Turning great ideas into successful products

PROTOTYPING WITH METAL 3D PRINTING
Value for our customer

Turning great ideas into successful products, that is the mission of our customers.

With prototypes made by Metal 3D printing, we enable you to receive functional and resilient prototypes within a very short lead time of two weeks. This enables you to test factors such as usability, ergonomics, manufacturability and materials. Thereby, you can adapt the function and the design of your components at an early stage in the development process. This saves costs and minimizes the investment risk of your company.

3D-PRINTED PROTOTYPES ARE CHARACTERIZED BY

- Full design freedom
- Quick time to market
- No tooling investment
- GKN Additive as one-stop solution provider


Conventional prototype management reaches its limits in today’s engineering development cycles.

In conventional prototyping, there are often problems caused by long waiting times, for example due to bureaucracy or the development of necessary tools.

Metal 3d printing gives you the possibility to substitute net shape and complex geometries from conventional manufacturing technologies without tooling costs and an improved time to market.

<table>
<thead>
<tr>
<th></th>
<th>MACHINING</th>
<th>SAND (IRON-AI.) CASTING</th>
<th>FINE BLANKING and FORMING</th>
<th>INVESTMENT CASTING</th>
<th>LASER POWDER BED</th>
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<tbody>
<tr>
<td><strong>TOOLING COST</strong></td>
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<tr>
<td><strong>TIME</strong></td>
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<td><strong>NET SHAPE</strong></td>
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<td><strong>3-D DESIGN</strong></td>
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<td><strong>DESIGN FLEXIBILITY</strong></td>
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<td><strong>COMPLEX GEOMETRIES</strong></td>
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<tr>
<td><strong>SIZE DIMENSIONS</strong></td>
<td>800x800x400 (typical)</td>
<td>800x800x400 (typical)</td>
<td>2000x2000x20 (typical)</td>
<td>Min. 100g weight up to 1 kg</td>
<td>420x420x400 (typical)</td>
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<tr>
<td><strong>TOLERANCES</strong></td>
<td>+/- 0,02mm</td>
<td>+/- 2 mm</td>
<td>+/- 0,05 mm</td>
<td>1% of nominal tolerance</td>
<td>+/- 0,15 mm</td>
</tr>
<tr>
<td><strong>MATERIALS</strong></td>
<td>All conventional used materials</td>
<td>Ductile cast iron, AlSi10Mg</td>
<td>All conventional used sheet metal materials</td>
<td>Ductile cast iron, AlSi10Mg</td>
<td>1.4404, 316L, 1.2709 Tool steel, 20MnCr5, CuCr1Zr, AlSi10Mg</td>
</tr>
</tbody>
</table>
ADVANTAGES AND BENEFITS OF GKN’S 3D PRINTED PROTOTYPES

**SPEED**
- Global print network with local support
- Immediate printability check with InstAMetal
- Instant response time and low administrative effort due to or individually tailored frame contracts

**STANDARDS**
- Global print network with standardized parameters
- IATF 16949 & ISO 9001 certificates
- Topology optimization & Fatigue analysis

**DATA SECURITY**
- Direct digitally connected customer/GKN systems
- Guaranteed data security, all data is stored on premise (no cloud/no external storage locations)

**SUPPORT**
- Contribute to the customer’s design process, incl. recommendation of material selection
- Experience Days: Identify AM value in the product development (Technology Pitch, Pain points, Cost estimation)
GKN AM PRODUCTION EXAMPLES

GKN is supporting engineers in transmission development with prototypes made by Metal 3D Printing in order to achieve the optimum result for the customer in the shortest possible time. Based on the experience within the automotive industry and application understanding, GKN has always been able to satisfy the high demands of its customers and in many cases even exceeded their expectations.

<table>
<thead>
<tr>
<th></th>
<th>THIN ELEMENTS / STRUCTURES</th>
<th>HOUSINGS</th>
<th>PIPES</th>
<th>FIXTURES/BRACKETS</th>
<th>HYDRAULIC COMPONENTS</th>
<th>TRANSMISSION PARTS</th>
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<tbody>
<tr>
<td><strong>STANDARD PROCESS</strong></td>
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<td></td>
<td>Stamping / Bending</td>
<td>Casting</td>
<td>Hydro forming</td>
<td>Machining</td>
<td>Fine casting</td>
<td>Machining</td>
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<td><strong>STANDARD DELIVERY</strong></td>
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<td>/welding</td>
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<td>8 weeks</td>
<td>6 weeks</td>
<td>8 weeks</td>
<td>4-6 weeks</td>
<td>12 weeks</td>
<td>6 weeks</td>
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<tr>
<td><strong>AM DELIVERY</strong></td>
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<td>2 weeks</td>
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<td>incl.</td>
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<td>machining</td>
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<td><strong>STANDARD MATERIAL</strong></td>
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<td></td>
<td>Stainless</td>
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<td>Different materials</td>
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<td>Different</td>
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<td>steel</td>
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<td>al. alloys</td>
<td>alloys</td>
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<tr>
<td><strong>MATERIAL</strong></td>
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<td></td>
<td>AISi10Mg, 1.2709, 316L</td>
<td>AISi10Mg</td>
<td>AISi10Mg, 316L</td>
<td>AISi10Mg, 316L</td>
<td>316L</td>
<td>20MnCr5, 316L</td>
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<td><strong>EXAMPLE</strong></td>
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MATERIAL AS THE COST INFLUENCER

**CASE STUDY**

- **Helical gears**
  - PM-surface densified
  - tool costs: 100 k€
  - lead time: 14 weeks

- **Plastic components**
  - Plastic injection moulding
  - tool costs: 15 – 50 k€
  - lead time: 10 weeks

- **Housing**
  - Aluminium die casting
  - tool costs: 100 k€
  - lead time: 14 weeks

- **Cover**
  - Deep drawn sheet metal
  - tool costs: 20 k€
  - lead time: 8 weeks

- **Axle**
  - Machined and broaching
  - tool costs: 50 k€
  - lead time: 8 weeks

With AM all these parts could have been produced in just one month instead of minimum 3 months - without tooling costs!
Standardized AM Prototyping

Conversion of your initial situation into our AM Framework

1. AM INTRODUCTION
   - Consultation with AM Sales Engineer
   - Experience Day/Training (optional)

2. TEST PERIOD
   - GKN AM Prototyping „AM Conventional“

3. FRAME CONTRACTS
   - cm³-model (volume contract)

4. SYSTEM CONNECTION
   - Direct connection to GKN-MES
   - Lowest administration effort

5. SOP

Standarized AM Prototyping framework

2 weeks delivery time

Flexible & individual production orders with monthly total invoicing
About GKN Additives

GKN Additive is a digital manufacturer of metal AM parts and materials for prototypes, medium series and the aftermarket. Our AM production plants are embedded in Industry 4.0, backed by an intelligent global print network for maximum efficiency and prompt delivery to our customers. What sets us apart is our history.

GKN Additive builds on GKN Powder Metallurgy’s dual expertise in powder production and metal processing to drive industrialization across the whole Additive Manufacturing value chain.

From advanced metal powders to design and manufacturing services, we drive new technologies to the limit to make technology simpler, faster and more accessible.

Connect with us

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To learn more about GKN Additive, visit:

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