04

SONOREX DIGITEC DT ... F – Ultrasonic baths with flat oscillating tanks

Especially practical for homogenisation, sample preparation and rapid degassing of samples.

from page 52

SONOSHAKE – Ultrasonic bath with shaking device for sample preparation

Ideally equipped for the field of analytics and medical diagnostics.

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Recirculating chiller LABOCOOL LC 400

Every ultrasonic bath can now be expanded with a cooling function.

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SONOREX Ultrasonic baths for cleaning of analysis sieves

Removes impurities from even the finest mesh and ensures reliably reproducible results.

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SONOCOOL – Ultrasonic bath with cooling

For a constant temperature with heat-sensitive samples in analytical laboratories and pathologies.

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BactoSonic – Ultrasonic bath for gentle removing of biofilms

Reliably frees medical implants from infectious microorganisms.

from page 68

SONOREX DIGITEC DT...F

Ultrasonic baths with flat oscillating tanks

Flat baths are especially designed for homogenisation or sample preparation and rapid degassing of samples in laboratory vessels. Uniform sonication of all samples, regardless of their size and arrangement, is conducted at a higher power intensity [W/l] than in the standard ultrasonic bath. This guarantees reproducible results. Due to the shallower tank depth, the need for contact liquid is also lower. Spring clamps for the vessels prevent them from tipping over or floating.

Advantages

- Uniform sonication of samples irrespective of size and arrangement of the flasks
- Reproducible results
- Homogenising or fast degassing of samples
- Holder for laboratory flasks ZF and spring clamps EK prevent floating or tilting of laboratory flasks

Type	Internal tank dimensions l × w × d [mm]	Capacity [l]	Code No.	External dimensions l × w × h [mm]	Ultrasonic peak power* [W]	Ultrasonic nominal output [W]	Outlet ball Valve
DT 510 F	300 × 240 × 65	4.3	3242	325 × 265 × 195	560	140	G ½
DT 1028 F	500 × 300 × 65	9.5	3243	535× 325 × 205	1280	320	G ½

*corresponds to 4 times nominal power

SONOREX DT 510 F (left) with holder for laboratory flasks and DT 1028 F (right) with spring clamps

Sets consisting of:
SONOREX DIGITEC DT 510 F, 1 basket K 10 F,
1 bottle TICKOPUR R 33
Code No. 13242

SONOREX DIGITEC DT 1028 F, 2 baskets K 10 F,
1 bottle TICKOPUR R 33
Code No. 13243

Spring clamps EK for laboratory flasks

Stainless steel spring clamps prevent the laboratory flasks from floating or tipping over.

Type	Code No.	for volume [ml]	Min. flask diameter [mm]	Max. flask diameter [mm]	Max. quantity of flasks for K 10 F [pcs.]
EK 10	7521	10	23	31	18
EK 25	7519	25	30	42	18
EK 50	7518	50	35	52	9
EK 100	7516	100	40	65	6
EK 250	3259	250	55	85	5

Holder for laboratory flasks ZF

Holder for laboratory flasks prevent the laboratory flasks from floating or tilting in the basket K 10 F.

Type	Code No.	Quantity [pcs.]
ZF 10	3524	5 x 155 mm 3 x 215 mm

SONOSHAKE Set

Ultrasonic bath with shaking device for sample preparation

With separate chiller LABOCOOL LC 400 expandable.
(see p. 56-57)

The SONOSHAKE offers a wide range of applications for sample preparation in many areas of analysis, such as in environmental and food analytics as well as in medical diagnostics. The samples can be sonicated both for a defined period of time and also in continuous operation. Rapid degassing via the DEGAS function is also possible. The shaking device allows gentle to strong horizontal movement up to a maximum of 20 mm thanks to four different shaking frequencies. Both processes can be carried out simultaneously and also separately. For example, pre-homogenisation and final homogenisation with ultrasound are achieved with a defined shaking frequency, in a significantly shorter time.
Any sediment in the sample can be loosened with defined shaking. Homogenisation is carried out by the additional ultrasound.

- Analogue settings of time and shaking frequency
- Reciprocating motion: settings in 4 steps possible
- Constant amplitude of 20 mm independently of loading
- Rack easy to remove
- Fast mounting of laboratory clamps EK 10 –250 (separately to order)
- Shaking platform approx. 410 × 280 mm [l × w]
- Required floor space approx. 850 x 360 mm [l × w]

The ultrasonic bath SONOREX DIGITEC DT 1028 F can easily be retrofitted with the SA 1028 shaking device. To cool temperature-sensitive samples during sonication and to remove process heat, the LC 400 recirculating chiller can be connected to the SA 1028 shaking device using the optionally available ELC 2 add-on module.

SONOSHAKE – Combination of flat ultrasonic bath and shaking device.

SONOSHAKE Set
Code No. 3257
consisting of:
ultrasonic bath DT 1028 F and shaking device SA 1028

Shaking device SA 1028
Code No. 3249

SA 1028

DT 1028 F

Spring clamps EK for laboratory flasks

Stainless steel spring clamps prevent the laboratory flasks from floating or tipping over.

Type	Code No.	for volume [ml]	Min. flask diameter [mm]	Max. flask diameter [mm]	Max. quantity of flasks [pcs.]
EK 10	7521	10	23	31	36
EK 25	7519	25	30	42	36
EK 50	7518	50	35	52	18
EK 100	7516	100	40	65	12
EK 250	3259	250	55	85	10

LABOCOOL LC 400 Recirculating chiller

LABOCOOL LC 400 is used for either removal of process heat or effective cooling of samples during sonication in an ultrasonic bath. Compared to conventional recirculating coolers, LABOCOOL LC 400 is characterised by a closed water circuit without equalisation tank, thus, the ultrasonic bath from overflowing.

Thanks to the natural refrigerant R-290, LABOCOOL LC 400 is particularly efficient and climate-friendly.

For applications with SONOPULS homogeniser: LABOCOOL LC 200

Applications with cooling

Sonication reduces the processing time for sample preparation for following analysis and enables more reproducible results. Due to the high ultrasonic power, frictional heat is generated which warms-up the sonication liquid in a short time.

In order to protect the sample from excessive heat input, many applications require the connection of an external cooling system. For this application, LABOCOOL LC 400 provides a ready-to-connect complete solution that always enables a cooling of samples at the push of a button.

For all SONOREX bath sizes up to 30 l volume and for SONOSHAKE

LABOCOOL LC 400 recirculating chiller for cooling is suitable for all SONOREX ultrasonic baths with bottom drain. The connection is made using the supplied hoses. Add-on module ELC 1 enables the connection of two ultrasonic baths at the same time.

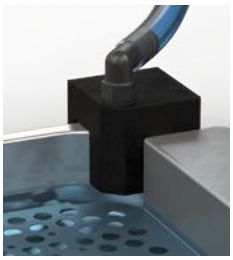
To connect the SONOSHAKE, the ELC 2 add-on module is required. Thanks to the 3-way ball valve supplied, the tank emptying function is preserved.

Code No. 3851 for ELC 1

Code No. 3852 for ELC 2

Connecting hub

This fits to all SONOREX ultrasonic baths up to 30 l and will be attached to the ultrasonic bath without tools. The use of baskets is not affected by the connecting hub.

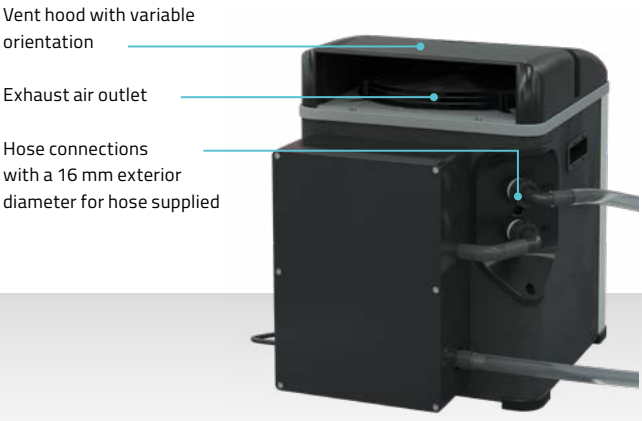


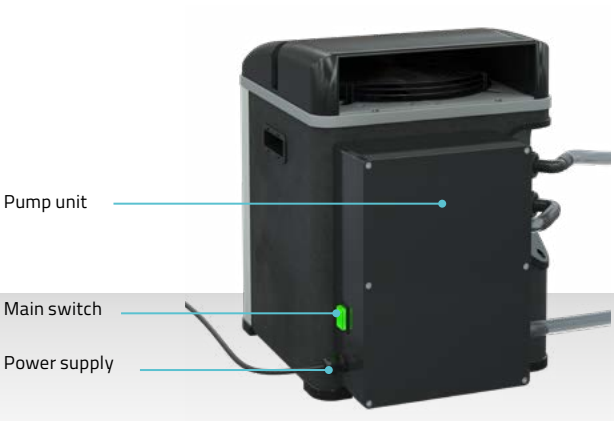
Front side

The display shows the status of the cooling function and the water temperature in the ultrasonic bath. Via side buttons the desired water temperature can l selected within a range of 5–30 °C.

Rear side

Pump unit and main switch are located at the rear of the device.





Type	Code No.	For baths	External dimensions l × w × h [mm]	Cooling power [W]	Refrige-rant type	Refrigerant quantity [g]	Pump type	Pump power [W]	Flow-through rate [l/h]
LC 400	3850	SONOREX	410 × 320 × 420	400	R-290	90	Centrifugal pump	10	600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SONOREX PR 140 DH

Ultrasonic bath for the cleaning of volumetric glassware with lengths up to 755 mm

Clean and particulary fatty-free glass surfaces are necessary for a correct volume measurement:
The liquid to be measured must flow well down the glass wall and must not form droplets.

Features

- For reuseable volumetric glassware as well as long parts up to 755 mm length
- Heating for better removing of fatty residues
- Frequency modulation "Sweep" for a very homogeneous ultrasonic field; damages at the glass surface are nearly prevented, attacking of graduation as well as glass corrosion will be avoided compared to manuall cleaning with rough sponges or brushes
- Placing onto the floor near the drain is possible
- Simultaneous cleaning and disinfection with STAMMOPUR 24 in case of infectious contamination
- Biologically degradable agent TICKOPUR for gentle removing of stubborn fatty residues (R 33) or mineral ones (TR 3)
- Multiple use of cleaning solution is possible
- Ultrasonic tank made of stainless steel AISI 304 (1.5 mm thickness)
- Handles for easy transport within the lab
- Operation foil keypad guarantees a simple cleaning of the housing surface
- All functions like time, DEGAS or optionally temperature can be set at the push of the button
- Drain with ball valve for easy and fast emptying

Ready-to-operate set:

- Ultrasonic bath pipettes washer PR 140 DH
- Inset basket K 140 B
- Lid D 140 D
- Cleaning concentrates
  TICKOPUR R 33 – 5 liters
  TICKOPUR TR 3 – 1 liter

PR 140 DH with K 140 B and D 140 D

Type	Internal tank dimensions l × w × d [mm]	Capacity [l]	Code No.	External dimensions l × w × h [mm]	Ultrasonic peak power* [W]	Ultrasonic nominal power [W]	Heating power [W]	Outlet ball valve
PR 140 DH	150 × 150 × 895	min. 9 max. 18	2070	330 × 330 × 1003	860	215	700	G ½

*corresponds to 4 times nominal power


TICKOPUR R 3
BANDELIN
SONOREX DIGITEC

SONOREX
Ultrasonic baths for the cleaning of analysis sieves

Analysis sieves are test equipment with very high accuracy which are especially used in the fields of quality control in research and production. A thorough cleaning of analysis sieves is the basis for precise and reproducible results. Therefore, manufacturer of sieves recommend a cleaning of sieves by ultrasound. By cleaning in an ultrasonic bath, the particles are removed also from finest meshes (< 500 µm), contamination of the next sample will be prevented. There is no changing of mesh size and material tension.
Not only analysis sieves can be cleaned effectively and thoroughly, but also a mill tools.

Analysed sieves which are used in sieve shakers are cleaned intensively and gentle within a few minutes. The sieves are ready for the next analysis within a very short time.

We recommend our universal cleaning concentrate TICKOPUR R 33 as well as a suitable sieve holder SH.

Analysis sieve before and after cleaning

For cleaning of a single sieve:

Type	Internal tank dimensions [mm]	Capacity [l]	Code No.	For analysis sieves up to Ø [mm]	Ultrasonic peak power* [W]	Ultrasonic nominal power [W]	Accessories [mm]	Code No.
DT 106	Ø 240, 130	5.6	3270	200	480	120	SH 7	314
RK 106	Ø 240, 130	5.6	326	200	480	120	SH 7	314
RK 1040	Ø 500, 195	39.5	319	500	1520	380	GH 28	290

*corresponds to 4-times nominal power

SONOREX SUPER RK 106 and
SONOREX DIGITEC DT 106 with SH 7

SONOREX SUPER RK 1040
with GH 28

Cleaning of a single sieve with ultrasound in the SONOREX ultrasonic bath DT 106
youtube.com/bandelin

Cleaning of up to five sieves with ultrasound in the SONOREX ultrasonic bath RK 1028 CH
youtube.com/bandelin

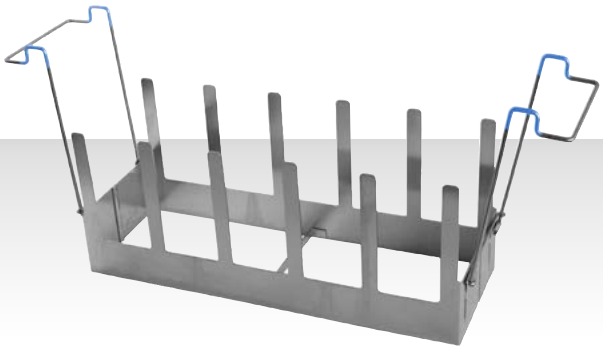
DT 106 with SH 7

RK 1028 C
with SH 28 C

For simultaneous cleaning of up to five sieves:

Type	Internal tank dimensions [mm]	Capacity [l]	Code No.	For analysis sieves up to Ø [mm]	Ultrasonic peak power* [W]	Ultrasonic nominal power [W]	Accessories [mm]	Code No.
RK 1028 C	500 × 300 × 300	45.0	661	200	2000	500	SH 28 C	307

*corresponds to 4-times nominal power



SONOREX SUPER RK 1028 C
with SH 28 C

SONOCOOL

Ultrasonic bath with cooling for use in analytical laboratories and pathologies

The SONOCOOL ultrasound device is the best option for all instances in which temperature constancy in the ultrasonic bath is required, e.g. for quality control in the pharmaceutical industry, in the food and beverages industry, and also in pathology. Its scope of functions focuses on the essentials: Ultrasound intensity – Sonication time – Temperature.
Extensive accessories expand the possibilities for use. With the bath it is possible to use the catalytic effect of ultrasound for processes during which simultaneous cooling is required. Heat-sensitive samples are protected by the cooling function and process sequences can be designed to be faster and more effective than customary procedures.

Control panel of SONOCOOL ultrasonic bath

Advantages of the SONOCOOL SC 255.2

- Compact and powerful – ultrasound and cooling in one device
- Air-cooled cooling unit
- Climate-friendly refrigerant R-290
- Dissipation of the process heat caused by the ultrasound
- Adjustable bath temperature:
  4 to 40 °C at 20 °C room temperature
- Individual parameter variation (time, temperature, performance) and thus adaptation to the respective test specimen
- Long lifespan – welded tank AISI 316 L, material thickness 2 mm
- Monitoring of the fill level
- Glass lid: Sample observation, easy cleaning

Welded tank (stainless steel AISI 316 L)

Stopcock and drain nozzle

Glass lid, integrated bracket

Examples for applications in laboratory

(constant temperature conditions required)

- Sample preparation for subsequent analysis, e.g. determination of chemical and biological agents (especially chromium [VI] analytics)
- Dissolve solids in solvents and degas eluents

Advantage: Temperature-sensitive materials are not destroyed/attacked.

Examples for applications in pathology

- Acceleration of decalcification of femoral head preparations, shin stem preparations and osteosarcomas
- Acceleration of decalcification of hard tooth tissue for histopathological processing

Advantages: Significant reduction of decalcification times without negatively affecting the quality of the specimen and improvement of the cutting quality.

Ready-to-use laboratory set:

- Ultrasonic bath SC 255.2
- Insert basket K 5 SC
- Lid D 255 G
- 1 bottle TICKOPUR TR 3
  (concentrate for producing contact liquid)
-

Code No. 3500032 – 230 V EU plug CEE 7/7
3500032-GB – 230 V GB-plug BS 1363
3500032-CH – 230 V CH-plug T 12 Typ J

Ready-to-use pathology set:

- Ultrasonic bath SC 255.2
- Sample holder PH 255-11
- Lid D 255 G
- Insert beaker SD 01.2 – 20 pcs.
- 1 bottle TICKOPUR TR 3
  (concentrate for producing contact liquid)

Code No. 3500031 – 230 V-EU plug CEE 7/7
3500031-GB – 230 V-GB plug BS 1363
3500031-CH – 230 V-CH plug T 12 Typ J

Type	Internal tank dimensions l × w × d [mm]	Capacity [l]	External dimensions l × w × h [mm]	Ultrasonic peak power* [W]	Ultrasonic nominal power [W]	Cooling power [W]	Outlet
SONOCOOL	280 × 150 × 150	6.3	60 × 605 × 385	720	180	200	hose, front left, concealed

*corresponds to 4-times nominal power

Accessories available for the laboratory

BANDELIN offers the right accessories for various applications in the laboratory.

Insert basket K 5 SC
stainless steel
260 × 110 × 40 mm, l × w × d
Mesh size 5 × 5 mm
Load capacity max. 5 kg
Code No. 302701

Stainless steel spring clamps prevent the laboratory flasks from floating or tipping over.

Type	Code No.	For flasks [ml]	Min. flask diameter [mm]	Max. flask diameter [mm]	Max. quantity of flasks [pcs.]
EK 10	7521	10	23	31	17
EK 25	7519	25	30	42	10
EK 50	7518	50	35	52	7
EK 100	7516	100	40	65	4
EK 250	3259	250	55	85	2

Available accessories for the pathology

For various applications in pathology BANDELIN offers the right accessories.

Sample holder PH 255-1
for 1 box IB 18
Code No. 3519

Box IB 18
material: polypropylene
VPE = 5 pcs.
Code No. 3283

Sample holder PH 255-11
for 11 inset beakers SD 01.2
Code No. 3512

Inset beaker SD 01.2
VPE = 10 pcs. à 100 ml
material: glass, without spout
inner Ø 44 mm, height 80 mm
Code No. 3517

Sample holder PH 255-2
for 2 inset beakers SD 06
Code No. 3518

Inset beaker SD 06
material: glass, 600 ml
Innen Ø 84 mm, height 125 mm
with lid
Inserting without the black ring
Code No. 330

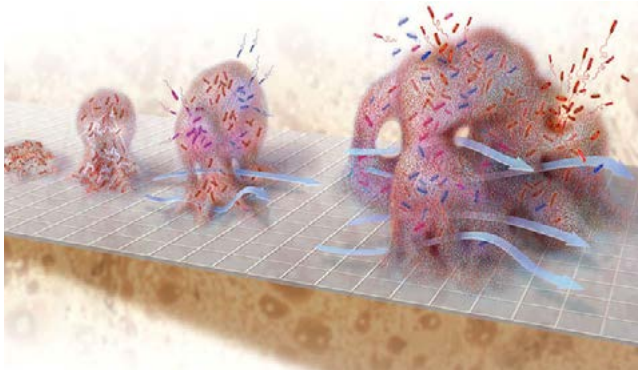
Sample holder PH-2W
for 2 x 24-well-plates
Code No. 3521

Detailed application examples in pathology for the SONOCOOL

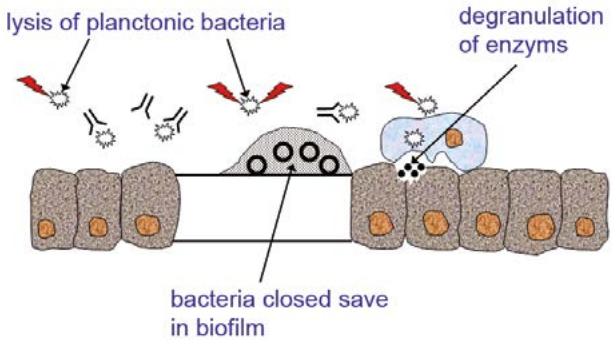
Type	No.	Use
Decalcification	PT-101	Examination of the decalcification process at a variable ultrasonic output in a subjective comparison (Test cuttability, microscopic assessment)
Decalcification	PT-102	Checking the decalcification process with different ultrasound power and different decalcifying solution in objective comparison (contact radiography)
Decalcification	PT-103	Results of the decalcification for osteosarcomas
Decalcification	PT-104	Result of the biomolecular reprocessing of a bone preparation
Decalcification	PT-105	Acceleration of the decalcification process of hard tooth tissue in the SONOCOOL ultrasonic bath

BactoSonic
Ultrasonic bath for gentle removing of biofilms

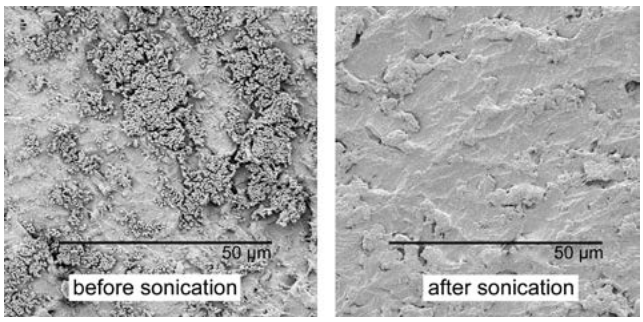
With the increasing use of medical implants, we are also increasingly confronted with infectious biofilms on such implants. The most common implants include joint prostheses, osteosyntheses, vascular prostheses, pacemakers and defibrillators, dental implants, neurosurgical shunts and breast implants.
The success of therapy for implant infections depends on a precise microbiological diagnosis. Because microorganisms form biofilms on foreign bodies, they are often difficult to detect in surrounding tissues.
Sonication (ultrasound) can gently remove microorganisms from the surface of an infected implant. The implant is immersed in liquid so that the ultrasonic waves can act on the entire surface of the implant. After sonication, the liquid (the sonicate) is prepared for cultures and can then be used immediately in the subsequent analysis (e.g. PCR). Thus, sonication makes it possible to quickly diagnose the location of the infection when implants need to be removed.
The BactoSonic was developed in cooperation with a research institute.



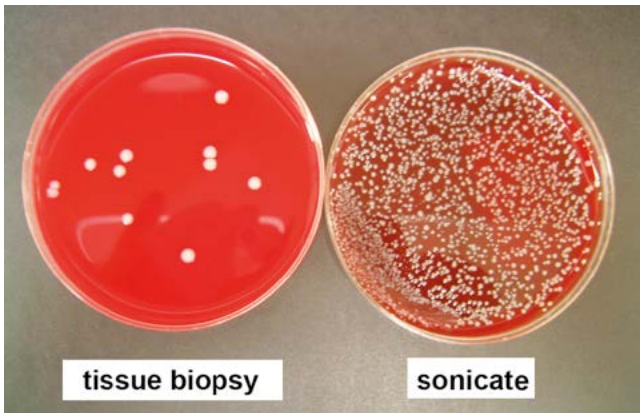
Planktonic and biofilm forms of bacteria



Biofilm on the implant surface



Success of biofilm removal



Comparison of cultures from tissue biopsy and sonication fluid (sonicate)

Principle of BactoSonic

The implants are placed in the airtight implant boxes and sonicated in the specially designed ultrasonic bath BactoSonic.
Compared to other ultrasonic baths, BactoSonic works with a very **low ultrasonic intensity and increased homogeneity**. 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.

The following implants can be examined using the sonication method:

- Orthopaedic implants (joint prostheses, osteosyntheses)
- Breast prostheses
- Internal neurosurgical shunts
- Cardiac pacemakers and ICDs (implantable cardio-verter/defibrillator devices)
- Similar implants that can be removed aseptically from the body

The following materials cannot be examined with the sonication:

- Bone fragments (e.g. sequestrum)
- Soft tissue

The following materials can only be examined to a limited extent with sonicaton:
Implants taken from primarily non-sterile areas (e.g. VAC sponges, vascular catheters, external cerebrospinal fluid drains, etc.) can be examined using the sonication method, but the limit values of microorganisms cannot be applied.

BactoSonic BS 14.2

Type	Internal tank dimensions l × w × d [mm]	Capacity [l]	External dimensions l × w × h [mm]	Ultrasonic peak power* [W]	Ultrasonic nominal power [W]	Heating power [W]	Outlet ball valve
BactoSonic	325 × 300 × 150	13.5	355 × 325 × 305	800	200	–	G ½

*corresponds to 4-times nominal power

BactoSonic 14.2, consisting of:

- Ultrasonic bath BS 14.2
- Wire frame for foil test FT 14
- Standard operating procedures
- 1 bottle TICKOPUR R 33
  (concentrat for producing contact liquid)
- Implant boxes (polypropylene)
  2 pcs. IB 5, 0,52 l, Internal dim. 125 × 85 × 50 mm
  2 pcs. IB 6, 0,6 l, Internal dim. Ø 120 × 55 mm
  1 pc. IB 10, 1,0 l, Internal dim. 255 × 95 × 43 mm
  1 pc. IB 18, 1,8 l, Internal dim. 185 × 120 × 80 mm
  1 pc. IB 20, 2,0 l, Internal dim. 112 × 80 × 265 mm
- Container carriers BT 5, BT 6, BT 10,
  BT 18 (polycarbonate)
  GH 14 (stainless steel)

Code No. 3291

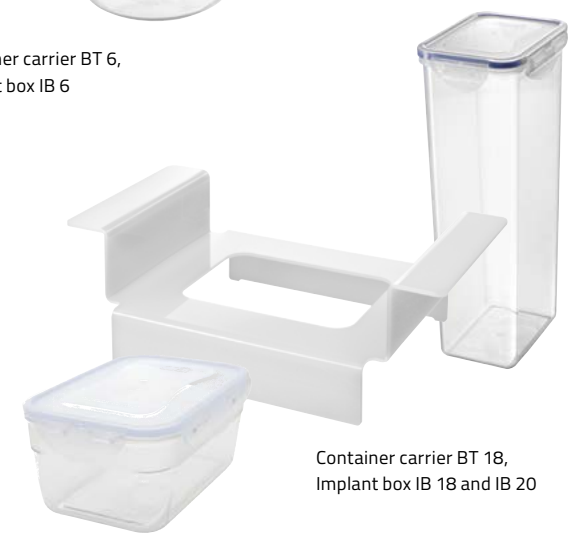
BS 14.2

Container carrier BT 5,
Implant box IB 5

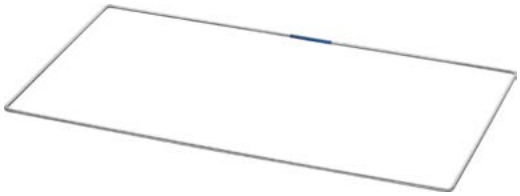
Container carrier BT 6,
Implant box IB 6

TICKOPUR R 33 – 1 l

Container carrier BT 10,
Implant box IB 10



Container carrier BT 18,
Implant box IB 18 and IB 20



Wire frame for foil test FT 14

Utensil holder GH 14


TICKOPUR R 33
BANDELIN
SONOREX DIGITEC
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SONOSHAKE