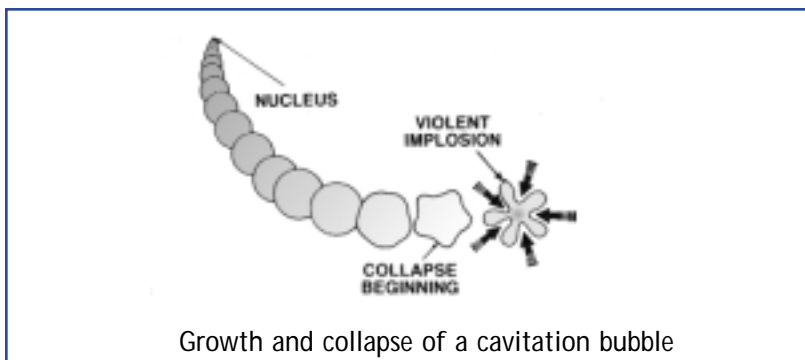


OPTIMIZING YOUR ULTRASONIC CLEANER

Ultrasonic cleaners have been workhorses in both laboratories and industry for decades. This acceptance is based on their ability to remove soils from inaccessible areas quickly, completely, and consistently without reliance on operator technique. Brasonic tabletop cleaners offer a number of features which allow the operator to optimize their performance.

Ultrasound is sound transmitted at frequencies beyond the range of human hearing. To understand how ultrasound can perform cleaning, it helps to understand the underlying principles and how they are applied in cleaning. High frequency energy is generated by an electrical power supply and applied to heavy duty, industrial piezoelectric transducers. These transducers convert this electrical energy to high frequency mechanical energy vibrating at a rate of 40,000 times per second, producing alternating high and low pressure waves within the cleaning liquid. The liquid is compressed during the high pressure phase of the wave cycle, then pulled apart during the low pressure phase. As the pressure in the liquid is reduced during the low pressure phase, cavities grow from microscopic nuclei to a maximum critical diameter, as shown in the diagram below. During the subsequent high-pressure phase, these cavities are compressed and implode. The released energy is powerful, but safe for parts because it is localized on a microscopic scale. This process is called "cavitation."

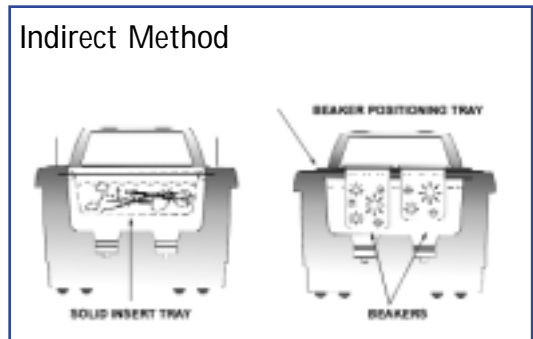
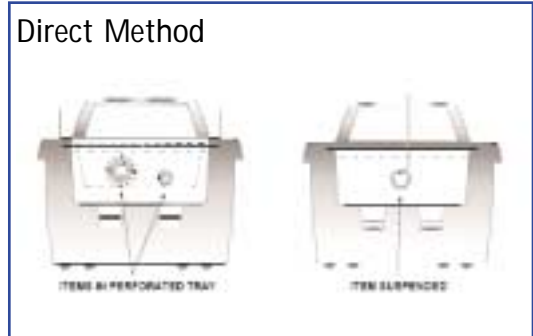


There are many factors affecting the strength of cavitation including temperature, surface tension, viscosity, and density of the liquid. When selecting an ultrasonic benchtop cleaner, it is important that it permit as much control as possible of these factors. If temperature and time can be controlled, then cleaning consistency can be improved. For example, a microprocessor-based digital thermostat allows selection and constant digital display of the solution temperature at the optimum point. The availability of heat can also increase the chemical activity of cleaning solutions, permitting safer concentrations. Many solutions operate best at temperatures between 120-150° F. Adding a wetting agent or surfactant to the bath can reduce surface tension of the liquid. Reduced surface tension will increase cavitation strength. Higher viscosity liquids tend not to cavitate well due to their inability to create and collapse cavities quickly. Higher density liquids create intense cavitation with a greater implosive force.

Application of these principles can result in faster more effective cleaning. See the reverse side of this sheet for helpful hints and important items to remember.

Remember, when using your cleaner...

- Never place parts or receptacles directly on the bottom of the unit. It can cause the unit to fail because the parts will reflect the ultrasonic energy back into the transducer(s). Always allow at least one inch between the tank bottom and the beaker or receptacle for adequate cavitation. Keep solution within one inch of the top of the unit when the beaker or tray is in place.
- If using a tray or basket to lower the parts into the solution, it is better to use a holder that is of open construction, either an open mesh basket or an insert tray, that is adequately perforated for drainage. This also permits free access of the sound waves to the parts.
- Renew cleaning solution often to increase ultrasonic cleaning activity. Solutions, as with most chemicals, become “spent” over time. Solutions can become contaminated with suspended soil particles, which can settle to the tank bottom and inhibit ultrasonic activity.
- Wait 5 to 10 minutes after activating the equipment for fresh solution to degas. This need not be repeated with subsequent use, as degassing is required only after the bath is freshly filled.
- Never use solvents in a small benchtop cleaner. It is neither safe nor environmentally responsible. Solvents vaporize quickly and can collect under the unit where ignition is possible from electrical components. Mineral acids and bleach can also damage the unit.



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