

NEW CHIPBREAKER SERIES

# PCBN

Complete range on PCBN turning inserts

TURNING



# INTRODUCTION TO PCBN

PCBN (Polycrystalline Cubic Boron Nitride) is not found in nature, it is a synthetic material which is the result of an high temperature and high pressure process (HTHP). When PCBN tips are brazed onto a carbide insert, a powerful cutting tool is created; when the insert is made entirely of PCBN, performance reaches an even higher level.

PCBN is among the hardest materials known, exhibiting hardness characteristics nearly equivalent to those of diamond. Designed for demanding machining applications, PCBN provides exceptional precision, stability, and efficiency, making it an optimal choice for high-volume manufacturing.

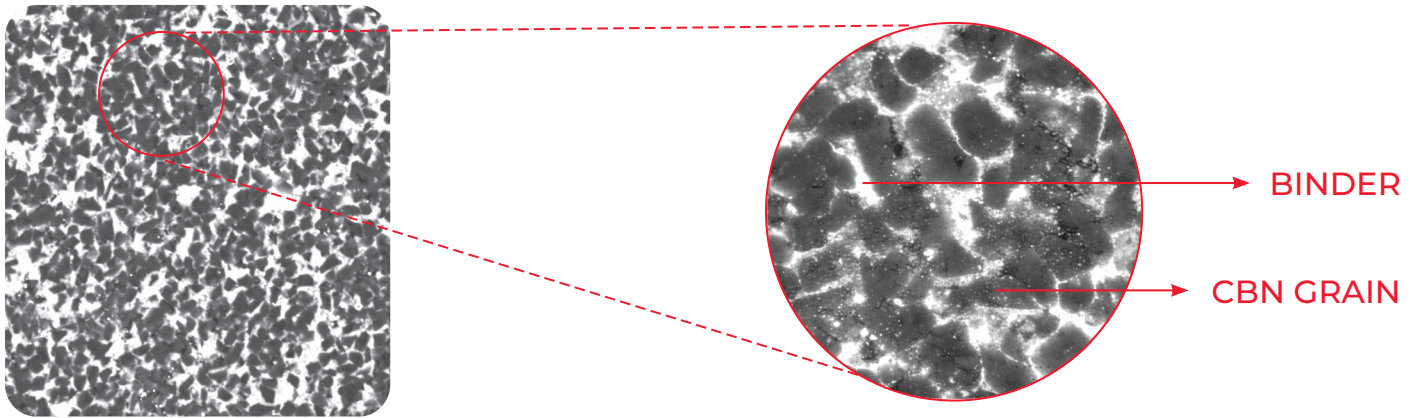
## KEY BENEFITS

- **Exceptional wear resistance**, supporting high-speed machining in both dry and wet conditions.
- **Low reactivity with ferrous alloys**, preventing chemical wear and diffusion-related tool failure.
- **Ideal for hard materials** such as hardened steels, cast irons and superalloys.
- **Long tool life due to resistance to** high cutting temperatures and forces.
- **Stable performance under** extreme mechanical loads.



# INTRODUCTION TO PCBN

## What is PCBN?



### CBN CONTENT

**Low CBN content** - better for continuous machining, high heat / high speed applications.

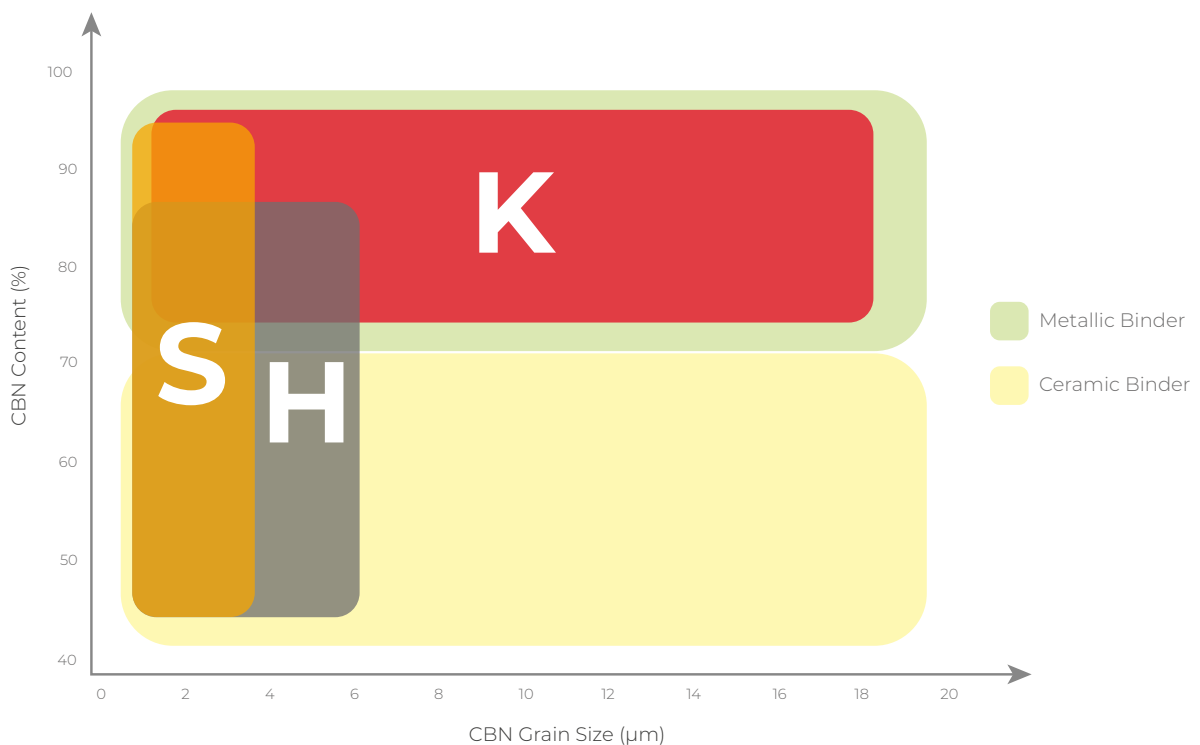
**High CBN content** - better for interrupted or heavy cuts, where impact resistance or abrasion resistance is required.

### CBN GRAIN SIZE

The performance of PCBN inserts is strongly dependent on the average CBN grain size.

**Coarse grain** - high thermal and chemical stability, ideal for continuous turning and finishing operations.

**Fine grain** - higher toughness and shock resistance for interrupted operations.

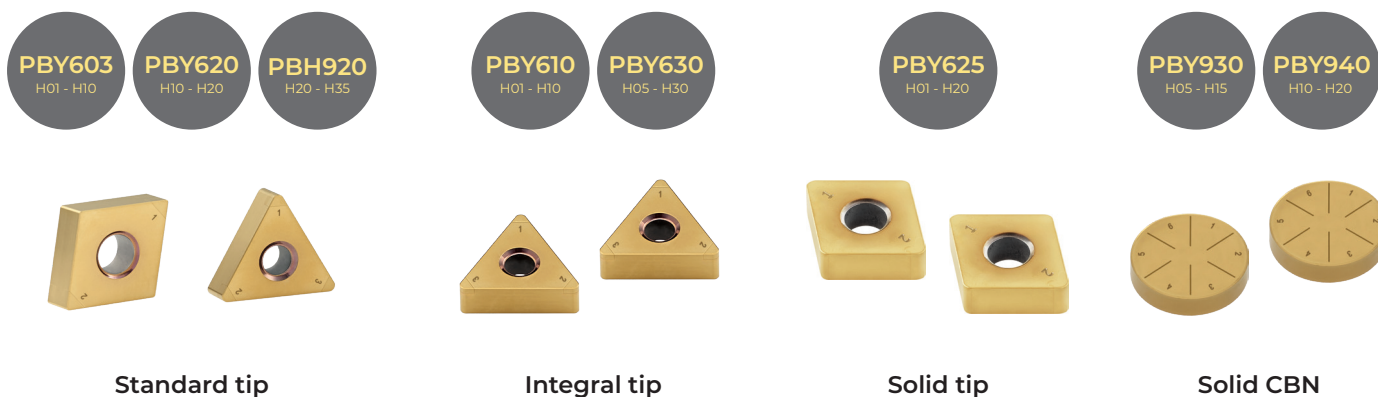


# PCBN GRADES SELECTION

PCBN inserts excel in the finishing and semi-finishing of hardened steels (45-68 HRC) as well as cast iron and heat-resistant super alloys (HRSA).

## Grades description

| Grade                | Code | Characteristics   | Application  |
|----------------------|------|---|--|
| PBY603               | Y5   | Low PCBN content grade with medium grain size and ceramic binder. Great wear and abrasion resistance.   | <ul style="list-style-type: none"> <li>For continuously and lightly interrupted cutting of Hardened Steel (H01-H10);</li> <li>Finishing abrasive high strength cast irons;</li> <li>Can also be used to machine HRSA (S01-S10);</li> </ul> |
| <b>NEW</b><br>PBY610 | 2H   | Low PCBN content grade with medium grain size which provides combination of wear resistance and thermal stability.                                      | <ul style="list-style-type: none"> <li>For continuous or lightly interrupted turning of common hardened steels (H10-H20).</li> </ul>   |
| PBY620               | Y4   | Low PCBN content grade with medium grain size which provides enhanced crater and flank wear resistance with an excellent balance of toughness.          | <ul style="list-style-type: none"> <li>For moderately to heavily interrupted turning of all hardened steels (H10-H20).</li> </ul>  |
| PBY625               | 4C   | Low PCBN content grade with very fine grain size for improved toughness.  | <ul style="list-style-type: none"> <li>Heavily interrupted machining of hardened steels.</li> </ul>  |
| <b>NEW</b><br>PBY630 | 3D   | Low-content PCBN grade with medium grain size, engineered for extended tool life across both general-purpose and high-efficiency machining applications | <ul style="list-style-type: none"> <li>For continuous or interrupted turning of common hardened steels (H10-H20).</li> </ul>   |
| PBH920               | S4   | High PCBN content with excellent abrasion resistance.   | <ul style="list-style-type: none"> <li>For machining all types of cast iron (K01-K30);</li> <li>First choice for machining ferrous powder metals;</li> <li>Can also be used to machine HRSA (S20-S30);</li> </ul>                          |
| PBY930               | W3   | High abrasive wear resistance; High impact toughness;   | <ul style="list-style-type: none"> <li>For Cast Iron with high Niquel and Chrome content (pumps and engine blocks).</li> </ul>   |
| PBY940               | W4   | High fracture toughness; High thermal conductivity;   | <ul style="list-style-type: none"> <li>For Alloy steels with high content of Cr, grey cast irons and hardened steels with Ni.</li> </ul>   |



# PCBN GRADES SELECTION

Our laser and grinding machining technologies can reach a wide range of tailor-made solutions. The chip breakers can be customized according to our customer's needs and still maintain with a high cutting edge quality.

## PCBN recommended cutting data

| Workpiece material  | Material | Recommend grade for PCBN |        |        |        |          |          | Vc (m/min)  |            |
|---|----------|--------------------------|--------|--------|--------|----------|----------|-------------|------------|
|   |          | PBH920                   | PBY603 | PBY610 | PBY620 | PBY630   | PBY625   |             |            |
| Hardened Steel (HRC 45-68)<br>Tool-Steel, Case Hardened Steel,<br>Continuous Cut<br>(recommended without Coolants)  | <b>H</b> |                          |        | ⊗      |        |          |          | Semi-finish | 80 - 180   |
|   |          |                          |        |        |        |          |          | Finish      | 80 - 200   |
|   |          |                          |        |        |        | NEW<br>⊗ | NEW<br>⊗ | Finish      | 80 - 250   |
| Hardened Steel (HRC 45-68)<br>Tool-Steel, Case Hardened Steel,<br>Interrupted Cut<br>(recommended without Coolants) | <b>H</b> | ○                        |        |        | ⊗      | ○        | ⊗        | Semi-finish | 70 - 160   |
|   |          |                          |        |        |        |          |          | Finish      | 70 - 180   |
| Grey Cast Iron  | <b>K</b> |                          | ⊗      |        |        |          |          | Semi-finish | 500 - 1000 |
|   |          |                          |        |        |        |          |          | Finish      | 600 - 2000 |
| High Temperature Alloys (Inconel,<br>Waspoloy, Hasteloy)<br>Exotic and High Nickel + Cobalt<br>basis                | <b>S</b> |                          | ⊗      | ⊗      |        |          |          | Finish      | 50 - 300   |

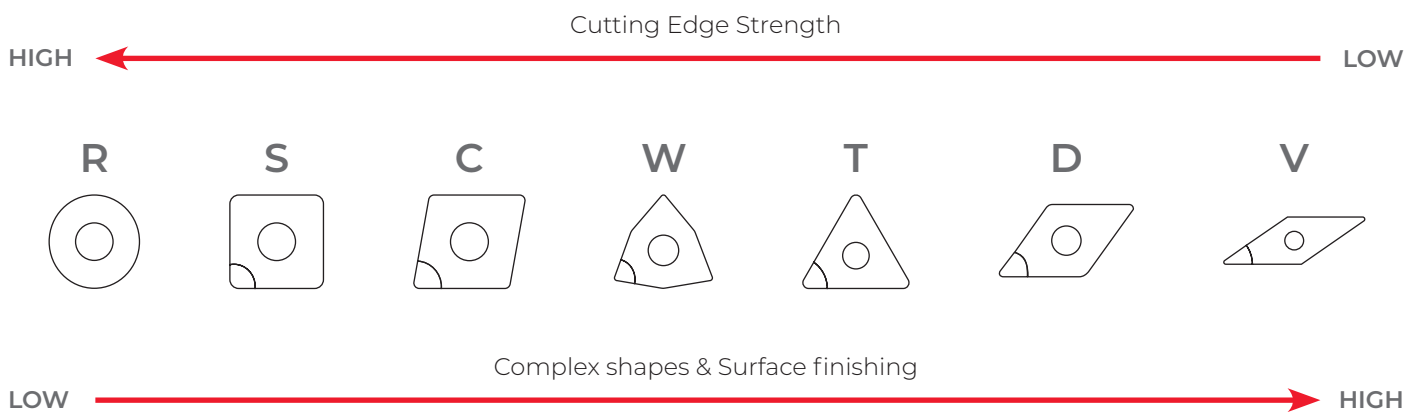
⊗ Recommended ○ Second choice

# SELECTION GUIDE

When selecting PCBN inserts, priority should be given to maximizing edge strength. Insert profiles with greater corner support and increased nose radius improve load-bearing capacity, thermal stability, and fracture resistance under hard-turning conditions. Increased radius and insert thickness enhance rigidity and wear behavior, but also raise cutting forces, requiring a stable machine-tool-workholding system.

In general, select the most structurally robust geometry that the setup, component, and cutting parameters can accommodate to ensure process security and consistent tool life.

## Insert Geometry



## PCBN Shape

**Solid CBN**  
No tips  
All CBN



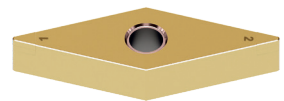
**Solid tip**  
CBN over the full height  
of the insert



**Integral tip**  
CBN without carbide base

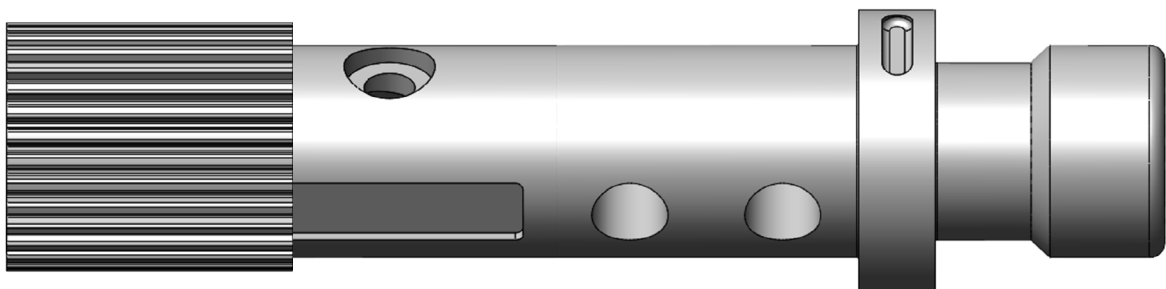


**Standard tip**  
CBN with carbide base



Interrupted Cut

Continuous Cut



# SELECTION GUIDE

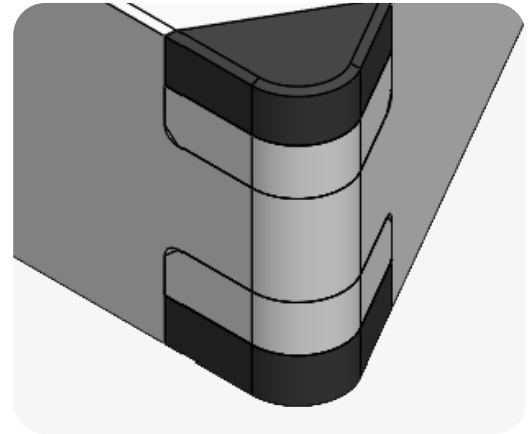
## Standard Tip

### Key Points

- PCBN grown on carbide base;
- Most common and cost-effective design;
- Good balance of toughness and wear resistance;

### Best Use Cases

- General hardened steel machining (55 - 62 HRC);
- Continuous or semi-interrupted cuts - light to medium;
- Ideal starting point for most hard-turning parts;



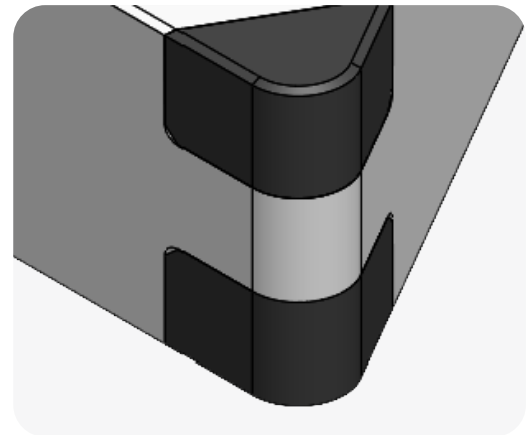
## Integral Tip

### Key Points

- PCBN tip without carbide base;
- Higher rigidity and thermal resistance than standard;
- Stronger cutting edge for consistent performance;

### Best Use Cases

- Continuous or interrupted cuts;
- Applications with moderate cutting demands and stable setups;
- When increased edge strength over standard tip is required;



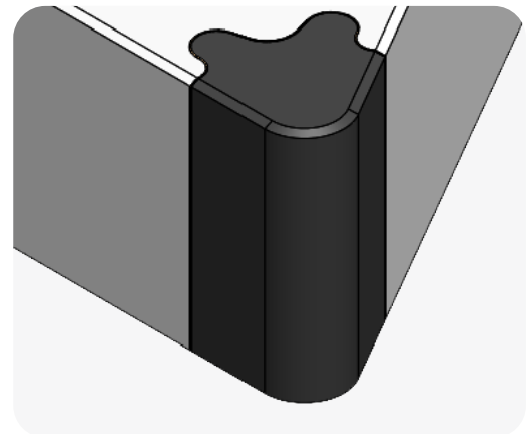
## Solid Tip

### Key Points

- PCBN extends through the full height of the insert at the cutting corners;
- Puzzle-joint PCBN interface improves bonding strength and edge stability;
- Larger PCBN volume for higher wear resistance and thermal stability;
- Designed for heavy-duty hard-turning and demanding environments;

### Best Use Cases

- Severe cutting conditions with high mechanical and thermal load;
- Medium to heavy interrupted cuts;
- Long cycle times with sustained heat exposure;
- Excellent choice when standard and integral tips fracture prematurely;



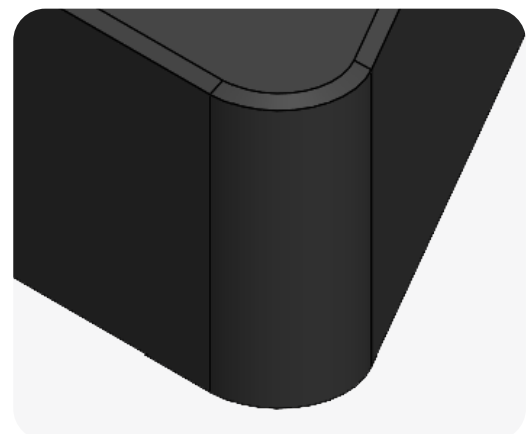
## Solid PCBN Full Body

### Key Points

- Entire insert made of PCBN;
- Maximum impact resistance & tool life;
- Highest structural integrity among PCBN geometries;

### Best Use Cases

- Extreme wear environments;
- Heavy interrupted cuts requiring maximum edge strength;
- Long unattended machining cycles;



# SELECTION GUIDE

## Choose your geometry quickly

| Insert Type         | Durability | Toughness |
|---------------------|------------|-----------|
| <b>Standard Tip</b> | ⊗ ⊗ ⊗      | ⊗ ⊗       |
| <b>Integral Tip</b> | ⊗ ⊗ ⊗ ⊗    | ⊗ ⊗       |
| <b>Solid Tip</b>    | ⊗ ⊗ ⊗ ⊗ ⊗  | ⊗ ⊗ ⊗     |
| <b>Solid CBN</b>    | ⊗ ⊗ ⊗ ⊗ ⊗  | ⊗ ⊗ ⊗ ⊗   |

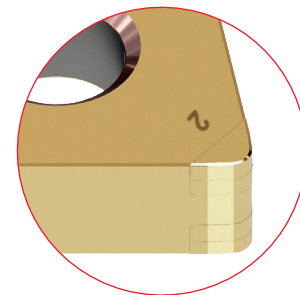
| Tip type    |                       |
|-------------|-----------------------|
| Z1 (1 tip)  | Z4S (2 solid tips)    |
| Z2 (2 tips) | Z6S (3 solid tips)    |
| Z3 (3 tips) | S - Solid CBN         |
| Z4 (4 tips) | Z2I (2 integral tips) |
| Z5 (5 tips) | Z3I (3 integral tips) |
| Z6 (6 tips) | Z4I (4 integral tips) |
| Z8 (8 tips) | Z6I (6 integral tips) |

| Wiper                   |               |
|-------------------------|---------------|
| <b>WG</b>               | General Wiper |
| Used only when required |               |

## Wiper insert

### Wiper inserts provide two possibilities for process improvement:

- Improved surface finish with standard cutting parameters;
- Maintained surface finish at substantially higher feed rate;



|  | Standard (RE = 0,8mm) | Wiper (RE= 0,8mm) |
|--|-----------------------|-------------------|
| <b>Insert type</b>                       |                       |                   |
| <b>Surface Roughness (R<sub>a</sub>)</b> | 0,81 μm               | 0,42 μm           |

### Note

These values were achieved with the following cutting conditions:

Hardened Steel HRC60 |  $V_c = 130$  m/min |  $f_n = 0,12$  mm/rev |  $a_p = 0,2$  mm |  $\lambda = 2,5$  mm / ISO 21920

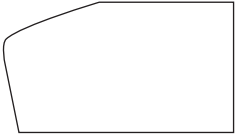
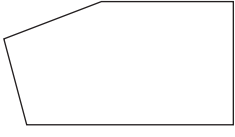


# EDGE PREPARATION SELECTION

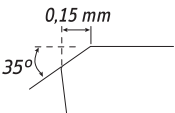

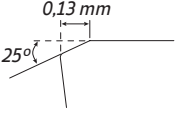

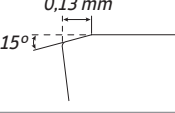

Proper edge preparation is essential for reliable PCBN performance, especially in hard-turning and interrupted cuts. Chamfered and honed edges help balance cutting forces and reinforce the cutting zone, reducing chipping and flaking.

Negative-rake designs with controlled chamfer/hone direct forces into the insert body, improving stability and tool life. For tougher conditions, a larger nose radius and stronger edge preparation further increase impact resistance.

## Edge preparation

Cutting forces edge strength

|   |                 |   |  |
|---|-----------------|---|--|
| + | <b>S - Land</b> |    | <b>S   Preparation with chamfer and honing - Standard</b> <ul style="list-style-type: none"> <li>▪ First choice for hard part turning;</li> <li>▪ Stronger edge than T - land, with more resistance to chipping and fracture, resulting in more predictable tool life;</li> <li>▪ Generates consistent surface finish;</li> <li>▪ Critical in interrupted cutting and when using large depth of cut;</li> <li>▪ Feed rate must be greater than hone size;</li> </ul> |
|   | <b>T - Land</b> |   | <b>T   Preparation with chamfer</b> <ul style="list-style-type: none"> <li>▪ T - land is a common edge preparation for PCBN;</li> <li>▪ Preferred choice for cast iron;</li> <li>▪ Good alternative to S - land in hard part turning when reduced cutting forces and tighter tolerances are required;</li> </ul>   |
|   | <b>E - Land</b> |  | <b>E   Preparation with edge honing</b> <ul style="list-style-type: none"> <li>▪ Recommended for HRSA finishing operation;</li> <li>▪ Honing helps strengthen the edge, giving resistance to chipping and fracturing;</li> <li>▪ Feed rates must be greater than the hone size to allow actual cutting action to take place and prevent rubbing;</li> </ul>  |
| - | <b>F - Land</b> |  | <b>F   Preparation without honing</b> <ul style="list-style-type: none"> <li>▪ Sharp cutting edge;</li> <li>▪ F - Standard is a common edge preparation for PCD;</li> <li>▪ Recommended for aluminium or other non-ferrous materials;</li> </ul>   |

| Honing Types                                    | Specifications  |
|---|---|
| <b>S3515</b><br>For interrupted machining       |  <span style="float: right;">  Difficult Conditions                 </span> |
| <b>S2513</b><br>For general purpose machining   |  <span style="float: right;">  Average Conditions                 </span>   |
| <b>S1513</b><br>For stable continuous machining |  <span style="float: right;">  Good Conditions                 </span>      |

**Note**  
Based on our experience sometimes it is necessary to define edge preparation during several tests to provide the best possible solution for each application.

# CHIPBREAKERS IN PCBN INSERTS

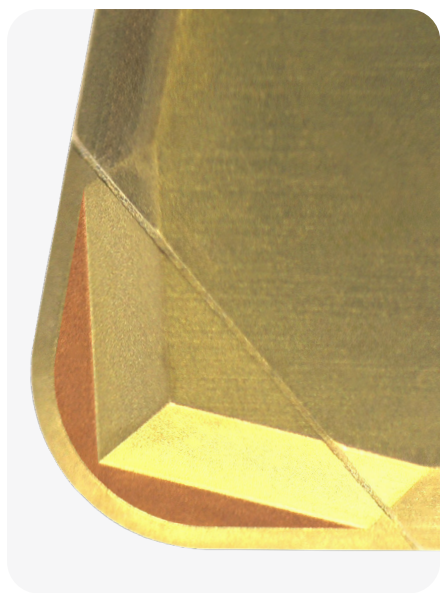
## Get involved with the new -SB chipbreaker

### Shaping Boundaries on hard materials

The **-SB chipbreaker**, engineered for PCBN cutting edges, redefines chip control in hard-turning. Consistent chip breaking, secure cutting in low interrupted operations, and reliable stability across extreme conditions - even where traditional geometries fail.

## KEY ADVANTAGES OF -SB CHIPBREAKER

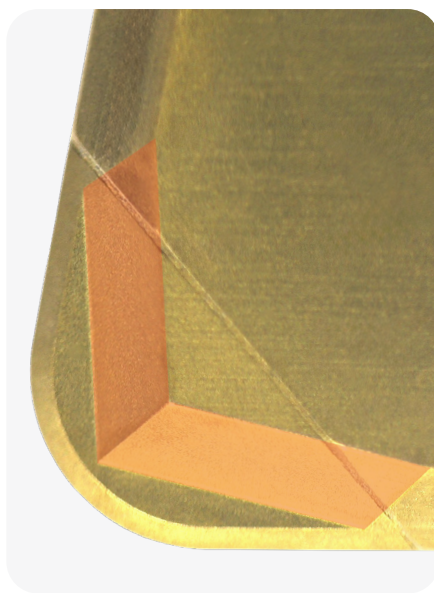
- **Ideal for carburized layer removal** offering excellent resistance to chipping.
- **Ground chipbreaker** designed for superior chip control.
- **Ensures long tool life** due to reduced cutting forces.
- **Great depths of cut** allowing enhanced productivity.



# 01.

## SLIDING ZONE

Enhanced edge preparation and chip sliding on cutting edge for reduced cutting force, thus increasing tool life.



# 02.

## BREAKING ZONE

Inclined ramp chip-breaker that curls and segments the chip while reinforcing the edge, allowing higher ap in finishing and stable chip control in hard-turning.

# CHIPBREAKERS IN PCBN INSERTS

## Experience the new -BR chipbreaker

Breaks chips, Rules performance on hard materials

In hard turning operations, especially for finishing conditions, chip control becomes critical for enhancing surface finishing, process stability and tool life.

The **-BR chipbreaker** ensures reliable chip evacuation and smooth cutting forces, enabling consistent surface finishing performance and dimensional accuracy in the most demanding hardened steels.

## KEY ADVANTAGES OF -BR CHIPBREAKER

- **Prevents long or uncontrolled chips** - ensuring safe and continuous machining.
- **Improves tool life** - controlled cutting forces and smaller chips enable more efficient heat removal from the cutting zone.
- **Enhances surface finish and dimensional accuracy** - avoids vibration and instability.
- **Advanced chipbreaker geometry** produced by laser precision machining.



# 01.

### PRE-COMPRESSION ZONE

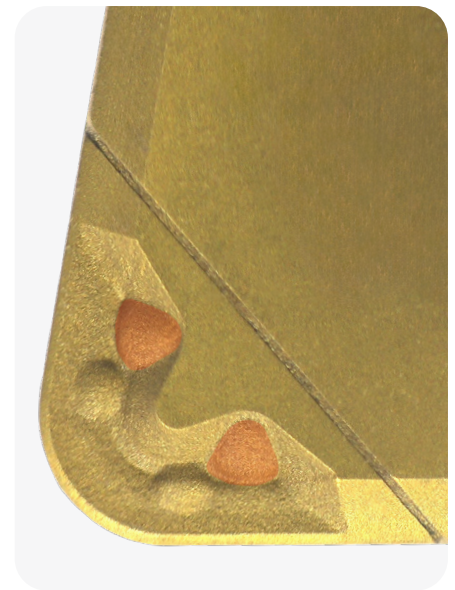
This area initiates early chip deformation right at the sliding region beginning, lowering cutting resistance before the chip reaches the main breaker geometry.



# 02.

### CHIP GUIDING AND CURLING ZONE

Inclined walls that force and stabilize chip curvature, ensuring a controlled chip flow trajectory and preventing long or uncontrolled chips during cutting.



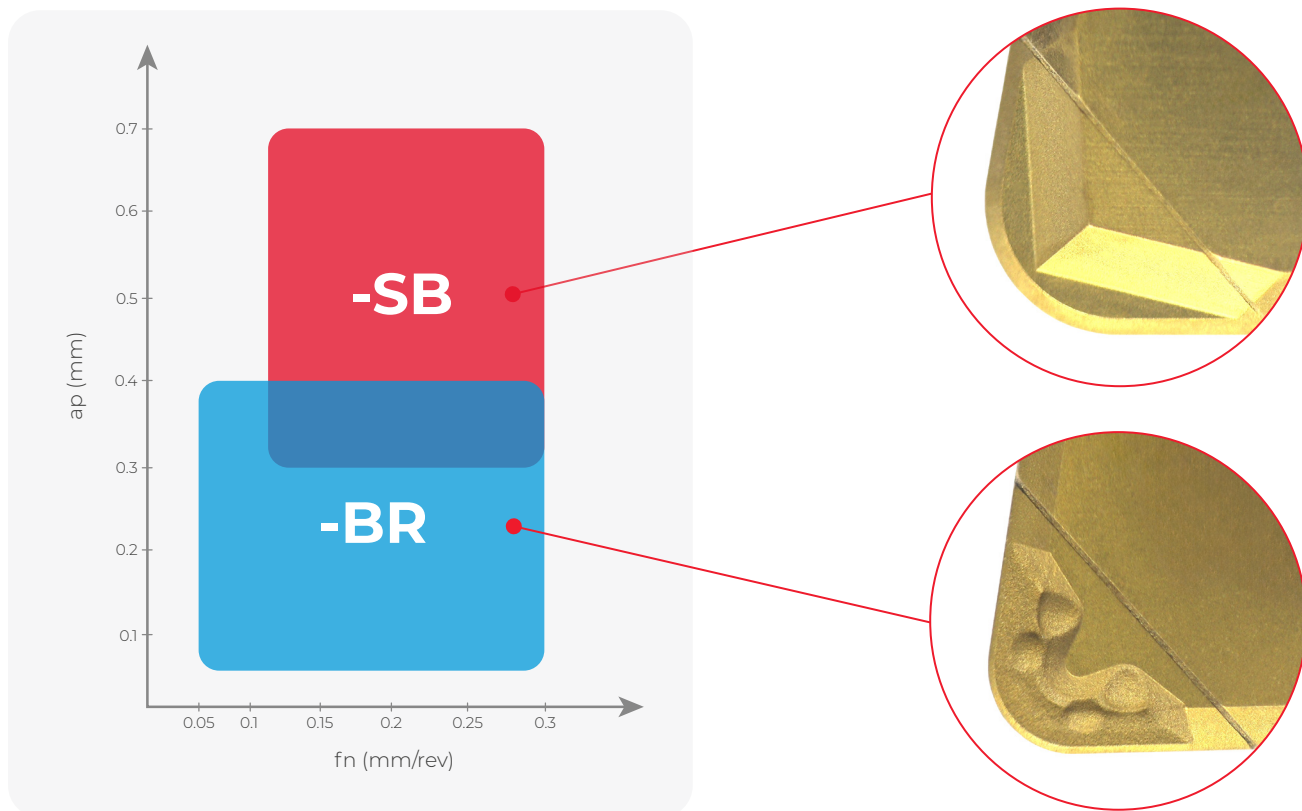
# 03.

### FINAL BREAKING ZONE

Acts as a secondary safety breaker, ensuring complete chip fragmentation.

# CHIPBREAKERS IN PCBN INSERTS

## Cutting conditions overview



## Chipbreaker machining applications

| Chipbreaker | Application                          | Recommended cutting range                |
|-------------|--------------------------------------|--|
| -SB         | Carburized layer removal<br><b>H</b> | Higher depth of cut<br>ap = 0.3 - 0.7 mm |
| -BR         | Hardened steel finishing<br><b>H</b> | Small depth of cut<br>ap = 0.05 - 0.3 mm |

# TEST REPORT CONVENTIONAL vs CHIPBREAKER

Conventional PCBN inserts can generate long or irregular chips when hard-turning, especially at lower feed rates and small depths of cut. These uncontrolled chips can lead to instability, heat accumulation, and operational risk.

The **-BR chipbreaker** is specifically engineered to initiate chip curling and promote consistent fragmentation, resulting in shorter, predictable, and easy-to-evacuate chips across a wider cutting range.

The chip map below demonstrates how the **-BR geometry** delivers superior chip control versus a conventional insert under same cutting conditions - ensuring enhanced chip control, improved process reliability, and safer chip evacuation in hardened materials.

| ap (mm) \ fn (mm/rev) |                  | fn (mm/rev) |     |     |
|-----------------------|------------------|-------------|-----|-----|
|                       |                  | 0,1         | 0,2 | 0,3 |
| 0,1                   | Conventional     |             |     |     |
|                       | With Chipbreaker |             |     |     |
| 0,2                   | Conventional     |             |     |     |
|                       | With Chipbreaker |             |     |     |
| 0,3                   | Conventional     |             |     |     |
|                       | With Chipbreaker |             |     |     |

**Note**

This test was performed with the following conditions:  
 Hardened Steel X155 - 55 HRC |  $V_c = 180$  m/min

# NEGATIVE PCBN INSERTS OVERVIEW

## WITH CHIPBREAKER

| CNGM Z2<br>Multiple Tips  | DNGM Z2<br>Multiple Tips  | TNGM Z3<br>Multiple Tips | VNGM Z2<br>Multiple Tips |
|---|---|--------------------------|--------------------------|
| <b>NEW</b>  | <b>NEW</b>  | <b>NEW</b>               | <b>NEW</b>               |
|  |  |                          |                          |
| Size 12   | Size 15   | Size 16                  | Size 16                  |
| Page 8  | Page 8  | Page 8                   | Page 8                   |

## WITH CHIPBREAKER

| CNGG Z4<br>Multiple Tips  | DNGG Z4<br>Multiple Tips  | CNGA Z1<br>Single Tip  | DNGA Z1<br>Single Tip   |
|---|---|--|---|
| <b>NEW</b>  | <b>NEW</b>  |  |   |
|  |  |  |  |
| Size 12   | Size 15   | Size 12  | Size 15   |
| Page 8  | Page 8  | Page 10  | Page 10   |

## CNGA Z2 | Z4 Multiple Tips      DNGA Z2 | Z4 Multiple Tips      SNGA Z4 Multiple Tips

|   |   |   |
|---|---|---|
|  |  |  |
| Size 12   | Size 11   15  | Size 12   |
| Page 10   | Page 10   | Page 12   |

## NEGATIVE PCBN INSERTS OVERVIEW

Vista genérica de pastilhas negativas PCBN | Visión general de plaquitas negativas de PCBN

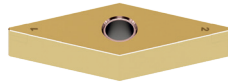
### TNGA Z3 | Z6 Multiple Tips



Size 16

Page 12

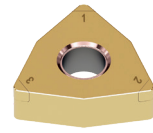
### VNGA Z2 Multiple Tips



Size 16

Page 12

### WNGA Z3 | Z6 Multiple Tips



Size 08

Page 12

### CNGA Z4S Solid Tips



Size 12

Page 14

### DNGA Z4S Solid Tips



Size 11 | 15

Page 14

### TNGA Z6S Solid Tips



Size 16

Page 14

### VNGA Z4S Solid Tips



Size 16

Page 14




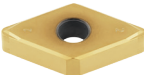
### RNGN S Solid CBN



Size 06 | 09 | 12

Page 16

# PCBN NEGATIVE INSERTS WITH CHIPBREAKER

|   |                      |                    |                 | H      |        |        |        |
|---|----------------------|--------------------|-----------------|--------|--------|--------|--------|
|   |                      | (2) Grade code     |                 | Y5     | 2H     | Y4     | 3D     |
| Inserts<br>Pastilhas<br>Plaquetas   | (1)<br>Geometry code | ISO Reference      | ANSI Reference  | PBY603 | PBY610 | PBY620 | PBY630 |
| -BR CHIPBREAKER   |                      |                    |                 |        |        |        |        |
| <b>NEW</b> CNGM Z2<br>   | 1125181              | CNGM 120404-BR Z2I | CNGM 431-BR Z2I |        | ○      |        |        |
|   | 1125182              | CNGM 120408-BR Z2I | CNGM 432-BR Z2I |        | ⊗      |        |        |
|   | 1125183              | CNGM 120412-BR Z2I | CNGM 433-BR Z2I |        | ⊗      |        |        |
| <b>NEW</b> DNGM Z2<br>   | 1125184              | DNGM 150404-BR Z2I | DNGM 431-BR Z2I |        | ○      |        |        |
|   | 1125185              | DNGM 150408-BR Z2I | DNGM 432-BR Z2I |        | ⊗      |        |        |
|   | 1125186              | DNGM 150412-BR Z2I | DNGM 433-BR Z2I |        | ⊗      |        |        |
| <b>NEW</b> TNGM Z3  | 1125187              | TNGM 160404-BR Z3I | TNGM 331-BR Z3I |        | ○      |        |        |
|   | 1125188              | TNGM 160408-BR Z3I | TNGM 332-BR Z3I |        | ○      |        |        |
|   | 1125189              | TNGM 160412-BR Z3I | TNGM 333-BR Z3I |        | ○      |        |        |
| <b>NEW</b> VNGM Z2  | 1125190              | VNGM 160604-BR Z2I | VNGM 331-BR Z2I |        | ○      |        |        |
|   | 1125191              | VNGM 160608-BR Z2I | VNGM 332-BR Z2I |        | ○      |        |        |
|   | 1125192              | VNGM 160612-BR Z2I | VNGM 333-BR Z2I |        | ○      |        |        |
| -SB CHIPBREAKER   |                      |                    |                 |        |        |        |        |
| <b>NEW</b> CNGG Z4<br> | 1125049              | CNGG 120412-SB Z4I | CNGG 433-SB Z4I |        |        |        | ⊗      |
| <b>NEW</b> DNGG Z4<br> | 1125117              | DNGG 150412-SB Z4I | DNGG 433-SB Z4I |        |        |        | ⊗      |

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

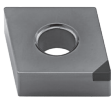
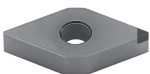


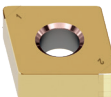
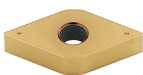
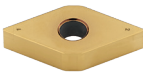
Insert Order Code: <sup>(1)</sup> Geometry code + <sup>(2)</sup> Grade code

# PCBN NEGATIVE INSERTS WITH CHIPBREAKER

Multiple tips

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |       |      |     |      |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|-------|------|-----|------|------|--|------|------|-----------|------|------|--|
| CDEC  | IC    | S    | RE  | D1   | SL   | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |  |
| -BR CHIPBREAKER                                       |       |      |     |      |      |  |      |      |           |      |      |  |
| 2   | 12,70 | 4,76 | 4   | 5,16 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 12,70 | 4,76 | 8   | 5,16 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 12,70 | 4,76 | 12  | 5,16 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 12,70 | 4,76 | 4   | 5,16 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 12,70 | 4,76 | 8   | 5,16 | 2,10 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 12,70 | 4,76 | 12  | 5,16 | 2,20 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 3   | 9,53  | 4,76 | 4   | 3,81 | 2,30 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 3   | 9,53  | 4,76 | 8   | 3,81 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 3   | 9,53  | 4,76 | 12  | 3,81 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53  | 4,76 | 4   | 3,81 | 2,80 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53  | 4,76 | 8   | 3,81 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53  | 4,76 | 12  | 3,81 | 1,90 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| -SB CHIPBREAKER                                       |       |      |     |      |      |  |      |      |           |      |      |  |
| 4   | 12,7  | 4,76 | 1,2 | 4,81 | 2,00 | 0,50   | 0,30 | 0,70 | 0,2       | 0,10 | 0,30 |  |
| 4   | 12,7  | 4,76 | 1,2 | 5,81 | 2,30 | 0,50   | 0,30 | 0,70 | 0,2       | 0,10 | 0,30 |  |

# PCBN NEGATIVE INSERTS

|  |                      |                |                         | K                    | H      |        |
|--|----------------------|----------------|-------------------------|----------------------|--------|--------|
|  |                      | (2) Grade code |                         | S4                   | Y5     | Y4     |
| Inserts<br>Pastilhas<br>Plaquetas  | (1)<br>Geometry code | ISO Reference  | ANSI Reference          | PBH920               | PBY603 | PBY620 |
| SINGLE TIP   |                      |                |                         |                      |        |        |
|             | CNGA Z1              | 1124300        | CNGA 120404-S2513 Z1    | CNGA 431-S2513 Z1    | ○      |        |
|  |                      | 1124111        | CNGA 120408-S2513 Z1    | CNGA 432-S2513 Z1    | ⊗      |        |
|  |                      | 1124301        | CNGA 120412-S2513 Z1    | CNGA 433-S2513 Z1    | ○      |        |
|  |                      | 1124302        | CNGA 120416-S2513 Z1    | CNGA 434-S2513 Z1    | ○      |        |
|             | DNGA Z1              | 1124306        | DNGA 150404-S2513 Z1    | DNGA 431-S2513 Z1    | ○      | ○      |
|  |                      | 1124112        | DNGA 150408-S2513 Z1    | DNGA 432-S2513 Z1    | ⊗      | ○      |
|  |                      | 1124536        | DNGA 150412-S2513 Z1    | DNGA 433-S2513 Z1    | ○      | ○      |
|  |                      | 1124307        | DNGA 150608-S2513 Z1    | DNGA 442-S2513 Z1    | ○      |        |
|  |                      | 1124308        | DNGA 150612-S2513 Z1    | DNGA 443-S2513 Z1    | ○      |        |
| MULTIPLE TIP   |                      |                |                         |                      |        |        |
|             | CNGA Z2              | 1124343        | CNGA 120402-S2513 Z2    | CNGA 431.5-S2513 Z2  | ○      |        |
|  |                      | 1124344        | CNGA 120404-S2513 Z2    | CNGA 431-S2513 Z2    | ⊗      | ⊗      |
|  |                      | 1124175        | CNGA 120408-S2513 Z2    | CNGA 432-S2513 Z2    | ⊗      | ⊗      |
|  |                      | 1124568        | CNGA 120408-S3515 Z2    | CNGA 432-S3515 Z2    |        | ⊗      |
|  |                      | 1124468        | CNGA 120412-S2513 Z2    | CNGA 433-S2513 Z2    | ⊗      | ⊗      |
|           | CNGA Z4              | 1124474        | CNGA 120404-S2513 Z4    | CNGA 431-S2513 Z4    |        | ⊗      |
|  |                      | 1124692        | CNGA 120408-S1513 Z4    | CNGA 432-S1513 Z4    |        | ○      |
|  |                      | 1124134        | CNGA 120408-S2513 Z4    | CNGA 432-S2513 Z4    | ○      | ⊗      |
|  |                      | 1124570        | CNGA 120408-S3515 Z4    | CNGA 432-S3515 Z4    |        | ○      |
|  |                      | 1124475        | CNGA 120412-S2513 Z4    | CNGA 433-S2513 Z4    |        | ⊗      |
| <br>Wiper | CNGA WG Z4           | 1124534        | CNGA 120404-S1513 WG Z4 | CNGA 431-S1513 WG Z4 |        | ○      |
|  |                      | 1124535        | CNGA 120404-S2513 WG Z4 | CNGA 431-S2513 WG Z4 |        | ○      |
|  |                      | 1124517        | CNGA 120408-S1513 WG Z4 | CNGA 432-S1513 WG Z4 |        | ⊗      |
|  |                      | 1124518        | CNGA 120408-S2513 WG Z4 | CNGA 432-S2513 WG Z4 |        | ⊗      |
|  |                      | 1125024        | CNGA 120412-S1513 WG Z4 | CNGA 433-S1513 WG Z4 |        | ⊗      |
|           | DNGA Z2              | 1124616        | DNGA 110404-S2513 Z2    | DNGA 331-S2513 Z2    |        | ⊗      |
|  |                      | 1124615        | DNGA 110408-S2513 Z2    | DNGA 332-S2513 Z2    |        | ⊗      |
|  |                      | 1124617        | DNGA 110412-S2513 Z2    | DNGA 333-S2513 Z2    |        | ⊗      |
|  |                      | 1124482        | DNGA 150404-S2513 Z2    | DNGA 431-S2513 Z2    |        | ⊗      |
|  |                      | 1124483        | DNGA 150408-S2513 Z2    | DNGA 432-S2513 Z2    |        | ⊗      |
|  |                      | 1124537        | DNGA 150412-S2513 Z2    | DNGA 433-S2513 Z2    |        | ○      |
|  |                      | 1124348        | DNGA 150604-S2513 Z2    | DNGA 441-S2513 Z2    | ⊗      | ⊗      |
|  |                      | 1124177        | DNGA 150608-S2513 Z2    | DNGA 442-S2513 Z2    | ⊗      | ⊗      |
|  |                      | 1124572        | DNGA 150608-S3515 Z2    | DNGA 442-S3515 Z2    |        | ○      |
|  |                      | 1124377        | DNGA 150612-S2513 Z2    | DNGA 443-S2513 Z2    | ⊗      | ⊗      |
|           | DNGA Z4              | 1124479        | DNGA 150604-S2513 Z4    | DNGA 441-S2513 Z4    |        | ⊗      |
|  |                      | 1124133        | DNGA 150608-S2513 Z4    | DNGA 442-S2513 Z4    | ○      | ⊗      |
|  |                      | 1124575        | DNGA 150608-S3515 Z4    | DNGA 442-S3515 Z4    |        | ○      |
|  |                      | 1124480        | DNGA 150612-S2513 Z4    | DNGA 443-S2513 Z4    |        | ⊗      |
|  |                      | 1124576        | DNGA 150612-S3515 Z4    | DNGA 443-S3515 Z4    |        | ○      |

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta





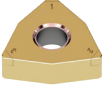
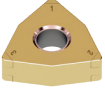
Insert Order Code: <sup>(1)</sup> Geometry code + <sup>(2)</sup> Grade code

# PCBN NEGATIVE INSERTS

Single tip | Multiple tips

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |        |      |      |      |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|--------|------|------|------|------|--|------|------|-----------|------|------|--|
| CDEC  | IC     | S    | RE   | D1   | SL   | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |  |
| SINGLE TIP  |        |      |      |      |      |  |      |      |           |      |      |  |
| 1   | 12,70  | 4,76 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 1   | 12,70  | 4,76 | 0,80 | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 1   | 12,70  | 4,76 | 1,20 | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 1   | 12,70  | 4,76 | 1,60 | 5,16 | 2,20 | 0,30   | 0,05 | 0,50 | 0,15      | 0,08 | 0,30 |  |
| 1   | 12,70  | 4,76 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 1   | 12,70  | 4,76 | 0,80 | 5,16 | 2,50 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 1   | 12,70  | 4,76 | 1,20 | 5,16 | 2,20 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 1   | 12,70  | 6,35 | 0,80 | 5,16 | 2,50 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 1   | 12,70  | 6,35 | 1,20 | 5,16 | 2,20 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| MULTIPLE TIP  |        |      |      |      |      |  |      |      |           |      |      |  |
| 2   | 12,70  | 4,76 | 0,20 | 5,16 | 2,60 | 0,15   | 0,08 | 0,38 | 0,05      | 0,05 | 0,20 |  |
| 2   | 12,70  | 4,76 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 2   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 12,70  | 4,76 | 1,20 | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 2   | 12,70  | 4,76 | 1,20 | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 1,20 | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 1,20 | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 0,40 | 5,16 | 2,40 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,70  | 4,76 | 0,40 | 5,16 | 2,40 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,70  | 4,76 | 0,80 | 5,16 | 2,40 | 2,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 2   | 9,525  | 4,76 | 0,40 | 3,81 | 2,50 | 0,10   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 2   | 9,525  | 4,76 | 0,80 | 3,81 | 2,00 | 0,15   | 0,08 | 0,40 | 0,10      | 0,08 | 0,30 |  |
| 2   | 9,525  | 4,76 | 1,20 | 3,81 | 2,00 | 0,20   | 0,08 | 0,40 | 0,15      | 0,08 | 0,30 |  |
| 2   | 12,700 | 4,76 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 2   | 12,700 | 4,76 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 12,700 | 4,76 | 1,20 | 5,16 | 2,20 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 2   | 12,700 | 6,35 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 2   | 12,700 | 6,35 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 12,700 | 6,35 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 12,700 | 6,35 | 1,20 | 5,16 | 2,00 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 2   | 12,700 | 6,35 | 1,20 | 5,16 | 2,00 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,700 | 6,35 | 0,40 | 5,16 | 2,50 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,700 | 6,35 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,700 | 6,35 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,700 | 6,35 | 1,20 | 5,16 | 1,70 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,700 | 6,35 | 1,20 | 5,16 | 1,70 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |

# PCBN NEGATIVE INSERTS

|   |                      |                      |                     | K      | H      |        |
|---|----------------------|----------------------|---------------------|--------|--------|--------|
|   |                      | (2) Grade code       |                     | S4     | Y5     | Y4     |
| Inserts<br>Pastilhas<br>Plaquitas   | (1)<br>Geometry code | ISO Reference        | ANSI Reference      | PBH920 | PBY603 | PBY620 |
| MULTIPLE TIP  |                      |                      |                     |        |        |        |
|    | 1124178              | SNGA 120404-S2513 Z4 | SNGA 431-S2513 Z4   | ○      | ○      | ⊗      |
|   | 1124538              | SNGA 120404-T2513 Z4 | SNGA 431-T2513 Z4   | ○      |        |        |
|   | 1124354              | SNGA 120408-S2513 Z4 | SNGA 432-S2513 Z4   | ○      | ○      | ⊗      |
|   | 1124577              | SNGA 120408-S3515 Z4 | SNGA 432-S3515 Z4   |        |        | ○      |
|   | 1124433              | SNGA 120408-T2513 Z4 | SNGA 432-T2513 Z4   | ⊗      |        |        |
|   | 1124539              | SNGA 120412-S2513 Z4 | SNGA 433-S2513 Z4   |        | ○      | ⊗      |
|   | 1124578              | SNGA 120412-S3515 Z4 | SNGA 433-S3515 Z4   |        |        | ○      |
|   | 1124540              | SNGA 120412-T2513 Z4 | SNGA 433-T2513 Z4   | ○      |        |        |
|    | 1124357              | TNGA 160404-S2513 Z3 | TNGA 331-S2513 Z3   | ○      | ⊗      | ⊗      |
|   | 1124179              | TNGA 160408-S2513 Z3 | TNGA 332-S2513 Z3   | ○      | ⊗      | ⊗      |
|   | 1124579              | TNGA 160408-S3515 Z3 | TNGA 332-S3515 Z3   |        |        | ○      |
|   | 1124469              | TNGA 160412-S2513 Z3 | TNGA 333-S2513 Z3   | ○      | ⊗      | ⊗      |
|   | 1124746              | TNGA 160412-S3515 Z3 | TNGA 333-S3515 Z3   |        |        | ⊗      |
|   | 1124603              | TNGA 160416-S2513 Z3 | TNGA 334-S2513 Z3   |        | ⊗      | ⊗      |
|   | 1124604              | TNGA 160420-S2513 Z3 | TNGA 335-S2513 Z3   |        | ⊗      | ⊗      |
|   | 1124477              | TNGA 160404-S2513 Z6 | TNGA 331-S2513 Z6   | ⊗      | ⊗      | ○      |
|  | 1124097              | TNGA 160408-S2513 Z6 | TNGA 332-S2513 Z6   | ⊗      | ⊗      | ○      |
|   | 1124581              | TNGA 160408-S3515 Z6 | TNGA 332-S3515 Z6   |        |        | ○      |
|   | 1125023              | TNGA 160412-S1513 Z6 | TNGA 333-S1513 Z6   |        | ⊗      |        |
|   | 1124478              | TNGA 160412-S2513 Z6 | TNGA 333-S2513 Z6   |        | ⊗      | ○      |
|   | 1124582              | TNGA 160412-S3515 Z6 | TNGA 333-S3515 Z6   |        |        | ○      |
|   | 1124361              | VNGA 160402-S2513 Z2 | VNGA 331.5-S2513 Z2 | ○      |        |        |
|  | 1124163              | VNGA 160404-S2513 Z2 | VNGA 331-S2513 Z2   | ○      | ⊗      | ⊗      |
|   | 1124098              | VNGA 160408-S2513 Z2 | VNGA 332-S2513 Z2   | ○      | ⊗      | ⊗      |
|   | 1124470              | VNGA 160412-S2513 Z2 | VNGA 333-S2513 Z2   | ○      | ⊗      | ⊗      |
|   | 1124471              | WNGA 080404-S2513 Z3 | WNGA 431-S2513 Z3   | ○      | ⊗      | ⊗      |
|  | 1124472              | WNGA 080408-S2513 Z3 | WNGA 432-S2513 Z3   | ○      | ⊗      | ⊗      |
|   | 1124583              | WNGA 080408-S3515 Z3 | WNGA 432-S3515 Z3   |        |        | ○      |
|   | 1124473              | WNGA 080412-S2513 Z3 | WNGA 433-S2513 Z3   | ○      | ⊗      | ⊗      |
|   | 1124584              | WNGA 080412-S3515 Z3 | WNGA 433-S3515 Z3   |        |        | ○      |
|   | 1124589              | WNGA 080404-S2513 Z6 | WNGA 431-S2513 Z6   |        | ○      | ○      |
|  | 1124588              | WNGA 080408-S2513 Z6 | WNGA 432-S2513 Z6   |        | ○      | ○      |
|   | 1124585              | WNGA 080408-S3515 Z6 | WNGA 432-S3515 Z6   |        |        | ○      |
|   | 1124587              | WNGA 080412-S2513 Z6 | WNGA 433-S2513 Z6   |        | ○      | ○      |
|   | 1124586              | WNGA 080412-S3515 Z6 | WNGA 433-S3515 Z6   |        |        | ○      |

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: (1) Geometry code + (2) Grade code






# PCBN NEGATIVE INSERTS

Multiple tips

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |        |      |       |      |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|--------|------|-------|------|------|--|------|------|-----------|------|------|--|
| CDEC  | IC     | S    | RE    | D1   | SL   | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |  |
| MULTIPLE TIP  |        |      |       |      |      |  |      |      |           |      |      |  |
| 4   | 12,700 | 4,76 | 0,40  | 5,16 | 2,40 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,700 | 4,76 | 0,40  | 5,16 | 2,40 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,700 | 4,76 | 0,80  | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 0,80  | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20  | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20  | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20  | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20  | 5,16 | 2,30 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 3   | 9,525  | 4,76 | 0,40  | 3,81 | 2,30 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 3   | 9,525  | 4,76 | 0,80  | 3,81 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 3   | 9,525  | 4,76 | 0,80  | 3,81 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 3   | 9,525  | 4,76 | 1,20  | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 3   | 9,525  | 4,76 | 1,20  | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 3   | 9,525  | 4,76 | 1,60  | 3,81 | 3,00 | 0,30   | 0,08 | 0,70 | 0,14      | 0,10 | 0,35 |  |
| 3   | 9,525  | 4,73 | 2,00  | 3,81 | 3,00 | 0,35   | 0,10 | 0,55 | 0,16      | 0,10 | 0,40 |  |
| 6   | 9,525  | 4,76 | 0,40  | 3,81 | 2,30 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 6   | 9,525  | 4,76 | 0,80  | 3,81 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 0,80  | 3,81 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 1,20  | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 1,20  | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 1,20  | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 2   | 9,525  | 4,76 | 20,00 | 3,81 | 3,00 | 0,13   | 0,08 | 0,50 | 0,05      | 0,05 | 0,20 |  |
| 2   | 9,525  | 4,76 | 0,40  | 3,81 | 2,80 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 2   | 9,525  | 4,76 | 0,80  | 3,81 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 9,525  | 4,76 | 1,20  | 3,81 | 1,90 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 3   | 12,700 | 4,76 | 0,40  | 5,16 | 2,30 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 3   | 12,700 | 4,76 | 0,80  | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 3   | 12,700 | 4,76 | 0,80  | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 3   | 12,700 | 4,76 | 1,20  | 5,16 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 3   | 12,700 | 4,76 | 1,20  | 5,16 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 6   | 12,700 | 4,76 | 1,20  | 5,16 | 2,00 | 0,25   | 0,08 | 0,40 | 0,12      | 0,08 | 0,30 |  |
| 6   | 12,700 | 4,76 | 0,80  | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 6   | 12,700 | 4,76 | 0,80  | 5,16 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 6   | 12,700 | 4,76 | 0,40  | 5,16 | 2,30 | 0,15   | 0,08 | 0,60 | 0,08      | 0,05 | 0,20 |  |
| 6   | 12,700 | 4,76 | 1,20  | 5,16 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |

# PCBN NEGATIVE INSERTS

Solid tips

|   |                      |                          |                       | H      |        |        |
|---|----------------------|--------------------------|-----------------------|--------|--------|--------|
|   |                      | (2) Grade code           |                       | Y5     | Y4     | 4C     |
| Inserts<br>Pastilhas<br>Plaquitas   | (1)<br>Geometry code | ISO Reference            | ANSI Reference        | PBY603 | PBY620 | PBY625 |
| SOLID TIPS  |                      |                          |                       |        |        |        |
|                          | 1124982              | CNGA 120404-S2515 Z4S    | CNGA 431-S2515 Z4S    |        |        | ○      |
|   | 1124983              | CNGA 120408-S2515 Z4S    | CNGA 432-S2515 Z4S    |        |        | ⊗      |
|   | 1124804              | CNGA 120412-S2513 Z4S    | CNGA 433-S2513 Z4S    |        |        | ⊗      |
| CNGA WG Z4S<br><br>Wiper | 1125025              | CNGA 120412-S1513 WG Z4S | CNGA 433-S1513 WG Z4S | ○      |        |        |
|                          | 1124992              | DNGA 110404-S2515 Z4S    | DNGA 331-S2515 Z4S    |        |        | ○      |
|   | 1124993              | DNGA 110408-S2515 Z4S    | DNGA 332-S2515 Z4S    |        |        | ⊗      |
|   | 1124994              | DNGA 110412-S2515 Z4S    | DNGA 333-S2515 Z4S    |        |        | ⊗      |
|   | 1124986              | DNGA 150404-S2515 Z4S    | DNGA 431-S2515 Z4S    |        |        | ○      |
|   | 1124987              | DNGA 150408-S2515 Z4S    | DNGA 432-S2515 Z4S    |        |        | ⊗      |
|   | 1124988              | DNGA 150412-S2515 Z4S    | DNGA 433-S2515 Z4S    |        |        | ⊗      |
|                        | 1124984              | TNGA 160404-S2515 Z6S    | TNGA 331-S2515 Z6S    |        |        | ○      |
|   | 1124985              | TNGA 160408-S2515 Z6S    | TNGA 332-S2515 Z6S    |        |        | ⊗      |
|   | 1124960              | TNGA 160412-S1513 Z6S    | TNGA 333-S1513 Z6S    | ⊗      |        |        |
|   | 1124836              | TNGA 160412-S2513 Z6S    | TNGA 333-S2513 Z6S    |        |        | ⊗      |
|   | 1125026              | TNGA 160420-S2513 Z6S    | TNGA 335-S2513 Z6S    | ⊗      | ⊗      |        |
|                        | 1124995              | VNGA 160404-S2515 Z4S    | VNGA 331-S2515 Z4S    |        |        | ○      |
|   | 1124996              | VNGA 160408-S2515 Z4S    | VNGA 332-S2515 Z4S    |        |        | ⊗      |
|   | 1124997              | VNGA 160412-S2515 Z4S    | VNGA 333-S2515 Z4S    |        |        | ⊗      |

⊗ Stock Itens | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta


Insert Order Code: <sup>(1)</sup> Geometry code + <sup>(2)</sup> Grade code

# PCBN NEGATIVE INSERTS

Solid tips

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |        |      |      |      |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|--------|------|------|------|------|--|------|------|-----------|------|------|--|
| CDEC  | IC     | S    | RE   | D1   | SL   | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |  |
| SOLID TIPS  |        |      |      |      |      |  |      |      |           |      |      |  |
| 4   | 12,700 | 4,76 | 0,40 | 5,16 | 2,20 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,700 | 4,76 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20 | 5,16 | 2,00 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20 | 5,16 | 2,10 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 4   | 9,525  | 4,76 | 0,40 | 3,81 | 2,20 | 0,10   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 4   | 9,525  | 4,76 | 0,80 | 3,81 | 2,10 | 0,15   | 0,08 | 0,40 | 0,10      | 0,08 | 0,30 |  |
| 4   | 9,525  | 4,76 | 1,20 | 3,81 | 2,00 | 0,20   | 0,08 | 0,40 | 0,15      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 0,40 | 5,16 | 2,20 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 4   | 12,700 | 4,76 | 0,80 | 5,16 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 12,700 | 4,76 | 1,20 | 5,16 | 2,00 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 0,40 | 3,81 | 2,20 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 6   | 9,525  | 4,76 | 0,80 | 3,81 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 1,20 | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 1,20 | 3,81 | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |  |
| 6   | 9,525  | 4,76 | 2,00 | 3,81 | 2,50 | 0,35   | 0,10 | 0,70 | 0,16      | 0,10 | 0,40 |  |
| 4   | 9,525  | 4,76 | 0,40 | 3,81 | 2,20 | 0,15   | 0,08 | 0,50 | 0,08      | 0,05 | 0,20 |  |
| 4   | 9,525  | 4,76 | 0,80 | 3,81 | 2,10 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 4   | 9,525  | 4,76 | 1,20 | 3,81 | 2,00 | 0,25   | 0,08 | 0,50 | 0,12      | 0,08 | 0,30 |  |

# CBN SOLID INSERTS

|   |                      |                |                     | H                |                       |                                  |
|---|----------------------|----------------|---------------------|------------------|-----------------------|----------------------------------|
|   |                      | (2) Grade code |                     | W3               | W4                    |                                  |
| Inserts<br>Pastilhas<br>Plaquetas   | (1)<br>Geometry code | ISO Reference  | ANSI Reference      | PBY930           | PBY940                |                                  |
| SOLID INSERT  |                      |                |                     |                  |                       |                                  |
|  | RNGN S               | 1124631        | RNGN 060300-S2020 S | RNGN 220-S2020 S | <input type="radio"/> | <input checked="" type="radio"/> |
|   |                      | 1124630        | RNGN 090300-S2020 S | RNGN 320-S2020 S | <input type="radio"/> | <input checked="" type="radio"/> |
|   |                      | 1124629        | RNGN 120300-S2020 S | RNGN 420-S2020 S | <input type="radio"/> | <input checked="" type="radio"/> |
|   |                      | 1124699        | RNGN 120400-S2020 S | RNGN 430-S2020 S | <input type="radio"/> | <input checked="" type="radio"/> |

Stock Itens | Itens de stock

Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: <sup>(1)</sup>Repair code + <sup>(2)</sup>Grade code

|                    |                                       |                | H                     |                       |
|--------------------|---------------------------------------|----------------|-----------------------|-----------------------|
|                    |                                       | (2) Grade code | W3                    | W4                    |
| (1)<br>Repair code | Reference<br>Referência<br>Referencia |                | PBY930                | PBY940                |
| 3120072            | RNGN 06 (2.18) 00-S2020S (0603)       |                | <input type="radio"/> | <input type="radio"/> |
| 3120058            | RNGN 060200-S2020 S (0903)            |                | <input type="radio"/> | <input type="radio"/> |
| 3120068            | RNGN 060300-S2020 S (0903)            |                | <input type="radio"/> | <input type="radio"/> |
| 3120071            | RNGN 060300-S2020 S (1203)            |                | <input type="radio"/> | <input type="radio"/> |
| 3120057            | RNGN 090300-S2020 S (1203)            |                | <input type="radio"/> | <input type="radio"/> |
| 3120070            | RNGN 090400-S2020 S (1204)            |                | <input type="radio"/> | <input type="radio"/> |
| 3120056            | RNGN 120300-S2020 S (1204)            |                | <input type="radio"/> | <input type="radio"/> |

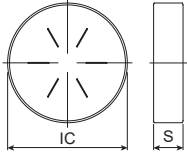
Stock Itens | Itens de stock

Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: <sup>(1)</sup>Repair code + <sup>(2)</sup>Grade code

## CBN SOLID INSERTS



### Reground Inserts

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico                              |
|---|------|--|------|------|-----------|------|------|---|
| IC  | S    | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |   |
| SOLID INSERT  |      |  |      |      |           |      |      |  |
| 4   | 2,40 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |   |
| 4   | 2,40 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |   |
| 4   | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |   |
| 6   | 2,00 | 0,25   | 0,08 | 0,60 | 0,12      | 0,08 | 0,30 |   |

| Final Dimensions (mm)<br>Dimensões Finais (mm)<br>Dimensiones Finales (mm) |      | Raw Material<br>Matéria-prima<br>Materia prima |
|--|------|--|
| IC   | S    |  |
| 6,35   | 2,18 | RNGN 060300-S2020 S                            |
| 6,35   | 2,38 | RNGN 090300-S2020 S                            |
| 6,35   | 3,18 | RNGN 090300-S2020 S                            |
| 6,35   | 3,18 | RNGN 120300-S2020 S                            |
| 9,53   | 3,18 | RNGN 120300-S2020 S                            |
| 9,53   | 4,76 | RNGN 120400-S2020 S                            |
| 12,7   | 3,18 | RNGN 120400-S2020 S                            |

# POSITIVE PCBN INSERTS OVERVIEW

## WITH CHIPBREAKER

| CCGT Z2<br>Multiple Tips   | DCGT Z2<br>Multiple Tips | TPGT Z3<br>Multiple Tips | VBGT Z2<br>Multiple Tips   |
|--|--------------------------|--------------------------|--|
| NEW<br> | NEW                      | NEW                      | NEW<br> |
| Size 06   09   | Size 07   11             | Size 11                  | Size 11   16   |
| Page 20  | Page 20                  | Page 20                  | Page 20  |

| TPGW Z1<br>Single Tip   |
|---|
|  |
| Size 11   |
| Page 24   |

| CCGW Z2<br>Multiple Tips  | DCGW Z2<br>Multiple Tips  | TCGW   TPGW Z3<br>Multiple Tips   |
|---|---|---|
|  |  |  |
| Size 06   09  | Size 07   11  | Size 09   11  |
| Page 22   | Page 22   | Page 24   |

## POSITIVE PCBN INSERTS OVERVIEW

Vista genérica de pastilhas positivas PCBN | Visión general de plaquitas positivas de PCBN

**VBGW Z2**  
Multiple Tips



Size 11 | 16

Page 24



**VCGW Z2**  
Multiple Tips



Size 16

Page 24

# PCBN POSITIVE INSERTS WITH CHIPBREAKER

|   |                      |                    |                   | H      |        |        |
|---|----------------------|--------------------|-------------------|--------|--------|--------|
|   |                      | (2) Grade code     |                   | Y5     | 2H     | Y4     |
| Inserts<br>Pastilhas<br>Plaquetas   | (1)<br>Geometry code | ISO Reference      | ANSI Reference    | PBY603 | PBY610 | PBY620 |
| MULTIPLE TIP  |                      |                    |                   |        |        |        |
| <b>NEW</b> CCGT Z2<br><br>   | 1125193              | CCGT 060204-BR Z2I | CCGT 21.51-BR Z2I |        | ⊗      |        |
|   | 1125225              | CCGT 060208-BR Z2I | CCGT 21.52-BR Z2I |        | ⊗      |        |
|   | 1125194              | CCGT 09T304-BR Z2I | CCGT 32.51-BR Z2I |        | ○      |        |
|   | 1125195              | CCGT 09T308-BR Z2I | CCGT 32.52-BR Z2I |        | ○      |        |
| <b>NEW</b> DCGT Z2  | 1125196              | DCGT 070204-BR Z2I | DCGT 21.51-BR Z2I |        | ⊗      |        |
|   | 1125197              | DCGT 11T304-BR Z2I | DCGT 32.51-BR Z2I |        | ⊗      |        |
|   | 1125198              | DCGT 11T308-BR Z2I | DCGT 32.52-BR Z2I |        | ○      |        |
| <b>NEW</b> TPGT Z3  | 1125199              | TPGT 110304-BR Z3I | TPGT 221-BR Z3I   |        | ○      |        |
|   | 1125200              | TPGT 110308-BR Z3I | TPGT 222-BR Z3I   |        | ○      |        |
| <b>NEW</b> VBGT Z2<br><br> | 1125201              | VBGT 110304-BR Z2I | VBGT 221-BR Z2I   |        | ○      |        |
|   | 1125202              | VBGT 110308-BR Z2I | VBGT 222-BR Z2I   |        | ○      |        |
|   | 1125203              | VBGT 160404-BR Z2I | VBGT 331-BR Z2I   |        | ⊗      |        |
|   | 1125204              | VBGT 160408-BR Z2I | VBGT 332-BR Z2I   |        | ○      |        |

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta


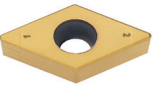
Insert Order Code: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code

# PCBN POSITIVE INSERTS WITH CHIPBREAKER

Multiple tips

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |      |      |    |      |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|------|------|----|------|------|--|------|------|-----------|------|------|--|
| CDEC  | IC   | S    | RE | D1   | SL   | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |  |
| MULTIPLE TIP  |      |      |    |      |      |  |      |      |           |      |      |  |
| 2   | 6,35 | 2,38 | 4  | 2,80 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 6,35 | 2,38 | 8  | 2,80 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 3,97 | 4  | 4,40 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 3,97 | 8  | 4,40 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 6,35 | 2,38 | 4  | 2,80 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 3,97 | 4  | 4,40 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 3,97 | 8  | 4,40 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 6,35 | 2,38 | 4  | 2,80 | 2,50 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 3,97 | 8  | 4,40 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
|   | 6,35 | 3,18 | 4  | 4,30 | 2,30 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 3   | 6,35 | 3,18 | 8  | 4,30 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 6,35 | 3,18 | 4  | 2,80 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 6,35 | 3,18 | 8  | 2,80 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 4,76 | 4  | 4,40 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |
| 2   | 9,53 | 4,76 | 8  | 4,40 | 2,00 | 0,20   | 0,05 | 0,40 | 0,15      | 0,05 | 0,30 |  |

# PCBN POSITIVE INSERTS

|   |                      |                         |                          | H      |        |
|---|----------------------|-------------------------|--------------------------|--------|--------|
|   |                      | (2) Grade code          |                          | Y5     | Y4     |
| Inserts<br>Pastilhas<br>Plaquetas   | (1)<br>Geometry code | ISO Reference           | ANSI Reference           | PBV603 | PBV620 |
| MULTIPLE TIP  |                      |                         |                          |        |        |
|    | 1124605              | CCGW 060202-S1513 Z2    | CCGW 21.50.5-S1513 Z2    | ⊗      | ⊗      |
|   | 1124635              | CCGW 060202-S2513 Z2    | CCGW 21.50.5-S2513 Z2    | ⊗      | ⊗      |
|   | 1124606              | CCGW 060204-S1513 Z2    | CCGW 21.51-S1513 Z2      | ⊗      | ⊗      |
|   | 1124555              | CCGW 060204-S2513 Z2    | CCGW 21.51-S2513 Z2      | ⊗      | ⊗      |
|   | 1124607              | CCGW 060208-S1513 Z2    | CCGW 21.52-S1513 Z2      | ⊗      | ⊗      |
|   | 1124636              | CCGW 060208-S2513 Z2    | CCGW 21.52-S2513 Z2      | ⊗      | ⊗      |
|   | 1124638              | CCGW 09T302-S2513 Z2    | CCGW 32.50.5-S2513 Z2    | ⊗      | ⊗      |
|   | 1124640              | CCGW 09T304-S2513 Z2    | CCGW 32.51-S2513 Z2      | ⊗      | ⊗      |
|   | 1124632              | CCGW 09T308-S2513 Z2    | CCGW 32.52-S2513 Z2      | ⊗      | ⊗      |
|   | 1124637              | CCGW 09T302-S2513 WG Z2 | CCGW 32.50.5-S2513 WG Z2 | ○      | ○      |
|   | 1124639              | CCGW 09T304-S2513 WG Z2 | CCGW 32.51-S2513 WG Z2   | ⊗      | ⊗      |
|   | 1124641              | CCGW 09T308-S2513 WG Z2 | CCGW 32.52-S2513 WG Z2   | ⊗      | ⊗      |
|   | 1124608              | CCGW 09T302-S1513 Z2    | CCGW 32.50.5-S1513 Z2    | ⊗      | ⊗      |
|   | 1124609              | CCGW 09T304-S1513 Z2    | CCGW 32.51-S1513 Z2      | ⊗      | ⊗      |
|   | 1124610              | CCGW 09T308-S1513 Z2    | CCGW 32.52-S1513 Z2      | ⊗      | ⊗      |
|  | 1124642              | DCGW 070202-S1513 Z2    | DCGW 21.50.5-S1513 Z2    | ⊗      | ○      |
|   | 1124611              | DCGW 070202-S2513 Z2    | DCGW 21.50.5-S2513 Z2    | ⊗      | ⊗      |
|   | 1124643              | DCGW 070204-S1513 Z2    | DCGW 21.51-S1513 Z2      | ⊗      | ○      |
|   | 1124436              | DCGW 070204-S2513 Z2    | DCGW 21.51-S2513 Z2      | ⊗      | ⊗      |
|   | 1124644              | DCGW 070208-S1513 Z2    | DCGW 21.52-S1513 Z2      | ○      | ○      |
|   | 1124612              | DCGW 070208-S2513 Z2    | DCGW 21.52-S2513 Z2      | ⊗      | ⊗      |
|   | 1124613              | DCGW 11T302-S2513 Z2    | DCGW 32.50.5-S2513 Z2    | ⊗      | ⊗      |
|   | 1124554              | DCGW 11T304-S2513 Z2    | DCGW 32.51-S2513 Z2      | ⊗      | ⊗      |
|   | 1124744              | DCGW 11T304-S3515 Z2    | DCGW 32.51-S3515 Z2      |        | ⊗      |
|   | 1124614              | DCGW 11T308-S2513 Z2    | DCGW 32.52-S2513 Z2      | ⊗      | ⊗      |
|   | 1124745              | DCGW 11T308-S3515 Z2    | DCGW 32.52-S3515 Z2      |        | ⊗      |
|   | 1124645              | DCGW 11T302-S1513 Z2    | DCGW 32.50.5-S1513 Z2    | ⊗      | ○      |
|   | 1124647              | DCGW 11T304-S1513 Z2    | DCGW 32.51-S1513 Z2      | ⊗      | ⊗      |
|   | 1124649              | DCGW 11T308-S1513 Z2    | DCGW 32.52-S1513 Z2      | ⊗      | ○      |

⊗ Stock Itens | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code

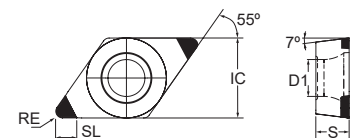
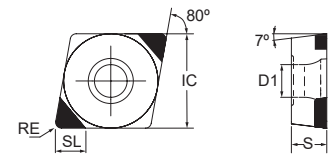
# PCBN POSITIVE INSERTS

Multiple tips






| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |    |   |    |    |    | Cutting conditions<br>Condições de corte<br>Condiciones de corte |     |     |           |     |     | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|----|---|----|----|----|--|-----|-----|-----------|-----|-----|--|
| CDEC  | IC | S | RE | D1 | SL | AP (mm)  | MIN | MAX | FN (mm/r) | MIN | MAX |  |

MULTIPLE TIP

|   |       |      |      |      |      |      |      |      |      |      |      |
|---|-------|------|------|------|------|------|------|------|------|------|------|
| 2 | 6,350 | 2,38 | 0,20 | 2,80 | 2,00 | 0,15 | 0,05 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 6,350 | 2,38 | 0,20 | 2,80 | 2,40 | 0,15 | 0,05 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 6,350 | 2,38 | 0,40 | 2,80 | 2,00 | 0,15 | 0,05 | 0,40 | 0,08 | 0,05 | 0,25 |
| 2 | 6,350 | 2,38 | 0,40 | 2,80 | 2,00 | 0,15 | 0,05 | 0,40 | 0,08 | 0,05 | 0,25 |
| 2 | 6,350 | 2,38 | 0,80 | 2,80 | 2,00 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 6,350 | 2,38 | 0,80 | 2,80 | 2,40 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 9,525 | 3,97 | 0,20 | 4,40 | 2,50 | 0,15 | 0,05 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 9,525 | 3,97 | 0,40 | 4,40 | 2,50 | 0,20 | 0,08 | 0,40 | 0,10 | 0,05 | 0,25 |
| 2 | 9,525 | 3,97 | 0,80 | 4,40 | 2,50 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 9,525 | 3,97 | 0,20 | 4,40 | 2,40 | 0,15 | 0,05 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 9,525 | 3,97 | 0,40 | 4,40 | 2,40 | 0,20 | 0,08 | 0,40 | 0,10 | 0,05 | 0,25 |
| 2 | 9,525 | 3,97 | 0,80 | 4,40 | 2,40 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 9,525 | 3,97 | 0,20 | 4,40 | 2,00 | 0,15 | 0,05 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 9,525 | 3,97 | 0,40 | 4,40 | 2,00 | 0,20 | 0,08 | 0,40 | 0,10 | 0,05 | 0,25 |
| 2 | 9,525 | 3,97 | 0,80 | 4,40 | 2,00 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 6,350 | 2,38 | 0,20 | 2,80 | 2,50 | 0,15 | 0,08 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 6,350 | 2,38 | 0,20 | 2,80 | 2,00 | 0,15 | 0,08 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 6,350 | 2,38 | 0,40 | 2,80 | 2,50 | 0,15 | 0,08 | 0,40 | 0,08 | 0,05 | 0,25 |
| 2 | 6,350 | 2,38 | 0,40 | 2,80 | 2,40 | 0,15 | 0,08 | 0,40 | 0,08 | 0,05 | 0,25 |
| 2 | 6,350 | 2,38 | 0,80 | 2,80 | 2,00 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 6,350 | 2,38 | 0,80 | 2,80 | 2,50 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 9,525 | 3,97 | 0,20 | 4,40 | 2,70 | 0,15 | 0,08 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 9,525 | 3,97 | 0,40 | 4,40 | 2,50 | 0,20 | 0,08 | 0,40 | 0,10 | 0,05 | 0,25 |
| 2 | 9,525 | 3,97 | 0,40 | 4,40 | 2,50 | 0,20 | 0,08 | 0,40 | 0,10 | 0,05 | 0,25 |
| 2 | 9,525 | 3,97 | 0,80 | 4,40 | 2,00 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 9,525 | 3,97 | 0,80 | 4,40 | 2,00 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |
| 2 | 9,525 | 3,97 | 0,20 | 4,40 | 2,70 | 0,15 | 0,08 | 0,20 | 0,08 | 0,05 | 0,20 |
| 2 | 9,525 | 3,97 | 0,40 | 4,40 | 2,50 | 0,20 | 0,08 | 0,40 | 0,10 | 0,05 | 0,25 |
| 2 | 9,525 | 3,97 | 0,80 | 4,40 | 2,00 | 0,20 | 0,08 | 0,50 | 0,10 | 0,08 | 0,30 |



# PCBN POSITIVE INSERTS

|   |                      |                      |                         | H      |        |
|---|----------------------|----------------------|-------------------------|--------|--------|
|   |                      | (2) Grade code       |                         | Y5     | Y4     |
| Inserts<br>Pastilhas<br>Plaquetas   | (1)<br>Geometry code | ISO Reference        | ANSI Reference          | PBYG03 | PBYG20 |
| MULTIPLE TIP  |                      |                      |                         |        |        |
|    | 1124715              | TCGW 110204-S2513 Z3 | TCGW 21.51-S2513 Z3     | ○      |        |
|   | 1124434              | TCGW 16T304-S2513 Z3 | TCGW 32.51-S2513 Z3     | ⊗      | ⊗      |
|   | 1124651              | TCGW 16T308-S2513 Z3 | TCGW 32.52-S2513 Z3     | ⊗      | ⊗      |
| SINGLE TIP  |                      |                      |                         |        |        |
|    | 1124657              | TPGW 110302-S2513 Z1 | TPGW 220.5-S2513 Z1     | ○      | ○      |
|   | 1124660              | TPGW 110304-S2513 Z1 | TPGW 221-S2513 Z1       | ⊗      | ○      |
|   | 1124598              | TPGW 110308-S2513 Z1 | TPGW 222-S2513 Z1       | ⊗      | ⊗      |
| MULTIPLE TIP  |                      |                      |                         |        |        |
|    | 1124653              | TPGW 090202-S2513 Z3 | TPGW 1.81.50.5-S2513 Z3 | ⊗      | ○      |
|   | 1124655              | TPGW 090204-S2513 Z3 | TPGW 1.81.51-S2513 Z3   | ⊗      | ⊗      |
|   | 1124652              | TPGW 090202-S1513 Z3 | TPGW 1.81.50.5-S1513 Z3 | ⊗      | ○      |
|   | 1124654              | TPGW 090204-S1513 Z3 | TPGW 1.81.51-S1513 Z3   | ⊗      | ○      |
|   | 1124658              | TPGW 110302-S2513 Z3 | TPGW 220.5-S2513 Z3     | ⊗      | ⊗      |
|   | 1124661              | TPGW 110304-S2513 Z3 | TPGW 221-S2513 Z3       | ⊗      | ⊗      |
|   | 1124663              | TPGW 110308-S2513 Z3 | TPGW 222-S2513 Z3       | ○      | ⊗      |
|   | 1124656              | TPGW 110302-S1513 Z3 | TPGW 220.5-S1513 Z3     | ⊗      | ○      |
|   | 1124659              | TPGW 110304-S1513 Z3 | TPGW 221-S1513 Z3       | ⊗      | ○      |
|   | 1124662              | TPGW 110308-S1513 Z3 | TPGW 222-S1513 Z3       | ○      | ○      |
|  | 1124664              | VBGW 110302-S2513 Z2 | VBGW 220.5-S2513 Z2     | ⊗      | ⊗      |
|   | 1124665              | VBGW 110304-S2513 Z2 | VBGW 221-S2513 Z2       | ⊗      | ⊗      |
|   | 1124666              | VBGW 110308-S2513 Z2 | VBGW 222-S2513 Z2       | ○      | ⊗      |
|   | 1124618              | VBGW 160402-S2513 Z2 | VBGW 330.5-S2513 Z2     | ⊗      | ⊗      |
|   | 1124619              | VBGW 160404-S2513 Z2 | VBGW 331-S2513 Z2       | ⊗      | ⊗      |
|   | 1124620              | VBGW 160408-S2513 Z2 | VBGW 332-S2513 Z2       | ⊗      | ⊗      |
|   | 1124621              | VBGW 160402-S1513 Z2 | VBGW 330.5-S1513 Z2     | ⊗      | ⊗      |
|   | 1124622              | VBGW 160404-S1513 Z2 | VBGW 331-S1513 Z2       | ⊗      | ⊗      |
|   | 1124623              | VBGW 160408-S1513 Z2 | VBGW 332-S1513 Z2       | ⊗      | ⊗      |
|  | 1124667              | VCGW 160404-S2513 Z2 | VCGW 331-S2513 Z2       | ⊗      | ⊗      |
|   | 1124668              | VCGW 160408-S2513 Z2 | VCGW 332-S2513 Z2       | ⊗      | ⊗      |

⊗ Stock Items | Itens de stock

○ Available under request | Disponível sob consulta | Disponible bajo consulta

Insert Order Code: (1) Geometry code + (2) Grade code

# PCBN POSITIVE INSERTS

Single tip | Multiple tips

| Dimensions (mm)<br>Dimensões (mm)<br>Dimensiones (mm) |       |      |      |      |      | Cutting conditions<br>Condições de corte<br>Condiciones de corte |      |      |           |      |      | Technical drawing<br>Desenho técnico<br>Dibujo técnico |
|---|-------|------|------|------|------|--|------|------|-----------|------|------|--|
| CDEC  | IC    | S    | RE   | D1   | SL   | AP (mm)  | MIN  | MAX  | FN (mm/r) | MIN  | MAX  |  |
| MULTIPLE TIP  |       |      |      |      |      |  |      |      |           |      |      |  |
| 3   | 6,350 | 2,38 | 0,20 | 4,40 | 2,50 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 3   | 9,525 | 3,97 | 0,40 | 4,40 | 2,50 | 0,15   | 0,08 | 0,45 | 0,08      | 0,05 | 0,20 |  |
| 3   | 9,525 | 3,97 | 0,80 | 4,40 | 2,00 | 0,20   | 0,08 | 0,45 | 0,10      | 0,08 | 0,30 |  |
| SINGLE TIP  |       |      |      |      |      |  |      |      |           |      |      |  |
| 1   | 6,350 | 3,18 | 0,20 | 2,80 | 2,40 | 0,15   | 0,08 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 1   | 6,350 | 3,18 | 0,40 | 2,80 | 2,30 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 1   | 6,350 | 3,18 | 0,80 | 2,80 | 2,40 | 0,20   | 0,08 | 0,45 | 0,10      | 0,08 | 0,20 |  |
| MULTIPLE TIP  |       |      |      |      |      |  |      |      |           |      |      |  |
| 3   | 5,560 | 2,38 | 0,20 | 2,50 | 2,50 | 0,10   | 0,05 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 3   | 5,560 | 2,38 | 0,40 | 2,50 | 2,30 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,15 |  |
| 3   | 5,560 | 2,38 | 0,20 | 2,50 | 2,50 | 0,10   | 0,08 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 3   | 5,560 | 2,38 | 0,40 | 2,50 | 2,30 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,15 |  |
| 3   | 6,350 | 3,18 | 0,20 | 2,80 | 2,40 | 0,15   | 0,08 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 3   | 6,350 | 3,18 | 0,40 | 2,80 | 2,30 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 3   | 6,350 | 3,18 | 0,80 | 2,80 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,20 |  |
| 3   | 6,350 | 3,18 | 0,20 | 2,80 | 2,40 | 0,15   | 0,08 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 3   | 6,350 | 3,18 | 0,40 | 2,80 | 2,30 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 3   | 6,350 | 3,18 | 0,80 | 2,80 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,20 |  |
| 2   | 6,350 | 3,18 | 0,20 | 2,80 | 3,20 | 0,10   | 0,08 | 0,20 | 0,05      | 0,05 | 0,15 |  |
| 2   | 6,350 | 3,18 | 0,40 | 2,80 | 2,80 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 2   | 6,350 | 3,18 | 0,80 | 2,80 | 2,00 | 0,15   | 0,08 | 0,50 | 0,10      | 0,08 | 0,25 |  |
| 2   | 9,525 | 4,76 | 0,20 | 4,40 | 2,00 | 0,10   | 0,08 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 2   | 9,525 | 4,76 | 0,40 | 4,40 | 2,00 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 2   | 9,525 | 4,76 | 0,80 | 4,40 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 9,525 | 4,76 | 0,20 | 4,40 | 2,00 | 0,10   | 0,08 | 0,20 | 0,08      | 0,05 | 0,15 |  |
| 2   | 9,525 | 4,76 | 0,40 | 4,40 | 2,00 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 2   | 9,525 | 4,76 | 0,80 | 4,40 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |
| 2   | 9,525 | 4,76 | 0,40 | 4,40 | 2,80 | 0,15   | 0,08 | 0,40 | 0,08      | 0,05 | 0,20 |  |
| 2   | 9,525 | 4,76 | 0,80 | 4,40 | 2,00 | 0,20   | 0,08 | 0,50 | 0,10      | 0,08 | 0,30 |  |

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