

Coated SUMIBORON^{series} for Hardened Steel

Rev. 3

The Pinnacle of High-efficiency / High-precision / Stable Cutting

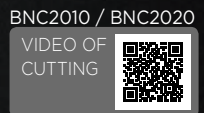


LINEUP

- General-purpose Machining Expansion **BNC2125**
- BNC2020**
- High-precision Machining Expansion **BNC2115**
- BNC2010**
- High-speed Machining Expansion **BNC2105**
- Heavy Interrupted Machining New **BNC2135**

New New Grade for Heavy Interrupted Machining
Introducing **BNC2135**

**Coated SUMIBORON
for Hardened Steel Machining**

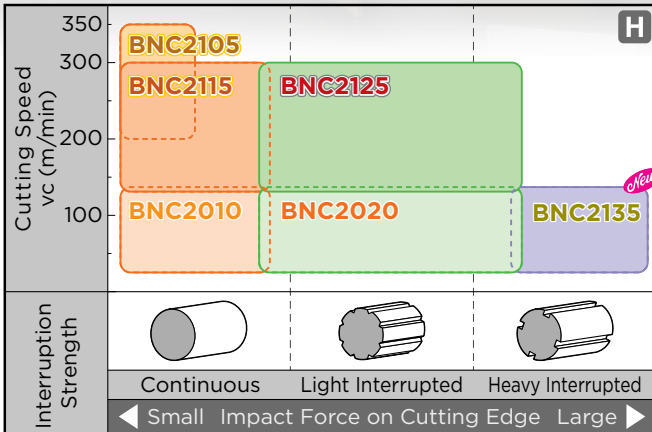


BNC2105 / BNC2115 / BNC2125 BNC2135 / BNC2010 / BNC2020

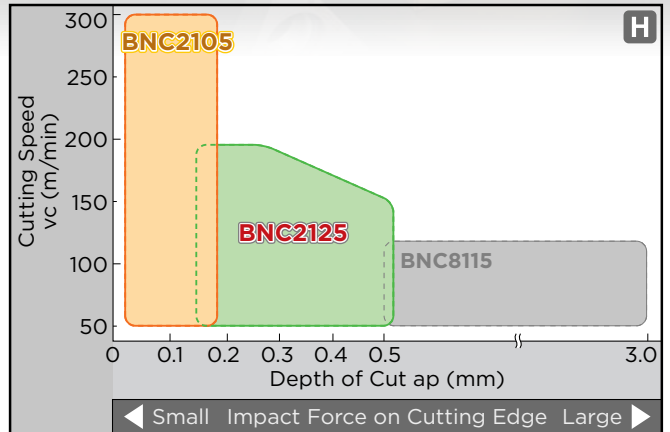
The Pinnacle of High-efficiency / High-precision / Stable Cutting

■ Application Range

● Induction Hardened Steel (S45C/S55C, etc.), Carburised Steel



● Bearing Steel (SUJ2, etc.)



■ Features

BNC2105

Highly wear-resistant grade for high-speed machining
Excellent wear resistant coating and CBN substrate, achieve stable and long tool life in high-speed machining.

BNC2115

The ultimate in high-precision machining of hardened steel
Utilizing a thick coating with exceptional notch wear resistance and a tough CBN substrate to achieve stable and excellent surface finish.

BNC2125

First recommendation for hardened steel machining
Combination of a tough CBN substrate and a thick coating that has a balance of wear resistance and toughness, to achieve stable machining in a wide range of applications.

BNC2135 new

Achieves long and stable tool life in heavy interrupted cutting of hardened steel
Utilising a highly fracture-resistant coating and a high-strength substrate to achieve long and stable tool life in interrupted machining.

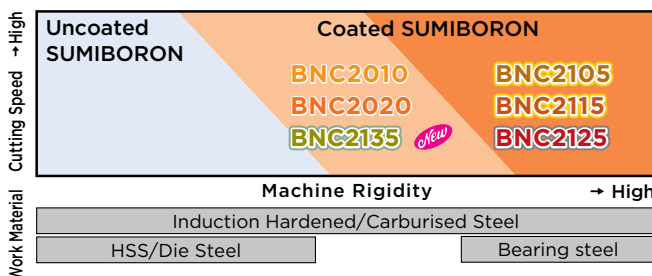
BNC2010

High-precision grade for low- to medium-speed machining
Excellent wear resistant CBN substrate and coating layer, for high-precision machining that requires surface roughness and surface finish accuracy.

BNC2020

General-purpose grade for low- to medium-speed machining
Utilizing an especially high wear resistant coating and a tough CBN substrate. Excellent machining stability in low-rigidity situations and high-load cutting

■ Differentiation



■ Recommended Cutting Conditions

| Grade | Cutting Speed vc (m/min) | Feed Rate f (mm/rev) | Depth of Cut ap (mm) |
|----------------|--------------------------|----------------------|----------------------|
| | Min. - Optimum -Max. | Min. - Optimum -Max. | Min. - Optimum -Max. |
| BNC2105 | 150 - 200 - 350 | 0.03 - 0.10 - 0.15 | 0.03 - 0.15 - 0.20 |
| BNC2115 | 110 - 180 - 300 | 0.03 - 0.10 - 0.20 | 0.03 - 0.20 - 0.35 |
| BNC2125 | 110 - 160 - 300 | 0.05 - 0.20 - 0.40 | 0.05 - 0.30 - 0.50 |
| BNC2135 | 50 - 100 - 150 | 0.03 - 0.10 - 0.20 | 0.03 - 0.20 - 0.30 |
| BNC2010 | 50 - 140 - 180 | 0.03 - 0.10 - 0.20 | 0.03 - 0.20 - 0.35 |
| BNC2020 | 50 - 120 - 180 | 0.03 - 0.20 - 0.40 | 0.05 - 0.30 - 0.50 |

■ CBN Substrate and Coating Structure

BNC2105 High-precision Machining (High-speed)
Coating Thickness: 3µm

Thick layer of super multi-layered ultra-fine TiAlBN coating with high strength and high hardness coupled with a highly thermal- and wear-resistant substrate to maintain excellent finished surface precision

BNC2115 High-precision Machining (Medium- to High-speed)
Coating Thickness: 3µm

Thick layer of high-strength super multi-layered TiAlSiN coating with highly heat-resistant TiCN coating on a tough substrate to achieve excellent surface finish quality

BNC2125 General-purpose Machining (Medium- to High-speed)
Coating Thickness: 3µm

Thick layer of super multi-layered ultra-fine TiAlBN coating with high strength and high hardness coupled with a tough substrate achieves high performance in a wide range of applications

BNC2135 ^{New} Interrupted Machining (Low- to Medium-speed)
Coating Thickness: 1µm

Utilising new coating technology to create fine, high-strength AlCrN and TiAlN layers on a high-strength substrate to achieve high fracture resistance

BNC2010 High-precision Machining (Low- to Medium-speed)
Coating Thickness: 2µm

Stacked high-strength AlCrN multi-layered coating and highly heat-resistant TiCN coating are applied to a highly wear-resistant substrate to maintain excellent surface finish quality

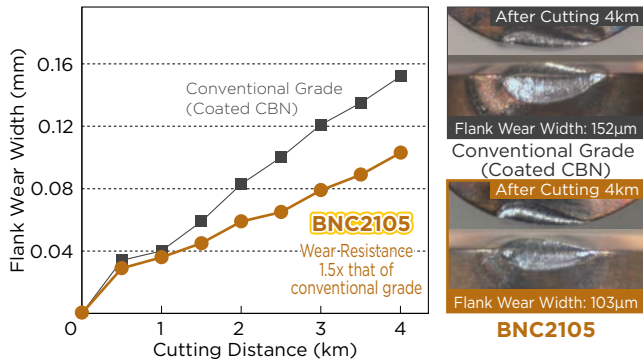
BNC2020 General-purpose Machining (Low- to Medium-speed, Unstable Cutting)
Coating Thickness: 2µm

Application of highly wear-resistant TiAlN coating to a tough substrate dramatically improves machining stability in low-rigidity setups and high-load cutting

BNC2105/BNC2115/BNC2125/BNC2135/BNC2010/BNC2020

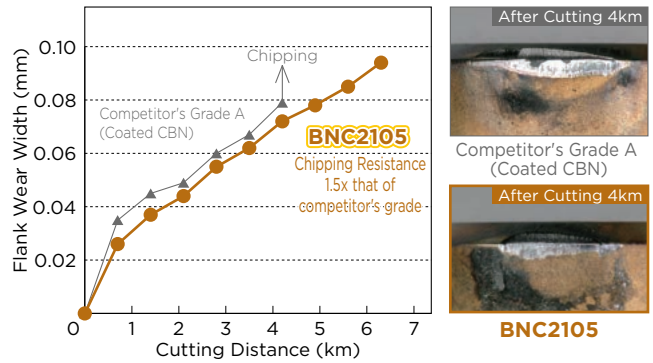
Cutting Performance

BNC2105 Continuous Cutting (Wear Resistance)



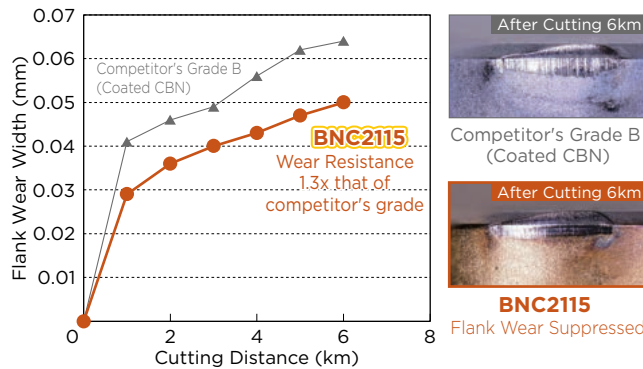
Work Material: SUJ2 (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 200\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.1\text{mm}$ Wet

BNC2105 Continuous Cutting (Wear Resistance)



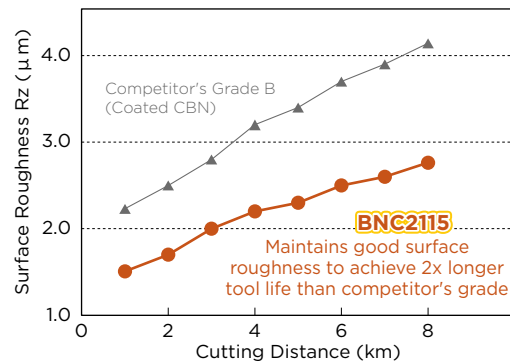
Work Material: SCM415H (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 250\text{m/min}$, $f = 0.06\text{mm/rev}$, $a_p = 0.1\text{mm}$ Wet

BNC2115 Continuous Cutting (Wear Resistance)



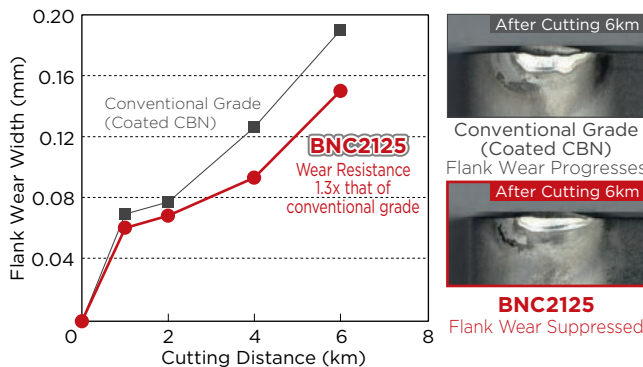
Work Material: SCM415H (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 200\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.15\text{mm}$ Wet

BNC2115 Continuous Cutting (Machined Surface Roughness)



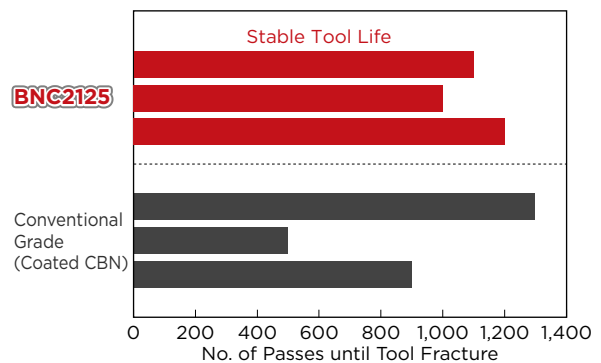
Work Material: SCM415H (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 200\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.15\text{mm}$ Wet

BNC2125 Continuous Cutting (Wear Resistance)



Work Material: SUJ2 (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 150\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.2\text{mm}$ Wet

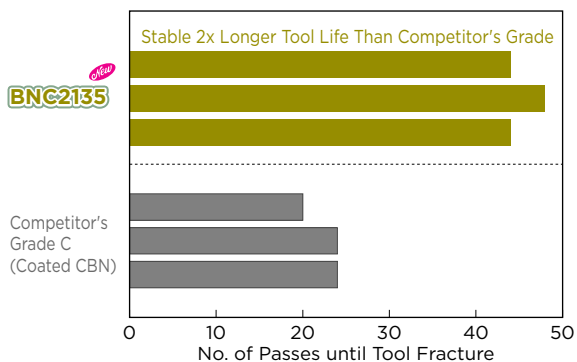
BNC2125 High-load Cutting (Fracture Resistance)



Work Material: SUJ2 (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 150\text{m/min}$, $f = 0.15\text{mm/rev}$, $a_p = 0.5\text{mm}$, 63m/time Wet

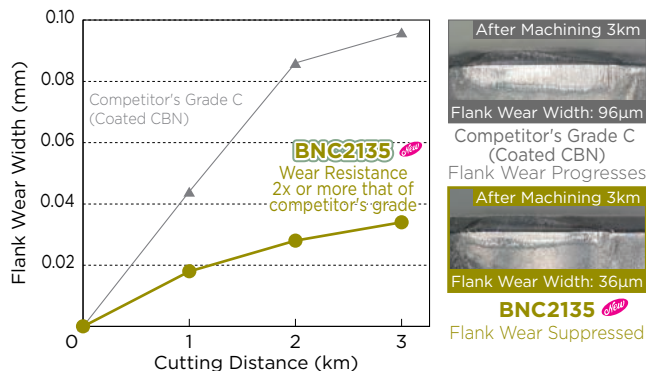
■ Cutting Performance

BNC2135 ^{NEW} Heavy Interrupted Cutting (Fracture Resistance)



Work Material: SCM415H Heavy Intermittent Grooved Facing (58 to 62 HRC)
 Tool Cat. No.: 4NC-CNGA120408
 Cutting Conditions: $v_c = 120\text{m/min}$ $f = 0.1\text{mm/rev}$ $a_p = 0.2\text{mm}$ Wet

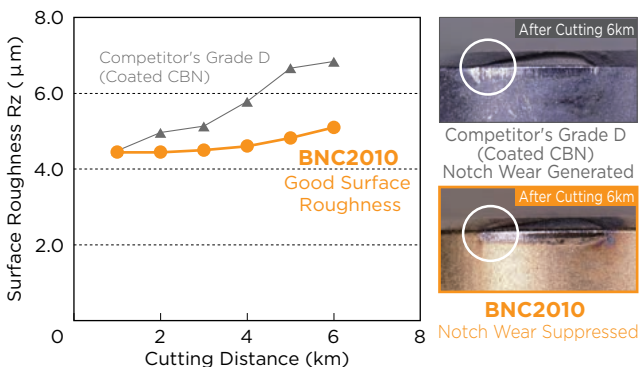
BNC2135 ^{NEW} Continuous Cutting (Wear Resistance)



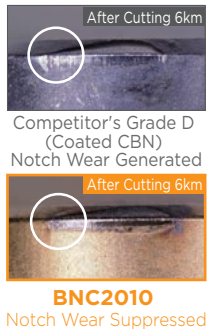
Work Material: SCM415H (58 to 62 HRC)
 Tool Cat. No.: 4NC-CNGA120408
 Cutting Conditions: $v_c = 120\text{m/min}$ $f = 0.1\text{mm/rev}$ $a_p = 0.2\text{mm}$ Wet



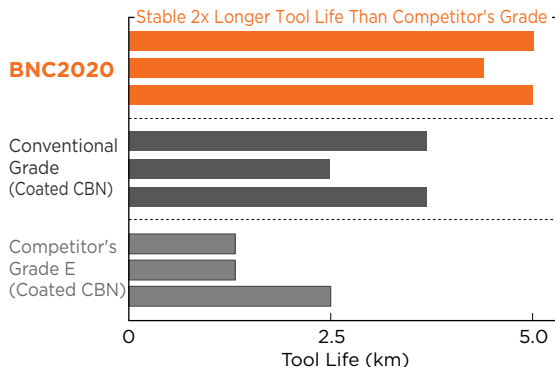
BNC2010 Continuous Cutting (Machined Surface Roughness)



Work Material: SCM415H (58-62HRC)
 Tool Cat. No.: 4NC-DNGA150408
 Cutting Conditions: $v_c = 120\text{m/min}$, $f = 0.14\text{mm/rev}$, $a_p = 0.15\text{mm}$ Wet



BNC2020 Interrupted Cutting (Fracture Resistance)

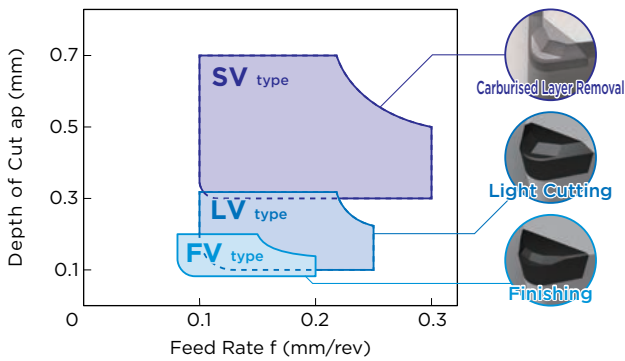


Work Material: SCM415H with 5 grooves (58 to 62HRC)
 Tool Cat. No.: 4NC-CNGA120412
 Cutting Conditions: $v_c = 130\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.6\text{mm}$ Dry

BNC2105/BNC2115/BNC2125/BNC2135/BNC2010/BNC2020

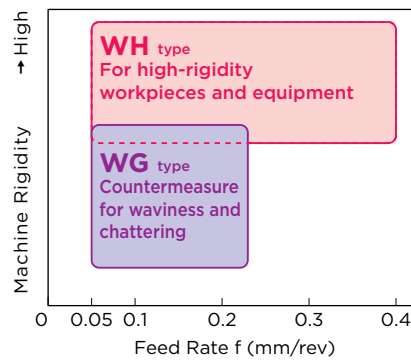
■ One-Use Insert with Chipbreaker BREAK MASTER

● Application Range



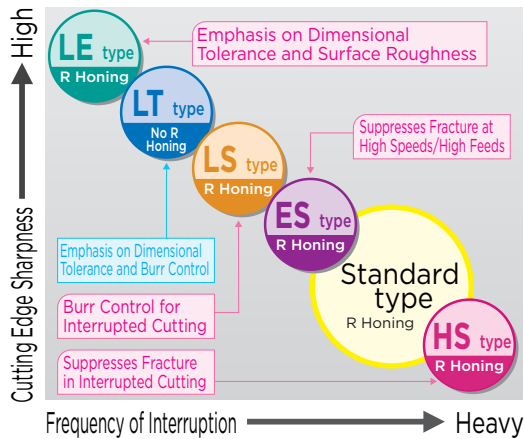
■ One-Use Wiper Insert

● Application Range Precautions when Using Wiper Inserts P12



■ Cutting Edge Treatment Specification

Optimal cutting edge treatment applied to various grades and geometries to avoid cutting edge fracture caused by the heavy loads generated during the machining of high-hardness materials such as hardened steel.



High-precision type **LE** **LT** **LS**

World's smallest class edge treatment for coated CBN in hardened steel machining. Lowers cutting force

Strong-edged type **HS**

Suppresses cutting edge chipping and fracture
Stable tool life in interrupted machining

High-efficiency type **ES**

Suppresses crater wear and its resultant edge chipping
Stable tool life in high-speed, high-feed machining

● Cutting Edge Specification List

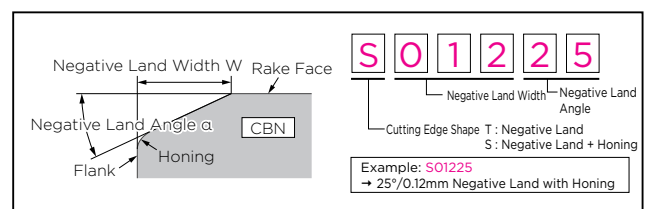
| Work Material | Grade | Neg.-Pos. | Standard | | | | Low Cutting Force L | | | | Strong Edged H | | | | High-efficiency type E | | | | | | |
|----------------|-------------------|-------------------|------------------------------------------------|----------|------|-----------|----------------------------|------------------------------------------------|----------|------|-----------------------|-----------|------------------------------------------------|----------|-------------------------------|-----------|-----------|------------------------------------------------|----------|------|--------|
| | | | Cutting Edge Specification Identification Code | α | W | Honing | Notation | Cutting Edge Specification Identification Code | α | W | Honing | Notation | Cutting Edge Specification Identification Code | α | W | Honing | Notation | Cutting Edge Specification Identification Code | α | W | Honing |
| Hardened Steel | BNC2105 | Negative/Positive | S01225 | 25° | 0.12 | Yes | LS | S00515 | 15° | 0.05 | Yes | HS | S01730 | 30° | 0.17 | Yes | ES | S00535 | 35° | 0.05 | Yes |
| | BNC2115 | Negative/Positive | S01225 | 25° | 0.12 | Yes | LS | S00515 | 15° | 0.05 | Yes | HS | S01730 | 30° | 0.17 | Yes | ES | S00535 | 35° | 0.05 | Yes |
| | BNC2125 | Negative/Positive | S01225 | 25° | 0.12 | Yes | LS | S00515 | 15° | 0.05 | Yes | HS | S02735 | 35° | 0.27 | Yes | ES | S00535 | 35° | 0.05 | Yes |
| | BNC2135 | Negative/Positive | S01225 | 25° | 0.12 | Yes | LS | S00515 | 15° | 0.05 | Yes | HS | S01735 | 35° | 0.17 | Yes | ES | S00535 | 35° | 0.05 | Yes |
| | BNC2010 | Negative/Positive | S01225 | 25° | 0.12 | Yes | LE | - | 0° | 0 | Yes | HS | S01730 | 30° | 0.17 | Yes | ES | S00535 | 35° | 0.05 | Yes |
| BNC2020 | Negative/Positive | S01225 | 25° | 0.12 | Yes | LT | T00515 | 15° | 0.05 | No | HS | S02735 | 35° | 0.27 | Yes | ES | S00535 | 35° | 0.05 | Yes | |

● Cutting Edge Specification of Wiper/Chipbreaker Inserts (Common)

| Type | Notation | Neg.-Pos. | Cutting Edge Specification Identification Code | α | W | Honing |
|--------------------------|-------------|-------------------|------------------------------------------------|----------|------|--------|
| Wiper Inserts | WG | Negative/Positive | S01215 | 15° | 0.12 | Yes |
| | WH | Negative/Positive | S01215 | 15° | 0.12 | Yes |
| Inserts with Chipbreaker | N-FV | Negative/Positive | - | 0° | 0 | Yes |
| | N-LV | Negative/Positive | S00535 | 35° | 0.05 | Yes |
| | N-SV | Negative | S01235 | 35° | 0.12 | Yes |

Precautions when Using Wiper Inserts P12

● Cutting Edge Specification Identification Code



Stock Table: Negative type Multi-Cornered, One-Use Inserts

Negative Triangular type

| Appearance | Cat. No. | Stock | | | | | Dimensions (mm) | | | | | | |
|------------|--------------------|---------|---------|---------|---------|---------|-----------------|----------------------|-------------------------|------------------|-----------|-----------|---------------|
| | | BNC2105 | BNC2115 | BNC2125 | BNC2135 | BNC2010 | BNC2020 | No. of Cutting Edges | CBN Cutting Edge Length | Inscribed Circle | Thickness | Hole Dia. | Corner Radius |
| | 3NC-TNGA160404 | | | | | | | 3 | 2.2 | | | | 0.4 |
| | 3NC-TNGA160408 | | | | | | | 3 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 3NC-TNGA160412 | | | | | | | 3 | 1.9 | | | | 1.2 |
| | 3NC-TNGA160416 *1 | | | | | | | 3 | 3.3 | | | | 1.6 |
| | 3NC-TNGA160420 *1 | | | | | | | 3 | 3.0 | 9.525 | 4.76 | 3.81 | 2.0 |
| | 3NC-TNGA160424 *1 | | | | | | | 3 | 2.7 | | | | 2.4 |
| | 6NC-TNGA160402 | | | | | | | 6 | 2.3 | | | | 0.2 |
| | 6NC-TNGA160404 | | | | | | | 6 | 2.2 | 9.525 | 4.76 | 3.81 | 0.4 |
| | 6NC-TNGA160408 | | | | | | | 6 | 1.9 | | | | 0.8 |
| | 6NC-TNGA160412 | | | | | | | 6 | 1.9 | | | | 1.2 |
| | 6NC-TNGA160416 *1 | | | | | | | 6 | 3.3 | | | | 1.6 |
| | 6NC-TNGA160420 *1 | | | | | | | 6 | 3.0 | 9.525 | 4.76 | 3.81 | 2.0 |
| | 6NC-TNGA160424 *1 | | | | | | | 6 | 2.7 | | | | 2.4 |
| | 6NC-TNGG160404N-FV | | | | | | | 6 | 2.2 | | | | 0.4 |
| | 6NC-TNGG160408N-FV | | | | | | | 6 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 6NC-TNGG160412N-FV | | | | | | | 6 | 1.9 | | | | 1.2 |
| | 6NC-TNGG160404N-LV | | | | | | | 6 | 2.2 | | | | 0.4 |
| | 6NC-TNGG160408N-LV | | | | | | | 6 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 6NC-TNGG160412N-LV | | | | | | | 6 | 1.9 | | | | 1.2 |
| | 6NC-TNGG160404N-SV | | | | | | | 6 | 2.2 | | | | 0.4 |
| | 6NC-TNGG160408N-SV | | | | | | | 6 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 6NC-TNGG160412N-SV | | | | | | | 6 | 1.9 | | | | 1.2 |
| | 3NC-TNGA160404LE | | | | | | | 3 | 2.2 | | | | 0.4 |
| | 3NC-TNGA160408LE | | | | | | | 3 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 3NC-TNGA160412LE | | | | | | | 3 | 1.9 | | | | 1.2 |
| | 3NC-TNGA160402LT | | | | | | | 3 | 2.3 | | | | 0.2 |
| | 3NC-TNGA160404LT | | | | | | | 3 | 2.2 | 9.525 | 4.76 | 3.81 | 0.4 |
| | 3NC-TNGA160408LT | | | | | | | 3 | 1.9 | | | | 0.8 |
| | 3NC-TNGA160412LT | | | | | | | 3 | 1.9 | | | | 1.2 |
| | 3NC-TNGA160402LS | | | | | | | 3 | 2.3 | | | | 0.2 |
| | 3NC-TNGA160404LS | | | | | | | 3 | 2.2 | 9.525 | 4.76 | 3.81 | 0.4 |
| | 3NC-TNGA160408LS | | | | | | | 3 | 1.9 | | | | 0.8 |
| | 3NC-TNGA160412LS | | | | | | | 3 | 1.9 | | | | 1.2 |
| | 6NC-TNGA160404HS | | | | | | | 6 | 2.2 | | | | 0.4 |
| | 6NC-TNGA160408HS | | | | | | | 6 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 6NC-TNGA160412HS | | | | | | | 6 | 1.9 | | | | 1.2 |
| | 6NC-TNGA160404ES | | | | | | | 6 | 2.2 | | | | 0.4 |
| | 6NC-TNGA160408ES | | | | | | | 6 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 6NC-TNGA160412ES | | | | | | | 6 | 1.9 | | | | 1.2 |

*1 For use with SUMIBORON Special Holders for High-Efficiency Machining.

Negative Trigon type

| Appearance | Cat. No. | Stock | | | | | Dimensions (mm) | | | | | | |
|------------|------------------|---------|---------|---------|---------|---------|-----------------|----------------------|-------------------------|------------------|-----------|-----------|---------------|
| | | BNC2105 | BNC2115 | BNC2125 | BNC2135 | BNC2010 | BNC2020 | No. of Cutting Edges | CBN Cutting Edge Length | Inscribed Circle | Thickness | Hole Dia. | Corner Radius |
| | 6NC-WNGA080404 | | | | | | | 6 | 2.4 | | | | 0.4 |
| | 6NC-WNGA080408 | | | | | | | 6 | 2.3 | 12.7 | 4.76 | 5.16 | 0.8 |
| | 6NC-WNGA080412 | | | | | | | 6 | 2.2 | | | | 1.2 |
| | 6NC-WNGA080408WG | | | | | | | 6 | 2.2 | 12.7 | 4.76 | 5.16 | 0.8 |
| | 6NC-WNGA080408WH | | | | | | | 6 | 2.3 | 12.7 | 4.76 | 5.16 | 0.8 |
| | 3NC-WNGA080408LT | | | | | | | 3 | 2.3 | 12.7 | 4.76 | 5.16 | 0.8 |
| | 3NC-WNGA080408LS | | | | | | | 3 | 2.3 | 12.7 | 4.76 | 5.16 | 0.8 |
| | 6NC-WNGA080408HS | | | | | | | 6 | 2.3 | 12.7 | 4.76 | 5.16 | 0.8 |

Stock Table: For SUMIBORON Small Hole Boring Bars

Insert for BNZ type

| Appearance | Cat. No. | Stock | | Dimensions (mm) | | | | |
|------------|-----------------|---------|---------|------------------|-----------|-----------|---------------|-----|
| | | BNC2010 | BNC2020 | Inscribed Circle | Thickness | Hole Dia. | Corner Radius | |
| | NC-ZNEX040102LE | | | 1 | 4.76 | 1.59 | 2.3 | 0.2 |
| | NC-ZNEX040104LE | | | 1 | 4.76 | 1.59 | 2.3 | 0.4 |
| | NC-ZNEX040102LT | | | 1 | 4.76 | 1.59 | 2.3 | 0.2 |
| | NC-ZNEX040104LT | | | 1 | 4.76 | 1.59 | 2.3 | 0.4 |

Part Number Suffix: LE: Low Resistance + With Honing, LT: Low Resistance + Negative Land
For details on applicable holders for the above inserts, please refer to the general catalog.

Negative 35° Diamond type

| Appearance | Cat. No. | Stock | | | | | Dimensions (mm) | | | | | | |
|------------|--------------------|---------|---------|---------|---------|---------|-----------------|----------------------|-------------------------|------------------|-----------|-----------|---------------|
| | | BNC2105 | BNC2115 | BNC2125 | BNC2135 | BNC2010 | BNC2020 | No. of Cutting Edges | CBN Cutting Edge Length | Inscribed Circle | Thickness | Hole Dia. | Corner Radius |
| | 2NC-VNGA160404 | | | | | | | 2 | 2.8 | | | | 0.4 |
| | 2NC-VNGA160408 | | | | | | | 2 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 2NC-VNGA160412 | | | | | | | 2 | 1.7 | | | | 1.2 |
| | 4NC-VNGA160402 | | | | | | | 4 | 3.3 | | | | 0.2 |
| | 4NC-VNGA160404 | | | | | | | 4 | 2.8 | 9.525 | 4.76 | 3.81 | 0.4 |
| | 4NC-VNGA160408 | | | | | | | 4 | 1.9 | | | | 0.8 |
| | 4NC-VNGA160412 | | | | | | | 4 | 1.7 | | | | 1.2 |
| | 4NC-VNGG160404N-FV | | | | | | | 4 | 2.8 | | | | 0.4 |
| | 4NC-VNGG160408N-FV | | | | | | | 4 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 4NC-VNGG160404N-LV | | | | | | | 4 | 2.8 | | | | 0.4 |
| | 4NC-VNGG160408N-LV | | | | | | | 4 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 2NC-VNGA160402LT | | | | | | | 2 | 3.3 | | | | 0.2 |
| | 2NC-VNGA160404LT | | | | | | | 2 | 2.8 | 9.525 | 4.76 | 3.81 | 0.4 |
| | 2NC-VNGA160408LT | | | | | | | 2 | 1.9 | | | | 0.8 |
| | 2NC-VNGA160412LT | | | | | | | 2 | 1.7 | | | | 1.2 |
| | 2NC-VNGA160402LS | | | | | | | 2 | 3.3 | | | | 0.2 |
| | 2NC-VNGA160404LS | | | | | | | 2 | 2.8 | 9.525 | 4.76 | 3.81 | 0.4 |
| | 2NC-VNGA160408LS | | | | | | | 2 | 1.9 | | | | 0.8 |
| | 2NC-VNGA160412LS | | | | | | | 2 | 1.7 | | | | 1.2 |
| | 4NC-VNGA160404HS | | | | | | | 4 | 2.8 | | | | 0.4 |
| | 4NC-VNGA160408HS | | | | | | | 4 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 4NC-VNGA160412HS | | | | | | | 4 | 1.7 | | | | 1.2 |
| | 4NC-VNGA160404ES | | | | | | | 4 | 2.8 | | | | 0.4 |
| | 4NC-VNGA160408ES | | | | | | | 4 | 1.9 | 9.525 | 4.76 | 3.81 | 0.8 |
| | 4NC-VNGA160412ES | | | | | | | 4 | 1.7 | | | | 1.2 |

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item), Blank: Made-to-order item, — mark: Not available

Detailed Cutting Edge Specifications P6

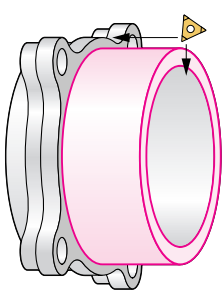
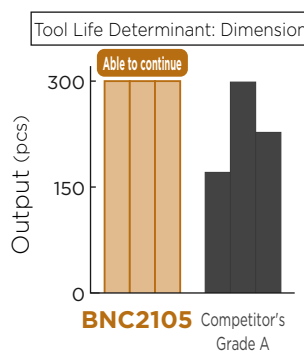
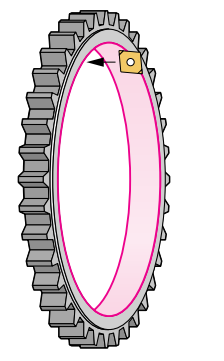
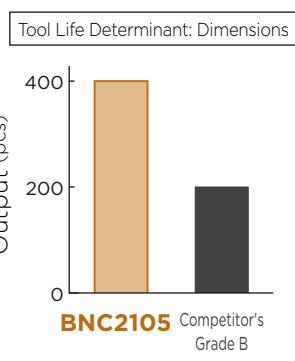
Part Number Suffix Code

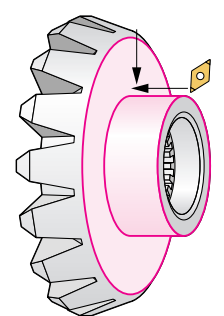
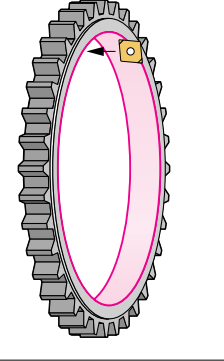
Precautions when Using Wiper Inserts P12

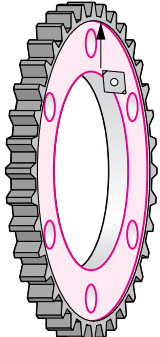
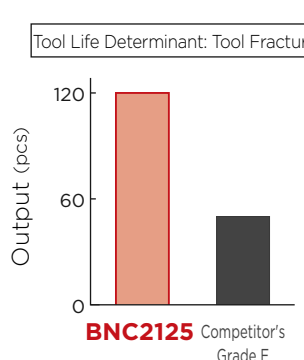
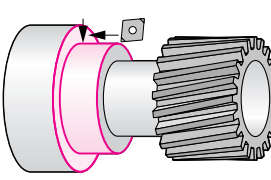
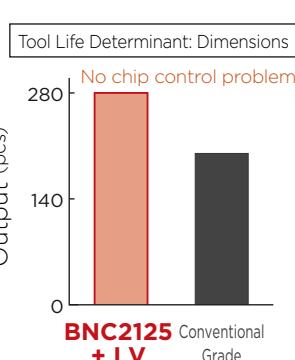
| Type | Code | Applications | Type | Code | Cutting Edge Treatment Specification |
|------------------|------|--------------------------|----------------------|------|-----------------------------------------------|
| Wiper Insert | WG | Low-Feed | Standard type | LE | (With) Honing |
| | WH | High-Feed | | LT | Low Resistance + With Honing |
| With Chipbreaker | FV | Finishing | High-precision type | LT | Low Resistance + Negative Land |
| | LV | Light Cutting | | LS | Low Resistance + Negative Land + With Honing |
| | SV | Carburized Layer Removal | | ES | Strong Edge + Negative Land + With Honing |
| | | | High-efficiency type | ES | High Efficiency + Negative Land + With Honing |

BNC2105/BNC2115/BNC2125/BNC2135/BNC2010/BNC2020

Application Examples of BNC2105 / BNC2115 / BNC2125

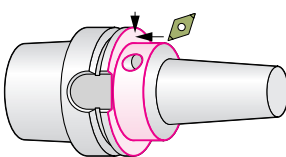
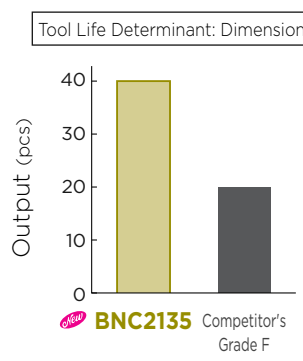
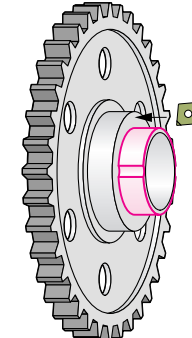
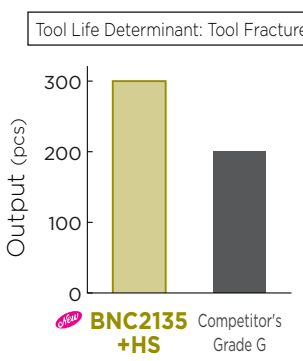
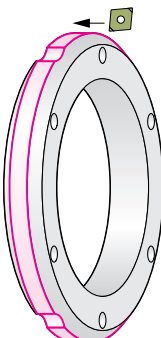
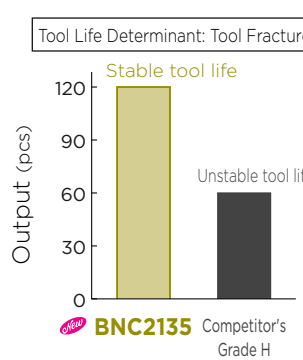
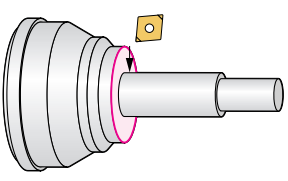
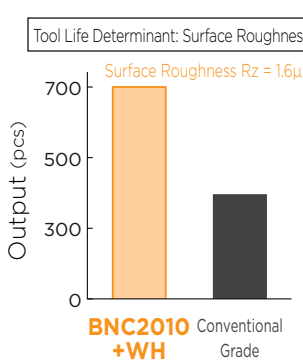
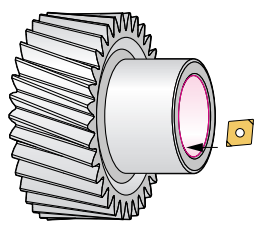
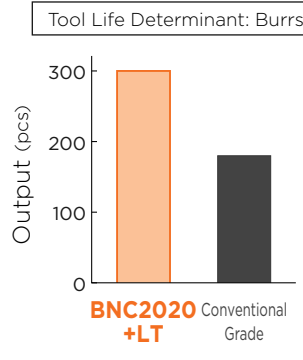
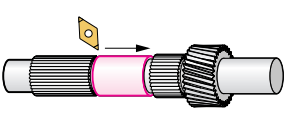
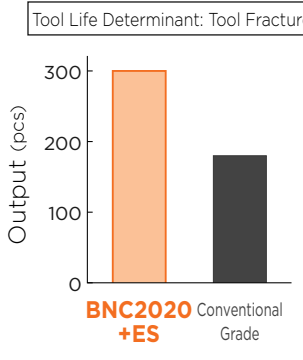
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| <p>SUJ2 Bearing Steel Hub (60HRC) BNC2105 H</p> <p>BNC2105 suppresses fractures due to crater wear and realises stable machining</p>  <p>Tool Life Determinant: Dimensions</p>  <p>Output (pcs)</p> <p>BNC2105 Able to continue Competitor's Grade A</p> <p>Tool: 6NC-TNGA160408 (BNC2105) Cutting Conditions: $vc = 230\text{m/min}$, $f = 0.12\text{mm/rev}$, $ap = 0.10\text{mm}$ Wet</p> | <p>Scr420H Hardened Steel Ring Gear (60HRC) BNC2105 H</p> <p>BNC2105 maintains excellent wear resistance for a long time compared to competitor's coated CBN</p>  <p>Tool Life Determinant: Dimensions</p>  <p>Output (pcs)</p> <p>BNC2105 Competitor's Grade B</p> <p>Tool: 4NC-CNGA120412 (BNC2105) Cutting Conditions: $vc = 200\text{m/min}$, $f = 0.10\text{mm/rev}$, $ap = 0.10\text{mm}$ Wet</p> |
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| <p>SCM415H Hardened Steel Gear (60HRC) BNC2115 H</p> <p>Compared to competitor's coated CBN, BNC2115 reduces flank wear width by 30%, able to continue with good surface roughness</p>  <p>Tool Life Determinant: Surface Roughness</p>  <p>Surface roughness (Rz) (μm)</p> <p>Tool Life</p> <p>BNC2115 Able to continue Competitor's Grade C (After machining 280 units)</p> <p>Tool: 4NC-DNGA150404 (BNC2115) Cutting Conditions: $vc = 160\text{m/min}$, $f = 0.10\text{mm/rev}$, $ap = 0.25\text{mm}$ Wet</p> | <p>Scr440H Hardened Steel Ring Gear (60HRC) BNC2115 H</p> <p>BNC2115 WH type wiper insert maintains excellent surface roughness for a long time compared to competitor's coated CBN (wiper insert)</p>  <p>Tool Life Determinant: Surface Roughness</p>  <p>Output (pcs)</p> <p>BNC2115 +WH Competitor's Grade D</p> <p>Tool: 2NC-CCGW09T308WH (BNC2115) Cutting Conditions: $vc = 150\text{m/min}$, $f = 0.12\text{mm/rev}$, $ap = 0.10\text{mm}$ Wet</p> |
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| <p>Scr420H Hardened Steel Ring Gear (60HRC) BNC2125 H</p> <p>BNC2125 suppresses fractures due to crater wear and realises at least double the tool life</p>  <p>Tool Life Determinant: Tool Fracture</p>  <p>Output (pcs)</p> <p>BNC2125 Competitor's Grade E</p> <p>Tool: 4NC-CNGA120412 (BNC2125) Cutting Conditions: $vc = 150\text{m/min}$, $f = 0.2\text{mm/rev}$, $ap = 0.3\text{mm}$ Dry</p> | <p>S15C Hardened Steel Sun Gear (60HRC) BNC2125 H</p> <p>BNC2125 BREAK MASTER LV type offers long tool life and resolves chip control problems</p>  <p>Tool Life Determinant: Dimensions</p>  <p>Output (pcs)</p> <p>BNC2125 + LV No chip control problem Conventional Grade</p> <p>Tool: 4NC-CNGG120408N-LV (BNC2125) Cutting Conditions: $vc = 190\text{m/min}$, $f = 0.13\text{mm/rev}$, $ap = 0.30\text{mm}$ Wet</p> |
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BNC2105/BNC2115/BNC2125/BNC2135/BNC2010/BNC2020

Application Examples of BNC2135 / BNC2010 / BNC2020

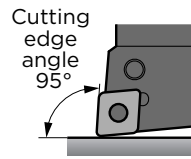
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| <p>SCM420H Hardened Steel Hydro Chuck (58HRC) BNC2135 H</p> <p>BNC2135 has better fracture resistance than competitor's coated CBN, achieving longer tool life</p>  <p>Tool Life Determinant: Dimensions</p>  <p>Output (pcs)</p> <p>BNC2135 Competitor's Grade F</p> <p>Tool: 4NC-DNGA150404 (BNC2135) Cutting Conditions: $vc = 100\text{m/min}$ $f = 0.1\text{ mm/rev}$ $ap = 0.05\text{mm}$ Wet</p> | <p>SCr420H Hardened Steel Gear (60HRC) BNC2135 H</p> <p>BNC2135 with strong HS type cutting edge treatment suppresses fractures in heavy interrupted cutting, improving tool life</p>  <p>Tool Life Determinant: Tool Fracture</p>  <p>Output (pcs)</p> <p>BNC2135 +HS Competitor's Grade G</p> <p>Tool: 4NC-CNGA120404HS (BNC2135) Cutting Conditions: $vc = 100\text{m/min}$ $f = 0.2\text{mm/rev}$ $ap = 0.1\text{ mm}$ Dry</p> |
| <p>S55C Hardened Steel Clutch Component (55HRC) BNC2135 H</p> <p>BNC2135 exhibits stable machining in addition to longer tool life by suppressing fractures</p>  <p>Tool Life Determinant: Tool Fracture</p>  <p>Output (pcs)</p> <p>BNC2135 Competitor's Grade H</p> <p>Tool: 4NC-CNGA120408 (BNC2135) Cutting Conditions: $vc = 50\text{m/min}$ $f = 0.1\text{ mm/rev}$ $ap = 0.1\text{mm}$ Dry</p> | <p>S45C Hardened Steel CVJ Outer Race (60HRC) BNC2010 H</p> <p>BNC2010 WH type wiper insert maintains excellent surface roughness for a long time</p>  <p>Tool Life Determinant: Surface Roughness</p>  <p>Output (pcs)</p> <p>BNC2010 +WH Conventional Grade</p> <p>Surface Roughness $Rz = 1.6\mu\text{m}$</p> <p>Tool: 2NC-CNGA120412WH (BNC2010) Cutting Conditions: $vc = 150\text{m/min}$, $f = 0.2\text{mm/rev}$, $ap = 0.2\text{mm}$ Dry</p> |
| <p>SCr420H Hardened Steel Gear (60HRC) BNC2020 H</p> <p>BNC2020 with high-precision LT type cutting edge treatment suppresses burrs and improves tool life</p>  <p>Tool Life Determinant: Burrs</p>  <p>Output (pcs)</p> <p>BNC2020 +LT Conventional Grade</p> <p>Tool: 2NC-CNGA120408LT (BNC2020) Cutting Conditions: $vc = 100\text{m/min}$, $f = 0.10\text{mm/rev}$, $ap = 0.15\text{mm}$ Dry</p> | <p>SCr420H Hardened Steel Shaft (60HRC) BNC2020 H</p> <p>BNC2020 with high-efficiency ES type cutting edge treatment suppresses fractures due to crater wear and offers long tool life</p>  <p>Tool Life Determinant: Tool Fracture</p>  <p>Output (pcs)</p> <p>BNC2020 +ES Conventional Grade</p> <p>Tool: 4NC-DNGA150408ES (BNC2020) Cutting Conditions: $vc = 150\text{m/min}$, $f = 0.15\text{mm/rev}$, $ap = 0.10\text{mm}$ Dry</p> |

■ Precautions when Using Wiper Inserts

When using CNGA type / CCGW type / WNGA type Wiper Inserts

Use a holder with a cutting angle of 95°. Machining program **modification is required**.

CNGA, CCGW and WNGA type wiper inserts do not comply with the ISO standard profiles. Correct the cutting edge position (tool offset) as explained on the right.



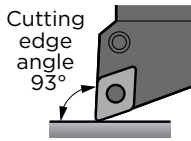
Cutting Edge Position Correction for CNGA type / CCGW type / WNGA type (WG type / WH type)

| Corner Radius | Type | X-axis direction | Z-axis direction |
|---------------|---------|------------------|------------------|
| R0.4 | WG type | -0.02 | -0.02 |
| | WH type | -0.06 | -0.06 |
| R0.8 / R1.2 | WG type | -0.01 | -0.01 |
| | WH type | -0.06 | -0.06 |

When using DNGA type / DCGW type Wiper Inserts

Use a holder with a cutting angle of 93°. Machining program **modification is required**.

DNGA and DCGW type wiper inserts do not comply with the ISO standard profiles. Correct the cutting edge position (tool offset) as explained on the right.



Cutting Edge Position Correction for DNGA type / DCGW type (WG type / WH type)

| Corner Radius | Type | X-axis direction | Z-axis direction |
|---------------|---------|------------------|------------------|
| R0.4 | WG type | -0.17 | -0.01 |
| | WH type | -0.70 | -0.06 |
| R0.8 | WG type | -0.05 | 0 |
| | WH type | -0.58 | -0.05 |

Note: Unlike other contour shapes, the DNGA/DCGW types can only exhibit wiper effect for external and internal diameter machining, and cannot be used for facing.

< SAFETY NOTES >



- Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.

- Please handle with care as this product has sharp edges.
- Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.

- When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.

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<https://www.sumitool.com/global>