

SONOPULS Ultrasonic Homogenizers, BANDELIN

Selecting the best SONOPULS ultrasonic homogenizer for your needs

The ultrasonic output of an homogenizer depends on the amplitude present at the ultrasound-emitting surface of the sonotrode. Start with the volume of the sample that is to be subjected to the ultrasound. Use the diameter of the ultrasound vessel into which the sonotrode is to be immersed and the following table to determine the optimum sonotrode amplitude and the correct SONOPULS ultrasonic homogenizer.

Titanium sonotrodes in conjunction with the SONOPULS ultrasonic homogenizer

Type	Dia. mm	HD 2070	HD 2200	Amplitude μm_{ss} HD 2070/2200
MS 72	2	1 ml – 25 ml	2 ml – 30 ml	253/282
MS 73	3	2 ml – 50 ml	5 ml – 90 ml	212/302
KE 76	6	5 ml – 100 ml	10 ml – 350 ml	165/249
TT 13	13	10 ml – 200 ml	20 ml – 900 ml	78/149
TT 19	19		25 ml – 900 ml	– / 73
TT 25	25		30 ml – 1000 ml	– / 48

Examples:

1 ml liquid in centrifuge vial with 9 mm ID: MS 73 microtip on HD 2070.

15 ml liquid in test tube with 12 mm ID: KE 76 conical tip on HD 2070.

100 ml liquid in glass beaker with 45 mm ID: TT 13 titanium disk on HD 2200.

SONOPULS HD 2070 and HD 2200

Cell disintegration, accelerated reaction, extracting, emulsifying, suspending, homogenizing, degassing of liquids and for the SONOCHEMIE. Controllable, high energy density for the processing and preparation of samples with ultrasound in the biochemistry lab, in research and in small-scale production.

Amplitude adjustment with electronic stabilization in a range of 10 – 100% for consistent results.

Pulsation of 10 – 100% limits the temperature increase when handling heat-sensitive samples. Cooling in pauses between sound pulses. 20 kHz equalized sound. Sound period 1 sec to 99 min. All values appear on the digital display. Protected against dry-running and constant operation. 230 V (115 V also available). Noise suppressed with CE mark of approval. Also as a medical product in compliance with the In Vitro Diagnostics Directive.

Article	Order No.
① SONOPULS HD 2070 kit	53 07 02450
For volumes from 2 ml to 50 ml. Ready-to-use basic model: HF generator GM 2070, ultrasonic transducer UW 2070, horn SH 70 G with external thread and microtip MS 73 dia. 3 mm. 70 W HF power. See table above for other volumes.	

Article	Order No.
SONOPULS HD 2200 kit	53 07 02530
For volumes from 20 ml to 900 ml. Ready-to-use basic model: HF generator GM 2200, ultrasonic transducer UW 2200, booster horn, SH 213 G with external thread and titanium disk TT 13 dia. 13 mm. 200 W HF power. See table above for other volumes.	

Accessories for HD 2070 and HD 2200

For accommodating titanium sonotrodes:

Titanium horns instead of SH 70 G/SH 213 G

Article	Order No.
SH 219 G Ø 19 mm for UW 2200	53 07 02210
SH 225 G Ø 25 mm for UW 2200	53 07 02212

SONOPULS HD 3100 and HD 3200

- Amplitude control in % or as power control in watts
- Pulsation: Working intervals of 0.1 s to 600 s, rest intervals of 0.2 s to 600 s
- Timer 9 h: 59 min: 59 s
- Energy input indicated in kJ
- 9 user programs
- Indication of permissible sonotrodes
- Automatic amplitude limit after preselecting the mounted sonotrode
- Temperature display from 0 to 120°C, choice of cut-out or acoustic alarm if maximum temperature is exceeded, optional temperature sensor
- WINPULS remote control system for process configuration by PC via RS-232 and IR interface
- Illuminated LCD graphic display



- | Article | Order No. |
|--|--------------------|
| ② SONOPULS HD 3100 set | 53 07 03680 |
| For volumes from 2 ml to 50 ml. Ready-to-use basic model with GM 3100 generator, UW 3100 ultrasonic transducer, SH 70 G booster horn and MS 73 microtip with 3 mm diameter. Max. 100 W HF power. 20 kHz working frequency. 230 V~, 50/60 Hz or 115 V~, 50/60 Hz. Five 2 to 13 mm diameter titanium sonotrodes available for volumes from 1 ml to 200 ml. | |

- | Article | Order No. |
|--|--------------------|
| ③ SONOPULS HD 3200 set | 53 07 03660 |
| For volumes from 20 ml to 900 ml. Ready-to-use basic model with GM 3200 generator, UW 3200 ultrasonic transducer, SH 70 G booster horn and TT 13 titanium disk with 13 mm diameter. Max. 200 W HF power. 20 kHz working frequency. 230 V~, 50/60 Hz or 115 V~, 50/60 Hz. Eight 2 to 25 mm diameter titanium sonotrodes available for volumes from 2 ml to 1000 ml. | |

The stand and vessel shown in the illustration are not included in delivery.

- | Article | Order No. |
|--|--------------------|
| ④ SONOPULS HD 3400 | 10 07 33690 |
| For volumes from 100 ml to 2500 ml. Ready-to-operate basic equipment consisting of generator GM 3400, ultrasonic converter UW 3400, booster horn SH 3425 and extended probe, 25 mm diameter. HF-output max. 400 W _{eff} | |
| Stand and vessel shown in the illustration are not included in delivery. | |

Accessories for HD 3100 and HD 3200

- | Article | Order No. |
|--|--------------------|
| ⑤ WINPULS remote control for HD 3100/3200 | 53 07 03625 |
| For process monitoring using a PC with WIN 2000 or WIN XP. Various additional functions such as test logging and user-friendly data storage management (up to 99 memory slots). Set consisting of WINPULS software and IR 1 infrared adapter for RS 232 interface. | |
| ⑥ TM 100 temperature sensor | 53 07 03622 |
| For HD 3100/3200, for measuring the sample temperature from 0 to 120°C. | |

Titanium sonotrodes

Type	Version	Ø mm	for	Order No.
⑦ MS 72	Micro tip	2	SH 70 G, SH 213 G	53 07 03062
⑧ MS 73	Micro tip	3	SH 70 G, SH 213 G	53 07 03065
⑨ KE 76	Conical tip	6	SH 70 G, SH 213 G	53 07 03068
⑩ TT 13	Titanium disk	13	SH 70 G, SH 213 G	53 07 05215
⑪ TT 19	Titanium disk	19	SH 219 G	53 07 05223
⑫ TT 25	Titanium disk	25	SH 225 G	53 07 05225

Beaker resonator

Indirect exposure:

Article	Order No.
BB 2G for SH 70 G and TT 13, plastic	53 07 06062
⑬ BB 6 for HD 2200, plastic	53 07 03605
BR 30 for HD 2070, HD 2200, titanium alloy	53 07 06205

Reaction cup holders

- | Article | Order No. |
|--|--------------------|
| ⑭ EH 6 | 53 07 06206 |
| For accommodating up to 6 samples simultaneously. Contact-free exposure in the BB6. (perforation diameter 11.5 mm) | |

- | Article | Order No. |
|--|--------------------|
| ⑮ EH 3 | 53 07 06278 |
| For the BR 30. For exposing 3 samples simultaneously. Two interchangeable disks with perforation diameter 8.5 or 11.5 mm | |

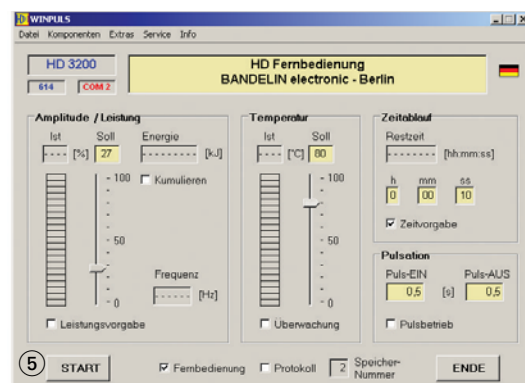
Cooling vessels

With liquid cooling of the sample, made of glass for visual inspection

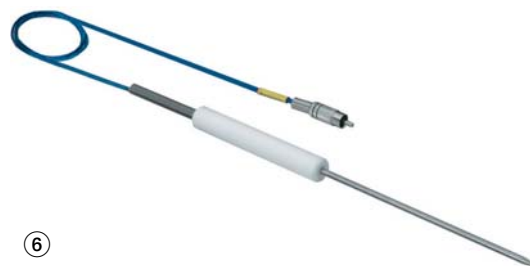
Article	Order No.
KG 3 up to 15 ml, for sonotrodes up to Ø 13 mm	53 07 07003
KG 5 up to 80 ml, for sonotrodes up to Ø 25 mm	53 07 07005



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⑥



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⑮



Flow-through vessels

With cooling jacket, made of glass for visual inspection or of stainless steel

Type	Volume ml	Material	for	Order No.
DG 3	– 15 ml	Glas	Sonotrodes up to $\varnothing$ 13 mm	53 07 07103
DG 5	– 80 ml	Glas	Sonotrodes up to $\varnothing$ 25 mm	53 07 07105
16 DG 4 G		Stainless steel	HD 2070/HD 2200	53 07 03608

Exposure vessels made of glass

Article	Volume ml	for	Order No.
RZ 3	120	Sonotrodes up to $\varnothing$ 25 mm, HD 2070/2200/3200/3100	53 07 07120
RZ 5	900	Sonotrodes up to $\varnothing$ 25 mm, HD 2200/3200	53 07 07121
SZ 3	20	Sonotrodes up to $\varnothing$ 13 mm, HD 2070/2200/3200/3100	53 07 07122
SZ 5	130	Sonotrodes up to $\varnothing$ 25 mm, HD 2200/3200/3400	53 07 07123

RZ = Rosette cells, SZ = Suslick cells

Accessories

Article	Order No.
Extension piece VS 70	53 07 08225
For SH 70 G	
Sonotrode long VS 70 T	53 07 08494
For SH 70 G and SH 213 G	
Sonotrode long VS 200 T	53 07 08478
For SH 225 G	
Standard ground adapter NA 29 G	53 07 09029
For NS 29/32 SH 70/213 G	
Standard ground adapter NA 45 G	53 07 09031
For NS 45/40 SH 70/213/219/225 G	
Foot switch remote control TS 8	53 07 09108
For HD 2070/2200/3100/3200/3400	
Stainless steel stand HG 5	53 07 09205
For HD 2070/2200/3100/3200	
Stainless steel stand HG 10	10 07 33646
For HD 3400	
17 Clamping device KL 7	10 07 33636
For HG 5 / HG 10. With rod, swivelling clamp and quick clamp for reaction vessels dia. 15 mm to dia. 100 mm	
18 Supporting table AT 7	10 07 33644
Suitable for KL 7 or in LS 7	

Sound-reducing boxes

Sound-reducing boxes lower the noise level. Rear openings for gas supply or flow-through exposure.

Article	Order No.
Sound-reducing box LS 4	53 07 09301
Made of wood, 10 dB (AU), für HD 2070/2200	
Article	Order No.
19 Sound-reducing box LS 7	53 07 03615
Made of stainless steel, 20 dB (AU), with height-adjustable lifting table for HD 2070/2200/3100/3200. For indirect exposure with the BR 30, BB 6 or BB 2 G you must turn the LS 7 through 180°. This requires base UG 6.	
Article	Order No.
20 Sound-reducing box LS 10	10 07 33637
Stainless steel, 20 dB (AU), for HD 3400	
Article	Order No.
21 Base UG 6	53 07 03616
Article	Order No.
22 Spacer tube AH 6	53 07 03619
For direct exposure with long sonotrodes (MS 72/73, KE 76, VS 70 with TT 13, VS 200 with TT 25, VS 70 T, VS 200 T and GS..). Is clamped directly in the closure of LS 7.	



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