

## Lab Ultrasonic processor for pipe

High volume treatment

## I Specifications of the Lab750 Ultrasonic for pipe

### I.1 Equipment

- Ultrasonic generator from the NexTgen range delivering up to  $750W_{rms}$  in a continuous way
- **Lab tube Processor including the 22kHz transducer,**
- **LabTablet interface for easy setting,**
- Temperature control device with temperature sensor included to the ultrasonic generator to allow temperature monitoring,
- Control and monitoring software for the NexTgen generator,
- Technical documentation.



### I.2 The NexTgen ultrasonic power generator

We therefore propose the use of a NexTgen Lab750 generator providing a rated power of  $750W_{rms}$ . The sonication is performed in a volume up to 600ml in batch and very large volume with a circulating process.

The parameters of the generators from the NexTgen range can be defined by a LabTablet or by computer thanks to an Ethernet connection and a control software enabling the power tuning. This elementary setting software is called "Start" and is supplied with the generator. A general and technical documentation is added to the offer and describes the generator and its software features.

**Basic features:**

- A single control mode : auto-tuned frequency mode,
- On/Off by with pushbutton/footswitch,
- The power setting can be done by computer and thanks to the "START" configuration software.

**Optional features:**

- Control parameters available through the "Advanced" PC software,
- Acquisition of information on PC via Ethernet connection, recovery of ultrasound and temperature data for post-processing on Excel with the "NexTgen Advanced» PC software.

### I.3 The 22kHz Lab Pipe:





- The equipment consist of a tube with radial external transducer fixed around the tube. The main advantage of this configuration to promote radial propagation with a high level of energy along the axis of the tube. There is no probe inside and the cavitation erosion is less important regarding the high power of the system. The Tube processor sonicate in batch condition with volume arrangement from 0.5 liter with a thick tap at the bottom up to 0.8 liter. In these configurations the power/liter is able to increase to 800W/l.

Tube Processor Power	tube diameter	Liquid level	Sonicated volume	Power/Liter
(Watts Rms)	(mm)	(mm)	(Liter)	W/L
400	80	90	0,5	885
400	80	120	0,6	663
400	80	150	0,8	531

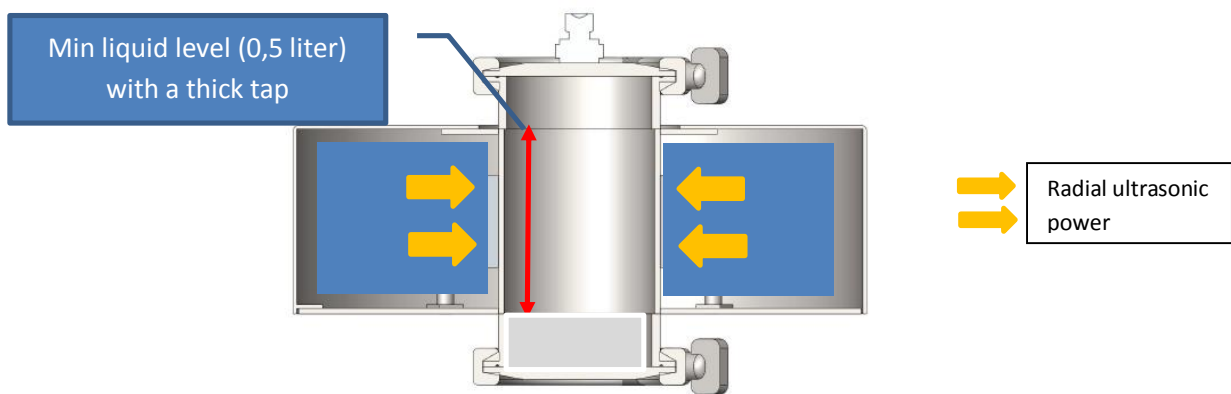
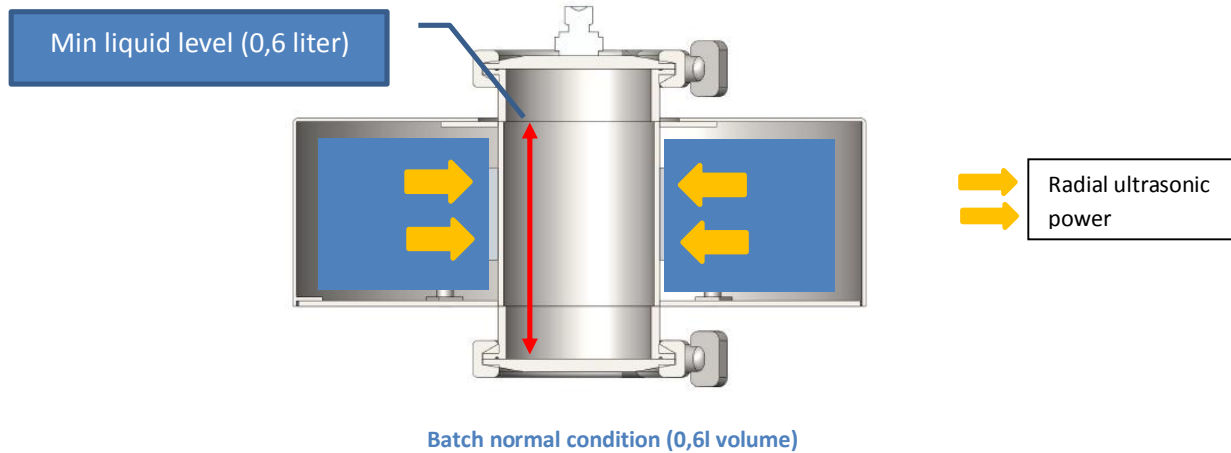


Figure 5: Batch Thick tape condition 0,5l volume

In batch condition, the temperature increase is fast, and to avoid any problem, the temperature is managed with the generator with a stop condition.

It is very easy to adapt this equipment for continuous processing by removing the two taps and connect the equipment in a loop. The scale up consist to provide an industrial tube with a 4 to 8 identical stages.

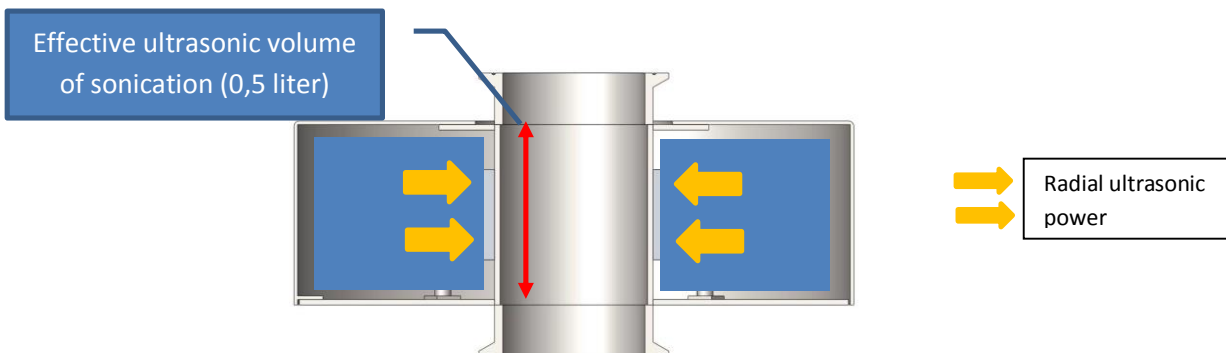


Figure 6: Continuous process configuration

## I.4 The control and data acquisition software (optional):

- **The “Advanced” PC software**

The software allows you to centralize all exchanges between the NexTgen generator and the PC control. It controls the start / stop system.

It allows you to configure the following settings:

- Frequency
- Amplitude / Power
- Time
- Cycle

It allows the following things:

- The real-time measurement of the power cycle,
- The graph visualization,
- Data export to Excel
- Various features analysis

- **Temperature control device :**

The operation of the temperature control device is performed by the **“Advanced” PC software** which acquires data and processes them according to the same principle as the power curve. It is thus possible to have curves showing ultrasound measures in association with the evolution of the product temperature.

The temperature management -when it is to be regulated- is performed by setting a maximum operating threshold. As we approach this threshold, it will trigger a temporary reduction / stoppage of ultrasonic power supplied to return to normal temperature.





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