



Blackstone~NEY Ultrasonics Pushes the Technological Envelope AGAIN!

Blackstone~NEY Ultrasonics introduces the industry's first **multi-frequency ultrasonic generator**.

The **multiSONIK**™ is an advanced digital generator that provides the ability to **select single or multiple frequencies** for a **single process tank**. Your cleaning results are optimized when your process includes **lower frequencies** for removing larger particles, and **higher frequencies** for removing sub-micron particles. This can now all be achieved in just one tank!

- Conserves Valuable Space
- Capital Expenditure Savings
- DI Water Consumption Improved
- Increased Product Yield
- Faster Cycle Times
- Enhances Solvent Cleaning Applications
- Proven Field Reliability
- *New Freedom for the Process Engineer*

Technology of the Future Today!
One tank, one generator



Technology of the Past
Multiple tanks each driven by its own generator





Fact: First to bring you Sweep Frequency

Fact: First to bring you Dual Sweep

Fact: First to bring you High Frequency Ultrasonics

Fact: First to bring you the Universal Transducer, and now –

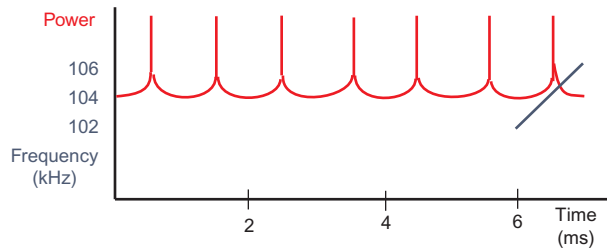
The next revolutionary step in cleaning technology, the

multiSONIKTM with upSWEEPTM

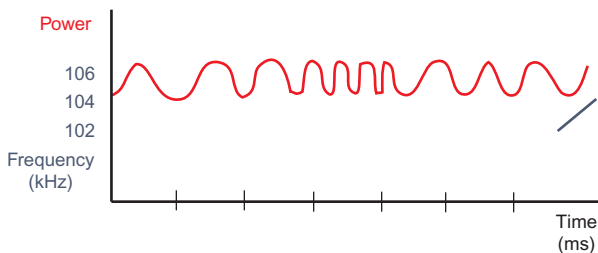
multiSONIK: The next revolutionary step in ultrasonic cleaning technology. For the first time a system that allows operation at constant power at multiple distinct frequencies. Blackstone~NEY Ultrasonics has continuously focused on the entire ultrasonic cleaning process, not just the transducer or generator in isolation. It is this holistic approach that drives all of our engineering efforts, demonstrated in the major performance factors of frequency modulation, amplitude modulation and transducer design and, now, multiple frequencies from a single generator/transducer combination.

Frequency Modulation

The innovators who, in 1988, brought you the concept of SWEEP frequency extend the state of the art with patented dualSWEEP and now upSWEEP technology. The concept of dualSWEEP, an improvement to the conventional fixed frequency sweep rate, is the introduction into the tank of a non-constant sweep. This is accomplished by linearly sweeping the sweep rate. When a typical Langevin-type transducer is swept through a bandwidth of frequencies, the output power is not constant for each frequency. Generally, the output power of a sharp resonance transducer peaks near the center of the bandwidth. When sweeping up in frequency, a peak pulse of power is put into the tank at the center of the sweep range; when sweeping down in frequency, another peak pulse of power is put into the tank at the center of this sweep range.



Conventional ultrasonic power delivery to a cleaning fluid. Conventional sweep results in periodic pulses that can excite a part into damaging resonance.



Our patented dualSWEEP technology, coupled with the broadband universal transducer, protects parts from damaging resonances by delivering power evenly and non-periodically.

This process continues, producing equally spaced power pulses at a rate equal to two times the sweep rate. The resonance phenomena is caused by repeatedly pumping energy into a part at its resonant frequency. A non-constant sweep rate will vary the spacing between the power pulses, avoiding a resonant condition and potential damage.



In this scenario there is no fixed frequency at which the power pulses are supplied to the liquid and therefore, no repetitive single frequency to excite the part being cleaned into resonance. This modulation eliminates the possibility of a part being excited into a damaging resonance at a frequency of two times the sweep rate. Unlike the competition, our universal transducer is designed for a broad bandwidth and thus avoids abrupt transfers of power to the tank.

Yet another innovation is the repetitive, monotonical sweeping of the frequency from a high frequency to a lower frequency. This causes an ever-expanding wavelength in the tank which is repeated each sweep cycle. This results in a net upward force on contamination in the liquid. For bottom mounted transducers on a tank with overflow weirs, this extra upward force helps the system purge itself of contamination.

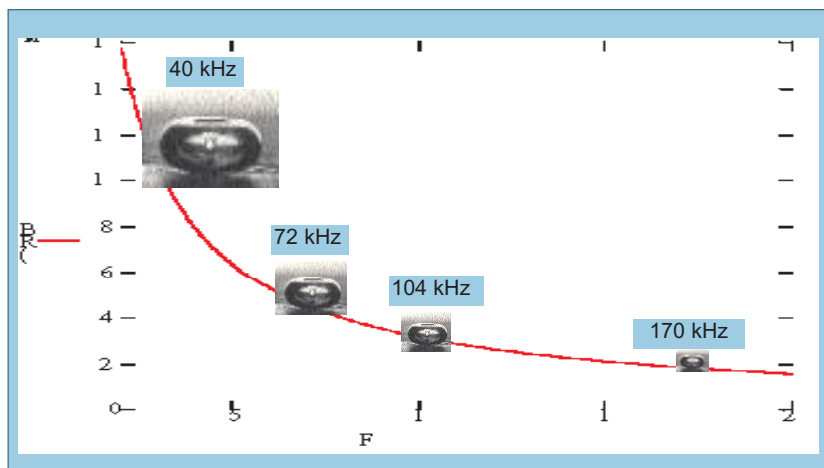
Amplitude Modulation

Amplitude modulation is achieved in essentially two ways: One is to smoothly vary the amplitude output, or waveform, of a generator. The other method is to introduce periodic times during ultrasonic cleaning when the generator output is brought to zero. Waveform types include sine wave, square wave, and quarter sine wave. Quarter sine wave modulation has the largest peak power-to-average power ratio and is best suited for hard-to-cavitate fluids. Square wave modulation has the smallest peak power-to-average power ratio and is best for soft substrates or parts susceptible to cavitation erosion. We offer all three within our total product line. The multiSONIK, however, features sine wave modulation which is best suited for the majority of precision cleaning applications.

Multiple Frequencies

multiSONIK is the first true, constant power, four frequency generator. When matched to our unique universal transducer, this device offers the process engineer a new degree of freedom through the ability to select cavitation event size. Since the smallest structure you can affect is determined by the minimum size of the bubble, your cleaning results are optimized when your process includes lower frequencies for removing larger particles, and higher frequencies for removing sub-micron particles.

This can now all be achieved in just one tank.



The science of multiple frequencies

As the frequency of insonation increases, the radius, and thus the energy, of each cavitation event decreases. The larger radius characteristic of lower frequencies creates a much more aggressive cleaning action, while the smaller radii bubbles of the higher frequencies are gentle and safe for long immersion times and sub-micron particle removal.

Glossary

Frequency Modulation The time dependence of the frequency output of a generator. One of the methods by which the cleaning activity in a tank can be affected.

◆ **SWEEP** The variation, within some bandwidth, of the operating frequency about the resonant frequency. Pioneered by Blackstone~NEY Ultrasonics' engineers, now an industry standard.

◆ **dualSWEEP** The variation, within some bandwidth, of the sweep rate about the optimum sweep rate. Exclusive Blackstone~NEY technology designed to prevent part resonance and thus damage.

◆ **upSWEEP** A modification of traditional sweep such that the sound in a tank is sweeping only from high frequency to low. This exclusive technology yields an ever increasing wavelength in the tank to bring contaminants to the surface and over the weir.

Amplitude Modulation The time dependence of the output amplitude of an ultrasonic generator. This is another method by which the cleaning activity in a tank can be affected.

Waveform The time dependence of the magnitude of the output of an ultrasonic generator. This is often quantified by stating the peak power-to-average power ratio.

Duty Cycle The percent of the time during an ultrasonic cleaning cycle when the generator output is turned on. This function enhances cleaning by facilitating the degassing of a fluid, and is varied by the multiSONIK's power control.

multiSONIK™
Generating the Future of Ultrasonics

- ◆ Standard frequencies: 40, 72, 104 and 170 kHz
- ◆ Power Output: 900 Watts at each frequency
- ◆ Full PLC Control
- ◆ Optional handheld PLC (*shown*)
- ◆ Power control 0.1 - 5.0 Volt DC analog
- ◆ Power meter 0.1 - 5.0 Volt DC analog
- ◆ 24 Volt Remote On/Off
- ◆ 24 Volt Binary Frequency Select
- ◆ 208, 220 or 240 Volt 1 Ø, 50/60 Hz



Dimensions

Horizontal model: 6" H x 13" W x 18" D
Vertical model: 12.25" H x 5.25" W x 16" D
OEM sales model: 7" H x 10" W x 11.5" D

*Custom configurations available to meet
your specific process requirements.*

Optimize your precision cleaning!

Contact us for more information or to request a demonstration system today.

Visit

www.blackstone-ney.com

for more technical details
and product information!



P. O. Box 220
9 N. Main Street
Jamestown, NY 14702-0220

800 766-6606
716 665-2340
fax 716 665-2480
precision@blackstone-ney.com