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Ultrasonic Cleaning

Unlike some other cleaning processes, ultrasonic cleaning will not damage intricate, lightweight, or easily damaged parts.

Parts that have a tendency to tightly nest will shadow each other, reducing cleaning efficiency. Since ultrasonic cleaning is done in a tank, it is by nature a batch process. The success of the process is very dependent on the ultrasonics, the chemistry used, part geometry, and weight of the part.



Above: an ultrasonic cleaning tank with in-line waste water recovery

How it Works

- Ultrasonic cleaning works by producing sound waves in liquids. The waves consist of both
- high- and low-pressure fronts. The low-pressure fronts are small enough to cause bubbles to form. The high-pressure fronts cause the bubbles to collapse. The expanding and collapsing bubbles loosen contaminants on the part surface and the chemical cleaners either dissolve or segregate the free contaminants
- As with sound waves in air, ultrasonic sound waves can be varied by both frequency (pitch) and amplitude (power). Higher frequencies will produce smaller bubbles and lower frequencies will produce larger bubbles. Larger bubbles will typically dislodge large particles and smaller bubbles small particles. Typical industrial systems are either 25 KHz or 40 KHz, which can handle the particle sizes in the range of normal automotive cleaning. Ultrasonic cleaning systems with a much higher frequency are used in the computer industry where tiny particles need to be removed.



An Anilox Roller before and after ultrasonic cleaning

Key Advantages of ultrasonic cleaning

- ❖ Able to clean delicate parts without damage
- ❖ Able to clean small apertures, blind holes, and crevices
- ❖ Able to clean sensitive parts (wiring, plastics) with relatively mild chemistries
- ❖ Does not require line-of-sight for effective cleaning

Disadvantages of Ultrasonic Cleaning

- ❖ It is a batch process
- ❖ Large loads are not cleaned as quickly as small loads due to energy absorption
- ❖ Large heavy parts can “shadow” each other or themselves resulting in poor cleaning
- ❖ Extremely thick layers of grease, and grease mixed with dirt, are slow to remove
- ❖ Aggressive chemistries combined with ultrasonics can pinhole foil and pit some materials