BANDELIN
Ultraschall seit 1955

High-power ultrasound

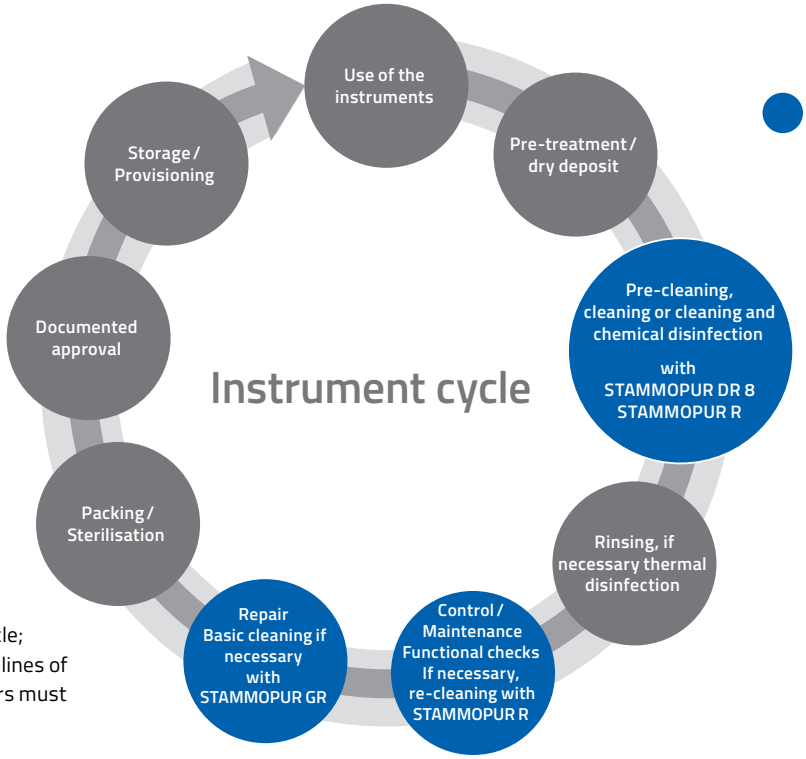
Use and Application

Practice and Clinic

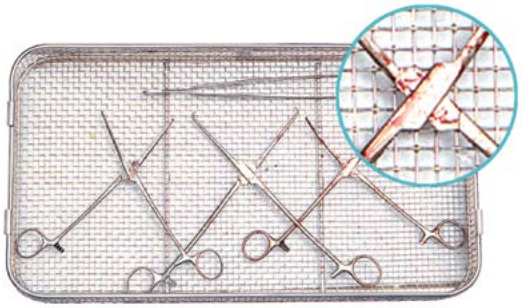
Content

SONOREX

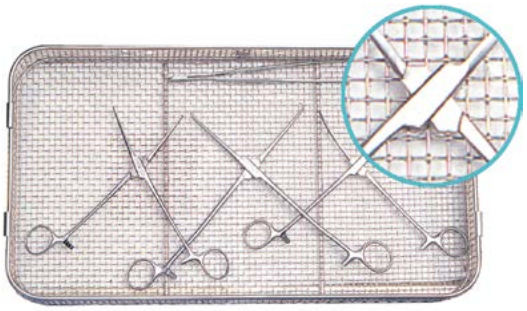
Ultrasonic baths for cleaning and chemical disinfection of medical instruments



An exemplary instrument cycle; national guidelines and guidelines of the instrument manufacturers must be observed!



Medical instruments before ...



... and after cleaning with ultrasound

How does ultrasound help in the cleaning of instruments?

Cavitation causes dirt residue and infectious agents in the instruments placed in the liquid to be positively "exploded away". Locations, surfaces, corners and openings that are hard to access can be reached and cleaned by ultrasound ("electronic brushes"). Ultrasound performs the cleaning in a few minutes, and surpasses any manual cleaning. At the same time it acts gently, as it causes no mechanical damage such as scratching.
BANDELIN ultrasonic baths operate usually at the intensive cleaning frequency of 35 kHz.
All are equipped with Sweep to provide a homogeneous ultrasound field.

Advantages of instrument treatment in the ultrasonic bath

- High cleaning effect in hard-to-access locations such as drill holes, articulations or joints – with no mechanical damage
- Gentle on instruments
- Rapid instrument circulation
- Reduction of chemical disinfection (duration) by catalytic effect when using suitable preparations (e.g. STAMMOPUR DR 8).
- Economical use of water, chemicals and energy

Recommendations on the application

BANDELIN ultrasonic baths, in combination with the right accessories and preparations made especially for use with ultrasonic baths, permit fast and thorough cleaning and chemical disinfection of medical instruments.
They are used

- as mechanical support for manual cleaning processes
- for removing stubborn soiling before or after mechanical reprocessing
- for cleaning support as an integral part of the mechanical reprocessing procedure.
- for shorter disinfection times while still maintaining intensive cleaning levels

It is important to remember that all cleaning objects must be thoroughly rinsed under running water after use in the ultrasonic bath.

Objects to be cleaned	Cleaning and disinfection agents	Usage notes
Standard instruments (scissors, needle holders, tweezers, forceps, trocars) MIS instruments and accessories, micro-clamps, take-apart tube shaft instruments Micro-instruments for neurosurgery/ophthalmology Endoscope accessories such as biopsy forceps, snares, valves EKG/EEG elektrodes Small parts	**STAMMOPUR R** Instrument Cleaner **STAMMOPUR DR 8** VAH certified, Instrument disinfection and intensive cleaning	Direct sonication in insert baskets following dry deposit or non-fixing wet deposit Silicone knob mats for placement of sensitive instruments
Robotic instruments	**STAMMOPUR R** Instrument Cleaner	Direct sonication, connected at the moving device
Stained, encrusted or oxidised instruments	**STAMMOPUR GR** Instrument basic cleaner	Indirect sonication in an insert beaker or insert tub

Knowledge of ultrasound

Ultrasound and cavitation – what are they?

Oscillations at frequencies above 18 kHz (18,000 oscillations per second) are termed ultrasound. During the tension phase these oscillations cause the generation of millions of tiny vacuum bubbles in all liquids, which then implode in the compaction phase, causing highly effective pressure surges. This process is called cavitation.

Which ultrasonic bath should I select?

The size of the cleaning object will determine the size of the bath and thus the device type. Basket dimensions must be taken into account when selecting a device. To prevent device overload, it is always better to choose a somewhat larger device. This also results in additional space for other uses.
Further important criteria for the decision are the operating controls and the desired design – see following page. For rinsable MIS instruments and complex robotic instruments, ultrasonic baths with additional functions such as rinsing and instrument motion are available, in order to meet the higher cleaning requirements.

Does an ultrasonic bath need a heating?

Devices without heating are preferred for cleaning after dry deposits, as at temperatures above 40 °C there is a risk of protein coagulation. Devices with a heating are used for basic cleaning of instruments, as in such cases, heating of the bath fluid shortens the cleaning time and removes soiling more quickly.

What accessories are necessary?

Cleaning objects must not lie on the bottom of the tank. Baskets and other insert beakers prevent scratching both to the cleaning objects and the bottom of the tank. When cleaning very small or sensitive parts, further accessories may be advisable to facilitate careful placement. For safety reasons, it is recommended to operate ultrasonic baths covered during operation.

What fluids should be used?

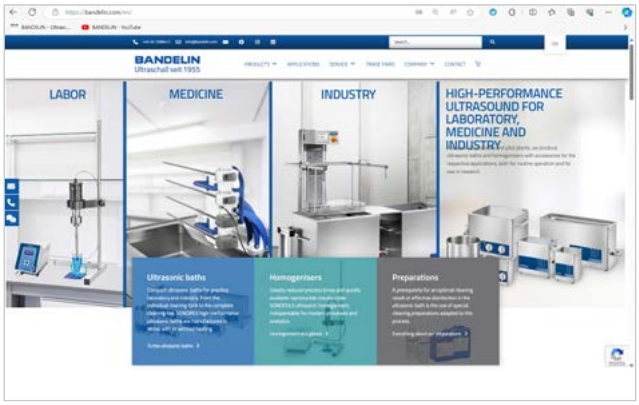
STAMMOPUR preparations have been specially developed for use in ultrasonic baths. Water without a detergent will not have a cleaning effect. Do not use household detergents or pure fully desalinated (DI) water. For work with acids, a plastic insert tub must be used. Never use inflammable or explosive fluids directly in the oscillating tank!

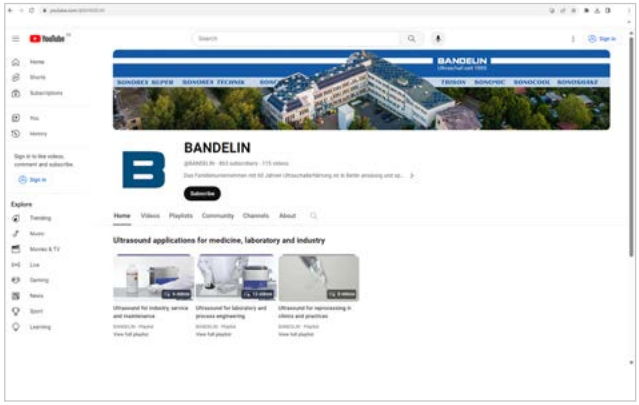
How can ultrasonic baths be tested?

The effectiveness of ultrasonic baths depends on the intensity and distribution of the process-typical cavitation in the oscillating tank. The foil test (in accordance with DIN 58341:2020-07; IEC TR 60886) is a simple procedure for demonstrating the intensity and distribution of cavitation in an ultrasonic bath. In this test, an aluminium foil placed in the tank is perforated / destroyed to a certain degree by cavitation, depending on the duration of sonication. To achieve reproducible foil test results, it is important to provide similar testing conditions in each case. Suitable setups for performing foil tests are available as accessories for the ultrasonic baths.
More information about foil test see of page 22.

If you want to know more ...

... visit our website or our YouTube channel with a lot of helpful tutorials!
Or contact us directly... we are always pleased to provide advice, so call us at +49 (0)30 76880-212.





SONOREX Ultrasonic baths

Digital or analogue – compact or built-in bath – **your choice!**

	DIGITEC DT ... /M	SUPER RK ...	ZE ... DT	ZE ...
Capacity [l]	0.9 – 46.0	0.9 – 28.0	29.0 – 46.0	29.0 – 46.0
Ultrasonic frequency [kHz]	35	35	35	35
Pulse function	✓	✓	✓	✓
Sweep	✓	✓	✓	✓
Rapid degassing DEGAS	✓	–	✓	–
Additional ultrasound from the side	–	–	ZE 1032 DT / 1059 DT	ZE 1032 / 1059
Time setting [min]	1, 2, 3, 4, 5, 10, 15, 30, ∞	1 – 15, ∞	1, 2, 3, 4, 5, 10, 15, 30, ∞	1 – 15, ∞
Program storage	1 program	–	1 program	–
Safety shut-down	after 12 hours	–	after 12 hours	–
Heating thermostatically adjustable [°C]	version "H" : 20 – 80	version "H" 30 – 80 RK 31 H: 65 fixed	–	–
Setting accuracy of bath temperature [K]	± 2,5	± 5	–	–
Excess temperature signal	✓	–	✓	–
Inclined tank bottom for complete emptying	DT 1058 M	–	✓	✓
Filling level mark for safe dosage	✓	✓	✓	✓
Outlet	one-piece welded from DT 106	one-piece welded from RK 106	bead 1½" (drain set G 1½ optional)	
Thickness tank material [mm]	0.8	0.8	2.0	2. 0
Degree of protection	IP 33	IP 32	–	–
Mains supply: **230 V~ (± 10 %), 50/60 Hz** **115 V~ (± 10 %), 50/60 Hz**	 ✓ ✓	 ✓ ✓	 ✓ ✓	 ✓ ✓
Medical device	class I	class I	class I	class I

SONOREX DIGITEC DT

Ultrasonic baths with digital operation

SONOREX SUPER RK

Ultrasonic baths with easy-to-operate turning knobs

Type	Internal tank dimensions l × w × d [mm]	Capacity [l]	Code No.	External dimensions l × w × d [mm]	Ultrasonic peak power [W]	Ultrasonic nominal power [W]	Heating power [W]	Outlet ball valve
DT 31			3200				–	
DT 31 H			3220				70	
RK 31			329				–	
RK 31 H	190 × 85 × 60	0.9	044	205 × 100 × 180	160	40	70	–
DT 100			3210				–	
DT 100 H			3230				140	
RK 100			301				–	
RK 100 H	240 × 140 × 100	3.0	312	260 × 160 × 250	320	80	140	–
DT 106			3270				–	
RK 106	Dia. 240 × 130	5.6	306	Dia. 265 × 270	480	120	–	G ¼
DT 156			3275				–	
RK 156	500 × 140 × 100	6.0	305	530 × 165 × 245	640	160	–	G ¼
DT 255			3215				–	
DT 255 H			3240				280	
RK 255			3066				–	
RK 255 H	300 × 150 × 150	5.5	316	325 × 175 × 295	640	160	280	G ¼
DT 514			3250				–	
DT 514 H			3211				600	
RK 514			277				–	
RK 514 H	325 × 300 × 150	13.5	207	355 × 325 × 305	860	215	600	G ½
DT 1028			3255				–	
DT 1028 H			3231				1300	
RK 1028			322				–	
RK 1028 H	500 × 300 × 200	28.0	324	535 × 325 × 400	1200	300	1300	G ½
DT 1058 M	600 × 400 × 200/220+	46.0	304120	670 × 470 × 400	2400	600	–	G ¾

*corresponds to 4 times output + inclined tank bottom

SONOREX ZE

Ultrasonic baths for built-in

Mounting examples

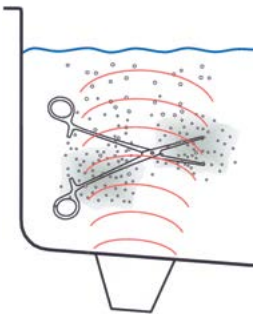
Advantages of built-in baths

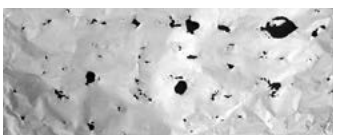
- Hygienic, unobstructed work surfaces thanks to under-table mounting
- Inclined tank bottom for easier emptying
- Hygienic maintenance due to rounded tank corners
- Operating control on the front side
- Ultrasonic generators may be installed optional right or left in the base cupboard
- Suitable for 1/1 DIN baskets as of model ZE 1031 and ISO baskets as of ZE 1058
- Built-in bath with ultrasound and rinsing tank without ultrasound – an option to expand your worktop

Built-in baths with bottom and side sonication

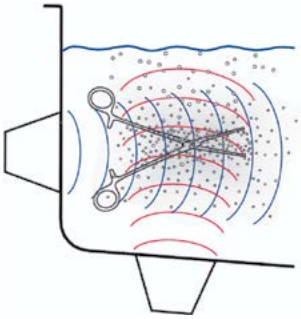
The foil test figures below show that ultrasonic baths with bottom and side sonication generate a more homogeneous sound field than baths with bottom sonication alone. This means a more gentle and uniform cleaning, an important consideration for highly sensitive instruments.

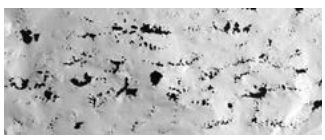
- Optimum sound distribution and reduction of acoustic shadows as a result of additional side sonication
- Electronically induced movements of the sound field by means of TwinSonic technology reduce local peaks of impact
- No additional oscillation necessary for the instrument basket, and no further space is needed in the working area
- The latest generator technology with Sweep
- Existing built-in baths with bottom sonication are easy to replace, thanks to an identical tank edge design





Foil after foil test in an ultrasonic bath with bottom sonication





Foil after foil test in an ultrasonic bath with sonication from bottom **and** side

Type	Internal tank dimensions l × w × d [mm]]	Capacity [l]	Code No.	External dimensions l × w × d [mm]	Ultrasonic peak power [W]	Ultrasonic nominal power [W]	Outlet
... with sonication from bottom							
ZE 1031 **ZE 1031 DT**	510 × 300 × 200/220⁺	29.0	3060 3217	570 × 360 × 270/290⁺	1200	300	bead 1½"
ZE 1058 **ZE 1058 DT**	600 × 400 × 200/220⁺	46.0	3050 3234	660 × 460 × 270/290⁺	2400	600	bead 1½"
... with sonication from bottom and side							
ZE 1032 **ZE 1032 DT**	510 × 300 × 200/220⁺	29.0	3075 3223	570 × 404 × 270/290⁺	1760	440	bead 1 ½"
ZE 1059 **ZE 1059 DT**	600 × 400 × 200/220⁺	46.0	3085 3248	660 × 504 × 270/290⁺	2400	600	bead 1 ½"

Rinsing tanks without ultrasound, for mounting into worktops

suitable for bath	Type	Code No.	Internal tank dimensions l × w × d [mm]	External dimensions l × w × d [mm]	Description
ZE 1031/1032 / ... DT	**SW 31 Z**	3048	510 × 300 × 200/220⁺	570 × 360 × 205/225⁺	with bead 1 ½", without drain set
ZE 1058/1059 DT	**SW 58 Z**	3049	600 × 400 × 200/220*	660 × 460 × 205/225⁺	with bead 1 ½", without drain set
optional: *drain set G 1 ½*		*3166*			*drain set with turning knob and stainless steel stopper*

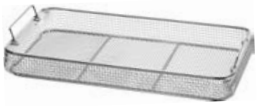
Digital control unit with temperature display

suitable for bath	Type	Code No.	Description
ZE 1031 bis ZE 1059	**ST 30 DT**	309803	The ST 30 DT digital control unit has an integrated temperature display and offers the user added safety to prevent protein coagulation. If the bath fluid heats up to > 40 °C, a red warning LED will also flash.

*corresponds to 4 times output ⁺ inclined tank bottom, mounting from below
Dimension without ultrasound generator, external dimensions of ultrasound generators 360 × 310 × 142 mm (l × w × h)

SONOREX Accessories

Appropriate accessories facilitate ultrasonic application and simultaneously protect the oscillating tank and instruments.
Objects to be cleaned or beakers must not be placed onto the tank bottom!

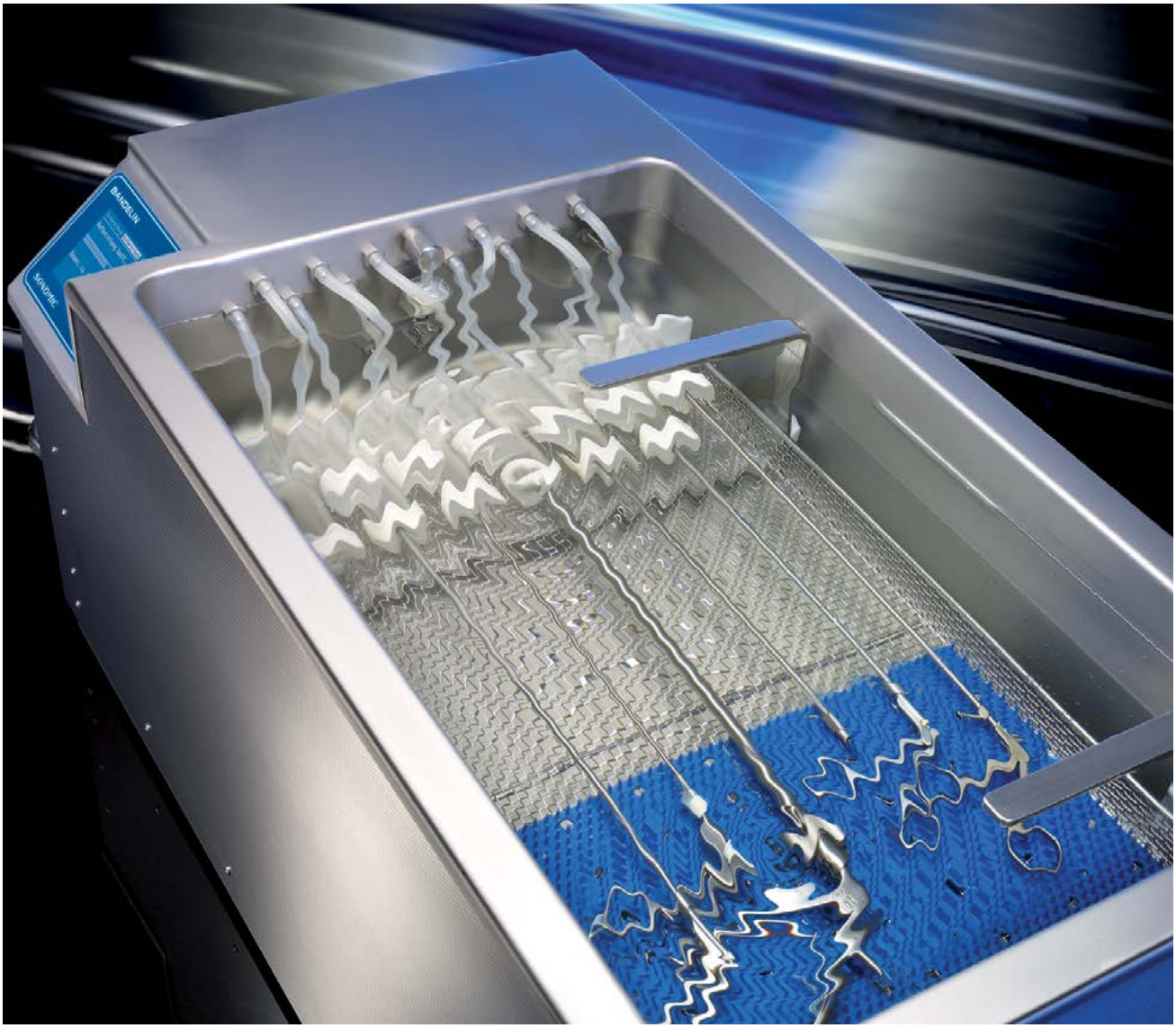
Accessories	Material	Function	Images (selection)	RK 31 / H DT 31 / H	RK 100 / H DT 100 / H
Lid	stainless steel	protects the bath fluid from contaminants from the outside condensation water runs back into the tank lid D...T especially for inset baskets with drop handles	 D 514	Type Code No. **D 08** 218	Type Code No. **D 100** 3003
Hinged lid	stainless steel	protects the bath fluid from contaminants from the outside condensation water runs back into the tank hinged lid D...G for built-in units	 D 1031 G	Type Code No. –	Type Code No. –
Insert basket	stainless steel	to use for the instruments to be cleaned	 K 14	Type l × w × d [mm] Code No. **K 08** 170 × 65 × 50 209	Type l × w × d [mm] Code No. **K 3 C** 200 × 110 × 40 3025
Inset basket	stainless steel	to use for the instruments to be cleaned. baskets with hinged handles in standard formats for instrument cleaning without basket change basket holder KT is necessary	 K 29 EM	Type l × w × d [mm] Code No. –	Type l × w × d [mm] Code No. –
Basket holder	stainless steel	support for inset baskets or DIN 1/1 and 1/2 sieve trays KT...Z is equipped with handles	 KT 57	Type Code No. –	Type Code No. –
Insert tub	plastic, with lid	especially for basic instrument cleaning with STAMMOPUR GR don't use at temperatures higher 60 °C	 KW 3	Type l × w × d [mm] Code No. –	Type l × w × d [mm] Code No. **KW 3** 195 × 115 × 88 715
Knob mat	silicone	for contact-free placement of highly-sensitive instruments, especially micro-instruments, during cleaning prevents damage to instruments; permeable for ultrasound	 SM 14	Type l × w [mm] Code No. –	Type l × w [mm] Code No. **SM 3** 170 × 97 093
Frame for foil test	stainless steel	The frame is used for foil test, which is as simple method for displaying the intensity and distribution of the cavitation in an ultrasonic bath.	 FT 1	Type Code No. **FT 1** 3190	Type Code No. **FT 4** 3074

	RK 106 DT 106	RK 156 DT 156	RK 255 / H DT 255 / H	RK 514 / H DT 514 / H	RK 1028 / H DT 1028 / H	DT 1058 M	ZE 1031 / DT ZE 1032 / DT	ZE 1058 / DT ZE 1059 / DT
	D 6 346	**D 156** 3004	**D 255** 3007	**D 514** 3010	**D 1028** 3011	**D 1058 M** 7526	**D 30** 7522	**D 57** 7520
	–	–	–	–	–	–	**D 1031 G** 3229	**D 1058 G** 3232
	K 6 dia. 215 x 50 356	**K 6 L** 460 × 100 × 50 202	**K 5 C** 260 × 110 × 40 3027	**K 14** 275 × 245 × 50 354	**K 28** 455 × 245 × 50 358	–	–	–
	–	–	–	–	**K 29 EM** 470 × 240 × 45 688	**K 29 EM** 470 × 240 × 45 688	**K 29 EM** 470 × 240 × 45 688	**K 29 EM** 470 × 240 × 45 688
	–	–	–	–	**KT 30** 7517	**KT 57** 7504	**KT 30 / KT 30 Z** 7517 / 7507	**KT 57 / KT 57 Z** 7504 / 3078
	–	–	**KW 5** 254 × 96 × 130 240	**KW 14** 280 × 215 × 145 613	**KW 28-0** 437 × 230 × 155 717	–	–	–
	–	**SM 6** 426 × 97 110	**SM 5** 213 × 97 101	**SM 14** 235 × 245 118	**SM 29** 470 × 245 178	**SM 29** 470 × 245 178	**SM 29** 470 × 245 178	**SM 29** 470 × 245 178
	FT 4 3074	**FT 6** 3222	**FT 4** 3074	**FT 14** 3084	**FT 40** 3094	**FT 37** 3674	**FT 36** 3673	**FT 37** 3674

SONOMIC MC 1001

Ultrasonic bath for MIS and standard instruments

Three patents in one device!



The reliable internal cleaning of MIS instruments and rinsable parts of other instruments ensures their continued use.
SONOMIC has been specially developed for these instruments and combines the effects of

damage-free ultrasonic cavitation,
the effective suction rinsing and
individual testing of instruments

in one device.
The integrated flow-control monitoring for each connected instrument guarantees reliable cleaning results and prevents instrument malfunction.

Advantages at a glance:

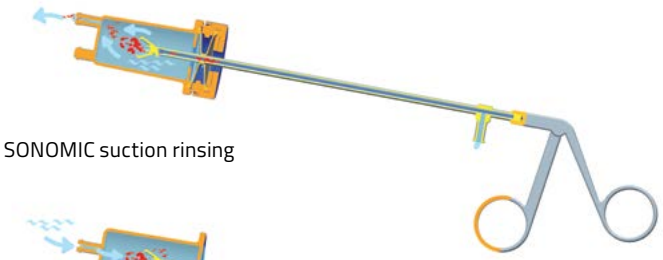
- Safety as a result of patented individual instrument rinsing and testing
- Patented suction rinsing principle
- Patented universal adapter for instrument connection without change of seal
- Temperature and filling level monitoring
- Reproducible program sequences
- Versatility:
  Can be used for standard instruments too
- Documentation by means of protocol print-outs

Individual instrument examination rather than general testing

If different MIS instruments are rinsed at the same time, the rinsing result for the individual instruments cannot be checked.
With SONOMIC this problem is solved by means of the innovative channel selector. Only one instrument at a time is released for rinsing, thus permitting individual flow-through monitoring. The minimum flow-through rate is 2 ml/s at 0.8 bar vacuum, otherwise the instrument will be identified as "non rinsable" and so indicated on the touch screen. The determination, classification and clear indication of successful rinsability for each instrument ensures a higher safety level during reprocessing.

SONOMIC suction rinsing compared to pressure rinsing from other suppliers

Generally, the majority of the soiling is concentrated at the distal end of MIS instruments. In comparable devices from other manufacturers, MIS instruments are often rinsed under pressure from the distal end. As a result, contamination is forced through the whole lumen of the instruments, thus presenting an increased risk of undesirable deposits, especially in constricted areas near the handles and in other difficult-to-reach areas of the instruments. The direct entry of dissolved contamination into the bath fluid is a further negative effect. The suction rinsing function exerted by the SONOMIC at the distal end of the instruments removes soiling against the direction of penetration, while fresh cleaning solution takes its place. This avoids unnecessary contamination of the rear lumen parts of the instruments. The removed contamination moves through the adapter into the exchangeable filter, rather than back into the bath fluid.

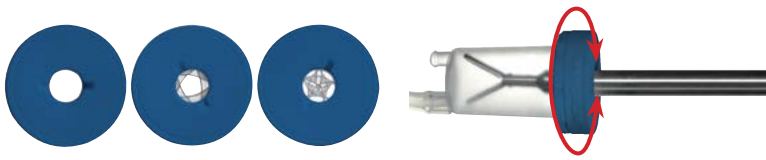


SONOMIC suction rinsing

Pressure rinsing from other suppliers

Connection of instruments to the universal adapter without change of seal

In the SONOMIC, twelve rinsable MIS instruments with diameters from 3 to 10 mm can each be connected to one of the identical adapters without having to change the adapter seal. The seal has an torsion principle that guarantees complete fluid-tightness against the outer shaft of the instruments. The highly elastic sealing material has been ultrasonically tested and is resistant to the preparations STAMMOPUR R and STAMMOPUR DR 8.



Torsion principle of the adapter seal

Filling level and temperature monitoring

The SONOMIC monitors the correct bath fluid level with an integrated filling level sensor. In case of non-compliance, it will not be possible to start the sonication, and the user will receive an error message on the touch screen.
Before each cycle, a temperature sensor tests whether the bath temperature is within the permitted range. If the bath fluid temperature is too low (< 18 °C), the heating automatically switches on. To prevent protein coagulation, a warning message appears at temperatures of about 40 °C.

Safety as a result of reproducible program sequences

The SONOMIC operating program contains a self-test and provides the user with clear instructions for all necessary work stages. For instance, an adapter test is performed prior to each load, an indispensable measure for reliable identification of non-penetrable instruments.

Documentation by means of protocol print-outs

For quality verification, SONOMIC provides several interfaces. When required, protocols with the following data can be printed out: cleaning mode, bath temperature, result of rinsing examination, etc.

SONOMIC MC 1001

Ready-to-use set:

- Ultrasonic bath MC 1001
- Basket K 1001 MC
- 12 adapters with seal and hose ADS 1000
- 12 adapter seals AD 1000
- Adapter testing strips APB 1000
- 30 filter cartridges EF 1001
- Frame for foil test FT 38

Internal tank dimensions l × w × d [mm]	650 × 400 × 160/170^{+}
Capacity [l]	42.5
Operating volume [l]	27.0
Code No.	3315
External dimensions l × w × d [mm]	860 × 490 × 325
Ultrasonic peak power* [W]	2400
Ultrasonic nominal power [W]	600
Ultrasonic frequency [kHz]	40
Control: touchscreen 96 × 61 mm	✓
Heating, program-controlled [W]	400
Pulse function	✓
Sweep	✓
Temperature monitoring	✓
Thickness tank material [mm]	2.0
Filling level mark	✓
Level sensor	✓
Outlet	ball valve ¾", thread feed pipe G ¾, at the rear side
Mounting into the worktop	–
Interfaces	USB-B, RS-232, LPT
Medical device	class I

*corresponds to 4 times output $^{+}$ inclined tank bottom

Accessories and Consumables

Accessories

		MC 1001
Lid Code No.		D 1000 MC 3312
Hinged lid Code No.		D 1001 G 3310
Inset basket l × w × d [mm] Code No.		K 1001 MC 520 × 340 × 50 3324
Knob mat l × w [mm] Code No.		SM 1000 MC 245 × 340 3313
Frame for foil test Code No.		FT 38 550 × 470 3672

Consumables

Filter cartridges Code No.		EF 1001 à 30 pcs. 3365 EF 1001 à 100 pcs. 3366		
Adapter seals Code No.		AD 1000 à 12 pcs. 3353	AD 1000 à 24 pcs. 3354	AD 1000 à 36 pcs. 3355
Adapters with seals and hose Code No.		ADS 100 à 1 pc. 3350		
Adapter testing strips Code No.		APB 1000 à 2 pcs. 3358		


STAMMOPUR DR 8

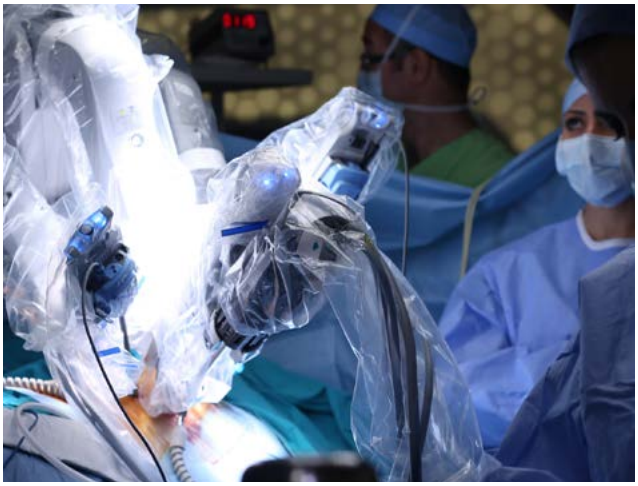

BANDELIN
TRISON
Home

TRISON 4000.2

Ultrasonic bath for robotic, MIS and standard instruments

Robot-assisted surgery? The future begins now.

The robotic systems now used in many clinics for supporting surgical treatments offer surgeons numerous advantages. First of all, they ensure a gentle and highly precise, minimally invasive procedure that can be carried out while preserving the nerves and organs.
For patients, procedures are more tolerable and put less strain on the body, and the recovery time is shortened. The highly complex technology has long become a standard in modern surgery and will come to be even more relevant for other medical disciplines in the future.



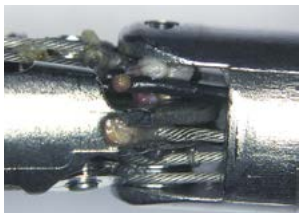
Complex instruments = complex reprocessing?

Due to their complex structure, robotic instruments have many critical points that need to be reprocessed. The instruments, which cannot be disassembled, consist of a housing with a long, thin shaft, various filigree Bowden cables and complex tips.

Due to their design and surgical use, robotic instruments need to be reprocessed via many individual process steps in order to be used on the next patient.

Here, particular attention is paid to effective pre-cleaning before the actual disinfection and sterilisation processes. Purely manual pre-cleaning, which not only ties up a lot of staff due to the repeated manual rinsing, moving and cleaning but is also prone to errors, is not acceptable for users as a reprocessing step.

The alternative: an ultrasonic bath, specially developed for pre-cleaning robotic instruments – the TRISON 4000.2.



Robotic instrument before reprocessing ...

... and after reprocessing

TRISON 4000.2: the standard for pre-cleaning robotic instruments

It is an innovative, modular ultrasonic bath, adapted to robotic instruments, which makes it possible to perform the 3 basic functions of cleaning, rinsing and moving in one process. This sequence ensures the best, and reproducible, cleaning results, saves time during pre-cleaning, optimises the overall reprocessing procedure, and also provides valid process documentation. Intuitive operation via the large touch display also ensures safe handling.

Ultrasound
Achieves the best possible cleaning results.

Movement
Improves cleaning performance.

Rinsing
Ensures effective interior cleaning.

Easy to use – safe processes

Operation via **7-inch touch display**

Everything at a glance

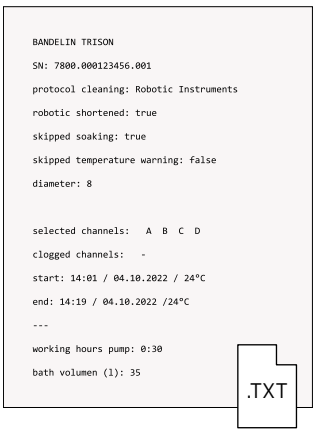
The programs can be selected in one click directly on the home screen. Other useful functions, such as rapid degassing, device care and settings, can be easily selected thanks to large buttons with supporting icons.

User-optimised menu navigation:

- Program quick start or supporting program management
- Visual representation of individual steps
- Help pages with explanations
- Individual settings (language, process times, warning temperatures, etc.)
- Program favourites
- Initial configuration when putting into service
- Access for servicing

Process screen with successful rinsing

Visual representation of individual steps



Process documentation

The TRISON 4000.2 has an interface concept for digital process documentation.
A protocol with all relevant cleaning parameters is created for each individual cleaning process. The protocols can be transmitted via the USB interface. Alternatively, the TRISON can be integrated into CSSD management software via the integrated network interface.

1 device – 3 uses

The TRISON has been specially developed for robotic instruments. However, MIS and standard instruments can also be cleaned effectively with appropriate accessories. In order to meet the cleaning requirements in question in the best possible way, there is a cleaning program available for each type of instrument.

Robotics

For simultaneous cleaning of up to 4 robotic instruments using the Twist moving device and corresponding hose connections for rinsing.

MIS

Ultrasonic cleaning and sequential individual rinsing of up to 8 MIS instruments in the specially developed TRISON Rack. The MIS program also includes rinsing channel monitoring.

Standard

For cleaning instruments in DIN and ISO baskets before further machine reprocessing. A basket holder is required.

Temperature monitoring with warning function
Ensures that the set limit values are complied with.

User languages
Easy to select different language outputs.

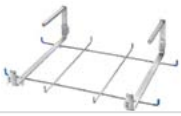
Flexible mounting
Available as a left-sided or right-sided version – for integration into a row or as a single solution in a rollable cabinet.

Process safety due to self-monitoring
Control of all functions to avoid incorrect operation.

Overall process optimisation
Increases the quality and reproducibility of the entire treatment chain.

Accessories and Consumables

Accessories

	Type	Code No.		External dimensions l × w ×d [mm]	Function and Compatibility
TRISON Rack 	TR 3001	right 7631	left 7731	640 × 405 × 150	basket with connections for up to eight MIS instruments; available either as right or left version
TRISON Rack 	TR 4000	7632		670 x 405 x 150	basket for Hugo™ RAS System or Versius® Surgical Robotic System robotic instruments
Inset basket 	K 29 EM	688		470 × 240 × 45	to use for the instruments to be cleaned (e. g. standard instruments)
Basket holder 	KT 3000 Z	7761		–	support of the inset basket
Lid 	D 4000 A	right 7955	left 7956	–	universal for all TRISON applications; for TRISON Twist only in lowered position; available either as right or left version
Spacer 	TX 4000 Xi	7763		–	for TRISON Twist Xi, PU à 2 pcs.
Frame for foil test 	FT 42	3224		700 × 440	The frame is used for foil test, which is as simple method for displaying the intensity and distribution of the cavitation in an ultrasonic bath.

Consumables

Filter cartridges Code No. 	EF 1001 à 30 pcs. 3365		EF 1001 à 100 pcs. 3366
Adapter seals Code No. 	AD 1000 à 8 pcs. 3361		AD 1000 à 24 pcs. 3354
Adapter with seal Code No. 	ADT 1000 à 1 pc. 7770		ADT 1000 à 8 pcs. 3359
Adapter testing strips Code No. 	APB 3000 à 2 pcs. 7771		
Hose set with coupling for TRISON Twist Code No. 	for Xi: SLS 4000 TT à 1 pc. 3362		for Si: SLS 3000 TT à 1 pc. 3363
Hose set with coupling for TRISON Rack, without adapters Code No. 	SLS 3000 TR 3364		
Hose set with couplings Code No. 	SLS 4000 CMR à 2 pcs. 33641		
Hose set with couplings Code No. 	SLS 4000 Medtronic Hugo à 2 pcs. 33642		


BANDELIN
TRISON

SONOBOARD Sets

Ultrasonic baths in stainless steel cabinets

The practical supplement to your sink unit facility, or for individual use!

SONOBOARD TRISON.2

For selected ultrasonic baths, BANDELIN offers ready-to-use sets consisting of an ultrasonic bath and a practical stainless steel cabinet. The double-walled stainless steel cabinets are equipped with overlapping fronts and all-round rubber seals on the doors and panels. Their flexible positioning (thanks to lockable casters), ergonomic working height and additional storage space make them a high quality and irreplaceable item of clinic equipment.
SONOBOARD has a high resilience to scratches and impacts, and is extremely resistant against chemicals. The smooth stainless steel surfaces reduce the accumulation of germs and bacteria to a minimum, and meet the most rigorous hygiene requirements.

Start-up and operation is fast and simple!

SONOBOARD is delivered as a ready-to-use set; only the utility services need to be connected.
Three variations are available, designed for different instrument types.

Features SONOBOARD STANDARD

- Operation on the front side
- Digital control unit with temperature monitoring
- Suitable for 1/1 DIN and ISO baskets

Features SONOBOARD TRISON.2

- Improved cleaning through a combination of ultrasound, rinsing and movement for robotic instruments
- Designed for robotic instruments
- Reliability as a result of individual instrument rinsing and testing
- Simple instrument connection
- Temperature monitoring (Robotic and MIS mode)
- Protocol function
- Available as left and right version

SONOBOARD STANDARD
for standard instruments

Ready-to-use set:

- Ultrasonic bath ZE 1058 with accessories (see page 8 – 9)
- Functional cabinet FS 900 S

SONOBOARD TRISON.2
for robotic, MIS and standard instruments

Ready-to-use set:

- Ultrasonic bath TRISON 4000.2 with accessories (see page 18)
- Functional cabinet FS 1200 T

	SONOBOARD STANDARD	SONOBOARD TRISON.2
Internal tank dimensions l × w × d [mm]	600 × 400 × 200 / 220+	770 × 420 × 165 / 190+
Capacity [l]	46.0	60.0
Operating volume [l]	32.0	35.0
Code No. (version)	3452	7855 (right) / 7854 (left)
External dimensions incl. rolls, l × w × h [mm]	900 × 700 × 930	1200 × 700 × 930
Ultrasonic peak power* [W]	2400	3040
Ultrasonic nominal power [W]	600	760
Ultrasonic frequency [kHz]	35	38
Pulse function	✓	✓
Sweep	✓	✓
Time setting [min]	1, 2, 3, 4, 5, 10, 15, 30, ∞	menu controlled
Temperature monitoring	✓	✓
Thickness tank material [mm]	2.0	2.0
Filling level mark	✓	✓
Level sensor	–	–
Outlet	G 1½ drain set with turning knob, stainless steel stopper and siphon G 1½ with hose	
Mains supply: 230 V~ (± 10 %), 50/60 Hz 115 V~ (± 10 %), 50/60 Hz	 ✓ ✓	 ✓ –
Current consumption** [A]	2.7	3.5
Interfaces	–	USB-A, Ethernet

*corresponds to 4 times output **in case of 230 V ~ (± 10 %) 50/60 Hz + inclined tank bottom

SONOBOARD
Accessories

	SONOBOARD STANDARD		SONOBOARD TRISON.2	
for standard instruments Code No.	Basket holder KT 57 Z 3078	Insert basket K 29 EM 688	Basket holder KT 3000 Z 7761	Insert basket K 29 EM 688
for MIS instruments Code No. (version)	–		TRISON Rack TR 3001 7631 (right) / 7731 (left)	TRISON Rack TR 4000 7632
for robotic instruments Code No. (version)	–		TRISON Twist TT 4000 Xi 7821 (right) / 7921 (left)	TRISON Twist TT 4000 Si 7820 (right) / 7920 (left)
Lid Code No.. (version)	D 57 7520		D 4000 A 7955 (right) / 7956 (left)	
Hinged lid Code No.	D 1058 G 3232		–	
Frame for foil test Code No.	FT 37 3674		FT 42 3224	

The Foil test – Function testing of an ultrasonic bath

A foil test1 is recommended for testing ultrasonic baths. This should be conducted upon initial startup and at regular intervals thereafter (e.g. every 3 months). The frequency of testing is the responsibility of the user. The foil test is a simple procedure for demonstrating the intensity and distribution of cavitation in an ultrasonic bath. It involves stretching aluminium foil over a foil testing frame, which will be perforated or destroyed to a certain degree by cavitation, depending on sonication time.

For purposes of reproducibility, it is important that the test conditions remain constant:
- Filling the oscillation tank to the filling level mark
- Temperature of the sonication fluid
- Degassing time
- Positioning of frame
- Foil type (brand, thickness)
- Sonication time
- Type and concentration of ultrasonic agent

bandelin.com/en/applications/foil-test/

Foils can be archived in a suitable way (scanning, photos, etc.) This allows the foils to be compared at any time. The perforated areas of all foils should have approx. the same dimensions and distribution – the results are never identical.
A process validation, e.g. for the treatment of medical products, can only be achieved by conducting regular foil tests.
To execute the foil test, different foil test frames can be ordered from the manufacturer BANDELIN. The foil test frames are suitable for a wide range of tank dimensions.
Aluminium household foil is also required to conduct the test and is not included in the delivery.

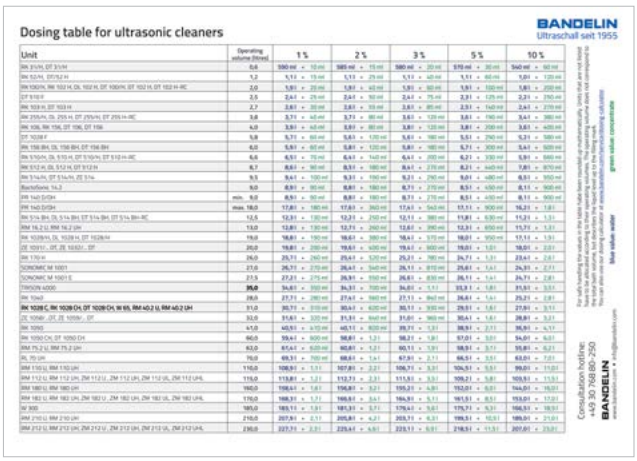
STAMMOPUR
Cleaning and disinfection agents

For optimum cleaning results in the ultrasonic bath, specially formulated detergents and disinfection agents are required alongside ultrasound performance, temperature and time. BANDELIN offers a balanced range of cleaning agents and disinfectants from DR. H. STAMM GmbH.
With their cavitation-conducive properties, these preparations support the cleaning process while protecting the materials.
The preparations are biologically degradable in accordance with the regulations of the Detergents Directive.
In treating the instruments, it is important to rinse them thoroughly after using the ultrasonic bath.

Important: Some common cleaning and disinfection agents from other manufacturers may contain components that attack the ultrasonic oscillating tank and could lead to breakdown due to pitting.

For the best cleaning results, the indicated concentration of the preparation must be observed.
To facilitate dosing, we provide a dosing table available that is only suitable for Bandelin equipment. The dosage table is available online: bandelin.com/chemie_Dr_STAMM/Dosiertabellen/Dosing_table_GB_BANDELIN.pdf

Product information and EC safety data sheets are available as pdf downloads from bandelin.com/en/docs-category/downloads/


Dosing table for ultrasonic cleaners

BANDELIN
Ultraschall seit 1955

Unit	Operating volume (litres)	1 %	2 %	3 %	5 %	10 %
RK 31/H, DT 31/H	0,6	590 ml + 10 ml	580 ml + 15 ml	580 ml + 20 ml	570 ml + 30 ml	560 ml + 40 ml
RK 52/H, DT52/H	1,2	1,16 l + 10 ml	1,15 l + 25 ml	1,15 l + 40 ml	1,13 l + 60 ml	1,10 l + 120 ml
RK 100/H, RK 102 H, DL 102 H, DT 100/H, DT 102 H, DT 102 H-RC	2,0	1,97 l + 20 ml	1,95 l + 40 ml	1,93 l + 60 ml	1,91 l + 100 ml	1,81 l + 200 ml
DT 510 F	2,5	2,47 l + 25 ml	2,41 l + 50 ml	2,41 l + 75 ml	2,31 l + 125 ml	2,21 l + 250 ml
RK 103 H, DT 103 H	2,7	2,67 l + 30 ml	2,61 l + 55 ml	2,61 l + 85 ml	2,51 l + 140 ml	2,41 l + 270 ml
RK 255/H, DL 255 H, DT 255/H, DT 255 H-RC	5,8	5,71 l + 60 ml	5,71 l + 80 ml	5,61 l + 120 ml	5,51 l + 190 ml	5,41 l + 380 ml
RK 106, RK 156, DT 106, DT 156	4,0	3,91 l + 40 ml	3,91 l + 80 ml	3,81 l + 120 ml	3,81 l + 200 ml	3,61 l + 400 ml
DT 103 F	5,8	5,71 l + 60 ml	5,61 l + 120 ml	5,61 l + 180 ml	5,51 l + 290 ml	5,31 l + 580 ml
RK 156/H, DL 156 RH, DT 156 RH	6,0	5,91 l + 60 ml	5,81 l + 120 ml	5,81 l + 180 ml	5,71 l + 300 ml	5,41 l + 600 ml
RK 510/H, DL 510 H, DT 510/H, DT 510 H-RC	6,6	6,51 l + 75 ml	6,41 l + 140 ml	6,41 l + 200 ml	6,21 l + 330 ml	5,91 l + 660 ml
RK 512 H, DL 512 H, DT 512 H	8,7	8,61 l + 90 ml	8,51 l + 180 ml	8,41 l + 270 ml	8,21 l + 440 ml	7,81 l + 870 ml
RK 514/H, DT 514/H, ZE 514	9,5	9,41 l + 100 ml	9,31 l + 190 ml	9,21 l + 290 ml	9,01 l + 480 ml	8,51 l + 950 ml
Bactoforce 14,2	9,0	8,91 l + 90 ml	8,81 l + 180 ml	8,71 l + 270 ml	8,51 l + 450 ml	8,11 l + 900 ml
RK 140 D/DH	min. 6,0 max. 18,0	8,91 l + 90 ml 17,81 l + 180 ml	8,81 l + 180 ml 17,61 l + 360 ml	8,71 l + 270 ml 17,41 l + 540 ml	8,51 l + 450 ml 17,11 l + 900 ml	8,11 l + 900 ml 16,21 l + 1,81 l
RK 514 BH, DL 514 BH, DT 514 BH, DT 514 BH-RC	12,8	12,71 l + 130 ml	12,71 l + 250 ml	12,11 l + 380 ml	11,81 l + 630 ml	11,21 l + 1,3 l
RK 156.2 U, RM 156.2 UH	13,0	12,81 l + 130 ml	12,71 l + 260 ml	12,61 l + 390 ml	12,31 l + 650 ml	11,71 l + 1,31 l
RK 1028/H, DL 1028 H, DT 1028/H	19,0	18,81 l + 190 ml	18,61 l + 380 ml	18,41 l + 570 ml	18,01 l + 950 ml	17,11 l + 1,91 l
ZE 1031/.., DT, ZE 1032/.., DT	20,0	19,81 l + 200 ml	19,61 l + 400 ml	19,41 l + 600 ml	19,01 l + 1,01 l	18,01 l + 2,01 l
RK 170/H	26,0	25,71 l + 260 ml	25,41 l + 520 ml	25,21 l + 780 ml	24,71 l + 1,31 l	23,41 l + 2,61 l
SONOREX M 1001	27,0	26,71 l + 270 ml	26,41 l + 540 ml	26,11 l + 810 ml	25,61 l + 1,41 l	24,31 l + 2,71 l
SONOREX M 1001 E	27,5	27,21 l + 275 ml	26,91 l + 550 ml	26,61 l + 830 ml	26,11 l + 1,41 l	24,71 l + 2,81 l
TRISON 4000	35,0	34,61 l + 350 ml	34,31 l + 700 ml	34,01 l + 1,11 l	33,31 l + 1,81 l	31,61 l + 3,51 l
RK 1040	28,0	27,71 l + 280 ml	27,41 l + 560 ml	27,11 l + 860 ml	26,61 l + 1,41 l	25,21 l + 2,81 l
RK 1028 C, RK 1028 CH, DT 1028/CH, W 65, RM 40.2 U, RM 40.2 UH	31,0	30,71 l + 310 ml	30,41 l + 620 ml	30,11 l + 930 ml	29,51 l + 1,61 l	27,91 l + 3,11 l
ZE 1050/.., DT, ZE 1050/.., DT	33,0	31,61 l + 320 ml	31,31 l + 640 ml	31,01 l + 960 ml	30,41 l + 1,61 l	28,81 l + 3,21 l
RK 1050	47,0	46,51 l + 470 ml	46,11 l + 920 ml	45,71 l + 1,31 l	44,91 l + 2,11 l	43,31 l + 4,11 l
RK 1050 CH, DT 1050 CH	60,0	59,41 l + 600 ml	58,81 l + 1,21 l	58,21 l + 1,81 l	57,01 l + 3,01 l	54,01 l + 6,01 l
RM 75.2 U, RM 75.2 UH	63,0	61,41 l + 620 ml	60,81 l + 1,21 l	60,11 l + 1,91 l	58,91 l + 3,11 l	55,81 l + 6,21 l
RL 70 UH	70,0	69,31 l + 700 ml	68,61 l + 1,41 l	67,91 l + 2,11 l	66,51 l + 3,51 l	63,01 l + 7,01 l
RM 110 U, RM 110 UH	110,0	108,91 l + 1,11 l	107,81 l + 2,21 l	106,71 l + 3,31 l	104,51 l + 5,51 l	99,01 l + 11,01 l
RM 112 U, RM 112 UH, ZM 112 U ..., ZM 112 UH, ZM 112 UL, ZM 112 UHL	115,0	113,81 l + 1,21 l	112,71 l + 2,31 l	111,61 l + 3,51 l	109,21 l + 5,81 l	103,91 l + 11,11 l
RM 180 U, RM 180 UH	180,0	178,61 l + 1,81 l	176,81 l + 3,71 l	175,21 l + 5,31 l	172,01 l + 8,51 l	166,01 l + 16,51 l
RM 182 U, RM 182 UH, ZM 182 U ..., ZM 182 UH, ZM 182 UL, ZM 182 UHL	170,0	168,31 l + 1,71 l	166,61 l + 3,41 l	164,91 l + 5,11 l	161,51 l + 8,51 l	153,01 l + 17,01 l
W 300	185,0	183,11 l + 1,91 l	181,31 l + 3,71 l	179,41 l + 5,61 l	175,71 l + 9,31 l	166,51 l + 18,51 l
RM 210 U, RM 210 UH	210,0	207,91 l + 2,11 l	205,81 l + 4,21 l	203,71 l + 6,31 l	199,51 l + 10,51 l	189,01 l + 21,01 l
RM 212 U, RM 212 UH, ZM 212 U ..., ZM 212 UH, ZM 212 UL, ZM 212 UHL	230,0	227,71 l + 2,31 l	225,41 l + 4,61 l	223,11 l + 6,91 l	218,51 l + 11,51 l	207,01 l + 23,01 l

Consultation hotline +49 30 768 80-250
BANDELIN
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Dosing table

① ②

Dosing aids	usable for	Code No.
Pump ①	5-l-jerrycan	268
Pump ①	10-l-jerrycan	2660
Measuring beaker ②	100 ml	294

STAMMOPUR DR 8

Instrument disinfection and intensive cleaning

Intensive cleaning and chemical disinfection of medical instruments and accessories

- VAH-certification, CE 0483
- Bactericidal, yeasticidal, limited virucidal
- Effective against avian influenza virus H5N1 and SARS-CoV-2
- Exceptionally effective cleaning power in the ultrasonic bath
- Very short ultrasonic treatment times with low application concentration
- Excellent material compatibility
- Mildly alkaline
- Low usage concentration means greater savings
- Aldehyde-, chlorine- and phenol-free

STAMMOPUR DR 8 is a concentrate for manual chemical disinfection and for disinfecting, non-fixating intensive cleaning, both in an ultrasonic and in an immersion bath, of
medical instruments and accessories
made of metal (including light metals), titanium, glass, ceramic, porcelain, plastic or rubber.

Application takes place during instrument reprocessing, for general, surgical, invasive and non-invasive medical instruments and accessories, in the CSSD, clinic, doctor's offices, as well as in medical foot care.

Active substances: mildly alkaline, pH 9.4 at 1 % in DI water, biodegradable.

Dangerous goods: Special transport regulations and costs. No transport by air freight.

Litres	1	2	5	10
Code No.	–	972	974	6028

Application in the ultrasonic bath (Dosage ▪ Treatment Time)
2 % ▪ 5 min: *bactericidal*[1], *yeasticidal*[2], *limited virucidal*[3] incl. H5N1 and SARS-CoV-2
2 % ▪ 10 min: *SV40*[3]
3 % ▪ 15 min: *Adenovirus*[3]

Application without ultrasound (Dosage ▪ Treatment Time)
1 % ▪ 60 min: *bactericidal*[1], *yeasticidal*[2]
2 % ▪ 30 min or 3 % ▪ 15 min: *bactericidal*[1], *yeasticidal*[2], *limited virucidal*[3] *incl. H5N1 and SARS-CoV-2; additionally SV40*[3]

[1]EN 13727, EN 14561, DGHM, high load; [2]EN 13624, EN 14562, DGHM, high load; [3]EN 14476, high load

Effectiveness evaluations are available on request.

MD

STAMMOPUR R

Instrument Cleaner

Cleaning and pre-cleaning of medical instruments and accessories

- Exceptionally effective cleaning power in the ultrasonic bath
- High blood-dissolving capacit
- Also removes stubborn, dried-in contamination
- Very short ultrasonic treatment times with economical, low application concentration
- Excellent material compatibility
- Mildly alkaline
- Pleasant odour
- Also recommended for pre-cleaning
- Useable as contact liquid

STAMMOPUR R is a concentrate used in the ultrasonic or immersion bath-based manual cleaning and pre-cleaning of
general, surgical, invasive and non-invasive medical instruments, accessories and medical device components made of metal, titanium, glass, porcelain, ceramics or plastic.

It is used as part of medical instrument reprocessing in CSSD (central sterile services departments), hospitals, private practices and podiatric-care institutions.

Karl Storz GmbH and Richard Wolf GmbH offer suitability recommendations for endoscopes and their accessories. When using STAMMOPUR R to reprocess endoscopes and endoscopic accessories, especially in an ultrasonic bath, manufacturer specifications must be strictly observed.

Base: tensides
mildly alkaline, pH 9.5 at 1 % in deionised water, biodegradable

Litres	1	2	5	10
Code No.	988	934	989	6029

Dosage ▪ Treatment Time

Application in the ultrasonic bath:
2 % ▪ 3 – 10 min

Application without ultrasound:
3 – 5 % ▪ max. 12 h
depends on contamination type and stubbornness.

MD

STAMMOPUR GR

Instrument basic cleaner

Basic cleaning for restoration of medical instruments and accessories

- Basic cleaning as a downstream process of instrument reprocessing
- Very high cleaning effect, which, however, only becomes effective in connection with the ultrasonic action in the ultrasonic bath at 50–60 °C
- Excellent material compatibility
- Strongly acidic
- Low usage concentration means greater savings
- To be used only with indirect sonication in an inset beaker

STAMMOPUR GR is a concentrate for manual basic cleaning in ultrasonic baths of
medical instruments, accessories and components of medical devices
made of stainless steel, precious metals, titanium, glass, ceramic, porcelain and plastic.

The application is intended to remove discoloration, oxides, stains, mineral residues and burnt-on residues on medical instruments.

Application takes place in the process of repairing medical instruments, accessories and components of medical devices, in the CSSD, in the clinic and in doctor's practices.

Dosage ▪ Treatment Time ▪ Temperature

Application in the ultrasonic bath:
5 % ▪ 3 – 10 min ▪ 50 – 60 °C

Application exclusively with indirect sonication.

It is used in a basic cleaning process during restoration as part of product refurbishing and supports qualitative and ecological sustainability.

Not suitable for materials sensitive to acids such as light metals and damaged chrome plating.

STAMMOPUR R (Dosage: 2 %) can be used as contact liquids.
Base: phosphoric acid, tensides
strongly acid, 1.9 at 1% in DI water, biodegradable

Dangerous goods: Special transport regulations and costs. No transport by air freight.

Litres	1	2	5	10
Code No.	968	938	969	6031

MD

BANDELIN Ultrasound since 1955

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 MIS 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 MIS 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, cleaning agents and disinfectants 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.

More information about our company you will find here:
bandelin.com/en/docs/prospekte/company-2/

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ISO 9001 and ISO 13485

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