MIDMARK®

M150 / M250 / M550

Soniclean® Ultrasonic Cleaners

(Ultrasonic Baths)

This unit is made for table top usage.

User's Guide

CPN-214-158

003-1159-00 Rev. K (9/4/13)

Table of Contents

Warranty

Ultrasonic Cleaners, when used in accordance with manufacturer's instructions and under normal use, are guaranteed for **two years after date of shipment.** Within the period guaranteed, the manufacturer will repair or replace free of charge, at its sole discretion, all parts that are defective because of material or workmanship including costs for removing or installing parts. Repairs are made on a Freight Out Bound repair depot basis.

Manufacturer's liability, whether based on warranty, negligence or other cause, arising out of and/or incidental to sale, use or operation of the transducer elements, or any part thereof, shall not in any case exceed the cost of repair or replacement of the defective equipment, and such repair or replacement shall be the exclusive remedy of the purchaser, and in no case shall manufacturer be responsible for any and/or all consequential or incidental damages including without limitation, and/or all consequential damages arising out of commercial losses.

CAUTION

- Do not place parts or containers directly on the bottom of the cleaning tank; use a tray or wire to suspend items.
- Do not allow the solution to drop more than 3/8 inch below the operating level line with the cleaner on.
- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion. Use only water-based solutions.
- Do not use mineral acids. These could damage the tank.

Ultrasonic Cleaners, Consumables, and Accessories

Description	Part Number
Cleaners	
M150 Ultrasonic Cleaner (120V) M150 Ultrasonic Cleaner (220V)	M150-001 M150-002
M250 Ultrasonic Cleaner (120V) M250 Ultrasonic Cleaner (220V)	M250-001 M250-002
M550 Ultrasonic Cleaner (120V) M550 Ultrasonic Cleaner (220V)	M550-001 M550-002
Chemistry	
Midmark General Purpose Cleaner (32 oz)	9A296001
Midmark Tartar and Stain Remover (32 oz)	9A297001
Midmark Enzymatic Cleaner (32 oz)	9A298001
Accessories	
M150 Accessory Kit	9A285001
M150 Accessory Kit w/Half Basket	9A286001
M250 Accessory Kit	9A287001
M250 Accessory Kit w/Half Basket	9A288001
M550 Accessory Kit	9A289001
M150 Safety Basket	9A290001
M150 Half Safety Basket	9A291001
M250 Full / M550 Half Safety Basket	9A292001
M250 Half Safety Basket	9A293001
M550 Safety Basket	9A294001
M250 Cassette Rack (holds 3 cassettes)	9A295001
M550 Cassette Rack (holds 6 cassettes)	9A407001

Safety Precautions

Before using your Ultrasonic Cleaner, please read and thoroughly understand these safety precautions. Failure to follow them may result in serious personal injury or property damage.

To avoid electrical shock:

- ***Do*** unplug from power source before filling or emptying the tank.
- ***Do*** keep the control panel and the area around the cleaner clean and dry -- wipe up solution which spills over the tank brim. Water and high voltage can cause electrical shock.
- ***Do not*** operate the cleaner without proper grounding.
- ***Do not*** remove the grounding prong on the line cord plug.
- ***Do not*** disassemble your cleaner -- high voltage inside the cleaner is dangerous.
- ***Do not*** immerse the cleaner in water.

To prevent personal and/or property damage:

- ***Do*** operate the cleaner with a cover.
- ***Do*** use water-based solutions.
- ***Do not*** ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion and will void your warranty. Use only water-based solutions.
- ***Do not*** ever use mineral acids. These could damage the tank.
- ***Do not*** touch the stainless steel tank or cleaning solution during use -- they may be hot.
- ***Do not*** allow fluid temperature to exceed 70ºC (160ºF).
- ***Do not*** place your fingers or hands into the tank while the cleaner is operating. Doing so may cause discomfort and possible skin irritation. Avoid contact with solutions and provide adequate ventilation.
- ***Do not*** use solutions containing chlorine bleach.

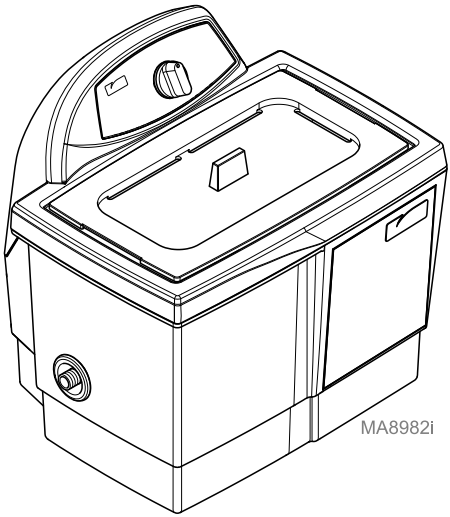
To prevent damage to the cleaner:

- ***Do*** change your solution regularly.
- ***Do not*** operate the cleaner dry.
- ***Do not*** place parts or containers directly on the bottom of the cleaning tank; use a tray or wire to suspend items. Failure to comply may cause transducer damage and will void your warranty.
- ***Do not*** allow the solution to drop more than 3/8 inch below the operating level line with the ultrasonics on. Failure to comply may cause transducer damage and will void your warranty.

Introduction

Ultrasonic Cleaners

This line of ultrasonic cleaners includes three models with capacities of 1-1/2 gallons, 2-1/2 gallons and 5-1/2 gallons. Each model is constructed using durable, industrial style 40kHz transducers. These provide increased cleaning power along with built in sweep frequency to ensure uniform cleaning activity throughout the bath. For safety and operator convenience, all three sizes have built in drains and are supplied with tank drain kits. Each model is supplied with a mechanical timer which can be set from 1 to 60 minutes. The timer also includes a “HOLD” position that will permit continuous operation.



When you first fill your unit, or refill it with fresh solution, use warm water with your chemistry. Turn on the ultrasonics by rotating the timer knob. If you place the cover on the unit, the solution will continue to heat and will stabilize near 60 degrees centigrade (140 degrees F).

Accessories For Your Cleaner

All units are supplied with a cover. In addition, a perforated insert tray (basket) is available to be used for immersing instruments or parts during cleaning.

Unpacking Your Cleaner

Please check your cleaner and its carton carefully for any external or internal damage. **If you find damage, contact your shipping carrier immediately,** before contacting your distributor. Please retain your packaging for future use.

Installing Your Cleaner

Check the plate on the back of the cleaner for correct power requirements. Position your cleaner within easy reach of a standard grounded electrical outlet. Do not place the cleaner on a circuit which could become overloaded.
If your cleaner does not operate correctly, first refer to the troubleshooting section for possible causes. If you are unable to resolve the problem, contact your distributor or an authorized service center for additional information.

Specifications

Equipment Specifications: North American Models (120V)

Model	Tank Capacity	Tank Size (in.)	Overall Size (in.)	Weight	Max. Sonics Power	Max. Draw Power Req.
M150 (120V)	1-1/2 gal. (5.7 L)	W: 11.5" D: 6" H: 6"	W: 15.6" D: 12.5" H: 14.8"	14 lbs. (6.4 KG)	110W	130W
M250 (120V)	2-1/2 gal. (9.5 L)	W: 11.5" D: 9.5" H: 6"	W: 15.6" D: 15.8" H: 14.9"	16 lbs. (7.3 KG)	160W	180W
M550 (120V)	5-1/2 gal. (20.8 L)	W: 19.5" D:11.5" H: 6"	W: 23.5" D: 18.3" H: 15.4"	28 lbs. (12.7 KG)	280W	320W

Fuse Table: North American Models (120V)

Model	Fuse 1	Fuse 2	Fuse 3
M150 (120V)	250V, 2.5A	250V, 1.6A	250V, 1A
M250 (120V)	250V, 5A	250V, 2A	250V, 1A
M550 (120V)	250V, 10A	250V, 3.15A	250V, 1A

Equipment Specifications: European Models (230V)						
Model	**Tank Capacity**	**Tank Size (mm)**	**Overall Size (mm)**	**Weight**	**Max. Sonics Power**	**Max. Draw Power Req.**
M150 (230V)	5.71 L (1-1/2 gal.)	W: 290 D: 150 H: 150	W: 396 D: 318 H: 376	8.2 kg (18 lbs.)	110W	130W
M250 (230V)	9.51 L (2-1/2 gal.)	W: 290 D: 240 H: 150	W: 396 D: 401 H: 378	9.5 kg (21 lbs)	160W	180W
M550 (230V)	20.81 L (5-1/2 gal.)	W: 495 D: 290 H: 150	W: 597 D: 465 H: 391	16.3 kg (36 lbs)	280W	320W

Fuse Table: European Models (230V)			
Model	**Fuse 1**	**Fuse 2**	**Fuse 3**
M150 (230V)	250V, 2.5A	250V, 1.6A	250V, 1A
M250 (230V)	250V, 5A	250V, 2A	250V, 1A
M550 (230V)	250V, 5A	250V, 2A	250V, 1A

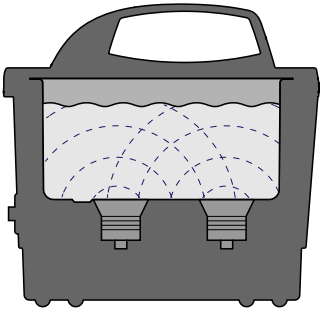
NOTE

- All models operate at a frequency of 40kHz.
- 120V ± 10%, 60Hz is optimum voltage for 120V units
- 220V ± 10%, 50Hz is optimum voltage for 220V units.
- All cleaners have CSA approval and comply with FCC regulations.
- Due to FCC filtering requirements units may trip GFI circuits.
- All units have a ground leakage current less than 0.50mA.

How Ultrasonics Cleaning Works

Ultrasonic sound is sound transmitted at frequencies generally beyond the range of human hearing. In your ultrasonic cleaner, ultrasonic sound (sonics) is used for cleaning materials and parts. This is how it works:

- As the sound waves from the transducer radiate through the solution in the tank, they cause alternating high and low pressures in the solution.



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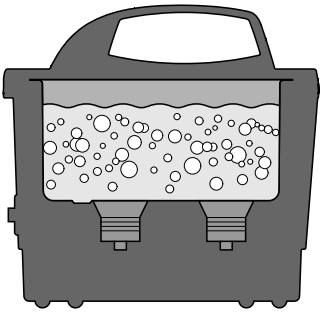
- During the low pressure stage, millions of microscopic bubbles form and grow. This process is called CAVITATION, meaning “formation of cavities”.



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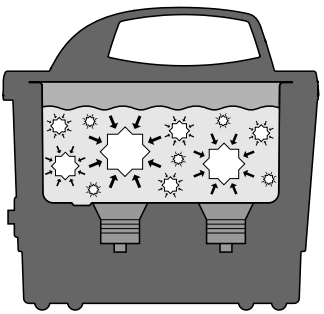
- During the high pressure stage, the bubbles collapse, or “implode” releasing enormous amounts of energy. These implosions act like an army of tiny scrub brushes. They work in all directions, attacking every surface and invading all recesses and openings.



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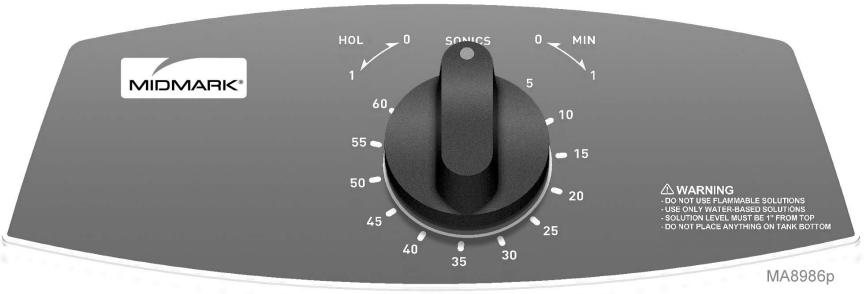
Operating Your Cleaner

If this is the first time you are using the cleaner, please read this whole section before operating your cleaner.

Operating Your Midmark Soniclean® Series Cleaner



Explanation of Controls

Control	Function
TIMER	Turn clockwise for variable times of 0-60 minutes to activate ultrasonic.
	Turn counter clockwise to “SONICS” position to turn OFF ultrasonic.
	Turn counter clockwise to the “HOLD” position to permit continuous operation.

Before You Start Cleaning

CAUTION

- Do not place parts or containers directly on the bottom of the cleaning tanks; use a tray or wire to suspend items.
- Do not allow the solution to drop more than 3/8 inch below the operating level line with the cleaner on.
- Do not ever use alcohol, gasoline or flammable solutions. Doing so could cause a fire or explosion. Use only water-based solutions.
- Do not ever use mineral acids. These could damage the tank.
- Failure to comply with these cautions will void your warranty.

Step	Action
1	Select a cleaning solution suitable for your application.
2	Allowing for the volume of the parts you will be cleaning and cleaning solution, fill the tank with warm tap water to the operating level line.
3	Add cleaning solution to the tank water.
4	Plug the cleaner into a grounded outlet.
5	For maximum efficiency, refer to page 11, “Optimizing Your Cleaner” before proceeding.

NOTE

If this is the first time you are running the cleaner, or if you have changed cleaning solution, you must degas the solution. If not, skip to ***"Cleaning Items"***.

Degassing

Step	Action
1	Turn the TIMER to 5-10 minutes and let the cleaner run to allow the solution to “degas”. The ultrasonics will drive out excess dissolved gas greatly improving the cleaner’s effectiveness.

Cleaning Items

NOTE
To stop ultrasonics at any time, turn the TIMER to zero.

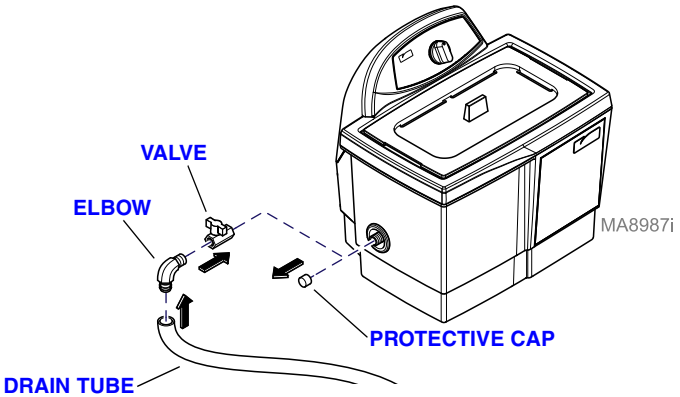
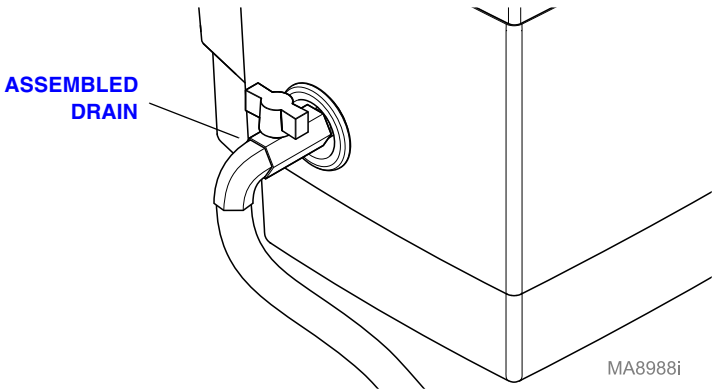
Step	Action
1	Set the TIMER for the amount of time you wish the items to be cleaned.
2	Place the items into a basket, perforated tray, or other device for suspending instruments or parts above the bottom.
3	If using beakers or a solid tray, add cleaning solution to beakers or tray to cover the items.
4	**Slowly** lower the tray or beakers into the tank. Do not allow items to contact the tank bottom. Do not aerate the solution.
5	When items are clean, **slowly** remove them from the cleaner.
6	Rinse the clean items with clean water and dry.

Draining Your Cleaner

WARNING
Do not immerse the cleaner in water. Unplug cleaner from power source.

NOTE
Models M150, M250, and M550 include a drain and valve kit.

Step	Action
1	Place the cleaner to allow easy reach of the drain tube into a waste disposal unit.
2	Remove the thread protecting cap from the end of the cleaner's drain pipe. This will expose the white teflon sealing tape on the drain pipe's threads.

3	Hand tighten the drain valve onto the drain pipe over the white teflon sealing tape. Finish tightening the valve in place using on adjustable or a 21mm wrench. Tighten the valve no more than one full turn when using the wrench until the handle is on top. **CAUTION:** Over tightening of the valve can cause damage to the ultrasonic tank. Always use teflon sealing tape or a sealing paste designed for use with stainless steel if retightening or refitting of the drain valve is required. 
4	Hand tighten the hose adaptor into the end of the drain valve. Slide the drain tube over the barbed hose adaptor end. 
5	Close the drain valve by turning the handle perpendicular to the valve body and the cleaner is ready to fill with solution. To open the valve and drain the cleaner, turn the handle so that it is in line with the valve body.

Optimizing Your Cleaner

Tank Optimization

Cleaning - check the tank for contamination whenever you change solution. If necessary, remove contaminants with a nonabrasive cloth and water.

Emptying - always unplug the cleaner before draining the tank. Drain the solution into an appropriate waste disposal unit.

Filling - always unplug the line cord before filling the tank. Fill the cleaner to the operating level using warm tap water.

Low solution level - will cause the cleaner to fail. When you remove heavy or bulky loads from the cleaner, the solution level may drop below the operating level. If so, be sure to replace lost solution and degas, if necessary, depending on the amount used.

Overload - do not rest any items on the tank bottom. Weight on the tank bottom dampens sound energy and will cause damage to the transducer. Instead, use a tray and/or other fixture to support all items. Allow at least one inch between the tank bottom and the beaker or receptacle for adequate cavitation.

Covers - allow the cleaner to heat up faster, to a higher temperature, and avoid excessive liquid evaporation.

Solution Optimization

Solution activity - the amount of visible activity is not necessarily related to optimum cavitation for cleaning.

Degassing - fresh solutions can contain dissolved gases (usually air) which reduces effective ultrasonic action. Although solutions will naturally degas over time, operating the ultrasonics without parts speeds up the degassing process. Solutions that have been sitting unused for 24 hours or longer have reabsorbed some gases.

Surface tension - can be reduced by adding solution to the bath. Reduced surface tension will increase cavitation intensity and enhance cleaning.

Solvents - never use solvents. Vapors of flammable solutions will collect under the cleaner, where ignition is possible from electrical components.

Renewal - cleaning solutions can become contaminated with use. Suspended soil particles on the bottom of the tank, inhibit ultrasonic activity. For optimum cleaning of general instruments in the medical and dental applications, Midmark recommends replacing the cleaning solution once per day. If cleaning heavily contaminated instruments, it may be necessary to change solutions more frequently.

Application Hints

First time cleaning - first experiment with one piece, then proceed with the remainder.

Solution level - Be sure to maintain solution level within 1/2 inch of the tank's "operating level" line. Surface activity can vary with liquid level.

Load size - It is faster and more efficient to run several small loads rather than a single large load.

Placing items - Never allow items to sit on the bottom of the tank. Always place them in a tray or beaker or suspend in the solution.

Rinsing items - After cleaning, use a clean water bath to rinse away chemicals adhering to items.

Lubricating items - When necessary, re-lubricate items immediately after cleaning.

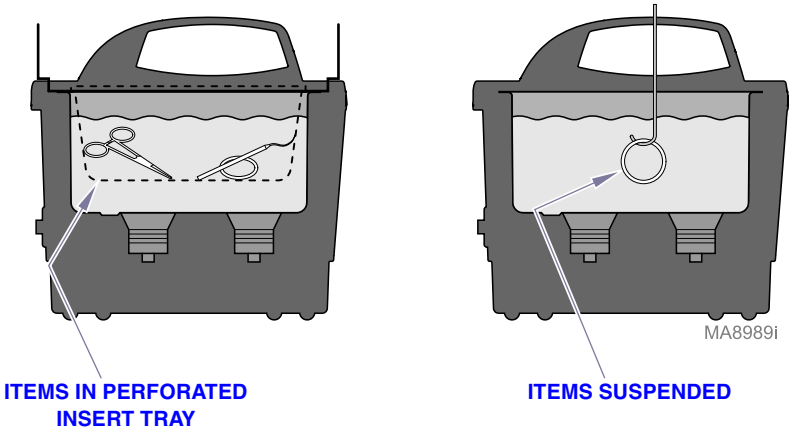
Drying items - Air drying at room temperature works for some items. Place parts requiring faster drying time under hot air blowers or in ovens.

Please call your local distributor if you have other application questions.

Cleaning Methods

There are two methods of cleaning - direct and indirect. Each has advantages and disadvantages. When in doubt, run test samples using both methods to decide which one produces the best results for you.

Direct Method

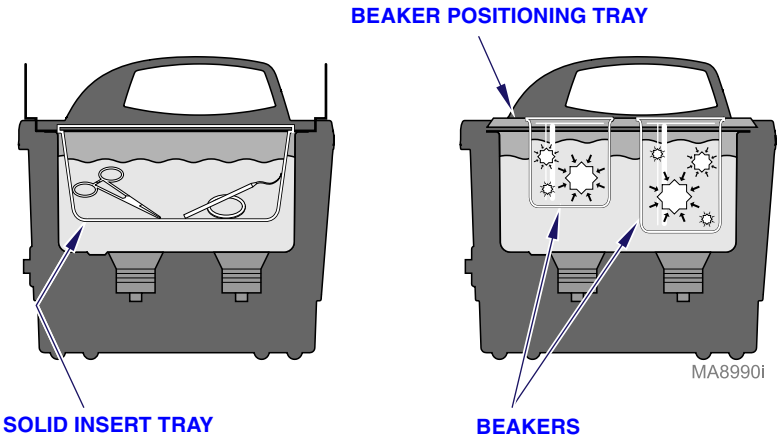


How it works:

- Fill the tank with warm water and a cleaning solution.
- Place the items to be cleaned in a perforated tray and lower them into the tank. You can also suspend items on a wire and then immerse them in the solution.

The advantages of this method are the simplicity of operation and cleaning effectiveness.

Indirect Method



How it works:

- Fill the tank with warm water and a cleaning solution.
- Pour your solution medium into one or more beakers or into a solid insert tray.
- Place the beakers in a beaker positioning cover or a solid insert tray to fit your cleaner. Beakers should not touch the tank's bottom.

The advantages of this method are:

- Removed soil stays in the beaker or tray so you can easily examine, filter or discard it.
- You can use one or more solutions at the same time.

  - two completely different cleaning solutions.

  - one beaker or tray with a cleaning solution and one with a rinse solution.
- Cleaning solution in your tank needs to be changed less often.

Troubleshooting

If your cleaner does not operate satisfactorily, please check the tables below for possible causes before calling your authorized service center.

WARNING
High voltage inside - dangerous shock hazard. DO NOT attempt to disassemble or repair the cleaner.

Troubleshooting Guide

Problem	Cause	What To Do
Cleaner will not start.	Cleaner not plugged in properly.	Plug into functioning electrical outlet.
	Mechanical timer not ON.	Turn timer clockwise.
	Blown fuse.	Call nearest authorized service center.
Decreased ultrasonic activity.	Solution is not degassed. **NOTE:** Refer to page 17 for cavitation check.	Make sure that tank was filled with warm tap water plus cleaning solution and has run 5-10 minutes.
	Solution is spent.	Change solution.
	Solution level is incorrect for load.	Adjust solution to within 3/8 inch of the tank's operating level line with load.
	Tank bottom is covered with soil particles.	Empty, then clean tank with warm water. Wipe with a nonabrasive cloth.
	Using deionized water in the tank.	Deionized water does not cavitate as actively as soapy tap water.

Service Center

With normal use, your Ultrasonic Cleaner should not require servicing. However, if it fails to operate satisfactorily, first try to diagnose the problem by following the suggestions in the Troubleshooting Guide.

WARNING
You will void the warranty if you disassemble your cleaner. High voltage inside the cleaner is dangerous.

If you find that your cleaner needs repair, carefully pack and return it to your local distributor. If under warranty, remember to include proof of purchase.

Your cleaner will be shipped by ground service unless you specify otherwise.

Repair Parts

Part Number	Description
014-0594-00	Valve, Ball, 3/8 FPT.
014-0595-00	Plastic Elbow, 3/8’ MPT X 1/2” Barb
053-1795-00	Timer Knob,
053-1796-00	Drain hose
053-1797-00	Foot.
066-0997-00	M150 Carton (16 X 19 X 21)
066-0998-00	M250 Carton (19 X 19 X 19)
066-0999-00	M550 Carton (25 X 30 X 21)

Cavitation Check

How to perform the “foil” test

Purpose: Used to Determine the Efficiency of an Ultrasonic Cleaner.

Regular testing of the ultrasonic cleaner to assure that it is operating properly is recommended. The frequency of testing depends on the particular application and frequency of use. Of course, testing should be performed whenever deterioration in the cleaner performance is suspected.

This foil test is relatively easy to perform and will provide a permanent record for the future comparative evaluation of the ultrasonic cleaners performance.

Step 1.) Obtain a roll of any standard weight household aluminum foil. (Note: heavy weight foil is less sensitive to the pebbling caused by ultrasonic cavitation and thus doesn’t work as well for this testing)

Step 2 .) Make a rigid support to which the aluminum foil will be attached. Cut a piece of wood dowel rod or small board (e.g. 1” x 1”, etc.) 2 inches longer than the length of the ultrasonic cleaner tank. The material this support is made of isn’t critical it just needs to provide a rigid support that can be laid across the top of the tank to provide a support to attach the foil to.

Step 3.) Cut a piece of foil approximately 6” in length and long enough to attach to the support prepared in step 2 and suspend almost to the bottom of the tank. Attach the foil to the support using tape or push pins to secure it. ***The foil must not touch the bottom or sides of the tanks***. Care should be taken to avoid crinkling of the foil. (See photo below)

Step 4.) With the foil test sample removed prepare a fresh ultrasonic cleaner solution by filling the tank nearly full with water. Add the recommended amount of Midmark cleaning solution and finish filling the tank to specified level with water.

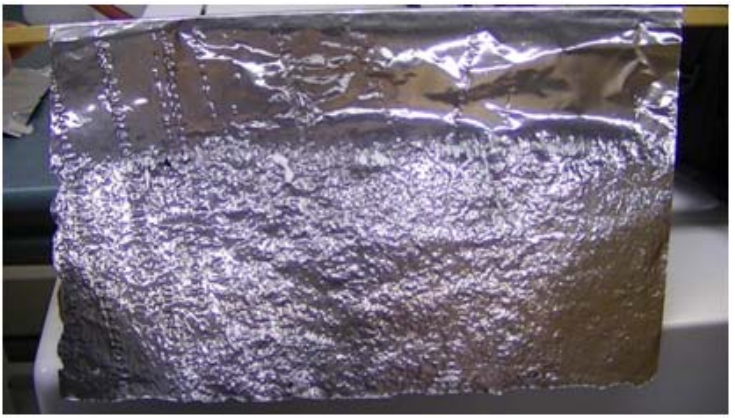
Step 5.) Turn the ultra cleaner on and set the timer for 10 minutes to degas the solution.

Step 6.) With the ultrasonic cleaner off lower the foil sample into the center of the tank positioning it so the foil isn't touching the sides or bottom of the tank. (See photo below) For larger units, e.g. Midmark model M550, multiple samples should be used to get a better sampling of the uniformity of the ultrasonic cavitation in the tank.

Step 7.) Turn the ultrasonic cleaner on for 3 minutes. Remove the foil sample allowing the excess cleaning solution to drain off the foil. Allow the sample to air dry, being careful not to wrinkle the foil.

Step 8.) The foil surface actually submerged in the solution should be uniformly covered with a small dimpling or pebbling effect, over the entire surface. There may also be some holes in the foil as a result of erosion caused by the interaction between the cleaning solution, the foil, and the ultrasonic action, but the objective of this test is to see how uniform the pebbling is, not how many holes are in the foil. If there are an excessive number of holes in the foil sample, run another test decreasing the exposure time to get a better sampling of the uniformity of the dimpling.

Results: The entire submerged area of the foil should be uniformly pebbled with tiny dimples from the ultrasonic implosions. Areas greater than 1”diameter, the size of the a quarter, that doesn’t have pebbling, may indicate that there is a problem with the ultrasonic unit. (See photo below)



Step 9.) If the results indicate a possible problem repeat the above steps using a new foil sample. If the results are the same contact your service provider to have the unit evaluated / repaired.

Step 10.) If the results confirm uniform cavitation (dimpling / pebbling of the foil) throughout the tank, label, date and file the foil test sample for future comparative purposes.

Note: If the foil test is done at the beginning of the day, the ultrasonic solutions should be removed from the tank prior to cleaning instruments, as the solution left is foil contaminated.

How to perform the “glass slide” test

A. Wet the frosted portion of a glass slide with tap water and draw an "X" with a No. 2 pencil from corner to corner of the frosted area. Making sure that the tank is filled to the fill line, immerse the frosted end of the slide into fresh cleaning solution. Turn on the ultrasonics. The lead "X" will begin to be removed almost immediately, and all lead should be removed within ten seconds.

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MIDMARK

Because we care.