



Industrial Product Range



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



Elma service: with experience and commitment for our customers



Wolfgang Kieseewetter, Manfred H. Schmidbauer and Dr. Ing. Andreas Klinkenberg

Highly specialized and yet innovative in multiple ways – this is Elma, a company which has successfully been on the market with their ultrasonic technology for more than 50 years now. Elma started in 1948 with only 2 people who had an idea for a totally new watch cleaning machine. They kept looking for the perfect cleaning technology which eventually led them to try ultrasound.

Constant research and permanent technical improvement of the products in the ultrasonic and process technology department have always been the core competence of the company. The product range contains a large number of serial units, modular cleaning lines and special custom-made cleaning installations. Cleaning chemicals, developed, tested and produced in our own chemical laboratory round off the ELMA product range and help to solve even the most difficult cleaning jobs in various business sectors.

ELMA are exporters of customized state-of-the-art technology into more than 70 countries all over the world, distributing their products to watchmakers and jewellers, to dental and research laboratories, to companies in the medical and optics sector and to industrial businesses.

You can find ELMA products on more than 100 international trade shows. Numerous distributors around the world recommend the ELMA technology to their customers and rely on the ELMA quality standard „Made in Germany“.

There is a staff of more than 200 people working in the research and production departments at three company sites in Singen in the South of Germany.

With ELMA, quality and service enjoy top priority! In addition to the main business with ultrasonic technology, we have been highly competent as a partner for watchmakers and jewellers, looking back on a long tradition in this sector. There are special machines for all purposes around the valuable watches and jewellery: for manufacturing, for testing, for servicing and for cleaning, and the ELMA engineers are constantly working on the development and design of new machines.

The Elma Management

A handwritten signature in blue ink, which appears to be 'Wolfgang Kieseewetter'.





*Michael Schnauffer
Optics/Solar Engineering*



*Berthold Relling
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*Karl-Heinz Schoch
Industry/Laboratory*

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 nano-technological applications.



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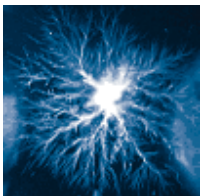
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Cleaning with ultrasound – today one of the best cleaning technologies: ecological, economical, intensive and gentle

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

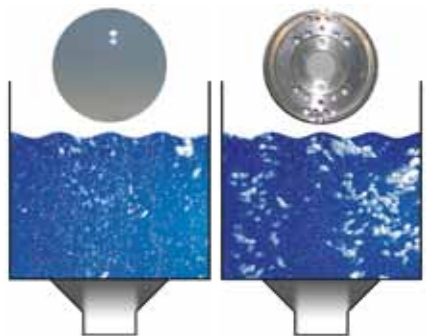
Elma technology and Elma service to him.

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.





Ultrasonic table-top unit



Elmasonic S 60 and S 60 H



Practical accessories

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



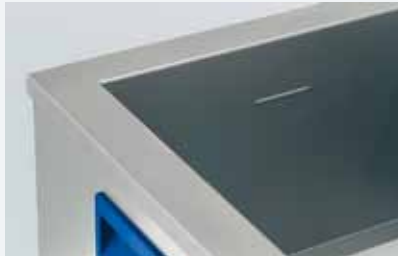
unit sizes from 0.8 to 90 litre

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



Custom-made installations



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

Elma stationary units

Ultrasonic cleaning units with large dimensions and high power



- 3 different tank sizes up to 300 litre
- bottom sound, front sound, and rear sound
- various degrees of automatization
- large range of accessory equipment
- Elma multi-frequency ultrasound
- robust components
- self-contained supporting stainless-steel structure
- adjustable feet
- ergonomic working height
- connection to various additional equipment possible
- overflow basin, emergency overflow, cascade ducting, bottom flooding

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

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.

Elmasonic X-tra basic	Elmasonic X-tra pro	Elmasonic X-tra Line pro Flex 1 and 2
Ultrasonic units:		
6 different unit sizes from 30 to 250 litre, multi-frequency technology for fine and coarse cleaning (25 kHz and 35 kHz)	5 different unit sizes from 25 to 150 litre in two multi-frequency versions (35/130 kHz and 25/45 kHz)	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
Cleaning items:		
Cleaning of small items and machinery components, casting moulds etc. during and after production	Small items, machinery components, bulk goods (in rotating basket), intermediary and final cleaning	Small items, machinery components, bulk goods (in rotating basket), intermediary and final cleaning; service cleaning; restoration of parts after a fire
Contaminations:		
Fat and grease, oil, wax, adhering processing residues that can be removed by emulsifying cleaners (no oil separating device)	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	
Cleaning media:		
Emulsifying cleaners (oil absorbing)	Demulsifying (oil separating) and emulsifying (oil absorbing) cleaners	Demulsifying (oil separating) and emulsifying (oil absorbing) cleaners
Recommendation:		
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	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	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
Oil, fat, grease: + + + Polishing pastes: + + + + + Chips: + + +	Oil, fat, grease: + + + + + Polishing pastes: + + + + + Chips: + + + + + Bulk goods: + + + + + Peripheral equipment possible, e.g. oil separator, filter-pump aggregates	Oil, fat, grease: + + + + + Polishing pastes: + + + + + Chips: + + + + + Bulk goods: + + + + + Peripheral equipment possible, e.g. oil separator, filter-pump aggregates, additional oscillation and rinsing tank

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



Elmasonic X-tra basic

This series of ultrasonic cleaning units with 6 different unit sizes is intended for tough application in production, workshop and service.

Quality that pays: high cleaning power with minimum wear

The stainless-steel casing and the durable transducer tank have been designed for permanent operation. We grant a warranty period of 3 years for the special resistant stainless steel, provided the unit is operated in one-shift mode and according to the Operating Instructions.

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

Set temperature/
heating on, off

US frequency/
US power

Cleaning time/
US on, off



Standby

Soft keys

US modes

Elmasonic X-tra pro



- 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

Elmasonic X-tra pro with rinsing station



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

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





Tanks with rounded corners, electro-polished surfaces



Infrared or hot air dryer



Safe, IR welded piping

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





Ultrasonic cleaning lines composed of modular components

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



Custom-made cleaning lines



The experienced Elma staff in production and service can look back on many years of designing and constructing specialized 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

Elma performance ultrasound

Immersion transducers and transducer plates, multi-frequency generators



- ideal for large tank capacities
- available as component with various modes of mounting
- two frequency pairs MF2 (25/45 kHz) and MF3 (35/130 kHz)
- cavitation-proof stainless steel
- multi-frequency ultrasonic generators

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



*Dr. Christoph Jung
Head of chemical process laboratory*



Application laboratory



Production of chemicals

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

EC 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



Elma Tec Clean

