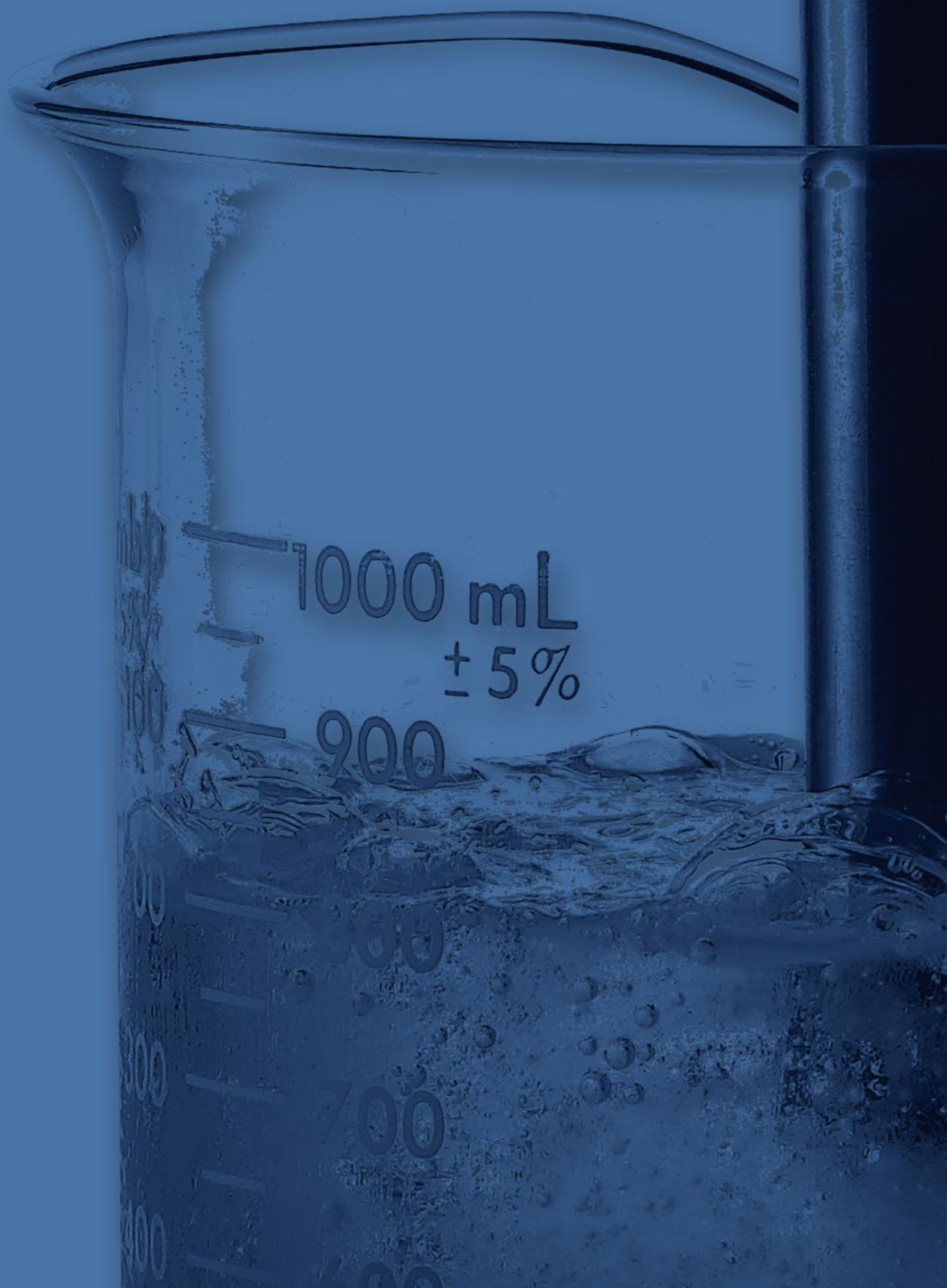


SONICATOR®



Ultrasonic Liquid Processors

QSONICA
SONICATORS



1000 mL

± 5%

900

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How Does a Sonicator Work?



Power Supply → **Converter** → **Probe/Horn**

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

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

The power supply provides high voltage pulses of energy at a frequency of 20kHz that drives a piezoelectric **Converter**. The converter is a cylindrical device which is connected to the power supply 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 expands and contracts longitudinally. 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 prevent overheating.

To ensure a positive outcome, it is important to select the appropriate power supply and probe to match the volume, viscosity and other parameters of each particular application.

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 recommended for many high throughput applications.



Q700 Sonicator

The Q700 Sonicator is the most technologically advanced ultrasonic processor available today. Improved internal circuitry provides more efficient operation and sample-to-sample consistency, ensuring that you can obtain reproducible results. The touchscreen interface enables easy programing and access to the Q700's unmatched feature set. Full amplitude control from 1-100% better enables users to define optimum settings for efficient sample processing in challenging applications.

We turned up the power, giving the Q700 Sonicator a maximum power output of 700 watts, more than most benchtop / laboratory-scale ultrasonic systems. This enables the Q700 to process larger volumes and utilize a wider range of accessories. The Q700 is 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.

PROCESSING VOLUME

0.2 – 1,000mL*

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" (13mm) diameter probe
- Power cable
- Converter cable
- Wrench set

TECHNICAL SPECIFICATIONS:

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

Specify desired voltage for export.

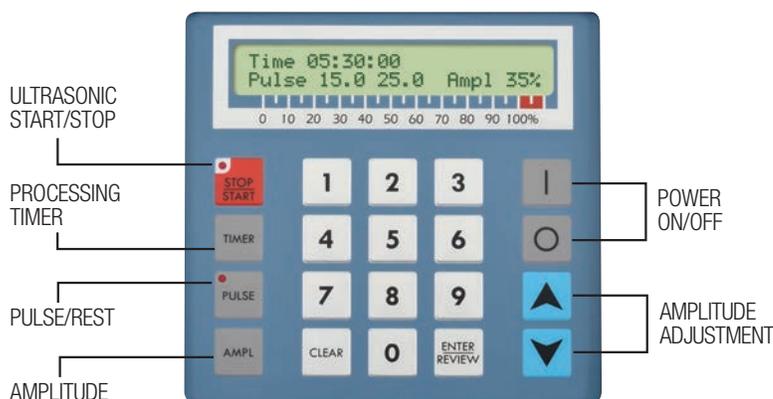
Q500 Sonicator

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

Processing Volume

0.2 – 1,000mL*

PART NO. Q500 INCLUDES:

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

TECHNICAL SPECIFICATIONS:

Power Rating:	500 watts
Frequency:	20kHz
Programmable Timer:	10 hours
Adjustable Pulse On/Off:	1 second to 1 minute
Dimensions (W x L x H):	8 x 15.25 x 8.5 in. (203 x 387 x 216 mm)
Voltage:	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. Solid tip probes can be used with any type of liquid. Contact Qsonica with questions regarding tip selection.



Standard Probes



Replaceable

Solid

Part #	Type of Tip	Processing Volume	Tip Diameter	Amplitude (microns)
4220	Replaceable Tip	20-250mL	1/2" (13mm)	120µm
4219	Solid Tip	20-250mL	1/2" (13mm)	120µm
4207	Replaceable Tip	50-500mL	3/4" (19mm)	60µm
4208	Solid Tip	50-500mL	3/4" (19mm)	60µm
4210	Replaceable Tip	100-1,000mL	1" (25mm)	35µm
4209	Solid Tip	100-1,000mL	1" (25mm)	35µm

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" (13mm)	#4220
4407	3/4" (19mm)	#4207
4408	1" (25mm)	#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	0.2-5mL	1/16" (2mm)	320µm
4418	1-15mL	1/8" (3mm)	380µm
4420	10-50mL	1/4" (6mm)	200µm

*The recommended processing volume range is application specific. 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" diameter for 48mm. This 2-piece assembly attaches directly to the converter.



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

Extenders

Extenders attach to standard probes of the same tip diameter and extend the length of the probe assembly to reach down into tall vessels.



Part #	Type of Tip	Length	Tip Diameter
406HW	Solid Tip	5"	1/2" (13mm)
407HW	Solid Tip	5"	3/4" (19mm)
408HW	Solid Tip	5"	1" (25mm)

Booster

A booster (#4121TI) attaches between the converter and a standard 3/4" or 1" probe. The booster will double the amplitude of the probe.



Part #	For Use With	Gain Ratio
4121TI	3/4" (19mm) and 1" (25mm) Probes	2 to 1

High Gain Probes

High gain probes offer double the amplitude of standard 3/4" and 1" probes. These probes attach directly to the converter and are available with solid or replaceable tips.



Part #	Type of Tip	Processing Volume	Tip Diameter	Amplitude (microns)
4305	Replaceable Tip	50-500mL	3/4" (19mm)	120µm
4306	Solid Tip	50-500mL	3/4" (19mm)	120µm
4310	Solid Tip	100-1,000mL	1" (25mm)	70µm
4311	Replaceable Tip	100-1,000mL	1" (25mm)	70µm

4 Tip Horns

The 4 Tip Horn enables 4 samples to be processed simultaneously. This horn is effective for cell disruption, mixing, homogenization and many other applications. This horn is available with either 1/8" or 1/4" tip diameters.

#4659 is a 4 Tip Horn with 1/8" tips. It is recommended for 1-15ml volumes and fits into both 1.5ml and 15ml tubes. The space between each tip is 1.05". The #504 and #510 CoolRacks are compatible with #4659.

#4674 is a 4 Tip Horn with 1/4" tips. It is recommended for 10-50ml volumes and is used with 15 and 50ml tubes. The space between each tip is 1.6". The #511 CoolRack is compatible with the #4674.



#4659

#4674



The #4130 Stand with Lab Jack is recommended for use with all high throughput horns. This stand holds the horn stable and level to ensure consistent results.

24 Tip Horn

The 24 Tip Horn processes each well of a 24 well plate at the same time. This horn is effective for cell disruption, mixing, dissolution and many other applications. The distance between each tip is .708".



#4579

Dual Horn

The Dual Horn allows a single Sonicator 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. Two 3/4" solid tip probes are included with the Dual Horn. The distance from center to center of each probe is 4.5". Replacement probes must be ordered in a matched set of 2 probes (#4208M).



#4525



#432B2
(Probe sold separately.)

Sound Enclosure

Sonicators are very loud devices and will cause discomfort to the user and anyone nearby. The Sound Enclosure reduces noise by approximately 20 dB and is compatible with all accessories.

In addition to reducing noise, the Sound Enclosure has an internal support rod and converter mounting system. Note that some heavy accessories require additional parts for added safety (Microplate horn and high throughput horns).

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



#432B2
(Cup Horn sold separately.)

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

How Flocells Work

Flocells offer inline/continuous, large volume batch sample processing and are ideal for mixing and dispersing applications. Batch volumes can be recirculated 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 a higher flow rate.

The liquid sample is pumped into the Flocell 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.

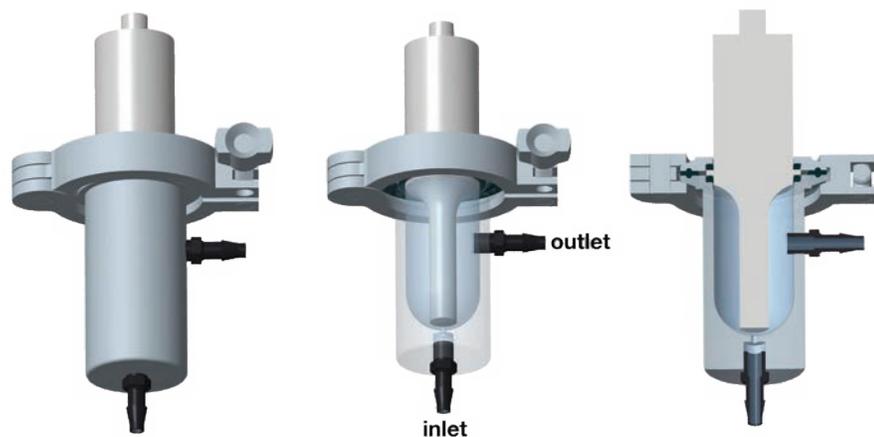
Flocells require long processing times so air cooling of the Converter is required. A pump, tank and associated tubing are not included. A variable speed pump is recommended.

Low Volume Flocell

The Low Volume Flocell (LVF) is available for use with either the Q500 or Q700 system. It is recommended for processing volumes of approximately 1-5L. This Flocell is equipped with 1/4" hose barb fittings and the probe must be ordered separately.

A 1/2" replaceable tip probe is available for aqueous samples only and a 1/2" solid probe can be used with aqueous or other types of liquids. These probes feature a flange for proper mounting with the LVF.

A pump, tank, tubing and additional accessories are not included. A variable speed pump is required.



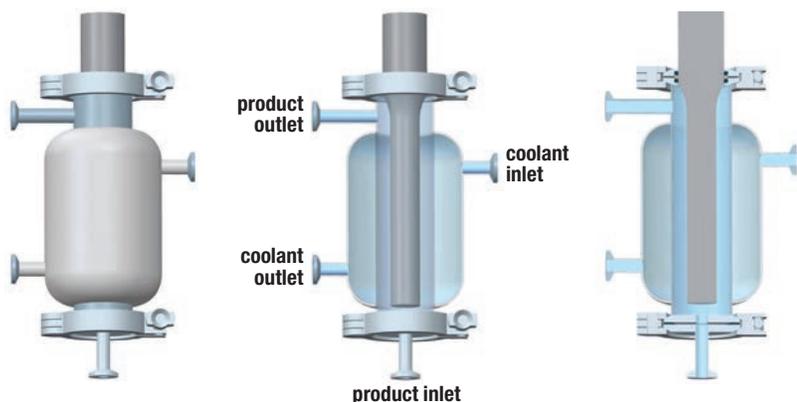
Part #	Description
4650	Low Volume Flocell <ul style="list-style-type: none"> • Material: 316L Stainless Steel • Operating pressure: 40 psi max. • Internal volume: 65mL • Maximum flow rate: 0.5L/min • Hose barb fittings for 1/4" (6mm) ID tubing • Dimensions (L x W): 9.1 x 3.5 in. 228 x 89 mm) — dimensions include probe and clamp
4643	1/2" (13mm) Replaceable tip probe with flange for #4650
4644	1/2" (13mm) Solid tip probe with flange for #4650

High Volume Floccell

The High Volume Floccell (HVF) is available for use with the Q700 system and is recommended for volumes of approximately 5-10L.

The Floccell is equipped with 1/2" sanitary connections, a water jacket and a 1" diameter probe. 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.

A pump, tank, tubing and additional accessories are not included. A variable speed pump is required.



Part #	Description
4549	High Volume Floccell <ul style="list-style-type: none"> • Dimensions (H x D): 17 x 16 in. (431 x 406 mm) • Includes #4625 Probe • Material: 316L Stainless Steel • Operating pressure: up to 100psi • 1/2" (13mm) Sanitary connections • Internal volume: 400mL • Maximum flow rate: 20L/min • Water jacketed for cooling
4625	1" (25mm) Diameter Floccell Probe

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. Both #440 and #451 tube racks are included. #440 is made for 1.5ml polystyrene tubes which are proven to process samples more efficiently than 1.5ml polypropylene tubes. #451 is used with standard polypropylene tubes.

Sonication generates heat, so inlets for cooling are located on each side of the cup. The #4905 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 each side to allow coolant tubing to pass from the Cup Horn to the Chiller.



#431C2



#440



#451

Optional Tube Racks



#449



#445



#455



#454



Part #	Tube Holder Description
440	8 x 1.5mL Polystyrene tubes
451	8 x 1.5mL Polypropylene tubes
449	12 x 500µl PCR tubes
445	24 x 200µl PCR tubes
455	1 x 50mL tube
454	1 x 15mL tube

Microplate Horn

(Only for use with Q700)

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

Place your samples into the water-filled reservoir where ultrasonic energy is transferred into each individual well or tube. Popular applications include cell lysis, dissolution, homogenization and PMCA.

The MPH generates heat and requires cooling. The #4905 Chiller is recommended to cool the MPH and maintain a specific water level inside the reservoir.



#Q700MPXC



Please note that PCR plates are the optimal design for use with the MPH. Qsonica recommends unskirted or semi-skirted plates where all the individual wells are exposed and surrounded by water for maximum ultrasonic energy transmission.



#431MPXH

Part #	Description
Q700MPXC	Q700MPX system and chiller package
Q700MPX	Q700 system, MPH and enclosure
431MPX	Microplate horn and enclosure
431MPXH	Microplate horn only
432B2MP	Sound enclosure with stand
447	Microplate holder
4268	1.5mL tube holder with cover
444	300ul tube holder with cover

Note: the Q700MPX does not include a standard 1/2" probe.

Optional Holders



#447



#4268



#444

Recirculating Chiller

Sonication generates heat which is detrimental to most applications. Attempting to control temperature with ice can be tedious and problematic. Qsonica Chillers simplify and automate the sample cooling process.

The Chiller does not have an internal reservoir to hold water. It will circulate and cool the water held within a Cup Horn, Microplate Horn or other vessel without affecting the water level. Quick-connect tubing and fittings (ordered separately) attach the Chiller to ports on the Cup Horn or Microplate Horn.

The Chiller is often used in conjunction with the pulsed sonication mode which will further reduce sample temperature. Older model Cup Horns or various sample containers may require special fittings so please contact us for ordering assistance.



Chiller shown with Sonicator, tubing set, Cup Horn and Sound Enclosure (sold separately).

Part #	Description
4905	High-Capacity Recirculating Chiller
4911	Tubing/Connector Set for Cup Horn
4916	Tubing/Connector Set for Microplate Horn
4933	Replacement Filter

TECHNICAL SPECIFICATIONS:	
Cooling Capacity:	400 watts
Temperature Range:	5-45° C
Dimensions:	13 x 11 x 13 in. (32 x 28 x 32 cm)
Weight:	28 lbs. (12.7kg.)
Voltage:	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

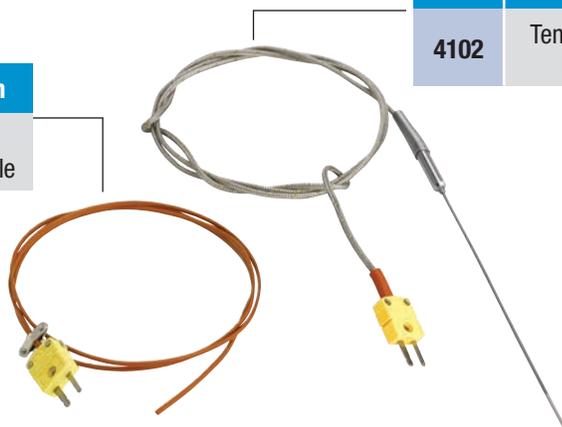


Temperature Monitoring Options

(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
4130	Heavy Duty Stand

The stand securely holds horns in place and ensures all tips are level. An adjustable jack stand to raise and lower samples is included



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

Compact design

Takes up less space than competitive units

Processing Volume

0.2 – 50mL*



PART NO. Q125 INCLUDES:

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

TECHNICAL SPECIFICATIONS:

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

Specify desired voltage for export.

Probes



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

Sound Enclosure



Part #	Description
432A	Sound Enclosure with Converter Holder, Exterior Dimensions (W x H x D) 20 x 12 x 12 in. (508 x 305 x 305 mm)

Support Stand

Part #	Description
460	Support Stand with Converter Holder



Converter

Part #	Description
CL18	Replacement Converter



8 Tip Horn

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



Cup Horn



Part # 4608
Horn Diameter 25/32" (20mm)
Cup ID 1.5" (38mm)

Holders available for 0.5mL, 1.5mL or 15mL tubes.

Q55 Sonicator

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

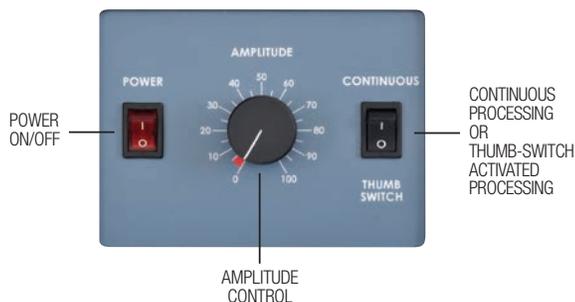
This model is effective for standard cell disruption and many other small volume applications. Probes are available in three different sizes.

FEATURES:

- Smallest unit available
- Thumb-switch or continuous operation
- Processing volume 0.2 - 50mL



Stand sold separately.



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

PART NO. Q55 INCLUDES:

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

TECHNICAL SPECIFICATIONS:

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

Specify desired voltage for export.

Optional Accessories

Part #	Description
460	Support Stand with Converter Holder
432A	Sound Enclosure with Converter Holder Exterior Dimensions (W x H x D) 20 x 12 x 12 in. (508 x 305 x 305 mm)
CL188	Replacement Converter



#CL188



#460



#432A

*Processing volume is application specific and will vary depending on many factors.

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



1.5mL Tubes

15mL Tubes

50mL 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

(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	15mL Centrifuge Tubes
511	4 Tube Rack	50mL Centrifuge Tubes
503	1L Square Ice Pan	#501, 502 or 504 CoolRacks
512	4L Rectangular Ice Pan	#510 or 511 CoolRacks
513	2.5L Round Ice Pan	#510 or 511 CoolRacks

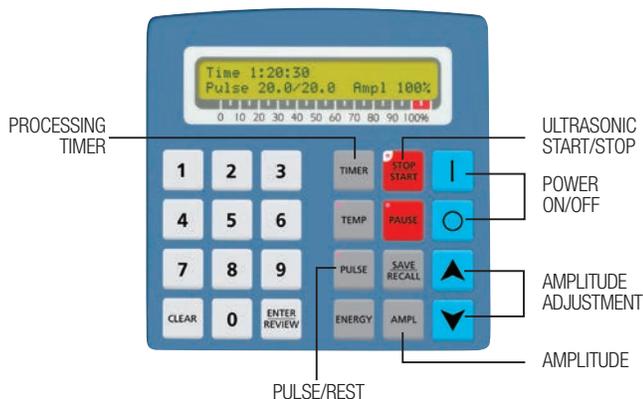
Q2000 Sonicator

The Q2000 offers the ability to process large volumes in individual batches or flow through applications. This model includes a high amplitude, 1.5" diameter, 10" long probe and booster. The Q2000 is powerful, durable and customizable.

The Q2000 Sonicator allows the user 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. A temperature monitoring probe option is also available.



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

Temperature protection

Prevents overheating of samples

Processing Volume

1 – 20L*

PART NO. Q2000 INCLUDES:

- Generator
- Converter
- Booster
- Converter cable
- Power cable
- Wrench set
- 1.5" (38mm) diameter probe

TECHNICAL SPECIFICATIONS:

Power Rating:	2,000 watts
Frequency:	20kHz
Programmable Timer:	10 hours
Adjustable Pulse On/Off:	1 second to 1 minute
Dimensions (H x W x D):	7 x 15 x 18.25 in. (178 x 380 x 463 mm)
Voltage:	230V, 50/60 Hz

Batch Processing

The Q2000 can be used to process approximately 1-20L when used with 2 probe sizes. The 1.5" diameter probe is standard and is recommended for 5L or more. An optional 1" diameter probe is available for processing 1L or more.



Replacement Probes

Two probe options are available with the Q2000. The #4777 probe is included with the system.



Part #	Tip Diameter	Processing Volume	Amplitude
4777	1.5" (38mm)	5 - 20L	100µm
4697	1" (25mm)	1 - 10L	100µm

Note: Processing volumes are application specific. There are many variables (viscosity, concentration, etc.) that can affect the min/max processing volumes and processing times. Stirring may be beneficial to viscous samples. Contact us for assistance.

Optional Accessories



#4474



#461



#4060

Part #	Description
4474	Sound Enclosure (H x W x D) 36 x 16 x 16 in. (914 x 406 x 406 mm)
461*	Support Stand and Converter Clamp
4060	Temperature Probe

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

High Volume In-Line Processing

Flocells offer inline/continuous, large volume, sample processing. The sample may be processed in a single pass, recirculated through multiple times or have a multi-unit configuration for even faster processing. The type of configuration and actual flow rate are dependent on the individual application, sample type and desired end result.

The liquid sample is pumped into the Flocell 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.



The unit is recommended for processing volumes of 5L or more. Routine applications include emulsification, cell lysis, homogenization, solubilizing, deagglomerating and dispersing.

The Flocell is compatible with the Q2000 system. The #4705 Flocell has 1/2" sanitary connections and includes the #4676 probe/horn. Sonication produces heat and this unit should be used with an external heat exchanger and chiller to maintain an acceptable sample temperature. Note that a pump, tank, chiller and other common accessories are not included.

Part #	Description
4705	Flocell <ul style="list-style-type: none"> Includes #4676 probe Material: 316L Stainless steel 1/2" Sanitary connections Hose barbs for 3/8" ID tubing Internal volume 110ml
4676	Flocell Probe 1.5" (38mm) diameter
4135	Stand for Flocell 11 x 10 x 16 in. (280 x 254 x 155mm)
4475	Sound Enclosure 14.5 x 17 x 32 in. (369 x 432 x 813mm)

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)	10mL - 50mL
1/2" (12mm)	20mL - 250mL
3/4" (19mm)	50mL - 500mL
1" (25mm)	100mL - 1,000mL
1" with booster	500mL - 1,500mL
Focell	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.

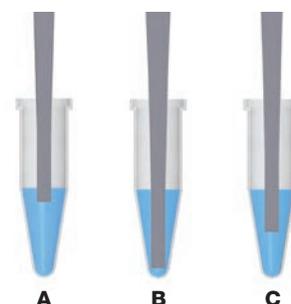
If you are processing a sample containing solvents or low surface tension liquids you must use a solid tip probe. Solid tip probes can be used for any type of sample.



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.

- 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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