

# Ultrasonic Cleaning

**What is Ultrasound?** Ultrasound is form of acoustical vibration occurring at frequencies too high to be perceived by the human ear, (usually above 20,000 Hz).

**What is Ultrasonic Cleaning?** Ultrasonic cleaning utilizes acoustical vibration at high frequencies through a liquid medium. The vibration of the fluid is so rapid that it forms bubbles and that process is known as "cavitation." Those bubbles "adhere" to the surfaces of instruments where they implode (collapse) causing the foreign matter to be dislodged in a gentle but total manner. Rather than time consuming scrubbing by brush, millions of microscopic bubbles or "vacuum cleaners" dislodge the foreign matter from surfaces, blind holes, pores, tight joints and places that cannot be reached by long time soaking and scrubbing. Ultrasonic cleaning accomplishes that in minutes and is so gentle it will not etch glass. The instruments are thoroughly cleaned, ready for sterilization, eliminating the possibility of "disinfected dirt."

**Will it harm items in the tank?** No! The choice of a proper chemical for placement in the tank is the critical factor for both effective cleaning and possible damage. If a chemical will cause damage to certain materials than that process can be speeded up by ultrasound.

**Why use chemicals?** They are critical to good cleaning. The use of the correct solvent in the correct concentration tends to lower surface tension while preserving cavitation action. Chemicals fall into two categories: Aqueous Chemicals such as our Cavi-Clean and Cavi-Clean Additive and, Organic solvents.

**Why consider Ultrasonic Cleaning?** *Time:* A more thorough job of cleaning can be done quicker. *Efficiency:* The effectiveness of cavitation enhances the sterilization process that many follow. A thin film of lubricating oil remaining on the instrument surface can protect spores against the steam of autoclaving. Soil can cover micro-organisms and they may remain present throughout the sterilizing cycle. While steam sterilization can kill pathogens, it will bake on protein and traces of minerals leading to corrosion and costly instrument repair. *Safety:* The scrub-brush method can contaminate by splattering polluted cleaning solutions in all directions or, flicking contaminated aerosols into the cleaning room atmosphere. *Cost Effective:* Hands used for scrub-brushing are free to do more important chores while the millions of cavitation bubbles clean more effectively—in less time.

**Does Ultrasonic cleaning have any germicidal capability?** Directly, no! Indirectly, yes! It is not a substitute for sterilization. Its germicidal capability is not due to destruction of micro-organisms by the sound waves. But, ultrasound does make it easier and quicker for an effective germicidal agent to do its job, be it by autoclave, gas or chemical processing.

**Is it Consuming?** No! The amount, type and location of the containment dictate cleaning time. Contaminants of long standing stains, rust, etc., may require more time or repeated cycles of cleaning. Also, the number of items per load can affect the effectiveness of cleaning. The "smaller" the bulk of the load, the less likely dampening of the waves will occur.

**Indications:** Ultrasonic cleaning has general applications within the medical field, industry, hobby field, athletics, home healthcare, etc. Within hospitals several departments can be identified as users such as: O.E. clinics, inhalation therapy, emergency rooms, clinical labs, dental clinics, etc.; for cleaning scalpels, hemostats, specula's, hand pieces, contra-angles, Petri dishes, etc. Specialists such as plastic surgeons, podiatrists, dentists, ENT, etc. are a few of the possible users of ultrasonic cleaning. For home healthcare and athletics, ultrasound can be applied to the cleaning of mouthpieces, safety glasses, hard lenses, certain respiratory accessories, etc. In home and hobby applications antique glass prisms, jewelry (except for soft or porous germs), drilling or finishing bits, etc. can be cleaned thoroughly while their useful life is extended.

**Contraindications:** Common sense should be applied to the use of ultrasonic cleaning and to the choice of the proper chemical. The possibilities of damage to the tank, to items to be cleaned or to the skin of the user should be clearly recognized prior to initiating a cleaning cycle. Stated warnings of all involved manufacturers should be observed. Do not place hands in tank during operating cycle.

# Ultrasonic Cleaning Guide

Contaminant	Chemical	Description	Caution	Directions	Approximate Cleaning Time*
General cleaning, dried blood, foreign matter, dirt and grime on jewelry, lensed and delicate instruments, and heat-labile materials	Cavi-Clean liquid detergent	All purpose concentrated detergent, neutral pH. Will not harm metals or their alloys. High sudsing. Excellent wetting and penetrating agent. Rust inhibitor. Will meet most cleaning requirements.	Do not clean jewelry containing soft or porous gems.	1 part in 100 parts water. (1 or 2 oz. (28.g or 56. g) per gallon). (3.78 liters).	Up to 15 minutes
Stains, remove metal oxides, loosen plaster, and enhance initial cleaning of surgical instruments	Cavi-Clean additive	Highly soluble powder to greatly increase cleaning action.	Use only as an additive to Cavi-Clean detergent. With certain detergents it may cause damage to cleaning tank or parts to be cleaned. Repeated usage may remove plating from parts and damage stainless steel instruments. Tank damage can be avoided by cleaning in a supplementary glass container. Should be utilized with dissimilar metals. Use only when necessary. Cavi-Clean will meet most cleaning requirements.	Add 1-3 teaspoons (0.36 to 1.1 ml) per gallon (3.8 liters) of water in conjunction with Cavi-Clean detergent. In extreme cases greater concentrations can be determined by trial, usually using less water in the cleaning tank.	Up to 15 minutes

\*Above suggested times include consideration for degassing.

## Considerations

<ul style="list-style-type: none"> <li>Ultrasonic cleaning is better accomplished in de-gassed water. Time for each cycle should include need to de-gas water.</li> <li>Repeating cleaning cycle may be necessary. Suggested cleaning times may be affected by length of time contaminant may have been present, whether instruments have been subjected to earlier ultrasonic cleaning, etc. Repeating the cleaning cycle will have greater affect upon stubborn contaminants.</li> <li>A regular routine of ultrasonic cleaning will insure cleanliness, improve function of box locks, prolong useful life of instruments and restore "useful life to instruments which may have been relegated to the bottom drawer."</li> <li>Rinse load before and after ultrasonic cleaning.</li> </ul>	<ul style="list-style-type: none"> <li>Cleaning of dissimilar items may be accomplished by placing them in a supplementary glass container within tank. (I.e. beaker for burrs, blades, dentures, electrodes.)</li> <li>When cleaning jewelry with set stones, it is important to know the condition of the setting. While ultrasonic cleaning will not damage a setting it can further loosen a stone whose setting is questionable. Be sure stones are not cracked or chipped.</li> <li>When using chemicals remember more may not be better. Repeated cleaning should be attempted rather than exceeding suggested manufacturer formula.</li> </ul>
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