Tech Insights

High-intensity ultrasonic processors are extremely versatile and can safely process a variety of organic and inorganic materials in a range of volumes. Typical applications include sample preparation, cell lysing, disaggregation, homogenization, particle size reduction, soil testing, and acceleration of chemical reactions.

Vibrations from the probe form millions of microscopic bubbles (cavities) that expand and implode violently. This phenomenon, called cavitation, produces the powerful shearing action at the probe tip and causes the molecules in the liquid to become intensely agitated.

Probes are fabricated from titanium alloy TI-6AL-4V, and act as mechanical transformers to increase the amplitude of vibration generated by the converter. The larger the probe diameter, the larger the volume that can be processed, but at reduced intensity. Higher wattages are required to process larger volumes, higher viscosities, and when working under high pressures. When working with samples containing organic solvents or low surface tension liquids, always use a solid probe and not a probe with a replaceable tip. All probes are autoclavable.

Cole-Parmer 130-Watt Ultrasonic Processors

Ideal for your low-volume applications—from 150 µL to 150 mL

- Automatic amplitude compensation ensures uniform probe amplitude regardless of varying load conditions
- Pulser feature provides greater control of sample processing and mixing by repeatedly allowing samples to settle back under probe after each burst
- 100% microprocessor based and programmable, ensuring adherence to the most exacting protocol
- Built-in probe rests help keep everything close at hand

Ultrasonic processor 04714-52 with thumb pulse button

Processors are microprocessor controlled and feature automatic tuning to eliminate the need for constant adjustment of the power supply. Energy monitor digitally displays the amount of energy in joules, and the amount of power in watts delivered to the probe. Variable power output control allows the ultrasonic vibrations at the probe tip to be set to any desired amplitude with output level clearly displayed on the screen. Automatic amplitude compensation ensures uniform probe amplitude regardless of the conditions encountered during the processing cycle. The elapsed time indicator monitors elapsed time and the duration of processing. Order optional foot switch separately on page 1875.

Models 04714-52 and -53 incorporate a pulsing button directly on the handpiece. These units can run continuously or in the pulse mode when the button or foot switch is depressed.

Find MORE!
For a complete selection of homogenizers, see **pages 758–768.**

Ultrasonic processor 04714-50 with timer and independent pulser

Models 04714-50 and -51 feature a timer that controls the processing time from 1 second to 10 hours and an independent on/off pulser (1 to 59 seconds) to enable safe treatment of temperature-sensitive samples at high intensities.

Note: These ultrasonic processors are intended for use only with the accessories listed on page 1875.

What's included: converter, tool kit, and 6-ft (1.8-m) cord with grounded plug (European plug on 220 VAC models). Models 04171-52 and -53 also include a ⅛" (3 mm) titanium probe and tip. Models 04714-50 and -51 also include a ¼" (6 mm) titanium probe and tip.

Specifications

CE 3 year warranty

Sample volume: 150 µL to 150 mL

Dimensions (L x W x H):
12½" x 9¾" x 3½" (31.8 x 24.8 x 8.9 cm)

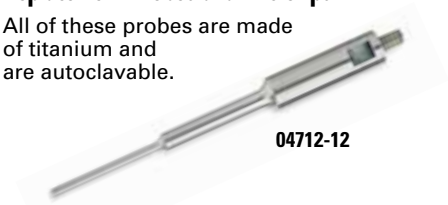
Catalog number	Power		Price
	VAC	Hz	
Ultrasonic processor			
TW-04714-52	115	50/60	
TW-04714-53	220	50/60	
Ultrasonic processor with timer and pulser			
TW-04714-50	115	50/60	
TW-04714-51	220	50/60	

Probe with thumb pulse button for processors 04714-52, and -53

Accessories for 130-Watt Ultrasonic Processors on page 1874

Replacement Probes and Microtips

All of these probes are made of titanium and are autoclavable.



04712-12

Catalog number	Tip dia	Sample volume	Price
TW-04712-12	⅛" (3 mm)	250 µL to 10 mL	
TW-04712-14	¼" (6 mm)	10 to 50 mL	
TW-04712-18	½" (13 mm)	50 to 150 mL	

Eight-Element Probe

This eight-element probe provides cost-effective processing of 250 µL to 2 mL samples simultaneously. The energy delivered to each tip is identical and approximately the wattage delivered by the power supply divided by the number of microtips. The probe consists of a coupler and eight microtips spaced 23⁄64" (9 mm) apart. Order power supply separately.

04712-08

Catalog number	No. of elements	Tip dia	Sample volume	Price
TW-04712-08	8	⅛"	250 µL to 2 mL	

Micro Cup Horn

Horn lets you process samples in absolute isolation without probe intrusion. Ideal for pathogenic, radioactive, or biohazardous materials.

Screw cup horn onto your inverted converter then fill with water and suspend test tube inside. Vibrations are transmitted through the water and induce cavitation. ID is 1.5" (38.1 mm).

04712-17

CE

Catalog number	Description	Price
TW-04712-17	Micro cup horn	

Foot Switch

Optional foot switch allows hands-free operation of ultrasonic processors. Includes 6-ft (1.8-m) cable.

04712-05

CE

Catalog number	Description	Price
TW-04712-05	Foot switch	

Sound Enclosure

Optional sound enclosure reduces noise levels caused by ultrasonic processing. Measures 12"W x 20"H x 12"D (30.5 x 50.8 x 30.5 cm). Support rod and clamp are included.

04712-50

Catalog number	Description	Price
TW-04712-50	Sound enclosure	

Stand and Converter Clamp

Optional stand has 24"H x ½" dia (61.0 x 1.3 cm) stainless steel rod and cast-iron base. Measures 9"L x 5½"W (22.9 x 14.0 cm).

Clamp securely supports 1¼" (32 mm) dia converter onto stand with ½" (13 mm) dia support rod. Chemical-resistant reinforced plastic.

04714-90 04712-92

Catalog number	Description	Price
TW-04712-92	Stand	
TW-04714-90	Converter, clamp	

Compact Ultrasonic Processor

Compact size occupies less bench space than any unit on the market

- Thumb-switch or continuous operation
- 20 kHz operating frequency

This economical ultrasonic processor is effective for standard cell disruption and many other small-volume applications. Probes are available in three different sizes; the ⅛" (3.2 mm) dia probe is included. Order additional probes and accessories separately below.

What's included: ⅛" (3.2 mm) dia microtip probe (04712-54), converter, converter cable, wrench set, and power cord.

NEW

04712-51

Specifications

2 year warranty

Sample volume: 200 µL to 50 mL (depending on probe size)
Operating frequency: 20 kHz
Dimensions (L x W x H): 7½" x 8" x 5¾" (19.1 x 20.3 x 14.6 cm)

Catalog number	Power		Price
	VAC	Hz	
TW-04712-51	110	50/60	
TW-04712-52	220	50/60	

TW-04712-94 **Support stand** with converter holder
TW-04712-56 **Booster,** 2:1 gain
TW-04712-57 **Converter cable,** 6 ft (1.8 m)
TW-04712-58 **Converter cable,** 10 ft (3 m)
TW-04712-59 **Replacement converter**

Microtip Probes

Catalog number	Tip dia	Sample volume	Price
TW-04712-53	5⁄64" (2 mm)	200 µL to 5 mL	
TW-04712-54	⅛" (3.2 mm)	500 µL to 15 mL	
TW-04712-55	¼" (6.4 mm)	10 to 50 mL	

Cole-Parmer® 500- and 750-Watt Ultrasonic Processors

Process batch samples as small as 250 µL or as large as 19 L/hr using optional continuous flow cell

- Exclusive energy (joules) monitor provides the most accurate method to reproduce results
- On/off independent pulser helps prevent overheating
- User-friendly menu-driven prompts provide intuitive guidance through all functions

Ultrasonic Processors

Our ultrasonic processors are capable of delivering 500 or 750 watts at 20 kHz. The 500-watt models are recommended for smaller volumes, and for probes of ½-inch or less. The 750-watt models are recommended for larger volumes, ¾-inch probes or greater, and the flow cells and cup horn found on page 2316. Process batch samples as small as 250 µL or as large as 19 L/hr using the continuous flow cell 04710-91 (order separately on page 1877). The sealed converter protects the unit from humidity, dust, dirt, and fumes. Units monitor both power (watts) and energy (joules), and feature 100% automatic tuning.

The independent on/off pulser ensures safe treatment of temperature-sensitive samples while processing at high intensity and controls on/off cycles from 1 to 59 seconds. The microprocessor-based timer controls your processes from 1 second up to 10 hours. Monitor displays the elapsed time, duration of processing, and power in watts and joules.

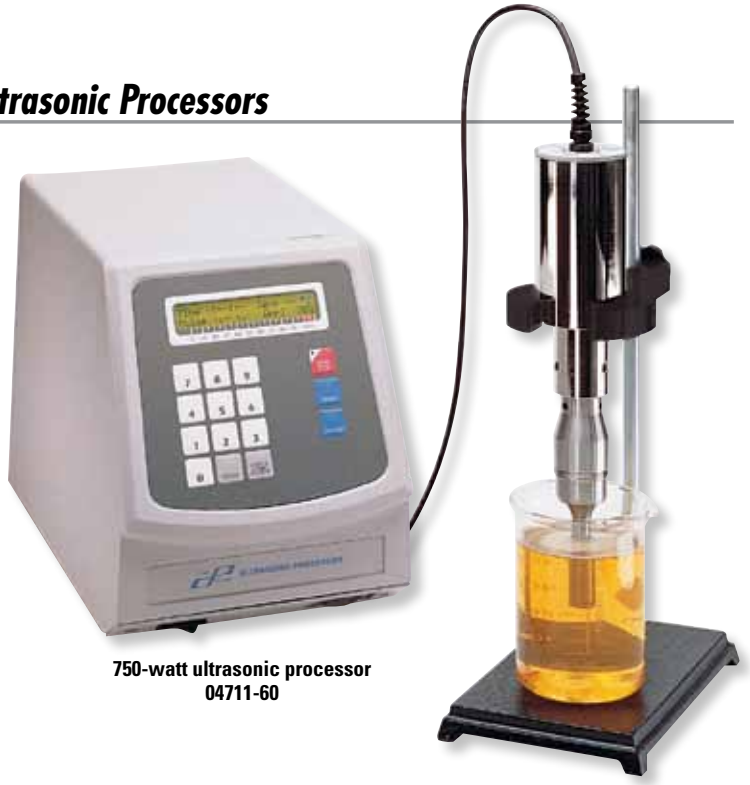
The tactile keypad, menu-driven display, and simple function keys combine for a user-friendly system. All programmed control parameters are displayed on the easy-to-read screen so you can continuously monitor your process.

Adjust cavitation energy intensity delivered to your samples with the variable amplitude control. The amount of power being delivered to the probe is displayed both digitally and as a bar graph. View selected output level on the screen.

Ultrasonic Processors with Temperature Controller and Energy Controller

These units have the same features as the models above plus an integral temperature controller, energy controller, and memory. The temperature controller prevents harmful overheating of the sample by terminating the ultrasonics when the sample reaches a predetermined temperature limit (select from 1 to 100°C); order temperature probe separately below. The time-saving memory stores up to ten procedures to facilitate accurate protocol repeatability, and the energy controller controls the amount of energy delivered to the sample.

What's included: converter, tool kit, foot switch connection, ½" (13-mm dia) probe 04710-31 with replaceable tip, and a 6-ft (1.8-m) cord with plug.



750-watt ultrasonic processor 04711-60

Order stand 04712-92 and clamp 04714-91 below.

Temperature probe 04711-50

750-watt ultrasonic processor 04711-40

Easy-to-read display screen allows you to continuously monitor your process.

Specifications

CE 3 year warranty

Sample volume: 250 µL to 19 L/hr† **Dimensions (W x H x D):** 7½" x 8½" x 13½" (19.1 x 21.6 x 34.3 cm)

Description	Frequency	Power		500-watt ultrasonic processors		750-watt ultrasonic processors	
		VAC	Hz	Catalog number	Price	Catalog number	Price
Ultrasonic processor	20 kHz	115 230	50/60 50/60	TW-04711-70 TW-04711-75		TW-04711-60 TW-04711-65	
Ultrasonic processor with temperature controller and energy controller	20 kHz	115 230	50/60 50/60	TW-04711-30 TW-04711-35		TW-04711-40 TW-04711-45	

†Maximum volume using continuous flow cell 04710-91 (order separately on page 1877.)

TW-04710-48 **Sound-abating enclosure.** Measures 14"W x 30"H x 14"D (35.6 x 76.2 x 35.6 cm). Support rod and converter clamp included

TW-04712-05 **Foot switch** for hands-free operation; 6-ft (1.8-m) cable included. CE-marked

TW-04712-92 **Stand.** 24"H x ½"-dia (61.0 x 1.3 cm) stainless steel rod and 9"L x 5½"W (22.9 x 14.0 cm) cast-iron base

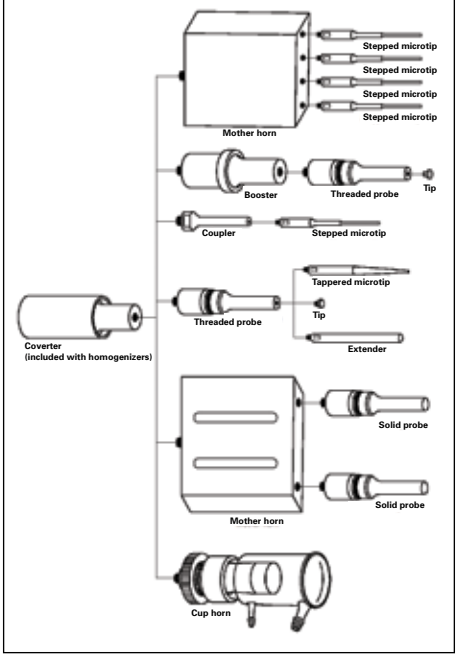
TW-04714-91 **Converter clamp** secures converter onto ½"-dia rod; made of chemical-resistant reinforced plastic

TW-04710-94 **Heavy-duty converter clamp,** fabricated of aluminum; recommended for industrial applications

TW-04711-50 **Stainless steel temperature probe** for models 04711-30, -35, -40, and -45. CSA-approved

Accessories for 500- and 750-Watt Ultrasonic Processors on page 1876

This diagram illustrates the accessories that can be used together.



Replacement Tips

Catalog number	Tip dia	Price
TW-04710-40†	½"	
TW-04710-41†	¾"	
TW-04710-47†	1"	

†Use with threaded probes only.

Microtips

Microtips can process small samples at a very high intensity. The tapered microtip screws in the ½" (13 mm) threaded end probe in place of the replaceable tip. The stepped microtip assembly consists of two parts—a microtip and a coupler. The stepped microtip assembly can process volumes as small as 250 mL.

04710-42

Catalog number	Tip dia	Sample volume	Price
Tapered microtips			
TW-04710-42	⅛"	1 to 10 mL	
TW-04710-44	3⁄16"	3 to 15 mL	
TW-04710-46	¼"	5 to 25 mL	
Stepped tip—must use with coupler below			
TW-04712-12	⅛"	0.25 to 10 mL	

TW-04710-85 Coupler for use with the stepped tip above

Replacement Probes

Catalog number	Tip dia	Sample volume	Price
Solid probes			
TW-04710-51	½"	10 to 250 mL	
TW-04710-55	1"	50 to 1000 mL	
Solid high-gain probes			
TW-04710-59	1"	50 to 1000 mL	
Threaded probes with replaceable tip			
TW-04710-31	½"	10 to 250 mL	
TW-04710-33	¾"	25 to 500 mL	
TW-04710-35	1"	50 to 1000 mL	

Multi-Element Probes

These valuable time-saving tools maximize productivity by processing numerous samples simultaneously. The multi-element probes screw into the converter in place of the ½" (13 mm) probe.

The energy delivered to each tip is uniform with 2% variation. The spacing between the tips is 22⁄32" (18 mm). Coupler and stepped microtips measure 10¼" (260 mm) long.

Probes process from 250 µL to 10 mL sample volume and consist of aluminum coupling and 4-, 8-, or 24-element probes.

04712-30

Catalog number	No. of elements	Tip dia	Sample volume	Price
TW-04712-30	4	⅛"	0.25 to 10 mL	
TW-04712-32	8			
TW-04712-34	24			

TW-04712-37 Heavy-duty support assembly

Booster

Use this booster to process very difficult samples. It increases the amplitude of vibration at the probe tip by a factor of two. **Note:** Do not use with microtips or high-gain probes.

Catalog number	Description	Price
TW-04710-84	Booster	

Extenders

Extenders screw into threaded end probes of identical diameter in place of the replaceable tip. Recommended when working with tall narrow vessels such as Erlenmeyer flasks. Extenders are fabricated from titanium alloy TI-6AL-4V and are autoclavable.

Catalog number	Tip dia	Price
TW-04710-80	½"	
TW-04710-81	¾"	
TW-04710-82	1"	

Continuous Flow Cell

04710-91

This low-volume cell screws onto the standard ½" dia probe and forces all of the sample solution to pass across the probe face. Recommended for the treatment of low-viscosity samples where the required insonation time is short. Use the cell to emulsify, disperse, and homogenize samples at flow rates up to 5 GPH (19 liters/hour). Fittings accept 5⁄16" ID soft tubing. Made of autoclavable stainless steel. Recommended for use with 750-watt processors.

Catalog number	Description	Price
TW-04710-91	Continuous flow cell	

Cup Horn

04710-38

Process samples in absolute isolation without probe intrusion. Ideal for pathogenic, radioactive, or biohazardous materials. Ultrasonic vibrations are transmitted through the water in the cup causing cavitation in the sample vessel. Cooling water can also be circulated through the cup during operation. Includes a floating microtube holder and a splash shield. Measures 2½" (6.4 cm) dia. Recommended for use with 750-watt processors.

Catalog number	Description	Price
TW-04710-38	Cup horn	

TW-04710-43 Replacement floating microtube holder

Cooling Cell

04710-89

This 300-mL cooling cell allows thorough and uniform treatment at low temperatures. Immerse cell in cooling bath. The liquid circulates repeatedly under the probe and through the three cooling arms.

Catalog number	Description	Price
TW-04710-89	Cooling cell	

Touch-Screen Ultrasonic Processor

Runs multiple programs in sequence

- User-friendly touch screen control
- Wide variety of applications—disrupt cells, shear DNA, mix compounds, extract samples, and nanoparticle dispersion
- Self diagnostics and help screens simplify operation

This 700-watt ultrasonic processor tracks frequency changes in the convertor/tip assembly caused by load and temperature changes, and maintains optimal electrical efficiency at all times. Updated features include improved frequency and amplitude control, multiple sequence programming, and the ability to more accurately track the total energy delivered to your sample. The digital design allows the system to run more efficiently and requires less power to effectively process samples. This reduced energy consumption allows the unit to run cooler which extends the life of internal components. Pulse on/off from 1 second to 24 hours and total run time up to 72 hours.

What's included: converter with cable, 13 mm horn, wrench set, and 6-ft (1.8-m) power cable. Order additional probes and accessories separately below.

04712-84

Specifications

CE 2 year warranty

Sample volume: 0.2 mL to 40 L
Adjustable pulse on/off time: 1 second to 24 hours
Operating frequency: 20 kHz
Dimensions (W x H x D): 8" x 15" x 8½" (20.3 x 38.1 x 21.6 cm)
Programmable timer: 1 second to 24 hours

Catalog number	Power		Price
	VAC	Hz	
TW-04712-82	120	50/60	
TW-04712-84	220	50/60	

Replacement Probe selection is determined by sample volume, sample type, and the desired intensity. As tip diameter increases, the intensity/amplitude decreases. Tips erode over time and replacement tips are available below.

04712-66

Catalog number	Tip dia	Sample volume	Price	Replacement tips†	
				Cat. no.	Price
TW-04712-66	13 mm	10 to 250 mL		TW-04711-86	
TW-04712-68	19 mm	25 to 500 mL		TW-04711-87	
TW-04712-70	25 mm	50 to 1000 mL		TW-04711-88	

†Use with threaded probes only.

Microtip Probes effectively process small samples and attach to the standard ½" (1.3 cm)-dia probe horn. The stepped microtip probe (04711-93) attaches directly to the converter and is ideal for reaching into long, thin tubes.

04711-89 04711-93 04711-90

Catalog number	Tip dia	Sample volume	Price
TW-04711-89	2 mm	0.2 to 5 mL	
TW-04711-90	3 mm	0.5 to 15 mL	
TW-04711-92	6 mm	5 to 50 mL	
TW-04711-93‡	3 mm	0.5 to 15 mL	

‡Stepped probe attaches directly to the converter.

TW-04711-94 **Replacement tip** for 04711-93

In-line Flow Cell is capable of processing a continuous flow of your sample up to 40 L/hr. Constructed of stainless steel. Inlet/outlet is ¼" NPT. Compatible with ½" (1.3 cm)-dia probe horn.

04711-98

Catalog number	Description	Price
TW-04711-98	Continuous flow cell	

Cup Horns are high-intensity ultrasonic water baths that allow samples to be processed in sealed vials or tubes—ideal for sterile or pathogenic sample processing. Cold water can be circulated through the system to keep your samples from overheating. A microtube holder is included. Stand sold separately below.

04712-75 shown with 04711-97

Catalog number	Processing volume	Price
TW-04712-75	8 microtubes	
TW-04712-76	20 microtubes	

TW-04711-97 **Cup horn stand**

Sound Enclosure reduces sound produced by sonication to safe and comfortable levels. A clear acrylic door allows viewing of samples, a removable support rod is also included. Exterior dimensions (L x W x H): 12" x 14½" x 23" (30.5 x 36.8 x 58.4 cm). Interior dimensions (L x W x H): 11" x 13" x 22" (27.9 x 33.0 x 55.9 cm).

04711-99

Catalog number	Description	Price
TW-04711-99	Sound enclosure	

US Toll-free: 800-323-4340 • Outside the US: 1-847-549-7600 • www.coleparmer.com
Canada 800-363-5900 • India 91-22-6716-2222 • UK 0500-345-300