

## Ultrasonic cleaning

### Process description

Ultrasound is the physical definition of a sound frequency used in ultrasonic cleaning with standard ultrasonic cleaning agents.

There are sonic waves with a frequency of 20 kHz, the so-called upper threshold of hearing, up to 1 GHz, the hypersound.

In liquids used for ultrasonic cleaning the ultrasonic waves spread as so-called longitudinal waves.

These longitudinal waves create zones with high over- and underpressure phases, which influence the vaporization of the liquid.

Liquid is held together by inner power of attraction (cohesion). If the ultrasonic intensity in a liquid is increased continuously, in the underpressure phase the liquid is partially vaporized and microscopic vapor bubbles emerge.

In the following overpressure phase these bubbles are led to implosion (cavitation). During this process extremely high forces lead to the creation of micro-shock waves and micro-currents.

Cavitation is influenced by many parameters. It depends from temperature, ultrasonic frequency and intensity as well as the kind of liquid and other ultrasonic parameters.

Cavitation has an excellent cleaning effect, similar to the use of innumerable micro-brushes.

Ultrasonic cleaning is particularly suitable for the following applications:

- process acceleration
- determination of residual contamination
- maintenance cleaning/service
- final and intermediate cleaning

