

A grayscale photograph of various forged metal components, including a large flange with a central bore and several bolt holes, and other complex mechanical parts in the background.

# MISSION FORGING

FORGING TECHNOLOGY  
STEEL & ALUMINUM

HIGH PERFORMANCE IN ALL  
APPLICATION AREAS

Krenhof – A member of the Pankl Group and its highly qualified and motivated employees implement the latest development trends,

methods and approaches for forging technology in a fast, flexible and reliable manner.



## 01. DROP FORGED PARTS BY KRENHOF

As Europe's leading drop forges in medium-batch production, Krenhof GmbH is characterized by flexibility, adherence to delivery dates and a high standard of quality. Thanks to our expertise in process simulation, tool development and tool making, we are able to develop and manufacture particularly competitive and process-reliable forged parts in co-operation with our customers.

Krenhof covers a very wide range of parts in terms of part weight, geometry and material.



**100g - 15kg**  
depending on  
**material**

**Steel / Aluminum**  
more than **100** alloys

Annual quantities  
of your product  
**50 - 500,000 Pts.**



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The company's core competence lies in the development and production of forged parts for the small and medium series made of steel and aluminum.



## 02. 300 YEARS OF TRADITION

Forging is not learned by theory; it needs years of experience. Our experience goes back 300 years. Today, through global suppliers such as MAGNA, our forgings are found in almost every make of premium car.



## 03. PRECISION AT ITS HIGHEST LEVEL

With the help of a high level of digitalisation and sophisticated processes in forging and heat treatment, we offer our customers homogeneous parts, particularly in terms of geometry and microstructure. This allows them to optimise their processes to a greater extent and thus generate further advantages.



**A bit better every day**



## 04. DESIGN & TOOLMAKING



The knowledge gained from FEA simulations and years of experience is constantly incorporated into technology of our forging tools. Thanks to perfect interaction of the state-of-the-art machine tools and experienced employees, tools are manufactured in-house, from semi-finished products to ready-to-install.

## 05. MATERIAL MANAGEMENT

Several thousand tons of steel and aluminium are processed at Krenhof per year. The 7.5m long, 5-ton steel bar bundles are unloaded from the truck by means of a magnetic crane and stored in our fully automated cassette storage system, with a capacity of 10,000 tons of steel. Three steel bar shears allow the bar material to be cut to the correct section lengths. Our aluminium forging lines are supplied by a circular saw. Due to our huge raw material stock, we are able to service our core markets accurately.

## 06. FORGING

Approximately 12 million drop forged steel parts are produced per year on 9 forging presses, with pressing forces between 1,000 – 1,800 tons. Our aluminium forging presses with pressing forces between 1,250 - 3,500 tons allow us to produce more than half a million drop forged parts per year.



Design & Toolmaking



Material Management & Cutting



Forging



Heat Treatment



Quality







## 07. HEAT TREATMENT

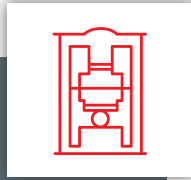
In order to achieve and maintain the required mechanical properties in a process-safe manner, optimised heat treatment tailored to each forged part is indispensable. Individual part hardening, directly through the forging heat, can minimise differences in strength or microstructure. With the help of our fully-automated isothermal annealing furnace we are able to anneal up to 4 tons of forged steel parts per hour.

Our aluminium heat treatment consists of 4 furnaces for solution annealing, a quenching device and 2 furnaces for artificial ageing. All of our furnaces fulfil the requirements of CQI-9 respectively AMS2750 standards.

## 08. QUALITY

Our state-of-the-art quality assurance and measurement technology enable us to carry out high-quality (100%) inspections of our forged parts. The quality of these tests, and the control loops derived from them, ensure our continuous, daily-practiced improvement process. To fulfil the high quality standards of our automotive and aerospace customers all of our aluminium parts run through a fully-automated pre-cleaning and pickling process followed by a liquid penetrant inspection. Additional to that we are able to apply surface finishing technologies such as sandblasting or vibratory grinding.





## FORGING

Our product portfolio includes forged parts for various industries, as automotive, two-wheels, truck & off-highway and industrial application, like common-rail, connecting rod, wishbone, uprights & knuckles, triple clamps and many more.

These parts involve a vast variety of different geometric shapes, with tight tolerances and precisely defined mechanical properties, as well as ready-to-install visible components. Mainly responsible for our quality at the highest level is the harmonious interaction of our employees, forging presses and tools.

## COMPETENCIES

<b>TECHNOLOGY</b>	Drop Forging, Machining, Heat Treatment
<b>PRODUCTS</b>	Automotive, Industrial Applications, Truck & Off-Highway, Two Wheeler
<b>CERTIFICATIONS</b>	ISO 9001, EN 9100, ISO 14001, VDA 6.1, IATF 16949

### Automotive

**Common-Rail (left), Uprights & Knuckles (right)**  
Design, validation & manufacturing of forged chassis components.  
With many years of experience in the automotive-industry, we are an established supplier for the medium series.



### Industrial Applications

**Anchor Nut (left), Medicinal Buckets (right)**  
Assembly part for special civil engineering. Because of our manufacturing processes, we are a reliable supplier in the construction, aerospace and medical technology industry.



### Truck & Off-Highway

**Spring Clamping Plate (left), Wishbone (right)**  
Ready-to-assemble component for truck axles, high logistical requirements. Because of our well-established production processes, we at Krenhof are able to supply our customers with high-quality-products.



### Two Wheeler

**Strut mount (left), Triple Clamps (right)**  
Very complex steel forged part for motorcycle steel frames, high demands on geometry, hardening process and surface. You can find our forged parts in well-known motorcycle-brands.





## QUALITY

- Fully-automated line for aluminium pre-cleaning and liquid penetrant inspection
- Rotating beam fatigue test
- Magnetic particle inspection (MT)
- Coordinate an contour measurement
- Visual inspection (VT)
- Roughness measurement
- 3D scan
- Metallography
- Tensile test
- Notched-bar impact-bending test
- Hardness testing

## PRODUCTION

- 10,000 tons of cassette steel storage
- 3 steel bar shears
- 1 circular saw for aluminum
- 1 circular saw for steel
- 9 eccentric forging presses  
1,000 – 1,800 tons
- 2 hydraulic presses 1,250 – 3,500 tons
- Automatic isothermal annealing furnace for steel alloys
- 6 lines for hardening through forging heat
- 4 furnaces for solution annealing and 2 artificial ageing furnaces for aluminum heat treatment
- Hydraulic press 20 MN cold calibration
- 4 sandblasting units for steel
- Aluminum sandblasting
- Vibratory grinding aluminum
- CNC machining (milling & turning)
- 6,000 high-rack storage space warehouse

## TOOLMAKING

- Forging development (Catia, Siemens NX)
- FEA process development (Deform)
- Tool development (Catia, Siemens NX, Edgecam 5-axis simultaneous)



## PANKL LOCATIONS



A Member of the Pankl Group

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