

IMHOF HARTCHROM



ENGLISH

Your partner for ...

- **Piston rods**
- **Shafts, tubes, pillars**
- **Mechanical parts
ready to be installed**
- **Friction welding**
- **Turning**
- **Grinding**
- **Hard chrome plating**
- **Repair chrome plating**

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*Dear
Business Partner,*

Our company, Imhof Hartchrom GmbH, is a modern, innovative enterprise performing friction welding, turning, grinding and hard chrome plating as our manufacturing processes. As a systems supplier for ready-to-install mechanical components, we offer you complete solutions ranging from materials procurement and logistics, to mechanical manufacturing, all the way to surface treatments. Many customers appreciate our expertise, our know-how and our reliability. May we soon welcome you as a new customer?

We would like to introduce you with our company on following pages.

We hope to have awakened your interest, and welcome you to our company



Our History

The metal working company Hofmann & Imhof was founded on May 15, 1970.

At that time, an old 200 m² storage building was available as production facility, where two employees began manufacturing operations. It only took a short time for the metal working company to find success in market, so the old storage building could not longer meet the company's need of space. In 1976, a new factory was built on the current company site in Karlstadt. The company became a new corporate form in 1985, Imhof Hartchrom GmbH.



Company founder Anton Imhof
(† 23.03.2010)



Imhof Hartchrom GmbH
administration building in Karlstadt

Imhof Hartchrom, a family-owned company, is now led by the second generation of ownership. Peter, Werner and Thomas Imhof, sons of the founder, now share the management of the company. A high level of quality, flexibility and delivery dependability is an inherent part of our company philosophy. The company now has a production space of 4,500 m². In three-shift operation, motivated employees provide rapid, flexible fulfillment of orders. Our customers are from a number of sectors: construction machines, printing machines, hydraulic cylinders, machine building, chemical industry, food technology, plastic injection machines, vehicle and appliance manufacturing, process technology, and much, much more...

Our Range of Services

- **Hard chrome plating**

Up to 10,000 mm in length

Up to 600 mm in diameter

Up to unit weight of 5,000 kg

in a variety of processes such as

Micro-chrome plating

Double-chrome plating

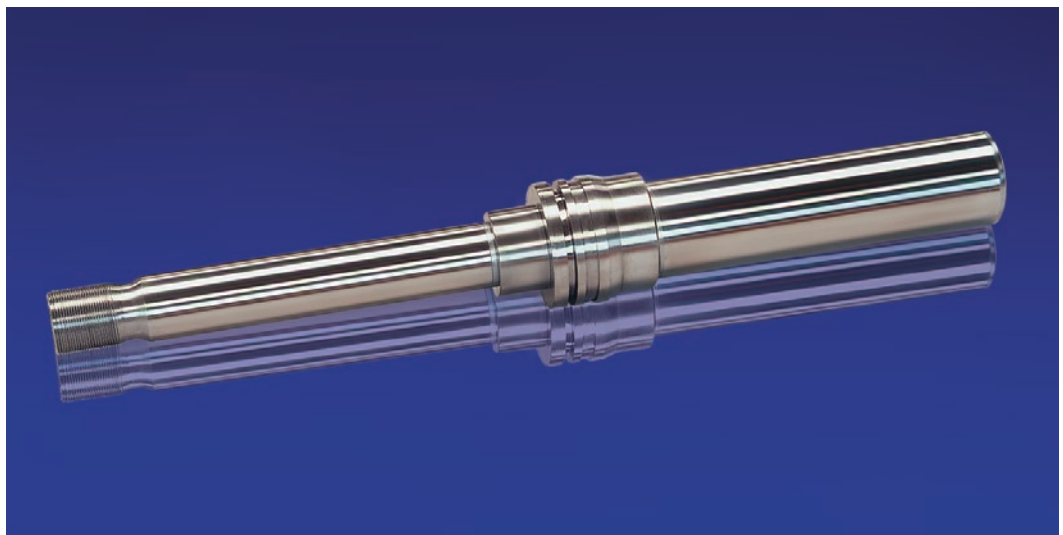
Three-layer-chrome plating

Inside chrome plating of pipes and bores

TSl finishing treatment

- **Ready-to-install
mechanical components**

According to your design drawings in hardened,
grinded, chrome-plated or nitrided execution



Ready-to-install piston with hard chrome plated surfaces

- **Friction welding**

Up to 90 mm in diameter for solid material
or 6,500 mm² friction surfaces for pipes
at maximum component length of 2,000 mm

- **Turning**

CNC turning up to 3,000 mm in length
Cycle controlled turning up to 5,000 mm in length
Conventional turning up to 8,000 mm in length

- **Grinding**

CNC grinding up to 3,000 mm in length
Conventional grinding up to 8,000 mm in length
Belt grinding up to 11,000 mm in length
up to unit weight of 5,000 kg

- **Straightening**

of piston rods, pipes, pillars and shafts
on 20 t or 250 t straightening press



Friction-welded piston rod

Hard chrome plating

It is hard to imagine modern technology without hard chrome plating. Therefore characteristic features of chrome plating are decisive.

- High resistance to wear
- Hardening up to 1,100 HV, making chromium significantly harder than case-hardened or nitrided steels
- Good corrosion resistance through variation in layer composition and layer structure
- Chemical Resistance
- High temperature resistance
- Hydrophobic characteristics
- Low coefficient of friction
- Extremely economical through possibility for reprocess of wear parts

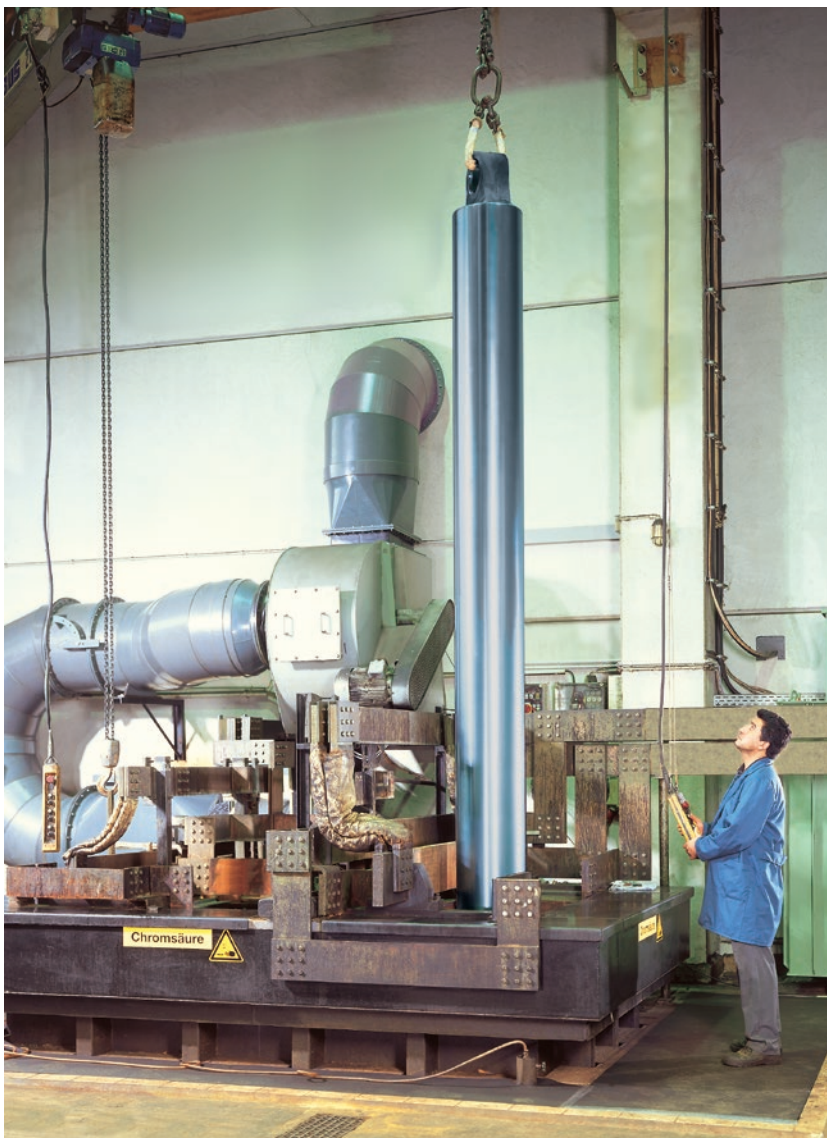


Pillars, hard chrome plated and polished, dimensions Ø 260 x 7,480 mm

Our expertise in the field of hard chrome plating enables us to recommend a suitable layer composition for each application.

Your choice of following processes:

- *Micro-chrome plating*
- *Double-chrome plating*
- *Three-layer-chrome plating*
- *Inside chrome plating of pipes and bores*
- *TSl finishing treatment*

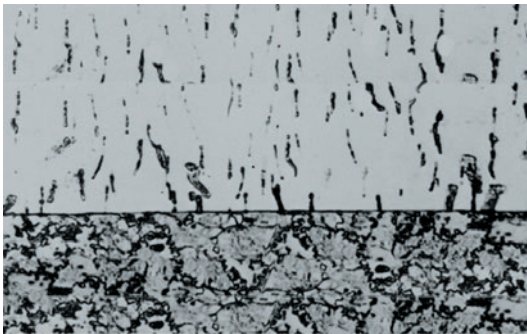


We would be glad to assist you with our benefit of years of experience.

Hard chrome plating of a hydraulic piston, dimensions Ø 400 x 4,800 mm

Micro-chrome plating

Micro-chrome plating involves micro-cracked chromium layers that are deposited from a mixed-acid chromium electrolyte.



Cross-section polish of a micro-cracked chrome layer. M = 750 times

The micro-cracked chromium layers are characterized by a finely woven network of cracks. The micro-chrome layers have good resistance to corrosion at high chrome layer hardness. The micro-chrome layers can be deposited in variable thicknesses up to about 500 μ . We recommend 25 μ as minimum layer thickness.



Piston rods hard chrome plated in micro-chrome process and polished

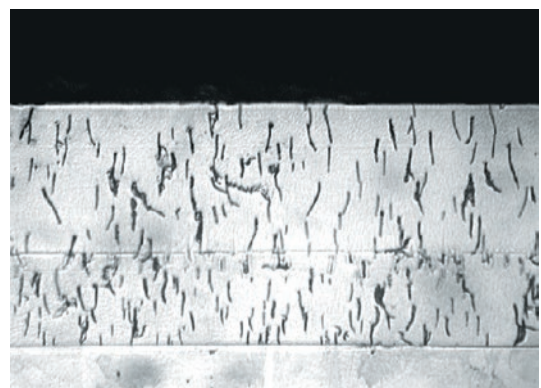
Double-chrome plating

For components subject to strong corrosion stress, we recommend our double-chrome plating process, which was developed and tested in our laboratory.

In this process, the surface area to be chrome-plated is finely finished to a roughness of $R_z < 1.5 \mu$. Followed by the deposit of a first micro-cracked chrome layer with thickness of about $20\text{--}25 \mu$. After mechanical and chemical intermediate treatment, happens the application of a second micro-cracked chrome layer with minimal layer thickness of 25μ . Finally a TSI- finishing treatment (TSI = Teflonizing) is carried out. The downstream polishing process serves to smooth the surface. For this process, we recommend a total layer thickness of $50 - 80 \mu$. Our process offers you an advantage in comparison to conventional hot chrome plating by eliminating an uncontrolled fracturing of the chromium coating under operational conditions.



Surface image
Crack structure double-chrome layer



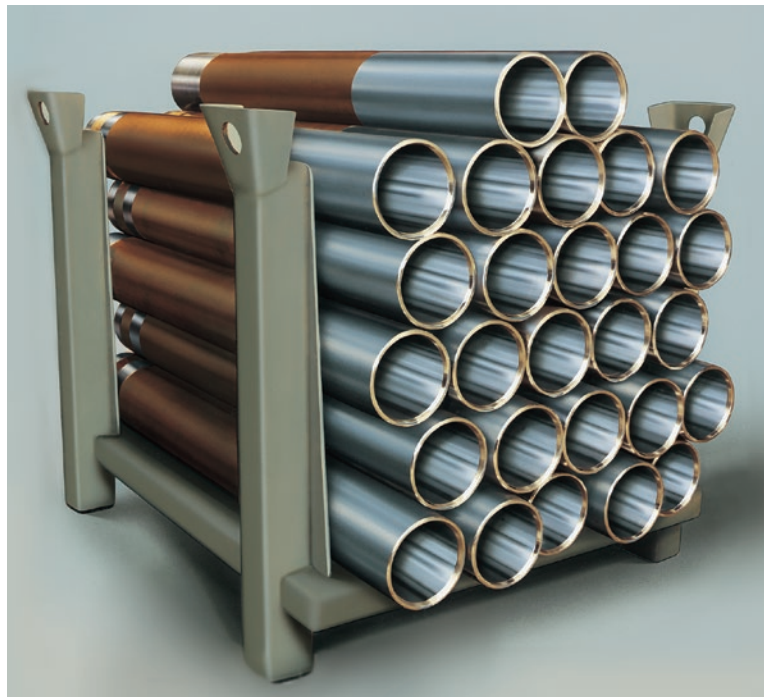
Cross-section polish of a
double-chrome layer. $M = 500$ times

Inside chrome plating

Another of our specialty fields is inside chrome plating of pipes, borings and running surfaces.

Through an own fixture construction, we can guarantee ideal layer thickness distribution even for complex part geometries.

Piston tubes
Boring
hard chrome plated
Layer thickness 25 μ



Tubes
Inside hard chrome
plated with layer
thickness 40 μ



TSI finishing treatment

Through a TSI finishing treatment (TSI= Teflonization), the corrosion resistance of hard chrome plating can be increased even more. In this process, an additional sealing of the chrome surface is carried out. Protracted tests and practical trials have confirmed the effectiveness of this process.



Piston rods,
hard chrome plated
and TSI-treated

Ready-to-install mechanical components

As a systems supplier for ready-to-install mechanical components, we have made ourselves a good name in the market.

We offer you complete solutions ranging from materials procurement and logistics, to mechanical production, all the way to surface treatment. We provide you surfaces in hardened, grinded, nitrided or chrome plated form.

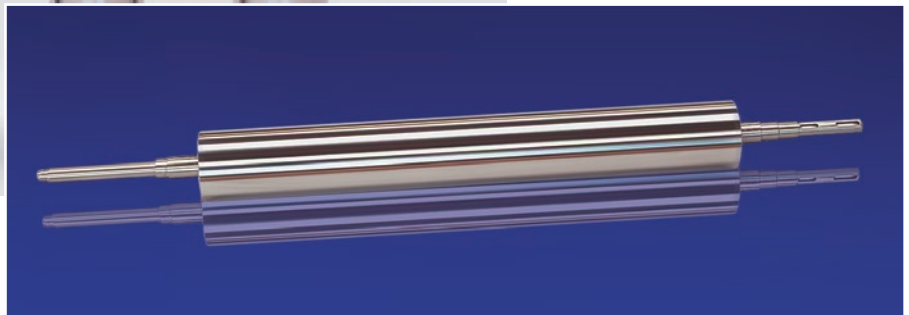
You only have one contact person who guides you through the whole process cycle.



Ready-to-install
piston rods,
friction-welded,
mechanically
processed, parti-
ally inductively
hardened,
grinded and hard
chrome plated



Pistons
Turned part with roller-
burnished radii, grinded
and hard chrome plated



Rollers for food technology,
friction welded, turned,
grinded and hard chrome
plated



Tie rod
Turned part dimension
Ø 250 x 4,580 mm

Friction welding

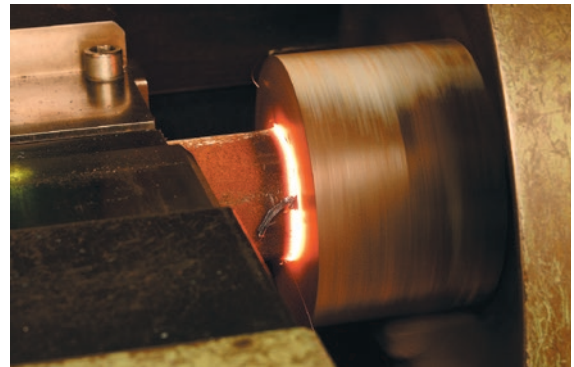
Friction welding – a recent manufacturing technology

Of two components to be connected, the part clamped spindle-sided into the machine is set into rotation and the part held in the sled clamping unit is beared against with defined pressure (friction force). The relative movement (rotation) and the simultaneously applied pressure lead to heating of the components' contact surfaces. Through heat conduction, the temperature is equalized over the entire contact surface in a very short time.

After rotation has been terminated, the pressure is increased again (the so-called upsetting), whereby the plasticized material is pressed outward. A bead formation, a characteristic of friction welding, is created. Friction welding demonstrates decisive advantages compared to other welding processes, including:

- Short welding times
- Pore-free weld connections
- Excellent weld quality
- No additional welding materials

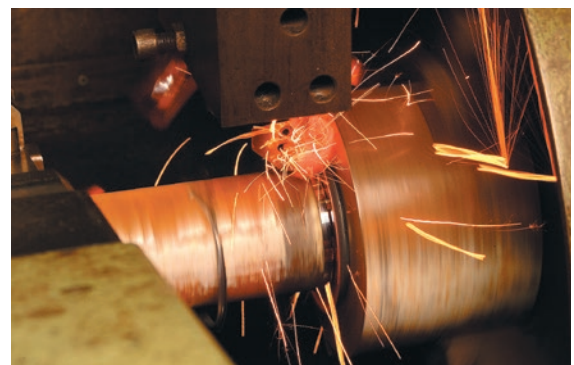
*We would be glad to carry out a
test weld for you.*



Friction phase



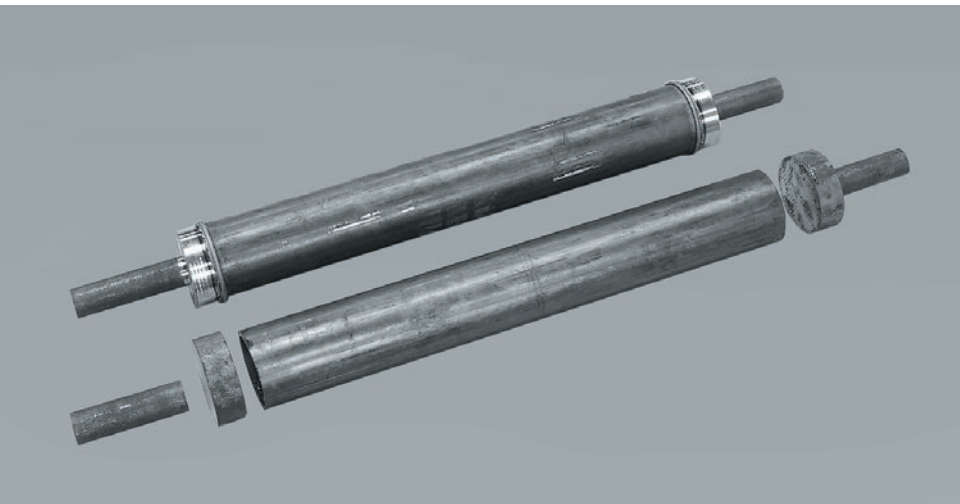
Compression process



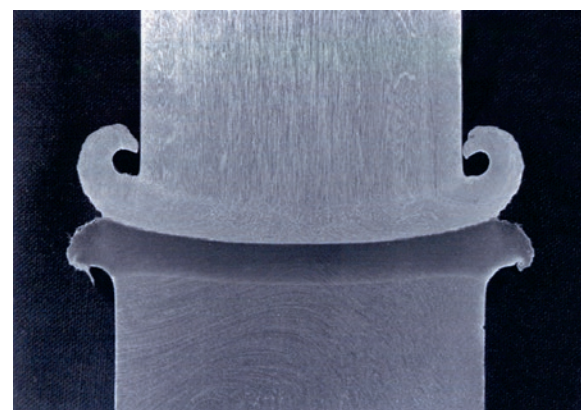
Turning of the friction weld bead formation



Detail view
friction welding machine



Process principle
friction welded rollers



Cross-section polish friction weld connection

Friction welded piston rods
Ø 90 mm

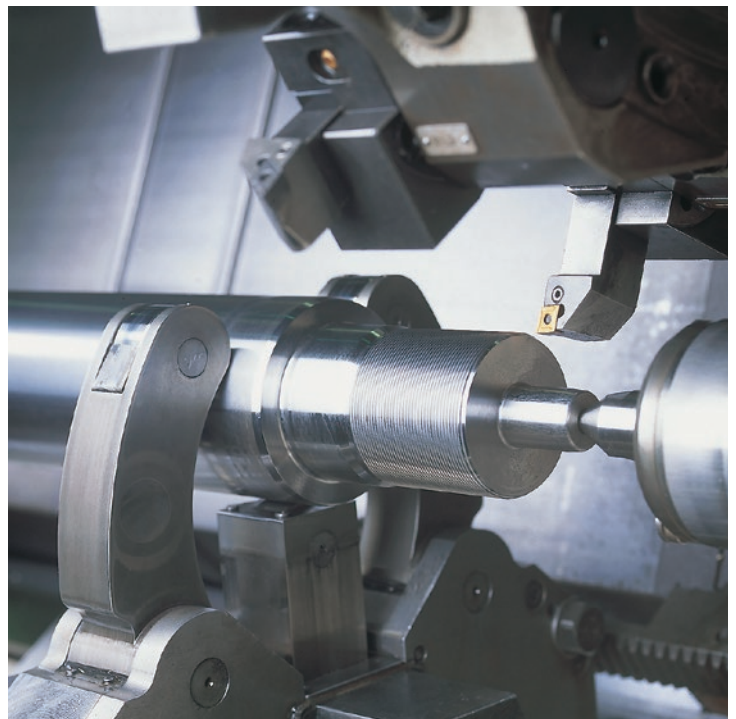
Machining manufacturing

Turning

Recent CNC turning machines with wide range of accessories, such as driven tools, hydraulic steady rests, C-axle, hollow clamping cylinders, etc., enable us to manufacture your products cost-effectively in proper quality.



Manufacturing area CNC-turning



CNC turning of piston rods



Production of
long turned parts

Spindling - Milling



Processing piston rod eye

Straightening – Grinding

Straightening

We carry out any necessary straightening work in-house before grinding. We have two hydraulic straightening presses with 20 tons and 250 tons of pressure at our disposal.

Straightening of a shaft
Ø 140 mm



Grinding

Corrosion resistant and high-quality hard chrome layers require a grinding technology tailored to the subsequent hard chrome plating. The use of recent CNC circular grinding machines (distance between centers up to 3,000 mm), combined with our long-standing know-how, enables us to meet your highest standards for quality and precision. Large parts with a length of 3,000 to 8,000 mm are grinded conventionally.

Grinding process





Manufacturing area
CNC grinding



Simulation of the
grinding process



Recent CNC grinding
machines guarantee
consistent quality

Belt grinding and polishing

*Likewise for long
part lengths and
heavy weights*

We can process part lengths up to 11,000 mm and unit weight up to 5,000 kg through the use of belt grinding or polishing to provide you with optimal surface quality.

Belt grinding can be carried out either on chrome plated or non chrome plated parts.



Belt grinding
of a piston rod
Dimensions
Ø 400 x 4,800 mm

Belt grinding assembly and
supporting steady rest



Quality Assurance

Through continuous monitoring of the production process, we can guarantee the flawless handling of your orders.

Processes are optimized through studies in our laboratory. We carry out multifaceted tests in our own lab, such as:

- Corrosion tests in accordance to DIN EN ISO 9227 (salt spray test)
- Metallographic investigations with regard to base materials, phase boundaries for base materials, chrome layers, chrome layer structures
- Hardness measurements for chrome layers
- Hardening process in friction weld connections
- Measurements of chrome layer thickness
- Measurements of surface roughness



Corrosion test chamber



Microscopic investigation of chrome layer structures

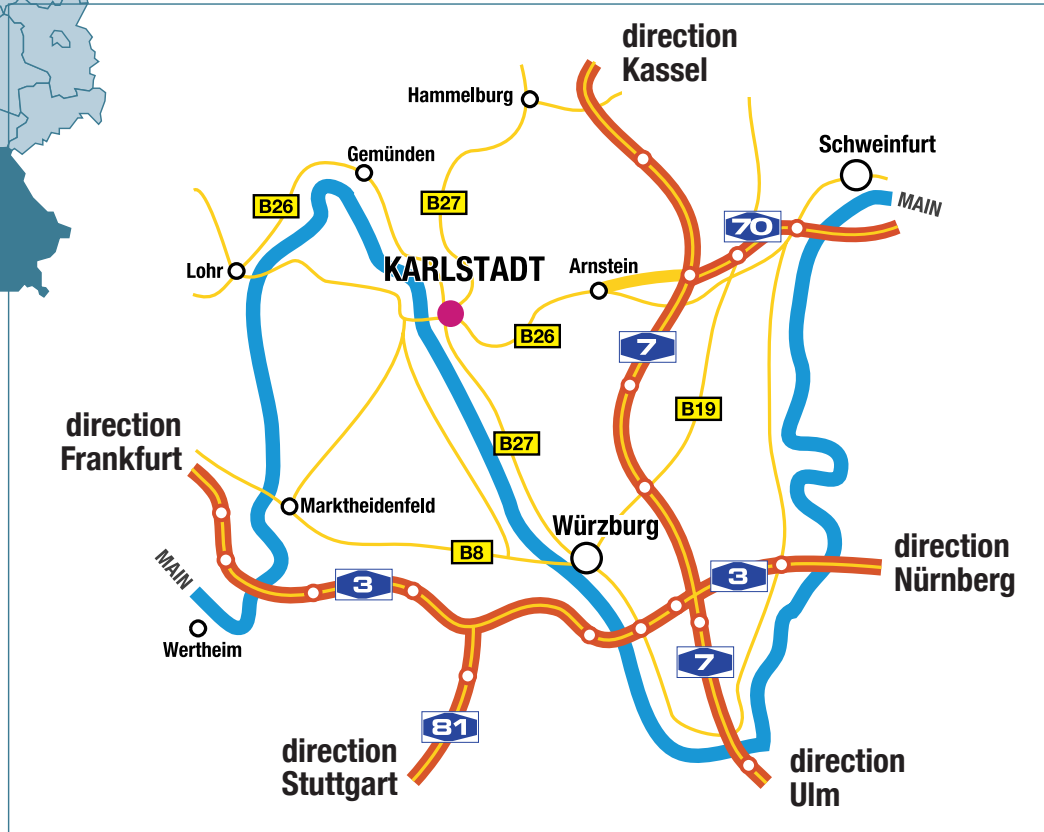
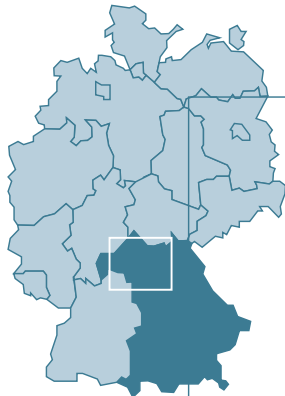
Our company sees itself as an effective, flexible and reliable partner for delivery of ready-to-install mechanical components and as service provider in friction welding, machining, grinding and hard chrome plating.

Our three-shift production, together with our highly advanced manufacturing technology, guarantees you just-in-time deliveries at the highest level.

Expert consulting is part of our job. Engage our experience in the cost-effective solution of your problems.

Contact confidently our team.

How to find us:





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