**Chipbreakers**

LV Type / FV Type Chipbreaker: For chip control during finishing of hardened steel

SV Type Chipbreaker: For chip control during carburized layer removal

**Grades**

- **Coated SUMIBORON**
  - **BNC100**
  - **BNC160**
  - **BNC200**
  - **BNC2020**
  - **BNC300**

- **Uncoated SUMIBORON**
  - **BN1000**
  - **BNX20**
  - **BNX25**
  - **BN2000**
  - **BN350**

**Recommended Cutting Conditions**

<table>
<thead>
<tr>
<th>Cutting Process</th>
<th>Grade</th>
<th>Depth of Cut $a_p$(mm)</th>
<th>Feed Rate $f$(mm/rev)</th>
<th>Cutting Speed $V_c$(m/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>BNC2010</td>
<td>0.03-0.20-0.35</td>
<td>0.03-0.10-0.20</td>
<td>120-200-300</td>
</tr>
<tr>
<td></td>
<td>BNC100</td>
<td>0.03-0.20-0.30</td>
<td>0.03-0.10-0.20</td>
<td>120-200-300</td>
</tr>
<tr>
<td></td>
<td>BN1000</td>
<td>0.03-0.15-0.20</td>
<td>0.03-0.10-0.15</td>
<td>100-150-300</td>
</tr>
<tr>
<td></td>
<td>BN10</td>
<td>0.03-0.20-0.20</td>
<td>0.03-0.10-0.15</td>
<td>120-180-300</td>
</tr>
<tr>
<td>General Turning</td>
<td>BNC2020</td>
<td>0.03-0.30-0.50</td>
<td>0.03-0.20-0.40</td>
<td>50-130-220</td>
</tr>
<tr>
<td></td>
<td>BNC160</td>
<td>0.03-0.20-0.35</td>
<td>0.03-0.10-0.25</td>
<td>120-180-220</td>
</tr>
<tr>
<td></td>
<td>BNC200</td>
<td>0.03-0.30-0.50</td>
<td>0.03-0.10-0.30</td>
<td>50-130-220</td>
</tr>
<tr>
<td></td>
<td>BN2000</td>
<td>0.03-0.20-0.30</td>
<td>0.03-0.10-0.20</td>
<td>50-100-200</td>
</tr>
<tr>
<td></td>
<td>BNX20</td>
<td>0.03-0.20-0.35</td>
<td>0.03-0.15-0.30</td>
<td>70-130-170</td>
</tr>
<tr>
<td>Interrupted</td>
<td>BNC300</td>
<td>0.03-0.20-0.30</td>
<td>0.03-0.10-0.20</td>
<td>50-100-150</td>
</tr>
<tr>
<td></td>
<td>BN350</td>
<td>0.03-0.20-0.30</td>
<td>0.03-0.15-0.30</td>
<td>120-160-220</td>
</tr>
<tr>
<td></td>
<td>BNX25</td>
<td>0.03-0.20-0.50</td>
<td>0.03-0.15-0.30</td>
<td>120-160-220</td>
</tr>
</tbody>
</table>
BNC2010 : For high-precision finishing requiring good surface roughness and dimensional accuracy. Enables stable machining and provides excellent surface roughness thanks to superior boundary wear resistant coating and CBN substrate.

BNC2020 : General purpose grade suitable for typical hardened steel machining applications. Achieves long tool life thanks to highly-wear-resistant and highly-adhesive coating and tough CBN substrate.

**Application Examples**

**BNC2010**

[Continuous External Turning of Main Shaft] (58 to 60HRC)
BNC2010 provides excellent wear resistance and achieves excellent surface roughness.

Work Material : SCM415 58-62HRC (Continuous)
Insert : 4NC-DNGA150408  Edge Treatment : S01225
Cutting Conditions : \( v_c = 160 \text{m/min} \), \( f = 0.08 \text{mm/rev} \), \( a_p = 0.1 \text{mm} \) Wet

Previous Coated CBN

**BNC2020**

[Carburized Layer Removal for Sun Gear] (58 to 60HRC)
BNC2020 achieves long tool life in high load cutting.

Work Material : SCM415-5V 58-62HRC (Interrupted Cutting)
Insert : 4NC-CNGA120412  Edge Treatment : S01225
Cutting Conditions : \( v_c = 130 \text{m/min} \), \( f = 0.1 \text{mm/rev} \), \( a_p = 0.6 \text{mm} \) Dry

Previous Coated CBN

**BNC2010**

[Facing of CVJ Outer Race] (58 to 60HRC)
BNC2010 with WH type wiper insert maintains excellent surface roughness for a long time.

Work Material : SCM415 58-62HRC (Continuous)
Insert : 4NC-DNGA150408  Edge Treatment : S01225
Cutting Conditions : \( v_c = 200 \text{m/min} \), \( f = 0.10 \text{mm/rev} \), \( a_p = 0.35 \text{mm} \) Dry

Previous Coated CBN

[Interrupted Machining of CVJ Cage Window] (58 to 60HRC)
BNC2020 strong edge HS type provides stable performance in interrupted cutting.

Work Material : SCM415-5V 58-62HRC (Interrupted Cutting)
Insert : 3NC-TNGA160420HS  Edge Treatment : S01225
Cutting Conditions : \( v_c = 120 \text{m/min} \), \( f = 0.1 \text{mm/rev} \), \( a_p = 0.15 \text{mm} \) Dry

Previous Coated CBN

---

**BNC2010 Cutting Performance**

Previous Coated CBN

BNC2010 Reduced boundary wear

**BNC2020 Cutting Performance**

Previous Coated CBN

BNC2020 Tool Life

---

For high-precision finishing requiring good surface roughness and dimensional accuracy. Enables stable machining and provides excellent surface roughness thanks to superior boundary wear resistant coating and CBN substrate.

General purpose grade suitable for typical hardened steel machining applications. Achieves long tool life thanks to highly-wear-resistant and highly-adhesive coating and tough CBN substrate.
**Grades**

**BN2000 / BN1000**

*BN2000*: General purpose grade suitable for typical hardened steel machining applications.

*BN1000*: For high speed machining. BN1000 provides the highest wear resistance of all uncoated SUMIBORON grades.

### Wear Resistance (Continuous Cutting)

- **BN2000**: Able to continue cutting
- **BN1000**: High wear resistance!

**Application Examples**

### BN2000

- **SCM415H Clutch Component**: Employs BN2000 for superior fracture resistance compared to conventional grade and longer tool life.

- **SCM415H CVT Pulley Slide**: Whereas conventional products required replacement after 100 workpieces (preset tool change,) BN2000 has no breakage after 250 workpieces.

### BN1000

- **SKD11 Plunger**: Long tool life and more stable surface roughness than coated CBN at extremely low cutting speeds.

- **SUJ2 Internal Boring**: BN1000 ensures less friction than conventional grades and achieves long tool life.
**BNC100**

**Shaft Component (Carburised Material 58 to 62HRC)**

BNC100 provides 1.5x cutting speed and 10x tool life.

<table>
<thead>
<tr>
<th>No. of Workpieces</th>
<th>BNC100 Ceramic Tool Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>10x tool life</td>
<td></td>
</tr>
</tbody>
</table>

Insert: 4NC-CNGA120408(BNC100)
Cutting Conditions: $v_c=150\text{m/min}$, $f=0.1\text{mm/rev}$, $a_p=0.15\text{mm}$ Wet

**BNC200**

**Bearing Steel (62HRC)**

Provides superior stability and 2 times longer tool life than competitor’s CBN.

Insert: 4NC-CNGA120412(BNC200)
Cutting Conditions: $v_c=150\text{m/min}$, $f=0.15\text{mm/rev}$, $a_p=0.25\text{mm}$ Dry

**BNC300**

**CVJ Component (Induction-Hardened Steel 58 to 63HRC)**

BNC300HS has no chipping, gives stable performance for 900 workpieces, and now has an extended preset tool life that is 1.8 times longer.

Insert: 4NC-CNGA120412LS(BNC300)
Cutting Conditions: $v_c=200\text{m/min}$, $f=0.05\text{mm/rev}$, $a_p=0.1\text{mm}$ Dry

**BNX10**

**S30C Shaft Component (60HRC)**

Double the efficiency and more than double the tool life of competitor’s CBN.

Insert: NU-CNMA120412(BNX10)
Cutting Conditions: $v_c=200\text{m/min}$, $f=0.08\text{mm/rev}$, $a_p=0.15\text{mm}$ Wet

**BNX25**

**SCM420 Gear Component (60HRC)**

Lower variance and 1.6 times longer tool life than competitor’s CBN.

Insert: NS-TNMA160408(BNX25)
Cutting Conditions: $v_c=150\text{m/min}$, $f=0.12\text{mm/rev}$, $a_p=0.2\text{mm}$ Dry

**BNX20**

**SCM415 Flange Component (62HRC)**

Better wear resistance and 2.4 times longer tool life than competitor’s CBN.

Insert: NU-TNMA160408(BNX20)
Cutting Conditions: $v_c=150\text{m/min}$, $f=0.1\text{mm/rev}$, $a_p=0.12\text{mm}$ Dry

**BNX350**

**SCh420H Gear Shaft Component (58 to 62HRC)**

Better fracture resistance and 2.5 times longer tool life than competitor’s CBN.

Insert: NU-CNMA120412(BNX350)
Cutting Conditions: $v_c=125\text{m/min}$, $f=0.15\text{mm/rev}$, $a_p=0.3\text{mm}$ Dry