Ultrasonic Technology for the Industrial Parts Cleaning

Ultrasonic serial units
Modular ultrasonic cleaning lines
Special custom-made ultrasonic cleaning lines
Cleaning chemicals

www.elma-ultrasonic.com
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. 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.
ELMA is your competent partner for all fine cleaning tasks, especially for leading companies in the precision optics industry, the electronics and semiconductor production, in the medical field, in the manufacture of precision metal parts, for the automobile industry, the nuclear energy sector, or for companies in the communication technology or environment and aviation technology sectors. Elma designs special cleaning installations and offers a complete customer service including a 24 hour service hotline.

The process laboratory
Our own process laboratory is an important interface between Elma and our customers. Our process laboratory engineers cooperate with our customers to design the perfect solution for each and every cleaning job. This is the basis on which the cleaning line is arranged so that the customer will be offered a complete and round solution. Through this cooperation it is possible to test and apply new technologies very successfully. Following this procedure, we can also systematically test and improve other fine cleaning methods, e.g. for the surface treatment before nanotechnological applications.

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All from one source
From table-top unit to custom-made robot installation

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

Elma has its 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.

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

unit sizes from 0.8 to 90 litre

The advantages at a glance
• perfect quality and long service life
• short cleaning period by 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, safe to run dry
• 13 different sizes – 0.8 to 90 litre – the perfect unit for each cleaning job
• large range of special accessories
**X-tra Table-top units**

For tough applications

- for tough and intensive cleaning jobs, with welded tanks of 3 to 14 litre
- "X-tra" long service life due to new cavitation-proof and surface reinforced stainless steel (3 years long term guarantee)
- powerful due to additional transducer systems
- high heating power for short heating periods
- uniform cleaning due to electronic sound field oscillation: Sweep
- safe to run dry
- 2 cleaning levels: Powerclean for intensive cleaning, and Softclean for gentle cleaning
- quick drain with welded duct

**Elmasonic XL**

Stand-alone units for the Industrial parts cleaning

- large ultrasonic units available in 3 sizes from 140 l up to approx. 300 l
- ideal for the removal of polishing pastes, particles, fats and oils
- high ultrasonic cleaning power with bottom-mounted ultrasound, or with side-mounted ultrasound on 2 or 3 sides
- multifrequency for rough and fine cleaning at 25 or 45 kHz
- industrial operating panel with display, very easy operation, clearly arranged display
- "controlled cavitation field": with side-mounted ultrasound on 2 sides, the cavitation fields can be controlled to optimize the sound field distribution
- all units are equipped with oil overflow basin to allow the connection of an oil separator
- optional: cleaning basket oscillation device for rinsing off contaminations in the bath
- optional: hinged flip-top noise protection cover for the reduction of the noise level

**Elmasonic X-tra LSM**

For cleaning in flammable and aqueous liquids

- two unit sizes 250 and 550
- multi-frequency technology 25/45 kHz
- built-in explosion protection against the forming of explosive atmospheres (primary explosion protection)
- TÜV certificate (German technical surveillance certificate) for the use of solvents
- use of solvents with ignition point above 55 °C possible
- permanent operation possible due to cooling device for a constant operating temperature
- within threshold limit values due to optional edge suction device
- units can be integrated in X-tra line
Ultrasonic industrial units

Which unit fits my cleaning task?

Elma provides the perfect solution for any cleaning problem. In industrial production processes a multitude of parts of most differing geometries, sizes, quantities and types of contamination need to be cleaned. A crucial factor for the cleaning result is the subsequent process. Will the cleaned items be further processed, e.g. by coating? Or do they undergo final cleaning? Elma offers various ultrasonic units complete with cleaning concentrates that are specially designed for industrial cleaning purposes.

<table>
<thead>
<tr>
<th>Elmaxonic X-tra basic</th>
<th>Elmaxonic X-tra pro</th>
<th>Elmaxonic X-tra Line pro Flex 1 and 2</th>
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</thead>
<tbody>
<tr>
<td><strong>Ultrasonic units:</strong></td>
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<tr>
<td>6 different unit sizes from 30 to 250 litre, multi-frequency technology for fine and coarse cleaning (25 kHz and 35 kHz)</td>
<td>5 different unit sizes from 25 to 150 litre in two multi-frequency versions (35/130 kHz and 25/45 kHz)</td>
<td>5 different unit sizes from 25 to 150 litre in two multi-frequency versions (35/130 kHz and 25/45 kHz), including support frame and carrier basket oscillation; expandable by rinsing station; available as single unit mounted on frame or as combined ultrasonic unit with rinsing tank</td>
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<tr>
<td><strong>Cleaning items:</strong></td>
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<tr>
<td>Cleaning of small items and machinery components, casting moulds etc. during and after production</td>
<td>Small items, machinery components, bulk goods (in rotating basket), intermediary and final cleaning</td>
<td>Small items, machinery components, bulk goods (in rotating basket), intermediary and final cleaning; service cleaning; restoration of parts after a fire</td>
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<td><strong>Contaminations:</strong></td>
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<td>Fat and grease, oil, wax, adhering processing residues that can be removed by emulsifying cleaners (no oil separating device)</td>
<td>Fat and grease, oil, wax, processing residues; oil separation, discharge of particles, bottom scouring allow the connection of bath care devices which in turn allow the use of demulsifying cleaners; also suitable for large quantities of oil</td>
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<td><strong>Cleaning media:</strong></td>
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<td>Emulsifying cleaners (oil absorbing)</td>
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<td><strong>Recommendation:</strong></td>
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<td>The different tank sizes make the units suitable for use in production, maintenance, workshops and service from the metal-working up to the jewellery industries, for every cleaning job that requires the removal of particles rather than oil</td>
<td>The different tank sizes make the units suitable for use in production, maintenance, workshops and service; ideal for the removal of large quantities of contamination; good for all cleaning jobs requiring numerous functions; the two multi-frequency pairs allow fine cleaning and coarse cleaning plus cleaning by ultrasonic flow without cavitation</td>
<td>The different tank sizes make the units suitable for use in production, maintenance, workshops and service; the two multi-frequency pairs allow fine cleaning and coarse cleaning plus cleaning by ultrasonic flow without cavitation; the units are equipped with an oscillation device (better removal of contaminations); a rinsing tank can be arranged beside the ultrasonic unit; ideal for a manual workstation</td>
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Elmasonic X-tra basic

Ultrasonic cleaning units designed as stationary units, available in 6 different tank sizes and equipped with multi-frequency technology 25/45 kHz
- 25 kHz for the coarse removal of lapping and polishing media
- 45 kHz for the removal of oil and grease
  ideal for hard metal and glass surfaces

High-performance ultrasound, ergonomic operation and easy handling: the ultrasonic cleaning units for workshop and production
Numerous features make operating the units easy and efficient at the same time.
All units are mounted on rollers and can be moved to various places in production sites and workshops. The ergonomically arranged operating panel allows monitoring and controlling of all ultrasonic parameters, such as time and heating pre-selections, frequency, Sweep and Pulse. In particular, the Pulse mode for a short-term power increase to remove tenacious adhering contaminations make the units universally applicable. The Sweep mode for a uniform sound field distribution is integrated and runs permanently.

Only ease of maintenance guarantees long-lived and uncomplicated operation
We have put great value to the development of easy-to-maintain equipment.
The units can be opened at the front. Operating panel and generator are combined in one piece and can be exchanged quickly and easily. The “intelligent” generators adjust automatically to the installed transducer elements. So, prolonged service breaks and idle phases are avoided.

- multi-frequency technology: 25 and 45 kHz in one unit for coarse cleaning jobs and for fine cleaning before surface processing
- ergonomic operation: robust, easy to operate, clearly arranged, splash-water proof
- Sweep – uniform power distribution throughout the bath
- Pulse – additional power for difficult cleaning applications
- optional accessory equipment: noise protection cover or stainless-steel cover
- inclined tank floor to help scouring of coarse contamination particles
**Elmasonic X-tra pro**

Ultrasonic cleaning units in 5 different tank sizes, applicable as:
- single unit
- Flex manual workstation
- basic unit for modular X-tra line cleaning lines

- 5 different unit sizes: 30, 55, 80, 120 and 150 litre bath capacity, 2 multi-frequency pairs: 25/45 kHz or 35/130 kHz
- switchable frequencies for intensive coarse and final cleaning purposes
- LCD display for the setting and monitoring of all parameters; 5 individual programmes can be stored, connectable via BUS system
- ultrasonic power control
- Pulse for increased cavitation
- Sweep for an optimized distribution of the cleaning power
- Degas for quick degassing of fresh cleaning baths
- overflow basin for oil surface skimming, connection of bottom scouring device and filter-pump aggregate possible
- optional: oscillation device for an improved rinsing effect
- highest quality and longevity

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The easily pluggable rinsing station allows pre-cleaning by hand shower, subsequent ultrasonic fine cleaning and follow-up rinsing.

- complete module for pre-cleaning and follow-up rinsing before and after the intensive ultrasonic cleaning – perfect for workshops and decentralized workstations
- can be operated with tap water or DI water, depending on the rinsing requirements
- no dilution of the cleaning bath due to separate rinsing water discharge
- optionally available on support frame and with oscillation device to assist the ultrasonic bath
- stainless-steel casing and special stainless-steel transducer tank

**Elmasonic X-tra pro with rinsing station**

**X-tra Line Flex 1 and 2**

- 6 different unit sizes
- all units in multi-frequency version for coarse and fine cleaning jobs
- Pulse for an increased cavitation
- Sweep for an optimized sound field distribution
- Degas for quick degassing of the cleaning liquid
- power regulation
- large range of peripheral equipment (filter-pump aggregate, oil separator, pure water unit, hand shower device, etc.)
Elmasonic X-tra line pro

Individual solutions with 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 pre-cleaning 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 by industrial PC (optional) with visualization
- remote control possible
- simple change of control language (with special characters D, GB, F, I, ES)
- integrated operating instructions
- process-controlled production to guarantee a constant productional quality (datalogger)
- excellent price performance ratio
- adjustment of investment costs to shorter product lifetimes
- flexible integration of the cleaning line into production processes (inline solution)
- short delivery times due to modular system
Elmasonic X-tra line precision

Multi-frequency cleaning line for fine cleaning applications before inspection and coating in the optical industry

- 2 different tank sizes: X-tra line precision 300 and X-tra line precision 550
- multi-frequency technology 25/45 kHz or 35/130 kHz
- the tanks have rounded corners, electro-polished surfaces and 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
- modular system, variable to fit changed requirements
- optional operating screen with visualization to control and monitor the process

- datalogger can be integrated in IPC control
- short delivery times
- Plug & Clean technology

Tanks with rounded corners, electro-polished surfaces

Infrared or hot air dryer

Safe, IR welded piping
Elma STC robot system
Single transport system – standardized cleaning system for large throughput rates and high cleaning demands

- standardized 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, datalogger
- 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 (datalogger)
- lower investment costs due to standardization

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)
- further features: see STC systems
The experienced Elma staff in production and service can look back on many years of designing and constructing specialized cleaning lines.

Custom-made cleaning lines

Cleaning of individual parts

Cleaning in batch operating mode
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
• low consumption of chemicals
• increased bath capacity

Elmapur
Water processing units

Water processing units for the creation of DI water, re-osmosis water or pure water for recirculation systems in various sizes between 100 – 2400 l/h.
Elma quality – excellent cleaning results and perfect service

Ronald Bauer
Product Manager Industrial Dept./Laboratory

**Pump-filter aggregates**

FP250 A / B / C

- dirt particle separator for a prolonged service period of cleaning baths
- increased cleaning power
- stable bath quality
- cost minimization due to reduced waste water quantities and low energy consumption
- suitable for various media
- available in 3 standard versions

**Elmasonic IG**

Ultrasonic industrial generators

Perfect adjustment of the cavitation fields

- Adjustment of the requested ultrasonic power via modular insertion technology between 200 W and 8000 W (single or double 19” insertion casing)
- Uniform sound field distribution by adjustment of the cavitation fields (on 2 side sound models) – a patent application has been filed –
- High degree of flexibility for fine and coarse cleaning jobs with performance ultrasound by multi-frequency technology 25/45 or 35/130 kHz
- Very simple and self-explanatory operation by operating panel foil with graphic display
- Equipped with Sweep, Degas, Pulse modes and power control
- Control via SPC or PC

**Elmasteam**

Modular steam jet cleaners

- 8 bar steam pressure
- switchable steam and compressed air operation
- optional pump allows permanent operation without breaks
- one unit offers the following processes:
  - pre-cleaning
  - steam cleaning
  - cleaning of sensitive surfaces
  - removal of soft and tenacious sticky contaminations, oil, polishing pastes
  - removal of residues of adhesives
- pre-cleaning of heavily contaminated items to allow longer service periods of a cleaning bath
- steam rinsing for spotlessly clean surfaces
- cleaning of sensitive surfaces (ceramics)
- cost-efficient due to multiple use options
elma clean
Cleaning concentrates developed and made by Elma

Elma, manufacturer of ultrasonic serial units and cleaning lines, develops and produces “tailor-cut” cleaning chemicals for industry and craft.

The application of ultrasound allows the economical use of cleaning chemicals. Generally, the chemicals are distributed as concentrates.

The combination of physical cleaning effect (ultrasound and temperature) with bio-degradable cleaning chemicals makes for an environment-friendly solution.

All cleaning chemicals have been formulated for specific industrial cleaning tasks, enhance the ultrasonic cavitation and can be discharged without problems after use. All Elma chemical products are listed with the German Federal Environment Agency.

elma tec clean
Broad range of applications in the industrial cleaning
- alkaline cleaners A1 to A5
- neutral cleaner N1
- acid cleaners S1 and S2

elma clean 300 series
Elma cleaners for the optical industry and the glass processing industry

elma clean
100/200 series
For the metal-working industry and for the cleaning of components

elma-KS: corrosion protection
The name Elma represents quality and know-how in all sectors where cleaning processes and cleaning technology are required – and it has done so for more than 50 years now. The heart of the company’s success is the ultrasonic technology.

The Elma product range for ultrasonic cleaning is the largest worldwide, both with regard to serial units, standardised and special cleaning lines. Based on its long-term experience, its innovative development and the specialised know-how, Elma makes and supplies top of the range technology for all sorts of cleaning jobs. This is what has made Elma famous as supplier of problem solutions 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 installations: a perfected service and round-the-clock technical support complete the excellent general picture. Elma also develops and produces a number of specialised equipment for the watch and jewellery business sector.

The cleaning chemicals, developed for various cleaning purposes in our own laboratory, are another Elma product. Today, Elma employs over 200 people; we are certified according to DIN EN 9001 and stand for reliability and cooperation with our customers. “Made by Elma Germany” – that’s the underlying principle which guarantees motivation, precision, quality and a constant enthusiasm for new developments.