Orbital forming technology
Combining high quality forming with cost-effectiveness
ORBITAL FORMING TECHNOLOGY. EFFICIENCY IS A WINNER

- High strength components thanks to strain hardening
- Excellent final-contour and surface accuracy
- Very low investment costs per component
- Large component forming in a single stage using little force and generating little friction
- Significantly more efficient manufacturing process than hot forming or chip-removing machining
- Considerably lower energy consumption (CO₂ emissions) because the material does not need to be heated up
- Simple tools, simple tool design
- Directly linkable to downstream processes
Orbital forming technology
A lot of performance with little force

Feintool’s orbital forming technology helps you achieve your metal forming production targets more quickly than other processes. You consume less energy, need less material and produce parts that leave nothing to be desired in terms of strength and precision. Furthermore, you can benefit from the complete range of services offered by the global market leader in fineblanking and forming.
The need for less force combined with excellent forming performance are the primary factors that make orbital forming technology a success. In just a single die-forging stage, you can produce workpieces of great dimensional and geometrical accuracy and with an outstanding surface finish.

**How orbital forming works**

In orbital forming, the forming force is only exerted on part of the surface of the workpiece. The lower die presses the blank against the upper die, which executes an orbiting movement. The material is ‘rolled’ into the die. The advantages are less friction and a reduced force requirement, allowing an astonishingly high standard of forming combined with low energy use.

**Ideal for complex parts too**

Orbital forming is a highly precise way of processing complex workpieces. In addition, critical elements are formed with outstanding precision.

**Designed to meet exacting requirements**

Feintool’s orbital cold-forming presses are designed to satisfy the most demanding production requirements. The presses combine our many years of experience in building hydraulic presses with the practical know-how we have acquired through developing applications and producing parts.

Net-shape manufacture of gear tooting in a single stage
THE PROCESS. SIMPLY MORE EFFICIENT

Direct comparison with impact extrusion

Conventional impact extrusion: several steps are required

- The entire tool surface is applied simultaneously to the workpiece material
- The contact stress between the workpiece and tool prevents radial material flow
- Several forming steps are needed to achieve the final geometry

With impact extrusion, friction at the die surfaces presents an obstacle to the radial material flow. The tension (surface pressure) is greatest in the centre of the workpiece and diminishes towards the exposed edge. The greater the friction, the greater the maximum tension ($\sigma_{\text{max}}$) becomes. In conventional impact extrusion processes, it can reach a level several times higher than the yield stress ($\sigma_F$).

Orbital cold forming: everything in a single stroke

- Only part of the tool surface is applied to the workpiece material
- The material is 'rolled' into the lower die by the orbiting movement of the upper die
- Both the contact stress and the force requirement are low; major changes can be made to the material shape
- Final geometry is achieved in a single forming process

A further advantage of orbital forming is that significant changes in shape can be achieved in a single operation without intermediate annealing. There is no need for expensive multi-stage dies of the type needed for traditional impact extrusion, or for the time-consuming setting up and adjusting that these require. This means that even your short and medium production runs will be highly cost-effective.
Feintool presses are highly energy-efficient to operate because they require very little forming force. And because the presses operate entirely without coolants and lubricants, they help to protect the environment.

Technology: precision handling of blanks
The pressing force needed for the forming operation is generated hydraulically in the lower part of the machine. The lower die executes a linear forward feed movement, which presses the material blank against the orbiting upper die. The orbiting movement is generated in the upper part of the machine.

The upper and lower dies are seated in conical mounts and tensioned hydraulically. The closed die height is set by a special drive mechanism in the upper part of the press. A hydraulically controlled ejector lifts the formed workpiece out of the lower die.

Hydraulics: a perfect match of fluids and force
The hydraulic system consists of the drive and control elements that power the ram movement, plus the oil tank. A separate unit is responsible for reliably lubricating the orbital forming head in its spherical bearings. The hydraulic fluid and lubricating oil are filtered and cooled in a by-pass section.

### Technical data

<table>
<thead>
<tr>
<th></th>
<th>T300</th>
<th>T630</th>
</tr>
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<tbody>
<tr>
<td>Press ram force</td>
<td>3000 (4000)*</td>
<td>6300 (8000)*</td>
</tr>
<tr>
<td>Total ram travel</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Orbital angle</td>
<td>0-2</td>
<td>0-2</td>
</tr>
<tr>
<td>Electrical power supply</td>
<td>120</td>
<td>280</td>
</tr>
<tr>
<td>Production capacity</td>
<td>up to 15 per min</td>
<td>up to 8 per min</td>
</tr>
<tr>
<td>Workpiece diameter</td>
<td>max. in mm</td>
<td>150</td>
</tr>
<tr>
<td>Workpiece weight</td>
<td>max. in g</td>
<td>1500</td>
</tr>
</tbody>
</table>

* Optional
We reserve the right to make technical modifications and improvements in the course of product advancement.
Die exchange: quick and easy
A fixed, motor-driven mechanism allows one operator to exchange dies safely and quickly. As a general rule, die changing should take no more than 20 minutes.

Electrical control unit and operator’s console: everything conveniently to hand
The high-voltage system and control unit are housed in two cabinets. The operator’s console with its colour screen makes operating the equipment easy: it allows tool data and production parameters to be input without difficulty. The control module communicates directly with the stored program control unit. The data for the different dies can be saved, stored and called up; time-savings are guaranteed.
AUTOMATION. SMART RUNNING
Maximum productivity for every application

24/7 production, no shift premiums, reliable operation: intelligent handling solutions enable you to obtain maximum productivity from your orbital forming press.

**Loading and removal**
Presses can be fitted with a range of custom handling systems to suit individual requirements. The most common are linear systems with a vertical stroke. Smaller workpieces are cleanly extracted by a compressed air jet.

**Deburring station**
Cutting off any burrs increases the efficiency of subsequent turning processes.

**Part handling**
Orbital forming presses are vibration-free. This means that they can be directly incorporated into production islands without any trouble; you will be able to produce components even more cost-effectively.

Handling arm with blank and finished part
Speeding up the whole line: a finished part every seven seconds.
Simulations provide a real insight into what goes on in your forming processes. Feintool’s experience goes back decades; our fineblanking and forming technology know-how is unsurpassed. Regardless of what stage your project has reached, our comprehensive range of services will support you step by step on the road to success.

Feasibility studies – laying the right foundations
Leave costly trial and error loops to your competitors. Without resorting to the use of tools, our feasibility studies and simulations will quickly provide you with a component that is ideally suited for forming processes. This takes you from concept to first component in the shortest possible time.

Application development – planning production
Our knowledge of inter-related factors will get you still further. We look at component design, materials and tool design from a fully integrated perspective. The result is a production concept with perfect component design and reliable processes.

Simulation – efficiently creating optimum processes
With the aid of our highly developed software, we can simulate the intended manufacturing process without using up a single kilogram of material. Simulation lets you optimise every step in the process in advance.

Design blanks – getting everything into good shape
Our solution enables customers to make annual savings of more than 2,000 tonnes of steel – not least due to optimum blank design.

Prototyping – prior to production
Our efficient prototyping service lets you refine the design and functions of your parts quickly and inexpensively. To ensure that production can commence quickly, only accurate prototypes and pre-production samples are used.
We can help with your production bottlenecks

Orbital forming dies for manufacturing complex geometries

Feintool has been producing formed components for all types of applications for decades. That’s why we know just what tools need to be capable of. Using state-of-the-art technologies, we can produce dies designed for the longest possible service life. With the right choice of materials and proper aftertreatment, finishing and coating processes, we are able to achieve results that give long term satisfaction. Because of its short tool changeover times and low-cost dies, orbital forming offers great cost-efficiency even in small production runs.

Technology support – optimising production

Regardless of whether you want to optimise current production or are planning to relocate it, Feintool’s experts will be happy to advise you on how to operate machines, on preventive maintenance and servicing and on relocation.

System planning and designing your system – a one-stop shop

Just let us know your requirements and production objectives, and we’ll take care of the rest. We’ll plan and build an orbital forming system that will bring you maximum benefits. Feintool’s world-beating technology and complete range of services will give you a decisive, long-term competitive advantage.

Contract manufacturing – for greater flexibility

Feintool offers effective support for just-in-time production. Whenever your production capacity is unable to cope with a specific manufacturing project, we can offer flexible and uncomplicated solutions. We can contract-manufacture a wide range of products for you. You will benefit from our highly trained workforce, modern production facilities, and our high quality standards.
APPLICATIONS. UNBOUNDED QUALITY
Manufacture complex components cost-efficiently

Clutch shaft, Ø 50mm, 700g
Disc with face gear, Ø 85mm, 380g
Hex flange, Ø 130mm, 900g
Cam plate injection pump, Ø 55mm, 160g
Toothed rack with variable toothing, Ø 28mm x 750mm, 3150g
Lever with Hirth serrations, overall length = 158mm, 200g
Coupling ring with spur gearing, Ø 60mm, 120g
Differential conical wheel, Ø 80mm, 420g
Flange with ball race, Ø 68mm, 1440g