
Operating Instructions



Elmasonic E

Ultrasonic Cleaning Units

• **TECHSPAN** •

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1 General

The present Operating Instructions are part of the delivered equipment. They must be ready for use at any time and remain with the unit in case of resale.

We reserve the right to carry out technical modifications on the unit due to advanced development.

2 Important safety warnings

Please observe any additional national safety regulations that may apply.

2.1 Instructions for the use of the present manual

Carefully read the Operating Instructions before you operate the unit. Do not use the present electrical unit for any purpose other than described in the Operating Instructions.

Warning symbols used in the present manual:



This symbol warns of the risk of injury and damage to the equipment.



This symbol warns of the risk of injury caused by electricity.



This symbol warns of the risk of injury caused by explosion and/or deflagration.



This symbol warns of the risk of injury caused by hot surfaces and liquids.



This symbol marks additional information.

Signal words used in the present manual:

Danger The signal word danger warns of a potential risk of serious injury and danger to life.

Warning The signal word warning warns of the risk of serious injury and heavy damage to the equipment.

Caution The signal word caution warns of the risk of light injury or damage to the equipment.

Attention The signal word attention warns of the risk of damage to the equipment.

2.2 Instructions for the use of the unit

Intended use	The present Elma ultrasonic cleaning unit has been designed for the treatment of items and liquids only. No cleaning of living beings or plants!
User	Operation of the unit by authorized and instructed staff only. Observe the instructions given in the manual.
Mains connection	For safety reasons, the present unit must be connected to a correctly grounded socket only. The technical details indicated on the nameplate must correspond with the available mains connection details, in particular those of the mains voltage and current connected value.
Prevention of electrical accidents	For purposes of maintenance and care of the unit, in case of suspected humidity inside the unit or in case of malfunctions and after operation pull the mains plug. The unit must be opened by authorised specialised personnel only.
Cleaning liquid	Fill the unit with a sufficient quantity of cleaning liquid before switch-on. Flammable liquids must not be treated by ultrasound directly in the cleaning tank: risk of fire and explosion!
Hot surfaces and liquids	Risk of burning and scalding! Depending on the operational period of the unit, unit surfaces, cleaning liquid, basket and cleaning items can heat up considerably.
Noise emission	Ultrasonic units can produce annoying sounds. Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.
Sound transmission at physical contact	Do not reach inside the cleaning liquid or touch sound-carrying parts (tank, basket, cleaning items, etc.) during operation.
Exclusion of liability	The manufacturer cannot be held liable for damages on persons, equipment or cleaning items caused by improper use. The operator is responsible for the instruction of the operating staff.

3 **Functioning**

Today, cleaning by ultrasound is the most modern fine cleaning method.

The electric high-frequency energy created by an ultrasonic generator is transformed into mechanical energy by piezo-electrical transducer systems and is then transmitted into the bath.

This process creates millions of tiny vacuum bubbles which implode due to the variations of pressure caused by the ultrasonic activity. Highly energetic liquid jets are created. These jets remove dirt particles from surfaces and even from the smallest grooves and bores.

3.1 **Ultrasonic cleaning factors**



Basically, the cleaning result depends on four factors:

Mechanical energy

Ultrasonic energy is probably the most important mechanical factor in the cleaning process. This energy must be transmitted through a liquid medium to the surfaces which are to be cleaned.

The present Elmasonic E unit is fitted with the innovative sweep function device: electronic oscillation of the sound field (sweep function) prevents the formation of zones of low performance in the ultrasonic bath.

Cleaning media

For saponification and removal of the dirt particles a suitable cleaning agent is required. Elma has a large range of cleaning media on offer.

Cleaning chemicals are also necessary to reduce the surface tension. This increases considerably the efficiency of the ultrasonic activity.

Temperature

The effect of the cleaning medium is improved by the optimised temperature of the cleaning liquid.

For Elma cleaning products please observe the instructions given on the label or the product information leaflets.

Cleaning period

The cleaning period depends on the degree and the kind of contamination and on the correct selection of ultrasonic energy, cleaning agent and temperature.

4 Product description

4.1 Elmasonic E product features

- cleaning tank made of cavitation-resistant stainless steel
- casing made of stainless steel, hygienic and easy to clean
- high performance sandwich transducer systems
- permanent sweep function for an optimised sound field distribution in the cleaning liquid
- quick-drain valve on the back of the unit (from E 60 H)
- dry-run protected heating
- temperature-controlled ultrasonic operation: the cleaning process starts automatically when the set temperature is reached; the cleaning liquid is regularly mixed during the heating up so that the cleaning liquid is evenly heated
- automatic mixing during heating-up period
- plug-in mains supply
- electronical turning knob
- splashwater-proof operating panel
- plastic carrying handles (from E 30 H)
- automatic switch-off after 12 h operation to prevent unintended permanent operation

4.2 CE conformity

The present Elma ultrasonic unit is in compliance with the CE marking criteria.

The declaration of conformity is available from the manufacturer.

4.3 Delivered equipment

- Ultrasonic cleaning unit
- Lid
- Mains cable
- Tube socket with tube clamp (from E 60 H)
- Operating Instructions

4.4

Unit front view / side view



Illustration 4.4 Front view / side view E 60 H

- A Filling line** indicates the recommended maximum filling level. This level should not be exceeded even with cleaning items inside.
- B Plastic carrying handles** (Not available on E 15) for the safe transportation of the unit even with hot casing.
- C Turning knob for the draining of the tank** (from E 60)
Functional description see *section 4.6*.
- D Operating panel** for the control of the operating functions.
Description see *section 4.7*.

4.5 Unit back view

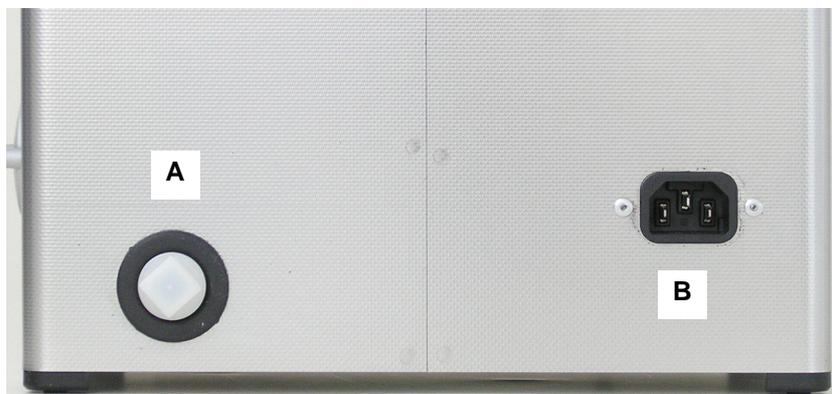


Illustration 4.5 Unit back view (as delivered) Elmasonic E 60 H – E 300 H

- A Liquid drain duct** for draining the tank (up from E 60)
- B Mains supply socket** for quick and easy removal of the mains cable e.g. for transportation purposes

4.6 Turning knob for draining the tank (from E 60)

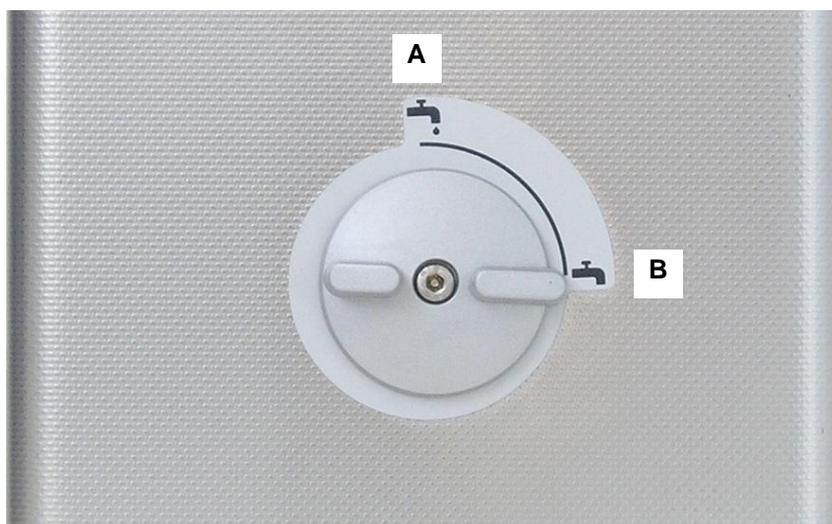


Illustration 4.6 View turning knob for draining the tank Elmasonic E 60 H – E 300 H

- A Vertical position:** drain open
- B Horizontal position:** drain shut

4.7

Description of operating elements

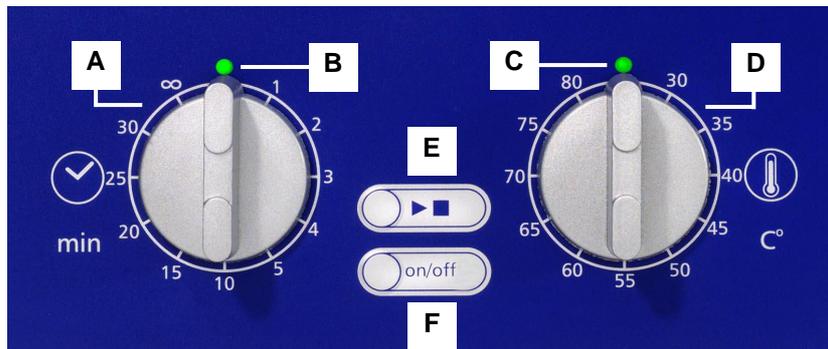


Illustration 4.7 View operating elements

- A Turning knob cleaning period ***
Setting options for short-period operation: 1; 2; 3; 4; 5; 10; 15; 20; 25; 30 min (with automatic switch-off).
Permanent position ∞ for continued operation. Here the unit must be switched off by hand.
For safety reasons the unit is automatically switched off after 12h permanent operation.
- B LED display Ultrasound** is lighted when ultrasound is switched on
- C LED display Temperature** is lighted when heating is switched on; turns dark when set temperature is reached.
- D Turning knob Temperature *** the temperature can be set in steps of 5°C in a range of 30°– 80°C.
- E Key start/stopp for ultrasonic operation** and temperature-controlled ultrasonic operation.
- F Key on/off** for switching the unit on and off.

* for setting the value: turn knob **clockwise**
for resetting the value: turn knob **anti-clockwise**

4.8 Operating and display functions.

Action	Setting	Result	Display
switch on unit	press on/off key	unit is ready for operation	on/off LED is on
switch off the unit	press on/off key	unit is switched off	all displays are off
start ultrasound - now -	select period by turning knob for cleaning period press key ►■ (ultrasound)	ultrasound is operating	ultrasound LED is on
start ultrasound - temperature-controlled*; with mixing of cleaning liquid – * if set temperature > actual temperature	set period set temperature by turning knob for temperature keep key ►■ pressed for > 2 sec	heating operates ultrasound is started automatically set period ultrasound runs down	ultrasound LED blinks as soon as the set temperature is reached the ultrasound LED is on
stop ultrasound before end of set period	turn set period to 0 or press key ►■	ultrasound switched off	ultrasound LED is off
switch on heating	select set temperature	heating operates	temperature LED is lighted when heating is operating temperature LED turns dark when set temperature is reached
switch off heating by hand	turn set temperature to position „0“	heating switched off	temperature LED is off

5 Initial operation

- Check for transport damages** Check the Elmasonic E for possible transport damages before initial operation. In case of visible damage do not connect the unit to the mains. Contact your supplier and forwarding agent.
- Placement** For operation, place the unit on a dry and solid surface. Ensure that the workplace is sufficiently ventilated!
- Do not use a soft surface (e.g. a carpet) as this may impede the ventilation of the unit.



DANGER

Risk of electrocution due to humidity inside the unit!
Protect the unit from entering humidity.

The unit inside is splash-water-proof. Keep workplace and casing dry in order to prevent electrical accidents and damages on the unit.

- Ambient conditions**
- Allowed ambient temperature during operation: +5°C - +40°C
 - Allowed relative humidity of air during operation: max.80%
 - In-door operation only

5.1 Set up of the liquid drain (from E 60 H)

On the delivered unit, the drain duct for the cleaning liquid is closed off with a plastic screw cap.

For setting up the liquid drain fix the delivered tube socket to the drain duct.

- Proceed as follows**
1. Unscrew (anti-clockwise) the plastic screw cap (see *illustration 5.1*)
 2. Screw the tube socket (included in delivery) onto the inside thread of the drain duct (clockwise).
 3. Turn the tube socket into the required drain position (see *illustration 5.2*).
The plastic thread is self-sealing when the socket has been screwed in by hand as far as possible.
Note: Unscrewing the tube socket (anti-clockwise) can cause a leak of the thread.
 4. The drain duct is now ready for connection to a customer-provided discharge system. Use a standard tube (dia 1/2"). Push the tube onto the socket and fix it with the clamp included in the delivery.

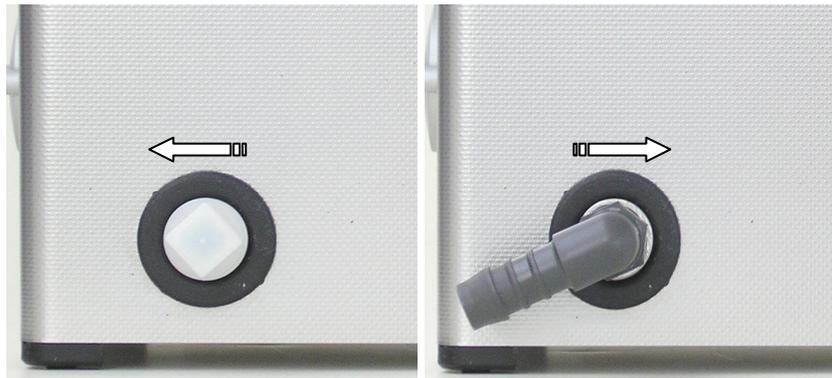


Illustration 5.1

Drain with plastic screw cap

Illustration 5.2

Drain fitted with standard tube

5.2

Connecting the unit to the mains

Required mains conditions

Earth grounded socket:

1 phase (220-240 or 100-120V); 1 N; 1 PE protective earth.

The power supply must be protected by an earth leakage circuit breaker.

Connect mains cable

Use the plug-in mains cable delivered with the unit. Connect the unit to a grounded shockproof socket only. Ensure that the values indicated on the nameplate of the unit correspond with the available connecting conditions.

The mains plug must be connected to an easily accessible socket only, as it serves as interrupted device!

6 Putting unit into operation

6.1 Filling of the unit

Shut the drain Shut the drain duct before filling the tank. (Turning knob for draining of the tank into horizontal position (see *section 4.6*).

Observe filling level Fill the cleaning tank with a sufficient quantity of a suitable cleaning liquid before switch-on.



The optimum filling level is approx. 2/3 of the tank volume. The marked maximum filling level of the tank indicates the recommended filling level with cleaning items in the bath. (See also *section 4.4 Illustration 4.4*)

Suitable cleaning agents Ensure that the chosen cleaning agent is suitable for treatment in an ultrasonic bath and observe the instructions on dosage and the compatibility of the material. We recommend the use of the cleaning agents listed in *section 8.3*.

Prohibited cleaning agents Flammable products are generally not allowed for use in an ultrasonic bath. Observe the safety warnings given in *section 8.1*.



DANGER

Risk of fire and explosion!
Never use flammable liquids or solvents directly in an ultrasonic cleaning bath.
Use the cleaning chemicals listed in *section 8.3*.



Ultrasonic activity increases the vaporisation of liquids and creates a very fine mist which can catch fire on any ignition source. Observe the instructions on limitations of use given in *section 8.1*.



ATTENTION

Risk of damage to the transducer tank!
Do not use any acid cleaning agents (pH value < 7) directly in the stainless steel tank if the cleaning items or the contamination of the cleaning items contain halogenides (fluorides, chlorides or bromides). The same applies to NaCl solutions.
Use the cleaning chemicals listed in *section 8.3*.



The stainless steel tank can be destroyed by crevice corrosion in a very short time. Substances that cause crevice corrosion can be contained in household cleaners.
Observe the instructions on limitations of use given in *section 8.2*.
For queries please contact the manufacturer or your supplier.

6.2

Placement of cleaning items

The ultrasonic bath has been designed for the ultrasonic treatment of items and liquids only.

Do not clean living beings or plants!



Do not reach inside the tank during ultrasonic operation!

Cell walls can be damaged by prolonged exposure to ultrasonic activity.

For placing and taking out the cleaning items always switch off the unit.

No cleaning items on the bottom of the tank

Do not place the cleaning items directly onto the bottom of the cleaning tank, as this might lead to damages to the unit.

Use cleaning basket

Place the cleaning items into the stainless steel cleaning basket (accessory equipment).

Acid tank

For the use of cleaning chemicals which might destroy or damage the stainless steel tank use a separate container. For the special plastic cleaner tank for acid chemicals please contact your supplier.

7

Ultrasonic cleaning process

Please observe the following instructions before starting the ultrasonic cleaning process.

It is the user's responsibility to check the cleaning results.



CAUTION

Risk of scalding by hot surfaces and cleaning liquid!

Ultrasonic energy is physically transformed into heat.

The unit and the cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.

During permanent operation with cover temperatures exceeding 60°C can be reached.

During permanent operation with cover and heating temperatures exceeding 80°C can be reached.

Do not reach inside the bath.

If necessary touch unit and basket with protecting gloves!



CAUTION

Ultrasonic units can produce annoying sounds.

Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.



ATTENTION

Sensitive surfaces can be damaged when exposed to ultrasound over prolonged periods, particularly at low cleaning frequencies.

Ensure that sensitive surfaces are exposed to ultrasonic activity for a suitable period only.

If in doubt check the cleaning progress regularly and observe the state of the surface material.



ATTENTION

Ultrasonic energy is physically transformed into heat.

The unit and the cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.

During permanent operation with cover temperatures exceeding 60°C can be reached.

For the cleaning of temperature-sensitive items please take into consideration the heating-up of the cleaning liquid.

Please observe that the temperature of the cleaning media remains below 42°C when cleaning parts contaminated with fresh protein or blood.

7.1

Heating up of the cleaning liquid

Depending of the degree and kind of contamination and on the cleaning medium used it might be required to heat up the cleaning liquid. For a quick heating-up process and in order to prevent unnecessary energy losses we recommend to use a cover.



The ultrasonic energy is transformed physically into heat. Low set temperatures can be exceeded during ultrasonic operation.

The cleaning effect through ultrasonic cavitation is reduced when cleaning with high temperatures. We recommend not to exceed a temperature of 80°C inside the tank.

For the recommended cleaning temperature please observe the product information of the used elma clean cleaner.



CAUTION

High temperatures! Risk of burning and scalding!

Cleaning liquid, cleaning tank, casing, lid, basket and cleaning items can heat up considerably.

Do not reach inside the bath.

If necessary wear protective gloves when touching unit and basket!



ATTENTION

Cleaning temperature recommendations in the medical sector:

Please observe that the temperature of the cleaning media remains below 42°C when cleaning parts contaminated with fresh protein or blood.

Please observe the temperature even when using low or no heating.

How to proceed

Heating control by turning temperature knob

Press the on/off key to start the unit.

Select the required cleaning temperature by turning the temperature knob.

The temperature LED is lighted.

The heating is operated until the set temperature is reached.

As soon as the actual temperature is equal to or higher than the set temperature, the heating switches off.

The temperature LED turns dark.

7.2 Temperature-controlled cleaning

Functioning Elmasonic E units are equipped with an additional temperature-controlled cleaning function. The cleaning process is automatically started as soon as the required bath temperature is reached.

- How to proceed**
1. Place the cleaning items into the tank.
 2. Select the required temperature.
 3. Set the required ultrasonic cleaning period.
 4. Keep the start/stop key pressed > 2 sec:
The unit starts heating up.
During the heating-up process the ultrasound is regularly activated to mix the liquid.
When the set temperature is reached the ultrasound is switched on for the duration of the set cleaning period.



When the set cleaning period has run down, the ultrasonic activity switches off automatically. The heating continues operating at the set temperature.

7.3 Automatic mixing of the liquid during heating up

Without mixing of the liquid the generated heat will rise to the surface of the bath. This will cause a strong gradient of temperature inside the cleaning tank. In order to ensure an even heating-up of the cleaning liquid, it makes sense to mix the liquid from time to time, e.g. by means of ultrasound.

Elmasonic E units are equipped with an additional mixing device which guarantees the optimum mixing of the cleaning liquid during the heating up process.

Functioning The ultrasound is activated for operating periods of approx. 5 seconds each with one-minute breaks in between.

- How to proceed**
1. select the required cleaning period (set period)
 2. set the required temperature
 3. to start keep the ►■ key pressed for > 2 sec
(see chart 4.8)



Operation only when set temperature > actual temperature

7.4 Starting the cleaning process manually

Set cleaning period Set the required cleaning period with the turning knob.

Short period operation For short period operation set the required cleaning period at the turning knob.

Press the ►■ key to start the ultrasonic operation.

The unit starts the ultrasonic cleaning process. The LED display ultrasound is lighted. The ultrasound is automatically switched off when the set period has run down.

Permanent operation For permanent operation turn the turning knob clockwise into ∞ position. In this operating mode there is no automatic switch-off. The ultrasonic activity must be switched off by hand after the cleaning process has been finished; press the ►■ key to switch off. Alternatively, turn the turning knob back into "0" position. **Caution:** Turn the turning knob anti-clockwise into "0" position!



In order to avoid unintended permanent operation, the Elmasonic E units are equipped with a safety switch-off automatically. The unit switches off completely after 12 h permanent operation. In case you wish to continue operation start the unit again.

7.5 After the cleaning

Follow-up treatment of cleaning items When the cleaning process is finished rinse the cleaning items, e.g. under the tap.

Drain the unit Drain the liquid as soon as it is dirty or when the unit is not operated over a prolonged period of time. Certain residues and types of contamination may destroy or damage the stainless steel tank.

Use the quick-drain duct to drain the cleaning tank (*see section 4.8*).

8 Cleaning media



The cleaning chemical to be used must be suitable for the use in an ultrasonic bath to prevent damage to the tank or injuries to the user. Use the recommended cleaners mentioned in *section 8.3*. Observe the restrictions to cleaners containing solvents and aqueous cleaners mentioned *in sections 8.1 and 8.2*.

For queries please contact the manufacturer or your supplier.

Exclusion of liability

Damages caused by non-compliance with the instructions given in *sections 8.1 and 8.2* will not be covered by the manufacturer's warranty!

8.1

Limitations of use of cleaners containing solvents



Never use flammable liquids or solvents directly in an ultrasonic cleaning tank. Risk of fire and explosion!



Ultrasound increases the volume of vaporisation of liquids and creates a very fine mist that can catch fire on any ignition source at any time.

Do **not** fill potentially explosive substances and flammable solvents

- marked in compliance with the EEC directives by symbols and safety warnings R 1 to R 9
- or E, F+, F, O or R 10, R 11 or R 12 for flammable substances

into the stainless steel tank for ultrasonic treatment.

Exception

In compliance with the general regulations on the protection of labour, certain limited volumes of flammable liquids (max. 1 litre) can be used in an ultrasonic cleaning unit under the following conditions: these liquids must be filled into a suitable separate vessel (e.g. beaker) with sufficient ventilation; this vessel (beaker) can then be put into the stainless steel tank which is filled with non-flammable liquid (water with a few drops of interlacing agent).

8.2 Limitations on aqueous cleaners

Do not use aqueous cleaning media with pH values in the acid range ($\text{pH} < 7$) directly in the ultrasonic tank if fluoride (F^-), chloride (Cl^-) or bromide (Br^-) ions can be taken in by the removed dirt or through the cleaning chemical. These can destroy the stainless-steel tank by crevice corrosion within a very short period of ultrasonic operation.

Acids and alkaline solutions Other media which can destroy the stainless-steel tanks when used in high concentrations or with high temperatures during ultrasonic operation are: nitric acid, sulphuric acid, formic acid, hydrofluoric acid (even diluted). (Completeness of list not guaranteed.)

Entrainment of chemical substances The above limitations for the use of chemicals in an ultrasonic bath also apply for the aforementioned chemicals when these are brought into an aqueous (particularly distilled water) bath through entrainment or from the removed dirt.

Acid-resistant tank For the ultrasonic treatment with the above mentioned media use an acid-resistant tank (available as accessory equipment).

Disinfectants The limitations of use also apply to the standard cleaners and disinfectants if these contain the above mentioned compounds.

Safety regulations Observe the safety warnings indicated by the manufacturer of the chemicals (e.g. goggles, gloves, R and S phrases).

8.3 List of recommended cleaning media

Elma has a large range of suitable cleaning products on offer developed by chemical engineers in the Elma laboratory. Please contact your supplier to find the most suitable cleaning chemical for your application.

Environment – friendly products The organic detergents contained in the elma clean cleaning concentrates are biodegradable. Product informations and safety data sheets are available from the manufacturer.

8.3.1

Dental

- elma clean 10** Universal cleaning concentrate for the cleaning of instruments and laboratory equipment made of plastic, ceramic, stainless steel, rubber and glass.
- elma clean 25** Ready-to-use cleaner for impression spoons: removes dental plaster and alginates. Ready-for-use cleaning bath.
- elma clean 35** Cleaning concentrate for prostheses with activated oxygen for the cleaning of dental prostheses made of metal, ceramics and plastic. The released oxygen refreshes the prosthesis hygienically.
- elma clean 40** Chemical cleaning concentrate for the removal of cement and carbonate (lime). For the cleaning of precious metals, ceramics, plastics, glass and rubber. Removes metal oxide, cement, fluxing media, etc.
- elma clean 55d** Aldehyde-free drill cleaning concentrate for instruments made of stainless steel. For the hygienical removal of amalgam remains, blood, tissue, etc.; with anti-corrosion effect.
- elma clean 60** Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

8.3.2

Medical

- elma clean 10** Universal cleaning concentrate for the cleaning of instruments and laboratory equipment made of plastic, ceramic, stainless steel, rubber and glass.
- elma clean 60** Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

8.3.3

Optics

- elma opto clean** Cleaning concentrate for glasses, frames, optical lenses and components. Also suitable for plastics.

8.3.4 Laboratory

- elma lab clean S10** Acid cleaning concentrate for glass, ceramics, metal incl. light and non-ferrous heavy metals, plastic. Removes mineral deposits, lime, lime soap and non-ferrous heavy metal oxides, mineral grease and oil.
- elma lab clean S20** Strong acid cleaning concentrate for stainless steel, glass and plastic. Removes tenacious contaminations such as rust, organic residues, inorganic compounds and mineral grease and oil. Not suitable for aluminum and light metal alloys.
- elma lab clean N10** Neutral universal and laboratory cleaning concentrate for sensitive materials such as aluminum and light metals. Removes lime soap, light oil and grease and finger marks.
- elma lab clean A10** Alkaline cleaning concentrate for glass, porcelain, metal and plastic. Removes grease, glass grease, gumming, remains of labels and calcification. Also suitable for the laboratory rinsing machine.
- elma lab clean A20sf** Special cleaning concentrate for pipettes, does not contain any tensides. Mildly alkaline, suitable for use in an ultrasonic cleaning unit and in the laboratory rinsing machine. Also suitable for use in pipette rinsing machines that require active cleaning agents (soaking).

8.3.5 Jewellery

- elma clean 75** Ammoniacal cleaning concentrate with brightening effect for precious and nonferrous heavy metals; for the removal of abrasive and polishing pastes. Not suitable for soft stones, pearls or corals.
- elma clean 85** Gentle, neutral cleaning concentrate for the jewellery workshop. Suitable for soft stones and fancy jewellery.
- elma noble clean** Cleaning and brightening of gold, silver and platinum jewellery within seconds. Not suitable for soft stones, pearls or corals. Ready-to-use cleaner.
- elma ultra clean** Extra gentle, mild alkaline cleaning concentrate for precious metal jewellery, in particular gold and gold-alloys will be given a new shine, with stones. Clean soft stones without ultrasound.
- elma super clean** Ammoniacal cleaning concentrate for jewellery made of precious metals, with brightening effect. Clean soft stones without ultrasound.

8.3.6 Watches

- elma chrono clean 1:20** Neutral concentrate for the aqueous cleaning of disassembled watches / clocks; removes resin residues and rust.
- elma cleaning-concentrate 1:9** Ammoniacal aqueous cleaning concentrate for disassembled watches / clocks with brightening effect on non-ferrous parts.

8.3.7 Industry and workshop

- elma tec clean A1** Cleaning concentrate (alkaline) for electronics and fine optics: removes light oils, grease, fluxing agents, dust, finger prints, etc.
- elma tec clean A2** Intensive cleaner (ammoniacal) with brightening effect for nonferrous and precious metals: removes grinding, polishing and lapping media, grease, oil, etc.
- elma tec clean A3** Cleaning concentrate (alkaline) for iron, steel, stainless steel and precious metals: removes punching oil, drawing grease, soot, forge, grinding and polishing media, high-performance cooling lubricants, etc.
- elma tec clean A4** Universal cleaning concentrate (alkaline): removes oil, grease, soot, coking, forge, dust, finger prints, etc.
- elma tec clean A5** Powerful cleaner (alkaline) in powder form for iron and light metals: removes forged and gummed oil and grease, grinding and polishing media, lacquer and paint remnants, wax, etc.
- elma tec clean N1** Neutral cleaning concentrate: removes oil, grease, grinding, lapping and polishing media, dust, sweat, finger prints, etc.
- elma tec clean S1** Mild acid cleaning concentrate: removes rust, lime, oxide films (e.g. verdigris), grease, oil, etc.
- elma tec clean S2** Strong acid cleaning concentrate: removes mineral contaminations such as lime, rust and other oxides, films that can be removed with corrosives, etc.

9 Maintenance

9.1 Maintenance / Care

Pull the mains plug before carrying out any maintenance works!

- Electrical security** The present Elmasonic E unit is maintenance-free.
Check the casing and the mains cable for damage regularly in order to prevent electrical accidents.
- Care of transducer tank** Lime deposits on the stainless-steel tank can be cleaned gently e.g. with elma clean 40 or elma clean 115C (operate the unit with concentrate + water).
- Grid of air fan** Check regularly the grid of the air fan at the bottom of the unit (not existent in all units).
Remove dirt if necessary to allow sufficient ventilation inside the unit.
- Care of casing** Residues of cleaning media can be wiped away with a household cleaner or decalcifier depending on the kind of contamination. **Do not put the unit in or under water!**
- Disinfection** If the unit is used for medical and sanitary purposes it is necessary to disinfect the transducer tank and the surfaces regularly (standard surface disinfectants).

9.2

Service life of the transducer tank



The transducer tank and particularly the ultrasound transmitting surfaces are wear parts. The changes on the surfaces that occur after a certain operating period are visible first as grey areas and later on as material abrasions, the so-called cavitation erosion.

To prolong the service life of your ultrasonic unit even more we recommend to observe the following instructions:

- Regularly remove any cleaning residues, in particular metal particles and rust films.
- Use suitable cleaning chemicals, with particular caution concerning the kind of removed contamination (see instructions *section 8.2*).
- Abrasive particles from removed contaminations (e.g. polishing pastes) must be drained and removed from the cleaning tank as frequently as possible (exchange the cleaning bath).
- Exchange the cleaning medium before it is too heavily contaminated.
- Do not operate the ultrasound unnecessarily; switch off after the cleaning process.

9.3

Repair

**Opening by
authorised
specialised
personnel only**

Repair and maintenance works which require the unit to be connected and opened must be carried out by authorised and specialised personnel only.



DANGER

Risk of electrocution due to live parts inside the unit!

Pull the mains plug before opening the unit!

The manufacturer cannot be held responsible for any damage caused by unauthorised maintenance or repair works on the unit.

In case of a break-down of the unit please contact the manufacturer or your supplier.

10 Technical details

	Tank max. volume (approx. litre)	Tank effective volume (approx. litre)	Tank internal dimensions W x D x H (approx. mm)	Unit external dimensions W x D x H (approx. mm)	Basket internal dimensions W x D x H (approx. mm)	Weight (approx. kg)
E 15 H	1,75	1,2	151x137x100	175x180x212	112x103x50	2,1
E 30 H	2,75	1,9	240x137x100	300x179x214	198x106x50	2,8
E 60 H	5,75	4,3	300x151x150	365x186x264	255x115x75	4,6
E 70 H	6,9	5,2	505x137x100	568x179x214	465x106x50	5,5
E 100 H	9,5	7,5	300x240x150	365x278x264	255x200x75	5,6
E 120 H	12,75	9	300x240x200	365x278x321	250x190x115	6,9
E 180 H	18	12,9	327x300x200	390x340x321	280x250x115	8,1
E 300 H	28	20,6	505x300x200	568x340x321	455x250x115	10,2

	Mains voltage variants (Vac)	Ultrasound frequency (kHz)	Power consumption total (W)	Ultrasonic power RMS (W)	Ultrasonic peak power max*. (W)	Heating power (W)
E 15 H	100-120 220-240	37	90	30	240	60
E 30 H	100-120 220-240	37	240	40	320	200
E 60 H	100-120 220-240	37	500	100	400	400
E 70 H	100-120 220-240	37	520	120	480	400
E 100 H	100-120 220-240	37	500	100	400	400
E 120 H	100-120 220-240	37	750	150	600	600
E 180 H	100-120 220-240	37	950	150	600	800
E 300 H	100-120 220-240	37	1000	200	800	800

* E 15 H – E 30H: impulse wave form; E 60 H – E 300H: standard sine-wave modulation
 The choice of the waveform has been matched to the relevant tank size. The signal form of the wave results in a factor 4 or 8 for the ultrasonic peak max., depending on the modulation of the wave.

11 Trouble shooting

Fault	Possible cause	Remedy
Housing damaged	<ul style="list-style-type: none"> by third party, transport damage 	return unit to supplier or manufacturer
Mains cable damaged	<ul style="list-style-type: none"> by third party, transport damage 	purchase new original mains cable from supplier or manufacturer
No operating functions; all LED displays dark	<ul style="list-style-type: none"> mains cable not plugged in 	<ul style="list-style-type: none"> plug in mains cable
	<ul style="list-style-type: none"> socket dead 	<ul style="list-style-type: none"> check socket/fuse
	<ul style="list-style-type: none"> mains cable damaged / interrupted 	<ul style="list-style-type: none"> replace mains cable
	<ul style="list-style-type: none"> fault of electronics 	<ul style="list-style-type: none"> return unit to supplier / manufacturer
No ultrasound; LED display ultrasound dark	<ul style="list-style-type: none"> turning knob for ultrasound in position „0“ 	<ul style="list-style-type: none"> switch on ultrasound at turning knob
	<ul style="list-style-type: none"> unit is switched 	<ul style="list-style-type: none"> switch on the unit at key on/off
	<ul style="list-style-type: none"> key ►■ (ultrasound) not pressed 	<ul style="list-style-type: none"> switch on key ►■
	<ul style="list-style-type: none"> fault of electronics 	<ul style="list-style-type: none"> return unit to supplier / manufacturer
No ultrasound; LED display ultrasound is blinking rapidly = fault indication ultrasound	<ul style="list-style-type: none"> unsuitable filling level 	<ul style="list-style-type: none"> change filling level, switch unit off and
	<ul style="list-style-type: none"> fault of electronics 	<ul style="list-style-type: none"> switch unit off and on if fault occurs again: return unit to supplier / manufacturer
Cleaning result not satisfactory	<ul style="list-style-type: none"> possibly no cleaning medium or wrong cleaning medium used 	<ul style="list-style-type: none"> use suitable cleaning medium
	<ul style="list-style-type: none"> possibly cleaning temperature not suitable 	<ul style="list-style-type: none"> heat up cleaning liquid
	<ul style="list-style-type: none"> possibly cleaning period too short 	<ul style="list-style-type: none"> repeat cleaning interval

Fault	Possible cause	Remedy
Unit does not heat up; LED display temperature dark	<ul style="list-style-type: none"> • turning knob temperature in position „0“ 	<ul style="list-style-type: none"> • switch on turning knob temperature
	<ul style="list-style-type: none"> • unit is switched 	<ul style="list-style-type: none"> • switch on unit at key on/off
	<ul style="list-style-type: none"> • fault of electronics 	<ul style="list-style-type: none"> • return unit to supplier / manufacturer
No heating; LED display temperature is blinking rapidly = fault indication heating	<ul style="list-style-type: none"> • fault of electronics 	<ul style="list-style-type: none"> • switch unit off and on; if fault occurs again: return unit to supplier / manufacturer
Heating period not satisfactory	<ul style="list-style-type: none"> • loss of heating energy 	<ul style="list-style-type: none"> • use cover (optional accessory equipment)
	<ul style="list-style-type: none"> • no revolution of cleaning liquid 	<ul style="list-style-type: none"> • e.g. switch on ultrasound
Unit produces boiling noise during heating up	<ul style="list-style-type: none"> • no revolution of cleaning liquid 	<ul style="list-style-type: none"> • e.g. switch on ultrasound
Set temperature is exceeded	<ul style="list-style-type: none"> • temperature sensor does not measure the average temperature (no revolution) 	<ul style="list-style-type: none"> • revolve liquid by hand or by means of ultrasound
	<ul style="list-style-type: none"> • set temperature too low, ultrasonic energy heats up the liquid more than required (physical process) 	<ul style="list-style-type: none"> • for low set temperatures do not switch on heating
		<ul style="list-style-type: none"> • switch on ultrasound for short periods only
No operational functions; displays of LED ultrasound and LED temperature are blinking rapidly = fault indication programme control	<ul style="list-style-type: none"> • fault of electronics 	<ul style="list-style-type: none"> • switch unit off and on if fault occurs again: return unit to supplier / manufacturer

12

Putting out of action and waste disposal



The unit can be taken to metal and electronics recycling stations or returned to the manufacturer.

13

Manufacturer's contact address

TECHSPANGROUP

Australia & New Zealand -

Australia Phone: 1-800 148 791 Fax: 1-800 148 799

FNew Zealand Phone: 0800 603 603 Fax: (09) 827 6567

e-mail: info@techspanonline.com

Please visit our homepage. You will find helpful information and descriptions on our large product range:

www.techspanonline.com

Should you have any queries or suggestions concerning the present unit, its operation or the Operating Instructions?

Please contact us, we will be glad to assist:

Technical Support

Phone Aus - 1-800 148 791 NZ - 0800 603 603

Fax Aus - 1-800 148 799 NZ - (09) 827 6567

e-mail: info@techspanonline.com