INDUSTRIAL SONOMECHANICS®

ULTRASONIC PROCESSORS COMPARISON

Contact our Sales team to learn more or request a quotation:
Tel: 786.233.9255 | E-mail: contact@sonomechanics.com
Website: Sonomechanics.com

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FEATURES WHY THIS MATTERS	LSP-600 LABORATORY-SCALE PROCESSOR	BSP-1200 BENCH-SCALE PROCESSOR	ISP-3600 INDUSTRIAL-SCALE PROCESSOR
Ultrasonic System Configuration Modes and Volume Capacities • All ISM systems have batch and flow-through mode capabilities that allow you to process both small and large volumes of liquids. Switching between batch and flow-through modes is straightforward and quick. • BSP-1200 and ISP-3600 systems have no upper limitations for liquid volume capacity and allow for continuous 24/7 operation.	• Configuration modes: ◦ Batch ◦ Flow-through • Volume capacities: ◦ Batch: 15 ml – 500 ml ◦ Flow-through: 500 ml – 2 L • Continuous operation for up to 1 hour at a time	• Configuration modes: ◦ Batch ◦ Flow-through • Volume capacities: ◦ Batch: 15 ml – 2 L ◦ Flow-through: 1 L – unlimited • Continuous 24/7 operation	• Configuration modes: ◦ Batch ◦ Flow-through • Volume capacities: ◦ Batch: 15 ml – 10 L ◦ Flow-through: 2 L – unlimited • Continuous 24/7 operation
Processing Rate • The processing rate is how much material can be treated per unit of time to achieve the desired result. Processing rates are application-specific and dependent on many variables (type of process, liquid properties, etc.). ISM systems provide flexibility to meet a multitude of processing rate requirements.	• Process-dependent	• 5 times faster than LSP-600	• 5 times faster than BSP-1200 • 25 times faster than LSP-600
Ultrasonic Generator • The generator powers the entire ultrasonic system, enabling the transducer/Barbell Horn® assembly to produce high amplitudes that are necessary for most processes, including the production of nanoemulsions, liposomes and other nanoparticles. • Technology note – the power of an ultrasonic system is wasted if it is not equipped with a Barbell Horn® that permits creating high amplitudes in large volumes of liquid. • ISM technology is unique in its ability to translate all available generator power to process liquids via high ultrasonic amplitudes.	• Input: ◦ 100 – 240 Vac, 50/60 Hz, 10 Amp (max) • Output: ◦ Power: 600 W (max) ◦ Frequency: 20 +/- 1 kHz	• Input: ◦ 100 – 240 Vac, 50/60 Hz. 10 Amp (max) • Output: ◦ Power: 1200 W (max) ◦ Frequency: 20 +/- 1 kHz	• Input: ◦ 200 – 240 Vac, 50/60 Hz, 20 Amp (max) • Output: ◦ Power: 3600 W (max) ◦ Frequency: 20 +/- 1 kHz
	Additional features: continuous resonance frequency lock, automatic power adjustment, fine amplitude adjustment and lock (20 - 100 %), real-time monitoring of output power and frequency, optional external control, optional pulsed operation.		
Transducer • The transducer converts electrical energy coming from the ultrasonic generator into mechanical energy in the form of ultrasonic vibrations. These vibrations are then transmitted to the Barbell Horn® for amplification and delivery to the process liquid. • ISM offers water-cooled transducers with BSP-1200 and ISP-3600 ultrasonic systems, ensuring precise temperature control during continuous 24/7 operation. • Water-cooled transducers are sealed to the outside environment, which makes them suitable for high-humidity conditions as well as for processing flammable materials, such as fuels and organic solvents. • Water-cooled transducers are patented and can only be found with ISM systems.	• Air-cooled • Power: 600 W (max) • Amplitude: 22 µm (max) • Frequency: 20 +/- 1 kHz	• Water-cooled • Sealed to environment • Power: 1200 W (max) • Amplitude: 24 µm (max) • Frequency: 20 +/- 1 kHz	• Water-cooled • Sealed to environment • Power: 3600 W (max) • Amplitude: 24 µm (max) • Frequency: 20 +/- 1 kHz

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Barbell Horn® • Ultrasonic horns amplify the amplitude of mechanical (ultrasonic) vibrations coming from the transducer and transmit them to the process liquid. • The Barbell Horn® reliably and continuously transmits high-amplitude ultrasound to large amounts of liquid, inducing high-intensity, large-volume cavitation and ensuring the best possible product quality. • Barbell Horns® are patented and can only be found with ISM systems.	• Full-wave Barbell Horn® ◦ Amplitude: 115 µm (max) ◦ Tip diameter: 21 mm ◦ Batch and flow-through modes	• Half-wave Barbell Horn® ◦ Amplitude: 95 µm (max) ◦ Tip diameter: 32 mm ◦ Flow-through mode • Full-wave Barbell Horn® ◦ Amplitude: 97 µm (max) ◦ Tip diameter: 35 mm ◦ Batch mode	• Half-wave Booster Half-wave Barbell Horn® ◦ Amplitude: 112 µm (max) ◦ Tip diameter: 45 mm ◦ Batch and flow-through modes
Reactor Chamber • The reactor chamber (flow cell) makes it possible to configure an ISM ultrasonic system for continuous liquid processing in the "flow-through" mode. • Flow-through processing allows for unlimited liquid volume capacity, improved ultrasonic exposure uniformity, and percise temperature control.	• Integrated cooling jacket included	• Integrated cooling jacket included	• Heat exchanger required
Support Stand with Clamps • The support stand securely holds the transducer/Barbell Horn®/reactor chamber assembly.	• Shaft diameter: 8 mm • Medium duty	• Shaft diameter: 25.4 mm • Heavy duty	• Shaft diameter: 25.4 mm • Heavy duty
Chiller • The chiller is necessary to efficiently cool the BSP-1200 and ISP-3600 water-cooled transducers as well as for process liquid temperature control with all ISM ultrasonic systems.	• Cooling capacity: 1400 W • 110 Vac, 50/60 Hz, 6.5 Amp (max) or • 220 Vac, 50/60 Hz, 3.3 Amp (max)	• Cooling capacity: 1400 W • 110 Vac, 50/60 Hz, 6.5 Amp (max) or • 220 Vac, 50/60 Hz, 3.3 Amp (max)	• Cooling capacity: 3600 W • 110 Vac, 50/60 Hz, 11 Amp (max) or • 220 Vac, 50/60 Hz, 6 Amp (max)
Storage Tank • The storage tank holds the process liquid and agitates it with a magnetically driven mixer during continuous processing. • Optimized for the production of nanoemulsions, liposomes, and other nanoparticles. • Integrated magnetically driven mixer ensures homogeneous processing and can only be found with ISM systems.	• Available with a magnetic stirrer with hotplate and stir bar • Material: Borosilicate glass	• Includes an integrated magnetically driven mixer • Material: 304 SS	• Includes an integrated magnetically driven mixer • Material: 304 SS
Pump • The peristaltic pump is used to move the process liquid out of the storage tank, through the reactor chamber and back into the storage tank (flow-through mode). • Also used for passing the finished nanoemulsions through in-line filters.	• Peristaltic • Reversible flow • 110 Vac, 50/60 Hz, 1 Amp (max) or • 220 Vac, 50/60 Hz, 0.5 Amp (max)	• Peristaltic • Reversible flow • 110 Vac, 50/60 Hz, 1 Amp (max) or • 220 Vac, 50/60 Hz, 0.5 Amp (max)	• Peristaltic • Revesible flow • 110 Vac, 50/60 Hz, 2 Amp (max) or • 220 Vac, 50/60 Hz, 1.5 Amp (max)
In-line Capsule Filters • Filtration is necessary when producing nanoemulsions and liposomes in order to remove any particulate contamination (e.g., microorganisms, dust, titanium particles).	• Laboratory-scale • Membrane pore size: ◦ 220 nm or ◦ 1.2 µm	• Bench-scale • Membrane pore size: ◦ 220 nm or ◦ 1.2 µm	• Industrial-scale • Membrane pore size: ◦ 220 nm or ◦ 1.2 µm
ISM Maintenance/Service Support • ISM provides access to warranty and technical support services to all its ultrasonic equipment customers.	• Included with purchase	• Included with purchase	• Included with purchase