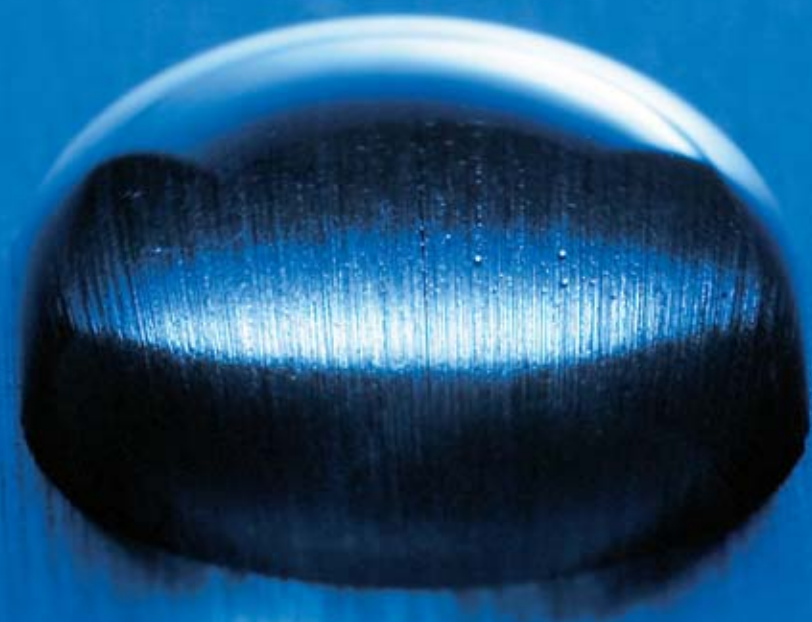


THE PERFECTION OF NATURE
IS OUR CHALLENGE





COMPANY PROFILE

ElpoChem has been active in the specialized field of chemical and electrochemical finishing of metal surfaces since 1970, offering the full range of process engineering services. The company develops and produces systems and plants to meet specified requirements as well as the electrolytes needed for material surface treatment.

ElpoChem AG provides technical consulting and has in-house laboratories for development, analysis and applications to analyze customer baths and provide treated samples of customer parts.

ElpoChem AG supplies custom plants and systems and the required material-specific electrolytes and chemicals for chemical and electrochemical polishing, pickling, passivating and deburring of your parts.



Jürg Romann
Management

dimensions and tolerances as well as materials and processing objective.

When you need metal surfaces of the highest quality, in medical technology or components subject to extreme conditions, we are the right partner for you.

SERVICES

Consulting

We provide you with competent advice regarding material properties and the resultant optimal process technologies.

Sample processing

We are pleased to process your production samples in our application laboratory to show you what can be accomplished with our processes.



Business location of ElpoChem in Volketswil (Zurich)

SERVICE

Our experience and expertise is available to you through ElpoChem service. Together with our partners, we maintain capacity for you to process challenging large or special components. This applies to

Process engineering

Your investment will be backed by our expert support and accompaniment for your processes and applications. We produce a situation analysis, define the process technology required, develop a comprehensive quotation and implement your project according to your requirements.



Production facility of ElpoChem

Support of customer plants

In order to provide you with optimal support for managing your processing baths, we take bath samples and analyze them in our laboratory.

This ensures that consistent high quality of the treated parts can be maintained.

OUR WORLD IS ON THE SURFACE

Individual advice
for customers
is our standard



Customer-specific development

We can also gladly develop products and processes defined by you which are adapted specifically to your operation.



Production tank
8'000 liter

FerroChem-processes

for chemical polishing and deburring of:

- **Carbon steel** (not tempered or tempered)

ChemoLux-processes

for chemical polishing and deburring of:

- **Cooper** and copper alloys
- **Aluminum** and aluminum alloys

ElpoNox-processes

for pickling, cleaning and passivation of:

- **Stainless steel** (austenitic and ferritic)
- **Steel** (tool steel, carbon steel, special alloys)
- **Cooper** and copper alloys
- **Aluminum** and aluminum alloys
- **Titanium** and titanium alloys (Nitinol etc.)
etc.

ElpoChem develops processes individually design for the respective customer's needs.

THE PROCESSES

ElpoLux - Processes for electrochemical polishing and deburring

- **Stainless steel** (austenitic and ferritic)
- **Steel** (tool steel, carbon steel, special alloys)
- **Cooper** and copper alloys
- **Aluminum** and aluminum alloys
- **Nickel** and nickel alloys (Hastalloy, Alloy 59 etc.)
- **Titanium** and titanium alloys (Nitinol etc.)
- **Chrome-cobalt** alloys
- **Molybdenum** and molybdenum alloys
- **And other processes for special alloys**

The ElpoChem
analytical laboratory



The ElpoChem
chemical warehouse



71579

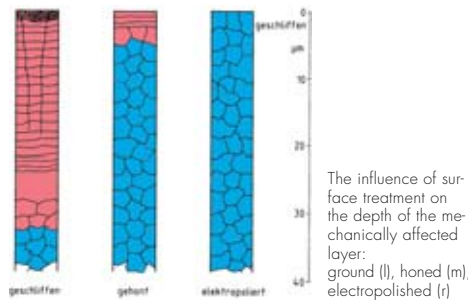
ELECTROPOLISHING

Surfaces are critical to the appearance, function and service life of metal parts. For this reason, the treatment of metal surfaces is of key importance for finishing and the cost of parts. Electrochemical polishing and deburring (electropolishing) significantly improve the characteristics of metal surfaces, which has a lasting effect on the durability and reliability of the processed parts.



Spaghetti-gripper on a stainless steel sheet
Stainless steel sheet partly electropolished

edges and corners, which results in reliable fine deburring of the surface to the greatest degree. Mechanical processing (such as drilling, grinding and polishing) changes or damages materials with the effects of force and heat, which leads to cracks, stresses and changes in the microstructure and reduces the service life of the part. Electropolishing removes these disturbed surface zones, fully restoring the characteristics of the material. During the electropolishing of stainless steel, a continuous oxide layer rich in chromium oxide is created on the surface, which forms a passive protection layer against corrosion.



PROCESSES, CHARACTERISTICS, ADVANTAGES

Electropolishing is an electrochemical process for material removal from metal surfaces. The part is connected to the positive electrode as an anode, equipped with a cathode and immersed in a material-specific electrolyte. DC voltage is then applied to the part. The effect of the direct current causes metal to be removed from the component surface. The removal takes place without stresses and acts selectively with a preference for areas of microroughness. The surface is made smooth and shiny at the microscopic level. Macroscopic structures remain intact. Removal is more pronounced at

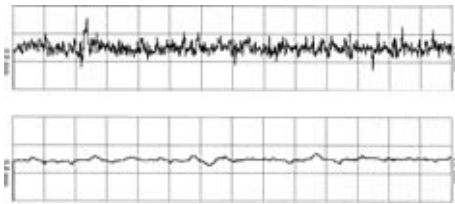


Electropolished brass key

NATURE GIVES US BRIGHT IDEAS



Reflector of a lamp
Aluminum
Electropolished



Surface roughness plot for a stainless steel plate:
ground with 180 grit (top), electropolished (bottom)

APPLICATION

Electropolished metal surfaces are used in all branches of industry for a wide variety of applications:

ADVANTAGES OF ELECTROPOLISHED SURFACES

- Metal purity, chemical passivation, excellent corrosion resistance
- No particles, reduced deposit formation, convenient for cleaning and sterilization
- Improves quality control (makes faults in the material and processing apparent)
- Decorative, shiny appearance
- Significantly fewer crack and strain nuclei and thus improved service life of parts

Electropolished
Stainless steel
Watch case



- Chemistry, bio-chemistry, pharmaceuticals
- Food and beverage industry
- Plant and apparatus engineering
- Mechanical engineering and tool-making

- Medical and laboratory technology
- Electrical engineering, electronics industry; textile and paper industry
- Automotive engineering
- Aerospace engineering
- Nuclear research and technology
- Vacuum technology and cryogenics

Electropolished stainless
steel dynamic hip screw



- Environmental engineering
- Jeweler's trade and the timepiece industry
- Architecture and construction
- Household and kitchen appliances
- etc.



Production cabinet
for semi-conductor production
Stainless steel
Electropolished (inside and outside)

Hip joint cutter
Stainless steel
Electropolished





CHEMICAL POLISHING AND DEBURRING

FERROCHEM AND CHEMOLUX PROCESSES



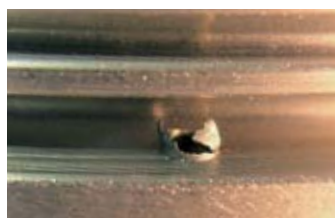
Gearing rings
Carbon steel
FerroChem-treated

The **FerroChem** and **ChemoLux** processes are used to deburring and smooth metal surfaces. Compared to grinding and honing, there is no mechanical stress or heat effect on the surface. Inaccessible corners and edges are also included and treated very effectively. Roughness is reduced and surface defects are eliminated, which gives the components greater fatigue resistance.

Surface of a litchi

BENEFITS OF CHEMICAL POLISHING

- Reduced wear and/or better sliding properties
- More precise compliance for the mass of parts
- Increased homogeneity and adhesion of surfaces
- Improved strength of welded and soldered joints
- Elimination of crack nuclei
- Complete removal of flash, overlaps, scales and particles
- Deburring and smoothing of surfaces and edges of all surfaces wetted by the bath, even hollow spaces
- Metallically pure surfaces
- Removal of grinding and drilling burrs, even those directed inward
- Precise material removal within tight tolerances
- No damage to sensitive parts, because the process works without mechanical stress
- No thermal stress



Drilled hole on a carbon steel ball bearing race before and after FerroChem-treated

NATURE PROTECTS ITSELF WITH IDEAL SURFACES



Chain saw elements
Carbon steel
FerroChem-treated

TYPICAL AREAS OF APPLICATION FOR THE FERROCHEM AND CHEMOLUX PROCESSES

- Fixtures and appliances
- Automotive parts
- Tapes and wires
- Tanks/Containers
- Turned and milled parts
- Injection nozzles
- Springs and switching elements
- Chains
- Ball bearing cages
- Needles
- Pipes
- Stamped parts
- Hydraulic and pneumatic controls
- Textile machine components
- Timepiece parts
- Toothed gears, pinions

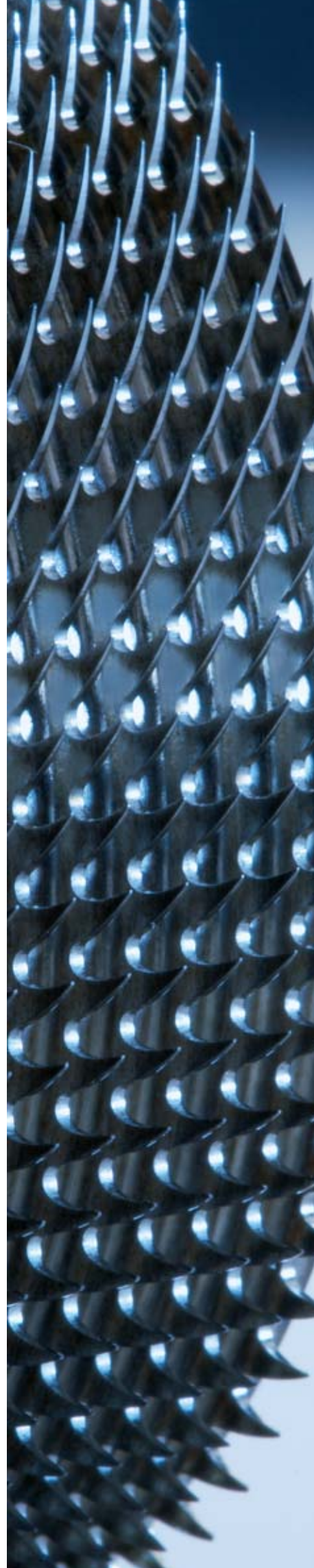


Carbon steel hair clipper
blade untreated,
FerroChem-treated



Lock cylinder
Brass
Chemolux-treated

Openend roll (textile industry)
Carbon steel
FerroChem-treated





CHEMICAL POLISHING AND DEBURRING

FERROCHEM AND CHEMOLUX PROCESSES



Precision weighing system:
Aluminum alloy,
Chemolux-deburred

HOW THE FERROCHEM AND CHEMOLUX PROCESS WORK

Chemical polishing causes controlled chemical removal at the surface with the effects of deburring and smoothing. The parts are immersed in the processing bath loose in baskets or drums or individually on racks. For processing long pipes or bore holes, the bath fluid can be pumped through the components.



High pressure cylinder
Carbon steel

NATURE TEACHES US

FerroChem and **ChemoLux** baths are chemically stable for a long period of use, which allows precise control of the metal removal based on the dwell time. The rate of removal is between 0.5 and 4 μm per minute – depending on the hardness and composition of the material – and can be increased by movement of the liquid.

The **FerroChem** and **ChemoLux** baths are distinguished by their efficiency and cost-effectiveness as well as low emissions compared to conventional process.



Flame cutter nozzle
Copper
ChemoLux-polished

COMPLETE SERVICE FROM A SINGLE SOURCE

The reliability and consistent quality of the processes in your company are supported by ElpoChem with a comprehensive range of products and services from a single source:

- Delivery of the optimal system for the process used, including pre- and post-treatment equipment
- Delivery of the required process chemicals
- Information and training of personnel
- Process-specific support and on-site troubleshooting
- Analyses of customers' process baths in our laboratory



Brass welding torch handles
polished with the ChemoLux
process

Bulk material (textile industry)
Carbon steel
FerroChem-treated



EACH FORM HAS ITS NATURAL FUNCTION

PICKLING

Pickling frees the part of scale and other impurities. Metals which can be treated with the ElpoChem pickling process include:

- Stainless steel
- Steel
- Copper and copper alloys
- Aluminum
- Titanium and titanium alloys
- and others

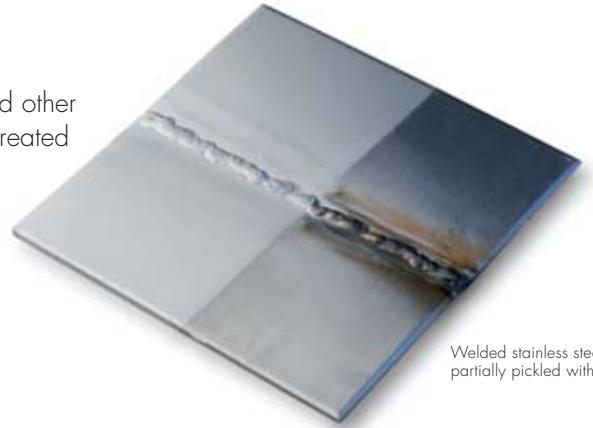
Pickling imparts lasting improvement to the corrosion resistance. After proper pickling, surfaces and welded seams are metallurgically blank and free of scale layers and temper colors.

CHEMICAL PICKLING

Pickling can be performed by spraying the pickling fluid or by immersing the part in a pickling bath. The dwell time ranges from a few minutes to several hours.

ANODIC PICKLING

With anodic pickling, the removal takes place with the application of direct current in specially equipped plants.



Welded stainless steel plate partially pickled with ElpoNox

ELPOCHEM SUPPLIES PICKLING CHEMICALS IN THE FOLLOWING FORMS:

- **Pickling pastes:** for cost-effectiveness treatment of welded seams for scale and temper colors
- **Pickling sprays:** for treating components with large surfaces
- **Bath pickling:** for immersion, sprinkling, pumping and use in spray chambers for pickling



Brass elbow fittings pickled with ElpoNox

SUPPLEMENTAL PRODUCTS

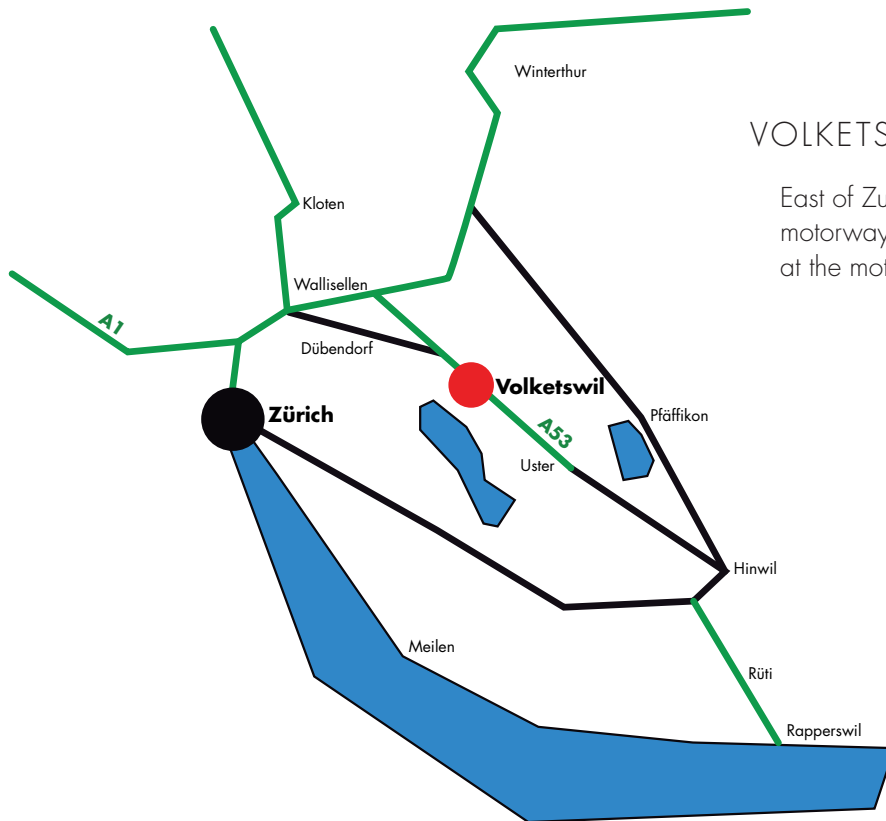
Our range of products also includes:

- Cleaning agents for various metals
- Pickling additives to reduce the effects on the environment
- Waste water chemicals

Screw thread drill
ElpoNox-pickled

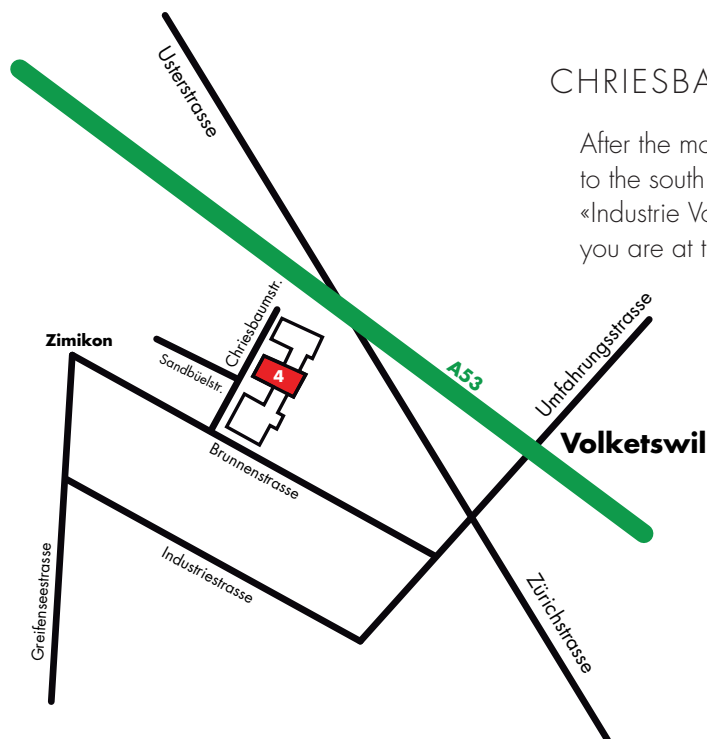
ElpoChem is your partner for first class and reliable surface refinement.

QUALITY
EASY TO FIND



VOLKETSUIL

East of Zurich 10km away from the motorway A1 you find Volketswil direct at the motorway A53.



CHRISBAUMSTRASSE 4

After the motorway exit Volketswil, turn to the south and follow the sign «Industrie Volketswil», after 500 meter you are at the business location of ElpoChem.

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