Ancorsteel 721 SH is a water atomized, prealloyed steel powder specifically developed for sinter hardening. It complements Ancorsteel 737 SH as it contains slightly lower levels of molybdenum and nickel.

Ancorsteel 721 SH may be used for applications where the slightly higher hardenability of Ancorsteel 737 SH is not required. With good compressibility and stable dimensional change Ancorsteel 721 SH is the powder of choice for small to medium size parts that are to be sinter hardened.

Typical Analysis and Properties

<table>
<thead>
<tr>
<th>Composition (weight %) (w/o)</th>
<th>C</th>
<th>Mn</th>
<th>Mo</th>
<th>Ni</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;0.01</td>
<td>0.4</td>
<td>0.9</td>
<td>0.5</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Apparent Density: 3.0 g/cm³
Flow Rate: 25 s/50g

Sieve Distribution (w/o)

<table>
<thead>
<tr>
<th>Micrometers</th>
<th>+250</th>
<th>-250 /+150</th>
<th>-150 /+45</th>
<th>-45</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Standard Mesh</td>
<td>(+60)</td>
<td>(-60 /+100)</td>
<td>(-100 /+325)</td>
<td>(-325)</td>
</tr>
<tr>
<td>Trace</td>
<td>10</td>
<td>70</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

The Effect of Compaction Pressure on Green Properties

1. **Green Density**
   - Composition Pressure (tsi)
   - Green Density (g/cm³)

2. **Green Strength**
   - Composition Pressure (tsi)
   - Green Strength (MPa)
Ankorsteel® 721 SH

Typical Analysis and Properties

Sintered Properties

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (w/o)</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Graphite (w/o)</td>
<td>0.7</td>
<td>0.7</td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

All premixes were made with 0.75 w/o Acrawax C as the lubricant. All compacts were sintered at 1120 °C (2050 °F) in a 90 w/o nitrogen/10 w/o hydrogen atmosphere for 15 minutes at temperature-accelerated cooling conditions include 2.75 inch/minute belt speed and 30 Hz Varicool settings leading to an average cooling rate of 1.6 °C/s in the sample between 650 °C (1200 °F) and 315 °C (600 °F); followed by a 200 °C (400 °F) temper for one hour.
Ancorsteel® 721 SH

Sintered Density vs. Compaction Pressure

All premixes were made with 0.75 w/o Acrawax C as the lubricant. All compacts were sintered at 1120 °C (2050 °F) in a 90 w/o nitrogen/10 w/o hydrogen atmosphere for 15 minutes at temperature-accelerated cooling conditions include 2.75 inch/minute belt speed and 30 Hz Varicool settings leading to an average cooling rate of 1.6 °C/s in the sample between 650 °C (1200 °F) and 315 °C (600 °F); followed by a 200 °C (400 °F) temper for one hour.

Jominy Hardenability

End-quench Jominy bars were prepared from premixes containing 0.75 w/o Acrawax C and compacted to a density of 7.0 g/cm³. The bars were sintered at 1120 °C (2050 °F) in a 90 w/o nitrogen/10 w/o hydrogen atmosphere for 15 minutes at temperature. The bars were austenitized at 900 °C (1650 °F) for 30 minutes and end-quenched according to Standards ASTM A 255 and MPIF 65.
Ancorsteel® 721 SH

Properties vs. Sintered Density

All premixes were made with 0.75 w/o Acrawax C as the lubricant. All compacts were sintered at 1120 °C (2050 °F) in a 90 v/o nitrogen/10 v/o hydrogen atmosphere for 15 minutes at temperature-accelerated cooling conditions include 2.75 inch/minute belt speed and 30 Hz Varicool settings leading to an average cooling rate of 1.6 °C/s in the sample between 650 °C (1200 °F) and 315 °C (600 °F); followed by a 200 °C (400 °F) temper for one hour.
Ancorsteel® 721 SH

Microstructures

Ancorsteel® 721 SH with 1% Cu and 0.7% graphite compacted at 690 MPa.

Ancorsteel® 721 SH with 2% Cu and 0.9% graphite compacted at 690 MPa.

The samples were sintered at 1120 °C (2050 °F) in a 90 v/o nitrogen/ 10 v/o hydrogen atmosphere for 15 minutes at temperature - accelerated cooling conditions include 2.75 inch/minute belt speed and 30 Hz Varicool settings leading to an average cooling rate of 1.6 °C/s in the sample between 650 °C (1200 °F) and 315 °C (600 °F); followed by a 200 °C (400 °F) temper for one hour.

IMPORTANT NOTICE: The data shown are based on laboratory processing standard test specimens. Results may vary from that obtained in production processing.