Over the last years a new sintering process is becoming more and more interesting which is called “SPS” (Spark Plasma Sintering) or “FAST” (Field Assisted Sintering Technique).

On the basis of FCT’s vacuum hot presses which have proved for decades now a new generation of hot presses has been developed which realizes the SPS-/FAST-technology at the state-of-the-art thus guaranteeing effective and reliable use of the below mentioned advantages of the process.

With this sintering method the tool respectively the component is heated directly by DC current pulses, so that cycle times of few minutes will be possible. The use of DC current pulses leads to an additional increase of the sintering activity with many materials resulting from the processes that occur on the points of contact of the powder particles (Joule heating, generation of plasma, electromigration etc.). Therefore significantly lower temperatures as well as significantly lower mould pressure than at conventional hot pressing and sintering will be possible.

This leads to absolutely new possibilities of producing a lot of materials with extraordinary attributes, for example:

- nanomaterials can be sintered without significant grain growth
- FGM ("Functionally Graded Materials")
- sputter targets
- composite materials
- innovative cemented carbide materials
- semi-conductor materials for thermoelectric application
- aluminum or copper alloys and intermetallics
- high-performance ceramics

The performance and design of FCT HP D equipments are characterized by:

- servo hydraulic force control
- precise, rigid frame with low deformation, accurate guiding of the pressing dies
- measuring of densification path
- double-walled water-cooled stainless steel vacuum vessel with a leak rate of up to $1 \times 10^{-3} \text{ mbar l/s}$
- easy accessibility
- temperature measurement and control can be chosen between axial/radial pyrometer or flexible thermocouples
- freely programmable sintering parameters for up to 50 segments per recipe
- freely programmable pulse on/off (1...255ms) for each segment individually
- heating rate up to 800 K/min
- extensive software for data recording and evaluation of all sintering parameters, available on a separate personal computer
- user friendly online process management system

Of course you can use the "FAST" furnace of our technology centre for your tests. Moreover our specialists will help you with their experiences in order to develop innovative sintering concepts and the corresponding furnaces for research and development as well as for the economic production.

Experience and competence in high-performance materials
Challenge us - we find your solutions!

www.fct-keramik.de
### Spark Plasma Sintering Furnace

**Type HP D / HHP D - direct / hybrid heated**

Spark plasma sintering furnace for field assisted sintering technique - „FAST“

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>HP D 5</td>
<td>Ø 60 x 180</td>
<td>Ø 30</td>
<td>50</td>
<td>7.2</td>
<td>5500</td>
<td>45</td>
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<tr>
<td>HP D 25</td>
<td>Ø 200 x 300</td>
<td>Ø 80</td>
<td>250</td>
<td>8</td>
<td>8000</td>
<td>78</td>
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<tr>
<td>HP D 125</td>
<td>Ø 350 x 300</td>
<td>Ø 150</td>
<td>1250</td>
<td>8</td>
<td>24000</td>
<td>212</td>
</tr>
<tr>
<td>HP D 250†</td>
<td>Ø 400 x 450</td>
<td>Ø 300</td>
<td>2500</td>
<td>8</td>
<td>48000</td>
<td>408</td>
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<tr>
<td>HHP D 25</td>
<td>Ø 200 x 200</td>
<td>Ø 80</td>
<td>250</td>
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<td>HHP D 400</td>
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</tbody>
</table>

* discontinuous or semi-continuous operation  ** max. heating capacity hybrid system

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**Spark Plasma Sintering Furnace**

**Type: FCT HP D 25**

**Spark Plasma Sintering Furnace**

**Type: FCT HP D 5**

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**Spark Plasma Sintering Furnace**

**Type: FCT HP D 250/C**

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