CBN Inserts For Gear Machining
Brief Introduction about Hunan Real Tech CBN inserts

- Hunan Real Tech Superabrasive & Tool Co., Ltd. have controlled the CBN design, manufacturing and application technique, our CBN inserts achieved innovative enhancement for anti-shock resistance, can be used in a variety of applications.

- RT solid CBN inserts can be used for rough, semi fine and fine turning, milling, honing workpiece of hardened steel, high nickel steel, high Chromium steel, the machining can be both continuous and interrupted, working efficiency is very high, take for example, our CBN inserts can turning the gear with \( V = 100 \text{m/min} \), turning the gray cast iron with \( V = 2000 \text{m/min} \).

- We have the patented CBN welding technique which provide the CBN more and extremely high binding strength with the base material, the inner structure and welding technique reach the world leading level. Various sizes and grades of our super-hard welding CBN inserts can meet different working conditions.

- Our CBN insert is now the first choice for heavy loading, high efficiency, energy saving cutting request.

- Our CBN inserts achieved many successful case for gear machining, enhance the working efficiency while lower down the product cost dramatically at the mean time.

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1. Fine turning hardened gear Bore/inner hole and end face

Turning replace the grinding to machining gear

1. The tolerance can be controlled under $\pm 0.01\text{mm}$.
2. Surface Roughness can be controlled under $Ra0.8-1.6\mu\text{m}$.
3. Reduce investment for grinding machine.
4. One time clamping can complete all complicated face fine machining process, save energy and reduce pollution.
5. Dry turning, environment friendly.

Note: The virtual machining tolerance is related with the lathe.

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Workpiece: Hardened alloy steel
Hardness: HRC48
CBN Insert: TNGA 110304
  S01020 (S0.1 × 20°)-6 edge
  Vc=100-120m/min; ap=0.06mm,
  f=0.06mm/r
  Ra0.8-1.6μm

Fine Honing the bore/inner hole, turning replace grinding process

Hunan Real Tech Tipped CBN turning insert show the same turning performance with a foreign competitor's product, but our tool duration is of 2 times compare with their product.

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### Reports from our customer for CBN Inserts gear machining

#### I. Application Example (Outer Diameter Turning, Material: 17CrNiMo6)

<table>
<thead>
<tr>
<th>Workpiece</th>
<th>Application Machine</th>
<th>Workpiece Hardness</th>
<th>Tool Number</th>
<th>Tool Number Type</th>
<th>Cutting Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>JGW3846-1001/01 (Second Gear)</td>
<td>普通中型车床 (C631-1)</td>
<td>HRC50°</td>
<td>90001°</td>
<td>SNM1120708</td>
<td>V (m/min)</td>
</tr>
<tr>
<td>JGW3846-1001/01 (Second Gear)</td>
<td>普通中型车床 (C631-1)</td>
<td>HRC50°</td>
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<td>—</td>
<td>65</td>
</tr>
</tbody>
</table>

**Notes:**
1. 上标：工作在渗碳淬火过程中，外圆未保护好，局部微裂，使得工作外圆某些局部硬度偏高；
2. 上标：立方氮化硼刀片在该试切参数下，产生积屑瘤，建议适当提高切削速度至100m/Min
3. 上标：硅陶瓷刀片在该试切参数下容易发生崩刃；
4. 通过对比可知，立方氮化硼刀片 (90001°) 的切削效率至少是硅陶瓷的2倍，且不容易崩刃。

#### II. Application Example (Outer Diameter Turning, Material: 17CrNiMo6)

<table>
<thead>
<tr>
<th>Workpiece</th>
<th>Application Machine</th>
<th>Workpiece Hardness</th>
<th>Tool Number</th>
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<td>JGW3846-1001/01 (Second Gear)</td>
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<td>90001°</td>
<td>SNM1120708</td>
<td>V (m/min)</td>
</tr>
<tr>
<td>JGW3846-1001/01 (Second Gear)</td>
<td>普通中型车床 (C631-1)</td>
<td>HRC50°</td>
<td>—</td>
<td>—</td>
<td>130</td>
</tr>
</tbody>
</table>

**Notes:**
1. 上标：工作在渗碳淬火过程中，外圆未保护好，局部微裂，使得工作外圆某些局部硬度偏高；
2. 上标：立方氮化硼刀片在该试切参数下，a）粗糙度能达到Ra3.2左右；b）断屑效果较好；
3. 上标：建议刀尖圆弧为R0.5更有利于精加工；d）单个刀片（8刃均破损）可加工6件该零件（漏装严重），刀片耐用度为150min左右。

#### III. Application Example (Outer Diameter Turning, Material: 17CrNiMo6)

<table>
<thead>
<tr>
<th>Workpiece</th>
<th>Application Machine</th>
<th>Workpiece Hardness</th>
<th>Tool Number</th>
<th>Tool Number Type</th>
<th>Cutting Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL1500A-2001A (Second Gear)</td>
<td>普通中型车床 (C631-1)</td>
<td>HRC50°</td>
<td>90001°</td>
<td>SNM1120708</td>
<td>V (m/min)</td>
</tr>
<tr>
<td>FL1500A-2001A (Second Gear)</td>
<td>普通中型车床 (C631-1)</td>
<td>HRC50°</td>
<td>90001°</td>
<td>SNM1120708</td>
<td>130-145</td>
</tr>
</tbody>
</table>

**Notes:**
1. 上标：工作在渗碳淬火过程中，外圆及端面未保护好，局部微裂，使得工作某些局部硬度偏高；
2. 上标：为加工零件外圆情况下的切削深度；
3. 上标：为加工零件端面情况下的切削深度；
4. 上标：a）粗糙度能达到Ra3.2左右；b）断屑效果较好；c）切削效率比硅陶瓷刀片好，不易崩刀，效率高；

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Wok report from our customer for the fine turning Automotive Transmission Gear Box

<table>
<thead>
<tr>
<th>刀具</th>
<th>转速 r/min</th>
<th>切削速度 m/min</th>
<th>进给速度 mm/rev</th>
<th>切削深度 mm</th>
<th>切削时间 (秒)</th>
<th>冷却方式</th>
<th>参数对比</th>
</tr>
</thead>
<tbody>
<tr>
<td>原用刀具</td>
<td>1600</td>
<td>130.6</td>
<td>0.06</td>
<td>0.15/0.07</td>
<td>23”</td>
<td>水溶液</td>
<td>相同</td>
</tr>
<tr>
<td>试验刀具</td>
<td>1600</td>
<td>130.6</td>
<td>0.06</td>
<td>0.15/0.07</td>
<td>23”</td>
<td>水溶液</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>刀具</th>
<th>品牌</th>
<th>刀具规格及材质</th>
<th>刀尖数</th>
<th>加工总数</th>
<th>刀尖平均加工件数</th>
<th>刀片单价</th>
<th>加工单价成本对比</th>
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</thead>
<tbody>
<tr>
<td>原用刀具</td>
<td>Foreign Brand</td>
<td>NP-CCGW09T304G MB825</td>
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<td>650</td>
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<tr>
<td>试验刀具</td>
<td>RealTech CBN</td>
<td>CCGW09T0304 S01020</td>
<td>2</td>
<td>2678</td>
<td>1339</td>
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<td></td>
</tr>
</tbody>
</table>

试验总结：对纹路减少有改善，其它效果相仿，有一定性价比，可以进行推广

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Interrupted Turning Gear Excircle

Solid CBN Insert: CNMN 120712 S02020 (S0.1×20°)
Workpiece: Alloy Steel
Hardness: HRC48-55
Gear Diameter: D1200mm
Vc=100m/min
ap= 0.5mm
f=0.3mm/r

Our Solid CBN insert is 3 times longer and 6 times more durable compared with imported competitors' carbide inserts.

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Solid CBN Inserts fine turning giant gear

Workpiece: ZG40CrNi2Mo
Hardness: HB310-350
Workpiece: Φ12000mm, 296 teeth per circle
Insert: SNMN201020
Holder: CSSNR4040S20
V=97.9m/min; ap=0.5mm, f=2.6mm/r

Interrupted turning

Solid CBN Inserts from Hunan Real Tech Superabrasive & Tool Co., Ltd show excellent working performance, tool life is 6 times longer than an international famous brand carbide insert with coating, price is only theirs’ 77%.

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Workpiece: 17CrNiMo6
Workpiece hardness: HRC57
CBN Insert: SNMN 120412 S02020
Holder: CSXNR4040S12T6
Lathe brand: 61160
Vc=90m/min;
ap=0.5mm,f=0.6mm/r

Our insert life is 3-5 times higher than insert from competitors, while cost can be reduce by 65%
Advantages of our CBN cutting tools

- Hunan Real Tech company has the integrated advantages of CBN abrasives and CBN cutting tools, our self research and manufactured CBN tools can offer better working performance. For different work piece materials, we adjust the bond and technique and aimed to gain customers' satisfaction.

- Hunan Real Tech company takes the initiative to develop the CBS thoroughly welded CBN inserts, it can offer higher heat resistance and higher binding strength compare with the conventional welding technique.

We promise to reduce your machining cost by 20%!

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