Perfectly yours.

Turning

# Super hard cutting materials

Efficient, economical, effective

This catalogue combines the experiences gained in the turning area into a standard programme. Carefully selected cutting materials in conjunction with special cutting edge designs and MAPAL quality guarantee the user a high degree of economy. And this means PCD and PcBN should also become a staple of your production system.

**Dr. Jochen Kress**

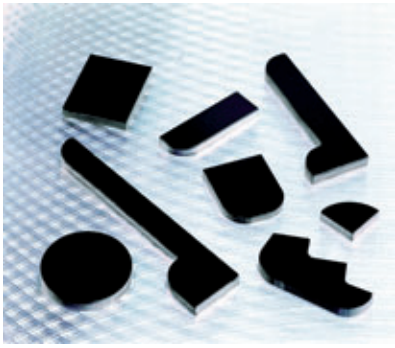
# MAPAL Competence: Super hard cutting materials

The two super hard cutting materials polycrystalline diamond (PCD) and polycrystalline cubic boron nitride (PcBN) have become a staple of the modern production world.
In machining non-ferrous materials, PCD allows for a considerable increase in productivity and quality. When machining hardened steel, PcBN dramatically simplifies the production processes. Additionally, the cutting speeds and tool life when machining cast iron and sintered iron materials can be decisively increased with PcBN.

The MAPAL Group has great experience in the processing and use of these cutting materials. MAPAL is one of the leading worldwide suppliers for gun boring and milling tools with PCD cutting edges, for hard reaming tools and for tools for hard milling constant velocity joints. In addition MAPAL tools are successfully used for machining cast and sintered materials. The use of the latest equipment for tool manufacturing combined with the high qualification of its personnel and stable processes guarantee a consistently high product quality and as a result reliability for the user.

Over the past years MAPAL has gained a high level of competence in turning operations. Building on existing knowledge of gun boring, milling and reaming, PCD and PcBN cutting edges have been supplied for applications with particularly high demands.

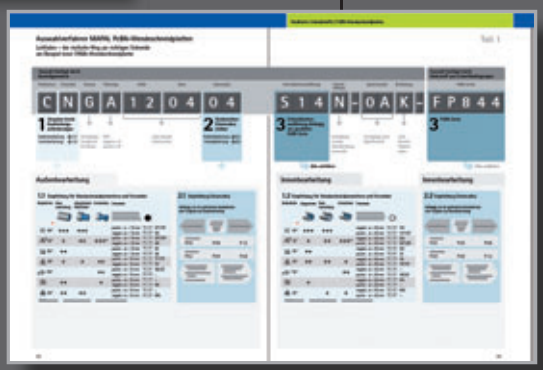
In these applications MAPAL benefits from its great experience in selecting cutting materials and designing the cutting edges, from its deep understanding of processes and its consistently high quality.



# The right choice

This is what the selection system in this catalogue is for. Based on the actual application it leads you step by step to the most suitable insert, the right cutting values and a successful machining operation.

**Machining task** + **MAPAL competence in super hard cutting materials** + **Easy selection process** + **Extensive standard programme** = **Reliable and economical machining solution**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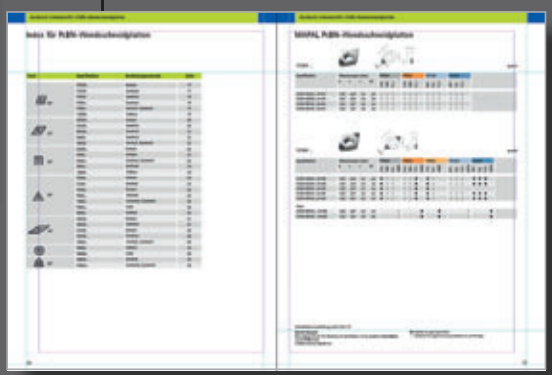

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## Foreword



## MAPAL Competence – PcBN indexable inserts

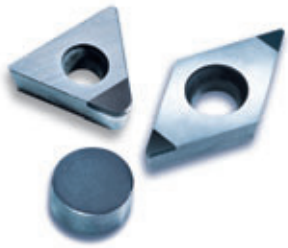


## MAPAL Competence – PcBN turning tools with SolidGrip system



## MAPAL Competence – PCD inserts





PcBN – indexable inserts

PCD – indexable inserts

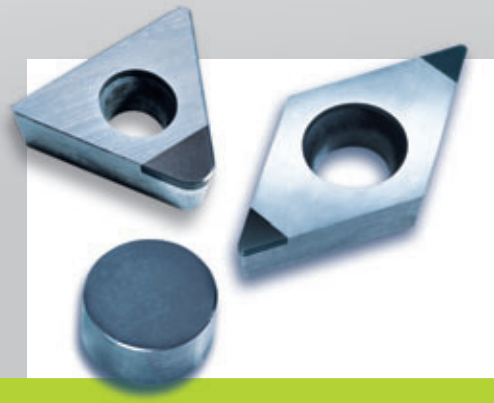
# Efficient, economical and effective MAPAL PcBN indexable inserts

Today modern, stable machine tools with fast, efficient drive systems and high levels of accuracy represent the backbone of an economical production system. In order to fully utilise the production potential using high cutting speeds and feeds for the cutting edge, the use of modern cutting materials with a high degree of hardness, such as PcBN, is an appropriate solution.

MAPAL PcBN cutting materials, with their high heat resistance, wear resistance and strong edges, provide the ideal conditions. As a result machining times and consequently costs per part can be clearly reduced in many cases, at the same time maintaining very good component quality.

When machining cast and sintered materials, productivity in the production process can be significantly increased by high machining values and long tool life compared to carbide.

When hard turning with PcBN, a noticeably high chip-to-chip volume can be achieved compared to grinding. With the same requirements for the component, productivity is normally higher and the operation is cheaper. In addition suitable machines for hard turning are in most cases better value when purchasing than grinding machines for comparable surface machining operations. Hard turning can be carried out dry. Grinding machines need grinding oil which will repeatedly become dirty and need to be cleaned or disposed of or stored at very high cost.



## A wide variety of applications

- **PcBN grades for smooth cut and interrupted cut**
- **Large selection of standard geometries and chamfer versions available for optimum tool life and quality**
- **Versions with multiple cutting edges for greater economy of the tools**
- **Inserts with high precision G tolerance**

# PCD – with extreme hardness and high performance MAPAL PKD – inserts

When using modern design materials, whether in the manufacture of vehicles, in the aerospace industry and also increasingly in machine manufacturing, a priority is improved use of energy. With the same or even higher dynamics, energy consumption needs to be reduced. For this reason the proportion of non ferrous metals, fibre reinforced plastics (CRP, GRP) and sandwich materials is steadily rising.

Using PCD to cut these materials is ideal. Because of its high degree of hardness and wear resistance, even with extremely abrasive materials, high cutting values and long tool life can be achieved and economical cutting results are guaranteed.

MAPAL started using PCD at a very early stage and has acquired a broad knowledge and many years of experience in this. Solutions are found for different machining tasks, with varying requirements in the context of abrasiveness, part geometry and machines. To achieve the optimum technical values with different requirements and to make full use of the efficiency of the PCD and the machines, the optimum cutting edge geometry must be produced with high accuracy and consistent quality. For this MAPAL uses the latest machine technology for grinding and eroding the cutting edges. New types of technology are also used for this, such as laser machining the PCD. Using lasers produces positive chip geometries and a variety of chipbreaker geometries on the PCD inserts which are used for example for types of aluminium which produce long chips. Short chips are then produced which are easy to remove and this clearly increases production reliability.

## The summary of the advantages

- **Maximum cutting values and economy**
- **High accuracy in the cutting edge geometry**
- **The latest production methods offer additional opportunities**

# Key to reference codes

## for MAPAL PcBN- and PCD inserts

| Insert form | Clearance angle | Tolerance | Insert type | Size | | Thickness | | Corner radius | |
|---|---|---|---|---|---|---|---|---|---|
| C | N | G | A | 1 | 2 | 0 | 4 | 0 | 4 |

### Insert form

| | |
|---|---|
| C | 80° |
| D | 55° |
| S | 90° |
| T | 60° |
| V | 35° |
| R | |
| W | 80° |

### Tolerance

| | |
|---|---|
| G | G class |

### Insert thickness

The thickness is measured from the insert's contact surface to the cutting edge.

| | Thickness (mm) |
|---|---|
| 01 | 1,59 |
| 02 | 2,38 |
| 03 | 3,18 |
| T3 | 3,97 |
| 04 | 4,76 |
| 06 | 6,35 |

### Corner radius

| | |
|---|---|
| 02 | 0,2 |
| 04 | 0,4 |
| 08 | 0,8 |
| 12 | 1,2 |

### Holding and/or chipbreaker symbol, metric

| | Hole | Hole configuration | Chip-breaker | Illustration |
|---|---|---|---|---|
| W | with | Cyl. hole + countersink one side (40 – 60°) | no | |
| T | with | | one side | |
| B | with | Cyl. hole + countersink one side (70 – 90°) | no | |
| H | with | | one side | |
| A | with | Cyl. hole | no | |
| M | with | Cyl. hole | one side | |
| N | without | – | no | |
| X | – | – | – | special design |

### Standard clearance angle

| | |
|---|---|
| N | 0° |
| B | 5° |
| C | 7° |
| P | 11° |

### Insert size

| IC d (mm) | C (l) | D (l) | R (l) | S (l) | T (l) | V (l) | W (l) |
|---|---|---|---|---|---|---|---|
| 5,56 | | | | | 09 (9,6) | | 03 (3,8) |
| 6,0 | | | 06 | | | | |
| 6,35 | 06 (6,4) | 07 (7,7) | | 06 (6,35) | 11 (11,0) | 11 (11,1) | 04 (4,3) |
| 7,94 | 08 (8,0) | | | 07 (7,94) | | | 05 (5,4) |
| 8,0 | | | 08 | | | | |
| 9,525 | 09 (9,7) | 11 (11,6) | 09 (9,525) | 09 (9,525) | 16 (16,5) | 16 (16,6) | 06 (6,5) |
| 10 | | | 10 | | | | |
| 12 | | | 12 | | | | |
| 12,7 | 12 (12,9) | 15 (15,5) | 12 (12,7) | 12 (12,7) | 22 (22,0) | | 08 (8,7) |

| PCD grade |
|---|
| PU660 |
| PU670 |
| PU620 |

**PU660**

Cutting edge design | Cutting direction | Chip groove | Tip | PCD grade

**S14N-0AB-**

PcBN grade

**FU720**

**-R**

Optional

## Cutting edge design

| | | |
|---|---|---|
| F | Sharp edged | 01 |
| E | Rounded | 01 |
| T | Chamfered | 13, 51 |
| S | Chamfered and rounded | 14, 59, 52, 55, 51, 54 |
| W | Wiper | 79, 85, 82, 87, 45, 49, 48 |

## Chip groove

| | |
|---|---|
| 0A | None |
| C1 | Lasered |
| C2 | Lasered |
| 1L | 10° parallel |
| 5L | 10° not parallel |
| 6L | 10° parallel / cutting edge tipped along full length |
| 6A | None / cutting edge tipped along full length |

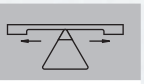
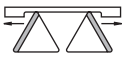
## PcBN grade

| |
|---|
| FU720 |
| FU430 |
| FP823 (coated) |
| FP844 (coated) |
| FP853 (coated) |

## Regrindable

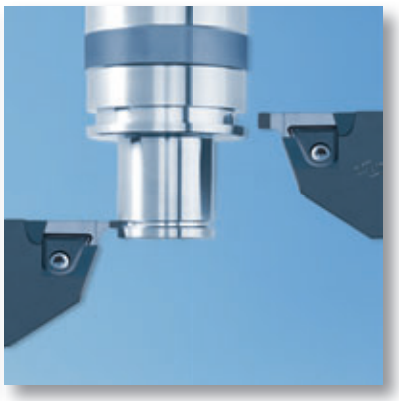
| | |
|---|---|
| R | Regrindable |

## Direction

| | | |
|---|---|---|
| N | Neutral |  |
| X | Right/ left |  |
| L | Left |  |
| R | Right |  |

## Tip

| | | |
|---|---|---|
| S |  | Solid |
| F |  | Whole cutting edge on one side |
| E |  | Whole cutting edge on both sides |
| A |  | Tipped on one side, one corner or along one length |
| B |  | Tipped on one side, two corners |
| C |  | Tipped on one side, three corners |
| K |  | Tipped on both sides, one corner |
| L |  | Tipped on both sides, two corners |
| M |  | Tipped on both sides, three corners |
| N |  | Tipped on both sides, four corners |



**MAPAL tool concepts for hard machining**

PcBN indexable inserts

# Efficient, economical, effective

From MAPAL's many years of experience in hard turning, and as a result of ongoing development and optimisation of the product programme, an extremely large number of insert geometries and different cutting materials have been produced which are available as standard. This means a great variety of different machining requirements can be met quickly and cost effectively.

**Economical manufacturing with intelligent tool solutions**

MAPAL became involved with the development and use of PcBN tipped tools with geometrically defined cutting edges at an early stage.

As a result MAPAL has developed new tool solutions for all application areas which have been produced by the intelligent combination and adaptation of our own efficient and effective system elements.
Whether for turning, milling or reaming – MAPAL offers an economical and reliable tool solution which can call on the full efficiency of PcBN as a cutting material for any application area.

# Selection process for MAPAL PcBN inserts

## An introduction to the easy way to find the right cutting edge using a CNGA insert as an example

**Selection based on component geometry**

| Insert form | Clearance angle | Tolerance | Insert type | Size | Thickness | Corner radius |
|---|---|---|---|---|---|---|
| C | N | G | A | 12 | 04 | 04 |

**1 Specifications from machining requirements**

External machining → 1.1
Internal machining → 1.2

Through high precision G tolerance

WSP
negative = A
positive = W

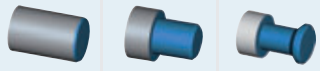
See selection table pages

**2 Required corner radius**

External machining → 2.1
Internal machining → 2.2

## External machining

### 1.1 Recommended insert form and clearance angle



| Insert form | Face machining | Longitud./ face turning | Form turning | Clearance angle (Machining diameter: ø < 15 mm = positive WSP; ø > 15 mm = negative WSP) | | |
|---|---|---|---|---|---|---|
| C 80° | ★★★ | ★★★ | | positive ø < 15 mm | | CC*/CP |
| | | | | negative ø > 15 mm | | CN |
| D 55° | ★ | ★★ | ★★★** | positive ø < 15 mm | | DC*/DP |
| | | | | negative ø > 15 mm | | DN |
| S 90° | ★★ | | | positive ø < 15 mm | | SC |
| | | | | negative ø > 15 mm | | SN |
| T 60° | ★ | ★ | ★★ | positive ø < 15 mm | | TC*/TP |
| | | | | negative ø > 15 mm | | TN |
| V 35° | | | ★★ | positive ø < 15 mm | | VB/VC |
| | | | | negative ø > 15 mm | | – |
| R | ★★ | | ★ | positive ø < 15 mm | | – |
| | | | | negative ø > 15 mm | | RN |
| W 80° | ★★ | ★★ | | positive ø < 15 mm | | – |
| | | | | negative ø > 15 mm | | WN |

★★★ = 1st choice * preferred clearance angle ** note penetration angle

### 2.1 Recommended corner radius

Subject to required component contour or specifications on component drawing

| Less cutting pressure | General machining first choice ★★★ | More cutting pressure |
|---|---|---|
| Negative WSP R 0,4 | R 0,8 | R 1,2 |
| Positive WSP R 0,2 | R 0,4 | R 0,8 |

- machining of thin walled parts
- less likely to vibrate
- better concentricity

- more stable cutting edge with interrupted cut
- better surface finish with same feed

# Part 1

| Cutting edge design | Cutting direction | Chip groove | Tip |
|---|---|---|---|
| S 1 4 | N - | 0 A | K - |

**3** Cutting edge design subject to PcBN grade selected

Through neutral cutting direction (universal)

Through without chip groove

See selection table pages

Please go to next page

Selection based on material and cutting conditions

PcBN grade

F P 8 4 4

**3** PcBN grade

Please go to next page

## Internal machining

### 1.2 Recommended insert form and clearance angle

| Insert form | Longitudinal turning | Face machining | Form turning | Clearance angle (Machining diameter: ø > 35 mm = negative WSP; ø < 35 mm = positive WSP) | |
|---|---|---|---|---|---|
| C 80° | ★★★ | ★★★ | | negative ø > 35 mm | CN |
| | | | | positive ø < 35 mm | CC*/CP |
| D 55° | ★ | ★★ | ★★★** | negative ø > 35 mm | DN |
| | | | | positive ø < 35 mm | DC*/DP |
| S 90° | ★★ | | | negative ø > 35 mm | SN |
| | | | | positive ø < 35 mm | SC |
| T 60° | ★★ | ★★ | ★ | negative ø > 35 mm | TN |
| | | | | positive ø < 35 mm | TC*/TP |
| V 35° | | | ★★ | negative ø > 35 mm | – |
| | | | | positive ø < 35 mm | VB/VC |
| R | ★ | | | negative ø > 35 mm | RN |
| | | | | positive ø < 35 mm | – |
| W 80° | | ★ | ★ | negative ø > 35 mm | WN |
| | | | | positive ø < 35 mm | – |

★★★ = 1st choice * preferred clearance angle ** note penetration angle

## Internal machining

### 2.2 Recommended corner radius

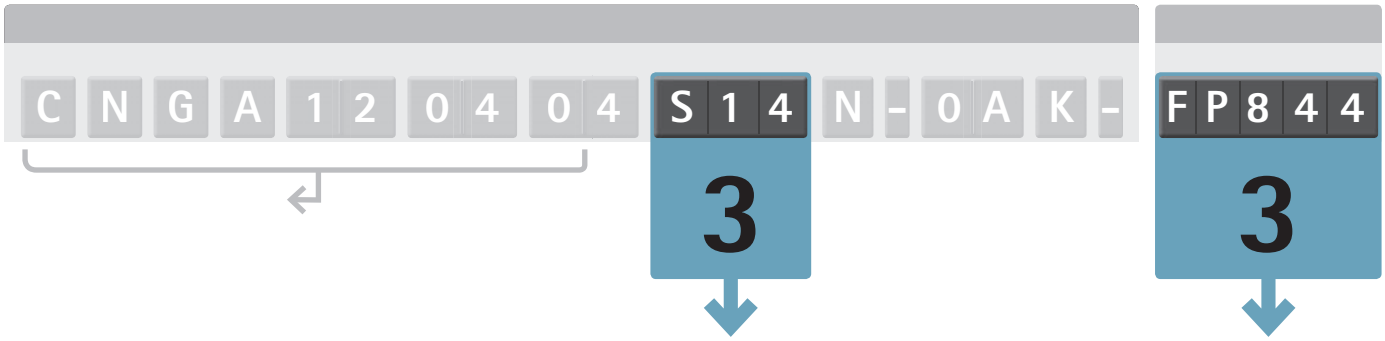
Subject to required component contour or specifications on component drawing

| Less cutting pressure | General machining 1st choice ★★★ | More cutting pressure |
|---|---|---|
| Positive WSP R 0,2 | R 0,4 | R 0,8 |
| Negative WSP R 0,4 | R 0,8 | R 1,2 |

- machining of thin walled parts
- less likely to vibrate
- better concentricity

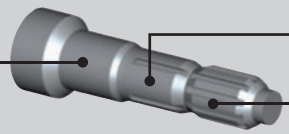
- more stable cutting edge with interrupted cut
- better surface finish with same feed

# Selection process for MAPAL PcBN inserts




## PcBN grade and cutting edge design

### 3 Selection of PcBN grade and cutting edge based on material and cutting conditions



Continous cut ●

Continuous cut to partly interrupted cut, slight variations in allowances

Interrupted cut and strong variations in allowances

| | Material | | FP844 | FP853 | FP823 | FU720 | FU430 |
|---|---|---|---|---|---|---|---|
| | | | Grades with low CBN content | coated low CBN content | | Grades with high CBN content | |
| | | | Toughness / Wear resistance | Toughness / Wear resistance | | Toughness / Wear resistance | |
| | | | Cutting edge design | | | | |
| H | Hardened steel 47-65 HRC<br>Case hardened steel, heat treated steel, tool steel, ball bearing steel | ● | | S12 | T13 | | |
| | | ◗ | S14 | T51 | S14 | | |
| | | ⌘ | S59 | | S14 | | |
| | Carbide Co content >25 % (Co content <25 % with PCD) | ● | | | | | T51 |
| P | Sintered steel<br>Sint D | ● | | | T13 | | E01 |
| | | ◗ | | | S14 | | T51 |
| | | ⌘ | S59 | | | | T13 |
| | Sintered steel, hardened | ● | | | | | E01 |
| | | ◗ | | | | T51 | T51 |
| | | ⌘ | | | | T13 | T13 |
| K | Grey cast iron<br>GG20, GG25, GG30 | ● | | | | E01 | E01 |
| | | ◗⌘ | | | | T51 | T13 |
| | Cast iron with graphite<br>GGG40, GGG50, GGG60 | ● | S14 | | | | T51 |
| | | ◗⌘ | S59 | | | | T13 |
| | Chilled cast iron<br>(Ni hard / NiCr cast iron) | ● | | | | T51 | T51 |
| | | ◗⌘ | | | | T13 | T13 |
| S | Steel with high heat resistance<br>(Hastalloy, Nimonic, Inconel...)<br>Co-base, Ni-base | ● | | | T13 | | E01 |
| | | ◗⌘ | | | | T13 | T51 |
| | Titanium and titanium alloys | ● | T13 | | | | E01 |
| | | ◗⌘ | T13 | | | | T13 |
| | Hard anti-wear treatment (Stellite)<br>(Cr/Ni/Co coatings) | ● | | | T13 | T51 | |
| | | ◗⌘ | | | T13 | T13 | |

● 1st choice

● 2nd choice

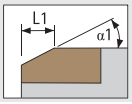
# MAPAL PcBN grades and cutting edge designs

## PcBN grades

| | |
|---|---|
| FP844 | PcBN grade with low proportion of CBN. The universal grade for machining hardened parts also with interrupted cut and at medium cutting speeds. |
| FP853 | A coated high performance grade for finishing hardened steel, the ideal supplement to FU823 / FP844. Very high performance particularly with continuous cut at high cutting speeds and stable overall system. This grade is for both dry and wet machining. |
| FP823 | This coated grade covers, like the grade FP844, a large range of applications and can be used with smooth and interrupted cuts, preferably on hardened steel and for dry machining. The PcBN substrate has high cutting edge stability. |
| FU430 | This high CBN content PcBN grade is particular distinguished by very high resistance to wear and toughness. The application area of this versatile grade extends from cast iron materials to various super alloys and sintered steels. |
| FU720 | The ideal addition to FU430. With regard to toughness this high CBN content grade demonstrates its advantages in cutting cast iron materials (GGG), super alloys and sintered steels and also has good wear resistance. |

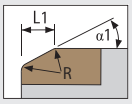
## Cutting edge designs

Next to the PcBN grade used and the cutting parameters selected, selection of suitable cutting edge designs is the greatest variable which has a positive effect on the insert's machining results. In many cases longer tool life, better surface finish or increased dimensional stability on the part depend on the chamfer geometry which is selected.



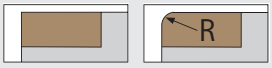

### T chamfered

A chamfered cutting edge is the recommended design for continuous to partially interrupted cut. Subject to its shape, the chamfer prevents pitting and burrs.



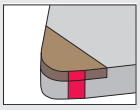

### S chamfered and rounded

A rounding of the chamfered cutting edge gives the cutting edge extra stability.
The S shape is particularly suitable for high demands with continuous and interrupted cut.




### F sharp edged and E sharp edged and rounded

Sharp cutting edges transfer only low compression forces onto the part being machined and are particularly suitable for thin walled parts. Rounding gives extra stability.



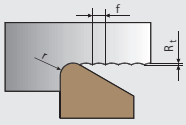
### W wiper

Improvement to surface finish: Compared to a conventional insert, using the wiper geometry with the same feed achieves an $R_a$ value which is many times better.

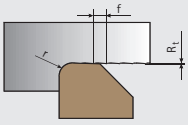
Reduction in machining time: If the same $R_a$ value is to be achieved as with a standard insert, using the insert with wiper geometry means double the feed can be applied.

Note:
Check approach angles of the tool!

C insert 95°
D insert 93° (wiper action on both sides only possible when machining diameter)




Standard geometry

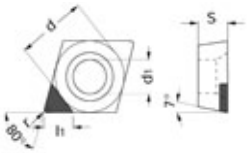



Wiper geometry: 2 to 4 times higher feed = same surface finish
Same feed = 2 to 4 times better surface finish
(assuming stability of part and machine).

# Index for PcBN indexable inserts

# MAPAL PcBN indexable inserts

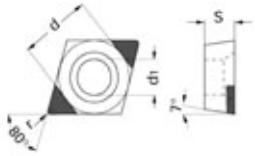
## CCGW ...




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| CCGW 060202 ...N-0AA | 6,35 | 2,38 | 0,2 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CCGW 060204 ...N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CCGW 09T304 ...N-0AA | 9,52 | 3,97 | 0,4 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CCGW 09T308 ...N-0AA | 9,52 | 3,97 | 0,8 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

## CCGW ...




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W85 | S14 | S59 | T13 | W85 | S12 | T51 | W85 | | E01 | T51 | T13 | W79 | E01 | T51 | T13 | W79 |
| CCGW 060202 ...N-0AB | 6,35 | 2,38 | 0,2 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| CCGW 060204 ...N-0AB | 6,35 | 2,38 | 0,4 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| CCGW 09T302 ...N-0AB | 9,52 | 3,97 | 0,2 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | | | | | | | | |
| CCGW 09T304 ...N-0AB | 9,52 | 3,97 | 0,4 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| CCGW 09T308 ...N-0AB | 9,52 | 3,97 | 0,8 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| Wiper | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGW 09T304 ...-N-0AB | 9,52 | 3,97 | 0,4 | 4,4 | | | | ○ | | | | ● | | | ● | | | | | ○ | | | | ● |
| CCGW 09T308 ...-N-0AB | 9,52 | 3,97 | 0,8 | 4,4 | | | | ○ | | | | ● | | | ● | | | | | ○ | | | | ● |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

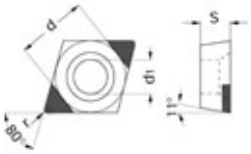
CCGW09T304**T51**N-0AB-**FU720**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

## CPGW ...




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W85 | S14 | S59 | T13 | W85 | S12 | T51 | W85 | | E01 | T51 | T13 | W79 | E01 | T51 | T13 | W79 |
| CPGW 060202 ...N-0AB | 6,35 | 2,38 | 0,2 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CPGW 060204 ...N-0AB | 6,35 | 2,38 | 0,4 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CPGW 09T304 ...N-0AB | 9,52 | 3,97 | 0,4 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CPGW 09T308 ...N-0AB | 9,52 | 3,97 | 0,8 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| Wiper | | | | | | | | | | | | | | | | | | | | | | | | |
| CPGW 09T304 ...-N-0AB | 9,52 | 3,97 | 0,4 | 4,4 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |
| CPGW 09T308 ...-N-0AB | 9,52 | 3,97 | 0,8 | 4,4 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |

## CNGA ...


negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W87 | S14 | S59 | T13 | W87 | S12 | T51 | W87 | | E01 | T51 | T13 | W82 | E01 | T51 | T13 | W82 |
| CNGA 120404 ...N-0AB | 12,7 | 4,76 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| CNGA 120408 ...N-0AB | 12,7 | 4,76 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| CNGA 120412 ...N-0AB | 12,7 | 4,76 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| Wiper | | | | | | | | | | | | | | | | | | | | | | | | |
| CNGA 120404 ...N-0AB | 12,7 | 4,76 | 0,4 | 5,13 | | | | ○ | | | | ○ | | | ● | | | | | ○ | | | | ○ |
| CNGA 120408 ...N-0AB | 12,7 | 4,76 | 0,8 | 5,13 | | | | ○ | | | | ○ | | | ● | | | | | ○ | | | | ○ |
| CNGA 120412 ...N-0AB | 12,7 | 4,76 | 1,2 | 5,13 | | | | ○ | | | | ○ | | | ● | | | | | ○ | | | | ○ |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

CNGA120404**S14**N-0AB-**FP844**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

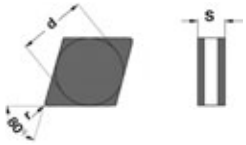
# MAPAL PcBN indexable inserts

## CNGA ...


negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W87 | S14 | S59 | T13 | W87 | S12 | T51 | W87 | | E01 | T51 | T13 | W82 | E01 | T51 | T13 | W82 |
| CNGA 120404 ...N-0AL | 12,7 | 4,76 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CNGA 120408 ...N-0AL | 12,7 | 4,76 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| CNGA 120412 ...N-0AL | 12,7 | 4,76 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| Wiper | | | | | | | | | | | | | | | | | | | | | | | | |
| CNGA 120404 ...N-0AL | 12,7 | 4,76 | 0,4 | 5,13 | | | | ○ | | | | ● | | | ● | | | | | ○ | | | | ○ |
| CNGA 120408 ...N-0AL | 12,7 | 4,76 | 0,8 | 5,13 | | | | ○ | | | | ● | | | ● | | | | | ○ | | | | ● |
| CNGA 120412 ...N-0AL | 12,7 | 4,76 | 1,2 | 5,13 | | | | ○ | | | | ● | | | ● | | | | | ○ | | | | ● |

## CNGN ...




negative

| Specification | Dimensions (mm) | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | E01 | T51 | T13 | W82 | E01 | T51 | T13 | W82 |
| CNGN 090304...N-0AE | 9,52 | 3,18 | 0,4 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CNGN 090308...N-0AE | 9,52 | 3,18 | 0,8 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CNGN 090312...N-0AE | 9,52 | 3,18 | 1,2 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CNGN 120408...N-0AE | 12,7 | 4,76 | 0,8 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| CNGN 120412...N-0AE | 12,7 | 4,76 | 1,2 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| Wiper | | | | | | | | | | | | |
| CNGN 120408 ...N-0AE | 12,7 | 4,76 | 0,8 | | | | | ○ | | | | ○ |
| CNGN 120412 ...N-0AE | 12,7 | 4,76 | 1,2 | | | | | ○ | | | | ○ |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

CNGA120408**T13**N-0AL-**FP823**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

## DCGW ...


positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| DCGW 070202 ...N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DCGW 070204 ...N-0AA | 6,35 | 2,38 | 0,8 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DCGW 11T304 ...N-0AA | 9,535 | 3,97 | 0,4 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DCGW 11T308 ...N-0AA | 9,535 | 3,97 | 0,8 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

## DCGW ...


positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W85 | S14 | S59 | T13 | W87 | S12 | T51 | W85 | | E01 | T51 | T13 | W79 | E01 | T51 | T13 | W79 |
| DCGW 070202 ...N-0AB | 6,35 | 2,38 | 0,2 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| DCGW 070204 ...N-0AB | 6,35 | 2,38 | 0,4 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| DCGW 070208 ...N-0AB | 6,35 | 2,38 | 0,8 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| DCGW 11T302 ...N-0AB | 9,535 | 3,97 | 0,2 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| DCGW 11T304 ...N-0AB | 9,535 | 3,97 | 0,4 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| DCGW 11T308 ...N-0AB | 9,535 | 3,97 | 0,8 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| Wiper | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGW 11T304 ...-N-0AB | 9,535 | 3,97 | 0,4 | 4,4 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |
| DCGW 11T308 ...-N-0AB | 9,535 | 3,97 | 0,8 | 4,4 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

DCGW11T304**W79**N-0AB-**FU430**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

## DPGW ...


positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W85 | S14 | S59 | T13 | W87 | E01 | T51 | T13 | W79 | E01 | T51 | T13 | W79 |
| DPGW 070202 ...N-0AB | 6,35 | 2,38 | 0,2 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DPGW 070204 ...N-0AB | 6,35 | 2,38 | 0,4 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DPGW 11T304 ...N-0AB | 9,52 | 3,97 | 0,4 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DPGW 11T308 ...N-0AB | 9,52 | 3,97 | 0,8 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| Wiper | | | | | | | | | | | | | | | | | | | | |
| DPGW 11T304 ...N-0AB | 9,52 | 3,97 | 0,4 | 4,4 | | | | ○ | | | | ○ | | | | ○ | | | | ○ |
| DPGW 11T308 ...N-0AB | 9,52 | 3,97 | 0,8 | 4,4 | | | | ○ | | | | ○ | | | | ○ | | | | ○ |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

DNGA150608**E01**N-0AK-**FU430**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts


## DNGA ...

negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | W87 | S14 | S59 | T13 | W87 | S12 | T51 | W87 | | E01 | T51 | T13 | W82 | E01 | T51 | T13 | W82 |
| DNGA 150404 ...N-0AB | 12,7 | 4,76 | 0,4 | 5,13 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150408 ...N-0AB | 12,7 | 4,76 | 0,8 | 5,13 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150412 ...N-0AB | 12,7 | 4,76 | 1,2 | 5,13 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150604 ...N-0AB | 12,7 | 6,35 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| DNGA 150608 ...N-0AB | 12,7 | 6,35 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| DNGA 150612 ...N-0AB | 12,7 | 6,35 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| Wiper | | | | | | | | | | | | | | | | | | | | | | | | |
| DNGA 150404 ...N-0AB | 12,7 | 4,76 | 0,4 | 5,13 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |
| DNGA 150408 ...N-0AB | 12,7 | 4,76 | 0,8 | 5,13 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |
| DNGA 150604 ...N-0AB | 12,7 | 6,35 | 0,4 | 5,13 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |
| DNGA 150608 ...N-0AB | 12,7 | 6,35 | 0,8 | 5,13 | | | | ○ | | | | ○ | | | ○ | | | | | ○ | | | | ○ |


## DNGA ...

negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| DNGA 150404 ...N-0AL | 9,52 | 4,76 | 0,4 | 3,81 | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | | | | | | | | |
| DNGA 150408 ...N-0AL | 9,52 | 4,76 | 0,8 | 3,81 | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150412 ...N-0AL | 9,52 | 4,76 | 1,2 | 3,81 | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150604 ...N-0AL | 12,7 | 6,35 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150608 ...N-0AL | 12,7 | 6,35 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| DNGA 150612 ...N-0AL | 12,7 | 6,35 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

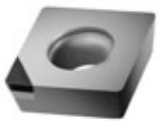
DNGA150608**S14**N-OAL-**FP844**

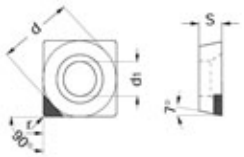
● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

## SCGW ...

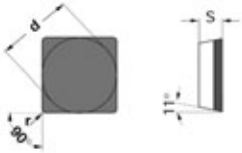





positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| SCGW 09T304 ...N-0AA | 9,52 | 3,97 | 0,4 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| SCGW 09T308 ...N-0AA | 9,52 | 3,97 | 0,8 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ● | ● | ● | |

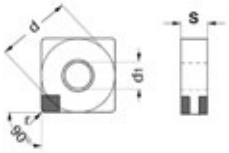
## SPGN ...




positive

| Specification | Dimensions (mm) | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | E01 | T51 | T13 | | E01 | T51 | T13 | |
| SPGN 090308 ...N-0AF | 9,52 | 3,18 | 0,8 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| SPGN 090312 ...N-0AF | 9,52 | 3,18 | 1,2 | | ○ | ○ | ○ | | ○ | ○ | ○ | |

## SNGA ...




negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| SNGA 120404 ...N-0AK | 12,7 | 4,76 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ● | ● | ○ | |
| SNGA 120408 ...N-0AK | 12,7 | 4,76 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ● | ● | ○ | |
| SNGA 120412 ...N-0AK | 12,7 | 4,76 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ● | ● | ○ | |

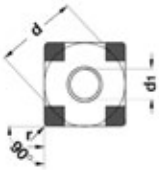
Recommended cutting data see page 31

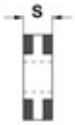
**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.
SCGW09T308**T51**N-0AA-**FU720**

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

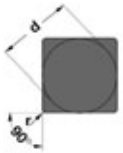



## SNGA ...

negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| SNGA 120404 ...N-0AN | 12,7 | 4,76 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ○ | |
| SNGA 120408 ...N-0AN | 12,7 | 4,76 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ○ | |
| SNGA 120412 ...N-0AN | 12,7 | 4,76 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ○ | |





## SNGN ...

negative

| Specification | Dimensions (mm) | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | E01 | T51 | T13 | | E01 | T51 | T13 | |
| SNGN 090308 ...N-0AE | 9,52 | 3,18 | 0,8 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| SNGN 090312 ...N-0AE | 9,52 | 3,18 | 1,2 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| SNGN 120408 ...N-0AE | 12,7 | 4,76 | 0,8 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| SNGN 120412 ...N-0AE | 12,7 | 4,76 | 1,2 | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

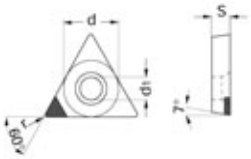
SNGN090308**T13**N-0AE-**FU720**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

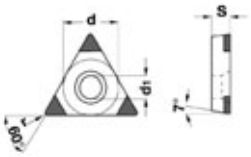
## TCGW ...




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TCGW 090204...N-0AA | 5,56 | 2,38 | 0,4 | 2,5 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TCGW 090208...N-0AA | 5,56 | 2,38 | 0,8 | 2,5 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TCGW 110204...N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TCGW 110208...N-0AA | 5,56 | 2,38 | 0,8 | 2,5 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |

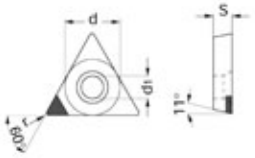
## TCGW ...




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TCGW 090204...N-0AC | 5,56 | 2,38 | 0,4 | 2,5 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ● | |
| TCGW 090208...N-0AC | 5,56 | 2,38 | 0,8 | 2,5 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ● | |
| TCGW 110204...N-0AC | 6,35 | 2,38 | 0,4 | 2,8 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ● | |
| TCGW 110208...N-0AC | 5,56 | 2,38 | 0,8 | 2,5 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ○ | ● | ● | |

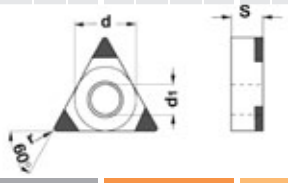
## TPGW ...




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TPGW 090204...N-0AA | 5,56 | 2,38 | 0,4 | 2,5 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| TPGW 090208...N-0AA | 5,56 | 2,38 | 0,8 | 2,5 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| TPGW 110204...N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| TPGW 110208...N-0AA | 6,35 | 2,38 | 0,8 | 2,8 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

## TNGA ...




negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TNGA 160404 ...N-0AC | 9,52 | 4,76 | 0,4 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TNGA 160408 ...N-0AC | 9,52 | 4,76 | 0,8 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TNGA 160412 ...N-0AC | 9,52 | 4,76 | 1,2 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |

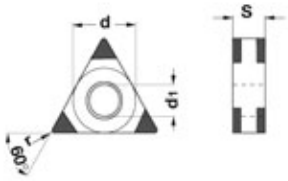
Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.
TNGA160412**E01**N-0AC-**FU720**

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

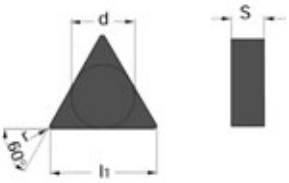
# MAPAL PcBN indexable inserts




## TNGA ...

negative

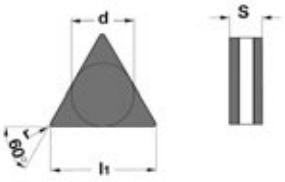
| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TNGA 160404 ...N-0AM | 9,52 | 4,76 | 0,4 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TNGA 160408 ...N-0AM | 9,52 | 4,76 | 0,8 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| TNGA 160412 ...N-0AM | 9,52 | 4,76 | 1,2 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |




## TNGN ...

negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | |
| TNGN 110304 ...N-0AS | 6,35 | 3,18 | 0,4 | | ● | ○ | ○ | | ○ | ○ | ● | |
| TNGN 110308 ...N-0AS | 6,35 | 3,18 | 0,8 | | ● | ○ | ○ | | ○ | ○ | ● | |
| TNGN 110312 ...N-0AS | 6,35 | 3,18 | 1,2 | | ● | ○ | ○ | | ○ | ○ | ● | |




## TNGN ...

negative

| Specification | Dimensions (mm) | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TNGN 110304 ...N-0AE | 6,35 | 3,18 | 0,4 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| TNGN 110308 ...N-0AE | 6,35 | 3,18 | 0,8 | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| TNGN 110312 ...N-0AE | 6,35 | 3,18 | 1,2 | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

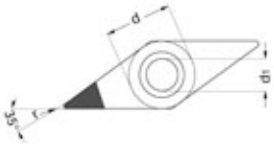
TNGA160404**S59**N-0AM-**FP844**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

## VBGW ...

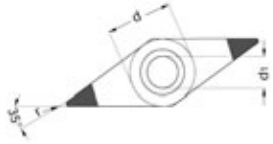




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | W87 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| VBGW 160402 ...N-0AA | 9,52 | 4,76 | 0,2 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| VBGW 160404 ...N-0AA | 9,52 | 4,76 | 0,4 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| VBGW 160408 ...N-0AA | 9,52 | 4,76 | 0,8 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| VBGW 160412 ...N-0AA | 9,52 | 4,76 | 1,2 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

## VBGW ...





positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | W87 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| VBGW 160404 ...N-0AB | 9,52 | 4,76 | 0,4 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | ○ | | ○ | ○ | ○ | | ○ | ● | ○ | |
| VBGW 160408 ...N-0AB | 9,52 | 4,76 | 0,8 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | ○ | | ○ | ○ | ○ | | ○ | ● | ○ | |
| VBGW 160412 ...N-0AB | 9,52 | 4,76 | 1,2 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ● | ○ | ○ | | ○ | ○ | ○ | | ○ | ● | ○ | |

Recommended cutting data see page 31

**Order example**

Please complete the code with the **cutting edge** and **PcBN grade** grade with your order.

VBGW160412**S14**N-0AA-**FU820**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

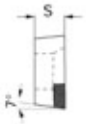
## VCGW ...



positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| VCGW 160402 ...N-0AA | 9,52 | 4,76 | 0,2 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| VCGW 160404 ...N-0AA | 9,52 | 4,76 | 0,4 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| VCGW 160408 ...N-0AA | 9,52 | 4,76 | 0,8 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| VCGW 160412 ...N-0AA | 9,52 | 4,76 | 1,2 | 4,4 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

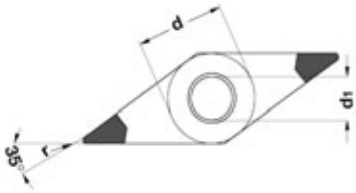
## VCGW ...

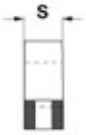




positive

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| VCGW 110302 ...N-0AB | 6,35 | 3,18 | 0,2 | 2,9 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| VCGW 110304 ...N-0AB | 6,35 | 3,18 | 0,4 | 2,9 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| VCGW 160404 ...N-0AB | 9,52 | 4,76 | 0,4 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| VCGW 160408 ...N-0AB | 9,52 | 4,76 | 0,8 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |
| VCGW 160412 ...N-0AB | 9,52 | 4,76 | 1,2 | 4,4 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ○ | ● | ○ | |

## VNGA ...




negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FP853 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | S12 | T51 | | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| VNGA 160404 ...N-0AL | 9,52 | 4,76 | 0,4 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| VNGA 160408 ...N-0AL | 9,52 | 4,76 | 0,8 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |
| VNGA 160412 ...N-0AL | 9,52 | 4,76 | 1,2 | 3,81 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | | | ○ | ○ | ○ | | ● | ● | ● | |

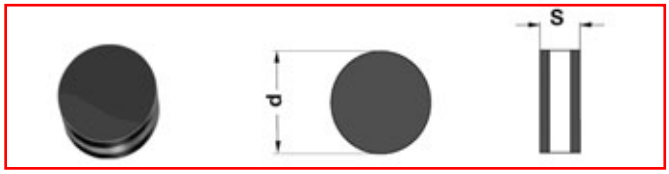
Recommended cutting data see page 31

**Order example**
Please complete the code with the **cutting edge** and **PcBN grade** with your order.
VNGA160408**S14**N-0AL-**FP823**

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PcBN indexable inserts

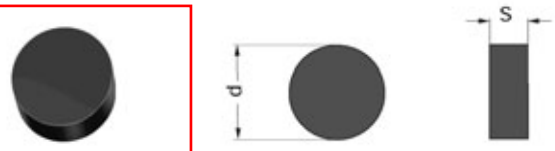
## RNGN ...




negative

| Specification | Dimensions (mm) | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | E01 | T51 | T13 | | E01 | T51 | T13 | |
| RNGN 090300 ...N-0AE | 9,52 | 3,18 | | | ○ | ○ | ○ | | ● | ● | ● | |
| RNGN 120400 ...N-0AE | 12,7 | 4,76 | | | ○ | ○ | ○ | | ● | ● | ● | |

## RNGN ...




negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | |
| RNGN 060300 ...N-0AS | 6,35 | 3,18 | | | ● | ○ | ○ | | ○ | ○ | ● | |
| RNGN 090300 ...N-0AS | 9,52 | 3,18 | | | ● | ○ | ○ | | ○ | ○ | ● | |

Recommended cutting data see page 31

**Order example**

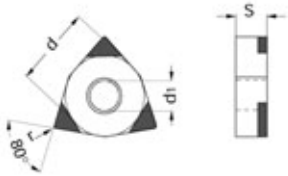
Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

RNGN060300**S14**N-0AS-**FP823**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

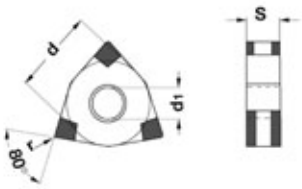
# MAPAL PcBN indexable inserts




## WNGA ...

negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| WNGA 080404 ...N-0AC | 12,7 | 4,76 | 0,4 | 5,13 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| WNGA 080408 ...N-0AC | 12,7 | 4,76 | 0,8 | 5,13 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| WNGA 080412 ...N-0AC | 12,7 | 4,76 | 1,2 | 5,13 | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |




## WNGA ...

negative

| Specification | Dimensions (mm) | | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | d1 | S14 | S59 | T13 | | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| WNGA 080404 ...N-0AM | 12,7 | 4,76 | 0,4 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ○ | ● | ○ | |
| WNGA 080408 ...N-0AM | 12,7 | 4,76 | 0,8 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ○ | ● | ○ | |
| WNGA 080412 ...N-0AM | 12,7 | 4,76 | 1,2 | 5,13 | ● | ○ | ○ | | ○ | ○ | ● | | ○ | ○ | ○ | | ○ | ● | ○ | |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

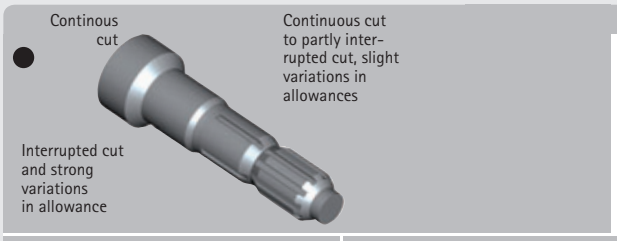
WNGA080412**S14**N-0AM-**FP844**

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# PcBN recommended cutting data

The cutting speeds stated are guidelines. The best values for the specific application should be determined in trials or during the operation as the effects of part geometry, clamping and machine stability and accuracy cannot be taken into account in this table.



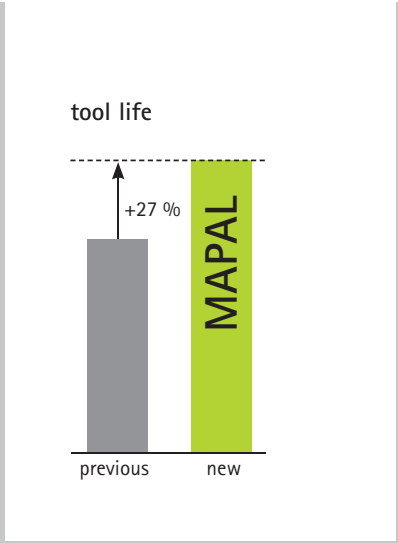

| | Material | Cutting conditions | FP844 | FP853 | FP823 | FU720 | FU430 |
|---|---|---|---|---|---|---|---|
| | | | Grades with low CBN content (Toughness / Wear resistance) | coated low CBN content (Toughness / Wear resistance) | | Grades with high CBN content (Toughness / Wear resistance) | |
| | | | Recommended cutting speed $v_c$ (m/min) | | | | |
| H | Hardened steel 47-65 HRC<br>Case hardened steel, heat treated steel, tool steel, ball bearing steel | ● | | 180 – 250 – 300 | 120 – 170 – 220 | | |
| | | ◖ | 120 – 140 – 180 | 180 – 230 – 300 | 120 – 150 – 180 | | |
| | | ✖ | 100 – 120 – 160 | | 100 – 120 – 160 | | |
| | Carbide<br>Co content >25 %<br>(Co content <25 % with PCD) | ● | | | | | 25 – 30 – 45 |
| P | Sintered steel<br>Sint D | ● | | | 150 – 300 – 400 | | 150 – 300 – 400 |
| | | ◖ | | | 120 – 220 – 320 | | 120 – 220 – 320 |
| | | ✖ | 120 – 180 – 250 | | | | 120 – 180 – 250 |
| | Sintered steel, hardened | ● | | | | | 120 – 160 – 200 |
| | | ◖ | | | | 120 – 160 – 200 | 100 – 140 – 180 |
| | | ✖ | | | | 100 – 130 – 180 | 100 – 120 – 180 |
| K | Grey cast iron<br>GG20, GG25, GG30 | ● | | | | 400 – 700 – 1200 | 400 – 700 – 1200 |
| | | ◖ ✖ | | | | 400 – 700 – 1200 | 400 – 700 – 1200 |
| | Cast iron with graphite<br>GGG40, GGG50, GGG60 | ● | 300 – 450 – 700 | | | | 280 – 400 – 700 |
| | | ◖ ✖ | 300 – 450 – 700 | | | | 280 – 400 – 700 |
| | Chilled cast iron<br>(Ni hard / NiCr cast iron) | ● | | | | 80 – 130 – 180 | 80 – 130 – 180 |
| | | ◖ ✖ | | | | 70 – 110 – 150 | 70 – 110 – 150 |
| S | Steel with high heat resistance<br>(Hastalloy, Nimonic, Inconel...)<br>Co base, Ni base | ● | | | 100 – 160 – 200 | | 120 – 180 – 250 |
| | | ◖ ✖ | | | | 100 – 150 – 220 | 100 – 130 – 220 |
| | Titanium and titanium alloys | ● | 120 – 170 – 250 | | | | 100 – 160 – 220 |
| | | ◖ ✖ | 100 – 150 – 220 | | | | 100 – 140 – 220 |
| | Hard anti-wear treatment<br>(Stellite)<br>(Cr/Ni/Co coatings) | ● | | | 70 – 90 – 120 | 70 – 90 – 120 | |
| | | ◖ ✖ | | | 70 – 90 – 100 | 50 – 70 – 100 | |

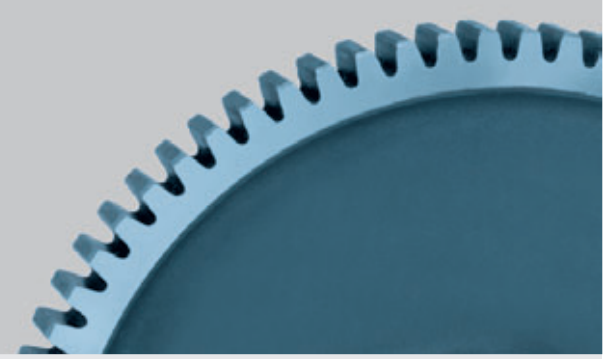
● 1st choice
● 2nd choice

# Examples of PcBN inserts in practice

## Gearwheel / steering wheel – serrated surface

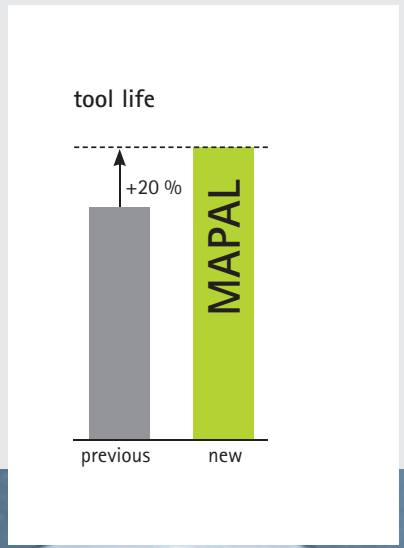
| | |
|---|---|
| Description | The heavily interrupted cut on the surface of the gear causes extreme stress on the cutting material and the tool. |
| Operation (dry machining) | Face turning the lateral serrated surface |
| Workpiece | Gearwheel (steering wheel) |
| Material | 20 MnCr 5 |
| Hardness | 59 – 61 HRC |
| Cutting speed $v_c$ | 140 m/min |
| Feed f | 0,12 mm |
| Cutting depth $a_p$ | 0,15 – 0,2 mm |
| Insert | CNGA120408S59N-0AK-FP844 |



## Gearwheel / steering wheel – bore

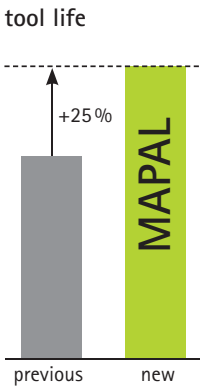
| | |
|---|---|
| Description | Because of an optimised cutting edge geometry in conjunction with the MAPAL PcBN grade selected it was possible to achieve a significant increase in tool life compared to the competitor. |
| Operation (dry machining) | Finish turning bore ø $64^{N6}$ |
| Workpiece | Gearwheel (steering wheel) |
| Material | 25 MnCr 4 |
| Hardness | 59 – 63 HRC |
| Cutting speed $v_c$ | 170 m/min |
| Feed f | 0,14 mm |
| Cutting depth $a_p$ | 0,15 mm |
| Insert | DCGW11T312S14N-0AB-FU840 |




# Examples of PcBN inserts in practice

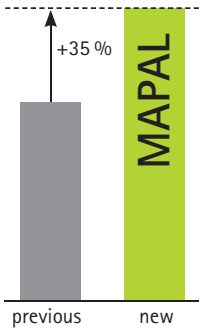
## Crown Wheel (Gear drive component)

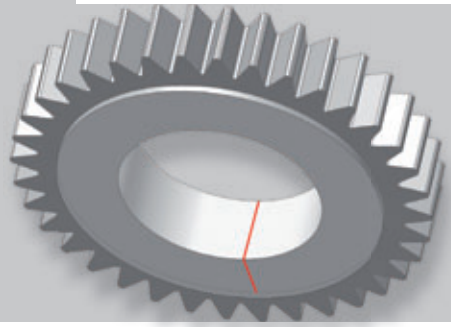
| | |
|---|---|
| Description | Due to the long insert machining time necessary for machining smooth cuts, a special PcBN insert quality as well as edge preparation are required. |
| Operation | Longitudinal Machining Smooth Cut |
| Workpiece | Crown Wheel |
| Material | 20MnCrS5 |
| Hardness | 58 - 63 HRC |
| Cutting speed $v_c$ | 180 m/min |
| Feed f | 0,12 mm |
| Cutting depth $a_p$ | ~ 0,15 mm |
| Insert | CNGA120408W87N-0AB-FP853 |




## Gear Wheel

| | |
|---|---|
| Description | Due to the increased usage of sintered materials for gear wheel machining, special PcBN inserts are required. |
| Operation | Facing and longitudinal machining of hardened sintered materials |
| Material | SK72-01 |
| Hardness | ~ 60 HRC |
| Cutting speed $v_c$ | 150 m/min |
| Feed f | 0,08 mm |
| Cutting depth $a_p$ | 0,2 mm |
| Insert | DCGW11T308T13-0AB-FU430 |



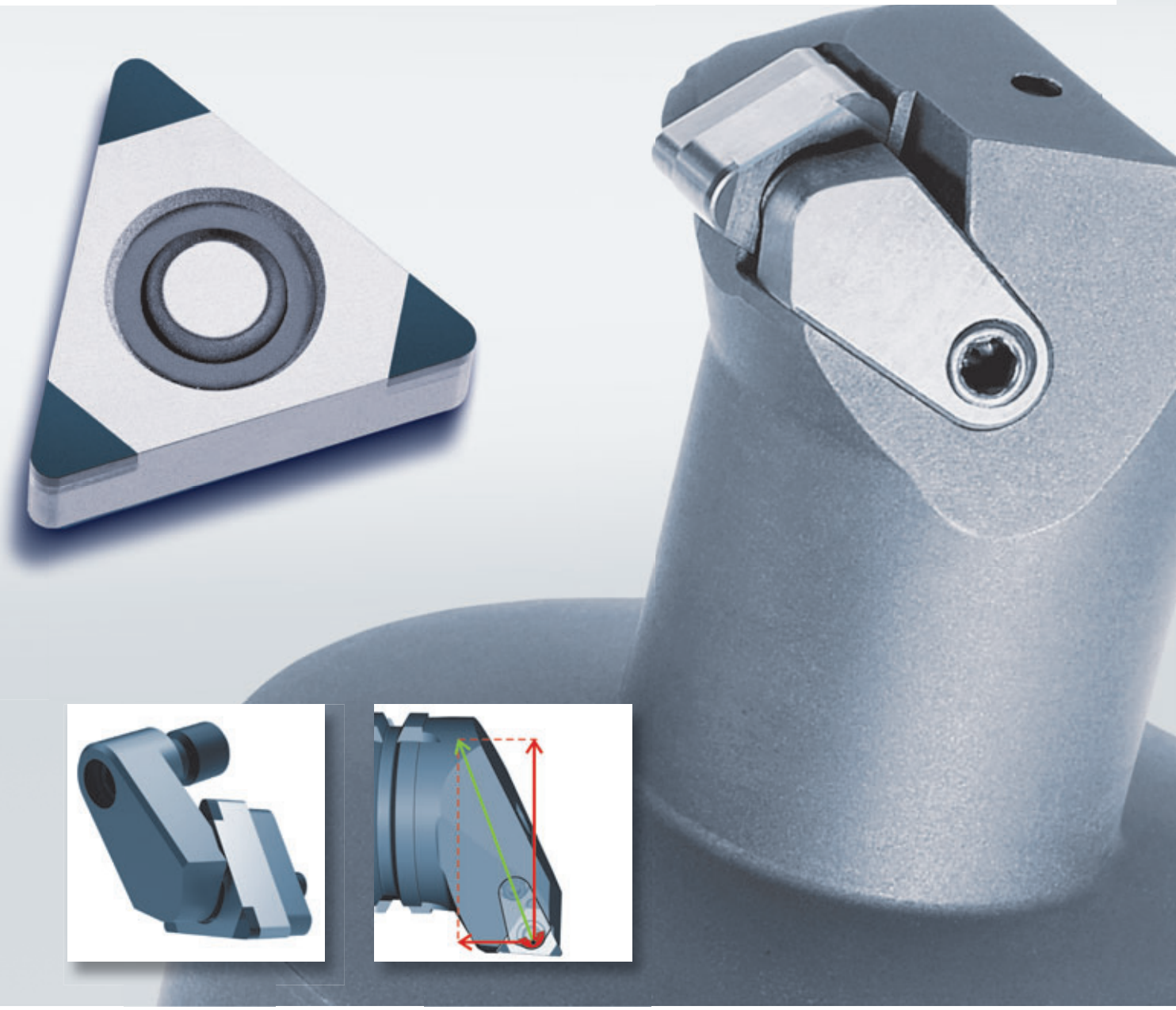



# MAPAL SolidGrip – PcBN turning tools with professional clamping system

## SolidGrip – The tool system for demanding machining tasks

During hard turning the stiffness of the overall system is crucial in relation to the tool life that can be achieved. Here, above all, relative movement between indexable insert and workpiece must be avoided.

This is where the new MAPAL clamping system SolidGrip comes into play. It comprises special inserts with round clamping groove and matched clamping jaws. Due to the form locking between the insert and the clamping plate, the insert sits firmly in the high precision insert seats on the SolidGrip tool holder. This situation is ensured by the optimal force distribution due to the special geometrical arrangement. The indexable insert is firmly pressed into the tool holder by the clamping force generated in the axial and in the radial direction. Even at high radial forces, the insert is securely fixed resulting in the prevention of undesirable relative movements. This characteristic makes possible high precision, vibrationfree, cost-effective hard machining.



# MAPAL SolidGrip – perfectly yours.

High cost-effectiveness even during particularly demanding machining tasks is the focus of this new development from MAPAL. An extensive programme of indexable inserts with high performance PcBN grades and cutting edge geometries covers the complete range of hard machining.

Carrier tools individually matched to the machining task ensure the entire potential of this new type of hard turning can be exploited.

To guarantee a constantly stiff, low vibration tool system, as well as the insert clamping the tool mounting is very important.

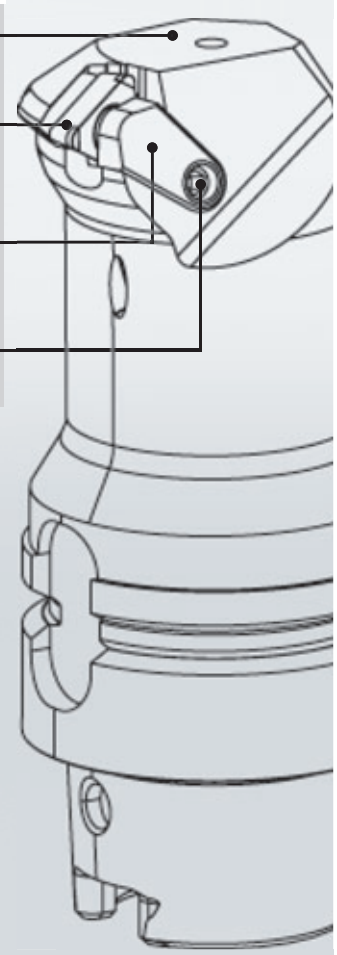
MAPAL offers the SolidGrip tool system with all common machine connections.

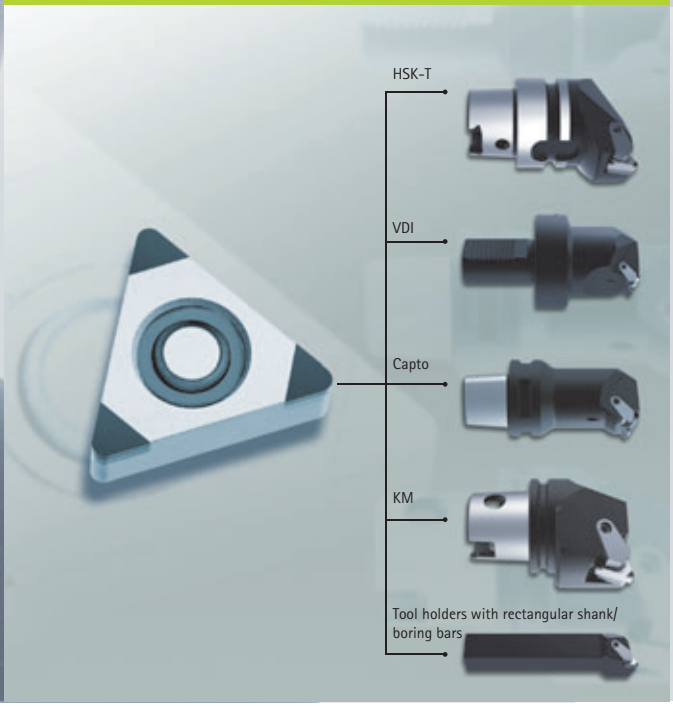
SolidGrip tools designed as monoblocks, ideally with HSK-T mounting, represent an optimum solution. However, compared to systems with inserts with holes, significant economical advantages can also be obtained on the use of SolidGrip tool holders with rectangular shank or boring bars.

## Advantages at a glance

- Higher stability
- Low vibration
- Very high accuracy
- Increased tool life
- Coolant outlet right at the cutting edge (optional)
- Cost reduction due to multiple cutting edges

## SolidGrip – system overview

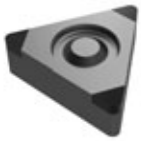


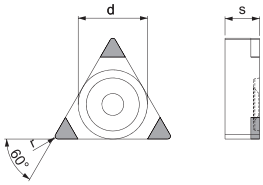



# MAPAL PcBN indexable inserts

## TNGX ...

negative

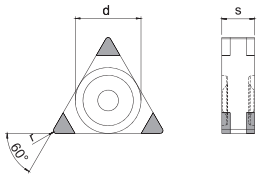





| Specification | Dimensions (mm) | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | S14 | S59 | T13 | W85 | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TNGX 160404 ...N-0AC | 9,52 | 4,76 | 0,4 | ● | ○ | ○ | | ○ | ○ | ● | | | | ○ | | ○ | ○ | ○ | |
| TNGX 160408 ...N-0AC | 9,52 | 4,76 | 0,8 | ● | ○ | ○ | | ○ | ○ | ● | | | | ○ | | ○ | ○ | ○ | |
| TNGX 160412 ...N-0AC | 9,52 | 7,76 | 1,2 | ● | ○ | ○ | | ○ | ○ | ● | | | | ○ | | ○ | ○ | ○ | |

## TNGX ...

negative




| Specification | Dimensions (mm) | | | FP844 | | | | FP823 | | | | FU720 | | | | FU430 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | s | r | S14 | S59 | T13 | W85 | S14 | S59 | T13 | | E01 | T51 | T13 | | E01 | T51 | T13 | |
| TNGX 160404 ...N-0AM | 9,52 | 4,76 | 0,4 | ● | ○ | ○ | | ○ | ○ | ● | | | | ○ | | ○ | ○ | ○ | |
| TNGX 160408 ...N-0AM | 9,52 | 4,76 | 0,8 | ● | ○ | ○ | | ○ | ○ | ● | | | | ○ | | ○ | ○ | ○ | |
| TNGX 160412 ...N-0AM | 9,52 | 7,76 | 1,2 | ● | ○ | ○ | | ○ | ○ | ● | | | | ○ | | ○ | ○ | ○ | |

Recommended cutting data see page 31

**Order example**

Please complete the code with the selected **cutting edge** and **PcBN grade** with your order.

TNGX160404**S59**N-0AM-**FP844**

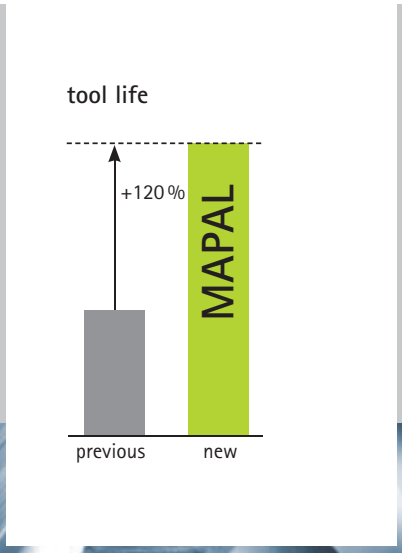
● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# Examples of SolidGrip tools in practice

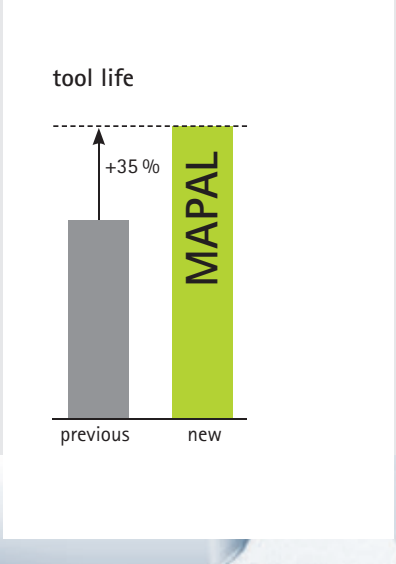
## Journal on constant-velocity joints

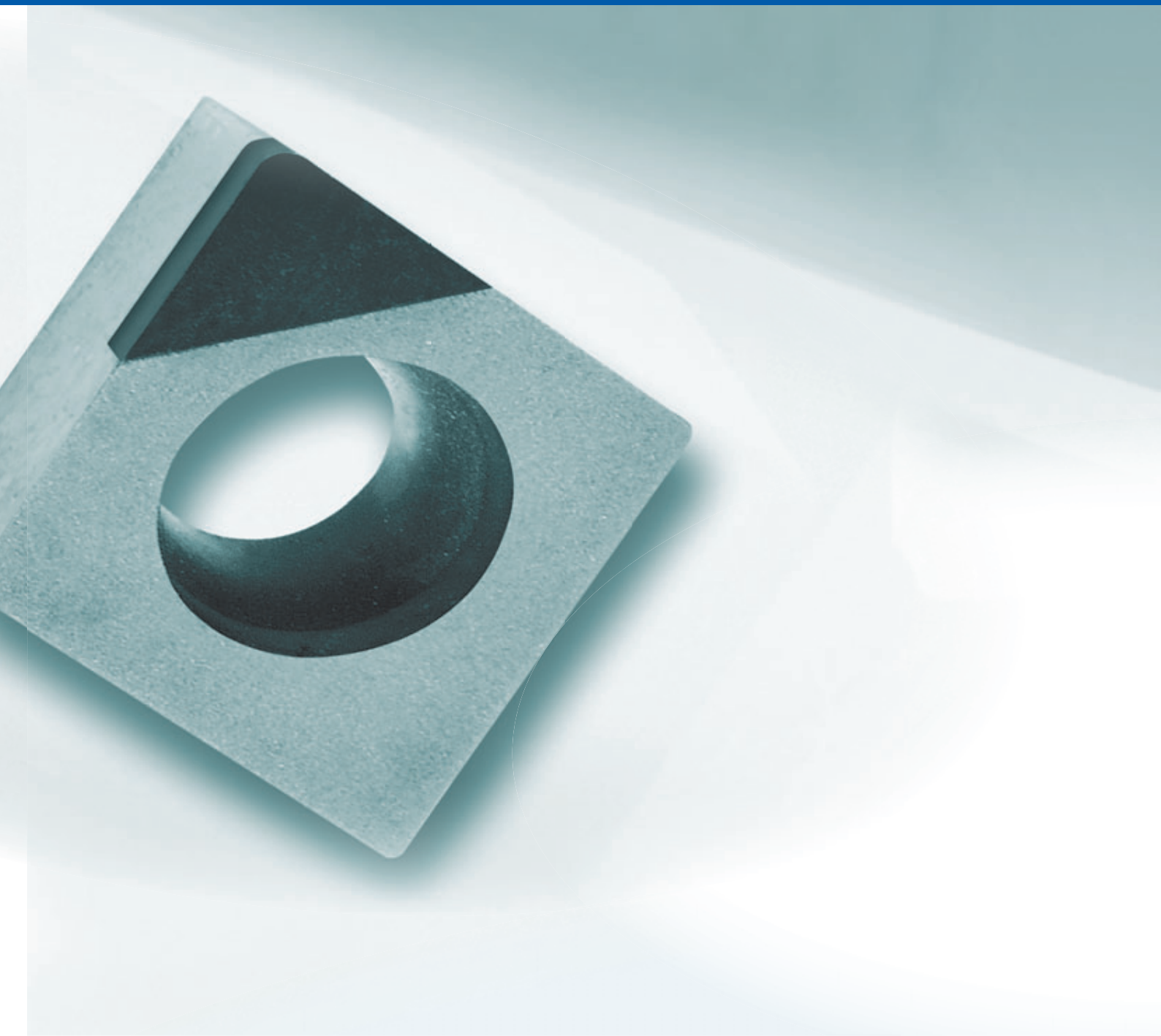
| | |
|---|---|
| Description | The heavily interrupted cut and the curved machining contour place particularly high requirements on the insert clamping |
| Operation | Internal machining of the ball cage raceway |
| Workpiece | Journal (outer race) |
| Material | Cf 53 |
| Hardness | 60 ± 2 HRC |
| Cutting speed $v_c$ | 180 m/min |
| Feed f | 0,15 mm |
| Cutting depth $a_p$ | 0,5 mm |

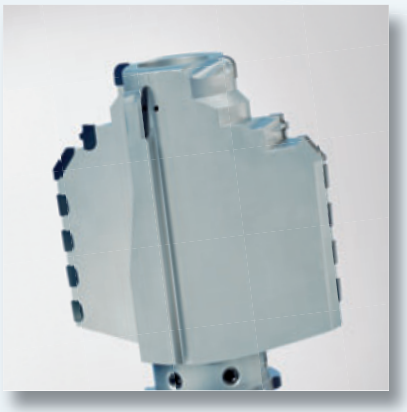



## Hard Turning on the Ball Bearing Cage

| | |
|---|---|
| Description | The interrupted cuts in combination with the thin-walled, unstable component require a very stiff tooling concept. |
| Operation (dry machining) | External machining on the ball cage |
| Workpiece | Ball cage |
| Material | 16MnCr5 |
| Hardness | 60 ± 2 HRC |
| Cutting speed $v_c$ | 110 m/min |
| Feed f | 0,15 mm |
| Cutting depth $a_p$ | 0,2 mm |







## PCD grades and cutting edge designs

With PCD the variety of different grades is far smaller than with PcBN, which makes selection easier. The grades differ mainly in their micro-structure, in other words in the size of the diamond particles.
MAPAL offers a carefully chosen selection of tried and tested grades which are best suited to high accuracy, efficient cutting.

In particular for materials producing long chips, such as aluminium wrought alloys with low Si content for example, MAPAL offers cutting edges with chipbreaker structures. Two different tried and tested structures are available as standard, with one structure specifically for controlled chip fracturing in precision machining and one for machining with greater cutting depths. The chips are compressed and broken without the structure being jammed and without build-up on the cutting edges.

## High performance PCD tools for all applications

In the last ten years MAPAL has shown itself to be one of the principal manufacturers in the tool sector with PCD tips. The programme for this product line covers precision boring tools, circu-lar milling tools and end mills and a successful face milling head system with replaceable milling cartridges.

Modern and precise clamping systems combined with exact grinding quality for maximum dimen-sional stability and concentricity open up numerous opportunities for fixed, brazed MAPAL PCD tools. (Further information can be found in our catalogue "MAPAL Competence – PCD Tools")

# Selection process for MAPAL PCD inserts

## An introduction to the easy way to find the right cutting edge

### Recommended insert form and clearance angle

Please select on page 10/11
→ External machining: 1.1
→ Internal machining: 1.2

### Recommended corner radius

Please select on page 10/11
→ External machining: 2.1
→ Internal machining: 2.2

## PCD grades

### PU620

Universal fine grain PCD grade for the efficient machining of non-ferrous metals as well as non-metallic materials such as fibre-reinforced plastics. It features particularly high edge stability with good wear resistance and can achieve high surface finishes.

### PU660 (only in combination with chipbreaker C1)

Fine grain PCD grade with carbide substrate. The fine grain gives the cutting edge a good degree of sharpness (chipping). The high wear resistance, particularly with abrasive materials, gives this grade good tool life even with close tolerances.

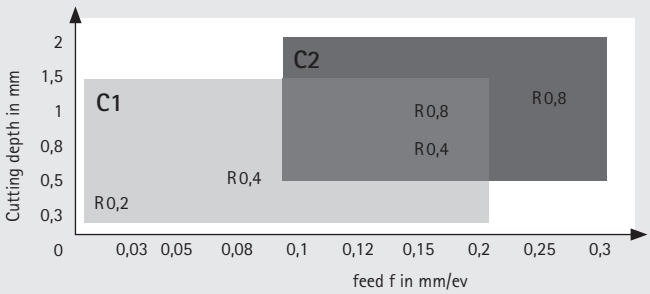
### PU670 (only in combination with chipbreaker C2)

PCD cutting material with medium grain on a carbide substrate. Excellent mechanical wear resistance and very tough. Can also be used for milling operations.

## PCD recommended cutting values

| Material | Cutting speed m/min |
|---|---|
| Aluminium with Si < 12 % | 800 – 3000 |
| Aluminium with Si > 12 % | 500 – 1800 |
| Copper and copper alloys | 500 – 1500 |
| Brass | 500 – 1500 |
| Bronze | 200 – 500 |
| Carbon/graphit | 200 – 500 |
| Green ceramic | 100 – 500 |
| High quality metal (platinum, gold, silver, etc.) | 100 – 400 |
| Plastics | 400 – 1200 |
| Plastics, fibre reinforced | 300 – 800 |
| Sintered steel | 50 – 90 |
| Carbide 25 % > Co content > 10 % | 10 – 30 |

## Chip breaker geometry






**Chip breaker structure C1:**
Chip breaker structure C1 was specially developed for cutting tasks with low cutting depths and therefore thin chips.
The chips are also reliably broken even at high cutting speeds and can be cleared without any problem.

**Chip breaker structure C2:**
For cutting tasks with greater cutting depths structure C2 is available. With this chip breaker structure short, easy to manage chips are also produced.

# Index for PCD inserts

| Shape | Specification | Tip version | Chip breaker/ chip groove | Page |
|---|---|---|---|---|
| C 80° | CCGW... | One cuttinge edge, one corner | no | 42 |
| | CCGW... | One cuttinge edge, one full length | no | 42 |
| | CCGW... | One cuttinge edge, one full length shortened | no | 42 |
| | CCGT... | One cuttinge edge, one corner | positive | 43 |
| | CCGT... | One cuttinge edge, one full length | positive | 43 |
| | CCGT... | One cuttinge edge, one full length shortened | positive | 43 |
| | CCGT... | One cuttinge edge, one corner | lasered C1 | 44 |
| | CCGT... | One cuttinge edge, one corner | lasered C2 | 44 |
| | CPGW... | One cuttinge edge, one corner | no | 45 |
| | CPGW... | One cuttinge edge, one full length | no | 45 |
| | CPGW... | One cuttinge edge, one full length shortened | no | 45 |
| | CPGT... | One cuttinge edge, one corner | positive | 46 |
| | CPGT... | One cuttinge edge, one full length | positive | 46 |
| | CPGT... | One cuttinge edge, one full length shortened | positive | 46 |
| D 55° | DCGW... | One cuttinge edge, one corner | no | 47 |
| | DCGT... | One cuttinge edge, one corner | lasered C1 | 47 |
| | DCGT... | One cuttinge edge, one corner | lasered C2 | 47 |
| | DPGW... | One cuttinge edge, one corner | no | 47 |
| S 90° | SCGW... | One cuttinge edge, one corner | no | 48 |
| | SCGW... | One cuttinge edge, one full length | no | 48 |
| | SCGW... | One cuttinge edge, one full length shortened | no | 48 |
| | SCGT... | One cuttinge edge, one corner | positive | 49 |
| | SCGT... | One cuttinge edge, one full length | positive | 49 |
| | SCGT... | One cuttinge edge, one full length shortened | positive | 49 |
| | SCGT... | One cuttinge edge, one corner | lasered C1 | 50 |
| | SCGT... | One cuttinge edge, one corner | lasered C2 | 50 |
| | SPGW... | One cuttinge edge, one corner | no | 51 |
| | SPGW... | One cuttinge edge, one full length | no | 51 |
| | SPGW... | One cuttinge edge, one full length shortened | no | 51 |
| | SPGT... | One cuttinge edge, one corner | positive | 52 |
| | SPGT... | One cuttinge edge, one full length | positive | 52 |
| | SPGT... | One cuttinge edge, one full length shortened | positive | 52 |
| T 60° | TCGW... | One cuttinge edge, one corner | no | 53 |
| | TCGW... | One cuttinge edge, one full length | no | 53 |
| | TCGW... | One cuttinge edge, one full length shortened | no | 53 |
| | TCGT... | One cuttinge edge, one corner | positive | 54 |
| | TCGT... | One cuttinge edge, one full length | positive | 54 |
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| | TCGT... | One cuttinge edge, one corner | lasered C2 | 55 |
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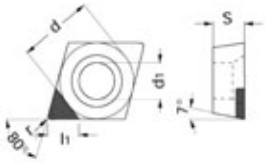
| V 35° | VBGW... | One cuttinge edge, one corner | no | 56 |
| | VBGT... | One cuttinge edge, one corner | lasered C1 | 56 |
| | VCGW... | One cuttinge edge, one corner | no | 56 |
| | VCGT... | One cuttinge edge, one corner | lasered C1 | 56 |

# MAPAL PCD inserts

## CCGW ...
0° chip angle

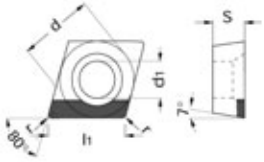



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGW 060204 F01N -0AA | 6,35 | 2,38 | 0,4 | 2,8 | 3,1 | ● | 30011027 |
| CCGW 060208 F01N -0AA | 6,35 | 2,38 | 0,8 | 2,8 | 3 | ● | 30011028 |
| CCGW 09T304 F01N -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 3,5 | ● | 30011031 |
| CCGW 09T308 F01N -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 3,4 | ● | 30011032 |
| CCGW 120404 F01N -0AA | 12,7 | 4,76 | 0,4 | 5,5 | 4,7 | ● | 30011033 |
| CCGW 120408 F01N -0AA | 12,7 | 4,76 | 0,8 | 5,5 | 4,6 | ● | 30011034 |

## CCGW ...
0° chip angle

L/R

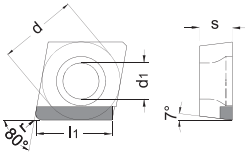



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGW 060204 F01L-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ● | 30034583 |
| CCGW 060208 F01L-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ● | 30034582 |
| CCGW 09T304 F01L-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ● | 30034581 |
| CCGW 09T308 F01L-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ● | 30030896 |
| CCGW 120404 F01L-0AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,5 | ● | 30034580 |
| CCGW 120408 F01L-0AA | 12,7 | 4,76 | 0,8 | 5,5 | 12 | ● | 30085679 |
| CCGW 060204 F01R-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ● | 30041499 |
| CCGW 060208 F01R-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ● | 30085716 |
| CCGW 09T304 F01R-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ● | 30083391 |
| CCGW 09T308 F01R-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ● | 30036478 |
| CCGW 120404 F01R-0AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,5 | ● | 30085719 |
| CCGW 120408 F01R-0AA | 12,7 | 4,76 | 0,8 | 5,5 | 12 | ● | 30085720 |

## CCGW ...
0° chip angle

L/R



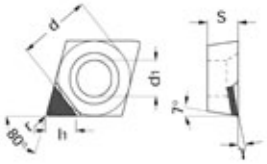

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGW 060204 F01L -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249380 |
| CCGW 060208 F01L -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249381 |
| CCGW 09T304 F01L -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249382 |
| CCGW 09T308 F01L -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249383 |
| CCGW 120404 F01L -6AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,6 | ○ | 30249384 |
| CCGW 120408 F01L -6AA | 12,7 | 4,76 | 0,8 | 5,5 | 12,5 | ○ | 30249385 |
| CCGW 060204 F01R -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249386 |
| CCGW 060208 F01R -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249387 |
| CCGW 09T304 F01R -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249388 |
| CCGW 09T308 F01R -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249389 |
| CCGW 120404 F01R -6AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,6 | ○ | 30249390 |
| CCGW 120408 F01R -6AA | 12,7 | 4,76 | 0,8 | 5,5 | 12,5 | ○ | 30249391 |

Recommended cutting data see page 40

# MAPAL PCD inserts

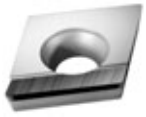
## CCGT ...
positive chip angle



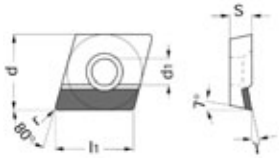

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGT 060204 F01N-5LA | 6,35 | 2,38 | 0,4 | 2,8 | 3,1 | ● | 30046179 |
| CCGT 060208 F01N-5LA | 6,35 | 2,38 | 0,8 | 2,8 | 3 | ● | 30081181 |
| CCGT 09T304 F01N-5LA | 9,52 | 3,97 | 0,4 | 4,4 | 3,5 | ● | 30029194 |
| CCGT 09T308 F01N-5LA | 9,52 | 3,97 | 0,8 | 4,4 | 3,4 | ● | 30039802 |
| CCGT 120404 F01N-5LA | 12,7 | 4,76 | 0,4 | 5,5 | 4,7 | ● | 30085663 |
| CCGT 120408 F01N-5LA | 12,7 | 4,76 | 0,8 | 5,5 | 4,6 | ● | 30085664 |

## CCGT ...
positive chip angle



L/R

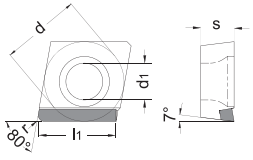



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGT 060204 F01L-1LA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ● | 30085694 |
| CCGT 060208 F01L-1LA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ● | 30085695 |
| CCGT 09T304 F01L-1LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ● | 30085698 |
| CCGT 09T308 F01L-1LA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ● | 30039803 |
| CCGT 120404 F01L-1LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,5 | ● | 30040424 |
| CCGT 120408 F01L-1LA | 12,7 | 4,76 | 0,8 | 5,5 | 12 | ● | 30085701 |
| CCGT 060204 F01R-1LA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ● | 30085721 |
| CCGT 060208 F01R-1LA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ● | 30085722 |
| CCGT 09T304 F01R-1LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ● | 30039812 |
| CCGT 09T308 F01R-1LA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ● | 30039811 |
| CCGT 120404 F01R-1LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,5 | ● | 30085727 |
| CCGT 120408 F01R-1LA | 12,7 | 4,76 | 0,8 | 5,5 | 12 | ● | 30085728 |

## CCGT ...
positive chip angle

L/R



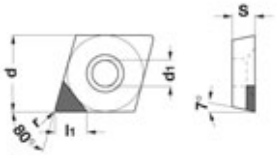

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGT 060204 F01L -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249392 |
| CCGT 060208 F01L -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249393 |
| CCGT 09T304 F01L -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249394 |
| CCGT 09T308 F01L -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249395 |
| CCGT 120404 F01L -6LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,6 | ○ | 30249396 |
| CCGT 120408 F01L -6LA | 12,7 | 4,76 | 0,8 | 5,5 | 12,5 | ○ | 30249397 |
| CCGT 060204 F01R -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249398 |
| CCGT 060208 F01R -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249399 |
| CCGT 09T304 F01R -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249400 |
| CCGT 09T308 F01R -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249401 |
| CCGT 120404 F01R -6LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,6 | ○ | 30249402 |
| CCGT 120408 F01R -6LA | 12,7 | 4,76 | 0,8 | 5,5 | 12,5 | ○ | 30249403 |

Recommended cutting data see page 40

# MAPAL PCD inserts

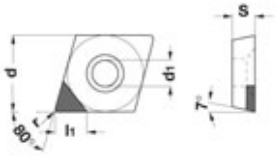
## CCGT ...
Chip breaker geometry C1




positive

| Specification | Dimensions (mm) | | | | | PU660 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGT 060202 F01N-C1A | 6,35 | 2,38 | 0,2 | 2,8 | 3,4 | ● | 10098159 |
| CCGT 060204 F01N-C1A | 6,35 | 2,38 | 0,4 | 2,8 | 3,2 | ● | 10104313 |
| CCGT 09T304 F01N-C1A | 9,52 | 3,97 | 0,4 | 4,4 | 4,3 | ● | 10099042 |
| CCGT 09T308 F01N-C1A | 9,52 | 3,97 | 0,8 | 4,4 | 4,1 | ● | 30234050 |

## CCGT ...
Chip breaker geometry C2




positive

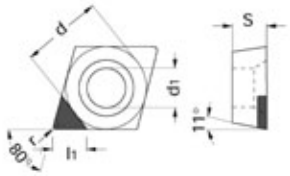
| Specification | Dimensions (mm) | | | | | PU670 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CCGT 060202 F01N-C2A | 6,35 | 2,38 | 0,2 | 2,8 | 3,4 | ● | 30234059 |
| CCGT 060204 F01N-C2A | 6,35 | 2,38 | 0,4 | 2,8 | 3,2 | ● | 30234060 |
| CCGT 09T304 F01N-C2A | 9,52 | 3,97 | 0,4 | 4,4 | 4,3 | ● | 30234061 |
| CCGT 09T308 F01N-C2A | 9,52 | 3,97 | 0,8 | 4,4 | 4,1 | ● | 30234062 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

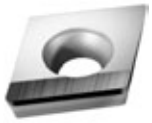
## CPGW ...
0° chip angle



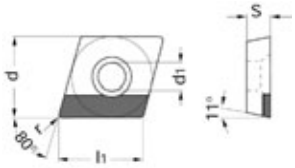

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CPGW 060204 F01N -0AA | 6,35 | 2,38 | 0,4 | 2,8 | 3,1 | ● | 30011029 |
| CPGW 060208 F01N -0AA | 6,35 | 2,38 | 0,8 | 2,8 | 3 | ● | 30011030 |
| CPGW 09T304 F01N -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 3,5 | ● | 30085768 |
| CPGW 09T308 F01N -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 3,4 | ● | 30249405 |

## CPGW ...
0° chip angle



L/R

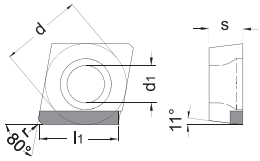



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CPGW 060204 F01L-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ● | 30036376 |
| CPGW 060208 F01L-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ● | 30085678 |
| CPGW 09T304 F01L-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ● | 30249406 |
| CPGW 09T308 F01L-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ● | 30249407 |
| CPGW 060204 F01R-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ● | 30040594 |
| CPGW 060208 F01R-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ● | 30085717 |
| CPGW 09T304 F01R-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ● | 30085790 |
| CPGW 09T308 F01R-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ● | 30249409 |

## CPGW ...
0° chip angle

L/R




positive

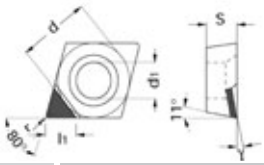
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CPGW 060204 F01L -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249410 |
| CPGW 060208 F01L -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249411 |
| CPGW 09T304 F01L -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249412 |
| CPGW 09T308 F01L -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249413 |
| CPGW 060204 F01R -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249414 |
| CPGW 060208 F01R -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249415 |
| CPGW 09T304 F01R -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249416 |
| CPGW 09T308 F01R -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249417 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

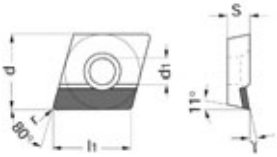
## CPGT ...
positive chip angle




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CPGT 060204 F01N -5LA | 6,35 | 2,38 | 0,2 | 2,8 | 3,1 | ○ | 30085661 |
| CPGT 060208 F01N -5LA | 6,35 | 2,38 | 0,4 | 2,8 | 3 | ○ | 30085662 |
| CPGT 09T304 F01N -5LA | 9,52 | 3,97 | 0,4 | 4,4 | 3,5 | ○ | 30249418 |
| CPGT 09T308 F01N -5LA | 9,52 | 3,97 | 0,8 | 4,4 | 3,4 | ○ | 30249419 |

## CPGT ...
positive chip angle

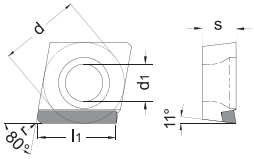



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CPGT 060204 F01L -1LA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ○ | 30085696 |
| CPGT 060208 F01L -1LA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ○ | 30085697 |
| CPGT 09T304 F01L -1LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ○ | 30249420 |
| CPGT 09T308 F01L -1LA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ○ | 30249421 |
| CPGT 060204 F01R -1LA | 6,35 | 2,38 | 0,4 | 2,8 | 6 | ○ | 30085723 |
| CPGT 060208 F01R -1LA | 6,35 | 2,38 | 0,8 | 2,8 | 5,6 | ○ | 30085724 |
| CPGT 09T304 F01R -1LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,2 | ○ | 30249422 |
| CPGT 09T308 F01R -1LA | 9,52 | 3,97 | 0,8 | 4,4 | 8,8 | ○ | 30249423 |

## CPGT ...
positive chip angle

L/R




positive

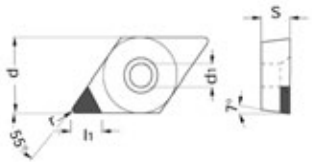
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| CPGT 060204 F01L -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249424 |
| CPGT 060208 F01L -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249425 |
| CPGT 09T304 F01L -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249426 |
| CPGT 09T308 F01L -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249427 |
| CPGT 060204 F01R -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249428 |
| CPGT 060208 F01R -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 6,1 | ○ | 30249429 |
| CPGT 09T304 F01R -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,4 | ○ | 30249430 |
| CPGT 09T308 F01R -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249431 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

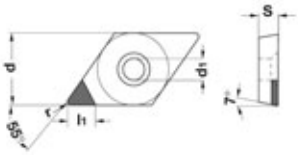
## DCGW ...
0° chip angle




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| DCGW 070202 F01N-0AA | 6,35 | 2,38 | 0,2 | 2,8 | 3,7 | ● | 30249512 |
| DCGW 070204 F01N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 3,4 | ● | 30249513 |
| DCGW 070208 F01N-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 3,0 | ● | 30249514 |
| DCGW 11T304 F01N-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 3,9 | ● | 30234072 |
| DCGW 11T308 F01N-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 3,5 | ● | 30234073 |

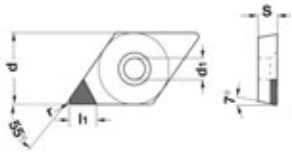
## DCGT ...
Chip breaker geometry C1




positive

| Specification | Dimensions (mm) | | | | | PU660 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| DCGT 070202 F01N-C1A | 6,35 | 2,38 | 0,2 | 2,8 | 3,7 | ● | 30223531 |
| DCGT 070204 F01N-C1A | 6,35 | 2,38 | 0,4 | 2,8 | 3,4 | ● | 10104930 |
| DCGT 11T302 F01N-C1A | 9,52 | 3,97 | 0,2 | 4,4 | 4,7 | ● | 30234051 |
| DCGT 11T304 F01N-C1A | 9,52 | 3,97 | 0,4 | 4,4 | 4,3 | ● | 30234052 |
| DCGT 11T308 F01N-C1A | 9,52 | 3,97 | 0,8 | 4,4 | 4 | ● | 30234053 |

## DCGT ...
Chip breaker geometry C2




positive

| Specification | Dimensions (mm) | | | | | PU670 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| DCGT 070202 F01N-C2A | 6,35 | 2,38 | 0,2 | 2,8 | 3,7 | ● | 30234063 |
| DCGT 070204 F01N-C2A | 6,35 | 2,38 | 0,4 | 2,8 | 3,4 | ● | 30234064 |
| DCGT 11T302 F01N-C2A | 9,52 | 3,97 | 0,2 | 4,4 | 4,7 | ● | 30234065 |
| DCGT 11T304 F01N-C2A | 9,52 | 3,97 | 0,4 | 4,4 | 4,3 | ● | 30234066 |
| DCGT 11T308 F01N-C2A | 9,52 | 3,97 | 0,8 | 4,4 | 4 | ● | 30234067 |

## DPGW ...
0° chip angle

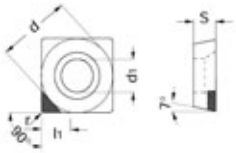

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| DPGW 070202 F01N-0AA | 6,35 | 2,38 | 0,2 | 2,8 | 3,7 | ○ | 30257651 |
| DPGW 070204 F01N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 3,4 | ○ | 30257654 |
| DPGW 070208 F01N-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 3,0 | ○ | 30257656 |
| DPGW 11T304 F01N-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 3,9 | ○ | 30257657 |
| DPGW 11T308 F01N-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 3,5 | ○ | 30257660 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

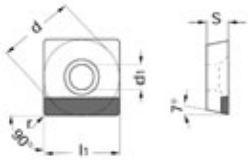
# MAPAL PCD inserts




## SCGW ...
0° chip angle

positive

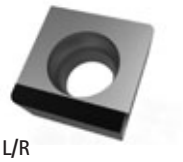
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGW 060204 F01N -0AA | 6,35 | 2,38 | 0,4 | 2,8 | 2,8 | ● | 30011035 |
| SCGW 060208 F01N -0AA | 6,35 | 2,38 | 0,8 | 2,8 | 2,8 | ● | 30011036 |
| SCGW 09T304 F01N -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 3,1 | ● | 30011037 |
| SCGW 09T308 F01N -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 3,1 | ● | 30011038 |
| SCGW 120404 F01N -0AA | 12,7 | 4,76 | 0,4 | 5,5 | 4,5 | ● | 30011039 |
| SCGW 120408 F01N -0AA | 12,7 | 4,76 | 0,8 | 5,5 | 4,5 | ● | 30011040 |



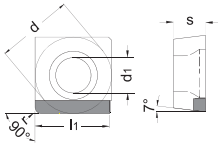

## SCGW ...
0° chip angle

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGW 060204 F01X -0AA | 6,35 | 2,38 | 0,4 | 2,8 | 5,9 | ● | 30085680 |
| SCGW 060208 F01X -0AA | 6,35 | 2,38 | 0,8 | 2,8 | 5,5 | ● | 30085681 |
| SCGW 09T304 F01X -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,1 | ● | 30025529 |
| SCGW 09T308 F01X -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 8,7 | ● | 30037231 |
| SCGW 120404 F01X -0AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,3 | ● | 30083392 |
| SCGW 120408 F01X -0AA | 12,7 | 4,76 | 0,8 | 5,5 | 11,9 | ● | 30085687 |



L/R




## SCGW ...
0° chip angle

positive

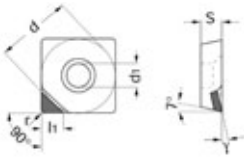
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGW 060204 F01L -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249432 |
| SCGW 060208 F01L -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 6,2 | ○ | 30249433 |
| SCGW 09T304 F01L -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249434 |
| SCGW 09T308 F01L -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249435 |
| SCGW 120404 F01L -6AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,4 | ○ | 30249436 |
| SCGW 120408 F01L -6AA | 12,7 | 4,76 | 0,8 | 5,5 | 12,4 | ○ | 30249437 |
| SCGW 060204 F01R -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249438 |
| SCGW 060208 F01R -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 6,2 | ○ | 30249439 |
| SCGW 09T304 F01R -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249440 |
| SCGW 09T308 F01R -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249441 |
| SCGW 120404 F01R -6AA | 12,7 | 4,76 | 0,4 | 5,5 | 12,4 | ○ | 30249442 |
| SCGW 120408 F01R -6AA | 12,7 | 4,76 | 0,8 | 5,5 | 12,4 | ○ | 30249443 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

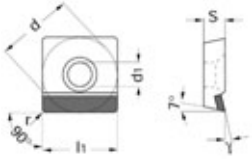
## SCGT ...
positive chip angle




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGT 060204 F01N -5LA | 6,35 | 2,38 | 0,4 | 2,8 | 2,8 | ● | 30085665 |
| SCGT 060208 F01N -5LA | 6,35 | 2,38 | 0,8 | 2,8 | 2,8 | ● | 30085666 |
| SCGT 09T304 F01N -5LA | 9,52 | 3,97 | 0,4 | 4,4 | 3,1 | ● | 30037904 |
| SCGT 09T308 F01N -5LA | 9,52 | 3,97 | 0,8 | 4,4 | 3,1 | ● | 30058354 |
| SCGT 120404 F01N -5LA | 12,7 | 4,76 | 0,4 | 5,5 | 4,5 | ● | 30085670 |
| SCGT 120408 F01N -5LA | 12,7 | 4,76 | 0,8 | 5,5 | 4,5 | ● | 30039810 |

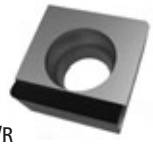
## SCGT ...
positive chip angle



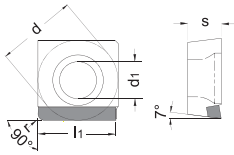

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGT 060204 F01X -1LA | 6,35 | 2,38 | 0,4 | 2,8 | 5,9 | ● | 30085702 |
| SCGT 060208 F01X -1LA | 6,35 | 2,38 | 0,8 | 2,8 | 5,5 | ● | 30085703 |
| SCGT 09T304 F01X -1LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,1 | ● | 30047583 |
| SCGT 09T308 F01X -1LA | 9,52 | 3,97 | 0,8 | 4,4 | 8,7 | ● | 30085707 |
| SCGT 120404 F01X -1LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,3 | ● | 30085708 |
| SCGT 120408 F01X -1LA | 12,7 | 4,76 | 0,8 | 5,5 | 11,9 | ● | 30085709 |

## SCGT ...
positive chip angle



L/R




positive

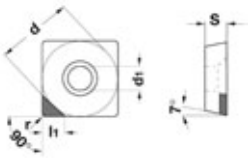
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGT 060204 F01L -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249444 |
| SCGT 060208 F01L -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 6,2 | ○ | 30249445 |
| SCGT 09T304 F01L -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249446 |
| SCGT 09T308 F01L -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249447 |
| SCGT 120404 F01L -6LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,4 | ○ | 30249448 |
| SCGT 120408 F01L -6LA | 12,7 | 4,76 | 0,8 | 5,5 | 12,4 | ○ | 30249449 |
| SCGT 060204 F01R -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 6,2 | ○ | 30249450 |
| SCGT 060208 F01R -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 6,2 | ○ | 30249451 |
| SCGT 09T304 F01R -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249452 |
| SCGT 09T308 F01R -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249453 |
| SCGT 120404 F01R -6LA | 12,7 | 4,76 | 0,4 | 5,5 | 12,4 | ○ | 30249454 |
| SCGT 120408 F01R -6LA | 12,7 | 4,76 | 0,8 | 5,5 | 12,4 | ○ | 30249455 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

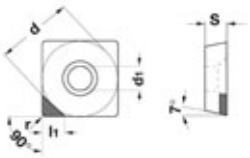
## SCGT ...
Chip breaker geometry C1




positive

| Specification | Dimensions (mm) | | | | | PU660 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGT 09T304 F01N-C1A | 9,52 | 3,97 | 0,4 | 4,4 | 4,4 | ● | 30250260 |
| SCGT 09T308 F01N-C1A | 9,52 | 3,97 | 0,8 | 4,4 | 4,3 | ● | 30250261 |
| SCGT 120404 F01N-C1A | 12,7 | 4,76 | 0,4 | 5,5 | 4,4 | ● | 30250262 |
| SCGT 120408 F01N-C1A | 12,7 | 4,76 | 0,8 | 5,5 | 4,3 | ● | 30250263 |

## SCGT ...
Chip breaker geometry C2




positive

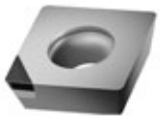
| Specification | Dimensions (mm) | | | | | PU670 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SCGT 09T304 F01N-C2A | 9,52 | 3,97 | 0,4 | 4,4 | 4,4 | ● | 30249456 |
| SCGT 09T308 F01N-C2A | 9,52 | 3,97 | 0,8 | 4,4 | 4,3 | ● | 30249457 |
| SCGT 120404 F01N-C2A | 12,7 | 4,76 | 0,4 | 5,5 | 4,4 | ● | 30249458 |
| SCGT 120408 F01N-C2A | 12,7 | 4,76 | 0,8 | 5,5 | 4,3 | ● | 30249459 |

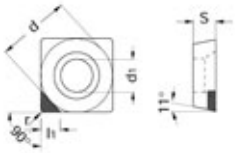
Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

## SPGW ...
0° chip angle

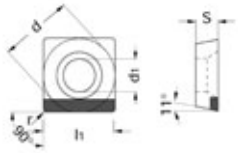





positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SPGW 060304 F01N -0AA | 6,35 | 3,18 | 0,4 | 2,8 | 2,8 | ● | 30036253 |
| SPGW 060308 F01N -0AA | 6,35 | 3,18 | 0,8 | 2,8 | 2,8 | ● | 30085658 |
| SPGW 09T304 F01N -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 3,1 | ● | 30249460 |
| SPGW 09T308 F01N -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 3,1 | ● | 30249461 |

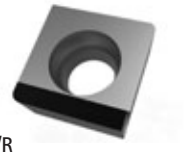
## SPGW ...
0° chip angle



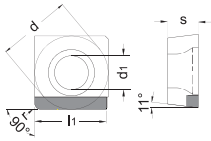

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SPGW 060304 F01X -0AA | 6,35 | 3,18 | 0,4 | 2,8 | 5,9 | ● | 30085682 |
| SPGW 060308 F01X -0AA | 6,35 | 3,18 | 0,8 | 2,8 | 5,5 | ● | 30085683 |
| SPGW 09T304 F01X -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,1 | ● | 30039129 |
| SPGW 09T308 F01X -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 8,7 | ● | 30249463 |

## SPGW ...
0° chip angle



L/R




positive

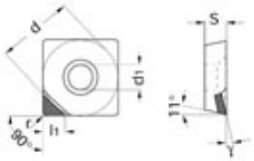
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SPGW 060304 F01L -6AA | 6,35 | 3,18 | 0,4 | 2,8 | 6,2 | ○ | 30249464 |
| SPGW 060308 F01L -6AA | 6,35 | 3,18 | 0,8 | 2,8 | 6,2 | ○ | 30249465 |
| SPGW 09T304 F01L -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249466 |
| SPGW 09T308 F01L -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249467 |
| SPGW 060304 F01R -6AA | 6,35 | 3,18 | 0,4 | 2,8 | 6,2 | ○ | 30249468 |
| SPGW 060308 F01R -6AA | 6,35 | 3,18 | 0,8 | 2,8 | 6,2 | ○ | 30249469 |
| SPGW 09T304 F01R -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249470 |
| SPGW 09T308 F01R -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249471 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

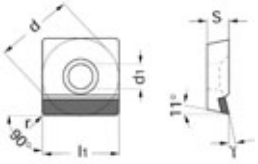
## SPGT ...
positive chip angle




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SPGT 060304 F01N -5LA | 6,35 | 3,18 | 0,4 | 2,8 | 2,8 | ○ | 30049511 |
| SPGT 060308 F01N -5LA | 6,35 | 3,18 | 0,8 | 2,8 | 2,8 | ○ | 30085668 |
| SPGT 09T304 F01N -5LA | 9,52 | 3,97 | 0,4 | 4,4 | 3,1 | ○ | 30249472 |
| SPGT 09T308 F01N -5LA | 9,52 | 3,97 | 0,8 | 4,4 | 3,1 | ○ | 30249473 |

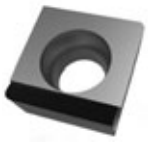
## SPGT ...
positive chip angle



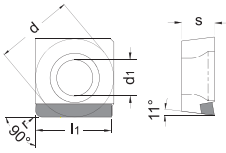

positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SPGT 060304 F01X -1LA | 6,35 | 3,18 | 0,4 | 2,8 | 5,9 | ○ | 30040407 |
| SPGT 060308 F01X -1LA | 6,35 | 3,18 | 0,8 | 2,8 | 5,5 | ○ | 30085705 |
| SPGT 09T304 F01X -1LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,1 | ○ | 30249474 |
| SPGT 09T308 F01X -1LA | 9,52 | 3,97 | 0,8 | 4,4 | 8,7 | ○ | 30249475 |

## SPGT ...
positive chip angle



L/R




positive

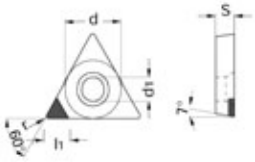
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| SPGT 060304 F01L -6LA | 6,35 | 3,18 | 0,4 | 2,8 | 6,2 | ○ | 30249476 |
| SPGT 060308 F01L -6LA | 6,35 | 3,18 | 0,8 | 2,8 | 6,2 | ○ | 30249477 |
| SPGT 09T304 F01L -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249478 |
| SPGT 09T308 F01L -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249479 |
| SPGT 060304 F01R -6LA | 6,35 | 3,18 | 0,4 | 2,8 | 6,2 | ○ | 30249480 |
| SPGT 060308 F01R -6LA | 6,35 | 3,18 | 0,8 | 2,8 | 6,2 | ○ | 30249481 |
| SPGT 09T304 F01R -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 9,3 | ○ | 30249482 |
| SPGT 09T308 F01R -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 9,3 | ○ | 30249483 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

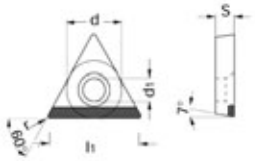
## TCGW ...
0° chip angle




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGW 090204 F01N -0AA | 5,56 | 2,38 | 0,4 | 2,5 | 3,4 | ● | 30011041 |
| TCGW 090208 F01N -0AA | 5,56 | 2,38 | 0,8 | 2,5 | 3,1 | ● | 30011042 |
| TCGW 110204 F01N -0AA | 6,35 | 2,38 | 0,4 | 2,8 | 3,8 | ● | 30011043 |
| TCGW 110208 F01N -0AA | 6,35 | 2,38 | 0,8 | 2,8 | 3,5 | ● | 30011044 |
| TCGW 16T304 F01N -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 5,4 | ● | 30011045 |
| TCGW 16T308 F01N -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 5,1 | ● | 30011046 |

## TCGW ...
0° chip angle

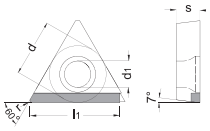



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGW 090204 F01X -0AA | 5,56 | 2,38 | 0,4 | 2,5 | 8,6 | ● | 30085688 |
| TCGW 090208 F01X -0AA | 5,56 | 2,38 | 0,8 | 2,5 | 7,6 | ● | 30085689 |
| TCGW 110204 F01X -0AA | 6,35 | 2,38 | 0,4 | 2,8 | 10 | ● | 30034491 |
| TCGW 110208 F01X -0AA | 6,35 | 2,38 | 0,8 | 2,8 | 9 | ● | 30085691 |
| TCGW 16T304 F01X -0AA | 9,52 | 3,97 | 0,4 | 4,4 | 15,5 | ● | 30085692 |
| TCGW 16T308 F01X -0AA | 9,52 | 3,97 | 0,8 | 4,4 | 14,5 | ● | 30085693 |

## TCGW ...
0° chip angle

L/R




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGW 090204 F01L -6AA | 5,56 | 2,38 | 0,4 | 2,5 | 8,6 | ○ | 30249484 |
| TCGW 090208 F01L -6AA | 5,56 | 2,38 | 0,8 | 2,5 | 8,3 | ○ | 30249485 |
| TCGW 110204 F01L -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 9,8 | ○ | 30249486 |
| TCGW 110208 F01L -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 9,5 | ○ | 30249487 |
| TCGW 16T304 F01L -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 15 | ○ | 30249488 |
| TCGW 16T308 F01L -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 14,7 | ○ | 30249489 |
| TCGW 090204 F01R -6AA | 5,56 | 2,38 | 0,4 | 2,5 | 8,6 | ○ | 30249490 |
| TCGW 090208 F01R -6AA | 5,56 | 2,38 | 0,8 | 2,5 | 8,3 | ○ | 30249491 |
| TCGW 110204 F01R -6AA | 6,35 | 2,38 | 0,4 | 2,8 | 9,8 | ○ | 30249492 |
| TCGW 110208 F01R -6AA | 6,35 | 2,38 | 0,8 | 2,8 | 9,5 | ○ | 30249493 |
| TCGW 16T304 F01R -6AA | 9,52 | 3,97 | 0,4 | 4,4 | 15 | ○ | 30249494 |
| TCGW 16T308 F01R -6AA | 9,52 | 3,97 | 0,8 | 4,4 | 14,7 | ○ | 30249495 |

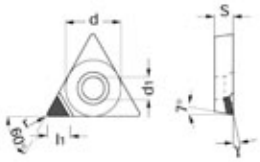
Recommended cutting data see page 40

● available ex stock Germany

○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

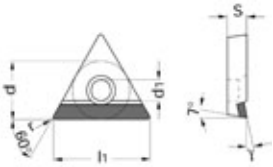
## TCGT ...
positive chip angle




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGT 090204 F01N -5LA | 5,56 | 2,38 | 0,4 | 2,5 | 3,4 | ● | 30085671 |
| TCGT 090208 F01N -5LA | 5,56 | 2,38 | 0,8 | 2,5 | 3,1 | ● | 30085672 |
| TCGT 110204 F01N -5LA | 6,35 | 2,38 | 0,4 | 2,8 | 3,8 | ● | 30085673 |
| TCGT 110208 F01N -5LA | 6,35 | 2,38 | 0,8 | 2,8 | 3,5 | ● | 30085674 |
| TCGT 16T304 F01N -5LA | 9,52 | 3,97 | 0,4 | 4,4 | 5,4 | ● | 30085675 |
| TCGT 16T308 F01N -5LA | 9,52 | 3,97 | 0,8 | 4,4 | 5,1 | ● | 30085676 |

## TCGT ...
positive chip angle

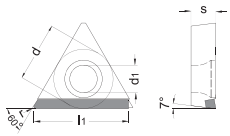



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGT 090204 F01X -1LA | 5,56 | 2,38 | 0,4 | 2,5 | 8,6 | ● | 30085710 |
| TCGT 090208 F01X -1LA | 5,56 | 2,38 | 0,8 | 2,5 | 7,6 | ● | 30085711 |
| TCGT 110204 F01X -1LA | 6,35 | 2,38 | 0,4 | 2,8 | 10 | ● | 30085712 |
| TCGT 110208 F01X -1LA | 6,35 | 2,38 | 0,8 | 2,8 | 9 | ● | 30085713 |
| TCGT 16T304 F01X -1LA | 9,52 | 3,97 | 0,4 | 4,4 | 15,5 | ● | 30085714 |
| TCGT 16T308 F01X -1LA | 9,52 | 3,97 | 0,8 | 4,4 | 14,5 | ● | 30085715 |

## TCGT ...
positive chip angle

L/R




positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGT 090204 F01L -6LA | 5,56 | 2,38 | 0,4 | 2,5 | 8,6 | ○ | 30249496 |
| TCGT 090208 F01L -6LA | 5,56 | 2,38 | 0,8 | 2,5 | 8,3 | ○ | 30249497 |
| TCGT 110204 F01L -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 9,8 | ○ | 30249498 |
| TCGT 110208 F01L -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 9,5 | ○ | 30249499 |
| TCGT 16T304 F01L -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 15 | ○ | 30249500 |
| TCGT 16T308 F01L -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 14,7 | ○ | 30249501 |
| TCGT 090204 F01R -6LA | 5,56 | 2,38 | 0,4 | 2,5 | 8,6 | ○ | 30249502 |
| TCGT 090208 F01R -6LA | 5,56 | 2,38 | 0,8 | 2,5 | 8,3 | ○ | 30249503 |
| TCGT 110204 F01R -6LA | 6,35 | 2,38 | 0,4 | 2,8 | 9,8 | ○ | 30249504 |
| TCGT 110208 F01R -6LA | 6,35 | 2,38 | 0,8 | 2,8 | 9,5 | ○ | 30249505 |
| TCGT 16T304 F01R -6LA | 9,52 | 3,97 | 0,4 | 4,4 | 15 | ○ | 30249506 |
| TCGT 16T308 F01R -6LA | 9,52 | 3,97 | 0,8 | 4,4 | 14,7 | ○ | 30249507 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

## TCGT ...
Chip breaker geometry C1


positive

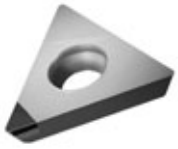
| Specification | Dimensions (mm) | | | | | PU660 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGT 110202 F01N-C1A | 6,35 | 2,38 | 0,2 | 2,8 | 3,7 | ● | 30234054 |
| TCGT 110204 F01N-C1A | 6,35 | 2,38 | 0,4 | 2,8 | 3,4 | ● | 30234055 |

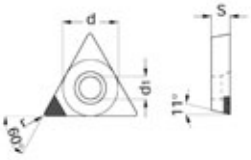
## TCGT ...
Chip breaker geometry C2


positive

| Specification | Dimensions (mm) | | | | | PU670 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TCGT 110202 F01N-C2A | 6,35 | 2,38 | 0,2 | 2,8 | 3,7 | ● | 30250264 |
| TCGT 110204 F01N-C2A | 6,35 | 2,38 | 0,4 | 2,8 | 3,4 | ● | 30250265 |

## TPGW ...
0° chip angle






positive

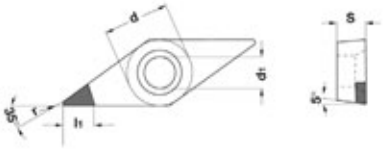
| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| TPGW 090204 F01N-0AA | 5,56 | 2,38 | 0,4 | 2,5 | 3,4 | ○ | 30252340 |
| TPGW 090208 F01N-0AA | 5,56 | 2,38 | 0,8 | 2,5 | 3,1 | ○ | 30257663 |
| TPGW 110204 F01N-0AA | 6,35 | 2,38 | 0,4 | 2,8 | 3,8 | ○ | 30257665 |
| TPGW 110208 F01N-0AA | 6,35 | 2,38 | 0,8 | 2,8 | 3,5 | ○ | 30257666 |
| TPGW 16T304 F01N-0AA | 9,52 | 3,97 | 0,4 | 4,4 | 5,4 | ○ | 30257668 |
| TPGW 16T308 F01N-0AA | 9,52 | 3,97 | 0,8 | 4,4 | 5,1 | ○ | 30257670 |

Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# MAPAL PCD inserts

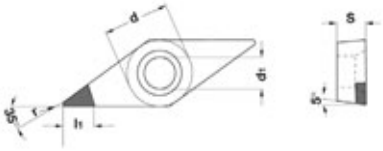
## VBGW ...
0° chip angle



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| VBGW 160404 F01N-0AA | 9,52 | 4,76 | 0,4 | 4,4 | 5,5 | ○ | 30249508 |
| VBGW 160408 F01N-0AA | 9,52 | 4,76 | 0,8 | 4,4 | 5 | ○ | 30249509 |

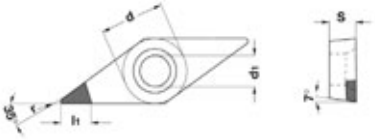
## VBGT ...
Chip breaker geometry C1



positive

| Specification | Dimensions (mm) | | | | | PU660 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| VBGT 160404 F01N-C1A | 9,52 | 4,76 | 0,4 | 4,4 | 5,5 | ● | 30234056 |
| VBGT 160408 F01N-C1A | 9,52 | 4,76 | 0,8 | 4,4 | 5 | ● | 30234057 |

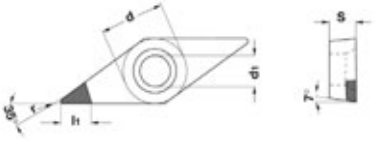
## VCGW ...
0° chip angle



positive

| Specification | Dimensions (mm) | | | | | PU620 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| VCGW 160404 F01N-0AA | 9,52 | 4,76 | 0,4 | 4,4 | 5,5 | ○ | 30249510 |
| VCGW 160408 F01N-0AA | 9,52 | 4,76 | 0,8 | 4,4 | 5 | ○ | 30249511 |

## VCGT ...
Chip breaker geometry C1



positive

| Specification | Dimensions (mm) | | | | | PU660 | |
|---|---|---|---|---|---|---|---|
| | d | s | r | $d_1$ | $l_1$ | | Order No. |
| VCGT 110302 F01N-C1A | 6,35 | 3,18 | 0,2 | 2,9 | 4,6 | ● | 30234058 |
| VCGT 110304 F01N-C1A | 6,35 | 3,18 | 0,4 | 2,9 | 3,9 | ● | 30223530 |
| VCGT 160404 F01N-C1A | 9,52 | 4,76 | 0,4 | 4,4 | 5,5 | ● | 10105369 |
| VCGT 160408 F01N-C1A | 9,52 | 4,76 | 0,8 | 4,4 | 5 | ● | 30228625 |

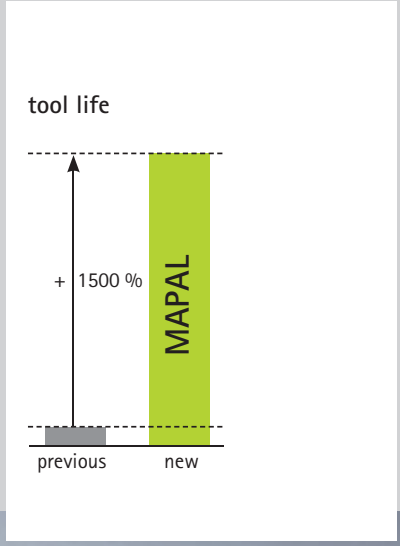
Recommended cutting data see page 40

● available ex stock Germany
○ Standard tool not on stock (delivery on request)

# Examples of PCD insert in practice

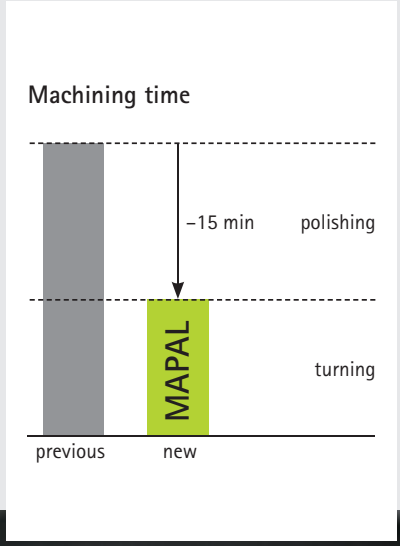
## Slide value for automatic transmission systems

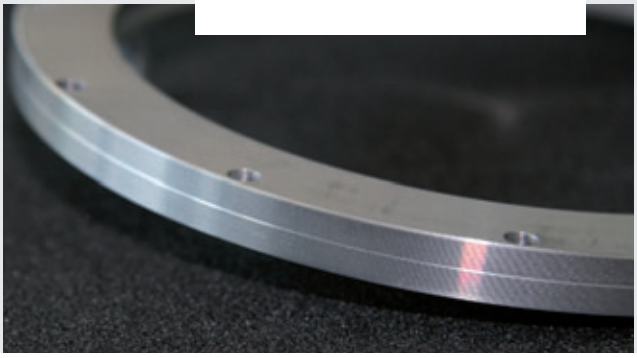
| | |
|---|---|
| Description | The PCD insert with chip breaker allows chips to be fractured in the best possible way. This means different machining diameters can be machined in less than six seconds. |
| Operation | Longitudinal turning of three different external diameters |
| Workpiece | Slide value |
| Material | AlMgSiPb F28 |
| Cutting speed $v_c$ | 140 - 215 m/min |
| Feed speed $v_f$ | 1.200 - 1.650 mm/min |
| Cutting depth $a_p$ | 0,15 - 0,2 mm |
| Insert | CCGT 09T308 F01N-C1A-PU660 (with lasered chip breaker) |




## External ring for a rotary connection (anti-friction bearing)

| | |
|---|---|
| Description | Until now, the required surface quality $R_a < 0.2$ could only be obtained with a subsequent polishing process. With the application of the MAPAL insert with chip breaker geometry, this second machining step could be omitted. |
| Operation | Longitudinal turning of external diameter $139{,}0^{-0{,}03}$ mm |
| Workpiece | External ring for a rotary connection (anti-friction bearing) |
| Material | Dispal S250 (AlSi20Fe5Ni2) |
| Cutting speed $v_c$ | 400 m/min |
| Feed f | 0,02 mm |
| Cutting depth $a_p$ | 0,5 mm |
| Insert | VBGT 160408 F01N-C1A-PU660 (with lasered chip breaker) |

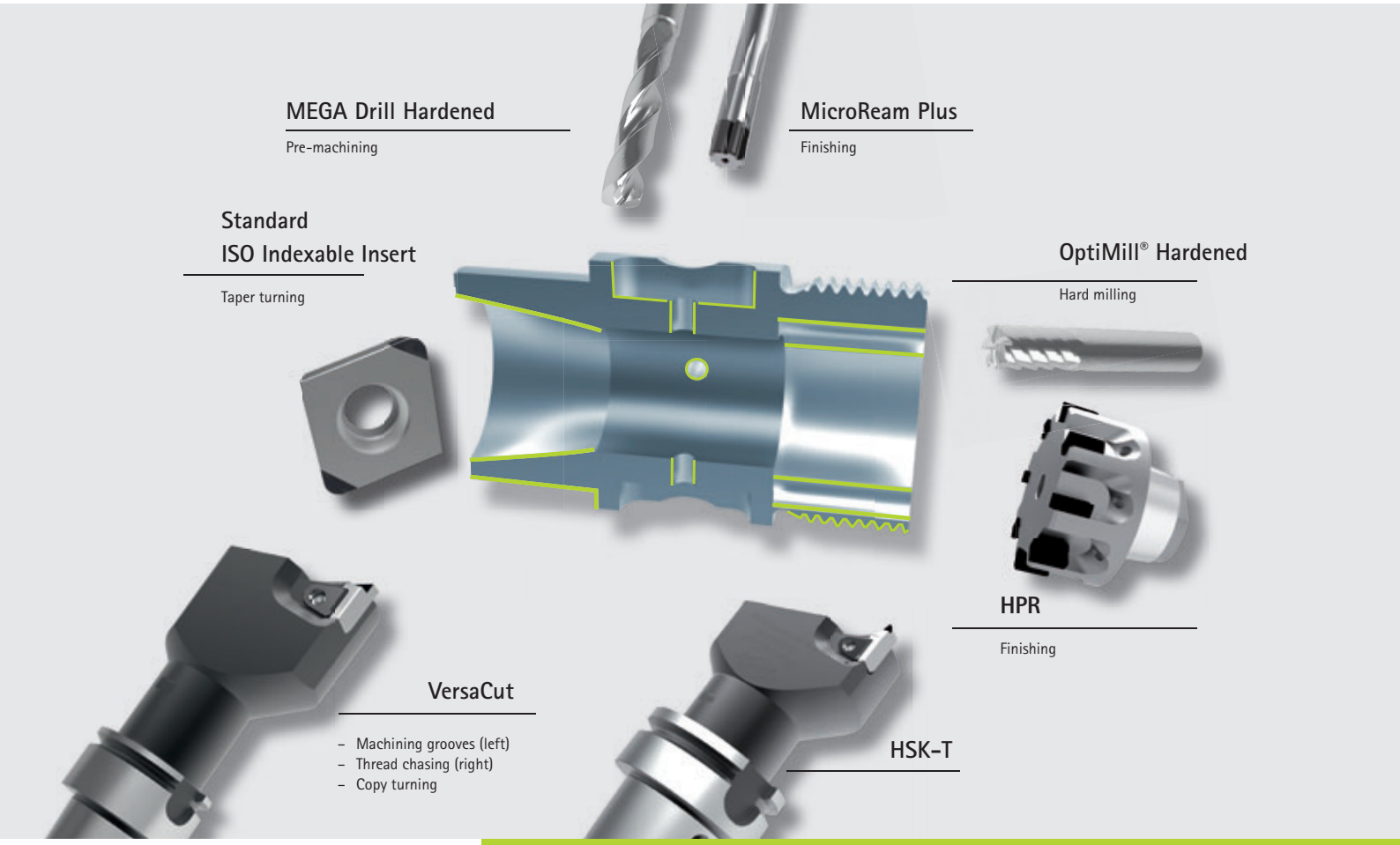


# MAPAL Competence Hard Machining

**Innovative tool solutions for complete machining**

MAPAL offer economical and process reliable tooling solutions for the complete machining of hardened components, in all the relevant areas of application; turning, milling, drilling and reaming.
It is important when laying out hart-machining processes, that the complete package of machine tool, clamping fixture and tooling are perfectly attuned to one another. To assure this, the MAPAL specialists have the necessary process Know-how at their disposal and can call upon a comprehensive range of efficient tools to meet the challenging requirements of hard machining.




Complete machining of a part with 58 HRC on a turning-milling center.

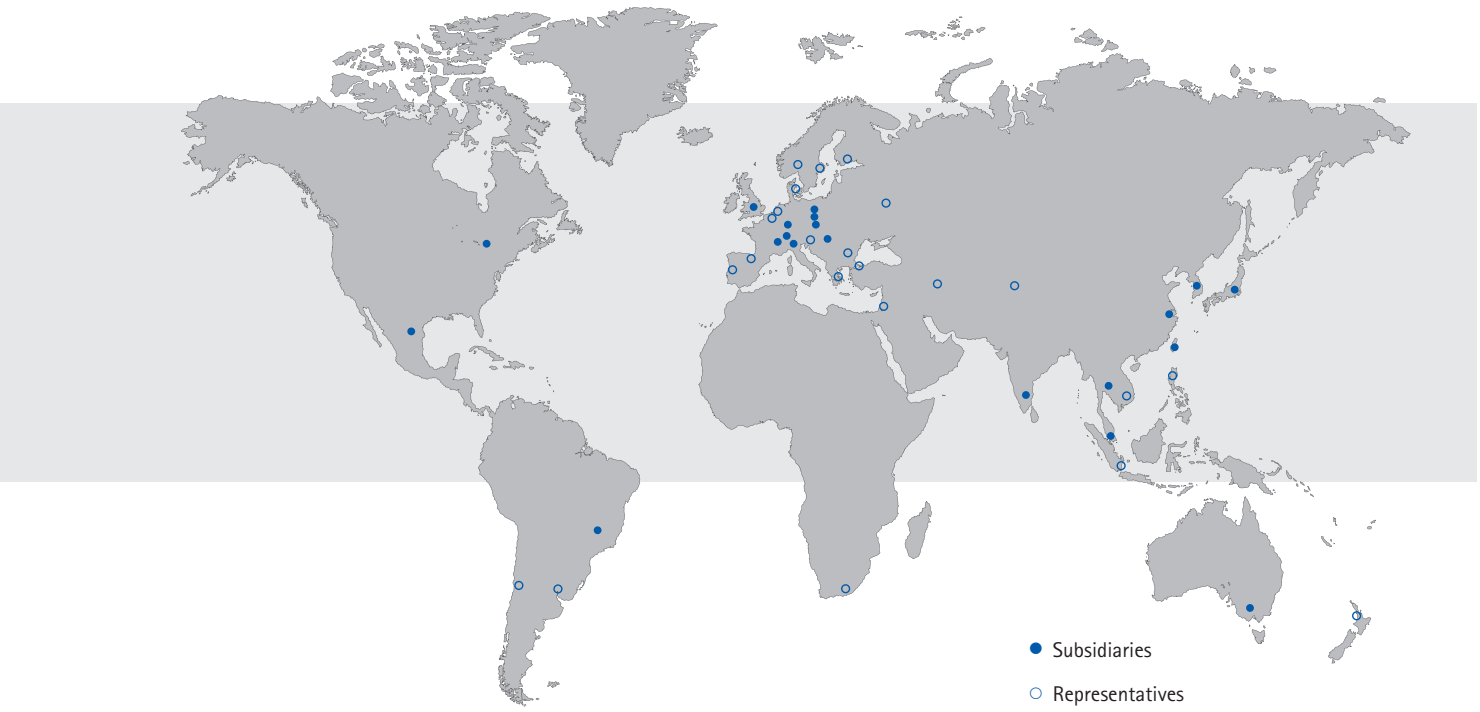
## Advantages:

- Vibration-free thread cutting, plunging, longitudinal turning
- Burr-free machining at interrupted cuts
- Soft cut with respect to solid drilling
- Smooth and vibration-free surfaces during milling
- Best surfaces and short machining times with high-performance reamers

# MAPAL – always close to the customer, everywhere.

Quality, close customer contact, early information on developments and market requirements are the core objectives of MAPAL. Every day more than 3,400 employees in the MAPAL Group prepare new, appropriate solutions for the machining tasks of our customers.

With continuous training and further training of employees and the constant interchange of experience, MAPAL safeguards its high technological standards and guarantees that proverbial MAPAL quality.

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MAPAL Dr. Kress KG in Aalen

MAPAL WWS GmbH in Pforzheim

MAPAL ISOTOOL GmbH in Sinsheim

MILLER GmbH in Altenstadt

Rudolf Strom GmbH in Vaihingen/Enz

August Beck GmbH & Co. KG in Winterlingen

WTE Präzisionstechnik GmbH in Kempten

| | |
|---|---|
| Australia | Valcor Australia Sales Pty. Ltd. in Ballarat, Victoria |
| Brazil | MAPAL do Brasil – Ferramentas de preçisão Ltda. in Belo Horizonte |
| China | MAPAL China Production and Trading Ltd. in Shanghai |
| France | MAPAL France S.A.S. in Le Chambon Feugerolles |
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Reaming and fine boring
Boring
Drilling
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Turning
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