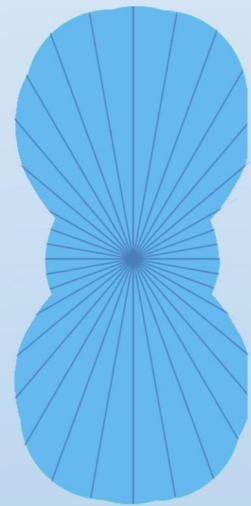


HYDRO BIOSCIENCE™

Eco Driven Solutions™

M e z z o - D B™

The Mezzo-DB™, is a state of the art ultrasonic device for algae and biofilm control. The Mezzo (Bi-Directional) – DB (Dual Bandwidth) offers features not found before in these types of devices. The bi-directional sound output is achieved with just one piezo sound emitter that operates in two different bandwidths for better control of green algae and diatoms in the lower bandwidth and blue-green algae in the higher bandwidth. The sound beam pattern would look like the illustration to the right with the sound coming from the square faces.



USES:

- Swimming Pools
- Small Decorative Ponds
- Water Features



The device works in harmony with aquatic wildlife (fish and animals), aquatic plants, bio-solids and planktonic organisms other than algae. Since the device can control biofilm formation on cleaned surfaces, you may notice surfaces near the device remain clean for long periods after being initially cleaned. This is due to inhibiting anaerobic bacterial colonization due to their sensing the ultrasonic signature as water turbulence. Fungi (e.g. Pythium) and bacteria with gas vesicles will also be controlled by the device by causing them to lose buoyancy.

The device creates ultrasonic frequencies that cover two important bandwidth areas where algae can be controlled via critical structural resonance similar to the way a crystal glass can be broken by the right sound pitch. Ultrasound works as the force to cause these internal vibrations in algae cells or in organelles inside the algae cells that disable them. The system is powered via the power module that is available for use with many types of power input.

Power Module: This can be AC or DC electrical input. AC inputs include 24, 100/120 and 240 volt service at 50 or 60 Hz. DC input is 24 volts via solar or AC charged batteries (typically two 12 volt batteries in series.) The power module converts the input power to the 44 volt DC line voltage needed to power the sonic head. The power supply will power two separate sonic heads for added economy.



Sonic Head:

This contains the frequency driver and the sonic emitter that produce the ultrasonic output signal. The top section houses the piezo sonic emitter between two metal plates so the sound is projected away in 2 directions. The base contains the needed circuitry to power the piezo operation. The two way output is unique in the industry.



***MEZZO-DB™**

Connecting Cable: This connects the power module with the sonic head to provide power and communications to and from the sonic head. The cable can come in any length up to 500 meters (about 1640 feet). Other devices of this type are typically limited to cables lengths of 75 meters due to cable voltage drop that reduces the incoming voltage and causes the sound output level to drop proportionately. The *MEZZO-DB™ has compensating circuitry in the sonic head to restore any voltage drop in the cable run so that it always runs at full strength and is a patent pending feature of the device.



Mezzo-DB™ Design Capability:

Green Algae and Diatom Algae Control Range: 150 meters bi-directionally from the device.

Blue-green Algae with gas vesicles Control Range: 400 meters bi-directionally from the device.

Frequency ranges:

Bandwidth 1: Low ultrasonic range 34 kHz

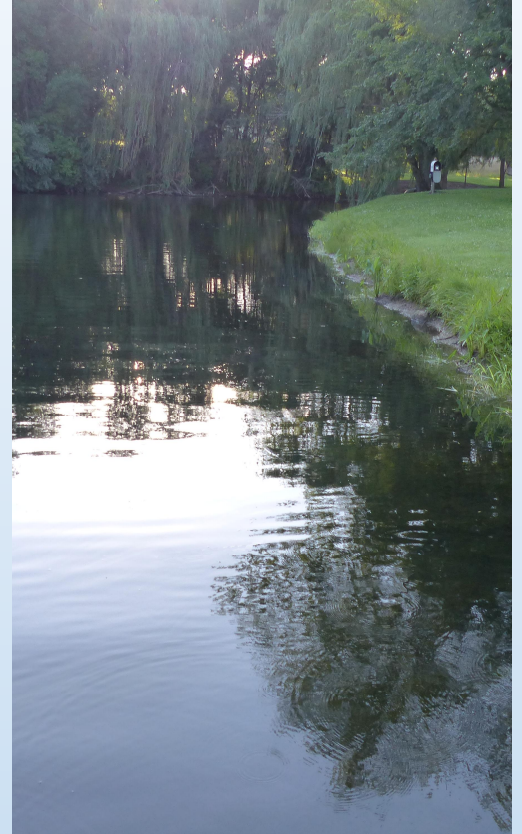
Bandwidth 2: High ultrasonic range 10 kHz

Total Frequencies per cycle: 2024

Time per cycle: about 34 minutes

Power consumed: 8 watts average on 120 volts AC
(about \$11 per year at \$0.15/kwh)

Peak instantaneous power - 25 watts.



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