

# SONICATOR®



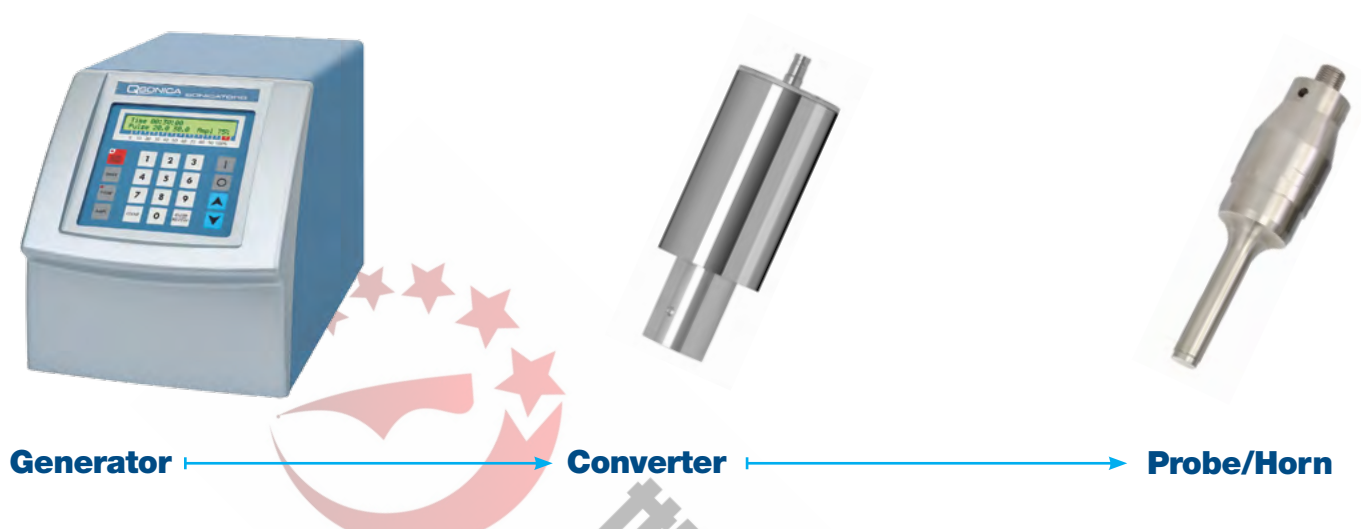
## Ultrasonic Liquid Processors

**QSONICA**  
SONICATORS

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# How Does a Sonicator Work?



**A Sonicator system is comprised of 3 major components: Generator, Converter and Horn (also known as a probe).**

The ultrasonic electronic **Generator** transforms AC line power to high frequency electrical energy. The generator features a keypad or buttons which allow the user to control the sonication parameters.

The generator provides high voltage pulses of energy at a frequency of 20 kHz that drives a piezoelectric **Converter**. The converter is a cylindrical device which is connected to the generator by a high voltage cable. The converter transforms electrical energy to mechanical vibration due to the characteristics of the internal piezoelectric crystals.

The vibration is amplified and transmitted down the length of the **Probe/Horn**. Probes have threaded ends and attach to the converter. During operation, the probe's tip longitudinally expands and contracts. Amplitude is the distance the tip travels and is dependent on the amplitude setting selected by the user.

In liquid, the rapid vibration of the tip causes cavitation, the formation and violent collapse of microscopic bubbles. The collapse of thousands of cavitation bubbles releases tremendous energy in the cavitation field. Objects and surfaces within the cavitation field are "processed." By increasing the amplitude setting, cavitation intensity within the sample is also increased.

The ultrasonic frequency is fixed at 20 kHz and does not fluctuate during sonication. The Sonicator continuously calibrates itself to ensure consistent output. Processing time and amplitude (intensity) are adjustable. Sonication generates heat so the system can be pulsed on/off to reduce this effect. If heating of the sample is not an issue, the continuous sonication option can be selected.

To ensure a positive outcome, it is important to select the appropriate generator and probe to match the volume, viscosity and other parameters of each particular application. Please consult with a Sonicator product specialist for help making the optimum choices.

# Direct vs. Indirect Sonication Methods

**DIRECT** Sonication (inserting a probe directly into a sample vessel) is the most common way to process a sample. Energy is transmitted from the probe directly into the sample with high intensity and the sample is processed quickly.

The diameter of the probe's tip dictates the liquid volume that can be effectively processed. Smaller tip diameters (Microtip probes) deliver high intensity sonication and the energy is focused within a small, concentrated area. Larger tip diameters can process larger volumes, but offer lower intensity. Boosters and High Gain horns can be used to increase the output of large diameter probes. Probes are offered with either replaceable or solid tips and are made from titanium.



**INDIRECT** Sonication eliminates the need for a probe to come in contact with your sample. This technique is often described as a high intensity ultrasonic bath. The ultrasonic energy is transmitted from the horn, up through the water and into a vessel or multiple sample tubes.

Indirect sonication is most effective for very small samples because foaming and sample loss are eliminated. Pathogenic or sterile samples are ideal for this method because aerosols and cross contamination are prevented. The Cup Horn and Microplate Horn deliver indirect sonication and are ideal for many high throughput applications.





# Q700 Sonicator

**The new Q700 is the most technologically advanced sonicator available today. A state-of-the-art touch screen interface offers intuitive control and provides a user-friendly experience. The most important feature of a Sonicator is reproducibility. Improved internal circuitry guarantees more efficient operation, sample-to-sample consistency and most importantly, a reliable end result.**

The Q700 is the only sonicator on the market that offers full amplitude control from 1-100%. This enables greater control of the probe's intensity, helping to pinpoint the optimum settings for efficient sample processing. We have increased maximum power output to 700 watts making the system more durable and capable of handling even larger samples if necessary. Our new display, design improvements and added accessories make this the most sophisticated and versatile Sonicator available today.



*Stand sold separately.*

## FEATURES:

### FULL AMPLITUDE CONTROL

Amplitude (intensity) is controlled from 1-100% giving a greater degree of resolution and the ability to pinpoint the amplitude needed to effectively process your sample.

### PROGRAMMABILITY

Parameters including processing times, pulse on/off and amplitude can be saved to memory and run by the touch of a button.

### PULSE MODE

Adjustable pulse On and Off times to reduce the heat gain in temperature sensitive samples.

### TEMPERATURE MONITORING

An optional temperature probe is available for those customers who wish to monitor the temperature of their sample. If the temperature limit is reached, sonication shuts down to prevent overheating.

### RoHS COMPLIANT

All Qsonica equipment is built lead free.

### RUN MULTIPLE PROGRAMS IN SEQUENCE

Multiple programs can be run in sequence. For example, the unit can be programmed to sonicate at 50% amplitude for 5 minutes, shut off for 2 minutes and re-start at 25% amplitude for 10 minutes. Up to 5 programs can be run in succession.

### TOTAL ENERGY OUTPUT DISPLAY

Energy delivered to the probe is displayed in both Watts and Joules.

### AUTO TUNING

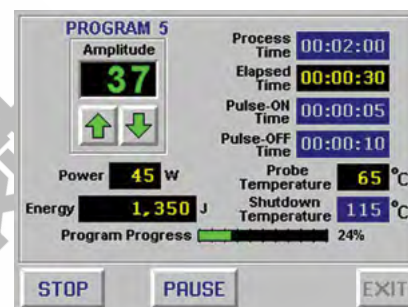
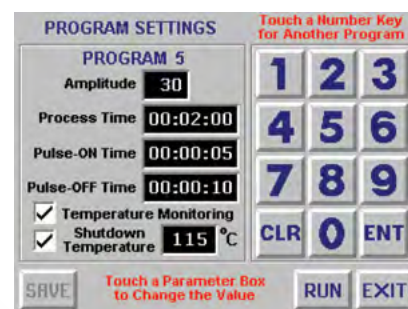
The Sonicator digitally tracks frequency changes in the converter / tip assembly caused by load and temperature changes and maintains electrical efficiency at all times. Manual tuning is unnecessary.

### OVERLOAD PROTECTION

The unit is equipped with fault detection circuitry to shut down sonication in the event that a fault occurs.

### TOUCH SCREEN CONTROL

A large, color LCD screen clearly displays all operating parameters and options. Intuitively and quickly access any of the sonicator's functions with a simple touch.



#### PART NO. Q700 INCLUDES:

- Generator
- Converter
- 1/2" (13 mm) diameter probe
- Power cable
- Converter cable
- Wrench set

#### TECHNICAL SPECIFICATIONS:

|                                 |                                          |
|---------------------------------|------------------------------------------|
| <b>Power Rating:</b>            | 700 watts                                |
| <b>Frequency:</b>               | 20 kHz                                   |
| <b>Programmability:</b>         | 10 memories plus sequencing              |
| <b>Programmable Timer:</b>      | 72 hours                                 |
| <b>Adjustable Pulse On/Off:</b> | 1 second to 24 hours                     |
| <b>Dimensions (W x L x H):</b>  | 8 x 15.25 x 8.5 in. (203 x 387 x 216 mm) |
| <b>Voltage:</b>                 | 110V, 50/60 Hz                           |

*Specify desired voltage for export.*

# Q500 Sonicator

**The Q500 is a powerful ultrasonic processor featuring programmable operation and a digital display of operating parameters. Popular applications include nanoparticle dispersion, creating emulsions, cell lysis and homogenization.**

Adjustable pulse On and Off times can be programmed from 1 second to 1 minute. Total programming has a maximum setting of 10 hours. A wide variety of probes and accessories are available to handle virtually any application.



*Stand sold separately.*



## FEATURES:

### Programmable operation

Set time and amplitude for hands free operation

### Pulse mode

Prevent heat buildup in temperature sensitive samples

### Digital amplitude / intensity control

Output intensity can be set from 20-100%

### Elapsed time indicator

Displays duration of sonication

### Display of wattage and joules

Real-time energy monitoring

### Overload protection

Prevents damage to circuitry if a fault occurs

### RoHS compliant

Uses lead free components

## PART NO. Q500 INCLUDES:

- Generator
- Converter
- 1/2" (13 mm) diameter probe
- Power cable
- Converter cable
- Wrench set

## TECHNICAL SPECIFICATIONS:

|                                 |                                         |
|---------------------------------|-----------------------------------------|
| <b>Power Rating:</b>            | 500 watts                               |
| <b>Frequency:</b>               | 20 kHz                                  |
| <b>Programmable Timer:</b>      | 10 hours                                |
| <b>Adjustable Pulse On/Off:</b> | 1 second to 1 minute                    |
| <b>Dimensions (W x L x H):</b>  | 8 x 5.25 x 8.5 in. (203 x 387 x 216 mm) |
| <b>Voltage:</b>                 | 110V, 50/60Hz                           |

*Specify desired voltage for export.*

Horns (also known as probes) are made from titanium and machined to specific sizes and shapes. When driven at their resonant frequency, they expand and contract longitudinally. This mechanical vibration is amplified and transmitted down the length of the probe. In liquid, the probe causes cavitation which constitutes the main mechanism for sample processing.

Choosing the appropriate horn is extremely important. The sample volume to be processed is directly related to the tip diameter. Smaller tip diameters (Microtip probes) deliver high intensity sonication, but the energy is focused within a small, concentrated area. Larger tip diameters can process larger volumes, but offer lower intensity. Probes are offered with replaceable or solid tips.

Probe tips will pit or erode over time and require replacement. Replaceable tip probes are used with aqueous samples only. In addition to aqueous samples, Solid probes can be used with organic solvents, alcohols and low surface tension liquids. Contact Qsonica with questions regarding proper tip selection.



## Standard Probes



Replaceable

Solid

| Part # | Type of Tip     | Processing Volume | Tip Diameter | Amplitude (microns) |
|--------|-----------------|-------------------|--------------|---------------------|
| 4220   | Replaceable Tip | 20-250 ml         | 1/2" (13 mm) | 120 $\mu$ m         |
| 4219   | Solid Tip       | 20-250 ml         | 1/2" (13 mm) | 120 $\mu$ m         |
| 4207   | Replaceable Tip | 50-500 ml         | 3/4" (19 mm) | 60 $\mu$ m          |
| 4208   | Solid Tip       | 50-500 ml         | 3/4" (19 mm) | 60 $\mu$ m          |
| 4210   | Replaceable Tip | 100-1,000 ml      | 1" (25 mm)   | 30 $\mu$ m          |
| 4209   | Solid Tip       | 100-1,000 ml      | 1" (25 mm)   | 30 $\mu$ m          |

Note: All amplitude values are measured at 100% output.



## Replacement Tips for Standard Probes

Standard 1/2", 3/4" and 1" horns have replaceable tips. During normal use, tips erode and become less effective over time. These worn tips can be easily removed and replaced.

| Part # | Tip Diameter | For Use With |
|--------|--------------|--------------|
| 4406   | 1/2" (13 mm) | #4220        |
| 4407   | 3/4" (19 mm) | #4207        |
| 4408   | 1" (25 mm)   | #4210        |



New Tip



Worn Tip

## Microtip Probes

Microtips are thin, high intensity probes which are designed for processing small sample volumes. Microtips screw into the threaded end of the standard 1/2" probe (#4220).



| Part # | Processing Volume* | Tip Diameter | Amplitude (microns) |
|--------|--------------------|--------------|---------------------|
| 4417   | 0.2-5 ml           | 1/16" (2 mm) | 320 µm              |
| 4418   | 1-15 ml            | 1/8" (3 mm)  | 380 µm              |
| 4420   | 5-50 ml            | 1/4" (6 mm)  | 200 µm              |

\* The recommended processing volume range is application specific. For example, samples containing surfactants foam easily and may require larger volumes for effective sonication. Contact Qsonica for application assistance.



## Coupler with Stepped Microtip

The stepped microtip and coupler assembly is a low intensity option which can be used to process small volumes that do not require high power. The probe tip remains 1/8" in diameter for 48mm. This 2-piece assembly attaches directly to the converter.



Coupler — # 4421



Stepped Microtip — Part # 4422

| Part # | Processing Volume                                 | Tip Diameter | Amplitude (microns) |
|--------|---------------------------------------------------|--------------|---------------------|
| 4422*  | 0.5-15 ml                                         | 1/8" (3 mm)  | 200 µm              |
| 4421   | Coupler - *required for use of a Stepped Microtip |              |                     |

## Extenders

Standard probes may not be long enough to fit down into certain long necked vessels. Extender probes attach to standard horns of the same tip diameter and extend the length of the horn assembly. Extenders are available in 5" and 10" lengths with either solid, or replaceable tips.



| Part #        | Type of Tip     | Length | Tip Diameter |
|---------------|-----------------|--------|--------------|
| <b>406HW</b>  | Solid Tip       | 5"     | 1/2" (13 mm) |
| <b>406HWT</b> | Replaceable Tip | 5"     | 1/2" (13 mm) |
| <b>407HW</b>  | Solid Tip       | 5"     | 3/4" (19 mm) |
| <b>407HWT</b> | Replaceable Tip | 5"     | 3/4" (19 mm) |
| <b>408HW</b>  | Solid Tip       | 5"     | 1" (25 mm)   |
| <b>408HWT</b> | Replaceable Tip | 5"     | 1" (25 mm)   |
| <b>407FW</b>  | Solid Tip       | 10"    | 3/4" (19 mm) |
| <b>407FWT</b> | Replaceable Tip | 10"    | 3/4" (19 mm) |
| <b>408FW</b>  | Solid Tip       | 10"    | 1" (25 mm)   |
| <b>408FWT</b> | Replaceable Tip | 10"    | 1" (25 mm)   |

Extenders offer the same processing volume and amplitude of their corresponding standard horn.

## Boosters



Booster horns increase the intensity of standard 3/4" and 1" horns. Boosters attach between the converter and horn to increase amplitude by the gain ratio indicated below.

| Part #      | For Use With                       | Gain Ratio |
|-------------|------------------------------------|------------|
| <b>4121</b> | 3/4" (19 mm) and 1" (25 mm) Probes | 2 to 1     |

## High Gain Horns



High gain horns (also known as high intensity horns) offer double the amplitude of standard 3/4" and 1" horns. High gain horns attach directly to the converter.

| Part #      | Type of Tip     | Processing Volume | Tip Diameter | Amplitude (microns) |
|-------------|-----------------|-------------------|--------------|---------------------|
| <b>4305</b> | Replaceable Tip | 50-500 ml         | 3/4" (19 mm) | 120 µm              |
| <b>4306</b> | Solid Tip       | 50-500 ml         | 3/4" (19 mm) | 120 µm              |
| <b>4310</b> | Solid Tip       | 100-1,000 ml      | 1" (25 mm)   | 60 µm               |
| <b>4311</b> | Replaceable Tip | 100-1,000 ml      | 1" (25 mm)   | 60 µm               |

## 4 Tip Horn



The 4 Tip Horn enables 4 samples to be processed simultaneously. This horn offers high intensity and is effective for cell disruption, mixing, homogenization and many other applications. Tip diameter is 1/8" and the space between each tip is 1.05".

The 4 Tip Horn can process 1-15ml sample volumes and is made to fit into both 1.5ml and 15ml tubes. When processing small volumes with high intensity, samples will heat up quickly. In addition to using the pulse mode, a CoolRack tube cooling module is highly recommended. CoolRack accessories work well with the 4 Tip Horn.

The 4 Tip Horn can be mounted in the #459 stand (as shown) or in the Sound Enclosure (#432B2; see page 11).

| Part #      | Description      |
|-------------|------------------|
| <b>4659</b> | 4 Tip Horn       |
| <b>4660</b> | Replacement Tips |



## 24 Tip Horn

The 24 Tip Horn processes each well of a 24 well plate simultaneously. This horn is effective for cell disruption,

mixing, dissolution and many other applications.

The 24 Tip Horn can be mounted inside the Sound Enclosure (page 11) to reduce the noise level generated by sonication. Alternatively, a Heavy Duty Stand is available (page 17) which allows precise adjustment of the horn in and out of the microplate.

| Part #      | Description      |
|-------------|------------------|
| <b>4579</b> | 24 Tip Horn      |
| <b>4660</b> | Replacement Tips |



## Dual Horn

The Dual Horn allows a single Sonicator unit to process two samples simultaneously. The rectangular-shaped horn doubles the unit's output, and enables two probes to vibrate with the same intensity as a single probe.

The distance from center to center of each probe is 4.5".

3/4" solid tip probes are included with the Dual Horn but 1/2" or 1" probes may also be used.

The Dual Horn is capable of withstanding the rigors and harsh chemicals of environmental testing labs. Sonication is used by environmental labs to process soil and sediment samples in lieu of soxhlet extraction methods. The Sonicator and Dual Horn meet the EPA requirements specified in method SW846-3550.

Dual Horn components can be ordered separately. The Dual Horn can be mounted in the Sound Enclosure (#432B2) or on the Heavy Duty Stand (#438).

| Part #      | Description                          |
|-------------|--------------------------------------|
| <b>4525</b> | Dual Horn with Probes                |
| <b>4208</b> | Replacement 3/4" (19 mm) Solid Probe |



432B2 shown with probe  
(Probe sold separately.)

| Part # | Description                                                                                                                  |
|--------|------------------------------------------------------------------------------------------------------------------------------|
| 432B2  | Sound Enclosure with<br>Converter Holder,<br>Exterior Dimensions (W x H x D)<br>13.5 x 30.5 x 13 in.<br>(343 x 775 x 330 mm) |

## Sound Enclosure

Sonicators are extremely loud devices and will cause discomfort to the user and anyone nearby. The Sound Enclosure reduces noise by approximately 20 dBa and is made to work with all accessories (excluding the Microplate Horn which has its own dedicated enclosure).

In addition to reducing noise, the Sound Enclosure has an internal support rod and converter mounting system. Any Qsonica probe or horn will be held safely and securely inside the unit.

Two ports are located on either side of the enclosure for coolant tubing or a temperature monitoring probe. The interior walls are lined with acoustical foam and the door has a window so experiments can be visually monitored.



432B2 shown with cup horn  
(Cup horn sold separately.)



## Low Volume Flocells

The Low Volume Flocell (LVF) is available for use with either the Q500 or Q700 system. The Flocell (#4650) is equipped with ¼" (6 mm) hose barb fittings and does not include a probe. A ½" (12 mm) replaceable tip probe (#4643) or ½" (13 mm) solid probe (#4644) must be ordered separately. These probes feature a flange for proper mounting with the LVF. The replaceable tip probe is for use with aqueous samples only. Solid tip probes can be used with all types of solvents or low surface tension liquids.

Sonication generates heat so a Water Jacket (#4655) is available if the process requires cooling. The water jacket slides over the LVF and is used to recirculate cold water around the exterior of the flocell body. The water jacket includes ¼" (6 mm) hose barb fittings.

The LVF is recommended for processing sample volumes above 1L. Routine applications include cell lysis, mixing, solubilizing and deagglomerating/dispersing nanoparticles.



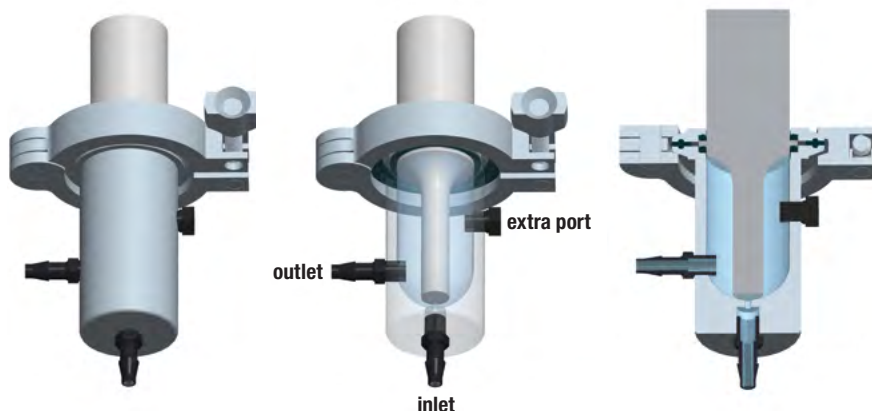
LVF Assembly  
with Probe



Flocell Assembly  
with Water Jacket



Probe



| Part # | Description                                                                                                                                                                                                                                                                                                                                                                              |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4650   | <b>Low Volume Flocell</b> <ul style="list-style-type: none"> <li>• Material: 316L Stainless Steel</li> <li>• Operating pressure: 40-100 psi max.</li> <li>• Internal volume: 65ml</li> <li>• Maximum flow rate: 0.5L/min</li> <li>• Hose barb fittings for ¼" (6 mm) ID tubing</li> <li>• Dimensions (H x D): 9.1 x 3.5 in. 228 x 89 mm) — dimensions include probe and clamp</li> </ul> |
| 4643   | <b>½" (13 mm) Replaceable tip probe with flange for #4650</b>                                                                                                                                                                                                                                                                                                                            |
| 4644   | <b>½" (13 mm) Solid tip probe with flange for #4650</b>                                                                                                                                                                                                                                                                                                                                  |
| 4655   | <b>Water Jacket for #4650</b>                                                                                                                                                                                                                                                                                                                                                            |

## How Flocells Work

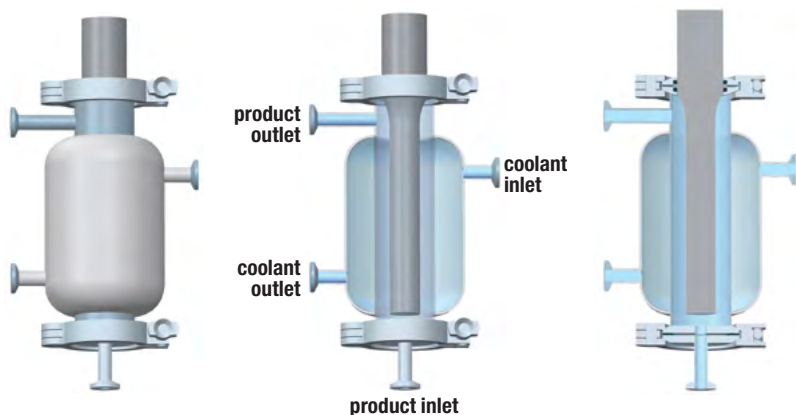
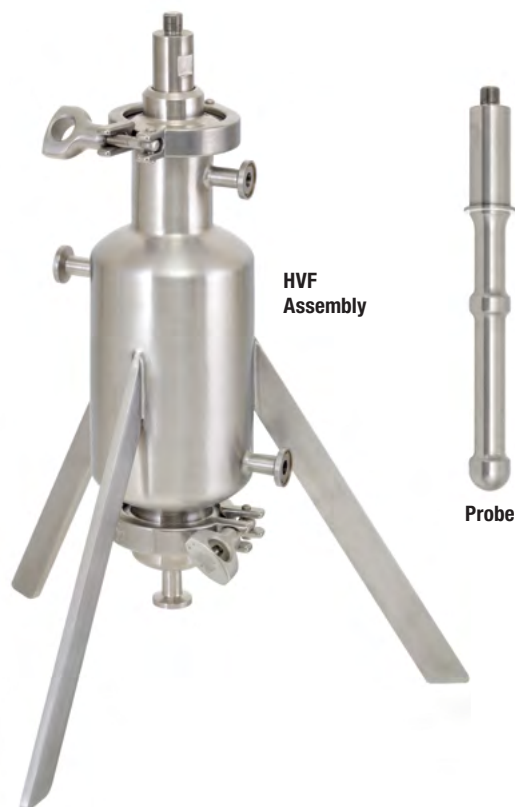
Flocells offer inline or continuous, large volume, batch sample processing. Flocells are ideal for mixing and dispersing applications. Batch volumes can be re-circulated through the system multiple times if increased sonication time is needed. Multiple units can be used in series to reduce processing time and/or maintain an even higher flow rate.

The liquid sample is pumped into the Floccell through the inlet at the bottom of the unit. As the sample passes through the cavitation field, it is processed. The processed liquid exits the unit through an outlet port. The degree of processing can be controlled by adjusting the intensity of sonication as well as flow rate.

## High Volume Flocells

The High Volume Floccell (HVF) is available for use with either the Q700 or Q1375 System. The Floccell (#4549) is equipped with ½" (13 mm) sanitary connections, a water jacket and 1" (25 mm) Diameter probe (#4625). The water jacket can be used to recirculate cold water around the exterior of the floccell body. This helps reduce the heat generated during ultrasonic processing.

The HVF is recommended for processing batch volumes of 5L or more. Routine applications include cell lysis, mixing, solubilizing and deagglomerating/dispersing nanoparticles.



| Part # | Description                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4549   | <b>High Volume Floccell</b> <ul style="list-style-type: none"> <li>• Dimensions (H x D): 17 x 16 in. (431 x 406 mm)</li> <li>• Includes #4625 Probe</li> <li>• Material: 316L Stainless Steel</li> <li>• Operating pressure: up to 100psi</li> <li>• ½" (13 mm) Sanitary connections</li> <li>• Internal volume: 400ml</li> <li>• Maximum flow rate: 20L/min</li> <li>• Water jacketed for cooling</li> </ul> |
| 4625   | <b>1" (25 mm) Diameter Floccell Probe</b>                                                                                                                                                                                                                                                                                                                                                                     |

## Cup Horn

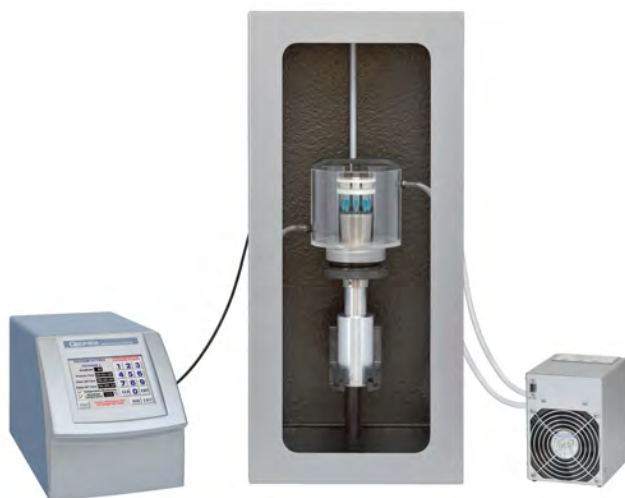
A Cup Horn offers indirect sonication and functions as a high intensity ultrasonic water bath. Multiple samples can be processed in sealed tubes eliminating cross contamination or aerosol issues.

The horn is mounted within an acrylic cup and the cup is filled with water. Sample tubes are placed in a rack at a fixed distance above the ultrasonic horn. Cavitation is produced in the water, processing the samples within the tubes. The #440 tube rack is included with the Cup Horn. This rack is made for 1.5ml polystyrene tubes which are proven to process samples more efficiently than 1.5ml polypropylene tubes.

Sonication generates heat so ports for cooling are located on each side of the cup. The #4900 Chiller is recommended for maintaining both the water temperature and water level within the Cup Horn. Maintaining a fixed water level is extremely important and only the Qsonica chiller can accurately control this variable.

The Sound Enclosure is highly recommended for all Cup Horn users. In addition to reducing sonication noise to safe levels, it securely holds the Cup Horn in place. The Sound Enclosure features ports on either side to allow coolant tubing to pass from the Cup Horn to the Chiller.

Note: Selecting the appropriate size and type of sample tube will greatly improve results. Contact Qsonica for application assistance.



**Part # 431C2**

Inner Diameter of Cup: 5.5"

Diameter of Horn: 2.5"

Tube Rack #440  
(8 tubes) is Included

### Optional Tube Racks



**Part #440**



**Part #451**



**Part #445**



**Part #449**

| Part #                   | Description                               |
|--------------------------|-------------------------------------------|
| <b>Tube Holder # 440</b> | 8 Tube Holder (1.5ml Polystyrene tubes)   |
| <b>Tube Holder # 451</b> | 8 Tube Holder (1.5ml Polypropylene tubes) |
| <b>Tube Holder # 449</b> | 12 Tube Holder (600ul PCR tubes)          |
| <b>Tube Holder # 445</b> | 24 Tube Holder (300ul PCR tubes)          |

## Microplate Horn

(Only for use with Q700)

Similar to a Cup Horn, but larger, the Microplate Horn is an indirect sonication device capable of processing an entire 96 well microtiter plate or many microtubes at one time.

Simply place your samples within the water-filled reservoir and the sonic energy is transferred into each individual well or tube.

The Horn is equipped with a clear acrylic collar to contain the liquid media within the reservoir. This allows the user to process deep well microplates or other tall vessels. Standard microtiter plates or PCR tubes require a smaller volume of liquid for sonication. For these applications, the clear acrylic collar may be removed and the lower, gray collar will allow for easier access to the samples.



#Q700MPX with Chiller and tubing set



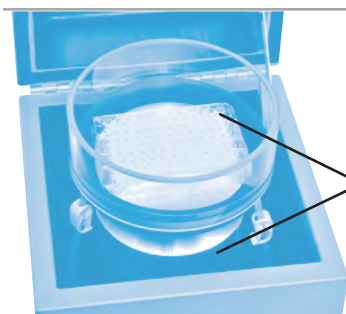
#431MPX



#431MPXH

| Part #         | Description                                               |
|----------------|-----------------------------------------------------------|
| <b>Q700MPX</b> | Q700 (Without Standard Probe), and the 431MPX             |
| <b>431MPX</b>  | Microplate Horn, Pinch Clamps, Tubing and Sound Enclosure |
| <b>431MPXH</b> | Microplate Horn Only                                      |
| <b>432MP</b>   | Sound Enclosure for Microplate Horn                       |
| <b>444</b>     | 300 $\mu$ l Microcentrifuge Tube Holder/Cover             |

Exterior dimensions of the Sound Enclosure are (W x D x H):  
10 x 10 x 17 in. (254 x 245 x 432 mm).



#444

The Microplate Horn is commonly used in PMCA research. A microcentrifuge tube holder and cover (#444) are available and often used for this application.



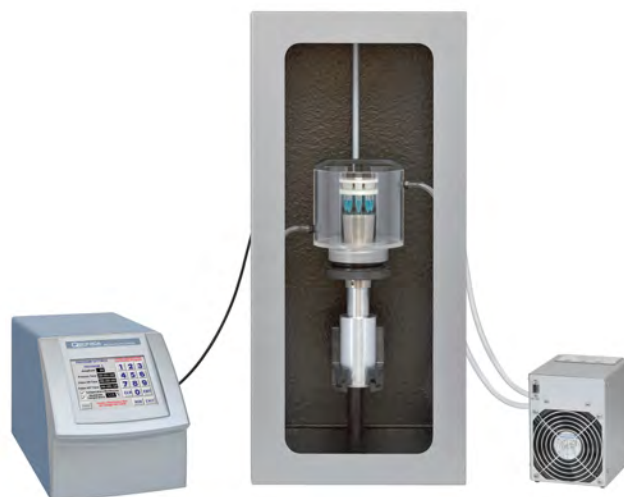
## Recirculating Chillers

Sonication generates heat which may be detrimental to some applications. Attempting to control temperature with ice and/or repeatedly changing out water is tedious and no longer necessary. Qsonica now offers 2 chiller options for automating the sample cooling process.

Quick-connect tubing and fittings (ordered separately) attach the chiller to the ports on the cup horn or microplate horn. When used in conjunction with the pulsed sonication mode, your desired water temperature will be maintained. Older model cup horns may require special fittings so please contact us for ordering assistance.



| Part # | Description                                            |
|--------|--------------------------------------------------------|
| 4900   | Compact Recirculating Chiller                          |
| 4910   | Tubing and Connector Set for Cup Horn for #4900        |
| 4915   | Tubing and Connector Set for Microplate Horn for #4900 |
| 4905   | High-Capacity Recirculating Chiller                    |
| 4911   | Tubing/Connector Set for Cup Horn for #4905            |
| 4916   | Tubing/Connector Set for Microplate Horn for #4905     |



Chiller shown with Sonicator, tubing set, cup horn and sound enclosure (sold separately).

| TECHNICAL SPECIFICATIONS: | Part No. 4900                    | Part No. 4905                     |
|---------------------------|----------------------------------|-----------------------------------|
| Cooling Capacity:         | 200 watts                        | 400 watts                         |
| Temperature Range:        | 2-45°C                           | 2-45°C                            |
| Dimensions:               | 7.5" x 5" x 7" (19 x 13 x 18 cm) | 13" x 11" x 13" (32 x 28 x 32 cm) |
| Weight:                   | 8 lbs. (3.6 kg.)                 | 28 lbs. (12.7 kg.)                |
| Voltage:                  | 115-230 VAC, 50/60 Hz            | 115-230 VAC, 50/60 Hz             |

## Replacement Converter



| Part # | Description           |
|--------|-----------------------|
| CL334  | Replacement Converter |

## Replacement Wrenches



| Part # | Description            |
|--------|------------------------|
| 4015   | Heavy Duty Pin Spanner |

| Part # | Description |
|--------|-------------|
| 404    | Wrench Set  |

## Temperature Monitoring Options

(Q700 only)

| Part # | Description           |
|--------|-----------------------|
| 4103   | Flexible Thermocouple |

2 types of temperature probes are available for use with the Q700 Sonicator



| Part # | Description       |
|--------|-------------------|
| 4102   | Temperature Probe |

## Replacement Converter Cable



| Part # | Description |
|--------|-------------|
| K4     | 6 ft. Long  |
| K4-10  | 10 ft. Long |

## Footswitch



Enables hands free operation

| Part # | Description       |
|--------|-------------------|
| FS-3   | For Use with Q700 |
| 4004   | For Use with Q500 |

## Heavy Duty Stand

| Part # | Description      |
|--------|------------------|
| 438    | Heavy Duty Stand |

Converter & horn not included

Precisely raises and lowers the converter and probe/horn into a sample vessel



## Large Clamp Stand

| Part # | Description                                              |
|--------|----------------------------------------------------------|
| 459    | Stand with 1/2" Diameter Support Rod and Converter Clamp |



## Jack Stand



Raises and lowers sample vessels to a stationary probe as needed.

| Part # | Description |
|--------|-------------|
| 357    | Jack Stand  |

# Q125 Sonicator

**The Q125 is a microprocessor based, programmable ultrasonic processor. Features include pulse mode and a digital display of both wattage and joules.**

The unit is effective for standard cell disruption, DNA/RNA shearing, homogenization and many other applications. The Q125 is ideal for small samples and for customers that do not plan to scale up to larger volumes in the future. This model offers the same programming and display features as the Q500 unit.



*Stand sold separately.*

## FEATURES:

### **Programmable operation**

Set time and amplitude for hands free operation

### **Pulse mode**

Prevent heat buildup in temperature sensitive samples

### **Digital amplitude / intensity control**

Output intensity can be set from 20-100%

### **Elapsed time indicator**

Displays duration of sonication

### **Display of wattage and joules**

Real-time energy monitoring

### **Overload protection**

Prevents damage to circuitry if a fault occurs

### **RoHS compliant**

Uses lead free components

### **Compact design**

Takes up less space than competitive units



## PART NO. Q125 INCLUDES:

- Generator
- Converter
- 1/8" (3 mm) diameter probe
- Power cable
- Converter cable
- Wrench set

## TECHNICAL SPECIFICATIONS:

|                                 |                                           |
|---------------------------------|-------------------------------------------|
| <b>Power Rating:</b>            | 125 watts                                 |
| <b>Frequency:</b>               | 20 kHz                                    |
| <b>Programmable Timer:</b>      | 10 hours                                  |
| <b>Adjustable Pulse On/Off:</b> | 1 second to 1 minute                      |
| <b>Dimensions (W x L x H):</b>  | 8 x 13.75 x 5.75 in. (203 x 349 x 146 mm) |
| <b>Voltage:</b>                 | 110V, 50/60 Hz                            |

*Specify desired voltage for export.*

## Probes



| Probes               | Part # 4423        | Part # 4422         | Part # 4435   |
|----------------------|--------------------|---------------------|---------------|
| Processing Volume*   | 200 $\mu$ l - 5 ml | 500 $\mu$ l - 15 ml | 10 ml - 50 ml |
| Tip Diameter         | 5/64" (2 mm)       | 1/8" (3 mm)         | 1/4" (6 mm)   |
| Amplitude ( $\mu$ m) | 200                | 180                 | 120           |

## Sound Enclosure



| Part # | Description                                                                                                        |
|--------|--------------------------------------------------------------------------------------------------------------------|
| 432A   | Sound Enclosure with Converter Holder,<br>Exterior Dimensions (H x W x D)<br>20 x 12 x 12 in. (508 x 254 x 254 mm) |

## Support Stand

| Part # | Description                         |
|--------|-------------------------------------|
| 460    | Support Stand with Converter Holder |



## Converter

| Part # | Description           |
|--------|-----------------------|
| CL18   | Replacement Converter |



## 8 Tip Horn

| Part # 4602                                                  |
|--------------------------------------------------------------|
| Tip Diameter<br>1/8" (3 mm)                                  |
| Distance<br>Between Tips<br>0.35" (9 mm)<br>center to center |



## Cup Horn



| Part # 4608                     |
|---------------------------------|
| Horn Diameter<br>25/32" (20 mm) |
| Cup ID*<br>1.5" (38 mm)         |

\*Accommodates (two)  
1.5 ml microtubes or  
(one) 15 ml Falcon tube.



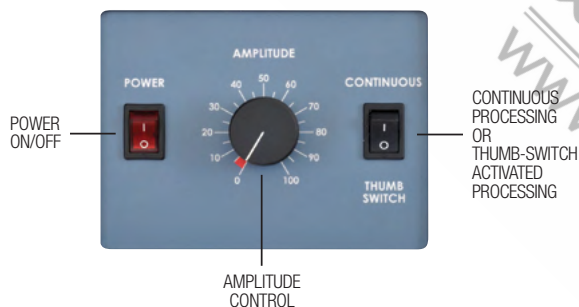
# Q55 Sonicator

**The Q55 is a compact and cost effective ultrasonic processor that will occupy less bench space than any unit on the market.**

This model is effective for standard cell disruption and many other small volume applications. Probes are available in three different sizes.

## FEATURES:

- Smallest unit available
- Thumb-switch or continuous operation
- Simple and effective operation



*Stand sold separately.*

## PART NO. Q55 INCLUDES:

- Generator
- Converter
- 1/8" (3 mm) dia. probe
- Power cable
- Converter cable
- Wrench set



| Probes             | Part # 4423   | Part # 4422    | Part # 4435   |
|--------------------|---------------|----------------|---------------|
| Processing Volume* | 200 µl - 5 ml | 500 µl - 15 ml | 10 ml - 50 ml |
| Tip Diameter       | 5/64" (2 mm)  | 1/8" (3 mm)    | 1/4" (6 mm)   |
| Amplitude (µm)     | 200           | 180            | 120           |

## TECHNICAL SPECIFICATIONS:

|                                |                                            |
|--------------------------------|--------------------------------------------|
| <b>Power Rating:</b>           | 55 watts                                   |
| <b>Frequency:</b>              | 20 kHz                                     |
| <b>Dimensions (W x L x H):</b> | 8 x 7.5 x 5.75 in.<br>(203 x 190 x 146 mm) |
| <b>Voltage:</b>                | 110V, 50/60 Hz                             |

*Specify desired voltage for export.*

## Optional Accessories

| Part #       | Description                                                                                                          |
|--------------|----------------------------------------------------------------------------------------------------------------------|
| <b>460</b>   | Support Stand with Converter Holder                                                                                  |
| <b>432A</b>  | Sound Enclosure with Converter Holder<br>Exterior Dimensions (H x W x D)<br>20 x 12 x 12 in.<br>(508 x 254 x 254 mm) |
| <b>CL188</b> | Replacement Converter                                                                                                |



#CL188



#460



#432A

# CoolRacks

## Tube Chilling Modules - Secure sample tubes and standardize temperature during sonication.

CoolRack® thermo-conductive tube modules eliminate inconsistencies which occur due to inserting tubes directly into ice, dry ice, alcohol baths, water baths and other common temperature sources. Place the module directly onto the temperature source and it will rapidly adapt to that temperature (from -196°C to +100°C). CoolRack modules ensure temperature standardization of all tubes when cooling, (snap) freezing or heating/thawing samples (within +/- 0.1°C) and reproducible temperature-sensitive procedures.



### PROBLEM

- Shifting Tubes
- Overheating Samples
- Inconsistent Tip Depth



### SOLUTION

- Fixed Tube Position
- Stable Temperature
- Reproducible Results



1.5 ml Tubes



15 ml Tubes



50 ml Tubes

### FEATURES:

- Keep tubes at desired temperature
- Prevent contamination from ice/water
- Organize and keep tubes upright
- Resistant to rust and corrosion
- Compatible with detergents and sterilizable



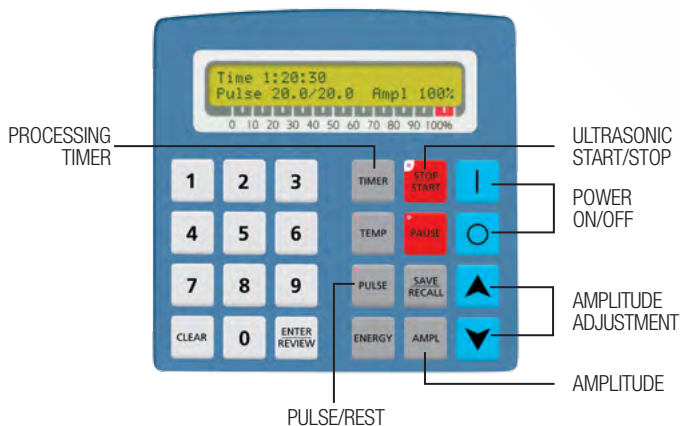
#504 CoolRack  
(shown with 4 tip horn)

| Part # | Description             | For Use With               |
|--------|-------------------------|----------------------------|
| 501    | 6 Tube Rack             | 1.5 and 2 ml Tubes         |
| 502    | 15 Tube Rack            | 1.5 and 2 ml Tubes         |
| 504    | 4 Tube Rack             | 1.5 and 2 ml Tubes         |
| 510    | 9 Tube Rack             | 15 ml Centriuge Tubes      |
| 511    | 4 Tube Rack             | 50ml Centriuge Tubes       |
| 503    | 1 L Square Ice Pan      | #501, 502 or 504 CoolRacks |
| 512    | 4 L Rectangular Ice Pan | #510 or 511 CoolRacks      |
| 513    | 2.5 L Round Ice Pan     | #510 or 511 CoolRacks      |

# Q1375 Sonicator

**The Q1375 offers the ability to process industrial scale sample volumes in individual batches or flow through applications. This model includes a 1" diameter, 10" long probe and booster. The booster increases the amplitude of the probe which enables larger volumes to be processed.**

The Q1375 Sonicator offers the ability to program processing times and a full range of intensity settings. Processing time can be set from 1 second to 10 hours. A pulsing feature is also included. Pulsing can reduce the amount of heat generated by sonication when processing temperature sensitive samples.



## FEATURES:

### Programmable operation

Set time and amplitude for hands free operation

### Pulse mode

Prevent heat buildup in temperature sensitive samples

### Digital amplitude / intensity control

Output intensity can be set from 20-100%

### Elapsed time indicator

Displays duration of sonication

### Display of wattage and joules

Real-time energy monitoring

### Overload protection

Prevents damage to circuitry if a fault occurs

### Temperature protection

Prevents overheating of samples

## PART NO. Q1375 INCLUDES:

- Generator
- Converter
- 3:1 Booster
- Converter cable
- Power cable
- Wrench set
- #4597 probe

## TECHNICAL SPECIFICATIONS:

|                                 |                                         |
|---------------------------------|-----------------------------------------|
| <b>Power Rating:</b>            | 1,375 watts                             |
| <b>Frequency:</b>               | 20 kHz                                  |
| <b>Programmable Timer:</b>      | 10 hours                                |
| <b>Adjustable Pulse On/Off:</b> | 1 second to 1 minute                    |
| <b>Dimensions (H x W x D):</b>  | 7 x 15 x 18.25 in. (178 x 380 x 463 mm) |
| <b>Voltage:</b>                 | 220V, 50/60 Hz                          |

## High Volume In-Line Processing



Flocells offer inline processing of larger sample volumes. Flocells are ideal for mixing, dispersing, lysing cells and many other applications. The Q1375F package features a high power Sonicator with a High Volume Floccell (HVF) for large scale processing.

The HVF has a maximum flow rate of 20 liters per minute. Individual flow rates will vary depending on the type of sample, degree of processing required and viscosity.

### PART NO. Q1375F INCLUDES:

- Q1375 (without Standard Probe)
- 4549 HVF (see page 13)
- 4625 Floccell Probe

## High Volume Batch Processing



#4597

#4617

#4662

Full wave probes are required to reach down inside and process samples within large vessels. Part #4597 is a standard probe and works well for many applications. Larger volumes and more difficult applications will benefit from the additional surface area and higher power of the #4617 probe. #4662 features a 2" tip diameter and can process an even larger volume than other probe options. Contact us for assistance with selecting a probe for your application.

| Probes             | Part # 4597   | Part # 4617 | Part # 4662 |
|--------------------|---------------|-------------|-------------|
| Processing Volume* | 500 ml - 10 L | 2 L - 20 L  | 10 L - 30 L |
| Tip Diameter       | 1" (25 mm)    | 1" (25 mm)  | 2" (51 mm)  |

*\*Actual processing volumes may vary based on the application and type of sample.*

## Optional Accessories



#4474



#4060



#461

| Part # | Description                                                                                   |
|--------|-----------------------------------------------------------------------------------------------|
| 4474   | Sound Enclosure with Converter Holder (H x W x D)<br>36 x 16 x 16 in.<br>(914 x 406 x 406 mm) |
| 4060   | Temperature Probe                                                                             |
| 461    | Support Stand and Converter Clamp                                                             |

*\*Stand and clamp can be used inside of enclosure.*



# Frequently Asked Questions

## Relationship between Sample Volume and Probe Size

Selecting the proper size probe is extremely important. Each probe has a recommended sample volume range.

Small volumes require a small tip to fit inside the sample tube. Small tips (microtips) are recommended for processing samples inside small, thin vessels and never samples larger than 50ml.

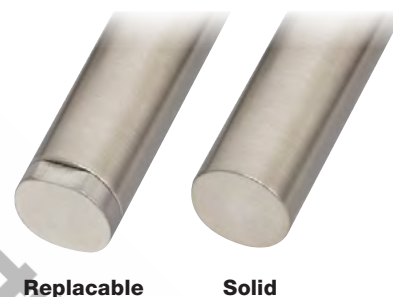
Larger volumes require a larger probe for effective processing. For example, a 1" probe will process 1 liter more quickly than a ¾" probe.

| Tip Diameter    | Processing Volume Range |
|-----------------|-------------------------|
| 1/16" (2mm)     | 200ul - 2ml             |
| 1/8" (3mm)      | 1ml - 15ml              |
| 1/4" (6mm)      | 5ml - 50ml              |
| 1/2" (12mm)     | 20ml - 250ml            |
| 3/4" (19mm)     | 100ml - 500ml           |
| 1" (25mm)       | 200ml - 1,000ml         |
| 1" with booster | 500ml - 1,500ml         |
| Flocell         | Continuous flow         |

## Replaceable vs. Solid Tips

Replaceable tip probes are used with aqueous samples. Replaceable tip probes have threaded ends and when the tip is worn out it can be unscrewed and replaced.

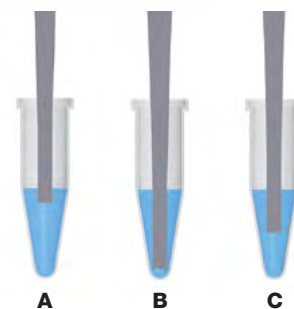
If you are processing a sample containing solvents or low surface tension liquids you must use a solid tip probe. Solid tip probes can be used for any type of sample.



## Tip Depth

Probes/tips must be submerged properly. If the tip is not submerged enough the sample will foam or bubble. If the tip is too deep it will not circulate the sample effectively.

Figure C indicates the correct set up and will achieve good results in the shortest processing time.



**For more detailed information on the above topics, as well as the topics below, visit the Literature section of [www.Sonicator.com](http://www.Sonicator.com).**

- Nanomaterials and Probe Size
- Controlling Temperature
- Power vs. Intensity
- Vessel Shape and Size
- Cooling the Converter
- How to Determine Energy Delivered
- Amplitude and Time Settings
- Booster Horn

*In addition, you will also find example protocols, publications, product manuals and warranty information on the site.*

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