



## **Ultrasonic Cleaning Systems for precleaning and final cleaning of surgical instruments, endoscopes and implants made of metal, ceramic and plastic**

- Customer-specific ultrasonic systems for precleaning and final cleaning with integratable passivation
- Modular ultrasonic standard systems for precleaning and final cleaning with integratable passivation
- Peripheral equipment, special equipment and accessories
- Ultrasonic series production equipment
- Elma cleaning chemicals

**Customer requirements**

Stage of cleaning process (precleaning, final cleaning with or without passivation)

Cleaning process for the parts has already been established

Cleaning process for the parts has not yet been established

**Cleaning lines**

Based on the required process, the required degree of cleanliness and the surface processing (passivation) Elma configures the suitable cleaning line including processes (aqueous, semi-aqueous or in combination with acid or solvents)

**Processes using Elma chemicals**

In the elma application laboratory our engineers cooperate with the customer to establish the individual cleaning process using Elma chemicals

Equipment and systems which can be validated depending on cleaning and throughput requirements

Quality assurance and its documentation using data logger

System control according to FDA 21CFR Part 11 (user management, audit trail)

Support for the risk analysis (FMEA) and validation of systems and processes (IQ & OQ)

Ultrasound with multiple frequency technology

Process laboratory for the optimum process solution

Cleaner from in-house development and production

After sales service in Europe, USA and Asia







### Elma STC robot system

Single transport system – standardised cleaning system for large throughput rates and high cleaning demands



- standardised cleaning system at excellent price performance ratio
- 5 standard tank sizes (50, 100, 200, 350, 600 litre)
- variable cleaning processes with numerous options
- various process chambers (cleaning, rinsing with/without ultrasound)
- various drying systems (hot air, trough-shape or flow dryer, IR dryer)
- additional equipment available (vacuum dryer, wet loading tank, etc.)
- various bath care systems (pump-filter systems, oil separators, pure water units)
- control by industrial PC with intuitive visualization, remote control and remote maintenance possible, data logger
- easy switching of languages (with special characters), integrated operating instructions
- Elma multi-frequency technology
- robust and proven components
- process-controlled production for validated stable production quality (data logger)
- lower investment cost due to standardisation
- user management and audit trail according to FDA 21CFR Part 11 via industrial PC

### Elma MTC Lift-Push system

Multiple transport system – fully automatic standard systems in various sizes for cleaning jobs requiring a high throughput



- Lift-Push technology allows high throughput rates
- 3 standard chamber sizes (50, 100, 200 litre)
- other features: see STC systems

### STC 350/350/300-8-WLT

Type: robot cleaning line for the final cleaning of instruments with integrated passivation

Cleaning product: instruments

Process: aqueous with hot air dryer and clean room filter

Cleaning chemicals: elma clean 275 d&s and elma clean 115 C

Periphery: pure water circulation system

Control via IPC and software according to FDA 21CFR Part 11



### MTC 300/300/400-9-WLT

Type: Lift-Push cleaning line with rotation for the final cleaning of implants

Cleaning product: ceramic implants

Process: aqueous with hot air dryer and clean room filter

Cleaning chemicals: elma clean 275 d&s and elma clean 250 d&s

Periphery: pure water circulation system

Control via IPC and software according to FDA 21CFR Part 11 and Elma data logger



### STC 300/400/360-8-WLT

Type: robot cleaning line for final cleaning with integrated passivation

Cleaning product: implants

Process: aqueous with hot air dryer and clean room filter

Cleaning chemicals: elma clean 275 d&s and elma clean 115 C

Periphery: pure water circulation system

Control via IPC and software according to FDA 21CFR Part 11 and Elma data logger



### **X-tra pre 550-8-WLT-R**

Type: modular cleaning line with transport robot system for precleaning  
Cleaning product: implants  
Process: aqueous with hot air dryer and clean room filter  
Cleaning chemicals: elma clean 270 d&s and elma clean 115 C  
Control via IPC and software according to FDA 21CFR Part 11



### **X-tra pre 550-7-WLT-F-R**

Type: modular cleaning line with transport robot for the final cleaning of implants prior to sterilisation  
Cleaning product: implants  
Process: aqueous with hot air dryer and clean room filter  
Cleaning chemicals: elma clean 275 d&s and elma clean 115 C  
Periphery: pure water circulation system  
Control via IPC and software according to FDA 21CFR Part 11



### **X-tra pre 300-8-WLT-F-R**

Type: modular cleaning line with transport robot for the precleaning of instruments; cleaning line includes partial encasing and laminar flow  
Cleaning product: instruments  
Process: aqueous with hot air dryer and clean room filter  
Cleaning chemicals: elma clean 275 d&s and elma clean 270 C  
Periphery: pure water circulation system  
Control via IPC and software according to FDA 21CFR Part 11



### **X-tra pro 550-2**

Type: modular unit for the intermediate cleaning of implants  
Cleaning product: implants for the intermediate cleaning prior to dimensional inspection  
Process: aqueous with integrated oil separation and particle filtration  
Additional feature: basket park position for the drying by customer-provided compressed air



## Elmasonic X-tra line pro for precleaning or intermediate cleaning with or without passivation

Individual solutions with of Elma series components,  
from manual up to fully automatic cleaning lines



- available in 5 different unit sizes: 300, 550, 800 (manual and automatic), 1200, 1600 (manual); (X-tra LSM units for the precleaning with solvents can be integrated)
- multi-frequency technology (25/45 kHz or 35/130 kHz)  
expandable by numerous peripheral units and equipment (automatic loading and unloading belt, dosing systems, digital temperature monitoring, Lift-Out, filter-pump unit, oil separator, etc.)
- flexible structures and cleaning procedures to adjust to various cleaning tasks
- well proven and reliable components
- graphic control system (with automatic transport robot)
- control via industrial PC with visualisation and according to FDA 21 CFR Part 11 (user management & audit trail)
- remote control possible
- simple change of control language
- integrated operating instructions
- process-controlled production to guarantee a constant productional quality (data logger)
- adjustment of investment costs to shorter product lifetimes
- flexible integration of the cleaning line into existing production processes
- short delivery times due to modular system







Tanks with rounded corners, electro-polished surfaces



Optional: infrared or hot air dryer



Safe, IR-welded piping

## Elmasonic X-tra line pre for final cleaning with or without passivation

Multi-frequency cleaning line for final cleaning in the medical engineering industry

- 3 different tank sizes: X-tra line precision 300, 550 and 800
- multi-frequency technology with 25/45 kHz or 35/130 kHz
- the tanks have rounded corners, electro-polished surfaces and a specially designed piping to optimize the draining of liquid residues and to prevent entrainment
- special peripheral units for finest cleaning tasks
  - hot air dryer with special particle filter
  - IR dryer
  - casing in laminar flow boxes for cleaning under clean room conditions
- manual or automatic robot systems
- individual carriers
- modular system, variable to fit changed requirements
- operating screen with visualization to control and monitor the process
- data logger can be integrated in IPC control
- bar code scanner for order entry
- remote maintenance of software via VPN connection
- short delivery times
- Plug & Clean technology
- FDA21 CFR Part 11 (user management + audit trail)



## Dryers WLT, VTD, IR

Hot air dryer, vacuum dryer, infrared dryer



- user-friendly loading from the top
- digital display of set and actual temperature
- very safe due to integrated limit temperature monitor
- casing and inner chamber made of stainless steel
- extremely short drying period

## Oil separators

ÖA100 and ÖA200



- bath care for oil emulsions
- prolonged service life
- increased cleaning power
- stable bath quality, therefore constant cleaning results
- lower consumption of fresh water and energy
- reduced quantity of waste water
- low consumption of chemicals
- increased bath capacity

## Elmapur

Water processing units



Water processing units for the creation of softened tap water, re-osmosis water or pure water for recirculation systems in various sizes between 100 and 2400 l/h.

## Elmasonic X-tra LSM

for the cleaning in flammable and aqueous liquids



- 2 unit sizes: 250 and 550
- multi-frequency technology: 25/45 kHz
- integrated explosion protection against the forming of an explosive atmosphere (primary explosion protection)
- TÜV-certified for the use of solvents
- for the use of solvents with flashpoint > 55 °C
- permanent operation possible due to cooling device for a constant operating temperature
- occupational exposure limits are kept due to optional suction device
- units can be integrated into existing X-tra Line



- pump-filter unit with buffer tank and double filtration
- surface skimming and bottom scouring through valve control



- processing of solvent by separation of dirt particles



## From table-top unit to custom-made robot cleaning line

All from one source



*Elmasonic P table-top unit*



*Elmasonic S 60 and S 60 H*



*Practical accessories*

## Elmasonic S

Ultrasonic table-top units with state-of-the-art technology

The product programme ranging from individual units via modular add-on cleaning lines to custom-made special industrial cleaning lines provides the perfect solution for each fine cleaning problem at an excellent price performance ratio.

Elma has their own chemical laboratory to test and establish high-quality cleaning processes. The advantages: process, chemicals, units, cleaning technology and service – all from one source made by Elma.



*unit sizes from 0.8 to 90 litre*

## Elmasonic P

The most professional way of using ultrasound

Digital display, self-explanatory, all data clearly arranged, set and actual values easy to monitor. Very easy to operate with all parameters at a glance.

2 ultrasonic frequencies (switchable) in one unit:

37 kHz – for the removal of coarse contamination

80 kHz – silent, ideal for quiet work areas, with prolonged process time

The advantages at a glance

- perfect quality and long service life
- short cleaning period due to strong ultrasonic power
- modern and functional design
- intensive and gentle cleaning at 37 kHz with elma performance transducers
- uniform cleaning due to electronic sound field oscillation (Sweep)
- quick degassing (Degas / Autodegas)
- electronic time and temperature control
- temperature-controlled autorun
- ceramic heating elements, safe to run dry
- 13 different sizes – 0.8 to 90 litre – the perfect unit for each cleaning job
- large range of special accessories

## Cleaning with ultrasound – today one of the best cleaning technologies: ecological, economical, intensive and gentle

### Ultrasound reduces the cleaning period by up to 90%!

Ultrasound is the term used for vibrations that cannot be perceived by the human ear (>20 kHz). For cleaning, vibrations between 20 and 130 kHz are applied. Transducer elements mounted to the bottom of a cleaning tank transmit high and low pressure waves into the liquid. At a certain level of vibrations the compound structure of the liquid tears and vacuum bubbles of sizes in the nano range are created. These



bubbles implode close to the surfaces of immersed cleaning items thereby directing a pressure jet toward surfaces

of the cleaning items. This process is called cavitation. It removes dirt particles both gently and thoroughly from all parts that are completely immersed, even from the tiniest grooves or bore holes. In particular, cleaning items of complicated geometric shape and hollow parts are cleaned, which is where cleaning jets or manual cleaning methods fail.



### Multi-frequency technology

The development of multi-frequency units by Elma is a masterpiece of technical engineering. Multi-frequency units are fitted with a single transducer system that can produce two different ultrasonic frequencies. So two different materials can be cleaned in the same cleaning tank: sensitive surfaces can be treated with high frequencies, and robust pieces can be cleaned with low frequencies.

### Only the right cleaning procedure yields a perfect result

Elma researches and develops the optimized cleaning procedure in their own application laboratory. Each new cleaning problem is regarded as a challenge which is generally addressed in cooperation with the customer.

The technical equipment provided in the Elma application laboratory is of the highest standard and includes the latest cleaning technologies for ultrasonic, spray and steam jet cleaning, for rinsing and for drying. Even clean room conditions can be simulated.



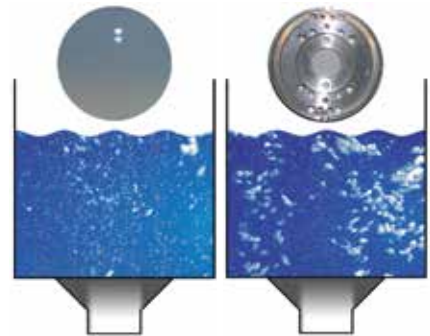
Finding a solution for a difficult cleaning problem satisfies the customer and proves the high quality of Elma technology and Elma service to him.

The cleaning chemicals are formulated and produced individually for each cleaning task, so quite often a new cleaning problem leads to the production and distribution of a new cleaning product.

Each year, Elma carries out numerous cleaning tests ranging from simple processes to highly complex cleaning arrangements, which provide solutions with serial units or which generate new processes for the Elma cleaning lines.



The cleaning problem is always the core issue, and the Elma customers appreciate the commitment with which it is solved.



### The Elma Kavimeter

Mobile system for the measuring of the cavitation; for validation and quality control of ultrasonic cleaning lines and units

### What the Kavimeter does

Measuring of the following ultrasonic parameters: frequency, sound pressure and signal form; measuring and evaluation of the cavitation noise; calculation of the cavitation intensity and the power density of ultrasonic equipment in cleaning lines and units

### Applications

Measuring and setting of the required ultrasonic parameters in process chambers; measuring and recording of the ultrasonic parameters for validation and quality control of cleaning systems in production processes

## Cleaning concentrates for aqueous cleaning and for passivation in the medical engineering industry (instruments, implants)

Contamination	Preceding / following process step	Stainless steel, titanium	Al alloys	Ceramics	Plastics	Product (short product name)	Properties	Recommended concentration, characteristics; pH value
Precleaning and intermediate cleaning								
Residues, e.g. emulsions, oil, grease, grinding and polishing media	after and between process steps of milling, turning, drilling and grinding	+	-	+	+	elma clean 110 (EC 110)	concentrate for use in ultrasonic cleaner; NaOH based, emulsifying – not suitable for oil separator	3–5 vol%, highly alkaline; pH: 12–13
Residues, e.g. emulsions, oil, grease, grinding and polishing media	after and between process steps of milling, turning, drilling and grinding	+	-	+	+	elma clean 112 (EC 112) + elma clean 212 (EC 212)	alkaline tenside concentrate for use in ultrasonic cleaner, KOH based, demulsifying – suitable for oil separator	4 vol% EC 112 + 0.4 vol% EC 212, highly alkaline; pH: ~13
Final cleaning or finest cleaning								
Polishing and grinding media, finger prints, dust, particles	after polishing, grinding, blasting and prior to packing	+	-	+	+	elma clean 110 (EC 110)	concentrate for use in ultrasonic cleaner, NaOH based, emulsifying – not suitable for oil separator	3–5 vol%, highly alkaline; pH: ~13
Grinding media, finger prints, dust and particles	after grinding, blasting and prior to packing	+	+	+	+	elma clean 260 dip& splash (EC 260d&s)*1)	concentrate for ultrasonic immersion and spray cleaning, dissolves lime soap, demulsifying	immersion cleaning: 1–2 vol%, spray cleaning: 0.5–1 vol%, neutral; pH: 7.5–8.5
Grinding media, finger prints, dust and particles	after grinding, blasting and prior to packing	+	-	+	+	elma clean 275 dip& splash (EC 275 d&s)*2)	concentrate for use in ultrasonic cleaner, KOH based, demulsifying	immersion cleaning: 1–2 vol%, spray cleaning: 0.5–1 vol%, alkaline, pH. 12–13
Polishing and grinding media, finger prints, dust and particles	2. cleaning step after alkaline cleaning, after polishing, grinding, blasting and prior to packing	+	+	+	+	elma clean 115C (EC 115C)*3)	concentrate for use in ultrasonic cleaner, based on citric acid, emulsifying	1–3 vol%, acid; pH: 3–4
Passivation of stainless-steel surfaces								
Iron ions in stainless-steel surface (passive layer) – they present a risk of corrosion	after alkaline or pH neutral cleaning, prior to rinsing, drying and packing	+	-	+	+	elma clean 115C (EC 115C)*3)	dissolves iron ions from the passive layer through formation of soluble iron compounds	7–10 vol%, acid; pH: ~2

\*1) also available as registered medical device under label elma lab clean N10 (ELC N10)

\*2) also available as registered medical device under label elma lab clean A25 (ELC A25)

\*3) also available as registered medical device under label elma lab clean S15 (ELC S15)



Ultrasonic Cleaning Technology · Appliances · Cleaning Media



The Elma product range for ultrasonic cleaning is the largest worldwide, both with regard to series units and standardized or special customized cleaning lines. Based on their long-term experience, their innovative development and the specialized know-how, Elma manufacture and supply top-of-the-range technology for all sorts of cleaning jobs. This is what has made Elma famous as suppliers of solutions to all sorts of cleaning problems all over the world, even for the most crucial cleaning tasks. But the high quality standard does not end with developing and manufacturing equipment and appliances: a perfect service and round-the-clock technical support complete the excellent general picture.

The cleaning chemicals, developed for various cleaning purposes in the Elma application laboratory, are an important part of the Elma product range.

Today, Elma employs more than 220 people; the company is certified according to DIN EN 9001 and focuses on reliability and close cooperation with the customers.

“Made by Elma Germany”- that’s the underlying principle which guarantees motivation, precision, quality and a constant enthusiasm for new developments.



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