Graymills

Benchtop Series Ultrasonic Cleaning Tanks

Operations and Maintenance Instructions

Be sure anyone operating this unit reads and understands all warnings and instructions. Keep this manual available for reference/training.

SAFETY WARNINGS

You will find various types of safety information on the following pages and on the labels attached to Graymills equipment. The following Safety Statements explain their meaning:

	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid personal injury or death.**
	**DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
	**WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
	**CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**
	**CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.**

READ BEFORE OPERATING

- Never work with equipment you feel may be unsafe. Contact your supervisor immediately if you feel a piece of equipment is in unsafe condition.
- Cleaning solutions may be irritating to skin and eyes. Always wear gloves, apron and safety glasses when using. If splashed in eyes, flush thoroughly with water and follow directions on cleaning solution.

UNPACKING

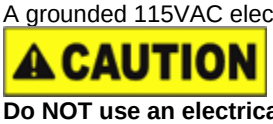
1) When the equipment is received, inspect the packaging exterior for shipping damage.
2) Report any visible packaging damage to the freight carrier immediately.
3) Carefully open the packaging and remove any packing material.
4) Remove the equipment from the carton and visually inspect for concealed damage.
5) Report any concealed damage to the freight carrier immediately.

Important: All claims for shipping damage must be handled directly with the freight carrier. Do **NOT** return damaged equipment to Graymills without first obtaining an RMA.

OPERATION

INSTALLATION AND SETUP

1) Choose a well-lit, well-ventilated work area with clear access to the cleaning tank.
2) Place the unit on a level bench or platform capable of supporting the weight of the cleaning tank when filled with fluid and the parts to be cleaned.
3) The bench surface should be resistant to the cleaning fluid used in the cleaner.
4) **Be sure that the airflow openings at the bottom of the tank are not blocked**.
5) A grounded 115VAC electrical outlet should be located near the cleaning tank.

   Do NOT use an electrical extension cord to connect the cleaning tank to the power source. It is strongly recommended that the electrical supply outlet be protected by a Ground Fault Circuit Interrupter (GFCI).
6) Provide an area near the cleaning tank for storage of the cleaning fluid used in your application. Refer to the **APPLICATIONS** section for recommendations on the proper cleaning fluid for your application.

   This ultrasonic cleaner is intended for use only with non-flammable cleaning fluids compatible with the stainless steel cleaning tank. NEVER use a flammable or combustible fluid in this parts cleaner. Using a flammable or combustible fluid in this equipment may produce a hazardous condition that can result in property damage or injury to personnel.
   This warning also applies to non-flammable fluids that have become contaminated with flammable or combustible materials.
   Refer to the APPLICATIONS section for recommendations on the proper cleaning fluid to use for your application. If in doubt, contact the Graymills customer service department at (773) 248-6825 for cleaning fluid recommendations.

STARTUP

1) Be sure the **ULTRASONIC GENERATOR** and **HEATER** switches are in the OFF position. Check that the drain valve is closed.
2) Fill the tank with the desired non-flammable, non-combustible cleaning fluid. **DO NOT OVERFILL**. Be sure to leave room above the liquid level to immerse the workload without spilling over the top of the tank. A good policy is to leave a 1½" minimum freeboard between the top of the fluid and the top of the tank with the workload fully immersed. This will reduce the possibility of spillage.
3) Add the required cleaning chemicals to the water in the tank. Consult the cleaning fluid manufacturer's literature and the **APPLICATIONS** section of this manual to determine the proper amount of detergent to add. The detergent may be pre-mixed with the water before filling the tank if desired. The amount of contaminants on the parts and the quality of the water in your area will affect the amount of detergent concentrate to add. After cleaning a few typical parts, the detergent concentration may be adjusted for best results.
4) Connect the power cord to the power outlet.

   Never operate the tank heaters or the ultrasonics without at least 6" of liquid in the tank. Operating the ultrasonic cleaner with a dry tank or with insufficient liquid will cause permanent damage to the heaters and/or the ultrasonic transducers.
5) Set the temperature control dial to the desired operating temperature. Consult the cleaning fluid manufacturer's literature and the **APPLICATIONS** section of this manual for guidance in setting the proper temperature. The optimum cleaning fluid temperature will be between 120º F. and 140º F.
6) Turn on the **HEATER** switch and allow the cleaning fluid to reach the set temperature.
7) Turn on the **ULTRASONIC GENERATOR** switch and allow the cleaning fluid to degas for several minutes. Refer to the **APPLICATIONS** section of this manual for an explanation of the degassing process.

PARTS CLEANING

1) Place the contaminated parts in a free-draining basket and lower the workload into the ultrasonic tank. Parts may be suspended in the tank by a hook or cable if that is more convenient.

   Avoid placing parts directly on the tank bottom. Damage to the parts or the tank bottom may occur.
   Retrieval of parts after cleaning is simplified if the parts are suspended in the cleaning fluid loaded in baskets or by using a hook.

2) Refer to the **APPLICATIONS** section of this manual for guidance as to the required cleaning time for your application. The cleaning time will be determined after cleaning a few trial loads and evaluating the resulting cleanliness level. Typical cleaning times will range from 3 to 6 minutes. Severely contaminated parts may require longer cleaning times. When starting out, **NEVER** leave parts in the ultrasonic tank unattended longer than 4 or 5 minutes. **Painted or polished part surfaces may become damaged by excessive exposure to the ultrasonics.**
3) Placing the lid on the tank will reduce any objectionable noise while cleaning parts. This will also reduce heat losses and the discharge of odors and vapors into the work environment.
4) Parts in the basket should be arranged so that the cleaning fluid can flow freely around all surfaces of the work and drain thoroughly after the cleaning process. Avoid over-filling the basket with too many layers of parts.
5) Concave or hollow parts should be placed so that they fill completely while submerged and drain completely after cleaning. Gentle tumbling while submerged or draining can often facilitate this process.

RINSING AND DRYING

1) The workload may require rinsing to flush away any contaminants that may re-deposit on the parts as they are withdrawn from the cleaning tank. Also, check cleaning solution instructions to see if they recommend rinsing. The parts may be immersed in a tank of clean water or held under a running water flow to rinse away any loosened debris. A heated rinse may be required to completely remove any remaining detergent residues.
2) If dry parts are required after cleaning, the workload may be blown dry or placed in a heated drying chamber to remove any remaining water. If compressed air is used to blow off the parts, it should be clean, oil-free and filtered to avoid re-contaminating the cleaned parts. Follow Safety Instructions for use of compressed air blowing.

MAINTENANCE

This machine utilizes dangerous high voltage to operate the ultrasonic transducers. Only qualified trained personnel should attempt any repairs or servicing of the ultrasonic components. Disconnect all power before servicing the ultrasonic generators or tank heaters.
If in doubt about any servicing procedures, contact Graymills' customer service department at (773) 248-6825.

Be sure to unplug the power cord and allow the tank to cool for 15 minutes before draining the fluid. Operating the heaters or the ultrasonics with a dry tank or with insufficient fluid level will permanently damage the heaters and/or the ultrasonic transducers.

CLEANING TANK

The cleaning tank should be cleaned periodically to remove accumulated debris from the sides and bottom. This should be done at least weekly, or more often if soil accumulation is high.

1) Place the **HEATER** and **ULTRASONIC GENERATOR** switches in the **OFF** position.
2) Unplug the power cord from the electrical outlet.
3) Open the drain valve and allow the tank to empty.
4) Using a stiff brush or sponge, wash out the tank interior using a mild detergent solution. Rinse thoroughly and repeat as needed.

   Avoid the use of abrasive materials such as scouring pads, scouring powder, scraping tools, etc. on the tank interior. Damaging the finish on the tank walls or bottom will shorten the life of the ultrasonic tank and may lead to the development of pinhole leaks over time.
5) Close the drain valve and re-fill the tank with fresh water and cleaning solution.
6) Re-connect the power cord and resume parts cleaning operations.

ULTRASONIC GENERATORS

⚠WARNING

This machine utilizes dangerous high voltage to operate the ultrasonic transducers. Only qualified trained personnel should attempt any repairs or servicing of the ultrasonic components. Disconnect all power before servicing the ultrasonic generators or tank heaters.
If in doubt about any servicing procedures, contact Graymills' customer service department at (773) 248-6825.

The ultrasonic cleaner has a fan to cool the electronic components. The fans may become blocked with lint or debris that will inhibit the free flow of air. Periodically (every 2-3 months) under normal conditions, the fan should be inspected (for debris build-up), cleaned and placed back into service. Disconnect all power before starting cleaning.

GENERAL DAILY MAINTENANCE

1) Inspect the power cord and connector for deterioration or damage. Repair or replace a damaged power cord or connector immediately.
2) Do not allow the ultrasonic cleaner to sit on a wet surface. Wipe up any water or cleaning solution from the tank mounting surface.
3) Remove any parts that may drop into the tank.

⚠CAUTION

Turn off the ultrasonic generators and heaters, and allow the cleaning solution to cool to room temperature before immersing your hands into the cleaning fluid. Use rubber gloves to protect your hands.

WEEKLY MAINTENANCE

1) Wash the cleaning tank interior as described on page 4.
2) Inspect the drain valve and fitting for leaks. Repair any leaks immediately. Replace the drain valve if necessary.
3) Wipe the tank cabinet with a damp **(NOT WET)** cloth to remove accumulated detergent residues and soils. If left on the cabinet, the detergent residues may produce a permanent stain on the metal surfaces.

⚠WARNING

Never under any circumstances immerse this equipment in water. Permanent damage, personnel injury and/or other property damage will result if this equipment is immersed.

APPLICATIONS

PRINCIPLES OF ULTRASONIC CLEANING

Ultrasonics is defined as a mechanical vibration above the range of human hearing (i.e., above 18,000 Hz.). Ultrasonic cleaning refers to the use of ultrasonic energy to assist in the cleaning of soiled objects while they are immersed in a cleaning fluid. Typical frequencies used in ultrasonic cleaning are: 20 kHz, 25 kHz, 40 kHz and 80 kHz.

Every ultrasonic cleaning system consists of three basic components:

1) An **Ultrasonic Generator** that converts 50 or 60 Hz. electric power from the electric utility supply to a high frequency electric signal in the ultrasonic range.
2) **Ultrasonic Transducers** to convert the ultrasonic electrical signal into mechanical vibrations.
3) A **tank** with the ultrasonic transducers bonded to its exterior and that contains the cleaning fluid and workpieces.

The tank is filled with a fluid suitable for the cleaning application. When the ultrasonic generator is activated, the transducers begin to vibrate at their natural frequency and couple the ultrasonic energy into the cleaning fluid. If sufficient energy is produced, the fluid molecules are pulled apart, creating microscopic "voids" or bubbles. This phenomenon is called **cavitation.** These cavitation bubbles increase and shrink in size in step with the ultrasonic frequency. Above a certain energy threshold, the bubbles will grow to an unstable size and then suddenly collapse, releasing a tremendous amount of energy into the fluid. If a soiled workpiece is immersed in the fluid, the cavitation bubbles will tend to collapse on the surfaces of the parts. This creates a scrubbing action that literally "blasts" away the contaminants from the parts.

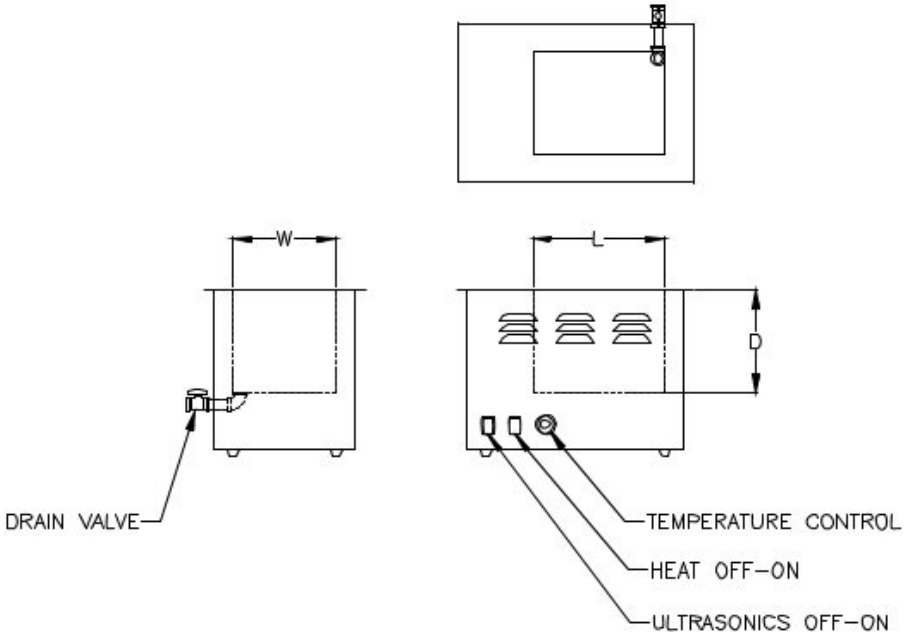
TIPS AND GUIDELINES FOR EFFECTIVE CLEANING

1) Choose a workbasket with the largest openings possible without allowing the parts to fall through.
2) For extremely small parts, a solid bottom basket with weep holes is preferred.
3) If the parts tend to "nest" or stick together, gentle agitation or tumbling will insure that the cleaning fluid reaches all the surfaces.
4) Hollow or concave parts should be positioned so that they fill and drain completely during the cleaning cycle. **Remember that the ultrasonics can only reach where the cleaning fluid reaches.**
5) Choose a detergent or cleaning fluid that is effective against contamination on the parts without damaging the parts or part surfaces.

   CAUTION

   Always test a cleaning fluid with a sample part before cleaning a large workload.
6) Use the mildest cleaning fluid that will be effective in your application. Start with the weakest dilution ratio recommended by the detergent manufacturer and gradually add more concentrate until satisfactory cleaning is obtained.
7) Gentle heating usually improves the cleaning performance. The optimum cleaning range is between 120°F and 140°F. Higher temperatures may be required in some applications.

SPECIFICATIONS



Model	Tank Capacity	Ultrasonic Power	Heater Power	Tank Dimensions (Inches) L	W	D	Power Required
BTU-4	**4.15 Gal.**	**250 W.**	**500 W.**	**12**	**8**	**10**	**120 V**
BTU-7	**7.33 Gal.**	**500 W.**	**500 W.**	**14**	**11**	**11**	**120 V**
BTU-17	**17 Gal.**	**750 W.**	**1,000 W.**	**20**	**14**	**14**	**120 V**

Materials of Construction:
Tank: 14 ga. T316L stainless steel
Cabinet: 16 ga. T304 stainless steel

Standard Accessories:
- Adjustable, thermostatically-controlled tank heater
- ¾" N.P.T. brass drain valve
- ¼" thick polypropylene tank cover with handle

Optional Accessories:
- Stainless steel mesh parts basket

WARRANTY

Graymills Corporation warrants that the equipment manufactured and delivered, when properly installed and maintained, shall be free from defects in workmanship and will function as quoted in the published specification. **Graymills** does not warrant process performance, nor assume any liability for equipment selection, adaptation, or installation.

Warranty does not apply to damages or defects caused by shipping, operator carelessness, misuse, improper application or installation, abnormal use, use of add-on-parts or equipment which damages or impairs the proper function of the unit, and modifications made to the unit. Warranty does not apply to expendable parts needing replacement periodically due to normal wear and tear.

A new Warranty period shall not be established for repaired or replaced materials or products. Such items shall remain under Warranty for only the remainder of the Warranty period of the original material or product.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY. **GRAYMILLS CORPORATION** MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY **GRAYMILLS CORPORATION** AND EXCLUDED FROM THIS SALE. **Graymills** warranty obligations and Buyer remedies (except to title), are solely and exclusively stated herein. In no case will **Graymills** be liable for consequential damages, loss of production, or any other loss incurred due to interruption of service.

Graymills' obligation under this Warranty shall be limited to:

1. Repairing or replacing (at **Graymills** sole discretion) any non-conforming or defective component within one year from the date of shipment from **Graymills**.
2. **ULTRASONIC EQUIPMENT –** On parts cleaners equipped with ultrasonics, the ultrasonic transducers are guaranteed against cracking, depolarizing or becoming detached from the radiating surface for a period of ten (10) years from the date of shipment from **Graymills**. This warranty does not cover transducer failure that results from operating the equipment with insufficient liquid in the tank as evidenced by inspection by **Graymills**.
3. Repairing or replacing (at **Graymills** sole discretion), components supplied by, but not manufactured by **Graymills**, to the extent of the warranty given by the original manufacturer.
4. This warranty does not cover rusting of a mild-steel parts cleaner used with aqueous (water-based) materials. On ultrasonic equipment, the finish of the stainless steel tank interior or the immersible transducer radiating surface is excluded from this warranty as erosion of these surfaces occurs normally during the course of operation.

Buyer must give **Graymills** prompt notice of any defect or failure.

If you believe you have a Warranty claim, contact **Graymills** at (773) 248-6825. Any return material must have an RMA number on the outside of the package and shipping prepaid or shipment will be refused. **Graymills** will promptly examine the material and determine if it is defective and within the Warranty period.