High-power ultrasound for industry – service – maintenance

Cleaning of parts and surfaces
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FAQs

What is ultrasound?
Oscillations at frequencies above 18 kHz (18,000 oscillations per second) are termed ultrasound. During the oscillating tension phase of a liquid, these oscillations cause millions of tiny vacuum bubbles to be generated, which then implode in the compaction phase, causing highly effective pressure surges. This process is called cavitation. Low frequencies of around 25 kHz create bubbles with larger diameters and more intensive pressure surges compared to higher frequencies of around 40 kHz, which are preferable for intensive and gentle cleaning.

How does ultrasound work?
Cavitation blasts dirt particles from the parts immersed in the liquid, even from recesses and drill holes. Ultrasound completes cleaning in a few minutes with an efficiency in excess of any manual cleaning. At the same time it is gentle in action, as it causes no mechanical damage such as scratching.

Which ultrasound bath size should I select?
The size of the cleaning objects will determine the size of the bath and thus the device type. Basket dimensions must be taken into account when selecting a device. To allow the ultrasound to act on all sides, it is always better to choose a somewhat larger device. This also provides greater potential for other uses. Other important selection criteria are the geometry of the cleaning objects and the nature of the soiling. For complex cleaning tasks, optional equipment such as rinsing baths and lifting devices are available, in order to meet the higher cleaning requirements.

Does an ultrasound bath need a heating?
Heating the cleaning liquids shortens cleaning time. Soiling is removed more quickly. Devices with heating are usually used for cleaning in the industrial sector.

How is the set temperature maintained?
The cavitation produced by the ultrasound heats up the liquid. Ultrasound baths with heating have a preset temperature selector. Once the target temperature is reached, the heating turns off, but the ultrasound will continue to increase the temperature in the bath as its mechanical energy is converted into heat energy.

What accessories are necessary?
Cleaning objects must not lie on the bottom of the bath. Baskets and other inset beakers prevent scratching both to the cleaning objects and the bath floor.
When cleaning very small or sensitive parts, further accessories may be advisable, e.g. to provide a placement which is gentle on the parts.
A cover reduces the sound level and protects the liquid in the oscillating tank from external contamination. The cover design ensures the return of condensate into the oscillating tank.

What liquids should be used?
TICKOPUR preparations have been specially developed for use in ultrasound baths. The cleaning liquid should be carefully selected to take account of the materials of the parts and the specific contamination. Unsuitable cleaning agents may damage the parts. Water without a cleaner will not have a cleaning effect. Do not use household cleaners or pure DI water.
Never use inflammable or explosive liquids directly in the oscillating tank!
**How often does the bath liquid need to be changed?**
The frequency of bath liquid changes will depend on the number of parts to be cleaned and the nature of the contamination.
If contamination levels in the bath liquid become too high, the cleaning effect will be impaired. This state can be deferred by use of filtration or oil separation, etc.

**What is degassing, and does degassing need to occur prior to the sonication process?**
Yes, just for a few minutes, in order to expel dissolved gases.
This is important for effective cleaning, as hard cavitation will only occur once the gases have been removed. The degassing time will depend on the size of the bath and the hardness of the water. The process will end when the sound changes and becomes quieter and less shrill.

**How many parts can be cleaned simultaneously?**
The parts should not overlap. There must be sufficient space between the parts. Bulk material must be loosely distributed.

**Can ultrasound damage the parts?**
Thousands of cavitation bubble implosions occur every second and these are very powerful. Despite this, ultrasonic cleaning is a safe procedure, as the energy is at a microscopically small level. The cavitation bubbles have a diameter of only 1-3 nm!

**May I reach into the ultrasound bath while it is in operation?**
This should be avoided. Ultrasound baths generally operate at a temperature between 50 - 60 °C. In addition, the cleaners used may be harmful to the skin. Dipping the hands into the ultrasound bath while ultrasound is being emitted should also be avoided as it could lead to damage to bone tissue.

**Is hearing protection necessary?**
For continuous work in the vicinity of the device, hearing protection is recommended.

**How can I test the ultrasound bath’s function?**
We recommend a foil test pursuant to IEC/TR 60886: Aluminium foil is stretched over a wire frame and sonicated for about 3 min. The foil must then show visible perforations.
See our instruction video: [Foil test](#).

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If you want to know more... visit our website with integrated YouTube channel and many helpful instruction videos! Or contact us directly ... We are always pleased to provide advice, so call us at +49 (0)30 76880-0.

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above: Performing the foil test.
below: Perforated foil after the test.
Ultrasonic cleaning

Advantages

Economical
Regular ultrasonic cleaning saves money. The gentle effect of the ultrasound prolongs the lifespan of the cleaned utensils and lessens the need for replacement parts. Quick cleaning times shorten downtimes.

Thorough
Ultrasonic cleaning processes are effective and have a very high cleaning efficiency. No brushes or cloths are necessary, thus avoiding damage to cleaned utensils and their surfaces. Even complex part shapes can be cleaned.

Environmentally friendly
Use of biodegradable cleaning agents rather than environmentally damaging solvents. Oil separators and bath filtration extend the service life of cleaning liquids and thus reduce the consumption of chemicals and water.

User-friendly
Ultrasonic cleaning devices are easy to install and operate. No special training is required.

Influencing factors
The interaction of four factors

Ultrasound
Very small vacuum bubbles are formed by the ultrasound in liquids, and immediately implode (cavitation). The forces generated cause the intensive but gentle removal of dirt particles from the item being cleaned.

Chemistry
The cleaning chemical encourages cavitation, reduces the surface tension of the water and frees and binds dirt particles. Depending on the type of contamination, different cleaning preparations will be used.

Temperature
Many cleaners only display their full effect at higher bath temperatures. The cleaning liquid can be heated by a heating facility in the device.

Time
Compared to other procedures, the joint use of chemicals and ultrasound reduces the cleaning time by up to 90%. Depending on the contamination, cleaning will take from a few seconds to a few minutes.
**SONOREX TECHNIK**

Typical areas of application for ultrasonic baths

**Precision mechanics**
Cleaning of parts in stainless steel, brass and aluminium

**Mechanical engineering**
Cleaning and degreasing of bearings, crankshafts, turning plates, workpieces and electrostatic filters

**Grinding and polishing**
Cleaning of lampshades, removal of lapping and polishing pastes.

**Mould cleaning**
Cleaning of injection moulds

**Automotive industry/workshop/servicing**
Cleaning of injection nozzles, carburettors, spray guns, nozzles, shock absorbers, engine parts, circuit boards, cutting tools, other tools, etc.

**Woodworking industry**
Cleaning of woodworking tools and machine parts during maintenance

**Medical technology**
Cleaning of prostheses, implants and joints

**Power stations**
Cleaning of oil and welding fume filters, decontamination

**Catering**
Cleaning and degreasing of e-filters and coffee machine parts

**Safety at work – fire protection**
Cleaning of respirator masks and sooty parts

**Transport technology**
Cleaning of relays, soldered frames, gearboxes and engine parts

**Pneumatic tools**
Removal of grease, oil, abrasion dust and resinification during repairs

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*Cleaning with ultrasound – examples*

- [Image of cleaned and dirty components demonstrating the effectiveness of ultrasonic cleaning.]
**SONOREX TECHNIK**

Typical areas of application for ultrasonic baths

**Materials testing**
Cleaning and degreasing of measuring tools

**Office technology**
Cleaning of parts from copy machines, printers, franking machines, housings and keyboards

**Energy industry**
Cleaning of valves and water meters

**Optical and glass industry**
Preliminary and intermediate cleaning of optical glass and lenses

**Thin film technology**
Cleaning of sensor parts

**Pharmaceutical industry**
Cleaning of metal filters and tableting punches

**Sports and leisure industry**
Cleaning of climbing holds on climbing walls, golf clubs and balls, diving equipment, etc.

**Jewelry industry**
Cleaning of metal wrist watch straps, chains, rings, etc.

More information in videos:
youtube.com/bandelin
or here:
Ultrasonic applications

Left dirty, right cleaned
Ever higher product quality requirements increasingly necessitate the use of high-value, flexible ultrasonic device technology. In response, BANDELIN offers a wide selection of SONOREX TECHNIK devices for individual cleaning tasks, each meeting today’s demands for quality, economy and environmental compatibility. The devices can be combined and, when extended with suitable peripherals, offer modular and flexible cleaning ranges with, e.g., integrated rinsing and drying.

Four variants of ultrasonic bath in all bath sizes

**UH** Ultrasonic baths with heating – for cleaning. The heating supports the cleaning effect of the chemicals

**U** Ultrasonic baths without heating – for cleaning temperature-sensitive parts or for rinsing.

**H** Rinsing baths (without ultrasound) with heating

**H** Rinsing baths without ultrasound or heating – for rinsing after ultrasonic cleaning.
# SONOREX TECHNIK

Available devices – summary

<table>
<thead>
<tr>
<th>Features</th>
<th>Type</th>
<th>RM 16.2 to RM 75.2</th>
<th>RM 110 to RM 210</th>
<th>RM 112 to RM 212</th>
<th>ZM 112 to ZM 212</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasonic output</td>
<td></td>
<td>fixed</td>
<td>fixed</td>
<td>fixed</td>
<td>adjustable</td>
</tr>
<tr>
<td>Ultrasonic frequency (kHz)</td>
<td></td>
<td>40</td>
<td>25 or 40</td>
<td>25 or 40</td>
<td>25 or 40 or both</td>
</tr>
<tr>
<td>Ultrasonic transducers</td>
<td></td>
<td>bottom sonication</td>
<td>bottom sonication</td>
<td>bottom sonication</td>
<td>bottom sonication or bottom and side sonication</td>
</tr>
<tr>
<td>Ultrasound generator</td>
<td></td>
<td>integral</td>
<td>integral</td>
<td>integral</td>
<td>separate</td>
</tr>
<tr>
<td>Heating (optional)</td>
<td></td>
<td>On/off with control indicator, thermostatically adjustable from 30–80 °C.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating elements</td>
<td></td>
<td>turning knob lower right</td>
<td>turning knob lower right</td>
<td>turning knob upper right</td>
<td>turning knob upper right</td>
</tr>
<tr>
<td>Time setting</td>
<td></td>
<td>1 - 15 min or continuous operation</td>
<td>variable via generator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material, oscillating tank</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2 mm stainless steel AISI 316L, welded</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tank bottom, inclined to drain</td>
<td></td>
<td>✓</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tank corners</td>
<td></td>
<td>right-angled</td>
<td>right-angled</td>
<td>rounded</td>
<td>rounded</td>
</tr>
<tr>
<td>Overflow gutter with drain</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Welded drain with three-way ball valve</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Filling level mark</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Float switch as dry run protection</td>
<td></td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sprinkle tube (for separate oil separator)</td>
<td></td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Housing material stainless steel AISI 304</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Feet</td>
<td></td>
<td>fixed</td>
<td>fixed</td>
<td>height-adjustable</td>
<td>height-adjustable</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
<td>IP 32</td>
<td>IP 32</td>
<td>IP 32</td>
<td>IP 32</td>
</tr>
</tbody>
</table>
### SONOREX TECHNIK

**Ultrasonic and rinsing baths RM**

#### RM 16.2 to RM 75.2 (13–62 litres)

**Equipment**
- **Welded cleaning tank**
  in 2 mm stainless steel AISI 316L.
- **Inclined tank bottom**
  for better cleaning results from optimum sound propagation. Facilitates emptying of the tank, and accumulations of soiling and residual liquid on the tank bottom are largely avoided.
- **Overflow gutter**
  together with an oil separator is able to drain off floating contamination, oils and greases from the bath surface.
- **Filling level mark**
  clearly stamped on the side as working filling level for cleaning liquid. Facilitates dosage.
- **Welded drain**
  with three-way ball valve for emptying or refilling the tank and for connecting a filtration.
- **Additional drain**
  for connecting an oil separator or emptying the overflow gutter.
- **Heating**
  On/off with control indicator, thermostatically adjustable from 30–80 °C.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 16.2 UH</td>
<td>325 × 275 × 200/210+</td>
<td>13</td>
<td>365 × 340 × 390</td>
<td>1200</td>
<td>300</td>
<td>800</td>
<td>4.8</td>
</tr>
<tr>
<td>RM 40.2 UH</td>
<td>475 × 300 × 300/315+</td>
<td>31</td>
<td>540 × 340 × 495</td>
<td>2000</td>
<td>500</td>
<td>1250</td>
<td>7.7</td>
</tr>
<tr>
<td>RM 75.2 UH</td>
<td>575 × 500 × 300/315+</td>
<td>62</td>
<td>640 × 540 × 520</td>
<td>4000</td>
<td>1000</td>
<td>1950</td>
<td>12.9</td>
</tr>
</tbody>
</table>

*inclined tank bottom; *corresponds to 4 times ultrasonic nominal power; Mains supply 230 V– (±10 %) 50/60 Hz
**SONOREX TECHNIK**

Ultrasonic and rinsing baths RM

**RM 110 to RM 210 (110–210 litres)**

**Equipment**
- as for RM 16.2 to RM 75.2, but with a flat tank bottom

**additionally**
- **Sprinkle tube**
  together with an oil separator create a flow on the bath surface which drains floating contamination, oils and greases from the bath surface into the overflow gutter.
- **Float switch**
  as dry run protection for heating and ultrasound. Height-adjustable feet for evening out uneven substrates.
- **Ultrasound generator (integral)**
  Frequency either 40 or 25 kHz

**RM 110 to RM 212 (115–230 litres)**

**Equipment**
- as for RM 110 to RM 210

**additionally**
- **Rounded tank corners**
  at the sides and bottom facilitate tank cleaning. Adhering soiling is avoided.
- **Controls fitted above**
  facilitate the operation of switches for ultrasound and heating.
- **Inclined tank bottom**
  for better cleaning results from optimum sound propagation. Facilitates emptying of the tank, and accumulations of soiling and residual liquid on the tank bottom are largely avoided.

<table>
<thead>
<tr>
<th>Type (selection)</th>
<th>Internal tank dimensions l x w x d [mm]</th>
<th>Operating volume [l]</th>
<th>External dimensions l x w x h [mm]</th>
<th>Ultrasonic peak output* [W]</th>
<th>Ultrasonic nominal output [W]</th>
<th>Heating power [W]</th>
<th>Current consumption ** [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 110 UH</td>
<td>600 x 450 x 450</td>
<td>110</td>
<td>780 x 550 x 800</td>
<td>4000</td>
<td>1000</td>
<td>4800</td>
<td>10.5</td>
</tr>
<tr>
<td>RM 180 UH</td>
<td>1000 x 500 x 400</td>
<td>160</td>
<td>1180 x 600 x 800</td>
<td>2 x 4000</td>
<td>2 x 1000</td>
<td>7200</td>
<td>14.8</td>
</tr>
<tr>
<td>RM 210 UH</td>
<td>750 x 650 x 500</td>
<td>210</td>
<td>930 x 750 x 800</td>
<td>2 x 4000</td>
<td>2 x 1000</td>
<td>7200</td>
<td>14.8</td>
</tr>
<tr>
<td>RM 112 UH</td>
<td>600 x 450 x 470/470*</td>
<td>115</td>
<td>780 x 610 x 800</td>
<td>4000</td>
<td>1000</td>
<td>4800</td>
<td>10.5</td>
</tr>
<tr>
<td>RM 182 UH</td>
<td>1000 x 500 x 420/420*</td>
<td>170</td>
<td>1180 x 660 x 800</td>
<td>2 x 4000</td>
<td>2 x 1000</td>
<td>7200</td>
<td>14.8</td>
</tr>
<tr>
<td>RM 212 UH</td>
<td>750 x 650 x 520/520*</td>
<td>230</td>
<td>930 x 810 x 800</td>
<td>2 x 4000</td>
<td>2 x 1000</td>
<td>7200</td>
<td>14.8</td>
</tr>
</tbody>
</table>

*inclined tank bottom; *corresponds to 4 times ultrasonic nominal power; ** per phase
Mains supply 400 V 3N– (±10 %) 50/60 Hz
**SONOREX TECHNIK**

Ultrasonic baths ZM

**ZM 112 to ZM 212 (115–230 Liter)**

**Equipment**
- as for RM 112 to RM 212 but external ultrasound generator
- Installation of generator in separate location from wet area is possible.
- Stepless power regulation.
- Serial interface and remote control connection for external control of the generator.
- Implementation of several cleaning baths, even with different frequencies, possible from a single generator.
- Model with bottom sonication (ZM ... U / UH) or with bottom and side sonication (ZM ... UL / UHL), also available in TwinSonic design.

TwinSonic design as multi-frequency device
Multi-frequency devices in TwinSonic design operate with ultrasound systems of different frequencies on the bottom and side. The benefits are an even sonication and power distribution for a better cleaning result in a shorter time.

<table>
<thead>
<tr>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZM 112 UH</td>
<td>600 × 450 × 450/470*</td>
<td>115</td>
<td>780 × 610 × 800</td>
<td>4000</td>
<td>1000</td>
<td>4800</td>
<td>4.3</td>
</tr>
<tr>
<td>ZM 112 UHL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.6</td>
</tr>
<tr>
<td>ZM 182 UH</td>
<td>1000 × 500 × 400/420*</td>
<td>170</td>
<td>1180 × 660 × 800</td>
<td>2 × 4000</td>
<td>2 × 1000</td>
<td>7200</td>
<td>8.6</td>
</tr>
<tr>
<td>ZM 182 UHL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.0</td>
</tr>
<tr>
<td>ZM 212 UH</td>
<td>750 × 650 × 500/520*</td>
<td>230</td>
<td>930 × 810 × 800</td>
<td>2 × 4000</td>
<td>2 × 1000</td>
<td>7200</td>
<td>8.6</td>
</tr>
<tr>
<td>ZM 212 UHL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.0</td>
</tr>
</tbody>
</table>

*inclined tank bottom; *corresponds to 4 times ultrasonic nominal power; ** per phase
Mains supply 400 V 3N- (±10 %) 50/60 Hz; ultrasound generator: 230 V– (± 10 %) 50/60 Hz
SONOREX TECHNIK

Accessories

Baskets
During ultrasonic cleaning, the cleaning objects should not be placed on the tank bottom, as the vibrations from the oscillating system can cause abrasion between the items and the tank. The use of a suitable cleaning basket is therefore necessary.

With the help of a basket, the cleaning objects can also be suitably placed in the device and later removed for rinsing without the user coming into contact with the cleaning or disinfection liquid.

Lids
The correct lid for the ultrasound bath protects the cleaning liquid from contamination. The noise of ultrasound bath operation is also dampened. The lid is designed so that any condensate is led back into the ultrasound bath.

Drop plates
These function as droplet and spray protection between the baths, when setting up several baths as a cleaning/rinsing line.

<table>
<thead>
<tr>
<th>Accessories</th>
<th>RM 16.2</th>
<th>RM 40.2</th>
<th>RM 75.2</th>
<th>RM 110 (RM 112 ZM 112)</th>
<th>RM 180 (RM 182 ZM 182)</th>
<th>RM 210 (RM 212 ZM 212)</th>
<th>Illustrations (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert basket</td>
<td>MK 16 B</td>
<td>MK 40 B</td>
<td>MK 75 B</td>
<td>MK 110</td>
<td>MK 180</td>
<td>MK 210</td>
<td><img src="image" alt="MK 40 B" /></td>
</tr>
<tr>
<td>Insert basket up to 40 kg</td>
<td>–</td>
<td>MK 40 S</td>
<td>MK 75 S</td>
<td>MK 110 S</td>
<td>MK 180 S</td>
<td>MK 210 S</td>
<td><img src="image" alt="MK 210 S" /></td>
</tr>
<tr>
<td>Insert basket for lifting device</td>
<td>MK 16 B</td>
<td>MK 40 B</td>
<td>MK 75 B</td>
<td>MK 110 B</td>
<td>MK 180 B</td>
<td>MK 210 B</td>
<td><img src="image" alt="MK 75 B" /></td>
</tr>
<tr>
<td>Insert basket up to 40 kg for lifting device</td>
<td>–</td>
<td>MK 40 BS</td>
<td>MK 75 BS</td>
<td>MK 110 BS</td>
<td>MK 180 BS</td>
<td>MK 210 BS</td>
<td><img src="image" alt="MK 75 BS" /></td>
</tr>
<tr>
<td>Lid</td>
<td>MD 16</td>
<td>MD 40</td>
<td>MD 75</td>
<td>MD 110</td>
<td>MD 180</td>
<td>MD 210</td>
<td><img src="image" alt="MD 110" /></td>
</tr>
<tr>
<td>Drop plate between 2 devices</td>
<td>TB 16</td>
<td>TB 40</td>
<td>TB 75</td>
<td>TB 110</td>
<td>TB 180</td>
<td>TB 210</td>
<td><img src="image" alt="TB 110" /></td>
</tr>
</tbody>
</table>

For more information (only german language):
https://bandelin.com/service/#miete

Ultrasound baths for rent

Do you need an ultrasound bath for cleaning parts for a limited time period?

We hire out ultrasonic baths with operating volumes from 13 to 230 litres with basket and lid.

Interested? Request a rental contract with questionnaire.

Rentals are only available within Germany.
SONOREX TECHNIK
Ultrasonic baths for special requirements

RL 70 UH
– Extra long and narrow oscillating tank
Applications:
Cleaning of long parts, e.g. pipes, profiles, gang saw blades, long cutter blocks.

L 220 / L 320
– Double tank for cleaning and rinsing in one device
Applications:
Cleaning of window blinds, lamp grids, reflectors, heddles, preforms or slats.

W 65 und W 300
– Extra deep oscillating tank
especially for use on ships
Tank with high freeboard
Applications:
Cleaning of oil filters, fittings, cylinder heads.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RL 70 UH</td>
<td>1700 × 250 × 250</td>
<td>70</td>
<td>1750 × 300 × 450</td>
<td>4000</td>
<td>1000</td>
<td>2000</td>
<td>13,1</td>
</tr>
<tr>
<td>L 220</td>
<td>2200 × 300 × 300/370+ per chamber</td>
<td>185</td>
<td>2320 × 750 × 850</td>
<td>2 × 4000</td>
<td>2 × 1000</td>
<td>–</td>
<td>8,6</td>
</tr>
<tr>
<td>L 320</td>
<td>3200 × 300 × 300/370+ per chamber</td>
<td>270</td>
<td>3320 × 750 × 850</td>
<td>4 × 4000</td>
<td>4 × 1000</td>
<td>–</td>
<td>13,0</td>
</tr>
<tr>
<td>W 65</td>
<td>500 × 300 × 450</td>
<td>30</td>
<td>560 × 360 × 650</td>
<td>1200</td>
<td>300</td>
<td>1450</td>
<td>7,0</td>
</tr>
<tr>
<td>W 300</td>
<td>1000 × 500 × 600</td>
<td>185</td>
<td>1180 × 600 × 1000</td>
<td>2 × 4000</td>
<td>2 × 1000</td>
<td>7200</td>
<td>14,8</td>
</tr>
</tbody>
</table>

*ultrasonic/rinsing chamber; *corresponds to 4 times ultrasonic nominal power; ** in case of L 320 and W 300, per phase
W 65, RL 70 UH, L 220: Mains supply 230 V~ (±10 %) 50/60 Hz, Frequency 40 kHz
W 300, L 320: Mains supply 400 V 3N~ (±10 %) 50/60 Hz, Frequency W 300: either 40 or 25 kHz, Frequency L 320: 40 kHz
On request, W300 also with integral autotransformer for connection to existing ship’s voltage.

Accessories and additional equipment on request.
Oscillations MO
The oscillating motion of the objects to be cleaned in the bath makes the ultrasonic cleaning more effective and improves the rinsing off of corroded soiling.

Lifting devices MB with oscillation
The electrically-driven lifting device with oscillation facilitates the lifting and lowering of the basket. When a tank rack is used, the basket can be moved between different baths.

Planing head holders HA
for efficient cleaning of planing heads.

Tank racks WG
WG tank racks for moving the MB lifting device between two or more baths.

Filtrations FA
Continuous filtering of the loosened particles extends the lifetime of the tank and maintains the cleaning power.

Oil separators OX
Oil and grease rising to the surface of the tank are led via the overflow gutter into the oil separator, where they are separated by gravity.

Air circulation dryer UT
The cleaning objects are dried after rinsing to quickly remove any residual moisture. Content from 19.5 to 90 litres.

Trough dryers TO
The cleaning objects are dried after rinsing to quickly remove any residual moisture. Content from 105 to 244 litres.
SONOREX TECHNIK
Examples of modular installations

RM 16 device series with oscillation

RM 16.2 UH
Ultrasonic bath with heating on oscillation MO 16.2

RM 16.2 U
Ultrasonic bath without heating on oscillation MO 16.2

RM 16.2 H
Rinsing bath with heating on oscillation MO 16.2

RM 210 UH
Ultrasonic bath with heating

RM 210 H
Rinsing bath with heating

RM 210
Rinsing bath without heating

RM 210 U
Ultrasonic bath without heating

RM 210
Rinsing bath without heating

TB 16
Drop plate between the tanks

MK 16 B
Insert basket

MB 16.2
Lifting device with oscillation, combined with tank rack WG 16-4

MK 16 B
Insert basket for lifting device

TB 16
Drop plate between the tanks

TB 16
Drop plate between the tanks

RM 210 UH
Ultrasonic bath with heating

RM 210 H
2nd rinsing bath with heating

RM 210
3rd rinsing bath without heating

RM 210
3rd rinsing bath without heating

MB 210.2 B
Lifting device with oscillation, combined with tank rack WG 210-4

MK 210 B
Insert basket for lifting device

TB 210
Drop plate between the tanks

TO 210
Trough dryer

Examples of modular installations
SONOREX CNp 28-2
High-performance ultrasonic bath with pulsed vacuum

Compact CNp cleaning system

Effective cleaning using CNp (Cyclic Nucleation Process), a combination of ultrasonic and pulsed vacuum cleaning in one compact device.

Applications: Capillary, 3D printed parts, sintered parts, complex components, bulk materials.

Simple setup
Plug in the mains plug (three-phase current) and compressed air connection, attach the wastewater connection, device is ready for operation.

Double-tank design
Intensive cleaning and rinsing at the same time or 2 x cleaning cycles or 2 x rinsing cycles.

Safe and defined operation
Automatic temperature control, time program and fill level monitoring.

Low maintenance
Ultrasonic system and control unit are maintenance-free.

Economical
Even for small cleaning volumes, space-saving.

Ready-to-use set:
• SONOREX CNp 28-2
• Inset basket K 28 EM (2 pcs.)
• Basket holder KT 28 (2 pcs.)

For more information and video

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CNp 28-2</td>
<td>510 x 300 x 260/280*</td>
<td>28</td>
<td>1,550 x 800 x 985</td>
<td>1200</td>
<td>300</td>
<td>3000</td>
<td>15.7</td>
<td>-0.8</td>
</tr>
</tbody>
</table>

All values (except external dimensions) per tank.
* inclined tank bottom; * corresponds to 4 times ultrasonic nominal power; ** per phase
SONOREX TECHNIK

High-power immersible transducers and flat transducer plates

High-power oscillating systems such as immersible transducers and flat transducer plates are used for retrofitting tanks for industrial ultrasonic cleaning or the acceleration of chemical or physical processes.

They are efficient and fail-safe and their large oscillation areas provide even sonication distribution. The oscillation systems are energised with high-power ultrasound generators.

**Immersible transducer**

For rapid integration into larger-sized tanks.

Features:
- 2 mm stainless steel AISI 316L, WIG welded
- Ultrasound frequencies 25 kHz or 40 kHz
- Different models accommodate the variety of uses

**Flat transducer plates**

For space-saving installation where space is limited.

The inner tank dimensions are unchanged.

Features:
- 3 mm stainless steel plate AISI 316L
- Ultrasound frequencies 25 kHz or 40 kHz
- Integration in right-angled tank section
- No drill holes or templates for threaded bolts necessary

**Explosive plated compound ultrasound**

Robust design gives enhanced mechanical stability.

Solid aluminium and stainless steel plates are inseparably combined by explosion.

The oscillating components are screwed to this composite plate rather than glued.

Features:
- Long life-time due to low wear
- Stainless steel plating: 3 mm, AISI 316Ti
- High temperature stability up to max. 125 °C
- Suitable for pressure and vacuum loads
- New type of acceleration characteristics
- Ultrasound frequencies 25 kHz or 40 kHz
- Use as immersible transducers or flat transducer plates

**CONVEXON TC immersible transducer**

Features:
- Convex radiation surface
- Even sonication distribution
- Homogeneous cleaning effectiveness
- Low surface erosion
- Enhanced lifespan
- 2 mm stainless steel AISI 316L, WIG welded
- Ultrasonic frequency 40 kHz

**CONCAVON TN immersible transducer**

Features:
- Concave radiation surface
- Even sonication distribution
- Concentrated cleaning effectiveness
- 2 mm stainless steel AISI 316L, WIG welded
- Ultrasonic frequency 40 kHz
**SONOREX TECHNIK**

Mounting examples

- **CONVEXON immersible transducers TC ... E**
  for suspension, with bent, permanently welded stainless steel tube and suspension hooks, easily moved and thus useable in different baths.

- **Immersible transducers T ... P**
  with PTFE protective hose, (2 m, flexible), stainless steel reinforced (AISI 304), e.g. for placing on the tank bottom.

- **Fixed cable F connection**
  with PG screw (water jet protection) – IP 65.

- **Quick-Connect technology**
  with TA connection box (droplet protected) – IP 51.

- **Immersible transducers T ... E / EF**
  for suspension, with bent, permanently welded stainless steel tube and suspension hooks, easily moved and thus useable in different baths.

- **Immersible transducers T ... W**
  with 90° stainless steel bend (AISI 304) and flexible 2 m PTFE protective hose, stainless-steel reinforced, e.g. for placement on the tank bottom where space is limited.

- **Immersible transducers T ... B**
  With stainless steel bolt fixing through the wall, thereby eliminating cables in the working area. Cable laying to the generator is done outside the tank.

- **CONVEXON immersible transducers TC ... RF**
  with stainless steel pipe penetration through the wall, with fixed cable.

- **Flat plate transducers P**
  for integration in the tank, with cover as protection against contact.

- **Immersible transducers T ... R**
  with stainless steel pipe penetration through the wall.

- **For integration in existing tanks either with plug-in HF-cable Quick-Connect technology (IP 51) or with HF fixed cable connection (IP65)**
SONOREX TECHNIK
High-power ultrasound generators LG

For operating high-power immersible transducers and flat transducer plates, high-power generators are used

Module generators LG

The micro-processor controlled LG ultrasound generators provide HF power up to max. 9.0 kW at 25 kHz or 40 kHz. The selection of generator with power and operating modules will depend on the total output of the ultrasonic oscillating systems being connected and the desired controllability of the application. At the core of the ultrasound generators are power modules up to 1.5 kW, with regulation of all working parameters by the on-board micro-processor.

Operating and power modules of the generators LG

Control module SM 3
- Stepless adjustment of target output from 10–100% via control dial
- START-STOP switch for HF delivery

Processor module PRO 3
- Individual programming for each power module
- Degassing function
- Error display

Power modules M 1003 and M 1503
- LEDs signal the operating mode
- Module switch for individual activation of each power module
- Power constant ± 2 %
- Protection from idle motion, short-circuiting and overload

rear: LG 8008 D – 8.0 kW
from left to right: LG 4004 F – 4.0 kW and LG 3020 T – 3.0 kW
SONOREX TECHNIK
Module concept for generators LG

Tried and tested modular technology – reliable and high-performance, with exchangeable operating and power modules

Modular
All LG generator modules can be conveniently operated from the front and exchanged. Settings are performed through the SM 3 or PRO 3 operating modules. Power delivery is handled by power module M.

Flexible
To increase generator power, additional power modules can be easily inserted in the free slots.

Mixed configurations with modules of different frequency (25 or 40 kHz) and power are also possible.

Communication
The rear connections for remote control and the serial interface RS 232 allow the generators to be incorporated in higher-level monitoring and control devices.

---

Ultrasound generators
Operating modules
Power modules

Desktop housing (T)
up to 3.0 kW
Dimensions (L × W × H) 218 × 405 × 198 mm
Mains connection: 230 V~ (±10 %) 50 / 60 Hz

Industrial housing (F)
up to 6.0 kW
Dimensions (L × W × H) 488 × 405 × 203 mm
or 19” plug-in unit
for electrical cabinet integration
Mains connection: 400 V 3N~ (±10 %) 50 / 60 Hz

Industrial housing (D)
up to 9.0 kW
Dimensions (L × W × H) 488 × 405 × 425 mm
or 19” plug-in unit
for electrical cabinet integration
Mains connection: 400 V 3N~ (±10 %) 50 / 60 Hz
SONOREX TECHNIK

High-power ultrasound generators TG and SG

Compact generators TG 1503 and TG 3003 especially for use in plant engineering

Micro-processor-controlled ultrasound generators TG 1503 and TG 3003 deliver HF power up to max. 3.0 kW at 25 kHz or 40 kHz, and in the case of TG 3003 a mixed configuration is also possible. The compact shape permits installation in a standard electrical cabinet, but holding brackets (optional) also allow for wall installation.

Compact generators TG 1503
Dimensions (L × W × H) 250 × 460 × 110 mm
Mains supply: 230 V~ (± 10 %) 50/60 Hz
Compact generators TG 3003
Dimensions (L × W × H) 250 × 460 × 160 mm
Mains supply: 230 V~ (± 10 %) 50/60 Hz

Remote operation/control

Remote operation

The rear connection socket allows the generators to be turned on and off with an external control switch.

FS 7: Remote control cable with 7 m cable length, one end with plug
FS 15 L: Remote control with time switch 1–15 min and continuous operation, cable with plug, 7 m long

Generator with protective housing SG 1510

The micro-processor-controlled ultrasound generators provide HF power up to max. 1.5 kW at 25 kHz or 40 kHz. Their hermetic enclosure and external cooling ribs allow these generators to be operated in both wet rooms and outdoors.

Dimensions (L × W × H) 490 × 265 × 225 mm
Mains supply: 230 V~ (± 10 %) 50/60 Hz

RS 232 interface connection for PLC or PC

The interface allows the generator to be incorporated in higher-level control and monitoring devices. The modules are directly controlled by the PLC.

TG 1503 – 1.5 kW
TG 3003 – 3.0 kW
SG 1510 – 1.5 kW
Individual configurations with ultrasonic oscillating systems

Tanks, basins, plates, flanges, pipes and other metal components are directly configured with ultrasonic oscillating systems for cleaning or other sonication purposes, where the use of immersible transducers or flat transducer plates is not possible. In this case the oscillating systems are glued to the external surfaces such that the sonication effect is directed into the liquid or onto an object in the liquid.

Project engineering information
The intended configuration surfaces must be flat. The output of each ultrasonic oscillating system will be max. 50 Watt. The oscillating systems can be provided with a housing (degree of protection IP 20) in aluminium which protects against contact but not splashing.

<table>
<thead>
<tr>
<th>Ultrasonic oscillating systems</th>
<th>PD 40 12</th>
<th>PD 25 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency [kHz]</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Diameter of adhesive surface per system [mm]</td>
<td>min. 55</td>
<td>min. 65</td>
</tr>
<tr>
<td>Construction height without housing [mm]</td>
<td>55</td>
<td>77</td>
</tr>
<tr>
<td>Construction height with housing [mm]</td>
<td>70</td>
<td>90</td>
</tr>
</tbody>
</table>

Ultrasound generator TG 50 /Z to TG 500 /Z

- Number of possible oscillating systems [qty]: 1 to 10
- HF output [W]: 30–500

Ultrasound generator LG 1001 T to LG 3020 T /PRO
Ultrasound generator TG 1503 or TG 3003

- Number of possible oscillating systems [qty]: 6 to 60
- HF output [W]: 300–3000

| Other configuration variants – including for curved surfaces, e.g. pipes – on request. |

Small generators TG 50 –TG 500 /Z for connection to special configurations

Generators TG
HF power to 500 W
Ultrasound frequency: 40 kHz or 25 kHz

Mains supply:
230 V~ (± 10 %) 50/60 Hz
alternatively
115 V ~ (± 10 %), 50/60 Hz
SONOREX TECHNIK

Sonoreactors

SONOBLOC
Tube reactors for use in process technology and cleaning

Applications
- Ultrasonic intensive treatment of flexible filiform products and of wire or ribbon-shaped continuous profiles
- Acceleration of desintegration and/or breakdown of organic material for increasing biogas yields and for treatment of sewage sludge
- Supporting the disinfection of germ and parasite laden circulation water in pisciculture
- Dispersing of solids in liquids (pharmaceutical production)
- Supporting disinfection (killing of bacteria) in water and sewage treatment
- CO₂ degassing from aqueous reactants
- Support of industrial and biotechnological processes in cleaning, disintegration, degassing and disagglomeration

VORTEX
Vortex reactors for use in process technology

Applications
- Intensification of industrial, biotechnological and chemical processes (suspension, emulsion, disagglomeration, reaction acceleration, degassing)
- Intensive degassing of dye solutions and photographic casting solutions
- CO₂ degassing from aqueous reactants
- Supporting disinfection (killing of bacteria) in water and sewage treatment
- Sterilisation of organic contents in industrial rinsing liquids
- Supporting the disinfection of germ and parasite laden circulation water in pisciculture
- Production of ultra-fine polishing pastes for the wafer industry
- Homogenisation of colour pigments in oil (paint manufacture)
**SONOREX**

Ultrasonic baths – analogue or digital

- **SONOREX SUPER RK** – Operation with turning knob
- **SONOREX DIGITEC DT** – Operation with foil keyboard

<table>
<thead>
<tr>
<th>Feature</th>
<th>SUPER RK ...</th>
<th>DIGITEC DT ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume [l]</td>
<td>3.0–90.0</td>
<td>3.0–90.0</td>
</tr>
<tr>
<td>Ultrasonic frequency (kHz)</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Sweep</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>DEGAS rapid degassing</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Operating elements</td>
<td>turning knobs</td>
<td>keypad</td>
</tr>
<tr>
<td>Time setting [min]</td>
<td>1–15, ∞</td>
<td>1, 2, 3, 4, 5, 10, 15, 30, ∞</td>
</tr>
<tr>
<td>Data memory</td>
<td>–</td>
<td>no, for type H-RC: WINSONIC software</td>
</tr>
<tr>
<td>Safety shut-down</td>
<td>–</td>
<td>after 12 hours</td>
</tr>
<tr>
<td>Heating, thermostatically controlled [°C]</td>
<td>30–80</td>
<td>20–80</td>
</tr>
<tr>
<td>Heating</td>
<td>optional, H-version</td>
<td>optional, H-version</td>
</tr>
<tr>
<td>Setting accuracy of bath temperature [K]</td>
<td>± 5</td>
<td>± 2.5</td>
</tr>
<tr>
<td>Protection against boiling retardation</td>
<td>–</td>
<td>✓, optional switch-on</td>
</tr>
<tr>
<td>Excess temperature signal</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Tank thickness [mm] / Material</td>
<td>0.8 / AISI 304 2 / AISI 316L</td>
<td>0.8 / AISI 304 2 / AISI 316L</td>
</tr>
<tr>
<td>Hard chromium plating</td>
<td>RK 102 H</td>
<td>DT 102 H / H-RC</td>
</tr>
<tr>
<td>Filling level mark for safe dosing</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>One-piece drain, welded</td>
<td>✓, from RK 102 H</td>
<td>✓, from DT 102 H</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 32</td>
<td>IP 33</td>
</tr>
<tr>
<td>Mains supply 230 V– [± 10 %] 50 / 60 Hz alternatively 115 V– [± 10 %] 50 / 60 Hz</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Interface/PC software</td>
<td>–</td>
<td>RS 232 in case of type H-RC</td>
</tr>
</tbody>
</table>
## SONOREX

Ultrasonic baths in compact design

for use in servicing, workshop, laboratory and technical college

<table>
<thead>
<tr>
<th>Type (selection)</th>
<th>Internal tank dimensions l × w × d [mm]</th>
<th>Capacity [l]</th>
<th>External dimensions l × w × h [mm]</th>
<th>Ultrasonic peak power* [W]</th>
<th>Ultrasonic nominal power [W]</th>
<th>Heating power [W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>RK 102 H DT 102 H</td>
<td>240 × 140 × 100</td>
<td>3.0</td>
<td>260 × 160 × 250</td>
<td>480</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>RK 156 BH DT 156 BH</td>
<td>500 × 140 × 150</td>
<td>9.0</td>
<td>530 × 165 × 300</td>
<td>860</td>
<td>215</td>
<td>600</td>
</tr>
<tr>
<td>RK 170 H</td>
<td>1000 × 200 × 200</td>
<td>39.0</td>
<td>1050 × 250 × 385</td>
<td>1520</td>
<td>380</td>
<td>1600</td>
</tr>
<tr>
<td>RK 255 H DT 255 H</td>
<td>300 × 150 × 150</td>
<td>5.5</td>
<td>325 × 175 × 295</td>
<td>640</td>
<td>160</td>
<td>280</td>
</tr>
<tr>
<td>RK 510 H DT 510 H</td>
<td>300 × 240 × 150</td>
<td>9.7</td>
<td>325 × 265 × 300</td>
<td>640</td>
<td>160</td>
<td>400</td>
</tr>
<tr>
<td>RK 514 H DT 514 H</td>
<td>325 × 300 × 150</td>
<td>13.5</td>
<td>355 × 325 × 305</td>
<td>860</td>
<td>215</td>
<td>600</td>
</tr>
<tr>
<td>RK 514 BH DT 514 BH</td>
<td>325 × 300 × 200</td>
<td>18.7</td>
<td>355 × 325 × 385</td>
<td>860</td>
<td>215</td>
<td>600</td>
</tr>
<tr>
<td>RK 1028 H DT 1028 H</td>
<td>500 × 300 × 200</td>
<td>28.0</td>
<td>535 × 325 × 400</td>
<td>1200</td>
<td>300</td>
<td>1300</td>
</tr>
<tr>
<td>RK 1028 CH DT 1028 CH</td>
<td>500 × 300 × 300</td>
<td>45.0</td>
<td>540 × 340 × 500</td>
<td>1200</td>
<td>300</td>
<td>1450</td>
</tr>
<tr>
<td>RK 1050 CH DT 1050 CH</td>
<td>600 × 500 × 300</td>
<td>90.0</td>
<td>640 × 540 × 530</td>
<td>2400</td>
<td>600</td>
<td>1950</td>
</tr>
</tbody>
</table>

*corresponds to 4 times ultrasonic nominal power
TICKOPUR
Cleaning concentrates

For optimum cleaning results in the ultrasound bath, specially formulated cleaning agents are necessary, in addition to the factors of ultrasound output, temperature and time. Bandelin offers a comprehensive range of special cleaning agents from DR.H. STAMM GmbH. These have been specially developed for ultrasound applications. With their cavitation-conducive properties, these preparations support the cleaning process while protecting the materials. According to cleaning task, basic, neutral and acid cleaners are used. The preparations are biologically degradable in accordance with the regulations of the Cleaners Directive. Rinsing is always necessary after cleaning.

Caution:
Do not use solvents directly in the ultrasound bath. Household cleaners, acids and many common acid cleaning agents are unsuitable and may lead to device failure as a result of pitting.

All TICKOPUR preparations may also be used in submersion and wiping procedures.

Product information and EC safety data sheets as pdf files under: Tickopur

<table>
<thead>
<tr>
<th>Dosing aids</th>
<th>used with</th>
<th>Code no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosing pump ⌀</td>
<td>5-l-jerrycan</td>
<td>268</td>
</tr>
<tr>
<td>Dosing pump ⌀</td>
<td>10-l-jerrycan</td>
<td>2660</td>
</tr>
<tr>
<td>Measuring beaker ⌀</td>
<td>100 ml</td>
<td>294</td>
</tr>
</tbody>
</table>
# TICKOPUR

## Cleaning concentrates

<table>
<thead>
<tr>
<th>Materials</th>
<th>Contamination</th>
<th>Cleaning concentrate</th>
<th>Litres*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel, stainless steel, non-ferrous, precious and light metals, glass, ceramics, plastics, rubber</td>
<td>General soiling, drilling, grinding, polishing and lapping residues, oil and grease-based residues, soot, ink, etc.</td>
<td>TICKOPUR R 33 Universal cleaner with corrosion protection for servicing, industry, engineering, laboratory, gentle on materials, mildly alkaline, pH 9.9 (1%), dosage 3–5 %</td>
<td>5 10 200</td>
</tr>
<tr>
<td>Steel, stainless steel, non-ferrous, precious and light metals, glass, ceramics, plastics, rubber</td>
<td>Light contamination, grinding, polishing and lapping residue, dust</td>
<td>TICKOPUR R 30 Neutral, tenside-based cleaner with corrosion protection, gentle on materials, emulsifying, neutral, pH 7.0, dosage 1–5 %</td>
<td>5 10</td>
</tr>
<tr>
<td>Steel, stainless steel, precious metals, glass, ceramics, plastic, rubber. Not for zinc, tin, light or non-ferrous metals.</td>
<td>Heavy mineral residue (limescale, silicates, phosphates, cements, etc.), rust, tempering colours, metal oxides, grease and oil films.</td>
<td>TICKOPUR R 27 Special cleaner on phosphoric acid basis, for intensive decalcification and rust removal, acid, pH 1.9 (1 %), dosage 5 %</td>
<td>5 10</td>
</tr>
<tr>
<td>Steel, stainless steel, non-ferrous, precious and light metals, glass, ceramics, plastics, rubber</td>
<td>Mineral residue, flash rust, grease, oils, waxes, pigments, grinding, polishing and lapping residues</td>
<td>TICKOPUR TR 3 Special cleaner on citric acid basis, gentle action, phosphate-free, with corrosion protection, weakly acid, pH 3.0 (1 %), dosage 5 %</td>
<td>5 10 200</td>
</tr>
<tr>
<td>Steel, stainless steel, non-ferrous, precious and light metals, glass, ceramics, plastics, rubber, soldered frames.</td>
<td>Grease, oils, waxes, pigments, fluxes, soldering pastes, drilling, grinding, polishing and lapping residues</td>
<td>TICKOPUR TR 7 Universal cleaner, demulsifying, for fast separation of oil and grease, phosphate-free, mildly alkaline, pH 8.9 (1 %), dosage 0.1–5 %</td>
<td>5 10</td>
</tr>
<tr>
<td>Steel, stainless steel, glass, ceramics, plastic, rubber. Not for tin, zinc and light metals. Non-ferrous heavy metals may become corroded.</td>
<td>Coking residue, gumming, soot, pigments, greases, oils, waxes, pigments, fogging, drilling, grinding, polishing and lapping residues</td>
<td>TICKOPUR TR 13 Intensive cleaner, demulsifying, for stub-born contamination, phosphate and silicate free, alkaline, pH 11.9 (1 %), dosage 0.1–10 %</td>
<td>5 10 200</td>
</tr>
<tr>
<td>Steel, stainless steel, glass, ceramics, plastics, rubber. Not for light metals. Caution with tin, zinc and non-ferrous metals.</td>
<td>Coking residue, gumming, soot, greases, oils, waxes, silicone oil, fogging, drilling, grinding, polishing and lapping residues.</td>
<td>TICKOPUR R 60 Intensive cleaner, phosphate-free, strongly alkaline, pH 12.3 (1 %), dosage 2–20 %</td>
<td>5 10</td>
</tr>
</tbody>
</table>

* Other container sizes on request. All TICKOPUR preparations may be used in submersion and wiping procedures

## Corrosion protection for ferrous metals

<table>
<thead>
<tr>
<th>Materials</th>
<th>Properties</th>
<th>Concentrate</th>
<th>Litres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable for all ferrous metals such as cast irons, unprotected steels in a large number of alloys.</td>
<td>Effective corrosion protection for indoor storage after cleaning with TICKOPUR agents and subsequent rinsing with water. No oil/grease film formation.</td>
<td>TICKOPUR KS 1 Universal corrosion protection for all ferrous metals, solvent-free, neutral, pH 7.4 (1 %), dosage 0.5–2 %</td>
<td>2 5</td>
</tr>
</tbody>
</table>

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Company portrait

We are a family-owned company located in Berlin and meanwhile run in the third generation, specialised in development, manufacturing and sales of ultrasonic devices, the corresponding accessories and application-specific cleaning agents and disinfectants.

A wide vertical range of manufacture, modern production lines and a motivated staff guarantee a high quality of the products. Our devices contribute to the success of our customers in the laboratory, medical, dental, pharmaceutical, industrial, craft as well as service.

As early as 1955, our company began developing and manufacturing high-performance ultrasonic devices. The constant expansion of the product range and a sharp rise in sales led to an expansion of the production area in 1985. In 1992, ultrasonic homogenisers and controllable, power-constant ultrasonic generators were introduced to the market.

The period from 1996 to 2004 was characterised by the development and production of innovative ultrasonic baths and immersible transducers as well as tube reactors for industrial applications.

In the following years, BANDELIN’s product range was expanded by new laboratory ultrasonic devices. After the introduction of the ultrasonic bath for simultaneous cleaning and rinsing of MIC instruments, a further development was launched in 2016 for robotic instruments.

Today, the reputation of our brands SONOREX, SONOPULS, SONOMIC and TRISON stand for the high quality awareness of our employees and is equated in expert circles with ultrasound.

The most important product groups include:
SONOREX – ultrasonic baths and reactors
SONOPULS – ultrasonic homogenisers
SONOMIC – ultrasonic baths for rinsable MIC and standard instruments
TRISON – ultrasonic baths for robotic-, rinsable MIS and standard instruments
TICKOPUR – cleaning agents
STAMMOPUR – cleaning agents and disinfectants

We are innovation leaders in the development of ultrasonic devices and new areas of application. In the past we have registered 79 patents / utility models as well as 68 trade brands. Our participation in various committees in the development of new standards and guidelines serve to ensure the highest standards for ultrasonic applications.

As the only complete supplier of ultrasonic devices, accessories, disinfectants and cleaning agents with approvals and certifications according to ISO 9001 and ISO 13485, BANDELIN is the market leader.

Over one million units have already been delivered to our customers.