H.C. Starck Solutions is leading the quickly evolving field of metal additive manufacturing (AM), combining our competencies in 3D printing technologies with 100 years of expertise in refractory metals.

The Powder Bed Fusion – Laser (PBF-L) is the most well known AM method for producing metal parts. During the process, spherical metal powders are spread in layers while a laser is used to melt and fuse the layers to create unique part shapes. Development of suitable powders and printing parameters enables H.C. Starck Solutions to supply refractory metal parts into a wide range of applications.

Powder bed fusion allows for the production of full density parts, while maintaining highest design accuracy. It is a preferred option for materials that can be used in an as-welded condition. Tight tolerances and a smooth printed surface finish make it the method of choice for highly complex shapes.

With our flexible manufacturing capabilities, we are able to offer fast deliveries of small quantities and work with our customers to not only print their existing parts, but also discuss re-design opportunities to take full advantage of the benefits of AM.
H.C. Starck Solutions – Your Partner for AM

H.C. Starck Solutions utilizes the benefits of powder bed fusion to dramatically enhance part performance. Working closely with our customers, we select the correct materials and manufacturing strategy, maximizing the value to any given application.

### Powder Bed Fusion – Laser Process Capabilities

<table>
<thead>
<tr>
<th>Overall Build Size</th>
<th>285 x 248 x 248 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Feature Size</td>
<td>150 µm</td>
</tr>
<tr>
<td>Typical Dimensional Tolerance</td>
<td>± 1% with a minimum tolerance of ± 0.05 mm</td>
</tr>
<tr>
<td>Typical Density</td>
<td>&gt; 98% of theoretical</td>
</tr>
<tr>
<td>Current Materials</td>
<td>Pure Ta, Pure Mo, Mo-Re alloys and Nb alloys</td>
</tr>
<tr>
<td>Alternate Materials</td>
<td>Fe, Co, and Ni-based alloys upon request</td>
</tr>
</tbody>
</table>

### Potential Applications

- Heat exchangers
- Rocket nozzles
- Biomedical implants
- Collimators
- Pump impellers
- Defense parts
- Valve components
- Heat shields
- Light-weight structures

### What We Provide

- Tailored AM powder for powder bed fusion
- Laser parameter development and optimization
- Powder bed fusion part printing in custom materials
- Post-processing and heat treatment
- Topological Optimization
- Volumes from prototype range to production scale

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The values in this publication are typical values and do not constitute a specification.

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