



By Tracy Martin

## Sound Waves And Parts Cleaning

**H**ow much time do your service personnel spend cleaning parts? Does one employee get to do all the dirty work, or does each technician clean whatever he or she is working on? Either way, manual labor is involved, and as we all know, time is money. While wandering around Dealer Expo I saw several exhibitors that featured ultrasonic cleaning systems. While ultrasonic cleaning has been around for over 30 years, these products have been traditionally used by the medical or aerospace industries. Often considered too high tech for automotive or powersports use, ultrasonic technology offers a sound alternative to other parts cleaning methods. We asked the folks at Omegasonics how ultrasonic cleaning works and how it can save your service department money.

Ultrasonic cleaners use high frequency sound waves to create bubbles within a heated soapy bath. A process, called cavitation takes place when the water inside the cleaning tank is cold boiled. To visualize how this works, think of a sold object like a paper clip. If you bend a paper clip back and forth enough times it will break because the metal becomes fatigued. The bonds that bind the molecules in the paper clip together release their hold on each other, and the paper clip snaps in half. Water can be "broken" by using a similar process. Just like bending the paper clip back and forth to break it, water can be jiggled back and forth — this has to be done very quickly. Ultrasonic cleaning involves a transducer that is placed into a cleaning tank where it vibrates around 40,000 times per second. This action fatigues the water and breaks the water molecules apart.

So what does this have to do with cold boiling? Normally heating water to 212°F creates steam bubbles, but the vibrating method does the same thing without using any heat creating cold boiled water. As these "steam" bubbles pass over the surface of a part in the cleaning tank, they leave behind a void or cavity. The surrounding water molecules rush in to fill the void, and when they reach the center of the cavity, they collide with each other with great force. The shock waves created by all these zillions of bubbles collapsing is called cavitation and is strong enough to wear away metal. In fact, cavitation was discovered when ship builders were investigating why propellers on ships kept wearing out. Cavitations create a scrubbing action that cleans the parts.

Ultrasonic cleaning removes all kinds of crud including dirt, hydrocarbons, metal shavings, buffing/polishing compounds, built-up grease and carbon deposits to name a few. Ultrasonic cleaning tanks heat the soap solution to 150°F to make it more efficient. Typical cleaning times are around 30 to 40 minutes.

Here are some advantages of using ultrasonic cleaning in a service environment: 1) Lots of powersports vehicles have hard-to-clean components that have inaccessible grooves and other areas where dirt can hide and damage a rebuilt engine.

Ultrasonic cleaning cleans these hard-to-reach areas as well as exposed surfaces. Because ultrasonic cleaning action only removes oil, carbon, varnish and other built-up dirt, O-rings, seals and plastic can be left in place — a savings in labor time. 2) Increased technician productivity. Instead of one tech cleaning a carburetor using a can of spray cleaner (about \$6 per can), he can throw six carburetors, or other parts, into the ultrasonic cleaner tank, press a button and go do something else for half an hour. When he comes back the parts are spotless and ready to be assembled. Not only can you clean more parts with less labor, you can clean the hard stuff — carbon on piston tops for instance. 3) There's no solvent to "rent" and dispose of. Soap-based cleaners used for ultrasonic cleaning are non-toxic and meet EPA guidelines. Omegasonics manufactures over two dozen cleaning soaps including; "OmegaClean" a general purpose cleaner that won't harm aluminum finishes, "OmegaZyme" specifically used to consume

and digest oils and grease, and "OmegaBrite" a cleaner that can actually remove carbon deposits like those found on the tops of pistons and back sides of intake valves. Solutions used in tabletop systems last from three to six weeks. Floor models, because of their on-board filtration systems, don't have to have their solution changed for up to six months.

Ultrasonic cleaning tanks are available in various sizes from tanks large enough for an entire V8 engine block, to tabletop

systems more suited for motorcycle and ATV parts. Tabletop models come in sizes as small as 0.5 gallon to 7.75 gallons and range in price from \$350 to around \$1,700. Large shops may want to consider an industrial (25 gallons or more) sized cleaning system starting at about \$7,000. At first glance this may sound like a lot of money, but just add the cost of all those spray cans of carb and brake cleaner, the monthly bill for new solvent and its disposal, and lower technician productivity. It won't take many months for an ultrasonic cleaning system to pay for itself. ●



**Ultrasonic cleaners like these from Omegasonics, can save your dealership money over the long haul.**

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*Tracy Martin started working in the automotive aftermarket 25 years ago. He has worked as a certified A.S.E. technician and service writer. He is also a consultant for Snap-on and Nissan. He has developed and taught courses for EFI, ABS and other on-board computer-related subjects. In addition to his car career, he writes for several motorcycle magazines and has been riding for more than 30 years on all brands of bikes.*