



PRODUCTS & SERVICES  
FROM FEINTOOL SYSTEM PARTS



# COLD FORMING

Key technologies for  
precision components

 FEINTOOL

EXPANDING HORIZONS



## **FEINTOOL. WORLDWIDE PRESENCE – CUSTOMER PROXIMITY**

- ▶ Global solutions using cold forming and secondary processing
- ▶ Specialists for component design, prototyping, tooling development and series production
- ▶ Global systems supplier for demanding components



# SUCCESS WITH COLD FORMING

Partner of the automotive industry

---

Greater cost-effectiveness, enhanced quality, higher complexity levels: Feintool forming technologies are dedicated to the production of sophisticated, high-performance components. A state-of-the-art machine tool park caters for the manufacturing processes specified for any application. Ranging from ready-to-manufacture component design through to series production, Feintool is your full-services provider. Numerous patents demonstrate our ability to consistently push the parameters of the process envelope.

# THE PROCESSES. EFFICIENT PRODUCTION

## Technologies that slash costs

---



Transfer press: volume production of clutch disc carriers in a twelve-station roller tooling configuration



Piston assembly including dimensional checks, leak testing and laser marking

**Reduced fuel consumption and lowering CO<sub>2</sub> emission levels are the major challenges in automobile design and development. Significant optimization potential can be gained by lowering vehicle weight and within the powertrain itself. Cold forming processes allow economical industrial volume production of lightweight multifunctional components.**

At Feintool, an up-to-date machine tool park is in place to efficiently handle the processes needed to cold form aluminum, standard or high-strength steels using a minimum number of operations. Mechanical or hydraulic blanking and stamping, plus cold forming processes are flexibly combined to economically produce components of consistently high quality.

Following the forming process, secondary technologies and operations such as CNC machining, laser welding, module assembly or performance enhancing surface treatment are implemented. Appropriate materials that provide cold work- hardening benefits as a result of forming can frequently eliminate the need for subsequent heat treatment. It is equally possible to dispense with costly secondary stock-removal operations, for example, when producing gear teeth and spline profiles on pulleys. Resultant components or assemblies are ready to install.



Milling



Cold rolled poly-V profiles for belt pulleys

### **Cold forming, alternative and secondary processes**

- ▶ Transfer presses up to 2200 tons
- ▶ Fineblanking presses/Conventional presses for progressive tools
- ▶ Cold rolling, spinning and axial rolling on transfer presses
- ▶ Turning, milling, CNC machining
- ▶ Soldering, welding, laser welding
- ▶ Plasma nitriding
- ▶ Assembly, balancing
- ▶ Leak testing
- ▶ Performance enhancing surface treatment

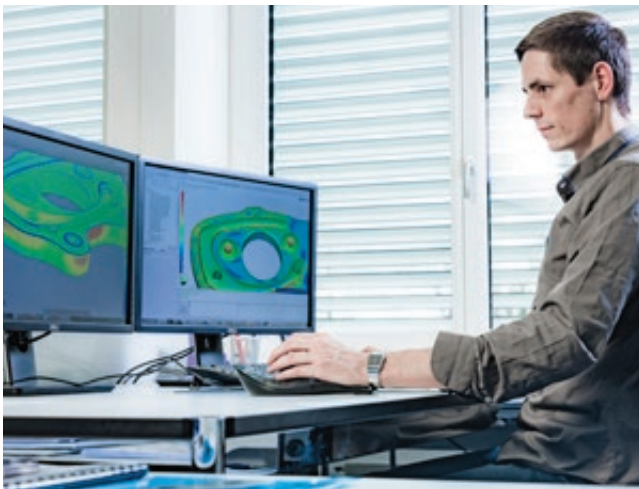


### **Rolling**

Feintool offers a diversity of processes for generating gear teeth and splines. Decisions on whether axial rolling on transfer presses, or an alternative process is applied depends on the technical requirements and the production volumes involved.

# DEVELOPMENT. HOLISTIC APPROACH

## Seamless evolution of multifunctional components



Simulation: creating a forming optimized component design



Prototyping: testing under production conditions

**Whether a totally innovative component is involved, or an existing one that needs improving – effective, cost-optimized design and seamless production processes are the parameters that define our work. Each case is treated individually, and benefits from both our extensive development expertise and our ability to push the technology envelope.**

From the project concept to the development of the tooling and manufacturing technology, right through to series production maturity, we collaborate with our customers in testing new technologies at our advanced design and simulation centers. Each phase is monitored through comprehensive quality management. The culmination of the process is the cost-effective production of your new component.

### **Simulation – for lower unit costs**

At an early stage already, our feasibility studies lead to forming optimized component design – the essential criterion for achieving low unit costs. With the assistance of our specialists we simulate your ideas and suggest improvements until optimal results are achieved for the tool and component combination.

### **Prototyping – testing for practical application**

In the initial phases of development projects, component prototypes can reveal potential defects through methodical inspection under practical conditions. These are eliminated and subsequently retested. Optimization of component design and functions using our prototyping capacity is time-saving and cost-effective – ideal benefits for achieving minimal lead times prior to production.



Engineering: optimized production concepts



Toolmaking: know-how makes all the difference



Quality management: assured precision

### **Engineering – ensuring efficient production**

Only the seamless interaction between component design, tooling development and manufacturing concept can achieve really worthwhile results. Feintool engineers deliver solutions ranging from CAD designs to FEM analysis, right up to generating layouts for the entire production process. Through this holistic approach, combined with a strong appreciation of complex issues, production concepts are generated that make the best of available resources and materials.

### **Toolmaking – for sustainable added value**

Each year, Feintool manufactures over a hundred tools across the globe, adding unique know-how and in-depth expertise on an almost daily basis. State-of-the-art machinery produces tooling that meet the highest demands, with many of the critical elements being processed in our own in-house heat treatment facilities. Their service life between regrinds and

accuracy ensure highly efficient series production, even with the most complex component geometries. In specific cases, Feintool cooperates with proven specialist partners.

### **Quality management – verifiably good**

Proactive quality planning is a key aspect of our quality assurance program. Our Technology Center and the category managers responsible for logistics, production and engineering at all our plants benefit from regular exchanges of experience and insight. This process begins at the quotation phase and supports each project right up to the launch of series production.

During series production, standardized, continuous improvement programs, to assure the qualitative and commercial objectives, are implemented. Our plants satisfy standards of quality (ISO 9001, ISO 14001 and ISO TS 16949) and energy management (ISO 50001).

# APPLICATIONS. TAILOR-MADE SOLUTIONS

## Meeting the challenges of modern mobility

Highly-specialized components highlight the problem solving expertise incorporated in cold forming applications. In realizing new development concepts within the automotive sector in particular, forming processes are vital when breaking new ground.

### Powertrains

Complex formed components are essential in the design of advanced dual clutch, automatic and hybrid transmissions, automatic CV transmissions and differentials. They contribute to weight saving, permit compact designs and enhance precision. Improvements in fuel consumption, reliability and gear shifting comfort of these powertrain concepts are achieving significant gains.

### Engines

Greater efficiency from smaller cubic capacities is a standard criterion specified for modern engines. Feintool produces several components with demanding degrees of deformation for fuel-efficient engines of this type.



Hybrid components: multiple deep-drawing operations and machined on a CNC turning and milling center

### Formed engine components

- ▶ Ring speed sensors for engine management
- ▶ Starter ring gears, also with sensor wheels
- ▶ Poly-V belt pulleys driving auxiliaries
- ▶ Pulleys for torsional vibration dampers and decoupled belt pulleys

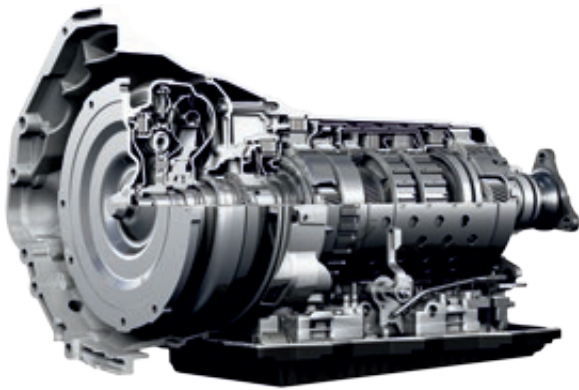


Belt pulley



Ring speed sensor





Modern automatic transmission: field of application for precision components

### Formed transmission components

- ▶ Clutch disc carriers for automatic transmissions
- ▶ Pistons for automatic transmissions
- ▶ Planetary gear carriers for automatic transmissions
- ▶ Overdrive drums for automatic transmissions
- ▶ Hubs for all-wheel drives/transmissions
- ▶ Drive plates and guide discs
- ▶ Rotor carriers, support flanges and bearing plates for hybrid drives



Piston



Overdrive drum



Planetary gear carrier



Guide disc



Clutch plate carrier



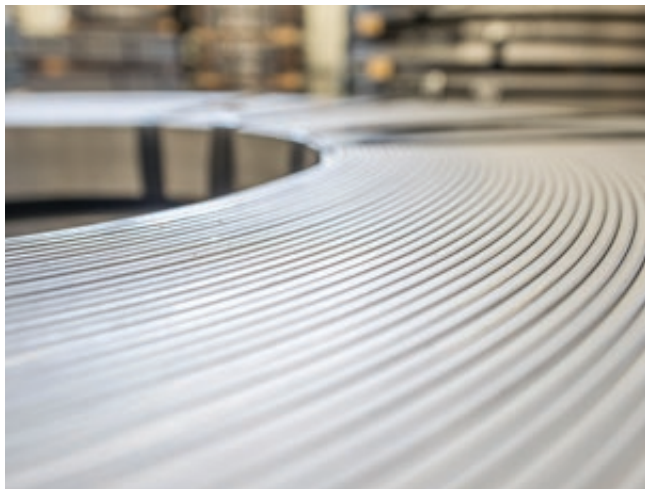
Clutch plate carrier

# RESEARCH. LOOKING FORWARD

Prepared for new challenges



Roller die



Coil stock

**Feintool is consistently establishing new standards in the field of forming technology. This capability is the outcome of uninterrupted basic research conducted in close collaboration with renowned universities, international institutions and universities of applied science.**

Through selective research projects and the on-going refinement of process technologies we allow our customers to gain that decisive competitive edge. By tapping into new applications we ensure that we – and you – are able to maintain the global technology leadership position.

## **Tooling materials and coating technologies**

Considerable emphasis is given to the quality of tooling materials, and the coatings applied to the active elements. These sectors are development focal points for Feintool specialists.

## **Production materials**

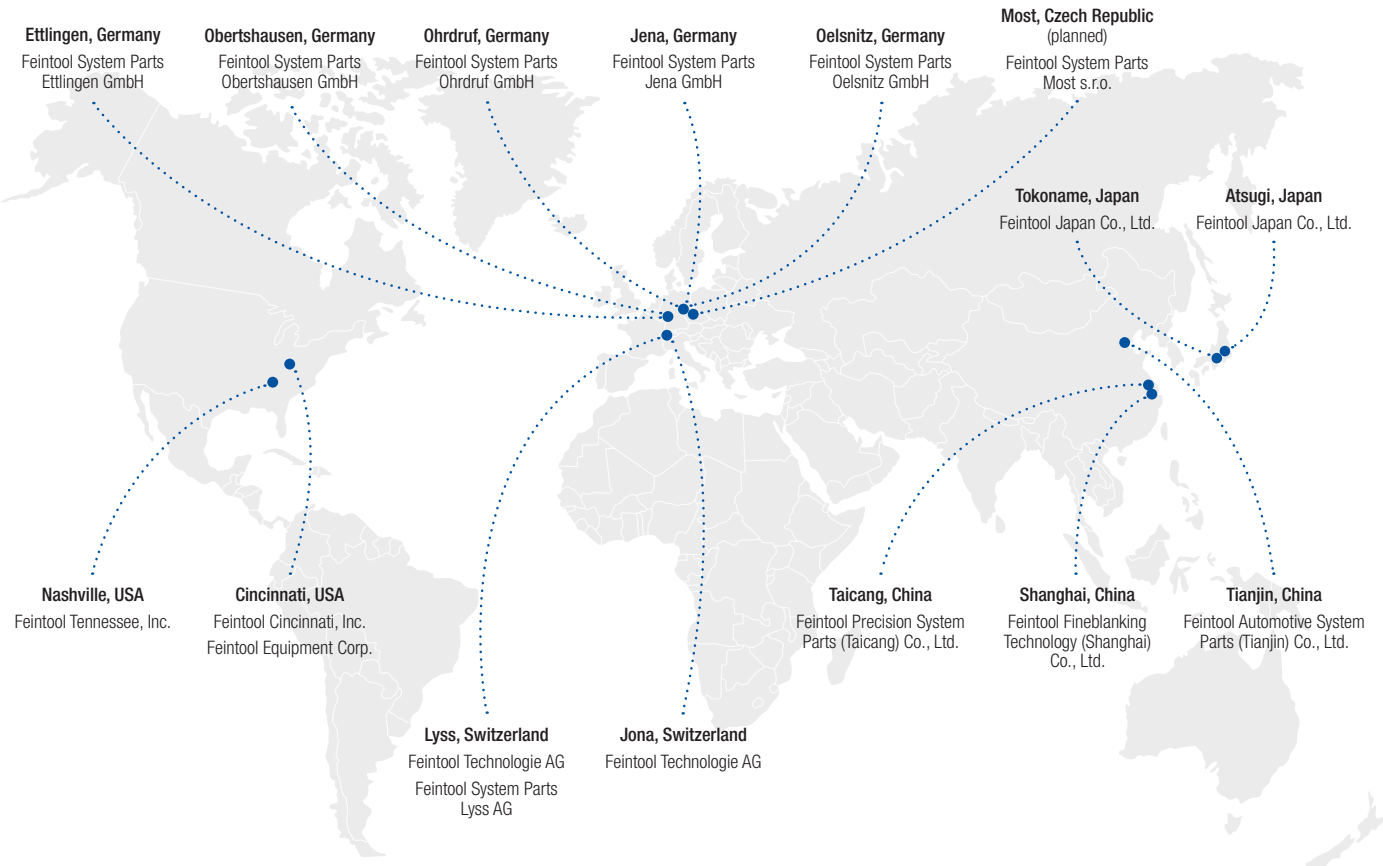
In order to economize on materials and minimize weight, selected material grades are processed – for example, alloyed or high-strength steels. In the development of suitable, production optimized materials, Feintool collaborates closely with prominent suppliers.

## **Global resources**

Feintool fosters technology transfer between its facilities in Europe, the USA and Asia, implementing lean management and Six Sigma practices to continuously improve quality and reduce costs.

# FEINTOOL. GLOBAL PARTNER

## Present in major automotive markets



**Feintool markets precision components, produced with the aid of cold forming and complementary processes, on a global basis. Cost-effective technological solutions with superior customer benefit are realized.**

Particular emphasis is given to advising customers in the initial phase of component development: an essential criterion for successfully generating efficient and unmatched technological solutions. With technology centers and production facilities for cold forming, Feintool is present in Switzerland, Germany, China and the USA.

**Feintool System Parts  
Obertshausen GmbH**  
Ringstrasse 10  
63179 Obertshausen  
Germany  
Phone +49 6104 401 0  
Fax +49 6104 401 204  
feintool-pfef@feintool.com  
www.feintool.com

**Feintool Cincinnati, Inc.**  
11280 Cornell Park Drive  
Cincinnati, OH 45242  
USA  
Phone +1 513 247 01 10  
Fax +1 513 247 00 60  
feintool-pbuc@feintool.com  
www.feintool.com

**Feintool Automotive System  
Parts (Tianjin) Co., Ltd.**  
No.216 Jingsi Road  
Airport Economic Area Tianjin  
300308 Tianjin  
Province, P. R. China  
Phone +86 22 5926 5838  
sales-china@feintool.com  
www.feintool.com