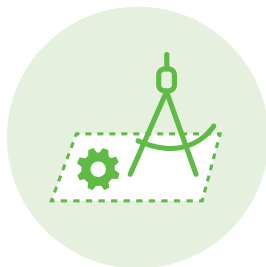
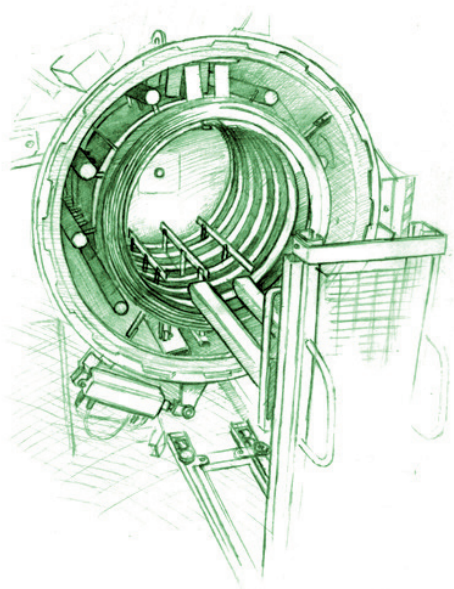


High Performance Metal Solutions

# H.C. Starck Engineering Service Solutions

H.C. Starck Solutions understands market trends and the latest cutting-edge technologies are providing us the opportunity to create value added solutions for complex applications. To this, we created our Engineering Solutions Services that provide customized engineering services for all furnace applications. From engineering design assistance to furnace products and applications, H.C. Starck Solutions can craft the solution to fit your company's furnace needs.



**LEVEL 1:**  
Basic Engineering



**LEVEL 2:**  
Proof Engineering



**LEVEL 3:**  
Finite Element Method

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# H.C. Starck Engineering Service Breakdown

Level	Services Included
<b>LEVEL 1:</b> <b>Basic Engineering</b>	<ul style="list-style-type: none"> <li>• Basic layouts in 2D and bill of materials</li> <li>• Selection of the number of sheets and calculations of the temperature in the individual layers;</li> <li>• Calculations: <ul style="list-style-type: none"> <li>• Heating elements – resistance (ohms)</li> <li>• Surface loading (W/cm<sup>2</sup>) and a secondary voltage (Volt)</li> <li>• Heat loss and heating power</li> <li>• Furnace hearth-supports inside the heating chambers/zones</li> </ul> </li> </ul>
<b>LEVEL 2:</b> <b>Proof Engineering</b>	<ul style="list-style-type: none"> <li>• Complete drawings in 3D/2D and bill of materials;</li> <li>• Selection of the number of sheets and calculations of the temperature in the individual layers;</li> <li>• Calculations: <ul style="list-style-type: none"> <li>• Heating elements – resistance (ohms)</li> <li>• Surface loading (W/cm<sup>2</sup>) and a secondary voltage (Volt)</li> <li>• Heat loss and heating power</li> <li>• Furnace hearth-supports inside the heating chambers/zones</li> </ul> </li> </ul>
<b>LEVEL 3:</b> <b>Finite Element Method (FEM)/</b> <b>Computational Fluid Dynamics(CFD)</b>	<ul style="list-style-type: none"> <li>• Preparation FEM/3D model of current design</li> <li>• Preparation CFD/3D model of current design</li> <li>• FEM simulations of current design: static stress, modal frequencies, thermal stress, thermal calculations, structural buckling, nonlinear static stress, event simulations and sharp optimization</li> <li>• CFD simulations of current design</li> <li>• Analysis of the result</li> </ul>

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

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