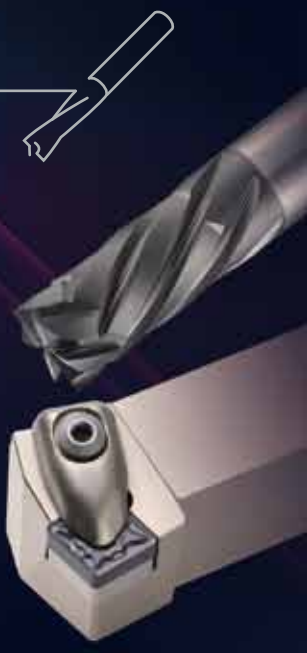
HIGHEST
QUALITY
TOTAL
SOLUTION

# New Product

## Korloy's New And Best-Selling Products



KORLOY

# Contents

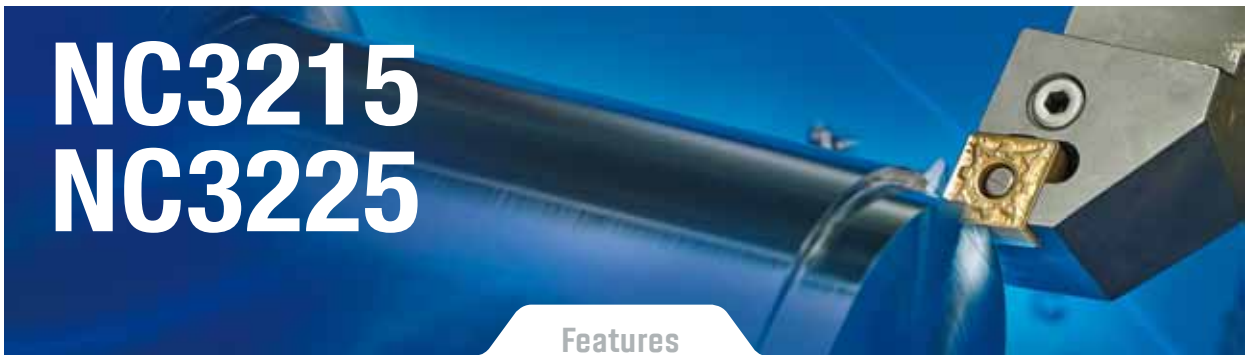


Korloy's New And
Best-Selling Products

# NEW PRODUCTS



# NC3215
# NC3225



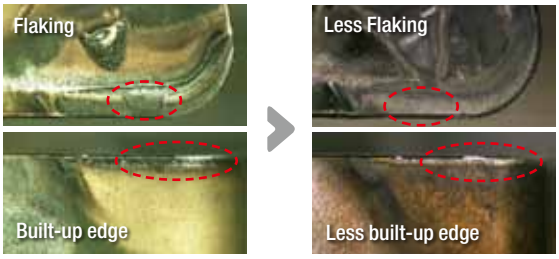
## Features

- Universal grade especially for machining forged automobile components and bearing steel both in continuous and interrupted cutting
- Available for all kinds of steels - carbon steel, alloy steel, rolled steel, tool steel, mild steel, bearing steel and other special kinds of steel
- New coating technology increases welding resistance and chipping resistance, which leads to longer tool life

## Features

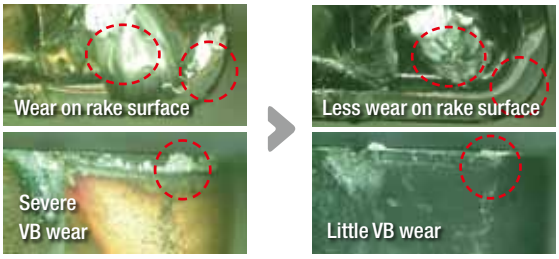
- **Stable tool life**
  → Higher production stability
- **Longer tool life & Higher removal rate**
  → High cutting conditions and shorter cutting time available
- **Ideal combination of a grade and chip breakers**
  → Prolongs tool life
  → Wide applications ranging from roughing to finishing

**Unstable tool life** → **Reduced flaking**




Competitor | **NC3215 / NC3225**

**Poor wear resistance** → **Increased wear resistance**




Competitor | **NC3215 / NC3225**

**Previous coating** → **New coating**

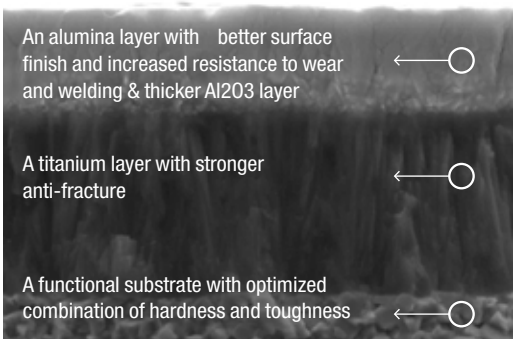

Disperse cutting force → Reduce chipping → Increase tool life → Improved productivity

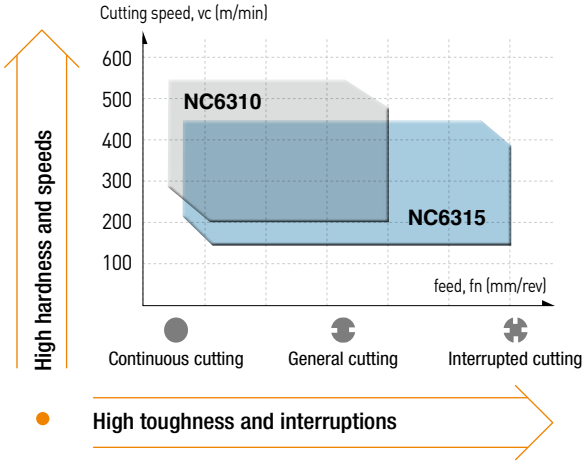
# NC6310
# NC6315

## Features

- Boosted productivity due to K10 & K15, the CVD-coated grades optimized for high speed and feed turning applications of cast iron
- MK chip breaker for medium cutting and RK chip breaker for roughing cast iron at high speeds and high feeds, wet or dry

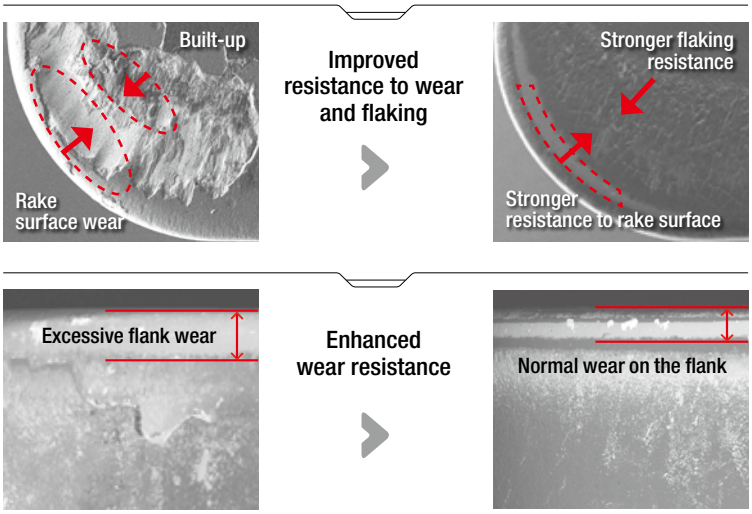
## Features




**MK**
(For medium cutting)

**RK**
(For rough cutting)



# NC9115/NC9125 NC9135

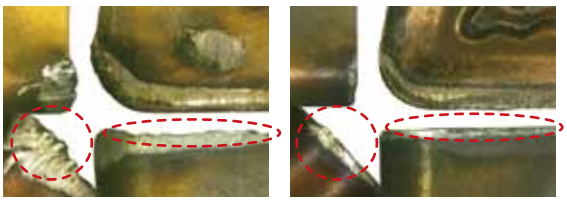
## Features

- Optimized for reducing built-up edges, notch wear, plastic deformation and burrs, and for machining stainless steel
- Ideal combination of a grade and MM/RM chip breakers for stable tool life and wide applications ranging from roughing to finishing
- Stable tool life even at high speeds, feeds and depth of cuts (for STS316, vc over 150m/min available), shortening cutting time
- Excellent versatility responding to workpiece change, covering the austenite, the martensite and the ferrite

## Features

- Coated layers of stronger chipping resistance and the substrate of high toughness → **Inhibited notch wear creation**
- Lubricative coating layers → **Improves welding resistance**

**Inhibited built-up edge and blade damage**

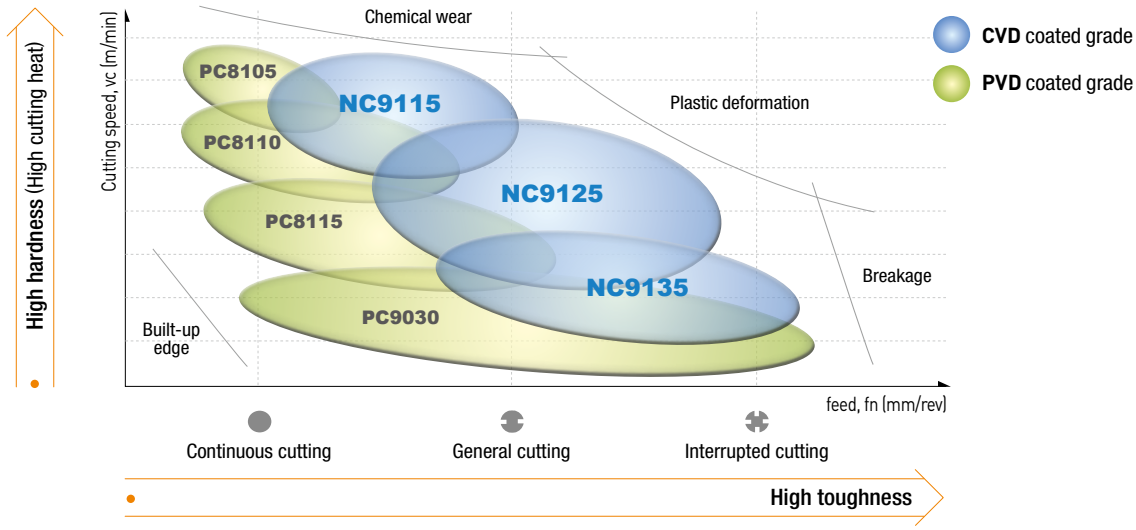


Competitor (M25) | **NC9125 (M25)**

**Inhibited wear on notch and relief surface**

Competitor (M25) | **NC9135 (M35)**

## Grades lineup



# PC2005/PC2010 PC2015

## Features

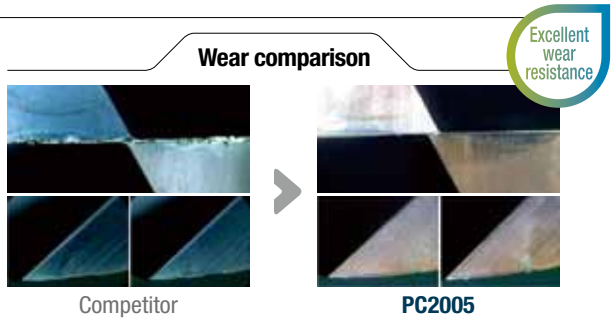
- Finishing grade lineup for tool steel and plastic die steel
- PC2005 with extremely hard substrate and coatings
- PC2010 with high hardened cutting edges, ideally suited for pre-hardened steel and interrupted cutting
- PC2015 for carbon steel and casting machining, demonstrating excellent performance in hard-to-cut materials

## Features

- **PC2005**
  **(For high hardness workpiece and press die steel)**

  Super high hardness substrate and coating improve wear resistance dramatically.

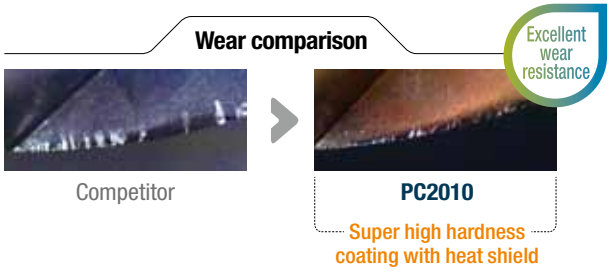
  → High hardness substrate prevents chipping and wear on relief surface.




- **PC2010**
  **(For pre hardened steel and plastic die steel)**

  Ultra fine WC and high contents cobalt were applied to the substrate to expand application range to high hardness steel and pre hardened steel.

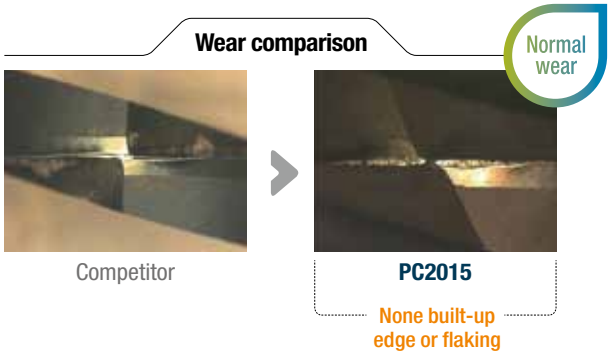
  → Heat shield coating was applied to prevent thermal crack.



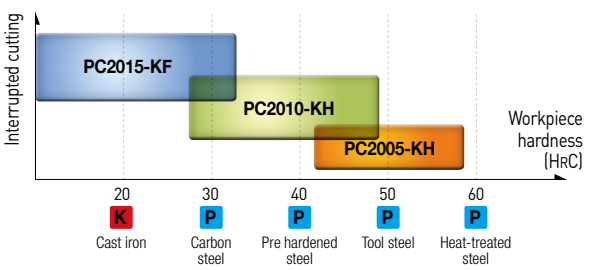

- **PC2015**
  **(Exclusive for Laser Mill for machining cast iron and carbon steel)**

  High toughness substrate based grade for general cutting of cast iron and HRSA with the use of lubricative coating layer.

  → High toughness substrate and coating layer less responsive to workpiece applied.




## Recommended grade and chip breaker



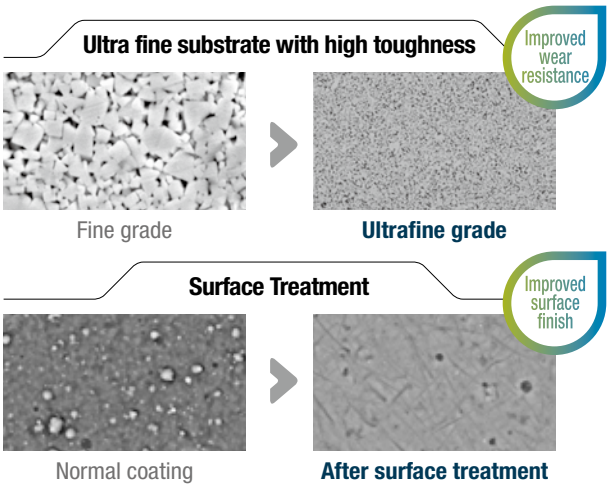
# PC2505
# PC2510

## Features

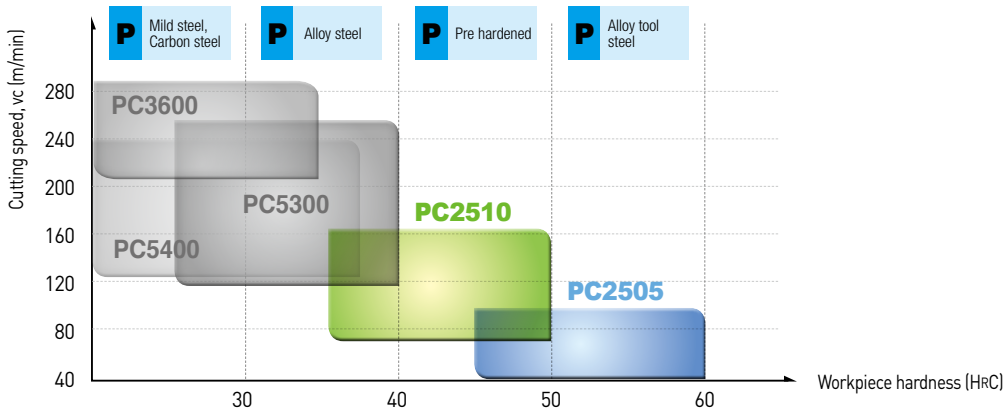
- Roughing grade series for high hardened steel
- PC2505 with excellent wear resistance, ideal for machining die steel and high hardened steels over HRC50
- PC2510 with stabilized toughness, ideal for interrupted cutting of high hardened steel and wet cutting accompanied by massive thermal shock

## Features

- **PC2505** – Ideal for heat treated steel and high hardened steel due to excellent wear resistance
- **PC2510** – Ideal for high hardened steel and pre-hardened steel thanks to excellent impact resistance




## Application guideline per workpiece



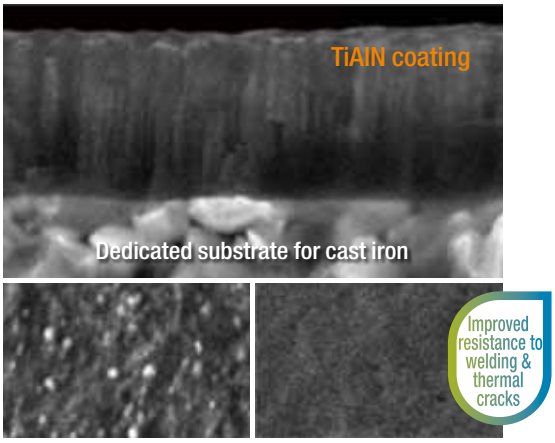
# PC6510

## Features

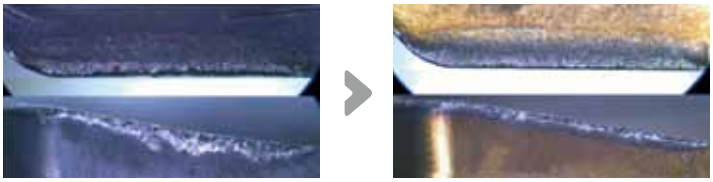
- PVD-coated grade specialized for milling applications of cast iron
- Stable tool life due to the minimized life deviation between inserts

## Features

- Extended cutting time due to the highly wear-resistant TiAlN coating
- Stable performance due to the highly wear-resistant and anti-fracture substrate for general cutting of cast iron
- Flaking and thermal cracks inhibited by the coating surface treatment

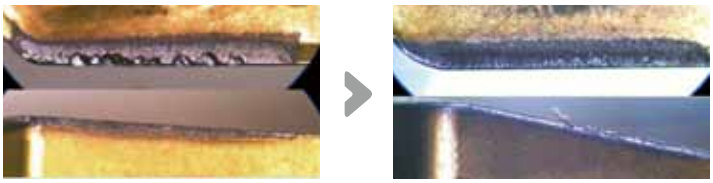



General coating | **Surface treatment applied**



Competitor | **NEW PC6510**

⇒ **Improved wear resistance**



Competitor | **NEW PC6510**

⇒ **Inhibited flaking and thermal cracks**

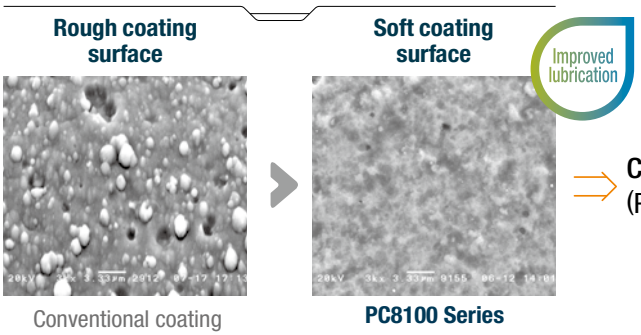
# PC8105/PC8110 PC8115

## Features

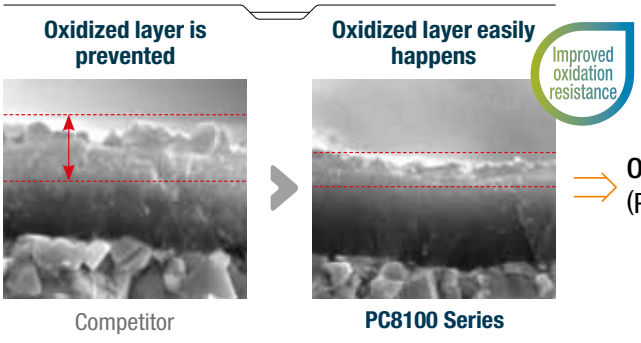
- Turning grade for heat resistant alloy and stainless steel
- Latest PVD coating technology with high hardness and high temperature oxidation resistance

## Features

- **PC8105**
  - Micro grain carbide minimizes chipping of cutting edge due to enhanced edge strength
  - Excellent tool life when finishing heat resistant alloys and stainless steels at high speeds
- **PC8110**
  - Substrate with superior wear resistance and plastic deformation resistance at high temperature
  - Long tool life when machining heat resistant alloy and stainless steel at high speed
- **PC8115**
  - Ultra fine matrix technology increases wear resistance and chipping resistance.
  - Strong cutting edge and excellent chipping resistance guarantees stable machining
  - Long tool life when machining heat resistant alloy and stainless steel at middle to low speed and medium cutting to roughing




**Coating surface treatment technology**
(Pictures of coating layer)




**Oxidation resistant coating technology**
(Pictures of coating layer heat-treated at 900°C)

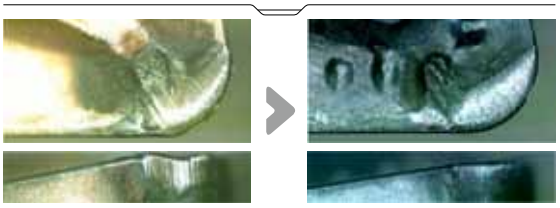
# CC1500
# CC2500

## Features

– High Performance Coated Cermet Grade for Machining Carbon Steel, Alloy Steel and Sintered Ferrous Alloy

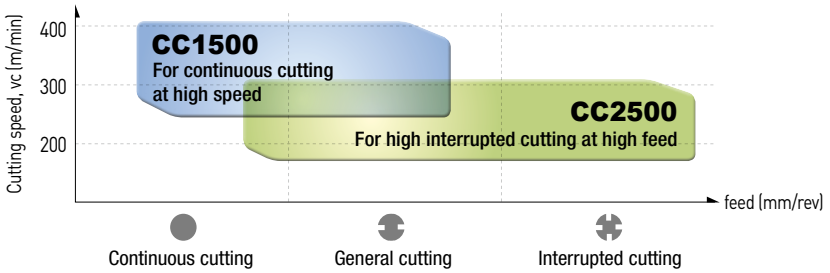
## Features

- **CC1500**
  - Maximized resistance to built-up edge and oxidation in continuous cutting at high speeds and low depth of cuts
  - Superior wear resistance vs. existing tools in continuous cutting of carbon steel and alloy steel

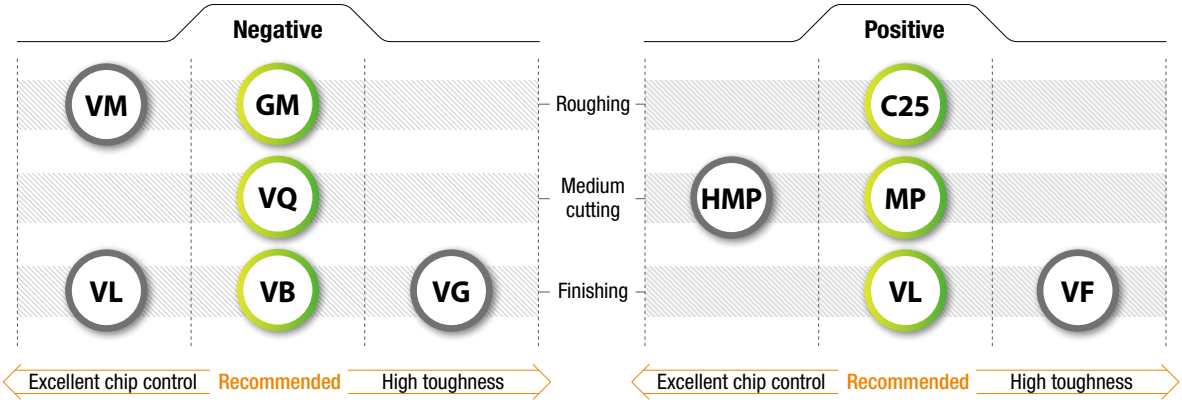



- **CC2500**
  - Maximized resistance to built-up edge and oxidation in interrupted cutting at high feeds and high depth of cuts
  - Superior impact resistance vs. existing tools in interrupted cutting of carbon steel and alloy steel


## Grades lineup




## Chip breakers lineup



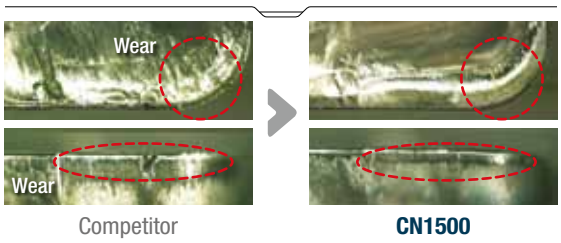
# CN1500
# CN2500

Features

– High Performance Cermet Grade for Machining Forged Steel and Sintered Ferrous Alloy

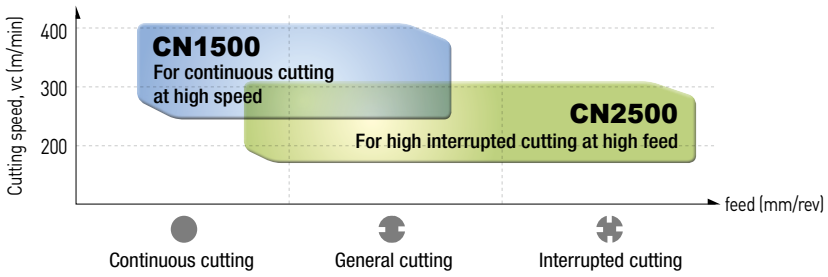
## Features

- **CN1500**
  - For continuous machining of cold/hot forged steel and Sintered ferrous alloy at high speed and low depth of cut
  - Excellent wear resistance and crater resistance

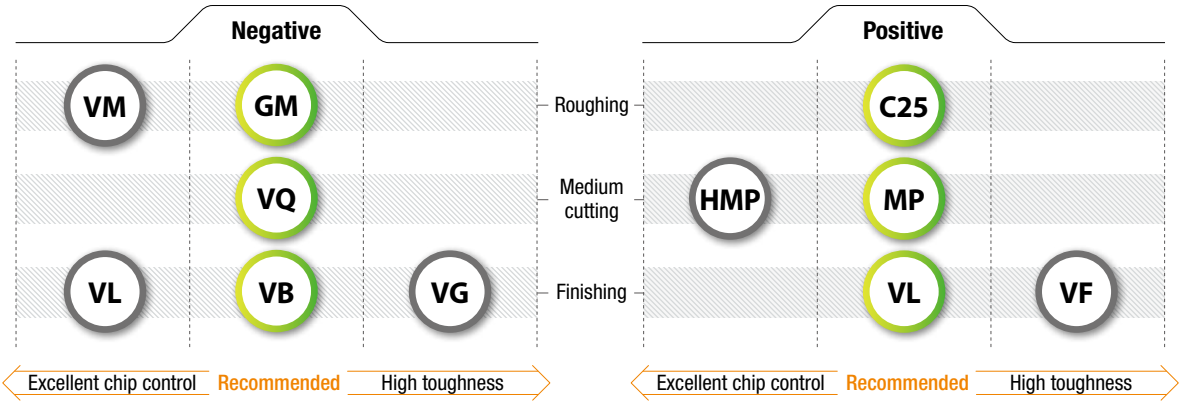



- **CN2500**
  - For high interrupted machining of cold/hot forged steel and Sintered ferrous alloy at high feed and high depth of cut
  - Excellent resistance against chipping, fracture and thermal crack

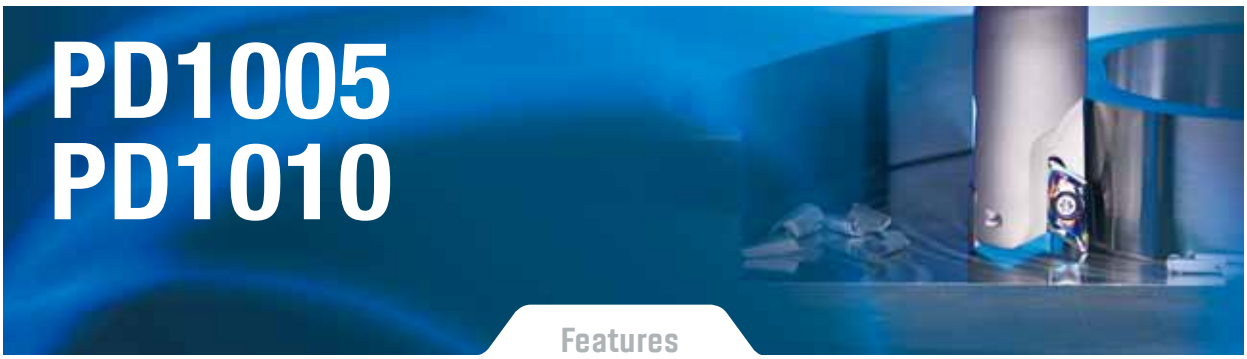

## Grades lineup




## Chip breakers lineup



# PD1005
# PD1010

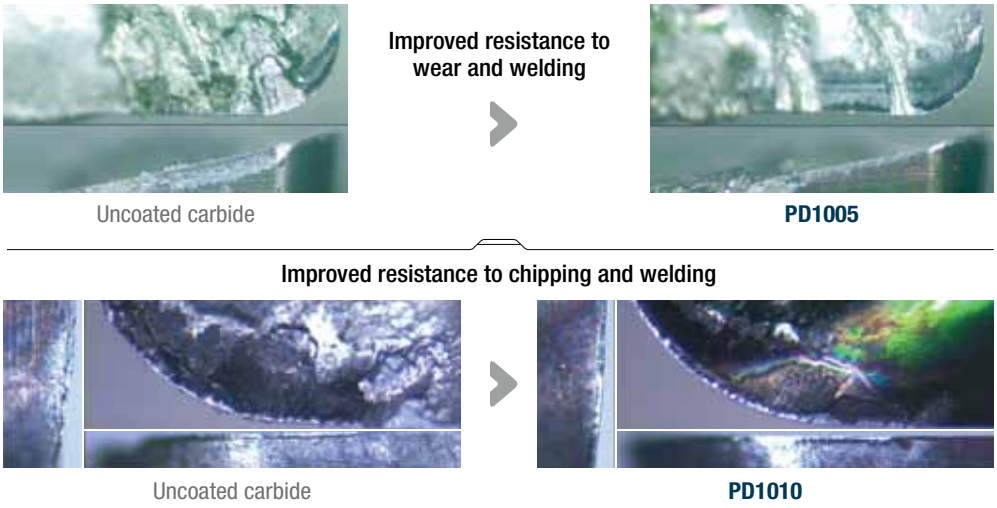


## Features

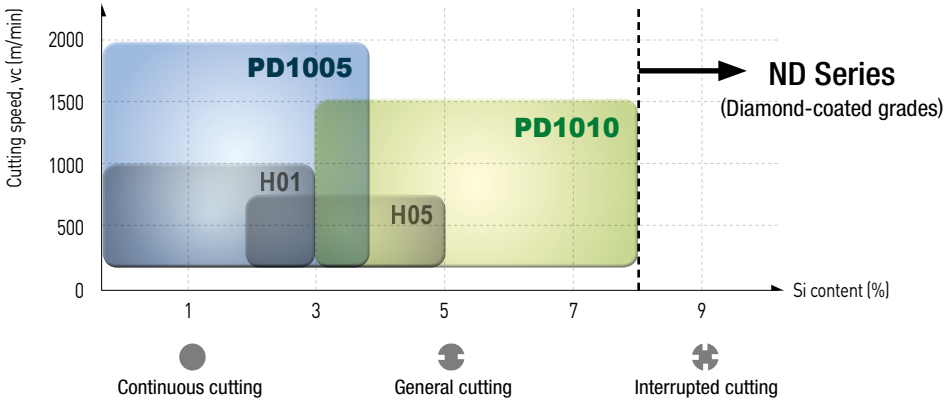
- DLC-coated grades for high speed and quality machining of non-ferrous metals such as aluminum and copper
- Maximized resistance to chipping and welding due to the dedicated grades and advanced DLC coating

## Features

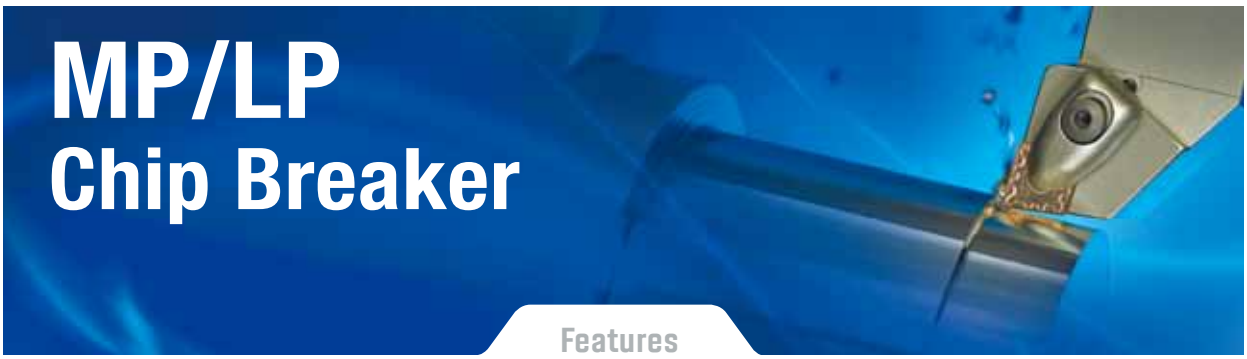
- **PD1005** – Excellent surface finish when machining general non-ferrous metals (Al, Cu) at high speeds
- **PD1010** – Stable tool life when machining hard non-ferrous metals (Al, Cu) or under interruptions




## Guideline for grades application



# MP/LP Chip Breaker



## Features

- Chip breaker for forged steel of automobile parts and normal steel
- Quad dots improve productivity through efficient chip control at high feed
- Angle land minimizes cutting force

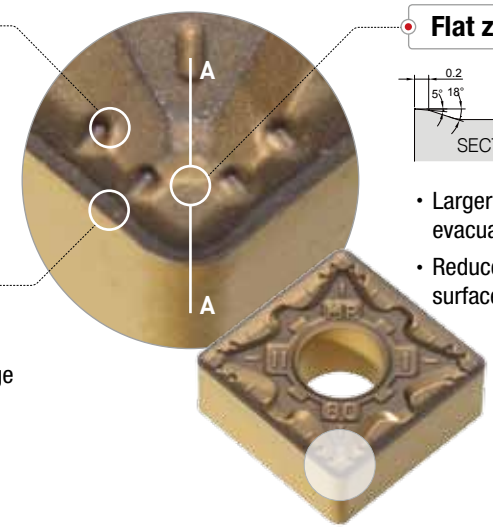
## Features of MP chip breaker

**Front two step dot**

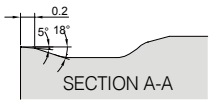
- Higher stability of chip curls at high feed
- Excellent chip control when copying
- Lower cutting force at high depth of cut

**Variable land**

- Less crater wear
- Prevents chipping on minor cutting edge
- Higher toughness at high depth of cut and interrupted cutting




**Flat zone**




- Larger chip pocket for better chip evacuation at high feed
- Reduced cutting force with larger contact surface of chips

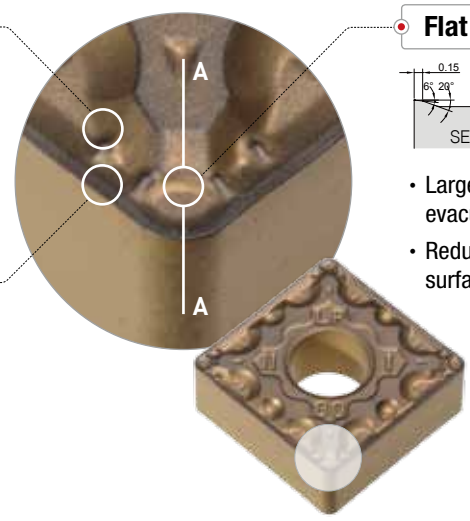
## Features of LP chip breaker

**Front dot**

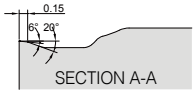
- Higher stability of chip curls at high feed
- Excellent chip control when copying
- Lower cutting force at low depth of cut and high feed

**Variable land**

- Less crater wear
- Prevents chipping on minor cutting edge




**Flat zone**




- Larger chip pocket for better chip evacuation at high feed
- Reduced cutting force with larger contact surface of chips

# RM/MM Chip Breaker

## Features

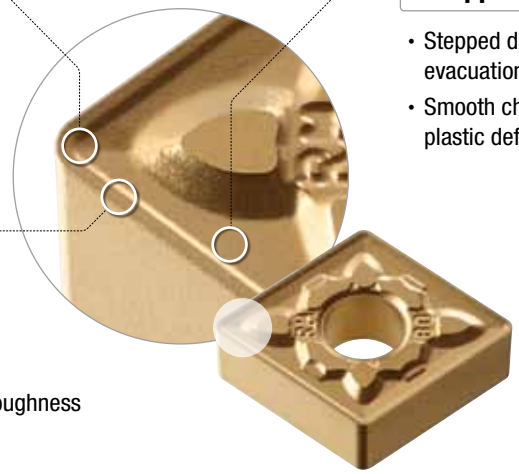
**RM** chip breaker
- Prevents notch wear and burrs at high feeds and depths of cut
- Reduced cutting force extends tool life in high feed machining

**MM** chip breaker
- The 1st recommended chip breaker for stainless steel machining
- A dual land achieves sharp cutting performance and insert toughness

## Features of RM chip breaker

**Variable land**
- Excellent chip control and sharp cutting at low depths of cut
- Delays crater wear
- Prevents plastic deformation

**Wide land & Gentle front angle**
- Sharp cutting edges and a wide land reduce cutting force
- Reduced burrs
- Dispersed cutting load enables higher toughness

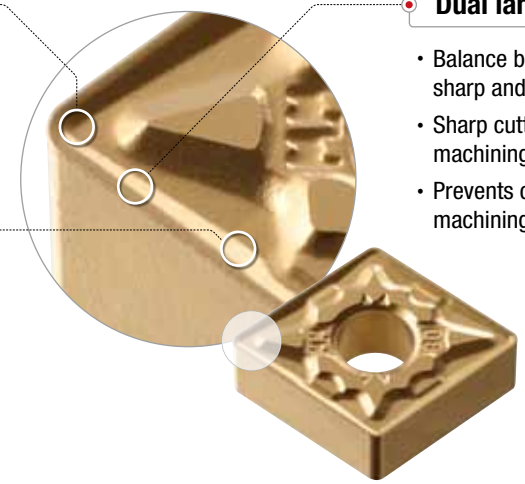


**Stepped design**
- Stepped design makes chip evacuation easier
- Smooth chip evacuation prevents plastic deformation

## Features of MM chip breaker

**Variable land**
- Excellent chip control and sharp cutting at low depths of cut
- Delays crater wear
- Prevents plastic deformation

**Wide chip pocket**
- Stable chip evacuation at high speeds/feeds
- Improved surface finishes by reduced workpiece scratches caused by work-hardened chips at high depths of cut
- Prevents built-up edge



**Dual land**
- Balance between requirements of sharp and tough cutting edges
- Sharp cutting edge for high speed machining
- Prevents chipping in interrupted machining

# MK/RK Chip Breaker

## Features

**MK** chip breaker – Angle lands provide upgraded surface finish

**RK** chip breaker – Ideally suited for high speed / high feed cutting of ductile cast iron and gray cast iron

– Flat lands provide upgraded toughness and chipping resistance

## Features of MK chip breaker

**Angle land**

- Angle lands provide sharper cutting performance
- Maximized wear resistance in continuous cutting
- High quality results in surface finish

**Wide supporting area**

- Higher clamping stability
- Prevents chipping at vibrations during operation

## Features of RK chip breaker

**Flat land**

- Flat lands provide upgraded toughness and chipping resistance
- Stable machining availability under high cutting loads at high depth of cuts or interrupted cutting
- Optimized land width for high feed machining

**Wide supporting area**

- Higher clamping stability
- Minimizes vibration and chipping

# KGT

## Features

- Double-sided inserts of KGT reduces machining cost
- Strong clamping system ensures stable and accurate machining
- The foreside and clearance face of the KGT insert having cutting edges are optimal for grooving, parting-off, turning and facing with reducing processing time
- Three-dimensional chip breaker ensures excellent chip control in various applications

## Top side (Insert)


- **Strong clamping** → Higher machining reliability
- **Self-centering** → Higher accuracy
- **Anti-chattering design** → Fine surface finish

## KGT lineup

**Application**

| | Parting | Grooving | Turning | Copying | Special | For Aluminium |
|---|---|---|---|---|---|---|
| Medium and large, interrupted cutting | **Rough Parting** For high feed parting off<br>**Rough Grooving** For high feed machining | **Turning-Multi Grooving** For general purpose | | **Copying** | **Blank** For customized shapes | **KGGN-A** For copying aluminium |
| Small, continuous cutting | **Light Parting** For low feed parting off<br>**Rough Grooving** For low feed machining | **T(KGMI) Internal Grooving** For internal machining | | | | **KRGN-A** For grooving aluminium |

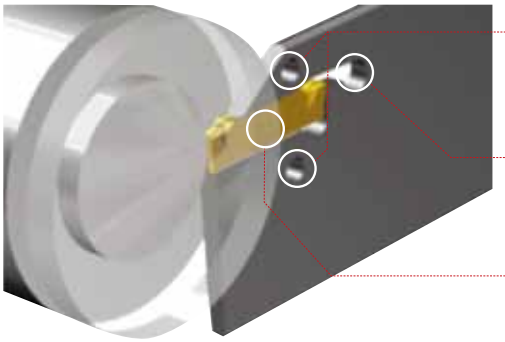
- Lead angle applied to LP & RP chip breakers - only for parting off
- B chip breaker can be customized (contact required in advance)

# KGT Blade

## Features

- Parting application with the use of existing KGT inserts
- Economical machining with a double sided insert
- Specially designed slot for strong and stable clamping
- Easy change of insert with the use of exclusive wrench

## Features



**Specially designed slot**

- Strong clamping and durability

**Easy change of insert**

**Wide clamping area**

- Better stability

## How to clamp insert

① ⇒ ② Rotation: Release
② ⇒ ① Rotation: Conclusion


Insert the pin of wrench into the hole of blade.

Clamp the insert on its seat after turning the handle to 45˚~160˚ for loosening the seat.

Finish clamp by removing the wrench after moving it back to its original state.

## Blade lineup

Range of cutting edge width: 1.5 ~ 8.0mm

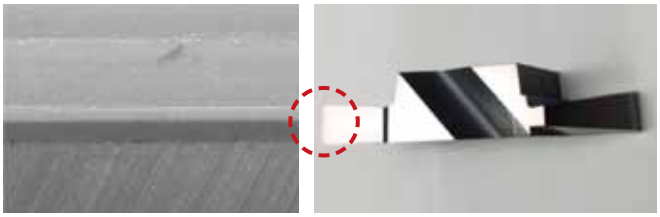
1.5mm type | 2.0mm type | 3.0mm type | 4.0mm type | 5.0mm type | 6.0mm type | 8.0mm type

# Top Notch

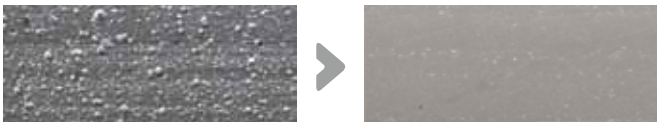
## Features

- Strong clamping force for grooving highly hard workpieces or hard-to-cut materials
- Excellent surface finish and tool life due to the lubricative cutting edges in uniformly high quality
- Grooving applications available in extra high precision
- A wide selection provided including a coated grade and cBN grade

## Features

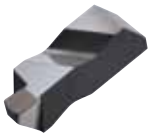


- Excellent surface finish due to cutting edges in uniformly high quality

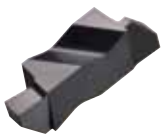



- Lower cutting load due to the lubricating treatment

### Product range



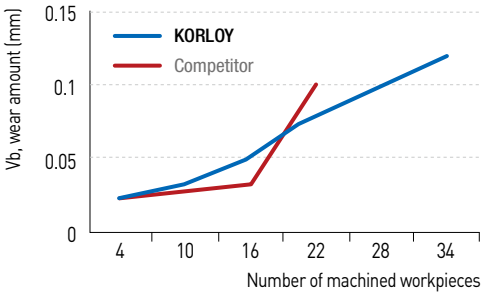
**PC8110**
(Coated insert)



**cBN**
(Insert)

## Performance evaluation

| | |
|---|---|
| • Workpiece | Ti6AL4V, external grooving |
| • Cutting conditions | vc (m/min) = 80, ap (mm) = 3, fn (mm/rev) = 0.1, wet |
| | 154% longer tool life compared to the competitor's |




**Number of machined workpieces**

Competitor

**KGNP3M300R (PC8110)**

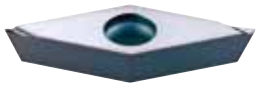
# AUTO Tools

## Features

- High precision machining of small parts and complex forms, etc.
- High quality products through stable machining
- Exclusive insert for automatic lathes

## E class tolerance (KF/KM type) – Fully ground high precision Insert

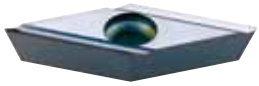
### KF type



For finishing

- Sharp edges for low cutting load
- Smooth chip flow and excellent surface finish when finishing

### KM type

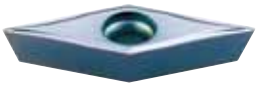


For medium to finishing

- Wide chip pocket for wide range machining
- Improved chip flow for longer tool life and cutting performance

## G class tolerance (VP1 type)

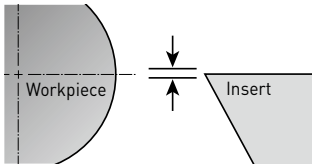
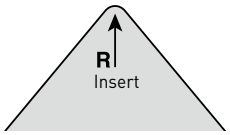
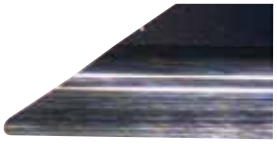
### VP1 type



For medium to finishing

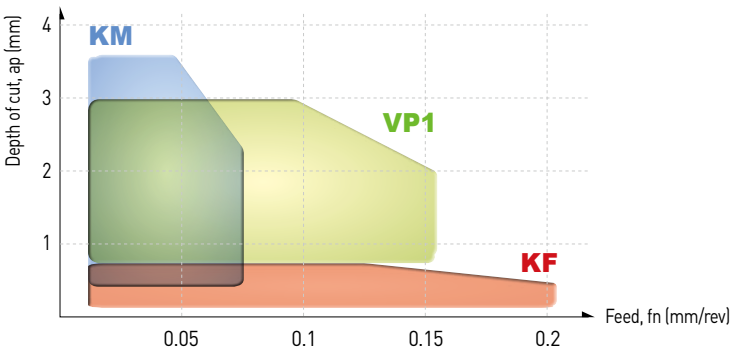
- Three dimensional C/B for stable chip control
- Sharp edges for low cutting load and heat

## Insert tolerance

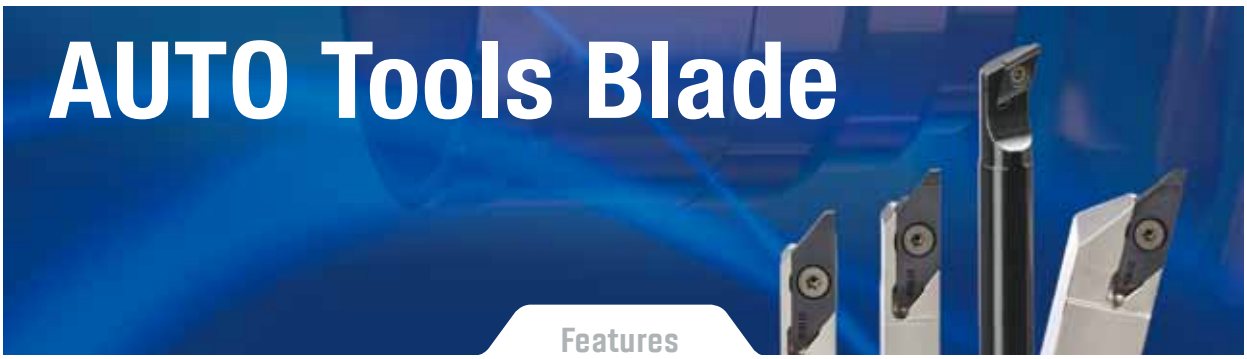
| Precise tolerance | True R formation / Minus tolerance | High surface quality |
|---|---|---|
|   |   |  |
| • E class: ±0.025mm | • Existing one: ±0.02mm<br>• Minus tolerance: 0 ~ -0.02mm | • Precise machining: High quality and precision |

Offset adjustment is not required by insert change, due to the same insert height → **Increased productivity**

## Cutting range



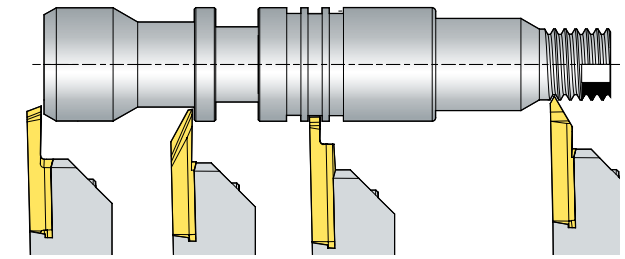
# AUTO Tools Blade



## Features

- Blade insert for automatic lathes
- For external machining of precise small parts
- 4 types - SSB (for back turning), SGB (for grooving), SBT (for threading), SBC (for parting off)
- Convenient use of one holder to all blade inserts

## Application example



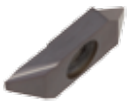
**SBC** (For cut off/Parting) **SBB** (For back turning) **SBG** (For grooving) **SBT** (For threading)

## Types of blade insert

### SBC (For cut off/Parting)

- Cutting width: 0.7~2.0
- D Max.: 16mm
- Nose R: 0.05mm

### SBB (For back turning)

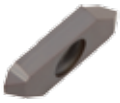


- Approach angle: 59°
- Max. cutting depth: 4mm
- Nose R: 0.05, 0.1, 0.2mm

### SBG (For grooving)

- Width: 0.5~2.5mm
- Nose R: 0.05mm

### SBT (For threading)



- V profile: 60°
- Pitch: 0.2~1.0mm
- Nose R: 0.05mm

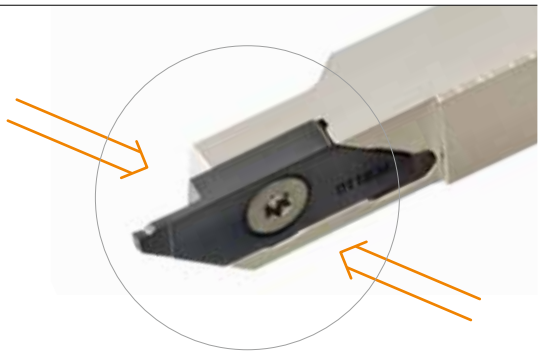
## Blade holder

**Screw holes on both sides**

- Easy to exchange inserts → Improved productivity

**Insert corner change**

- Tolerance repetition ±0.001 Within → Save setting time

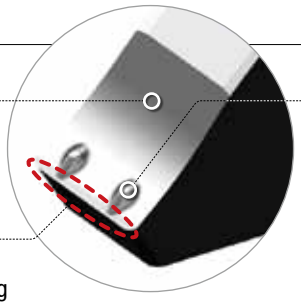


# TB-M

## Features

- Minimized cutting force at high speed and high feed → Smooth chip evacuation outside each groove
- High precision cutting performance → Exceptional surface finish and accurate dimensions
- Excellent chip flow and cutting results → Ideal for automated and unmanned production

## TB5-M chip breaker



**Lowered back area**

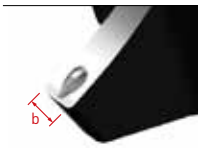
- Minimizes chip frictions to prevent overload when evacuating chips

**Cutting edge land**

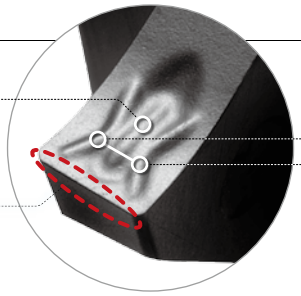
- Prevents chipping and improves machining stability in interrupted cutting

**Beveled protruding dots**

- Facilitate smooth chip evacuation outside each groove. Minimize chip control work load at high depth of cuts. Form chip curls at regular intervals

| Designation | TB5050N-M ~ TB5120N-M | TB5140N-M ~ TB5178N-M | TB5196N-M ~ TB5239N-M | TB5247N-M ~ TB5287N-M | TB5300N-M ~ TB5318N-M |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Cutting edge width (b) | 0.5 ~ 1.2mm | 1.40 ~ 1.78mm | 1.96 ~ 2.39mm | 2.47 ~ 2.87mm | 3.0 ~ 3.18mm |

## TB4-M chip breaker



**Sub dots**

- Control stability of chip curls at high feed

**Sharp cutting edges**

- Deliver sharp cutting performance

**Main dots**

- Show exceptional chip control in turning and chamfering applications. Facilitate smooth chip evacuation outside each groove . Form chip curls at regular intervals

| Designation | TB4150R-M ~ TB4185R-M | TB4200R-M ~ TB4228R-M | TB4300R-M ~ TB4350R-M | TB4400R-M ~ TB4450R-M |
|---|---|---|---|---|
| |  |  |  |  |
| Cutting edge width (b) | 1.5 ~ 1.85mm | 2.0 ~ 2.8mm | 3.0 ~ 3.5mm | 4.0 ~ 4.5mm |

# FMR P-Positive

## Features

- Stable clamping system enables stable machining and productivity
- Varied product line-up ensures wide application range
- Optimal shape and grade with high hardness for hard-to-cut material machining

## Features

- P-positive relief angle (11˚) ensures high rigidity and high machinability in die steel and high-resistant alloy machining
- Flat clearance face of insert prevents interference and revolution while machining
- Optimal grades and chip breakers for various workpieces

**Chip breaker**

- Concave shape ensures wide chip pocket and lowers cutting temperature

**Through-coolant system**

- Superb chip evacuation
- Low cutting heat ensures long tool life

**Clearance face for preventing rotation**

- Prevents rotation in machining
- Divides corners
- Prevents interference in high-feed machining
- Ensures stable clamping

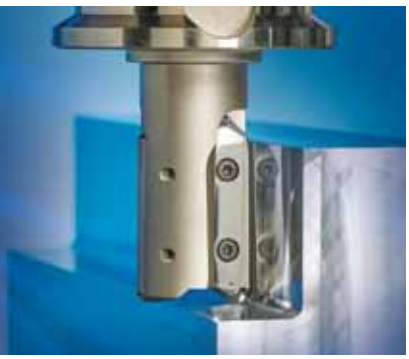
## Type

**Cutter**
Ø40 ~ Ø250

**Shank**
Ø17 ~ Ø50

**Modular**
Ø17 ~ Ø42

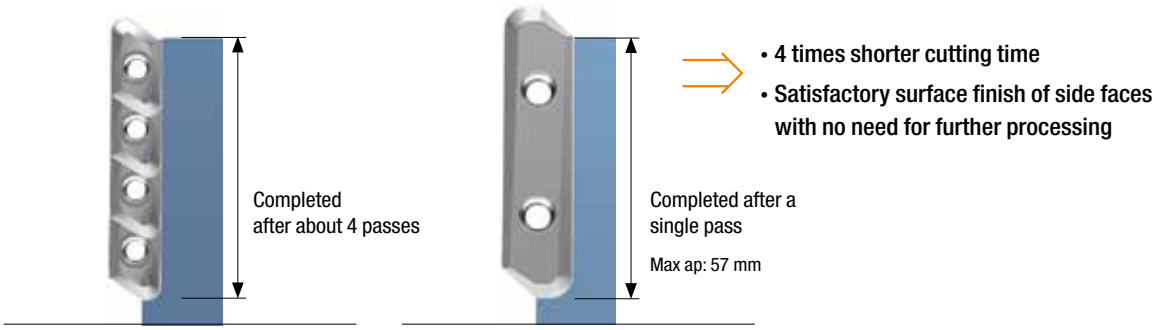
# Pro-XL Mill



## Features

- Cutting time is shortened by finishing the process with a single pass of deep shouldering in aluminum machining
- The single pass of shouldering enables perpendicular side faces without unevenness
- Two-Screw On system secures clamping stability

## Features


- 4 times shorter cutting time
- Satisfactory surface finish of side faces with no need for further processing

## Type

**Mono Tool**
Ø40 ~ Ø80

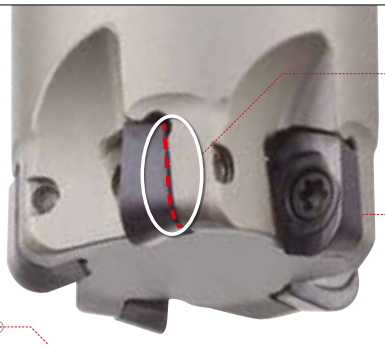
**Shank**
Ø40 ~ Ø50

# HFM

## Features

- Apply helix cutting edge on insert, low cutting load and reinforce toughness on corner
- Increased rigidity with double relief angle (11°, 13°), prevent interference with high feed
- To apply the negative axial rake angle when set up the holder, increased chipping resistance
- Tool life is increased with suitable C/B and grade for every material

## Features



**Holder Setup**

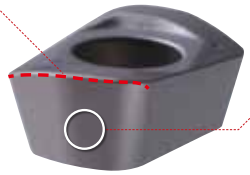
- To set up the negative axial rake angle, increased chipping resistance

**No. of tooth**

- Increased Tool life with increased flutes
- HRM (D) Ø20 (2 flutes) → HFM Ø20 (5 flutes)

**Major cutting edge**

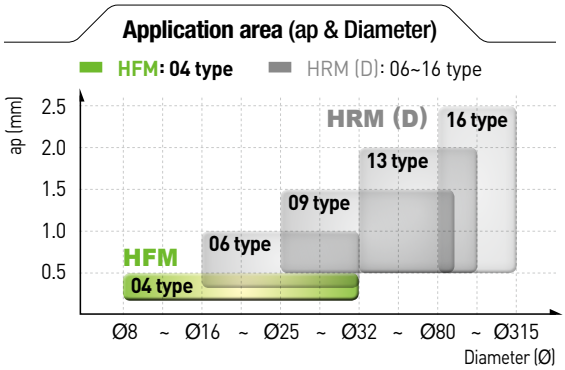
- Apply helix cutting edge
  - Improved sharpness of principle edge
  - Improved toughness of corner edge

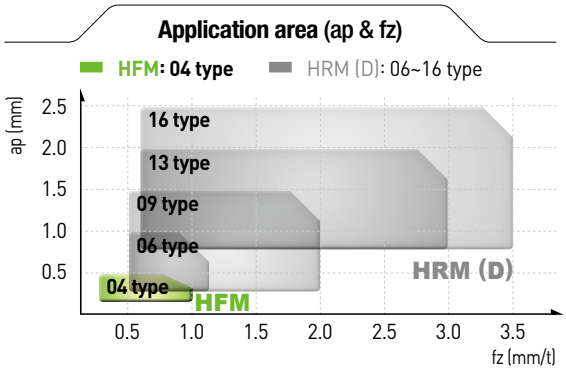


**Relief angle**

- 11, 13 double relief angle increase rigidity and prevent interference

## Application Area




## Type

**Shank**
Ø8 ~ Ø21

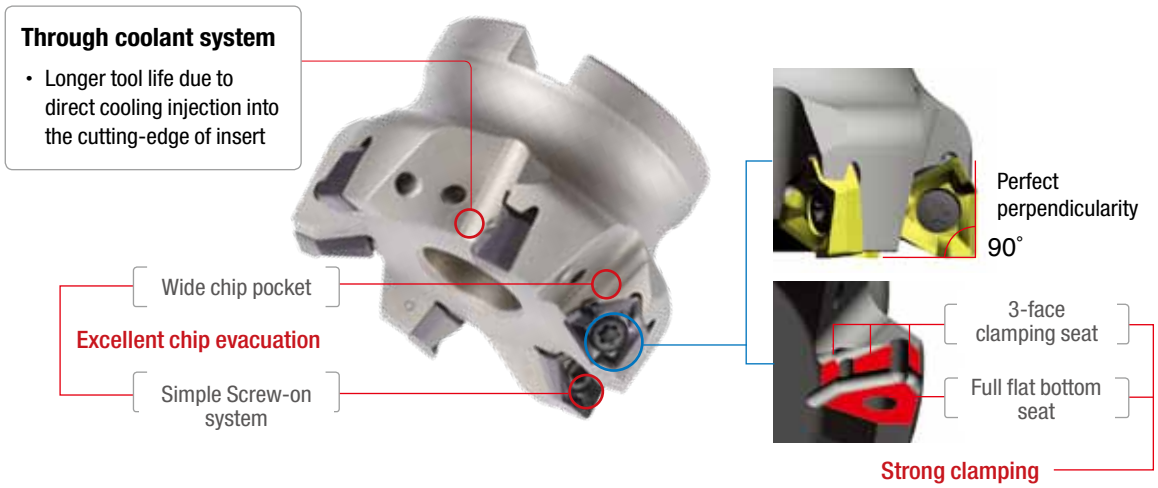
**Modular**
Ø8 ~ Ø33

# RM3 (Rich Mill)

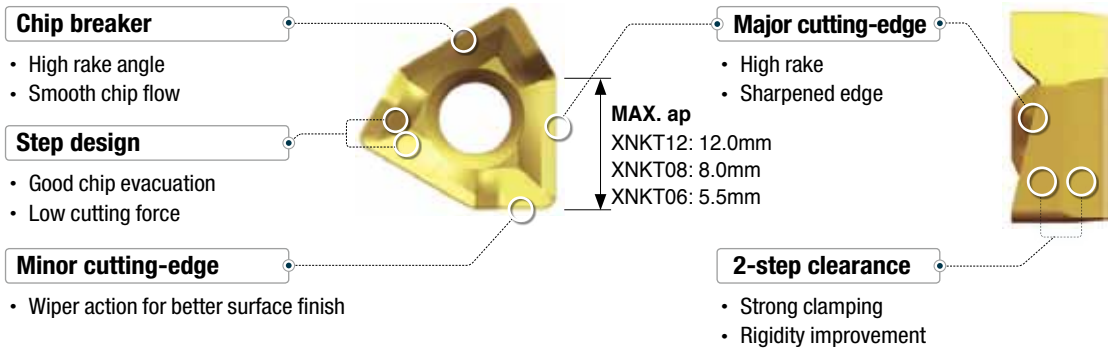
## Features

- True 90° shouldering operation
- Strong thick insert and 3-face clamping ensure stable operation even tough condition.
- Long tool life due to optimized manufacturing process

## Features of cutter




## Features of insert




## Type

**Cutter**
Ø40 ~ Ø125

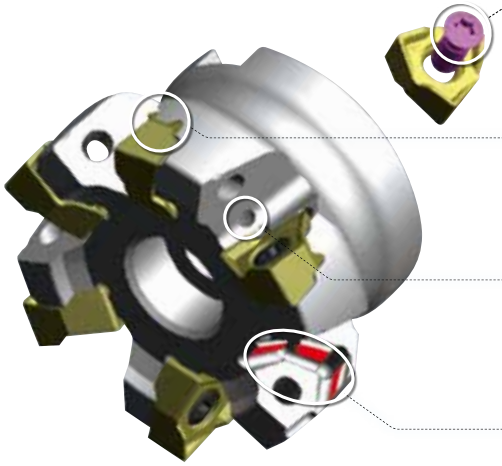
**Shank**
Ø20 ~ Ø63

# RM6
# (Rich Mill)

## Features

- 3 clamping surfaces on the side and strong clamping screws
- High precision, excellent perpendicularity, outstanding surface finish on the flank, accurate tolerance
- High rake angle and sharp cutting-edges for lower cutting resistance

## Features of cutter



### Strong clamping screws

- Strong clamping screws enable rigid clamping

### Streamlined holder design

- Improved chip evacuation in deep shouldering and slotting

### Through coolant system

- Improved chip flow and tool life thanks to insert cooling

### 3-side supporting system

- Stable tool life

## Features of insert

**Higher clamping stability**

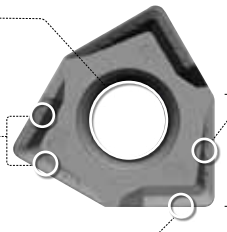
- Wide clamping areas and strong clamping screws for rigid clamping

**High rake angle chip breaker**

- Maintains stable clamping
- Induces smooth chip flow
  → Increases insert life

**Wide minor cutting-edges**

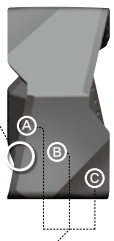
- Improved surface finish
- Enable multi-purpose machining incl. plunging



**MAX. ap**
WNGX08: 8.2mm
WNGX04: 4.3mm

**High rake cutting-edges**

- Improved machinability and reduces cutting resistance




**3-level flank relief surface**

- Enhances rigidity and enables stable clamping
  → Improves cutting stability

## Type

**Cutter**
Ø40 ~ Ø125

**Shank**
Ø20 ~ Ø50

# TP2P (Tangen-Pro)

## Features

- Clamping stability gained through tangential clamping system and wedge-shaped inserts
- Excellent surface finish nearly perfect perpendicularity, and highly even flank surface compared to competitors' designs
- Improved productivity due to High-rake angles and sharp cutting-edges which lead to lower cutting resistance (Ideally suited for high speed and high feed machining)

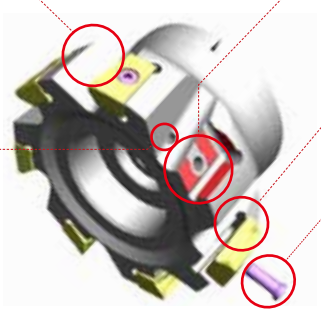
## Features of cutter

**Efficient holder design**

- Smoother chip evacuation in slotting or deep shouldering

**Through coolant system**

- Improved chip evacuation
- Longer tool life due to insert cooling



**Wide seat area**

- Strong clamping force

**Wedge type clamping**

- Stable insert life

**Tangential clamping**

- Multi-corner use
  → High feed machining availability

- **Tangential clamping system, wedge-shaped inserts and wide seat area**
  → Higher clamping stability (Lower vibrations and cutting resistance during machining)
- **Optimized H/D design with curved surface for smooth chip flow**
  → Excellent chip evacuation in ramping or deep shouldering

## Features of insert

**Wedge type clamping area**

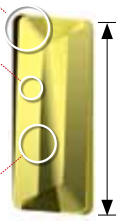
- Clamping in wedge form on seats
  → Creates strong clamping force

**High-rake angle chip breaker**

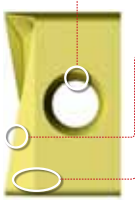
- High-rake angle applied
- Produces smooth chip flow → Extended insert life

**Convex projection**

- Improved chip evacuation
- Enhances rigidity



**MAX. ap**
LNKT17:
16.5mm



**Side hole (tangential type)**

- Higher clamping stability

**High-rake angle cutting-edges**

- Improves cutting performance while reducing cutting load

**2-level flank relief surface**

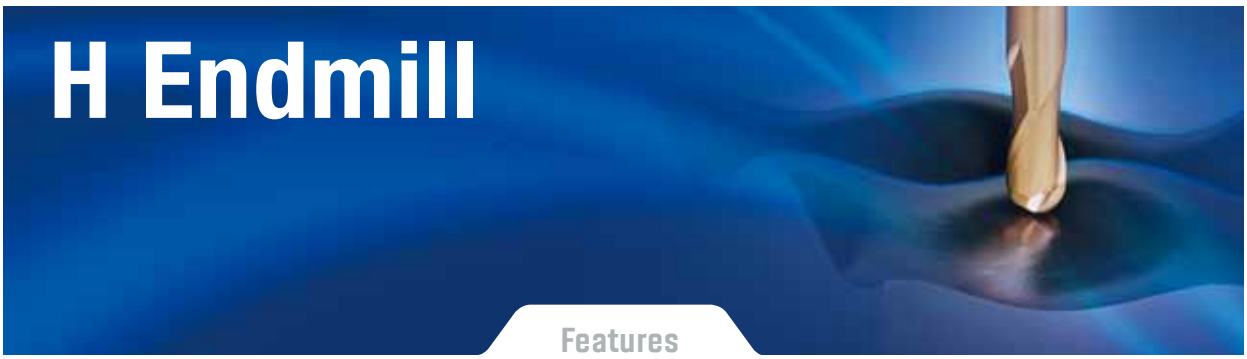
- 1st reverse positive relief surface enhances rigidity
- 2nd negative relief surface enables stable clamping
  → Improved chipping resistance and surface finish

## Type

**Cutter**
Ø40 ~ Ø125

**Shank**
Ø32 ~ Ø50

# H Endmill

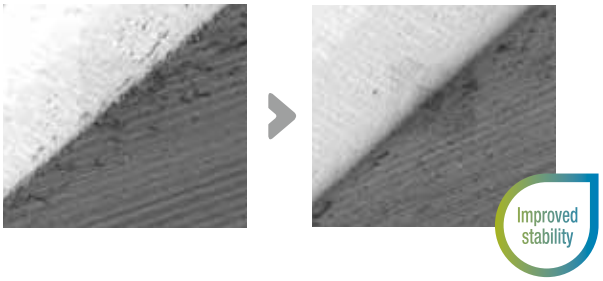


## Features

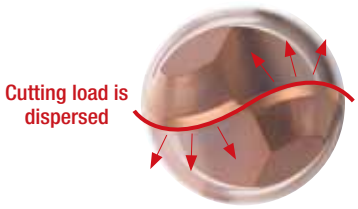
- For cutting high hardened and heat-treated steel under HRC70
- New coating technology improves wear resistance
- A new shape improves machinability
- High speed and highly accurate machining available

## Features

- **New grade (PC303S, PC310U)**
  Ultra fine substrate and AlTiSiN coating guarantee excellent wear resistance
- **Special edge treatment**
  Special cutting edge design was applied for less chipping and longer tool life
- **High accuracy with tolerance h5**
  High quality production system enables tolerance-h5 throughout the whole series



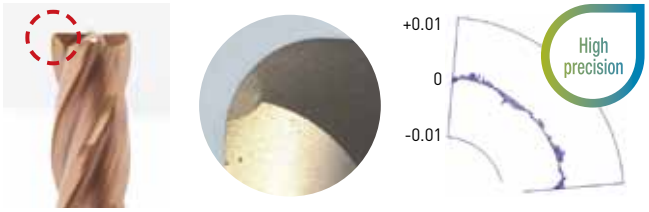

## PBE (Ball)




S shape of ball

- The S shape of ball disperses cutting loads
- The tolerance of ball R is under ±0.005mm

## PRE (Radius)




H Endmill radius | New shape of corner R | Measurement result of tolerance of corner R

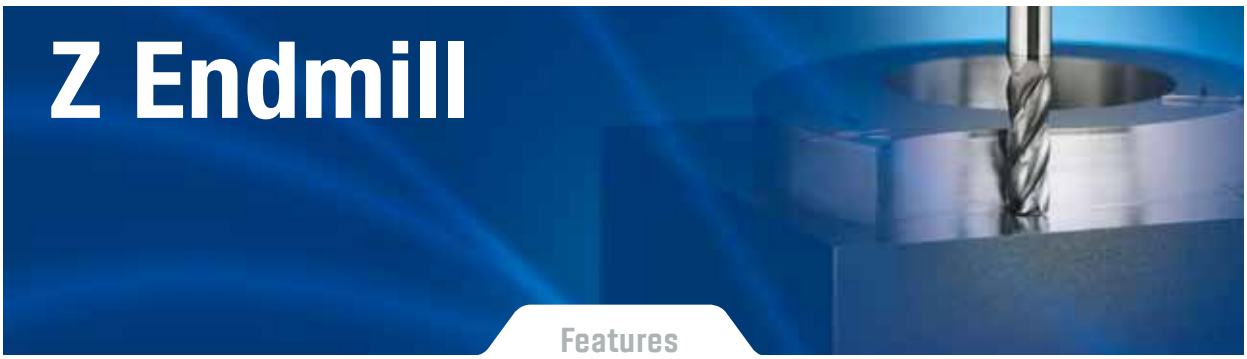
- The new shape of corner R reduces cutting loads
- The tolerance of corner R is under ±0.005mm

## Type

**Ball type**
PBE2000
Ø0.5 ~ Ø12

**Radius type**
PRE4000
Ø3 ~ Ø12

# Z Endmill



## Features

- Endmill for general cutting of various workpieces under HRC45 (carbon steel, alloy steel, cast iron, pre-hardened steel, etc.)
- New shape and coating improves performance and tool life
- Optimized blade design for less chipping and stable machining

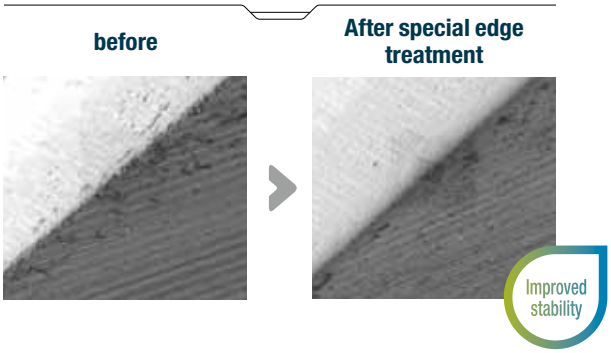
## Features

- **New grade (PC315E)**

  Fine substrate and lubricative coating guarantee excellent performance at high speed and high temperature
- **Special edge treatment**

  Special cutting-edge design was applied for less chipping and longer tool life
- **High accuracy with tolerance-h5**

  High quality production system enables tolerance-h5 throughout the whole series

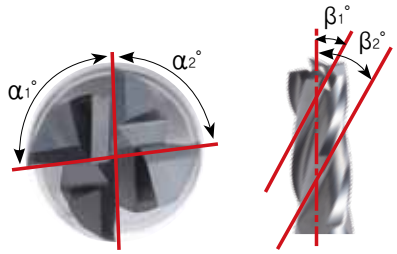



## ZBE (Ball)


S shape of ball

- The S shape of ball disperses cutting loads
- The tolerance of ball R is under ±0.005mm

## ZFE (Flat)




α1°≠α2°, β1°≠β2° Irregular indexing & helix

- Irregular indexing & helix prevent chattering and improve surface

## Type

**Flat type**
ZPE2000/4000
Ø1 ~ Ø16

**Short flat type**
ZSFE2000/4000
Ø1 ~ Ø12

**Ball type**
ZBE2000
Ø1 ~ Ø12

# T Endmill

## Features

- For machining dental prostheses made of zirconia, titanium, Co-Cr, wax, PMMA, etc
- Optimized cutting performance by matching a proper grade with each type of materials
- Inhibited unevenness and excellent finish in machined surfaces due to the optimized cutting-edge design
- Specialized tool shape for each machine type

## Features

- **A dedicated tool for each machine** - Meets marketplace demands
- **A specialized grade for each workpiece** - Provides optimized performance for various materials of implants
- **Optimized cutting-edge design** - Enables excellent machinability

**Tangential cutting-edge shape**

- One-Pass Grinding applied
- Inhibited unevenness and excellent finish in machined surfaces

**Center-Matched ball shape**

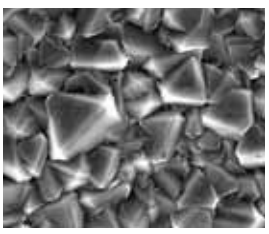
- Optimized center shape ensures relief angle at the ball point
- Cutting edges of the ball point shape provide excellent wear resistance and cutting performance

## Grade solution for zirconia

**Development of ND3000** (Diamond-coated grade)

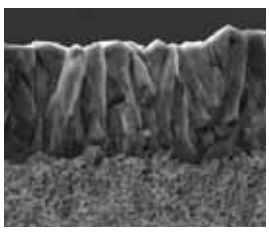
- High hardness diamond coating that is excellent in machining graphite and ceramic
- Optimized for high speed and medium duty cutting thanks to its excellent grip to coated layers

**Surface of ND3000**



High hardness diamond coating (Hv 10,000) provides excellent wear resistance

**Cross section of coated layers**

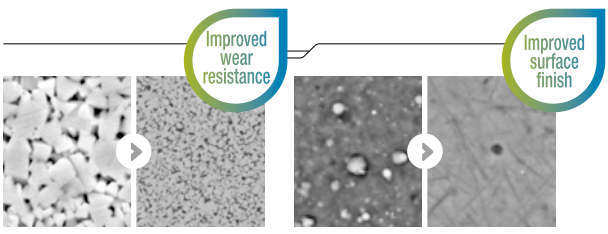


Specialized grade for Zirconia provides excellent adhesion

## Grade solution for titanium

**Development of PC2510** (Coated grade for high hardened steel)

- Post-coating treatment was applied to improve surface finish
- A grade optimized for interrupted machining of high hardness steels and wet treatment accompanying high thermal shock. Its ultrafine substrate features high toughness which allows stable performance



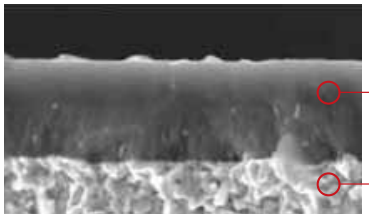
# Z+ Endmill

## Features

- Wide range of workpiece materials up to HRC47
- Wide application range from roughing to finishing
- Increased tool life thanks to a new substrate and advanced coating layers
- Prevented chipping and extended cutting time thanks to its optimized blade design

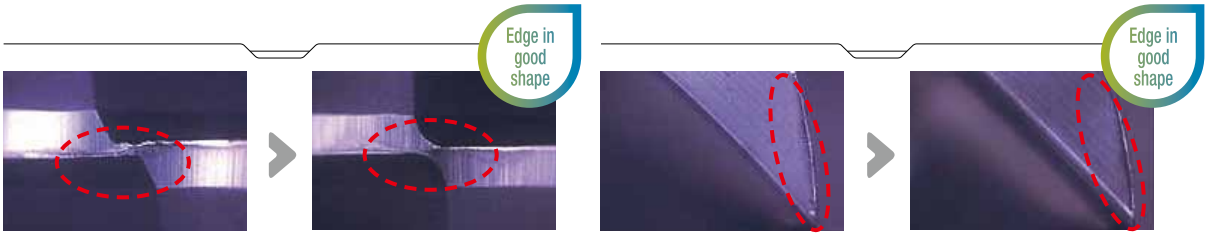
## Features

- **Wide range of workpiece materials** - Carbon steel, alloy steel, cast iron, etc
- **Extended tool life** - Newly invented substrate and high-tech coating layers applied
- **Higher productivity** - Wide application range from roughing to finishing



PC320U

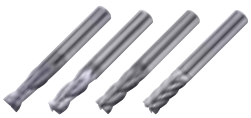
- **AlCrSiN coating layer**
  : Coating lubrication making possible high temperature/high speed machining
- **Ultra-fine substrate**
  : Substrate with excellent wear resistance applied




Competitor — Z+ Endmill — Competitor — Z+ Endmill

## Type

**Flat type**
ZPFE2000/3000/4000/6000
Ø1 ~ Ø25



**Short flat type**
ZPSFE2000/4000
Ø1 ~ Ø16

**Long flat type**
ZPLFE2000/4000
Ø2 ~ Ø20

**Long flute type**
ZPLFE2000/4000
Ø1 ~ Ø20

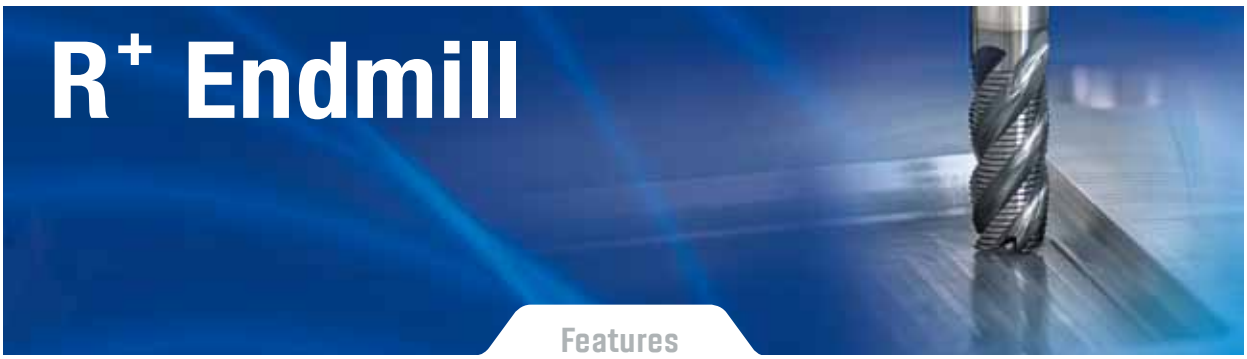
**Ball type**
ZPBE2000/4000
Ø0.8 ~ Ø20

**Long ball type**
ZPLBE2000
Ø2 ~ Ø12

**Radius type**
ZPRE2000/4000
Ø1 ~ Ø16

**Long radius type**
ZPRE2000/4000
Ø6 ~ Ø16

# R+ Endmill



## Features

- Cost-effective cutting-edge design for rough machining
- Specifically designed corners as irregular flute spacing and lead angle

## Features

- **Excellent machining efficiency -** Special design for medium to rough cutting
- **Longer cutting life -** Extended tool cost due to newly applied grades
- **Higher cutting performance -** Blade design ideal for roughing

**Lower cutting**

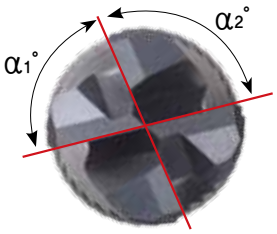
- Ideal for medium to rough cutting
- Special edge design

**Soft cutting**

- Serrated cutting edges
- 3 Combo R

### High quality results

**Irregular flute spacing to prevent chattering**
( $\alpha 1^\circ \neq \alpha 2^\circ$ )




**Irregular lead angles to disperse cutting force**
( $\beta 1^\circ \neq \beta 2^\circ$ )


## Type

| EM09CA / EM11CA | EM36CA / EM37CA | EM38CA / EM43CA | EM11PM / EM16PM / EM17PM | EM06H9 |
|---|---|---|---|---|
| Ø6 ~ Ø20 / Ø6 ~ Ø25 | Ø5 ~ Ø20 | Ø5 ~ Ø20 | Ø6 ~ Ø20 | Ø6 ~ Ø50 |

# D Endmill

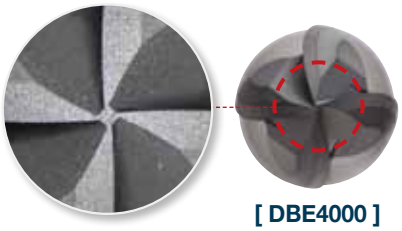
## Features

- Tangential cutting-edge geometries for excellent surface finish
- Excellent wear resistance due to high hardness and high purity diamond coating
- Advanced surface finish and cutting performance due to sharp edges and tangential tool geometries

## Features

### Center-matched ball shape (4-flutes)

- Ball point shape for high feed machining
- Improved rigidity and excellent surface finish



[ DBE4000 ]

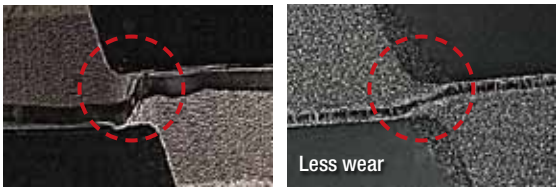
### Tangential cutting-edge geometries

- One-Pass grinding system
- Prevents stepped cone on the machined surface
- 2-flutes and 4-flutes tooling with a ball nose

## ND3000 (Diamond Coated Grade)

- High hardness diamond coating for machining graphite and ceramics
- Good adhesion strength for high speed and heavy duty machining

### Less flank wear




Competitor ND3000

⇒ Reduced creation of massive flank wear on the relief surface due to excellent wear resistance

### Less edge flaking


Competitor ND3000

⇒ Reduced coating delamination due to excellent adhesion between coating and substrate

## Type

**Flat type**
DFE2000/4000
(Ø1 ~ Ø12)

**Ball type**
DBE2000/4000
(Ø0.6 ~ Ø12)

# Composite Router Endmill

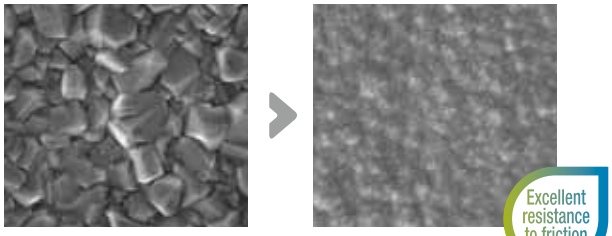
## Features

- Router endmills optimized for machining composite materials (CFRP/GFRP)
- Excellent tool life thanks to nano-crystal diamond coating
- Blade design for reducing flaking and burrs
- Improved productivity through high efficiency machining

## Features

- Diamond-coated grade ND2110 for machining composite materials
- High hardness diamond coating (over Hv 8,000)
- Nano-diamond coating with excellent resistance to friction and welding
- Improved resistance to flaking remove by applying the specialized grade for diamond coating

**Existing diamond coating** → **Nano-diamond coating**




### CCR (Router Endmill)

- Down cut design for low vibrations and cutting force
- Endmill for roughing, profiling, and grooving

### CCDR (Dual Helix Router Endmill)

- Dual helix design to inhibit flaking on upper and lower faces of workpieces
- Endmill for finishing, profiling, and grooving

### CCLR (Low Helix Router Endmill)

- Fewer burrs due to the low axial cutting force
- Endmill for finishing, profiling, and blind groove making

### CCRR (Reverse Helix Router Endmill)

- Reverse helix design to inhibit a drift in the workpiece's course
- Endmill for finishing, profiling, and through groove making

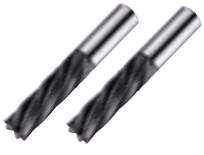
## Type

**Flat type**
CCDR2000/4000
Ø6 ~ Ø12

**Flat type**
CCR2000
Ø4 ~ Ø12

**Flat type**
CCLR4000
Ø4 ~ Ø12

**Flat type**
CCRR6000/8000
Ø6 ~ Ø12

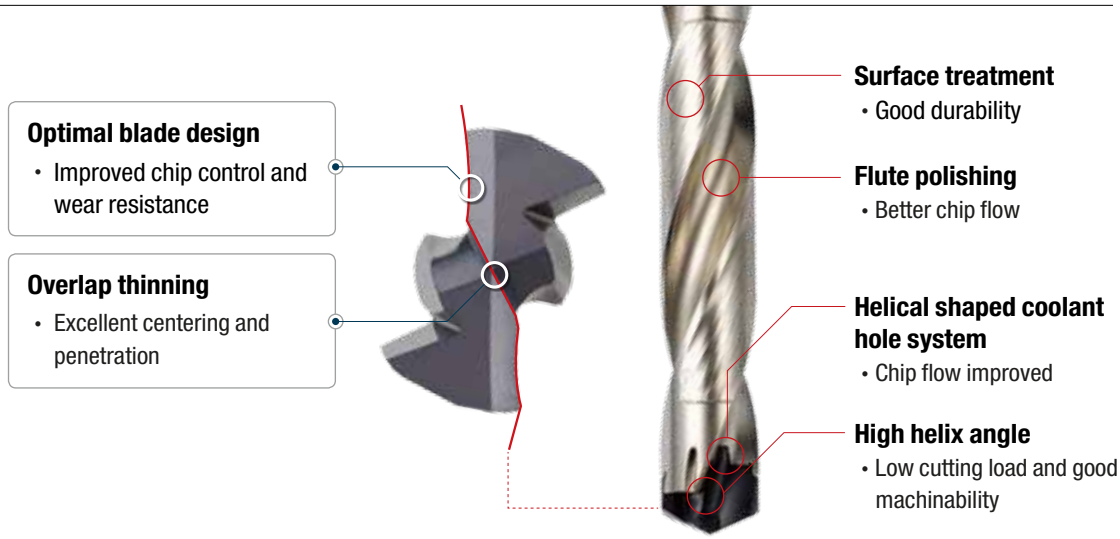


# TPDC

## Features

- One step clamp system → Increased stability
- Clamping system allowing to change inserts while the holder is attached on the machine → Shortened setting time
- Excellent chip control → Possible to use for various types of workpieces
- Wide chip pocket area secured → Better lubrication + chip flow improved
- Ultra-fine substrate + Multi-layer coating applied → Excellent anti chipping & wear resistance

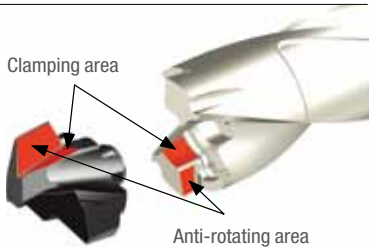
## Features




## Features of clamping system

### One step clamp system

- Easy and quick tool change with good repeatability
- Clamping area: Easy and fast tool change
- Anti-rotating area: Performs as a stopper
- Clamping and anti-rotating area make an acute angle to prevent insert rotation while machining




## Type

**TPDC-3D**
Ø12 ~ Ø25.99

**TPDC-5D**
Ø12 ~ Ø25.99

**TPDC-8D**
Ø12 ~ Ø25.99

# MSD Plus

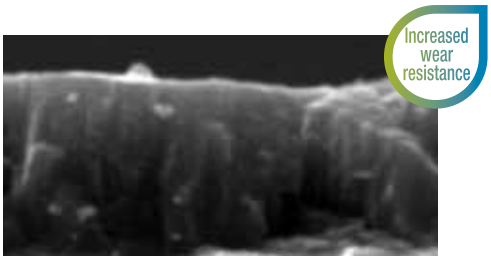
## Features

- Highly efficient hole making for various workpieces including automobile components
- Excellent chip evacuation thanks to wider chip pockets.
- Strong wear resistance thanks to our new PC325U grade

## Features

### New grade (PC325U)

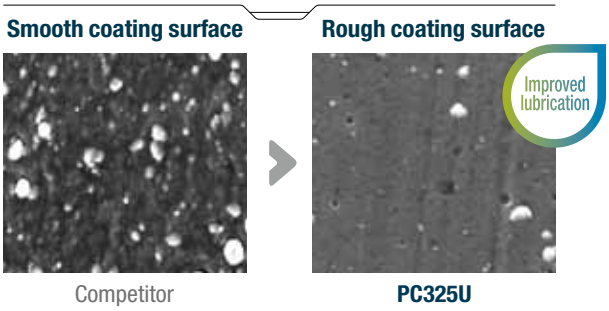
- Lubricative coating layer improves welding resistance at middle to high speed.
- Increase wear resistance in machining carbon steel




PC325U

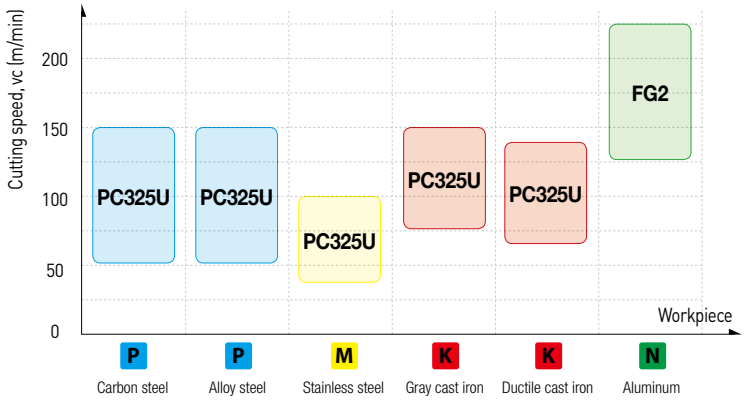
### Surface of coating layer

- Increased welding resistance and lower cutting load
- Reduced frictional resistance at cutting edges and on the flute

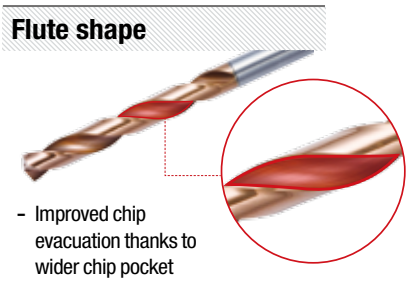



Competitor PC325U

## Application area




### Flute shape



- Improved chip evacuation thanks to wider chip pocket

## Type

**MSDP-□(P/M/K/N)**
Ø1 ~ Ø2.4

**MSDPH-□(P/M/K/N)**
Ø2.5 ~ Ø20

# MSD Plus-S

## Features

- Highly efficient hole making for various workpieces including automobile components
- Excellent chip evacuation thanks to wider chip pockets.
- Strong wear resistance thanks to our new PC325U grade

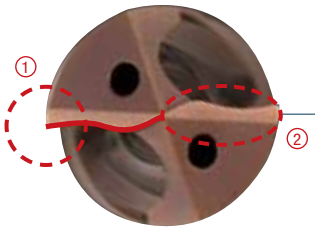
## Features

**Flute design**

- Wider chip pockets improve chip evacuation

**Optimized margin and back-tapered design**

- Reduced friction resistance and cutting temperature



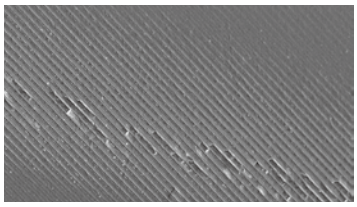

**Cutting-edge design**

- Notch-controlled blade design and specially treated cutting edges prevent chipping and breakage

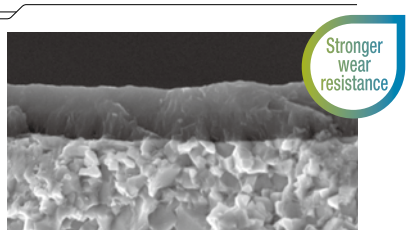
① Cutting edges designed for low cutting resistance

② Tip relief angle and shape optimized for heat evacuation

- Reduced friction resistance and improved chip evacuation due to excellent surface finish
- Exceptional wear resistance when machining heat-resistant alloys at high temperatures



Smooth coating surface




PC325T

## Type

**MSDPH-S**
Ø3.0 ~ Ø16

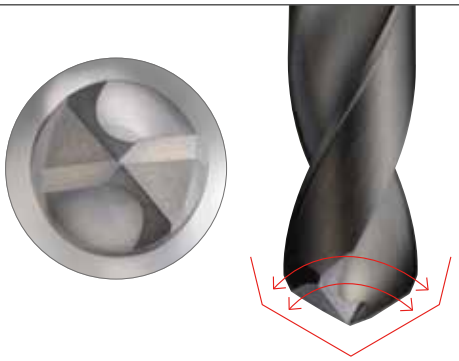
# MSD Plus CFRP

## Features

- Excellent wear resistance remove due to the new diamond-coated grade, ND2100
- Reduced burrs when machining CFRP due to high rake cutting edges

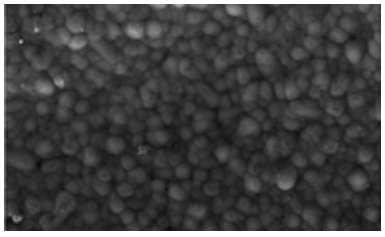
## Features

- Reduced thrust around corners due to the 2-step point angle
- Reduced burrs when drilling CFRP due to high rake cutting edges

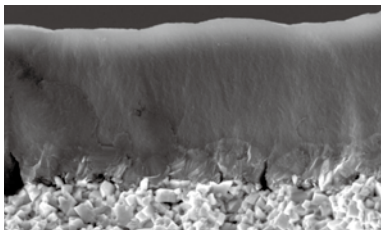


- Diamond Coating specialized in CFRP machining
- Diamond-coated substrate optimized for CFRP cutting

**High hardness diamond coating maintains well-cut shapes**



**Diamond coating's strong grip to the substrate**



- Inhibited burr creation by keeping cutting edges in good shape

**Less wear and flaking on the rake surface**


**Fewer burrs on workpieces**

## Type

**MSDP-5C**
Ø3 ~ Ø12.7

# MSFD

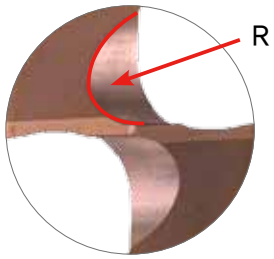
## Features

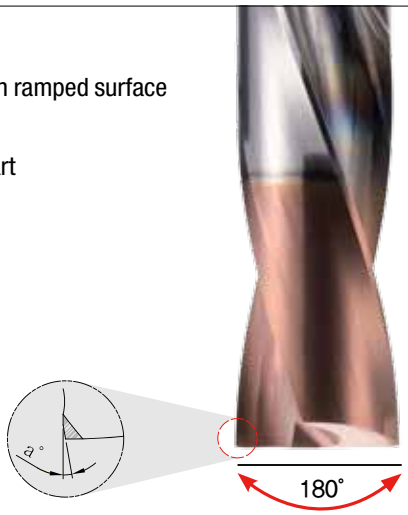
- High quality hole making capability with 180°-point angle
- Improved anti chipping and welding resistance by edge honing and chamfering which minimized the creation of burrs compared to general drills

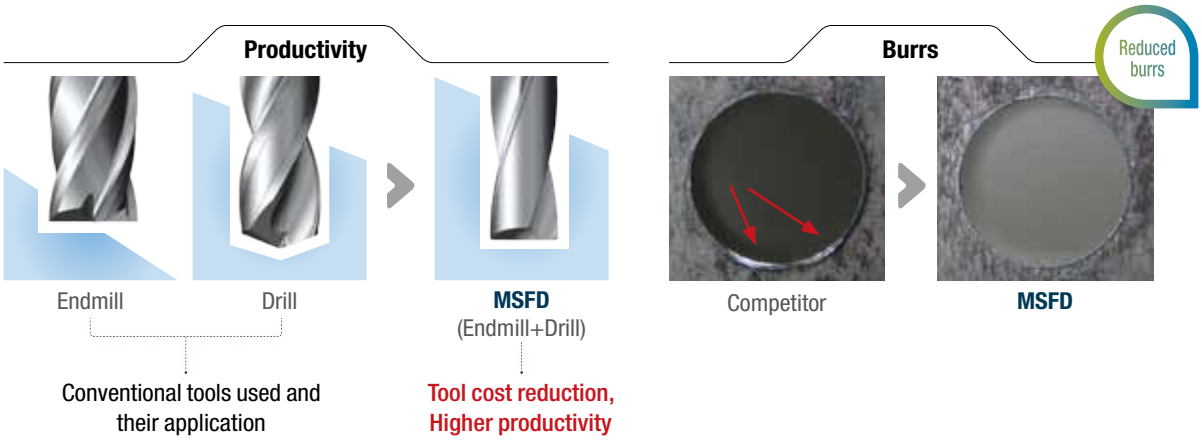
## Features

### Cutting edge design

- Excellent straightness with its 180° -point angle when drilling on ramped surface
- Stronger resistance to chipping through corner chamfering
- Widened chip pockets by the use of 'R' shape on the thinning part



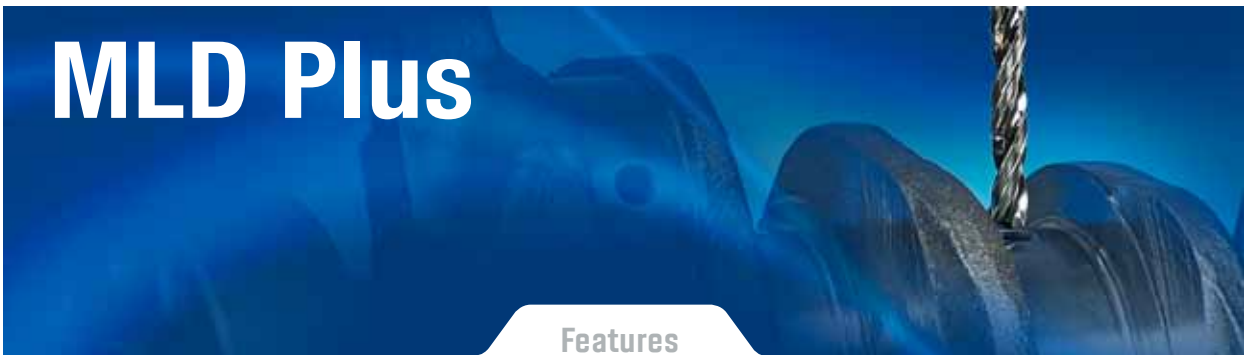




## Type

**MSFD-2P**
Ø2.5 ~ Ø12

**MSFDH-3P**
Ø2.5 ~ Ø12

# MLD Plus



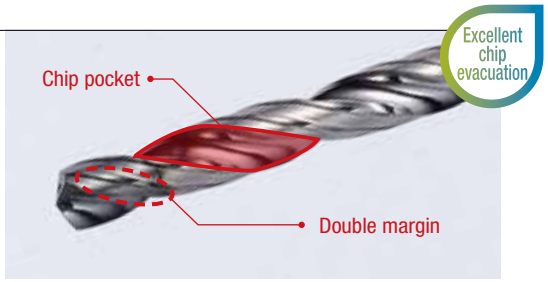
## Features

- Excellent stability due to new guide margin added
- Strong wear resistance due to our new PC315G grade

## Features

### Cutting edge and flute shape

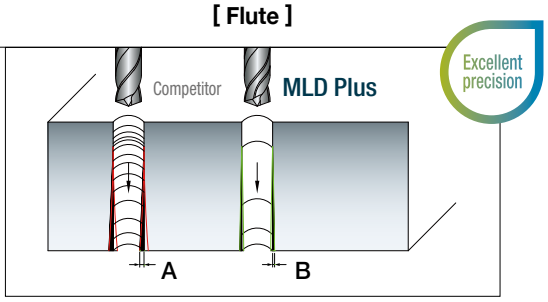
- Straight cutting edge provides better rigidity
- Excellent chip evacuation due to wider chip pocket and improved flute surface roughness
- Double margin secures machining stability




[ Flute ]

### Degree of machining precision

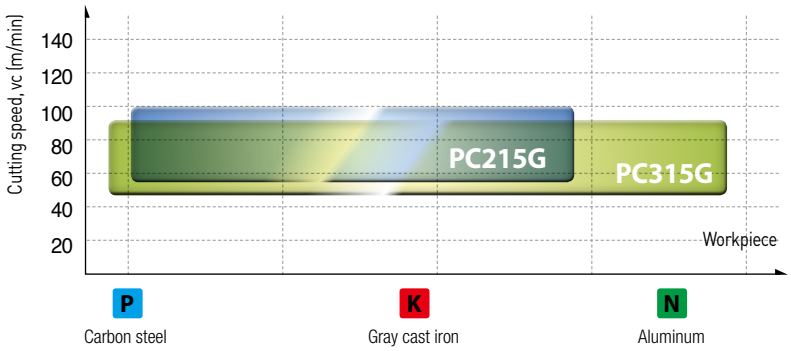
- Improved machining precision
  - Bent holes reduced, Inside hole surface roughness improved
  - Hole size uniformity increased
- Improved point shape
  - Precise location secured




**Reduced bent holes** compared to competitors (a > b)

## Application area

- **PC215G**
  Excellent performance when machining cast iron and alloy steel at high speed
- **PC315G**
  Universal grade excellent when machining carbon steel, cast iron, etc. at middle to low cutting speed




## Type

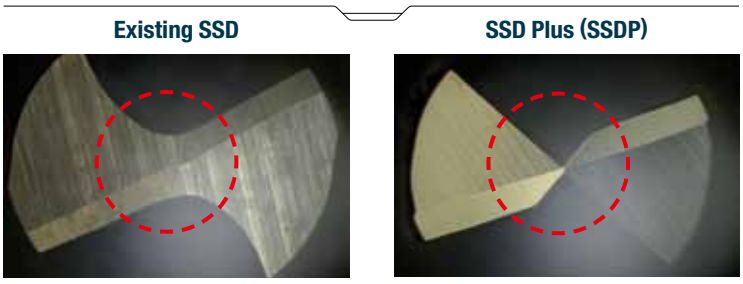
**MLD-□□(P/K/N)**
Ø3 ~ Ø10

# SSD Plus

## Features

- Improved chip control due to the new flute design
- Higher quality machining achieved from improved surface finish and forming
- Increased productivity due to stable tool life
- A variety of workpiece materials available including mild steel and non-ferrous

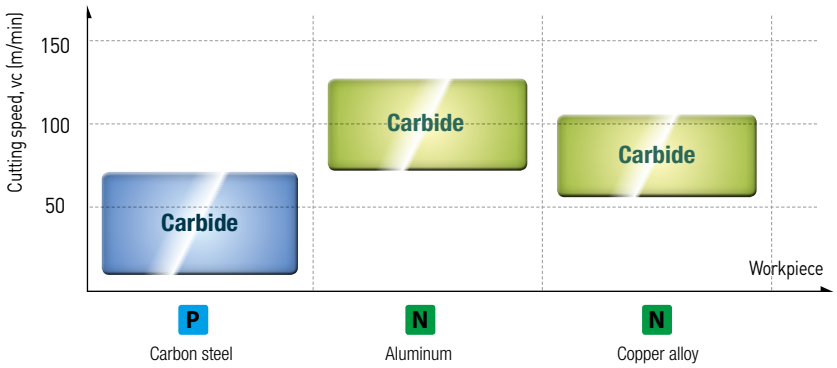
## Features




Application area : N

Application area : P, N

## Application area




## Type

**SSDP**
Ø1 ~ Ø15

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