



Super Sonic™ Immersion Cleaning System With Ultrasonics

Operation and Maintenance Instructions

WARNINGS/CAUTIONS

Read all of these SAFETY INSTRUCTIONS and those in the manual BEFORE installing or using this equipment. Keep this manual handy for reference/training.

SAFETY

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:

 The Safety Alert Symbol means:
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

 **DANGER** – The DANGER Symbol means that failure to follow this safety statement **WILL** result in serious personal injury or death.

 **WARNING** – The WARNING Symbol means that failure to follow this safety statement might result in serious personal injury or death.

 **CAUTION** – The CAUTION Symbol means failure to follow this safety statement might result in personal injury or property damage.

NOTE – The NOTE Symbol means that failure to follow these instructions could cause damage to the equipment or cause it to operate improperly.

CAUTION

Never work with equipment you feel may be unsafe. Contact your Supervisor immediately if you feel a piece of equipment is in an unsafe condition.

DANGER

Never use a flammable or combustible fluid in this unit. Use only nonflammable, non-combustible, water-based, low foaming cleaning compounds in this machine. We recommend our low foaming Aquatene. Contact Graymills for specific details on the formula best suited for your application.

WARNING

Do NOT contaminate cleaning fluid with any flammable or combustible material such as gasoline, alcohol, mineral spirits, etc.

Drain parts to be cleaned of any flammable material or combustible material before placing inside cleaning tank. Even small quantities can create a dangerous fire hazard.

Follow all directions, Warnings and Cautions for the cleaning material being used. If any cleaning solutions are splashed on clothing, remove wet clothing promptly and thoroughly wash body areas that have been in contact with the solution. Do NOT permit saturated clothing to remain in contact with skin. Industrial cleaners can cause irritation to some individuals.

Cleaning solutions may irritate skin and eyes. If splashed in eyes, flush thoroughly with water. Consult Material Safety Data Sheet (MSDS) and a physician.

Always wear appropriate safety items such as gloves, apron, safety glasses or goggles when loading or unloading unit.

If you have any questions regarding the correct cleaning fluids to use in this unit, call Graymills at 773-248-6825 and ask for Customer Service.

POWER SUPPLY, WIRING AND GROUNDING

WARNING

HIGH VOLTAGE! Install ground and wiring according to local and National Electrical Code requirements.

- Install a fused disconnect switch on all power legs near the unit
- Disconnect and lockout electrical supply before installing or servicing unit.

DANGER

Failure to permanently ground the unit and controls before connecting to electrical power can cause shock, burns or death.

Unit must be properly grounded to prevent electric shock hazard. The unit should be wired to the electrical supply by a qualified electrician. There is a grounding attachment point in the control cabinet that is a $\frac{1}{4}$ "-20 bolt with a ground symbol adjacent to it.

User must supply a GFCI for the electrical service in areas where it is required.

DANGER

Do Not operate the unit unless the electrical control cabinet is closed and secured. Only trained maintenance personnel should open the electrical control box.

WARNING

Keep pump and motor clean and free of all contaminates. Never allow any liquids to come into contact with motor or electrical systems as an electric shock hazard could result.

Care should be taken to avoid clogging the air intakes for the ultrasonic generators, located on a rack at the back of the unit, with dust or dirt. Do NOT add any additional screens or filters to the air intake.

Excessive ambient temperature (over 105^0 F) can permanently damage the ultrasonic generator circuits.

DESCRIPTION/SPECIFICATIONS

The immersion cleaning system described in the following sections has been designed for a wide variety of parts cleaning applications requiring gentle but thorough cleaning of intricate parts. The information in this manual will allow the operator/technician to operate the unit to get the system's maximum cleaning potential.

The unit is constructed as a self-contained, all stainless steel unit with a weir chamber and lift platform. There are attachment points for a roller platform for parts handling on both sides of the unit. The unit features heated aqueous cleaning fluid and ultrasonic generators and transducers.

Typical operation of the unit includes immersion of the parts into the tank using the lift platform, with parts cleaning action improved by platform agitation and use of ultrasonics to thoroughly clean parts.

The unit has a number of features that make it easier to use and maintain the unit, including:

- Stainless-steel, corrosion resistant tank and exterior
- Ultrasonic Cleaning precisely controlled by a timer
- Heated aqueous unit provides safe, non-toxic cleaning without solvent disposal costs
- Sparger System removes surface oil and contaminants from the surface of the cleaning tank so parts emerge cleaner
- Sparger System works automatically to circulate heated cleaning solution throughout the cleaning tank to reduce downtime
- Automated lift platform for easy parts loading/unloading
- Electronic Controls and Touch-Screen interface for easy setup and operation

Unit Specifications

Cleaning Fluid	Water and aqueous detergent
Tank Capacity (including weir chamber)	183 gallons
Weight of Unit (empty)	1250 pounds
Weight of Unit (with fluid)	2800 pounds (approx)
Overall Dimensions	72" H X 63" W X 55" D
Height-Floor to Tank Rim	35"
Maximum Part Height	17"
Maximum Water Temperature	180^0 F*

*Ultrasonics will contribute to heat gain.

Materials of Construction

- Stainless Steel tank, lid, lift platform, front cover and skin

- Powder-coated Carbon Steel frame and rear cover

Power Input

Pneumatic

Recommended 80 psi (70 psi min)

Electrical

230 VAC 3-Phase 36A for one bank of heaters; 54A with optional second bank of heaters

Heater Capacity

4 kW with one heater bank

8 kW with optional second heater bank

Ultrasonic Cleaning Power

Individual Generator and Transducer

Nominal Power	1,000 watts
Peak Power	2,000 watts

Total Machine Output

Nominal Power	3,000 watts
Peak Power	6,000 watts

Lift Platform and Cleaning Space

Platform Dimensions – 37" W x 25" Deep

Immersion Depth of Platform:

- at top of oscillation stroke – 14"
- at bottom of oscillation stroke – 18"

Lift platform capacity – 300 pounds

INSTALLATION AND OPERATION

SITE PREPARATION

Before installing, careful consideration should be given to the place of operation. Place unit on a smooth, level surface.

CAUTION

The work area should be well ventilated.

Provide adequate lighting in the work area to permit viewing of the cleaning process and of the floor area around the machine. Be sure to allow adequate room to bring work to and from the machine. Use flooring or floor covering that does not become slippery when wet. Provide sufficient clearance around the machine for fluid changeovers and servicing.

Prior to changing cleaning fluid or servicing the unit, make sure that that heating element and cleaning solution have cooled.

INSTALLATION

LOCATING THE MACHINE

The machine should be placed in a dry location free from water mist or spray. The internal electronic

components can be damaged by high humidity or water spray. When filling the machine and rinsing any parts after ultrasonic cleaning, avoid water spray on the any electrical components, especially the cabinet and ultrasonic generators. If the roller platform is used to transfer parts to a secondary process, make sure the parts do not spill cleaning fluid on the electronic components during transfer.

1. Adjust (4) leveling feet of the machine so that the two beams on the bottom of the unit are approximately one quarter inch (.25") above the floor. NOTE: For weir and sparger system to work properly, unit must be level.
2. Connect an air supply of 100-150 psi, capable of providing 2.4 CFM at 100 psi to the NPT female fitting on air lock output.
3. Connect 3-Phase, 230 VAC electrical power, from a dedicated branch circuit, to the electrical control box. Connect the ground wire, of equal or greater current rating as the power conductors, to the 1/4"-20 ground stud in the electrical cabinet. The ground wire must have a bonded ring terminal and be secured by a nut and lock washer. Secure the power cable with ground to the electrical cabinet by the cable clamp provided. Close and secure door to electrical cabinet.

WARNING

Do not turn on electrical power to the machine unless main tank is full. Operating Ultrasonics in an empty tank will destroy the transducers.

4. See Operation Section of this manual for operation of the lid and lift platform.
5. Fill the main tank and weir chamber as follows:
 - a) Close ball valve between drain lines from main Tank and weir chamber.



(Figure 1 – Valve Setting)

- b) Set 3-way ball valve to permit flow from drain hoses to pump (shown in closed position above in Figure 1).



(Figure 2 – Water Output)

- c) Set ball valve on water filter output to approximately 100% open (shown 50% open above in Figure 2).
- d) Fill main tank with water until the water spills over from the main tank into the weir chamber. It is recommended that the water level in the weir chamber is 10" below the level of water in the main tank.
- e) NOTE: When tank is full of fluid and parts are immersed in tank, the water level in the weir chamber should be at least two inches below the water level in the main tank.
6. Re-adjust the (4) leveling feet of the machine so that the surface of the water is level. To be effective, the sparger bar should spray evenly across the entire surface of the water. If the unit is not level, the individual nozzles will spray above the surface at some points, and below the surface at others, lessening effectiveness of the spray.
7. Reach under the bottom edge of the rear cover and plug the three ultrasonic generators into the three 230V outlets provided. The outlets are on the right side of the machine as seen from the front. It does not matter which generator is plugged into which outlet.
8. Remove the wire from the tubing on the skimmer drain outlet. Put free end of tubing in a suitable container to receive any liquids skimmed off the surface of the weir chamber. The container must be positioned lower than the skimmer outlet.
9. See Operation Section of this manual for set-up of the functions available for performing various cleaning cycles, heating, and skimming tramp fluids. Set-up includes setting duration times for soaking, oscillating the lift platform, applying ultrasonic power and sparging the surface of the tank to remove contaminants. Set-up also permits specifying automatic heating and skimming cycles.

OPERATION

User Interface: The user interface controls the machine using four switches and the touch screen panel located on the control box on the side of the unit.

CAUTION

Maximum part height is 17". Anything larger than 17" on the platform will collide with the lid, causing damage to the machine.

Switch Operation:

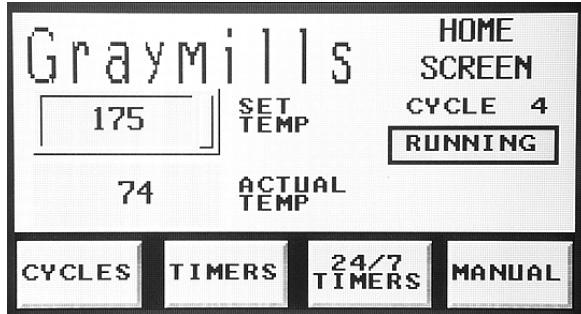
- **ON-OFF SWITCH:** To turn the unit ON, turn the switch to the right momentarily and release. The switch will be illuminated green when power is ON. To turn the unit OFF, turn the switch to the left momentarily and release. The illumination for the switch will go off when the unit is OFF. Turning the unit ON also activates the touch screen and causes it to be illuminated.
- **EMERGENCY STOP SWITCH:** (E-Stop) To stop all unit functions, press the red button in. This will interrupt power to all controls. The machine will turn OFF, and all heater, ultrasonic power, sparger pump and skimmer operation will cease. The lid will close and the lift platform will go to the bottom of the tank. To start up the unit, the red button must be twisted in the direction shown by the white arrows and the button must be released. The ON-OFF switch must be used to restart the machine.
- **START SWITCH:** To start one of the pre-programmed cleaning cycles, momentarily press and release this green button. Choice of cleaning cycle is done using the touch screen as described below.
NOTE: Always START a cycle with the lid up and the lift platform up. If the lid or lift platform are not up, press and hold the RESET button.
- **RESET SWITCH:** To reset the unit, press and hold this black button. The RESET button immediately terminates any cleaning cycle in progress, raises the lid and raises the lift platform. The RESET button also clears any error messages.

Touch Screen Operation:

TOUCH SCREEN displays information and acts as a keypad. To operate a button on the touch screen, push on the darkened square with your fingertip.

The various screens and the buttons on each screen are described below (in Figure 3).

HOME SCREEN



(Figure 3)

When user turns on the unit, this is the screen that the touch screen displays after the controls boot up. This screen shows the following information:

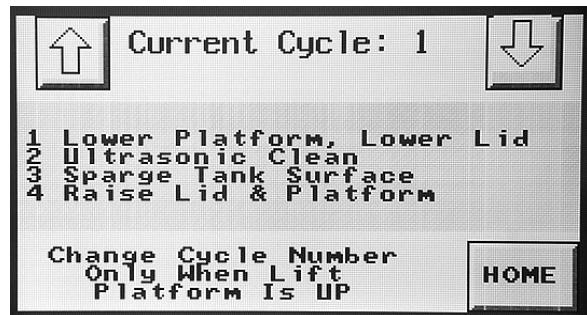
- Set Temperature – Temperature which the controller will warm the water to when the heater function is on.
- Actual Temperature – Temperature of the water, as measured at the temperature probe. (Actual temperature at the water surface may be higher.)
- Cycle Number – Cleaning cycle program number the machine will run when the CYCLE switch is operated.
- Cycle Run Indicator – In this position, the words “RUNNING” or “STOPPED” are displayed.

HOME SCREEN BUTTONS:

- **SET TEMPERATURE** – If user presses the number displayed, a keypad appears. This allows the user to enter a new set temperature. Press ENTER (new data) or CANCEL (retain old data) to return to the Home Screen.
- **CYCLES** – This button takes the user to the screen for setting the cycle number. (Figure 4)
- **TIMERS** – This button takes the user to the screen for setting the duration of various timed machine functions. (Figure 5)
- **24/7 TIMERS** – This button takes the user to the screens for setting up the schedule for automatic turn on and turn off of the heater and the skimmer. (Figure 6)
- **MANUAL** – This button takes the user to the screens for manually operating certain machine functions, including opening and

closing the lid and raising and lowering the lift platform.

CYCLE SCREEN



(Figure 4)

The CYCLE SCREEN displays the number of the cleaning cycle currently selected and a brief description of what that cycle does. The duration of the various functions, which make up each cycle are set in the TIMERS screen. (Figure 5)

Allow for 4 cycles, as described below.

Cycle 1:

- “1 Lower Platform, Lower Lid”
- “2 Ultrasonic Clean”
- “3 Sparge Tank Surface”
- “4 Raise Lid and Platform”

Cycle 2:

- “1 Lower Platform, Lower Lid”
- “2 Oscillate Lift Platform”
- “3 Ultrasonic Clean”
- “4 Sparge Tank Surface”
- “5 Raise Lid and Platform”

Cycle 3:

- “1 Lower Platform, Lower Lid”
- “2 Oscillate Lift Platform”
- “3 Ultrasonic Clean & Oscillate”
- “4 Sparge Tank Surface”
- “5 Raise Lid and Platform”

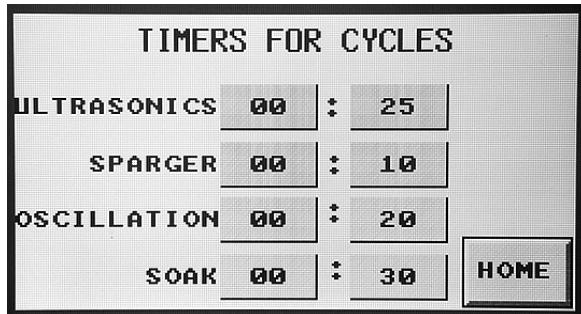
Cycle 4:

- “1 Lower Platform, Lower lid”
- “2 Soak per Timer”
- “3 Ultrasonic Clean”
- “4 Sparge Tank Surface”
- “5 Raise Lid and Platform”

CYCLE SCREEN BUTTONS:

- ↑ and ↓ – Press the arrows to choose a higher or lower cycle number.
- **HOME** – Takes the user back to the HOME SCREEN.

TIMERS SCREEN



(Figure 5)

The TIMERS SCREEN allows the operator the ability to set the duration of the four functions used in the cleaning cycles. The four functions are:

- ULTRASONICS – Sound generators
- SPARGER – Cleaning the surface
- OSCILLATION – Up and down motion
- SOAK – No motion

TIMERS SCREEN BUTTONS:

- **MINUTES and SECONDS** – If user presses either the minutes or seconds for any of the four functions, the operator is prompted to enter a new timer value on a keypad. (Minutes and seconds are set separately.)
- **HOME** – Takes the user back to the HOME SCREEN

SETTING THE TIMERS:



(Figure 5a)

1. Press either the minutes or seconds for any of the four functions.
2. A keypad will be displayed. (Figure 5a)
3. Enter new values and press ENTER to save.
4. Press CANCEL to retain old data and return to the TIMERS SCREEN.

24/7 TIMERS SCREEN



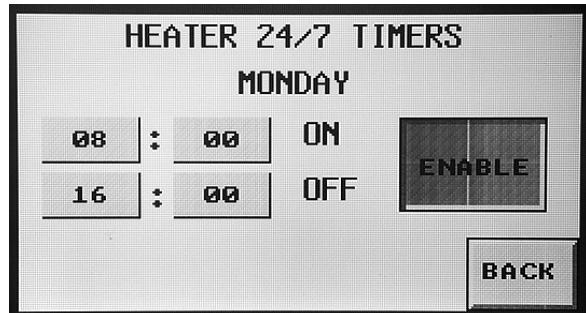
(Figure 6)

The 24/7 TIMERS SCREEN allows the operator the ability to set the hours of the day in which the skimmer and heater operate as well as setting the current date and time.

24/7 TIMERS SCREEN BUTTONS:

- **SKIMMER 24/7 TIMERS** – Takes the operator to the skimmer settings page
- **HEATER 24/7 TIMERS** – Takes the operator to the heater settings page
- **SET TIME** – Causes a screen to appear which allows the operator to set the date and time. Once set, this information is kept up to date by an internal battery, even when power is turned off. The time must be reset for daylight savings time clock changes and time zone changes, when the machine is moved.

SETTING 24/7 TIMERS:



(Figure 6a)

Skimmer and Heater 24/7 timers are set by means of screens as described below. Screens are identical for skimmer and heater functions, except for title at top of screen.

First screen entered is the day-of-the-week screen. Each day-of-the-week button takes the user to a screen like that shown above (in Figure 6a).

The next screen entered is for setting 24/7 timer output turn-on and turn-off times for a particular day. It has

hour and minute buttons that call up keypads (see Figure 5a) for entering time, based on a 24-hour clock.

EXAMPLES: 4:00 AM is 04:00

4:00 PM is 16:00

12:00 AM is 00:00 – can be used to indicate either the beginning or end of the day.

There is an ENABLE toggle button, which turns ON the skimmer or heater's 24/7 timer output at the time shown next to "ON." When the ENABLE button is activated, its color turns from dark to light. When ENABLE is not activated, nothing happens at the time shown next to "ON." The skimmer or heater 24/7 timer output is always turned off at the time next to "OFF."

BACK returns the user to the day-of-the-week screen.

24/7 TIMER SETTING EXAMPLE:

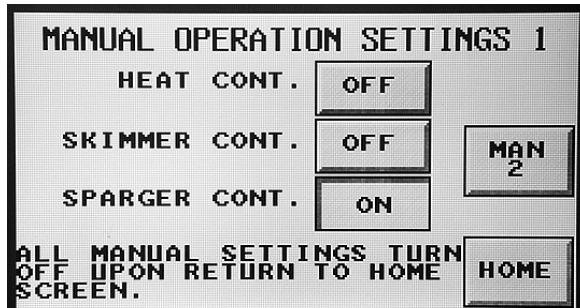
To set a 24/7 timer output to go ON at 10:00 PM on Tuesday and OFF at 6:00 AM on Wednesday, do the following:

1. Press the SKIMMER 24/7 TIMERS button.
2. Select TUE.
3. On the Tuesday screen, Set the ON time to 22:00 and activate the ENABLE button. Verify that the OFF time is set to some time earlier than 22:00, such as 21:45.
4. Select WED.
5. On the Wednesday screen, set the OFF time to 06:00. Verify that the ON time is set to some time later than 06:00, such as 20:30, or deactivate the ENABLE button.

MANUAL SCREEN

The two MANUAL SCREENS have buttons for turning ON and OFF various functions and for raising and lowering the lid and the lift platform.

Each of the two screens has a button that takes the user to the other screen. The HOME button, in the lower right corner of the screen, takes the user back to the HOME screen and turns OFF any function that was turned ON. The HOME button does not affect the position of the lid or the lift platform.



(Figure 7a – MANUAL OPERATION SETTINGS 1)

MANUAL OPERATION SETTINGS 1 FUNCTIONS:

- **HEAT CONTINUOUS** – When toggled ON, this button causes the heater to go ON, if the water temperature is less than the set temperature. This will operate the heater even if the heater 24/7 timer has turned the heater OFF. When this button is toggled OFF, the heater 24/7 timer will resume control.
- **SKIM CONTINUOUS** – When toggled ON, this button causes the skimmer to go ON. This will operate the skimmer even if the skimmer 24/7 timer has turned the skimmer OFF. When this button is toggled OFF, the skimmer 24/7 timer will resume control.
- **SPARGER CONTINUOUS** – When toggled ON, this button causes the sparger to run continuously.



(Figure 7b – MANUAL OPERATION SETTINGS 2)

MANUAL OPERATION SETTINGS 2 FUNCTIONS:

- **OSCILLATE** – When toggled ON, this button causes the lift platform to enter the oscillation zone and to oscillate up and down. When this button is toggled OFF, or when the HOME button is pressed, the lift platform descends to the bottom of its travel and oscillation stops.
- **PLATFORM UP/DOWN** – The operator may raise or lower the lift PLATFORM by means of UP and DOWN pushbuttons.
- **LID UP/DOWN** – The operator may raise or lower the LID by means of UP and DOWN pushbuttons.

NOTE: The lift platform will not go up if the lid is down. Likewise, the lid will not go down if the lift platform is in its fully up position.

TROUBLESHOOTING



(Figure 8)



(Figure 9)

TROUBLESHOOTING ERROR SCREENS:

Three conditions cause the machine to display an error screen like that shown in Figures 8 and 9. The error screens describe what failed and give suggestions for correcting the cause of the failure. Pressing the RESET button clears the error screen.

Failures covered by the self-diagnostics are as follows:

1. **LID LIFT FAILED** – The lid did not open as required by a cycle, MANUAL screen command or RESET command.
2. **LIFT PLATFORM FAILED TO RAISE** – The lift platform did not raise to its fully up position as required by a cycle, MANUAL screen command or RESET command.
3. **LIFT PLATFORM FAILED TO DESCEND COMPLETELY** – The lift platform did not descend to its fully down position as required by a cycle or MANUAL screen command.

SELF DIAGNOSIS AND REPAIR:

The machine does not go on when the power switch is turned to the ON position

- Verify that the branch circuit that supplies electrical power to the machine is ON.
- Open the electrical control box and verify that the circuit breaker is turned ON. The window by the switch on the breaker should show the color RED if the breaker is ON.

DANGER

230 Volt power connections are exposed whenever the electrical control box is open.

The skimmer does not operate

- Verify that the skimmer is plugged into the 115 VAC outlet on the back of the machine.

The ultrasonic generators do not operate

- Verify that each of the three generators is plugged into a 230 VAC single-phase outlet on the back of the machine. The outlets are on the right side of the machine as seen from the front, under the bottom edge of the rear cover. It does not matter which generator is plugged into which outlet.

Erratic cycle behavior

- Check position of proximity switch to indicate a lid up position on the lid cylinder. When lid is up, the red light at x4 on the PLC inside the control should be illuminated. Adjust switch position until light turns on. If light never illuminates, replace sensor.

MAINTENANCE

WARNING

Before performing any maintenance on this unit, be sure to disconnect electric power.

WARNING

This unit utilizes high voltage to operate the ultrasonic transducers. Only qualified trained personnel should attempt any repairs or servicing of the ultrasonic components. The ultrasonic generator utilizes high voltage, and only a qualified electrician or service personnel should attempt to disconnect or service the ultrasonic generators.

WARNING

Several routine maintenance procedures should be followed to enhance the performance of the equipment and to ensure safety and long term reliability.

Ultrasonic Generators

The ultrasonic generators have fans to cool the electronic components. These fans may become blocked with lint or debris that will inhibit the free flow of air.

Periodically, the generators should be inspected and any dirt, lint or dust buildup should be removed by qualified service personnel.

General Cleaning

To prevent build-up of contamination on tank walls and bottom, it is advisable to periodically drain the tank solution and wash out the tank.

Be careful when cleaning the ultrasonic tank to not scratch or abrade the ultrasonic radiating surface, as this will reduce the life of the radiating surface.

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.

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