
rated (US and Canada) for outdoor use. The unit is NSF 60 rated indicating no chemical residual, low chemical leaching from components, and a safe end-of-life environmental impact (ie. No lead or other harmful components sealed in the device. The frequency generator is housed in the transducer assembly and drives the piezo element that acts like an underwater speaker. The unit is also CE rated and has an EPA Registration #074929-MA-001.

It generates sound frequencies that are fatal for most types of algae, but are harmless to humans, animals, fish and aquatic plants. It damages green algae and diatoms by tearing the inner cell wall away from the connected outer surface contractile vacuole that controls pressure and fluid flow thus preventing normal cell function. In a different manner, blue-green algae are killed by breaking hundreds of very tiny and easily broken floatation tubes in each cell called gas vesicles. Without them these algae can no longer float to the surface for sufficient light and they die. Fungi with gas vesicles such as Pithium and Fusarium are also controlled.

Additionally, ultrasound has been shown to greatly reduce bacterial colonization on clean surfaces. The effect occurs due to sufficient sound energy levels to cause a sensation of turbulence for facultative anaerobic bacteria. These types of bacteria form the initial under layer colonies that eventually form biofilm, a colony of various organisms including algae and higher order organisms that plague many water facilities. By preventing the initial layer formation, the biofilm building process is interrupted to substantially reduce cleaning costs: 1) increased cleaning cycle time periods 2) reduced cleaning time, and 3) reduced chemical consumption. In potable water facilities this reduces THM and HAA levels by limiting halide disinfection products such as Chlorine, Sodium hypochlorite, etc. This effect requires higher levels of sound intensity, so the effect range is less than for algae at about 340 feet (103 meters).

Applications and Technical Data:

The Sonic Solutions SS 600 has a maximum control ranges of up to 2274 feet (693 meters) for simple blue green algae and up to 854 feet (260 meters) for other roaming algae. Potential applications are: Industrial and municipal water supplies and treatment lagoons, lakes, ponds, drinking water storage impoundments, water purifying systems, cooling towers, horticulture water storage, irrigation systems, recycled water containers, aquaculture raceways and recycled water plants.



Technical data Sonic Solutions SS 600	
Control Range:	Green roaming, filamentous and diatoms: 854 feet (261 meters), 6.6 acres (2.7 hectares) Blue-green algae: 2274 feet (693 meters), 20+ acres (8+ hectares) or more under ideal conditions. Biofilm growth on cleaned surfaces: 340 feet (104 meters), 1.0 acres (0.42 hectares)
Power Used:	18.5 watts on AC power (12.3 watts on DC power)
Input Voltage	110 volt AC common household current with GFCI or 24 volt DC (solar rechargeable). 220 volt AC EU and UK style plugs available.
Cable:	50 feet (15 meters) extendable to 200 feet (61 meters) rated SJTOW for heavy duty outdoor use. Waterproof connectors.
Certifications	UL listed power supply for outdoor use (E249834) NSF/ANSI 61 CE certified EPA Registration #074929-MA-001
Warranty	2 Years Service by Manufacturer