BANDELIN
Ultraschall seit 1955

High-power ultrasound
for laboratory and process engineering

Cleaning – Dispersing – Homogenizing
Cell disruption – Sample preparation

Content

SONOREX®
Ultrasonic baths

Applications

- cleaning of technical glassware like burettes, pipettes, petri dishes and laboratory flasks, analysis sieves up to 400 mm diameter, all kinds of metal parts and electronic components
- cleaning and disinfection of medical instruments
- degassing of beer samples for analysis of alcohol contents original worth, colour, pH value
- degassing of solvents for HPLC
- degassing of food samples from cans for analysis of stannous content
- test method for freeze-thaw resistance of concrete: CDF test – through sonication, loosely adhering scaled particles are removed from surface
- extraction of quaternary ammonium compounds (QAC) of wood
- extraction of herbs samples for determination of aflatoxines (causing mold decay on food)
- extraction of soil samples for determination of hydrocarbons
- production of emulsions
- mixing of plasma and sera
- homogenizing of samples for residue analysis in vegetarian food
- accelerating chemical reactions
- acceleration of suspending processes
- preparation for pollutant analysis of either drinking or drain water
- preparation of liposomes in cosmetics and pharmacy
- preparation of samples for analysis of THC-content in canabis
- preparation of samples for analysis, e. g. analysis of hair

SONOREX®

Ultrasonic baths – digital or analogue

	DIGITEC DT ...	DIGIPLUS DL ...	SUPER RK ...
capacity (l)	0.9 – 90.0	3.0 – 28.0	0.9 – 90.0
time setting (min)	1, 2, 3, 4, 5, 10, 15, 30, ∞	1, 2, 3, 4, 5, 10, 15, 30, ∞	1–15, ∞
safety shut-down	after 12 hours	after 12 hours	
heating	optional, version „H“	optional, version „H“	optional, version „H“
heating, thermostatically adjustable (°C)	20 – 80	20 – 80	30 – 80 RK 31 H: 65, fixed
excess temperature signal	✓	✓	
protection against retardation of boiling	✓, optionally switch-on	✓, optionally switch-on	
setting accuracy of bath temperature	± 2.5 K	± 2.5 K	± 5 K
thickness tank material, standard: version „C“:	0.8 mm, AISI 304 2 mm, AISI 316 Ti	0.8 mm, AISI 304	0.8 mm, AISI 304 2 mm, AISI 316 Ti
marking of filling level for safe dosage	✓	✓	✓
hard chromium-plated	DT 102 H / H-RC	DL 102 H	RK 102 H
one-piece drain, welded	✓, from DT 102 H	✓	✓, from RK 102 H
Degree of protection	IP 33	IP 33	IP 32
ultrasonic frequency (kHz)	35	35	35
sweep – SweepTec®	✓	✓	✓
power setting		3, 20 – 100 % in 10 % steps	
PCT-transducers (PCT = lead circonate titanate)	✓	✓	✓
fast degassing DEGAS	✓	✓	
mains supply: 230 V~ (± 10 %) 50/60 Hz alternatively:115 V~ (± 10 %) 50/60 Hz	✓	✓	✓
data memory	no, Type H-RC: WINSONIC® software		
interface / PC software	RS 232 , Type H-RC / ✓		
CE marked as medical device	✓	✓	✓

SONOREX DIGITEC®

Ultrasonic baths with fast degassing

starting from the left: DT 106 , DT 31, DT 255 H, DT 510 H

internal tank dimensions (l × w × d) mm	capa-city l	type	code no.	external dimensions (l × w × h) mm	drain ball valve	ultrasonic peak output* W	HF output, effective W	heating power W
190 × 85 × 60	0.9	DT 31 DT 31 H	3200 3220	205 × 100 × 180	- -	160 160	40 40	- 70
150 × 140 × 100	1.8	DT 52 DT 52 H	3205 3225	175 × 165 × 230	-	240 240	60 60	- 140
240 × 140 × 100	3.0	DT 100 DT 100 H DT 102 H	3210 3230 3235	260 × 160 × 250	- - G ¼	320 320 480	80 80 120	- 140 140
240 × 140 × 150	4.0	DT 103 H	3201	260 × 160 × 310	G ¼	560	140	200
dia. 240 × 130	5.6	DT 106	3270	dia. 265 × 270	G ¼	480	120	-
500 × 140 × 100	6.0	DT 156	3275	530 × 165 × 245	G ¼	640	160	-
500 × 140 × 150	9.0	DT 156 BH	3221	530 × 165 × 300	G ¼	860	215	600
300 × 150 × 150	5.5	DT 255 DT 255 H	3215 3240	325 × 175 × 295	G ¼ G ¼	640 640	160 160	- 280
300 × 240 × 150	9.7	DT 510 DT 510 H	3245 3206	325 × 265 × 305	G ½ G ½	640 640	160 160	- 400
300 × 240 × 200	13.0	DT 512 H	3226	325 × 265 × 350	G ½	860	215	400
325 × 300 × 150	13.5	DT 514 DT 514 H	3250 3211	355 × 325 × 305	G ½ G ½	860 860	215 215	- 600
325 × 300 × 200	18.7	DT 514 BH	3216	355 × 325 × 385	G ½	860	215	600
500 × 300 × 200	28.0	DT 1028 DT 1028 H	3255 3231	535 × 325 × 400	G ½ G ½	1200 1200	300 300	- 1300
500 × 300 × 300	45.0	DT 1028 CH	3266	540 × 340 × 500	G ½	1200	300	1450
600 × 500 × 300	90.0	DT 1050 CH	3271	640 × 540 × 530	G ½	2400	600	1950
DT ... RC baths with infrared interface for process documentation **								
240 × 140 × 100	3.0	DT 102 H-RC	3071	260 × 160 × 250	G ¼	480	120	140
300 × 150 × 150	5.5	DT 255 H-RC	3081	325 × 175 × 295	G ¼	640	160	280
300 × 240 × 150	9.7	DT 510 H-RC	3091	325 × 265 × 305	G ½	640	160	400
325 × 300 × 200	18.7	DT 514 BH-RC	3095	355 × 325 × 385	G ½	860	215	600

*corresponds to 4 times HF output ** WINSONIC DT remote control for MICROSOFT® WINDOWS® required, code no. 3090

SONOREX DIGIPLUS®

Ultrasonic baths with fast degassing and power settings

from 20 to 100 % in 10 % steps

starting from the left: DL 255 H, DL 102 H, DL 156 BH

internal tank dimensions (l × w × d) mm	capa-city l	type	code no.	external dimensions (l × w × h) mm	drain ball valve	ultrasonic peak output* W	HF output, effective W	heating power W
240 × 140 × 100	3.0	DL 102 H	7180	260 × 160 × 250	G ¼	480	120	140
500 × 140 × 150	9.0	DL 156 BH	7181	530 × 165 × 300	G ¼	860	215	600
300 × 150 × 150	5.5	DL 255 H	7182	325 × 175 × 295	G ¼	640	160	280
300 × 240 × 150	9.7	DL 510 H	7183	325 × 265 × 305	G ½	640	160	400
300 × 240 × 200	13.0	DL 512 H	7184	325 × 265 × 350	G ½	860	215	400
325 × 300 × 200	18.7	DL 514 BH	7185	355 × 325 × 385	G ½	860	215	600
500 × 300 × 200	28.0	DL 1028 H	7186	535 × 325 × 400	G ½	1200	300	1300

*corresponds to 4 times HF output

SONOREX SUPER®

Ultrasonic baths with easy-to-operate turning knobs

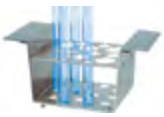
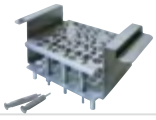
starting from the left: RK 106, RK 102 H, RK 156 BH

internal tank dimensions (l × w × d) mm	capa-city l	type	code no.	external dimensions (l × w × d) mm	drain ball valve	ultrasonic peak output* W	HF output, effective W	heating power W
190 × 85 × 60	0.9	RK 31 RK 31 H	329 044	205 × 100 × 180	- -	160 160	40 40	- 70
150 × 140 × 100	1.8	RK 52 RK 52 H	311 164	175 × 165 × 225	- -	240 240	60 60	- 140
240 × 140 × 100	3.0	RK 100 RK 100 H RK 102 H	301 312 303	260 × 160 × 250	- - G ¼	320 320 480	80 80 120	- 140 140
240 × 140 × 150	4.0	RK 103 H	326	260 × 160 × 310	G ¼	560	140	200
dia. 240 × 130	5.6	RK 106	306	dia. 265 × 270	G ¼	480	120	-
500 × 140 × 100	6.0	RK 156	305	530 × 165 × 245	G ¼	640	160	-
500 × 140 × 150	9.0	RK 156 BH	646	530 × 165 × 300	G ¼	860	215	600
1000 × 200 × 200	39.0	RK 170 H	076	1050 × 250 × 385	G ½	1520	380	1600
300 × 150 × 150	5.5	RK 255 RK 255 H	3066 316	325 × 175 × 295	G ¼ G ¼	640 640	160 160	- 280
300 × 240 × 150	9.7	RK 510 RK 510 H	327 321	325 × 265 × 305	G ½ G ½	640 640	160 160	- 400
300 × 240 × 200	13.0	RK 512 H	795	325 × 265 × 350	G ½	860	215	400
325 × 300 × 150	13.5	RK 514 RK 514 H	277 207	355 × 325 × 305	G ½ G ½	860 860	215 215	- 600
325 × 300 × 200	18.7	RK 514 BH	263	355 × 325 × 385	G ½	860	215	600
500 × 300 × 200	28.0	RK 1028 RK 1028 H	322 324	535 × 325 × 400	G ½ G ½	1200 1200	300 300	- 1300
500 × 300 × 300	45.0	RK 1028 C	661	540 × 340 × 500	G ½	2000	500	-
500 × 300 × 300	45.0	RK 1028 CH	143	540 × 340 × 500	G ½	1200*	300	1450
dia. 500 × 195	39.5	RK 1040	319	dia. 540 × 500	G ½	1200	300	-
600 × 500 × 200	58.0	RK 1050	323	655 × 535 × 425	G ½	2400	600	-
600 × 500 × 300	90.0	RK 1050 CH	184	640 × 540 × 530	G ½	2400*	600	1950

*corresponds to 4 times HF output

SONOREX® Accessories

Appropriate accessories facilitate ultrasonic application and simultaneously protect oscillating tank and parts to be sonicated. **Objects to be cleaned or vessels must not be placed onto the tank bottom!**

		material	function
insert basket K		stainless steel	optimal ultrasonic transmission
insert basket PK / K...P		plastic, with holes	for sensitive surfaces
utensil holder GH		stainless steel	for large parts or flasks
lid D		stainless steel	protect the tank liquid from outside dirt; condensation water runs back into the tank
insert tub KW		plastic, with lid	for cleaning in aggressive liquids
position lid DE		stainless steel	for fixing the inset beakers
beaker holder ES		stainless steel	for fixing the inset beakers
inset beaker EB / KB / PD / SD		stainless steel / plastic / glass	indirect cleaning of small parts in aggressive liquids or solvents
inset basket KD / PD		stainless steel / plastic	use in inset beakers, for small or sensitive parts
lid DD 06		plastic	for inset beakers SD 06, PD 06 and EB 05; minimum order quantity: 10 pcs.
handle adjustment for insert baskets and utensil holders		stainless steel	stepples adjustment of immersion depth of baskets
sieve holder SH		stainless steel	SH 7 – cleaning of one sieve up to dia. 200 mm SH 28C – gentle cleaning of 1 to 5 analysis sieves up to dia. 200 mm
spring clamp EK		stainless steel	easy fixing to the bottom of insert basket or utensil holder; prevent floating and canting of flasks
test tube holder RG		stainless steel	simultaneous sonication of 1 to 6 (dia. up to 25 mm) or to 8 (dia. up16 mm) test tubes
tabletting punch holder TH		stainless steel	hold tabletting punches with different diameters (hole pattern for EURO-B or EURO-D-Type)

	lid	insert basket l × w × h (mm)	insert basket l × w × h (mm)	utensil holder l × w (mm)	insert tub l × w × d (mm)	positioning lid beaker holder
RK 31 / H **DT 31 / H**	D 08	K 08 170 × 65 × 50				DE 08
RK 52 / H **DT 52 / H**	D 52	K 1 C 120 × 110 × 40	PK 1 C 90 × 90 × 66	GH 1 129 × 117		DE 52
RK 100 / H **RK 102 H** **DT 100 / H** **DT 102 H /H-RC** **DL 102 H**	D 100	K 3 C 200 × 110 × 40	PK 2 C 187 × 90 × 56	GH 1 129 × 117		DE 100
RK 103 H **DT 103 H**	D 100	K 3 CL 200 × 110 × 40	PK 3 C 187× 90 × 56	GH 1 129 × 117	KW 3 195 × 115 × 88	DE 100
RK 106 **DT 106**	D 6	K 6 dia. 215 x 50				DE 6
RK 156 **DT 156**	D 156	K 6 L 460 × 100 × 50				DE 156
RK 156 BH **DT 156 BH** **DL 156 BH**	D 156	K 6 BL 460 × 100 × 50				DE 156
RK 170 H	D 170	K 7 950 × 150 × 50				
RK/DT 255 / H **DT 255 H-RC** **DL 255 H**	D 255	K 5 C 260 × 110 × 40	K 5 P 254 × 96 × 130		KW 5 254 × 96 × 130	DE 255
RK/DT 510 / H **DT 510 H-RC** **DL 510 H**	D 510	K 10 250 × 195 × 50		GH 10 260 × 200	KW 10-0 242 × 182 × 136	DE 510
RK 512 H **DT 512 H** **DL 512 H**	D 510	K 10 B 250 × 195 × 50				DE 510
RK 514 / H **DT 514 / H**	D 514	K 14 275 × 245 × 50			KW 14 275 × 210 × 195	DE 514
RK /DT 514 BH **DT 514 BH-RC** **DL 514 BH**	D 514	K 14 B 275 × 245 × 50			KW 14 B 275 × 210 × 195	DE 514
RK 1028 / H **DT 1028 / H** **DL 1028 H**	D 1028	K 28 455 × 245 × 50		GH 28 455 × 250	KW 28-0 437 × 230 × 155	ES 4
RK 1028 C **RK 1028 CH** **DT 1028 CH**	D 1028	K 28 C 455 × 245 × 50			KW 28-0 437 × 230 × 155	ES 4
RK 1040	D 40	K 40 dia. 480 × 50				
RK 1050	D 1050 C	K 50 545 × 450 × 50			KW 50-0 517 × 445 × 184	ES 4
RK 1050 CH **DT 1050 CH**	D 1050 C	K 50 C 545 × 450 × 50			KW 50 B-0 520 × 445 × 284	ES 4

TICKOPUR + STAMMOPUR
Cleaning and disinfecting agents

Besides ultrasonic power, temperature and time, specially balanced cleaning agents are also necessary to achieve optimum cleaning results. With special agents from DR. H. STAMM GmbH BANDELIN offers a wide range of adequate cleaning agents.
These cleaning agents were specially developed for ultrasonic applications. With their cavitation-aiding properties, the special agents support the cleaning process and are gentle to the material at the same time. Depending on the cleaning tasks, either alkaline, neutral or acidic cleaning agents are recommended. They are biologically degradable and easy to dispose of. Rinsing after cleaning is necessary to remove remaining residues of cleaning agents and diluted soil particles from the parts to be cleaned.

All TICKOPUR agents are also suitable for immersing and wiping.

It is not allowed to use combustible liquids directly in the ultrasonic bath. Household cleaners, acids and most of the customary acid cleaners are improper cleaning agents because they could destroy the tank by pitting corrosion resulting finally in breakdown of the ultrasonic bath.

Further reading on request.
Product information, safety data sheets and dosing table as PDF file you will find at:
www.bandelin.com

Dosing aids	Type	Code No.
5-l-jerrycan	pump	268
25-l-jerrycan (optional)	stop cock pump	252 266

left: pump, right: stop cock

contamination	objects to be cleaned	concentrate	Litres
general contamination, oily and greasy residues, soot, ink, drilling, grinding, polishing and lapping residues etc.	glass, ceramics, plastics, rubber, steel, stainless steel, non-ferrous-, precious- and light metals, sieves, pipettes, respirators, PC-boards, glasses. Caution with tin and zinc.	**TICKOPUR R 33** universal cleaner gentle cleaning, anticorrosive **mildly alkaline,** pH 9.9 (1 %) dosage 1 to 5 % , 1 to 10 min EXAM-expertise	2 5 25 200
light drilling, grinding, polishing and lapping residues, dust, soot, oily and greasy residues etc.	glass, ceramics, plastics, rubber, steel, stainless steel, non-ferrous-, precious- and light metals	**TICKOPUR R 30** neutral cleaner gentle cleaning, anticorrosive **neutral,** pH 7 dosage 1 to 5 %, 1 to 10 min	2 5 25 200
heavy mineral residues like limescale, silicate, phosphate, rust, cement, temper colours, metal oxides, grease and oil films etc.	glass, ceramics, plastics, rubber, steel, stainless steel, precious metals. Not for light and non-ferrous metals, tin and zinc!	**TICKOPUR R 27** special cleaner – based on phosphoric acid anticorrosive **acidic**, pH 1.9 (1 %) dosage 5 %, 1 to 10 min	2 5 25 200
resinous residues, soot, grease, oils, waxes, pigments, coloured fog, silicon oils, flux media, oxides at copper, brass, bronze and precious metals.	glass, ceramics, plastics, rubber, steel, stainless steel, non-ferrous- and precious metals, analysis sieves. Caution with light metals.	**TICKOPUR RW 77** special cleaner with ammonia without phosphate, gentle to material **mildly alkaline**, pH 9.9 (1 %) dosage 5 %, 1 to 10 min	2 5 25 200
coke residues, resinous residues, soot, pigments, grease, oils, waxes, silicon oils, coloured fog, drilling, grinding, polishing and lapping residues etc.	glass, ceramics, plastics, rubber, steel, stainless steel. Not for light metals, tin and zinc!	**TICKOPUR R 60** intensive cleaner saponifying, without phosphate **alkaline**, pH 12.8 (1 %) dosage 2 to 20 %, 1 to 10 min	2 5 25 200
mineral residues, drifting rust, grease, oils, waxes, pigments, drilling, grinding, polishing and lapping residues.	steel, stainless steel, non-ferrous, precious and light metals, glass, ceramics, plastics, rubber.	**TICKOPUR TR 3** special cleaner – based on citric acid gentle cleaning, without phosphate, anti-corrosive **weakly acidic,** pH 3.0 (1 %) dosage 5 %, 1 to 10 min	2 5 25 200
coke residues, resinous residues, soot, grease, oils, waxes, pigments, coloured fog, drilling, grinding, polishing and lapping residues.	steel, stainless steel, glass, ceramics, plastics, rubber Not for tin, zinc and light metals! Non-ferrous metals can be affected.	**TICKOPUR TR 13** intensive cleaner – demulsifying for stubborn contamination, without phosphate and silicate **alkaline**, pH 11.9 (1 %) dosage 0.1 to 10 %, 1 to 10 min	2 5 25 200
general contamination, biofilms, soot, pigments, oil- and fat-containing residues etc.	glass, ceramics, plastics, rubber, steel, stainless steel, non-ferrous-, precious- and light metals, instruments, pipettes, respirators, protective goggles etc.	**STAMMOPUR 24** intensive instrument cleaning and disinfection Residue-free rinsing, neutral scent. Very gentle to material. Free from aldehydes, chlorine and phenols. Bactericidal, tuberculocidal, yeasticidal, virucidal against Vaccinia, BVDV, H5N1, HBV, HCV, HIV. **mildly alkaline**, pH 9.4 (1 %) Application with ultrasound: 1 % – 15 min, 2 % – 5 min VAH certified, EXAM-expertise	2 5 25

Detailed advice and technical documentation: ☏ +49 30 76880-258

SONOREX® TECHNIK
Ultrasonic baths for industry

filling level mark
well recognizable imprint for the minimum filling level of the cleaning fluid

spraying pipe
(from RM 110) generates in connection with an oil seperator a movement on the liquid's surface that leads floating oil and grease from the bath surface into the overflow weir

liquid level switch
as dry run protection for heating and ultra-sonic transducers

drain for 3-way ball valve
for emptying or refilling the tank or connecting to a filtration

height-adjustable feet

weir
floating contamination like particles, oil and grease can be removed from the bath surface using an oil separator

welded cleaning tank
made of 2 mm stainless steel AISI 316 Ti

additional outlet
for connection of an oil separator or for emptying the fluid behind the weir

ultrasound
on/off with pilot lamp, time switch 1 to 15 min. or continuous operation

heating
on/off with pilot lamp, temperature thermostatically adjustable from 30 to 80 °C

ultrasonic generator
frequency 40 kHz, from RM 110 also 25 kHz

drip-proof housing
made of stainless steel AISI 304

Detailed advice and technical documentation: ☏ +49 30 76880-19

In 4 versions combinable: RM ... without ultrasound and heating ▪ RM ... U – with ultrasound RM ... H – with heating ▪ RM ... UH – with ultrasound and heating

internal tank dimensions (l × Bw × d) mm	capacity l	type (selection)	code no.	external dimensions (l × w × h) mm	ultrasonic peak output* W	HF output, effective W	heating power W
325 × 275 × 200	13.0	RM 16 UH	8200	365 × 340 × 390	1200	300	800
480 × 300 × 300	30.0	RM 40 UH	8210	540 × 340 × 500	2000	500	1250
580 × 500 × 300	60.0	RM 75 UH	8220	640 × 540 × 530	4000	1000	1950
600 × 450 × 450	110.0	RM 110 UH	8230	780 × 550 × 800	4000	1000	4800
1000 × 500 × 400	160.0	RM 180 UH	8250	1180 × 600 × 800	2 × 4000	2 × 1000	7200
750 × 650 × 500	210.0	RM 210 UH	8270	930 × 750 × 800	2 × 4000	2 × 1000	7200

*corresponds to 4 times HF output

mains connection: RM 16 UH bis RM 75 UH: 230 V~ (±10 %) 50/60 Hz, RM 110 UH to 210 UH: 400 V 3N~ (±10 %) 50/60 Hz. CEKON-PLUG 16 A

SONOREX®
Special ultrasonic baths

SONOREX DIGITEC DT ... F

Flat ultrasonic baths with fast degassing function for sample preparation

- uniform sonication of samples irrespective of size and arrangement of the flasks:
- homogenizing or fast degassing of samples at the push of the button
- spring clamps EK prevent floating and tilting of labor flasks

internal tank dimensions (l × w × d) mm	capacity l	type	code no.	external dimensions (l × w × h) mm	drain ball valve	ultrasonic peak output* W	HF output, effective W
300 × 240 × 65	4.3	DT 510 F	3242	325 × 265 × 195	G ½	560	140
500 × 300 × 65	9.5	DT 1028 F	3243	535× 325 × 205	G ½	1280	320

accessories	suitable for GL 510 F	code no.
GL 510 F		3262
EK 10	18 ×	051
EK 25	18 ×	053
EK 50	9 ×	055
EK100	6 ×	057
EK 250	5 ×	3259

*corresponds to 4 times HF output

SONOSHAKE®

Ultrasonic bath SONOREX DIGITEC DT 1028 F combined with shaking device SA 1028

– registred pattern DE 20 2009 017 749 –

SONOSHAKE offers a wide range of possible applications for sample preparation in many areas of analysis, for example, in environmental and foodstuffs analytics as well as in the area of medical diagnostics.

Both procedures can be carried out simultaneously or separately.

This means that a sample can be pre-homogenized at a specified shaking frequency, and then final homogenization can be achieved in a very short time using ultrasound.

- analogue setting of time (1–15 min or continuous) and shaking frequency
- reciprocating motion: settings in 4 steps possible of up to 200 shakes/min
- constant amplitude of 20 mm independently of loading
- rack easy to remove
- fast mounting of the laboratory clamps EK 10 –250 (ordering separately)
- shaking platform approx. 410 × 280 mm (l × w)
- Mounting of
  36 × 10-ml-flasks or
  36 × 25-ml-flasks or
  18 × 50-ml-flasks or
  12 × 100-ml-flasks or
  10 × 250-ml-flasks
- required floor space approx. 850 x 360 mm (l × w)

SONOSHAKE Best.-Nr. 3257

The shaking device SA 1028 must be added to existing ultrasonic bath DT 1028 F.

SA 1028 Best.-Nr. 3249

SONOREX®
Special ultrasonic baths

Pipette and burettes cleaning

PR 140 D / DH

- gentle cleaning of glass volume-measuring devices and parts with lengths up to 755 mm
- heating optional (DH) – dissolves grease residues
- tank: stainless steel (AISI 316Ti, 2 mm thick)– especially robust
- kipp handles for easy transport
- placement on the floor nearby the drain
- cleaning liquid for multiple use, fast emptying by ball valve

Ready-to-use set:

- pipette cleaner PR 140 D
- pipette basket K 140 B
- lid D 140 D
- cleaning concentrates
  TICKOPUR R 33 – 5 litres
  TICKOPUR R 27 – 1 litre

code no. PR 140 D = 2060
code no. PR 140 DH = 2065

Gentle cleaning of analysis sieves

RK 106, DT 106, RK 1028 C, RK 1040

Analysis sieves are test equipment and require careful cleaning. Clean sieves are necessary for safe results.

Single cleaning of sieves up to dia. 200 mm
suitable for RK 106 or DT 106
sieve holder SH 7, code no. 314

Simultaneous cleaning of up to 5 analysis sieves up to dia. 200 mm
suitable for RK 1028 C
sieve holder SH 28 C, code no. 307

Single cleaning of sieves up to dia. 400 mm
suitable for RK 1040
sieve holder SH 28 C, code no. 307

We recommend the cleaning concentrate TICKOPUR R 33.

Cleaning and disinfecting of personal protective equipment (PPE)

RK 514 BH, RK 1028 CH, RK 1050 CH, RM 180 UH

Cleaning and disinfecting in one process with STAMMOPUR 24.

- thorough – reliable removal of dirt from internals or even from angles and corners
- gentle – no scratching by manual treatment
- economical – cleaning and disinfecting of up to 15 breathing masks

SONOCOOL®

Ultrasonic bath with cooling for use in pathology and analysis laboratory

Applications

- decalcification process at variable ultrasonic outputs in a subjective comparison (cuttability test, microscopic analysis)
- decalcification process at variable ultrasonic outputs and variable decalcification solutions, in an objective comparison (contact radiography)
- decalcification for osteosarcoma
- biomolecular preparation of a bone speciment

Advantages

- increased life span by welded tank: stainless steel AISI 316Ti, 2 mm thick
- lid made of glass for sample observation and easy cleaning
- level sensor for contact liquid as dry run protection
- lighted LCD display for remaining time – actual temperature – pause/diagnostics – set time/set temperature – ultrasonic power
- serial interface for remote control

Further information at:
www.bandelin.com/prospekte/SONOCOOL_Flyer_GB_BANDELIN.pdf

Ready-to-use set:

- ultrasonic bath SC 255
- sample holder PH 255-11 for 11 inset beakers SD 01.2
- lid D 255 G
- 20 inset beakers SD 01.2, glass, without spoth, à 100 ml
- 250 ml TICKOPUR TR 3 (concentrate for producing the contact liquid)

code no. 3500

inner tank dimensions (l × w × d) (mm)	280 × 150 × 150
tank volume contact liquid (l)	5.0
external dimensions (l× w × h) (mm)	360 × 605 × 385
housing	aluminium, coated, with grip recesses
outlet	front left, concealed
adjustable bath temperature (°C) at 20 °C room temperature	15 – 40
countdown operation (h)	up to 100
cooling power (W)	200
ultrasonic power (W)	180, adjustable in 25, 50, 75, 100 %
ultrasonic frequency (kHz)	35, SweepTec®
current consumption (A)	1.6
mains connection (V)	230 ~ (± 10 %), 50 Hz

BACTOSONIC®

Gentle removing of biofilm

Fast microbiological diagnostic method for implant-associated infections

The successful treatment of implant infections depends on an accurate microbiological diagnosis.
Microorganisms form biofilms on implant surfaces, what makes them difficult to detect by conventional methods. BactoSonic gently removes biofilms from implant surfaces.

Principle of BactoSonic

The implants are placed in the air-tight implant boxes and sonicated in the specially designed ultrasonic bath BactoSonic.
Compared to other ultrasonic baths, BactoSonic works with a **very low ultrasound intensity**.
The biofilm is removed without killing the bacteria, a quantitative assessment is possible.
The sonicated liquid is cultured and the quantity of bacteria can be determined. Compared to standard methods (e. g. biopsies from periprosthetic tissue) **up to 10,000 times more bacteria can be detected.**

Mixed infections and different bacteria morphotypes can better be identified.
The sensitivity especially of patients with previous antibiotic therapy is improved.

Ready-to-use set
BactoSonic BS 14.2:

- ultrasonic bath BS 14
- wire frame for foil test
- scientifically tested procedure
- concentrat for producing contact liquid
  TICKOPUR TR 3 – 250 ml
- implantboxes (polypropylene)
  2 pcs. IB 5 0.52 l
  2 pcs. IB 6 0.6 l
  1 pc. IB 10 1.0 l
  1 pc. IB 18 1.8 l
  1 pc. IB 20 2.0 l
- box trays BT 5, BT 6, BT 10, BT 18 (polycarbonate)
  GH 14 (stainless steel)

code no. 3290

inner tank dimensions (l × w × d) (mm)	325 × 300 × 150
tank volume contact liquid (l)	9.5
external dimensions (l × w × d) (mm)	355 × 325 × 305
drain ball valve, left	G ½
time switch (min)	1 – 15 and ∞
power selction switch(%)	20, 40, 60, 80, 100
HF output, effective (W)	max. 200
ultrasonic frequency (kHz)	40
current consumption (A)	1.0
mains connection (V)	230 ~ (± 10 %), alternatively 115 ~ (± 10 %), 50/60 Hz

Knowledge about ultrasound

Book "Low-Frequency Ultrasound" on request at BANDELIN

How does ultrasound work

Vibrations at frequencies exceeding 18 kHz (18,000 vibrations per second) are called ultrasound.
As a result of these vibrations millions of smallest vacuum bubbles are formed in liquids. They implode during the high pressure phase and create highly effective pressure waves. This process is called cavitation and causes the removal of dirt particles from the objects to be cleaned. Lower frequencies of approx. 20 kHz which are applicable in cell disruption, produce bubbles with larger diameters and stronger pressure waves than higher frequencies of approx. 35 kHz which are used for intense but gentle cleaning. The HF generator converts the mains frequency into the corresponding frequency of the ultrasonic bath.
This frequency is transformed into mechanical vibrations by transducers underneath the tank.Ultrasound is transmitted to the liquid in the bath.
All ultrasonic baths use SweepTec® – a special frequency modulation around on optimally fixed operating point. A very homogeneous and even ultrasonic field is achieved.

Advantages of ultrasonic cleaning

Ultrasonic cavitation removes dirt rapidly from items, thoroughly and deep from pores, even from difficult to reach places such as cavities or holes.
Ultrasound cleans only in a few minutes and exceeds in its efficiency other cleaning methods. Ultrasonic cleaning is also gentle because even slight damage like scratches are eliminated.

Advantages in process engineering and sonochemistry

Cavitation not only can be used for various purposes, but a very fine emulsion of oil and water can be produced by ultrasonic application. Compared to other manufacturing processes this emulsion is more stable. For sonochemical processes in an ultrasonic bath, the reaction vessel should have a thin bottom. Thus, the ultrasonic energy is radiated directly and effectively into the reaction vessel.

How to select the proper device

SONOREX ultrasonic baths work with the intense cleaning frequency of 35 kHz. Size and number of objects to be cleaned determine size of the ultrasonic bath.
When selecting the unit, dimensions of the accessories, e. g. baskets have to be considered.
To avoid overloading, it is recommended to choose a slightly larger unit.
This also allows additional applications at a later stage.

Should an ultrasonic unit have a heating

Warm cleaning solutions reduce the cleaning time; dirt is removed faster. Units with heaters are the preferred choice for cleaning processes in laboratories.
Disinfectant solutions must not be warmed-up because protein coagulation starts at a temperature of 40 °C (104° F) and this poses an obstacle for some cleaning and all disinfection processes. Therefore, units without heaters are recommended for these applications.

What kind of accessories should be used

Objects to be cleaned and reaction vessels must not be placed on the tank bottom. Insert baskets avoid scratching either the parts to be cleaned or the tank bottom. Beakers are placed into positioning lids and are used for cleaning of small objects or when working with aggressive solutions.

Which cleaning agents are appropriate

TICKOPUR and STAMMOPUR cleaning and disinfectant agents have been especially developed for application in SONOREX ultrasonic baths.
Water without any cleaning agent does not clean.
Household detergents as well as DI-water should never be used. It is necessary to use plastic insert tubs, when working with acids or removing acid residues.
Flammable liquids must not be used directly in the ultrasonic tank.

SONOPULS®
Ultrasonic homogenizers

How to select the proper device

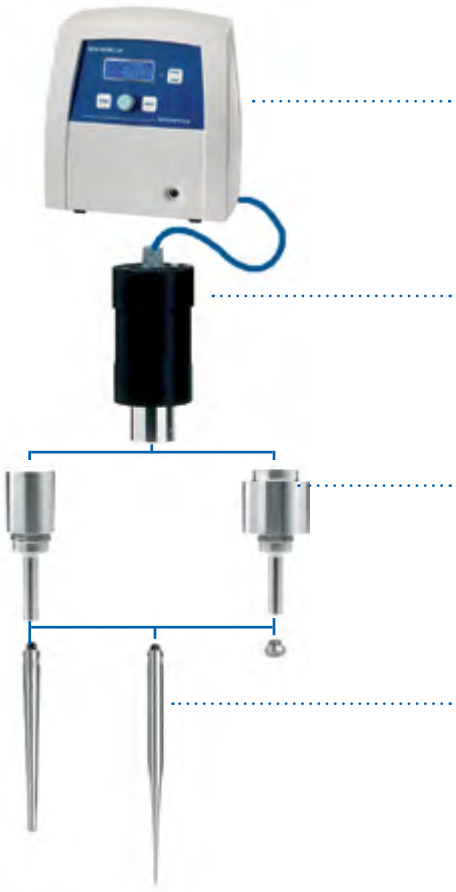
Ultrasonic homogenizers are used in laboratories, hospitals and in industry for scientific experiments and analysis as well as in pilot or small lot production.

What are the differences between ultrasonic homogenizers and ultrasonic baths?
The effective power of ultrasonic baths is fixed. Their power density (W/l) is relatively low and location dependent. When sonicating several samples in one batch, the position of samples has always to be considered. In case of using ultrasonic homogenizers, either the effective power or the amplitude can be adjusted. The power density (W/l) is very high and focused. Caused by using probes with defined radiation, a reproducibility is guaranteed.

Which probes are most suitable?
Probe selection is determined by the sample volume to be processed and the desired power density. The larger the diameter of the radiating surface of the tip, the larger the volume that can be sonicated; but the power density is decreasing. For e. g. disrupting yeast cells a very high power density is necessary. The radiating surface of a probe is only at the tip but not round the probe!

Is it possible to manufacture costumized probes?
No. The probes are tuned to a specific frequency (half a wavelenght or multiple). Their lenghts are fixed by their design.

What is more important when choosing an ultrasonic device: power rating or amplitude?
The power output (W) is not the sole criterion for selecting the ultrasonic homogenizer. This value only indicates the power of the HF generator but not the energy delivered to the sample. The amplitude at the radiating surface of the probe is the determining factor for the evaluation of the irradiation result while taking the volume of the sample into consideration.
SONOPULS ultrasonic homogenizers provide higher amplitudes than devices customary in the market due to the optimal matching of all components.



Construction and principle of operating

HF generator
transforms of low-frequency voltage of 50 Hz into high-frequency voltage of 20 kHz

Ultrasonic converter
transforms electrical voltage delivered from the generator into mechanical vibrations of 20 kHz

Standard and booster horns
increase amplitudes by their specially designed shape. The external thread is made for close connection of vessels

Probes
transmit ultrasonic energy into the sample;
microtips, tapered and flat tips dia. e. g. 2, 3, 6, 13, 19 or 25 mm are available for use in different volumes
material: Ti-Al6-V4

Features

AMPLICHRON®-system
guarantees a constant amplitude independently from changing conditions within the sample – for reproducible results. Settings within a range of 10 to 100 % are possible. Verification of actual value at the display. Permanent control of ultrasound irradiation as well as indication of wear of the probe.

Pulsation
limits temperature increase when processing heat-sensitive samples. The adjustable pulsation allows cooling during rest intervals.

Continuous operation
constant sound radiation – extremely effective

Switching ON / OFF – easy to handle
either at the generator or directly at the ultrasonic converter via button or remote control.

Integrated timer
duration of sonication storable; indication of elapsed time during continuous operation or of remaining time in count-down mode.

Foil keypad
fail-safe during continuous operation and idling

CE-marked, also as medical device compliant to the directive for in-vitro diagnostics 98/79/EG

Applications

Typical areas of application

- Disruption of cells, bacteria, virus, tissue, also mixed tissue e. g. for extraction of cell contents
- Disruption of tissue, also mixed tissue
- Emulsifying of hardly mixable liquids, e.g. oil and water, particle size in µm range
- Deagglomeration of nanoparticles in material research (nanostructurized material) in medicine, biotechnology, automobile industry
- Acceleration of chemical reactions
- Production of dispersions

Analysis

- Preparing samples for grain size determination or environmental analysis
- Homogenizing of cheese samples for determination of nitrates

Biochemistry – Biology – Medicine

- Sonication of small high-quality samples for analysis like EIA or RIA
- Due to high amplitudes, disruption of high-resistant bacteria, cells or tissues is possible. Indirect processing of sample in cup booster BR 30 or in cup horns BB 6 is recommended to avoid cross-contamination
- Detection of prions by cyclic amplification of protein misfolding
- Simultaneous sonication of 12 samples in microplates: HD 3100 with MR 12-2

Chemistry – Sonochemistry

- Acceleration of chemical reactions or destroying of highly-molecular compounds

Pharmacy – Cosmetics

- Production of larger volumes of long lasting emulsions, e. g. lotions and production of antigens, vaccines or liposomes

General information (extract)

5119i General information on ultrasonic homogenizers
5169b Power determination
5159i Life span of probes
5469b Applications - overview
5299b Food sector

Professional hints (extract)

Molecular Biology – Microbiology – Pharmacy – Medicine

B-101 Protein extraction
B-102 Yeasts cells
B-103 Procurement of stroma-free haemolysate / paternity test
B-104 Muscle and pulmonary tissue from mice – homogenization for RNA isolation
B-106 Liposomes - producing SLV (unilamellar liposomes) by disintegration of MLV (multilamellar liposomes)
B-109 Homogenization of pulp of sugar beet, for cell disruption
B-110 Replication of infectious prions – process acceleration via ultrasound
B-111 Tissue disruption generally
B-112 Tissue disruption of e. g. aorta, liver, stomach, bowel, lung
B-121 Escherichia Coli
B-124 DNA / fragmentation
B-125 Enterobacter

Sample preparation for analysis

C-105 Cellulose samples
C-106 Sediments of water samples / disagglomeration
C-108 Dispersing of solid particles (Al_2O_3, SiO_2)
C-113 Sample preparation for grain size analysis

Sample preparation for analytics in the area of environment

U-101 Sewerage samples / homogenizing
U-102 Soil samples / homogenizing
U-103 Produzing of ceramic slurry
U-104 Soil samples / fertiliser recommendation

Above information by indicating the number on request: info@bandelin.com




	HD 4000 serie	mini20	HD 2000 serie	HD 3000 serie
application	for research	for small volumes	for lab routine	for research and technology
sample volume	0.5 to 250 ml	0.1 to 25 ml	1 to 1000 ml	1 to 2500 ml
ultrasonic converter	2, optionally	1	1	1
amplitude control	10 to 100 %	10 to 100 %	10 to 100 %	10 to 100 %
power control	✓ HF power	✓ HF power		✓ HF power
automatic amplitude limiting	yes, after preselection of probe	✓		yes, after preselection of probe
pulsation	ON cycles 0.2 to 600 s OFF cycles 0.3 to 600 s	ON cycles 0.1 to 60 s OFF cycles 0.2 to 60 s	10 – 100 % – storable – (duty cycle, base 1 s)	ON cycles 0.2 to 600 s OFF cycles 0.3 to 600 s
time modes	9 h: 59 min: 59 s continuous or timed	59 min: 59 s	99 min: 59 s continuous or timed	9 h: 59 min: 59 s continuous or timed
safety shut down	9 h: 59 min: 59 s	59 min: 59 s		9 h: 59 min: 59 s
display	alphanumeric liquid crystal display of amplitude, pulsation, mode, time, energy	alphanumeric liquid crystal display of amplitude, pulsation, mode, time, energy	numerical seven-segment display of amplitude, pulsation mode and time	alphanumeric liquid crystal display of amplitude, pulsation, mode, time, energy
energy monitoring	in kJ	in kJ		in kJ
temperature monitoring and measurement	optional, -20 to 120 °C, temperature probe necessary, optional signal tone or switch-off			optional, 0 to 120 °C, temperature probe necessary, optional signal tone or switch-off
batch operation	✓			
remote control with PC	RS 232	RS 232 (infrared)		RS 232 (infrared)
PC-Software, optionally available	WINPULS®			WINPULS®
error diagnosis	✓	✓		✓
processing frequency	20 kHz	30 kHz	20 kHz	20 kHz
program storage	✓, 9	✓, 9		✓, 9
operating test	✓	✓		✓
remote control	foot switch		foot switch	foot switch
mains connection	230 V~ (±10 %), optionally 115 V~ (±10 %), 50/60 Hz	115 V~/230 V~ (±10 %), 50/60 Hz, automatic voltage detection	230 V~ (±10 %), optionally with voltage selector 115 V~ (±10 %), 50/60 Hz	230 V~ (±10 %), optionally 115 V~ (±10 %) except HD 3400, 50/60 Hz

SONOPULS®
Ultrasonic homogenizers
HD 4050, HD 4100, HD 4200

New technnology for lab routine

HD 4100

SONOPULS HD 4050
for volumes from 0.5 to 100 ml

Ready-to-use set:
for volumes from 0.5 to 20 ml
HF power, effective: max. 50 W
- HF generator GM 4100
- ultrasonic converter UW 50
- titanium probe TS 102, dia. 2 mm

code no. 4050

SONOPULS HD 4100
for volumes from 2 to 200 ml

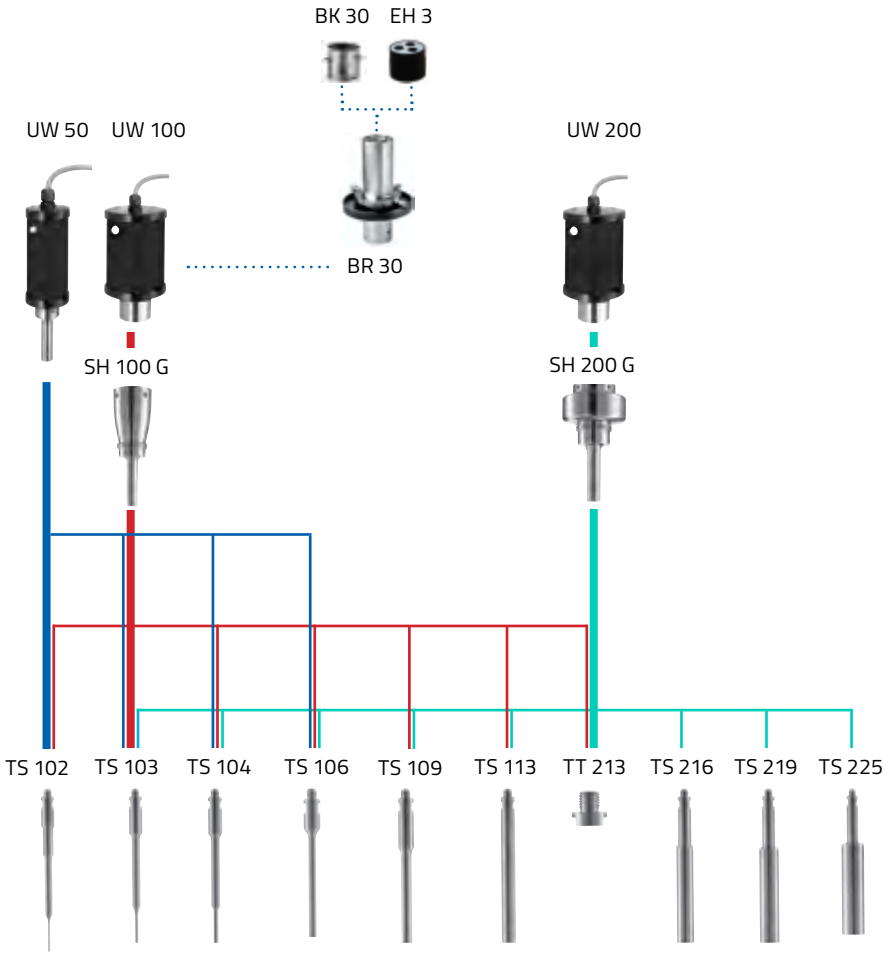
Ready-to-use set:
for volumes from 3 to 50 ml
HF power, effective: max. 100 W
- HF generator GM 4100
- ultrasonic converter UW 100
- standard horn SH 100 G
- titanium probes TS 103, dia. 3 mm

code no. 4100

SONOPULS HD 4200
for volumes from 5 to 1000 ml

Ready-to-use set:
for volumes from 20 to 900 ml
HF power, effective: max. 200 W
- HF generator GM 4200
- ultrasonic converter UW 200
- standard horn SH 200 G
- titanium flat tip TT 213, dia. 13 mm

code no. 4200



	HD 4050	HD 4100	HD 4200
HF generator	GM 4100	GM 4100	GM 4200
l × w × h (mm)	150 × 220 × 335	150 × 220 × 335	150 × 220 × 335
ultrasonic converter	UW 50	UW 100	UW 200
dia. × l (mm)	45 × 175	70 × 150	70 × 150
available probes dia. (mm)	2/ 3/ 4.5/ 6	2/ 3/ 4.5/ 6/ 9/ 13	3/ 4.5/ 6/ 9/ 13/ 16/ 25

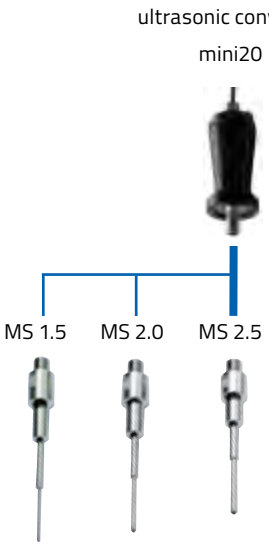
SONOPULS®
Ultrasonic homogenizer mini20

for small volumes

SONOPULS mini20
for volumes from 0.1 to 25 ml

Ready-to-use set:
for volumes from 0.5 to 25 ml
HF power, effective: max. 20 W
- HF generator mini20
- ultrasonic converter mini20
- microtip MS 2.5, dia. 2.5 mm

code no. 3665



	mini20
HF generator	mini20
l × w × h (mm)	250 × 256 × 154
ultrasonic converter	mini20
dia. × l (mm)	50 × 160
available probes dia. (mm)	1.5/ 2.0/ 2.5

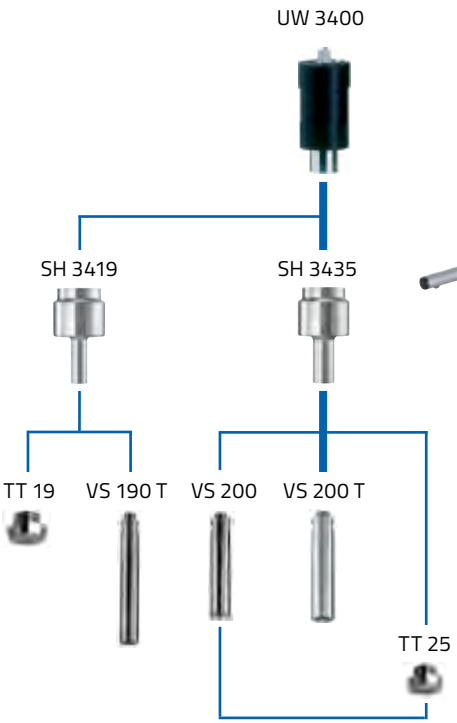
SONOPULS®
Ultrasonic homogenizer HD 3400

with advanced functionality

SONOPULS HD 3400
for volumes from 100 to 2500 ml

Ready-to-use set:
for volumes from 100 to 2500 ml
HF power, effective: max. 400 W
- HF generator GM 3400
- ultrasonic converter UW 3400
- booster horn SH 3425
- titanium flat tip VS 200 T, dia. 25 mm

code no. 3690



	HD 3400
HF generator	GM 3400
l × w × h (mm)	324 × 230 × 130
ultrasonic converter	UW 3400
dia. × l (mm)	90 × 180
available probes dia. (mm)	19/ 25

SONOPULS®
Ultrasonic homogenizers HD 2070 and HD 3100

SONOPULS HD 2070
for volumes from 1 to 200 ml

Ready-to-use set:
for volumes from 2 to 50 ml
HF power, effective: max. 70 W
- HF generator GM 2070
- ultrasonic converter UW 2070
- standard horn SH 70 G
- microtip MS 73, dia. 3 mm

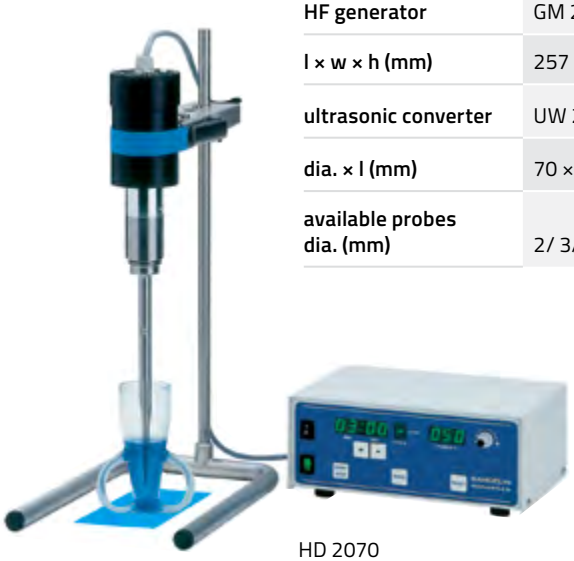
code no. 2450

SONOPULS HD 3100
for volumes from 1 to 200 ml

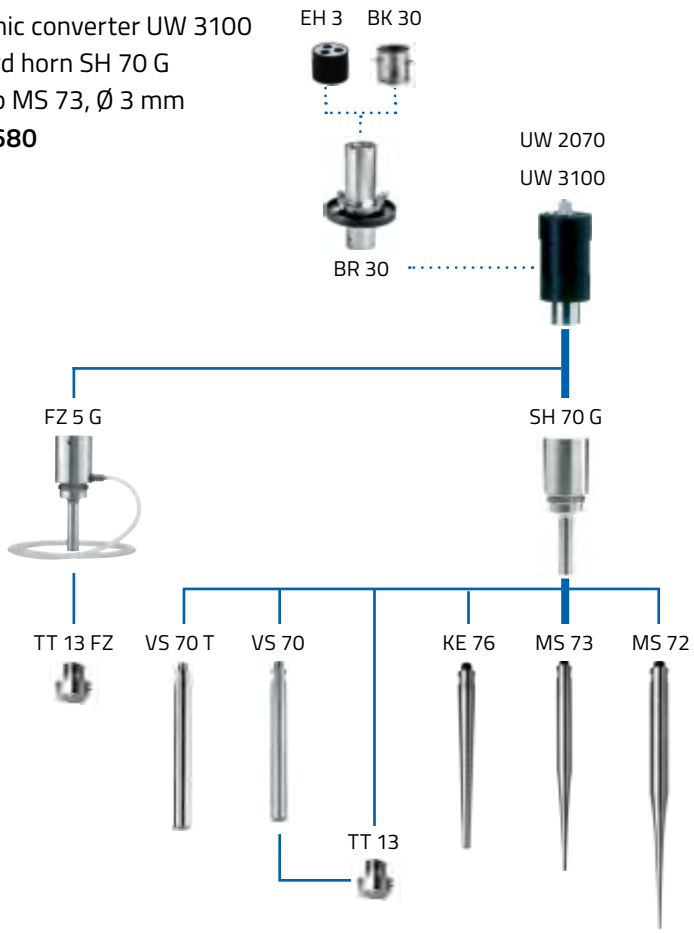
Ready-to-use set:
for volumes from 2 to 50 ml
HF power, effective: max. 100 W
- HF generator GM 3100
- ultrasonic converter UW 3100
- standard horn SH 70 G
- microtip MS 73, Ø 3 mm

code no. 3680

	HD 2070	HD 3100
HF generator	GM 2070	GM 3100
l × w × h (mm)	257 × 180 × 115	250 × 256 × 154
ultrasonic converter	UW 2070	UW 3100
dia. × l (mm)	70 × 150	70 × 150
available probes dia. (mm)	2/ 3/ 6/ 13	2/ 3/ 6/ 13



HD 2070



SONOPULS®
Ultrasonic homogenizers HD 2200 and HD 3200

SONOPULS HD 2200
for volumes from 2 to 1000 ml

Ready-to-use set:
for volumes from 20 to 900 ml
HF power, effective: max. 200 W
- HF generator GM 2200
- ultrasonic converter UW 2200
- booster horn SH 213 G
- titanium flat tip TT 13, dia. 13 mm

code no. 2530

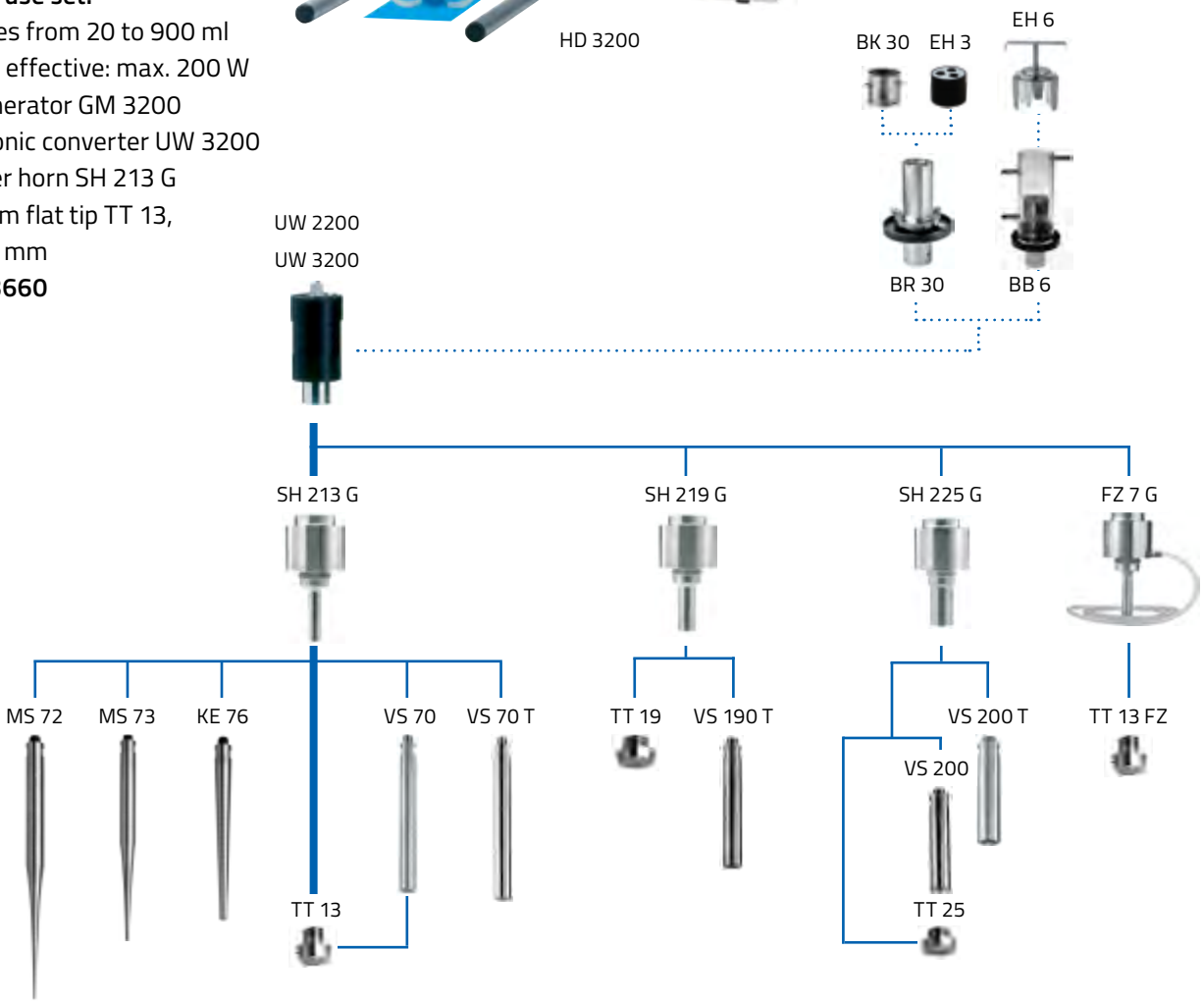
SONOPULS HD 3200
for volumes from 2 to 1000 ml

Ready-to-use set:
for volumes from 20 to 900 ml
HF power, effective: max. 200 W
- HF generator GM 3200
- ultrasonic converter UW 3200
- booster horn SH 213 G
- titanium flat tip TT 13, dia. 13 mm

code no. 3660

	HD 2200	HD 3200
HF generator	GM 2200	GM 3200
l × w × h (mm)	257 × 180 × 150	250 × 256 × 154
ultrasonic converter	UW 2200	UW 3200
dia. × l (mm)	70 × 150	70 × 150
available probes dia. (mm)	2/ 3/ 6/ 13/ 19/ 25	2/ 3/ 6/ 13/ 19/ 25

HD 3200



SONOPULS®
Probes

Probes are subjects to wear and tear. We recommend to order spare probes when purchasing the homogenizer.

Probes for connection to standard and booster horns

– made of titanium alloy (Ti-Al6-V4) –

Probes transmit mechanical longitudinal waves into the sample. They are thermo-resistant, can be treated in autoclaves and are resistant to corrosive media. Sample volume, diameter of the processing vessel and the required amplitude determine the selection of the unit and the type of probe. The higher the amplitude, the more intense the sonication.

		microtips					titanium probes				
		MS 1.5	MS 2.0	MS 2.5	MS 72	MS 73	TS 102	TS 103	TS 104	TS 106	
code no.		3639	3654	3652	492	529	3740	3741	3742	3743	
diameter	mm	1.5	2.0	2.5	2	3	2	3	4,5	6	
length* approx.	mm	64	59	55	191	175	150	139	131	103	
standard horn for HD 2070/3100		-	-	-	SH 70 G	SH 70 G	-	-	-	-	
booster horn for HD 2200/3200		-	-	-	SH 213 G	SH 213 G	-	-	-	-	
booster horn for HD 3400		-	-	-	-	-	-	-	-	-	
standard horn for HD 4100		-	-	-	-	-	SH 100 G	SH 100 G	SH 100 G	SH 100 G	
standard horn for HD 4200		-	-	-	-	-	SH 200 G	SH 200 G	SH 200 G	SH 200 G	
amplitude for HD 2070/3100 (peak to peak)	µm	-	-	-	253/285	212/245	-	-	-	-	
amplitude for HD 2200/3200 (Peak to peak)	µm	-	-	-	282/286	302/308	-	-	-	-	
amplitude for HD 3400 (peak to peak)	µm	-	-	-	-	-	-	-	-	-	
amplitude for mini20	µm	65	70	72	-	-	-	-	-	-	
amplitude for HD 4050/4100 /4200 (peak to peak)	µm	-	-	-	-	-	125/260/-	118/245/280	90/195/235	70/155/210	
volume HD 2070/3100	ml	-	-	-	1 to 25	2 to 50	-	-	5 to 100	-	
volume HD 2200/3200	ml	-	-	-	2 to 30	5 to 90	-	-	10 to 350		
volume HD 3400	ml	-	-	-	-	-	-	-	-	-	
volume mini20	ml	0.1 to 10	0.25 to 20	0.5 to 25	-	-	-	-	-	-	
volume HD 4050	ml	-	-	-	-	-	0.5 to 20	1 to 25	3 to 50	5 to 75	
volume HD 4100	ml	-	-	-	-	-	2 to 25	3 to 50	5 to 75	10 to 100	
volume HD 4200	ml	-	-	-	-	-	-	5 to 90	5 to 100	10 to 350	
vessel dia. (minimum)	mm	4	6	6	4	6	4	6	8	8	

*probe length may vary slightly due to the variations in the titanium material

Probes achieve an enhanced amplitude caused by their configurations. This is followed by highest ultrasonic power density in liquids. These probes are used for special tasks in laboratories like for cell and bacteria disruption in biology or acceleration of reactions in chemistry.

Titanium flat tips TT are used for sonication of medium sized samples.

Extended probes VS are especially used for treatment of ceramic suspensions or for sample preparation for following grain size determination.

Probe extension ...

... for enlarging the operating depth in deep vessels. It is mounted between standard or booster horn and flat tip.

VS 70 between SH 70 G /213 G and TT 13

VS 200 between SH 225 G and TT 25

	probe extension	
	VS 70	VS 200
for HD	2070 / 2200 3100 / 3200	2200 / 3200
code no.	500	415

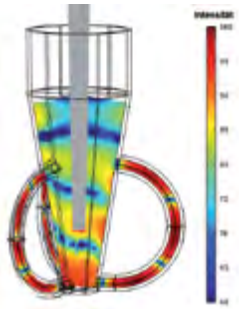
titanium probes					extended probes			tapered tip	titanium flat tips			
TS 109	TS 113	TS 216	TS 219	TS 225	VS 70 T	VS 190 T	VS 200 T	KE 76	TT 13	TT19	TT 25	TT 213
3744	3745	3746	3747	3748	494	3638	478	530	497	491	532	3750
9	13	16	19	25	13	19	25	6	13	19	25	13
117	130	-	-	-	130	130	130	135	5	5	6	-
-	-	-	-	-	SH 70 G	-	-	SH 70 G	SH 70 G	-	-	-
-	-	-	-	-	SH 213 G	SH 219 G	SH 225 G	SH 213 G	SH 213 G	SH 219 G	SH 225 G	-
-	-	-	-	-	-	SH 3419	SH 3425	-	-	-	-	-
SH 100 G	SH 100 G	SH 100 G	SH 100 G	SH 100 G		-	-	-		-	-	SH 100 G
SH 200 G	SH 200 G	SH 200 G	SH 200 G	SH 200 G	-	-	-	-	-	-	-	SH 200 G
-	-	-	-	-	80/97	-	-	165/191	78/93	-	-	-
-	-	-	-	-	153/170	73/81	46/51	249/255	149/165	73/81	48/53	-
-	-	-	-	-	-	116	82	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
58/130/185	-/82/132	-/-/90	-/-/68	-/-/50	-	-	-	-	-	-	-	-/82/132
-	-	-	-	-	10 to 200	-	-	5 to 100	10 to 200	-	-	-
-				-	20 to 900	25 to 900	30 to 1000	10 to 350	20 to 900	25 to 900	30 to 1000	-
-	-	-	-	-	-	100 to 1500	100 to 2500	-	-	-	-	-
-					-	-	-	-	-	-	-	-
10 to 100	-	-	-	-	-	-	-	-	-	-	-	-
15 to 150	20 to 200	-	-	-	-	-	-	-	-	-	-	20 to 200
10 to 500	20 to 900	25 to 900	25 to 900	30 to 1000	-	-	-	-	-	-	-	20 to 900
12	17	20	23	29	17	23	29	8	17	23	29	17

SONOPULS®
Accessories

		material	function	
standard horn SH		Ti-6Al-4V	transmit and amplify vibrations down the length of the probe; replaceable probes can be connected; with exterior thread to connect various vessels	type code no.
booster horn SH				type code no.
flow-through standard horn FZ				type code no.
flow-through booster horn FZ			to produce stable mixtures of either non-mixable or hardly mixable liquids (oil/water); with exterior thread to connect various vessels	type code no.
sleeve adapter NA		PTFE	standard ground glass vessels can be connected to standard or booster horns with exterior thread	type code no.

Processing vessels for direct processing

flow-trough processing vessel DG		stainless steel	continuous flow-through processing, e. g. emulsifying; dispersing or homogenizing; overpressure < 2 bar maximum volume to be sonicated in flow-through: 50 l/h sample can be sonicated repeatedly in circulation	type code no.
flow-trough vessel DG		borosilicate glass	– with cooling jacket – processing of larger samples in flow-through circulation of cooling liquid to keep sample from overheating	type code no.
cooling vessel KG		borosilicate glass	– with cooling jacket – processing of temperature-sensitive samples circulation of cooling liquid to keep sample from overheating	type code no.
rosett cell RZ		borosilicate glass	intense and uniform sonication of liquid samples caused by the shape of the vessel	type code no.



Intensity distribution
(distance between probe tip KE 76 and vessel bottom = 3 cm)
Reference: Beuth Hochschule Berlin

HD 2070	HD 2200	HD 3100	HD 3200	HD 3400	HD 4050	HD 4100	HD 4200
SH 70 G 486		SH 70 G 486				SH 100 G 3731	
	SH 213 G SH 219 G SH 225 G 3647 / 527 / 3634		SH 213 G SH 219 G SH 225 G 3647 / 527 / 3634	SH 3419 SH 3425 3679 / 3692			SH 200 G 3732
FZ 5 G 490		FZ 5 G 490					
	FZ 7 G 452		FZ 7 G 452				
NA 29 G NA45 G 540 / 487						NA 29 G NA 45 G 540 / 487	
DG 4 G 3608						DG 4 G 3608	
DG 3 538	DG 3 / DG 5 / DG 6 538 / 482 / 3819	DG 3 538	DG 3 / DG 5 / DG 6 538 / 482 / 3819	DG 6 3819	DG 3 538		DG 3 / DG 5 DG 6 538 / 482 3819
KG 3 536	KG 3 / KG 5 536 / 481	KG 3 635	KG 3 / KG 5 635 / 481		KG 3 635		KG 3 / KG 5 635 / 481
RZ 1 / RZ 2 / RZ 3 3606 /3607 522	RZ 1 / RZ 2 / RZ 3 RZ 4 / RZ 5 3606 / 3607 / 522 3256 / 483	RZ 1 / RZ 2 / RZ 3 3606 / 3607 522	RZ 1 / RZ 2 / RZ 3 RZ 4 / RZ 5 3606 / 3607 / 522 3256 / 483	RZ 4 / RZ 5 3256 / 483	RZ 1 / RZ 2 / RZ 3 3606 / 3607 / 522		RZ 1 / RZ 2 /RZ 3 RZ 4 / RZ 5 3606 / 3607 522 / 3256 483

SONOPULS®
Zubehör

Processing vessels for indirect processing

		material	function	
cup horn BB		plastic + Ti-6Al-4V	equipped with inlet and outlet for circulation of cooling liquid; also useable for direct sonication	type code no.
microtube holder EH 6		stainless steel	for simultaneous treatment of up to 6 samples, max. 2.5 ml; a mix-up of samples is excluded due to markings at the holder; for BB 6	type code no.
microtube holder EH 3		stainless steel + plastic	for simultaneous treatment of up to 3 samples, max. 2.5 ml; 2 exchangable discs with hole diameters 8.5 or 11.5 mm; for BR 30	type code no.
cup booster BK		stainless steel	for intensive cleaning of small parts, e. g. radioactively contaminated seeds; for BR 30	type code no.
Becherresonator BR		Ti-6Al-4V	high-intensive irradiation, of e. g. radioactively contaminated seeds or bacteria as well as for flow-through sonication; either cooling or flow-through processing are possible.	type code no.

Further accessories

stainless steel stand HG		stainless steel	with clamp for safe fixing of ultrasonic converter	type code no.
clamp KL			for HG 5 / HG 10 with rod and swivelling clamp for reaction vessels dia. 15 mm to 100 mm	type code no.
supporting table AT			suitable for KL 7 or in LS 8; with non-slip mat to hold sample vessels securely in place	type code no.
sound proof box LS		plastic-coated walls or stainless steel/ door trans-parent	to reduce the noise level; LS 4 – 10 dB-AU damping, LS 8 / LS 11 – 20 dB-AU damping LS 8 / LS 11 – included rod and swivelling clamp for reaction vessels	type code no.
special support UG		stainless steel	for inverted position of the LS during indirect sonocation, special support UG 6 is necessary	type code no.
distance tube AH		plastic	AH 6 – direct processing with long probes in LS 8 AH 50 – adapter for fixing UW 50 to HG 5 or in LS 4/8	type code no.
foot switch remote control TS		metal + plastic	for easy switching ON/OFF of the HF generator; with 3 m connection cable	type code no.
temperature sensor TM		metal version	temperature module is activated after connection to HF generator; for measuring temperatures from 0 to 120 °C temperature sensor dia. TM 50 = 1.9 mm, TM 100 = 4 mm	type code no.
WINPULS® remote control			for process control with PC for operation systems MICRO-SOFT® WINDOWS®; with different additional functions like test logging and comfortable data storage (up to 99 storages). Set composed of WINPULS® software and infrared adapter IR 1 for interface RS 232	type code no.

HD 2070	HD 2200	HD 3100	HD 3200	HD 3400	HD 4050	HD 4100	HD 4200
	BB 6 3605		BB 6 3605				
	EH 6 059		EH 6 059				
EH 3 078	EH 3 078	EH 3 078	EH 3 078				EH 3 078
		BK 30 098					BK 30 098
		BR 30 082					BR 30 082

		HG 5 459		HG 10 3646	HG 5 459		
		KL 7 3636					KL 7 3636
		AT 7 3644					AT 7 3644
		LS 4 / LS 8 416 / 3653		LS 11 3663	LS 4 / LS 8 + AH 50 416 / 3653 + 3820	LS 4 / LS 8 416 / 3653	LS 8 3653
		UG 6 3616			UG 6 3616		
		AH 6 3619			AH 50 3820		AH 6 3619
		TS 8 531			TS 8 531		
					TM 50 / TM 100 3733 / 3622		
					WINPULS 3625		

SONOREX® TECHNIK
Sonoreactors

SONOBLOC®

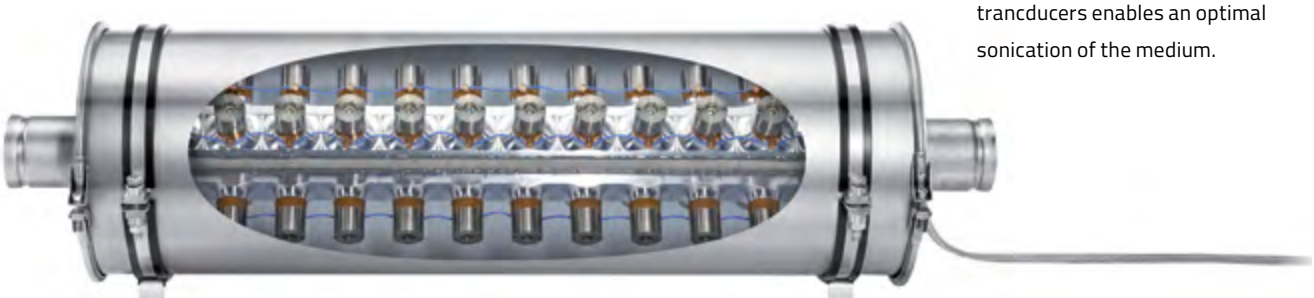
Tube reactors for use in process engineering and for cleaning

SB 8-1002,1

SB 101-2002

Applications

- ultrasonic intensive treatment of flexible fibrous products and wire or band-shaped endless profiles
- support of industrial and biotechnological processes in cleaning, disintegrating, degassing and disagglomerating
- efficient cleaning by removing grease, oil, emulsions and/or crack residues with single- and multiple-wire cleaning
- CO_2 degassing of aqueous reactants
- support of disinfection (bacterial elimination) in water and wastewater treatment
- disintegration and decomposition of organic material to increase the biogas yield of anaerobic digestion
- support of disinfection of bacteria- and parasite-burdened fishbreeding circulating waters
- dispersion of solid particles in liquids (medicine production)



Set-up of a tube reactor:
The special arrangement of trancducers enables an optimal sonication of the medium.

VORTEX®

Vortex reactor for use in process engineering

patent EP 22 23 742

WR 4-1503,01

Applications

- intensifying of industrial, biotechnological and chemical processes, disintegrating, degassing and disagglomerating
- intense degassing of dye solutions and photographic emulsions
- CO_2 degassing of aqueous reactants
- support of disinfection (bacterial elimination) in water and wastewater treatment
- disinfection of organic contaminant material in industrial rinsing liquids for recycling
- support of disinfection of bacteria- and parasite-burdened fishbreeding circulating waters
- producing of finest polishing pastes for wafer industry
- homogenizing of pigments in oil (producing of ink)

Technical data regarding sonoreactors please see page 32.

Ultrasonic-UV-reactor for use in process aquaculture, water treatment and sewage disinfection

UV 5-1002,05

Applications

- elumination of germs and parasites in the circulation water of aquaculture systems (fish and ornamental fish farming, leech farming)
- disinfection (elumination of bacteria) during water and sewage treatment

	SONOBLOC tube reactorbloc RB			VORTEX reactorbloc WB			ultrasonic-UV-reactorbloc AQ
	8-1002	**8-1004**	**101-2002**	**4-1402**	**4-1503**	**4-1604**	**5-1002.05**
flow-through rate (l/min)	1–100			1–50			3.5–50
internal pressure, max. (bar)	10			10			2 (UV lamp)
solid particles (mm)	< 50		< 80	< 5			< 5
power density, max. (W/l)	500		444	480	520	550	~ 420
power max. (W)	1000		2000	1400	1500	1600	1000
frequency (kHz)	25	40	25	25	25 / 40	40	25
radiation power							UV-C 254 nm
reaction tube	tube 2"		tube 3"	gap between 2 tubes			gap between 2 tubes
tube material stainless steel AISI 316Ti **dimmensions (mm)**	dia. 60.3 × 3.6		dia. 88.9 × 3.6	dia. 139.7 × 2.6; dia. 104 × 2			dia. 88.9 × 3.6; dia. 48.3 × 2
dimensions of housing (l × w × h) (mm)	260 × 150 × 990		dia. 370 × 1215	290 × 290 × 642			895 × 895 × 1000
built-in length (mm)	1215			856			
Degree of protection	IP 22, optional IP 65		IP 65	IP 22			IP 30
weight, net (kg)	~ 35		~ 50	~ 50			~ 55
HF generator (separate)	LG 1001 T		LG 2002 T	LG 1510 T	LG 2002 T		LG 1001 T-UV

Accessories – optional

victaulic connection
consisting of:
2 pcs. 2" or 3" victaulic stainless steel coupling AISI 316Ti with EPDM gasket
2 pcs. stainless steel tube connection, AISI 316Ti, 2" or 3", for welding into existing pipe system

For further information please visit our homepage: www.bandelin.com

BANDELIN

Ultrasound since 1955

BANDELIN electronic, a family-owned mid-sized company, is located in the capital of Germany – Berlin. Development and manufacture of ultrasonic devices and disinfection and cleaning agents are carried out in Berlin. A wide vertical range of manufacture, modern production lines and a motivated staff guarantee a high quality of the products. The customers can buy everything from one-hand. Ultrasonic devices are in use in nearly all branches like industry, maintenance, service, medical, pharmaceutical and dental fields as well as laboratories.

Development and manufacture of high-power ultrasonic units began already in 1955. The product range was enlarged in the middle of the eighties caused by increased sales. Adjustable and power-constant HF-generators were launched in 1992.

The brand names SONOREX, SONOPULS and SONOMIC are equated with ultrasound from experts.

The most important product groups are:

- SONOREX – Ultrasonic baths and reactors
- SONOPULS – Ultrasonic homogenizers
- SONOMIC – Ultrasonic bath for rinsable keyhole surgery instruments and standard instruments
- TRISON – Ultrasonic bath for robotic instruments, rinsable keyhole surgery instruments and standard instruments
- STAMMOPUR – Disinfecting and cleaning agents

BANDELIN electronic is the leader in development of new ultrasonic devices and opening up new application areas. In the past about 33 patterns / utility patents and 56 brand names were applied for.
The company supports several committees in compiling of norms and guidelines.
All products are CE marked.

Made in Germany.

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🖷 **+49 30 7734699**
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Certified according to
EN ISO 9001:2008,
EN ISO 13485:2012

Tell us your requirements –
We will pleased to advice you at no obligation.

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www.bandelin.com

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