



# CERABOOST

INDEXABLE INSERTS AND SOLID CERAMIC END MILLS

## NEW CERAMIC CUTTING TOOLS



# CERABOOST

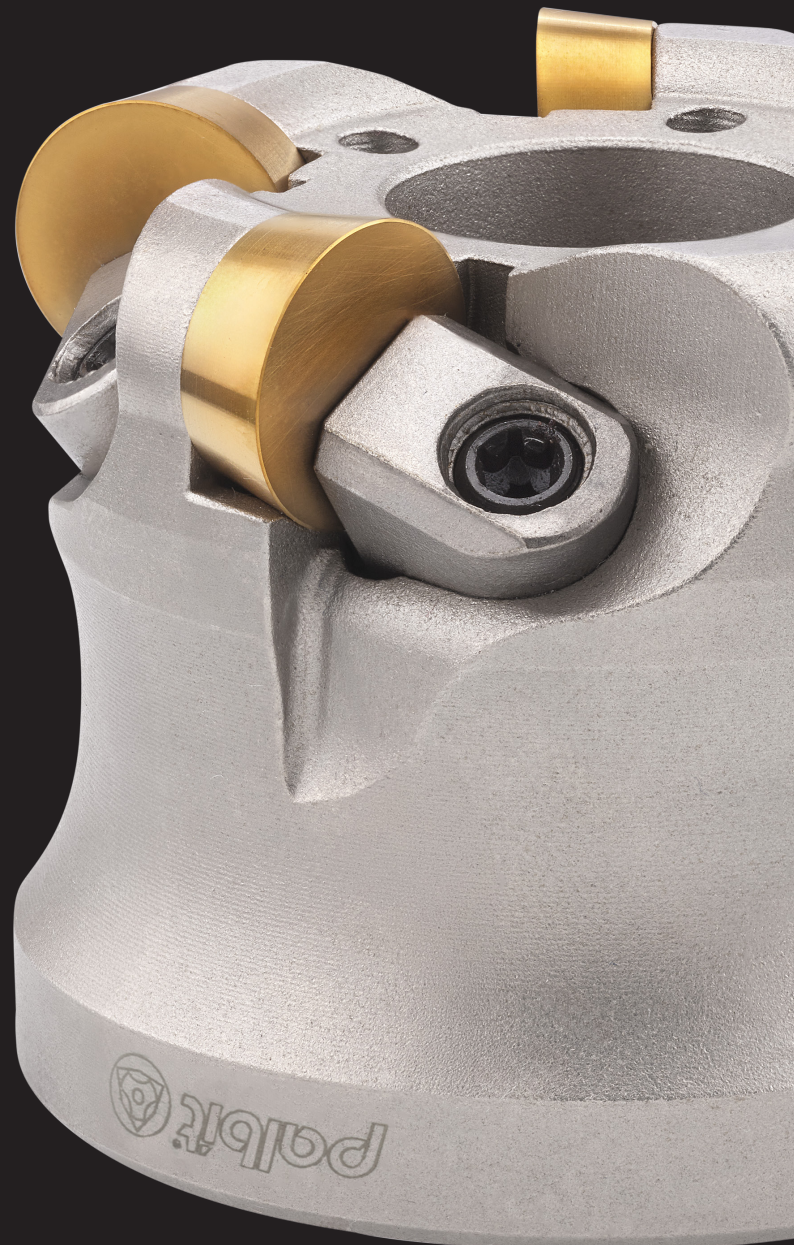
## INDEXABLE INSERTS AND SOLID CERAMIC END MILLS

The evolution of modern manufacturing has led to the increased use of difficult-to-machine materials, such as iron-based, nickel-based, cobalt-based, and titanium-based superalloys. While these materials offer superior performance, their high temperature properties, high hardness and wear resistance present significant challenges for traditional tools, often resulting in extremely low tool life. This drives the need for advanced tools to effectively overcome these machining difficulties.

Ceramic cutting tools have emerged as a revolutionary solution in machining technology, delivering exceptional performance in high speed and high temperature applications. Designed specifically for materials such as heat resistant superalloys and hardened steels, where traditional carbide tools struggle, ceramics redefine the efficiency of modern machining operations with exceptional thermal resistance, high hardness and the ability to maintain edge integrity at extreme speeds. Their use results in faster cycle times, increasing productivity and cost effectiveness.

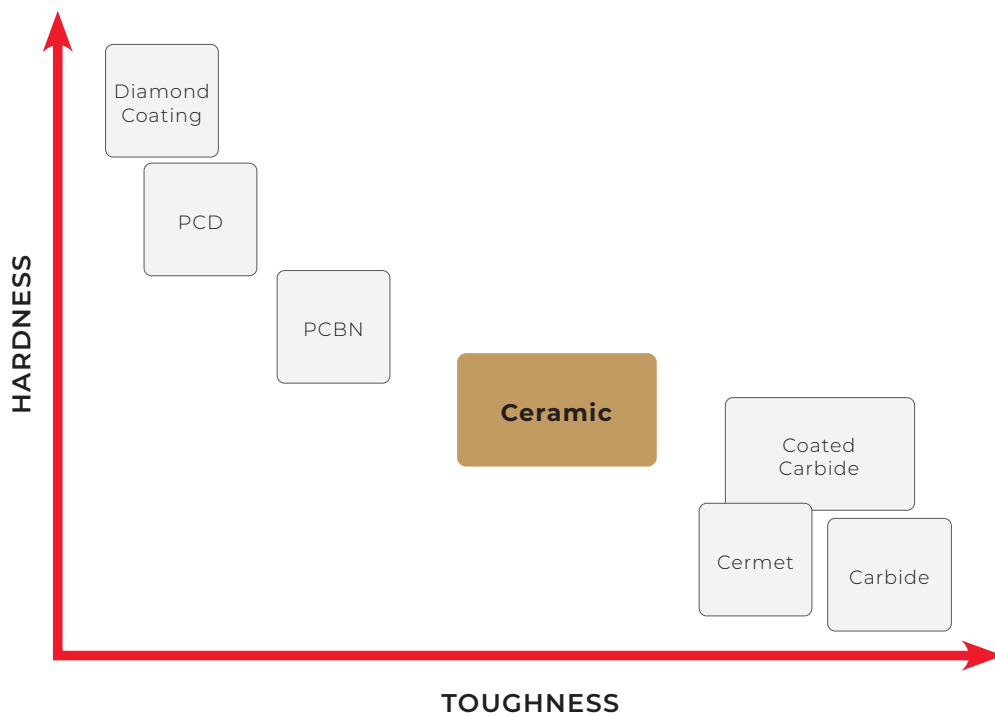
With the introduction of the **CERABOOST** line, Palbit is taking an exciting step into the world of ceramic tools. Using our extensive expertise in cutting tool solutions, we have developed a range of ceramic tools designed to meet the most demanding machining challenges.

**Redefining machining  
excellence** with advanced  
ceramic solutions for  
challenging materials.



## NEW CERAMIC GRADES

To meet the challenges of machining advanced materials, ceramic cutting tools have been developed and are now regarded as one of the most effective solutions. Their excellent heat resistance and chemical stability, exceptional hardness, and wear resistance make them highly suitable for demanding applications. Primarily composed of alumina ( $\text{Al}_2\text{O}_3$ ) or silicon nitride ( $\text{Si}_3\text{N}_4$ ), ceramic tools are tailored to meet specific requirements through the use of different grades and additives. These tools excel in high-speed machining and extreme environments, offering superior performance and high material removal rates compared to traditional materials, making them a preferred choice for demanding applications.



## KEY BENEFITS OF THE CERAMIC GRADES

- Excellent heat resistance
- High hardness
- High wear resistance
- Excellent chemical stability
- Dry machining

## NEW CERAMIC GRADES

Palbit offers a special ceramic grade, **PCN010**, which can be either coated or uncoated, being ideal for machining nickel-based alloys, such as Inconel. The **PCN010** grade, with a SiAlON composition, makes it possible to achieve high material removal rates under extreme operating conditions while minimising wear in roughing applications. SiAlON ceramic grades are characterised by their exceptional hardness and an extreme wear resistance allied with chemical stability.

The **PCN010** grade, when coated, becomes the **PCNY10** grade, offering several key benefits. These include easy wear detection, a low coefficient of friction, reduced material adhesion, and more stable wear progression.



### Top coating (TiN)

Designed for easy wear detection, low friction coefficient, reduced material adhesion, and more stable wear progression.



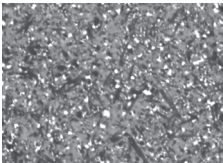
### Doped layer

Enhances thermal stability together with high hardness and good oxidation resistance.



### Inner coating (TiAlN)

Offers excellent wear and high temperature resistance, thus allowing working at higher cutting speeds.



### Substrate

Palbit SiAlON ceramic substrate combined with excellent heat resistance and high hardness.





## INTRODUCING CERABOOST PRODUCTS

Nickel-based superalloys are valued for their exceptional high-temperature strength, structural reliability and resistance to corrosion and fatigue, making them ideal for engineering components subject to high thermo-mechanical loads, particularly in the aerospace industry. However, their remarkable properties result in poor machinability, which limits processing efficiency. Challenges include high shear strength, tendency to work hardening, abrasive carbide precipitates and extreme temperatures at the tool-chip interface. In addition, low thermal conductivity impedes heat removal, while the material's high weldability causes built-up edge on cutting tools, further complicating machining operations and requiring advanced cutting technologies to improve performance and efficiency.

Palbit's **CERABOOST** range combines advanced ceramic technology with optimised geometry to deliver outstanding performance and efficiency in nickel-based alloys, from roughing to semi-finishing.

The **CERABOOST** range of milling tools includes ceramic indexable inserts and solid ceramic end mills. They are designed to meet the different requirements of superalloys machining.



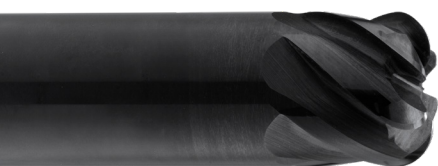
### INDEXABLE INSERTS:

**CERABOOST 44090 | RPGN 0602:** Diameter Ø16 and Ø20mm.

**CERABOOST 44190 | RPGN 0903:** Diameter Ø25 and Ø32mm.

**CERABOOST 44290 | RPGN 1204:** Diameter Ø32, Ø40 and Ø50mm.

**CERABOOST 44590 | RPGN 1207:** Diameter Ø50, Ø63 and Ø80mm.



### SOLID CERAMIC END MILLS:

**CERABOOST CR42SS:** Diameter Ø6 to Ø16mm.

# CERABOOST INDEXABLE INSERTS

**CERABOOST 44090 | 44190 | 44290 | 44590** is a high performance ceramic insert milling solution for machining heat resistant superalloys, offering both round positive and negative insert geometries to meet different requirements. Designed for stability, it improves machining processes by delivering consistent performance at high speeds, resulting in increased productivity in demanding applications such as aerospace and energy.

## Round Inserts

Positive or negative inserts.

## Shank Type

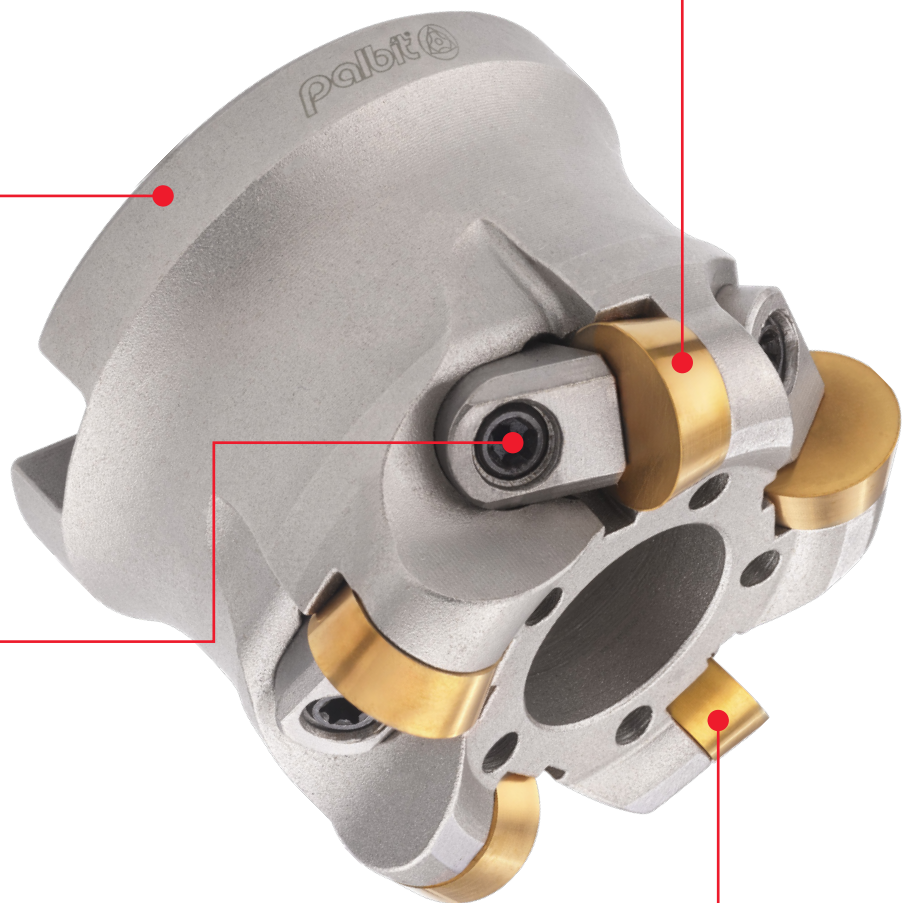
With threaded or arbor mounting to enable both small and large cutting diameters.

## Clamp System

Wedge or screw clamp to ensure quick and easy indexing.

## Coated Inserts

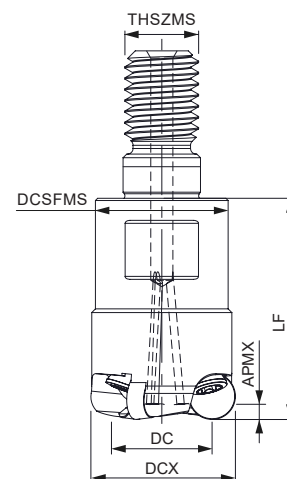
To reduce material adhesion.



# CERABOOST 44090 | 44190 | 44290



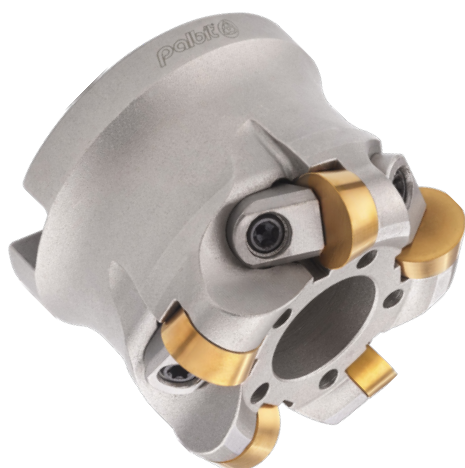
**Threaded Coupling**  
KAPR=90° | GAMP=+5°~+5,5°



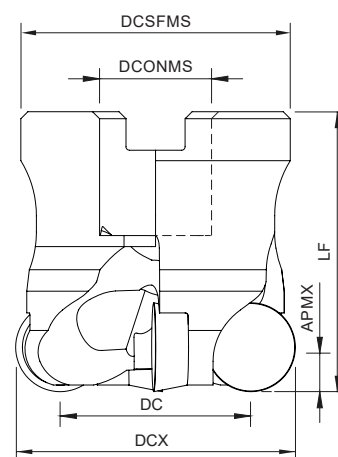
| Order code<br>Código | Reference<br>Referência<br>Referencia | CICT | Dimensions   Dimensões   Dimensiones (mm) |      |        |        |    | WT    | Specifications | Insert<br>Pastilha<br>Inserto | Stock |
|----------------------|---------------------------------------|------|---|------|--------|--------|----|-------|----------------|-------------------------------|-------|
|                      |                                       |      | DCX                                       | DC   | THSZMS | DCSFMS | LF |       | APMX (mm)      |                               |       |
| 44090                |                                       |      |   |      |        |        |    |       |                |                               |       |
| 181208900            | 016R44090-02-04-M08023                | 2    | 16  | 9,7  | M8     | 14     | 23 | 0,030 | 1,60           | RPGN 0602..                   | Ⓢ     |
| 181209000            | 020R44090-03-05-M10030                | 3    | 20  | 13,7 | M10    | 18     | 30 | 0,060 | 1,60           | RPGN 0602..                   | Ⓢ     |
| 44190                |                                       |      |   |      |        |        |    |       |                |                               |       |
| 181209100            | 025R44190-03-05-M12035                | 3    | 25  | 15,5 | M12    | 21     | 35 | 0,090 | 2,50           | RPGN 0903..                   | Ⓢ     |
| 181209200            | 032R44190-04-05-M16043                | 4    | 32  | 22,5 | M16    | 29     | 43 | 0,210 | 2,50           | RPGN 0903..                   | Ⓢ     |
| 44290                |                                       |      |   |      |        |        |    |       |                |                               |       |
| 181209300            | 032R44290-03-00-M16043                | 3    | 32  | 19,4 | M16    | 29     | 43 | 0,200 | 3,20           | RPGN 1204..                   | Ⓢ     |

Ⓢ Stock item | Produto de stock | Itens de stock

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



**Arbor Mounting**  
KAPR=90° | GAMP=0°+5°

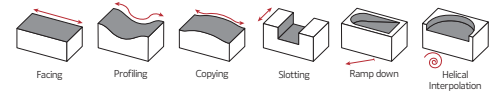


| Order code<br>Código | Reference<br>Referência<br>Referencia | CICT | Dimensions   Dimensões   Dimensiones (mm) |      |        |        |    | WT    | Specifications |              | Insert<br>Pastilha<br>Inserto | Stock |
|----------------------|---------------------------------------|------|---|------|--------|--------|----|-------|----------------|--------------|-------------------------------|-------|
|                      |                                       |      | DCX                                       | DC   | DCONMS | DCSFMS | LF |       | Arbor<br>Type  | APMX<br>(mm) |                               |       |
| 44290                |                                       |      |   |      |        |        |    |       |                |              |                               |       |
| 181208700            | 040B44290-04-00-016040                | 4    | 40  | 27,3 | 16     | 38,5   | 40 | 0,180 | A              | 3,20         | RPGN 1204..                   | Ⓢ     |
| 181208800            | 050B44290-05-05-022040                | 5    | 50  | 37,4 | 22     | 49,0   | 40 | 0,281 | A              | 3,20         | RPGN 1204..                   | Ⓢ     |

Ⓢ Stock item | Produto de stock | Itens de stock

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

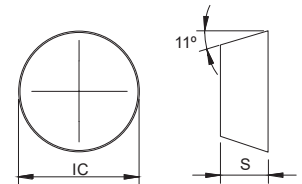







## RPGN Inserts | Pastilhas | Plaquetas



RPGN



RPGN

|                                 |                   | S   | Dimensions<br>Dimensões<br>Dimensiones<br>(mm) |      |
|---------------------------------|-------------------|---|--|------|
|                                 |                   | PVD   |  |      |
|                                 |                   | <sup>(2)</sup> Grade code   |  |      |
| <sup>(1)</sup><br>Geometry code | ISO<br>Reference  | PCNY10  | IC   | S    |
| 1113539                         | RPGN 060200-T2010 |  | 6,35   | 2,38 |
| 1113540                         | RPGN 090300-T2010 |  | 9,525  | 3,18 |
| 1125066                         | RPGN 120400-T2010 |  | 12,70  | 4,76 |

First choice | Primeira opção | 1ª opción

Stock item | Produto de stock | Itens de stock

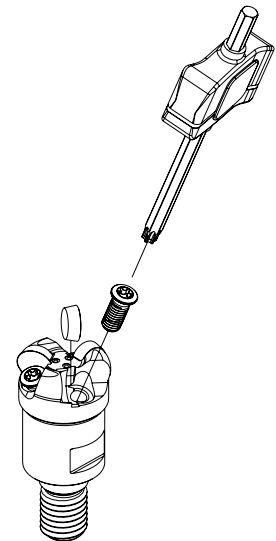
Available under request | Disponível sobre consulta  
Disponible bajo consulta

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

## SPARE PARTS Acessórios | Repuestos

| Cutter<br>DC     | Screw Clamp | Wedge Screw | Wedge Clamp | Chuck Screw | Key (Torx) | Key (Torx - Nm) |
|------------------|-------------|-------------|-------------|-------------|------------|-----------------|
|                  |             |             |             |             |            |                 |
| R44090 - 16 - 20 | P0401000    | -           | -           | -           | XT15-S35   | DT1530          |
| R44190 - 25 - 32 | P0501302    | -           | -           | -           | XT20-S40   | DT2050          |
| R44290 - 32      | P0501302    | -           | -           | -           | XT20-S40   | DT2050          |
| B44290 - 40      | -           | F0601300    | WA06000     | D0803596    | XT15-S35   | DT1530          |
| B44290 - 50      | -           | F0601300    | WA06000     | -           | XT15-S35   | DT1530          |

Order separately



## RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

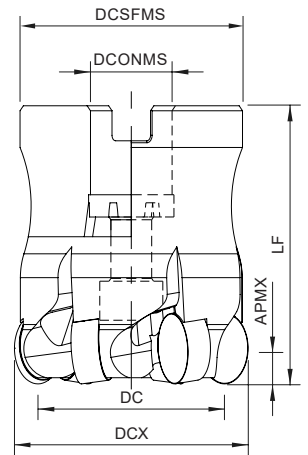
| ISO | PSM | Material              | HB<br>(Brinell) | Vc (m/min) | Feed fz (mm/t) |             |             |
|-----|-----|-----------------------|-----------------|------------|----------------|-------------|-------------|
|     |     |                       |                 | PCNY10     | RPGN 0602..    | RPGN 0903.. | RPGN 1204.. |
| S   | 11  | Ni-based super alloys | 200-450         | 500-1300   | 0,05-0,12      | 0,05-0,15   | 0,05-0,20   |

(Note 1) Cutting conditions  $a_e/DC=70\%$ .

# CERABOOST 44590



**Arbor Mounting**  
KAPR=90° | GAMP=-5°



| Order code<br>Código | Reference<br>Referência<br>Referencia | CIC | Dimensions   Dimensões   Dimensiones (mm) |       |        |        |    | WT    | Specifications |              | Insert<br>Pastilha<br>Inserto | Stock |
|----------------------|---------------------------------------|-----|---|-------|--------|--------|----|-------|----------------|--------------|-------------------------------|-------|
|                      |                                       |     | DCX                                       | DC    | DCONMS | DCSFMS | LF |       | Arbor<br>Type  | APMX<br>(mm) |                               |       |
| 44590                |                                       |     |   |       |        |        |    |       |                |              |                               |       |
| 181209400            | 050B44590-04-05-022040                | 4   | 50  | 37,45 | 22     | 49     | 40 | 0,320 | A              | 3,20         | RNGN 1207..                   | ⊗     |
| 181209500            | 063B44590-06-05-022050                | 6   | 63  | 50,30 | 22     | 60     | 50 | 0,690 | A              | 3,20         | RNGN 1207..                   | ⊗     |
| 181209600            | 080B44590-07-05-027050                | 7   | 80  | 67,54 | 27     | 64     | 50 | 1,000 | A              | 3,20         | RNGN 1207..                   | ⊗     |

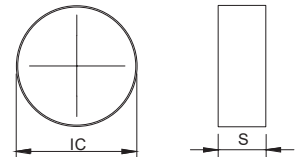
⊗ Stock item | Produto de stock | Itens de stock

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

## RNGN Inserts | Pastilhas | Plaquetas



RNGN



RNGN

|                   |                   | S      | Dimensions<br>Dimensões<br>Dimensiones<br>(mm) |
|-------------------|-------------------|--------|--|
|                   |                   | PVD    |  |
|                   | (2) Grade code    | 2J     |  |
| (1) Geometry code | ISO Reference     | PCNY10 |  |
| 1113541           | RNGN 120700-T2010 | ⊗      | IC 12,70 S 7,94                                |

⊗ First choice | Primeira opção | 1ª opción

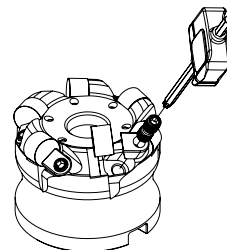
⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta  
Disponible bajo consulta

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

## SPARE PARTS Acessórios | Repuestos

| Cutter<br>DC     | Wedge Screw | Wedge Clamp | Key (Torx) | Key<br>(Torx - Nm) |
|------------------|-------------|-------------|------------|--------------------|
|                  |             |             |            |                    |
| B44590 - 50      | F0601300    | WA06000     | XT15-S35   | DT1530             |
| B44590 - 63 - 80 | F0601600    | WA06000     | XT15-S35   | DT1530             |

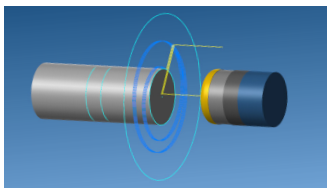


## RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

| ISO | PSM | Material              | HB<br>(Brinell) | Vc (m/min) | Feed fz (mm/t) |
|-----|-----|-----------------------|-----------------|------------|----------------|
|     |     |                       |                 | PCNY10     | RNGN 1204..    |
| S   | 11  | Ni-based super alloys | 200-450         | 500-1300   | 0,05-0,20      |

(Note 1) Cutting conditions  $a_e/DC=70\%$ .

# TEST REPORT | RPGN inserts



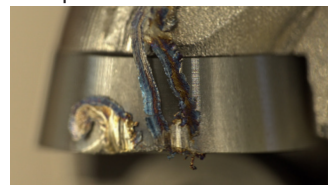
**Toolholder:** 025R44190-03-05-M12035  
**Insert:** RPGN 090300-T2010 PCNY10  
**Workpiece Material:** Inconel 718 (20 HRC)  
**Operation:** Face Milling  
**Coolant:** Dry

|                       |           |
|-----------------------|-----------|
| Diameter: DC          | 25 mm     |
| Number of teeth: Z    | 3         |
| Cutting speed: $V_c$  | 800 m/min |
| Feed per tooth: $f_z$ | 0,10 mm/t |
| Depth of cut: ap      | 0,5 mm    |
| Stepover : ae         | 12,5 mm   |

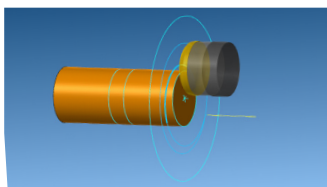
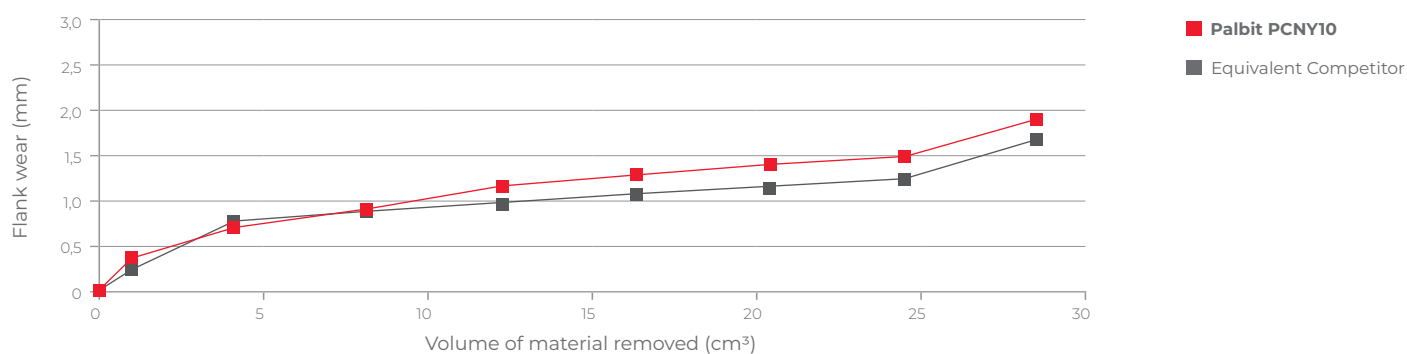
Palbit



Competitor



Flank wear after 28,6 cm³ of material removed



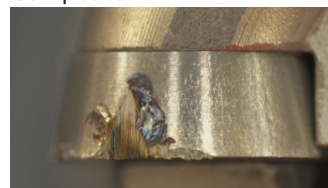
**Toolholder:** 040B44290-04-05-016040  
**Insert:** RPGN 120400-T2010 PCNY10  
**Workpiece Material:** Inconel 718 (20 HRC)  
**Operation:** Face Milling  
**Coolant:** Dry

|                       |            |
|-----------------------|------------|
| Diameter: DC          | 40 mm      |
| Number of teeth: Z    | 4          |
| Cutting speed: $V_c$  | 1000 m/min |
| Feed per tooth: $f_z$ | 0,10 mm/t  |
| Depth of cut: ap      | 1 mm       |
| Stepover : ae         | 20 mm      |

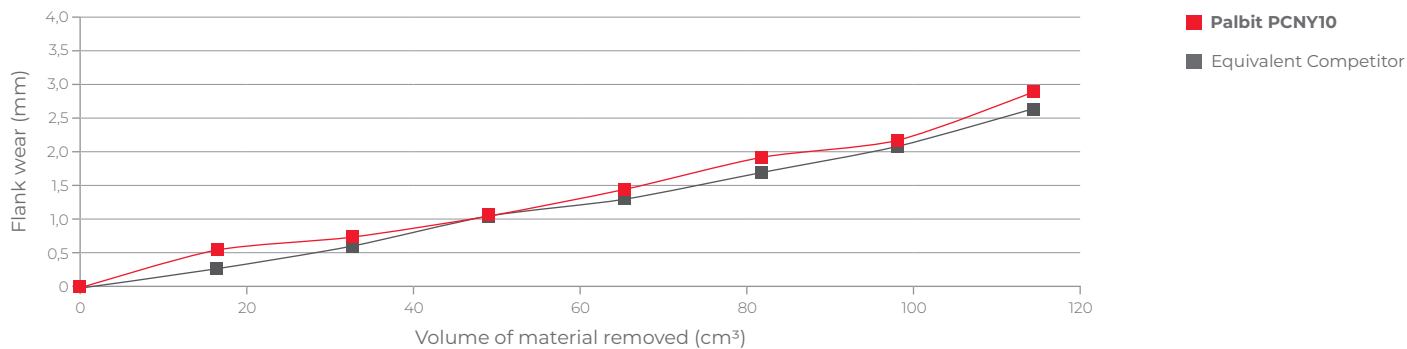
Palbit



Competitor



Flank wear after 114,4 cm³ of material removed



# CERABOOST CR42SS

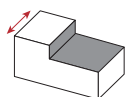
**CERABOOST CR42SS** end mills feature an advanced substrate combined with a unique cutting geometry to deliver improved productivity. The strength of the ceramic allows users to apply chip loads comparable to solid carbide end mills while operating at the higher speeds typical of ceramic machining. These innovative ceramic end mills offer a significant increase in productivity compared to traditional solid carbide tools.

The versatile CR42SS geometry is developed to handle a wide range of operations in nickel-based alloys.

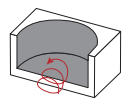
## Features & Benefits

- High speeds for increased productivity
- High material removal rates
- Optimized cutting edge for nickel-based alloys
- Ramping capability up to 2,5°
- Suitable for dynamic trochoidal milling
- PCN010 grade for improving productivity and wear resistance

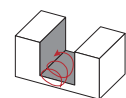
## Operations



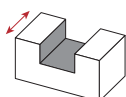
Shouldering



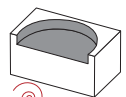
Trochoidal Milling



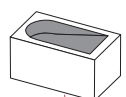
Trochoidal Slotting



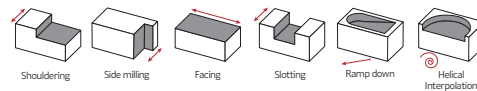
Slotting



Helical Interpolation



Ramp Down



### Robust Core

75% of the cutting diameter.

### High Performance Substrate

High heat resistance for high speed machining.

### Optimized Flute Geometry

For smooth chip evacuation.

### 6 or 8 flutes

For high feed rates.

### Front Cutting Edge Cavity

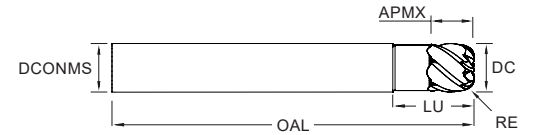
Optimized ball gash / s-gash for better chip evacuation

### Corner Radius

Minimize edge chipping and extend tool life ensuring reliability.



## CR42SS Corner radius



|                           | <sup>(2)</sup> Grade code             |     | 1J     | Dimensions   Dimensões   Dimensiones (mm) |        |      |      |      |     |
|---------------------------|---------------------------------------|-----|--------|---|--------|------|------|------|-----|
| <sup>(1)</sup> Order code | Reference<br>Referência<br>Referencia | NOF | PCN010 | DC  | DCONMS | APMX | RE   | LU   | OAL |
| HA (Cylindrical)          |                                       |     |        |   |        |      |      |      |     |
| 1182588                   | CR42SS 6 060 045 R200                 | 6   | ⊗      | 6   | 6      | 4,5  | 2,00 | 10,5 | 60  |
| 1182589                   | CR42SS 6 080 065 R200                 | 6   | ⊗      | 8   | 8      | 6,5  | 2,00 | 12,5 | 60  |
| 1182590                   | CR42SS 6 100 065 R200                 | 6   | ⊗      | 10  | 10     | 6,5  | 2,00 | 12,5 | 65  |
| 1182591                   | CR42SS 6 120 090 R200                 | 6   | ⊗      | 12  | 12     | 9,0  | 2,00 | 15,0 | 70  |
| 1182592                   | CR42SS 8 160 140 R200                 | 8   | ⊗      | 16  | 16     | 14,0 | 2,00 | 20,0 | 90  |

⊗ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

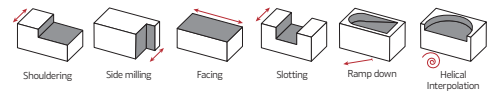
End mill order code = (1) Geometry Code + (2) Grade Code

## RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

|     |     |                       |         |            | ae / DC = 10% |           |           |           |           |
|-----|-----|-----------------------|---------|------------|---------------|-----------|-----------|-----------|-----------|
| ISO | PSM | Material              | HB      | Vc (m/min) | fz (mm/t)     |           |           |           |           |
|     |     |                       |         |            | 6             | 8         | 10        | 12        | 16        |
| S   | 11  | Ni-based super alloys | 200-450 | 500-750    | 0,02-0,04     | 0,02-0,04 | 0,02-0,06 | 0,03-0,06 | 0,03-0,06 |

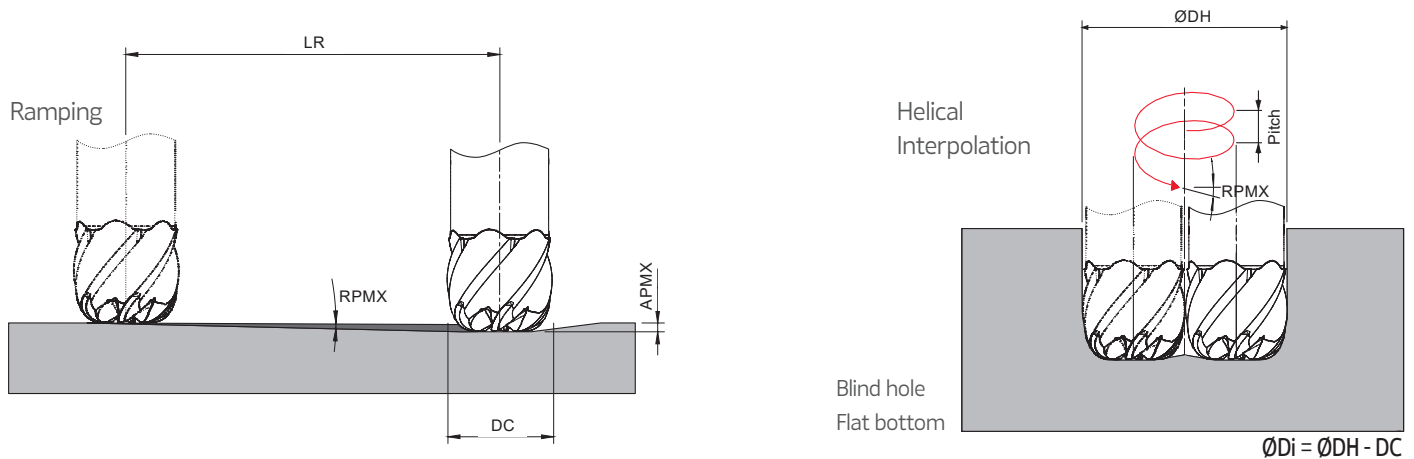
|     |     |                       |         |            | ae / DC = 100% |      |      |      |      |
|-----|-----|-----------------------|---------|------------|----------------|------|------|------|------|
| ISO | PSM | Material              | HB      | Vc (m/min) | fz (mm/t)      |      |      |      |      |
|     |     |                       |         |            | 6              | 8    | 10   | 12   | 16   |
| S   | 11  | Ni-based super alloys | 200-450 | 350-525    | 0,02           | 0,02 | 0,03 | 0,03 | 0,03 |

| BEST PRACTICES   |   |
|------------------|---|
| Cutting speed    | Maintaining a high cutting speed allows the cutting tool to minimize wear   |
| Coolant          | It is recommended not to use coolant or air blowing to prevent thermal cracking. Air blowing should only be used when superior chip evacuation is necessary.  |
| Tool holder      | A hydraulic chuck or precision milling chuck is highly recommended to ensure stable machining under the high temperatures generated during application. The heating chuck is disabled.                                    |
| Milling Strategy | Climb milling is highly recommended due to the characteristics of the application. Conventional milling can result in accelerated wear of the cutting edge and may affect the hardened surface of the workpiece material. |
| Finishing        | A finishing allowance of at least 0,3 mm is recommended.  |
| Built-up edge    | Do not manually remove any built-up edge, as this may damage the cutting edge.  |



## RAMPING AND HELICAL INTERPOLATION

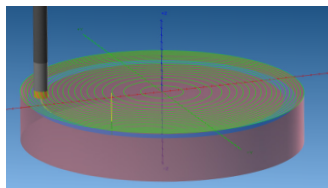
Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



| DC | RPMX | Ramping |        | Helical Interpolation |        |                |
|----|------|---------|--------|-----------------------|--------|----------------|
|    |      | APMX    | Min LR | ØDHmin                | ØDHmax | Max Pitch/Rev. |
| 6  | 1,50 | 0,90    | 34,4   | 7,8                   | 8,0    | 0,10<br>0,15   |
| 8  | 1,50 | 1,20    | 45,8   | 10,4                  | 12,0   | 0,15<br>0,30   |
| 10 | 1,50 | 1,50    | 57,3   | 13,0                  | 16,0   | 0,20<br>0,45   |
| 12 | 1,50 | 1,80    | 68,7   | 15,6                  | 20,0   | 0,25<br>0,65   |
| 16 | 1,50 | 2,40    | 91,7   | 20,8                  | 28,0   | 0,35<br>0,95   |

Note: During helical interpolation do not exceed APMX.

## TEST REPORT Relatório de Teste | Informe de Prueba



Workpiece CAM program

**End mill:** CR42SS 6 080 065 R200 PCN010

**Diameter DC:** Ø 8mm

**Workpiece Material:** Inconel 718 (43 HRC)

**Operation:** Shoulder Milling

**Coolant:** Dry

| Test | Cutting speed<br>Vc (m/min) | Feed per tooth<br>fz (mm/t) | Depth of cut<br>ap (mm) | Stepover<br>ae (mm) |
|------|-----------------------------|-----------------------------|-------------------------|---------------------|
| 1    | 600                         | 0,030                       | 5                       | 0,4                 |
| 2    | 600                         | 0,015                       | 5                       | 0,4                 |
| 3    | 500                         | 0,015                       | 5                       | 0,4                 |
| 4    | 500                         | 0,030                       | 5                       | 0,4                 |



# CERABOOST

INDEXABLE INSERTS AND SOLID CERAMIC END MILLS



Check the QrCode  
to our website page for more information



#### HEADQUARTERS

PALBIT, S.A.

T (+351) 234 540 300 | F (+351) 234 540 301

palbit@palbit.pt | www.palbit.pt

#### Branch office

PALBIT México, S de RL de CV

T (+52) 5555 454 543 | F (+52) 5552 509 190

info@palbit.com.mx | www.palbit.pt/mx

#### Branch office

PALBIT Brasil

T (+55) 011 25 343 648

palbit@palbit.com.br | www.palbit.pt/br