Sonicator – Vibra-Cell Autotune Series 750 Watt Model

Location of Machine: Composites Lab - Nanoparticle Containment Room, RFM 1218

Location of SOP and Machine Operating & Safety Manual: Composites Lab website under resources; Composites Lab TRACS site; and Hardcopy near machine.

Emergency Contact:

- Call 911
- Call EHS & Risk Management at 512-245-3616
- Call Head Lab Technician, Dr. Ray Cook (office 512-245-2050)
- Call Dr. Jitendra S Tate (office 512-245-4872)

Before using this machine:

- You must have permission from Dr. Tate.
- You must have received formal training from technician or, trained research student (designated by Dr. Tate) related to machine safety and operation.
- You must read and understand **SOP.**
- You must use this machine under direct supervision of Dr. Tate or, Dr. Cook or, trained research student (designated by Dr. Tate).
- You must have signed "Lab Rules" document with Dr. Tate. This document must be signed every semester fall, spring, and summer (as applicable).
- If you do NOT follow above instructions you will be held responsible for your own safety and damages.

Safety Precautions:

Protective Equipment: Prior to performing this procedure, the following personal protective equipment must be obtained and ready for use: **Heat Gloves, Respirator Mask, Safety Goggles, and Lab Coat.**

Important Safeguards:

1. When mounting the probe, always clamp the converter housing. Never clamp the probe.
2. Never operate the power supply unless it is connected to the converter.
3. Never secure anything to the probe, except at the nodal point (Point of no activity).
4. Never touch a vibrating probe.
5. Never allow a microtip or extender to vibrate in air for more than 10 seconds.
6. When using a tapered microtip, always keep the amplitude below 40%.
7. Do not allow the vibrating microtip to contact anything but the sample.
8. Air-cool the converter when sample temperature exceeds 100°C, and when working at high intensity for more than 30 minutes.

9. **When processing samples containing organic solvents or low surface tension liquids ALWAYS use a solid probe.**

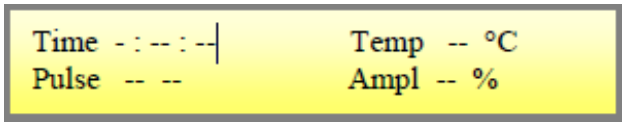
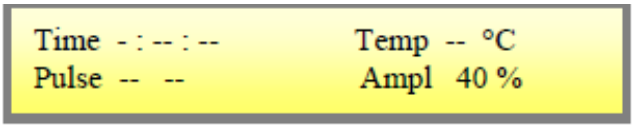
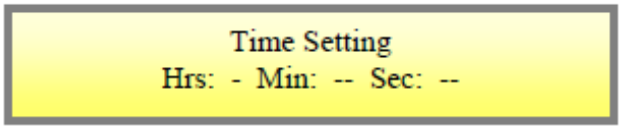
General information

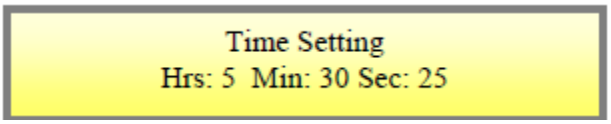
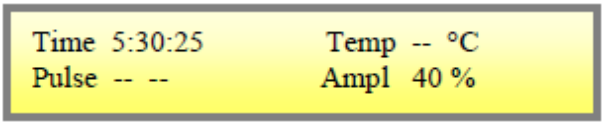
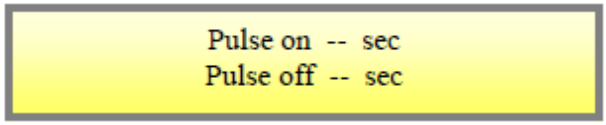
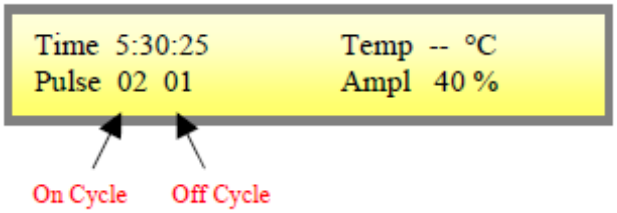
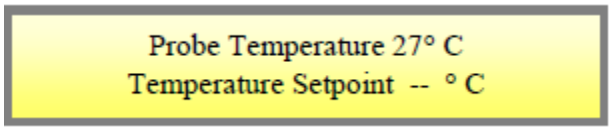
The Vibra-Cell is the most technologically advanced high intensity Ultrasonic Processor available to the researcher. Extremely versatile, it can safely process a wide range of organic and inorganic materials – **from microliters to liters**. Typical applications include: sample preparation, cell lysing, disaggregation, homogenization, particle size reduction, soil testing, acceleration of chemical reactions, de-foaming and atomization.

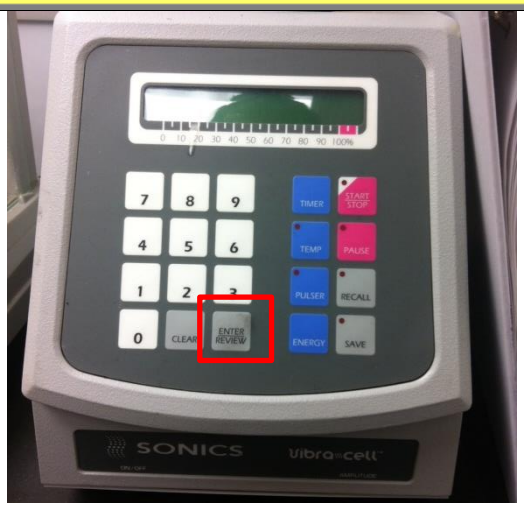
When used with environmentally safe aqueous cleaning solutions, the Vibra-Cell becomes a powerful cleaning tool, capable of removing the most tenacious contaminants from normally inaccessible locations. Unlike ultrasonic baths which dissipate the vibrational energy over a large area, the Vibra-Cell probe focuses the energy, and creates a concentrated, high intensity cleaning zone. For critical and localized cleaning applications, the Vibra-Cell is both fast and thorough.

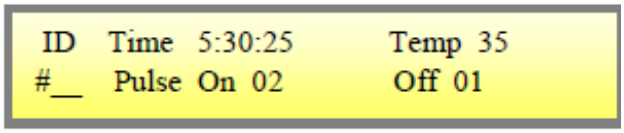
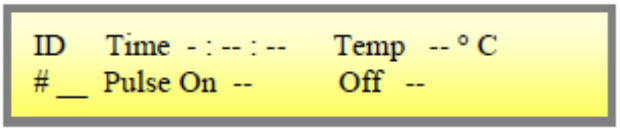
Specifications:

Tip diameter of ½".
Batch Volume of 10-250ml.
Amplitude of 119µm.
Process control and monitoring from 1°C to 100°C.
Timer from 1s to 9h, 59min, 59s
Pulse cycle from 1s to 59s

Sonication Standard Operating Procedure	
1. Set ON/OFF power switch to ON. Screen will display the power rating of the Ultrasonic Processor, cautionary notices, and the following control parameters.	
2. Set amplitude, because the amplitude required to process a sample is application dependent. Screen will display: **Note: Do not exceed 40% amplitude, when you are using tapered microtip.** Now, the Ultrasonic Processor will be ready for continuous operation. Furthermore, you can set time, temperature, energy, pulse parameters.	
3. Set timer. The processing time function monitors and controls only the ON portion of the duty cycle. To set the processing time, press the TIMER key. Screen will display: a) Using numeric keys, set the processing time. For e.g.	

b) Using numeric keys, set the processing time. For e.g.	
c) Press ENTER then screen will display.	
4. Set PULSER. There is ON and OFF cycle, which can be set independently from 01 sec to 59 sec. During the OFF cycle, the red indicator of the PULSER will illuminate. If the OFF portion of the cycle exceeds 3sec, a cautionary message will display on screen – Sonics is OFF cycle. After pressing PULSER screen will display:	
a) Using numeric keys, set ON cycle. ENTER it. Then set OFF cycle. Press ENTER/REVIEW key, screen will display: For e.g.	
5. Set TEMP. Temperature function prevents overheating of the sample by continuously monitoring the sample temperature. **If the temperature must be monitored, then insert the optional temperature probe forcefully into the small jack on the rear panel.** Press the TEMP key. Press CLEAR key to clear temperature set point displayed.	

Screen will display.	
6. Set ENERGY. The ultrasonic processor generator continuously monitors the amount of energy in joules that is being delivered to the probe. Press ENERGY key, screen will display.	Energy Setting - , --- , --- Joules
7. Using numeric keys, set the energy. Press ENTER key, screen will display.	Time 5:30:25 Temp -- ° C Pulse 02 01 Ampl 40 % or Energy: 0000000 Joules Time: 0:00:00 H:M:S
8. REVIEW. This function provides a window on the process by displaying various parameters without process interruption. Pressing REVIEW/ENTER will consecutively display information that you have already set.	

9. SAVE. This function retains in memory up to 10 control parameters under a storage identification (ID) number. To store the parameters under an ID, press SAVE key. Screen will display: 10. Using numeric keys enter ID number. Press SAVE key to store the control parameters under the assigned ID number. The indicator light on SAVE key will go out, and screen will display again the same parameters. *Note: Energy and Amplitude cannot be saved into memory.*	
11. RECALL. This function can retrieve from memory; any of the 10 stored control parameters for verification or usage. Press RECALL key, indicator light on it goes on and sceen will display. a. Enter ID number, screen will display parametes saved under that ID number.	
12. To review all the information that has been stored, press keys 0 to 9 one at a time. Note: This procedure can be repeated as long as the wattmeter reads less than 20 watts with the probe out of the sample, when the AMPLITUDE control is set at 100. If the wattmeter reads over 20 watts the probe or replacable tip should be	

replaced with a new one	