

# BNC2010 / BNC2020



BNC2010 & BNC2020 Grades for machining  
Hardened Steel



# BNC2010

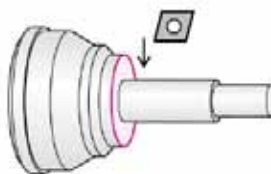


## BNC2010 Features & Benefits

- Sumitomo's new BNC2010 CBN grade contains 10% higher CBN content than conventional grade creating significantly higher wear resistance
- BNC2010 has excellent surface finish resulting from high notch wear resistant multi-layers

## Application Examples

### CVJ outer race Face Turning



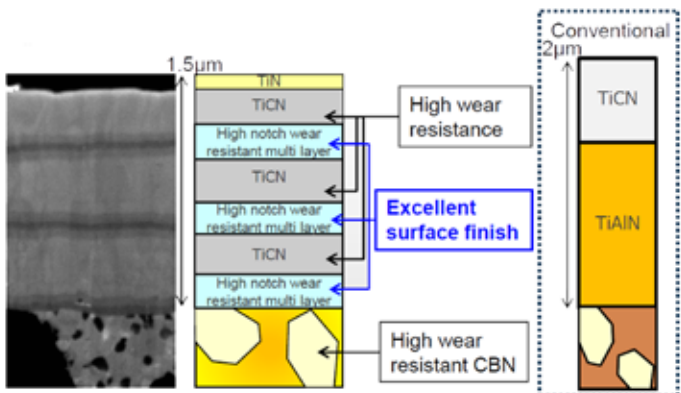
#### Cutting Conditions:

**Part Material:** 1053 Steel (HRC58-63)

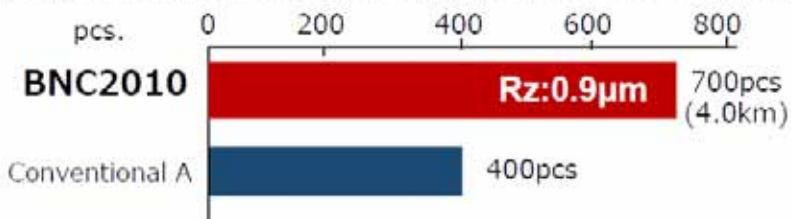
**Insert:** 4NC-CNGA433WG-BNC2010

**Cutting Condition:**  $V_c$ : 500 sfm  $f$ : 0.008 ipr  
 $a_p$ : 0.0078", Dry

## BNC2010 Structure



| Grade              | Binder | CBN content(%) | CBN grain size(µm) | TRS (GPa)   | K1C (MPa · m <sup>1/2</sup> ) |
|--------------------|--------|----------------|--------------------|-------------|-------------------------------|
| <b>BNC2010</b>     | TiCN   | 50 - 55        | 2                  | 1.10 - 1.20 | 5.5 - 6.0                     |
| Conventional Grade | TiN    | 40 - 45        | 1                  | 1.05 - 1.15 | 5.0 - 5.5                     |



BNC2010  
700pcs

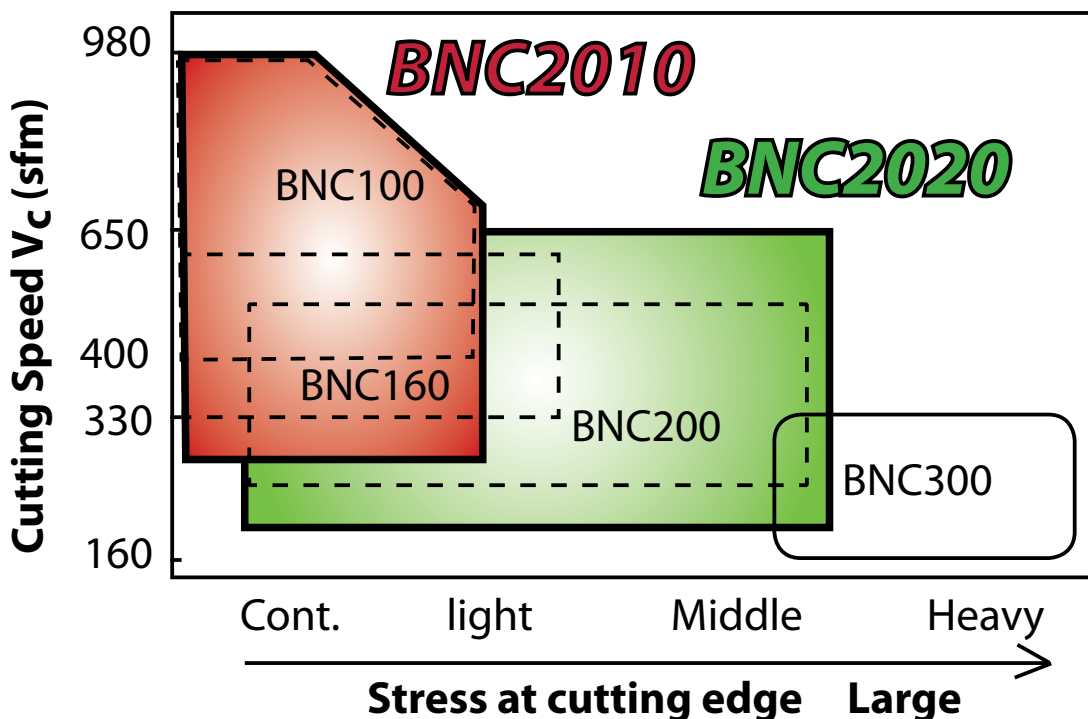


Conventional A  
400pcs



Notch Wear

## Cutting Conditions



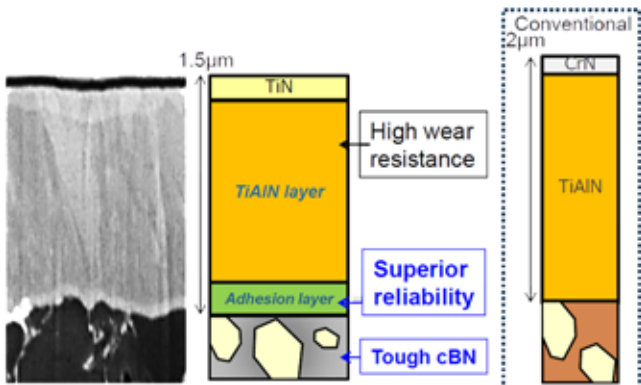
# BNC2020



## BNC2020 Features & Benefits

- Sumitomo's new BNC2020 contains CBN particles that provide superb chipping resistance, stable performance and long tool life
- The strength of CBN particles provides excellent chipping resistance, ensures stable performance and long tool life in high efficiency and interrupted machining of hardened steel

## BNC2020 Structure



| Grade              | Binder | CBN content(%) | CBN grain size(µm) | TRS (GPa)   | K1C (MPa · m <sup>1/2</sup> ) |
|--------------------|--------|----------------|--------------------|-------------|-------------------------------|
| BNC2020            | TiN    | 70 – 75        | 5                  | 1.20 – 1.30 | 7.0 – 7.5                     |
| Conventional Grade | TiN    | 65 – 70        | 4                  | 1.15 – 1.25 | 6.5 – 7.0                     |

### Carburized layer removal machining

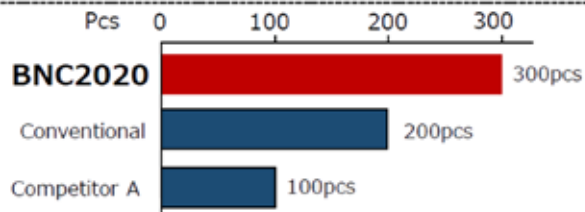


#### Cutting Conditions:

**Part Material:** 5120 Steel (HRC60)

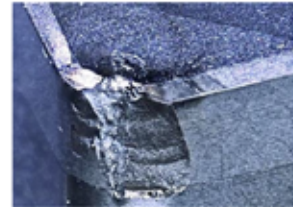
**Insert:** 4NC-CNGA432-BNC2020

**Cutting Condition:**  $V_c$ : 500 sfm  $f$ : 0.006 ipr  
 $a_p$ : 0.020", Wet



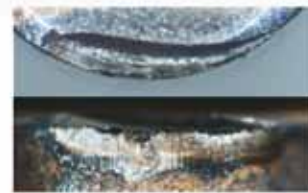
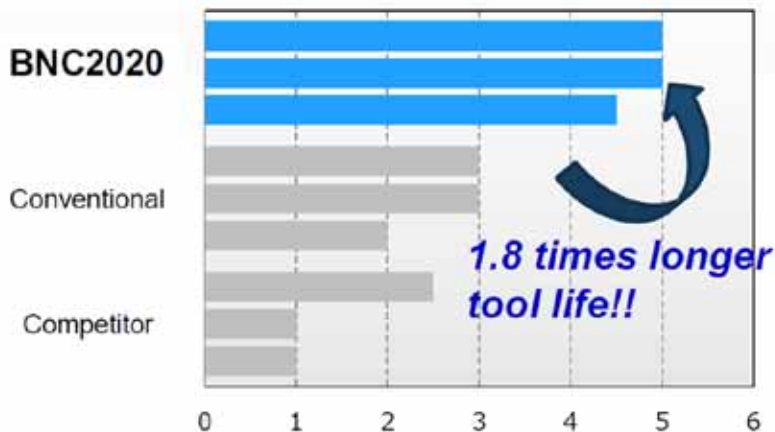
BNC2020 : 300 pcs

Conventional : 200 pcs



**BNC2020 achieves 1.5 times longer life than conventional CBN**

## Application Example #2



BNC2020 (5.0km)



Conventional (3.0km)



Competitor (1.0km)

### Application Example Cutting Conditions:

**Part Material:** 4115 Steel HRC58-62

**Insert:** 4NC-CNGA433-BNC2020

**Cutting Condition:**  $V_c$ : 430 sfm  $f$ : 0.004 ipr  
 $a_p$ : 0.024", Dry



# BNC2010 & BNC2020 Inventory - Negative Inserts

## CNGA 80° Diamond/Negative

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCCNGA432              | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 2NCCNGA432HS            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 2NCCNGA433              | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 2NCCNGA433HS            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 4NCCNGA431              | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGA431HS            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGA431W             | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGA431WG            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGA431WH            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGA432              | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGA432HS            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGA432W             | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGA432WG            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGA432WH            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGA433              | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 4NCCNGA433HS            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 4NCCNGA433W             | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 4NCCNGA433WG            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |

## CNGG 80° Diamond/Negative/w/ Chipbreaker

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 4NCCNGG431FV            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGG431LV            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCCNGG432FV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGG432LV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGG432SV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCCNGG433SV            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |

## DNGA 55° Diamond/Negative

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCDNGA432              | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 2NCDNGA432HS            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 2NCDNGA433              | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 2NCDNGA433HS            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 4NCDNGA431              | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGA431HS            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGA431WG            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGA431WH            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGA432              | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGA432HS            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCDNGA432WG            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCDNGA432WH            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCDNGA433              | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 4NCDNGA433HS            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |

●= USA Stocked item

## DNGG 55° Diamond/Negative/w/ Chipbreaker

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 4NCDNGG431FV            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGG431LV            | ●       | ●       | .500             | .1875     | .0156       | .015       | .2031                |
| 4NCDNGG432FV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCDNGG432LV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCDNGG432SV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 4NCDNGG433SV            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |

## SNGA Square Type/Negative

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCSNGA432              |         | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 2NCSNGA433              |         | ●       | .500             | .1875     | .0469       | .015       | .2031                |

## TNGA 60° Triangle/Negative

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 3NCTNGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 3NCTNGA332HS            | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 6NCTNGA331              | ●       | ●       | .375             | .1875     | .0156       | .015       | .150                 |
| 6NCTNGA331HS            | ●       | ●       | .375             | .1875     | .0156       | .015       | .150                 |
| 6NCTNGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 6NCTNGA332HS            | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 6NCTNGA333              | ●       | ●       | .375             | .1875     | .0469       | .015       | .150                 |
| 6NCTNGA333HS            | ●       | ●       | .375             | .1875     | .0469       | .015       | .150                 |

## TNGG Triangle/Negative/w/ Chipbreaker

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 6NCTNGG332SV            |         | ●       | .375             | .1875     | .0313       | .015       | .150                 |

## VNGA 35° Diamond/Negative

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCVNGA331              | ●       |         | .375             | .1875     | .0156       | .015       | .150                 |
| 2NCVNGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 2NCVNGA332HS            | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 4NCVNGA331              | ●       | ●       | .375             | .1875     | .0156       | .015       | .150                 |
| 4NCVNGA331HS            | ●       | ●       | .375             | .1875     | .0156       | .015       | .150                 |
| 4NCVNGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 4NCVNGA332HS            | ●       | ●       | .375             | .1875     | .0313       | .015       | .150                 |
| 4NCVNGA333              | ●       | ●       | .375             | .1875     | .0469       | .015       | .150                 |

## WNGA 80° Trigon/Negative

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 6NCWNGA432              | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 6NCWNGA432HS            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 6NCWNGA432WG            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 6NCWNGA432WH            | ●       | ●       | .500             | .1875     | .0313       | .015       | .2031                |
| 6NCWNGA433WG            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |
| 6NCWNGA433WH            | ●       | ●       | .500             | .1875     | .0469       | .015       | .2031                |

# BNC2010 & BNC2020 Inventory - Positive Inserts

## CCGA 80° Diamond/7° Relief

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCCCGA21.50.5          | ●       | ●       | .250             | .094      | .0078       | .015       | .110                 |
| 2NCCCGA21.50.5WG        | ●       | ●       | .250             | .094      | .0078       | .015       | .110                 |
| 2NCCCGA21.51            | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCCCGA21.52            | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCCCGA21.51WG          | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCCCGA21.52WG          | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCCCGA32.50.5          | ●       | ●       | .375             | .156      | .0078       | .015       | .1732                |
| 2NCCCGA32.50.5WG        | ●       | ●       | .375             | .156      | .0078       | .015       | .1732                |
| 2NCCCGA32.51            | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCCCGA32.51W           | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCCCGA32.51WG          | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCCCGA32.52            | ●       | ●       | .375             | .156      | .0313       | .015       | .1732                |
| 2NCCCGA32.52WG          | ●       | ●       | .375             | .156      | .0313       | .015       | .1732                |
| NCCCGA21.51             | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |

## DCGT 55° Diamond/7° Relief/w/ Chipbreaker

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCDCGT21.50.5FV        | ●       | ●       | .250             | .094      | .0078       | .015       | .110                 |
| 2NCDCGT21.51FV          | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCDCGT21.52FV          | ●       | ●       | .250             | .094      | .0313       | .015       | .110                 |
| 2NCDCGT32.50.5LV        | ●       | ●       | .375             | .156      | .0078       | .015       | .1732                |
| 2NCDCGT32.51LV          | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCDCGT32.52LV          | ●       | ●       | .375             | .156      | .0313       | .015       | .1732                |

## TCGA Triangle/7° Relief

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| NCTCGA21.51             | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| NCTCGA21.52             | ●       | ●       | .250             | .094      | .0313       | .015       | .110                 |

## CCGT 80° Diamond/7° Relief/w/ Chipbreaker

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCCCGT21.50.5FV        | ●       | ●       | .250             | .094      | .0078       | .015       | .110                 |
| 2NCCCGT21.51FV          | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCCCGT21.52FV          | ●       | ●       | .250             | .094      | .0313       | .015       | .110                 |
| 2NCCCGT32.50.5LV        | ●       | ●       | .375             | .156      | .0078       | .015       | .1732                |
| 2NCCCGT32.51LV          | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCCCGT32.52LV          | ●       | ●       | .375             | .156      | .0313       | .015       | .1732                |

## TPGA Triangle/11° Relief

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 3NCTPGA221              | ●       | ●       | .250             | .125      | .0156       | .015       | .110                 |
| 3NCTPGA222              | ●       | ●       | .250             | .125      | .0313       | .015       | .110                 |
| 3NCTPGA331              | ●       | ●       | .375             | .1875     | .0156       | .015       | .1693                |
| 3NCTPGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .1693                |
| NCTPGA221               | ●       | ●       | .250             | .125      | .0156       | .015       | .130                 |
| NCTPGA222               | ●       | ●       | .250             | .125      | .0313       | .015       | .130                 |

## DCGA 55° Diamond/7° Relief

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCDCGA21.50.5          | ●       | ●       | .250             | .094      | .0078       | .015       | .110                 |
| 2NCDCGA21.50.5WG        | ●       | ●       | .250             | .094      | .0078       | .015       | .110                 |
| 2NCDCGA21.51            | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCDCGA21.51WG          | ●       | ●       | .250             | .094      | .0156       | .015       | .110                 |
| 2NCDCGA21.52WG          | ●       | ●       | .250             | .094      | .0313       | .015       | .110                 |
| 2NCDCGA32.50.5          | ●       | ●       | .375             | .156      | .0078       | .015       | .1732                |
| 2NCDCGA32.50.5WG        | ●       | ●       | .375             | .156      | .0078       | .015       | .1732                |
| 2NCDCGA32.51            | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCDCGA32.51WG          | ●       | ●       | .375             | .156      | .0156       | .015       | .1732                |
| 2NCDCGA32.52            | ●       | ●       | .375             | .156      | .0313       | .015       | .1732                |
| 2NCDCGA32.52WG          | ●       | ●       | .375             | .156      | .0313       | .015       | .1732                |

## VBGA 35° Diamond/5° Relief

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCVBGA221              | ●       | ●       | .250             | .125      | .0156       | .015       | .134                 |
| 2NCVBGA222              | ●       | ●       | .250             | .125      | .0313       | .015       | .134                 |
| 2NCVBGA331              | ●       | ●       | .375             | .1875     | .0156       | .015       | .1732                |
| 2NCVBGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .1732                |

## VCGA 35° Diamond/7° Relief

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| 2NCVCGA331              | ●       | ●       | .375             | .1875     | .0156       | .015       | .1732                |
| 2NCVCGA331HS            | ●       | ●       | .375             | .1875     | .0156       | .015       | .1732                |
| 2NCVCGA331LS            | ●       | ●       | .375             | .1875     | .0156       | .015       | .1732                |
| 2NCVCGA332              | ●       | ●       | .375             | .1875     | .0313       | .015       | .1732                |
| 2NCVCGA332HS            | ●       | ●       | .375             | .1875     | .0313       | .015       | .1732                |

● = USA Stocked item

## ZNEX Inserts for BNZ Boring Bar

| Sumitomo Catalog Number | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Nose Radius | Max D.O.C. | Insert Hole Diameter |
|-------------------------|---------|---------|------------------|-----------|-------------|------------|----------------------|
| NCZNEX620.5             | ●       | ●       | .1875            | .0625     | .0078       | .015       | .090                 |
| NCZNEX621               | ●       | ●       | .1875            | .0625     | .0156       | .015       | .090                 |



## Sumitomo Electric Carbide, Inc.

### Headquarters

1001 Business Center Drive  
Mount Prospect, IL 60056-2181  
P.O. Box 545, Mt. Prospect, IL 60056-0545  
Phone: (800) 950-5202  
Phone: (847) 635-0044  
Fax: (847) 635-7866  
<http://www.sumicarbide.com>

### Detroit Branch

14496 Sheldon Road #230  
Plymouth, MI 48170  
Phone: (800) 239-5177  
Phone: (734) 451-0200  
Fax: (734) 451-5338

### Sumitomo Electric Tool Engineering Center

5637 S. Westridge Drive  
New Berlin, WI 53151  
Phone: (800) 950-5202

### Huntsville Branch

6700 Odyssey Drive  
Suite 211  
Huntsville, AL 35806  
Phone: (256) 971-1203  
Fax: (256) 971-1205

### Indiana Branch

595 S. Emerson Avenue  
Suite 100  
Greenwood, IN 46143  
Phone: (800) 950-5202

### Sumicarbide Canada, Inc.

150 Research Lane  
Unit #210  
Guelph, Ontario N1G 4T2  
Canada  
Phone: (519) 265-6050  
Phone: (844) 211-6050

### Torrance Branch

21241 South Western Avenue  
Suite 120  
Torrance, CA 90501  
Phone: (800) 950-5202  
Fax: (310) 782-0211

