



Zenith Ultrasonics

Waves at Work

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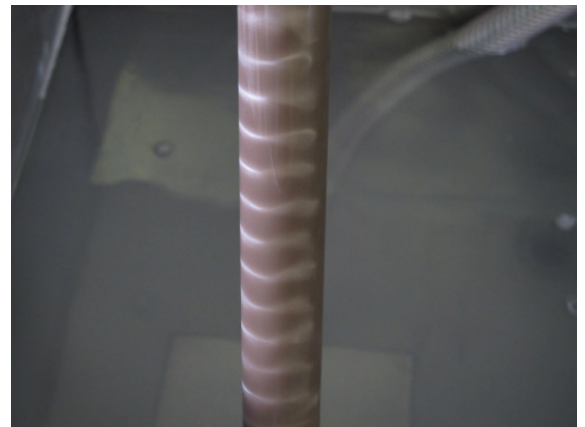
Patented ADVANTAGE Automation Systems

For Industrial Cleaning Applications



Zenith's ADVANTAGE Automation System (US Patent 10,112,221), is designed specifically for both industrial and precision cleaning applications. This unique system is engineered to be easy to operate and maintain, while simultaneously maximizing the cleaning performance of the machine by including a dedicated oscillation platform on each tank that serves to intermittently oscillate the product being processed DURING the process. This is a significant advantage when processing parts, since oscillation greatly aids in contaminant removal on all areas of the product and can prevent damage to parts which are sensitive to ultrasonic damage such as polished aluminum.

To fully understand why oscillation drastically improves an ultrasonic cleaning process, you must first understand that ultrasonic cleaners do not produce completely evenly distributed scrubbing energy everywhere in the bath, regardless of Sweep Frequency Circuits or any other information you have heard from competitive vendors, and any simple "foil test" can be used to confirm our information. The most intense scrubbing takes place at the *standing waves* produced by the ultrasonic system. The photo to the right depicts Zenith's Ultra-Probe Ultrasonic Demonstration Device when submerged in a 40kHz ultrasonic cleaning bath. The light-colored stripes indicate the areas of intense ultrasonic activity, while the darker areas between the stripes indicate areas of significantly reduced ultrasonic activity. The distance between neighboring standing waves is approximately 1/2" at 40kHz. When parts are cleaned in such a system, parts are aggressively scrubbed every 1/2" while areas between are scrubbed significantly less aggressively.



By oscillating the product intermittently, items being cleaned are scanned through the standing waves, thereby producing a more even scrubbing effect on the parts in the same way that a turntable in a microwave oven heats food more evenly.

In addition, oscillating the product through the surface of the liquid has additional benefits. Blind holes and other detailed parts areas are repeatedly filled and drained to remove the contamination that has been



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loosened by the ultrasonic system, but remains trapped in these areas. Furthermore, parts that are oscillated through the surface pass through the highest ultrasonic energy band which is present just below the surface of the liquid where all ultrasonic energy reaching the surface is reflected back down into the tank.

Also, passing the parts through the surface creates a dragging action of liquid on the parts which tends to drag the loosened contaminants from the product. We have addressed several applications which were not successful unless such dragging action was introduced.

If that were not enough, the oscillation action provided by this system can also prevent damage to components which are sensitive to ultrasonic etching, such as polished or machined aluminum components. Damage is prevented by moving the product which scans objects through the ultrasonic energy patterns rather than allowing the ultrasonic action to attack the same location for long periods of time. The photo to the right depicts a part which was damaged by ultrasonic etching. The ADVANTAGE can prevent this damage from occurring without any modifications.

The basket transfer method on Advantage automated systems is performed using a highly-reliable and simple method. While some systems, like our TRANSTAR Automation System, move baskets by lifting them out of the tank and dropping them off in the next processing tank, the Advantage system pushes the basket along a guided path that is created between neighboring oscillation platforms using standard NFPA pneumatic cylinders or precision ball screw actuators. There is NEVER a possibility of dropping parts or “crashing” the system with the Advantage since the baskets never disengage from the oscillation platforms.

Although there are 1 or 2 other manufacturers which transfer baskets in the same way, the real “advantage” of Zenith’s design is how the baskets are suspended during the process.

Anyone that has used an ultrasonic cleaner before can attest to the fact that ultrasonic energy is absorbed by anything and everything which is submerged in the bath. To maximize ultrasonic scrubbing performance,





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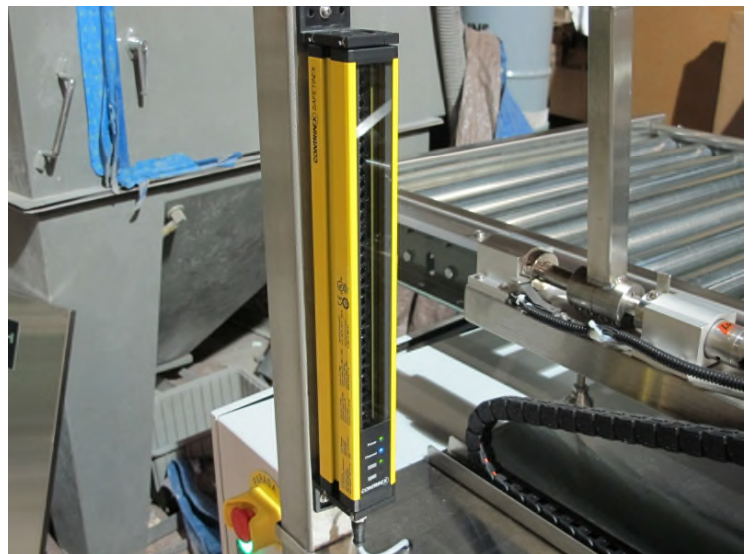
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you must eliminate ANYTHING which is submerged in the bath other than the parts and the basket. This allows the most possible energy to be dedicated to cleaning parts. While all other manufacturers of such system support the parts from underneath, Zenith supports the baskets from overhead and the difference in performance is significant. By supporting the baskets from overhead using our patented design, ultrasonic scrubbing action is increased by over 500%, and a simple foil test will confirm this. This design represents the largest improvement in automated ultrasonic system design in the past 30 years.

Since parts are suspended from overhead, the oscillation platforms can be strengthened by adding cross-members to them. This allows Zenith to offer the Advantage system to customers requiring extremely high load capacities. The first Advantage system ever built was designed to support a 600 pound load. If you had to support such a load from underneath, the framing below the basket would be so thick and energy-absorbing that very little energy would reach the part, energy that is vitally important when cleaning such heavy objects.



Standard equipment includes all stainless steel framing, tanks, and exterior panels, light safety curtain to protect operators, CROSSFIRE Multiple Frequency Ultrasonic Systems (US Patent 5,865,199 and 6,019,852) to provide the power of low frequencies with the penetration and improved energy distribution of higher frequencies, a color touch-screen human/machine interface, Variable Recipe Programming where baskets of any recipe can be added at any time, pause features to permit part rotation or compressed air blow-off, and much more.



If your parts demand the absolute best possible performance out of an automated ultrasonic cleaning system at a highly-competitive price, contact Zenith for additional information or a quotation on our Advantage Automation System.