2021

BANDELIN
Ultraschall seit 1955

High-power ultrasound
Sonoreactors

Cleaning – Degassing
Disagglomeration – Emulsifying – Disinfection

SONOREX TECHNIK
Sonoreactors

SONOBLOC
Tube reactors for use in process engineering and for cleaning

SB 8-1002.01

SB 101-2002.01

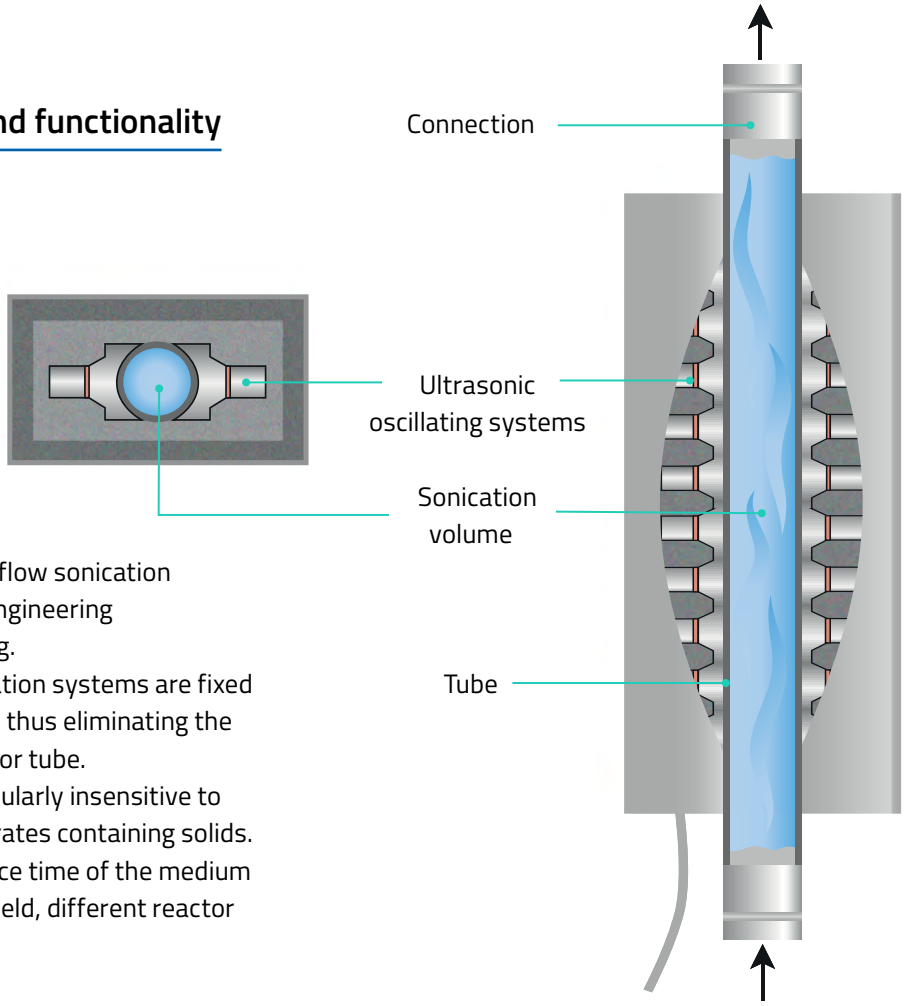
Features

- Large-volume flow-through sonication across the entire tube cross section of the reactor
- Advantageous intensive sonication of thin and/or fibrous products due to distinctive focus zone in the reactor tube
- Space-saving narrow design for tight parallel installations
- Optimised design 25 kHz or 40 kHz ultrasound operating frequency
- Easy scale-up for extendable series or parallel operation through modular construction
- Simple installation and versatile use due to Victaulic connection technology; optionally with thread, flange or Tri-Clamp connections
- Long service life due to 3.6 mm thick stainless steel tube material AISI 316L
- Standard design with housing, degree of protection IP 30. For use in environments with elevated penetration of dust and moisture, with housing degree of protection IP 65
- Reproducible results due to capacity control via a microprocessor-controlled ultrasound generator

Applications

- Ultrasonic intensive treatment of flexible filiform products and of wire or ribbon-shaped continuous profiles
- Acceleration of desintegration and/or breakdown of organic material for increasing biogas yields and for treatment of sewage sludge
- Supporting the disinfection of germ and parasite laden circulation water in pisciculture
- Dispersing of solids in liquids (pharmaceutical production)
- Supporting disinfection (killing of bacteria) in water and sewage treatment
- CO_2 degassing from aqueous reactants
- Efficient cleaning of grease, oil, emulsions and/or cracked residues in single and multiple wire cleaning
- Support of industrial and biotechnological processes in cleaning, disintegration, degassing and disagglomeration

Schematic construction and functionality



The figures show the schematic construction of a tube reactor type RB 8.
Tube reactors allow the intensive flow sonication of high volume flows in process engineering and are also used for wire cleaning.
In this design, the powerful oscillation systems are fixed to the outside of the reactor tube, thus eliminating the need for internals inside the reactor tube.
Tube reactors are therefore particularly insensitive to blockages when sonicating substrates containing solids.
Depending on the desired residence time of the medium to be sonicated in the cavitation field, different reactor sizes are available.

Technical data

	RB 8-1002.01 – .04	RB 8-1004.01 – .04	RB 81-1002.01	RB 101-2002.01
Filling volume [l]	2.4			6.4
Sonication volume [l]	2.0			4.5
Flow-trough rate [l/min]	1 – 100			1 – 100
Sonication length [mm]	910			860
Power intensity, max. [W/l]	500			444
Ultrasonic nominal power [W]	1000			2000
Ultrasonic frequency [kHz]	25	40	25	25
Tube dimensions (Ø × material thickness) [mm]	60.3 × 3.6			88.9 × 3.6
Tube length incl. connections* [mm]	.01 = 1215 / .02= 1215 / .03= 1100 / .04= 1215			1215
Tube dimensions, internal [mm]	53			81.7
Tube material	Stainless steel, AISI 316L			
Housing dimensions (l× w × h) [mm] (Ø × h) [mm]	260 × 120 × 990** –		285 × 150 × 1075 –	– 340 × 1000**
HF connection cable (EMC-protected), quantity [pcs.] × length [m]	1 × 5			2 × 5
Internal pressure, max. [bar]	10			10
Weight, net [kg]	~ 35			~ 50
Degree of protection	IP 30		IP 65	IP 65
Ultrasound generator (separate)	LG 1001 T			LG 2002 T

*Connection variants see page 7. ** incl. mounting brackets

SONOREX TECHNIK
Sonoreactors

VORTEX
Vortex reactor for use in process engineering

Bundesministerium für Bildung und Forschung

WR 4-1503.01

Features

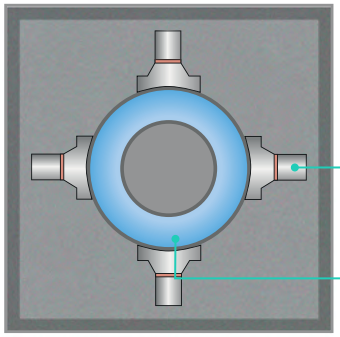
- High-intensity flow-through sonication through targeted rotary movement of the sonication medium in the reactor
- High process yield through cavitation-intensive ultrasonic near field in a narrow reaction gap
- Efficient omnidirectional characteristic through extensive reactor exterior configuration
- Wide range of uses due to single-frequency or TwinSonic versions for 25 kHz and/ or 40 kHz ultrasonic frequency
- Easy scale-up for extendable series or parallel operation through modular construction
- Simple installation and versatile use due to Victaulic connection technology; optionally with thread, flange or Tri-Clamp connections
- Long service life due to 2.6 mm thick stainless steel tube material AISI 316L
- Reproducible results due to capacity control via a microprocessor-controlled ultrasound generator

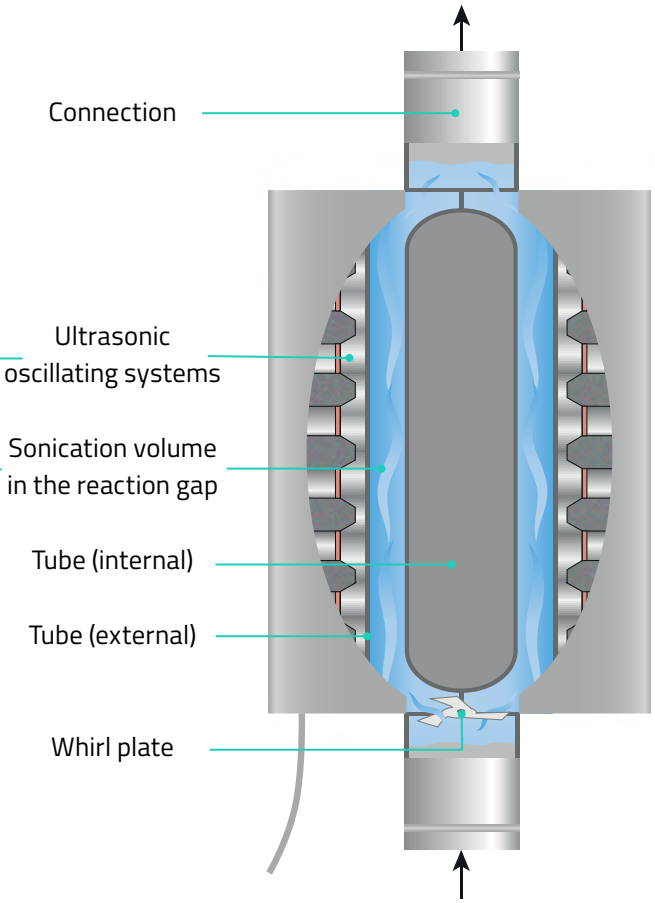
Applications

- Intensivation of industrial, biotechnological and chemical processes (suspension, emulsion, disag-glomeration, reaction acceleration, degassing)
- Intensive degassing of dye solutions and photographic casting solutions
- CO_2 degassing from aqueous reactants
- Supporting disinfection (killing of bacteria) in water and sewage treatment
- Sterilisation of organic contents in industrial rinsing liquids
- Supporting the disinfection of germ and parasite laden circulation water in pisciculture
- Production of ultra-fine polishing pastes for the wafer industry
- Homogenisation of colour pigments in oil (paint industry)

Two exemplary fields of application for sonoreactors; in the paint and cosmetics industry

Schematic construction and functionality





The figures show the schematic construction of a vortex reactor type WB 4. The vortex reactor enables the defined flow of the liquid medium to be sonicated through a double slit and guarantees a homogeneous sonication on the particularly cavitation-intensive inner surface of the reactor tube. An additional swirling of the medium to be sonicated when entering the reactor tube further improves the homogenisation.

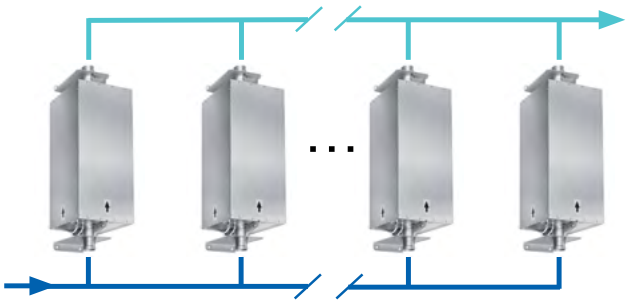
Technical data	WB 4-1402.01 – .04	WB 4-1503.01 – .04	WB 4-1604.01 – .04
Filling volume* [l]		~5	
Sonication volume [l]		2.9	
Flow-trough rate [l/min]		1 – 50	
Sonication length [mm]		500	
Power intensity, max. [W/l]	480	520	550
Ultrasonic nominal power [W]	1400	1500	1600
Ultrasonic frequency [kHz]	25	25 and 40	40
Tube dimensions, internal/ external (Ø × material thickness) [mm]		104 × 2 / 139.7 × 2.6	
Tube length incl. connections** [mm]		.01 = 856 / .02= 856 / .03= 796 / .04= 856	
Tube material		Stainless steel, AISI 316L	
Housing dimensions (l× w × h) [mm]		290 × 290 × 642	
Reaction gap [mm]		15	
Solid particles		< 5 mm	
HF connection cable (EMC-protected), quantity [pcs.] × length [m]	1 × 5	2 × 5	2 × 5
Internal pressure, max. [bar]		10	
Weight, net*** [kg]		~ 50	
Degree of protection		IP 30	
Ultrasound generator (separate)	LG 1510 T	LG 2002 T	LG 2002 T

* The filling volume depends on the connection variants. ** Connection variants see page 7
*** The weight depends on the type (vortex reactor bloc) and the total power

Scale-up operations of the sonoreactors

▪ Tube reactors SONOBLOC and VORTEX reactors

Parallel operation
For sonication of large quantities, e.g. 400 l/min with multiple reactors (also possible in combination with serial operation).

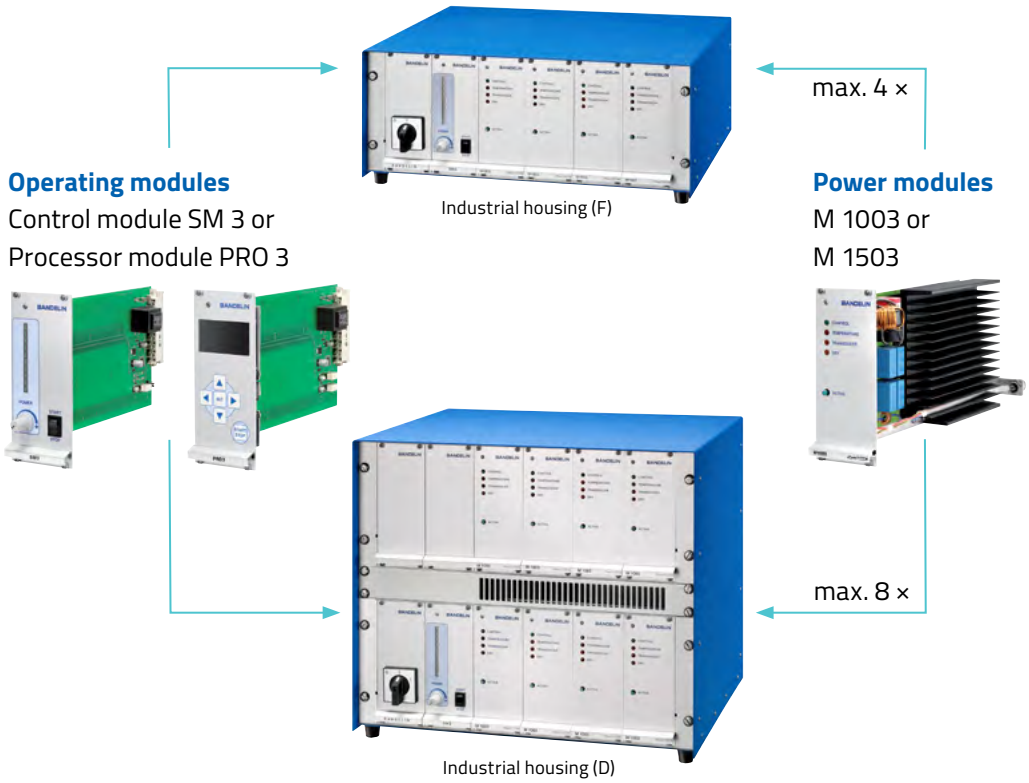


Serial operation
For high-intensity, continuous sonication with multiple reactors (also possible in combination with parallel operation).

▪ Ultrasound generators LG ... for scale-up operation

To operate the reactors, high-performance, microprocessor-controlled ultrasound generators LG of up to 9000 W are used.

Generators are controlled directly at the generator or externally via the RS 232 serial interface or the remote control connection.



Industrial housing (F) up to 6 kW
Dimensions (l × w × h): 488 × 405 × 203 mm
or 19"-plug-in unit for electrical cabinet integration
Mains supply: 400 V 3N~ (± 10%) 50/60 Hz

Industrial housing (D) up to 9 kW
Dimensions (l × w × h): 488 × 405 × 425 mm
or 19"-plug-in unit for electrical cabinet integration
Mains supply: 400 V 3N~ (± 10%) 50/60 Hz

Type code reactors

A tube or vortex reactor is defined by the type code:

Construction size
4 = construction size 2" of WR and WB
8 = construction size 2" of SB and RB
10 = construction size 3" of SB and RB

Individual name
RB = tube reactor
WB = vortex reactor
or
Set name
SB = tube reactor incl. generator LG,
WR = vortex reactor incl. generator LG

Degree of protection of housing
without = IP 30 (standard)
1 = IP 65 (dust and jet water protected)

Total power
XX = value × 100 (total internal and external power),
here then 10 × 100 = 1000 Watt

SB 8 1-10 0 2.01-DL

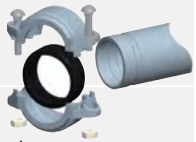
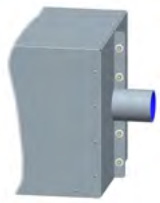
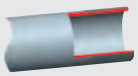
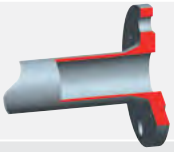
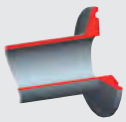
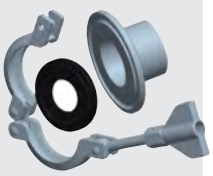
Connection versions
.01 = Victaulic
.02 = thread
.03 = flange
.04 = Tri-Clamp

Construction variants
-DL = with compressed-air connection
-S = special version

Frequency (external)
0 = without configuration
2 = 25 kHz
3 = mixed configuration (25 and 40 kHz)
4 = 40 kHz

Frequency (internal)
0 = without configuration
2 = 25 kHz
4 = 40 kHz

Connection variants

Active components	Variants	Tube Ø	Optional accessories
 **Tube reactor bloc RB** (Out and input: tube of stainless steel, AISI 316L)	**.01** (standard) **Victaulic connection** 	2"	**VAS 2** Victaulic connection, consisting of: 2 pcs. stainless steel tube connection, AISI 316L, dia. 60.3 × 3.6 × 100 mm long, for welding into existing tube systems 2 pcs. 2"-Victaulic coupling with EPDM gasket 
			VAK 2 2 pcs. 2"-Victaulic coupling with EPDM gasket, for connection of 2 tube reactor blocs in serial operation
		3"	**VAS 3** Victaulic connection, consisting of: 2 pcs. stainless steel tube connection, AISI 316L, Ø 88,9 × 3,6 × 100 mm long, for welding into existing tube systems, 2 pcs. 3"-Victaulic coupling with EPDM gasket
 **Vortex reactor bloc WB** (Out and input: tube of stainless steel, AISI 316L)	**.02** (optional) **External thread** 	2"	–
	.03 (optional) **Flange connection**, Welding-neck flange DIN 2633 ND 16 DN 50 	2"	–
	.04 (optional) **Clamp connection (Tri-Clamp)**, DIN 32676, clamp tube end ISO, DN 50 (flange-Ø 77.5 mm) 	2"	**KAS 2** Clamping connection (Tri-Clamp) consisting of: 2 pcs. ISO clamp connection, DN 32676 ISO, short, DN 60.3, stainless steel AISI 316L, flange diameter 77.5 mm, tube diameter 60.3 × 2.28 mm long, for welding into existing tube systems 2 pcs. clamps for flange diameter 77.5 mm 

BANDELIN – Ultraschall seit 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 MIC instruments, a further development was launched in 2016 for robotic instruments.

Today, the reputation of our brands SONOREX, SONOPULS, SONOMIC and TRISON stand for the high quality awareness of our employees and is equated in expert circles with ultrasound.
The most important product groups include:

SONOREX	– Ultrasonic baths and reactors
SONOPULS	– Ultrasonic homogenisers
SONOMIC	– Ultrasonic baths for rinsable MIC and standard instruments
TRISON	– Ultrasonic baths for robotic-, rinsable MIS and standard instruments
TICKOPUR	– Cleaning agents
STAMMOPUR	– Cleaning agents and disinfectants

We are innovation leaders in the development of ultrasonic devices and new areas of application. In the past we have registered 79 patents / utility models as well as 68 trade brands. Our participation in various committees in the development of new standards and guidelines serve to ensure the highest standards for ultrasonic applications.
As the only complete supplier of ultrasonic devices, accessories, disinfectants and cleaning agents with approvals and certifications according to ISO 9001 and ISO 13485, BANDELIN is the market leader.
Over one million units have already been delivered to our customers.

More information about our company you will find in our company portrait, here as **PDF download**.

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