# Сонореактор UTR200

## Технические характеристики

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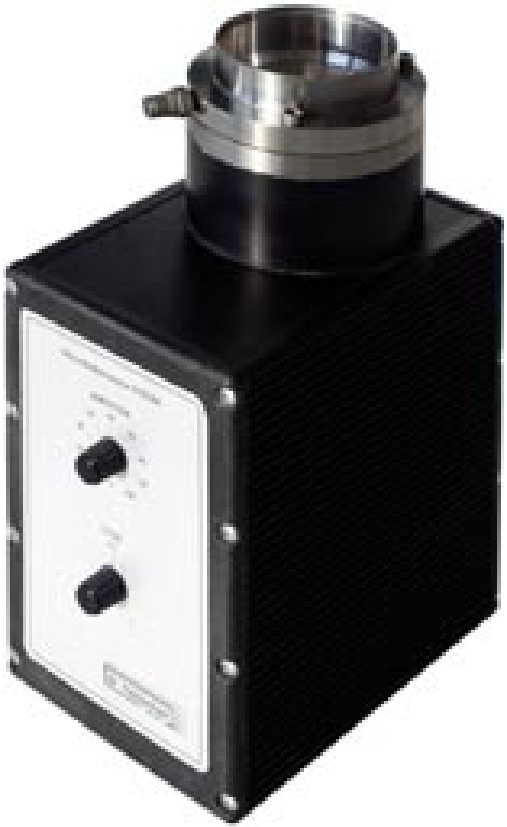
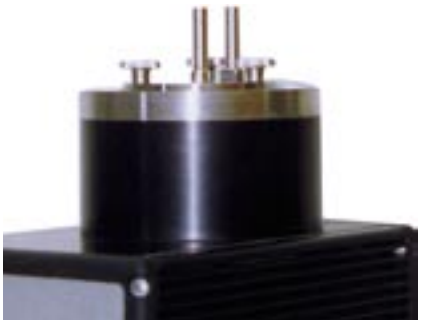


The sonoreactor UTR200 (200 watts, 24kHz) works as an ultrasonic bath but at a 50 times higher intensity. In addi-tion, it is dry-running protected. It is suited for the direct or indirect sonica-tion of liquids e.g. for cell disruption, homogenizing or emulsifying. The bea-ker-shaped sonotrode is machined from one piece in order to prevent leakages. The upper part of the sono-trode is oscillation-free and can be used for mounting the respective accessories for diverse application cases. A corresponding reactor cover takes the Eppendorf tubes or test tubes for indirect sonication. By means of the reactor cover the chamber is hermetically sealed. If the cover has an additional inlet and outlet the sonore-actor can be used as a flow system. A sieving extension with a bajonet lock takes a pile of sieves for fine grain sizes (diameter 75mm, finest mesh size 5 micron). The ultrasound, which is transmitted to the sieves, acceler-ates the wet sieving process.



UTR200 as reactor chamber

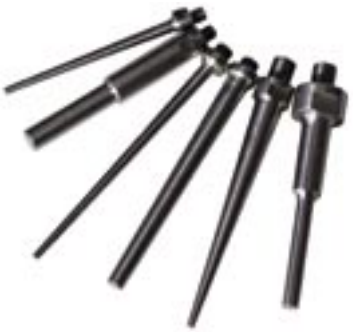
# sonotrodes

The sonotrodes are the tools that transmit the ultrasound into the liquid. The selection of the sonotrodes depends on the sample volume and on the required ultrasound intensity. Thin-bodied sonotrodes achieve very high amplitudes up to 250µm, that result in very high ultrasound power densities under the oscillating end surface. A small but very intensive cavitation zone is generated. The bigger the diameter, the higher is the ultrasound power, that is transmitted via the consequently bigger end face of the sonotrode. The ultrasound power density i.e. the ratio between power and oscillating surface becomes smaller. The cavitation zone becomes larger but less intensive.

A titanium alloy has proven to be the best sonotrode material as it allows very high amplitudes and as it is resistant to most liquids. Therefore this titanium alloy is the standard material for our sonotrodes and the ultrasonic processors are adjusted to it. For special application cases we manufacture sonotrodes made of stainless steel, glass or ceramics. The max. amplitudes of the sonotrodes made of these materials are significantly below those of the titanium sonotrodes.

The lengths of the sonotrodes are determined by lambda/half. If the ultrasonic processor has the frequency of 24kHz, the titanium sonotrode has approx. the length 100mm but can also be manufactured in manifold lengths. Sonotrodes with O-rings or oscillating-free flanges are used for the input of ultrasound in flow cells or in closed or pressurized systems.

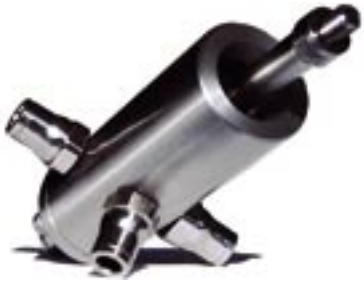
The cavitation, that takes place at the sonotrode surface, results in an abrasional effect. At the max. amplitude, approx. 1mm of the sonotrode abrades within 1000 hours of operation in water.The frequency scanning system of our ultrasonic processors raises then automatically the frequency, so that an abrasion of up to 5mm of the sonotrode does not result in a considerable loss of power.



| **sample volume** (ml) | **UP50H** | **UP100H** | **UP200H** | **UP200S** | **UP400S** |
|---|---|---|---|---|---|
| 0.01 - 0.50 | 0.5 | 0.5 | | | |
| 0.1 - 5.0 | 1 | 1 | 1 | 1 | |
| 2 - 50 | 2 | 2 | 2 | 2 | |
| 5 - 100 | 3 | 3 | 3 | 3 | 3 |
| 10 - 250 | 7 | 7 | 7 | 7 | 7 |
| 20 - 500 | | 10 | | | |
| 50 - 1000 | | | 14 | 14 | 14 |
| 100 - 2000 | | | | | 22 |

Approximated values for the selection of the ultrasonic processors and the sonotrode diameters according to sample size.

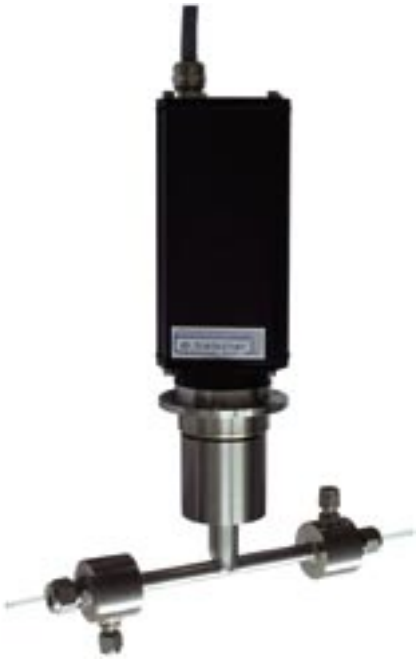
# flow cells for continuous operation



stainless steel flow cell D7K with MS7D

glass flow cell for UP100H

For our ultrasonic processor we offer flow cells made of glass or stainless steel. The liquid to be sonicated is lead in from below and passes through the cavitation zone under the sonotrode. The appropriate sonotrodes are equipped with O-rings, that are fitted closely to the cell wall or the PTFE-adapter. For higher pressures and temperatures the sonotrodes may be equipped with metallic oscillating-free flanges that are mounted to the stainless steel flow cells. The selected flow rate corresponds to the energy input required. The temperature of the medium can be influenced by means of a cooling jacket. Special designs of the flow cell e.g. several supply connectors, when emulsifying are manufactured according to the demands of the customer. A new product in our product range is the mini flow cell (patent pending). When using this mini cell, the medium is hermetically sealed, so that the sonication can be realized without contamination.



UIP250H56 with mini flow cell Dmini

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