User instructions



SONOREX DIGITEC Series F

Ultrasonic baths for preparation of samples



Valid for:

DT 510 F and DT 1028 F

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General

The equipment, the accessories and the preparations are to be used in accordance with the user instructions and/or the product information.

The instructions are part of the scope of delivery and are to be stored in the vicinity of the device for later reference. This also applies if possession of the device is transferred.

Before the device is put into operation, these User Instructions are to be read carefully and completely in order for the user to become familiarised with all functions.

The warnings and safety precautions (Section 1.5) are always to be followed during use.

The manufacturer will not assume any responsibility for the device's safety or functional ability in the event of improper handling or usage contrary to the intended purpose. In the event of unauthorised alterations/modifications, both the warranty claim and the CE conformity will expire.

If any service is required, please contact the specialist dealer in charge or the manufacturer.

Symbol	Significance	Explanation
Λ	Danger	Identifies information that could signify a risk to life and limb, especially through electric shock, if not observed.
	Caution	Identifies information that is to be observed and adhered to without fail, to prevent damage to the device and danger to the user. When device parts are labelled with this symbol, reference must be made to the documentation.
	Warning	Warns of a hot surface.
!	Important	Identifies information that is important for execution.
í	Note	Identifies information provided for explanatory purposes.
+	Medical note	Identifies information that is important for medical use.
IVD	In vitro diagnostics information	Identifies information that is important for in vitro diagnostics applications.
	Do not grip inside	For health reasons, touching the oscillating fluid is prohibited.
	Wear ear protectors	For health reasons, standing for long periods of time in the vicinity of the device without ear protectors is prohibited.
\checkmark	Operating sequence instructions	Identifies instructions that are to be followed in the described sequence.

Symbols used:

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1 Product description

Ultrasonic bath of type SONOREX DIGITEC DT ... F user instructions. The exact type specification and serial number are found on the type plate, on the rear side of the ultrasonic bath.

Product features:

- · Stainless steel oscillating tank (1) with transducers, ultrasound frequency 35 kHz
- Digital timer for 1, 2, 3, 4, 5, 10, 15, 30 min and continuous operation (2)
- Filling level mark for safe filling (3)
- · Compact, easy to clean stainless steel housing (4)
- Rubber feet for safe positioning (5)
- Outlet with ball valve (6) for easy draining of the bath fluid and handles (7)



1.1 Mode of operation

SONOREX ultrasonic baths use the effect of cavitation. Under their oscillating tank bottoms they contain piezoelectric transducers, the energy of which is transferred to the bath fluid with ultrasound frequency as mechanical oscillations. As a result, microscopically small bubbles are continuously formed in the bath fluid, which release energy upon imploding and generate local micro currents. This process is called cavitation. During the cleaning processes, it causes contamination to be regularly "blasted" from the hard surfaces of the objects being treated. At the same time, dirt particles are dispersed and fresh bath fluid flows in. During sonochemical processes, cavitation may have a catalytic effect, e.g., with the production of stable emulsions or the rapid degasification of fluids with a high gas content.

SONOREX ultrasonic baths are efficiently supported by SweepTec®automatic frequency control. SweepTec® immediately balances load-dependent working point fluctuations to the optimal working point using fast frequency modulation. This produces an especially homogeneous and uniform ultrasound field in the bath volume for constantly reproducible results.

1.2 Purpose

General application

The SONOREX ultrasonic baths with their flat baths were developed for the preparation of samples in laboratories, clinics and academic research.

With corresponding accessories, it is possible to sonicate samples in laboratory flasks of different shapes and sizes. The samples can be sonicated both for a defined time and also in continuous operation. It is not permissible to prepare objects to be cleaned in the ultrasonic baths.

Application examples:

- Preparation of samples
- Even, indirect sonication of the samples
- Homogenisation
- Rapid degasification of samples

e.g., in medical diagnostics, environmental and foodstuff analysis and ultrasonic chemistry.

Sonication is always carried out in connection with a suitable preparation that is added to the bath fluid.

For correct use, the supplied beaker holder or another holder is required for storing the inset beakers with the samples during the sonication. Nothing must stand or lie directly on the bottom of the bath – this is the only way to ensure optimal diffusion of the ultrasound.

The ultrasonic bath is operated from the front. The operation is usually carried out on a table.

In vitro diagnostic laboratory procedures (preparation of samples)

The SONOREX ultrasonic baths can be used for in vitro diagnostic preparation or laboratory procedures (e.g., preparation of samples) in which medical information is gathered from the ultrasonic treatment of organic or inorganic material.

In this case, they are classified and treated in accordance with the Directive 98/79/EC on in vitro diagnostic medical devices.

1.3 CE conformity

IVD

SONOREX ultrasonic baths are declared as IVD products and satisfy the CE marking criteria for the European Directives:

- "IVD" directive
- "Low-voltage directive"
- "Electromagnetic compatibility" directive
- WEEE Directive

in their currently valid versions.

A declaration of conformity can be requested from the manufacturer by providing the serial number.

1.4 Technical data

SONOREX ultrasonic baths are interference-free and CE . Safety: EN 61010-1, EMC: EN 61326-1

Mains supply:	230 V~ (± 10 %) 50/60 Hz, (115 V upon request), mains cable length 2 m
Protection class:	Class I
Frequency	35 kHz
Oscillating tank:	Stainless steel
Serial number (SN):	See type plate on the rear side of the ultrasonic bath
Degree of protection:	IP 33 according to DIN 60529



foreign bodies with a diameter of 2.5 mm or larger



Protected from splashes up to 60° from its vertical axis

Bath type	Order no.	Interior dimensions (L × W × D)	Operating volume	Outlet (valve)	Ultrasonic peak power* / Ultrasonic nominal output	Weight (net)	Current consump- tion (230 V)	Current consump- tion (115 V)
		mm	I		W / W _{eff}	kg	A	А
DT 510 F	3242	300 × 240 × 65	2.5	G ½	560 / 140	5.5	0,7	-
DT 1028 F	3243	500 × 300 × 65	5.8	G ½	1280 / 320	10	1.4	2.8

In order to improve the effect the ultrasound is being modulated whereby, depending upon the ultrasonic bath, a 4- or 8-fold Ultrasonic nominal output value is yielded as ultrasonic peak power, in connection with SweepTec[®].

Ambient conditions according to EN 61 010-1

Overvoltage category:	II
Degree of contamination:	2
Permissible ambient temperature:	5 to 40 °C
Permissible relative humidity up to 31°C:	80%
Permissible relative humidity up to 40°C:	50%
No dewing.	
Only for indoor operation.	

IVD

Specifications for use as a medical device

Name:	Ultrasonic bath SONOREX DIGITEC F
UMDNS nomenclature (ECRI / DIMDI):	14-263
Purpose:	See Section 1.2.
Classification (in acc. with	
Directive 98/79/EC for IVD):	Device category 5 device
Type, model, serial number, year of manufactu	ure: See type plate on the rear side of the device

The ultrasonic bath has been inspected pursuant to the currently applicable standards and is to be installed and put into operation pursuant to EMC directions,

 Specifications pursuant to the Medical Devices Operator Ordinance (MPBetreibV):

 Startup at location, functional check

 and personnel training (§ 10):
 Not required

 Technical safety controls, (STK, § 11):
 No specifications

 Technical measurement controls, (MTK, § 14): Not applicable

1.4.1 Electromagnetic ambient conditions (EMC)

The device was tested to DIN EN 61326-1 for electromagnetic compatibility (EMC) and complies with the requirements for class B devices according to EN 55011.

It is suitable for use in facilities and areas which are directly connected to a public low-voltage supply network, e.g. medical laboratory facilities.

It may generate radio interferences or disrupt the operation of devices nearby. It may be necessary to take remedial measures such as realigning the device or a reconfiguration of the ultrasonic bath or the shield.

During operation, portable or mobile HF communication systems in the vicinity of the ultrasonic bath should be turned off – their operation may be disrupted.

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1.5 Warnings and safety precautions

General

- Keep the ultrasonic bath out of the reach of children and persons who have not been instructed in its operation by reference to these instructions.
- We will not offer a guarantee for damages to the ultrasonic bath or oscillating tank, or to the objects to be treated, as a result of use of inadequate disinfection agents or detergents.
- · Keep the surface of the ultrasonic bath and operating elements clean and dry.
- Do not expose the ultrasonic bath to corroding influences.
- · Move the ultrasonic bath only when it is empty.
- · Empty the ultrasonic bath only while turned off.
- Ultrasonic baths adhere to prescribed EMC limit values, such that it can be assumed that the
 electromagnetic radiation emanating from the units is harmless to humans. However, a binding
 statement for wearers of implants can only be made at the place of work and together with the
 implant manufacturer. In case of doubt, information regarding the allowable electromagnetic
 exposure level is to be obtained from the implant manufacturer.

Operation

- · Observe ambient and set-up conditions, see Section 1.4.
- Only plug the ultrasonic bath to an outlet with a grounded socket.
- · Do not operate the ultrasonic bath without fluids.
- Do not stand or lay any objects on the tank bottom, accessories must be used, see Section 7.
- Do not immerse any parts of the body (e.g., hands, feet) or living beings (animals or plants) into the tank; in particular, do not immerse them in the bath fluid during ultrasound operation. Danger: Ultrasound has a cell-destroying effect.



- In the event of continuous activity within a 2 m radius, adequate hearing protection must be used. Danger: Hearing disturbances during operation when not wearing hearing protection – the typical ultrasound cavitation noise can be very uncomfortable.
- · Do not operate the ultrasonic bath while unattended.



Advice for the medical and laboratory field

· The ultrasonic bath is exclusively intended for use by medical skilled personnel.

Damages

- If damage to the ultrasonic bath is detected, do not connect the ultrasonic bath to the mains.
- · In the event of defects, disconnect the mains plug immediately.
- · Repairs are only to be conducted by authorised skilled personnel or by the manufacturer.
- · Defective parts may only be replaced with original parts.

2 Preparation

Carefully unpack the ultrasonic bath and accessories and inspect them for completeness or possible transportation damages. If any damages or defects are found, these are to be immediately notified in writing to the transportation company and to the supplier. Before start-up, the ultrasonic bath is to be left to stand at its operating location for 2 hours so that it may adapt to the ambient conditions.

2.1 Scope of delivery

- 1 Ultrasonic bath see delivery note
- 1 Ball valve with hose, packaged separately with sealing tape and assembly instructions
- 1 Beaker holder (for DT 510 F) /
- 2 Beaker holder (for DT 1028 F)
- 1 TICKOPUR R 33 (250 ml)
- 1 User instructions

Additional accessories according to order - see delivery note

2.2 Set-up / assembly

- · Place the ultrasonic bath atop a firm, level and dry surface. In doing so
 - observe the maximum weight of the ultrasonic bath, including fluid. Net weight see Technical Data Section 1.4.
 - Do not block the air supply below the ultrasonic bath.



- Guard against moisture and wetness risk of electric shock.
- Install the ball valve, hose socket and hose, which are included in the delivery, pursuant to the
 enclosed assembly instructions.

2.3 Start-up

- > Thoroughly rinse the ultrasonic bath's oscillating tank with water before its first use.
- > Connect the ultrasonic bath up to the power supply (grounded socket).
- Conduct function test. To do so, switch on the ultrasonic bath, start the ultrasound briefly and then stop it again (maximum 1 to 2 seconds). A hissing noise should be heard. Then switch device off again.
- It is recommended that a foil test be conducted as part of quality assurance prior to the first use, see appendix for information.
- > Place accessories in the ultrasonic bath as necessary.

3 Operation

3.1 Operating elements

The unit is operated at the front:



- 1 Ultrasonic bath ON/OFF button
- 2 Preset time button with time scale above
- 3 Start/Stop button Ultrasound

3.1.1 Ultrasound

With the ultrasonic bath turned on – ON/OFF button – after the time is preset, the ultrasound output is turned on with the Start/Stop button.

Timed operation:

- · Setting via pressing buttons
 - → Time 1, 2, 3, 4, 5, 10, 15 or 30 minutes
 - Following pressing of the Start/Stop button, a running light displays the remaining time optically.
 - Once the time expires, the ultrasonic output is stopped automatically.
- · Premature pressing of the Start/Stop button ends the ultrasound output.

Continuous operation:

- · Setting via pressing buttons
 - → LED ∞ lights up
 - Following pressing of the Start/Stop button, the top (green) LED lights up constantly.
 - Ultrasonic bath does not turn off automatically: press the Start/Stop button to switch it off.

Notes

- For safety reasons, the ultrasound bath is turned off automatically if no button is pressed for more than 12 hours.
- While turned off, the ultrasonic bath may remain connected to the mains. It can be disconnected from the mains by pulling out the mains plug.





3.2 Special functions

Degas (_____ – in the time scale area)

• The DEGAS function is switched on for degassing the system before sonication. To do so, set the required time with the preset time button, then hold the Start/Stop button for at least 2 seconds.

The system can be stopped prematurely by pressing the Start/Stop button. During the degassing, the top green LED (**Jul**) also flashes until the time expires.

 Switching between ultrasound – degas: If the Start/Stop button is kept depressed for a long time when ultrasound is running, the ultrasound is firstly switched off and then after approx. 2 seconds the Degas function is activated.

Locking continuous operation (00 - in the time scale area)

To avoid accidentally turning on the continuous operation, the continuous operation can be deactivated:

- > Pull the mains plug out.
- Press the preset time button, hold it depressed and insert the mains plug at the same time. The yellow LED "1 min" lights up in confirmation.

The function can be reactivated in the same way. The green LED continuous operation (∞) lights up in confirmation.

4 Use

Depending on the application, the samples are sonicated **indirectly** in laboratory flasks or other sample vessels, which are inserted in the contact fluid in the oscillating tank.

Direct sonication of objects in the bath fluid in the ultrasonic baths DT \dots F is not permitted.

The intended course is described step by step in the following sections.



4.1 Fill oscillating tank

If inset beakers are used in the ultrasonic bath, a contact fluid must always be used as otherwise the ultrasound cannot pass through the air (between the ultrasonic oscillating tank and the inset beaker). This contact fluid must be able to transfer the ultrasound to the fluid in the inset beaker without loss if possible. The surface tension is very high in municipal and deionised water. As a result of this high surface tension, the cavitation does not occur throughout the entire solution. It generally only forms on the bottom of the oscillating tank or on inhomogeneities in the water. To reduce the surface tension, you should add a surfactant preparation which is biodegradable, easily disposable, gentle to the material and long-lasting. We recommend TICKOPUR R 33, which is easily available from specialist laboratory supply dealers. Even when used for a long period of time, this preparation does not leave any scrum or incrustations, does not turn cloudy and on average functions for 5-7 days before needing to be changed.

The ultrasonic bath is turned off for filling.

- > Check that the ball valve is closed.
- > Fill 1/3 of oscillating tank with water.
- Add the surfactant preparation in the correct dosage, e.g., 1% TICKOPUR R 33.

Dosage	Filling quantity	TICKOPUR R 33 1%		R R 33
		Water	+	Concentrate
DT 510 F	2.5 litres	2.48	+	25 ml
DT 1028 F	5.8 litres	5.74 I	+	58 ml



Fill carefully up to the filling level mark, avoid as much as possible the formation of foam. The oscillating tank must be filled depending on the sample vessels used, as they displace the contact fluid.

IMPORTANT:

With the sample vessels inserted, the filling level should be at or slightly above the filling level mark, as a too low filling level damages the ultrasonic bath!

Instructions - filling

- Do not fill oscillating tank with hot water. Maximum filling temperature: 50°C.
- · At least drinking-quality water must be used to fill the oscillating tank.
- · Only use distilled or deionised water without additives in inset beakers or insert tubs.
- Do not use any combustible, explosive, non-aqueous liquids or azeotropic mixtures directly in the stainless steel oscillating tank (e.g. benzine, solvents). Furthermore, chemicals that contain or that separate chloride ions (some disinfectants, household cleaners, and dish detergents), may not be used directly in the stainless steel tank.
- When working with aggressive preparations in inset beakers or insert tubs: Prevent the contact fluid or stainless steel surfaces from being sprayed. If necessary, replace the contact fluid, clean the surfaces and wipe dry.

- When using strongly acidic preparations, the hard chromium plating of the ball valve may become corroded and the ball valve start to leak.
 If the use of a strongly acidic cleaning agent cannot be avoided, the use of a stainless steel ball valve is recommended.
- When using preparations, the safety instructions included in the product leaflets are to be fundamentally adhered to.
- · Replace used sonication fluids, do not refresh by adding fluids.

4.2 Degassing the fluid

Freshly-filled bath fluid or fluid that has remained in the oscillating tank for a longer period of time must be degassed prior to use. See also Section 4.5.1.

- > Remove basket and other accessories from the oscillating tank.
- > Turn on the ultrasonic bath.
- For degassing, set the time and start the ultrasound (Press START/STOP button for 2 sec), see Section 3.2.

4.3 Ultrasound operation

For optimal diffusion of the ultrasound and protection of the oscillating tank, nothing should be in contact with the bottom of the bath during sonication. Laboratory flasks and other sample vessels must be stored in the supplied beaker holder or similar accessories. We recommend the use of special holding clamps for fixing the sample vessels in the holder (see Section 7). They prevent the sample vessels from moving around or toppling over during sonication.

- It is possible to treat multiple sample vessels with different fluids at the same time.
- When treating small quantities of combustible fluids in sample vessels, the country-specific guidelines/regulations that are currently in effect are to be observed!

The ultrasonic bath is turned off for inserting the beakers.

- > Insert the sample vessels into the beaker holder, ensuring:
 - The sample vessels must be immersed at least 2 cm deep in the contact fluid.
 - · Remove any air bubbles below the vessels.
 - The fill level of the oscillating tank must always be at or slightly above the filling level mark following equipment. A low fill level will damage the ultrasonic bath!



- Set the required sonication period and start the ultrasound, see Section 3.1.1.
- Following sonication, remove the sample vessels from the tank and set down atop a level surface.

Caution: Depending on the length of the sonication, the flasks/samples may be hot.

Before the next sonication, verify the service life of the contact fluid. Heed the specifications of the preparation manufacturer. If the solution in the ultrasonic bath becomes heavily contaminated, it should be replaced earlier as it can reduce the efficacy of the ultrasound.

Notes on the temperature of the bath fluid:

- Ultrasound energy warms up the bath fluid (even without additional heating). The temperature of the bath fluid can increase rapidly if the ultrasound is active for long periods of time and/or the oscillating tank is covered.
- To protect the electronic components inside the ultrasonic bath, the ultrasound output is reduced upon reaching a critical interior temperature in order to inhibit a further increase in the temperature.
- The fluid in the oscillating tank must not exceed a maximum operating temperature of 100°C.

4.4 Empty the oscillating tank.

Layers of contamination on the tank bottom reduce the ultrasonic output. The oscillating tank must be emptied after a long period of use, see Section 4.5.2.

- Switching off the ultrasonic bath (ON/OFF button).
- Pull the mains plug out.
- > Do not place the ultrasonic bath in the sink.
- Empty the oscillating tank by placing the ball valve handle in direction of discharge to open outlet.
- After emptying the oscillating tank, rinse it thoroughly. Then dry with a soft cloth.
 For further ages instructions, and Section 5.

For further care instructions, see Section 5.

4.5 Further information

4.5.1 Degassing

Degassing the bath fluid increases the ultrasound effect.

Freshly-filled fluid or fluid that has remained in the oscillating tank for a longer period of time must be degassed prior to use. Gases released in the fluid (e.g., oxygen) are reduced through degassing and the ultrasound effect is thus significantly improved.

Switch on the ultrasound (without sonication objects, basket, etc.)

- Ultrasonic baths with up to 10 litres bath volume: 10 min

The cavitation noise changes during degassing, loud degassing noises disappear at the end of the degassing process, the ultrasonic bath appears to work more quietly.

A lower noise level, however, does not mean a reduction in ultrasonic power. It rather means the end of the degassing process and an improvement in the ultrasound effect.

4.5.2 Disposal of sonication fluids

The working solution is disposed of pursuant to the specifications in the product leaflet and the label supplied by the manufacturer of the preparations employed. All aqueous preparations made by DR H. STAMM GmbH are prepared pursuant to the regulations of the German Washing and Cleansing Agents Act, are biodegradable and as working solutions may be disposed of in the wastewater. Strongly acidic and strongly alkaline fluids are to be previously neutralised pursuant to technical data sheet specifications. The manufacturer's specifications for the respective preparations should be observed.

During cleaning, materials hazardous to water such as oils, heavy metal compounds, etc., depending on the type of contamination, may enter the working solution. If the limit values are exceeded, the working solution must be reconditioned (removal of contaminants) or be disposed of as toxic waste.

Disinfection and cleaning agents that become contaminated when used are considered "waste material" pursuant to the German Waste Act (AbfG) and may not be taken back by the manufacturer. In other countries, the relevant supplementary/divergent national regulations should be taken into account.

In every case, the statutory provisions and regulations of municipal wastewater plants must be adhered to. Information is provided by municipal wastewater plants as well as by environmental agencies



5 Cleaning and maintenance of the ultrasonic bath

To achieve an optimum lifespan for the ultrasonic bath, cleaning and maintenance are to be conducted regularly.

CAUTION !



Disconnect the ultrasonic bath from the mains before cleaning / maintenance.

Do not rinse or immerse the ultrasonic bath in water, and do not expose it to splash water.

No guarantee will apply to damage caused by the use of unsuitable surface disinfection agents or detergents.

5.1 **Cleaning and care**

Oscillating tank

The oscillating tank of an ultrasonic bath is a wear part. It is continuously exposed to cavitation during ultrasound operation. Dirt particles remaining in the tank abrade and damage the tank surface through the movement of the fluid, therefore

- Rinse the oscillating tank with water thoroughly and frequently and dry using a soft cloth.
- Regularly remove residue from the edges of the oscillating tank using a commercial stainless steel cleaning product without any abrasive additives.
- Do not use steel wool, scrapers or graters for cleaning / maintenance.
- Rust particles from the water pipe system can penetrate the passive protective layer of the stainless steel, "activating" the stainless steel and making it begin to rust. The extraneous rust produces localised corrosion of the stainless steel. For this reason, remove rust stains immediately using a soft cloth and a commercial stainless steel cleaning product without abrasive additives

Housing

- Do not use any abrasive cleaners, only commercial care products without abrasive additives.
- Housing is to be wiped off only from the outside with a moist cloth; afterwards, allow to dry alone or wipe dry.

5.2 **Disinfection for medical applications**

If disinfection of the ultrasonic bath is not performed correctly or regularly, there is a risk of microorganisms colonising the device and causing microbiological contamination, particularly on the rim of the bath and around the outflow, which can result in a cross infection.



In order to avoid any cross-contamination as a result of the colonisation of microorganisms, especially along the tank edge and in the drain outlet area, but also on the operator panel, these areas are to be regularly cleaned and disinfected with a suitable surface disinfectant, i.e. one that is at least bactericidal, yeasticidal and virucidal against enveloped viruses. Accessories such as holders and baskets should be processed regularly in a cleaning and disinfection unit.

5.3 Warehousing / storing

During long periods of non-use, the ultrasonic bath is to be stored in a cool, dry location.

Maintenance and repair 6

6 1 Maintenance

SONOREX ultrasonic baths require no maintenance. For purposes of regular control, the following functional checks may be carried out.

6.2 **Functional checks**

Check the LEDs

A test routine can be started for an internal function check:

The ultrasonic bath must be switched off for this. When the Start/Stop button is kept held down, the ultrasonic bath is switched on with the ON/OFF button.

All LEDs light up after each other for a 1/3 second. The last set values are then displayed. The test is then successfully completed.

If there are any deviations, the ultrasonic bath must be sent in for checking/repairs.

Monitoring the ultrasound

Function can be checked using a standard wattmeter. It is to be inserted between the ultrasonic bath's mains plug and the socket.

- · Fill the oscillating tank with fluid, see Section 4.1.
- Switch ultrasound on: Next, the value displayed is to be compared with the corresponding value in the technical data (Section 1.4) (tolerances \pm 20%).

Checking the ultrasound effect

For monitoring, we recommend the performance of a foil test.

A suitable frame for the foil test can be requested from the manufacturer. Customary aluminium foil is used to conduct the test. Next, a comparison is made with previously-generated foils. For more detailed information, please see the appendix.

A measurement procedure is described in DIN SPEC 40170:2013-11 (Measurement and evaluation of cavitation noise).

6.3 Error analysis

SONOREX ultrasonic baths are robustly constructed and designed for a high level of reliability. Nevertheless, the possibility of a malfunction due to a defective component can never be fully discounted.

The following overview of possible sources of error should serve as an aid for error detection and elimination

- Ultrasonic bath oscillates weakly, unevenly or noise is too loud:
 - Has fluid been properly degassed? \Rightarrow Treat for 10 min. - Is it overloaded with objects to be treated? \Rightarrow Remove a few parts. - Uneven noises (wobbling) \Rightarrow No error – slightly adjust the filling level of the fluid ⇒ Natural wear
- Slight erosion visible on the bottom of the bath?
- Ultrasonic bath OK.

Any malfunctions are to be communicated in writing to the manufacturer.

6.4 Repairs and service

A CAUTION!

Repair work may only be carried out by authorised, qualified personnel or by the manufacturer. The manufacturer assumes no liability for unauthorised interventions on the ultrasonic bath!

If errors or defects are ascertained as a result of the functional check, and if it is impossible to rectify these, the ultrasonic bath may no longer be used. In such a case, please contact the supplier or the manufacturer:

BANDELIN electronic GmbH & Co. KG Heinrichstrasse 3-4 12207 Berlin

Repair service: Tel.: +49 30 768 80-13 Fax: +49 30 768 80-2 00 13 E-mail: info@bandelin.com

In the case of returns, the general terms and conditions for delivery and payment of BANDELIN electronic GmbH & Co. KG shall apply. In addition, the ultrasonic bath is to be cleaned and decontaminated, see the following Section.

Decontamination certificate

If the ultrasonic bath is sent back to the manufacturer for repairs (with accessories, as the case may be), the form "Certificate of Decontamination" is to be filled out and affixed to the packaging on the outside, in a visible spot.

If this form has not been filled out, we reserve the right to refuse receipt of the package in order to protect our employees.

The form can be downloaded from the Internet as a PDF file: www.bandelin.com - Download ...

7 Accessories

The proper accessories facilitate use of the ultrasound and also protect the oscillating tank and samples/objects to be treated.

BANDELIN offers a broad range of accessories. Additional information may be obtained from our supplier, our sales representatives or from our website.

No-obligation telephone consultation:	Internet:
+49 30 768 80-0	www.bandelin.com

7.1 Required accessories

Required accessory is the supplied beaker holder. For detailed information see appendix A.

Do not stand or lay any objects directly on the tank bottom.

7.2 Optional accessories - not applicable -

For detailed information see appendix A.

7.3 Preparations

Special preparations are required for use of the ultrasound that are ultrasound-compatible, i.e. they are cavitation-conducive, biodegradable, easily disposable, gentle to the material and long-lasting.

BANDELIN recommends the TICKOPUR and STAMMOPUR concentrates from DR. H. STAMM GmbH, which have been specially developed for ultrasound applications and utilise the ultrasound optimally.

Additional information may be obtained from our supplier, our sales representatives or from our website.

No-obligation telephone consultation: +49 30 768 80-280 Internet: www.dr-stamm.de

IMPORTANT!

- When using preparations, the safety instructions on the label and in the respective product leaflet must be adhered to.
- Keep the preparations out of the reach of children and also of persons who have not been instructed in their use by reference to the product information.
- Do not ingest or inhale the preparations and do not allow them to come into contact with the eyes or skin.
- Preparations in powder form may only be used fully dissolved.

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8 Consumable materials - not applicable -

9 Taking the unit out of service

If the ultrasonic bath no longer works, it must be disposed of appropriately.



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A B	 Holding clamps EK, made of stainless steel, for laboratory flasks. Prevent them from buoying upwards. To be screwed into insert baskets and utensil holders. EK 10 - 10 ml - max. Ø 31 mm EK 25 - 25 ml - max. Ø 42 mm EK 50 - 50 ml - max. Ø 52 mm EK 100 - 100 ml - max. Ø 65 mm EK 250 - 250 ml - max. Ø 85 mm
	Beaker holder GL F, stainless steel, for holding the EK holding clamps
	Shaking device SA 1028, for holding up to 35 EK holding clamps

Accessories Devices	Holding clamps for laboratory flasks	Beaker holder	Shaking device
DT 510 F	EK 10, EK 25, EK 50, EK 100, EK 250	GL 510 F	-
DT 1028 F	EK 10, EK 25, EK 50, EK 100, EK 250	2 × GL 510 F	SA 1028

B Foil test

Information

Foil test

Testing of ultrasonic baths

A foil test¹ is recommended for testing ultrasonic baths. It is to be conducted upon initial startup, and at regular intervals thereafter (e.g. every 3 months). The frequency of testing is the responsibility of the user.

The foil test is a simple procedure to demonstrate the intensity and distribution of cavitation in an ultrasonic bath. To do so, aluminium foil is stretched over a foil test frame. It is perforated or destroyed to a certain degree by cavitation, depending on the duration.

For purposes of reproducibility, it is **important that the test** conditions remain constant:

- Fill level in the oscillating tank (⅔)
- Temperature of tank contents
- Degassing time, if needed (degassing 5 to 30 min. before the test, depending on the tank contents)
 Time may need to be extended with acidic cleaning solutions.
- Frame positioning
- Foil properties (thickness, surface)
- Sonication time
- Concentration and type of ultrasound preparation

Foils can be archived in a suitable way (scanning, photos, etc.) This allows the foils to be compared at any time. The perforated areas of all foils should have approx. the same dimensions and distribution – the results are never identical. A process validation, e.g. for the treatment of medical products, can only be achieved by conducting regular foil tests.

To execute the foil test, different foil test frames FT can be ordered from the manufacturer (for a fee). The foil test frames are suitable for a wide range of tank dimensions. Aluminium household foil is also required to conduct the test and is not included in the delivery.

Film: http://bandelin.com/folientest/.

Fluid for the foil test

In order to obtain an adequately strong cavitation effect, the surface tension of the water used must also be reduced for the foil test with the help of surfactant preparations. We recommend the following ultrasound preparations: STAMMOPUR DR 8, STAMMOPUR R, TICKOMED 1, TICKOPUR R 33, TICKOPUR R 30, TICKOPUR TR 7

If none of these preparations is available, a neutral or mildly alkaline preparation that does not destroy aluminium may be used. The preparation must be approved by the manufacturer for use in ultrasonic baths.



Example



¹ Investigations on test procedures for ultrasonic cleaners. IEC/TR 60886 (1987-03)



Conducting the foil test

- Fill 2/3 of the oscillating tank with water and a suitable ultrasound preparation in the dosage specified by the manufacturer.
- 2. Degas the liquid: < 10 I 10 min and > 10 I 30 min (see user instructions.)
- Stretch aluminium foil (household foil with a thickness of 10 μm to 25 μm) over the wire frame (stainless steel). Depending on the tank size, it is possible that the frame protrudes from the tank.

Covering the portion of the frame that is submerged will suffice.



Aluminium foil, folded 10mm along the edge

 With the ultrasound switched off, place the foil-wrapped wire frame diagonally inside the oscillating tank, adjust if necessary.



- Switch on the ultrasound and sonicate the foil for at least one minute until visible perforations or holes are produced. With sturdier foils (thicker or coated ones), the sonication time can last up to 3 minutes.
- 6. Switch off the ultrasound, take the foil out and let it dry.
- 7. The foil must be perforated, otherwise contact the manufacturer.



- Archive it together with testing date and the serial number of the ultrasonic bath.
- 9. After the test, the oscillating tank must be thoroughly rinsed out to remove any loose foil particles.

	for interior tank dimensions in mm (L x W x H)			
Туре	from	to	Order No.	for
FT 1	190 × 85 × 60		3190	DT 31/H, DT 52/H RK 31/H, RK 52/H
FT 4	240 × 140 × 80	300 × 150 × 150	3074	DL 102 H, DL 255 H, DT 100/H, DT 102H/H-RC, DT 103, DT 106, DT 255/H/H-RC, RK 100/H, RK 102 H, RK 103, RK 106, RK 255/H
FT 6	500 × 140 × 100	500 × 140 × 150	3222	DL 156 BH, DT 156/BH, DT 1028 F RK 156/BH
FT 14	280 × 234 × 80	325 × 300 × 300	3084	DL 510 H, DL 512 H, DL 514 BH, DT 510/H/H-RC, DT 512 H, DT 514H/BH/BH-RC, RK 510/H, RK 512 H, RK 514/H/BH, ZE 514/DT
FT 36	510 × 300 × 200/220		3673	ZE 1031/1032/DT
FT 37	600 × 400 × 200/220		3674	DT 1058 M, ZE 1058/1059/DT
FT 38	650 × 400 × 140/160		3672	MC 1001/E
FT 40	500 × 300 × 80	500 × 300 × 300	3094	DL 1028 H, DT 1028/H/CH, RK 170 H, RK 1028/H/C/CH, RK 1040
FT 42	700 × 420 ×	160/190	3224	TRISON (TE 3000)
FT 45	600 × 400 × 200	600 × 400 × 200	3204	DT 1050 CH, RK 1050/CH

939x GB/2018-09

Note:

The user instructions in this and other languages as well as further information are available on the supplied CD.