MITSUBISHI MATERIALS

# PRODUCT NEWS 2025

NEW

# PRODUCT NEWS 2025

**NEW PRODUCTS AND SERIES EXPANSIONS AT A GLANCE**

Mitsubishi Materials is consistently focusing on specific customer needs to better meet the challenges of the modern metal working industry. This catalogue shows all the new products and series expansions for turning, milling and drilling applications.

**CURRENT, INNOVATIVE, COMPETITIVE**

**NOTES:** This Product News 2025 (N038) complements the General Catalogue C010.
It contains all new products and series expansions that have been launched after the release of the C010 catalogue.

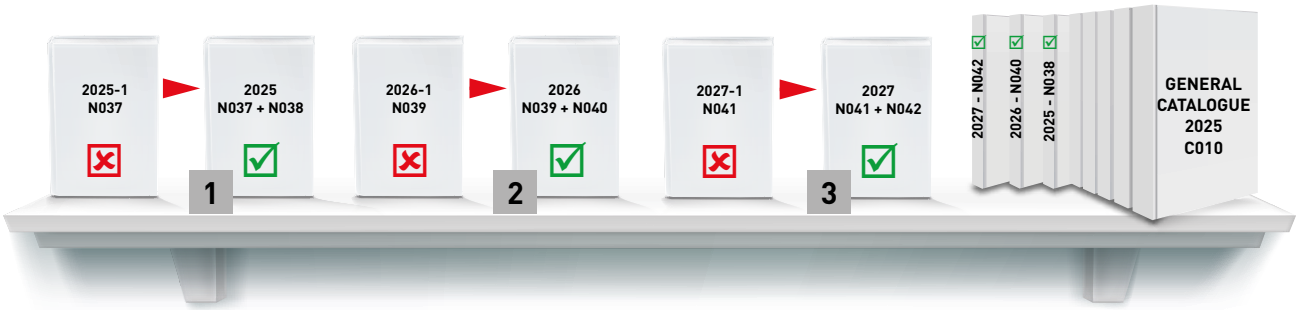
We reserve the right to make changes to any item compared to the information and illustrations shown in this catalogue, e.g. with regard to technical data, construction, equipment provided, material and external appearance. All dimensions are in millimetres. You will find the latest version of this catalogue on our website: www.mmc-carbide.com

NEW = **NEW / PRODUCT EXPANSION FOR PRODUCT NEWS 2025 (N038)**

NEW = **NEW / PRODUCT EXPANSION FOR PRODUCT NEWS 2025-1 (N037)**

# CATALOGUE SYSTEM

## HOW TO REPLACE PRODUCT NEWS BOOKS




**NOTES:**

1 The Product News 2025-1 – N037 will be integrated into Product News 2025 – N038.

2 The Product News 2026-1 – N039 will be integrated into Product News 2026 – N040.

3 The Product News 2027-1 – N041 will be integrated into Product News 2027 – N042.

☑ **The yearly Product News catalogues N038, N040 and N042 will complement the existing GENERAL CATALOGUE.**

☒ The Product News book ending with -1, can be disposed of after the publishing of the yearly Product News book.

## TRANSITION FROM THE EXISTING TO THE NEW GENERAL CATALOGUE

**NOTES:**

☑ **The yearly Product News catalogues N038, N040 and N042 will merge into the new GENERAL CATALOGUE.**

# INDEX

## TURNING TOOLS


NEW **GT SERIES** 6
10/2025 External grooving form for small parts machining.
GTAT type inserts added for ring and circlip grooving.

NEW **XB SERIES** 21
10/2025 Versatile indexable turning tool for a wide variety of grooving and chamfering applications with one holder.
Thread tapping can be replaced by machining.

NEW **BORING BARS AND INSERTS FOR SMALL PARTS MACHINING** 39
10/2025 Expansion of positive geometry E class inserts.
NEW FSF/FSF-P chipbreaker – Ideal chipbreaker for small depths of cut and
04/2025 finish turning operations.
New high performance hard steel boring bars.
Boring bars for small parts machining, compatible with Swiss-type lathes.

NEW **FSF/FSF-P CHIPBREAKER** 101
04/2025 Ideal chipbreaker for small depths of cut and finish turning operations.

NEW **MC/MP7100 SERIES** 108
04/2025 Dedicated carbide substrate.
New coating technology for stainless steel turning.
Creation of a new series for a variety of stainless steel applications.

NEW **MC6100 SERIES** 139
04/2025 New FPH chipbreaker for low depths of cut and high feed finishing.
CVD coated grade for steel turning.

NEW **MICRO-MINI TWIN** 145
04/2025 New sleeves with internal coolant. Expansion of sleeves with external coolant.
Micro-Mini Twin boring bars for high precision and small parts machining.
Ideal for small-diameter boring of steel and stainless steel.
Economical, solid shank type with two cutting edges.

NEW **BC8200/MB8200 SERIES** 166
04/2025 The next generation of coated and uncoated PcBN grades for machining hardened steels.
Expanded geometry range for coated PcBN grades BC8220 and BC8210.
Introduction of the new BL-Breaker in BC8220, ensuring effective chip control during medium to light depth-of-cut operations.
Launch of the new uncoated PcBN grades MB8220 and MB8210 for hardened steel turning applications.

**INDEX**

# SOLID MILLING TOOLS


NEW **iMX END MILL SYSTEM WITH EXCHANGEABLE HEADS** 201
10/2025 Conical torus iMX head with multiple though coolant holes.
The ideal tool for blade machining.
ER Collet with ER range 16 – 40 and iMX connection sizes iMX10 – 25.

NEW **VQ SERIES** 206
10/2025 VQ3XL/VQ4XL/VQ4XLRB – 3 and 4 flute square type and 4 flute corner radius solid carbide end mills for maximum performance on micro-machining applications.
NEW VQJCS/VQLCS/VQELCS – Solid carbide milling cutters with chipbreaker and irregular pitch
04/2025 flutes in 3, 4 and 5 x DC cutting lengths.
VQ2XLBR - Expanded range of 2-flute ball nose end mills.
VQJCSRB/VQLCSRB/VQELCSRB – New corner radius, solid carbide milling cutters with chipbreaker and irregular pitch flutes in 3, 4 and 5 x DC cutting lengths.


# INDEXABLE MILLING TOOLS


NEW **MV1000 SERIES** 240
04/2025 Expanded geometry range for a wide variety of applications.
The ideal coated carbide grade for milling.

NEW **WWX SERIES** 254
04/2025 MV1030 – Grade expansion for WWX200/WWX400.
WWX200 – Expanded geometry range.
High performance 90° face milling cutter with double-sided trigon inserts for shoulder, face and copy milling.

NEW **MX3030** 279
04/2025 APX3000 – Expanded geometry range.
Cermet grade for a wider range of applications.

**INDEX**

## DRILLING TOOLS


NEW **DXAS** 284
10/2025 New and innovative exchangeable head drills.
For high performance and accurate drilling of steels.
From diameter 18.0 - 30.0 mm with L/D 1.5/3/5/8.

NEW **DFAS/MFE** 298
04/2025 DFAS-E – Solid carbide flat bottom drills (m7 tolerance).
DFAS – Now available in a longer L/D = 5 type.
MFE – Solid carbide flat bottom drills (h7 tolerance).

NEW **MINI DVAS** 320
04/2025 Solid carbide TRISTAR drill series – Fast, reliable and accurate.
Now available in extra long L/D = 50.
Ø 1.0 mm – Ø 2.9 mm/L/D = 2 – 50

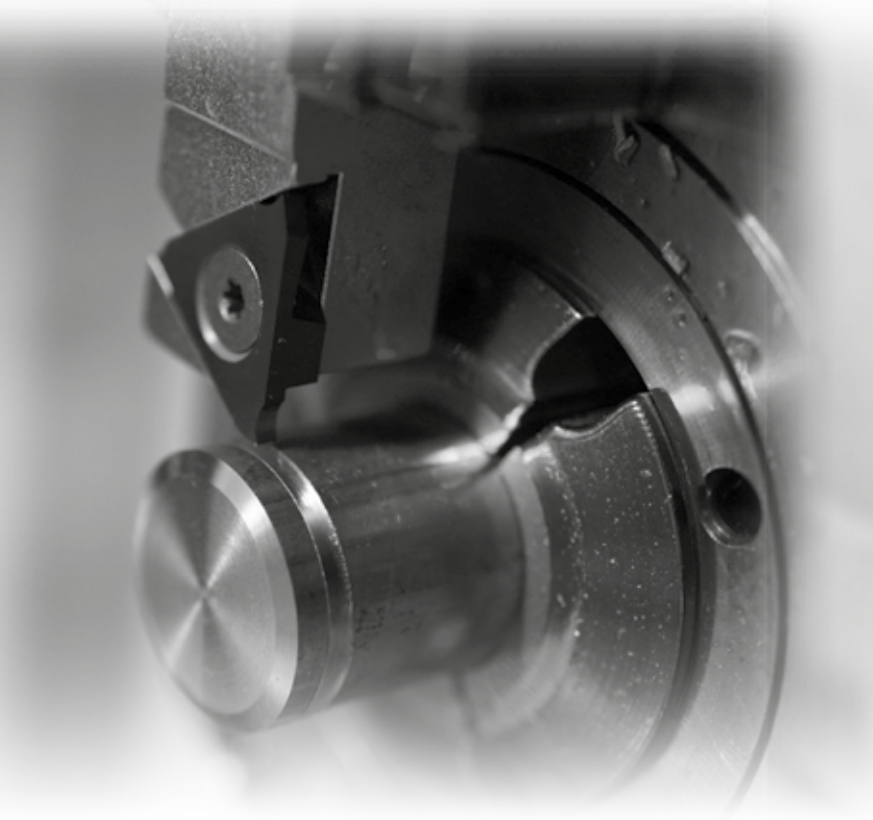

## MPLUS TOOLS

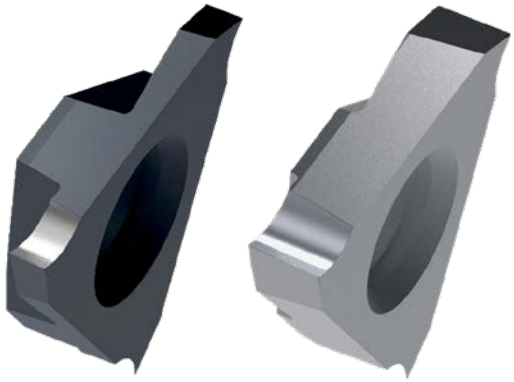

NEW **G80A** 331
04/2025 Parting off system for TORNOS multi-spindle machines.

NEW **415SD** 345
04/2025 MV1020/MV1030 – Grade expansion.
First choice for high-feed machining.

# GT SERIES

## FOR EXTERNAL AND INTERNAL APPLICATIONS





Interested in more...

**B282**

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MITSUBISHI MATERIALS

NEW

# GT HOLDER

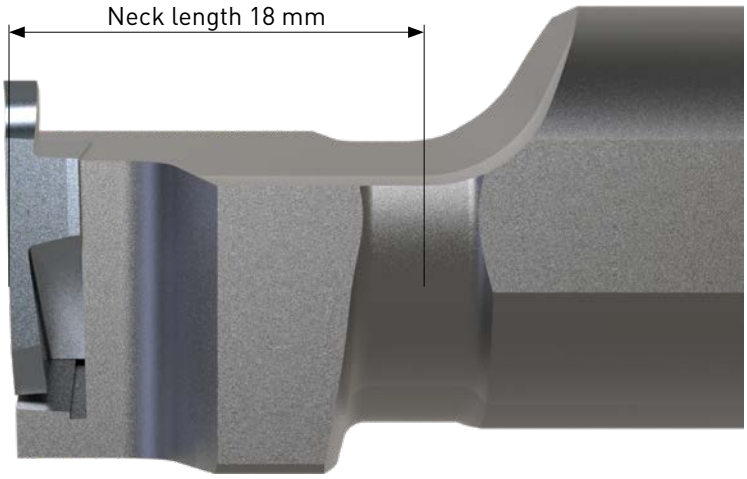
## EXTERNAL GROOVING FOR SMALL PARTS MACHINING

**NEW - 90° HOLDER**

The neck dimensions have been optimised to improve resistance to chatter and vibration.

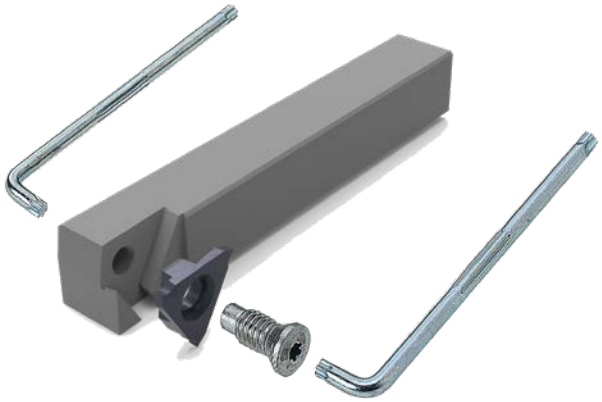
SH-GTAF GTAF

**ROUND SHANK HOLDER**
**FOR REAR TOOL POST**




## BACK CLAMPING MECHANISM

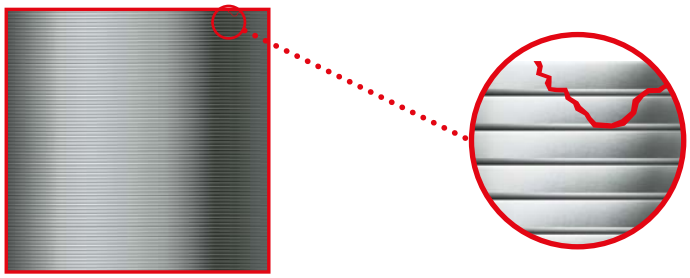
For gang type tool posts on Swiss automatic lathes, tools can be changed quickly and accurately using the same wrench on both sides, improving machine operating efficiency.
Offset type is not included.



# COATING

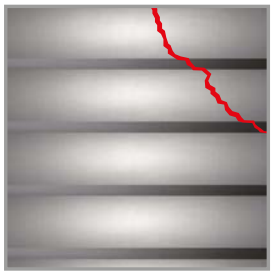
## MS7025 – NANO-MULTILAYER COATING

By combining the high lubrication layer with excellent welding resistance and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, the film damage is significantly reduced and the welding and wear resistance are dramatically improved.



Nano-multilayer coating

Enlarged image

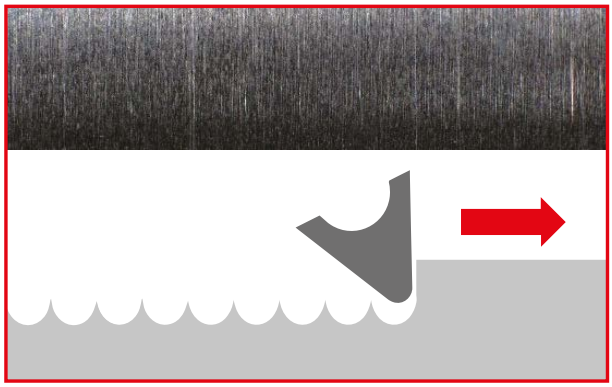


Conventional multilayer coating

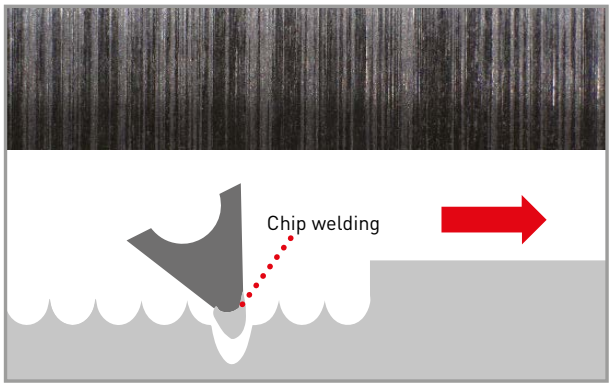
## EFFECTS OF THE HIGH LUBRICATION LAYER

The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining. Additionally, this reduces blemishes on the machined surface of the component.

Surface Finish



MS7025




Conventional

## MT2015 – CARBIDE GRADE (NON COATED)

Has the usual high wear resistance of carbide but is also tough and therefore resists sudden fracturing. Expected to extend the tool life when machining non-ferrous metals such as aluminium alloys.

## VP15TF / VP15KZ – PVD COATED GRADES

(Al,Ti)N coated grade with excellent heat resistance and has high adhesion strength to the carbide substrate. Highly versatile and can be used in a variety of machining processes.

# GT SERIES

## SELECTION STANDARD

| Angle | Name of tool holder | | Note | Shank size | Applicable insert type |
|---|---|---|---|---|---|
| **SQUARE SHANK** | | | | | |
| 0° | **GTAH** | CW (Groove width) 0.25 – 3.0 mm | Without offset | 8 x 8 x 80 | GTAT GTBT GTCT |
| | | | | 8 x 8 x 120 | |
| | | | | 10 x 10 x 80 | |
| | | | | 10 x 10 x 120 | |
| | | | | 12 x 12 x 80 | |
| | | | | 12 x 12 x 120 | |
| | | | | 16 x 16 x 120 | |
| | | | With offset | 20 x 20 x 120 | |
| | | | | 25 x 25 x 150 | |
| | **GTBH** | CW (Groove width) 1.45 – 3.0 mm | Without offset | 10 x 10 x 80 | GTBT GTCT |
| | | | | 10 x 10 x 120 | |
| | | | | 12 x 12 x 120 | |
| | | | | 16 x 16 x 120 | |
| | | | With offset | 20 x 20 x 120 | |
| | | | | 25 x 25 x 150 | |
| | **GTCH** | CW (Groove width) 2.5 – 3.0 mm | Without offset | 10 x 10 x 80 | GTCT |
| | | | | 10 x 10 x 120 | |
| 90° | **GTAF** | CW (Groove width) 0.25 – 3.0 mm | | 10 x 10 x 100 | GTAT GTBT GTCT |
| | | | | 12 x 12 x 100 | |
| | | | | 16 x 16 x 120 | |
| | | | | 20 x 20 x 120 | |
| | | | | 25 x 25 x 120 | |
| **ROUND SHANK** | | | | | |
| 90° | **SH-GTAF** | CW (Groove width) 0.25 – 3.0 mm | For back tool post | 16 x 85 | GTAT GTBT GTCT |
| | | | | 19.05 x 115 | |
| | | | | 20 x 100 | |
| | | | | 22 x 120 | |
| | | | | 25 x 120 | |
| | | | | 25.4 x 115 | |

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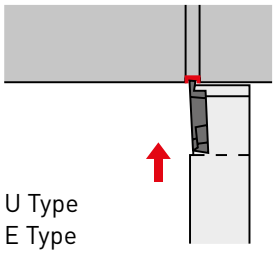
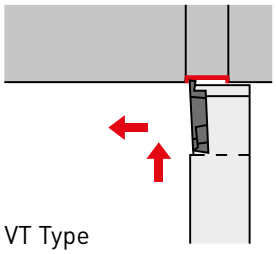
= NEW

# GTAH / GTBH / GTCH

## EXTERNAL GROOVING

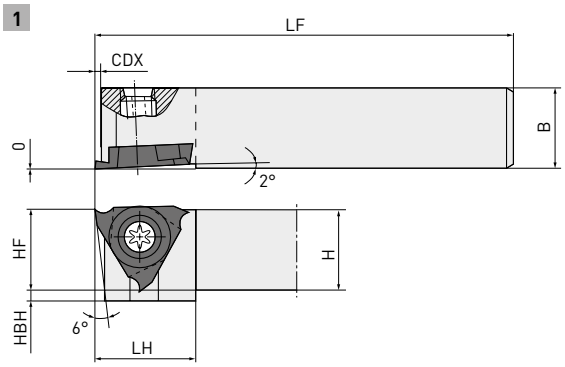


U Type
E Type

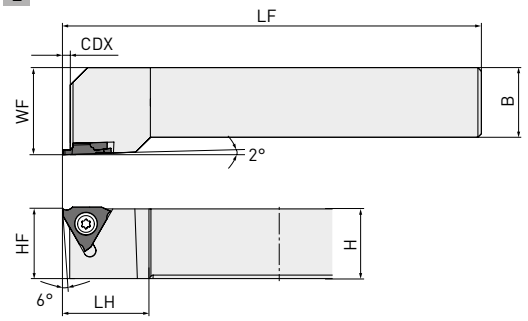


VT Type

**1**




**2**




*Right hand tool holder shown.*

| | Order number | Stock R | Stock L | H | B | HF | LF | WF | CDX* | LH | HBH | Cutting width min. | Cutting width max. | Type | Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GTAHR/L0808-20S | ● | ● | 8 | 8 | 8 | 80 | — | 2 | 15 | 5 | 0.25 | 3.0 | 1 | |
| | GTAHR/L0808-20 | ● | ● | 8 | 8 | 8 | 120 | — | 2 | 15 | 5 | 0.25 | 3.0 | 1 | |
| | GTAHR/L1010-20S | ● | ● | 10 | 10 | 10 | 80 | — | 2 | 15 | 3 | 0.25 | 3.0 | 1 | |
| | GTAHR/L1010-20 | ● | ● | 10 | 10 | 10 | 120 | — | 2 | 15 | 3 | 0.25 | 3.0 | 1 | GTAT |
| | GTAHR/L1212-20S | ● | ● | 12 | 12 | 12 | 80 | — | 2 | 15 | 1 | 0.25 | 3.0 | 1 | GTBT* |
| | GTAHR/L1212-20 | ● | ● | 12 | 12 | 12 | 120 | — | 2 | 15 | 1 | 0.25 | 3.0 | 1 | GTCT* |
| | GTAHR/L1616-20 | ● | ● | 16 | 16 | 16 | 120 | — | 2 | 15 | — | 0.25 | 3.0 | 1 | |
| NEW | GTAHR/L2020-20 | ● | ● | 20 | 20 | 20 | 120 | 25 | 2 | 25 | — | 0.25 | 3.0 | 2 | |
| NEW | GTAHR/L2525-20 | ● | ● | 25 | 25 | 25 | 150 | 32 | 2 | 25 | — | 0.25 | 3.0 | 2 | |
| | GTBHR/L1010-30S | ● | ● | 10 | 10 | 10 | 80 | — | 3 | 15 | 3 | 1.45 | 3.0 | 1 | |
| | GTBHR/L1010-30 | ● | ● | 10 | 10 | 10 | 120 | — | 3 | 15 | 3 | 1.45 | 3.0 | 1 | |
| | GTBHR/L1212-30 | ● | ● | 12 | 12 | 12 | 120 | — | 3 | 15 | 1 | 1.45 | 3.0 | 1 | GTBT |
| | GTBHR/L1616-30 | ● | ● | 16 | 16 | 16 | 120 | — | 3 | 15 | — | 1.45 | 3.0 | 1 | GTCT |
| NEW | GTBHR/L2020-30 | ● | ● | 20 | 20 | 20 | 120 | 25 | 3 | 25 | — | 1.45 | 3.0 | 2 | |
| NEW | GTBHR/L2525-30 | ● | ● | 25 | 25 | 25 | 150 | 32 | 3 | 25 | — | 1.45 | 3.0 | 2 | |
| | GTCHR/L1010-30S | ● | ● | 10 | 10 | 10 | 80 | — | 3 | 15 | 3 | 2.5 | 3.0 | 1 | |
| | GTCHR/L1010-30 | ● | ● | 10 | 10 | 10 | 120 | — | 3 | 15 | 3 | 2.5 | 3.0 | 1 | GTCT |

1/1

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use right hand inserts for right hand holders and left hand inserts for left hand holders.

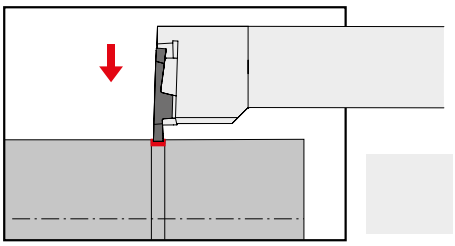


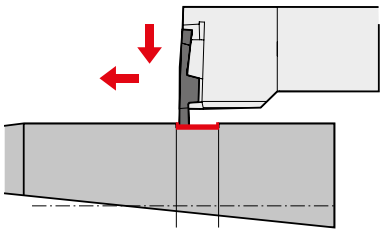
● : Inventory maintained. ★ : Inventory maintained in Japan.

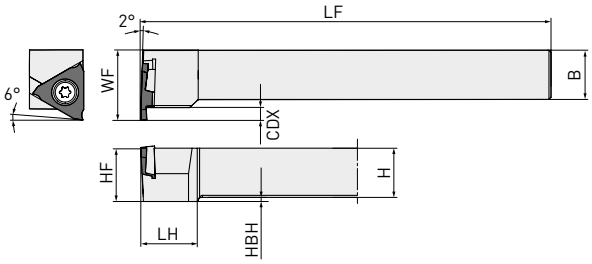
NEW

# GTAF

## EXTERNAL GROOVING








*Right hand tool holder shown.*

| Order number | Stock | | H | B | HF | LF | WF | CDX* | LH | HBH | Cutting width | | Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | L | | | | | | | | | min. | max. | |
| GTAFR/L1010-30 | ● | ● | 10 | 10 | 10 | 100 | 15 | 3 | 14 | 3 | 0.25 | 3.0 | GTAT<br>GTBT*<br>GTCT* |
| GTAFR/L1212-30 | ● | ● | 12 | 12 | 12 | 100 | 17 | 3 | 14 | 1 | 0.25 | 3.0 | |
| GTAFR/L1616-30 | ● | ● | 16 | 16 | 16 | 120 | 21 | 3 | 14 | — | 0.25 | 3.0 | |
| GTAFR/L2020-30 | ● | ● | 10 | 10 | 10 | 120 | 25 | 3 | 14 | — | 0.25 | 3.0 | |
| GTAFR/L2525-30 | ● | ● | 25 | 25 | 25 | 120 | 30 | 3 | 14 | — | 0.25 | 3.0 | |

1/1

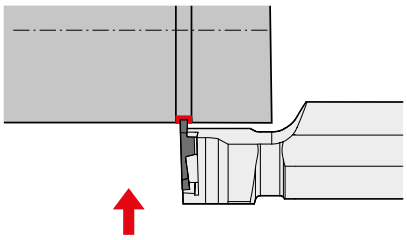
* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

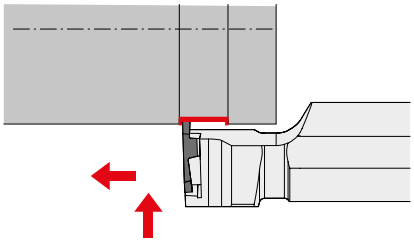
1. Please use left hand insert for right hand holder and right hand insert for left hand holder.

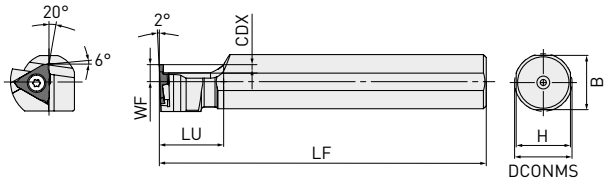
NEW

# SH-GTAF

## EXTERNAL GROOVING








*Left hand tool holder shown.*

| Order number | Stock | | H | B | DCONMS | LF | LU | WF | CDX* | Cutting width | | Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | L | | | | | | | | min. | max. | |
| SH160-GTAFL-30 | | ● | 15 | 15 | 16 | 85 | 18 | 6 | 3 | 0.25 | 3.0 | GTAT<br>GTBT*<br>GTCT* |
| SH190-GTAFL-30 | | ● | 18 | 18 | 19.05 | 115 | 18 | 6 | 3 | 0.25 | 3.0 | |
| SH200-GTAFL-30 | | ● | 19 | 19 | 20 | 100 | 18 | 6 | 3 | 0.25 | 3.0 | |
| SH220-GTAFL-30 | | ● | 21 | 21 | 22 | 120 | 18 | 6 | 3 | 0.25 | 3.0 | |
| SH250-GTAFL-30 | | ● | 24 | 24 | 25 | 120 | 18 | 10 | 3 | 0.25 | 3.0 | |
| SH254-GTAFL-30 | | ● | 24 | 24 | 25.4 | 115 | 18 | 10 | 3 | 0.25 | 3.0 | |

1/1

* It is not possible to machine depths over CDX dimensions (max. groove depth).
For the actual maximum depth that can be machined, only check the CDX of the insert.

1. Please use left hand insert for right hand holder and right hand insert for left hand holder.



● : Inventory maintained. ★ : Inventory maintained in Japan.

# SPARE PARTS

### GTAH / GTBH / GTCH

| Holder type | | | |
|---|---|---|---|
| | **Clamp screw** | **Clamp torque (Nm)** | **Wrench** |
| GT□H-0808, 1010, 1212, 1616 | NS404W | 1.0 | NKY15S |
| GT□H-2020, 2525 | FC400890T | 2.5 | TKY10F |

### GTAF

| | | |
|---|---|---|
| **Clamp screw** | **Clamp torque (Nm)** | **Wrench** |
| FC400890T | 2.5 | TKY10F |

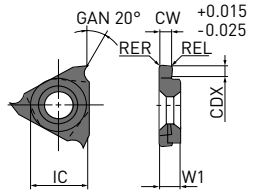
### SH-GTAF

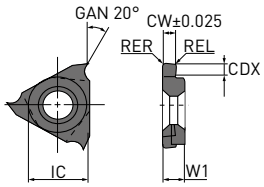
| | | |
|---|---|---|
| **Clamp screw** | **Clamp torque (Nm)** | **Wrench** |
| FC400890T | 2.5 | TKY10F |

# GT SERIES

## INSERTS

| | Order number | Hand | MS7025 | VP15TF | VP15KZ | MT2015 | TF15 | CW | CDX* | RER/L | IC | W1 | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NEW | GTAT02506V3RP-E | R | ● | | | ● | | 0.25 | 0.27 | 0.03 | 9.525 | 3.18 | Precision Groove E Type (Ring and circlip grooving) |
| NEW | GTAT03006V3RP-E | R | ● | | | ● | | 0.30 | 0.27 | 0.03 | 9.525 | 3.18 | |
| NEW | GTAT03306V3RP-E | R | ● | | | ● | | 0.33 | 0.27 | 0.03 | 9.525 | 3.18 | |
| NEW | GTAT04312V3RP-E | R | ● | | | ● | | 0.43 | 0.9 | 0.03 | 9.525 | 3.18 | |
| NEW | GTAT05312V5RP-E | R | ● | | | ● | | 0.53 | 0.9 | 0.05 | 9.525 | 3.18 | |
| NEW | GTAT05312V5LP-E | L | ● | | | ● | | 0.53 | 0.9 | 0.05 | 9.525 | 3.18 | |
| | GTAT03306V3R-E | R | | ● | | | | 0.33 | 0.27 | 0.03 | 9.525 | 3.18 | E Type (Ring and circlip grooving) |
| | GTAT03306V3L-E | L | | ★ | | | | 0.33 | 0.27 | 0.03 | 9.525 | 3.18 | |
| | GTAT04312V3R-E | R | | ● | | | | 0.43 | 0.9 | 0.03 | 9.525 | 3.18 | |
| | GTAT04312V3L-E | L | | ★ | | | | 0.43 | 0.9 | 0.03 | 9.525 | 3.18 | |
| | GTAT05312V5R-E | R | | ● | | | | 0.53 | 0.9 | 0.05 | 9.525 | 3.18 | |
| | GTAT05312V5L-E | L | | ★ | | | | 0.53 | 0.9 | 0.05 | 9.525 | 3.18 | |
| NEW | GTAT06512V5R-E | R | ● | | | ● | | 0.65 | 0.9 | 0.05 | 9.525 | 3.18 | |
| NEW | GTAT06512V5L-E | L | ● | | | ● | | 0.65 | 0.9 | 0.05 | 9.525 | 3.18 | |
| | GTAT07520V5R-E | R | ● | ● | | ● | | 0.75 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT07520V5L-E | L | ● | ★ | | ● | | 0.75 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT09520V5R-E | R | ● | ● | | ● | | 0.95 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT09520V5L-E | L | ● | ★ | | ● | | 0.95 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT10020V5R-E | R | ● | ● | | ● | | 1.00 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT10020V5L-E | L | ● | ★ | | ● | | 1.00 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT1002001R-E | R | | ● | | | | 1.00 | 1.8 | 0.1 | 9.525 | 3.18 | |
| | GTAT1002001L-E | L | | ★ | | | | 1.00 | 1.8 | 0.1 | 9.525 | 3.18 | |
| NEW | GTAT11020V5R-E | R | ● | | | ● | | 1.10 | 1.8 | 0.05 | 9.525 | 3.18 | |
| NEW | GTAT11020V5L-E | L | ● | | | ● | | 1.10 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT12020V5R-E | R | ● | ● | | ● | | 1.20 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT12020V5L-E | L | ● | ★ | | ● | | 1.20 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT1202001R-E | R | | ● | | | | 1.20 | 1.8 | 0.1 | 9.525 | 3.18 | |
| | GTAT1202001L-E | L | | ★ | | | | 1.20 | 1.8 | 0.1 | 9.525 | 3.18 | |
| NEW | GTAT12520V5R-E | R | ● | | | ● | | 1.25 | 1.8 | 0.05 | 9.525 | 3.18 | |
| NEW | GTAT12520V5L-E | L | ● | | | ● | | 1.25 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT14020V5R-E | R | ● | ● | | ● | | 1.40 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTAT14020V5L-E | L | ● | ★ | | ● | | 1.40 | 1.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT14530V5R-E | R | ● | | | ● | | 1.45 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT14530V5L-E | L | ● | | | ● | | 1.45 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT15030V5R-E | R | ● | ● | | ● | | 1.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT15030V5L-E | L | ● | ★ | | ● | | 1.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT1503001R-E | R | | ● | | | | 1.50 | 2.8 | 0.1 | 9.525 | 3.18 | |
| | GTBT1503001L-E | L | | ★ | | | | 1.50 | 2.8 | 0.1 | 9.525 | 3.18 | |
| | GTBT17030V5R-E | R | ● | | | ● | | 1.70 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT17030V5L-E | L | ● | | | ● | | 1.70 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT17530V5R-E | R | ● | | | ● | | 1.75 | 2.8 | 0.05 | 9.525 | 3.18 | |
| | GTBT17530V5L-E | L | ● | | | ● | | 1.75 | 2.8 | 0.05 | 9.525 | 3.18 | |




*Right hand insert shown.*

1/3

(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

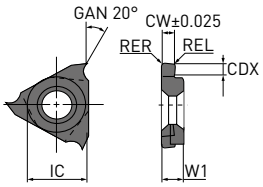
* CDX is a value that assumes the machining diameter of Ø 42 or less.
Please note that the maximum machining depth is limited by the holder used.

● / ★ = Expansion

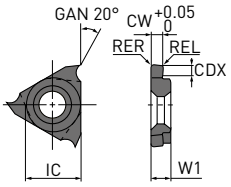
● : Inventory maintained. ★ : Inventory maintained in Japan.

## GT SERIES – INSERTS

| Order number | Hand | MS7025 | VP15TF | VP15KZ | MT2015 | TF15 | CW | CDX* | RER/L | IC | W1 | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GTBT18030V5R-E | R | ● | ● | | ● | | 1.80 | 2.8 | 0.05 | 9.525 | 3.18 | E Type (Ring and circlip grooving) |
| GTBT18030V5L-E | L | ● | ★ | | ● | | 1.80 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT20030V5R-E | R | ● | ● | | ● | | 2.00 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT20030V5L-E | L | ● | ★ | | ● | | 2.00 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT2003001R-E | R | ● | ● | | | | 2.00 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTBT2003001L-E | L | ● | ★ | | | | 2.00 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTBT22530V5R-E | R | ● | ● | | ● | | 2.25 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT22530V5L-E | L | ● | ★ | | ● | | 2.25 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT2253001R-E | R | ● | | | | | 2.25 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTBT2253001L-E | L | ● | | | | | 2.25 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTCT25030V5R-E | R | ● | ★ | | ● | | 2.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT25030V5L-E | L | ● | ★ | | ● | | 2.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT2503001R-E | R | ● | | | | | 2.50 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTCT2503001L-E | L | ● | | | | | 2.50 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTCT27530V5R-E | R | ● | ★ | | ● | | 2.75 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT27530V5L-E | L | ● | ★ | | ● | | 2.75 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT30030V5R-E | R | ● | ★ | | ● | | 3.00 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT30030V5L-E | L | ● | ★ | | ● | | 3.00 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT3003001R-E | R | ● | | | | | 3.00 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTCT3003001L-E | L | ● | | | | | 3.00 | 2.8 | 0.1 | 9.525 | 3.18 | |
| GTAT03006V3R-U | R | ● | ● | | ● | | 0.30 | 0.27 | 0.03 | 9.525 | 3.18 | U Type (General purpose grooving) |
| GTAT03006V3L-U | L | ● | ★ | | ● | | 0.30 | 0.27 | 0.03 | 9.525 | 3.18 | |
| GTAT05012V5R-U | R | ● | ● | | ● | | 0.50 | 0.9 | 0.05 | 9.525 | 3.18 | |
| GTAT05012V5L-U | L | ● | ★ | | ● | | 0.50 | 0.9 | 0.05 | 9.525 | 3.18 | |
| GTAT07520V5R-U | R | ● | ● | | ● | | 0.75 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT07520V5L-U | L | ● | ★ | | ● | | 0.75 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT09520V5R-U | R | ● | ● | | ● | | 0.95 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT09520V5L-U | L | ● | ★ | | ● | | 0.95 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT10020V5R-U | R | ● | ● | | ● | | 1.00 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT10020V5L-U | L | ● | ★ | | ● | | 1.00 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT10320V5R-U | R | | ● | | | | 1.03 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT12520V5R-U | R | ● | ● | | ● | | 1.25 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTAT12520V5L-U | L | ● | ★ | | ● | | 1.25 | 1.8 | 0.05 | 9.525 | 3.18 | |
| GTBT14530V5R-U | R | ● | ● | | ● | | 1.45 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT14530V5L-U | L | ● | ★ | | ● | | 1.45 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT15030V5R-U | R | ● | ● | | ● | | 1.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT15030V5L-U | L | ● | ★ | | ● | | 1.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT17530V5R-U | R | ● | ● | | ● | | 1.75 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT17530V5L-U | L | ● | ★ | | ● | | 1.75 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT20030V5R-U | R | ● | ● | | ● | | 2.00 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTBT20030V5L-U | L | ● | ★ | | ● | | 2.00 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT25030V5R-U | R | ● | ★ | | ● | | 2.50 | 2.8 | 0.05 | 9.525 | 3.18 | |
| GTCT25030V5L-U | L | ● | ★ | | ● | | 2.50 | 2.8 | 0.05 | 9.525 | 3.18 | |




*Right hand insert shown.*




*Right hand insert shown.*



(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* CDX is a value that assumes the machining diameter of Ø 42 or less.
Please note that the maximum machining depth is limited by the holder used.



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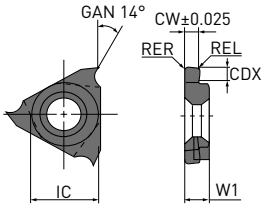
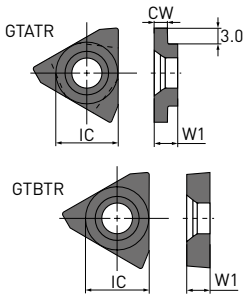
● : Inventory maintained. ★ : Inventory maintained in Japan.

## GT SERIES – INSERTS

| Order number | Hand | MS7025 | VP15TF | VP15KZ | MT2015 | TF15 | CW | CDX* | RER/L | IC | W1 | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GTAT0330600R-VT | R | | | ● | | | 0.33 | 0.25 | 0 | 9.525 | 3.18 | VT Type (Grooving, Side turning) |
| GTAT0431200R-VT | R | | | ● | | | 0.43 | 0.9 | 0 | 9.525 | 3.18 | |
| GTAT0532000R-VT | R | | | ● | | | 0.53 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT0652000R-VT | R | | | ● | | | 0.65 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT0752000R-VT | R | | | ● | | | 0.75 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT0802000R-VT | R | | | ● | | | 0.80 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT0852000R-VT | R | | | ● | | | 0.85 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT0952000R-VT | R | | | ● | | | 0.95 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT1002000R-VT | R | | | ● | | | 1.00 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT1102000R-VT | R | | | ● | | | 1.10 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT1202000R-VT | R | | | ● | | | 1.20 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT1302000R-VT | R | | | ● | | | 1.30 | 1.6 | 0 | 9.525 | 3.18 | |
| GTAT1402000R-VT | R | | | ● | | | 1.40 | 1.6 | 0 | 9.525 | 3.18 | |
| GTBT1503000R-VT | R | | | ● | | | 1.50 | 2.7 | 0 | 9.525 | 3.18 | |
| GTBT2003000R-VT | R | | | ● | | | 2.00 | 2.7 | 0 | 9.525 | 3.18 | |
| GTATR | R | | | | | ★ | 1.76 | — | — | 9.525 | 3.18 | Blank |
| GTATL | L | | | | | ★ | 1.76 | — | — | 9.525 | 3.18 | |
| GTBTR | R | | | | | ★ | — | — | — | 9.525 | 3.18 | |
| GTBTL | L | | | | | ★ | — | — | — | 9.525 | 3.18 | |




*Right hand insert shown.*

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(Each case contains 5 inserts. Blank inserts are packed in 10 per case.)

* CDX is a value that assumes the machining diameter of Ø 42 or less.
Please note that the maximum machining depth is limited by the holder used.



● / ★ = Expansion

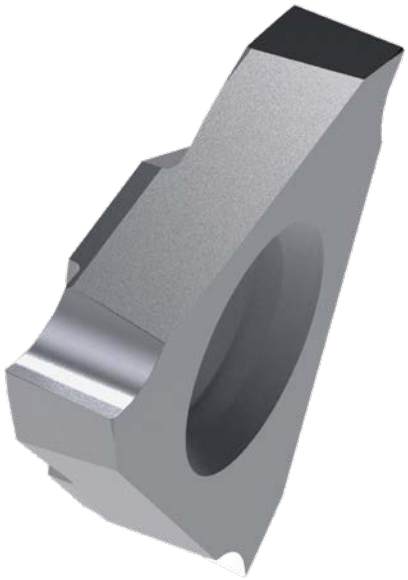
● : Inventory maintained. ★ : Inventory maintained in Japan.

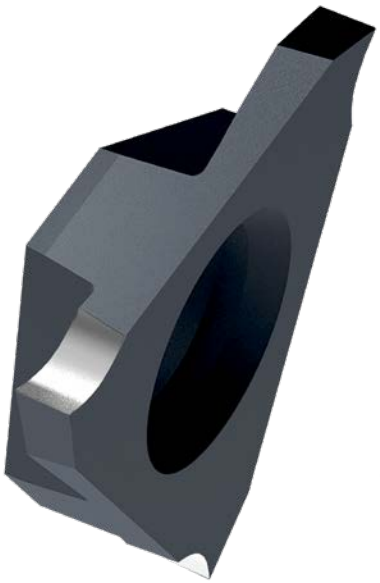
# GT SERIES

## RECOMMENDED CUTTING CONDITIONS

| | Material | Hardness | Grade | Vc | f |
|---|---|---|---|---|---|
| P | Pure iron, Free cutting steel | — | MS7025, VP15TF | 110 (30 – 180) | 0.05 (0.01 – 0.09) |
| P | Carbon steel , Alloy steel | 180HB – 280HB | MS7025, VP15TF | 100 (50 – 150) | 0.05 (0.02 – 0.09) |
| M | Stainless steel | ≤200HB | MS7025 | 80 (50 – 120) | 0.03 (0.02 – 0.05) |
| N | Non-Ferrous metal | — | MT2015 | 150 (70 – 230) | 0.07 (0.03 – 0.11) |

1/1





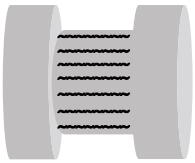
# SH-GTAF

## APPLICATION EXAMPLES

### SUS304: COMPARISON OF MACHINED SURFACES (ROUND SHANK HOLDER)

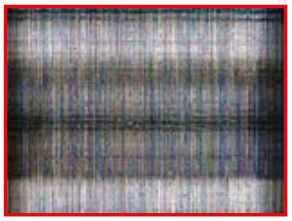
High rigidity and large machining depth provide excellent resistance to chatter and vibration.

| | |
|---|---|
| Material | SUS304 Ø 16 mm |
| Vc (m/min) | 80 |
| f (mm/rev) | 0.03, 0.07 |
| Groove width (mm) | 3.0 |
| Groove depth (mm) | 1.5 |
| Cutting mode | Wet cutting |

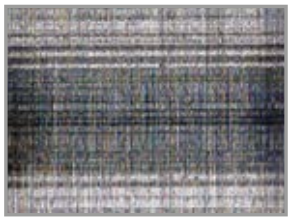


Traces of chatter and vibration

**f = 0.03 (mm/rev)**



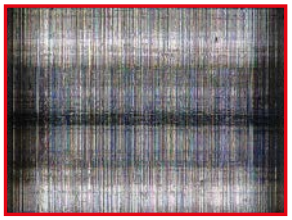
**SH-GTAF**



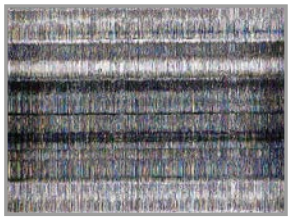
Conventional

Chatter and vibration occurred.

**f = 0.07 (mm/rev)**



**SH-GTAF**



Conventional

Chatter and vibration occurred.

# MT2015

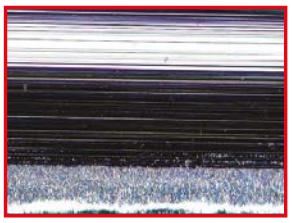
## APPLICATION EXAMPLES

### COMPARISON OF CUTTING EDGE DAMAGE : A6061

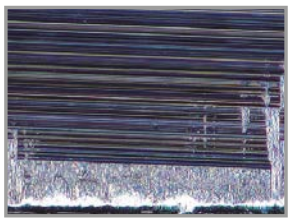
By suppressing damage to the cutting edge caused by chip welding, longer tool life can be expected.

| | |
|---|---|
| Material | A6061 Ø 18 mm |
| Vc (m/min) | 150 |
| f (mm/rev) | 0.04 |
| Radial depth of cut (mm) | 2.5 |
| Cutting mode | Wet cutting |

**AFTER 1 MACHINING PASS**

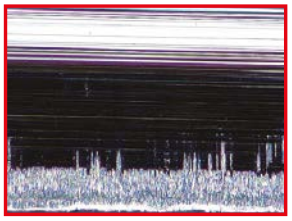


GTBT – MT2015

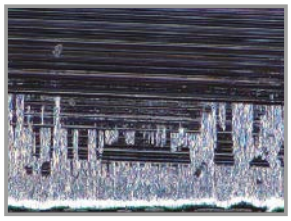


Conventional

**AFTER 50 MACHINING PASSES**

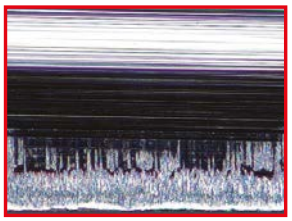


GTBT – MT2015

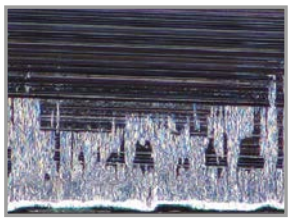


Conventional

**AFTER 100 MACHINING PASSES**



GTBT – MT2015



Conventional

# MS7025

## APPLICATION EXAMPLES

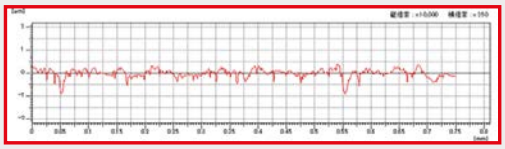
### COMPARISON OF SURFACE ROUGHNESS AND CUTTING EDGE DAMAGE: PURE IRON-BASED SOFT MAGNETIC MATERIALS

The component surface roughness is excellent because damage caused by welding is suppressed. It also has excellent wear resistance.

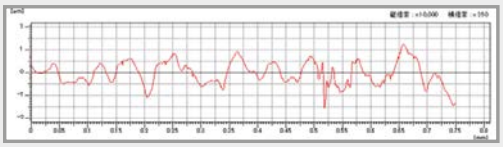
### SURFACE ROUGHNESS WHEN FINISHING A GROOVE WITH A BOTTOM DIAMETER OF 11MM

MS7025 achieves a good component surface finish from the start of machining and maintains excellent consistency even after 100 passes.

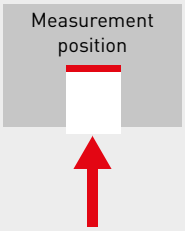
**AFTER 50 MACHINING PASSES**



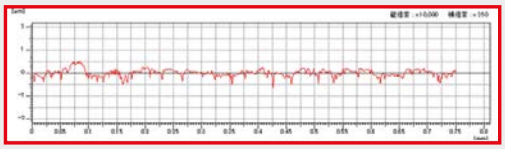
GTBT – MS7025



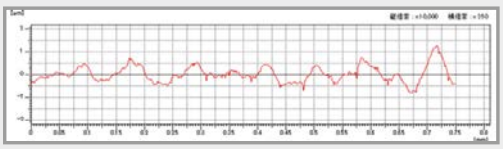
Conventional




**AFTER 100 MACHINING PASSES**



GTBT – MS7025



Conventional

### CUTTING EDGE DAMAGE

| | |
|---|---|
| Material | Pure iron-based soft magnetic material Ø16 mm |
| Vc (m/min) | 150 |
| f (mm/rev) | 0.04 |
| Radial depth of cut (mm) | 2.5 |
| Cutting mode | Wet cutting |

**AFTER 50 MACHINING PASSES**

GTBT - MS7025

Conventional
Chipping occurred due to welding.

**AFTER 100 MACHINING PASSES**

GTBT - MS7025

Conventional

NEW

# XB SERIES

## INDEXABLE TURNING TOOL

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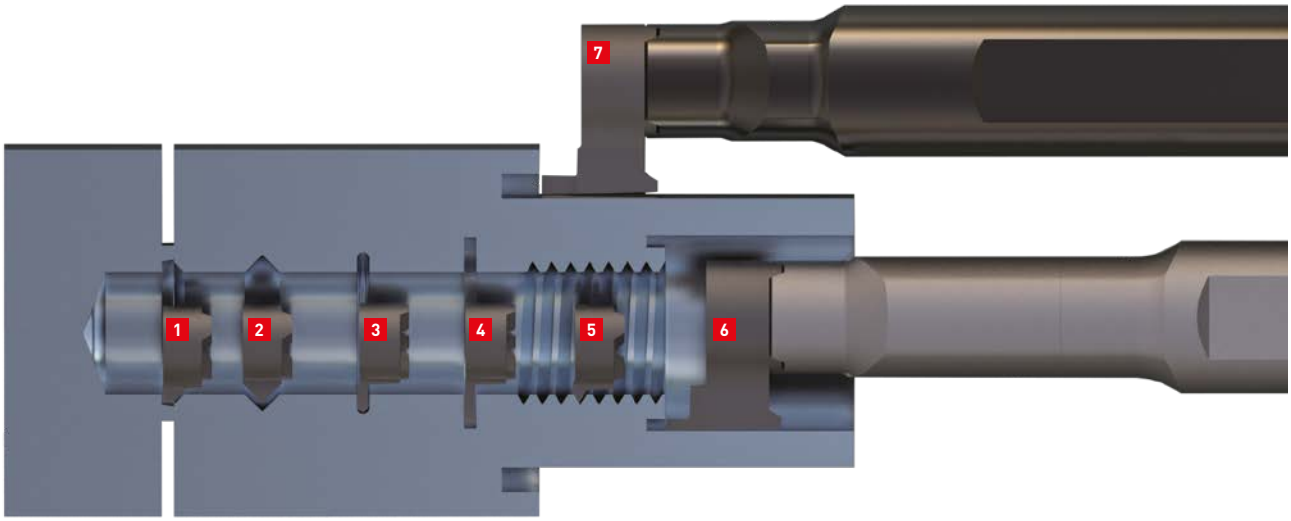
# XB SERIES

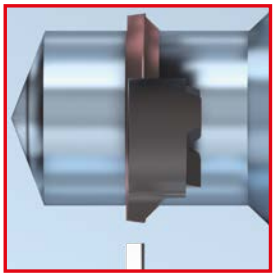
## INDEXABLE TURNING TOOL

**VERSATILE RANGE OF APPLICATIONS WITH ONE HOLDER**

With high-quality cutting edges and excellent sharpness, a full range of  tools for a variety of applications are available. Experience the efficiency and stability provided by this new indexable turning tool.

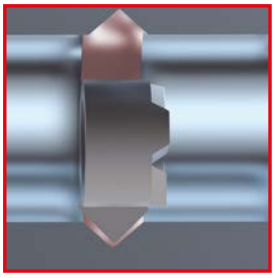



**1 CHAMFERING**
(Internal cutting for cutting off)



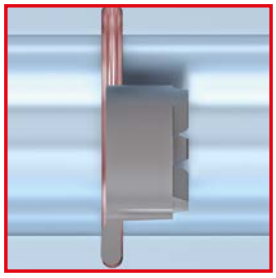
XBSX

**2 CHAMFERING**



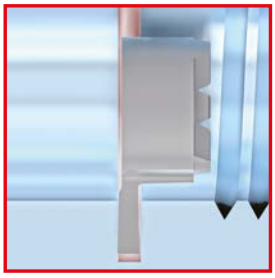
XBSC

**3 GROOVING**
(Round type)



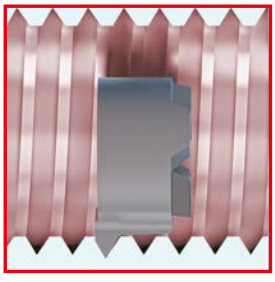
XBSR

**4 GROOVING**
(Flat type)



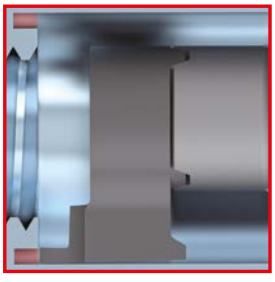
XBSG

**5 INTERNAL THREADING**



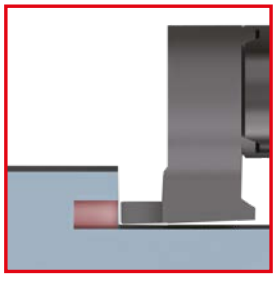
XBST

**6 INTERNAL SIDE FACE GROOVING**



XBSF

**7 EXTERNAL SIDE FACE GROOVING**



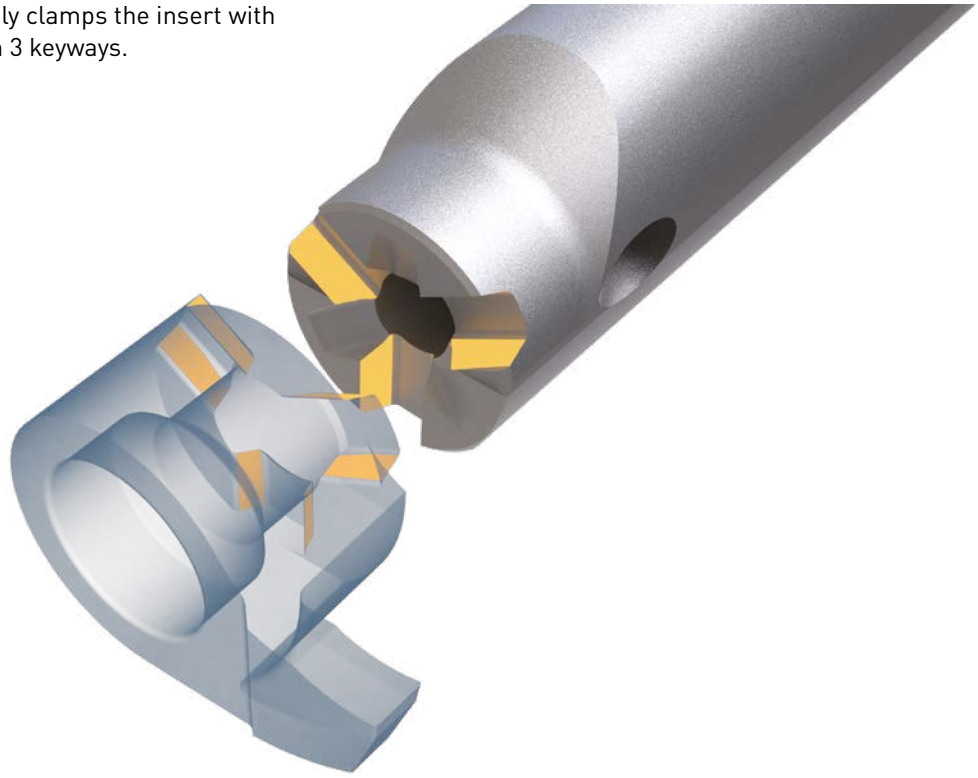
XBSE

# XB SERIES

## FEATURES

### SIX-SIDED RESTRAINT

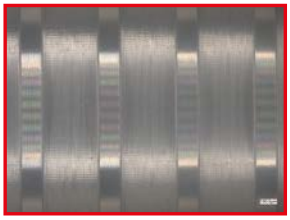
Highly rigid design that firmly clamps the insert with six side restraints located in 3 keyways.



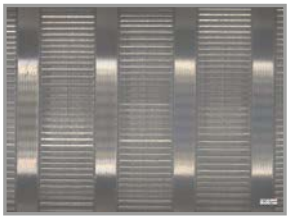
### SUS304: COMPARISON OF GROOVING SURFACES

The XB Series excels at suppressing chatter and vibration.

| | |
|---|---|
| Material | SUS304 |
| Tool | XBSG08H08200R005R |
| Vc (m/min) | 65 |
| f (mm/rev) | 0.01 |
| Groove Shape (mm) | 2.0 (Width) |
| | 0.75 (ap) |
| Cutting mode | Internal coolant 1 MPa |



XB Series



Conventional

Chatter and vibration occurred.

# XB SERIES

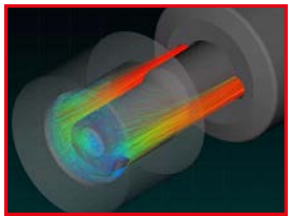
## FEATURES

### INTERNAL AND EXTERNAL COOLANT TYPE

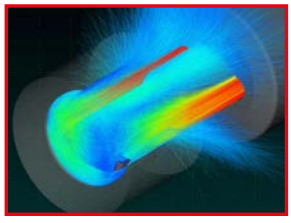
Both types of holders, carbide and steel are supplied as standard with internal coolant.
External coolant type is also standard for the steel holders, but it can be combined with the internal coolant type SLV sleeve holder.

### COMBINATION WITH SLV SLEEVE HOLDER

The internal coolant type SLV sleeve holder has a taper pipe thread at the rear end of the sleeve, that enables direct connection of high-pressure coolant.
Supplying copious coolant through the tool provides adequate cooling and improves chip removal.
This significantly reduces problems during internal machining.



Delivers large amounts of coolant.



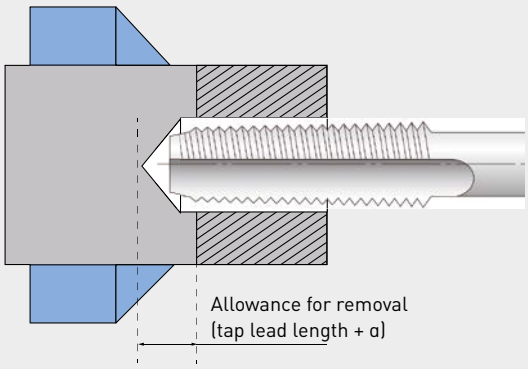
Easily penetrates to the bottom of the hole and prevents chip accumulation.

# XB SERIES

## PROPOSE A SOLUTION

### THREADING: REPLACE TAPPING WITH AN INDEXABLE TURNING TOOL

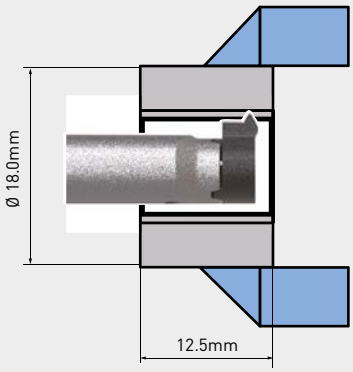
Compared to tapping, which requires a clearance (lead length + a), the XB Series can save work material and reduce cycle times. Therefore it is recommended to switch from tapping to using an indexable tool.




| Tool | Carbide tap |
|---|---|
| Vc (m/min) | 40 |
| f (mm/rev) | 1.25 |

A four step processi is required to remove the chips.

With the XB Series, threading can be started immediately after cutting-off.




| Tool | XB Series |
|---|---|
| Vc (m/min) | 60 |
| f (mm/rev) | 1.25 |

6 passes

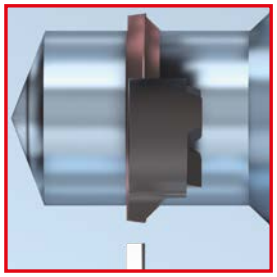
Tool life comparison using a tap and threading insert

Tap - Number of components machined - 100

XB Threading insert - Number of components machined - 176

### REALISE BURR-FREE MACHINING BY UTILISING INTERNAL CUTTING OFF

Chamfering before cutting-off reduces the need for a deburring process.



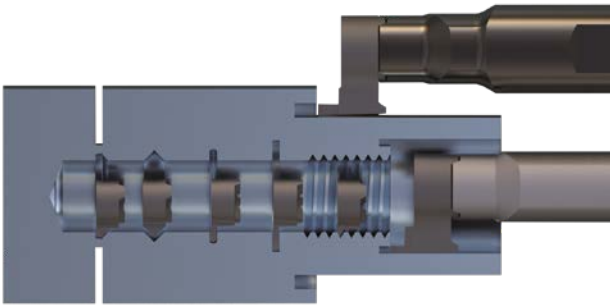
# XB SERIES

## MIN. CUTTING DIAMETER AND MAX. CUTTING DEPTH BY APPLICATION

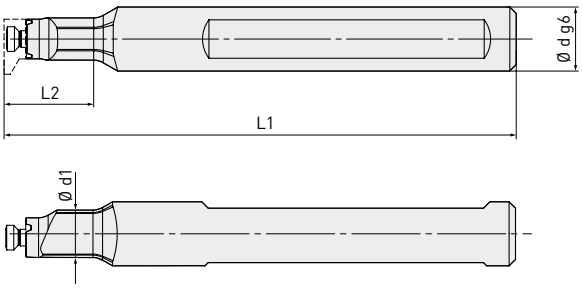
| Applications | Shape | Min. cutting diameter (mm) | Max. cutting depth (mm) | Holder type | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | H07 | H08 | H09 | H11 | H14 |
| Grooving | Flat type | 7.8 | 2.0 | ✓ | | | | |
| | | 8.0 | 1.0 | | ✓ | | | |
| | | 9.0 | 1.8 | | | ✓ | | |
| | | 10.0 | 2.8 | | | ✓ | | |
| | | 11.0 | 2.3 | | | | ✓ | |
| | | 14.0 | 4.0 | | | | | ✓ |
| | Round type | 8.0 | 1.0 | | ✓ | | | |
| | | 9.0 | 1.6 | | | ✓ | | |
| | | 11.0 | 2.3 | | | | ✓ | |
| | | 14.0 | 4.0 | | | | | ✓ |
| | External side face | 14.0 | 6.0 | | | | | ✓ |
| | Internal side face | 12.0 | 6.0 | | | | | ✓ |
| Internal threading | Partial profile 60° | 8.0 | — | | ✓ | | | |
| | | 9.0 | — | | | ✓ | | |
| | | 11.0 | — | | | | ✓ | |
| | ISO metric 60° | 9.0 | — | | | ✓ | | |
| | | 11.0 | — | | | | ✓ | |
| | | 14.0 | — | | | | | ✓ |
| Chamfering | 45° | 7.0 | 0.8 | ✓ | | | | |
| | | 8.0 | 1.4 | | ✓ | | | |
| | | 9.0 | 1.3 | | | ✓ | | |
| | | 11.0 | 1.5 | | | | ✓ | |
| | | 14.0 | 1.5 | | | | | ✓ |
| | Internal cutting for cutting off | 8.0 | 1.0 | | ✓ | | | |
| | | 9.0 | 1.5 | | | ✓ | | |
| | | 11.0 | 1.5 | | | | ✓ | |
| | | 14.0 | 1.5 | | | | | ✓ |

# XBSH_S

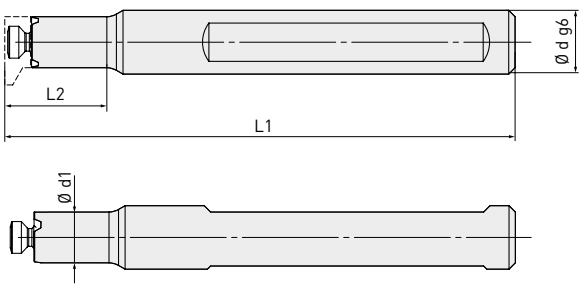
## STEEL SHANK WITHOUT COOLANT HOLE



1




2



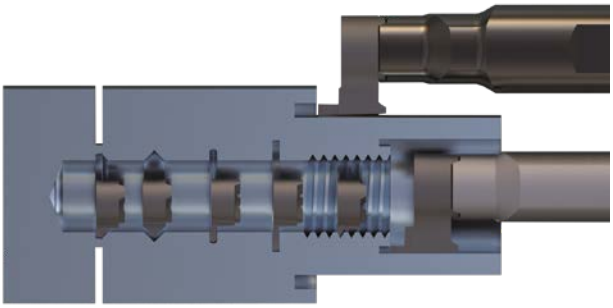

| Order number | Hand | Stock | Ø d g6 | Ø d1 | L1 | L2 | Insert number | Type |
|---|---|---|---|---|---|---|---|---|
| XBSH070700080S | R | ● | 7 | 4.8 x 6 | 80 | 12 | XBS○○○H07 | 1 |
| XBSH080700080S | R | ● | 7 | 6 | 80 | 12 | XBS○○○H08 | 2 |
| XBSH091000080S | R | ● | 10 | 6.6 x 7.4 | 80 | 14 | XBS○○○H09 | 1 |
| XBSH111000080S | R | ● | 10 | 8 | 80 | 16 | XBS○○○H11 | 2 |
| XBSH141200080S | R | ● | 12 | 9.5 x 11 | 80 | 18 | XBS○○○H14 | 1 |
| | | | | | | | | 1/1 |

36 Vc

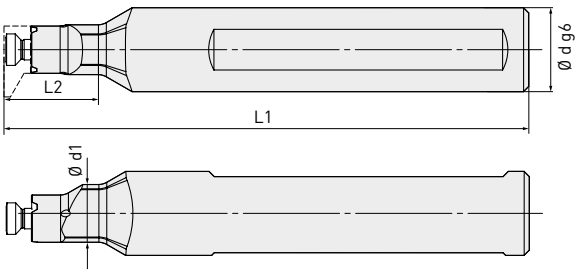
● : Inventory maintained. ★ : Inventory maintained in Japan.

# XBSH_S-C

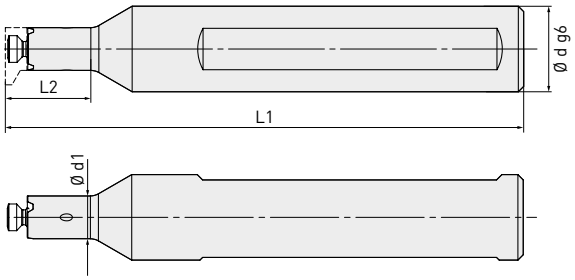
## STEEL SHANK WITH COOLANT HOLE



1




2




| Order number | Hand | Stock | Ø d g6 | Ø d1 | L1 | L2 | Insert number | Type |
|---|---|---|---|---|---|---|---|---|
| XBSH071600080S-C | R | ● | 16 | 4.8 x 6 | 80 | 12 | XBS○○○H07 | 1 |
| XBSH081600080S-C | R | ● | 16 | 6 | 80 | 12 | XBS○○○H08 | 2 |
| XBSH091600095S-C | R | ● | 16 | 6.6 x 7.4 | 95 | 14 | XBS○○○H09 | 1 |
| XBSH111600097S-C | R | ● | 16 | 8 | 97 | 16 | XBS○○○H11 | 2 |
| XBSH141600100S-C | R | ● | 16 | 9.5 x 11 | 100 | 18 | XBS○○○H14 | 1 |
| | | | | | | | | 1/1 |

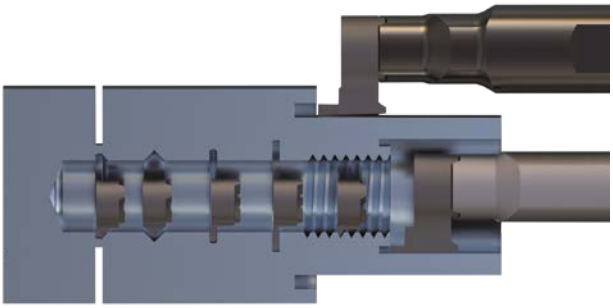
36 Vc



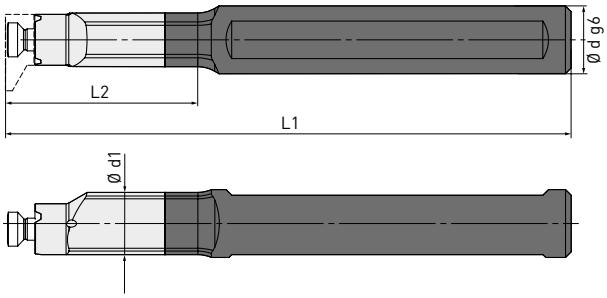
● : Inventory maintained. ★ : Inventory maintained in Japan.

# XBSH_C-C

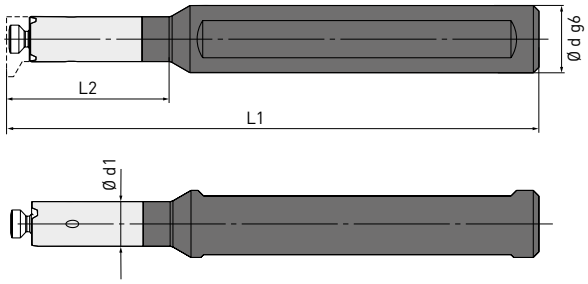
## CARBIDE SHANK WITH COOLANT HOLE



1




2




| Order number | Hand | Stock | Ø d g6 | Ø d1 | L1 | L2 | Insert number | Type |
|---|---|---|---|---|---|---|---|---|
| XBSH071200080C-C | R | ● | 12 | 4.8 x 6 | 80 | 21 | XBS○○○H07 | 1 |
| XBSH081200080C-C | R | ● | 12 | 6 | 80 | 21 | XBS○○○H08 | 2 |
| XBSH091200090C-C | R | ● | 12 | 6.6 x 7.4 | 90 | 22 | XBS○○○H09 | 1 |
| XBSH091200098C-C | R | ● | 12 | 6.6 x 7.4 | 98 | 30 | XBS○○○H09 | 1 |
| XBSH111200095C-C | R | ● | 12 | 8 | 95 | 29 | XBS○○○H11 | 2 |
| XBSH111200110C-C | R | ● | 12 | 8 | 110 | 42 | XBS○○○H11 | 2 |
| XBSH141200100C-C | R | ● | 12 | 9.5 x 11 | 100 | 34 | XBS○○○H14 | 1 |
| XBSH141200110C-C | R | ● | 12 | 9.5 x 11 | 110 | 45 | XBS○○○H14 | 1 |

1/1

36 Vc

## SPARE PARTS

| Tool holder type | Clamp screw | Wrench | Torque (Nm) |
|---|---|---|---|
| XBSH07 | TPS20-X | TIP7F-X | 0.8 |
| XBSH08 | TPS26-X | TIP8F-X | 1.2 |
| XBSH09 | TPS26-X | TIP8F-X | 1.2 |
| XBSH11 | TPS35-X | TIP10F-X | 3.5 |
| XBSH14 | TPS40-X | TIP15F-X | 4.5 |

● : Inventory maintained. ★ : Inventory maintained in Japan.

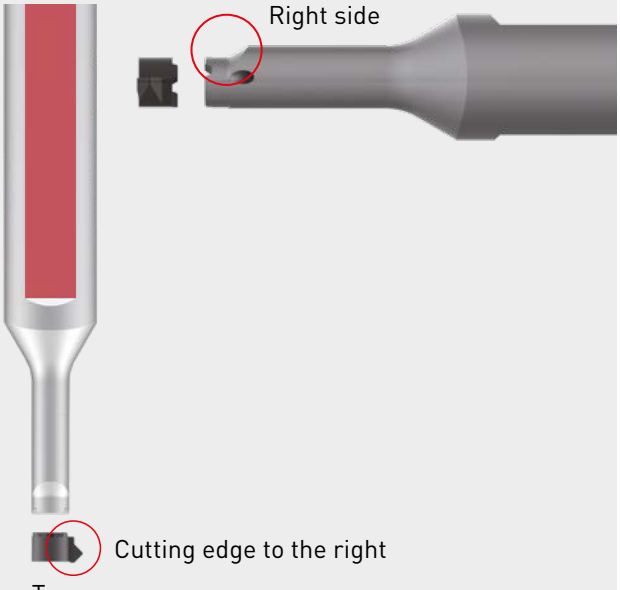
# XB SERIES

## PRECAUTIONS WHEN INSTALLING INSERTS

Set the cutting edge so that the tip faces to the right, using the flat surface of the holder as a reference.
The location of the keyway varies depending on the holder size.

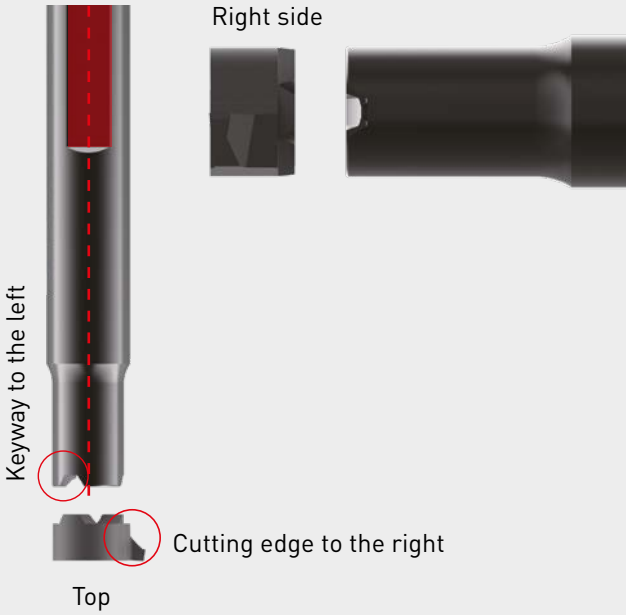
### XBSH07/XBSH09/XBSH14

The holder datum is the flat surface with the slope shown below, and the cutting edge of the insert is on the right side.



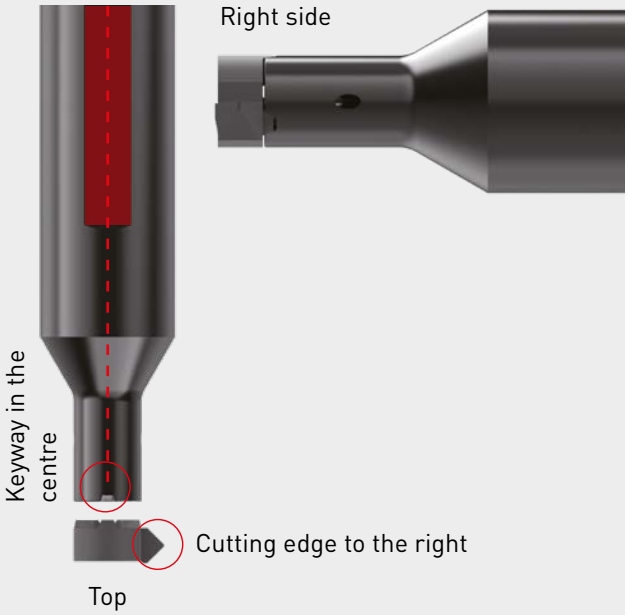

### XBSH08

The holder has a cylindrical shape.
The side with the keyway to the left of the centre of the flat surface is the top.




### XBSH11

The holder is cylindrical.
The side with the key groove in the centre is the top.

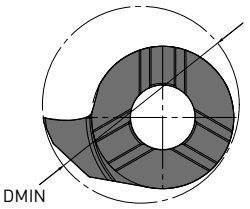


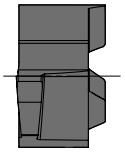
# XB SERIES

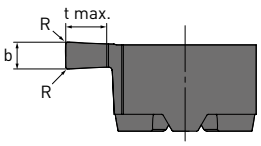
## INSERTS

### GROOVING
### (FLAT TYPE)

| Order number | Hand | MPB115* | DMIN | R | t max. | b | Holder type | Geometry |
|---|---|---|---|---|---|---|---|---|
| XBSG08H07100R005R | R | ● | 7.8 | 0.05 | 2.0 | 1.00 | H07 | |
| XBSG08H07125R005R | R | ● | 7.8 | 0.05 | 2.0 | 1.25 | H07 | |
| XBSG08H07150R005R | R | ● | 7.8 | 0.05 | 2.0 | 1.50 | H07 | |
| XBSG08H07200R005R | R | ● | 7.8 | 0.05 | 2.0 | 2.00 | H07 | |
| XBSG08H08100R005R | R | ● | 8.0 | 0.05 | 1.0 | 1.00 | H08 | |
| XBSG08H08125R005R | R | ● | 8.0 | 0.05 | 1.0 | 1.25 | H08 | |
| XBSG08H08150R005R | R | ● | 8.0 | 0.05 | 1.0 | 1.50 | H08 | |
| XBSG08H08200R005R | R | ● | 8.0 | 0.05 | 1.0 | 2.00 | H08 | |
| XBSG09H09100R005R | R | ● | 9.0 | 0.05 | 1.8 | 1.00 | H09 | |
| XBSG09H09125R005R | R | ● | 9.0 | 0.05 | 1.8 | 1.25 | H09 | |
| XBSG09H09150R005R | R | ● | 9.0 | 0.05 | 1.8 | 1.50 | H09 | |
| XBSG09H09200R005R | R | ● | 9.0 | 0.05 | 1.8 | 2.00 | H09 | |
| XBSG10H09100R005R | R | ● | 10.0 | 0.05 | 2.8 | 1.00 | H09 | |
| XBSG10H09125R005R | R | ● | 10.0 | 0.05 | 2.8 | 1.25 | H09 | |
| XBSG10H09150R005R | R | ● | 10.0 | 0.05 | 2.8 | 1.50 | H09 | |
| XBSG10H09200R005R | R | ● | 10.0 | 0.05 | 2.8 | 2.00 | H09 | |
| XBSG10H09250R010R | R | ● | 10.0 | 0.10 | 2.8 | 2.50 | H09 | |
| XBSG10H09300R010R | R | ● | 10.0 | 0.10 | 2.8 | 3.00 | H09 | |
| XBSG11H11100R005R | R | ● | 11.0 | 0.05 | 2.3 | 1.00 | H11 | |
| XBSG11H11125R005R | R | ● | 11.0 | 0.05 | 2.3 | 1.25 | H11 | |
| XBSG11H11150R010R | R | ● | 11.0 | 0.10 | 2.3 | 1.50 | H11 | |
| XBSG11H11200R010R | R | ● | 11.0 | 0.10 | 2.3 | 2.00 | H11 | |
| XBSG11H11250R020R | R | ● | 11.0 | 0.20 | 2.3 | 2.50 | H11 | |
| XBSG11H11300R020R | R | ● | 11.0 | 0.20 | 2.3 | 3.00 | H11 | |
| XBSG14H14100R005R | R | ● | 14.0 | 0.05 | 4.0 | 1.00 | H14 | |
| XBSG14H14125R005R | R | ● | 14.0 | 0.05 | 4.0 | 1.25 | H14 | |
| XBSG14H14150R010R | R | ● | 14.0 | 0.10 | 4.0 | 1.50 | H14 | |
| XBSG14H14200R010R | R | ● | 14.0 | 0.10 | 4.0 | 2.00 | H14 | |
| XBSG14H14250R020R | R | ● | 14.0 | 0.20 | 4.0 | 2.50 | H14 | |
| XBSG14H14300R020R | R | ● | 14.0 | 0.20 | 4.0 | 3.00 | H14 | |






1/1

* Coated

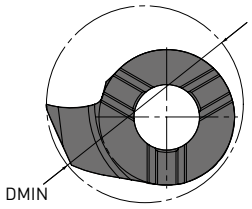


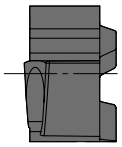
● : Inventory maintained. ★ : Inventory maintained in Japan.

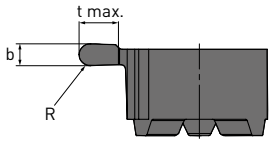
## XB SERIES – INSERTS

### GROOVING
### (ROUND TYPE)

| Order number | Hand | MPB115* | DMIN | R | t max. | b | Holder type | Geometry |
|---|---|---|---|---|---|---|---|---|
| XBSR08H08080R040R | R | ● | 8.0 | 0.4 | 1.0 | 0.8 | H08 | |
| XBSR08H08100R050R | R | ● | 8.0 | 0.5 | 1.0 | 1.0 | H08 | |
| XBSR08H08200R100R | R | ● | 8.0 | 1.0 | 1.0 | 2.0 | H08 | |
| XBSR09H09080R040R | R | ● | 9.0 | 0.4 | 1.6 | 0.8 | H09 | |
| XBSR09H09100R050R | R | ● | 9.0 | 0.5 | 1.6 | 1.0 | H09 | |
| XBSR09H09200R100R | R | ● | 9.0 | 1.0 | 1.6 | 2.0 | H09 | |
| XBSR11H11080R040R | R | ● | 11.0 | 0.4 | 2.3 | 0.8 | H11 | |
| XBSR11H11100R050R | R | ● | 11.0 | 0.5 | 2.3 | 1.0 | H11 | |
| XBSR11H11200R100R | R | ● | 11.0 | 1.0 | 2.3 | 2.0 | H11 | |
| XBSR14H14100R050R | R | ● | 14.0 | 0.5 | 4.0 | 1.0 | H14 | |
| XBSR14H14200R100R | R | ● | 14.0 | 1.0 | 4.0 | 2.0 | H14 | |
| XBSR14H14300R150R | R | ● | 14.0 | 1.5 | 4.0 | 3.0 | H14 | |



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* Coated



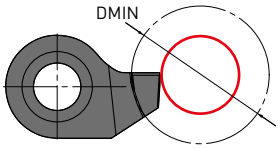


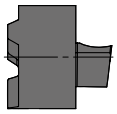
● : Inventory maintained. ★ : Inventory maintained in Japan.

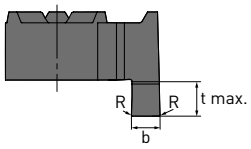
## XB SERIES – INSERTS

### EXTERNAL AND INTERNAL SIDE FACE GROOVING

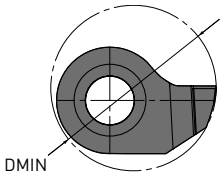
| Order number | Hand | MPB115* | DMIN | R | t max. | b | Holder type | Geometry |
|---|---|---|---|---|---|---|---|---|
| XBSE12H14100R010R | R | ● | 12.0 | 0.1 | 1.5 | 1.0 | H14 | External side face |
| XBSE12H14150R010R | R | ● | 12.0 | 0.1 | 2.5 | 1.5 | H14 | |
| XBSE12H14200R010R | R | ● | 12.0 | 0.1 | 3.0 | 2.0 | H14 | |
| XBSE12H14250AR010R | R | ● | 12.0 | 0.1 | 3.0 | 2.5 | H14 | |
| XBSE12H14250BR010R | R | ● | 12.0 | 0.1 | 5.0 | 2.5 | H14 | |
| XBSE12H14300AR010R | R | ● | 12.0 | 0.1 | 3.0 | 3.0 | H14 | |
| XBSE12H14300BR010R | R | ● | 12.0 | 0.1 | 6.0 | 3.0 | H14 | |

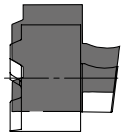


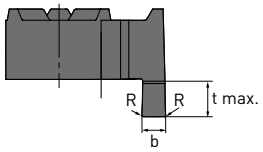






| Order number | Hand | MPB115* | DMIN | R | t max. | b | Holder type | Geometry |
|---|---|---|---|---|---|---|---|---|
| XBSF14H14100R010R | R | ● | 14.0 | 0.1 | 1.5 | 1.0 | H14 | Internal side face |
| XBSF14H14150R010R | R | ● | 14.0 | 0.1 | 2.5 | 1.5 | H14 | |
| XBSF14H14200R010R | R | ● | 14.0 | 0.1 | 3.0 | 2.0 | H14 | |
| XBSF14H14250AR010R | R | ● | 14.0 | 0.1 | 3.0 | 2.5 | H14 | |
| XBSF14H14250BR010R | R | ● | 14.0 | 0.1 | 5.0 | 2.5 | H14 | |
| XBSF14H14300AR010R | R | ● | 14.0 | 0.1 | 3.0 | 3.0 | H14 | |
| XBSF14H14300BR010R | R | ● | 14.0 | 0.1 | 6.0 | 3.0 | H14 | |



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* Coated

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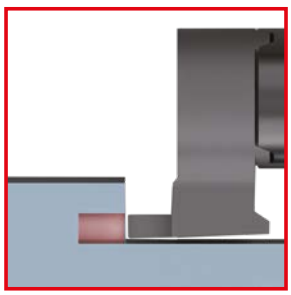
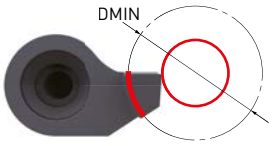
It is designed to avoid interference, therefore correct installation is important.

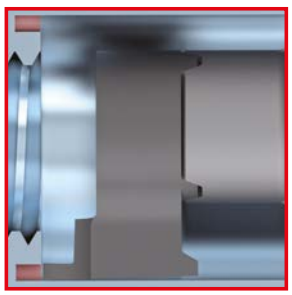
### EXTERNAL SIDE FACE



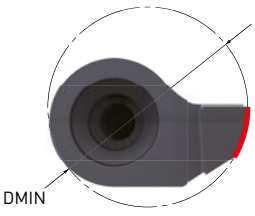
Relief angle is inside




### INTERNAL SIDE FACE



Relief angle is outside

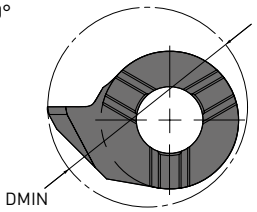


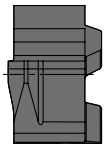

● : Inventory maintained. ★ : Inventory maintained in Japan.

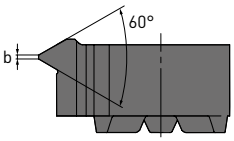
## XB SERIES – INSERTS

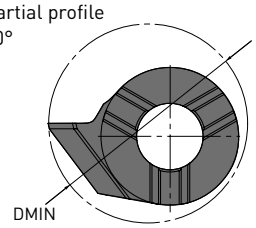
### INTERNAL THREADING

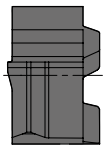
| Order number | Hand | MPB115* | DMIN | b | Pitch | Holder type | Geometry |
|---|---|---|---|---|---|---|---|
| XBST09H09100ISOR | R | ● | 9.0 | 0.12 | 1.00 | H09 | ISO metric 60° |
| XBST09H09150ISOR | R | ● | 9.0 | 0.18 | 1.50 | H09 | |
| XBST09H09175ISOR | R | ● | 9.0 | 0.20 | 1.75 | H09 | |
| XBST11H11100ISOR | R | ● | 11.0 | 0.12 | 1.00 | H11 | |
| XBST11H11150ISOR | R | ● | 11.0 | 0.18 | 1.50 | H11 | |
| XBST11H11200ISOR | R | ● | 11.0 | 0.25 | 2.00 | H11 | |
| XBST14H14100ISOR | R | ● | 14.0 | 0.12 | 1.00 | H14 | |
| XBST14H14150ISOR | R | ● | 14.0 | 0.18 | 1.50 | H14 | |
| XBST14H14200ISOR | R | ● | 14.0 | 0.25 | 2.00 | H14 | |
| XBST14H14250ISOR | R | ● | 14.0 | 0.31 | 2.50 | H14 | |
| XBST08H0805060R | R | ● | 8.0 | 0.06 | 0.5 – 0.75 | H08 | Partial profile 60° |
| XBST08H0810060R | R | ● | 8.0 | 0.12 | 1.0 – 1.25 | H08 | |
| XBST08H0815060R | R | ● | 8.0 | 0.18 | 1.5 – 1.75 | H08 | |
| XBST09H0905060R | R | ● | 9.0 | 0.06 | 0.5 – 0.75 | H09 | |
| XBST09H0910060R | R | ● | 9.0 | 0.12 | 1.0 – 1.25 | H09 | |
| XBST09H0915060R | R | ● | 9.0 | 0.18 | 1.5 – 1.75 | H09 | |
| XBST09H0917560R | R | ● | 9.0 | 0.20 | 1.75 – 2.0 | H09 | |
| XBST11H1110060R | R | ● | 11.0 | 0.12 | 1.0 – 1.25 | H11 | |
| XBST11H1115060R | R | ● | 11.0 | 0.18 | 1.5 – 1.75 | H11 | |
| XBST11H1120060R | R | ● | 11.0 | 0.25 | 2.0 – 2.5 | H11 | |

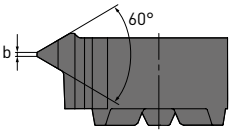




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* Coated



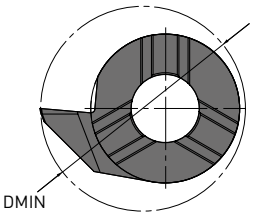


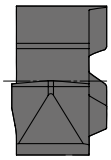
● : Inventory maintained. ★ : Inventory maintained in Japan.

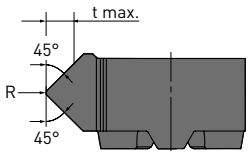
## XB SERIES – INSERTS

### CHAMFERING

| Order number | Hand | MPB115* | DMIN | R | t max. | Holder type | Geometry |
|---|---|---|---|---|---|---|---|
| XBSC07H074545R020R | R | ● | 7.0 | 0.2 | 0.8 | H07 | |
| XBSC08H084545R020R | R | ● | 8.0 | 0.2 | 1.4 | H08 | |
| XBSC09H094545R020R | R | ● | 9.0 | 0.2 | 1.3 | H09 | |
| XBSC11H114545R020R | R | ● | 11.0 | 0.2 | 1.5 | H11 | |
| XBSC14H144545R020R | R | ● | 14.0 | 0.2 | 1.5 | H14 | |



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* Coated

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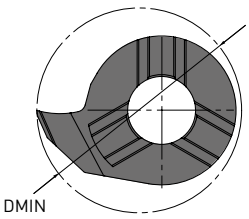
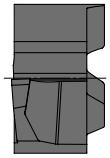
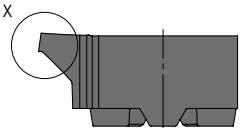
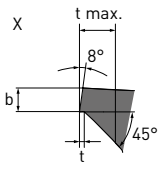
### CHAMFERING (INTERNAL CUTTING FOR CUTTING OFF)

| Order number | Hand | MPB115* | DMIN | t max. | t | b | Holder type | Geometry |
|---|---|---|---|---|---|---|---|---|
| XBSX08H080845R | R | ● | 8.0 | 1.0 | 0.2 | 1.0 | H08 | |
| XBSX09H090845R | R | ● | 9.0 | 1.5 | 0.2 | 1.0 | H09 | |
| XBSX11H110845R | R | ● | 11.0 | 1.5 | 0.2 | 1.0 | H11 | |
| XBSX14H140845R | R | ● | 14.0 | 1.5 | 0.2 | 1.0 | H14 | |



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* Coated

36 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

# XB SERIES

## RECOMMENDED CUTTING CONDITIONS

### CUTTING SPEED

| | Material | | Heat treatment | Hardness | Vc |
|---|---|---|---|---|---|
| P | Non-alloyed steel | S10C | Annealing | 125 HB | 160 (100 – 260) |
| | | S45C | Annealing | 190 HB | 140 ( 80 – 230) |
| | | S45C | Tempering | 250 HB | 140 ( 80 – 180) |
| | | S55C | Annealing | 270 HB | 110 ( 70 – 180) |
| | | S55C | Tempering | 300 HB | 100 ( 60 – 150) |
| | Low alloy steel | SCM415 | Annealing | 180 HB | 110 ( 70 – 180) |
| | | SCM415 | Tempering | 275 HB | 100 ( 60 – 150) |
| | | SCM440 | Tempering | 300 HB | 90 ( 50 – 140) |
| | | SCM440 | Tempering | 375 HB | 80 ( 50 – 130) |
| | High alloy steel | S45C, SCM440 | Annealing | 200 HB | 80 ( 50 – 130) |
| | | SKD61 | Quenching and tempering | 300 HB | 70 ( 40 – 100) |
| | | SKD61 | Quenching and tempering | 400 HB | 50 ( 30 – 80) |
| M | Ferritic stainless steel | SUS430 | Annealing | 200 HB | 100 ( 60 – 160) |
| | Martensitic stainless steel | SUS420J1, SUS420J2 | Tempering | 250 HB | 90 ( 50 – 140) |
| | Austenitic stainless steel | SUS304 | Quench hardening | 200 HB | 80 ( 50 – 180) |
| | | SUH310 | Tempering | 300 HB | 70 ( 40 – 140) |
| | Duplex stainless steel | SUS329J1 | Annealing | 230 HB | 60 ( 40 – 110) |
| K | Grey cast iron | FC200 | — | 180 HB | 90 ( 50 – 230) |
| | | FC300 | — | 260 HB | 100 ( 50 – 160) |
| | Ductile cast iron, Ferrite | FCD400 | — | 160 HB | 80 ( 50 – 150) |
| | Ductile cast iron, Pearlite | FCD700 | — | 250 HB | 70 ( 40 – 130) |
| | Malleable cast iron, Ferrite | FCMB350 | — | 130 HB | 120 ( 70 – 230) |
| | Malleable cast iron, Pearlite | FCMP490 | — | 230 HB | 100 ( 60 – 190) |
| N | Forged aluminium alloys | A1050 | Annealing | 60 HB | 290 (180 – 540) |
| | | A6061 | Hardening Treatment | 100 HB | 280 (170 – 510) |
| | Cast aluminium alloys | AC4A | Annealing | 75 HB | 240 (140 – 440) |
| | | AC4CH | Hardening Treatment | 90 HB | 200 (120 – 380) |
| | | AC9B, ADC14 | Hardening Treatment | 130 HB | 120 ( 70 – 230) |
| | Copper, Copper alloys | C3604 | — | 110 HB | 210 (130 – 390) |
| | | C2700 | — | 90 HB | 180 (110 – 330) |
| | | C1100 | — | 100 HB | 130 ( 90 – 290) |
| | Magnesium alloys | AZ61 | — | 70 HB | 100 ( 70 – 290) |
| S | Titanium alloys | Ti-99.5 | — | — | 50 ( 30 – 100) |
| | | Ti-6Al-4V, Ti-3Al-2.5V | Hardening Treatment | — | 40 ( 20 – 60) |
| | | Ti-5Al-5V-5Mo-3Cr, Ti-10V-2Fe-3Al | — | 410 HB | 30 ( 20 – 50) |

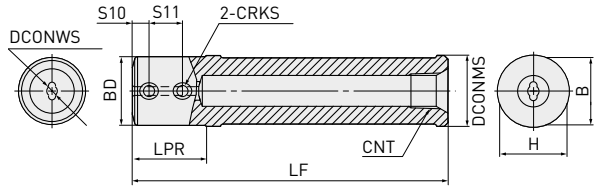
1/1

### FEED PER REVOLUTION

| Machining | f (mm/rev) |
|---|---|
| Grooving | 0.01 – 0.03 |
| Boring and profiling | 0.03 – 0.10 |
| End face grooving | 0.02 – 0.06 |

# XB SERIES

## SLV HOLDER




### WITH COOLANT HOLE

| Order number | Stock | DCONMS | DCONWS | BD | LF | LU | H | B | S10 | S11 | CNT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SLV190080070A | ● | 19.05 | 7.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 | Rc1/8 |
| SLV190110070A | ● | 19.05 | 7.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 | Rc1/8 |
| SLV200080070A | ● | 20.0 | 7.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 | Rc1/8 |
| SLV220115070A | ● | 22.0 | 7.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 5.0 | 10 | Rc1/8 |
| SLV250067070A | ● | 25.0 | 7.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 | Rc1/8 |
| SLV250110070A | ● | 25.0 | 7.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 | Rc1/8 |
| SLV254080070A | ● | 25.4 | 7.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 | Rc1/8 |
| SLV254110070A | ● | 25.4 | 7.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 | Rc1/8 |
| SLV320110070A | ● | 32.0 | 7.0 | 20.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 | Rc1/8 |
| SLV320110100A | ● | 32.0 | 10.0 | 25.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 | Rc1/4 |
| SLV320110120A | ● | 32.0 | 12.0 | 25.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 | Rc3/8 |

## XB SERIES – SLV HOLDER

### MOUNTING CHART

| Series | | Boring bar type | Holder type |
|---|---|---|---|
| XB | Multifunction | XBSH07 | SLV○○○○○○070A/N |
| XB | Multifunction | XBSH08 | SLV○○○○○○070A/N |
| XB | Multifunction | XBSH09 | SLV○○○○○○100A/N |
| XB | Multifunction | XBSH11 | SLV○○○○○○100A/N |
| XB | Multifunction | XBSH14 | SLV○○○○○○120A/N |
| MICRO-MINI TWIN | Boring | CB07RS | SLV○○○○○○070A/N |
| MICRO-MINI TWIN | Grooving | CG0712RS | SLV○○○○○○070A/N |
| MICRO-MINI TWIN | Grooving | CG0713RS | SLV○○○○○○070A/N |
| MICRO-MINI TWIN | Grooving | CG07RS | SLV○○○○○○070A/N |
| MICRO-DEX | Internal | C07KS○○○R○○ | SLV○○○○○○070A/N |
| BORING BAR | Internal | C08-07S○○○R/L | SLV○○○○○○070A/N |
| BORING BAR | Internal | C12-10S○○○R/L | SLV○○○○○○100A/N |
| BORING BAR | Internal | C13-10SDQCR/L | SLV○○○○○○100A/N |
| BORING BAR | Internal | C14-10SDUCR/L | SLV○○○○○○100A/N |
| BORING BAR | Internal | C/S14-12S○○○R/L | SLV○○○○○○120A/N |
| BORING BAR | Internal | C16-10SVPCR/L | SLV○○○○○○100A/N |
| BORING BAR | Internal | C/S16-12S○○○R/L | SLV○○○○○○120A/N |
| BORING BAR | Internal | C/S20-12SVPBR/L | SLV○○○○○○120A/N |

1/1

# SPARE PARTS

| Tool holder type | Clamp screw | Wrench | Torque (Nm) |
|---|---|---|---|
| SLV○○○○○○070A/N | HSS05004 | HKY25R | 4.0 |
| SLV○○○○○○100A/N | | | |
| SLV○○○○○○120A/N | | | |

# BORING BARS AND INSERTS FOR SMALL PARTS MACHINING

## COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES

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MITSUBISHI MATERIALS

# BORING BARS AND INSERTS FOR SMALL PARTS MACHINING

## OVERALL LENGTH COMPATIBLE WITH SWISS-TYPE AUTOMATIC LATHES

**SCREW-ON TYPE**

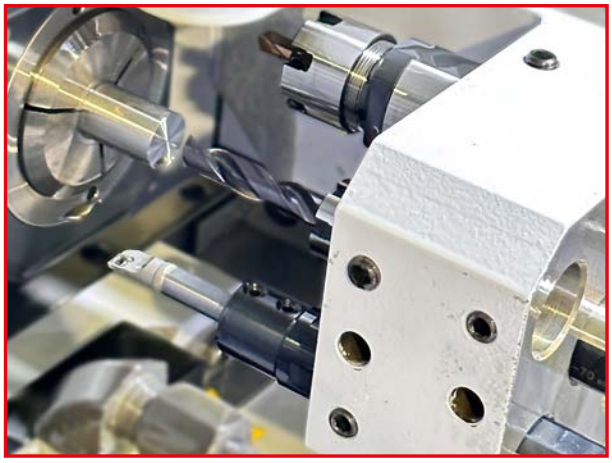
**CARBIDE SHANK:**
80 mm, 90 mm, 140 mm, 180 mm

**HARD STEEL SHANK*:**
70 mm, 80 mm, 90 mm
* The shank material has excellent resistance to damage caused by chip evacuation.

**STEEL SHANK:**
90 mm, 150 mm

**WITH COOLANT HOLE**
Some items with small diameter carbide shanks do not have a coolant hole.
Please check the series list on page 42.

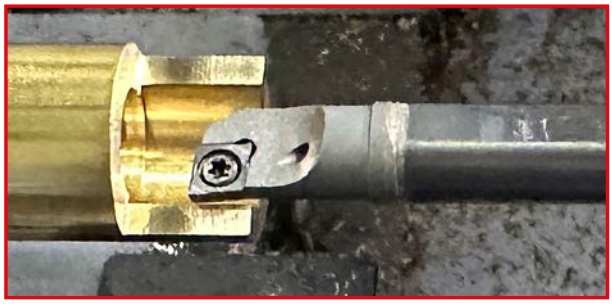
**NO NEED TO SHORTEN THE SHANK**
The length of the tools are compatible with Swiss-type automatic lathes, therefore no need to cut the shank to prevent interference.



# THROUGH COOLANT CARBIDE SHANK WITH MINIMUM MACHINING DIAMETER OF 9 MM

The boring bar with a minimum machining diameter of 9 mm provides a large clearance and enables excellent chip evacuation.

**CLEARANCE COMPARISON: HOLE DIAMETER 11 MM**



**Boring Bar for machining small parts**
Minimum machining diameter of 9 mm

**Dimple Bar**
Minimum machining diameter of 10 mm

# IDENTIFICATION

| 1. Shank material | |
|---|---|
| C | Carbide shank |
| H | Hard steel shank |
| S | Steel shank |

| 4. Clamp structure | |
|---|---|
| S | Screw-on |

| 5. Insert shape | |
|---|---|
| C | RHOMBIC 80° |
| D | RHOMBIC 55° |
| T | TRIANGULAR 60° |
| V | RHOMBIC 35° |
| W | TRIGON |

| 6. Cutting angle KAPR | |
|---|---|
| U | 93° |
| L | 95° |
| Q | 107.5° |
| P | 117.5° |
| J | 142° |

| 7. Insert clearance | |
|---|---|
| B | 5° POSITIVE |
| C | 7° POSITIVE |
| P | 11° POSITIVE |

2. Min. machining Diameter **DMIN (mm)**

3. Shank diameter **DCONMS (mm)**

| 1 | 2 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 10 | | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | 18 | - | 16 | S | C | L | C | R | 09 | - | 180 | - | C |

| 8. Hand of tool | |
|---|---|
| R | Right hand |
| L | Left hand |

| 9. Cutting edge length symbol and inscribed circle | | | | | | |
|---|---|---|---|---|---|---|
| Inscribed circle (mm) | 3.97 | 4.76 | 5.56 | 6.35 | 7.94 | 9.525 |
| RHOMBIC 80° | 03 | 04 | — | 06 | 08 | 09 |
| RHOMBIC 55° | — | — | — | 07 | — | 11 |
| TRIANGULAR 60° | 06 | 08 | 09 | 11 | — | 16 |
| RHOMBIC 35° | — | 08 | — | 11 | — | 16 |
| TRIGON | 02 | L3 | — | 04 | — | 06 |

| 10. Tool length (mm) | |
|---|---|
| 070 | 70 |
| 080 | 80 |
| 090 | 90 |
| 140 | 140 |
| 150 | 150 |
| 180 | 180 |
| 200 | 200 |
| 250 | 250 |

| 11. Coolant hole | |
|---|---|
| C | With coolant hole |

# SELECTION STANDARD

| Insert shape | Holder type | KAPR | Shank material | Tool length | DMIN | DCONMS | Economical | Cutting edge strength | Profile turning | Internal coolant | Deep boring (L/D>6) | Holder | Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RHOMBIC 80° **Normal clearance 7°** | SCLC | 95° | Carbide | 80, 90 | 5 – 8 | 4 – 7 | | ◎ | | | ◎ | B210-H | 60 |
| | | | Carbide | 90, 140, 180 | 9 – 34 | 8 – 32 | | ◎ | | ◎ | ◎ | B210-H | |
| | | | Hard Steel | 70,80,90 | 5 – 10 | 4 – 8 | | ◎ | | | | 43 | |
| | | | Hard Steel | 90 | 12 | 10 | | ◎ | | ◎ | | 44 | |
| | | | Steel | 90, 150 | 14 – 34 | 12 – 32 | | ◎ | | ◎ | | B210-H | |
| RHOMBIC 80° **Normal clearance 11°** | SCLP | 95° | Carbide | 140, 180 | 12 – 30 | 10 – 25 | | ◎ | | ◎ | ◎ | B210-H | 69 |
| | | | Hard Steel | 90 | 12 | 10 | | ◎ | | ◎ | | 45 | |
| | | | Steel | 90, 150 | 14 – 30 | 12 – 25 | | ◎ | | ◎ | | B210-H | |
| TRIANGULAR 60° **Normal clearance 7°** | STUC | 93° | Carbide | 90 | 7 – 8 | 6 – 7 | ◎ | | | | ◎ | B210-H | 80 |
| | | | Carbide | 90, 140, 180 | 9 – 32 | 8 – 25 | ◎ | | | ◎ | ◎ | B210-H | |
| | | | Hard Steel | 80 | 7 – 10 | 6 – 8 | ◎ | | | | | 46 | |
| | | | Hard Steel | 90 | 12 | 10 | ◎ | | | ◎ | | 47 | |
| | | | Steel | 90, 150 | 14 – 40 | 12 – 32 | ◎ | | | ◎ | | B210-H | |
| TRIANGULAR 60° **Normal clearance 11°** | STUP | 93° | Carbide | 90, 140, 180 | 10 – 34 | 8 – 25 | ◎ | | | ◎ | ◎ | B210-H | 83 |
| | | | Hard Steel | 80 | 10 | 8 | ◎ | | | | | 48 | |
| | | | Hard Steel | 90 | 12 | 10 | ◎ | | | ◎ | | 49 | |
| | | | Steel | 90, 150 | 14 – 34 | 12 – 25 | ◎ | | | ◎ | | B210-H | |
| RHOMBIC 55° **Normal clearance 7°** | SDUC | 93° | Carbide | 140, 180 | 14 – 32 | 10 – 25 | | | ◎ | ◎ | ◎ | B210-H | 72 |
| | | | Hard Steel | 90 | 14 | 10 | | | ◎ | ◎ | | 50 | |
| | | | Steel | 150 | 16 – 32 | 12 – 25 | | | ◎ | ◎ | | B210-H | |
| RHOMBIC 55° **Normal clearance 7°** | SDQC | 107.5° | Carbide | 140, 180 | 13 – 30 | 10 – 25 | | | ◎ | ◎ | ◎ | B210-H | 72 |
| | | | Hard Steel | 90 | 13 | 10 | | | ◎ | ◎ | | 51 | |
| | | | Steel | 90, 150 | 16 – 30 | 12 – 25 | | | ◎ | ◎ | | B210-H | |
| RHOMBIC 35° **Normal clearance 7°** | SVUC | 93° | Carbide | 140 | 16 | 12 | | | ◎ | ◎ | | 52 | 90 |
| | | | Steel | 90 | 16 | 12 | | | ◎ | ◎ | | 53 | |
| | SVPC | 117.5° | Carbide | 140 | 16 | 10 | | | ◎ | ◎ | | 54 | |
| | | | Hard Steel | 90 | 16 | 10 | | | ◎ | ◎ | | 55 | |
| | SVJC | 142° | Steel | 90, 150 | 16 – 20 | 12 – 16 | | | ◎ | ◎ | | 57 | |
| RHOMBIC 35° **Normal clearance 5°** | SVUB | 93° | Carbide | 180 | 20 – 34 | 16 – 25 | | | ◎ | ◎ | | 52 | 87 |
| | | | Steel | 150, 200 | 20 – 40 | 16 – 32 | | | ◎ | ◎ | | 53 | |
| | SVPB | 117.5° | Carbide | 180 | 20 – 34 | 12 – 25 | | | ◎ | ◎ | | 54 | |
| | | | Steel | 150, 200 | 20 – 40 | 12 – 32 | | | ◎ | ◎ | | 56 | |
| | SVJB | 142° | Steel | 150, 200, 250 | 25 – 50 | 20 – 40 | | | ◎ | ◎ | | 57 | |
| TRIGON **Normal clearance 7°** | SWUC | 93° | Carbide | 80, 90 | 6 – 8 | 5 – 7 | ◎ | ◎ | | | ◎ | B210-H | 92 |
| | | | Carbide | 90, 140, 180 | 10 – 22 | 8 – 20 | ◎ | ◎ | | ◎ | ◎ | B210-H | |
| | | | Hard Steel | 70,80 | 6 – 10 | 5 – 8 | ◎ | ◎ | | | | 58 | |
| | | | Hard Steel | 80 | 12 | 10 | ◎ | ◎ | | ◎ | | 59 | |
| | | | Steel | 90, 150 | 14 – 22 | 12 – 20 | ◎ | ◎ | | ◎ | | B210-H | |

### INSTRUCTIONS FOR THE USE OF CPGT, TPGX / TPMX TYPE INSERTS

Boring bars for machining small parts can use the inserts listed in the table below by changing the clamp screws.

| Insert type | Clamp screw |
|---|---|
| CPGT0802○○ (Ø7.94) | TS3 |
| CPGT0903○○ (Ø9.525) | TS4 |

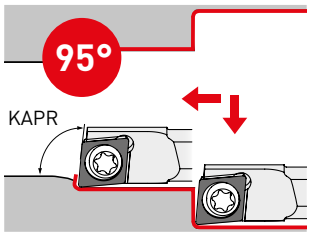
| Insert type | Clamp screw |
|---|---|
| TPGX0802○○ (Ø4.76) | CS200T |
| TPGX/TPMX0902○○ (Ø5.56) | CS250T |
| TPGX/TPMX1103○○ (Ø9.525) | CS300890T |

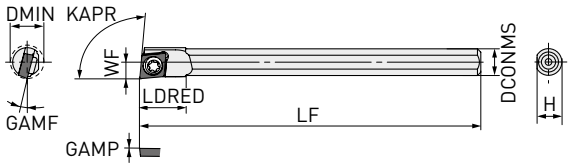
1. Shortening is necessary if the screw is too long.

NEW

# H-SCLC

## HARD STEEL SHANK WITHOUT COOLANT HOLE




*Right hand tool holder shown.*

CC○○-Inserts

| FP | FS |
|---|---|
| | |
| (06) | (06) |
| PCBN/PCD | |
| R/L-F | |
| | |
| (03,04) | (03,04) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H05-04SCLCR03-070 | ● | R | 5 | 4 | 70 | 7 | 2.5 | 3.7 | 15° | 0° | | 03S1○○ |
| H05-04SCLCL03-070 | ● | L | 5 | 4 | 70 | 7 | 2.5 | 3.7 | 15° | 0° | | 03S1○○ |
| H055-04SCLCR03-070 | ● | R | 5.5 | 4 | 70 | 7 | 2.95 | 3.7 | 15° | 0° | | 03S1○○ |
| H06-05SCLCR03-070 | ● | R | 6 | 5 | 70 | 9 | 3.0 | 4.7 | 13° | 0° | | 03S1○○ |
| H06-05SCLCL03-070 | ● | L | 6 | 5 | 70 | 9 | 3.0 | 4.7 | 13° | 0° | | 03S1○○ |
| H07-06SCLCR04-080 | ● | R | 7 | 6 | 80 | 10 | 3.5 | 5.7 | 13° | 0° | | 04T0○○ |
| H07-06SCLCL04-080 | ● | L | 7 | 6 | 80 | 10 | 3.5 | 5.7 | 13° | 0° | CC○○ | 04T0○○ |
| H08-07SCLCR04-080 | ● | R | 8 | 7 | 80 | 11 | 4.0 | 6.7 | 11° | 0° | | 04T0○○ |
| H08-07SCLCL04-080 | ● | L | 8 | 7 | 80 | 11 | 4.0 | 6.7 | 11° | 0° | | 04T0○○ |
| H09-08SCLCR04-080 | ● | R | 9 | 8 | 80 | 16 | 4.5 | 7.7 | 10° | 0° | | 04T0○○ |
| H10-08SCLCR04-080 | ● | R | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 9° | 0° | | 04T0○○ |
| H10-08SCLCR06-090 | ● | R | 10 | 8 | 90 | 16 | 5.0 | 7.7 | 14° | 0° | | 0602○○ |
| H10-08SCLCL06-090 | ● | L | 10 | 8 | 90 | 16 | 5.0 | 7.7 | 14° | 0° | | 0602○○ |

1/1

97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H○○-○○SCLCR/L03 | TS16 | TKY06F |
| H○○-○○SCLCR/L04 | TS21 | TKY06F |
| H○○-○○SCLCR/L06 | TS25 | TKY08F |

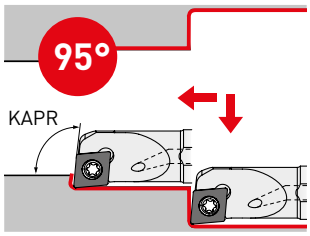
* Clamp torque (Nm): TS16 = 0.6, TS21 = 0.6, TS25 = 1.0

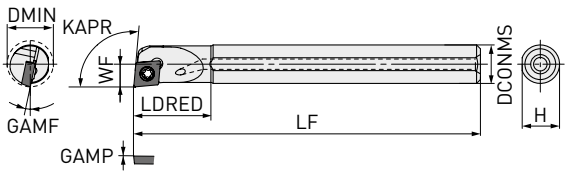
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SCLC-C

## HARD STEEL SHANK WITH COOLANT HOLE




*Right hand tool holder shown.*

CC○○-Inserts

| | |
|---|---|
| FP | FS |
| | |
| (06) | (06) |
| R/L-F | PCBN/PCD |
| | |
| (06) | (06) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H12-10SCLCR06-090-C | ● | R | 12 | 10 | 90 | 20 | 6.0 | 9.7 | 12° | 0° | CC○○ | 0602○○ |
| H12-10SCLCL06-090-C | ● | L | 12 | 10 | 90 | 20 | 6.0 | 9.7 | 12° | 0° | | 0602○○ |

1/1

97 Vc

## SPARE PARTS

| Boring bar type | | |
|---|---|---|
| | Clamp screw * | Wrench |
| H○○-○○SCLCR/L06 | TS25 | TKY08F |

* Clamp torque (Nm): TS25 = 1.0

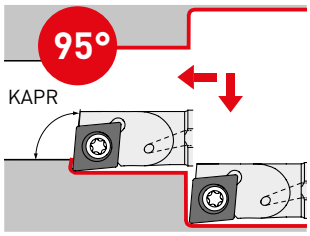


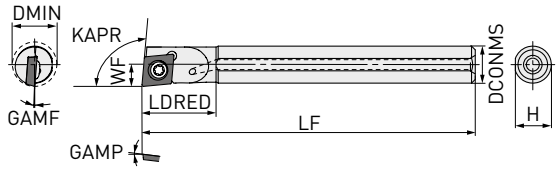
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SCLP-C

## HARD STEEL SHANK WITH COOLANT HOLE




*Right hand tool holder shown.*

CP○○-Inserts

| FP | FM | LP | LM |
|---|---|---|---|
| | | | |
| (08) | (08) | (08) | (08) |
| MP | MM | Flat Top | PCBN/PCD |
| | | | |
| (08) | (08) | (08) | (08) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H12-10SCLPR08-090-C | ● | R | 12 | 10 | 90 | 20 | 6.0 | 9.7 | 5° | 5° | CP○○ | 0802○○ |
| H12-10SCLPL08-090-C | ● | L | 12 | 10 | 90 | 20 | 6.0 | 9.7 | 5° | 5° | | 0802○○ |

1/1

97 Vc

## SPARE PARTS

| Boring bar type | | |
|---|---|---|
| | Clamp screw * | Wrench |
| H12-10SCLPR/L08 | TS3D | TKY10F |

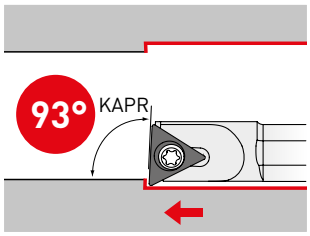
* Clamp torque (Nm): TS3D = 2.5

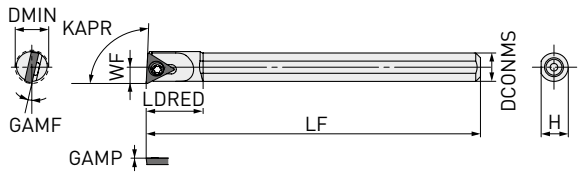
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-STUC

## HARD STEEL SHANK WITHOUT COOLANT HOLE




*Right hand tool holder shown.*

TC○○-Inserts

| F | F |
|---|---|
| FP | R/L-F |
| | |
| (09) | (06) |
| L | M |
| LP | MK |
| | |
| (09) | (09) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H07-06STUCR06-080 | ● | R | 7 | 6 | 80 | 12 | 3.5 | 5.7 | 13° | 0° | | 0601○○ |
| H07-06STUCL06-080 | ● | L | 7 | 6 | 80 | 12 | 3.5 | 5.7 | 13° | 0° | | 0601○○ |
| H08-07STUCR06-080 | ● | R | 8 | 7 | 80 | 12 | 4.0 | 6.7 | 12° | 0° | | 0601○○ |
| H08-07STUCL06-080 | ● | L | 8 | 7 | 80 | 12 | 4.0 | 6.7 | 12° | 0° | TC○○ | 0601○○ |
| H09-08STUCR06-080 | ● | R | 9 | 8 | 80 | 16 | 4.5 | 7.7 | 11° | 0° | | 0601○○ |
| H10-08STUCR09-080 | ● | R | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 14° | 0° | | 0902○○ |
| H10-08STUCL09-080 | ● | L | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 14° | 0° | | 0902○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H○○-○○STUCR/L06 | TS2C | TKY06F |
| H○○-○○STUCR/L09 | TS22 | TKY06F |

* Clamp torque (Nm): TS2C = 0.6, TS22 = 0.6

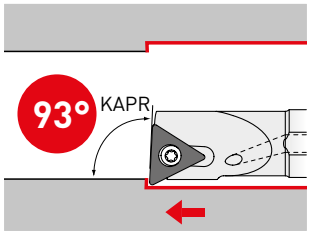


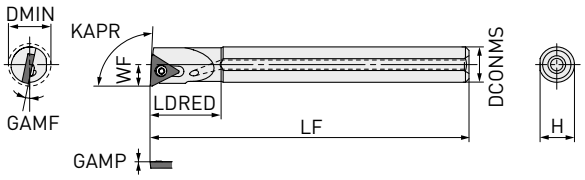
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-STUC-C

## HARD STEEL SHANK WITH COOLANT HOLE




*Right hand tool holder shown.*

TC○○-Inserts

| FP | FM |
|---|---|
| | |
| (09) | (09) |
| **LP** | **MK** |
| | |
| (09) | (09) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H12-10STUCR09-090-C | ● | R | 12 | 10 | 90 | 20 | 6.2 | 9.7 | 12° | 0° | TC○○ | 0902○○ |
| H12-10STUCL09-090-C | ● | L | 12 | 10 | 90 | 20 | 6.2 | 9.7 | 12° | 0° | | 0902○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H○○-○○STUCR/L09 | TS22 | TKY06F |

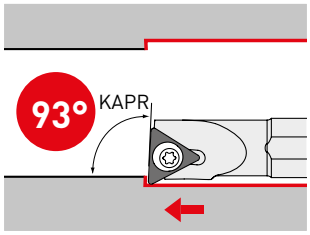
* Clamp torque (Nm): TS22 = 0.6

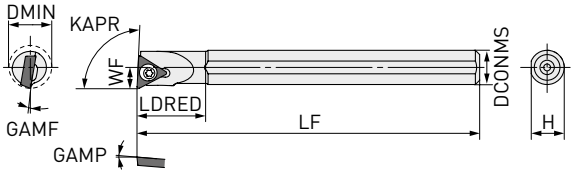
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-STUP

## HARD STEEL SHANK WITHOUT COOLANT HOLE




*Right hand tool holder shown.*

TP○○-Inserts

| | |
|---|---|
| FS | FV |
| | |
| (08) | (08) |
| Flat Top | |
| LP | |
| | |
| (08) | (08) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H10-08STUPR08-080 | ● | R | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 10° | 5° | TP○○ | 0802○○ |
| H10-08STUPL08-080 | ● | L | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 10° | 5° | | 0802○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H10-08STUPR/L08 | TS2D | TKY06F |

* Clamp torque (Nm): TS2D = 0.6

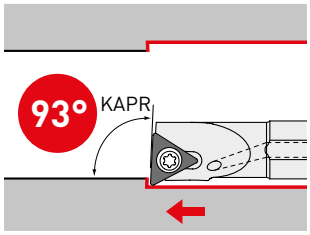


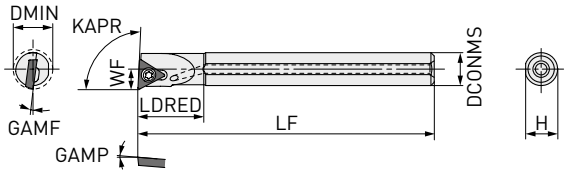
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-STUP-C

## HARD STEEL SHANK WITH COOLANT HOLE




*Right hand tool holder shown.*

TP○○-Inserts

| FS | FV |
|---|---|
| | |
| (09) | (09) |

| LP | Flat Top |
|---|---|
| | |
| (09) | (09) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H12-10STUPR09-090-C | ● | R | 12 | 10 | 90 | 20 | 6.2 | 9.7 | 8° | 5° | TP○○ | 0902○○ |
| H12-10STUPL09-090-C | ● | L | 12 | 10 | 90 | 20 | 6.2 | 9.7 | 8° | 5° | | 0902○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | | |
|---|---|---|
| | Clamp screw * | Wrench |
| H12-10STUPR/L09 | TS25D | TKY08F |

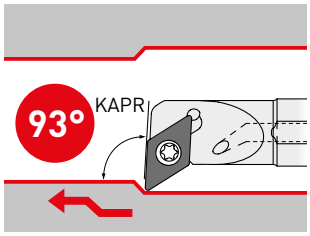
* Clamp torque (Nm): TS25D = 1.6

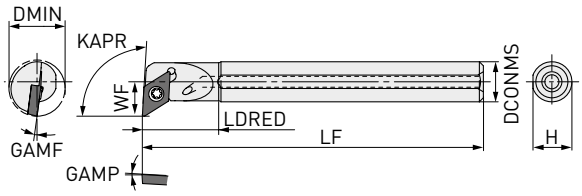
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SDUC-C

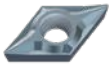
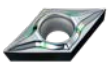
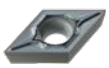
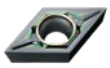
## HARD STEEL SHANK WITH COOLANT HOLE

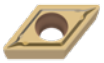
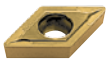
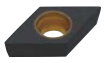



*Right hand tool holder shown.*

DC○○-Inserts

| FS | FS-P | LS | LS-P |
|---|---|---|---|
|  |  |  |  |
| (07) | (07) | (07) | (07) |

| MP | MM | Standard | Flat Top |
|---|---|---|---|
| |  |  |  |
| (07) | (07) | (07) | (07) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H14-10SDUCR07-090-C | ● | R | 14 | 10 | 90 | 19 | 8.7 | 9.7 | 7.5° | 3° | DC○○ | 0702○○ |
| H14-10SDUCL07-090-C | ● | L | 14 | 10 | 90 | 19 | 8.7 | 9.7 | 7.5° | 3° | | 0702○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H14-10SDUCR/L07 | TS25 | TKY08F |

* Clamp torque (Nm): TS25 = 1.0

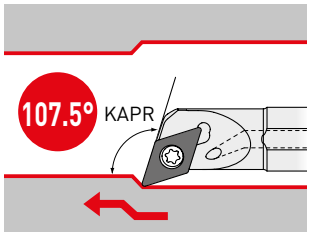


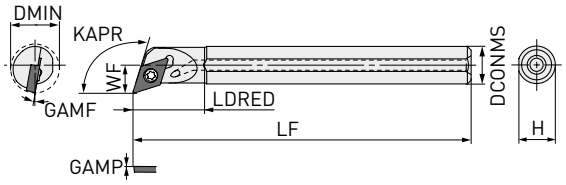
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SDQC-C

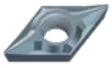
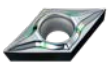
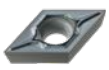
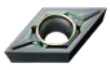
## HARD STEEL SHANK WITH COOLANT HOLE

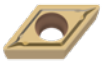
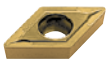
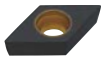



*Right hand tool holder shown.*

DC○○-Inserts

| FS | FS-P | LS | LS-P |
|---|---|---|---|
|  |  |  |  |
| (07) | (07) | (07) | (07) |

| MP | MM | Standard | Flat Top |
|---|---|---|---|
| |  |  |  |
| (07) | (07) | (07) | (07) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H13-10SDQCR07-090-C | ● | R | 13 | 10 | 90 | 19 | 7.5 | 9.7 | 10.0° | 0° | DC○○ | 0702○○ |
| H13-10SDQCL07-090-C | ● | L | 13 | 10 | 90 | 19 | 7.5 | 9.7 | 10.0° | 0° | | 0702○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H13-10SDQCR/L07 | TS25 | TKY08F |

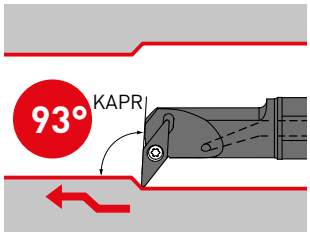
* Clamp torque (Nm): TS25 = 1.0

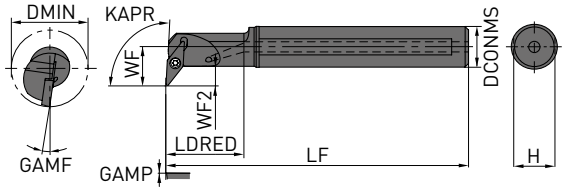
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# C-SVUC / B-C

## CARBIDE SHANK BORING BAR WITH COOLANT HOLE




*Right hand tool holder shown.*

VC/VB○○-Inserts

| FP | FM | LP | LM |
|---|---|---|---|
| | | | |
| (11,16) | (08,11,16) | (08,11,16) | (08,11,16) |

| MP | MM | Standard | PCBN/PCD |
|---|---|---|---|
| | | | |
| (16) | (16) | (16) | (11,16) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | WF2 | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C16-12SVUCR08-140-C | ● | R | 16 | 12 | 140 | 23 | 11.5 | 5.6 | 11 | 8° | 0° | VC○○ | 0802○○ |
| C20-16SVUBR11-180-C | ● | R | 20 | 16 | 180 | 28 | 16.0 | 8.1 | 15 | 8° | 0° | | 1103○○ |
| C20-16SVUBL11-180-C | ● | L | 20 | 16 | 180 | 28 | 16.0 | 8.1 | 15 | 8° | 0° | | 1103○○ |
| C25-20SVUBR11-180-C | ● | R | 25 | 20 | 180 | 32 | 18.0 | 8.1 | 19 | 7° | 0° | VB○○ | 1103○○ |
| C30-20SVUBR11-180-C | ● | R | 30 | 20 | 180 | 32 | 18.0 | 8.1 | 19 | 6° | 0° | | 1103○○ |
| C34-25SVUBR16-180-C | ● | R | 34 | 25 | 180 | 38 | 20.5 | 8.4 | 24 | 13° | 0° | | 1604○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| C16-12SVUCR08 | TS202 | TKY06F |
| C○○-○○SVUBR/L11 | TS255 | TKY08F |
| C34-25SVUBR16 | TS35D | TKY15F |

* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

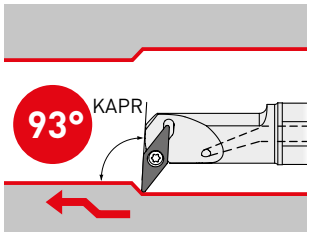


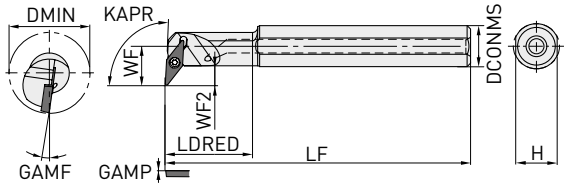
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# S-SVUC / B-C

## STEEL SHANK BORING BAR WITH COOLANT HOLE




*Right hand tool holder shown.*

VC/VB○○-Inserts

| FP | FM | LP | LM |
|---|---|---|---|
| | | | |
| (11,16) | (08,11,16) | (08,11,16) | (08,11,16) |

| MP | MM | Standard | PCBN/PCD |
|---|---|---|---|
| | | | |
| (16) | (16) | (16) | (11,16) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | WF2 | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S16-12SVUCR08-090-C | ● | R | 16 | 12 | 90 | 25.5 | 11.5 | 5.6 | 11 | 8° | 0° | VC○○ | 0802○○ |
| S20-16SVUBR11-150-C | ● | R | 20 | 16 | 150 | 32.5 | 16.0 | 8.1 | 15 | 8° | 0° | VB○○ | 1103○○ |
| S20-16SVUBL11-150-C | ● | L | 20 | 16 | 150 | 32.5 | 16.0 | 8.1 | 15 | 8° | 0° | | 1103○○ |
| S25-20SVUBR11-150-C | ● | R | 25 | 20 | 150 | 40.5 | 18.0 | 8.1 | 19 | 7° | 0° | | 1103○○ |
| S30-20SVUBR11-150-C | ● | R | 30 | 20 | 150 | 40.5 | 18.0 | 8.1 | 19 | 6° | 0° | | 1103○○ |
| S34-25SVUBR16-150-C | ● | R | 34 | 25 | 150 | 40.0 | 20.5 | 8.4 | 24 | 13° | 0° | | 1604○○ |
| S40-32SVUBR16-200-C | ● | R | 40 | 32 | 200 | 84.0 | 28.0 | 12.4 | 31 | 9° | 0° | | 1604○○ |

1/1

97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| S16-12SVUCR08 | TS202 | TKY06F |
| S○○-○○SVUBR/L11 | TS255 | TKY08F |
| S○○-○○SVUBR16 | TS35D | TKY15F |

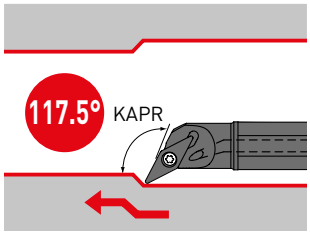
* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

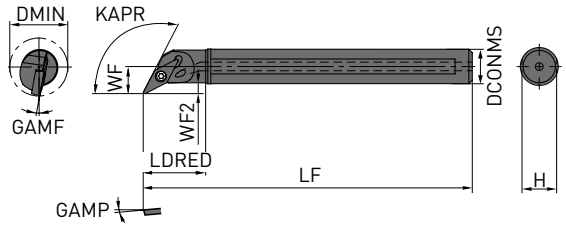
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# C-SVPC / B-C

## STEEL SHANK BORING BAR WITH COOLANT HOLE




*Right hand tool holder shown.*

VC/VB○○-Inserts

| FP | FM | LP | LM |
|---|---|---|---|
| | | | |
| (11,16) | (08,11,16) | (08,11,16) | (08,11,16) |

| MP | MM | Standard | PCBN/PCD |
|---|---|---|---|
| | | | |
| (16) | (16) | (16) | (11,16) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | WF2 | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C16-10SVPCR08-140-C | ● | R | 16 | 10 | 140 | 18 | 8.0 | 3.1 | 9 | 8° | -5° | VC○○ | 0802○○ |
| C16-10SVPCL08-140-C | ● | L | 16 | 10 | 140 | 18 | 8.0 | 3.1 | 9 | 8° | -5° | | 0802○○ |
| C20-12SVPBR11-180-C | ● | R | 20 | 12 | 180 | 23 | 10.0 | 4.1 | 11 | 8° | -5° | VB○○ | 1103○○ |
| C20-12SVPBL11-180-C | ● | L | 20 | 12 | 180 | 23 | 10.0 | 4.1 | 11 | 8° | -5° | | 1103○○ |
| C25-16SVPBR11-180-C | ● | R | 25 | 16 | 180 | 28 | 12.5 | 4.6 | 15 | 6° | -5° | | 1103○○ |
| C25-16SVPBL11-180-C | ● | L | 25 | 16 | 180 | 28 | 12.5 | 4.6 | 15 | 6° | -5° | | 1103○○ |
| C30-20SVPBR11-180-C | ● | R | 30 | 20 | 180 | 32 | 15.0 | 5.1 | 19 | 5° | -5° | | 1103○○ |
| C34-25SVPBR16-180-C | ● | R | 34 | 25 | 180 | 38 | 17.0 | 4.9 | 24 | 13° | -5° | | 1604○○ |

1/1

97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| C16-10SVPCR/L08 | TS202 | TKY06F |
| C○○-○○SVPBR/L11 | TS255 | TKY08F |
| C34-25SVPBR16 | TS35D | TKY15F |

* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

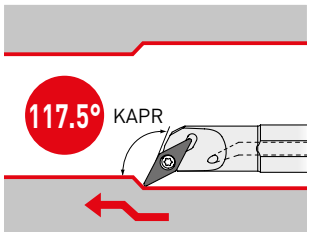


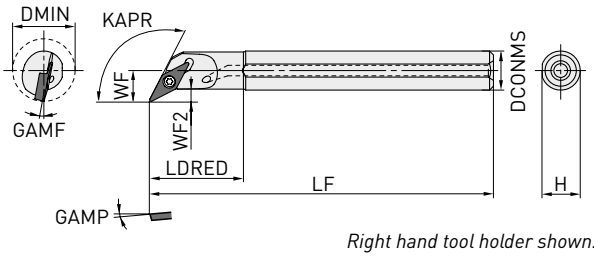
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SVPC-C

## HARD STEEL SHANK WITH COOLANT HOLE




*Right hand tool holder shown.*

VC○○-Inserts

| F | |
|---|---|
| FM | |
| | |
| (08) | |
| L | L |
| LP | LM |
| | |
| (08) | (08) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | WF2 | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H16-10SVPCR08-090-C | ● | R | 16 | 10 | 90 | 24 | 8.0 | 3.1 | 9.7 | 8.0° | -5° | VC○○ | 0802○○ |

1/1

97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H16-10SVPCR08 | TS202 | TKY06F |

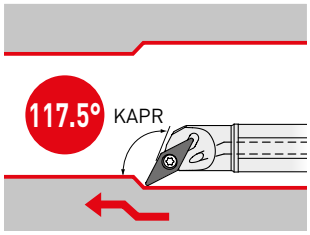
* Clamp torque (Nm): TS202 = 0.6

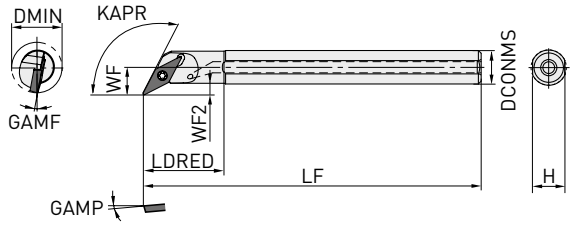
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# S-SVPB-C

## STEEL SHANK BORING BAR WITH COOLANT HOLE




*Right hand tool holder shown.*

VB○○-Inserts

| F | F | L | L |
|---|---|---|---|
| FP | FM | LP | LM |
| | | | |
| (11,16) | (08,11,16) | (08,11,16) | (08,11,16) |

| M | M | M | |
|---|---|---|---|
| MP | MM | Standard | PCBN/PCD |
| | | | |
| (16) | (16) | (16) | (11,16) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | WF2 | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S20-12SVPBR11-150-C | ● | R | 20 | 12 | 150 | 29 | 10.0 | 4.1 | 11 | 8° | -5° | | 1103○○ |
| S20-12SVPBL11-150-C | ● | L | 20 | 12 | 150 | 29 | 10.0 | 4.1 | 11 | 8° | -5° | | 1103○○ |
| S25-16SVPBR11-150-C | ● | R | 25 | 16 | 150 | 35 | 12.5 | 4.6 | 15 | 6° | -5° | | 1103○○ |
| S25-16SVPBL11-150-C | ● | L | 25 | 16 | 150 | 35 | 12.5 | 4.6 | 15 | 6° | -5° | VB○○ | 1103○○ |
| S30-20SVPBR11-150-C | ● | R | 30 | 20 | 150 | 41 | 15.0 | 5.1 | 19 | 5° | -5° | | 1103○○ |
| S34-25SVPBR16-150-C | ● | R | 34 | 25 | 150 | 51 | 17.0 | 4.9 | 24 | 13° | -5° | | 1604○○ |
| S40-32SVPBR16-200-C | ● | R | 40 | 32 | 200 | 54 | 22.0 | 6.4 | 31 | 9° | -5° | | 1604○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | | |
|---|---|---|
| | Clamp screw * | Wrench |
| S○○-○○SVPBR/L11 | TS255 | TKY08F |
| S○○-○○SVPBR16 | TS35D | TKY15F |

* Clamp torque (Nm): TS255 = 1.0, TS35D = 3.5

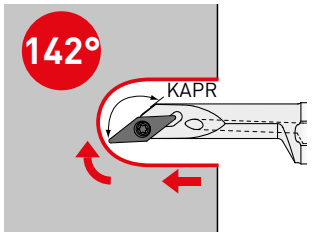


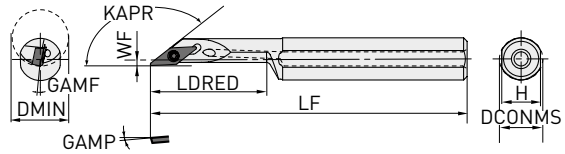
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# S-SVJC / B-C

## STEEL SHANK BORING BAR WITH COOLANT HOLE




*Right hand tool holder shown.*

VC/VB○○-Inserts

| F | F | L | L |
|---|---|---|---|
| FP | FM | LP | LM |
| | | | |
| (11,16) | (08,11,16) | (08,11,16) | (08,11,16) |

| M | M | M | |
|---|---|---|---|
| MP | MM | Standard | PCBN/PCD |
| | | | |
| (16) | (16) | (16) | (11,16) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S16-12SVJCR08-090-C | ● | R | 16 | 12 | 90 | 33 | 2.0 | 11 | 6° | -5° | VC○○ | 0802○○ |
| S20-16SVJCR08-150-C | ● | R | 20 | 16 | 150 | 43 | 2.0 | 15 | 5° | -5° | | 0802○○ |
| S25-20SVJBR11-150-C | ● | R | 25 | 20 | 150 | 48 | 2.0 | 19 | 6° | -5° | VB○○ | 1103○○ |
| S30-25SVJBR11-150-C | ● | R | 30 | 25 | 150 | 58 | 3.5 | 24 | 5° | -5° | | 1103○○ |
| S40-32SVJBR16-200-C | ● | R | 40 | 32 | 200 | 74 | 3.5 | 31 | 8° | -5° | | 1604○○ |
| S50-40SVJBR16-250-C | ● | R | 50 | 40 | 250 | 91 | 4.5 | 39 | 7° | -5° | | 1604○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| S○○-○○SVJCR08 | TS202 | TKY06F |
| S○○-○○SVJBR11 | TS255 | TKY08F |
| S○○-○○SVJBR16 | TS35D | TKY15F |

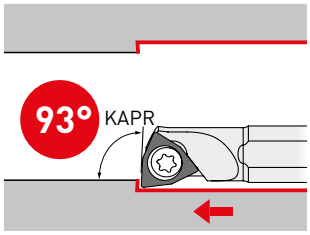
* Clamp torque (Nm): TS202 = 0.6, TS255 = 1.0, TS35D = 3.5

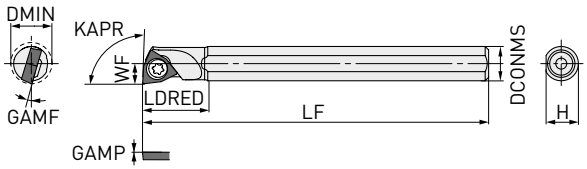
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SWUC

## HARD STEEL SHANK WITHOUT COOLANT HOLE




*Right hand tool holder shown.*

WC○○-Inserts

| F | M |
|---|---|
| FV | MP |
| | |
| (02,L3,04) | (02,L3,04) |
| M | PCBN/PCD |
| Standard | |
| | |
| (02,L3,04) | (L3) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H06-05SWUCR02-070 | ● | R | 6 | 5 | 70 | 9 | 3.0 | 4.7 | 17° | 0° | WC○○ | 0201○○ |
| H06-05SWUCL02-070 | ● | L | 6 | 5 | 70 | 9 | 3.0 | 4.7 | 17° | 0° | | 0201○○ |
| H08-07SWUCRL3-080 | ● | R | 8 | 7 | 80 | 11 | 4.0 | 6.7 | 15° | 0° | | L302○○ |
| H08-07SWUCLL3-080 | ● | L | 8 | 7 | 80 | 11 | 4.0 | 6.7 | 15° | 0° | | L302○○ |
| H10-08SWUCR04-080 | ● | R | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 15° | 0° | | 0402○○ |
| H10-08SWUCL04-080 | ● | L | 10 | 8 | 80 | 16 | 5.0 | 7.7 | 15° | 0° | | 0402○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | Clamp screw * | Wrench |
|---|---|---|
| H06-05SWUCR/L02 | TS21 | TKY06F |
| H08-07SWUCR/LL3 | TS2 | TKY06F |
| H10-08SWUCR/L04 | TS25 | TKY08F |

* Clamp torque (Nm): TS21 = 0.6, TS2 = 0.6, TS25 = 1.0

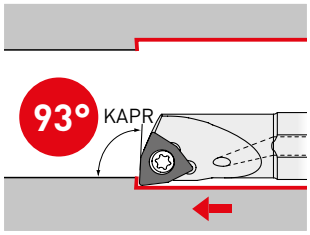


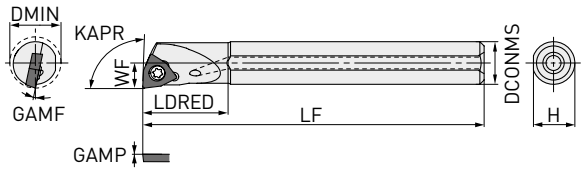
● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# H-SWUC-C

## HARD STEEL SHANK WITH COOLANT HOLE




*Right hand tool holder shown.*

WC○○-Inserts

| | |
|---|---|
| F | |
| FV | |
| | |
| (04) | |
| M | M |
| MP | Standard |
| | |
| (04) | (04) |

| Order number | Stock | Hand | DMIN | DCONMS | LF | LDRED | WF | H | GAMF | GAMP | Insert number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H12-10SWUCR04-080-C | ● | R | 12 | 10 | 80 | 20 | 6.0 | 9.7 | 12° | 0° | WC○○ | 0402○○ |
| H12-10SWUCL04-080-C | ● | L | 12 | 10 | 80 | 20 | 6.0 | 9.7 | 12° | 0° | | 0402○○ |

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97 Vc

## SPARE PARTS

| Boring bar type | | |
|---|---|---|
| | Clamp screw * | Wrench |
| H12-10SWUCR/L04 | TS25 | TKY08F |

* Clamp torque (Nm): TS25 = 1.0

● : Inventory maintained. ★ : Inventory maintained in Japan.

# CC TYPE INSERTS

## 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| | CCET060200L-SN*3 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | R/L-SN |
| | CCET060200R-SN*3 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET060201L-SN*3 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET060201R-SN*3 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET060202L-SN*3 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET060202R-SN*3 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET060204L-SN*3 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET060204R-SN*3 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET0602V3L-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET0602V3R-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET09T300L-SN*3 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET09T300R-SN*3 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T301L-SN*3 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T301R-SN*3 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T302L-SN*3 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T302R-SN*3 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T304L-SN*3 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T304R-SN*3 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | CCET09T3V3L-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | CCET09T3V3R-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | Medium cutting |
| NEW | CCET060201ML-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | MR/L-SN |
| NEW | CCET060201MR-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET060202ML-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET060202MR-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET09T301ML-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET09T301MR-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET09T302ML-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET09T302MR-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET09T304ML-SN | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | |
| NEW | CCET09T304MR-SN | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | | Medium cutting |

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*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
*3 Diameter of inscribed circle is special.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
❃: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ✲ | ❁ | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✲ | ● | ◐ | ✲ | ○ | ✲ | | | | ◐ | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | | ◶ | ❁ | | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ✲ | ◶ | ❁ | | | | | | | | ● | ◐ | | | ◶ |
| | Order number | RE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CCET060201L-SR | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | R/L-SR |
| | CCET060201R-SR | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | |
| | CCET060202L-SR | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | ★ | |
| | CCET060202R-SR | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | |
| | CCET060204L-SR | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | ★ | |
| | CCET060204R-SR | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | |
| | CCET0602V3L-SR | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET0602V3R-SR | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | |
| | CCET09T301L-SR | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET09T301R-SR | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET09T302L-SR | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET09T302R-SR | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | |
| | CCET09T304L-SR | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET09T304R-SR | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET09T3V3L-SR | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | ★ | |
| | CCET09T3V3R-SR | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | ★ | | | | | | ★ | Medium cutting |
| NEW | CCET060201ML-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | MR/L-SR |
| NEW | CCET060201MR-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET060202ML-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET060202MR-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET060204ML-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET060204MR-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET09T301ML-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET09T301MR-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET09T302ML-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET09T302MR-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET09T304ML-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| NEW | CCET09T304MR-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | Medium cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| P | Steel | | ● | ● | ● | ❖ | ❁ | | | | | | | | | | ● | ● | ❖ | | | | | ❖ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | | |
| M | Stainless steel | | | | | | | ● | ● | ● | ❖ | ● | ● | ❖ | ○ | ❖ | | | | ● | | | ◶ | ❖ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | | |
| K | Cast iron | | | | | | | | | | | | | | | | ● | ● | ❖ | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | | ● | ● | ● | ❖ | ◶ | | ❁ | | | | | | | ● | ● | | | ◶ | |
| NEW | CCET03S101ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | R/L-SRF |
| NEW | CCET03S101MR-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET03S102ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET03S102MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET03S104ML-SRF | 0.4 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET03S104MR-SRF | 0.4 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET03S1V3L-SRF | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET03S1V3R-SRF | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T001ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T001MR-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T002ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T002MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T004ML-SRF | 0.4 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T004MR-SRF | 0.4 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T0V3L-SRF | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET04T0V3R-SRF | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | CCET060201ML-SRF | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET060201MR-SRF | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET060202ML-SRF | 0.2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET060202MR-SRF | 0.2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET060204ML-SRF | 0.4 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET060204MR-SRF | 0.4 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET09T301ML-SRF | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET09T301MR-SRF | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET09T302ML-SRF | 0.2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET09T302MR-SRF | 0.2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET09T304ML-SRF | 0.4 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | CCET09T304MR-SRF | 0.4 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | Finish cutting |
| NEW | CCET060201ML-SS | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | R/L-SS |
| NEW | CCET060201MR-SS | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET060202ML-SS | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET060202MR-SS | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET060204ML-SS | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET060204MR-SS | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET0602V3L-SS | 0.03 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET0602V3R-SS | 0.03 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T301ML-SS | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T301MR-SS | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T302ML-SS | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T302MR-SS | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T304ML-SS | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T304MR-SS | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T3V3L-SS | 0.03 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | CCET09T3V3R-SS | 0.03 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | Light cutting |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTi20T | HTi05T | HTi10 |
| P | Steel | ◐ | ● | ◐ | ✣ | ❁ | ◐ | ● | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | | | | | | | | ✣ | ❁ | ❁ | | ◐ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | | | | ◐ | | | | ◶ | ✣ | ❁ | ❁ | | ○ | ○ | | ○ | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ◐ | ◐ | ✣ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✣ | ◶ | | ❁ | | | | | | | | ● | ◐ | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| CCET0602V3LW-SN | 0.03*2 | R/LW-SN |
| CCET0602V3RW-SN | 0.03*2 | |
| CCET09T3V3LW-SN | 0.03*2 | |
| CCET09T3V3RW-SN | 0.03*2 | Medium cutting |
| | | (Wiper) |
| CCGH060202ML-F | 0.2*2 | MR/L-F |
| CCGH060204ML-F | 0.4*2 | |
| CCGH060202MR-F | 0.2*2 | |
| CCGH060204MR-F | 0.4*2 | |
| | | Finish cutting |
| CCGH060202L-F | 0.2 | R/L-F |
| CCGH060202R-F | 0.2 | |
| CCGH060204L-F | 0.4 | |
| CCGH060204R-F | 0.4 | |
| | | Finish cutting |
| CCGT060202-AZ | 0.2 | AZ |
| CCGT060204-AZ | 0.4 | |
| CCGT09T302-AZ | 0.2 | |
| CCGT09T304-AZ | 0.4 | Medium cutting |
| CCGT09T308-AZ | 0.8 | Finish cutting |
| CCGT060201-FJ | 0.1 | FJ |
| CCGT060202-FJ | 0.2 | |
| CCGT0602V5-FJ | 0.05 | |
| CCGT09T301-FJ | 0.1 | |
| CCGT09T302-FJ | 0.2 | |
| CCGT09T304-FJ | 0.4 | |
| CCGT09T3V5-FJ | 0.05 | Finish cutting |
| CCGT060201M-FS | 0.1*2 | FS |
| CCGT060202M-FS | 0.2*2 | |
| CCGT060204M-FS | 0.4*2 | |
| CCGT09T301M-FS | 0.1*2 | |
| CCGT09T302M-FS | 0.2*2 | |
| CCGT09T304M-FS | 0.4*2 | Finish cutting |
| CCGT03S101M-FSF | 0.1 | FSF |
| CCGT03S102M-FSF | 0.2 | |
| CCGT04T001M-FSF | 0.1 | |
| CCGT04T002M-FSF | 0.2 | |
| CCGT060201M-FSF | 0.1 | |
| CCGT060202M-FSF | 0.2 | |
| CCGT060204M-FSF | 0.4 | Finish cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ✣ | ❁ | ◐ | ● | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | ◐ | ● | ✣ | | | | | ✣ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | | | | ◐ | | | | ◶ | ✣ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ◐ | ◐ | ✣ | | | | | ◶ | ❁ | | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✣ | ◶ | ❁ | | | | | | | | | ● | ◐ | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| CCGT03S101M-FSF-P | 0.1 | FSF-P |
| CCGT03S102M-FSF-P | 0.2 | |
| CCGT04T001M-FSF-P | 0.1 | |
| CCGT04T002M-FSF-P | 0.2 | |
| CCGT060201M-FSF-P | 0.1 | |
| CCGT060202M-FSF-P | 0.2 | |
| CCGT060204M-FSF-P | 0.4 | |
| CCGT0602V5M-FSF-P | 0.05 | |
| CCGT09T301M-FSF-P | 0.1 | |
| CCGT09T302M-FSF-P | 0.2 | |
| CCGT09T304M-FSF-P | 0.4 | |
| CCGT09T3V5M-FSF-P | 0.05 | Finish cutting |
| CCGT060201M-FS-P | 0.1 | FS-P |
| CCGT060202M-FS-P | 0.2*2 | |
| CCGT060204M-FS-P | 0.4*2 | |
| CCGT09T301M-FS-P | 0.1*2 | |
| CCGT09T302M-FS-P | 0.2*2 | |
| CCGT09T304M-FS-P | 0.4*2 | Finish cutting |
| CCGT060201M-LS | 0.1 | LS |
| CCGT060202M-LS | 0.2*2 | |
| CCGT060204M-LS | 0.4*2 | |
| CCGT09T301M-LS | 0.1*2 | |
| CCGT09T302M-LS | 0.2*2 | |
| CCGT09T304M-LS | 0.4*2 | Light cutting |
| CCGT060201M-LS-P | 0.1*2 | LS-P |
| CCGT060202M-LS-P | 0.2*2 | |
| CCGT060204M-LS-P | 0.4*2 | |
| CCGT0602V5M-LS-P | 0.05*2 | |
| CCGT09T301M-LS-P | 0.1*2 | |
| CCGT09T302M-LS-P | 0.2*2 | |
| CCGT09T304M-LS-P | 0.4*2 | Light cutting |
| CCGT03S101ML-F*3 | 0.1*2 | MR/L-F |
| CCGT03S102ML-F*3 | 0.2*2 | |
| CCGT03S104ML-F*3 | 0.4*2 | |
| CCGT04T001ML-F*3 | 0.1*2 | |
| CCGT04T002ML-F*3 | 0.2*2 | |
| CCGT04T004ML-F*3 | 0.4*2 | |
| CCGT03S101MR-F*3 | 0.1*2 | |
| CCGT03S102MR-F*3 | 0.2*2 | |
| CCGT03S104MR-F*3 | 0.4*2 | |
| CCGT04T001MR-F*3 | 0.1*2 | |
| CCGT04T002MR-F*3 | 0.2*2 | |
| CCGT04T004MR-F*3 | 0.4*2 | Finish cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
*3 Diameter of inscribed circle is special.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◉ | ● | ◉ | ✲ | ❁ | ◉ | ● | ◉ | ✲ | ● | ◉ | ✲ | ○ | ✲ | | | | | | | | ✲ | ❁ | ❁ | ❁ | ◉ | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ◉ | ● | ◉ | ✲ | ● | ◉ | ✲ | ○ | ✲ | | | | ◉ | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ◉ | ◉ | ✲ | | | | | ◶ | ❁ | | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◉ | ● | ◉ | ✲ | ◶ | ❁ | | | | | | | | | ● | ◉ | | ◶ |

| Order number | RE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CCGT03S101L-F*3 | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | R/L-F |
| CCGT03S102L-F*3 | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | ● | | | | | | |
| CCGT03S104L-F*3 | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | | | ● | | | | | | |
| CCGT03S1V3L-F*3 | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | |
| CCGT04T001L-F*3 | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | | |
| CCGT04T002L-F*3 | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | ● | | | | | | |
| CCGT04T004L-F*3 | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | ● | | | | | | |
| CCGT04T0V3L-F*3 | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | Finish cutting |
| CCGT060201L-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | R/L-SN |
| CCGT060201R-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT060202L-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT060202R-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT0602V3R-SN | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T301L-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT09T301R-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T302L-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T302R-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T304L-SN | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T304R-SN | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T3V3L-SN | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT09T3V3R-SN | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | Medium cutting |
| CCGT060201ML-SN | 0.1 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MR/L-SN |
| CCGT060201MR-SN | 0.1*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| CCGT060202ML-SN | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT060202MR-SN | 0.2*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| CCGT09T301ML-SN | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T301MR-SN | 0.1*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| CCGT09T302ML-SN | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T302MR-SN | 0.2*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| CCGT09T304ML-SN | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T304MR-SN | 0.4*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | Medium cutting |
| CCGT060201L-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | R/L-SS |
| CCGT060201R-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT060202L-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT060202R-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT0602V3L-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT0602V3R-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT09T301L-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT09T301R-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T302L-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T302R-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T3V3L-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| CCGT09T3V3R-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | Light cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
*3 Diameter of inscribed circle is special.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◉: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ✲ | ❁ | ◔ | ● | ◔ | ✲ | ● | ◔ | ✲ | ○ | ✲ | | | | | | | | ✲ | ❁ | ❁ | | ◔ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◔ | ● | ◔ | ✲ | ● | ◔ | ✲ | ○ | ✲ | | | | ◔ | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◔ | ● | ◔ | ✲ | ◶ | ❁ | | | | | | | | | ● | ◔ | | ◶ | |

| Order number | RE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CCGT060201ML-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MR/L-SS |
| CCGT060201MR-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT060202ML-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT060202MR-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T301ML-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T301MR-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T302ML-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T302MR-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T304ML-SS | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T304MR-SS | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| CCGT060201M-SMG | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SMG |
| CCGT060202M-SMG | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT060204M-SMG | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCGT09T301M-SMG | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T302M-SMG | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CCGT09T304M-SMG | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |
| CCGW060200 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | Flat Top |
| CCGW060201 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| CCGW060202 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| CCGW0602V5 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | |
| CCGW09T300 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | |
| CCGW09T301 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| CCGW09T302 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| CCGW09T304 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| CCGW09T3V5 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | |
| CCMH060202-MV | 0.2 | | | ● | ★ | | | | | | | ● | ● | | ● | | | | | | | | | ● | | | ● | ★ | ★ | ★ | ● | ★ | | | | | MV |
| CCMH060204-MV | 0.4 | | | ● | ★ | | | | | | | ● | ● | ● | ● | | ★ | | | | | | | ● | | | ● | ★ | | ● | ● | ● | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |
| CCMH060202-SV | 0.2 | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | ★ | | ★ | ● | ★ | | | | | SV |
| CCMH060204-SV | 0.4 | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | ● | | ★ | ★ | ★ | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| CCMT060202-FM | 0.2 | | | | | | | | | | | ★ | | | | | | | | | | | | ● | | | | | | | | | | | | FM |
| CCMT060204-FM | 0.4 | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCMT09T302-FM | 0.2 | | | | | | | | | | | ★ | | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCMT09T304-FM | 0.4 | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | | ● | | | | | | | | | | | | |
| CCMT09T308-FM | 0.8 | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | | ● | | | | | | | | | | | | Finish cutting |
| CCMT060202-FP | 0.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | | | | FP |
| CCMT060204-FP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | | | | |
| CCMT09T302-FP | 0.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | | | | |
| CCMT09T304-FP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | | | | |
| CCMT09T308-FP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | | | | | | Finish cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◔: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ✣ | ❁ | | | | | | | | | | | | | | | | | ✣ | ❁ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ○ | | ❁ | | | |
| M | Stainless steel | | | | | | ● | ● | ● | ✣ | ● | ● | ✣ | ○ | ✣ | | | | ● | | | ◶ | ✣ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✣ | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ | | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ✣ | ◶ | | ❁ | | | | | | | | ● | ● | | ◶ | |

| Order number | RE | Shape |
|---|---|---|
| CCMT060202-FS | 0.2 | FS |
| CCMT060204-FS | 0.4 | |
| CCMT09T302-FS | 0.2 | |
| CCMT09T304-FS | 0.4 | |
| CCMT09T308-FS | 0.8 | Finish cutting |
| CCMT060202-FV | 0.2 | FV |
| CCMT060204-FV | 0.4 | |
| CCMT09T302-FV | 0.2 | |
| CCMT09T304-FV | 0.4 | |
| CCMT09T308-FV | 0.8 | Finish cutting |
| CCMT060202-LM | 0.2 | LM |
| CCMT060204-LM | 0.4 | |
| CCMT060208-LM | 0.8 | |
| CCMT09T302-LM | 0.2 | |
| CCMT09T304-LM | 0.4 | |
| CCMT09T308-LM | 0.8 | Light cutting |
| CCMT060202-LP | 0.2 | LP |
| CCMT060204-LP | 0.4 | |
| CCMT060208-LP | 0.8 | |
| CCMT09T302-LP | 0.2 | |
| CCMT09T304-LP | 0.4 | |
| CCMT09T308-LP | 0.8 | Light cutting |
| CCMT060202-LS | 0.2 | LS |
| CCMT060204-LS | 0.4 | |
| CCMT09T302-LS | 0.2 | |
| CCMT09T304-LS | 0.4 | |
| CCMT09T308-LS | 0.8 | Light cutting |
| CCMT060202-MK | 0.2 | MK |
| CCMT060204-MK | 0.4 | |
| CCMT060208-MK | 0.8 | |
| CCMT09T302-MK | 0.2 | |
| CCMT09T304-MK | 0.4 | |
| CCMT09T308-MK | 0.8 | Medium cutting |
| CCMT060202-MM | 0.2 | MM |
| CCMT060204-MM | 0.4 | |
| CCMT060208-MM | 0.8 | |
| CCMT09T302-MM | 0.2 | |
| CCMT09T304-MM | 0.4 | |
| CCMT09T308-MM | 0.8 | |
| CCMT120404-MM | 0.4 | |
| CCMT120408-MM | 0.8 | |
| CCMT120412-MM | 1.2 | Medium cutting |

8/9

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ✿ | ❁ | | | | | | | | | | | | | | | | | ✿ | ❁ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ● | ● | ● | ✿ | ● | ● | ✿ | ○ | ✿ | | | | ● | | | ◶ | ✿ | ❁ | ❁ | | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✿ | | | | ◶ | | ❁ | | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ✿ | ◶ | | ❁ | | | | | | | | ● | ● | | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| CCMT060202-MP | 0.2 | MP |
| CCMT060204-MP | 0.4 | |
| CCMT060208-MP | 0.8 | |
| CCMT09T302-MP | 0.2 | |
| CCMT09T304-MP | 0.4 | |
| CCMT09T308-MP | 0.8 | Medium cutting |
| CCMT060202-MS | 0.2 | MS |
| CCMT060204-MS | 0.4 | |
| CCMT060208-MS | 0.8 | |
| CCMT09T302-MS | 0.2 | |
| CCMT09T304-MS | 0.4 | |
| CCMT09T308-MS | 0.8 | Medium cutting |
| CCMT060204-MW | 0.4 | MW |
| CCMT060208-MW | 0.8 | |
| CCMT09T304-MW | 0.4 | |
| CCMT09T308-MW | 0.8 | Medium cutting (Wiper) |
| CCMT060202-SW | 0.2 | SW |
| CCMT060204-SW | 0.4 | |
| CCMT060208-SW | 0.8 | |
| CCMT09T302-SW | 0.2 | |
| CCMT09T304-SW | 0.4 | Light cutting (Wiper) |
| CCMT09T308-SW | 0.8 | |
| CCMT060202 | 0.2 | Standard |
| CCMT060204 | 0.4 | |
| CCMT060208 | 0.8 | |
| CCMT09T302 | 0.2 | |
| CCMT09T304 | 0.4 | |
| CCMT09T308 | 0.8 | Medium cutting |
| CCMW060202 | 0.2 | Flat Top |
| CCMW060204 | 0.4 | |
| CCMW060208 | 0.8 | |
| CCMW09T304 | 0.4 | |
| CCMW09T308 | 0.8 | |
| CCMW09T312 | 1.2 | |

9/9

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✿: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

# CP TYPE INSERTS

## 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ❖ | ❁ | | | | | | | | | | | | | | | | | ❖ | ❁ | ❁ | ◐ | ○ | ○ | ◔ | ○ | ◔ | | ❁ | | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ❖ | ● | ◐ | ❖ | ○ | ❖ | | | | ◐ | | | ◔ | ❖ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ❖ | | | | ◔ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◔ | | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◔ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ❖ | ◔ | | ❁ | | | | | | | ● | ◐ | | | ◔ | |

| Order number | RE | Shape |
|---|---|---|
| CPGT080204L-F | 0.4 | R/L-F |
| CPGT080204R-F | 0.4 | |
| CPGT090302L-F | 0.2 | |
| CPGT090302R-F | 0.2 | |
| CPGT090304L-F | 0.4 | |
| CPGT090304R-F | 0.4 | Finish cutting |
| CPGT080202 | 0.2 | Standard |
| CPGT080204 | 0.4 | |
| CPGT090302 | 0.2 | |
| CPGT090304 | 0.4 | |
| | | Finish cutting |
| CPMB080202 | 0.2 | Flat Top |
| CPMB080204 | 0.4 | |
| CPMB080208 | 0.8 | |
| CPMB090302 | 0.2 | |
| CPMB090304 | 0.4 | |
| CPMB090308 | 0.8 | |
| CPMH080202-FM | 0.2 | FM |
| CPMH080204-FM | 0.4 | |
| CPMH090302-FM | 0.2 | |
| CPMH090304-FM | 0.4 | |
| CPMH090308-FM | 0.8 | Finish cutting |
| CPMH080202-FP | 0.2 | FP |
| CPMH080204-FP | 0.4 | |
| CPMH090302-FP | 0.2 | |
| CPMH090304-FP | 0.4 | |
| CPMH090308-FP | 0.8 | Finish cutting |
| CPMH080202-FS | 0.2 | FS |
| CPMH080204-FS | 0.4 | |
| CPMH090302-FS | 0.2 | |
| CPMH090304-FS | 0.4 | |
| CPMH090308-FS | 0.8 | Finish cutting |
| CPMH080202-FV | 0.2 | FV |
| CPMH080204-FV | 0.4 | |
| CPMH090302-FV | 0.2 | |
| CPMH090304-FV | 0.4 | |
| CPMH090308-FV | 0.8 | Finish cutting |

1/3

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## CP TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ✲ | ❁ | ● | ● | ● | ✲ | ● | ● | ✲ | ○ | ✲ | | | | ● | | | | ✲ | ✲ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ● | ● | ● | ✲ | ● | ● | ✲ | ○ | ✲ | | | | ● | | | ◶ | ✲ | ❁ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | ◶ | | ❁ | | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ✲ | ◶ | ❁ | | | | | | | | | ● | ● | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| CPMH080204-LM | 0.4 | LM |
| CPMH080208-LM | 0.8 | |
| CPMH090304-LM | 0.4 | |
| CPMH090308-LM | 0.8 | |
| | | Light cutting |
| CPMH080202-LP | 0.2 | LP |
| CPMH080204-LP | 0.4 | |
| CPMH080208-LP | 0.8 | |
| CPMH090302-LP | 0.2 | |
| CPMH090304-LP | 0.4 | |
| CPMH090308-LP | 0.8 | |
| | | Light cutting |
| CPMH080204-LS | 0.4 | LS |
| CPMH080208-LS | 0.8 | |
| CPMH090304-LS | 0.4 | |
| CPMH090308-LS | 0.8 | |
| | | Light cutting |
| CPMH080204-MK | 0.4 | MK |
| CPMH080208-MK | 0.8 | |
| CPMH090304-MK | 0.4 | |
| CPMH090308-MK | 0.8 | |
| | | Light cutting |
| CPMH080204-MM | 0.4 | MM |
| CPMH080208-MM | 0.8 | |
| CPMH090304-MM | 0.4 | |
| CPMH090308-MM | 0.8 | |
| | | Medium cutting |
| CPMH080204-MP | 0.4 | MP |
| CPMH080208-MP | 0.8 | |
| CPMH090304-MP | 0.4 | |
| CPMH090308-MP | 0.8 | |
| | | Medium cutting |
| CPMH080204-MS | 0.4 | MS |
| CPMH080208-MS | 0.8 | |
| CPMH090304-MS | 0.4 | |
| CPMH090308-MS | 0.8 | |
| | | Medium cutting |
| CPMH080204-MV | 0.4 | MV |
| CPMH080208-MV | 0.8 | |
| CPMH090304-MV | 0.4 | |
| CPMH090308-MV | 0.8 | |
| | | Medium cutting |

2/3

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## CP TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◉ | ● | ◉ | ✲ | ❁ | | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | ◉ | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ◉ | ● | ◉ | ✲ | ● | ◉ | ✲ | ○ | ✲ | | | | ◉ | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ◉ | ◉ | ✲ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◉ | ● | ◉ | ✲ | ◶ | | ❁ | | | | | | | | ● | ◉ | | ◶ |
| **Order number** | **RE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **Shape** |
| CPMH080204L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | ★ | R/L-F |
| CPMH080204R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | ★ | |
| CPMH090304L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | | | ★ | | | | | ★ | |
| CPMH090304R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | ★ | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| CPMH080202-SV | 0.2 | | | | | ● | | | | | | | | | ● | | | | | | | | | | ● | | ★ | | | ★ | ● | ★ | | | | | | SV |
| CPMH080204-SV | 0.4 | | | | | ● | | | | | | | | | ● | | | | | | | | | | ● | | ● | | | ● | ● | ★ | | | | | | |
| CPMH090302-SV | 0.2 | | | | | ● | | | | | | | | | ● | | | | | | | | | | ● | | ★ | | | ★ | ★ | ★ | | | | | | |
| CPMH090304-SV | 0.4 | | | | | ● | | | | | | | | | ● | | | | | | | | | | ● | | ★ | | | ● | ● | ★ | | | | | | |
| CPMH090308-SV | 0.8 | | | | | ● | | | | | | | | | ● | | | | | | | | | | ● | | ★ | | | ★ | ● | ★ | | | | | | Light cutting |
| CPMH080204 | 0.4 | | ★ | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Standard |
| CPMH080208 | 0.8 | | ★ | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CPMH090304 | 0.4 | | ★ | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CPMH090308 | 0.8 | | ★ | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |
| CPMX080204 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | Standard |
| CPMX080208 | 0.8 | | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | |
| CPMX090304 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | ★ | | | |
| CPMX090308 | 0.8 | | | | | ★ | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | ★ | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |

3/3

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◉: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# DC TYPE INSERTS

## 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| | DCET070200L-SN | 0.0*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | R/L-SN |
| | DCET070200R-SN | 0.0*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET070201L-SN | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET070201R-SN | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET070202L-SN | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET070202R-SN | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET070204L-SN | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET070204R-SN | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET0702V3L-SN | 0.03*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | ★ | | | | | ★ | | | | | ★ | |
| | DCET0702V3R-SN | 0.03*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | ● | | | | | ★ | | | | | ★ | |
| | DCET11T300L-SN | 0.0*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T300R-SN | 0.0*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T301L-SN | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T301R-SN | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T302L-SN | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T302R-SN | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T304L-SN | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T304R-SN | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T3V3L-SN | 0.03*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | ★ | | | | | ★ | ● | | | | ★ | |
| | DCET11T3V3R-SN | 0.03*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | ● | | | | | ★ | ● | | | | ★ | Medium cutting |
| NEW | DCET070201ML-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | MR/L-SN |
| NEW | DCET070201MR-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | |
| NEW | DCET070202ML-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | |
| NEW | DCET070202MR-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | | | |
| NEW | DCET070204MR-SN | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| NEW | DCET11T301ML-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | ● | | |
| NEW | DCET11T301MR-SN | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | ● | | |
| NEW | DCET11T302ML-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | ● | | |
| NEW | DCET11T302MR-SN | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | ● | | |
| NEW | DCET11T304ML-SN | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | ● | | |
| NEW | DCET11T304MR-SN | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | ● | ● | | | | | | | | | | ● | | Medium cutting |

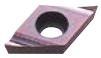
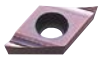
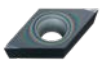
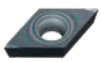
1/8

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| | DCET070201L-SR | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | R/L-SR |
| | DCET070201R-SR | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET070202L-SR | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET070202R-SR | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET070204L-SR | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET070204R-SR | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET0702V3L-SR | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ |  |
| | DCET0702V3R-SR | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T301L-SR | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T301R-SR | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T302L-SR | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T302R-SR | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T304L-SR | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T304R-SR | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | DCET11T3V3L-SR | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | DCET11T3V3R-SR | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | Medium cutting |
| NEW | DCET070201ML-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | MR/L-SR |
| NEW | DCET070201MR-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET070202ML-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET070202MR-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET070204ML-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET070204MR-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |  |
| NEW | DCET11T301ML-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET11T301MR-SR | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET11T302ML-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET11T302MR-SR | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET11T304ML-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| NEW | DCET11T304MR-SR | 0.4 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | Medium cutting |
| NEW | DCET0702V3L-SRF | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | R/L-SRF |
| NEW | DCET0702V3R-SRF | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | DCET11T3V3L-SRF | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | |  |
| NEW | DCET11T3V3R-SRF | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| | DCET070201ML-SRF | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | MR/L-SRF |
| | DCET070201MR-SRF | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | DCET070202ML-SRF | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | DCET070202MR-SRF | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | DCET070204ML-SRF | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | DCET070204MR-SRF | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | |  |
| | DCET11T301ML-SRF | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | DCET11T301MR-SRF | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | DCET11T302ML-SRF | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | DCET11T302MR-SRF | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| | DCET11T304ML-SRF | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | |
| NEW | DCET11T304MR-SRF | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | ● | | | | | Finish cutting |

2/8

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| NEW | DCET070201ML-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | R/L-SS |
| NEW | DCET070201MR-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET070202ML-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET070202MR-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET070204ML-SS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | DCET070204MR-SS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | DCET0702V3L-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET0702V3R-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T301ML-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T301MR-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T302ML-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T302MR-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T304ML-SS | 0.4 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T304MR-SS | 0.4 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | | | |
| NEW | DCET11T3V3L-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | DCET11T3V3R-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | Light cutting |
| | DCET0702V3LW-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | | R/LW-SN |
| | DCET0702V3RW-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| | DCET11T3V3LW-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | | |
| | DCET11T3V3RW-SN*3 | 0.03 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | Medium cutting (Wiper) |
| | DCGT070202-AZ | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | AZ |
| | DCGT070204-AZ | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | DCGT11T302-AZ | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | DCGT11T304-AZ | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | ● | Medium cutting |
| | DCGT11T308-AZ | 0.8 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | ● | Finish cutting |
| | DCGT070201M-FS | 0.1*2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | | | | | | | | | | FS |
| | DCGT070202M-FS | 0.2*2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | | | | | | | | | | |
| | DCGT070204M-FS | 0.4*2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | | | | | | | | | | |
| | DCGT11T301M-FS | 0.1*2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | | | | | | | | | | |
| | DCGT11T302M-FS | 0.2*2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | | | | | | | | | | |
| | DCGT11T304M-FS | 0.4*2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | ● | | | | | | | | | | | | | Finish cutting |
| | DCGT070201M-FSF | 0.1 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | FSF |
| | DCGT070202M-FSF | 0.2 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| | DCGT11T301M-FSF | 0.1 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| | DCGT11T302M-FSF | 0.2 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | Finish cutting |
| | DCGT070201M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | FSF-P |
| | DCGT070202M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| | DCGT0702V5M-FSF-P | 0.05 | | | | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| | DCGT11T301M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| | DCGT11T302M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| | DCGT11T304M-FSF-P | 0.4 | | | | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| | DCGT11T3V5M-FSF-P | 0.05 | | | | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | Finish cutting |

3/8

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.
*3 Diameter of inscribed circle is special.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
✣: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | |
|---|---|---|
| P | Steel | ●○ ●○ ●○ ✻○ ✻○ ✻● ✻○ |
| M | Stainless steel | ●○ ●○ ●○ ✻○ ●○ ●○ ✻○ ✻● ○○ ✻○ ●○ ○○ ○○ ○○ ✻○ |
| K | Cast iron | ●○ ●○ ✻○ ●○ ✻○ ○○ ○○ ✻○ ○○ ✻○ |
| N | Non-ferrous metal | ●○ |
| S | Heat resistant alloy, Titanium alloy | ●○ ●○ ●○ ✻○ ●○ ✻○ ●○ ●○ ●○ |

| Order number | RE | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTi20T | HTi05T | HTi10 | |
| DCGT070201M-FS-P | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | FS-P |
| DCGT070202M-FS-P | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | |
| DCGT070204M-FS-P | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | |
| DCGT11T301M-FS-P | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | |
| DCGT11T302M-FS-P | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | |
| DCGT11T304M-FS-P | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | ● | | | | | Finish cutting |
| DCGT070201M-LS | 0.1 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | | | | | | | | | | | LS |
| DCGT070202M-LS | 0.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | | | | | | | | | | | |
| DCGT070204M-LS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | | | | | | | | | | | |
| DCGT11T301M-LS | 0.1 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | | | | | | | | | | | |
| DCGT11T302M-LS | 0.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | | | | | | | | | | | |
| DCGT11T304M-LS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | | | | | | | | | | | | | | Light cutting |
| DCGT070201M-LS-P | 0.1*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | | | | LS-P |
| DCGT070202M-LS-P | 0.2*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | | | | |
| DCGT070204M-LS-P | 0.4*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | | | | |
| DCGT0702V5M-LS-P | 0.05*2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | |
| DCGT11T301M-LS-P | 0.1*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | | | | |
| DCGT11T302M-LS-P | 0.2*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | | | | |
| DCGT11T304M-LS-P | 0.4*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | ● | | | | | Light cutting |
| DCGT070202L-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | ★ | | | ● | | | | | | ★ | R/L-F |
| DCGT070202R-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | ★ | |
| DCGT070204L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | ★ | | | ● | | | | | | ★ | |
| DCGT070204R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | ★ | |
| DCGT11T302L-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | ★ | | | ● | | | | | | ★ | |
| DCGT11T302R-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | ★ | |
| DCGT11T304L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | ★ | | | ● | | | | | | ★ | |
| DCGT11T304R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | ★ | Finish cutting |
| DCGT070201R-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | R/L-SN |
| DCGT070202L-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT070202R-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT0702V3R-SN | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T301L-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T301R-SN | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T302L-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T302R-SN | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T304L-SN | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T304R-SN | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| DCGT11T3V3L-SN | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | | |
| DCGT11T3V3R-SN | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | | Medium cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
●: General cutting (1st recommendation)
○: General cutting (2nd recommendation)
✻●: Unstable cutting (1st recommendation)
✻○: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ✲ | ❁ | ● | ● | ● | ✲ | ● | ● | ✲ | ○ | ✲ | ● | ● | ✲ | ● | | | | ✲ | ✲ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ● | ● | ● | ✲ | ● | ● | ✲ | ○ | ✲ | | | | ● | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ✲ | ◶ | | ❁ | | | | | | | | ● | ● | | ◶ | |

| Order number | RE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DCGT070201ML-SN | 0.1 | ● | | | | | ★ | | | | | | | | | | | | ★ | | | | | | | | | | | | | | | | | | MR/L-SN |
| DCGT070201MR-SN | 0.1*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| DCGT070202ML-SN | 0.2*2 | ● | | | | | ★ | | | | | | | | | | | | ★ | | | | | | | | | | | | | | | | | | |
| DCGT070202MR-SN | 0.2*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| DCGT070204MR-SN | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| DCGT11T301ML-SN | 0.1*2 | ● | | | | | ★ | | | | | | | | | | | | ★ | | | | | | | | | | | | | | | | | | |
| DCGT11T301MR-SN | 0.1*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| DCGT11T302ML-SN | 0.2*2 | ● | | | | | ★ | | | | | | | | | | | | ★ | | | | | | | | | | | | | | | | | | |
| DCGT11T302MR-SN | 0.2*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| DCGT11T304ML-SN | 0.4*2 | ● | | | | | ★ | | | | | | | | | | | | ★ | | | | | | | | | | | | | | | | | | |
| DCGT11T304MR-SN | 0.4*2 | ● | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | Medium cutting |
| DCGT070201L-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | R/L-SS |
| DCGT070201R-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | |
| DCGT070202L-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | |
| DCGT070202R-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | |
| DCGT0702V3L-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | |
| DCGT0702V3R-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | |
| DCGT11T301R-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| DCGT11T302R-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| DCGT11T3V3R-SS | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | Light cutting |
| DCGT070201ML-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MR/L-SS |
| DCGT070201MR-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT070202ML-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT070202MR-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T301ML-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T301MR-SS | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T302ML-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T302MR-SS | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T304ML-SS | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T304MR-SS | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| DCGT11T301MR-SRF | 0.1*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | R-SRF |
| DCGT11T302MR-SRF | 0.2*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| DCGT11T304MR-SRF | 0.4*2 | | | | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| DCGT070201M-SMG | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | SMG |
| DCGT070202M-SMG | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| DCGT070204M-SMG | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| DCGT11T301M-SMG | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCGT11T302M-SMG | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| DCGT11T304M-SMG | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | Medium cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ✲ | ❁ | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ● | ● | ● | ✲ | ● | ● | ✲ | ○ | ✲ | | | | ● | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ✲ | ◶ | | ❁ | | | | | | | | ● | ● | | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| DCGW070200 | 0.0 | Flat Top |
| DCGW070201 | 0.1 | |
| DCGW070202 | 0.2 | |
| DCGW0702V5 | 0.05 | |
| DCGW11T300 | 0.0 | |
| DCGW11T301 | 0.1 | |
| DCGW11T302 | 0.2 | |
| DCGW11T304 | 0.4 | |
| DCGW11T3V5 | 0.05 | |
| DCMT070202-FM | 0.2 | FM |
| DCMT070204-FM | 0.4 | |
| DCMT11T302-FM | 0.2 | |
| DCMT11T304-FM | 0.4 | |
| DCMT11T308-FM | 0.8 | Finish cutting |
| DCMT070202-FP | 0.2 | FP |
| DCMT070204-FP | 0.4 | |
| DCMT11T302-FP | 0.2 | |
| DCMT11T304-FP | 0.4 | |
| DCMT11T308-FP | 0.8 | Finish cutting |
| DCMT070202-FS | 0.2 | FS |
| DCMT070204-FS | 0.4 | |
| DCMT11T302-FS | 0.2 | |
| DCMT11T304-FS | 0.4 | |
| DCMT11T308-FS | 0.8 | Finish cutting |
| DCMT070202-FV | 0.2 | FV |
| DCMT070204-FV | 0.4 | |
| DCMT070208-FV | 0.8 | |
| DCMT11T302-FV | 0.2 | |
| DCMT11T304-FV | 0.4 | |
| DCMT11T308-FV | 0.8 | Finish cutting |
| DCMT070202-LM | 0.2 | LM |
| DCMT070204-LM | 0.4 | |
| DCMT070208-LM | 0.8 | |
| DCMT11T302-LM | 0.2 | |
| DCMT11T304-LM | 0.4 | |
| DCMT11T308-LM | 0.8 | Light cutting |
| DCMT070202-LP | 0.2 | LP |
| DCMT070204-LP | 0.4 | |
| DCMT070208-LP | 0.8 | |
| DCMT11T302-LP | 0.2 | |
| DCMT11T304-LP | 0.4 | |
| DCMT11T308-LP | 0.8 | Light cutting |

6/8

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| DCMT070202-LS | 0.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | LS |
| DCMT070204-LS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT070208-LS | 0.8 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| DCMT11T302-LS | 0.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT11T304-LS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT11T308-LS | 0.8 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | Light cutting |
| DCMT070202-MK | 0.2 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | MK |
| DCMT070204-MK | 0.4 | | | | | | | | | | | | | | | ★ | ● | ★ | | | | | | | | | | | | | | | | | | | | |
| DCMT070208-MK | 0.8 | | | | | | | | | | | | | | | ★ | ● | ★ | | | | | | | | | | | | | | | | | | | | |
| DCMT11T302-MK | 0.2 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | |
| DCMT11T304-MK | 0.4 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | |
| DCMT11T308-MK | 0.8 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | Medium cutting |
| DCMT070202-MM | 0.2 | | | | | | | ● | ● | | | ● | ● | | | | | | | | | | | ● | | | | | | | | | | | | | | MM |
| DCMT070204-MM | 0.4 | | | | | | | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | | | | | | | | | | | |
| DCMT070208-MM | 0.8 | | | | | | | ● | ● | ★ | ● | ● | ★ | | | | | | | | | | | ● | ● | | | | | | | | | | | | | |
| DCMT11T302-MM | 0.2 | | | | | | | ● | ● | | | ● | | | | | | | | | | | | ● | | | | | | | | | | | | | | |
| DCMT11T304-MM | 0.4 | | | | | | | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | | | | | | | | | | | |
| DCMT11T308-MM | 0.8 | | | | | | | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | | | | | | | | | | | Medium cutting |
| DCMT070202-MP | 0.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MP |
| DCMT070204-MP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | | | | | | | |
| DCMT070208-MP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | ★ | | | | | | | |
| DCMT11T302-MP | 0.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCMT11T304-MP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | | | | | | | |
| DCMT11T308-MP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | | | | | | | |
| DCMT11T312-MP | 1.2 | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |
| DCMT070202-MS | 0.2 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | MS |
| DCMT070204-MS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT070208-MS | 0.8 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT11T302-MS | 0.2 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| DCMT11T304-MS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT11T308-MS | 0.8 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | |
| DCMT11T312-MS | 1.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | | Medium cutting |
| DCMT070202-MV | 0.2 | | ● | ● | ★ | ● | | | | | ● | ● | ● | ● | | | | | | | | | | | ● | | ● | ● | | ● | ★ | | | | | | MV |
| DCMT070204-MV | 0.4 | | ● | ● | ★ | ● | | | | | ● | ● | ● | ● | | ● | | | | | | | | | ● | | ● | ● | | ★ | ● | ★ | | | | | |
| DCMT070208-MV | 0.8 | | ● | ● | ★ | ● | | | | | ● | ● | | ● | | ● | | | | | | | | | ● | | ● | ● | | ★ | ★ | ★ | | | | | |
| DCMT11T302-MV | 0.2 | | ● | ● | ★ | ● | | | | | ● | | ● | ● | | | | | | | | | | | ● | | ● | ● | | ● | ● | | | | | | |
| DCMT11T304-MV | 0.4 | | ● | ● | ★ | ● | | | | | ● | ● | ● | ● | | ● | | | | | | | | | ● | | ● | ● | | ● | ● | | | | | | |
| DCMT11T308-MV | 0.8 | | ● | ★ | ★ | ● | | | | | ● | ● | ● | ● | | ● | | | | | | | | | ● | | ● | ● | | ● | ● | | | | | | Medium cutting |
| DCMT070202-SV | 0.2 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | | | | ★ | ● | ● | | | | | SV |
| DCMT070204-SV | 0.4 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | | | | ● | ● | ● | | | | | |
| DCMT070208-SV | 0.8 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | | | | ★ | ● | ★ | | | | | |
| DCMT11T302-SV | 0.2 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | | | | ● | ● | ● | | | | | |
| DCMT11T304-SV | 0.4 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | | | | ● | ● | ● | | | | | |
| DCMT11T308-SV | 0.8 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | | | | ● | ● | ★ | | | | | Light cutting |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
●: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
✣: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## DC TYPE INSERTS, 55° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTi20T | HTi05T | HTi10 |
| P | Steel | ◐ | ● | ◐ | ✲ | ❁ | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✲ | ● | ◐ | ✲ | ○ | ✲ | | | | ◐ | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ◐ | ◐ | ✲ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✲ | ◶ | | ❁ | | | | | | | | ● | ◐ | | | ◶ |
| **Order number** | **RE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **Shape** |
| DCMT070202 | 0.2 | | | | ● | | | | | | | | | ● | | | | | | | | | | | | | ● | ● | | | ● | ● | | ● | | | Standard |
| DCMT070204 | 0.4 | | | | ● | | | | | | | | | ● | | | | | | | | | | | ● | | ● | ● | | | ● | ● | | ● | | | |
| DCMT070208 | 0.8 | | | | | | | | | | | | | ● | | | | | | | | | | | | | ● | ★ | | | ● | ● | | | | | |
| DCMT11T302 | 0.2 | | | | ● | | | | | | | | | ● | | | | | | | | | | | | | ● | ● | | | ● | ● | | ● | | | |
| DCMT11T304 | 0.4 | | | | ● | | | | | | | | | ● | | | | | | | | | | | ● | | ● | ● | | | ● | ● | | ● | | ★ | |
| DCMT11T308 | 0.8 | | | | ● | | | | | | | | | ● | | | | | | | | | | | ● | | ● | ★ | | | ● | ● | | ● | | | Medium cutting |
| DCMW070204 | 0.4 | | | | | | | | | | | | | | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | ● | Flat Top |
| DCMW11T304 | 0.4 | | | | | | | | | | | | | | | ● | ● | ★ | | | | | | | | | | | | | ★ | | | ★ | ● | |
| DCMW11T308 | 0.8 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | ● | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DCMX070202-SW | 0.2 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | SW |
| DCMX070204-SW | 0.4 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| DCMX070208-SW | 0.8 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| DCMX11T302-SW | 0.2 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| DCMX11T304-SW | 0.4 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | Light cutting (Wiper) |
| DCMX11T308-SW | 0.8 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |

8/8

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# TC TYPE INSERTS

## 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| NEW | TCET080201ML-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | R/L-SS |
| NEW | TCET080201MR-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET080202ML-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET080202MR-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET110201ML-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET110201MR-SS | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET110202ML-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET110202MR-SS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET110204ML-SS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | |
| NEW | TCET110204MR-SS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | Light cutting |
| | TCGT110202-AZ | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | AZ |
| | TCGT110204-AZ | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TCGT110208-AZ | 0.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TCGT16T302-AZ | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TCGT16T304-AZ | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | Medium cutting |
| | TCGT16T308-AZ | 0.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | Finish cutting |
| | TCGT060101ML-F | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | MR/L-F |
| | TCGT060102ML-F | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TCGT060104ML-F | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TCGT060101MR-F | 0.1*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TCGT060102MR-F | 0.2*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TCGT060104MR-F | 0.4*2 | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| | TCGT060101L-F | 0.1 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | | R/L-F |
| | TCGT060102L-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | ★ | |
| | TCGT060102R-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | | ★ | |
| | TCGT060104L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ● | | | | | | ★ | |
| | TCGT060104R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | |
| | TCGT0601V3L-F | 0.03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | Finish cutting |
| | TCGW080201 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | Flat Top |
| | TCGW080202 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| | TCGW110201 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| | TCGW110202 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| | TCGW110204 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | |
| | TCMT090202-FM | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | FM |
| | TCMT090204-FM | 0.4 | | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | | ● | | | | | | | | | | | |
| | TCMT110202-FM | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| | TCMT110204-FM | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| | TCMT16T304-FM | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | Finish cutting |

1/3

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## TC TYPE INSERTS, 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ❖ | ❖ | ◕ | ◕ | ◕ | ❖ | ● | ◕ | ❖ | ○ | ❖ | | | | | | | | ❖ | ❖ | ❖ | ❖ | ◕ | ○ | ○ | ◶ | ○ | ◶ | | ❖ | | | |
| M | Stainless steel | | | | | | ◕ | ● | ◕ | ❖ | ● | ◕ | ❖ | ○ | ❖ | | | | ◕ | | | | ◶ | ❖ | ❖ | ❖ | | ○ | ○ | | ○ | | | ❖ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ❖ | | | | | ◶ | | ❖ | | | ○ | ○ | | ○ | | | ❖ | ○ | ◶ | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◕ | ● | ◕ | ❖ | ◶ | | ❖ | | | | | | | | ● | ◕ | | ◶ | |

| Order number | RE | Shape |
|---|---|---|
| TCMT090202-FP | 0.2 | FP |
| TCMT090204-FP | 0.4 | |
| TCMT110202-FP | 0.2 | |
| TCMT110204-FP | 0.4 | |
| TCMT16T304-FP | 0.4 | Finish cutting |
| TCMT110204-FV | 0.4 | FV |
| TCMT16T304-FV | 0.4 | |
| | | |
| | | |
| | | Finish cutting |
| TCMT110202-LK | 0.2 | LK |
| TCMT110204-LK | 0.4 | |
| TCMT110208-LK | 0.8 | |
| | | |
| | | Light cutting |
| TCMT090204-LM | 0.4 | LM |
| TCMT090208-LM | 0.8 | |
| TCMT110204-LM | 0.4 | |
| TCMT110208-LM | 0.8 | |
| TCMT16T304-LM | 0.4 | |
| TCMT16T308-LM | 0.8 | Light cutting |
| TCMT090204-LP | 0.4 | LP |
| TCMT090208-LP | 0.8 | |
| TCMT110202-LP | 0.2 | |
| TCMT110204-LP | 0.4 | |
| TCMT110208-LP | 0.8 | |
| TCMT16T304-LP | 0.4 | |
| TCMT16T308-LP | 0.8 | Light cutting |
| TCMT090202-LS | 0.2 | LS |
| TCMT110202-LS | 0.2 | |
| | | |
| | | |
| | | Light cutting |
| TCMT110204-MK | 0.4 | MK |
| TCMT110208-MK | 0.8 | |
| TCMT16T304-MK | 0.4 | |
| TCMT16T308-MK | 0.8 | |
| TCMT16T312-MK | 1.2 | Medium cutting |
| TCMT090204-MM | 0.4 | MM |
| TCMT090208-MM | 0.8 | |
| TCMT110204-MM | 0.4 | |
| TCMT110208-MM | 0.8 | |
| TCMT16T304-MM | 0.4 | |
| TCMT16T308-MM | 0.8 | |
| TCMT16T312-MM | 1.2 | Medium cutting |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## TC TYPE INSERTS, 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ● | ● | ● | ❖ | ❁ | ◐ | ◐ | ◐ | ❖ | ● | ◐ | ❖ | ○ | ❁ | ● | ● | ❖ | ◐ | | | | ❖ | ❁ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ❖ | ● | ◐ | ❖ | ○ | ❖ | | | | ◐ | | | | ◶ | ❖ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ❖ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ● | ● | ● | ❖ | ◶ | | ❁ | | | | | | | | ● | ● | | ◶ |

| Order number | RE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TCMT090204-MP | 0.4 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ★ | | | | | | MP |
| TCMT090208-MP | 0.8 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ★ | | | | | | |
| TCMT110202-MP | 0.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TCMT110204-MP | 0.4 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | | | | | |
| TCMT110208-MP | 0.8 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ★ | | | | | | |
| TCMT16T304-MP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ★ | | | | | | |
| TCMT16T308-MP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | |
| TCMT16T312-MP | 1.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ★ | | | | | | Medium cutting |
| TCMT090204-MS | 0.4 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | ● | | | | | MS |
| TCMT090208-MS | 0.8 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | ● | | | | | |
| TCMT110204-MS | 0.4 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | |
| TCMT110208-MS | 0.8 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | |
| TCMT16T304-MS | 0.4 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | ● | | | | | |
| TCMT16T308-MS | 0.8 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | ● | | | | | |
| TCMT16T312-MS | 1.2 | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | ● | | | | | Medium cutting |
| TCMT090204 | 0.4 | | | | | ★ | | | | | | | | ★ | | | | | | | | | | | | | ★ | ● | | | ● | ● | | | ● | | | Standard |
| TCMT110202 | 0.2 | | | | | ★ | | | | | | | | ● | | | | | | | | | | | ★ | | ★ | ★ | | | ● | ● | | | | | | |
| TCMT110204 | 0.4 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | ● | ★ | | | ● | ● | | | ● | | | |
| TCMT110208 | 0.8 | | | | | | | | | | | | | | | | | | | | | | | | ★ | | ● | | | | | | | | | | | |
| TCMT16T304 | 0.4 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ★ | | ● | ★ | | | ● | ● | | | ● | | | |
| TCMT16T308 | 0.8 | | | | | ● | | | | | | | | ● | | | | | | | | | | | ● | | ● | ★ | | | ● | ● | | | ● | | | Medium cutting |
| TCMW110204 | 0.4 | | | | | | | | | | | | | | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | ● | Flat Top |
| TCMW16T304 | 0.4 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | ● | |
| TCMW16T308 | 0.8 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | ● | |
| TCMW16T312 | 1.2 | | | | | | | | | | | | | | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | |
| TCMX090204-SW | 0.4 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | SW |
| TCMX110204-SW | 0.4 | | ● | ● | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (Wiper) |

3/3

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

# TP TYPE INSERTS

## 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| P | Steel | | ◐ | ● | ◐ | ❖ | ❁ | | | | | | | | | | | | | | | | | ❖ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | | |
| M | Stainless steel | | | | | | | ◐ | ● | ◐ | ❖ | ● | ◐ | ❖ | ○ | ❖ | | | | ◐ | | | ◶ | ❖ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | | |
| K | Cast iron | | | | | | | | | | | | | | | | ◐ | ◐ | ❖ | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ | | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ | |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ❖ | ◶ | | ❁ | | | | | | | ● | ◐ | | | ◶ | |
| NEW | TPEH080201ML-SR | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | R/L-SR |
| NEW | TPEH080201MR-SR | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH080202ML-SR | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH080202MR-SR | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH0802V3L-SR | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH0802V3R-SR | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH110301ML-SR | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH110301MR-SR | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH110302ML-SR | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH110302MR-SR | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH1103V3L-SR | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | |
| NEW | TPEH1103V3R-SR | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | | | | | | | | | | | | | | | Medium cutting |
| | TPGB080202 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | Flat Top |
| | TPGB080204 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB080208 | 0.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB090202 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB090204 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB110201 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB110202 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB110204 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB1102V5 | 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB160304 | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGB160308 | 0.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | |
| | TPGH080202L-FS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | ● | | | ★ | | | | | ★ | R/L-FS |
| | TPGH080202R-FS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | ★ | | | | | ★ | |
| | TPGH080204L-FS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | ● | | | ★ | | | | | ★ | |
| | TPGH080204R-FS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | ★ | | | | | ★ | |
| | TPGH090202L-FS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | ● | | | ★ | | | | | ★ | |
| | TPGH090202R-FS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | ★ | | | | | ★ | |
| | TPGH090204L-FS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | ★ | | | ★ | | | | | ★ | |
| | TPGH090204R-FS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | ★ | | | | | ★ | |
| | TPGH110302L-FS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | ● | | | ★ | | | | | ★ | |
| | TPGH110302R-FS | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | ● | | | | | ★ | |
| | TPGH110304L-FS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | ● | | | ● | | | | | ★ | |
| | TPGH110304R-FS | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | ★ | | | | | ★ | Finish cutting |
| | TPGH090201M-FSF | 0.1 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | FSF |
| | TPGH090202M-FSF | 0.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| | TPGH090204M-FSF | 0.4 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |

1/4

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## TP TYPE INSERTS, 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ✣ | ❁ | ◐ | ○ | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | | | | ◐ | | | | ✣ | ❁ | ❁ | ◐ | ○ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | | | | ◐ | | | ◶ | ✣ | ❁ | ❁ | | ○ | ○ | | ○ | | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ◐ | ✣ | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✣ | ◶ | | ❁ | | | | | | | | ● | ◐ | | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| TPGH080201M-FSF-P | 0.1 | FSF-P |
| TPGH080202M-FSF-P | 0.2 | |
| TPGH090201M-FSF-P | 0.1 | |
| TPGH090202M-FSF-P | 0.2 | |
| TPGH090204M-FSF-P | 0.4 | Finish cutting |
| TPGX080202 | 0.2 | Flat Top |
| TPGX080204 | 0.4 | |
| TPGX080208 | 0.8 | |
| TPGX090202 | 0.2 | |
| TPGX090204 | 0.4 | |
| TPGX090208 | 0.8 | |
| TPGX110302 | 0.2 | |
| TPGX110304 | 0.4 | |
| TPGX110308 | 0.8 | |
| TPGX080202L | 0.2 | R/L |
| TPGX080202R | 0.2 | |
| TPGX080204L | 0.4 | |
| TPGX080204R | 0.4 | |
| TPGX090202L | 0.2 | |
| TPGX090202R | 0.2 | |
| TPGX090204L | 0.4 | |
| TPGX090204R | 0.4 | |
| TPGX090208L | 0.8 | |
| TPGX090208R | 0.8 | |
| TPGX110302L | 0.2 | |
| TPGX110304L | 0.4 | |
| TPGX110304R | 0.4 | |
| TPGX110308L | 0.8 | |
| TPGX110308R | 0.8 | Finish cutting |
| TPMH090202-FM | 0.2 | FM |
| TPMH090204-FM | 0.4 | |
| TPMH110302-FM | 0.2 | |
| TPMH110304-FM | 0.4 | |
| TPMH110308-FM | 0.8 | Finish cutting |
| TPMH090202-FP | 0.2 | FP |
| TPMH090204-FP | 0.4 | |
| TPMH110302-FP | 0.2 | |
| TPMH110304-FP | 0.4 | |
| TPMH110308-FP | 0.8 | Finish cutting |
| TPMH090202-FS | 0.2 | FS |
| TPMH090204-FS | 0.4 | |
| TPMH110302-FS | 0.2 | |
| TPMH110304-FS | 0.4 | |
| TPMH110308-FS | 0.8 | Finish cutting |

2/4

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## TP TYPE INSERTS, 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ✲ | ✲ | | | | | | | | | | | | | | | | | ✲ | ✲ | ✲ | | ◐ | ○ | ○ | ◶ | ○ | ◶ | | | ✲ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✲ | ● | ◐ | ✲ | ○ | ✲ | | | | ◐ | | | ◶ | ✲ | ✲ | ✲ | | | ○ | ○ | | ○ | | | | ✲ | | |
| K | Cast iron | | | | | | | | | | | | | | | ◐ | ◐ | ✲ | | | | ◶ | | ✲ | | | | ○ | ○ | | ○ | | | | ✲ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✲ | ◶ | | ✲ | | | | | | | | ● | ◐ | | | ◶ |

| Order number | RE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPMH080202-FV | 0.2 | | | ★ | ★ | ● | | | | | | | | | | | | | | | | | | | ● | | ★ | | | | ★ | ★ | | | | | FV |
| TPMH080204-FV | 0.4 | | | ★ | ★ | ● | | | | | | | | | | | | | | | | | | | ● | | ★ | | | | ★ | ★ | | | | | |
| TPMH090202-FV | 0.2 | | | ★ | ★ | ★ | | | | | | | | | | | | | | | ● | | | ● | ● | | ● | | | | ● | ★ | | | | | |
| TPMH090204-FV | 0.4 | | | ● | ★ | ● | | | | | | | | | | | | | | | ● | | | ● | ● | | ★ | | | | ★ | ★ | | | | | |
| TPMH110302-FV | 0.2 | | | ★ | ★ | ★ | | | | | | | | | | | | | | | | | | | ● | | ● | | | | ★ | ★ | | | | | |
| TPMH110304-FV | 0.4 | | ● | ● | ★ | ● | | | | | | | | | | | | | | | ● | | | ● | ● | | ● | | | | ★ | ★ | | | | | |
| TPMH110308-FV | 0.8 | | ● | ● | ★ | ★ | | | | | | | | | | | | | | | ● | | | ● | ★ | | ★ | | | | ● | ★ | | | | | |
| TPMH160304-FV | 0.4 | | ● | ★ | ★ | ★ | | | | | | | | | | | | | | | ● | | | ● | ★ | | ★ | | | | ★ | ★ | | | | | |
| TPMH160308-FV | 0.8 | | | ● | ★ | | | | | | | | | | | | | | | | | | | | ★ | | ★ | | | | ★ | ★ | | | | | Finish cutting |
| TPMH110302-LK | 0.2 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | LK |
| TPMH110304-LK | 0.4 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | |
| TPMH110308-LK | 0.8 | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| TPMH090202-LM | 0.2 | | | | | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | LM |
| TPMH090204-LM | 0.4 | | | | | | | ● | ● | | | ● | ● | | | | | | | | | | | ● | | | | | | | | | | | | | |
| TPMH110302-LM | 0.2 | | | | | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| TPMH110304-LM | 0.4 | | | | | | | ● | ● | | | ● | ● | | | | | | | | | | | ● | | | | | | | | | | | | | |
| TPMH110308-LM | 0.8 | | | | | | | ● | ● | | | ● | ● | | | | | | | | | | | ● | | | | | | | | | | | | | |
| TPMH160302-LM | 0.2 | | | | | | | ● | ● | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| TPMH160304-LM | 0.4 | | | | | | | ● | ● | | | ● | ● | | | | | | | | | | | ● | | | | | | | | | | | | | |
| TPMH160308-LM | 0.8 | | | | | | | ● | ● | | | ● | ● | | | | | | | | | | | ● | | | | | | | | | | | | | Light cutting |
| TPMH080202-LP | 0.2 | | | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | LP |
| TPMH080204-LP | 0.4 | | | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPMH090202-LP | 0.2 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPMH090204-LP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPMH110302-LP | 0.2 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPMH110304-LP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPMH110308-LP | 0.8 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| TPMH090202-LS | 0.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | LS |
| TPMH090204-LS | 0.4 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| TPMH110302-LS | 0.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| TPMH110304-LS | 0.4 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| TPMH110308-LS | 0.8 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| TPMH160302-LS | 0.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| TPMH160304-LS | 0.4 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| TPMH160308-LS | 0.8 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | Light cutting |
| TPMH080202-MV | 0.2 | | | ● | ★ | ● | | | | | | ● | ● | | ● | | | | | | | | | | ★ | | ★ | | | | ★ | ★ | | | | | MV |
| TPMH080204-MV | 0.4 | | | ● | ★ | ● | | | | | | ● | ● | ● | ● | | ● | | | | | | | | ● | | ★ | ★ | | ★ | ● | ★ | | | | | |
| TPMH090202-MV | 0.2 | | | ● | ★ | ● | | | | | | | | | ● | | | | | | | | | | ● | | ★ | | | | ● | ★ | | | | | |
| TPMH090204-MV | 0.4 | | | ● | ★ | ● | | | | | | ● | ● | ● | ● | | ★ | | | | | | | | ● | | ★ | ● | | ★ | ● | ★ | | | | | |
| TPMH090208-MV | 0.8 | | | ● | ★ | ● | | | | | | ★ | ★ | | | | ★ | | | | | | | | ● | | ★ | | | | | ★ | | | | | |
| TPMH110302-MV | 0.2 | | | ● | ★ | ● | | | | | | ★ | ★ | | ★ | | | | | | | | | | ★ | | ★ | ★ | | ★ | ● | ★ | | | | | |
| TPMH110304-MV | 0.4 | | | ● | ★ | ● | | | | | | ● | ● | ● | ● | | ★ | | | | | | | | ● | | ★ | ★ | | ★ | ● | ★ | | | | | |
| TPMH110308-MV | 0.8 | | | ● | ★ | ● | | | | | | ★ | ● | ★ | ● | | ★ | | | | | | | | ● | | ★ | ★ | | ★ | ★ | ★ | | | | | Medium cutting |

3/4

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
✲: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## TP TYPE INSERTS, 60° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ✲ | ❁ | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | | ◐ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✲ | ● | ◐ | ✲ | ○ | ✲ | | | | ◐ | | | ◶ | ✲ | ❁ | ❁ | | | ○ | ○ | | ○ | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ◐ | ✲ | | | | ◶ | | ❁ | | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✲ | ◶ | | ❁ | | | | | | | | ● | ◐ | | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| TPMH080202-SV | 0.2 | SV |
| TPMH080204-SV | 0.4 | |
| TPMH090202-SV | 0.2 | |
| TPMH090204-SV | 0.4 | |
| TPMH110302-SV | 0.2 | |
| TPMH110304-SV | 0.4 | |
| TPMH110308-SV | 0.8 | Light cutting |
| TPMX090202-SW | 0.2 | SW |
| TPMX090204-SW | 0.4 | |
| TPMX090208-SW | 0.8 | |
| TPMX110302-SW | 0.2 | |
| TPMX110304-SW | 0.4 | Light cutting |
| TPMX110308-SW | 0.8 | (Wiper) |
| TPMX090204L | 0.4 | L |
| TPMX110304L | 0.4 | |
| | | Finish cutting |
| TPMX110304 | 0.4 | Standard |
| TPMX110308 | 0.8 | |
| | | Medium cutting |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# VB TYPE INSERTS

## 35° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| | VBET110300L-SN | 0.0*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | R/L-SN |
| | VBET110300R-SN | 0.0*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110301L-SN | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110301R-SN | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110302L-SN | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110302R-SN | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110304L-SN | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | VBET110304R-SN | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ● | |
| | VBET1103V3L-SN | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET1103V3R-SN | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | Medium cutting |
| | VBET110301L-SR | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | R/L-SR |
| | VBET110301R-SR | 0.1*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110302L-SR | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | VBET110302R-SR | 0.2*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET110304L-SR | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | VBET110304R-SR | 0.4*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | ★ | | | | | ★ | |
| | VBET1103V3L-SR | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | |
| | VBET1103V3R-SR | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | ★ | | | | | ★ | Medium cutting |
| NEW | VBET110301ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | ● | | | | | | | | | ● | | | | R/L-SRF |
| NEW | VBET110301MR-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | ● | | | | | | | | | ● | | | | |
| NEW | VBET110302ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | ● | | | | | | | | | ● | | | | |
| NEW | VBET110302MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | ● | | | | | | | | | ● | | | | |
| NEW | VBET1103V3L-SRF | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | ● | | | | | | | | | ● | | | | |
| NEW | VBET1103V3R-SRF | 0.03 | | | | | | ★ | | | | | | | | | | | | ● | | ● | | ● | | | | | | | | | ● | | | | Finish cutting |
| | VBET1103V3LW-SN | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | R/LW-SN |
| | VBET1103V3RW-SN | 0.03*2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | (Wiper) |
| | VBGT110301M-FS-P | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | FS-P |
| | VBGT110302M-FS-P | 0.2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| | VBGT110304M-FS-P | 0.4 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| | VBGT160401M-FS-P | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| | VBGT160402M-FS-P | 0.2 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| | VBGT160404M-FS-P | 0.4 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| | VBGT160408M-FS-P | 0.8 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | Finish cutting |



*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## VB TYPE INSERTS, 35° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| VBGT110302L-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● ★ | | | ★ | | | | | | ★ | R/L-F |
| VBGT110302R-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ ★ | | | ★ | | | | | | ★ | |
| VBGT110304L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | ★ | | | | | | ★ | |
| VBGT110304R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | ★ | | | | | | ★ | |
| VBGT160402L-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | ★ | | | | | | ★ | |
| VBGT160402R-F | 0.2 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | ★ | | | | | | ★ | |
| VBGT160404L-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | ★ | | | | | | ★ | |
| VBGT160404R-F | 0.4 | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | ★ | | | | | | ★ | Finish cutting |
| VBMT110302-FM | 0.2 | | | | | | | | | | | ★ | ★ | | | | | | | | | | ● | ● | | | | | | | | | | | | | FM |
| VBMT110304-FM | 0.4 | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | ● | ● | | | | | | | | | | | | | |
| VBMT110308-FM | 0.8 | | | | | | | | | | ★ | ★ | | | | | | | | | | | ● | ★ | | | | | | | | | | | | | |
| VBMT160404-FM | 0.4 | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | ● | ● | | | | | | | | | | | | | |
| VBMT160408-FM | 0.8 | | | | | | | | | | ★ | ★ | | | | | | | | | | | ● | ★ | | | | | | | | | | | | | |
| VBMT160412-FM | 1.2 | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | Finish cutting |
| VBMT110302-FP | 0.2 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | FP |
| VBMT110304-FP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | |
| VBMT110308-FP | 0.8 | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ★ | | | | | | |
| VBMT160404-FP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | |
| VBMT160408-FP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | |
| VBMT160412-FP | 1.2 | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| VBMT110302-FS | 0.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | FS |
| VBMT110304-FS | 0.4 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| VBMT110308-FS | 0.8 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| VBMT160404-FS | 0.4 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| VBMT160408-FS | 0.8 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| VBMT160412-FS | 1.2 | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | Finish cutting |
| VBMT110304-FV | 0.4 | | ● | ● | ★ | ● | | | | | | | | | | | | | | | ● | | | ● | ● | | | | | | ● | ★ | | | | | FV |
| VBMT110308-FV | 0.8 | | | ● | ★ | ★ | | | | | | | | | | | | | | | | | | ● | | | | | | | ★ | ★ | | | | | |
| VBMT160404-FV | 0.4 | | ● | ● | ★ | ● | | | | | | | | | | | | | | | ● | | | ● | ● | | | | | | ● | ★ | | | | | |
| VBMT160408-FV | 0.8 | | ● | ● | ★ | ● | | | | | | | | | | | | | | | ● | | | ● | ● | | | | | | ★ | ★ | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| VBMT110304-LM | 0.4 | | | | | | | ● | ● | ● | ● | ● | ● | | | | | | | | | | | ● | ● | | | | | | | | | | | | LM |
| VBMT110308-LM | 0.8 | | | | | | | ● | ★ | ★ | ● | ★ | ★ | | | | | | | | | | | ● | ● | | | | | | | | | | | | |
| VBMT160404-LM | 0.4 | | | | | | | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | ● | | | | | | | | | | | | |
| VBMT160408-LM | 0.8 | | | | | | | ● | ● | ★ | ● | ● | ★ | | | | | | | | | | | | ● | | | | | | | | | | | | |
| VBMT160412-LM | 1.2 | | | | | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |
| VBMT110304-LP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ★ | | | | | | LP |
| VBMT110308-LP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | | ● | | | | | | |
| VBMT160404-LP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | |
| VBMT160408-LP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | | | | | |
| VBMT160412-LP | 1.2 | | ● | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Light cutting |

2/3

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## VB TYPE INSERTS, 35° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◉ | ● | ◉ | ✲ | ✲ | ◉ | ● | ◉ | ✲ | ● | ◉ | ✲ | ○ | ✲ | ◉ | ◉ | ✲ | ◉ | | | | ✲ | ✲ | ✲ | ✲ | ◉ | ○ | ○ | ◶ | ○ | ◶ | | ✲ | | | |
| M | Stainless steel | ◉ | ● | ◉ | ✲ | ● | ◉ | ◉ | ✲ | ● | ◉ | ✲ | ○ | ✲ | | | | | ◉ | | | | ◶ | ✲ | ✲ | ✲ | | ○ | ○ | | ○ | | | ✲ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ◉ | ◉ | ✲ | | | | | ◶ | | ✲ | | | ○ | ○ | | ○ | | | ✲ | ○ | ◶ | |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◉ | ● | ◉ | ✲ | ◶ | | ✲ | | | | | | | | ● | ◉ | | ◶ |
| **Order number** | **RE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VBMT110302-LS | 0.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT110304-LS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT110308-LS | 0.8 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT160404-LS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT160408-LS | 0.8 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT160412-LS | 1.2 | | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| VBMT160404-MK | 0.4 | | | | | | | | | | | | | | | ★ | ● | ★ | | | | | | | | | | | | | | | | | | | |
| VBMT160408-MK | 0.8 | | | | | | | | | | | | | | | ★ | ● | ★ | | | | | | | | | | | | | | | | | | | |
| VBMT160404-MM | 0.4 | | | | | | | | ● | ● | ● | ● | ● | | | | | | | | | | | | ● | | | | | | | | | | | | |
| VBMT160408-MM | 0.8 | | | | | | | | ● | ● | ● | ● | ● | | | | | | | | | | | | ● | | | | | | | | | | | | |
| VBMT160404-MP | 0.4 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ● | | | ★ | | | | | | |
| VBMT160408-MP | 0.8 | | ● | ● | ★ | | | | | | | | | | | | | | | | | | | | | | ★ | | | ★ | | | | | | |
| VBMT160402-MS | 0.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT160404-MS | 0.4 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT160408-MS | 0.8 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT160412-MS | 1.2 | | | | | | | | | | | | | | | | | | | ● | ● | ● | | | | | | | | | | | ● | | | | |
| VBMT110304-MV | 0.4 | | | ● | ★ | ● | | | | | ● | ● | ● | ● | | ● | | | | | | | | | ● | | ● | ● | ★ | ● | ★ | | | | | |
| VBMT110308-MV | 0.8 | | | ● | ★ | ● | | | | | ★ | ★ | | ★ | | ● | | | | | | | | | ● | | ★ | ● | ★ | ● | ★ | | | | | |
| VBMT160404-MV | 0.4 | | | ● | ★ | ● | | | | | ● | ● | ● | ● | | ● | | | | | | | | | ● | | ● | ● | ● | ● | ● | | | | | |
| VBMT160408-MV | 0.8 | | | ★ | ★ | ● | | | | | ● | ● | | ● | | ● | | | | | | | | | ● | | ● | ● | ★ | ● | ★ | | | | | |
| VBMT110304-SV | 0.4 | | | | | ● | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | |
| VBMT110308-SV | 0.8 | | | | | ★ | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| VBMT160404-SV | 0.4 | | | | | ● | | | | | | | | | | | | | | | | | | | ● | | | | | | ● | | | | | |
| VBMT160408-SV | 0.8 | | | | | ● | | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | |
| VBMW160408 | 0.8 | | | | | | | | | | | | | | | ★ | ★ | ★ | | | | | | | | | | | | | | | | | | | |

| Order number | RE | Shape |
|---|---|---|
| VBMT110302-LS | 0.2 | LS |
| VBMT110304-LS | 0.4 | |
| VBMT110308-LS | 0.8 | |
| VBMT160404-LS | 0.4 | |
| VBMT160408-LS | 0.8 | |
| VBMT160412-LS | 1.2 | Light cutting |
| VBMT160404-MK | 0.4 | MK |
| VBMT160408-MK | 0.8 | |
| | | Medium cutting |
| VBMT160404-MM | 0.4 | MM |
| VBMT160408-MM | 0.8 | |
| | | Medium cutting |
| VBMT160404-MP | 0.4 | MP |
| VBMT160408-MP | 0.8 | |
| | | Medium cutting |
| VBMT160402-MS | 0.2 | MS |
| VBMT160404-MS | 0.4 | |
| VBMT160408-MS | 0.8 | |
| VBMT160412-MS | 1.2 | |
| | | Medium cutting |
| VBMT110304-MV | 0.4 | MV |
| VBMT110308-MV | 0.8 | |
| VBMT160404-MV | 0.4 | |
| VBMT160408-MV | 0.8 | |
| | | Medium cutting |
| VBMT110304-SV | 0.4 | SV |
| VBMT110308-SV | 0.8 | |
| VBMT160404-SV | 0.4 | |
| VBMT160408-SV | 0.8 | |
| | | Light cutting |
| VBMW160408 | 0.8 | Flat Top |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◉: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
✲: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

# VC TYPE INSERTS

## 35° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ❖ | ❁ | | | | | | | | | | | | | | | | | ❖ | ❁ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ❖ | ● | ◐ | ❖ | ○ | ❖ | | | | ◐ | | | | ◶ | ❖ | ❁ | ❁ | | ○ | ○ | | ○ | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ◐ | ◐ | ❖ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ❖ | ◶ | | ❁ | | | | | | | | ● | ◐ | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| VCET080202ML-SRF | 0.2*2 | MR/L-SRF |
| VCET080202MR-SRF | 0.2*2 | |
| VCET080204ML-SRF | 0.4*2 | |
| VCET080204MR-SRF | 0.4*2 | |
| VCET110301ML-SRF | 0.1*2 | |
| VCET110301MR-SRF | 0.1*2 | |
| VCET110302ML-SRF | 0.2*2 | |
| VCET110302MR-SRF | 0.2*2 | |
| VCET110304ML-SRF | 0.4*2 | |
| VCET110304MR-SRF | 0.4*2 | Finish cutting |
| VCGT110301M-FSF-P | 0.1 | FSF-P |
| VCGT110302M-FSF-P | 0.2 | |
| VCGT110304M-FSF-P | 0.4 | |
| | | Finish cutting |
| VCGT110301M-FS-P | 0.1*2 | FS-P |
| VCGT110302M-FS-P | 0.2*2 | |
| VCGT080202L-F | 0.2 | R/L-F |
| VCGT080202R-F | 0.2 | |
| VCGT080204L-F | 0.4 | |
| VCGT080204R-F | 0.4 | |
| | | Finish cutting |
| VCMT080202-FM | 0.2 | FM |
| VCMT080204-FM | 0.4 | |
| VCMT160404-FM | 0.4 | |
| VCMT160408-FM | 0.8 | |
| | | Finish cutting |
| VCMT080202-FP | 0.2 | FP |
| VCMT080204-FP | 0.4 | |
| | | Finish cutting |
| VCMT080202-FS | 0.2 | FS |
| VCMT080204-FS | 0.4 | |
| VCMT160404-FS | 0.4 | |
| VCMT160408-FS | 0.8 | |
| | | Finish cutting |

1/2

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

## VC TYPE INSERTS, 35° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTi20T | HTi05T | HTi10 |
| P | Steel | ● | ● | ● | ✲ | ❁ | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | ◕ | ● | ◕ | ✲ | ● | ◕ | ✲ | ○ | ✲ | | | | | | | | | ◕ | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◕ | ● | ◕ | ✲ | ◶ | ❁ | | | | | | | | | ● | ◕ | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| VCMT080202-FV | 0.2 | FV |
| VCMT080204-FV | 0.4 | |
| | | Finish cutting |
| VCMT080202-LM | 0.2 | LM |
| VCMT080204-LM | 0.4 | |
| | | Light cutting |
| VCMT080202-LP | 0.2 | LP |
| VCMT080204-LP | 0.4 | |
| | | Light cutting |
| VCMT080202-LS | 0.2 | LS |
| VCMT080204-LS | 0.4 | |
| | | Light cutting |
| VCMT080202-MV | 0.2 | MV |
| VCMT080204-MV | 0.4 | |
| | | Medium cutting |
| VCMT080202-SV | 0.2 | SV |
| VCMT080204-SV | 0.4 | |
| | | Light cutting |

2/2

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)
● / ★ = Expansion (N037)
● : Inventory maintained. ★ : Inventory maintained in Japan.

# WC TYPE INSERTS

## 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| NEW | WCET020101ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | R/L-SRF |
| NEW | WCET020101MR-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET020102ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET020102MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET040201ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET040201MR-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET040202ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET040202MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET06T302ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET06T302MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET06T304ML-SRF | 0.4 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCET06T304MR-SRF | 0.4 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCETL30201ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCETL30201MR-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCETL30202ML-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | |
| NEW | WCETL30202MR-SRF | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | | ● | | | | | | | | | ● | | | | | Finish cutting |
| | WCGT020101M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | FSF-P |
| | WCGT020102M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | |
| | WCGT040201M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | |
| | WCGT040202M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | |
| | WCGT06T301M-FSF-P | 0.1 | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | |
| | WCGT06T302M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | |
| | WCGT06T304M-FSF-P | 0.4 | | | | | | ● | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | |
| | WCGTL30201M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | |
| | WCGTL30202M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | ● | | | | | | | | | | | | | | Finish cutting |
| | WCGT020102L | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | R/L |
| | WCGT020102R | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | |
| | WCGT020104L | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | ● | | |
| | WCGT020104R | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ★ | | | | | | |
| | WCGTL30202L | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | |
| | WCGTL30204L | 0.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | | | | Finish cutting |
| | WCMT020102-FV | 0.2 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | FV |
| | WCMT020104-FV | 0.4 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| | WCMT040202-FV | 0.2 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| | WCMT040204-FV | 0.4 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| | WCMT06T302-FV | 0.2 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| | WCMT06T304-FV | 0.4 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| | WCMTL30202-FV | 0.2 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | |
| | WCMTL30204-FV | 0.4 | | ● | | | | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | | | | | Finish cutting |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## WC TYPE INSERTS, 80° WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTi20T | HTi05T | HTi10 |
| P | Steel | ● | ● | ● | ✲ | ❁ | | | | | | | | | | | | | | | | | | ✲ | ❁ | ❁ | ● | ○ | ○ | ◶ | ○ | ◶ | | ❁ | | | |
| M | Stainless steel | | | | | | ◕ | ● | ◕ | ✲ | ● | ● | ✲ | ○ | ✲ | | | | ◕ | | | | ◶ | ✲ | ❁ | ❁ | | ○ | ○ | | ○ | | | ❁ | | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ● | ✲ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◕ | ● | ◕ | ✲ | ◶ | | ❁ | | | | | | | | ● | ◕ | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| WCMT020102-MM | 0.2 | MM |
| WCMT020104-MM | 0.4 | |
| WCMT040202-MM | 0.2 | |
| WCMT040204-MM | 0.4 | |
| WCMT06T304-MM | 0.4 | |
| WCMT06T308-MM | 0.8 | |
| WCMTL30202-MM | 0.2 | |
| WCMTL30204-MM | 0.4 | Medium cutting |
| WCMT020102-MP | 0.2 | MP |
| WCMT020104-MP | 0.4 | |
| WCMT040202-MP | 0.2 | |
| WCMT040204-MP | 0.4 | |
| WCMT040208-MP | 0.8 | |
| WCMT06T304-MP | 0.4 | |
| WCMT06T308-MP | 0.8 | |
| WCMTL30202-MP | 0.2 | |
| WCMTL30204-MP | 0.4 | Medium cutting |
| WCMT020102 | 0.2 | Standard |
| WCMT020104 | 0.4 | |
| WCMT040202 | 0.2 | |
| WCMT040204 | 0.4 | |
| WCMT040208 | 0.8 | |
| WCMT06T304 | 0.4 | |
| WCMT06T308 | 0.8 | |
| WCMTL30202 | 0.2 | |
| WCMTL30204 | 0.4 | Medium cutting |



*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◕: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✲: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# INSERTS FOR OTHER TYPES OF BORING BARS

## POSITIVE WITH HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Order number | RE | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HTI05T | HTI10 | Shape |
| | TBGT060101M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | FSF-P |
| | TBGT060102M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| NEW | VPET110301ML-SN | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | MR/L-SN |
| NEW | VPET110301MR-SN | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET110302ML-SN | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET110302MR-SN | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Medium cutting |
| | VPET080201ML-SRF | 0.1*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | R/L-SRF |
| | VPET080201MR-SRF | 0.1*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET080202ML-SRF | 0.2*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET080202MR-SRF | 0.2*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET110301ML-SRF | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET110301MR-SRF | 0.1*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET110302ML-SRF | 0.2*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET110302MR-SRF | 0.2*2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| | VPET1103V3L-SRF | 0.03 | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | | | | | | | |
| | VPET1103V3R-SRF | 0.03 | | | | | | | | | | | | | | | | | | ● | | | | | | ★ | | | | | | | | | | | | Finish cutting |
| NEW | VPET080201ML-SS | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | MR/L-SS |
| NEW | VPET080201MR-SS | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET080202ML-SS | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET080202MR-SS | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET110301ML-SS | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET110301MR-SS | 0.1 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET110302ML-SS | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | |
| NEW | VPET110302MR-SS | 0.2 | | | | | | ★ | | | | | | | | | | | | ● | | | ● | | ● | | | | | | | | | | | | | Finish cutting |
| | VPGT110301M-FSF-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | FSF-P |
| | VPGT110302M-FSF-P | 0.2 | | | | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| | VPGT110304M-FSF-P | 0.4 | | | | | | ● | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |
| | VPGT110301M-FS-P | 0.1 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | FS-P |
| | VPGT110302M-FS-P | 0.2 | | | | | | ● | | | | | | | | | | | | ● | | | | | ● | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Finish cutting |

1/1

*1 To be replaced by new products.
*2 Indicates the maximum value of the corner R.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
●: General cutting (1st recommendation)
◔: General cutting (2nd recommendation)
❖: Unstable cutting (1st recommendation)
❖: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# INSERTS FOR OTHER TYPES OF BORING BARS

## POSITIVE WITHOUT HOLE

| | | Coated | | | | | | | | | | | | | | | | | | | Coated Cermet | | | | Cermet | | Carbide | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MS6015 | MC6115 | MC6125 | MC6135 | UE6020*1 | MS7025 | MC7015 | MC7025 | MP7035 | MC7115 | MC7125 | MP7135 | US7020 | US735 | MC5105 | MC5115 | MC5125 | MS9025 | MP9005 | MP9015 | MP9025 | VP10RT | VP30RT | VP15TF | UP20M | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | MT9005 | RT9010 | UTI20T | HT105T | HTI10 |
| P | Steel | ◐ | ● | ◐ | ✣ | ❁ | | | | | | | | | | | | | | | | | | ✣ | ❁ | ❁ | ◐ | ○ | ○ | ◶ | ○ | ◶ | | | ❁ | | |
| M | Stainless steel | | | | | | ◐ | ● | ◐ | ✣ | ● | ◐ | ✣ | ○ | ✣ | | | | ◐ | | | | ◶ | ✣ | ❁ | ❁ | | ○ | ○ | | ○ | | | | ❁ | | |
| K | Cast iron | | | | | | | | | | | | | | | ● | ◐ | ✣ | | | | | ◶ | | ❁ | | | ○ | ○ | | ○ | | | | ❁ | ○ | ◶ |
| N | Non-ferrous metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ◶ |
| S | Heat resistant alloy, Titanium alloy | | | | | | | | | | | | | | | | | | ◐ | ● | ◐ | ✣ | ◶ | | ❁ | | | | | | | | ● | ◐ | | | ◶ |

| Order number | RE | Shape |
|---|---|---|
| TPMR110304-LM | 0.4 | LM |
| TPMR110308-LM | 0.8 | |
| TPMR160304-LM | 0.4 | |
| TPMR160308-LM | 0.8 | |
| | | Light cutting |
| TPMR110304-MM | 0.4 | MM |
| TPMR110308-MM | 0.8 | |
| TPMR160304-MM | 0.4 | |
| TPMR160308-MM | 0.8 | |
| | | Medium cutting |
| TPGN090202 | 0.2 | Flat Top |
| TPGN090208 | 0.8 | |

1/1

*1 To be replaced by new products.

●: Stable cutting (1st recommendation)
○: Stable cutting (2nd recommendation)
◐: General cutting (1st recommendation)
◶: General cutting (2nd recommendation)
✣: Unstable cutting (1st recommendation)
❁: Unstable cutting (2nd recommendation)

● / ★ = Expansion (N038)

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# RECOMMENDED CUTTING CONDITIONS

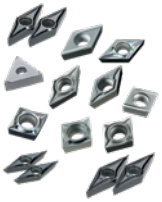
**Boring Bars for small parts machining**

Compatible with Swiss-Type Automatic Lathes

**B210-H**
www.mhg-mediastore.net

**MS6015 / MS7025 / MS9025**

MS Turning Series –
PVD Coated Grades



**B275**
www.mhg-mediastore.net

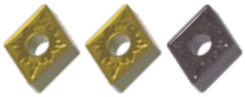
**MC6100 Series**

Bringing the Ultimate High Speed Cutting Performance

**B266**
www.mhg-mediastore.net

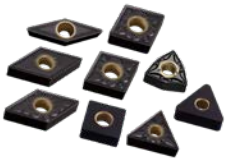
**MC / MP7100 Series**

Dedicated Carbide Substrate
New Coating Technology for Stainless Steel Turning



**B277**
www.mhg-mediastore.net

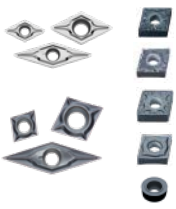
**MC5100 Series**
CVD Coated Grades for Cast Iron Turning from high speed through to interrupted turning



**B269**
www.mhg-mediastore.net

**MP / MT9000**

ISO Turning Inserts
for difficult to cut materials



**B214**
www.mhg-mediastore.net

# RECOMMENDED CUTTING CONDITIONS

| | Material | Hardness | Cutting mode | | Grade | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|
| P | Pure iron<br>Free cutting steel | — | Finish | R/L-F | MS6015 | 150 ( 50 – 250) | 0.01 – 0.15 | 0.1 – 0.4 |
| | | | Light | LS-P | MS6015 | 150 ( 50 – 250) | 0.01 – 0.15 | 0.3 – 2.2 |
| | | | Light | R/L-SS | MS6015 | 150 ( 50 – 250) | 0.01 – 0.15 | 0.2 – 0.8 |
| | | | Medium | R/L-SN | MS6015 | 150 ( 50 – 250) | 0.01 – 0.15 | 0.1 – 0.4 |
| | | | Medium | SMG | MS6015 | 150 ( 50 – 250) | 0.01 – 0.15 | 0.1 – 1.5 |
| | Carbon steel<br>Alloy steel | 180 – 280 HB | Finish | R/L-F | MS6015 | 100 ( 50 – 150) | 0.01 – 0.15 | 0.1 – 0.4 |
| | | | Light | LS-P | MS6015 | 100 ( 50 – 150) | 0.01 – 0.15 | 0.3 – 2.2 |
| | | | Light | R/L-SS | MS6015 | 100 ( 50 – 150) | 0.01 – 0.15 | 0.2 – 0.8 |
| | | | Medium | R/L-SN | MS6015 | 100 ( 50 – 150) | 0.01 – 0.15 | 0.1 – 0.4 |
| | | | Medium | SMG | MS6015 | 100 ( 50 – 150) | 0.01 – 0.15 | 0.1 – 1.5 |
| M | Austenitic<br>stainless teel | — | Finish | FS-P | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.2 – 0.5 |
| | | | Finish | FS-P | MS9025 | 100 ( 60 – 150) | 0.04 – 0.15 | 0.2 – 0.5 |
| | | | Finish | R/L-F | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.1 – 0.4 |
| | | | Finish | R-SRF | MS9025 | 100 ( 60 – 150) | 0.04 – 0.15 | 0.1 – 0.4 |
| | | | Light | LS-P | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.3 – 2.2 |
| | | | Light | LS-P | MS9025 | 100 ( 60 – 150) | 0.05 – 0.15 | 0.3 – 2.2 |
| | | | Medium | R-SN | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.1 – 3.8 |
| | | | Medium | R-SN | MS9025 | 100 ( 60 – 150) | 0.05 – 0.15 | 0.1 – 3.8 |
| | Ferritic and martensitic<br>stainless steel | — | Finish | FS-P | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.2 – 0.5 |
| | | | Finish | R-SRF | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.1 – 0.4 |
| | | | Light | LS-P | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.3 – 2.2 |
| | | | Light | R-SN | MS7025 | 60 ( 40 – 100) | 0.01 – 0.08 | 0.1 – 3.8 |
| | Soft magnetic stainless steel<br>(X105CrMo17 / 1.4125,<br>X42Cr13 / 1.2083, etc.) | 230 HBW | Finish | FS-P | MS7025 | 80 ( 40 – 160) | 0.02 – 0.08 | 0.2 – 1.4 |
| | | | Finish | FS-P | MS9025 | 100 ( 50 – 180) | 0.04 – 0.12 | 0.2 – 1.4 |
| | | | Finish | R-SRF | MS7025 | 80 ( 40 – 160) | 0.03 – 0.08 | 0.1 – 0.4 |
| | | | Finish | R-SRF | MS9025 | 100 ( 50 – 180) | 0.05 – 0.12 | 0.1 – 0.4 |
| | | | Light | LS-P | MS7025 | 80 ( 40 – 160) | 0.02 – 0.10 | 0.3 – 2.2 |
| | | | Light | LS-P | MS9025 | 100 ( 50 – 180) | 0.04 – 0.15 | 0.3 – 2.2 |
| | | | Medium | R-SN | MS7025 | 80 ( 40 – 160) | 0.01 – 0.10 | 0.1 – 3.8 |
| | | | Medium | R-SN | MS9025 | 100 ( 50 – 180) | 0.01 – 0.10 | 0.1 – 3.8 |
| | Precipitation hardened stainless steel<br>(17-4PH / 1.4542,<br>17-7PH / X7CrNi-A117-7 /<br>X5CrNi-CuNb17-4, etc.) | < 450 HB | Finish | FS-P | MS7025 | 60 ( 40 – 80) | 0.01 – 0.10 | 0.1 – 1.0 |
| | | | Finish | FS-P | MS9025 | 70 ( 50 – 100) | 0.03 – 0.15 | 0.1 – 1.0 |
| | | | Finish | R-SRF | MS7025 | 60 ( 40 – 80) | 0.01 – 0.10 | 0.1 – 0.4 |
| | | | Finish | R-SRF | MS9025 | 70 ( 50 – 100) | 0.03 – 0.15 | 0.1 – 0.4 |
| | | | Light | LS-P | MS7025 | 60 ( 40 – 80) | 0.04 – 0.10 | 0.2 – 2.2 |
| | | | Light | LS-P | MS9025 | 70 ( 50 – 100) | 0.04 – 0.15 | 0.2 – 2.2 |
| | | | Medium | R-SN | MS7025 | 60 ( 40 – 80) | 0.03 – 0.10 | 0.3 – 2.2 |
| | | | Medium | R-SN | MS9025 | 70 ( 50 – 100) | 0.04 – 0.15 | 0.2 – 2.2 |
| K | Grey cast iron | Tensile strength<br>< 350MPa | Finish | Flat Top | MC5115 | 225 (150 – 300) | 0.04 – 0.15 | 0.1 – 0.5 |
| | | | Finish | Flat Top | HTi10 | 100 ( 50 – 150) | 0.04 – 0.15 | 0.1 – 0.5 |
| | | | Light | Flat Top | MC5115 | 225 (150 – 300) | 0.04 – 0.15 | 0.2 – 1.0 |
| | | | Light | Flat Top | HTi10 | 100 ( 50 – 150) | 0.04 – 0.15 | 0.2 – 1.0 |
| | | | Medium | Flat Top | MC5115 | 225 (150 – 300) | 0.04 – 0.15 | 0.1 – 2.0 |
| | | | Medium | Flat Top | HTi10 | 100 ( 50 – 150) | 0.04 – 0.15 | 0.1 – 2.0 |
| S | Heat resistant alloy<br>(Heat resistant stainless steel,<br>etc.) | — | Finish | FS-P | MS9025 | 80 ( 40 – 140) | 0.04 – 0.12 | 0.2 – 1.0 |
| | | | Finish | R-SRF | MS9025 | 80 ( 40 – 140) | 0.05 – 0.12 | 0.1 – 0.4 |
| | | | Light | LS-P | MS9025 | 80 ( 40 – 140) | 0.04 – 0.15 | 0.3 – 2.2 |
| | | | Medium | R-SN | MS9025 | 80 ( 40 – 140) | 0.01 – 0.10 | 0.1 – 3.8 |

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1. If chatter or vibration occurs, adjust the cutting conditions and perform machining.
2. If the tool overhang amount is L/D = 5 or more for carbide shank or L/D = 3 or more for steel shank, please reduce the cutting speed by 10 % to 20 %.
3. Regarding the feed rate and depth of cut for breakers not listed in the table, please refer to the general catalogue C010J page A058 of for 7° positive and page A066 for 11° positive. For cutting speed, please refer to the grade introduction page A034.

General Catalogue

# RECOMMENDED CUTTING CONDITIONS

## MC6100 SERIES – 5°, 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| P | Mild steel | ≤180HB | ● | F | 1 | MC6115 | FP | 295 – 570 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | F | 2 | MC6115 | FV | 295 – 570 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | L | 1 | MC6115 | LP | 295 – 570 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | L | 2 | MC6115 | SW | 295 – 570 | 0.06 – 0.24 | 0.20 – 1.50 |
| | | | ● | M | 1 | MC6115 | MP | 245 – 475 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 2 | MC6115 | MV | 245 – 475 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 3 | MC6115 | MW | 245 – 475 | 0.10 – 0.35 | 0.80 – 2.50 |
| | | | ✤ | F | 1 | MC6125 | FP | 320 – 505 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | F | 2 | MC6135 | FP | 265 – 400 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | L | 1 | MC6125 | LP | 320 – 505 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✤ | L | 2 | MC6135 | LP | 265 – 400 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✤ | L | 3 | MC6125 | SW | 320 – 505 | 0.06 – 0.24 | 0.20 – 1.50 |
| | | | ✤ | M | 1 | MC6125 | MP | 270 – 420 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 2 | MC6135 | MP | 220 – 330 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 3 | MC6125 | MV | 270 – 420 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 4 | MC6125 | MW | 270 – 420 | 0.10 – 0.35 | 0.80 – 2.50 |
| | Carbon steel<br>Alloy steel | 180 – 280HB | ● | F | 1 | MC6115 | FP | 220 – 420 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | F | 2 | MC6125 | FP | 240 – 370 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | F | 3 | MC6115 | FV | 220 – 420 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | L | 1 | MC6115 | LP | 220 – 420 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | L | 2 | MC6125 | LP | 240 – 370 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | M | 1 | MC6125 | MP | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 2 | MC6115 | MP | 180 – 350 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 3 | MC6125 | MV | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 4 | MC6115 | MV | 180 – 350 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 5 | MC6115 | MW | 180 – 350 | 0.10 – 0.35 | 0.80 – 2.50 |
| | | | ✤ | F | 1 | MC6125 | FP | 240 – 370 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | F | 2 | MC6135 | FP | 195 – 295 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | F | 3 | MC6125 | FV | 240 – 370 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | L | 1 | MC6125 | LP | 240 – 370 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✤ | L | 2 | MC6135 | LP | 195 – 295 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✤ | L | 3 | MC6125 | SW | 240 – 370 | 0.06 – 0.24 | 0.20 – 1.50 |
| | | | ✤ | M | 1 | MC6125 | MP | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 2 | MC6135 | MP | 160 – 245 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 3 | MC6125 | MV | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | Carbon steel<br>Alloy steel | 280 – 350HB | ● | F | 1 | MC6115 | FP | 155 – 295 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | F | 2 | MC6115 | FV | 155 – 295 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | L | 1 | MC6115 | LP | 155 – 295 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | M | 1 | MC6115 | MP | 130 – 245 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 2 | MC6115 | MV | 130 – 245 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | F | 1 | MC6125 | FP | 170 – 265 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | F | 2 | MC6135 | FP | 135 – 210 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ✤ | L | 1 | MC6125 | LP | 170 – 265 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✤ | L | 2 | MC6135 | LP | 135 – 210 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✤ | M | 1 | MC6125 | MP | 140 – 220 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 2 | MC6135 | MP | 115 – 175 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✤ | M | 3 | MC6125 | MV | 140 – 220 | 0.08 – 0.30 | 0.30 – 2.00 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.



Cutting conditions : ● : Stable cutting ● : General cutting ✤ : Unstable cutting

# RECOMMENDED CUTTING CONDITIONS

## MC6100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| P | Mild steel | ≤180HB | ● | F | 1 | MC6125 | FP | 320 – 505 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | F | 2 | MC6125 | FV | 320 – 505 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | L | 1 | MC6125 | LP | 320 – 505 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | L | 2 | MC6115 | R-Std | 245 – 475 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 1 | MC6125 | MP | 270 – 420 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 2 | MC6115 | MP | 245 – 475 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 3 | MC6125 | MV | 270 – 420 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 4 | MC6115 | MV | 245 – 475 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | L | 1 | MC6125 | LP | 320 – 505 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✣ | L | 2 | MC6135 | LP | 265 – 400 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✣ | M | 1 | MC6125 | MP | 270 – 420 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | M | 2 | MC6135 | MP | 220 – 330 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | M | 3 | MC6125 | MV | 270 – 420 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | M | 4 | MC6135 | MV | 220 – 330 | 0.08 – 0.30 | 0.30 – 2.00 |
| | Carbon steel<br>Alloy steel | 180 – 280HB | ● | F | 1 | MC6125 | FP | 240 – 370 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | F | 2 | MC6125 | FV | 240 – 370 | 0.04 – 0.20 | 0.20 – 0.90 |
| | | | ● | L | 1 | MC6125 | LP | 240 – 370 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | L | 2 | MC6115 | LP | 220 – 420 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ● | M | 1 | MC6125 | MP | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 2 | MC6125 | MV | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 3 | MC6115 | R-Std | 180 – 350 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ● | M | 4 | MC6125 | R-Std | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | L | 1 | MC6125 | LP | 240 – 370 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✣ | L | 2 | MC6135 | LP | 195 – 295 | 0.06 – 0.25 | 0.20 – 1.00 |
| | | | ✣ | M | 1 | MC6125 | MP | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | M | 2 | MC6135 | MP | 160 – 245 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | M | 3 | MC6125 | MV | 200 – 310 | 0.08 – 0.30 | 0.30 – 2.00 |
| | | | ✣ | M | 4 | MC6135 | MV | 160 – 245 | 0.08 – 0.30 | 0.30 – 2.00 |

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting conditions : ● : Stable cutting ● : General cutting ✣ : Unstable cutting

# RECOMMENDED CUTTING CONDITIONS

## MC5100 SERIES – 5°, 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| Material | | Properties | Cutting mode | Grade | Vc |
|---|---|---|---|---|---|
| K | Gray cast iron | Tensile strength ≤350MPa | ● | MC5115 | 190 – 350 |
| | | | ◐ | MC5115 | 140 – 270 |
| | | | ✣ | MC5115 | 80 – 150 |
| | Ductile cast iron | Tensile strength ≤450MPa | ● | MC5115 | 170 – 320 |
| | | | ◐ | MC5115 | 130 – 250 |
| | | | ✣ | MC5125 | 60 – 130 |
| | | Tensile strength ≤800MPa | ● | MC5115 | 125 – 240 |
| | | | ◐ | MC5115 | 105 – 200 |
| | | | ✣ | MC5125 | 55 – 115 |

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## MC5100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| Material | | Properties | Cutting mode | Grade | Vc |
|---|---|---|---|---|---|
| K | Gray cast iron | Tensile strength ≤350MPa | ● | MC5115 | 150 – 300 |
| | | | ◐ | MC5115 | 140 – 270 |
| | | | ✣ | MC5115 | 80 – 150 |
| | Ductile cast iron | Tensile strength ≤450MPa | ● | MC5115 | 170 – 320 |
| | | | ◐ | MC5115 | 130 – 250 |
| | | | ✣ | MC5125 | 60 – 130 |
| | | Tensile strength ≤800MPa | ● | MC5115 | 125 – 240 |
| | | | ◐ | MC5115 | 105 – 200 |
| | | | ✣ | MC5125 | 55 – 115 |

1/1

| Cutting area | | f | ap |
|---|---|---|---|
| Light cutting | LK | 0.06 – 0.25 | 0.2 – 1.0 |
| | SW | 0.06 – 0.24 | 0.2 – 1.5 |
| Medium cutting | MK | 0.08 – 0.30 | 0.3 – 2.0 |
| | MV | 0.08 – 0.30 | 0.3 – 2.0 |
| | Standard | 0.08 – 0.30 | 0.3 – 2.0 |
| | MW | 0.10 – 0.35 | 0.8 – 2.5 |
| Heavy cutting | Flat Top | 0.08 – 0.30 | 0.3 – 2.0 |

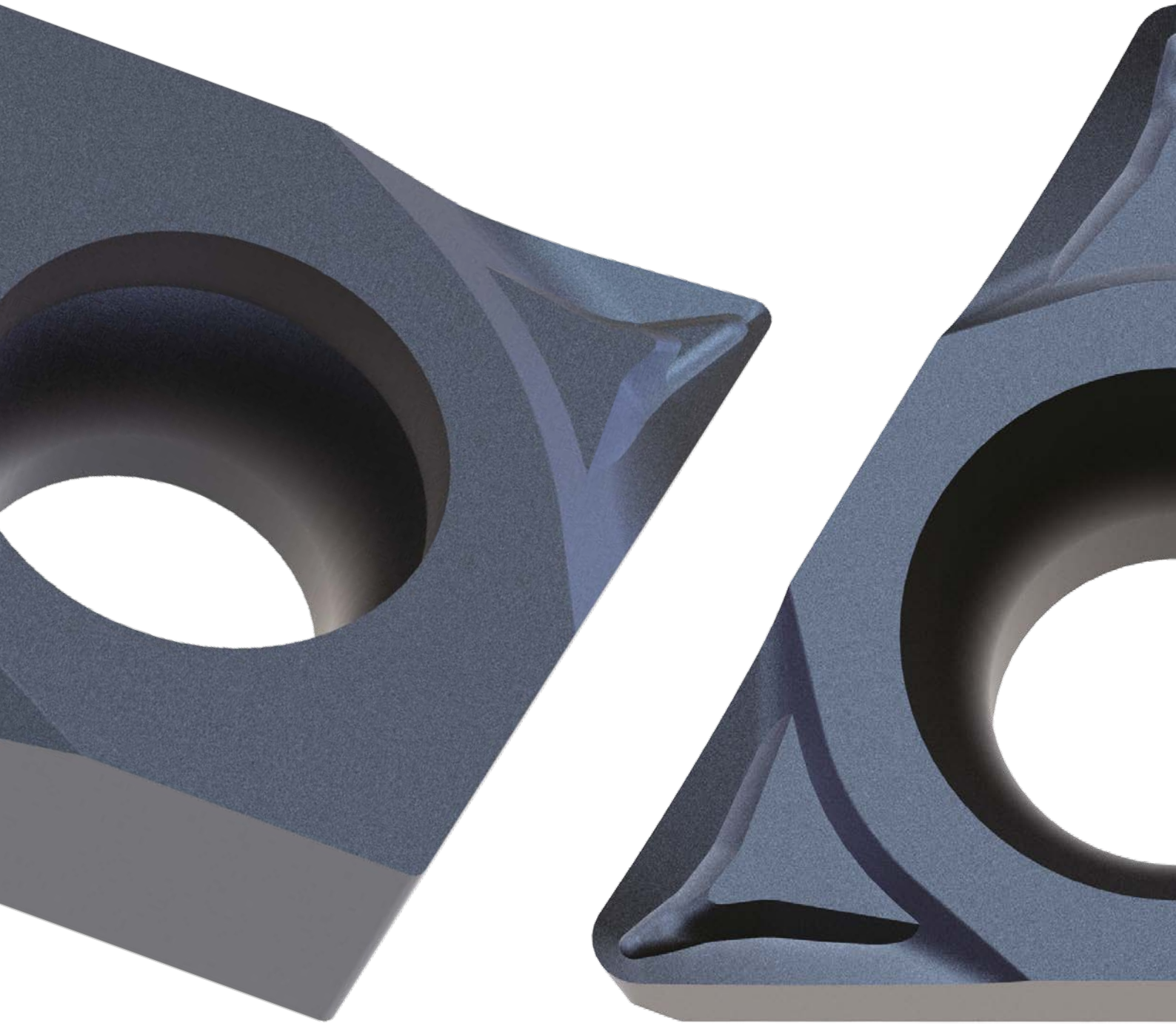


Cutting conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

NEW

# FSF / FSF-P CHIPBREAKER

## IDEAL CHIPBREAKER FOR SMALL DEPTHS OF CUT AND FINISHING OPERATIONS



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**B210-I**

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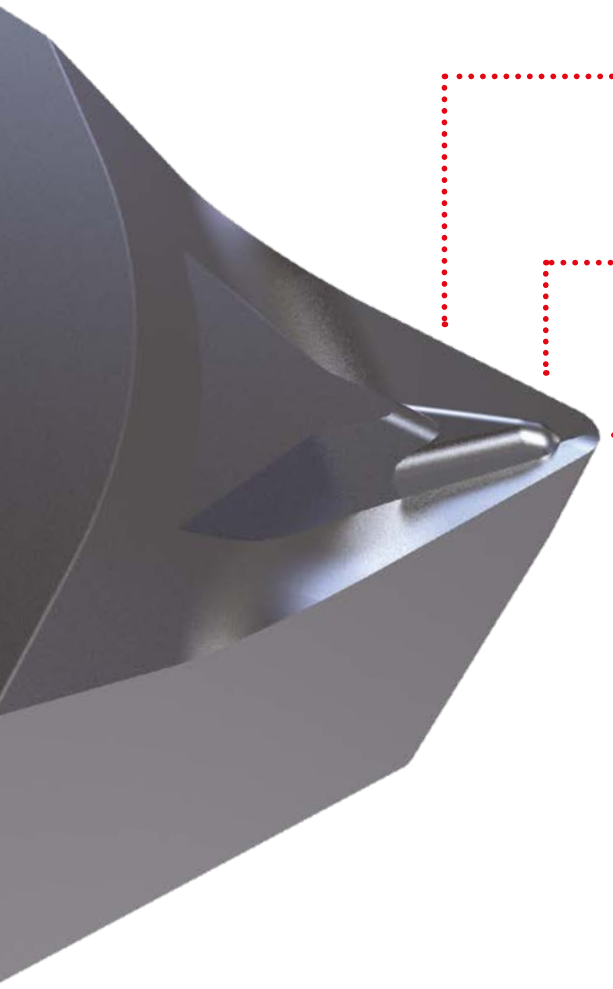
# FSF / FSF-P CHIPBREAKER

## CHIPBREAKER FOR SMALL DEPTHS OF CUT

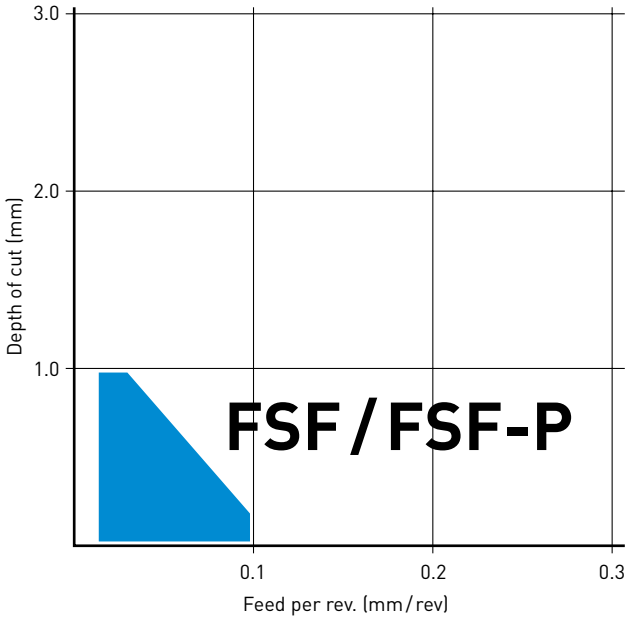


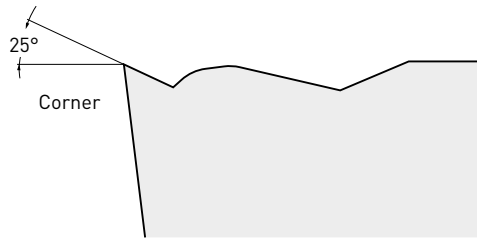
**SHARP CUTTING EDGE**
The sharp 25° rake angle provides a sharp cutting edge and a beautifully finished surface.

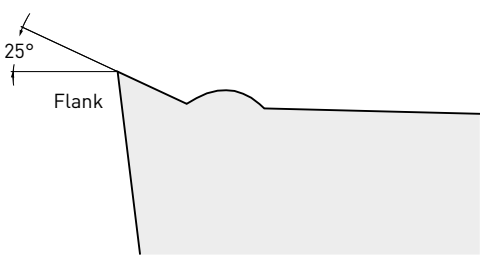
**LOW CUTTING RESISTANCE**
Low cutting resistance design with gentle chipbreaker protrusion.

**MULTI-STAGE CHIPBREAKER**
Responds to fluctuations in depth of cut.

## APPLICATION RANGE



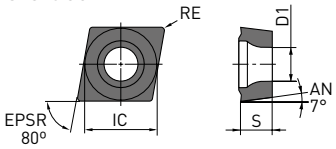



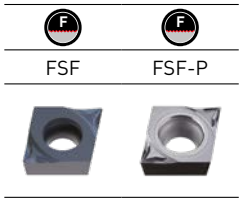



# CCGT

## 7° POSITIVE INSERTS (WITH HOLE)

**G Class**



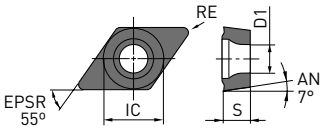



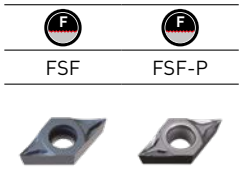

| Order number | | MP9025 | MS7025 | MS9025 | VP30RT | HTI10 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|---|---|
| CCGT03S101M-FSF | F | ● | | | | | 3.97 | 1.39 | 0.1 | 2.0 |
| CCGT03S102M-FSF | F | ● | | | | | 3.97 | 1.39 | 0.2 | 2.0 |
| CCGT04T001M-FSF | F | ● | | | | | 4.76 | 1.79 | 0.1 | 2.4 |
| CCGT04T002M-FSF | F | ● | | | | | 4.76 | 1.79 | 0.2 | 2.4 |
| CCGT060201M-FSF | F | ● | | | | | 6.35 | 2.38 | 0.1 | 2.8 |
| CCGT060202M-FSF | F | ● | | | | | 6.35 | 2.38 | 0.2 | 2.8 |
| CCGT060204M-FSF | F | ● | | | | | 6.35 | 2.38 | 0.4 | 2.8 |
| CCGT03S101M-FSF-P | F | | ● | ● | | | 3.97 | 1.39 | 0.1 | 2.0 |
| CCGT03S102M-FSF-P | F | | ● | ● | | | 3.97 | 1.39 | 0.2 | 2.0 |
| CCGT04T001M-FSF-P | F | | ● | ● | | | 4.76 | 1.79 | 0.1 | 2.4 |
| CCGT04T002M-FSF-P | F | | ● | ● | | | 4.76 | 1.79 | 0.2 | 2.4 |
| CCGT0602V5M-FSF-P | F | | ● | | ● | | 6.35 | 2.38 | 0.05 | 2.8 |
| CCGT060201M-FSF-P | F | | ● | ● | ● | | 6.35 | 2.38 | 0.1 | 2.8 |
| CCGT060202M-FSF-P | F | | ● | ● | ● | | 6.35 | 2.38 | 0.2 | 2.8 |
| CCGT060204M-FSF-P | F | | ● | ● | ● | | 6.35 | 2.38 | 0.4 | 2.8 |
| CCGT09T3V5M-FSF-P | F | | ● | | ● | | 9.525 | 3.97 | 0.05 | 4.4 |
| CCGT09T301M-FSF-P | F | | ● | ● | ● | | 9.525 | 3.97 | 0.1 | 4.4 |
| CCGT09T302M-FSF-P | F | | ● | | ● | | 9.525 | 3.97 | 0.2 | 4.4 |
| CCGT09T304M-FSF-P | F | | ● | | ● | | 9.525 | 3.97 | 0.4 | 4.4 |

# DCGT

## 7° POSITIVE INSERTS (WITH HOLE)

**G Class**




| Order number | | MP9025 | MS7025 | MS9025 | VP30RT | HTI10 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|---|---|
| DCGT070201M-FSF | F | ● | | | | | 6.35 | 2.38 | 0.1 | 2.8 |
| DCGT070202M-FSF | F | ● | | | | | 6.35 | 2.38 | 0.2 | 2.8 |
| DCGT11T301M-FSF | F | ● | | | | | 9.525 | 3.97 | 0.1 | 4.4 |
| DCGT11T302M-FSF | F | ● | | | | | 9.525 | 3.97 | 0.2 | 4.4 |
| DCGT0702V5M-FSF-P | F | | ● | | ● | | 6.35 | 2.38 | 0.05 | 2.8 |
| DCGT070201M-FSF-P | F | | ● | ● | ● | | 6.35 | 2.38 | 0.1 | 2.8 |
| DCGT070202M-FSF-P | F | | ● | ● | ● | | 6.35 | 2.38 | 0.2 | 2.8 |
| DCGT11T3V5M-FSF-P | F | | ● | | ● | | 9.525 | 3.97 | 0.05 | 4.4 |
| DCGT11T301M-FSF-P | F | | ● | ● | ● | | 9.525 | 3.97 | 0.1 | 4.4 |
| DCGT11T302M-FSF-P | F | | ● | ● | ● | | 9.525 | 3.97 | 0.2 | 4.4 |
| DCGT11T304M-FSF-P | F | | ● | | ● | | 9.525 | 3.97 | 0.4 | 4.4 |

1/1

107 Vc

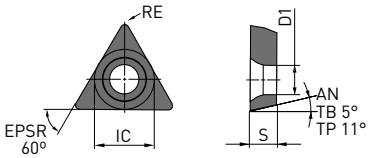


● : Inventory maintained. ★ : Inventory maintained in Japan.

# TBGT, TPGH

## 5°, 11° POSITIVE INSERTS (WITH HOLE)

**G Class**




| FSF-P | FSF | FSF-P |
|---|---|---|
| | | |

| Order number | F M | MP9025 | MS7025 | MS9025 | VP30RT | HTI10 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|---|---|
| TBGT060101M-FSF-P | F | | ● | ● | ● | | 3.97 | 1.59 | 0.1 | 2.3 |
| TBGT060102M-FSF-P | F | | ● | | ● | | 3.97 | 1.59 | 0.2 | 2.3 |
| TPGH090201M-FSF | F | ● | | | | | 5.56 | 2.38 | 0.1 | 2.9 |
| TPGH090202M-FSF | F | ● | | | | | 5.56 | 2.38 | 0.2 | 2.9 |
| TPGH090204M-FSF | F | ● | | | | | 5.56 | 2.38 | 0.4 | 2.9 |
| TPGH080201M-FSF-P | F | | ● | ● | ● | | 4.76 | 2.38 | 0.1 | 2.4 |
| TPGH080202M-FSF-P | F | | ● | | ● | | 4.76 | 2.38 | 0.2 | 2.4 |
| TPGH090201M-FSF-P | F | | ● | ● | ● | | 5.56 | 2.38 | 0.1 | 2.9 |
| TPGH090202M-FSF-P | F | | ● | ● | ● | | 5.56 | 2.38 | 0.2 | 2.9 |
| TPGH090204M-FSF-P | F | | ● | ● | ● | | 5.56 | 2.38 | 0.4 | 2.9 |

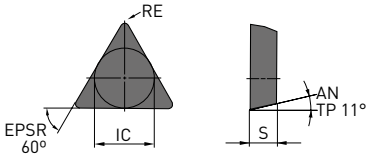
1/1

107 Vc

# TPGB

## 11° POSITIVE INSERTS (WITHOUT HOLE)

**G Class**




| Strong cutting edge |
|---|
| Flat Top |
| |

| Order number | F M | MP9025 | MS7025 | MS9025 | VP30RT | HTI10 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|---|---|
| TPGB110201 | M | | | | | ● | 6.35 | 2.38 | 0.1 | — |
| TPGB110202 | M | | | | | ● | 6.35 | 2.38 | 0.2 | — |
| TPGB110204 | M | | | | | ● | 6.35 | 2.38 | 0.4 | — |
| TPGB160304 | M | | | | | ● | 9.525 | 3.18 | 0.4 | — |
| TPGB160308 | M | | | | | ● | 9.525 | 3.18 | 0.8 | — |
| TPGB080202 | M | | | | | ● | 4.76 | 2.38 | 0.2 | — |
| TPGB080204 | M | | | | | ● | 4.76 | 2.38 | 0.4 | — |
| TPGB080208 | M | | | | | ● | 4.76 | 2.38 | 0.8 | — |
| TPGB090202 | M | | | | | ● | 5.56 | 2.38 | 0.2 | — |
| TPGB090204 | M | | | | | ● | 5.56 | 2.38 | 0.4 | — |
| TPGB1102V5 | M | | | | | ● | 6.35 | 2.38 | 0.05 | — |
| TPGN090202 | – | | | | | ● | 5.56 | 2.38 | 0.2 | — |
| TPGN090204 | – | | | | | ● | 5.56 | 2.38 | 0.4 | — |
| TPGN090208 | – | | | | | ● | 5.56 | 2.38 | 0.8 | — |

1/1

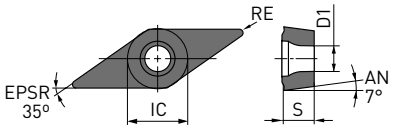
● : Inventory maintained. ★ : Inventory maintained in Japan.

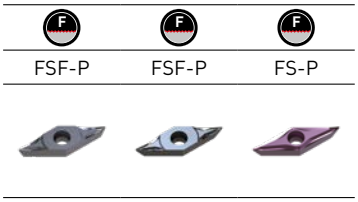
107 Vc

# VCGT, VPGT

## 7°, 11° POSITIVE INSERTS (WITH HOLE)

### G Class




| Order number | F | M | MP9025 | MS7025 | MS9025 | VP30RT | HTI10 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VCGT110301M-FSF-P | F | | | ● | ● | ● | | 6.35 | 3.18 | 0.1 | 2.8 |
| VCGT110302M-FSF-P | F | | | ● | | ● | | 6.35 | 3.18 | 0.2 | 2.8 |
| VCGT110304M-FSF-P | F | | | ● | | ● | | 6.35 | 3.18 | 0.4 | 2.8 |
| VPGT110301M-FSF-P | F | | | ● | ● | ● | | 6.35 | 3.18 | 0.1 | 2.9 |
| VPGT110302M-FSF-P | F | | | ● | | ● | | 6.35 | 3.18 | 0.2 | 2.9 |
| VPGT110304M-FSF-P | F | | | ● | | ● | | 6.35 | 3.18 | 0.4 | 2.9 |
| VPGT110301M-FS-P | F | | | ● | | ● | | 6.35 | 3.18 | 0.1 | 2.9 |
| VPGT110302M-FS-P | F | | | ● | | ● | | 6.35 | 3.18 | 0.2 | 2.9 |

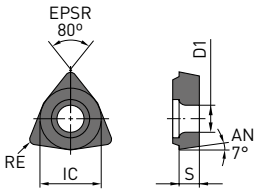
1/1

107 Vc

# WCGT

## 7° POSITIVE INSERTS (WITH HOLE)

### G Class



| Order number | F | M | MP9025 | MS7025 | MS9025 | VP30RT | HTI10 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WCGT020101M-FSF-P | F | | | ● | ● | ● | | 3.97 | 1.59 | 0.1 | 2.3 |
| WCGT020102M-FSF-P | F | | | ● | ● | ● | | 3.97 | 1.59 | 0.2 | 2.3 |
| WCGTL30201M-FSF-P | F | | | ● | ● | ● | | 4.76 | 2.38 | 0.1 | 2.3 |
| WCGTL30202M-FSF-P | F | | | ● | ● | ● | | 4.76 | 2.38 | 0.2 | 2.3 |
| WCGT040201M-FSF-P | F | | | ● | ● | ● | | 6.35 | 2.38 | 0.1 | 2.8 |
| WCGT040202M-FSF-P | F | | | ● | ● | ● | | 6.35 | 2.38 | 0.2 | 2.8 |
| WCGT06T301M-FSF-P | F | | | | ● | | | 9.525 | 3.97 | 0.1 | 4.4 |
| WCGT06T302M-FSF-P | F | | | ● | ● | ● | | 9.525 | 3.97 | 0.2 | 4.4 |
| WCGT06T304M-FSF-P | F | | | ● | | ● | | 9.525 | 3.97 | 0.4 | 4.4 |

1/1

107 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

# FSF / FSF-P CHIPBREAKER

## RECOMMENDED CUTTING CONDITIONS

### CUTTING SPEED

| | Material | Properties | F M | Cutting condition | MP9025 Vc | MS7025 Vc | MS9025 Vc | VP30RT Vc | HTI10 Vc |
|---|---|---|---|---|---|---|---|---|---|
| P | Soft magnetic iron, Mild steel | ≤180 HB | F | ● | — | 100 – 300 | — | — | — |
| | | | | ✤ | — | — | — | 155 – 190 | — |
| | Carbon steel, Alloy steel | 180–280 HB | F | ● | — | 40 – 130 | — | — | — |
| | | | | ✤ | — | — | — | 115 – 140 | — |
| | Carbon steel, Alloy steel | 280–350 HB | F | ✤ | — | — | — | 80 – 100 | — |
| M | Austenitic stainless steel | ≤200 HB | F | ● | — | 40 – 100 | 60 – 150 | — | — |
| | | | | ✤ | — | — | — | 50 – 90 | — |
| | Ferritic and martensitic stainless steel | ≤200 HB | F | ● | — | 40 – 100 | — | — | — |
| | | | F | ✤ | — | — | — | 50 – 90 | — |
| | Austenitic, Ferritic and martensitic stainless steel | >200 HB | F | ✤ | — | — | — | 40 – 75 | — |
| | Electromagnetic stainless steel | 230 HBW | F | ● | — | 40 – 160 | 50 – 180 | — | — |
| | Duplex stainless steel | ≤280 HB | F | ✤ | — | — | — | 35 – 60 | — |
| | Precipitation hardening stainless steel | <450 HB | F | ✤ | 70 – 85 | 40 – 80 | 50 – 100 | — | — |
| K | Grey cast iron | ≤350 MPa | M | ◐ ✤ | — | — | — | — | 90 – 125 |
| | Ductile cast iron | ≤450 MPa | M | ● ◐ ✤ | — | — | — | — | 70 – 100 |
| | Ductile cast iron | ≤800 MPa | M | ● ◐ ✤ | — | — | — | — | 60 – 90 |
| N | Aluminium alloys | — | M | ● ◐ ✤ | — | — | — | — | 300 – 700 |
| S | Heat resistant alloys | — | F | ● | — | — | 40 – 140 | — | — |
| | | | | ✤ | 25 – 40 | — | — | — | — |

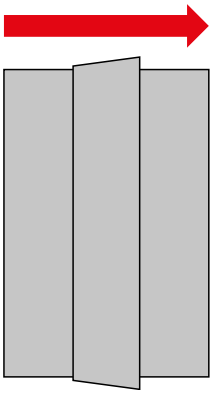
1/1

| Chipbreaker | f (mm / rev) | ap (mm) |
|---|---|---|
| FSF, FSF-P | 0.02 – 0.1 | 0.02 – 1.0 |
| FS-P | 0.04 – 0.2 | 0.2 – 0.9 |
| Standard | 0.08 – 0.3 | 0.3 – 2.0 |
| Flat Top | 0.08 – 0.3 | 0.3 – 2.0 |

## APPLICATION EXAMPLES

### EXTERNAL TURNING

| | |
|---|---|
| Workpiece material | DIN 1.4301 (X5CrNi18-10) |
| Insert | DCGT11T301M-FSF-P |
| Grade | MS9025 |
| Vc (m / min) | 120 |
| f (mm / rev) | 0.02 |
| ap (mm) | 0.1 |
| Cutting mode | Wet cutting (Oil) |
| Result | Chipping at the cutting edge was suppressed and chip removal was good. It is now possible to process 750 pieces, compared to the conventional 150 pieces tool life. |

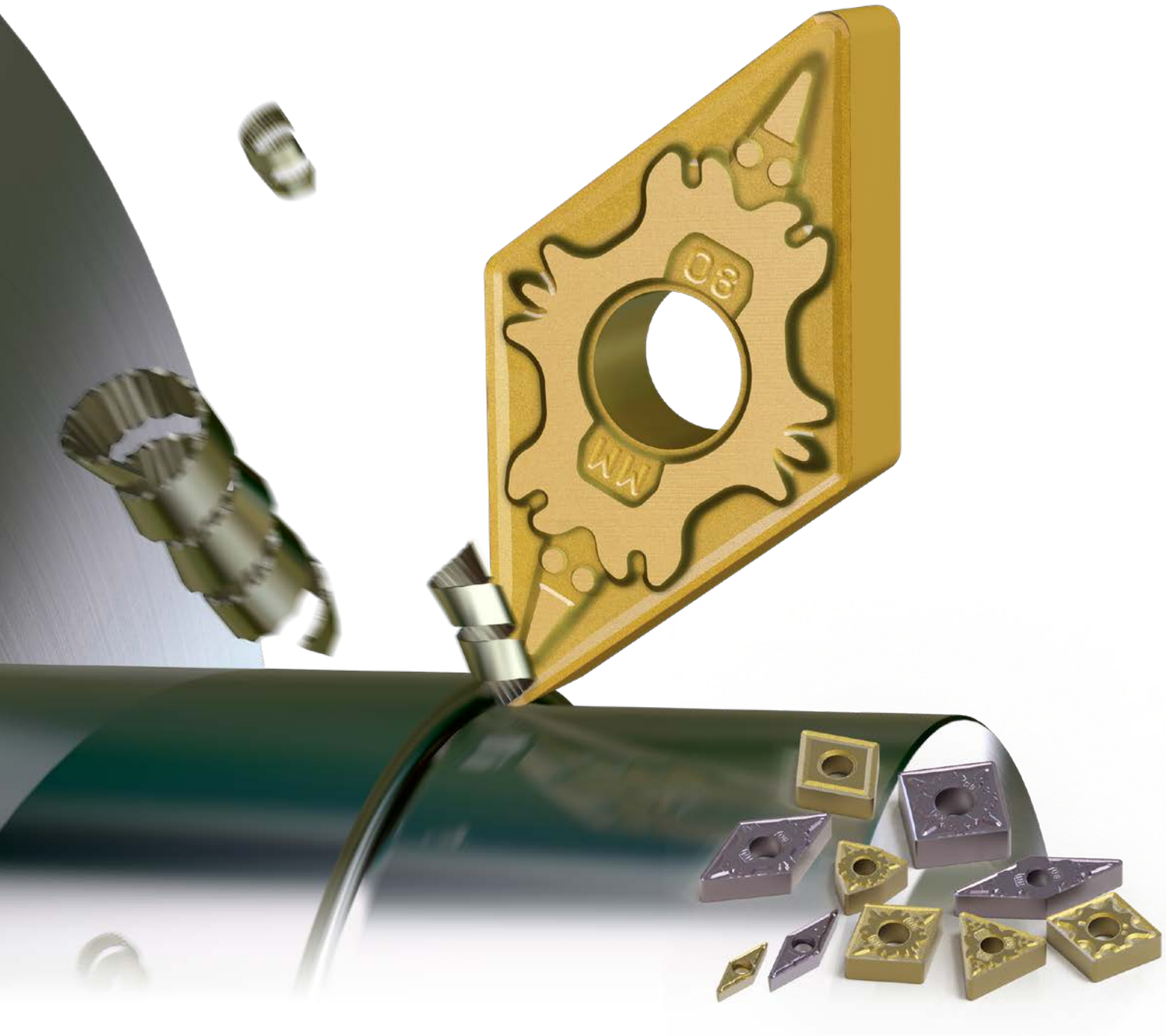


Cutting Conditions: ●: Stable cutting ◐: General cutting ✤: Unstable cutting
Cutting Area: F: Finish cutting M: Medium cutting

NEW

# MC / MP7100 SERIES

## DEDICATED CARBIDE SUBSTRATE
## NEW COATING TECHNOLOGY FOR STAINLESS STEEL TURNING



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# MC/MP7100 SERIES

## CREATION OF A NEW SERIES FOR A VARIETY OF STAINLESS STEEL APPLICATIONS

## MC7125

**THE ALL ROUND CHOICE FOR STAINLESS STEEL TURNING**

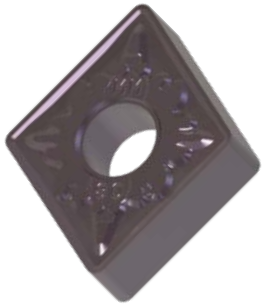
First recommended grade.
Compatible with a wide range of applications, from continuous cutting through to interrupted cutting.
Suitable for a wide variety of stainless steels.

## MC7115

**FOR HIGH SPEED TURNING**

CVD coated carbide grade specialised for high speed cutting.
For medium to large austenitic stainless steel parts, cutting speeds of 250 m/min or more reduce machining time.

## MP7135



**TOUGHER FOR INTERRUPTED CUTTING**

PVD coated carbide grade that is resistant to the impacts of interrupted cutting.
It is ideal for intermittent cutting of workpieces, as well as for rough machining of forged and cast stainless products.

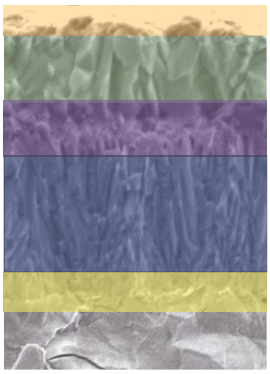
**MC/MP7100 SERIES MACHINING VIDEO**

# MC/MP7100 SERIES

## MC7125

### THE ALL-ROUNDER FOR STAINLESS STEEL TURNING

Incredibly stable with both plastic deformation and chipping resistance.



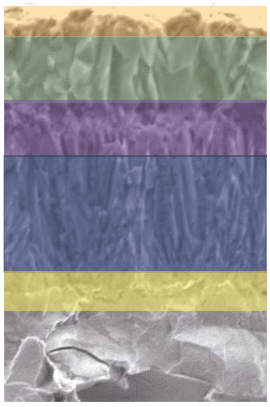

**COATING LAYER WITH HIGH ADHESIVE STRENGTH**
Tough and Super TOUGH-Grip dramatically improve adhesion strength and maximise the effectiveness of the coating.

**SUBSTRATE RESISTANT TO PLASTIC DEFORMATION AND CHIPPING**
By optimising the particle size distribution of the main component WC and improving its dispersibility, reduced contact between the WC particles, dramatically improves resistance to plastic deformation and fracture.

## MC7115

### FOR HIGH SPEED TURNING

Increases the hardness of the base material, providing excellent resistance to plastic deformation and crater wear.



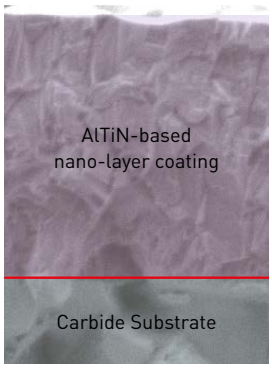

**COATING LAYER WITH HIGH ADHESIVE STRENGTH**
Tough and Super Tough Grip improve adhesion strength and maximise the effectiveness of the coating. “Super” Nano Texture Technology suppresses crater wear during high speed cutting.

**CARBIDE SUBSTRATE THAT IS STRONG FOR HIGH SPEED CUTTING**
The hard carbide substrate is resistant to the high temperatures generated during high speed cutting and has excellent resistance to plastic deformation and crater wear.

## MP7135

### TOUGHER FOR INTERRUPTED CUTTING

The highly heat resistant coating and dedicated carbide substrate provide both wear resistance and chipping resistance.




**AlTiN-BASED NANO-LAYER COATING**
By layering the highly heat resistant AlTiN coating at the Nano level, excellent wear and chipping resistance has been achieve.

**TECHNOLOGY TO IMPROVE ADHESION STRENGTH**
Suppresses peeling when machining stainless steel and exhibits excellent chipping resistance.

**DEDICATED CARBIDE BASE MATERIAL**
A carbide substrate exclusively for stainless steel that combines both wear and fracture resistance.

# MC/MP7100 SERIES

## COATED GRADE FOR STAINLESS STEEL TURNING

### IMPROVED COATING ADHESION STRENGTH AND DEDICATED CARBIDE SUBSTRATE SUPPRESSES NOTCHING DURING STAINLESS STEEL TURNING

Stainless steels are widely used for components that require resistance to corrosion. When comparing stainless steels to other steels and cast irons, it has low hardness but is tough to machine and susceptible to work hardening. Due to these characteristics, turning inserts are prone to edge damage and weld chipping. Additionally, plastic deformation of the insert due to the heat generated makes more difficult to cut, resulting in unstable tool life.
The properties of stainless steels, such as corrosion and heat resistance, vary greatly depending on the metallurgical structure and composition, and these small differences can make it appear is as if a completely different workpiece material is being machined.
Mitsubishi Materials has the ability to combine coating and substrate technology to produce a series of grades to successfully machine stainless steels.

Notching

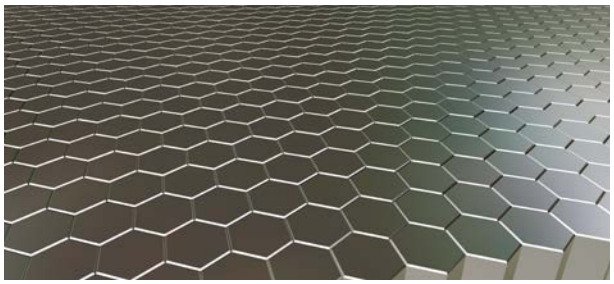
Fracture from welding chipping

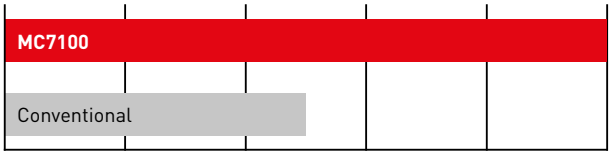
Plastic deformation

## FEATURES OF THE MC7100 SERIES COATING

### "SUPER" NANO TEXTURE TECHNOLOGY

The standard Nano Texture Technology has been improved and developed to be an industry leading standard for crystal growth of $Al_2O_3$ coatings. This Super Nano Texture Technology increases tool life and wear resistance due to the process that creates fine, dense crystal growth.



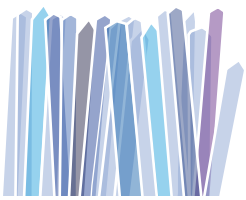



The ratio of $Al_2O_3$ crystal grains with the same orientation

**CRYSTAL ORIENTATION**
(Image)

**Conventional CVD inserts**

Grain size and
growth direction are uneven.



**Nano Texture**

Uniformity of the grain size and growth direction has improved.

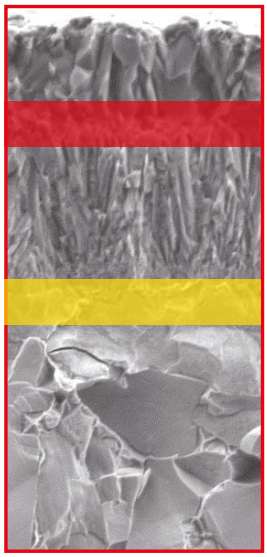
**"Super" Nano Texture**

Uniformity of the growth
direction has drastically improved.

# MC / MP7100 SERIES

## TOUGH AND SUB GRIP LAYERS

**THE EXTRA STRENGTH OF THE ADHESION BETWEEN THE COATING LAYERS SUPPRESSES PEELING DURING MACHINING OF STAINLESS STEELS**



**SUPER-TOUGH-GRIP**

The adhesion strength of the $Al_2O_3$ layer, which was prone to peeling due to the work-hardened layer when machining stainless steel, has been significantly improved.

**SUB-GRIP**

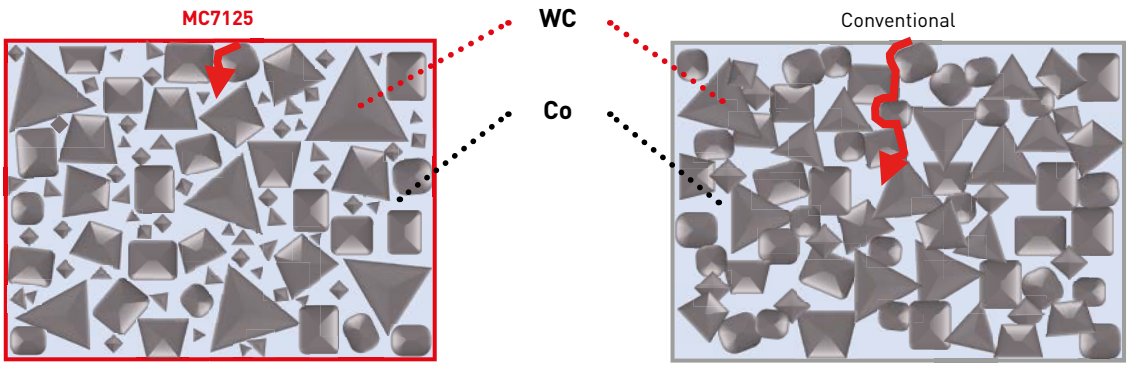
It increases the adhesion strength between the carbide substrate and the coating layer, and prevents the coating from peeling off due to welding.

## FEATURES OF THE CARBIDE SUBSTRATES

**MC7115**
Has crater wear and plastic deformation resistance that are ideal for high-speed cutting of stainless steel.

**MP7135**
The dedicated carbide substrate has excellent wear resistance and greatly improved chipping resistance.

**MC7125**
By optimising the particle size distribution, the boundary contact between the low toughness WC particles has been reduced and promotes hardness, thereby dramatically improving plastic deformation and fracture resistance.




Reduces **WC** boundaries and suppresses crack growth.

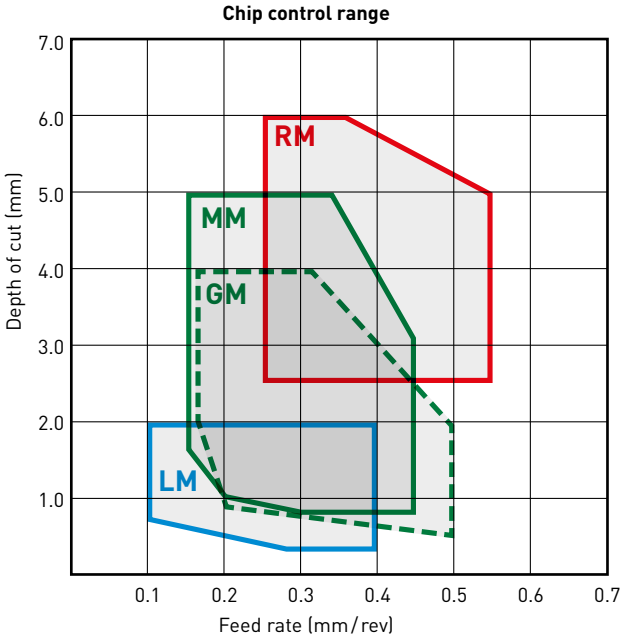
Cracks grow along the **WC** boundaries that are lower in toughness.

# CHIPBREAKER SYSTEM

## NEGATIVE INSERT FOR EXTERNAL TURNING

M

| | Light cutting | Medium cutting | Rough cutting |
|---|---|---|---|
| Stable cutting | LM MC7115 | MM MC7115 | RM MC7115 |
| General cutting | LM MC7125 | MM MC7125 | RM MC7125 |
| Unstable cutting | LM MP7135 | MM MP7135 | RM MP7135 |




**Stable cutting**
- Continuous cutting
- Constant depth of cut
- Pre-machined surfaces
- Securely clamped component cutting

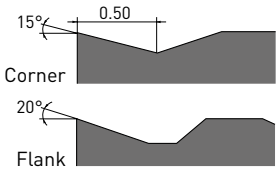
**General cutting**

**Unstable cutting**
- Heavy interrupted cutting
- Irregular depth of cut
- Low clamping rigidity cutting

## MAIN CHIPBREAKER

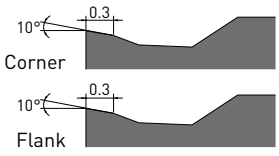
### LM CHIPBREAKER FOR LIGHT CUTTING

**Excellent burr control**
Reduces the incidence of burrs drastically because the sharpness properties and cutting edge strength are optimised with different rake angles.



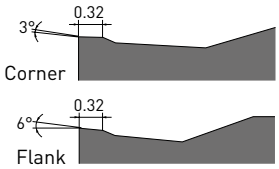

### MM CHIPBREAKER FOR MEDIUM CUTTING

**Excellent welding resistance**
The sharp design of the corner radius and main cutting edge improves welding resistance and prevents problems.



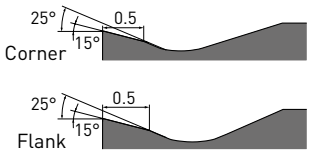

### RM CHIPBREAKER FOR ROUGH CUTTING

**Excellent fracture resistance**
By optimizing the land angle and honing geometry, high cutting edge stability is achieved during interrupted machining.



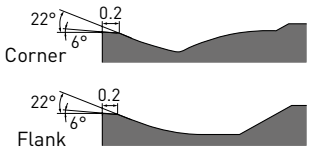

### GM CHIPBREAKER

**Interpolated chipbreaker**
Sub chipbreaker of the main LM and MM chipbreaker.
Excellent in notching resistance for light cutting to medium cutting.




### MA CHIPBREAKER

**Multi-Assist chipbreaker**
Suitable for medium cutting range.

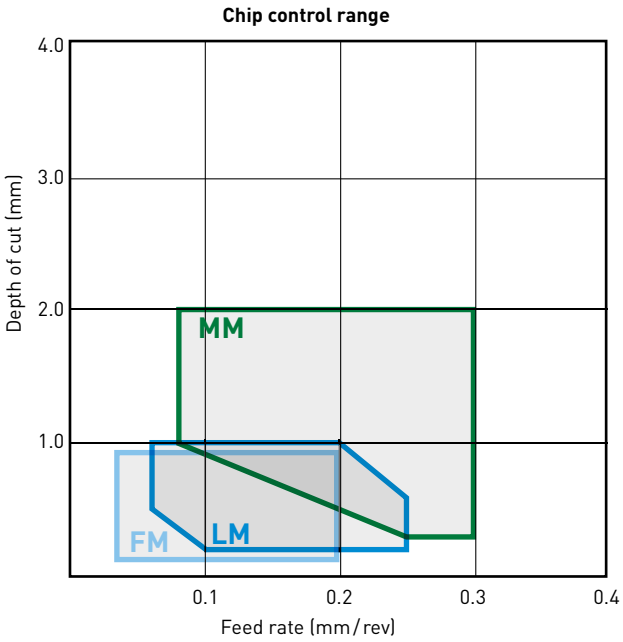


# CHIPBREAKER SYSTEM

## 5°, 7°, 11° POSITIVE INSERT

M

| | Finish cutting | Light cutting | Medium cutting |
|---|---|---|---|
| Stable cutting | **FM** MC7125 | **LM** MC7125 | **MM** MC7125 |
| General cutting | **FM** MC7125 | **LM** MC7125 | **MM** MC7125 |
| Unstable cutting | **FM** MP7135 | **LM** MP7135 | **MM** MP7135 |




**Stable cutting**
- Continuous cutting
- Constant depth of cut
- Pre-machined surfaces
- Securely clamped component cutting

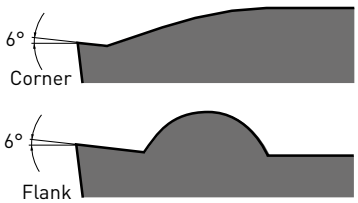
**General cutting**

**Unstable cutting**
- Heavy interrupted cutting
- Irregular depth of cut
- Low clamping rigidity cutting

## MAIN CHIPBREAKER

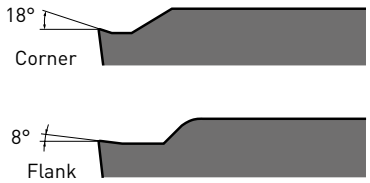
### FM CHIPBREAKER FOR FINISH CUTTING

**First recommendation for finishing stainless steel**
Chipbreaker protrusion at the tip controls chips even at small depth of cut. Maintains edge strength and prevents sudden fractures.
**5°, 7° Positive Insert**



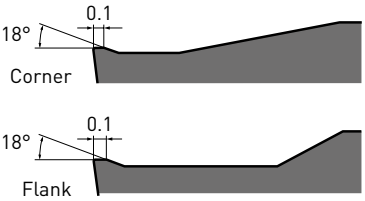

### LM CHIPBREAKER FOR LIGHT CUTTING

**First recommendation for light cutting of stainless steel**
The large rake angle gives a sharp cutting edge that prevents chip welding, which in turn helps to control the surface finish.
The protruding chipbreaker provides an ideal range of chip control.
**5°, 7°, 11° Positive Insert**




### MM CHIPBREAKER FOR MEDIUM CUTTING

**First recommendation for medium cutting of stainless steel**
The flat land enables a good balance of wear and fracture resistance. The wide pocket reduces vibration and chip jamming and also prevents increases in cutting resistance even at large depths of cut.
**5°, 7° Positive Insert**



# MC / MP7100 SERIES

## CLASSIFICATION

M

| Ferritic stainless steel | Austenitic stainless steel | Martensitic stainless steel | Hardened stainless steel |
|---|---|---|---|
| AISI430 / DIN 1.4016 | AISI304 / DIN 1.4301, AISI316 / DIN 1.4401 | AISI420J2 / DIN 1.4028 | AISI630 / DIN 1.4542 |

### MC7125

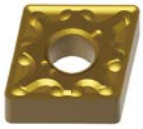
**First recommended**

**MM Chipbreaker**

The new design has improved sharpness and welding resistance.

**MA Chipbreaker**

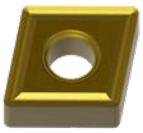
**When cutting edge stability is required**



A general-purpose chipbreaker with excellent stability and chip control.

**GM Chipbreaker**

**When sharpness is required**



It has a sharp cutting edge and produces chips that do not get tangled.

High-efficiency
High-speed

### MC7115

**MM Chipbreaker**

**LM Chipbreaker**

The large rake angle helps to reduce burrs.

Wear Resistance
Continuous Machining

Fracture Resistance
Intermittent Machining

### MP7135

**First recommended**

**GM Chipbreaker**

Combined with PVD coating, it provides excellent sharpness even during rough machining.

**MM Chipbreaker**

**When cutting edge stability is required**

**RM Chipbreaker**

**For rough machining**

The strong cutting edge geometry provides excellent breakage resistance during interrupted cutting.

| Duplex stainless steel |
|---|
| Duplex material, DIN 1.4462 |

For general stainless steels, MC7125 is the first recommendation.

For duplex stainless steels, MP7135 is the first recommendation.

Even with the same grade, it is possible to improve tool life by selecting the appropriate chipbreaker.

When using MC7125 and wear is stable, higher efficiency could be realised through higher speeds by using MC7115.

For greater fracture resistance choose MP7135.

When using MP7135 for continuous machining wear resistance and improved productivity can be realised by using MC7125.

# MC / MP7100 SERIES

## RECOMMENDED CUTTING CONDITIONS

### EXTRACTS FROM RECOMMENDED CONDITIONS FOR NEGATIVE INSERTS

| | Material | | Cutting conditions | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|
| M | Austenitic stainless steel AISI304 / DIN 1.4301, AISI316 / DIN 1.4401, etc. | L | First recommended | MC7115 | LM | 185 – 295 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | Fracture resistance | MC7125 | LM | 175 – 240 | 0.10 – 0.35 | 0.3 – 2.5 |
| | | M | First recommended | MC7125 | MM | 160 – 220 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Alternative | MC7125 | GM, MA | 160 – 220 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Wear resistance | MC7115 | MM | 170 – 270 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | Fracture resistance | MP7135 | GM, MM, MA | 120 – 155 | 0.15 – 0.50 | 0.3 – 4.0 |
| | | R | First recommended | MP7135 | RM | 110 – 145 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | Wear resistance | MC7125 | RM | 150 – 205 | 0.25 – 0.55 | 1.5 – 6.0 |
| | Ferritic and martensitic stainless steel AISI430 / DIN 1.4016, AISI420J2 / DIN 1.4028, etc. | L | First recommended | MC7115 | LM | 185 – 295 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | Fracture resistance | MC7125 | LM | 175 – 240 | 0.10 – 0.50 | 0.3 – 2.5 |
| | | M | First recommended | MC7125 | MM | 160 – 220 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Alternative | MC7125 | GM, MA | 160 – 220 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Wear resistance | MC7115 | MM | 170 – 270 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | Fracture resistance | MP7135 | GM, MM, MA | 120 – 155 | 0.15 – 0.50 | 0.3 – 4.0 |
| | | R | First recommended | MP7135 | RM | 110 – 145 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | Wear resistance | MC7125 | RM | 150 – 205 | 0.25 – 0.55 | 1.5 – 6.0 |
| | Precipitation-hardening stainless steel AISI630 / DIN 1.4542, etc. | L | First recommended | MC7115 | LM | 110 – 165 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | Fracture resistance | MC7125 | LM | 95 – 120 | 0.10 – 0.50 | 0.3 – 2.5 |
| | | M | First recommended | MC7125 | MM | 90 – 110 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Alternative | MC7125 | GM, MA | 90 – 110 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Wear resistance | MC7115 | MM | 100 – 150 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | Fracture resistance | MP7135 | GM, MM, MA | 65 – 90 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | R | First recommended | MP7135 | RM | 60 – 85 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | Wear resistance | MC7125 | RM | 85 – 100 | 0.25 – 0.55 | 1.5 – 6.0 |
| | Duplex stainless steel, Duplex material, DIN 1.4462, etc. | L | First recommended | MP7135 | LM | 85 – 115 | 0.10 – 0.40 | 0.3 – 2.5 |
| | | | Fracture resistance | MC7125 | LM | 115 – 160 | 0.10 – 0.40 | 0.3 – 2.5 |
| | | M | First recommended | MP7135 | GM | 80 – 105 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Alternative | MP7135 | MM, MA | 80 – 105 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | | Wear resistance | MC7125 | GM, MM, MA | 105 – 145 | 0.15 – 0.50 | 0.3 – 5.0 |
| | | R | First recommended | MP7135 | RM | 75 – 100 | 0.25 – 0.60 | 1.5 – 6.0 |

1/1

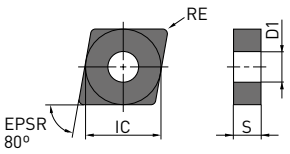
1. For recommended conditions other than those listed above, please refer to the information starting from page 130.

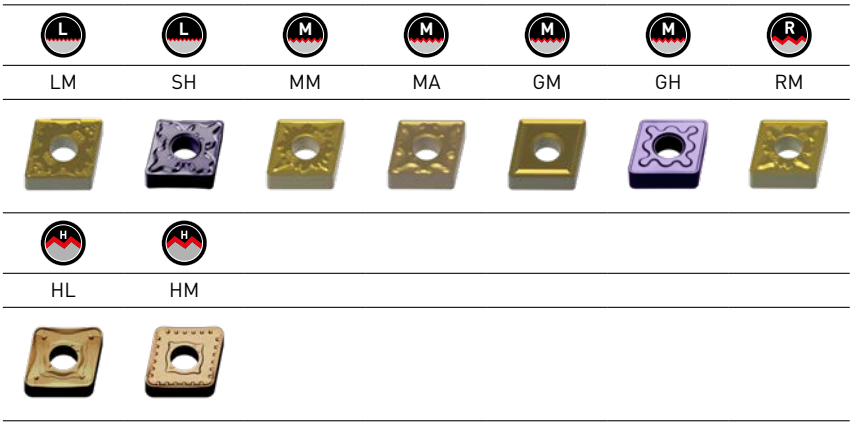
# CNMG, CNMM

## NEGATIVE INSERTS (WITH HOLE)

**M Class**

**CNMG, CNMM**




| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| CNMG120404-LM | L | ● | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| CNMG120408-LM | L | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-LM | L | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| CNMG120404-SH | L | | | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| CNMG120408-SH | L | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-MM | M | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| CNMG120416-MM | M | ● | ● | ● | 12.7 | 4.76 | 1.6 | 5.16 |
| CNMG160608-MM | M | ● | ● | ● | 15.875 | 6.35 | 0.8 | 6.35 |
| CNMG160612-MM | M | ● | ● | ● | 15.875 | 6.35 | 1.2 | 6.35 |
| CNMG160616-MM | M | ● | ● | ● | 15.875 | 6.35 | 1.6 | 6.35 |
| CNMG190608-MM | M | ● | ● | ● | 19.05 | 6.35 | 0.8 | 7.93 |
| CNMG190612-MM | M | ● | ● | ● | 19.05 | 6.35 | 1.2 | 7.93 |
| CNMG190616-MM | M | ● | ● | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| CNMG120404-MA | M | | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| CNMG120408-MA | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-MA | M | | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| CNMG120416-MA | M | | ● | ● | 12.7 | 4.76 | 1.6 | 5.16 |
| CNMG160608-MA | M | | | ● | 15.875 | 6.35 | 0.8 | 6.35 |
| CNMG160612-MA | M | | | ● | 15.875 | 6.35 | 1.2 | 6.35 |
| CNMG160616-MA | M | | | ● | 15.875 | 6.35 | 1.6 | 6.35 |
| CNMG190612-MA | M | | | ● | 19.05 | 6.35 | 1.2 | 7.93 |
| CNMG190616-MA | M | | ● | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| CNMG120404-GM | M | | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| CNMG120408-GM | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-GM | M | | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| CNMG120408-GH | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-GH | M | | | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| CNMG160612-GH | M | | | ● | 15.875 | 6.35 | 1.2 | 6.35 |
| CNMG190612-GH | M | | | ● | 19.05 | 6.35 | 1.2 | 7.93 |
| CNMG190616-GH | M | | | ● | 19.05 | 6.35 | 1.6 | 7.93 |



(10 inserts in one case)

130 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

## CNMG, CNMM – NEGATIVE INSERTS (WITH HOLE)

| Order number | | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| CNMG120408-RM | R | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-RM | R | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| CNMG120416-RM | R | ● | ● | ● | 12.7 | 4.76 | 1.6 | 5.16 |
| CNMG160612-RM | R | ● | ● | ● | 15.875 | 6.35 | 1.2 | 6.35 |
| CNMG160616-RM | R | ● | ● | ● | 15.875 | 6.35 | 1.6 | 6.35 |
| CNMG190612-RM | R | ● | ● | ● | 19.05 | 6.35 | 1.2 | 7.93 |
| CNMG190616-RM | R | ● | ● | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| CNMM190612-HL | H | | ● | | 19.05 | 6.35 | 1.2 | 7.93 |
| CNMM190616-HL | H | | ● | | 19.05 | 6.35 | 1.6 | 7.93 |
| CNMM190612-HM | H | | ● | | 19.05 | 6.35 | 1.2 | 7.93 |
| CNMM190616-HM | H | | ● | | 19.05 | 6.35 | 1.6 | 7.93 |

2/2

(10 inserts in one case)

130 Vc



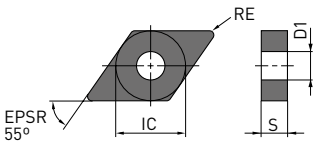
● : Inventory maintained. ★ : Inventory maintained in Japan.

# DNMG

## NEGATIVE INSERTS (WITH HOLE)

**M Class**

**DNMG**




| LM | SH | MM | MA | GM | GH | RM |
|---|---|---|---|---|---|---|
| | | | | | | |

| Order number | F L M R N | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| DNMG110404-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| DNMG110408-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| DNMG150404-LM | L | ● | ● | ★ | 12.7 | 4.76 | 0.4 | 5.16 |
| DNMG150408-LM | L | ● | ● | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150412-LM | L | ★ | ★ | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| DNMG150604-LM | L | ● | ● | ● | 12.7 | 6.35 | 0.4 | 5.16 |
| DNMG150608-LM | L | ● | ● | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG110404-SH | L | | | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| DNMG110408-SH | L | | | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| DNMG150404-SH | L | | | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| DNMG150408-SH | L | | | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150412-MM | M | | ★ | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| DNMG150608-MM | M | ● | ● | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG150612-MM | M | ★ | ● | ● | 12.7 | 6.35 | 1.2 | 5.16 |
| DNMG150404-MA | M | | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| DNMG150408-MA | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150412-MA | M | | ★ | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| DNMG150604-MA | M | | ● | ● | 12.7 | 6.35 | 0.4 | 5.16 |
| DNMG150608-MA | M | | ● | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG150612-MA | M | | ★ | ● | 12.7 | 6.35 | 1.2 | 5.16 |
| DNMG150404-GM | M | | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| DNMG150408-GM | M | | ★ | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150604-GM | M | | ● | ★ | 12.7 | 6.35 | 0.4 | 5.16 |
| DNMG150608-GM | M | | ● | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG150408-GH | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150412-GH | M | | | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| DNMG150608-GH | M | | | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG150612-GH | M | | | ● | 12.7 | 6.35 | 1.2 | 5.16 |
| DNMG150408-RM | R | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150412-RM | R | | ● | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| DNMG150416-RM | R | | ★ | ★ | 12.7 | 4.76 | 1.6 | 5.16 |
| DNMG150608-RM | R | | ● | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG150612-RM | R | | ● | ★ | 12.7 | 6.35 | 1.2 | 5.16 |



(10 inserts in one case)

130 Vc

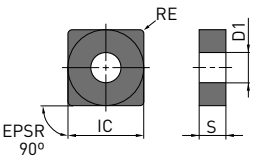
● : Inventory maintained. ★ : Inventory maintained in Japan.

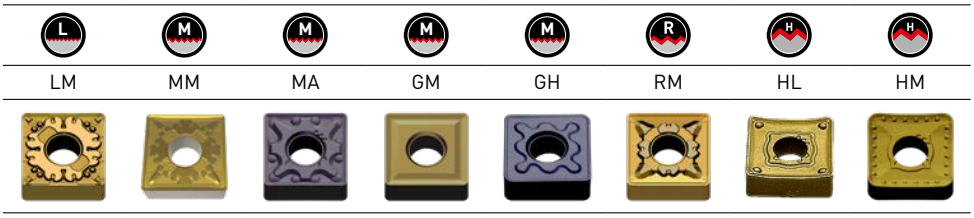
# SNMG, SNMM

## NEGATIVE INSERTS (WITH HOLE)

**M Class**

**SNMG, SNMM**




| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| SNMG120404-LM | L | ● | ★ | ★ | 12.7 | 4.76 | 0.4 | 5.16 |
| SNMG120408-LM | L | ● | ● | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| SNMG120408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| SNMG120412-MM | M | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| SNMG120416-MM | M | ★ | ★ | ★ | 12.7 | 4.76 | 1.6 | 5.16 |
| SNMG150608-MM | M | | ● | ★ | 15.875 | 6.35 | 0.8 | 6.35 |
| SNMG150612-MM | M | ● | ● | ★ | 15.875 | 6.35 | 1.2 | 6.35 |
| SNMG150616-MM | M | | ★ | | 15.875 | 6.35 | 1.6 | 6.35 |
| SNMG190612-MM | M | | ● | ● | 19.05 | 6.35 | 1.2 | 7.93 |
| SNMG190616-MM | M | | ● | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| SNMG120404-MA | M | | ● | ★ | 12.7 | 4.76 | 0.4 | 5.16 |
| SNMG120408-MA | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| SNMG120412-MA | M | | ★ | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| SNMG150608-MA | M | | ● | ● | 15.875 | 6.35 | 0.8 | 6.35 |
| SNMG150612-MA | M | | ● | ● | 15.875 | 6.35 | 1.2 | 6.35 |
| SNMG190616-MA | M | | ● | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| SNMG120404-GM | M | | ● | ★ | 12.7 | 4.76 | 0.4 | 5.16 |
| SNMG120408-GM | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| SNMG120412-GM | M | | ★ | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| SNMG120408-GH | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| SNMG120412-GH | M | | | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| SNMG120416-GH | M | | | ● | 12.7 | 4.76 | 1.6 | 5.16 |
| SNMG190612-GH | M | | | ● | 19.05 | 6.35 | 1.2 | 7.93 |
| SNMG190616-GH | M | | | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| SNMG120408-RM | R | ★ | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| SNMG120412-RM | R | ★ | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| SNMG120416-RM | R | ★ | ★ | ● | 12.7 | 4.76 | 1.6 | 5.16 |
| SNMG150612-RM | R | ● | ★ | ● | 15.875 | 6.35 | 1.2 | 6.35 |
| SNMG150616-RM | R | ● | | | 15.875 | 6.35 | 1.6 | 6.35 |
| SNMG190612-RM | R | ★ | ● | ★ | 19.05 | 6.35 | 1.2 | 7.93 |
| SNMG190616-RM | R | ● | ● | ● | 19.05 | 6.35 | 1.6 | 7.93 |
| SNMM190612-HL | H | | ★ | | 19.05 | 6.35 | 1.2 | 7.93 |
| SNMM190616-HL | H | | ★ | | 19.05 | 6.35 | 1.6 | 7.93 |
| SNMM190612-HM | H | | ● | | 19.05 | 6.35 | 1.2 | 7.93 |
| SNMM190616-HM | H | | ● | | 19.05 | 6.35 | 1.6 | 7.93 |
| SNMM250732-HM | H | | ● | | 25.4 | 7.94 | 3.2 | 9.12 |



(10 inserts in one case)





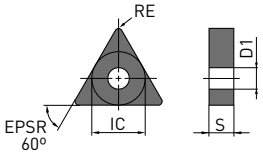
● : Inventory maintained. ★ : Inventory maintained in Japan.

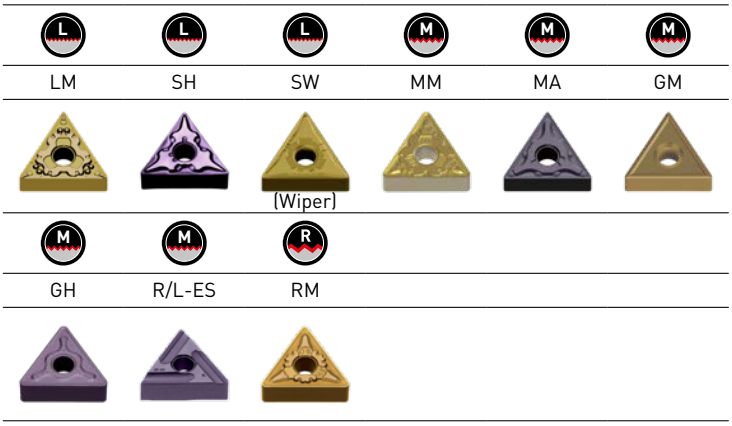
# TNMG, TNMX

## NEGATIVE INSERTS (WITH HOLE)

### M Class

### TNMG, TNMX




| Order number | F L M R N | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| TNMG160404-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| TNMG160408-LM | L | ★ | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160412-LM | L | ★ | ★ | ★ | 9.525 | 4.76 | 1.2 | 3.81 |
| TNMG160404-SH | L | | | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| TNMG160408-SH | L | | | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMX160408-SW | L | | ★ | | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160408-MM | M | ● | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160412-MM | M | ★ | ★ | ★ | 9.525 | 4.76 | 1.2 | 3.81 |
| TNMG220408-MM | M | ★ | ● | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG220412-MM | M | | ★ | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| TNMG220416-MM | M | | ● | | 12.7 | 4.76 | 1.6 | 5.16 |
| TNMG160404-MA | M | | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| TNMG160408-MA | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160412-MA | M | | ★ | ● | 9.525 | 4.76 | 1.2 | 3.81 |
| TNMG220408-MA | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG220412-MA | M | | ★ | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| TNMG160404-GM | M | | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| TNMG160408-GM | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160412-GM | M | | ● | ★ | 9.525 | 4.76 | 1.2 | 3.81 |
| TNMG220408-GM | M | | ★ | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG160408-GH | M | | | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG220408-GH | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG220412-GH | M | | | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| TNMG160404R-ES | M | | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| TNMG160404L-ES | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160408R-ES | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160408L-ES | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG220408R-ES | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG220408L-ES | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG160408-RM | R | ★ | ● | ★ | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160412-RM | R | ★ | ★ | ● | 9.525 | 4.76 | 1.2 | 3.81 |
| TNMG220408-RM | R | | ● | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| TNMG220412-RM | R | | ★ | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| TNMG220416-RM | R | | ● | ★ | 12.7 | 4.76 | 1.6 | 5.16 |



(10 inserts in one case)

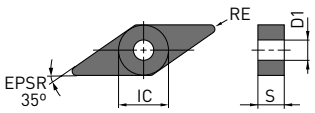
● : Inventory maintained. ★ : Inventory maintained in Japan.

# VNMG

## NEGATIVE INSERTS (WITH HOLE)

### M Class

### VNMG




| LM | MM | MA | GM |
|---|---|---|---|
| | | | |

| Order number | F L M R N | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| VNMG160404-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| VNMG160408-LM | L | ★ | ● | ★ | 9.525 | 4.76 | 0.8 | 3.81 |
| VNMG160408-MM | M | ● | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| VNMG160404-MA | M | | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| VNMG160408-MA | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| VNMG160404-GM | M | | ● | ★ | 9.525 | 4.76 | 0.4 | 3.81 |
| VNMG160408-GM | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |

1/1

(10 inserts in one case)

130 Vc



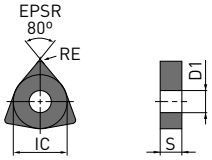
● : Inventory maintained. ★ : Inventory maintained in Japan.

# WNMG

## NEGATIVE INSERTS (WITH HOLE)

### M Class

### WNMG




| LM | SH | MM | MA | GM | GH |
|---|---|---|---|---|---|
| | | | | | |

| RM |
|---|
| |

| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| WNMG060404-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| WNMG060408-LM | L | ● | ● | ★ | 9.525 | 4.76 | 0.8 | 3.81 |
| WNMG080404-LM | L | ● | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| WNMG080408-LM | L | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG06T304-SH | L | | | ● | 9.525 | 3.97 | 0.4 | 3.81 |
| WNMG06T308-SH | L | | | ● | 9.525 | 3.97 | 0.8 | 3.81 |
| WNMG060404-SH | L | | | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| WNMG060408-SH | L | | | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| WNMG080404-SH | L | | | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| WNMG080408-SH | L | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG060408-MM | M | ★ | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| WNMG060412-MM | M | | ● | ● | 9.525 | 4.76 | 1.2 | 3.81 |
| WNMG080408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG080412-MM | M | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| WNMG06T304-MA | M | | ● | ● | 9.525 | 3.97 | 0.4 | 3.81 |
| WNMG06T308-MA | M | | ● | ● | 9.525 | 3.97 | 0.8 | 3.81 |
| WNMG06T312-MA | M | | ★ | ★ | 9.525 | 3.97 | 1.2 | 3.81 |
| WNMG060408-MA | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| WNMG060412-MA | M | | ★ | ● | 9.525 | 4.76 | 1.2 | 3.81 |
| WNMG080404-MA | M | | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| WNMG080408-MA | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG080412-MA | M | | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| WNMG060404-GM | M | | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| WNMG060408-GM | M | | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| WNMG080404-GM | M | | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| WNMG080408-GM | M | | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG080412-GM | M | | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| WNMG080408-GH | M | | | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG080412-GH | M | | | ● | 12.7 | 4.76 | 1.2 | 5.16 |
| WNMG060408-RM | R | ● | ★ | ★ | 9.525 | 4.76 | 0.8 | 3.81 |
| WNMG060412-RM | R | | ★ | ● | 9.525 | 4.76 | 1.2 | 3.81 |
| WNMG080408-RM | R | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG080412-RM | R | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |



(10 inserts in one case)



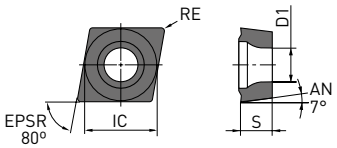
● : Inventory maintained. ★ : Inventory maintained in Japan.

# CCMT, CCMH, CPMH

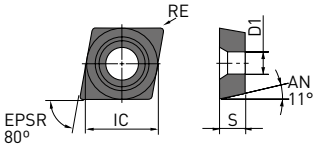
## 7°, 11° POSITIVE INSERTS (WITH HOLE)

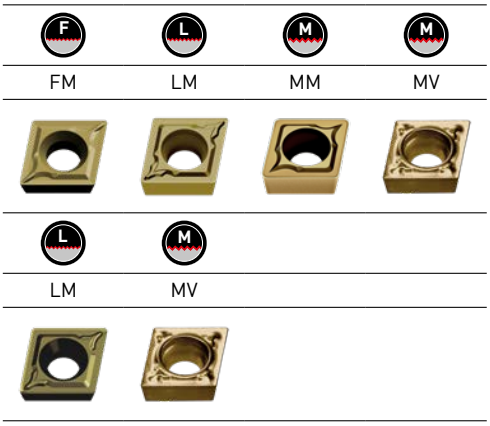
### M Class

#### CCMT, CCMH




#### CPMH




| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| CCMT060202-FM | F | | ★ | | 6.35 | 2.38 | 0.2 | 2.8 |
| CCMT060204-FM | F | ★ | ★ | ★ | 6.35 | 2.38 | 0.4 | 2.8 |
| CCMT09T302-FM | F | | ★ | | 9.525 | 3.97 | 0.2 | 4.4 |
| CCMT09T304-FM | F | ★ | ★ | ★ | 9.525 | 3.97 | 0.4 | 4.4 |
| CCMT09T308-FM | F | ★ | ★ | ★ | 9.525 | 3.97 | 0.8 | 4.4 |
| CCMT060204-LM | L | ● | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| CCMT060208-LM | L | ● | ● | ★ | 6.35 | 2.38 | 0.8 | 2.8 |
| CCMT09T304-LM | L | ● | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| CCMT09T308-LM | L | ● | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |
| CCMT060202-MM | M | | ● | ● | 6.35 | 2.38 | 0.2 | 2.8 |
| CCMT060204-MM | M | ● | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| CCMT060208-MM | M | ● | ● | ● | 6.35 | 2.38 | 0.8 | 2.8 |
| CCMT09T302-MM | M | | ● | ● | 9.525 | 3.97 | 0.2 | 4.4 |
| CCMT09T304-MM | M | ● | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| CCMT09T308-MM | M | ● | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |
| CCMT120404-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.4 | 5.5 |
| CCMT120408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.5 |
| CCMT120412-MM | M | ● | ● | ★ | 12.7 | 4.76 | 1.2 | 5.5 |
| CCMH060202-MV | M | | ● | ● | 6.35 | 2.38 | 0.2 | 2.8 |
| CCMH060204-MV | M | | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| CPMH080204-LM | L | ● | ● | ● | 7.94 | 2.38 | 0.4 | 3.5 |
| CPMH080208-LM | L | ● | ● | ● | 7.94 | 2.38 | 0.8 | 3.5 |
| CPMH090304-LM | L | ● | ● | ● | 9.525 | 3.18 | 0.4 | 4.4 |
| CPMH090308-LM | L | ● | ● | ● | 9.525 | 3.18 | 0.8 | 4.4 |
| CPMH080204-MV | M | | ● | ● | 7.94 | 2.38 | 0.4 | 3.5 |
| CPMH080208-MV | M | | ● | ● | 7.94 | 2.38 | 0.8 | 3.5 |
| CPMH090304-MV | M | | ● | ● | 9.525 | 3.18 | 0.4 | 4.4 |
| CPMH090308-MV | M | | ● | ● | 9.525 | 3.18 | 0.8 | 4.4 |



(10 inserts in one case)





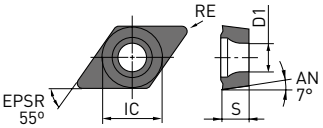
● : Inventory maintained. ★ : Inventory maintained in Japan.

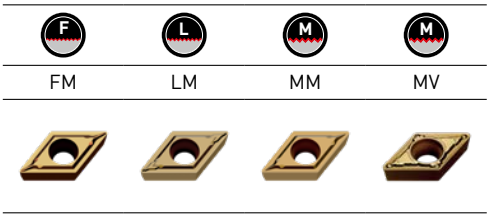
# DCMT

## 7° POSITIVE INSERTS (WITH HOLE)

**M Class**

**DCMT**




| Order number | F L M R N | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| DCMT070202-FM | F | | ★ | | 6.35 | 2.38 | 0.2 | 2.8 |
| DCMT070204-FM | F | ★ | ★ | | 6.35 | 2.38 | 0.4 | 2.8 |
| DCMT11T302-FM | F | | ★ | | 9.525 | 3.97 | 0.2 | 4.4 |
| DCMT11T304-FM | F | ★ | ★ | ★ | 9.525 | 3.97 | 0.4 | 4.4 |
| DCMT11T308-FM | F | ★ | ★ | ★ | 9.525 | 3.97 | 0.8 | 4.4 |
| DCMT070202-LM | L | | ★ | | 6.35 | 2.38 | 0.2 | 2.8 |
| DCMT070204-LM | L | ● | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| DCMT070208-LM | L | ● | ● | ● | 6.35 | 2.38 | 0.8 | 2.8 |
| DCMT11T302-LM | L | | ★ | | 9.525 | 3.97 | 0.2 | 4.4 |
| DCMT11T304-LM | L | ★ | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| DCMT11T308-LM | L | ● | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |
| DCMT070202-MM | M | | ● | ● | 6.35 | 2.38 | 0.2 | 2.8 |
| DCMT070204-MM | M | ● | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| DCMT070208-MM | M | ● | ● | ★ | 6.35 | 2.38 | 0.8 | 2.8 |
| DCMT11T302-MM | M | | ● | | 9.525 | 3.97 | 0.2 | 4.4 |
| DCMT11T304-MM | M | ● | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| DCMT11T308-MM | M | ● | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |
| DCMT150404-MM | M | ● | ● | ★ | 12.7 | 4.76 | 0.4 | 5.5 |
| DCMT150408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.5 |
| DCMT070202-MV | M | | ● | ● | 6.35 | 2.38 | 0.2 | 2.8 |
| DCMT070204-MV | M | | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| DCMT070208-MV | M | | ● | ● | 6.35 | 2.38 | 0.8 | 2.8 |
| DCMT11T302-MV | M | | ● | | 9.525 | 3.97 | 0.2 | 4.4 |
| DCMT11T304-MV | M | | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| DCMT11T308-MV | M | | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |



(10 inserts in one case)

130 Vc

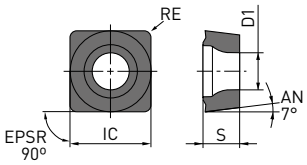
● : Inventory maintained. ★ : Inventory maintained in Japan.

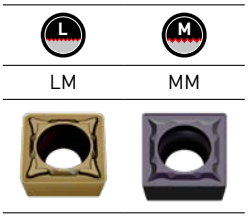
# SCMT

## 7° POSITIVE INSERTS (WITH HOLE)

### M Class

### SCMT




| Order number | F L M R N | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| SCMT09T304-LM | L | ● | ★ | ★ | 9.525 | 3.97 | 0.4 | 4.4 |
| SCMT09T308-LM | L | ● | ★ | ★ | 9.525 | 3.97 | 0.8 | 4.4 |
| SCMT09T304-MM | M | ● | ● | ★ | 9.525 | 3.97 | 0.4 | 4.4 |
| SCMT09T308-MM | M | ● | ● | ★ | 9.525 | 3.97 | 0.8 | 4.4 |
| SCMT120404-MM | M | ● | ● | ★ | 12.7 | 4.76 | 0.4 | 5.5 |
| SCMT120408-MM | M | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.5 |



(10 inserts in one case)

130 Vc



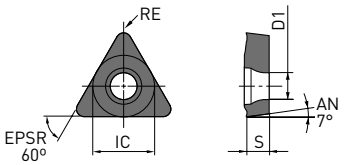
● : Inventory maintained. ★ : Inventory maintained in Japan.

# TCMT, TPMH

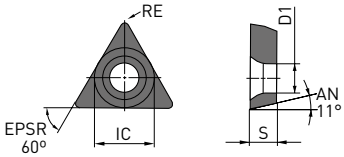
## 7°, 11° POSITIVE INSERTS (WITH HOLE)

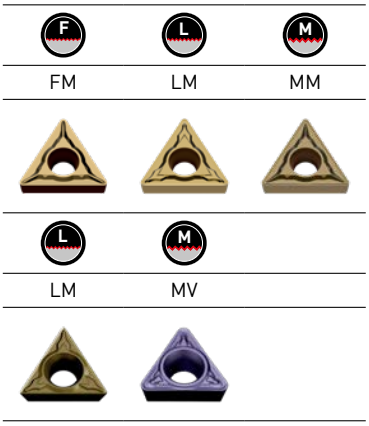
### M Class

#### TCMT




#### TPMH




| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| TCMT090204-FM | F | ★ | ★ | ★ | 5.56 | 2.38 | 0.4 | 2.5 |
| TCMT090204-LM | L | | ● | ★ | 5.56 | 2.38 | 0.4 | 2.5 |
| TCMT110204-LM | L | | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| TCMT110208-LM | L | | ● | ● | 6.35 | 2.38 | 0.8 | 2.8 |
| TCMT16T304-LM | L | ● | ● | ★ | 9.525 | 3.97 | 0.4 | 4.4 |
| TCMT16T308-LM | L | ● | ● | ★ | 9.525 | 3.97 | 0.8 | 4.4 |
| TCMT090204-MM | M | | ● | ★ | 5.56 | 2.38 | 0.4 | 2.5 |
| TCMT090208-MM | M | | | ★ | 5.56 | 2.38 | 0.8 | 2.5 |
| TCMT110204-MM | M | | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| TCMT110208-MM | M | ★ | ● | ★ | 6.35 | 2.38 | 0.8 | 2.8 |
| TCMT130304-MM | M | | | ★ | 7.94 | 3.18 | 0.4 | 3.4 |
| TCMT16T304-MM | M | ● | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| TCMT16T308-MM | M | ● | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |
| TCMT16T312-MM | M | | ● | ● | 9.525 | 3.97 | 1.2 | 4.4 |
| TPMH090204-LM | L | | ● | ● | 5.56 | 2.38 | 0.4 | 2.9 |
| TPMH110304-LM | L | | ● | ● | 6.35 | 3.18 | 0.4 | 3.4 |
| TPMH110308-LM | L | | ● | ● | 6.35 | 3.18 | 0.8 | 3.4 |
| TPMH160304-LM | L | | ● | ● | 9.525 | 3.18 | 0.4 | 4.4 |
| TPMH160308-LM | L | | ● | ● | 9.525 | 3.18 | 0.8 | 4.4 |
| TPMH080202-MV | M | | ● | ● | 4.76 | 2.38 | 0.2 | 2.4 |
| TPMH080204-MV | M | | ● | ● | 4.76 | 2.38 | 0.4 | 2.4 |
| TPMH090204-MV | M | | ● | ● | 5.56 | 2.38 | 0.4 | 2.9 |
| TPMH090208-MV | M | | ★ | ★ | 5.56 | 2.38 | 0.8 | 2.9 |
| TPMH110302-MV | M | | ★ | ★ | 6.35 | 3.18 | 0.2 | 3.4 |
| TPMH110304-MV | M | | ● | ● | 6.35 | 3.18 | 0.4 | 3.4 |
| TPMH110308-MV | M | | ★ | ● | 6.35 | 3.18 | 0.8 | 3.4 |
| TPMH160304-MV | M | | ● | ● | 9.525 | 3.18 | 0.4 | 4.4 |
| TPMH160308-MV | M | | ● | ● | 9.525 | 3.18 | 0.8 | 4.4 |



(10 inserts in one case)



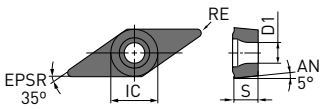
● : Inventory maintained. ★ : Inventory maintained in Japan.

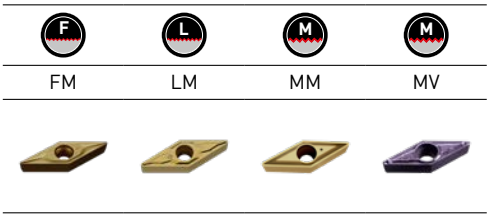
# VBMT, VCMT

## 5°, 7° POSITIVE INSERTS (WITH HOLE)

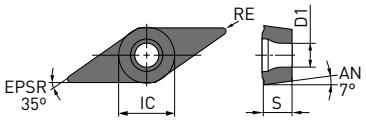
### M Class

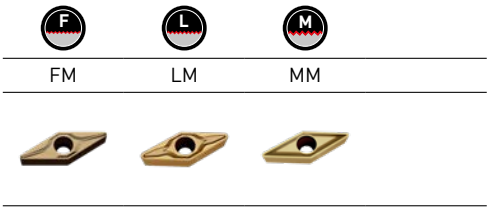
#### VBMT




#### VCMT




| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| VBMT110302-FM | F | | ★ | ★ | 6.35 | 3.18 | 0.2 | 2.9 |
| VBMT110304-FM | F | ★ | ★ | ★ | 6.35 | 3.18 | 0.4 | 2.9 |
| VBMT110308-FM | F | ★ | ★ | | 6.35 | 3.18 | 0.8 | 2.9 |
| VBMT160404-FM | F | ★ | ★ | ★ | 9.525 | 4.76 | 0.4 | 4.4 |
| VBMT160408-FM | F | ★ | ★ | | 9.525 | 4.76 | 0.8 | 4.4 |
| VBMT110304-LM | L | ● | ● | ● | 6.35 | 3.18 | 0.4 | 2.9 |
| VBMT110308-LM | L | ● | ★ | ★ | 6.35 | 3.18 | 0.8 | 2.9 |
| VBMT160404-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.4 | 4.4 |
| VBMT160408-LM | L | ● | ● | ★ | 9.525 | 4.76 | 0.8 | 4.4 |
| VBMT160404-MM | M | ● | ● | ● | 9.525 | 4.76 | 0.4 | 4.4 |
| VBMT160408-MM | M | ● | ● | ● | 9.525 | 4.76 | 0.8 | 4.4 |
| VBMT110304-MV | M | | ● | ● | 6.35 | 3.18 | 0.4 | 2.9 |
| VBMT110308-MV | M | | ★ | ★ | 6.35 | 3.18 | 0.8 | 2.9 |
| VBMT160404-MV | M | | ● | ● | 9.525 | 4.76 | 0.4 | 4.4 |
| VBMT160408-MV | M | | ● | ● | 9.525 | 4.76 | 0.8 | 4.4 |
| VCMT110302-FM | F | | ★ | ★ | 6.35 | 3.18 | 0.2 | 2.8 |
| VCMT110304-FM | F | ★ | ★ | ★ | 6.35 | 3.18 | 0.4 | 2.8 |
| VCMT160404-FM | F | ★ | ★ | ★ | 9.525 | 4.76 | 0.4 | 4.4 |
| VCMT110304-LM | L | ● | ● | ● | 6.35 | 3.18 | 0.4 | 2.8 |
| VCMT110308-LM | L | ● | ● | ● | 6.35 | 3.18 | 0.8 | 2.8 |
| VCMT160404-LM | L | ● | ● | ● | 9.525 | 4.76 | 0.4 | 4.4 |
| VCMT160408-LM | L | ● | ● | ★ | 9.525 | 4.76 | 0.8 | 4.4 |
| VCMT160404-MM | M | ● | ● | ● | 9.525 | 4.76 | 0.4 | 4.4 |
| VCMT160408-MM | M | ● | ● | ● | 9.525 | 4.76 | 0.8 | 4.4 |
| VCMT160412-MM | M | | ★ | ★ | 9.525 | 4.76 | 1.2 | 4.4 |
| VCMT080202-MV | M | | ● | ● | 4.76 | 2.38 | 0.2 | 2.4 |
| VCMT080204-MV | M | | ● | ● | 4.76 | 2.38 | 0.4 | 2.4 |



(10 inserts in one case)





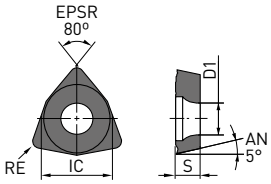
● : Inventory maintained. ★ : Inventory maintained in Japan.

# WBMT, WCMT, WPMT

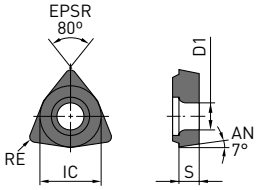
## 5°, 7°, 11° POSITIVE INSERTS (WITH HOLE)

### M Class

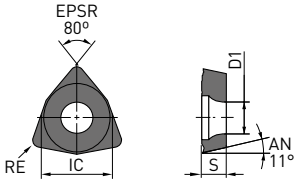
#### WBMT




#### WCMT




#### WPMT




L-MV

MM

MV

| Order number | F L M R H | MC7115 | MC7125 | MP7135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| WBMTL30202L-MV | M | | ★ | | 4.76 | 2.38 | 0.2 | 2.3 |
| WBMTL30204L-MV | M | | ★ | | 4.76 | 2.38 | 0.4 | 2.3 |
| WCMT020102-MM | M | | ● | ● | 3.97 | 1.59 | 0.2 | 2.3 |
| WCMT020104-MM | M | | ● | ● | 3.97 | 1.59 | 0.4 | 2.3 |
| WCMTL30202-MM | M | | ● | ● | 4.76 | 2.38 | 0.2 | 2.3 |
| WCMTL30204-MM | M | | ● | ● | 4.76 | 2.38 | 0.4 | 2.3 |
| WCMT040202-MM | M | | ● | ● | 6.35 | 2.38 | 0.2 | 2.8 |
| WCMT040204-MM | M | | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| WCMT06T304-MM | M | | ● | ● | 9.525 | 3.97 | 0.4 | 4.4 |
| WCMT06T308-MM | M | | ● | ● | 9.525 | 3.97 | 0.8 | 4.4 |
| WPMT040204-MV | M | | ● | ● | 6.35 | 2.38 | 0.4 | 2.8 |
| WPMT060304-MV | M | | ● | ● | 9.525 | 3.18 | 0.4 | 4.4 |
| WPMT060308-MV | M | | ● | ● | 9.525 | 3.18 | 0.8 | 4.4 |



(10 inserts in one case)

130 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

# MC / MP7100 SERIES

## RECOMMENDED CUTTING CONDITIONS

### NEGATIVE INSERTS (FOR EXTERNAL TURNING)

| Material | | Hardness | Cutting mode | | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Austenitic stainless steel | <200 HB | ● | L | 1 | MC7115 | LM | 185 – 295 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 2 | MC7125 | LM | 175 – 240 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 3 | MC7125 | SW | 175 – 240 | 0.10 – 0.50 | 0.3 – 2.5 |
| | | | ● | M | 1 | MC7115 | MM | 170 – 270 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | R | 1 | MC7115 | RM | 160 – 255 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | H | 1 | MC7125 | HL | 135 – 185 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ◐ | L | 1 | MC7125 | LM | 175 – 240 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 160 – 220 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 2 | MC7125 | GM | 160 – 220 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 3 | MC7125 | MA | 160 – 220 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | M | 4 | MC7125 | R/L-ES | 160 – 220 | 0.20 – 0.50 | 0.8 – 4.0 |
| | | | ◐ | M | 5 | MP7135 | GM | 120 – 155 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 6 | MP7135 | MM | 120 – 155 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 7 | MP7135 | MA | 120 – 155 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | R | 1 | MC7125 | RM | 150 – 205 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 2 | MP7135 | RM | 110 – 145 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 3 | MP7135 | GH | 110 – 145 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ◐ | H | 1 | MC7125 | HL | 135 – 185 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ◐ | H | 2 | MC7125 | HM | 135 – 185 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 130 – 170 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ✣ | L | 2 | MP7135 | SH | 130 – 170 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ✣ | M | 1 | MP7135 | GM | 120 – 155 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ✣ | M | 2 | MP7135 | MM | 120 – 155 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ✣ | M | 3 | MP7135 | MA | 120 – 155 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ✣ | M | 4 | MC7125 | R/L-ES | 160 – 220 | 0.20 – 0.50 | 0.8 – 4.0 |
| | | | ✣ | R | 1 | MP7135 | RM | 110 – 145 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ✣ | R | 2 | MP7135 | GH | 110 – 145 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ✣ | H | 1 | MC7125 | HL | 135 – 185 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ✣ | H | 2 | MC7125 | HM | 135 – 185 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | 200 HB | ● | L | 1 | MC7115 | LM | 155 – 245 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 2 | MC7125 | LM | 145 – 200 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | M | 1 | MC7115 | MM | 140 – 225 | 0.15 – 0.45 | 0.7 – 0.5 |
| | | | ● | R | 1 | MC7115 | RM | 135 – 215 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | H | 1 | MC7125 | HL | 110 – 155 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ● | H | 2 | MC7125 | HM | 110 – 155 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 145 – 200 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 130 – 180 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 2 | MC7125 | GM | 130 – 180 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 3 | MC7125 | MA | 130 – 180 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | M | 4 | MP7135 | GM | 100 – 130 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 5 | MP7135 | MM | 100 – 130 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 6 | MP7135 | MA | 100 – 130 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | R | 1 | MC7125 | RM | 125 – 175 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 2 | MP7135 | RM | 95 – 120 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 3 | MP7135 | GH | 95 – 120 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ◐ | H | 1 | MC7125 | HL | 110 – 155 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ◐ | H | 2 | MC7125 | HM | 110 – 155 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 110 – 140 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ✣ | L | 2 | MP7135 | SH | 110 – 140 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ✣ | M | 1 | MP7135 | GM | 100 – 130 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ✣ | M | 2 | MP7135 | MM | 100 – 130 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ✣ | M | 3 | MP7135 | MA | 100 – 130 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ✣ | R | 1 | MP7135 | RM | 95 – 120 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ✣ | R | 2 | MP7135 | GH | 95 – 120 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ✣ | H | 1 | MC7125 | HL | 110 – 155 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ✣ | H | 2 | MC7125 | HM | 110 – 155 | 0.50 – 1.10 | 2.0 – 10.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC/MP7100 SERIES – NEGATIVE INSERTS (FOR EXTERNAL TURNING)

| Material | | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Ferritic and martensitic Stainless steel | <200 HB | ● | L | 1 | MC7115 | LM | 185 – 295 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 2 | MC7125 | LM | 175 – 240 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | M | 1 | MC7115 | MM | 170 – 270 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | R | 1 | MC7115 | RM | 160 – 255 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | H | 1 | MC7125 | HL | 135 – 185 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ● | H | 2 | MC7125 | HM | 135 – 185 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 175 – 240 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 160 – 220 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 2 | MC7125 | GM | 160 – 220 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 3 | MC7125 | MA | 160 – 220 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | M | 4 | MP7135 | GM | 120 – 155 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 5 | MP7135 | MM | 120 – 155 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 6 | MP7135 | MA | 120 – 155 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | R | 1 | MC7125 | RM | 150 – 205 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 2 | MP7135 | RM | 110 – 145 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 3 | MP7135 | GH | 110 – 145 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ◐ | H | 1 | MC7125 | HL | 135 – 185 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ◐ | H | 2 | MC7125 | HM | 135 – 185 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 130 – 170 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ✣ | L | 2 | MP7135 | SH | 130 – 170 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ✣ | M | 1 | MP7135 | GM | 120 – 155 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ✣ | M | 2 | MP7135 | MM | 120 – 155 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ✣ | M | 3 | MP7135 | MA | 120 – 155 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ✣ | R | 1 | MP7135 | RM | 110 – 145 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ✣ | R | 2 | MP7135 | GH | 110 – 145 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ✣ | H | 1 | MC7125 | HL | 135 – 185 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ✣ | H | 2 | MC7125 | HM | 135 – 185 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | >200 HB | ● | L | 1 | MC7115 | LM | 155 – 245 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 2 | MC7125 | LM | 145 – 200 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 3 | MC7125 | SW | 145 – 200 | 0.10 – 0.50 | 0.3 – 2.5 |
| | | | ● | M | 1 | MC7115 | MM | 140 – 225 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | R | 1 | MC7115 | RM | 135 – 215 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | H | 1 | MC7125 | HL | 110 – 155 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ● | H | 2 | MC7125 | HM | 110 – 155 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 145 – 200 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 130 – 180 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 2 | MC7125 | GM | 130 – 180 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 3 | MC7125 | MA | 130 – 180 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | M | 4 | MP7135 | GM | 100 – 130 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 5 | MP7135 | MM | 100 – 130 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 6 | MP7135 | MA | 100 – 130 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | M | 7 | MP7135 | R/L-ES | 100 – 130 | 0.20 – 0.50 | 0.8 – 4.0 |
| | | | ◐ | R | 1 | MC7125 | RM | 125 – 175 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | H | 1 | MC7125 | HL | 110 – 155 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ◐ | H | 2 | MC7125 | HM | 110 – 155 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 110 – 140 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ✣ | L | 2 | MP7135 | SH | 110 – 140 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ✣ | M | 1 | MP7135 | GM | 100 – 130 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ✣ | M | 2 | MP7135 | MM | 100 – 130 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ✣ | M | 3 | MP7135 | MA | 100 – 130 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ✣ | M | 4 | MP7135 | R/L-ES | 100 – 130 | 0.20 – 0.50 | 0.8 – 4.0 |
| | | | ✣ | R | 1 | MP7135 | RM | 95 – 120 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ✣ | R | 2 | MP7135 | GH | 95 – 120 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ✣ | H | 1 | MC7125 | HL | 110 – 155 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ✣ | H | 2 | MC7125 | HM | 110 – 155 | 0.50 – 1.10 | 2.0 – 10.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC/MP7100 SERIES – NEGATIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Two-phase stainless steel | <280 HB | ● | L | 1 | MP7135 | LM | 85 – 115 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 2 | MP7135 | SH | 85 – 115 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ● | L | 3 | MC7125 | LM | 115 – 160 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 4 | MC7125 | SW | 115 – 160 | 0.10 – 0.50 | 0.3 – 2.5 |
| | | | ● | L | 5 | MC7115 | LM | 125 – 200 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | M | 1 | MP7135 | GM | 80 – 105 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ● | M | 2 | MP7135 | MM | 80 – 105 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | M | 3 | MP7135 | MA | 80 – 105 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ● | M | 4 | MC7125 | MM | 105 – 145 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | M | 5 | MC7125 | GM | 105 – 145 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ● | M | 6 | MC7125 | MA | 105 – 145 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ● | M | 7 | MC7115 | MM | 115 – 180 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | R | 1 | MP7135 | RM | 75 – 100 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | R | 2 | MP7135 | GH | 75 – 100 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ● | R | 3 | MC7125 | RM | 100 – 140 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | H | 1 | MC7125 | HL | 90 – 125 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ● | H | 2 | MC7125 | HM | 90 – 125 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ◐ | L | 1 | MP7135 | LM | 85 – 115 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | L | 2 | MP7135 | SH | 85 – 115 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ◐ | L | 3 | MC7125 | LM | 115 – 160 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | M | 1 | MP7135 | GM | 80 – 105 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 2 | MP7135 | MM | 80 – 105 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 3 | MP7135 | MA | 80 – 105 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | M | 4 | MP7135 | R/L-ES | 80 – 105 | 0.20 – 0.50 | 0.8 – 4.0 |
| | | | ◐ | M | 5 | MC7125 | MM | 105 – 145 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 6 | MC7125 | GM | 105 – 145 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 7 | MC7125 | MA | 105 – 145 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ◐ | R | 1 | MP7135 | RM | 75 – 100 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 2 | MP7135 | GH | 75 – 100 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ◐ | R | 3 | MC7125 | RM | 100 – 140 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | H | 1 | MC7125 | HL | 90 – 125 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ◐ | H | 2 | MC7125 | HM | 90 – 125 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 85 – 115 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ✣ | L | 2 | MP7135 | SH | 85 – 115 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ✣ | M | 1 | MP7135 | GM | 80 – 105 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ✣ | M | 2 | MP7135 | MM | 80 – 105 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ✣ | M | 3 | MP7135 | MA | 80 – 105 | 0.20 – 0.50 | 0.3 – 4.0 |
| | | | ✣ | M | 4 | MP7135 | R/L-ES | 80 – 105 | 0.20 – 0.50 | 0.8 – 4.0 |
| | | | ✣ | R | 1 | MP7135 | RM | 75 – 100 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ✣ | R | 2 | MP7135 | GH | 75 – 100 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ✣ | H | 1 | MC7125 | HL | 90 – 125 | 0.30 – 0.70 | 3.0 – 7.5 |
| | | | ✣ | H | 2 | MC7125 | HM | 90 – 125 | 0.50 – 1.10 | 2.0 – 10.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.



Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC / MP7100 SERIES – NEGATIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Precipitation-hardening stainless steel | 450 HB | ● | L | 1 | MC7115 | LM | 110 – 165 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 2 | MC7125 | LM | 95 – 120 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ● | L | 3 | MC7125 | SW | 95 – 120 | 0.10 – 0.50 | 0.3 – 2.5 |
| | | | ● | M | 1 | MC7115 | MM | 100 – 150 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ● | R | 1 | MC7115 | RM | 95 – 140 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ● | H | 1 | MC7125 | HL | 75 – 90 | 0.40 – 1.00 | 1.5 – 8.0 |
| | | | ● | H | 2 | MC7125 | HM | 75 – 90 | 0.50 – 1.10 | 2.0 – 10.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 95 – 120 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | L | 2 | MP7135 | LM | 70 – 95 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ◐ | L | 3 | MP7135 | SH | 70 – 95 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 90 – 110 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 2 | MC7125 | GM | 90 – 110 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 3 | MC7125 | MA | 90 – 110 | 0.10 – 0.30 | 0.5 – 3.0 |
| | | | ◐ | M | 4 | MC7125 | R/L-ES | 90 – 110 | 0.20 – 0.50 | 0.8 – 3.0 |
| | | | ◐ | M | 5 | MP7135 | GM | 65 – 90 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ◐ | M | 6 | MP7135 | MM | 65 – 90 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ◐ | M | 7 | MP7135 | MA | 65 – 90 | 0.10 – 0.30 | 0.5 – 3.0 |
| | | | ◐ | R | 1 | MC7125 | RM | 85 – 100 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 2 | MP7135 | RM | 60 – 85 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ◐ | R | 3 | MP7135 | GH | 60 – 85 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ◐ | H | 1 | MC7125 | HL | 75 – 90 | 0.40 – 1.00 | 1.5 – 8.0 |
| | | | ◐ | H | 2 | MC7125 | HM | 75 – 90 | 0.50 – 1.00 | 2.0 – 10.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 70 – 95 | 0.10 – 0.35 | 0.3 – 2.0 |
| | | | ✣ | L | 2 | MP7135 | SH | 70 – 95 | 0.10 – 0.40 | 0.3 – 2.0 |
| | | | ✣ | M | 1 | MP7135 | GM | 65 – 90 | 0.16 – 0.50 | 0.5 – 4.0 |
| | | | ✣ | M | 2 | MP7135 | MM | 65 – 90 | 0.15 – 0.45 | 0.7 – 5.0 |
| | | | ✣ | M | 3 | MP7135 | MA | 65 – 90 | 0.10 – 0.30 | 0.5 – 3.0 |
| | | | ✣ | R | 1 | MP7135 | RM | 60 – 85 | 0.25 – 0.55 | 1.5 – 6.0 |
| | | | ✣ | R | 2 | MP7135 | GH | 60 – 85 | 0.25 – 0.60 | 1.5 – 6.0 |
| | | | ✣ | H | 1 | MC7125 | HL | 75 – 90 | 0.40 – 1.00 | 1.5 – 8.0 |
| | | | ✣ | H | 2 | MC7125 | HM | 75 – 90 | 0.50 – 1.10 | 2.0 – 10.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC/MP7100 SERIES – 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Austenitic stainless steel | <200 HB | ● | F | 1 | MC7115 | FM | 160 – 255 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | F | 2 | MC7125 | FM | 150 – 210 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 160 – 255 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 135 – 215 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | F | 1 | MC7125 | FM | 150 – 210 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | L | 2 | MP7135 | LM | 115 – 145 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | F | 1 | MP7135 | FM | 115 – 145 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ✣ | L | 1 | MP7135 | LM | 115 – 145 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | 200 HB | ● | F | 1 | MC7115 | FM | 135 – 215 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | F | 2 | MC7125 | FM | 125 – 175 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 135 – 215 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 110 – 180 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | F | 1 | MC7125 | FM | 125 – 175 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | L | 2 | MP7135 | LM | 95 – 120 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | F | 1 | MP7135 | FM | 95 – 120 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ✣ | L | 1 | MP7135 | LM | 95 – 120 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | Ferritic and martensitic stainless steel | <200 HB | ● | F | 1 | MC7125 | FM | 150 – 210 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 160 – 255 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 135 – 215 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | F | 1 | MC7125 | FM | 150 – 210 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | L | 2 | MP7135 | LM | 115 – 145 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | F | 1 | MP7135 | FM | 115 – 145 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ✣ | L | 1 | MP7135 | LM | 115 – 145 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.



Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC/MP7100 SERIES – 7° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Ferritic and martensitic stainless steel | >200 HB | ● | F | 1 | MC7125 | FM | 125 – 175 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | F | 2 | MC7115 | FM | 135 – 215 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 135 – 215 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 110 – 180 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | F | 1 | MC7125 | FM | 125 – 175 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | L | 2 | MP7135 | LM | 95 – 120 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | F | 1 | MP7135 | FM | 95 – 120 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ✣ | L | 1 | MP7135 | LM | 95 – 120 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | Two-phase stainless steel | <280 HB | ● | F | 1 | MP7135 | FM | 75 – 100 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | L | 1 | MP7135 | LM | 75 – 100 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7125 | LM | 100 – 140 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 3 | MC7115 | LM | 110 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MP7135 | MM | 65 – 80 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MM | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7125 | MV | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 4 | MC7115 | MM | 90 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | F | 1 | MC7125 | FM | 100 – 140 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | L | 1 | MC7125 | LM | 100 – 140 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | F | 1 | MP7135 | FM | 75 – 100 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ✣ | L | 1 | MP7135 | LM | 75 – 100 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 65 – 80 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 65 – 80 | 0.08 – 0.30 | 0.3 – 2.0 |
| | Precipitation-hardening stainless steel | 450 HB | ● | F | 1 | MC7115 | FM | 95 – 140 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ● | L | 1 | MC7115 | LM | 95 – 140 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7125 | LM | 85 – 105 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7115 | MM | 80 – 120 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MM | 70 – 85 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ◐ | F | 1 | MC7125 | FM | 85 – 105 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | F | 2 | MP7135 | FM | 60 – 85 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ◐ | L | 1 | MC7125 | LM | 85 – 105 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ◐ | L | 2 | MP7135 | LM | 60 – 85 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 70 – 85 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 70 – 85 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 3 | MP7135 | MM | 50 – 70 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ✣ | F | 1 | MP7135 | FM | 60 – 85 | 0.04 – 0.20 | 0.2 – 0.9 |
| | | | ✣ | L | 1 | MP7135 | LM | 60 – 85 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 50 – 70 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 50 – 70 | 0.08 – 0.30 | 0.3 – 2.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC/MP7100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Austenitic stainless steel | <200 HB | ● | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 160 – 255 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7115 | MM | 135 – 215 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 115 – 145 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | 200 HB | ● | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 135 – 215 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 110 – 180 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 95 – 120 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | Ferritic and martensitic stainless steel | <200 HB | ● | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 160 – 255 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 135 – 215 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 150 – 210 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 125 – 175 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 115 – 145 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 95 – 120 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | >200 HB | ● | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 135 – 215 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 110 – 180 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 125 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 105 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 95 – 120 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 80 – 100 | 0.08 – 0.30 | 0.3 – 2.0 |



1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.



Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## MC/MP7100 SERIES – 11° POSITIVE INSERTS (FOR EXTERNAL TURNING)

| | Material | Hardness | Cutting mode | F L M R H | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| M | Two-phase stainless steel | <280 HB | ● | L | 1 | MC7125 | LM | 100 – 140 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 110 – 175 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ● | M | 3 | MC7115 | MM | 90 – 145 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | L | 1 | MP7135 | LM | 75 – 100 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | L | 2 | MC7125 | LM | 100 – 140 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 85 – 115 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 75 – 100 | 0.06 – 0.25 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MP7135 | MM | 65 – 80 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MP7135 | MV | 65 – 80 | 0.08 – 0.30 | 0.3 – 2.0 |
| | Precipitation-hardening stainless steel | 450 HB | ● | L | 1 | MC7125 | LM | 85 – 105 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ● | L | 2 | MC7115 | LM | 95 – 140 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ● | M | 1 | MC7125 | MM | 70 – 85 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ● | M | 2 | MC7125 | MV | 70 – 85 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ◐ | L | 1 | MC7125 | LM | 85 – 105 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ◐ | M | 1 | MC7125 | MM | 70 – 85 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ◐ | M | 2 | MC7125 | MV | 70 – 85 | 0.08 – 0.30 | 0.3 – 2.0 |
| | | | ✣ | L | 1 | MP7135 | LM | 60 – 85 | 0.06 – 0.20 | 0.2 – 1.0 |
| | | | ✣ | M | 1 | MC7125 | MM | 70 – 85 | 0.08 – 0.25 | 0.3 – 2.0 |
| | | | ✣ | M | 2 | MC7125 | MV | 70 – 85 | 0.08 – 0.30 | 0.3 – 2.0 |

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1. Recommended cutting conditions for 5° / 7° / 11° positive inserts are provided as a guideline only.
   Verify the recommended conditions for each boring bar as cutting conditions for internal machining will vary depending on the length of overhang.

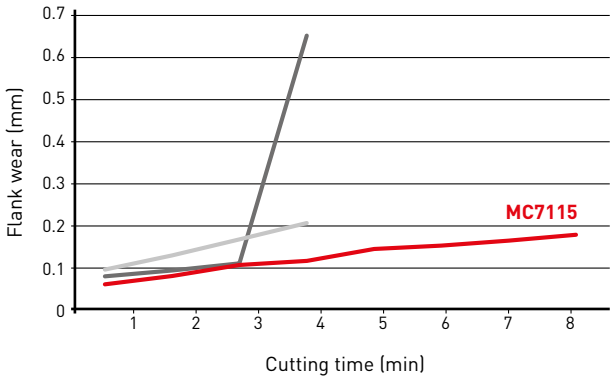
Cutting Conditions : ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

# MC/MP7100

## APPLICATION EXAMPLES

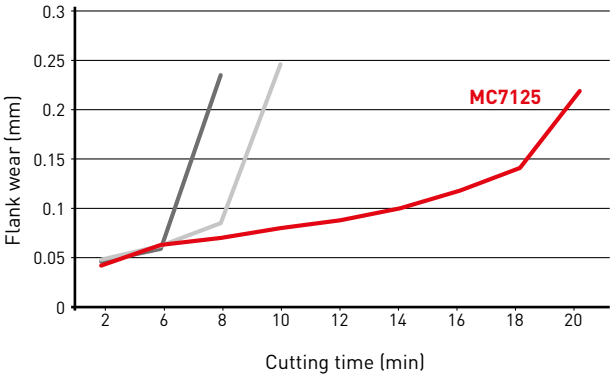
### MC7115: COMPARISON OF WEAR RESISTANCE DURING WET CUTTING

| | |
|---|---|
| Tool | CNMG120408-◌◌ |
| Material | DIN X5CrNi189 |
| Vc (m/min) | 250 |
| f (mm/rev) | 0.30 |
| ap (mm) | 1.5 |
| Cutting mode | Wet cutting |
| Results | Tool life doubled |



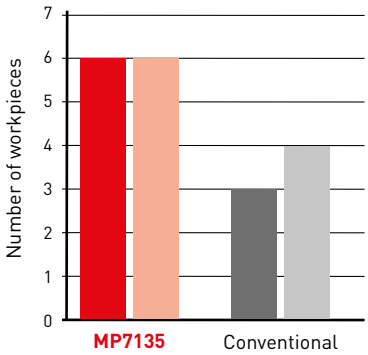

### MC7125: COMPARISON OF WEAR RESISTANCE DURING WET CUTTING

| | |
|---|---|
| Tool | CNMG120408-◌◌ |
| Material | DIN X2CrNiMo1812 |
| Vc (m/min) | 250 |
| f (mm/rev) | 0.30 |
| ap (mm) | 1.5 |
| Cutting mode | Wet cutting |
| Results | Tool life doubled |




### MP7135: INTERMITTENT CUTTING COMPARISON

| | |
|---|---|
| Tool | CNMG120408-◌◌ |
| Material | DIN X5CrNi189 |
| Vc (m/min) | 120 |
| f (mm/rev) | 0.25 |
| ap (mm) | 2.0 x 2 pass |
| Cutting mode | Wet cutting |
| Results | Almost double tool life |

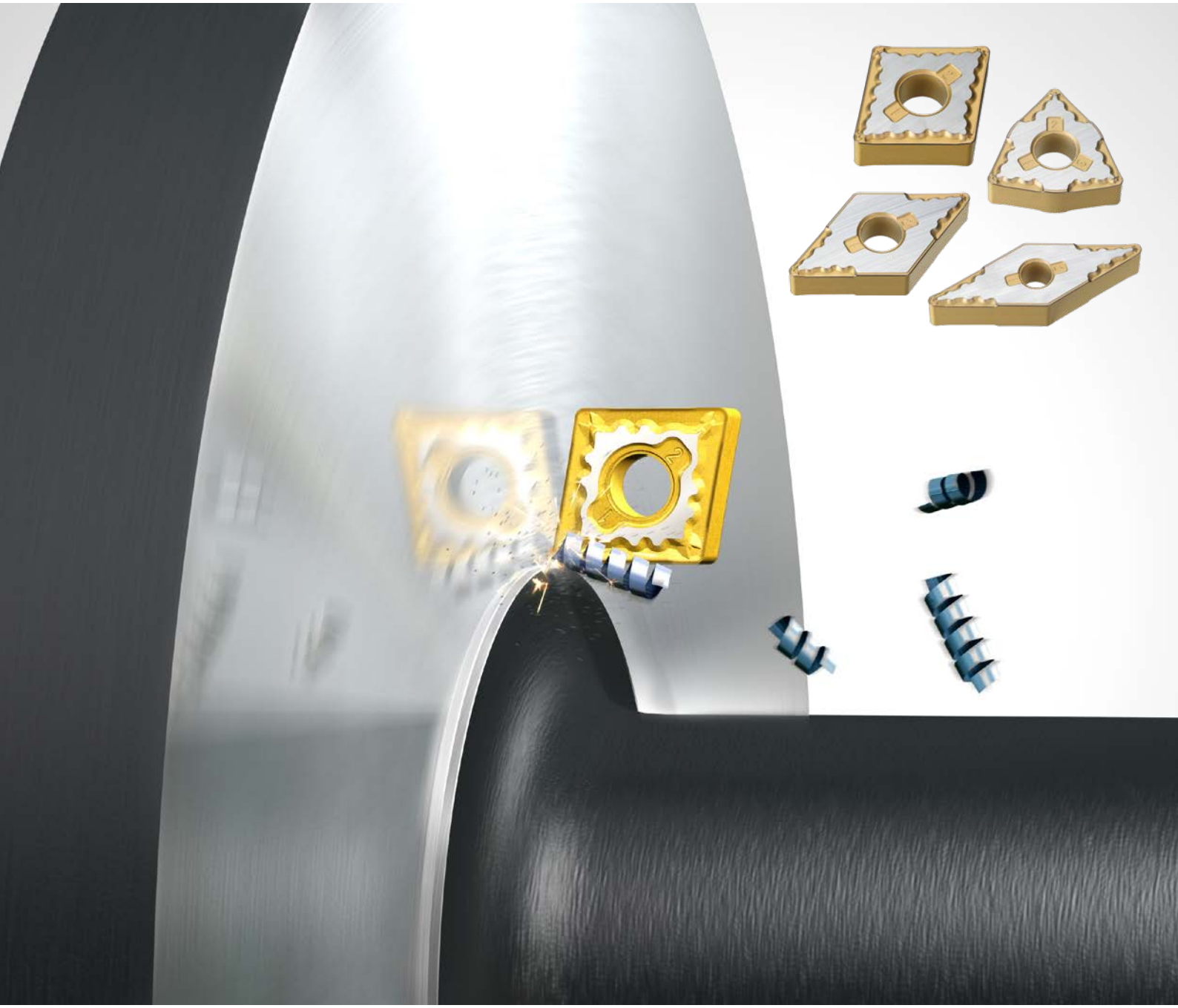



■: MC/MP7100 ■ A ■ B : Conventional tool

*The examples shown are customer's applications, therefore can differ from the recommended conditions.*

# MC6100 SERIES

## BRINGING THE ULTIMATE HIGH SPEED CUTTING PERFORMANCE



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NEW

# FPH CHIPBREAKER

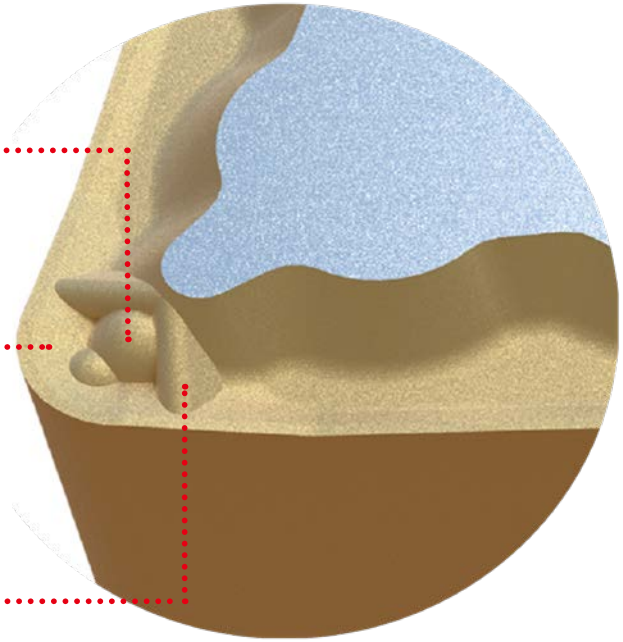
## FOR LOW DEPTHS OF CUT AND HIGH FEED FINISHING

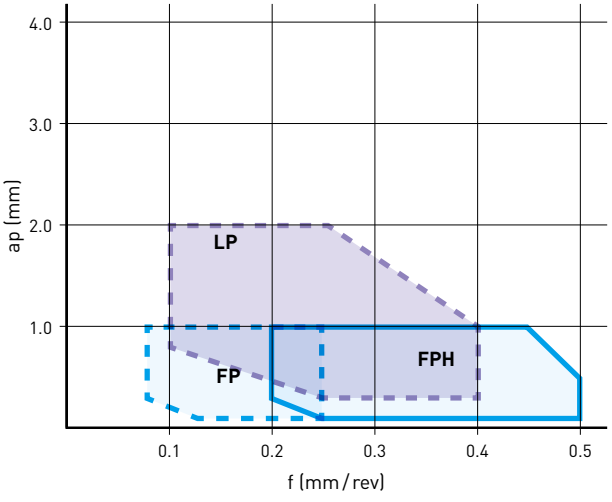
The combination of a positive land cutting edge shape and a two-stage protrusion optimises chip generation at low depths of cut, high feed conditions, thereby reducing machining times.

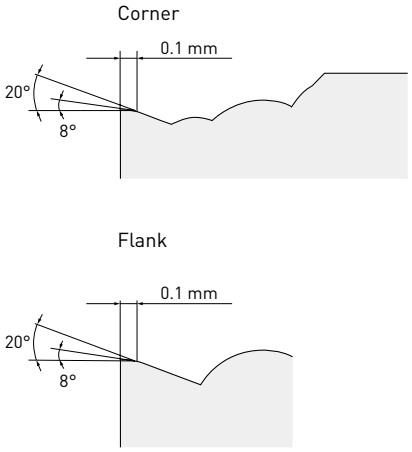
**Main Convex**
Provides consistent chip curling effect even for the thicker chips produced at high feed rates.

**Positive Land**
Optimum balance of sharpness and fracture resistance.

**Sub Convex**
Enables good chip breaking when copy turning with varying depths of cut.






**HOW TO USE**

1. When using the FPH chipbreaker, keep the depth of cut to 1 mm or less and the feed rate per revolution to 0.2 mm/rev or more.
2. If the depth of cut is 1 mm or more, we recommend using an LP chipbreaker.
3. If the feed rate per revolution is less than 0.2 mm/rev, we recommend an FP chipbreaker.

NEW

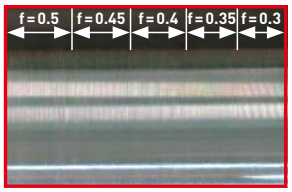
# FPH CHIPBREAKER

## CUTTING PERFORMANCE

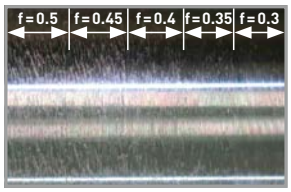
### DIN 1.7225 (42CRMO4): COMPARISON OF CHIPS AND FINISHED SURFACE

The FPH chipbreaker has excellent chip breaking properties, therefore a good component surface finish can always be expected.

| | |
|---|---|
| Material | DIN 1.7225 (42CrMo4) |
| Insert | CNMG120408-○○ MC6125 |
| Vc (m/min) | 200 |
| f (mm/rev) | The fluctuation values are shown in the image. |
| ap (mm) | 0.2 |
| Cutting mode | Wet cutting |



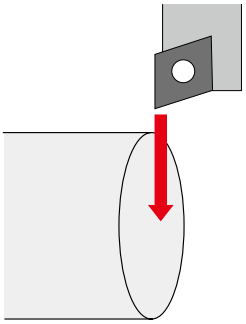

**MC6125 + FPH**

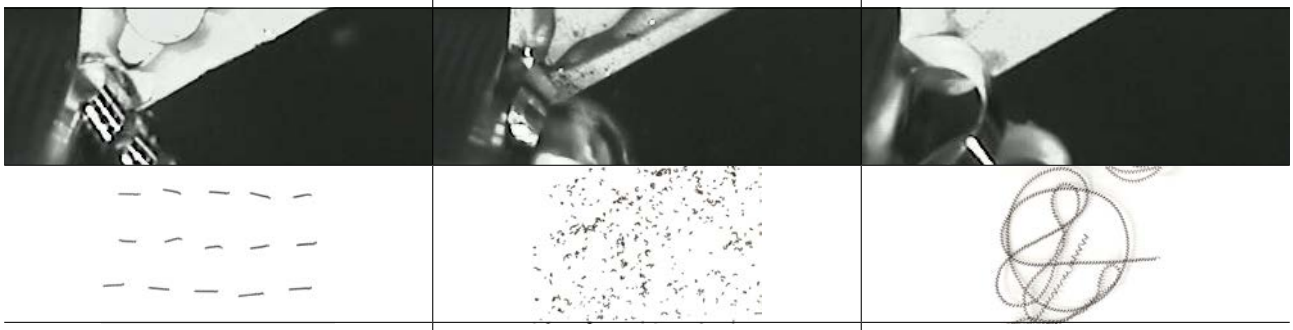



Conventional

### CHIP COMPARISON

| | |
|---|---|
| Material | DIN 1.7225 (42CrMo4) |
| Insert | DNMG150408-○○ |
| Vc (m/min) | 200 |
| f (mm/rev) | 0.3 |
| ap (mm) | 0.2 |
| Cutting mode | Dry cutting |



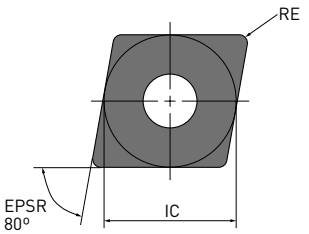
| **FPH** | Conventional finish cutting chipbreaker | Conventional light cutting chipbreaker |
|---|---|---|
|  | | |
| Broken into pieces of ideal length. | Excessive division.<br>This is a condition where the finished surface is prone to scratches. | Long chips are being generated.<br>There is a high risk of it wrapping around the workpiece and interrupting the machining process. |

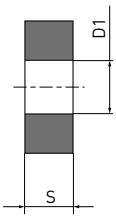
# CNMG

## NEGATIVE INSERTS (WITH HOLE)

### M Class

#### CNMG




F

FPH

| Order number | F L M R H | MC6115 | MC6125 | MC6135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| CNMG120404-FPH | F | ● | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| CNMG120408-FPH | F | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| CNMG120412-FPH | F | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |

1/1

(10 inserts in one case)

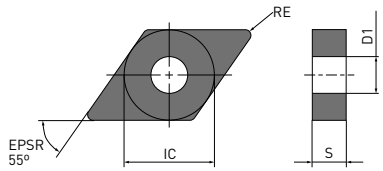
144 Vc

# DNMG

## NEGATIVE INSERTS (WITH HOLE)

### M Class

#### DNMG

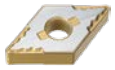






F

FPH



| Order number | F L M R H | MC6115 | MC6125 | MC6135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| DNMG150404-FPH | F | ★ | ★ | ★ | 12.7 | 4.76 | 0.4 | 5.16 |
| DNMG150408-FPH | F | ★ | ★ | ★ | 12.7 | 4.76 | 0.8 | 5.16 |
| DNMG150412-FPH | F | ★ | ★ | ★ | 12.7 | 4.76 | 1.2 | 5.16 |
| DNMG150604-FPH | F | ● | ● | ● | 12.7 | 6.35 | 0.4 | 5.16 |
| DNMG150608-FPH | F | ● | ● | ● | 12.7 | 6.35 | 0.8 | 5.16 |
| DNMG150612-FPH | F | ● | ● | ● | 12.7 | 6.35 | 1.2 | 5.16 |

1/1

(10 inserts in one case)

144 Vc

● / ★ = Expansion

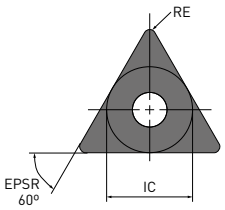
● : Inventory maintained. ★ : Inventory maintained in Japan.

# TNMG

## NEGATIVE INSERTS (WITH HOLE)

### M Class

#### TNMG




F

FPH

| Order number | F L M R H | MC6115 | MC6125 | MC6135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| TNMG160404-FPH | F | ● | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| TNMG160408-FPH | F | ● | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| TNMG160412-FPH | F | ● | ● | ● | 9.525 | 4.76 | 1.2 | 3.81 |

1/1

(10 inserts in one case)

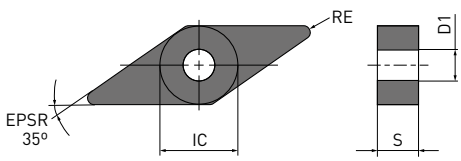
144 Vc

# VNMG

## NEGATIVE INSERTS (WITH HOLE)

### M Class

#### VNMG




F

FPH

| Order number | F L M R H | MC6115 | MC6125 | MC6135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| VNMG160404-FPH | F | ● | ● | ● | 9.525 | 4.76 | 0.4 | 3.81 |
| VNMG160408-FPH | F | ● | ● | ● | 9.525 | 4.76 | 0.8 | 3.81 |
| VNMG160412-FPH | F | ● | ● | ● | 9.525 | 4.76 | 1.2 | 3.81 |

1/1

(10 inserts in one case)

144 Vc

● / ★ = Expansion

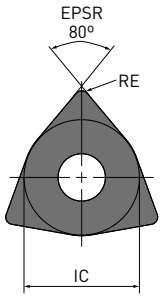
● : Inventory maintained. ★ : Inventory maintained in Japan.

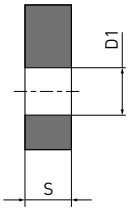
# WNMG

## NEGATIVE INSERTS (WITH HOLE)

**M Class**

**WNMG**




F

FPH

| Order number | F L M R N | MC6115 | MC6125 | MC6135 | IC | S | RE | D1 |
|---|---|---|---|---|---|---|---|---|
| WNMG080404-FPH | F | ● | ● | ● | 12.7 | 4.76 | 0.4 | 5.16 |
| WNMG080408-FPH | F | ● | ● | ● | 12.7 | 4.76 | 0.8 | 5.16 |
| WNMG080412-FPH | F | ● | ● | ● | 12.7 | 4.76 | 1.2 | 5.16 |

1/1

(10 inserts in one case)

144 Vc

# MC6100 SERIES

## RECOMMENDED CUTTING CONDITIONS

**NEGATIVE INSERTS (FOR EXTERNAL TURNING)**

| | Material | Properties | Conditions | F L M R | Priority | Grade | | Vc | f | ap |
|---|---|---|---|---|---|---|---|---|---|---|
| P | Carbon and alloy steel | 180 – 280 HB | ● | F | 1 | MC6115 | FPH | 275 – 525 | 0.20 – 0.50 | 0.10 – 1.00 |
| | | | ◐ | F | 1 | MC6125 | FPH | 300 – 465 | 0.20 – 0.50 | 0.10 – 1.00 |
| | | | ✥ | F | 3 | MC6135 | FPH | 245 – 370 | 0.20 – 0.50 | 0.10 – 1.00 |

1/1

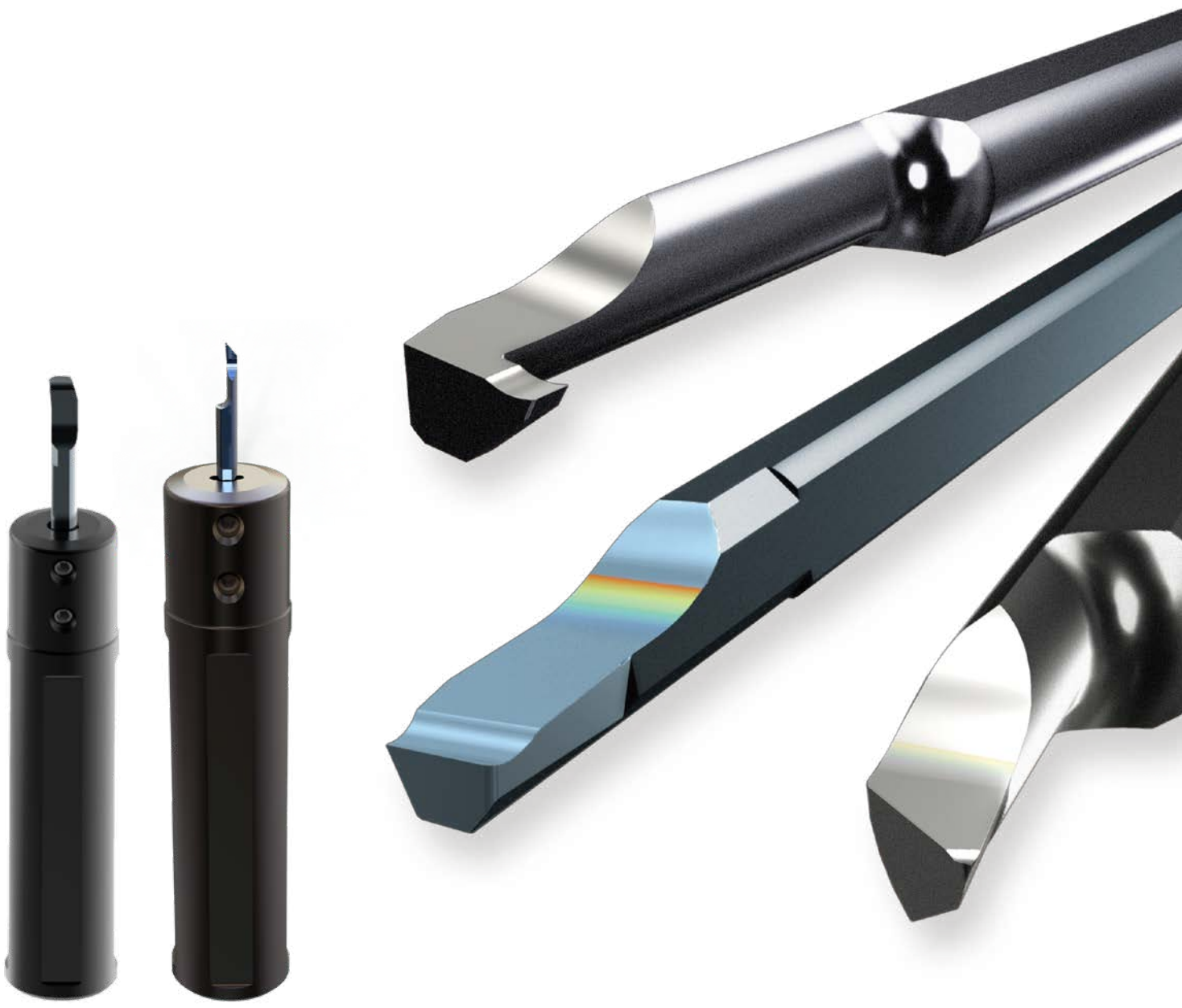
Cutting conditions: ●: Stable cutting ◐: General cutting ✥: Unstable cutting

● / ★ = Expansion

● : Inventory maintained. ★ : Inventory maintained in Japan.

# MICRO-MINI TWIN

## BORING BAR FOR HIGH PRECISION AND SMALL PARTS MACHINING



Interested in more...

**B042-G**

www.mhg-mediastore.net

MITSUBISHI MATERIALS

# MICRO-MINI TWIN

## IDEAL FOR SMALL DIAMETER BORING OF STEELS AND STAINLESS STEEL

**ECONOMICAL, SOLID SHANK TYPE WITH TWO CUTTING EDGES**

A cutting edge on each end provides reduced tooling costs.

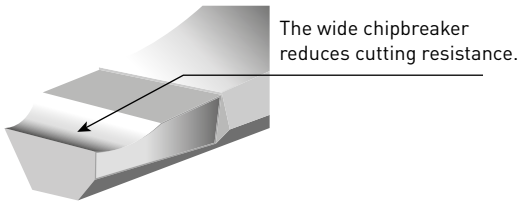
**MULTI PURPOSE BORING BAR**
The multi-functionality of the MICRO-MINI TWIN enables a wide application range that covers boring, grooving and threading and is available with or without a chipbreaker.

**MINIMUM CUTTING DIAMETER:**

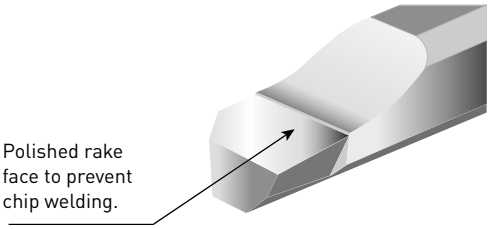
| | |
|---|---|
| Boring: | Ø 2.2 mm ~ |
| | RE: 0.05, 0.1, 0.15, 0.2 |
| Copying: | Ø 3.5 mm ~ |
| Grooving: | Ø 3 mm ~ |
| Threading: | Ø 3 mm ~ |

## AVAILABLE WITH OR WITHOUT A CHIPBREAKER

With chipbreaker




Without chipbreaker




The highly polished rake face and smooth cutting edge surface provides a superior product than conventional boring bars.

# CUTTING PERFORMANCE

## POLISHED RAKE FACE

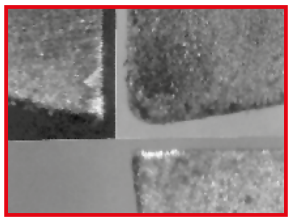
### MACHINING OF STAINLESS STEEL

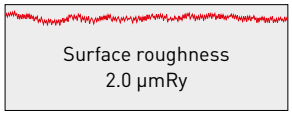
| | |
|---|---|
| Insert | CB05RS, VP15TF |
| Material | 1.4301 (X5CrNi18-9) |
| Vc (m/min) | 100 |
| fr (mm/rev) | 0.02 |
| ap (mm) | 0.1 |
| Coolant | Wet cutting |

The polished rake face prevents chip welding
and enables excellent component surface finishes.

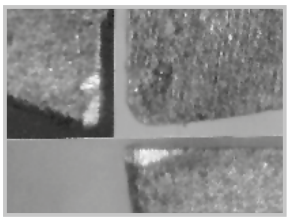
**CUTTING EDGE WEAR**

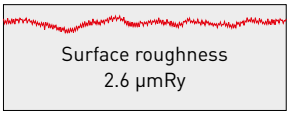
**MICRO-MINI TWIN**
(Polished rake face)



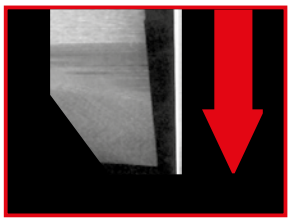



Conventional

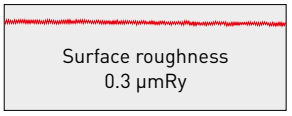




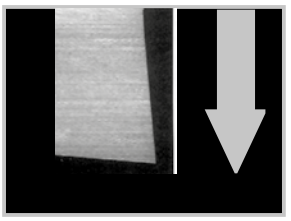

**MICRO-MINI TWIN**
(Polished rake face)



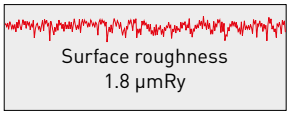
Direction of
measurement




Conventional



Direction of
measurement

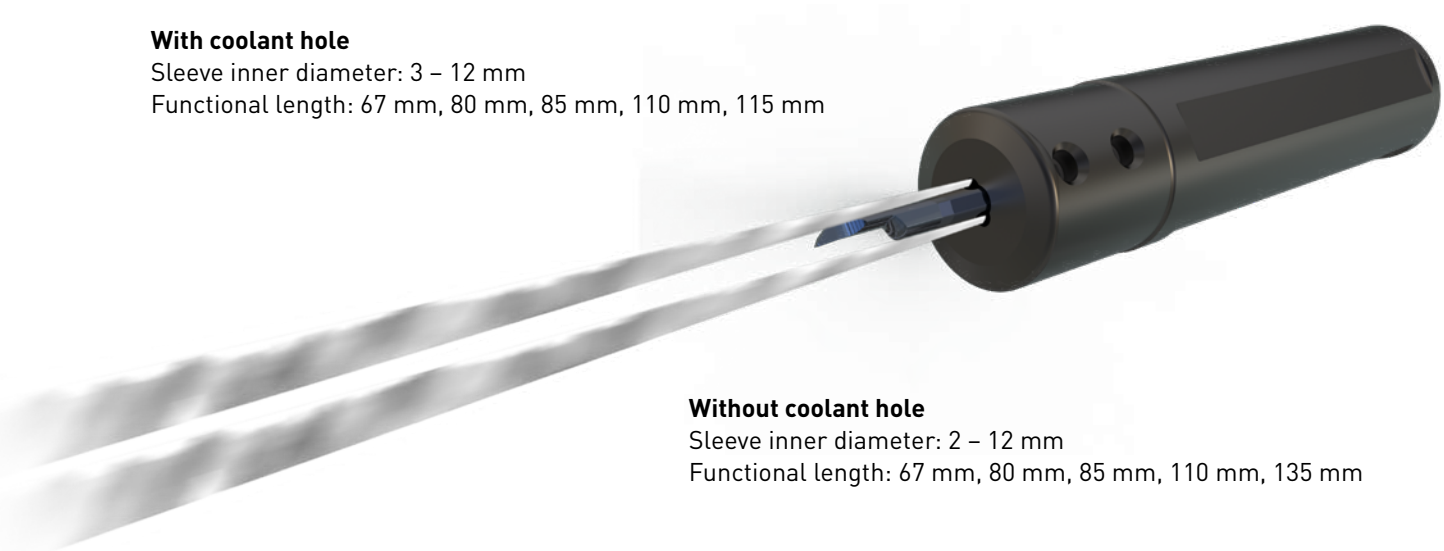



NEW

# SLEEVE

A sleeve specially designed the MICRO-MINI TWIN for optimum use on Swiss-Type lathes.

**With coolant hole**
Sleeve inner diameter: 3 – 12 mm
Functional length: 67 mm, 80 mm, 85 mm, 110 mm, 115 mm



**Without coolant hole**
Sleeve inner diameter: 2 – 12 mm
Functional length: 67 mm, 80 mm, 85 mm, 110 mm, 135 mm

# MS9025

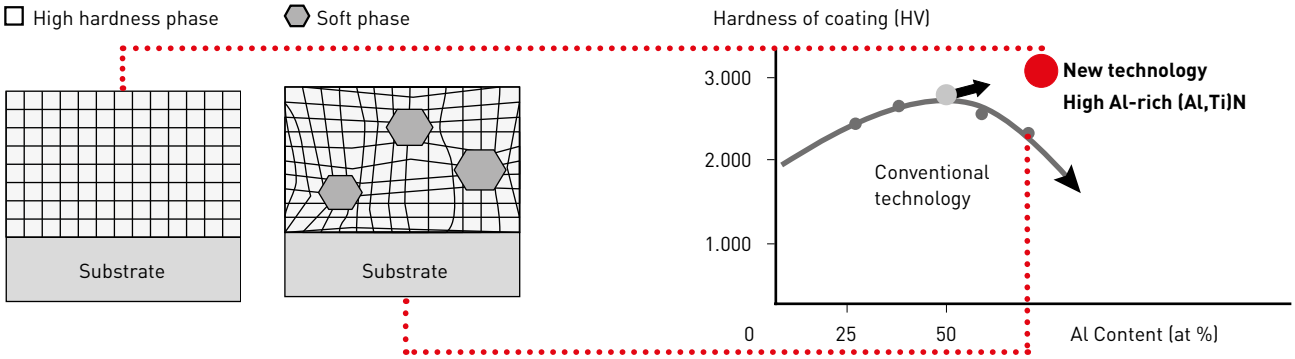
## PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

Effectively reduces notch wear whilst also providing fracture resistance.

## HIGH AL-RICH (Al, Ti)N SINGLE LAYER COATING TECHNOLOGY

### HIGH AL AND CONVENTIONAL COATING COMPARISON

The high Al-rich (Al,Ti)N single layer coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, cratering and welding resistance.

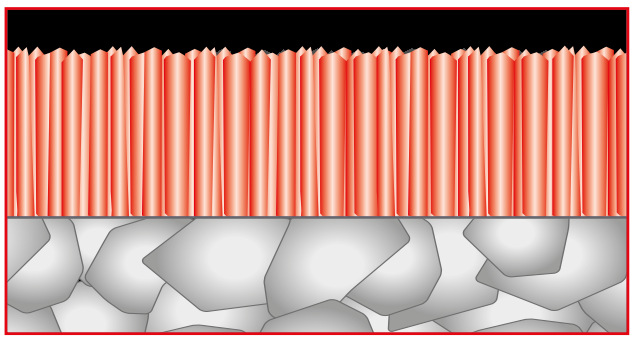



### SMOOTH SURFACE OF THE COATING

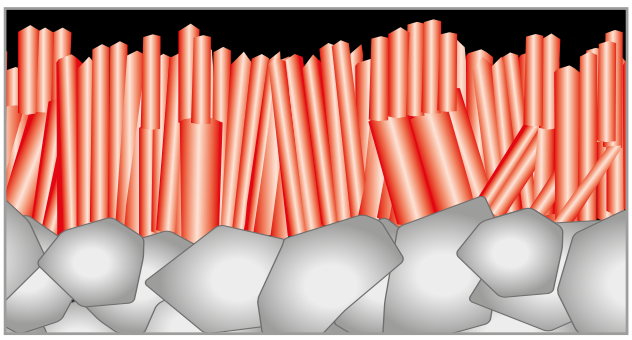
The even surface of the coating has been achieved by first making the carbide substrate smooth then by promoting straight growth of the coating crystals. This leads to excellent welding resistance.

**Smooth Cemented Carbide**
- Straight crystal growth
- Smooth carbide surface
- Excellent welding resistance

**Rough Cemented Carbide**
- Random crystal growth direction
- Performance is variable due to defects and voids in the surface



MS9025



Conventional

*MS9025 grade for stainless steel added to the series MICRO-MINI TWIN.*

# MS7025

## PVD COATED GRADES FOR HIGH PRECISION AND SMALL PARTS MACHINING

A precise nano-multilayer coating provides dramatically improved welding and wear resistance.

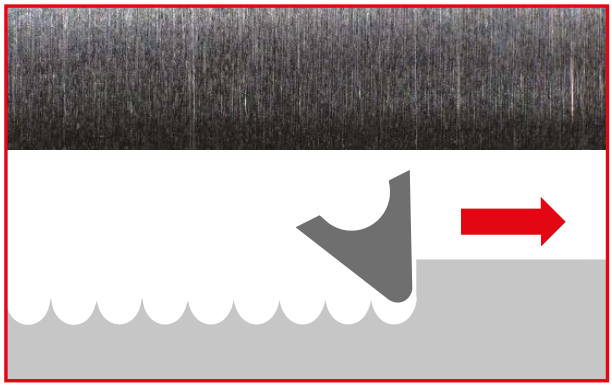
## NANO-MULTILAYER COATING

By combining the high lubrication layer with excellent welding resistance, and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, damage when machining is significantly reduced. Additionally, machining marks on the component surface are reduced.

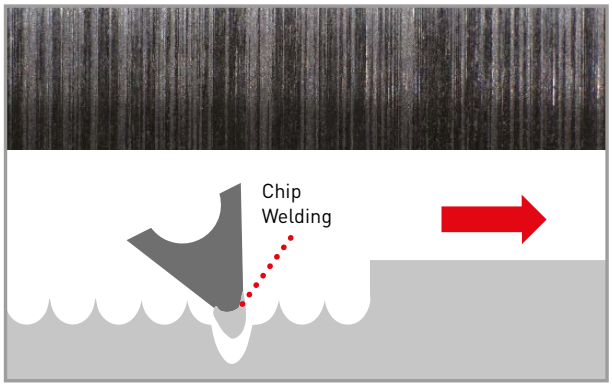
## IMPROVED QUALITY OF THE MACHINED SURFACE

The nano-level, high lubrication layer suppresses built-up edge caused by chip welding which tends to occur in low feed machining and in addition reduces machining marks on the component surface.

**SURFACE FINISH**



MS7025



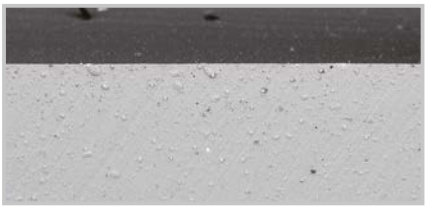

Conventional

## IMPROVED MACHINED SURFACE QUALITY

MS7025 improves machining accuracy and suppresses burrs and sudden chipping by maintaining uniform, sharp cutting edges.

MS7025

Enlarged photo of the cutting edge

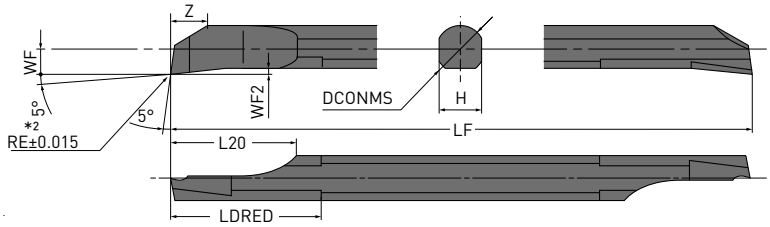


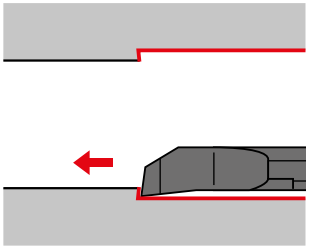
Conventional

*MS7025 grade for stainless steel added to the series MICRO-MINI TWIN.*

# CB-TYPE

## MICRO-MINI TWIN FOR INTERNAL MACHINING



*Right hand tool only.*

| Order number | MS7025 | MS9025 | VP15TF | TF15 | | DMIN*1 | | RE*2 | DCONMS | LF | L20 | LDRED | WF | WF2 | H | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | l/d ≤ 3 | l/d ≥ 3 | | | | | | | | | |
| CB02RS | | | ● | ● | without | 2.2 | 3.6 | 0.05 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB02RS-B | ● | ● | ● | ● | with | 2.2 | 4.6 | 0.05 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB02RS-01 | | | ● | ● | without | 2.2 | 3.6 | 0.1 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB02RS-01B | ● | ● | ● | ● | with | 2.2 | 4.6 | 0.1 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB02RS-015B | ● | ● | | | with | 2.2 | 4.6 | 0.15 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB02RS-02 | | | ● | ● | without | 2.2 | 3.6 | 0.2 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB02RS-02B | ● | ● | ● | ● | with | 2.2 | 4.6 | 0.2 | 2.0 | 50 | 5.0 | 6.0 | 1.0 | 0.25 | 1.8 | 1.4 |
| CB025RS-B | ● | ● | | | with | 2.7 | 4.7 | 0.05 | 2.5 | 50 | 6.25 | 7.5 | 1.25 | 0.30 | 2.25 | 1.8 |
| CB025RS-01B | ● | ● | | | with | 2.7 | 4.7 | 0.1 | 2.5 | 50 | 6.25 | 7.5 | 1.25 | 0.30 | 2.25 | 1.8 |
| CB025RS-015B | ● | ● | | | with | 2.7 | 4.7 | 0.15 | 2.5 | 50 | 6.25 | 7.5 | 1.25 | 0.30 | 2.25 | 1.8 |
| CB025RS-02B | ● | ● | | | with | 2.7 | 4.7 | 0.2 | 2.5 | 50 | 6.25 | 7.5 | 1.25 | 0.30 | 2.25 | 1.8 |
| CB03RS | | | ● | ● | without | 3.2 | 4.2 | 0.05 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB03RS-B | ● | ● | ● | ● | with | 3.2 | 4.8 | 0.05 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB03RS-01 | | | ● | ● | without | 3.2 | 4.2 | 0.1 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB03RS-01B | ● | ● | ● | ● | with | 3.2 | 4.8 | 0.1 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB03RS-015B | ● | ● | | | with | 3.2 | 4.8 | 0.15 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB03RS-02 | | | ● | ● | without | 3.2 | 4.2 | 0.2 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB03RS-02B | ● | ● | ● | ● | with | 3.2 | 4.8 | 0.2 | 3.0 | 50 | 7.5 | 9.0 | 1.5 | 0.35 | 2.7 | 2.3 |
| CB035RS-B | ● | ● | | | with | 3.7 | 5.2 | 0.05 | 3.5 | 60 | 8.75 | 10.5 | 1.75 | 0.40 | 3.15 | 2.6 |
| CB035RS-01B | ● | ● | | | with | 3.7 | 5.2 | 0.1 | 3.5 | 60 | 8.75 | 10.5 | 1.75 | 0.40 | 3.15 | 2.6 |
| CB035RS-015B | ● | ● | | | with | 3.7 | 5.2 | 0.15 | 3.5 | 60 | 8.75 | 10.5 | 1.75 | 0.40 | 3.15 | 2.6 |
| CB035RS-02B | ● | ● | | | with | 3.7 | 5.2 | 0.2 | 3.5 | 60 | 8.75 | 10.5 | 1.75 | 0.40 | 3.15 | 2.6 |
| CB04RS | | | ● | ● | without | 4.2 | 5.1 | 0.05 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB04RS-B | ● | ● | ● | ● | with | 4.2 | 5.5 | 0.05 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB04RS-01 | | | ● | ● | without | 4.2 | 5.1 | 0.1 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB04RS-01B | ● | ● | ● | ● | with | 4.2 | 5.5 | 0.1 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB04RS-015B | ● | ● | | | with | 4.2 | 5.5 | 0.15 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB04RS-02 | | | ● | ● | without | 4.2 | 5.1 | 0.2 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB04RS-02B | ● | ● | ● | ● | with | 4.2 | 5.5 | 0.2 | 4.0 | 60 | 10.0 | 12.0 | 2.0 | 0.45 | 3.6 | 3.1 |
| CB045RS-B | ● | ● | | | with | 4.7 | 6.0 | 0.05 | 4.5 | 70 | 11.25 | 13.5 | 2.25 | 0.50 | 4.05 | 3.4 |
| CB045RS-01B | ● | ● | | | with | 4.7 | 6.0 | 0.1 | 4.5 | 70 | 11.25 | 13.5 | 2.25 | 0.50 | 4.05 | 3.4 |
| CB045RS-015B | ● | ● | | | with | 4.7 | 6.0 | 0.15 | 4.5 | 70 | 11.25 | 13.5 | 2.25 | 0.50 | 4.05 | 3.4 |
| CB045RS-02B | ● | ● | | | with | 4.7 | 6.0 | 0.2 | 4.5 | 70 | 11.25 | 13.5 | 2.25 | 0.50 | 4.05 | 3.4 |

1/2

*1 DMIN: Min. Cutting Diameter
*2 The RE dimension represents the size before grinding a chip breaker.
1. (MICRO-MINI TWIN is available in 1 piece in one pack.)

152 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

## CB-TYPE, MICRO-MINI TWIN FOR INTERNAL MACHINING

| Order number | MS7025 | MS9025 | VP15TF | TF15 | | DMIN*1 | | RE*2 | DCONMS | LF | L20 | LDRED | WF | WF2 | H | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | l/d ≤ 3 | l/d ≥ 3 | | | | | | | | | |
| CB05RS | | | ● | ● | without | 5.2 | 6.0 | 0.05 | 5 | 70 | 12.5 | 15.0 | 2.5 | 0.55 | 4.5 | 3.9 |
| CB05RS-B | ● | ● | ● | ● | with | 5.2 | 6.4 | 0.05 | 5 | 70 | 12.5 | 15.0 | 2.5 | 0.55 | 4.5 | 3.9 |
| CB05RS-015B | ● | ● | | | with | 5.2 | 6.4 | 0.15 | 5 | 70 | 12.5 | 15.0 | 2.5 | 0.55 | 4.5 | 3.9 |
| CB05RS-02 | | | ● | ● | without | 5.2 | 6.0 | 0.2 | 5 | 70 | 12.5 | 15.0 | 2.5 | 0.55 | 4.5 | 3.9 |
| CB05RS-02B | ● | ● | ● | ● | with | 5.2 | 6.4 | 0.2 | 5 | 70 | 12.5 | 15.0 | 2.5 | 0.55 | 4.5 | 3.9 |
| CB06RS | | | ● | ● | without | 6.2 | 7.2 | 0.05 | 6 | 75 | 12.5 | 18.0 | 3.0 | 0.65 | 5.4 | 4.7 |
| CB06RS-B | ● | ● | ● | ● | with | 6.2 | 7.3 | 0.05 | 6 | 75 | 12.5 | 18.0 | 3.0 | 0.65 | 5.4 | 4.7 |
| CB06RS-02 | | | ● | ● | without | 6.2 | 7.2 | 0.2 | 6 | 75 | 12.5 | 18.0 | 3.0 | 0.65 | 5.4 | 4.7 |
| CB06RS-02B | ● | ● | ● | ● | with | 6.2 | 7.8 | 0.2 | 6 | 75 | 12.5 | 18.0 | 3.0 | 0.65 | 5.4 | 4.7 |
| CB07RS | | | ● | ● | without | 7.2 | 8.6 | 0.05 | 7 | 85 | 12.5 | 21.0 | 3.5 | 0.75 | 6.3 | 5.5 |
| CB07RS-B | ● | ● | ● | ● | with | 7.2 | 8.8 | 0.05 | 7 | 85 | 12.5 | 21.0 | 3.5 | 0.75 | 6.3 | 5.5 |
| CB07RS-02 | | | ● | ● | without | 7.2 | 8.6 | 0.2 | 7 | 85 | 12.5 | 21.0 | 3.5 | 0.75 | 6.3 | 5.5 |
| CB07RS-02B | ● | ● | ● | ● | with | 7.2 | 9.2 | 0.2 | 7 | 85 | 12.5 | 21.0 | 3.5 | 0.75 | 6.3 | 5.5 |
| CB08RS | | | ● | ● | without | 8.2 | 9.5 | 0.05 | 8 | 95 | 15.0 | 24.0 | 4.0 | 0.85 | 7.2 | 6.3 |
| CB08RS-B | ● | ● | ● | ● | with | 8.2 | 9.6 | 0.05 | 8 | 95 | 15.0 | 24.0 | 4.0 | 0.85 | 7.2 | 6.3 |
| CB08RS-02 | | | ● | ● | without | 8.2 | 9.5 | 0.2 | 8 | 95 | 15.0 | 24.0 | 4.0 | 0.85 | 7.2 | 6.3 |
| CB08RS-02B | ● | ● | ● | ● | with | 8.2 | 9.8 | 0.2 | 8 | 95 | 15.0 | 24.0 | 4.0 | 0.85 | 7.2 | 6.3 |



*1 DMIN: Min. Cutting Diameter
*2 The RE dimension represents the size before grinding a chipbreaker.
1. (MICRO-MINI TWIN is available in 1 piece in one pack.)

152 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

# CB-TYPE

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | Grade | Vc | f | ap | Tool overhang L/D |
|---|---|---|---|---|---|---|---|
| P | Pure iron, Free cutting steel | — | MS7025 | 80 (40 – 120) | 0.03 (0.01 – 0.05) | 0.2 (0.1 – 0.3) | 3 – 5 |
| P | Carbon steel, alloy steel | Hardness 180 – 350HB | MS7025, VP15TF | 80 (40 – 120) | 0.03 (0.01 – 0.05) | 0.2 (0.1 – 0.3) | 3 – 5 |
| M | Stainless steel | Hardness ≤200HB | MS7025, MS9025, VP15TF | 80 (40 – 120) | 0.03 (0.01 – 0.05) | 0.2 (0.1 – 0.3) | 3 – 5 |
| K | Gray cast iron | Tensile strength ≤350MPa | VP15TF | 80 (40 – 120) | 0.03 (0.01 – 0.05) | 0.2 (0.1 – 0.3) | 3 – 5 |
| N | Non-ferrous metal | — | TF15 | 120 (80 – 160) | 0.05 (0.01 – 0.08) | 0.3 (0.1 – 0.5) | 3 – 5 |
| S | Heat resistant alloy | — | MS9025 | 60 (40 – 80) | 0.02 (0.01 – 0.03) | 0.2 (0.1 – 0.3) | 3 – 5 |

1/1

1. Recommend wet cutting.

## CORRECT USE OF MICRO-MINI TWIN GRADES

### MS7025

P Steel

M Stainless steel

- Specially designed to enable good surface finishes when machining stainless steels.
- For general use on a wide range of materials.

### MS9025

S Heat resistant alloy

M Stainless steel

- Ideal for stainless steels and high efficiency machining of difficult-to-cut materials.

### VP15TF

P Steel

M Stainless steel

K Gray cast iron

- For general use on a wide range of materials including cast iron.

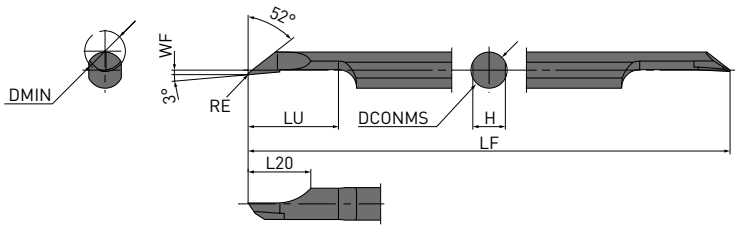
### TF15

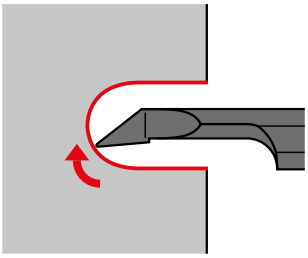
N Non-ferrous metal

- For machining non-ferrous metals.

# CR-TYPE

## MICRO-MINI TWIN FOR INTERNAL COPYING



*Right hand tool only.*

| Order number | MS7025 | MS9025 | VP15TF | TF15 | | DMIN | RE | DCONMS | LF | LU | L20 | WF | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CR03RS-01 | | | ● | ● | without | 3.5 | 0.1 | 3.0 | 50 | 8 | 6.0 | 0.15 | 2.7 |
| CR03RS-01B | ● | ● | ● | ● | with | 3.5 | 0.1 | 3.0 | 50 | 8 | 6.0 | 0.15 | 2.7 |
| CR035RS-01B | ● | ● | | | with | 4.0 | 0.1 | 3.5 | 60 | 8 | 6.5 | 0.15 | 3.15 |
| CR04RS-01 | | | ● | ● | without | 4.5 | 0.1 | 4.0 | 60 | 10 | 7.0 | 0.15 | 3.6 |
| CR04RS-01B | ● | ● | ● | ● | with | 4.5 | 0.1 | 4.0 | 60 | 10 | 7.0 | 0.15 | 3.6 |
| CR045RS-01B | ● | ● | | | with | 5.0 | 0.1 | 4.5 | 70 | 10 | 7.5 | 0.15 | 4.05 |
| CR05RS-01 | | | ● | ● | without | 5.5 | 0.1 | 5.0 | 70 | 12 | 8.0 | 0.15 | 4.5 |
| CR05RS-01B | ● | ● | ● | ● | with | 5.5 | 0.1 | 5.0 | 70 | 12 | 8.0 | 0.15 | 4.5 |

1/1

153 Vc

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | Grade | Vc | f | | ap |
|---|---|---|---|---|---|---|---|
| | | | | | 0.3 RS – 045 RS | 05 RS | |
| P | Pure iron, Free cutting steel | — | MS7025 | 80 (40 – 120) | 0.02 (0.01 – 0.03) | 0.03 (0.01 – 0.05) | 0.05 |
| P | Carbon steel, alloy steel | Hardness 180 – 350HB | MS7025, VP15TF | 80 (40 – 120) | 0.02 (0.01 – 0.03) | 0.03 (0.01 – 0.05) | 0.05 |
| M | Stainless steel | Hardness ≤200HB | MS7025, MS9025, VP15TF | 80 (40 – 120) | 0.02 (0.01 – 0.03) | 0.03 (0.01 – 0.05) | 0.05 |
| K | Gray cast iron | Tensile strength ≤350MPa | VP15TF | 80 (40 – 120) | 0.03 (0.01 – 0.05) | 0.03 (0.01 – 0.05) | 0.05 |
| N | Non-ferrous metal | — | TF15 | 120 (80 – 160) | 0.03 (0.01 – 0.05) | 0.05 (0.01 – 0.08) | 0.05 |
| S | Heat resistant alloy | — | MS9025 | 60 (40 – 80) | 0.02 (0.01 – 0.03) | 0.02 (0.01 – 0.03) | 0.05 |

1/1

1. Recommend wet cutting.
2. The recommended tool overhang of CR type is LU + 2 mm.

● : Inventory maintained. ★ : Inventory maintained in Japan.

# PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

**When using a holder for general purpose / small automatic lathe:**

1 To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

2 When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

**When using Mitsubishi Materials holders:**

When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. (RBH1620N, RBH19020N, RBH2020N and RBH2520N do not have the 3rd screw.) The set torque value for clamping screw is 2.0 Nm.

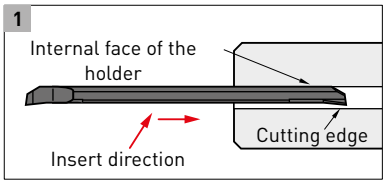
**When using a square type holder:**

1 When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the MICRO-MINI bar. Refer to fig.3.

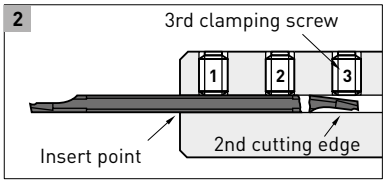
2 Make sure that the clamping screws are tightened to the recommended values.

3 Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

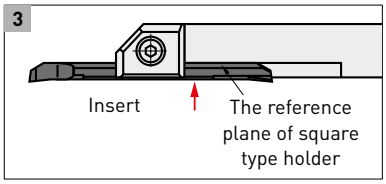
1




2




3




Tighten the clamping screw ensuring the MICRO-MINI TWIN boring bars is in contact with the reference plane of square type holder.

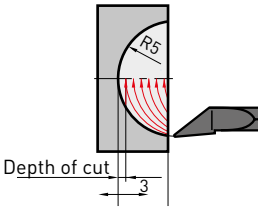
# MACHINING METHODS OF THE CR-TYPE

By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.

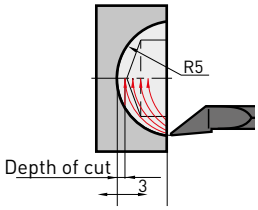
| | |
|---|---|
| Insert | CR05RS-01B |
| Workpiece material | C20 |
| Vc (m/min) | 80 |
| f (mm/rev) | 0.05 |
| ap (mm) | 0.05 |
| Coolant | Wet cutting |

## PROFILE TURNING

**Machining a workpiece without a pre-prepared hole**

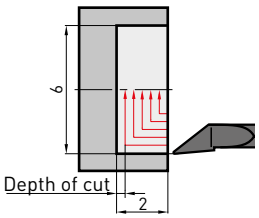



**Machining a workpiece with a pre-prepared hole**

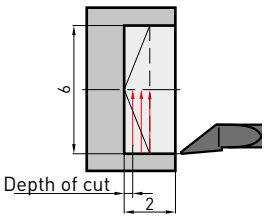



## INNER END FACING

**Machining a workpiece without a pre-prepared hole**

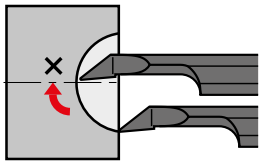



**Machining a workpiece with a pre-prepared hole**



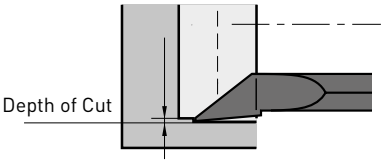

## NOTES FOR USE

### PROFILE TURNING, INNER END FACING



The cutting edge should not cross the centre line of the workpiece.
If the cutting edge crosses the centre line of a workpiece, the cutting edge can fracture.

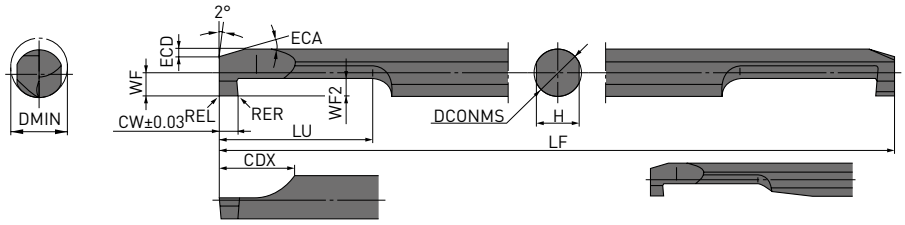
### COPYING




The depth of cut should be smaller than the corner radius value.
With depths of cut larger than the corner radius value, burrs will be formed.

# CG-TYPE

## MICRO-MINI TWIN FOR INTERNAL GROOVING




* CG03○○RS-○○B (VP15TF, TF15) *only.*

| Order number | MS7025 | MS9025 | VP15TF | TF15 | | DMIN | CW | WF2 | RER/L | DCONMS | LF | LU | CDX | WF | H | ECA | ECD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CG0305RS-10 | | | ● | ★ | without | 3 | 1 | 1.0 | 0.05 | 3 | 50 | 5 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG0305RS-10B | ● | ● | ★ | ★ | with | 3 | 1 | 1.0 | 0.05 | 3 | 50 | 5 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG0306RS-20 | | | ★ | ★ | without | 3 | 2 | 1.0 | 0.1 | 3 | 50 | 6 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG0306RS-20B | ● | ● | ★ | ★ | with | 3 | 2 | 1.0 | 0.1 | 3 | 50 | 6 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG03RS-10 | | | ● | ★ | without | 3 | 1 | 1.0 | 0.05 | 3 | 50 | 10 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG03RS-10B | ● | ● | ★ | ★ | with | 3 | 1 | 1.0 | 0.05 | 3 | 50 | 10 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG03RS-20 | | | ★ | ★ | without | 3 | 2 | 1.0 | 0.1 | 3 | 50 | 11 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG03RS-20B | ● | ● | ★ | ★ | with | 3 | 2 | 1.0 | 0.1 | 3 | 50 | 11 | 6 | 1.3 | 2.7 | 15° | 0.3 |
| CG0407RS-10 | | | ★ | ★ | without | 4 | 1 | 1.5 | 0.05 | 4 | 60 | 7 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG0407RS-10B | ● | ● | ★ | ★ | with | 4 | 1 | 1.5 | 0.05 | 4 | 60 | 7 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG0408RS-20 | | | ★ | ★ | without | 4 | 2 | 1.5 | 0.1 | 4 | 60 | 8 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG0408RS-20B | ● | ● | ★ | ★ | with | 4 | 2 | 1.5 | 0.1 | 4 | 60 | 8 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG04RS-10 | | | ● | ★ | without | 4 | 1 | 1.5 | 0.05 | 4 | 60 | 15 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG04RS-10B | ● | ● | ★ | ★ | with | 4 | 1 | 1.5 | 0.05 | 4 | 60 | 15 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG04RS-20 | | | ★ | ★ | without | 4 | 2 | 1.5 | 0.1 | 4 | 60 | 16 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG04RS-20B | ● | ● | ● | ★ | with | 4 | 2 | 1.5 | 0.1 | 4 | 60 | 16 | 7 | 1.8 | 3.6 | 15° | 0.5 |
| CG0510RS-10 | | | ● | ★ | without | 5 | 1 | 2.0 | 0.05 | 5 | 70 | 10 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG0510RS-10B | ● | ● | ● | ★ | with | 5 | 1 | 2.0 | 0.05 | 5 | 70 | 10 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG0511RS-20 | | | ● | ★ | without | 5 | 2 | 2.0 | 0.1 | 5 | 70 | 11 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG0511RS-20B | ● | ● | ★ | ★ | with | 5 | 2 | 2.0 | 0.1 | 5 | 70 | 11 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG05RS-10 | | | ● | ★ | without | 5 | 1 | 2.0 | 0.05 | 5 | 70 | 20 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG05RS-10B | ● | ● | ★ | ★ | with | 5 | 1 | 2.0 | 0.05 | 5 | 70 | 20 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG05RS-20 | | | ★ | ● | without | 5 | 2 | 2.0 | 0.1 | 5 | 70 | 21 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG05RS-20B | ● | ● | ● | ★ | with | 5 | 2 | 2.0 | 0.1 | 5 | 70 | 21 | 8 | 2.3 | 4.5 | 15° | 0.7 |
| CG0610RS-10 | | | ● | ★ | without | 6 | 1 | 2.0 | 0.05 | 6 | 75 | 10 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG0610RS-10B | ● | ● | ● | ★ | with | 6 | 1 | 2.0 | 0.05 | 6 | 75 | 10 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG0611RS-20 | | | ● | ★ | without | 6 | 2 | 2.0 | 0.1 | 6 | 75 | 11 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG0611RS-20B | ● | ● | ● | ★ | with | 6 | 2 | 2.0 | 0.1 | 6 | 75 | 11 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG06RS-10 | | | ● | ★ | without | 6 | 1 | 2.0 | 0.05 | 6 | 75 | 20 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG06RS-10B | ● | ● | ● | ● | with | 6 | 1 | 2.0 | 0.05 | 6 | 75 | 20 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG06RS-20 | | | ● | ★ | without | 6 | 2 | 2.0 | 0.1 | 6 | 75 | 21 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG06RS-20B | ● | ● | ● | ● | with | 6 | 2 | 2.0 | 0.1 | 6 | 75 | 21 | 8 | 2.8 | 5.4 | 15° | 0.7 |
| CG0712RS-10 | | | ● | ★ | without | 7 | 1 | 2.0 | 0.05 | 7 | 85 | 12 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG0712RS-10B | ● | ● | ● | ★ | with | 7 | 1 | 2.0 | 0.05 | 7 | 85 | 12 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG0713RS-20 | | | ★ | ★ | without | 7 | 2 | 2.0 | 0.1 | 7 | 85 | 13 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG0713RS-20B | ● | ● | ★ | ★ | with | 7 | 2 | 2.0 | 0.1 | 7 | 85 | 13 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG07RS-10 | | | ★ | ★ | without | 7 | 1 | 2.0 | 0.05 | 7 | 85 | 25 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG07RS-10B | ● | ● | ● | ★ | with | 7 | 1 | 2.0 | 0.05 | 7 | 85 | 25 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG07RS-20 | | | ● | ★ | without | 7 | 2 | 2.0 | 0.1 | 7 | 85 | 26 | 8 | 3.3 | 6.4 | 15° | 0.7 |
| CG07RS-20B | ● | ● | ● | ● | with | 7 | 2 | 2.0 | 0.1 | 7 | 85 | 26 | 8 | 3.3 | 6.4 | 15° | 0.7 |



1. The maximum groove depth is WF2 dimension - 0.1 mm.
2. (MICRO-MINI TWIN is available in 1 piece in one pack.)

156 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

# CG-TYPE

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | Grade | Vc | f | | Recommended tool overhang (mm) |
|---|---|---|---|---|---|---|---|
| | | | | | 03RS/04RS | 05RS/06RS/07RS | |
| P | Pure iron, Free cutting steel | — | MS7025 | 80 (40 – 120) | 0.02 (0.01 – 0.03) | 0.03 (0.01 – 0.05) | LU + 2 mm |
| P | Carbon steel, alloy steel | Hardness 180 – 350HB | MS7025, VP15TF | 80 (40 – 120) | 0.02 (0.01 – 0.03) | 0.03 (0.01 – 0.05) | LU + 2 mm |
| M | Stainless steel | Hardness ≤200HB | MS7025, MS9025, VP15TF | 80 (40 – 120) | 0.02 (0.01 – 0.03) | 0.03 (0.01 – 0.05) | LU + 2 mm |
| K | Gray cast iron | Tensile strength ≤350MPa | VP15TF | 80 (40 – 120) | 0.03 (0.01 – 0.05) | 0.03 (0.01 – 0.05) | LU + 2 mm |
| N | Non-ferrous metal | — | TF15 | 120 (80 – 160) | 0.03 (0.01 – 0.05) | 0.05 (0.01 – 0.08) | LU + 2 mm |
| S | Heat resistant alloy | — | MS9025 | 60 (40 – 80) | 0.02 (0.01 – 0.03) | 0.02 (0.01 – 0.03) | LU + 2 mm |

1/1

1. Recommend wet machining.

## PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

**When using a holder for general purpose / small automatic lathe:**

1 To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

2 When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

**When using Mitsubishi Materials holders:**

When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for clamping screw is 2.0 Nm.

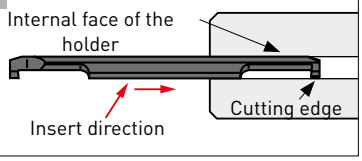
**When using a square type holder:**

1 When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the MICRO-MINI bar. Refer to fig.3.

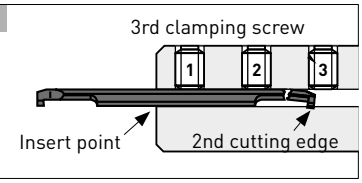
2 Make sure that the clamping screws are tightened to the recommended values.

3 Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

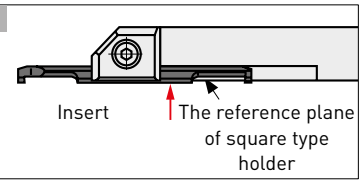
1




2



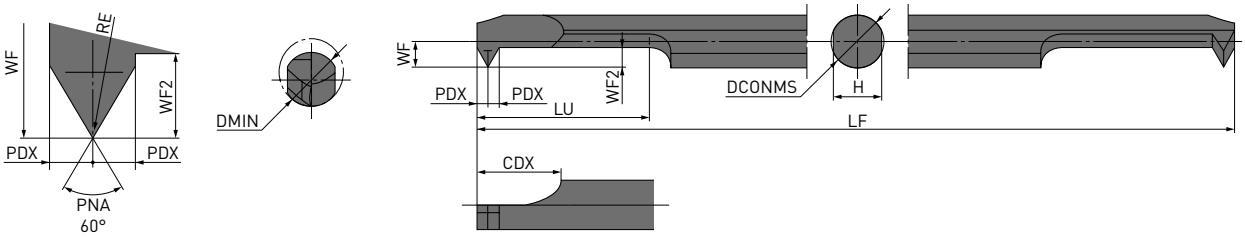

3




Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

# CT-TYPE

## MICRO-MINI TWIN




| Order number | MS7025 | MS9025 | VP15TF | TF15 | | DMIN | RE | DCONMS | LF | LU | CDX | WF | PDX | WF2 | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CT0305RS-M4 | | | ★ | ★ | without | 3.0 | 0.03 | 3.0 | 50 | 5.2 | 6.0 | 1.3 | 0.6 | 1.2 | 2.7 |
| CT03RS-M4 | | | ● | ● | without | 3.0 | 0.03 | 3.0 | 50 | 10.2 | 6.0 | 1.3 | 0.6 | 1.2 | 2.7 |
| CT03RS-M4B | ● | ● | ● | ● | with | 3.0 | 0.03 | 3.0 | 50 | 10.2 | 6.0 | 1.3 | 0.6 | 1.2 | 2.7 |
| CT035RS-M5B | ● | ● | | | with | 4.0 | 0.03 | 3.5 | 60 | 10.4 | 6.5 | 1.55 | 0.7 | 1.45 | 3.15 |
| CT0407RS-M6 | | | ★ | ★ | without | 4.5 | 0.05 | 4.0 | 60 | 7.6 | 7.0 | 1.8 | 0.8 | 1.7 | 3.6 |
| CT04RS-M6 | | | ● | ● | without | 4.5 | 0.05 | 4.0 | 60 | 15.6 | 7.0 | 1.8 | 0.8 | 1.7 | 3.6 |
| CT04RS-M6B | ● | ● | ● | ● | with | 4.5 | 0.05 | 4.0 | 60 | 15.6 | 7.0 | 1.8 | 0.8 | 1.7 | 3.6 |
| CT045RS-M7B | ● | ● | | | with | 5.0 | 0.05 | 4.5 | 70 | 15.8 | 7.5 | 2.05 | 0.9 | 1.95 | 4.05 |
| CT0511RS-M8 | | | ★ | ★ | without | 6.0 | 0.05 | 5.0 | 70 | 11 | 8.0 | 2.3 | 1.0 | 2.2 | 4.5 |
| CT05RS-M8 | | | ● | ● | without | 6.0 | 0.05 | 5.0 | 70 | 21 | 8.0 | 2.3 | 1.0 | 2.2 | 4.5 |
| CT05RS-M8B | ● | ● | ● | ● | with | 6.0 | 0.05 | 5.0 | 70 | 21 | 8.0 | 2.3 | 1.0 | 2.2 | 4.5 |
| CT0611RS-M10 | | | ★ | ★ | without | 7.0 | 0.05 | 6.0 | 75 | 11 | 8.0 | 2.8 | 1.0 | 2.2 | 5.4 |
| CT06RS-M10 | | | ● | ● | without | 7.0 | 0.05 | 6.0 | 75 | 21 | 8.0 | 2.8 | 1.0 | 2.2 | 5.4 |
| CT06RS-M10B | ● | ● | ● | ● | with | 7.0 | 0.05 | 6.0 | 75 | 21 | 8.0 | 2.8 | 1.0 | 2.2 | 5.4 |

1/1

1. (MICRO-MINI TWIN is available in 1 piece in one pack.)

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## STANDARDS FOR THREADING

| Tool type | Threads | | | |
|---|---|---|---|---|
| | Metric screw | | Unified coarse screw | |
| | Thread | Pitch (mm) | Thread | Pitch (thread/inch) |
| CT03 | ≥ M4 | 0.50 – 1.00 | ≥ No.8 - 32UNC<br>≥ No.8 - 36UNF | 36 – 24 |
| CT035 | ≥ M5 | 0.50 – 1.00 | ≥ No.10 - 24UNC<br>≥ No.10 - 32UNF | 32 – 24 |
| CT04 | ≥ M6 | 0.75 – 1.25 | ≥ 1/4 - 20UNC<br>≥ 1/4 - 28UNF | 28 – 20 |
| CT045 | ≥ M7 | 0.75 – 1.25 | ≥ 1/4 - 20UNC<br>≥ 1/4 - 28UNF | 28 – 20 |
| CT05 | ≥ M8 | 0.75 – 1.50 | ≥ 5/16 - 18UNC<br>≥ 5/16 - 24UNF | 24 – 18 |
| CT06 | ≥ M10 | 0.75 – 1.75 | ≥ 3/8 - 16UNC<br>≥ 3/8 - 24UNF | 24 – 16 |

● : Inventory maintained. ★ : Inventory maintained in Japan.

# CT-TYPE

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | Grade | Vc | Recommended tool overhang (mm) |
|---|---|---|---|---|---|
| P | Pure iron, Free cutting steel | — | MS7025 | 50 (30 – 80) | LU + 2 mm |
| P | Carbon steel, alloy steel | Hardness 180 – 350HB | MS7025, VP15TF | 50 (30 – 80) | LU + 2 mm |
| M | Stainless steel | Hardness ≤200HB | MS7025, MS9025, VP15TF | 50 (30 – 80) | LU + 2 mm |
| K | Gray cast iron | Tensile strength ≤350MPa | VP15TF | 50 (30 – 80) | LU + 2 mm |
| N | Non-ferrous metal | — | TF15 | 80 (50 – 100) | LU + 2 mm |
| S | Heat resistant alloy | — | MS9025 | 40 (30 – 60) | LU + 2 mm |

1/1

1. Recommend wet machining.
2. Pay special attention to machining of small diameters at high revolutions as the feed rate cannot keep up with the speed.

## STANDARD DEPTH OF CUT

The chart shows the cutting depths when machining external ISO metric screw threads.

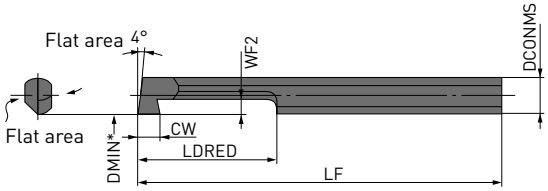
### METRIC

| P (Pitch) | | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 |
|---|---|---|---|---|---|---|---|
| Total cutting depth | | 0.29 | 0.43 | 0.58 | 0.72 | 0.87 | 1.01 |
| Number of passes | 1 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 |
| | 2 | 0.05 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 |
| | 3 | 0.05 | 0.05 | 0.06 | 0.07 | 0.07 | 0.07 |
| | 4 | 0.04 | 0.05 | 0.05 | 0.07 | 0.07 | 0.07 |
| | 5 | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 | 0.07 |
| | 6 | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 | 0.06 |
| | 7 | 0.02 | 0.04 | 0.04 | 0.05 | 0.06 | 0.06 |
| | 8 | 0.01 | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 |
| | 9 | — | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 |
| | 10 | — | 0.02 | 0.03 | 0.04 | 0.05 | 0.05 |
| | 11 | — | 0.01 | 0.03 | 0.04 | 0.05 | 0.05 |
| | 12 | — | — | 0.03 | 0.03 | 0.04 | 0.05 |
| | 13 | — | — | 0.02 | 0.03 | 0.04 | 0.04 |
| | 14 | — | — | 0.01 | 0.02 | 0.03 | 0.04 |
| | 15 | — | — | — | 0.01 | 0.03 | 0.04 |
| | 16 | — | — | — | — | 0.03 | 0.03 |
| | 17 | — | — | — | — | 0.02 | 0.03 |
| | 18 | — | — | — | — | 0.01 | 0.03 |
| | 19 | — | — | — | — | — | 0.03 |
| | 20 | — | — | — | — | — | 0.02 |
| | 21 | — | — | — | — | — | 0.01 |

# MICRO-MINI BORING BARS

## STANDARD MICRO-MINI BORING BARS (SOLID CARBIDE BORING BAR)

- Solid carbide type with minimum cutting diameter Ø 3.2 mm.
- l/d is 5 times the diameter.
- Cutting edge can be shaped according to the application thus, it covers a wide application range (threading, grooving, copying, etc).




*Right hand tool only.*

| Order number | TF15 | CW | DCONMS | LF | LDRED | DMIN | WF2 |
|---|---|---|---|---|---|---|---|
| C03FR-BLS | ★ | 2.0 | 3 | 80 | 15 | 3.2 | 1.0 |
| C04FR-BLS | ★ | 2.5 | 4 | 80 | 20 | 4.2 | 1.5 |
| C05HR-BLS | ★ | 3.0 | 5 | 100 | 25 | 5.2 | 2.0 |

1/1

* DMIN : Min. cutting diameter
1. (MICRO-MINI TWIN is available in 1 piece in one pack.)

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# MICRO-MINI BORING BARS

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | Vc | f | ap | l/d | Edge condition (mm) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Corner radius or BCH | *Honing |
| P | Carbon steel, alloy steel | Hardness 180 – 350HB | 40 (30 – 50) | 0.05 (– 0.1) | 0.2 (0.1 – 0.3) | 5 | 0.1 – 0.5 | 0.01 – 0.05 |
| M | Stainless steel | Hardness ≤200HB | 40 (30 – 50) | 0.05 (– 0.1) | 0.2 (0.1 – 0.3) | 5 | <0.4 | <0.03 (Honing not required) |
| K | Gray cast iron | Tensile strength ≤350MPa | 40 (30 – 50) | 0.05 (– 0.05) | 0.2 (0.1 – 0.3) | 5 | 0.1 – 0.5 | 0.01 – 0.05 |
| N | Non-ferrous metal | — | 80 (60 – 100) | 0.05 (– 0.1) | 0.3 (0.1 – 0.5) | 5 | 0.1 – 0.5 | <0.03 (Honing not required) |

1/1

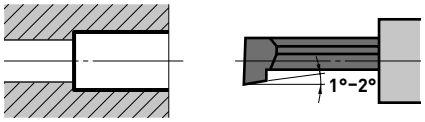
* Cutting edge is not honed. Please hone according to the workpiece before machining.

## GRINDING THE CUTTING EDGE OF MICRO-MINI BORING BAR

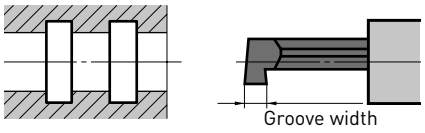
- MICRO-MINI boring bars can be used for boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrinding, use a diamond whetstone approximately #250 – #400.
- Please grind according to the application using the figure below as a reference.

## APPLICATION

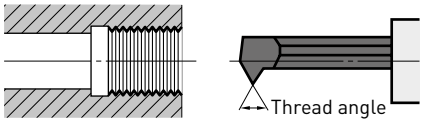
### BORING



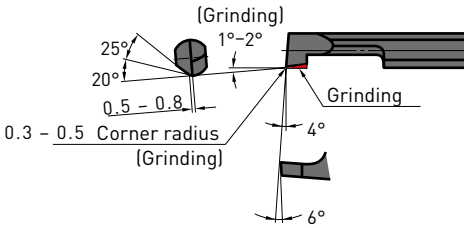

### GROOVING

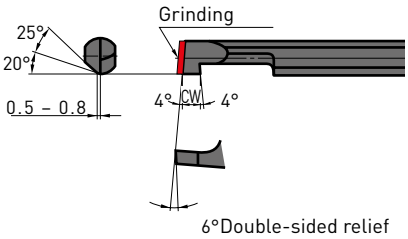


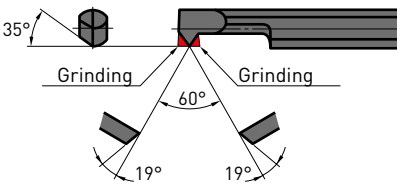

### THREADING



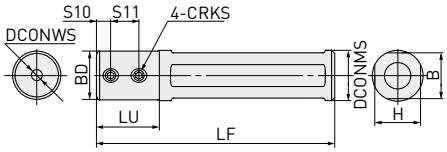

## GRINDING EXAMPLES



# ROUND TYPE HOLDER




## WITHOUT COOLANT HOLE

| | Order number | Stock | DCONMS | DCONWS | BD | LF | LU | H | B | S10 | S11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NEW | SLV160085020N | ★ | 16.0 | 2.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085025N | ★ | 16.0 | 2.5 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085030N | ★ | 16.0 | 3.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085035N | ★ | 16.0 | 3.5 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085040N | ★ | 16.0 | 4.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085045N | ★ | 16.0 | 4.5 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085050N | ★ | 16.0 | 5.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 4.5 | 9 |
| NEW | SLV160085060N | ★ | 16.0 | 6.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 5.0 | 10 |
| NEW | SLV160085070N | ★ | 16.0 | 7.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 5.0 | 10 |
| NEW | SLV160085080N | ★ | 16.0 | 8.0 | 15.5 | 85 | 20 | 14.4 | 14.4 | 5.0 | 10 |
| NEW | SLV190085020N | ★ | 19.05 | 2.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| | SLV190085025N | ● | 19.05 | 2.5 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190085030N | ★ | 19.05 | 3.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| | SLV190085035N | ● | 19.05 | 3.5 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190085040N | ★ | 19.05 | 4.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| | SLV190085045N | ● | 19.05 | 4.5 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190085050N | ★ | 19.05 | 5.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190080060N | ★ | 19.05 | 6.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| NEW | SLV190080070N | ★ | 19.05 | 7.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| NEW | SLV190080080N | ★ | 19.05 | 8.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| NEW | SLV190110020N | ★ | 19.05 | 2.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| | SLV190110025N | ● | 19.05 | 2.5 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190110030N | ★ | 19.05 | 3.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| | SLV190110035N | ● | 19.05 | 3.5 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190110040N | ★ | 19.05 | 4.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| | SLV190110045N | ● | 19.05 | 4.5 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190110050N | ★ | 19.05 | 5.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| NEW | SLV190110060N | ★ | 19.05 | 6.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| NEW | SLV190110070N | ★ | 19.05 | 7.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| NEW | SLV190110080N | ★ | 19.05 | 8.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| NEW | SLV200085020N | ★ | 20.0 | 2.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| | SLV200085025N | ● | 20.0 | 2.5 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| NEW | SLV200085030N | ★ | 20.0 | 3.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| | SLV200085035N | ● | 20.0 | 3.5 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| NEW | SLV200085040N | ★ | 20.0 | 4.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| | SLV200085045N | ● | 20.0 | 4.5 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| NEW | SLV200085050N | ★ | 20.0 | 5.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| NEW | SLV200080060N | ★ | 20.0 | 6.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 |
| NEW | SLV200080070N | ★ | 20.0 | 7.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 |
| NEW | SLV200080080N | ★ | 20.0 | 8.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 |
| NEW | SLV220135020N | ★ | 22.0 | 2.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| | SLV220135025N | ● | 22.0 | 2.5 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| NEW | SLV220135030N | ★ | 22.0 | 3.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

## ROUND TYPE HOLDER

### WITHOUT COOLANT HOLE

| | Order number | Stock | DCONMS | DCONWS | BD | LF | LU | H | B | S10 | S11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SLV220135035N | ● | 22.0 | 3.5 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| NEW | SLV220135040N | ★ | 22.0 | 4.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| | SLV220135045N | ● | 22.0 | 4.5 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| NEW | SLV220135050N | ★ | 22.0 | 5.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| NEW | SLV220135060N | ★ | 22.0 | 6.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| NEW | SLV220135070N | ★ | 22.0 | 7.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| NEW | SLV220135080N | ★ | 22.0 | 8.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| NEW | SLV220135100N | ★ | 22.0 | 10.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| NEW | SLV220135120N | ★ | 22.0 | 12.0 | 20.0 | 135 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| NEW | SLV250067020N | ★ | 25.0 | 2.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| | SLV250067025N | ● | 25.0 | 2.5 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250067030N | ★ | 25.0 | 3.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| | SLV250067035N | ● | 25.0 | 3.5 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250067040N | ★ | 25.0 | 4.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| | SLV250067045N | ● | 25.0 | 4.5 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250067050N | ★ | 25.0 | 5.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250067060N | ★ | 25.0 | 6.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250067070N | ★ | 25.0 | 7.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250067080N | ★ | 25.0 | 8.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250067100N | ★ | 25.0 | 10.0 | 22.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250067120N | ★ | 25.0 | 12.0 | 22.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250110020N | ★ | 25.0 | 2.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| | SLV250110025N | ● | 25.0 | 2.5 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250110030N | ★ | 25.0 | 3.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| | SLV250110035N | ● | 25.0 | 3.5 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250110040N | ★ | 25.0 | 4.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| | SLV250110045N | ● | 25.0 | 4.5 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250110050N | ★ | 25.0 | 5.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| NEW | SLV250110060N | ★ | 25.0 | 6.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250110070N | ★ | 25.0 | 7.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250110080N | ★ | 25.0 | 8.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250110100N | ★ | 25.0 | 10.0 | 22.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV250110120N | ★ | 25.0 | 12.0 | 22.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| NEW | SLV254085020N | ★ | 25.4 | 2.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| | SLV254085025N | ● | 25.4 | 2.5 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254085030N | ★ | 25.4 | 3.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| | SLV254085035N | ● | 25.4 | 3.5 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254085040N | ★ | 25.4 | 4.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| | SLV254085045N | ● | 25.4 | 4.5 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254085050N | ★ | 25.4 | 5.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254080060N | ★ | 25.4 | 6.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254080070N | ★ | 25.4 | 7.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254080080N | ★ | 25.4 | 8.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254080100N | ★ | 25.4 | 10.0 | 22.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254080120N | ★ | 25.4 | 12.0 | 22.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254110020N | ★ | 25.4 | 2.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |





● : Inventory maintained. ★ : Inventory maintained in Japan.

## ROUND TYPE HOLDER

### WITHOUT COOLANT HOLE

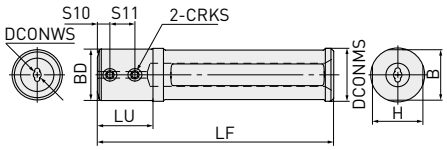
| | Order number | Stock | DCONMS | DCONWS | BD | LF | LU | H | B | S10 | S11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SLV254110025N | ● | 25.4 | 2.5 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254110030N | ★ | 25.4 | 3.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| | SLV254110035N | ● | 25.4 | 3.5 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254110040N | ★ | 25.4 | 4.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| | SLV254110045N | ● | 25.4 | 4.5 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254110050N | ★ | 25.4 | 5.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| NEW | SLV254110060N | ★ | 25.4 | 6.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254110070N | ★ | 25.4 | 7.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254110080N | ★ | 25.4 | 8.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254110100N | ★ | 25.4 | 10.0 | 22.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| NEW | SLV254110120N | ★ | 25.4 | 12.0 | 22.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# ROUND TYPE HOLDER




**WITH COOLANT HOLE**

| Order number | Stock | DCONMS | DCONWS | BD | LF | LU | H | B | S10 | S11 |
|---|---|---|---|---|---|---|---|---|---|---|
| SLV190085030A | ● | 19.05 | 3.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190085035A | ● | 19.05 | 3.5 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190085040A | ● | 19.05 | 4.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190085045A | ● | 19.05 | 4.5 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190085050A | ● | 19.05 | 5.0 | 18.5 | 85 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190080060A | ● | 19.05 | 6.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| SLV190080070A | ● | 19.05 | 7.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| SLV190080080A | ● | 19.05 | 8.0 | 18.5 | 80 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| SLV190110030A | ● | 19.05 | 3.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190110035A | ● | 19.05 | 3.5 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190110040A | ● | 19.05 | 4.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190110045A | ● | 19.05 | 4.5 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190110050A | ● | 19.05 | 5.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9 |
| SLV190110060A | ● | 19.05 | 6.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| SLV190110070A | ● | 19.05 | 7.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| SLV190110080A | ● | 19.05 | 8.0 | 18.5 | 110 | 20 | 17.8 | 17.8 | 5.0 | 10 |
| SLV200085030A | ● | 20.0 | 3.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| SLV200085035A | ● | 20.0 | 3.5 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| SLV200085040A | ● | 20.0 | 4.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| SLV200085045A | ● | 20.0 | 4.5 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| SLV200085050A | ● | 20.0 | 5.0 | 19.0 | 85 | 20 | 18.8 | 18.8 | 4.5 | 9 |
| SLV200080060A | ● | 20.0 | 6.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 |
| SLV200080070A | ● | 20.0 | 7.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 |
| SLV200080080A | ● | 20.0 | 8.0 | 19.0 | 80 | 20 | 18.8 | 18.8 | 5.0 | 10 |
| SLV220115030A | ● | 22.0 | 3.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| SLV220115035A | ● | 22.0 | 3.5 | 20.0 | 115 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| SLV220115040A | ● | 22.0 | 4.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| SLV220115045A | ● | 22.0 | 4.5 | 20.0 | 115 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| SLV220115050A | ● | 22.0 | 5.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 4.5 | 9 |
| SLV220115060A | ● | 22.0 | 6.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| SLV220115070A | ● | 22.0 | 7.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| SLV220115080A | ● | 22.0 | 8.0 | 20.0 | 115 | 20 | 20.8 | 20.8 | 5.0 | 10 |
| SLV250067030A | ● | 25.0 | 3.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250067035A | ● | 25.0 | 3.5 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250067040A | ● | 25.0 | 4.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250067045A | ● | 25.0 | 4.5 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250067050A | ● | 25.0 | 5.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250067060A | ● | 25.0 | 6.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| SLV250067070A | ● | 25.0 | 7.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| SLV250067080A | ● | 25.0 | 8.0 | 20.0 | 67 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| SLV250110030A | ● | 25.0 | 3.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250110035A | ● | 25.0 | 3.5 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250110040A | ● | 25.0 | 4.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |





● : Inventory maintained. ★ : Inventory maintained in Japan.

## ROUND TYPE HOLDER

### WITH COOLANT HOLE

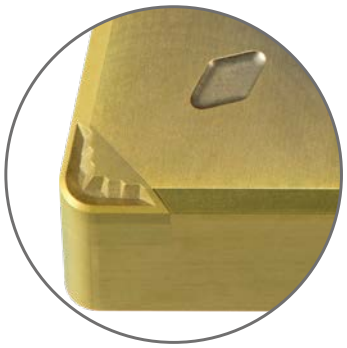
| Order number | Stock | DCONMS | DCONWS | BD | LF | LU | H | B | S10 | S11 |
|---|---|---|---|---|---|---|---|---|---|---|
| SLV250110045A | ● | 25.0 | 4.5 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250110050A | ● | 25.0 | 5.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9 |
| SLV250110060A | ● | 25.0 | 6.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| SLV250110070A | ● | 25.0 | 7.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| SLV250110080A | ● | 25.0 | 8.0 | 20.0 | 110 | 20 | 23.9 | 23.9 | 5.0 | 10 |
| SLV254085030A | ● | 25.4 | 3.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254085035A | ● | 25.4 | 3.5 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254085040A | ● | 25.4 | 4.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254085045A | ● | 25.4 | 4.5 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254085050A | ● | 25.4 | 5.0 | 20.0 | 85 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254080060A | ● | 25.4 | 6.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| SLV254080070A | ● | 25.4 | 7.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| SLV254080080A | ● | 25.4 | 8.0 | 20.0 | 80 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| SLV254110030A | ● | 25.4 | 3.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254110035A | ● | 25.4 | 3.5 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254110040A | ● | 25.4 | 4.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254110045A | ● | 25.4 | 4.5 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254110050A | ● | 25.4 | 5.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9 |
| SLV254110060A | ● | 25.4 | 6.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| SLV254110070A | ● | 25.4 | 7.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| SLV254110080A | ● | 25.4 | 8.0 | 20.0 | 110 | 20 | 24.4 | 24.4 | 5.0 | 10 |
| SLV320110050A | ● | 32.0 | 5.0 | 20.0 | 110 | 22 | 31.1 | 31.1 | 4.5 | 9 |
| SLV320110060A | ● | 32.0 | 6.0 | 20.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 |
| SLV320110070A | ● | 32.0 | 7.0 | 20.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 |
| SLV320110080A | ● | 32.0 | 8.0 | 20.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 |
| SLV320110100A | ● | 32.0 | 10.0 | 25.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 |
| SLV320110120A | ● | 32.0 | 12.0 | 25.0 | 110 | 22 | 31.1 | 31.1 | 5.0 | 10 |

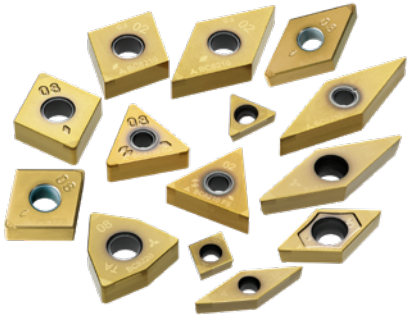


● : Inventory maintained. ★ : Inventory maintained in Japan.

# BC8200 / MB8200 SERIES

## THE NEXT GENERATION OF COATED AND UNCOATED PCBN GRADES FOR MACHINING HARDENED STEELS





Interested in more...

**B249**

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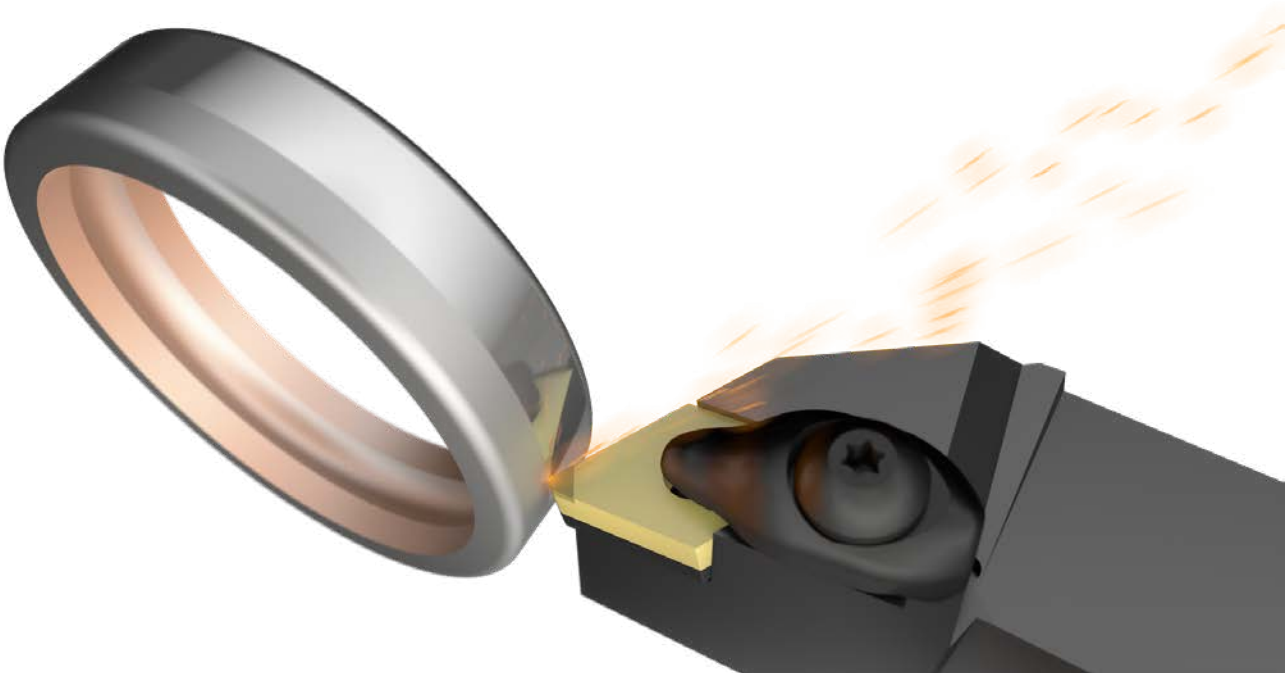
MITSUBISHI MATERIALS

# BC8200 SERIES

## BC8210

**FOR CONTINUOUS AND LIGHT INTERRUPTED CUTTING**

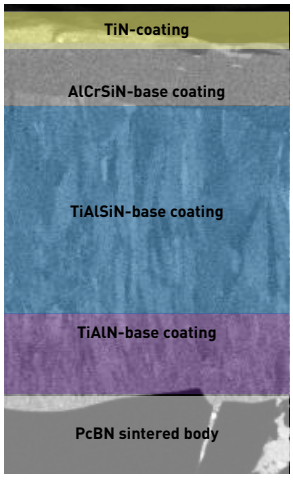


### HIGH-SPEED MACHINING WITH OUTSTANDING TOOL LIFE

Suitable for continuous through to light interrupted cutting. BC8210 exhibits excellent chipping, flank and crater wear resistance, thereby providing a stable machining process at high speed cutting conditions.

### NEW PVD COATING FOR LONG TOOL LIFE

A combination of the newly developed AlCrSiN-base coating that absorbs impacts, and the TiAlSiN-base coating which has excellent wear resistance, provide stability during continuous through to low interrupted cutting applications.

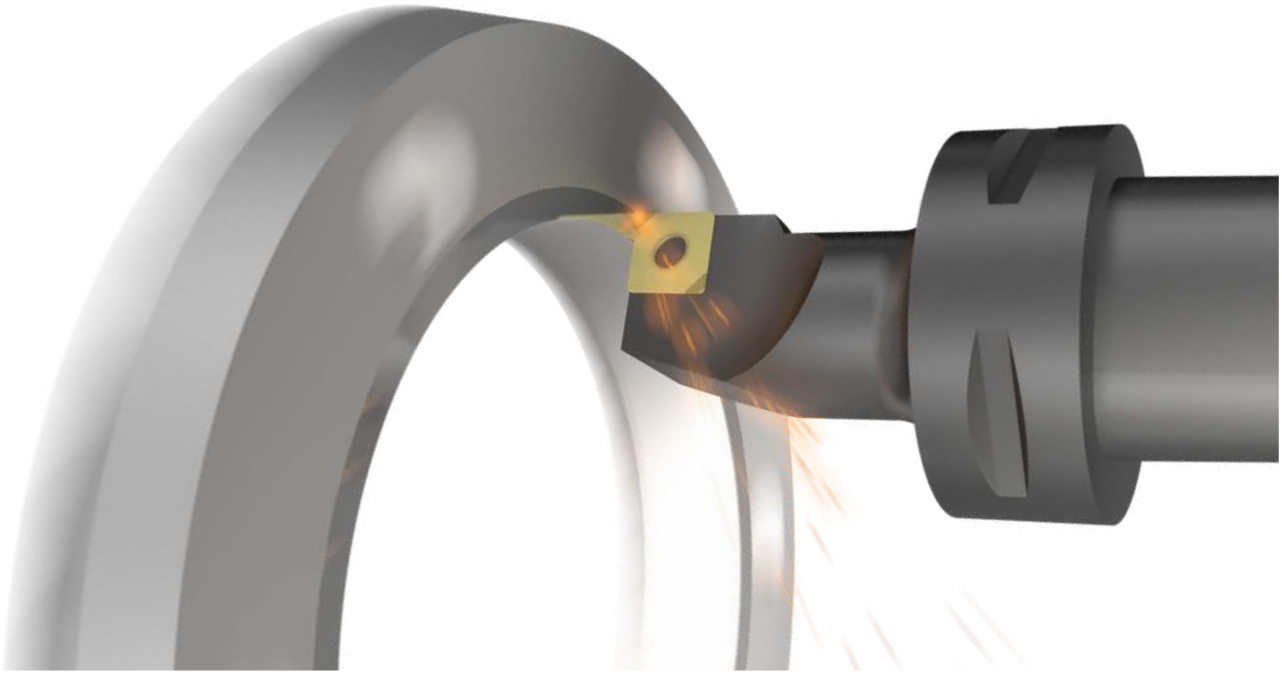



- Gold colour aids easy identification of used edges.
- Strong resistance to chipping absorbs impact forces.
- Excellent wear resistance and abrasion resistant layer.
- Improved strength of adhesion to the PcBN substrate prevents peeling.
- Excellent crater wear and chipping resistance exclusive BC8210 sintered substrate.

# BC8200 SERIES

## BC8220

**FOR GENERAL APPLICATIONS**

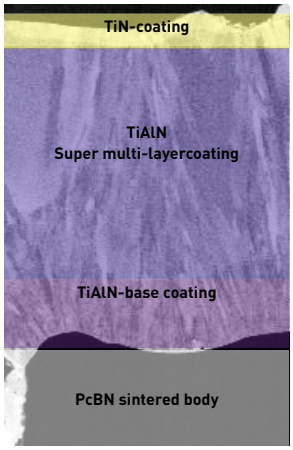


### ACHIEVES IMPRESSIVE TOOL LIFE OVER A WIDE RANGE OF CUTTING CONDITIONS

Highly suited to a wide application area from continuous through to heavy interrupted cutting. It also has excellent crater wear and fracture resistance due to the new PcBN base material and together with a new coating, tool life is dramatically extended.

### NEW PVD COATING WITH IDEAL BALANCE OF WEAR AND CHIPPING RESISTANCE

BC8220 utilises a new specially developed, super multi-layer PVD coating. The high level of both chipping and wear resistance is achieved by a much improved adhesion between the substrate and coating. Together with the easy identification of edges used due to the gold coloured TiN top coating layer, BC8220 achieves high performance and reliability over a wide range of hardened steel machining applications.




- Gold colour aids easy identification of used edges.
- High wear and chipping resistance.
- Improved strength of the adhesion to the PcBN substrate prevents peeling.
- Excellent crater wear and chipping resistance. Exclusive BC8220 sintered body.

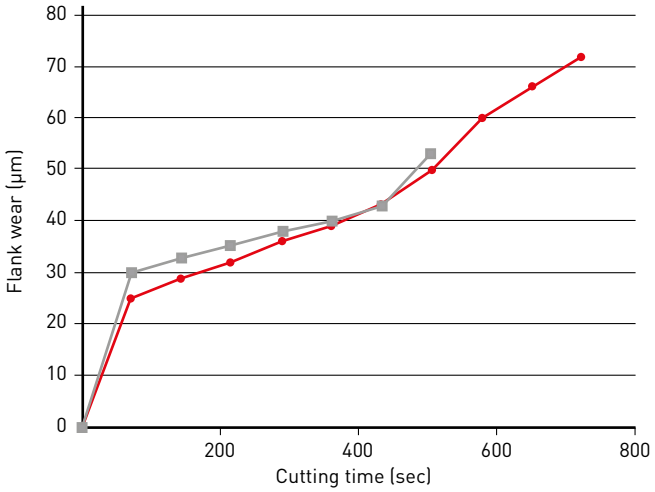
# BC8210

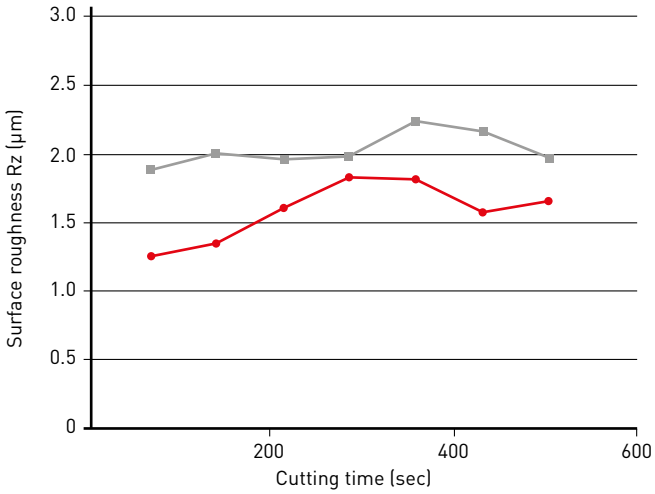
## CUTTING PERFORMANCE

### COMPARISON OF CONTINUOUS CUTTING

BC8210 reduces flank wear and maintains good surface finishes.

| | |
|---|---|
| Insert | NP-CNGA120408GS2 BC8210 |
| Material | DIN 20Cr4 |
| Vc (m/min) | 200 |
| f (mm/rev) | 0.1 |
| ap (mm) | 0.2 |
| Cutting mode | Dry cutting |




### COMPARISON OF LIGHT INTERRUPTED CUTTING

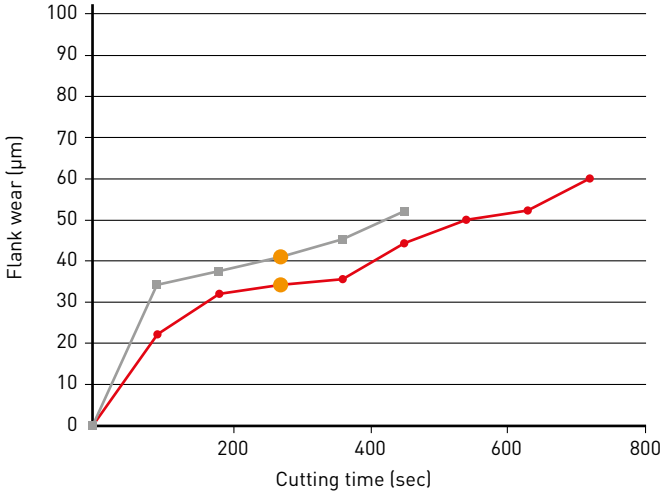
BC8210 provides excellent chipping resistance.

| | |
|---|---|
| Insert | NP-CNGA120408VA2 BC8210 |
| Material | DIN 20Cr4 |
| Vc (m/min) | 160 |
| f (mm/rev) | 0.1 |
| ap (mm) | 0.2 |
| Cutting mode | Dry cutting |

**CHIPPING AFTER MACHINING 360 SECONDS**

BC8210

Conventional




BC8210 Conventional

# BC8220

## CUTTING PERFORMANCE

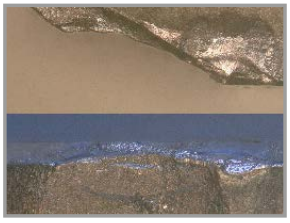
### COMPARISON OF FRACTURE RESISTANCE DURING MEDIUM INTERRUPTED CUTTING

BC8220 has excellent chipping and fracture resistance.

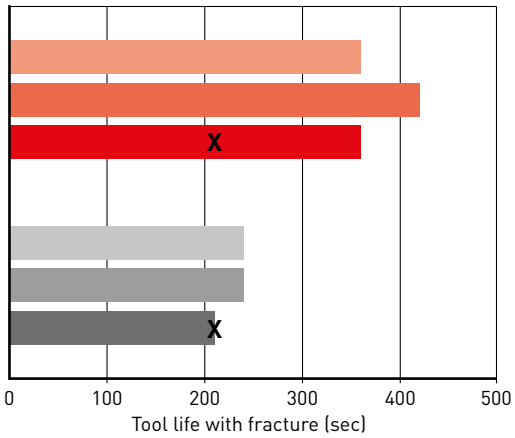
| | |
|---|---|
| Insert | NP-CNGA120408VA2 BC8220 |
| Material | DIN 20Cr4 |
| Vc (m/min) | 250 |
| f (mm/rev) | 0.15 |
| ap (mm) | 0.1 |
| Cutting mode | Dry cutting |

**FRACTURE AFTER MACHINING 210 SECONDS**

**BC8220**



Conventional



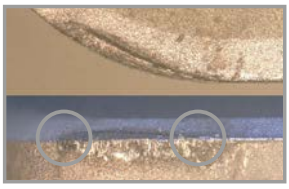

### COMPARISON OF FRACTURE RESISTANCE DURING HEAVY INTERRUPTED CUTTING

BC8220 has improved chipping resistance when compared to conventional products.

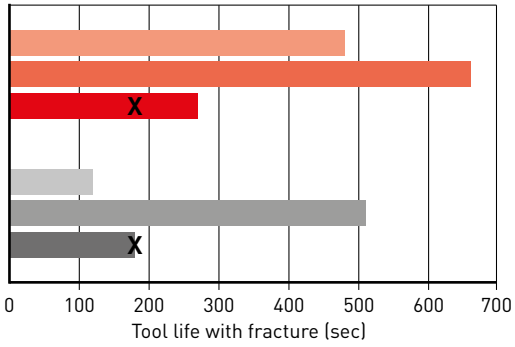
| | |
|---|---|
| Insert | NP-CNGA120408VA2 BC8220 |
| Material | DIN 20Cr4 |
| Vc (m/min) | 200 |
| f (mm/rev) | 0.05 |
| ap (mm) | 0.1 |
| Cutting mode | Wet cutting |

**CHIPPING AFTER MACHINING 180 SECONDS**

**BC8220**

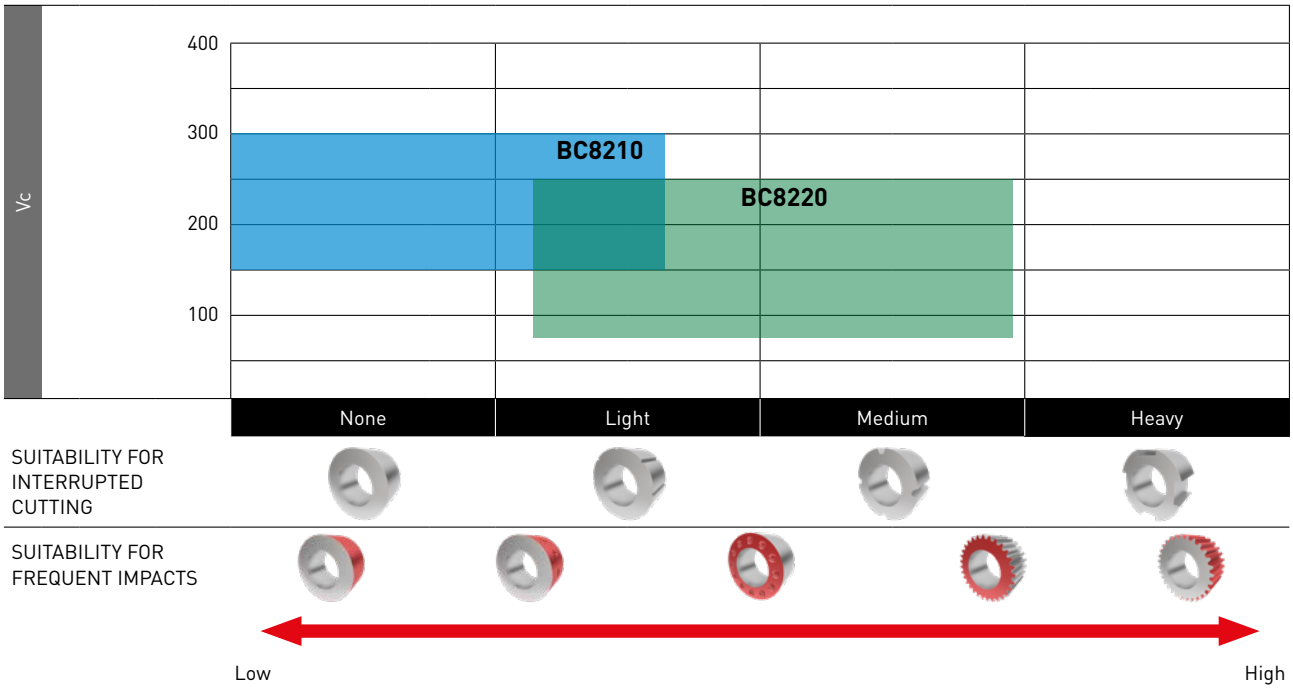


Conventional



# BC8200 SERIES

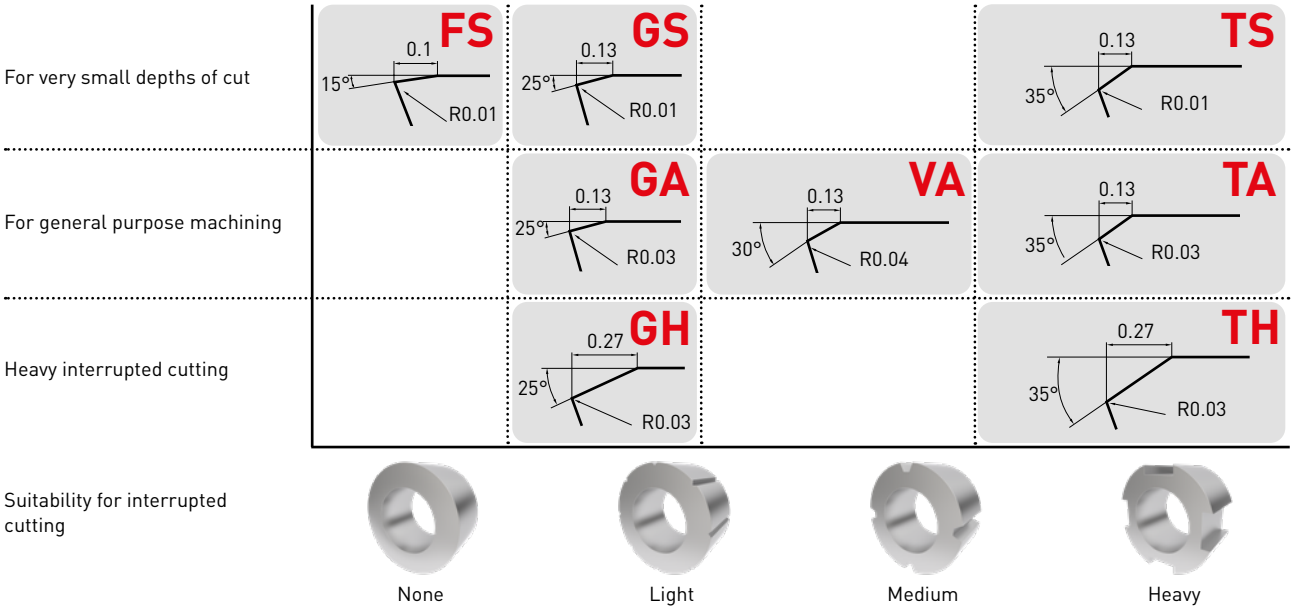
## BC8200 COATED PCBN SERIES



# BC8200 SERIES

## EDGE PREPARATION (HONING)

**A wide variety of cutting edge preparations are available for all applications.**
**VA honing type with improved facture resistance for high speeds and feeds.**







| | Continuous cutting | General purpose | | For fracture resistance | Interrupted cutting | |
|---|---|---|---|---|---|---|
| | General cutting | General cutting | High feed and depth | High speed and feed | General cutting | High feed and depth |
| **BC8210** | FS | GS | GH | | TS | |
| **BC8220** | | GA | GH | VA | TA | TH |

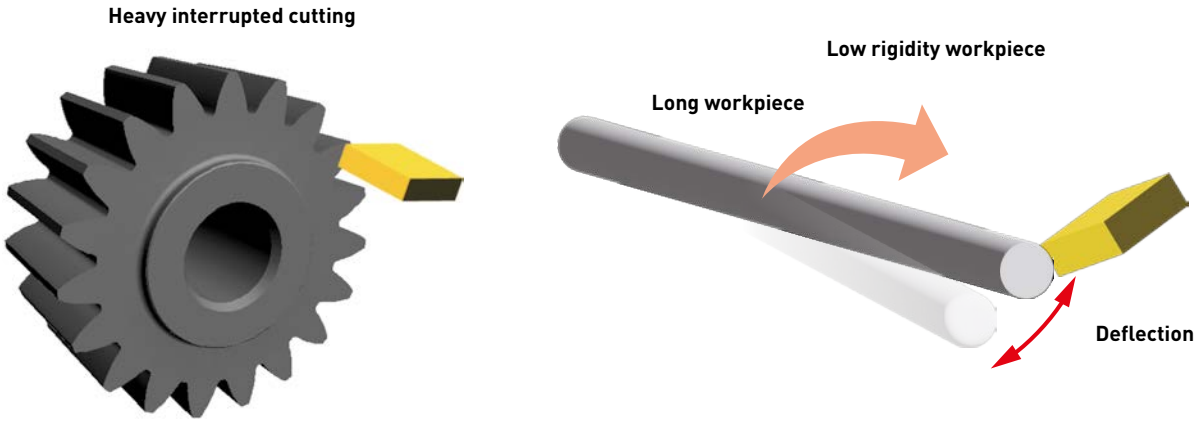
NEW

# MB8200 SERIES

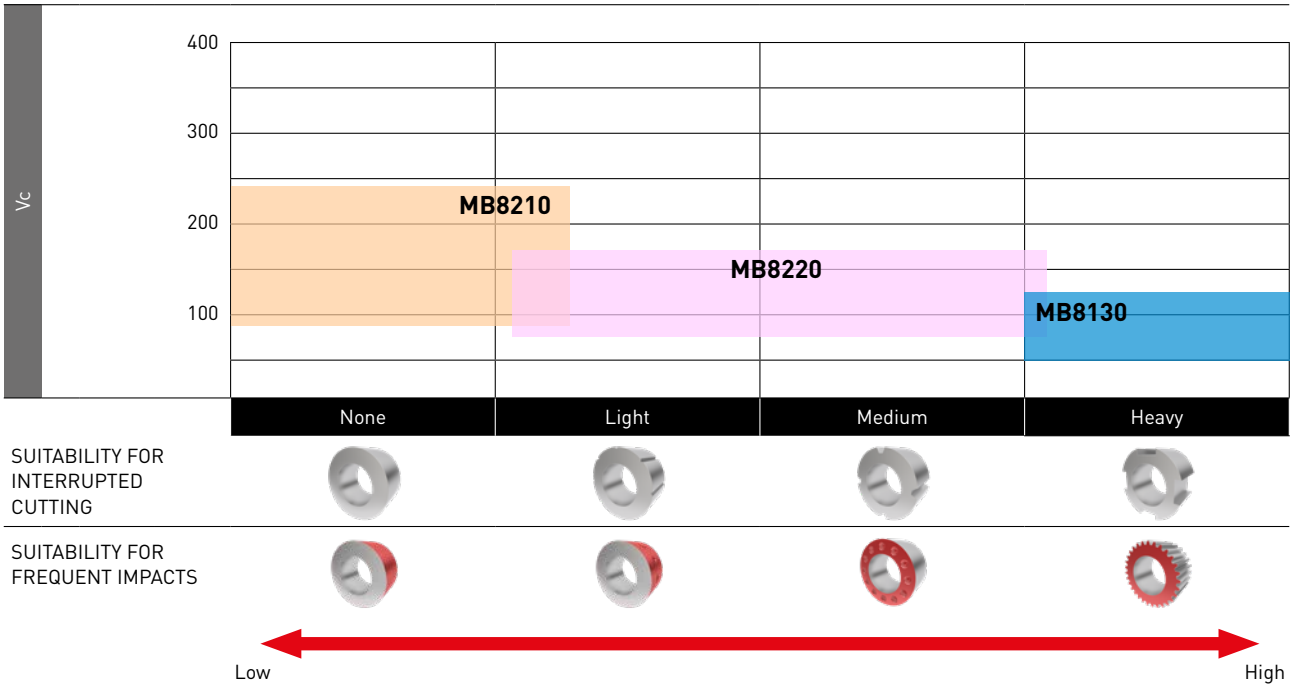
## UNCOATED PCBN GRADE FOR TURNING HARDENED STEEL

**DISPLAYS EXCELLENT CUTTING PERFORMANCE DURING MEDIUM INTERRUPTED MACHINING**

### RECOMMENDED MACHINING




### RECOMMENDED APPLICATION AREA




### MB8210

Enables stable machining during continuous and light intermittent cutting of low rigidity applications.

### MB8220

Displays excellent cutting performance during medium interrupted machining.

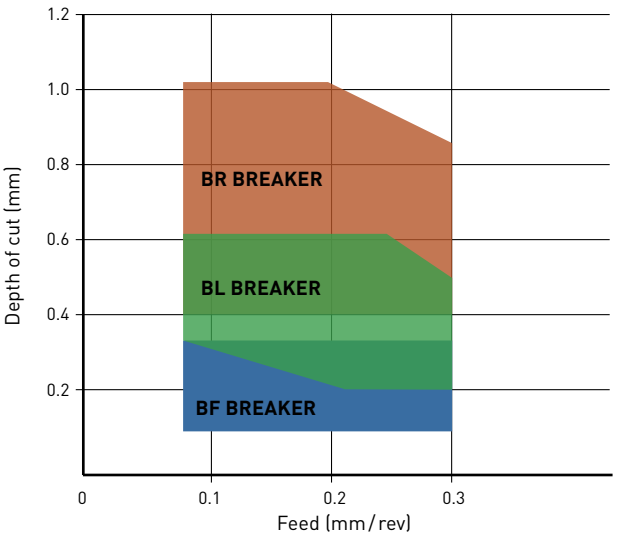
NEW

# BC8200 SERIES

## FEATURES OF THE INSERT

### CHIPBREAKER

The new BL chipbreaker provides good chip control at medium to light depths of cut.
A versatile range of chipbreakers are available for a wide range of applications.



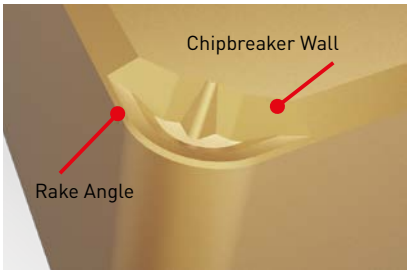
**Breaker system for excellent chip control when finishing, removing carburized layers, high load machining and for hard-soft machining.**

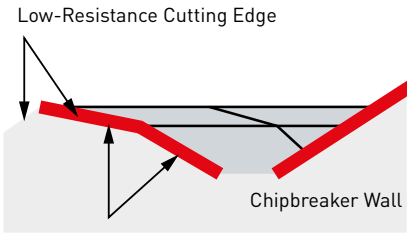
### BL BREAKER (BC8220)

It exhibits excellent chip control performance at cutting depths of 0.2 to 0.6 mm.
Combined with the dedicated honing, a low resistance cutting edge is created that suppresses chatter and vibration.

**Cutting Performance**

| | |
|---|---|
| Material | 20Cr4 (60HRC) |
| Insert | BL-CNGM120412TN2 |
| Vc (m/min) | 150 |
| f (mm/rev) | 0.2 |
| ap (mm) | 0.4 |
| Cutting mode | Dry cutting |

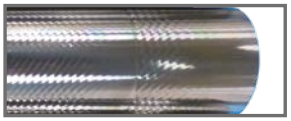



2 Step Rake Angle

### CONDITION OF THE FINISHED SURFACE

BL



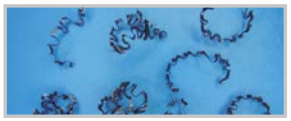
Conventional A

Conventional B

### CHIP SHAPE

BL

Conventional A



Conventional B

# BC8200 SERIES

## FEATURES OF THE INSERT

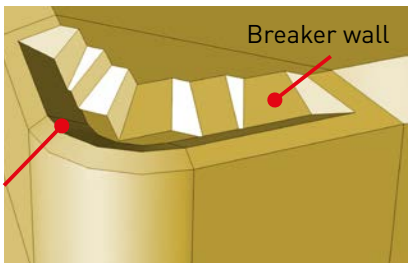
### BR BREAKER (BC8220)

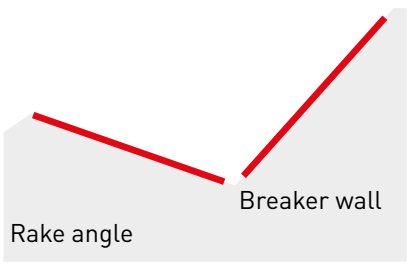
A reduced number of passes needed and improved chip control during high depths of cut.
Chips are formed with the effect from the rake angle and the multi stage breaker wall supports a wide range of cuts.

**Recommended cutting conditions:**

| | |
|---|---|
| Vc (m/min) | 80 – 200 |
| f (mm/rev) | <0.3 |
| ap (mm) | 0.6 – 1.0 |

Rake angle

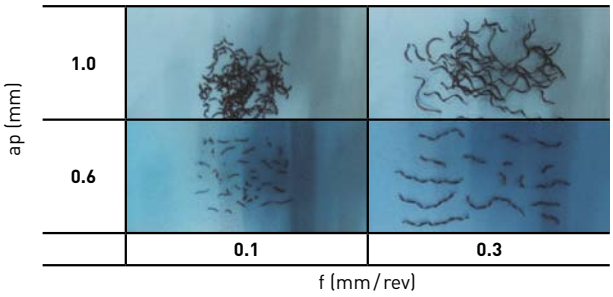



Achieves ideal chip control even at high depths of cut.

**Cutting Performance**

| | |
|---|---|
| Material | DIN 20Cr4 (60 HRC) |
| Insert | BR-CNGM120408TA2 |
| Vc (m/min) | 200 |
| f (mm/rev) | 0.1 / 0.3 |
| ap (mm) | 0.6 / 1.0 |
| Cutting mode | Dry cutting |

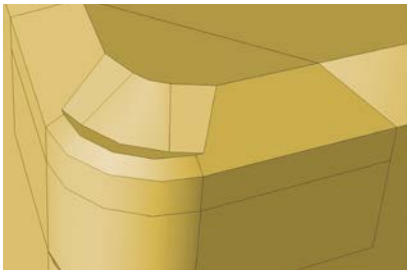


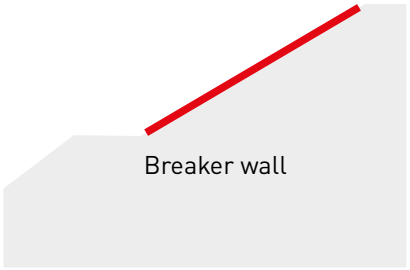

### BM BREAKER (BC8220)

Great chip control when machining at medium depths of cut. (0.3 – 0.8 mm)

**Recommended cutting conditions:**

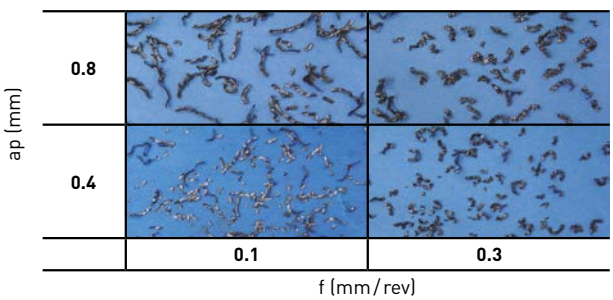
| | |
|---|---|
| Vc (m/min) | 80 – 200 |
| f (mm/rev) | <0.3 |
| ap (mm) | 0.3 – 0.8 |






**Cutting Performance**

| | |
|---|---|
| Material | DIN 15Cr3 (60 HRC) |
| Insert | BM-CNGM120408TA2 |
| Vc (m/min) | 160 |
| f (mm/rev) | 0.1 / 0.3 |
| ap (mm) | 0.4 / 0.8 |
| Cutting mode | Dry cutting |



# BC8200 SERIES

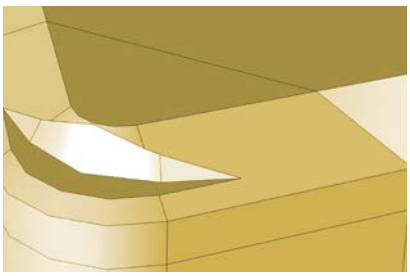
## FEATURES OF THE INSERT

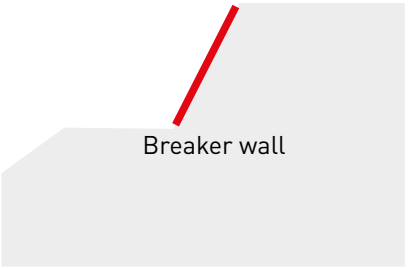
**BF BREAKER (BC8210, BC8220)**

Achieves excellent chip control while finish cutting at depths of 0.3 mm or less.

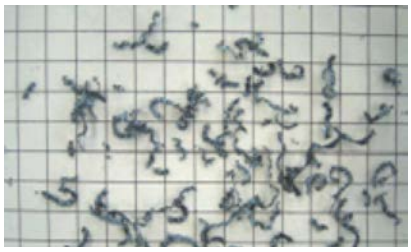
**Recommended cutting conditions:**

| | |
|---|---|
| Vc (m/min) | 80 – 200 |
| f (mm/rev) | <0.3 |
| ap (mm) | 0.1 – 0.3 |



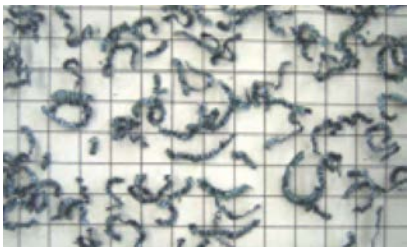



External turning



| | |
|---|---|
| Vc (m/min) | 100 |
| f (mm/rev) | 0.3 |
| ap (mm) | 0.2 |

Boring



| | |
|---|---|
| Vc (m/min) | 120 |
| f (mm/rev) | 0.3 |
| ap (mm) | 0.2 |

**Cutting Performance**

| | |
|---|---|
| Material | DIN 15Cr3 (60 HRC) |
| Insert | BF-CNGM120408TS2 |
| Cutting mode | Dry cutting |

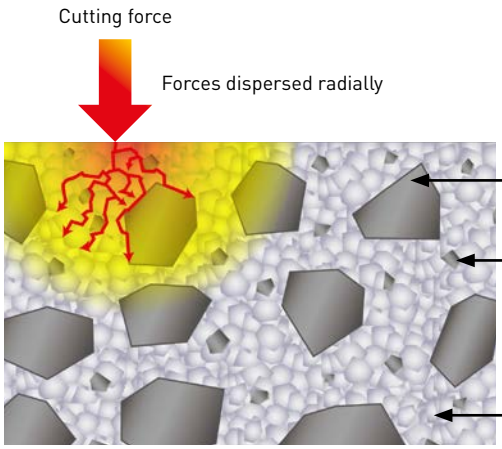
# BC8200 / MB8200 SERIES

## OPTIMISED SUBSTRATE TECHNOLOGY

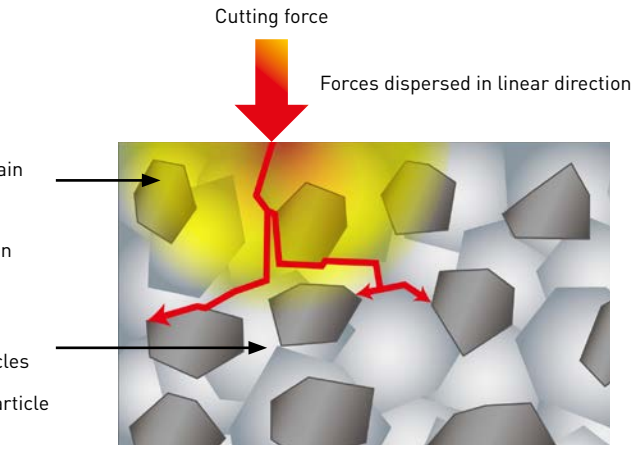
### PCBN SUBSTRATE FEATURING TOUGHNESS AND CRATER WEAR RESISTANCE

The PcBN substrate contains a ultra-fine grain, heat resistant binder.
This suppresses both chipping and crater wear and promotes longer tool life.

**BC8200 / BC8100 SERIES**




**CONVENTIONAL**

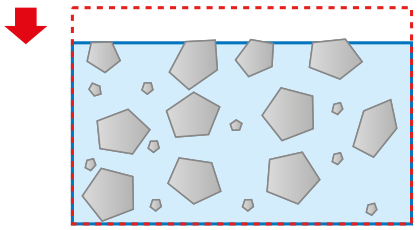


The ultra micro-particle binder for coated and uncoated PcBN inserts prevents linear crack development to avoid sudden fracturing.

### POSITIVE EFFECT OF THE NEWLY DEVELOPED, HEAT RESISTANT BINDER

The progress of crater wear is greatly reduced due to the use of a heat resistant binder.
This suppresses chipping, crater wear and fracturing.

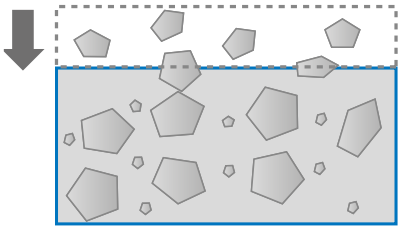
**BC8200 / MB8200 SERIES**



**Reduce crater wear**

Suppresses the binder wear caused by cutting heat.

**CONVENTIONAL**

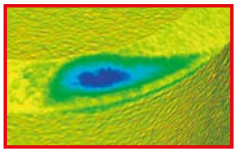


**Crater wear progress**

As binder wear progresses, the CBN particles are exposed and lost.

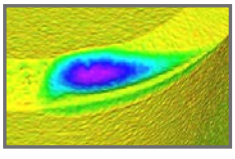
**BC8200 / MB8200 SERIES**

**Small crater wear**



**CONVENTIONAL**

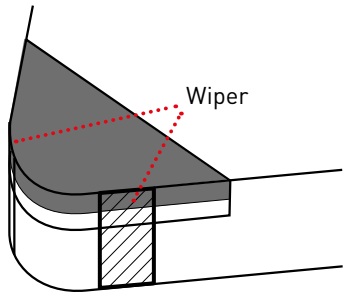
**Large crater wear**



**Crater wear**

Small  Large

# WIPER INSERT




### IMPROVING SURFACE FINISHES
Under the same machining conditions as conventional breakers, but with the feed rate increased, the surface finish of the workpiece can be improved.

### MORE EFFICIENCY
High feed rates not only shorten machining times, but also make it possible to combine roughing and finishing operations.

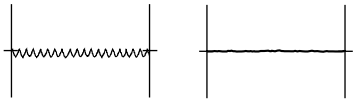
### INCREASED TOOL LIFE
When using in high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing which delays the progression of wear, thereby increasing tool life.

### BETTER CHIP CONTROL
Under high feed conditions, the chips generated become thicker and are more easily broken, thereby improving chip control.

## RECOMMENDED CUTTING CONDITIONS AND PERFORMANCE

**HIGH PRECISION FINISHING**

Without wiper | **With wiper**



Ry = 3.2 µm | Ry = 1.0 µm

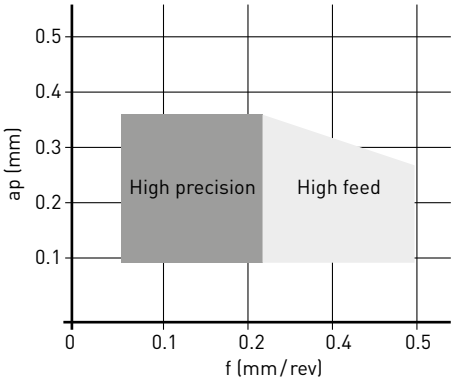
| | |
|---|---|
| Vc (m/min) | 100 |
| f (mm/rev) | 0.1 |
| ap (mm) | 0.1 |
| Cutting mode | Dry cutting |

**HIGH FEED MACHINING**

Without wiper | **With wiper**

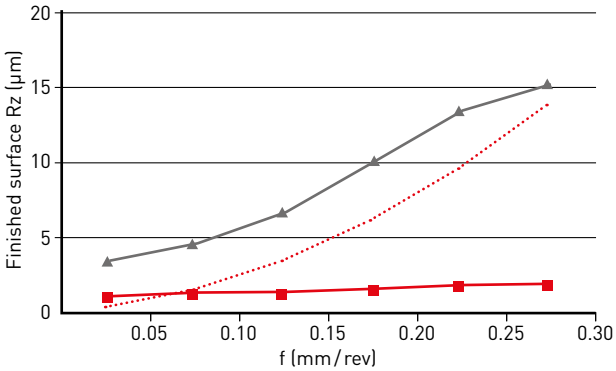
Ry = 12.2 µm | Ry = 1.2 µm

| | |
|---|---|
| Vc (m/min) | 100 |
| f (mm/rev) | 0.3 |
| ap (mm) | 0.1 |
| Cutting mode | Dry cutting |




## CUTTING PERFORMANCE

| | |
|---|---|
| Insert | NP-CNGA120408 |
| Material | Hardened steel (HRC60) |
| Cutting mode | Continuous |
| Vc (m/min) | 120 |
| f (mm/rev) | Various |
| ap (mm) | 0.1 |
| Cutting mode | Dry cutting |

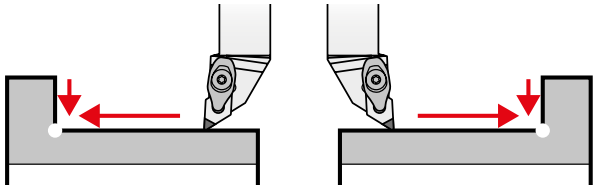



WL-Wiper
No wiper
Theoretical finished surface roughness

# COMBINATION OF BF BREAKER AND WS WIPER INSERT

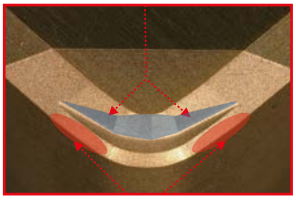
CNGM and DNGM types are now available with new inserts that combine a BF chipbreaker with a WS wiper Insert (BF-◌NGM◌◌◌◌◌◌TAWS2). It is effective for chip control and improvement of finished surface roughness without concern about the hand of the tool even during continuous external turning or internal turning and facing.

**Effect of chipbreaker and wiper insert**



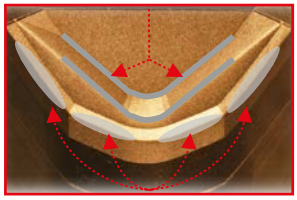
Demonstrates the effects of breaker and wiper Insert in both right handed and left handed cutting.

**BF CHIPBREAKER**



WS Wiper Insert (Neutral)
BF-CNGM120408TSWS2

**BF CHIPBREAKER**



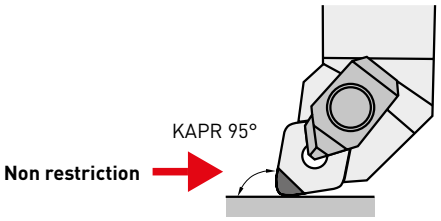
WS Wiper Insert (Neutral)
BF-DNGM150412TAWS2

## NOTES FOR USE

### WHEN USING A CNGM TYPE

**No Restriction for Holders**

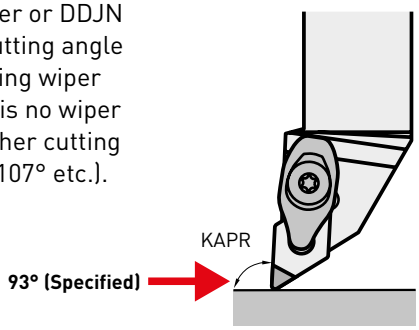
A standard holder can be used.
(*A double clamp, high rigidity tool is recommended.)



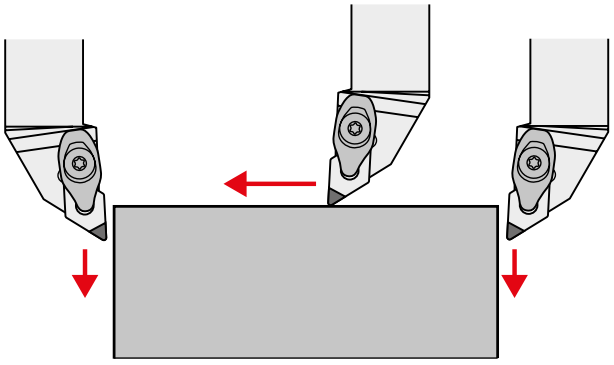

### WHEN USING A DNGM TYPE

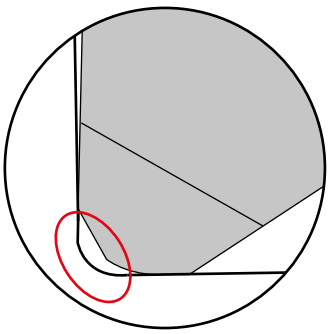
**Restriction for Holders**

Use a PDJN holder or DDJN holder with an cutting angle of 93° for improving wiper efficiency. There is no wiper efficiency with other cutting angles (60°, 90°,107° etc.).




Displays great wiper efficiency when machining the end face and outer diameter in both right-hand and left-hand machining.





* The DNGM type is not suitable for machining the R that connects the end face and the outer diameter because it will leave uncut parts.

# IDENTIFICATION

| BF | – | CNGM | 120404 | TA | WS | 2 | __ |
|---|---|---|---|---|---|---|---|
| | | Insert shape | Insert size | | | Number of cutting edges | |

**Insert geometry**

| | |
|---|---|
| BR | For high depth of cut chipbreaker |
| BL<br>BM | For medium depth of cut chipbreaker |
| BF | For finish cutting chipbreaker |
| NP | New petit cut |

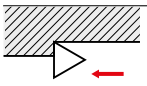
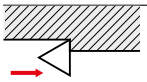
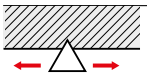
**Cutting edge preparation**

| | |
|---|---|
| FS | Continuous cutting |
| GS<br>GA<br>GH | General cutting |
| VA | For high speed, High feed cutting |
| TS<br>TA<br>TH | Interrupted cutting |

**Wiper**

| | |
|---|---|
| WS | With wiper |
| No mark | Without wiper |

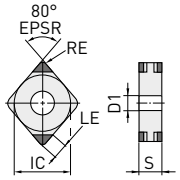
**Cutting direction***

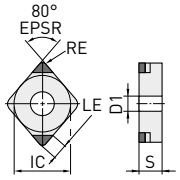
| Figure | Symbol |
|---|---|
|  | JR<br>Right |
|  | JL<br>Left |
|  | No mark<br>Neutral |

# CNGA, CNGM

## NEGATIVE INSERTS (WITH HOLE)

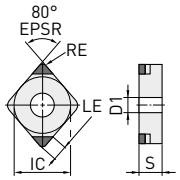
| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-CNGA120404GA4 | | ● | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GA4 | | ● | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GA4 | | ● | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GS4 | ● | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GS4 | ● | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GS4 | ● | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GH4 | ★ | ★ | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GH4 | ★ | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GH4 | ● | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404FS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408FS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412FS4 | ★ | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404VA4 | | ● | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408VA4 | | ● | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412VA4 | | ● | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404TA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408TA4 | | ● | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412TA4 | | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404TS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408TS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412TS4 | ★ | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120408TH4 | | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412TH4 | | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404FSWS4 | ● | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408FSWS4 | ● | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412FSWS4 | ● | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GAWS4 | | ● | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GAWS4 | | ● | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GAWS4 | | ● | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GSWS4 | ● | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GSWS4 | ● | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GSWS4 | ● | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120402GA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.2 | 5.16 | 1.7 | |
| NP-CNGA120404GA2 | ● | ● | | ● | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GA2 | ● | ● | | ● | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GA2 | ● | ● | | ● | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120402GS2 | ★ | | | | 2 | 12.7 | 4.76 | 0.2 | 5.16 | 1.7 | |
| NP-CNGA120404GS2 | ● | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GS2 | ● | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GS2 | ● | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GH2 | ● | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |

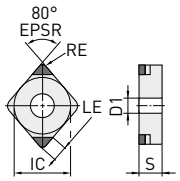


## CNGA, CNGM – NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-CNGA120402FS2 | ★ | | | | 2 | 12.7 | 4.76 | 0.2 | 5.16 | 1.7 | |
| NP-CNGA120404FS2 | ● | ● | ● | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408FS2 | ● | ● | ● | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412FS2 | ● | ● | ● | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404VA2 | | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408VA2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412VA2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404TA2 | ● | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408TA2 | ● | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412TA2 | ● | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404TS2 | ● | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408TS2 | ● | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412TS2 | ● | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120408TH2 | ● | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412TH2 | ● | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404FSWS2 | ● | | ● | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408FSWS2 | ● | | ● | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412FSWS2 | ● | | ● | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GAWS2 | | ● | | ● | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GAWS2 | | ● | | ★ | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GAWS2 | | ● | | ● | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NP-CNGA120404GSWS2 | ● | | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-CNGA120408GSWS2 | ● | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-CNGA120412GSWS2 | ● | | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| BF-CNGM120408TAWS2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BF-CNGM120412TAWS2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| BF-CNGM120404TS2 | ● | | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| BF-CNGM120408TS2 | ● | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BF-CNGM120412TS2 | ● | | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| BF-CNGM120408TSWS2 | ● | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BF-CNGM120412TSWS2 | ● | | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| NEW BL-CNGM120404TN2 | | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NEW BL-CNGM120408TN2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NEW BL-CNGM120412TN2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| BM-CNGM120404TA2 | | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| BM-CNGM120408TA2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BM-CNGM120412TA2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |
| BR-CNGM120404TA2 | | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| BR-CNGM120408TA2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BR-CNGM120412TA2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.2 | |




2/2



● / ★ = Expansion (N037)

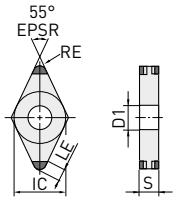


● : Inventory maintained. ★ : Inventory maintained in Japan.

# DNGA, DNGM

## NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-DNGA150404GA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408GA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412GA4 | | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604GA4 | | ● | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608GA4 | | ● | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612GA4 | | ● | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404GS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408GS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412GS4 | ★ | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604GS4 | ● | | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608GS4 | ● | | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612GS4 | ● | | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404GH4 | ★ | ★ | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408GH4 | ★ | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412GH4 | ★ | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604GH4 | ★ | ★ | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608GH4 | ★ | ★ | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612GH4 | ★ | ★ | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404FS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408FS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412FS4 | ★ | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604FS4 | ★ | | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608FS4 | ★ | | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612FS4 | ★ | | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404VA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408VA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412VA4 | | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604VA4 | | ★ | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608VA4 | | ★ | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612VA4 | | ★ | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404TA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408TA4 | | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412TA4 | | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604TA4 | | ★ | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608TA4 | | ★ | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612TA4 | | ★ | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |





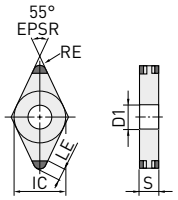

196 Vc

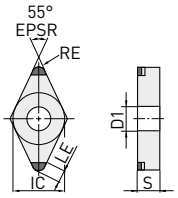
● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-DNGA150404TS4 | ★ | | | | 4 | 12.7 | 4.76 | | 5.16 | 2.1 | |
| NP-DNGA150408TS4 | ★ | | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412TS4 | ★ | | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604TS4 | ★ | | | | 4 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608TS4 | ★ | | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612TS4 | ★ | | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150408TH4 | | ★ | | | 4 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412TH4 | | ★ | | | 4 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150608TH4 | | ★ | | | 4 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612TH4 | | ★ | | | 4 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA110408GA2 | | ● | | ● | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-DNGA150402GA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.2 | 5.16 | 2.2 | |
| NP-DNGA150404GA2 | ★ | ★ | | ● | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408GA2 | ★ | ★ | | ● | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412GA2 | ★ | ★ | | ★ | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604GA2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608GA2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612GA2 | ● | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150402GS2 | ★ | | | | 2 | 12.7 | 4.76 | 0.2 | 5.16 | 2.2 | |
| NP-DNGA150404GS2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408GS2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412GS2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604GS2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608GS2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612GS2 | ● | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404GH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408GH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412GH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604GH2 | ★ | ★ | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608GH2 | ★ | ★ | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612GH2 | ★ | ★ | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150402FS2 | ★ | | ★ | | 2 | 12.7 | 4.76 | 0.2 | 5.16 | 2.2 | |
| NP-DNGA150404FS2 | ★ | ★ | ● | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408FS2 | ★ | ★ | ● | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412FS2 | ★ | ★ | ● | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604FS2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608FS2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612FS2 | ● | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404VA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408VA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412VA2 | | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604VA2 | | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608VA2 | | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612VA2 | | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |







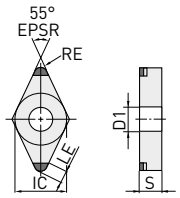

● / ★ = Expansion (N037)



● : Inventory maintained. ★ : Inventory maintained in Japan.

## DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-DNGA150404TA2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408TA2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412TA2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604TA2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608TA2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612TA2 | ● | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404TS2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150408TS2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412TS2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150604TS2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| NP-DNGA150608TS2 | ● | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612TS2 | ● | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150408TH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150412TH2 | ★ | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150608TH2 | ● | ★ | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| NP-DNGA150612TH2 | ● | ★ | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |
| NP-DNGA150404GAWS2JR | | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150404GAWS2JL | | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150408GAWS2JR | | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150408GAWS2JL | | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150604GAWS2JR | | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150604GAWS2JL | | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150608GAWS2JR | | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150608GAWS2JL | | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150404GSWS2JR | ★ | | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150404GSWS2JL | ★ | | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150408GSWS2JR | ★ | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150408GSWS2JL | ★ | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150604GSWS2JR | ● | | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150604GSWS2JL | ● | | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 1.8 | |
| NP-DNGA150608GSWS2JR | ● | | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 1.7 | |
| NP-DNGA150608GSWS2JL | ● | | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 1.7 | |



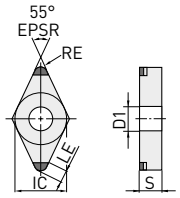



● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## DNGA, DNGM – NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BF-DNGM150408TAWS2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.4 | |
| BF-DNGM150412TAWS2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.6 | |
| BF-DNGM150404TS2 | ★ | | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| BF-DNGM150408TS2 | ★ | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BF-DNGM150412TS2 | ★ | | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| BF-DNGM150408TSWS2 | ★ | | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.4 | |
| BF-DNGM150412TSWS2 | ★ | | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.6 | |
| NEW BL-DNGM150404TN2 | | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| NEW BL-DNGM150408TN2 | | ● | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NEW BL-DNGM150412TN2 | | ● | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| BM-DNGM150404TA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| BM-DNGM150408TA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BM-DNGM150412TA2 | | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| BR-DNGM150404TA2 | | ● | | | 2 | 12.7 | 4.76 | 0.4 | 5.16 | 2.1 | |
| BR-DNGM150408TA2 | | ★ | | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| BR-DNGM150412TA2 | | ★ | | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 1.8 | |
| BR-DNGM150604TA2 | | ● | | | 2 | 12.7 | 6.35 | 0.4 | 5.16 | 2.1 | |
| BR-DNGM150608TA2 | | ● | | | 2 | 12.7 | 6.35 | 0.8 | 5.16 | 2.0 | |
| BR-DNGM150612TA2 | | ● | | | 2 | 12.7 | 6.35 | 1.2 | 5.16 | 1.8 | |

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196 Vc

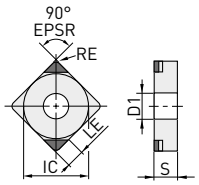
● / ★ = Expansion (N037)



● : Inventory maintained. ★ : Inventory maintained in Japan.

# SNGA

## NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW | MB8210 | NEW | MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-SNGA120408GA2 | | ● | | | ★ | | 2 | 12.7 | 4.76 | 0.8 | 5.16 | 2.2 |  |
| NP-SNGA120412GA2 | | ★ | | | ● | | 2 | 12.7 | 4.76 | 1.2 | 5.16 | 2.5 | |



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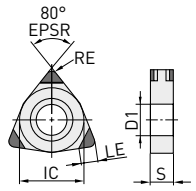
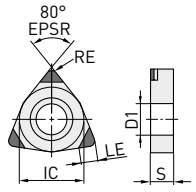
# WNGA

## NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW | MB8210 | NEW | MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-WNGA080408GS6 | ● | | | | | | 6 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 |  |
| NP-WNGA080408FS6 | ★ | | | | | | 6 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-WNGA080408TS6 | ★ | | | | | | 6 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-WNGA080408GA3 | | ★ | | | | | 3 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 |  |
| NP-WNGA080408GS3 | ★ | | | | | | 3 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-WNGA080408FS3 | ★ | | | | | | 3 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-WNGA080408TA3 | | ★ | | | | | 3 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-WNGA080408TS3 | ★ | | | | | | 3 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |
| NP-WNGA080408GSWS3 | ● | | | | | | 3 | 12.7 | 4.76 | 0.8 | 5.16 | 2.0 | |



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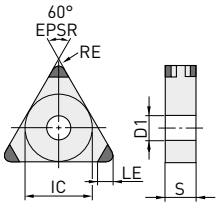
● / ★ = Expansion (N037)

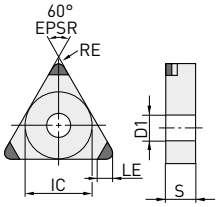
● : Inventory maintained. ★ : Inventory maintained in Japan.

# TNGA, TNGM

## NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-TNGA160404GA6 | | ● | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408GA6 | | ● | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412GA6 | | ● | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404GS6 | ● | | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408GS6 | ● | | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412GS6 | ● | | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404GH6 | | ★ | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408GH6 | | ★ | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412GH6 | | ★ | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404FS6 | ★ | | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408FS6 | ★ | | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412FS6 | ★ | | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404VA6 | | ★ | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408VA6 | | ★ | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412VA6 | | ★ | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404TA6 | | ★ | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408TA6 | | ★ | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412TA6 | | ★ | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404TS6 | ★ | | | | 6 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408TS6 | ★ | | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412TS6 | ★ | | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160408TH6 | | ★ | | | 6 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412TH6 | | ★ | | | 6 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160402GA3 | | ★ | | | 3 | 9.525 | 4.76 | 0.2 | 3.81 | 1.5 | |
| NP-TNGA160404GA3 | | ● | | ★ | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408GA3 | | ● | | ● | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412GA3 | | ★ | | ● | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160402GS3 | ★ | | | | 3 | 9.525 | 4.76 | 0.2 | 3.81 | 1.5 | |
| NP-TNGA160404GS3 | ★ | | | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408GS3 | ★ | | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412GS3 | ★ | | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404GH3 | | ★ | | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408GH3 | | ★ | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412GH3 | | ★ | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160402FS3 | ★ | | | | 3 | 9.525 | 4.76 | 0.2 | 3.81 | 1.5 | |
| NP-TNGA160404FS3 | ● | | ● | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408FS3 | ● | | ● | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412FS3 | ● | | ● | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |





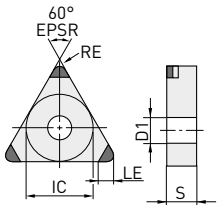

● / ★ = Expansion (N037)



● : Inventory maintained. ★ : Inventory maintained in Japan.

## TNGA, TNGM – NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-TNGA160404VA3 | | ★ | | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408VA3 | | ● | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412VA3 | | ★ | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404TA3 | | ● | | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408TA3 | | ● | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412TA3 | | ● | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160404TS3 | ● | | | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NP-TNGA160408TS3 | ● | | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412TS3 | ● | | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NP-TNGA160408TH3 | | ★ | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NP-TNGA160412TH3 | | ★ | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |
| NEW BL-TNGM160404TN3 | | ★ | | | 3 | 9.525 | 4.76 | 0.4 | 3.81 | 1.6 | |
| NEW BL-TNGM160408TN3 | | ★ | | | 3 | 9.525 | 4.76 | 0.8 | 3.81 | 1.7 | |
| NEW BL-TNGM160412TN3 | | ★ | | | 3 | 9.525 | 4.76 | 1.2 | 3.81 | 1.9 | |





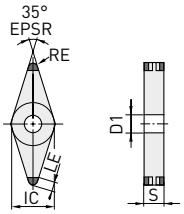

● / ★ = Expansion (N037)

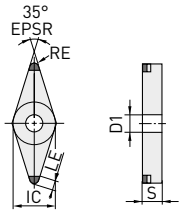
● : Inventory maintained. ★ : Inventory maintained in Japan.

# VNGA, VNGM

## NEGATIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-VNGA160404GA4 | | ● | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408GA4 | | ● | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160412GA4 | | ● | | | 4 | 9.525 | 4.76 | 1.2 | 3.81 | 1.5 | |
| NP-VNGA160404GS4 | ★ | | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408GS4 | ● | | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160412GS4 | ★ | | | | 4 | 9.525 | 4.76 | 1.2 | 3.81 | 1.5 | |
| NP-VNGA160404GH4 | | ★ | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408GH4 | | ★ | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404FS4 | ★ | | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408FS4 | ★ | | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404VA4 | | ★ | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408VA4 | | ★ | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160412VA4 | | ★ | | | 4 | 9.525 | 4.76 | 1.2 | 3.81 | 1.5 | |
| NP-VNGA160404TA4 | | ★ | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408TA4 | | ★ | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404TS4 | ★ | | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408TS4 | ★ | | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404TH4 | | ★ | | | 4 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408TH4 | | ★ | | | 4 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160402GA2 | | ● | | | 2 | 9.525 | 4.76 | 0.2 | 3.81 | 2.5 | |
| NP-VNGA160404GA2 | | ● | | ● | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408GA2 | | ● | | ● | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160412GA2 | | ★ | | ★ | 2 | 9.525 | 4.76 | 1.2 | 3.81 | 1.5 | |
| NP-VNGA160402GS2 | ★ | | | | 2 | 9.525 | 4.76 | 0.2 | 3.81 | 2.5 | |
| NP-VNGA160404GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160412GS2 | ★ | | | | 2 | 9.525 | 4.76 | 1.2 | 3.81 | 1.5 | |
| NP-VNGA160404GH2 | | ★ | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408GH2 | | ★ | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160402FS2 | ★ | | ● | | 2 | 9.525 | 4.76 | 0.2 | 3.81 | 2.5 | |
| NP-VNGA160404FS2 | ★ | | ● | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408FS2 | ★ | | ● | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404VA2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408VA2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160412VA2 | | ★ | | | 2 | 9.525 | 4.76 | 1.2 | 3.81 | 1.5 | |
| NP-VNGA160404TA2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408TA2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404TS2 | ★ | | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408TS2 | ★ | | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NP-VNGA160404TH2 | | ★ | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NP-VNGA160408TH2 | | ★ | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |
| NEW BL-VNGM160404TN2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 3.81 | 2.5 | |
| NEW BL-VNGM160408TN2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 3.81 | 2.0 | |

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● / ★ = Expansion (N037)

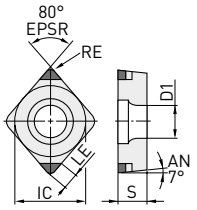


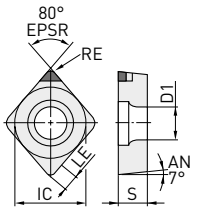
● : Inventory maintained. ★ : Inventory maintained in Japan.

# CCGW 7°, CCGT 7°, CPGB 11°

## POSITIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-CCGW060202GA2 | | ● | | | 2 | 6.35 | 2.38 | 0.2 | 2.8 | 1.7 | |
| NP-CCGW060204GA2 | | ● | | ● | 2 | 6.35 | 2.38 | 0.4 | 2.8 | 1.8 | |
| NP-CCGW060208GA2 | | ● | | ● | 2 | 6.35 | 2.38 | 0.8 | 2.8 | 2.0 | |
| NP-CCGW09T302GA2 | | ● | | | 2 | 9.525 | 3.97 | 0.2 | 4.4 | 1.7 | |
| NP-CCGW09T304GA2 | ● | ● | | ● | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308GA2 | ● | ● | | ● | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW060202GS2 | ★ | | | | 2 | 6.35 | 2.38 | 0.2 | 2.8 | 1.7 | |
| NP-CCGW060204GS2 | ● | | | | 2 | 6.35 | 2.38 | 0.4 | 2.8 | 1.8 | |
| NP-CCGW060208GS2 | ● | | | | 2 | 6.35 | 2.38 | 0.8 | 2.8 | 2.0 | |
| NP-CCGW09T302GS2 | ★ | | | | 2 | 9.525 | 3.97 | 0.2 | 4.4 | 1.7 | |
| NP-CCGW09T304GS2 | ● | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308GS2 | ● | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW060202FS2 | ● | | ● | | 2 | 6.35 | 2.38 | 0.2 | 2.8 | 1.7 | |
| NP-CCGW060204FS2 | ● | | ● | | 2 | 6.35 | 2.38 | 0.4 | 2.8 | 1.8 | |
| NP-CCGW060208FS2 | ● | | ● | | 2 | 6.35 | 2.38 | 0.8 | 2.8 | 2.0 | |
| NP-CCGW09T302FS2 | ● | | ● | | 2 | 9.525 | 3.97 | 0.2 | 4.4 | 1.7 | |
| NP-CCGW09T304FS2 | ● | ● | ● | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308FS2 | ● | ● | ● | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW09T304VA2 | | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308VA2 | | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW09T304TA2 | ● | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308TA2 | ● | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW09T304FSWS2 | ● | | ● | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308FSWS2 | ● | | ● | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW09T304GAWS2 | | ● | | ● | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308GAWS2 | | ● | | ● | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW09T304GSWS2 | ● | | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NP-CCGW09T308GSWS2 | ● | | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| BF-CCGT09T304TS2 | ● | | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| BF-CCGT09T308TS2 | ● | | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NEW BL-CCGT09T304TN2 | | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| NEW BL-CCGT09T308TN2 | | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| BM-CCGT09T304TA2 | | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 1.8 | |
| BM-CCGT09T308TA2 | | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-CCGW03S102FS | ● | | ● | | 1 | 3.57* | 1.39 | 0.2 | 2.0 | 1.1 | |
| NP-CCGW03S104FS | ● | | ● | | 1 | 3.57* | 1.39 | 0.4 | 2.0 | 1.0 | |
| NP-CCGW04T002FS | ● | | ● | | 1 | 4.37* | 1.79 | 0.2 | 2.4 | 1.5 | |
| NP-CCGW04T004FS | ● | | ● | | 1 | 4.37* | 1.79 | 0.4 | 2.4 | 1.4 | |



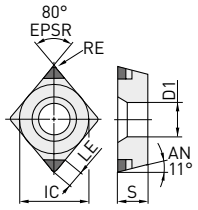



● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

## CCGW 7°, CCGT 7°, CPGB 11° – POSITIVE INSERTS (WITH HOLE)

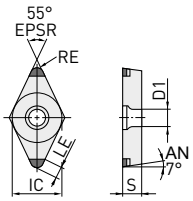
| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-CPGB080204GA2 | | ● | | | 2 | 7.94 | 2.38 | 0.4 | 3.5 | 1.8 | |
| NP-CPGB080208GA2 | | ● | | | 2 | 7.94 | 2.38 | 0.8 | 3.5 | 2.0 | |
| NP-CPGB080212GA2 | | ★ | | | 2 | 7.94 | 2.38 | 1.2 | 3.5 | 2.2 | |
| NP-CPGB090302GA2 | | ★ | | | 2 | 9.525 | 3.18 | 0.2 | 4.5 | 1.7 | |
| NP-CPGB090304GA2 | | ● | | | 2 | 9.525 | 3.18 | 0.4 | 4.5 | 1.8 | |
| NP-CPGB090308GA2 | | ● | | | 2 | 9.525 | 3.18 | 0.8 | 4.5 | 2.0 | |
| NP-CPGB090312GA2 | | ★ | | | 2 | 9.525 | 3.18 | 1.2 | 4.5 | 2.2 | |
| NP-CPGB080204GS2 | ★ | | | | 2 | 7.94 | 2.38 | 0.4 | 3.5 | 1.8 | |
| NP-CPGB080208GS2 | ★ | | | | 2 | 7.94 | 2.38 | 0.8 | 3.5 | 2.0 | |
| NP-CPGB090302GS2 | ★ | | | | 2 | 9.525 | 3.18 | 0.2 | 4.5 | 1.7 | |
| NP-CPGB090304GS2 | ★ | | | | 2 | 9.525 | 3.18 | 0.4 | 4.5 | 1.8 | |
| NP-CPGB090308GS2 | ★ | | | | 2 | 9.525 | 3.18 | 0.8 | 4.5 | 2.0 | |
| NP-CPGB090304VA2 | | ● | | | 2 | 9.525 | 3.18 | 0.4 | 4.5 | 1.8 | |
| NP-CPGB090308VA2 | | ● | | | 2 | 9.525 | 3.18 | 0.8 | 4.5 | 2.0 | |
| NP-CPGB090312VA2 | | ★ | | | 2 | 9.525 | 3.18 | 1.2 | 4.5 | 2.2 | |
| NP-CPGB090304TA2 | | ★ | | | 2 | 9.525 | 3.18 | 0.4 | 4.5 | 1.8 | |
| NP-CPGB090308TA2 | | ★ | | | 2 | 9.525 | 3.18 | 0.8 | 4.5 | 2.0 | |
| NP-CPGB090312TA2 | | ★ | | | 2 | 9.525 | 3.18 | 1.2 | 4.5 | 2.2 | |



# DCGW 7°, DCGT 7°

## POSITIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-DCGW070202GA2 | | ● | | | 2 | 6.35 | 2.38 | 0.2 | 2.8 | 2.2 | |
| NP-DCGW070204GA2 | | ● | | ● | 2 | 6.35 | 2.38 | 0.4 | 2.8 | 2.1 | |
| NP-DCGW070208GA2 | | ★ | | | 2 | 6.35 | 2.38 | 0.8 | 2.8 | 2.0 | |
| NP-DCGW11T302GA2 | | ● | | | 2 | 9.525 | 3.97 | 0.2 | 4.4 | 2.2 | |
| NP-DCGW11T304GA2 | ● | ● | | ● | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| NP-DCGW11T308GA2 | ● | ● | | ● | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-DCGW070202GS2 | ● | | | | 2 | 6.35 | 2.38 | 0.2 | 2.8 | 2.2 | |
| NP-DCGW070204GS2 | ● | | | | 2 | 6.35 | 2.38 | 0.4 | 2.8 | 2.1 | |
| NP-DCGW070208GS2 | ● | | | | 2 | 6.35 | 2.38 | 0.8 | 2.8 | 2.0 | |
| NP-DCGW11T302GS2 | ● | | | | 2 | 9.525 | 3.97 | 0.2 | 4.4 | 2.2 | |
| NP-DCGW11T304GS2 | ● | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| NP-DCGW11T308GS2 | ● | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-DCGW070202FS2 | ● | | ● | | 2 | 6.35 | 2.38 | 0.2 | 2.8 | 2.2 | |
| NP-DCGW070204FS2 | ● | | ● | | 2 | 6.35 | 2.38 | 0.4 | 2.8 | 2.1 | |
| NP-DCGW070208FS2 | ★ | | ● | | 2 | 6.35 | 2.38 | 0.8 | 2.8 | 2.0 | |
| NP-DCGW11T302FS2 | ● | | ● | | 2 | 9.525 | 3.97 | 0.2 | 4.4 | 2.2 | |
| NP-DCGW11T304FS2 | ● | ● | ● | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| NP-DCGW11T308FS2 | ● | ● | ● | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-DCGW11T304VA2 | | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| NP-DCGW11T308VA2 | | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NP-DCGW11T304TA2 | ● | ★ | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| NP-DCGW11T308TA2 | ● | ★ | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| BF-DCGT11T304TS2 | ● | | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| BF-DCGT11T308TS2 | ● | | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| NEW BL-DCGT11T304TN2 | | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| NEW BL-DCGT11T308TN2 | | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |
| BM-DCGT11T304TA2 | | ● | | | 2 | 9.525 | 3.97 | 0.4 | 4.4 | 2.1 | |
| BM-DCGT11T308TA2 | | ● | | | 2 | 9.525 | 3.97 | 0.8 | 4.4 | 2.0 | |




1/1

196 Vc

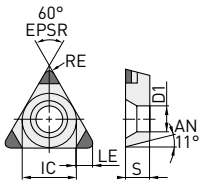
● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# TPGB 11°

## POSITIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-TPGB090204GA3 | | ★ | | ● | 3 | 5.56 | 2.38 | 0.4 | 2.9 | 1.6 | |
| NP-TPGB090208GA3 | | ★ | | ★ | 3 | 5.56 | 2.38 | 0.8 | 2.9 | 1.7 | |
| NP-TPGB110302GA3 | | ★ | | | 3 | 6.35 | 3.18 | 0.2 | 3.4 | 1.5 | |
| NP-TPGB110304GA3 | | ● | | ● | 3 | 6.35 | 3.18 | 0.4 | 3.4 | 1.6 | |
| NP-TPGB110308GA3 | | ● | | ★ | 3 | 6.35 | 3.18 | 0.8 | 3.4 | 1.7 | |
| NP-TPGB160304GA3 | | ● | | ★ | 3 | 9.525 | 3.18 | 0.4 | 4.4 | 1.6 | |
| NP-TPGB160308GA3 | | ● | | ★ | 3 | 9.525 | 3.18 | 0.8 | 4.4 | 1.7 | |
| NP-TPGB080204GS3 | ★ | | | | 3 | 4.76 | 2.38 | 0.4 | 2.4 | 1.6 | |
| NP-TPGB080208GS3 | ★ | | | | 3 | 4.76 | 2.38 | 0.8 | 2.4 | 1.7 | |
| NP-TPGB090204GS3 | ★ | | | | 3 | 5.56 | 2.38 | 0.4 | 2.9 | 1.6 | |
| NP-TPGB090208GS3 | ★ | | | | 3 | 5.56 | 2.38 | 0.8 | 2.9 | 1.7 | |
| NP-TPGB110302GS3 | ★ | | | | 3 | 6.35 | 3.18 | 0.2 | 3.4 | 1.5 | |
| NP-TPGB110304GS3 | ★ | | | | 3 | 6.35 | 3.18 | 0.4 | 3.4 | 1.6 | |
| NP-TPGB110308GS3 | ★ | | | | 3 | 6.35 | 3.18 | 0.8 | 3.4 | 1.7 | |
| NP-TPGB160304GS3 | ★ | | | | 3 | 9.525 | 3.18 | 0.4 | 4.4 | 1.6 | |
| NP-TPGB160308GS3 | ★ | | | | 3 | 9.525 | 3.18 | 0.8 | 4.4 | 1.7 | |
| NP-TPGB110302FS3 | ★ | | ★ | | 3 | 6.35 | 3.18 | 0.2 | 3.4 | 1.5 | |
| NP-TPGB110304FS3 | ★ | | ● | | 3 | 6.35 | 3.18 | 0.4 | 3.4 | 1.6 | |
| NP-TPGB110308FS3 | ★ | | ● | | 3 | 6.35 | 3.18 | 0.8 | 3.4 | 1.7 | |
| NP-TPGB110304VA3 | | ● | | | 3 | 6.35 | 3.18 | 0.4 | 3.4 | 1.6 | |
| NP-TPGB110308VA3 | | ● | | | 3 | 6.35 | 3.18 | 0.8 | 3.4 | 1.7 | |
| NP-TPGB110304TA3 | | ★ | | | 3 | 6.35 | 3.18 | 0.4 | 3.4 | 1.6 | |
| NP-TPGB110308TA3 | | ★ | | | 3 | 6.35 | 3.18 | 0.8 | 3.4 | 1.7 | |




1/1

196 Vc

● / ★ = Expansion (N037)

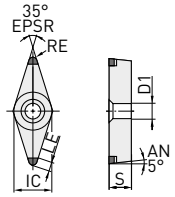


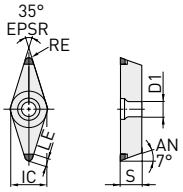
● : Inventory maintained. ★ : Inventory maintained in Japan.

# VBGW 5°, VBGT 5°, VCGW 7°

## POSITIVE INSERTS (WITH HOLE)

| Order number | BC8210 | BC8220 | NEW MB8210 | NEW MB8220 | ZEFF | IC | S | RE | D1 | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NP-VBGW110302GA2 | | ● | | | 2 | 6.35 | 3.18 | 0.2 | 2.85 | 2.5 | |
| NP-VBGW110304GA2 | | ● | | ★ | 2 | 6.35 | 3.18 | 0.4 | 2.85 | 2.5 | |
| NP-VBGW110308GA2 | | ★ | | ★ | 2 | 6.35 | 3.18 | 0.8 | 2.85 | 2.0 | |
| NP-VBGW160402GA2 | | ★ | | | 2 | 9.525 | 4.76 | 0.2 | 4.43 | 2.5 | |
| NP-VBGW160404GA2 | | ● | | ● | 2 | 9.525 | 4.76 | 0.4 | 4.43 | 2.5 | |
| NP-VBGW160408GA2 | | ● | | ● | 2 | 9.525 | 4.76 | 0.8 | 4.43 | 2.0 | |
| NP-VBGW110302GS2 | ★ | | | | 2 | 6.35 | 3.18 | 0.2 | 2.85 | 2.5 | |
| NP-VBGW110304GS2 | ★ | | | | 2 | 6.35 | 3.18 | 0.4 | 2.85 | 2.5 | |
| NP-VBGW110308GS2 | ★ | | | | 2 | 6.35 | 3.18 | 0.8 | 2.85 | 2.0 | |
| NP-VBGW160402GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.2 | 4.43 | 2.5 | |
| NP-VBGW160404GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.4 | 4.43 | 2.5 | |
| NP-VBGW160408GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.8 | 4.43 | 2.0 | |
| NP-VBGW110302FS2 | ● | | ● | | 2 | 6.35 | 3.18 | 0.2 | 2.85 | 2.5 | |
| NP-VBGW110304FS2 | ★ | | ● | | 2 | 6.35 | 3.18 | 0.4 | 2.85 | 2.5 | |
| NP-VBGW110308FS2 | ★ | | ● | | 2 | 6.35 | 3.18 | 0.8 | 2.85 | 2.0 | |
| NP-VBGW160402FS2 | ★ | | ● | | 2 | 9.525 | 4.76 | 0.2 | 4.43 | 2.5 | |
| NEW NP-VBGW160404FS2 | | | ● | | 2 | 9.525 | 4.76 | 0.4 | 4.43 | 2.5 | |
| NEW NP-VBGW160408FS2 | | | ● | | 2 | 9.525 | 4.76 | 0.8 | 4.43 | 2.0 | |
| NP-VBGW160404VA2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 4.43 | 2.5 | |
| NP-VBGW160408VA2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 4.43 | 2.0 | |
| NP-VBGW160404TA2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 4.43 | 2.5 | |
| NP-VBGW160408TA2 | | ★ | | | 2 | 9.525 | 4.76 | 0.8 | 4.43 | 2.0 | |
| NEW BL-VBGT110304TN2 | | ● | | | 2 | 6.35 | 3.18 | 0.4 | 2.85 | 2.5 | |
| NEW BL-VBGT110304TN2 | | ● | | | 2 | 6.35 | 3.18 | 0.8 | 2.85 | 2.0 | |
| NEW BL-VBGT160404TN2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 4.43 | 2.5 | |
| NEW BL-VBGT160408TN2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 4.43 | 2.0 | |
| NP-VCGW160404GA2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 4.4 | 2.5 | |
| NP-VCGW160408GA2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 4.4 | 2.0 | |
| NP-VCGW160404GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.4 | 4.4 | 2.5 | |
| NP-VCGW160408GS2 | ● | | | | 2 | 9.525 | 4.76 | 0.8 | 4.4 | 2.0 | |
| NP-VCGW160404VA2 | | ● | | | 2 | 9.525 | 4.76 | 0.4 | 4.4 | 2.5 | |
| NP-VCGW160408VA2 | | ● | | | 2 | 9.525 | 4.76 | 0.8 | 4.4 | 2.0 | |
| NP-VCGW160404TA2 | | ★ | | | 2 | 9.525 | 4.76 | 0.4 | 4.4 | 2.5 | |
| NP-VCGW160408TA2 | | ★ | | | 2 | 9.525 | 4.76 | 0.8 | 4.4 | 2.0 | |




1/1

196 Vc

● / ★ = Expansion (N037)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# BC8200 / MB8200 SERIES

## RECOMMENDED CUTTING CONDITIONS

| | Material | Grade | Cutting mode | Vc | f | ap | Coolant |
|---|---|---|---|---|---|---|---|
| H | Hardened steels | BC8210 | Continuous cutting | 150 – 250 (90 – 300) | ≤0.2 | ≤0.35 | Dry, wet |
| | | | Light interrupted cutting | 100 – 180 (50 – 200) | ≤0.2 | ≤0.35 | |
| | | BC8220 | Continuous cutting | 150 – 200 (80 – 250) | ≤0.2 | ≤0.5 | |
| | | | Light to medium interrupted cutting | 100 – 180 (50 – 200) | ≤0.2 | ≤0.3 | |

1/1

NEW

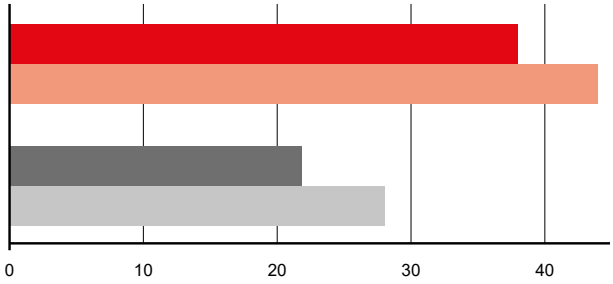
# MB8200 SERIES

## CUTTING PERFORMANCE

### COMPARISON OF CONTINUOUS CUTTING : SCR420 (60HRC)

MB8210 achieves stable machining during continuous cutting.

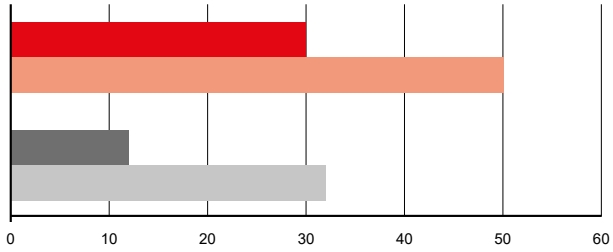
| | |
|---|---|
| Material | 20Cr4 (60HRC) |
| Insert | CNGA120408 |
| Vc (m/min) | 180 |
| f (mm/rev) | 0.15 |
| ap (mm) | 0.2 |
| Cutting mode | Dry cutting |




### COMPARISON OF LIGHT INTERRUPTED CUTTING : SCR420 (60HRC)

MB8220 achieves stable cutting and is ideal for light interrupted cutting.

| | |
|---|---|
| Material | 20Cr4 (60HRC) |
| Insert | CNGA120408 |
| Vc (m/min) | 130 |
| f (mm/rev) | 0.15 |
| ap (mm) | 0.2 |
| Cutting mode | Dry cutting |




## RECOMMENDED CUTTING CONDITIONS

| | Material | Grade | Cutting mode | Vc | f | ap | Coolant |
|---|---|---|---|---|---|---|---|
| H | Hardened steels (Heat treated steels) | **MB8210** | External continuous cutting | | –0.20 | –0.30 | Dry, wet |
| | | **MB8220** | External interrupted cutting | | –0.20 | –0.50 | |

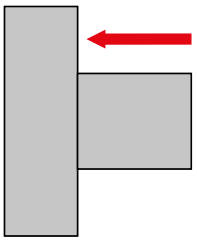
50 100 150 200 250

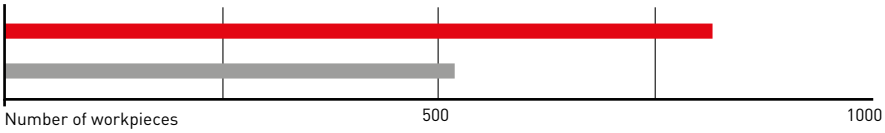
■ : Mitsubishi Materials tool ■ ■ : Conventional tool

# BC8200 SERIES

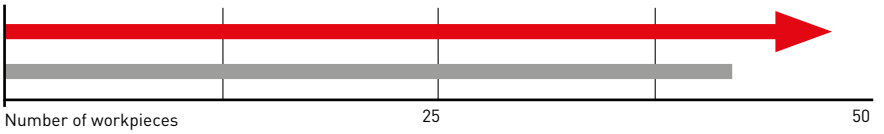
## APPLICATION EXAMPLES

| | |
|---|---|
| Insert | NP-CNGA120412GSWS2 BC8210 |
| Material | Non-micro alloyed Steel |
| Cutting mode | External continuous cutting |
| Vc (m/min) | 260 |
| f (mm/rev) | 0.20 |
| ap (mm) | 0.15 |
| Cutting mode | Dry cutting |
| Result | During continuous cutting, it was possible to maintain a good surface roughness and achieve a tool life of 1.6 x or more when compared to conventional products. |

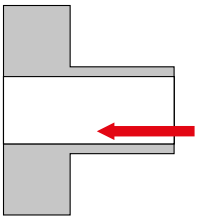


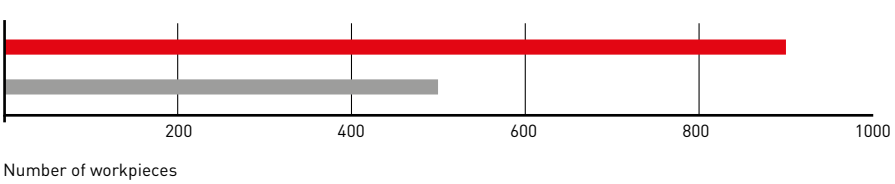



| | |
|---|---|
| Insert | NP-DCGW11T304GS2 BC8210 |
| Material | DIN 16MnCr5 |
| Cutting mode | Internal continuous cutting |
| Vc (m/min) | 240 |
| f (mm/rev) | 0.08 |
| ap (mm) | 0.20 |
| Cutting mode | Dry cutting |
| Result | The same tool life as continuous cutting was achieved. Good surface roughness compared to conventional products was also maintained. |




| | |
|---|---|
| Insert | NP-CCGW09T308GS2 BC8210 |
| Material | DIN 16MnCr5 |
| Component | Automobile parts |
| Cutting mode | Internal continuous cutting |
| Vc (m/min) | 140 |
| f (mm/rev) | 0.07 |
| ap (mm) | 0.10 |
| Cutting mode | Dry cutting |
| Result | By significantly suppressing the deterioration of the surface of the insert, tool life was extended during continuous cutting to 1.8 x longer than that of conventional products. |





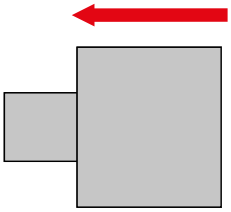



■ : Mitsubishi Materials tool ■ : Conventional tool

# BC8200 SERIES

## APPLICATION EXAMPLES

| | |
|---|---|
| Insert | NP-DNGA110416GA2 BC8220 |
| Material | DIN Cf53 (58HRC) |
| Component | Automobile parts |
| Cutting mode | External continuous cutting |
| Vc (m/min) | 140 |
| f (mm/rev) | 0.15 |
| ap (mm) | 0.15 |
| Cutting mode | Dry cutting |

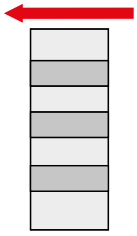


Result

Tool life for continuous cutting is 1.2 x longer than that of conventional products.

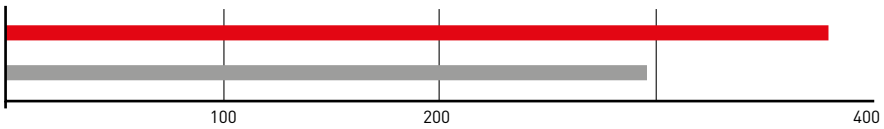
Number of workpieces

| | |
|---|---|
| Insert | NP-TNGA160420TA3 BC8220 |
| Material | DIN 16MnCr5 |
| Cutting mode | Heavy interrupted boring |
| Vc (m/min) | 130 |
| f (mm/rev) | 0.12 |
| ap (mm) | 0.25 |
| Cutting mode | Dry cutting |



Result

BC8220 has excellent fracture resistance and a tool life 1.25 x longer than conventional products.

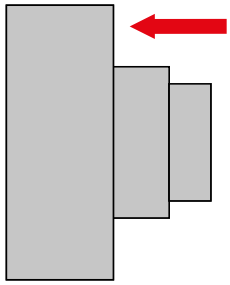



Number of workpieces

# BC8200 SERIES

## APPLICATION EXAMPLES

| | |
|---|---|
| Insert | BR-CNGM120408TA2 BC8220 |
| Material | Steel (62-64HRC) |
| Component | Gear |
| Cutting mode | External continuous cutting |
| Vc (m/min) | 150 – 170 |
| f (mm/rev) | 0.1 – 0.2 |
| ap (mm) | 0.7 |
| Cutting mode | Dry cutting |

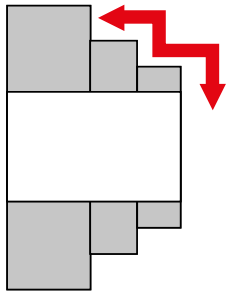


Result

While conventional products can machine up to 300 pieces, BC8220 can machine up to 450 pieces.

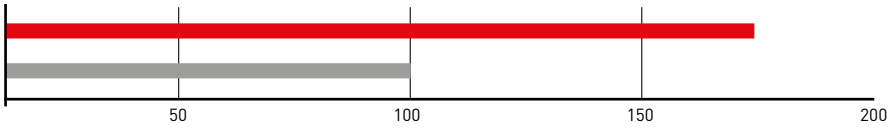
Number of workpieces

| | |
|---|---|
| Insert | BR-DNGM150408TA2 BC8220 |
| Material | SMnC420 (59-63HRC) |
| Component | Gear |
| Cutting mode | External continuous interrupted turning |
| Vc (m/min) | 180 |
| f (mm/rev) | 0.03 – 0.13 |
| ap (mm) | 1.0 – 1.1 |
| Cutting mode | Dry cutting |



Result

The BR breaker removed the required material in one pass compared to a conventional product that took 4 passes. This gave the BR breaker a tool life 1.5 x greater than the conventional product.




Number of workpieces



■ : Mitsubishi Materials tool ■ : Conventional tool

# iMX

## EXCHANGEABLE HEAD END MILLS

NEW

Interested in more...

**B200**

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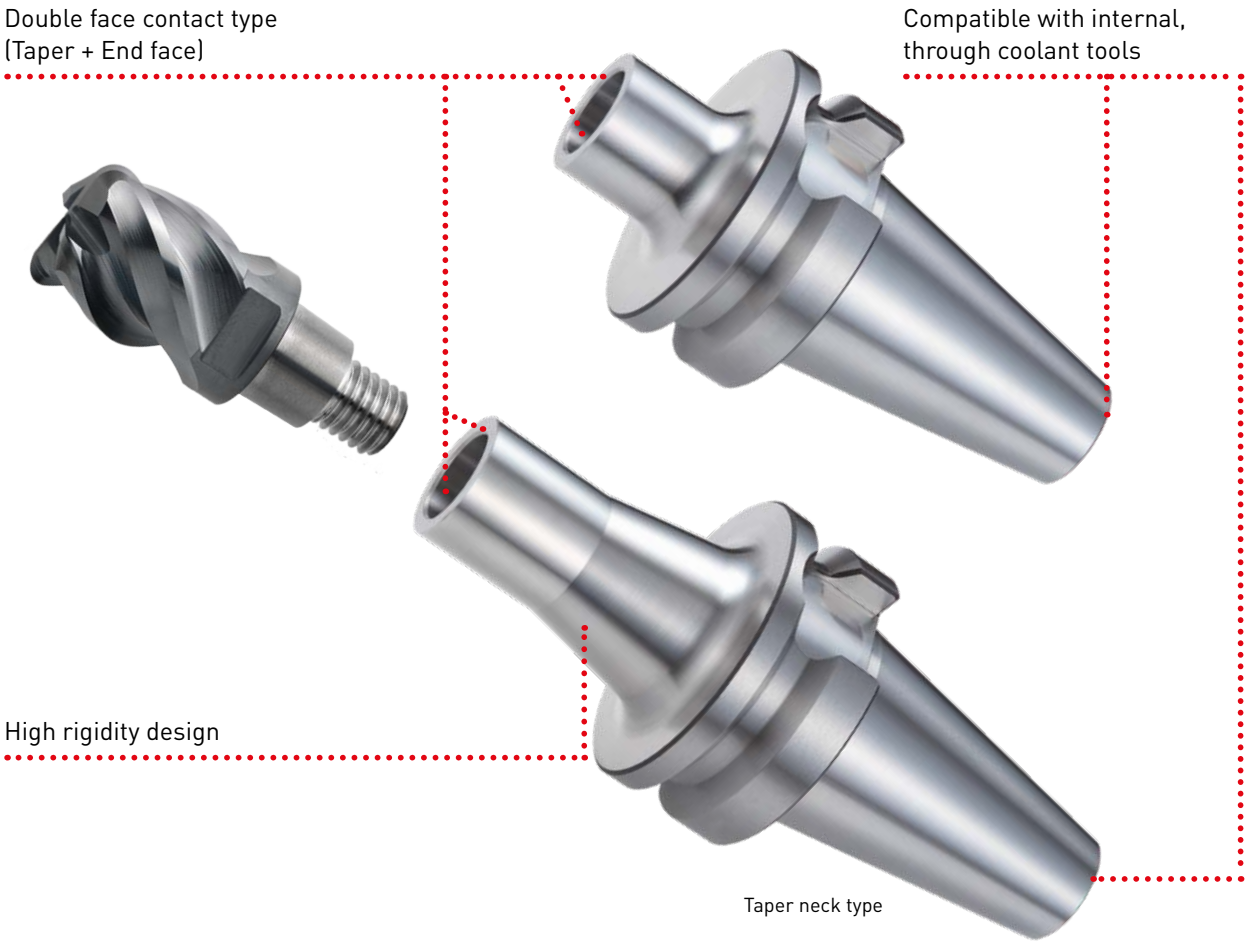
MITSUBISHI MATERIALS

# BT30 MONO-BLOCK TYPE – STEEL TOOL HOLDER

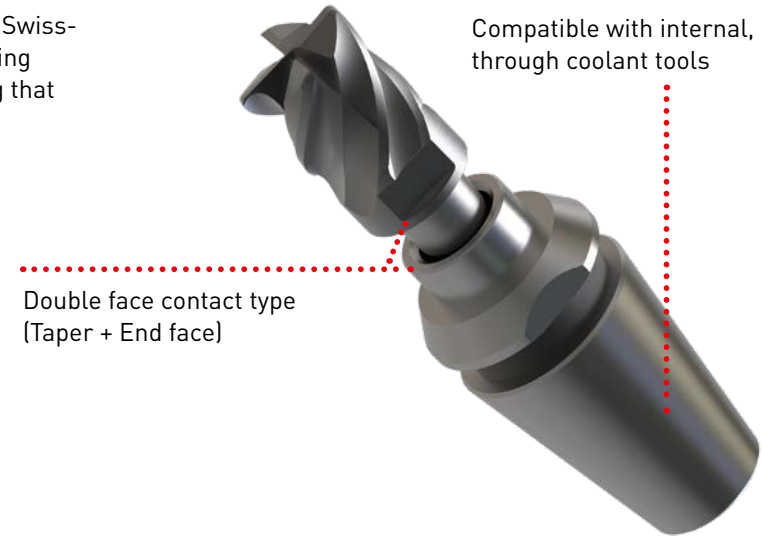
New tool holders for the iMX series. High rigidity realises high efficiency machining.




# ER COLLET

**EXCHANGEABLE HEAD END MILLS**

Ideal for quick change applications such as Swiss-type automatic lathes, multi-turret processing machines and for high-efficiency machining that requires rigid tool mounting.



NEW

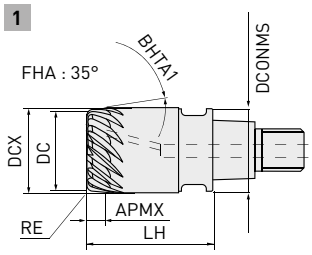
# IMX-C8T-E/C10T-E/ C12T-E/C15T-E

35°

## CORNER RADIUS HEAD, TAPER HEAD, MULTI-FLUTE, WITH COOLANT HOLES

M S

1




| RE |
|---|
| ±0.015 |

| DC<12 | DC>12 |
|---|---|
| 0<br>- 0.020 | 0<br>- 0.030 |

| Order number | EP7020 | DC | RE | APMX | DCX | LH | DCONMS | BHTA1 | ZEFP | Type |
|---|---|---|---|---|---|---|---|---|---|---|
| IMX10C8T080R10T080E | ● | 8 | 1 | 7.12 | 10 | 13 | 9.7 | 8° | 8 | |
| IMX12C10T100R10T080E | ● | 10 | 1 | 7.12 | 12 | 19 | 11.7 | 8° | 10 | |
| IMX16C15T150R10T080E | ● | 15 | 1 | 3.56 | 16 | 21 | 15.5 | 8° | 15 | 1 |
| IMX20C15T190R10T080E | ● | 19 | 1 | 3.56 | 20 | 27 | 19.5 | 8° | 15 | |
| IMX20C12T190R20T080E | ● | 19 | 2 | 3.56 | 20 | 27 | 19.5 | 8° | 12 | |

1/1

204 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

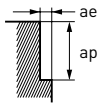
NEW

# IMX-C8T-E/C10T-E/ C12T-E/C15T-E

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | ZEFP | Vc | n | fz | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|---|
| M | Austenitic stainless steel, Ferritic and martensitic stainless steel | 8 | 8 | 300 | 12000 | 0.10 | 9600 | 0.3 | 1.2 |
| | | 10 | 10 | 300 | 9500 | 0.10 | 9500 | 0.3 | 1.5 |
| | | 15 | 15 | 300 | 6400 | 0.10 | 9600 | 0.3 | 2.2 |
| | | 19 | 12 | 300 | 5000 | 0.12 | 7200 | 0.3 | 2.8 |
| | | 19 | 15 | 300 | 5000 | 0.10 | 7500 | 0.3 | 2.8 |
| S | Heat resistant alloy | 8 | 8 | 60 | 2400 | 0.08 | 1500 | 0.3 | 0.8 |
| | | 10 | 10 | 60 | 1900 | 0.08 | 1500 | 0.3 | 1.0 |
| | | 15 | 15 | 60 | 1300 | 0.08 | 1600 | 0.3 | 1.5 |
| | | 19 | 12 | 60 | 1000 | 0.10 | 1200 | 0.3 | 1.9 |
| | | 19 | 15 | 60 | 1000 | 0.08 | 1200 | 0.3 | 1.9 |
| M | Precipitation hardening stainless steel, | 8 | 8 | 200 | 8000 | 0.10 | 6400 | 0.3 | 1.2 |
| | | 10 | 10 | 200 | 6400 | 0.10 | 6400 | 0.3 | 1.5 |
| | | 15 | 15 | 200 | 4200 | 0.10 | 6300 | 0.3 | 2.2 |
| S | Titanium alloys | 19 | 15 | 200 | 3400 | 0.12 | 4900 | 0.3 | 2.8 |
| | | 19 | 15 | 200 | 3400 | 0.10 | 5100 | 0.3 | 2.8 |




1/1

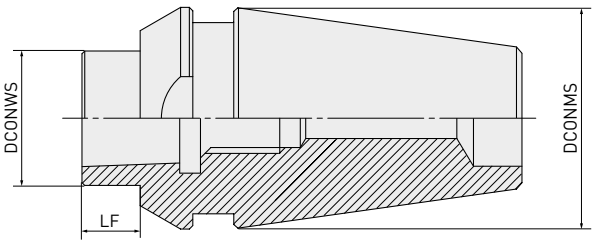
1. The use of water-soluble coolant is recommended.
2. Vibration may occur if the rigidity of the machine or workpiece is low.
   In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.

NEW

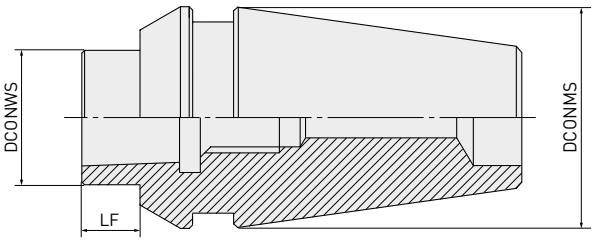
# iMX

## ER COLLET

1




2




| Order number | Stock | DCONWS | DCONMS | LF | Collet size | Suitable head | Type |
|---|---|---|---|---|---|---|---|
| IMX10-S04-ER16 | ★ | 9.7 | 16 | 4 | ER16 | IMX10 | 1 |
| IMX10-S04-ER20 | ★ | 9.7 | 20 | 4 | ER20 | IMX10 | 2 |
| IMX10-S04-ER25 | ★ | 9.7 | 25 | 4 | ER25 | IMX10 | 2 |
| IMX10-S04-ER32 | ★ | 9.7 | 32 | 4 | ER32 | IMX10 | 2 |
| IMX12-S05-ER16 | ★ | 11.7 | 16 | 5 | ER16 | IMX12 | 1 |
| IMX12-S05-ER20 | ★ | 11.7 | 20 | 5 | ER20 | IMX12 | 2 |
| IMX12-S05-ER25 | ★ | 11.7 | 25 | 5 | ER25 | IMX12 | 2 |
| IMX12-S05-ER32 | ★ | 11.7 | 32 | 5 | ER32 | IMX12 | 2 |
| IMX16-S08-ER25 | ★ | 15.5 | 25 | 8 | ER25 | IMX16 | 2 |
| IMX16-S08-ER32 | ★ | 15.5 | 32 | 8 | ER32 | IMX16 | 2 |
| IMX20-S10-ER32 | ★ | 19.5 | 32 | 10 | ER32 | IMX20 | 2 |
| IMX25-S12-ER32 | ★ | 24.5 | 32 | 12.5 | ER32 | IMX25 | 2 |



1. The fastening size of the holder and the head should be the same.
2. Please use a special wrench that matches the fastening size. This part is sold separately.
3. The depth of cut should be 50 – 60% of the recommended conditions for each head.

# VQ SERIES

## LATEST TECHNOLOGY, HIGH PERFORMANCE END MILLS FOR STAINLESS AND DIFFICULT-TO-CUT MATERIALS

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NEW

# VQ3XL/VQ4XL/VQ4XLRB/VQ2XLB

## END MILL, MULTI-FLUTE, LONG NECK

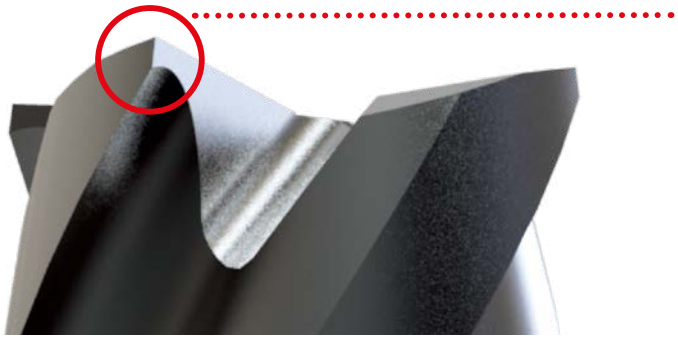
### MULTI-FLUTE

3 and 4-flute types provide more efficient machining than 2-flute types.

### HIGH RIGIDITY LONG NECK

The optimised long neck shape maintains rigidity while avoiding interference with the workpiece, enabling stable machining.

### VQ3XL/VQ4XL SQUARE



### MICRO GASH LAND

Suppresses chipping by increasing the strength of the corners of the tool.

### VQ4XLRB CORNER RADIUS

### END CUTTING EDGE CHIP POCKET

The geometry of the end cutting edge chip pocket has been optimised. For items with a large RE, the chip pocket is also increased in size, which provides excellent chip evacuation and reduces chip clogging.

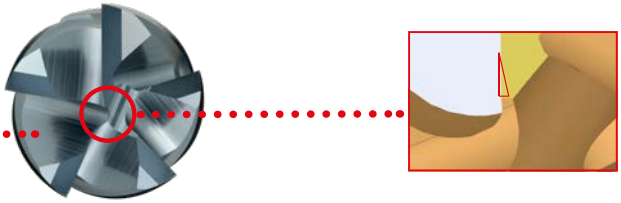
NEW

# VQLCS / VQELCS / VQJCSRB / VQLCSRB / VQELCSRB

## END MILL WITH IRREGULAR PITCH FLUTES AND CHIPBREAKER GEOMETRY

**UNIQUE END CUTTING EDGE GEOMETRY**

The unique end cutting edge geometry achieves high chipping resistance.



**IRREGULAR PITCH FLUTES AND MICRO CLEARANCE ANGLE OF THE PERIPHERAL CUTTING EDGE**

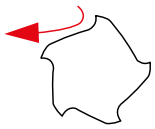
Due to its excellent vibration damping properties, chatter and vibration are suppressed making stable machining possible.

**CHIPBREAKER FUNCTION**

Prevents chip problems by combining great chip breaking capabilities and fracture resistance.

**CHIP POCKET GEOMETRY FOR HIGH EFFICIENCY MACHINING**

The rigid cross-sectional geometry with excellent chip evacuation properties is ideal for high efficiency machining such as trochoidal milling.



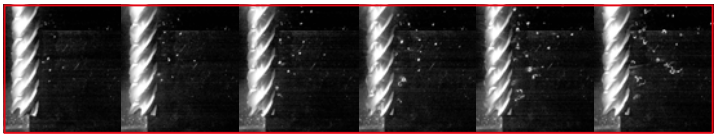
Ideal chip pocket geometry

# VQJCS / VQLCS

## CHIPBREAKER FUNCTION: HIGH-SPEED CAMERA COMPARISON

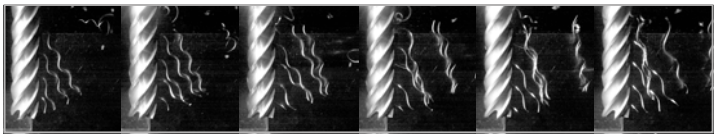
The excellent chip breaking properties reduces chip clogging and removes chips efficiently while also reducing the chips collecting together on the machine.

**VQLCS**



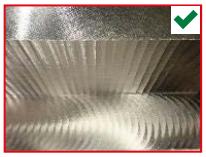
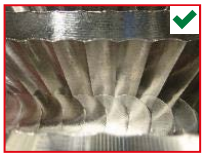
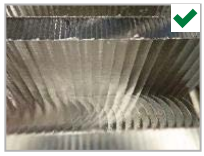
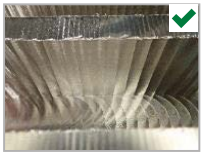
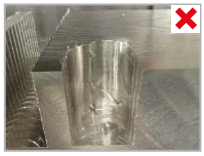
After machining with VQLCS

Without breaker



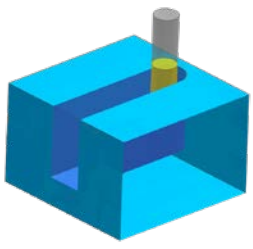
After machining with conventional

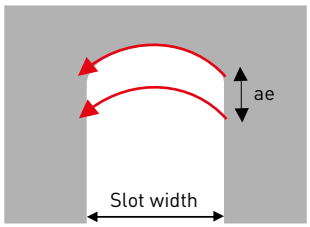
### EVALUATION OF TROCHOIDAL MILLING

| | ae = 1.8 mm | ae = 2.4 mm | ae = 3.0 mm | ae = 3.6 mm | ae = 6.0 mm |
|---|---|---|---|---|---|
| **VQLCS** |  | | | |  |
| Conventional | |  |  |  | |
| Conventional | | | | | |

✔ : Achieves stable machining ✖ : Problems caused by chips

| | |
|---|---|
| Material | 1.4301 |
| Tool | VQJCSD1200 |
| Vc (m/min) | 100 |
| fz (mm) | 0.05 |
| ap (mm) | 24 (DCx2) |
| ae Pitch (mm) | 1.8 – 6.0 |
| Slot width (mm) | 18 (DCx1.5) |
| Overhang length (mm) | 60 (DCx5) |
| Cutting mode | Trochoidal milling<br>External coolant (Emulsion) |



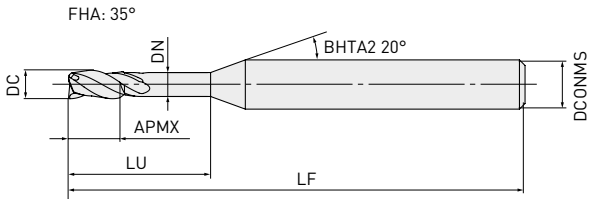


NEW

# VQ3XL

## END MILL, SHORT CUT LENGTH, LONG NECK, 3 FLUTE

P M N S




| DC |
|---|
| 0<br>-0.020 |

| DCONMS |
|---|
| 0<br>-0.005 |

- The use of SMART MIRACLE coating improves chip discharge dramatically.
- Small size, multi-flute end mills with a diameter of less than Ø 0.6 mm now available.

| Order number | Stock | DC | APMX | LF | LU | DN | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|---|
| VQ3XLD0020N006 | ● | 0.2 | 0.3 | 40 | 0.6 | 0.17 | 4 | 3 |
| VQ3XLD0020N010 | ● | 0.2 | 0.3 | 40 | 1.0 | 0.17 | 4 | 3 |
| VQ3XLD0020N016 | ● | 0.2 | 0.3 | 40 | 1.6 | 0.17 | 4 | 3 |
| VQ3XLD0030N009 | ● | 0.3 | 0.45 | 40 | 0.9 | 0.27 | 4 | 3 |
| VQ3XLD0030N015 | ● | 0.3 | 0.45 | 40 | 1.5 | 0.27 | 4 | 3 |
| VQ3XLD0030N024 | ● | 0.3 | 0.45 | 40 | 2.4 | 0.27 | 4 | 3 |

1/1

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

211 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

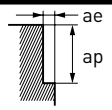
# VQ3XL

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| P<br>M<br>N<br>S | Carbon steel,<br>Alloy steel,<br>Austenitic stainless steel,<br>Titanium alloy,<br>Cobalt chromium alloy,<br>Copper,<br>Copper alloy | 0.2 | 0.6 | 25 | 40000 | 360 | 0.03 | 0.01 |
| | | 0.2 | 1 | 25 | 40000 | 240 | 0.03 | 0.01 |
| | | 0.2 | 1.6 | 25 | 40000 | 120 | 0.02 | 0.01 |
| | | 0.3 | 0.9 | 40 | 40000 | 480 | 0.045 | 0.015 |
| | | 0.3 | 1.5 | 40 | 40000 | 360 | 0.045 | 0.015 |
| | | 0.3 | 2.4 | 40 | 40000 | 180 | 0.03 | 0.015 |
| S | Heat resistant steel,<br>Pre-hardened steel,<br>Hardened steel | 0.2 | 0.6 | 20 | 32000 | 290 | 0.03 | 0.01 |
| | | 0.2 | 1 | 20 | 32000 | 190 | 0.03 | 0.01 |
| | | 0.2 | 1.6 | 20 | 32000 | 96 | 0.02 | 0.01 |
| | | 0.3 | 0.9 | 20 | 21000 | 250 | 0.045 | 0.015 |
| | | 0.3 | 1.5 | 20 | 21000 | 190 | 0.045 | 0.015 |
| | | 0.3 | 2.4 | 20 | 21000 | 95 | 0.03 | 0.015 |

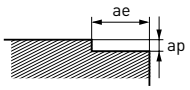
1/1




### BOTTOM FACE MILLING

| | Material | DC | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| P<br>M<br>N<br>S | Carbon steel,<br>Alloy steel,<br>Austenitic stainless steel,<br>Titanium alloy,<br>Cobalt chromium alloy,<br>Copper,<br>Copper alloy | 0.2 | 0.6 | 25 | 40000 | 360 | 0.015 | ≤0.2 |
| | | 0.2 | 1 | 25 | 40000 | 240 | 0.01 | ≤0.2 |
| | | 0.2 | 1.6 | 25 | 40000 | 120 | 0.005 | ≤0.2 |
| | | 0.3 | 0.9 | 40 | 40000 | 480 | 0.025 | ≤0.3 |
| | | 0.3 | 1.5 | 40 | 40000 | 360 | 0.02 | ≤0.3 |
| | | 0.3 | 2.4 | 40 | 40000 | 180 | 0.01 | ≤0.3 |
| S | Heat resistant alloy,<br>Pre-hardened steel,<br>Hardened steel | 0.2 | 0.6 | 20 | 32000 | 290 | 0.015 | ≤0.1 |
| | | 0.2 | 1 | 20 | 32000 | 190 | 0.01 | ≤0.1 |
| | | 0.2 | 1.6 | 20 | 32000 | 96 | 0.005 | ≤0.1 |
| | | 0.3 | 0.9 | 20 | 21000 | 250 | 0.025 | ≤0.15 |
| | | 0.3 | 1.5 | 20 | 21000 | 190 | 0.02 | ≤0.15 |
| | | 0.3 | 2.4 | 20 | 21000 | 95 | 0.01 | ≤0.15 |

1/1



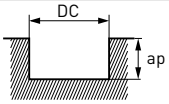
NEW

## VQ3XL

### SLOTTING

| | Material | DC | LU | Vc | n | Vf | ap |
|---|---|---|---|---|---|---|---|
| P M N S | Carbon steel, Alloy steel, Austenitic stainless steel, Titanium alloy, Cobalt chromium alloy, Copper, Copper alloy | 0.2 | 0.6 | 20 | 30000 | 270 | 0.015 |
| | | 0.2 | 1 | 20 | 30000 | 180 | 0.01 |
| | | 0.2 | 1.6 | 20 | 30000 | 90 | 0.005 |
| | | 0.3 | 0.9 | 30 | 30000 | 360 | 0.025 |
| | | 0.3 | 1.5 | 30 | 30000 | 270 | 0.02 |
| | | 0.3 | 2.4 | 30 | 30000 | 140 | 0.01 |
| S | Heat resistant alloy, Pre-hardened steel, Hardened steel | 0.2 | 0.6 | 15 | 24000 | 220 | 0.015 |
| | | 0.2 | 1 | 15 | 24000 | 140 | 0.01 |
| | | 0.2 | 1.6 | 15 | 24000 | 72 | 0.005 |
| | | 0.3 | 0.9 | 15 | 16000 | 190 | 0.025 |
| | | 0.3 | 1.5 | 15 | 16000 | 140 | 0.02 |
| | | 0.3 | 2.4 | 15 | 16000 | 72 | 0.01 |

1/1

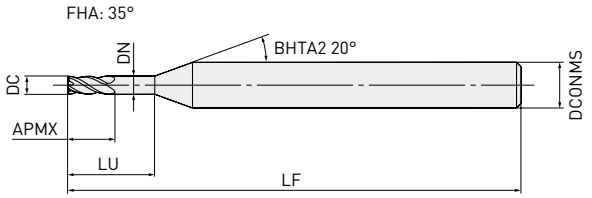


NEW

# VQ4XL

## END MILL, SHORT CUT LENGTH, LONG NECK, 4 FLUTE

P M N S




| DC |
|---|
| 0<br>-0.020 |

| DCONMS |
|---|
| 0<br>-0.005 |

- The use of SMART MIRACLE coating improves chip discharge dramatically.
- Small size, multi-flute end mills with a diameter of less than Ø 1.0 mm now available.

| Order number | Stock | DC | APMX | LF | LU | DN | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|---|
| VQ4XLD0040N012 | ● | 0.4 | 0.6 | 40 | 1.2 | 0.36 | 4 | 4 |
| VQ4XLD0040N020 | ● | 0.4 | 0.6 | 40 | 2 | 0.36 | 4 | 4 |
| VQ4XLD0040N032 | ● | 0.4 | 0.6 | 40 | 3.2 | 0.36 | 4 | 4 |
| VQ4XLD0050N015 | ● | 0.5 | 0.75 | 40 | 1.5 | 0.46 | 4 | 4 |
| VQ4XLD0050N025 | ● | 0.5 | 0.75 | 40 | 2.5 | 0.46 | 4 | 4 |
| VQ4XLD0050N040 | ● | 0.5 | 0.75 | 45 | 4 | 0.46 | 4 | 4 |
| VQ4XLD0060N018 | ● | 0.6 | 0.9 | 40 | 1.8 | 0.56 | 4 | 4 |
| VQ4XLD0060N030 | ● | 0.6 | 0.9 | 40 | 3 | 0.56 | 4 | 4 |
| VQ4XLD0060N048 | ● | 0.6 | 0.9 | 45 | 4.8 | 0.56 | 4 | 4 |
| VQ4XLD0070N021 | ● | 0.7 | 1.05 | 40 | 2.1 | 0.66 | 4 | 4 |
| VQ4XLD0070N035 | ● | 0.7 | 1.05 | 40 | 3.5 | 0.66 | 4 | 4 |
| VQ4XLD0070N056 | ● | 0.7 | 1.05 | 45 | 5.6 | 0.66 | 4 | 4 |
| VQ4XLD0080N024 | ● | 0.8 | 1.2 | 40 | 2.4 | 0.76 | 4 | 4 |
| VQ4XLD0080N040 | ● | 0.8 | 1.2 | 40 | 4 | 0.76 | 4 | 4 |
| VQ4XLD0080N064 | ● | 0.8 | 1.2 | 45 | 6.4 | 0.76 | 4 | 4 |
| VQ4XLD0100N030 | ● | 1.0 | 1.5 | 40 | 3 | 0.95 | 4 | 4 |
| VQ4XLD0100N050 | ● | 1.0 | 1.5 | 40 | 5 | 0.95 | 4 | 4 |
| VQ4XLD0100N080 | ● | 1.0 | 1.5 | 45 | 8 | 0.95 | 4 | 4 |

1/1

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

214 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

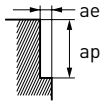
# VQ4XL

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| P M N S | Carbon steel, Alloy steel, Austenitic stainless steel, Titanium alloy, Cobalt chromium alloy, Copper, Copper alloy | 0.4 | 1.2 | 50 | 40000 | 800 | 0.06 | 0.02 |
| | | 0.4 | 2 | 50 | 40000 | 560 | 0.06 | 0.02 |
| | | 0.4 | 3.2 | 50 | 40000 | 320 | 0.04 | 0.02 |
| | | 0.5 | 1.5 | 60 | 38000 | 910 | 0.075 | 0.025 |
| | | 0.5 | 2.5 | 60 | 38000 | 610 | 0.075 | 0.025 |
| | | 0.5 | 4 | 60 | 38000 | 380 | 0.05 | 0.025 |
| | | 0.6 | 1.8 | 60 | 32000 | 900 | 0.09 | 0.03 |
| | | 0.6 | 3 | 60 | 32000 | 640 | 0.09 | 0.03 |
| | | 0.6 | 4.8 | 60 | 32000 | 380 | 0.06 | 0.03 |
| | | 0.7 | 2.1 | 60 | 27000 | 920 | 0.105 | 0.035 |
| | | 0.7 | 3.5 | 60 | 27000 | 650 | 0.105 | 0.035 |
| | | 0.7 | 5.6 | 60 | 27000 | 380 | 0.07 | 0.035 |
| | | 0.8 | 2.4 | 60 | 24000 | 960 | 0.12 | 0.04 |
| | | 0.8 | 4 | 60 | 24000 | 670 | 0.12 | 0.04 |
| | | 0.8 | 6.4 | 60 | 24000 | 380 | 0.08 | 0.04 |
| | | 1 | 3 | 60 | 20000 | 960 | 0.15 | 0.05 |
| | | 1 | 5 | 60 | 20000 | 800 | 0.15 | 0.05 |
| | | 1 | 8 | 60 | 20000 | 400 | 0.1 | 0.05 |
| S | Heat resistant steel, Pre-hardened steel, Hardened steel | 0.4 | 1.2 | 20 | 16000 | 320 | 0.06 | 0.02 |
| | | 0.4 | 2 | 20 | 16000 | 220 | 0.06 | 0.02 |
| | | 0.4 | 3.2 | 20 | 16000 | 130 | 0.04 | 0.02 |
| | | 0.5 | 1.5 | 20 | 13000 | 310 | 0.075 | 0.025 |
| | | 0.5 | 2.5 | 20 | 13000 | 210 | 0.075 | 0.025 |
| | | 0.5 | 4 | 20 | 13000 | 130 | 0.05 | 0.025 |
| | | 0.6 | 1.8 | 20 | 11000 | 310 | 0.09 | 0.03 |
| | | 0.6 | 3 | 20 | 11000 | 220 | 0.09 | 0.03 |
| | | 0.6 | 4.8 | 20 | 11000 | 130 | 0.06 | 0.03 |
| | | 0.7 | 2.1 | 20 | 9100 | 310 | 0.105 | 0.035 |
| | | 0.7 | 3.5 | 20 | 9100 | 220 | 0.105 | 0.035 |
| | | 0.7 | 5.6 | 20 | 9100 | 130 | 0.07 | 0.035 |
| | | 0.8 | 2.4 | 20 | 8000 | 320 | 0.12 | 0.04 |
| | | 0.8 | 4 | 20 | 8000 | 220 | 0.12 | 0.04 |
| | | 0.8 | 6.4 | 20 | 8000 | 130 | 0.08 | 0.04 |
| | | 1 | 3 | 20 | 6500 | 310 | 0.15 | 0.05 |
| | | 1 | 5 | 20 | 6500 | 260 | 0.15 | 0.05 |
| | | 1 | 8 | 20 | 6500 | 130 | 0.1 | 0.05 |

1/1

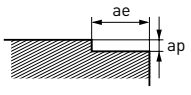


## VQ4XL

## BOTTOM FACE MILLING

| | Material | DC | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Austenitic stainless steel, Titanium alloy, Cobalt chromium alloy, Copper, Copper alloy | 0.4 | 1.2 | 50 | 40000 | 800 | 0.03 | ≤0.4 |
| | | 0.4 | 2 | 50 | 40000 | 560 | 0.02 | ≤0.4 |
| | | 0.4 | 3.2 | 50 | 40000 | 320 | 0.01 | ≤0.4 |
| | | 0.5 | 1.5 | 60 | 38000 | 910 | 0.04 | ≤0.5 |
| | | 0.5 | 2.5 | 60 | 38000 | 610 | 0.03 | ≤0.5 |
| | | 0.5 | 4 | 60 | 38000 | 380 | 0.015 | ≤0.5 |
| M | | 0.6 | 1.8 | 60 | 32000 | 900 | 0.05 | ≤0.6 |
| | | 0.6 | 3 | 60 | 32000 | 640 | 0.035 | ≤0.6 |
| | | 0.6 | 4.8 | 60 | 32000 | 380 | 0.02 | ≤0.6 |
| | | 0.7 | 2.1 | 60 | 27000 | 920 | 0.055 | ≤0.7 |
| | | 0.7 | 3.5 | 60 | 27000 | 650 | 0.035 | ≤0.7 |
| N | | 0.7 | 5.6 | 60 | 27000 | 380 | 0.02 | ≤0.7 |
| | | 0.8 | 2.4 | 60 | 24000 | 960 | 0.06 | ≤0.8 |
| | | 0.8 | 4 | 60 | 24000 | 670 | 0.04 | ≤0.8 |
| | | 0.8 | 6.4 | 60 | 24000 | 380 | 0.025 | ≤0.8 |
| S | | 1 | 3 | 60 | 20000 | 960 | 0.08 | ≤1 |
| | | 1 | 5 | 60 | 20000 | 800 | 0.05 | ≤1 |
| | | 1 | 8 | 60 | 20000 | 400 | 0.03 | ≤1 |
| S | Heat resistant steel, Pre-hardened steel, Hardened steel | 0.4 | 1.2 | 20 | 16000 | 320 | 0.03 | ≤0.2 |
| | | 0.4 | 2 | 20 | 16000 | 220 | 0.02 | ≤0.2 |
| | | 0.4 | 3.2 | 20 | 16000 | 130 | 0.01 | ≤0.2 |
| | | 0.5 | 1.5 | 20 | 13000 | 310 | 0.04 | ≤0.25 |
| | | 0.5 | 2.5 | 20 | 13000 | 210 | 0.03 | ≤0.25 |
| | | 0.5 | 4 | 20 | 13000 | 130 | 0.015 | ≤0.25 |
| | | 0.6 | 1.8 | 20 | 11000 | 310 | 0.05 | ≤0.3 |
| | | 0.6 | 3 | 20 | 11000 | 220 | 0.035 | ≤0.3 |
| | | 0.6 | 4.8 | 20 | 11000 | 130 | 0.02 | ≤0.3 |
| | | 0.7 | 2.1 | 20 | 9100 | 310 | 0.055 | ≤0.35 |
| | | 0.7 | 3.5 | 20 | 9100 | 220 | 0.035 | ≤0.35 |
| | | 0.7 | 5.6 | 20 | 9100 | 130 | 0.02 | ≤0.35 |
| | | 0.8 | 2.4 | 20 | 8000 | 320 | 0.06 | ≤0.4 |
| | | 0.8 | 4 | 20 | 8000 | 220 | 0.04 | ≤0.4 |
| | | 0.8 | 6.4 | 20 | 8000 | 130 | 0.025 | ≤0.4 |
| | | 1 | 3 | 20 | 6500 | 310 | 0.08 | ≤0.5 |
| | | 1 | 5 | 20 | 6500 | 260 | 0.05 | ≤0.5 |
| | | 1 | 8 | 20 | 6500 | 130 | 0.03 | ≤0.5 |





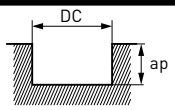
NEW

## VQ4XL

## SLOTTING

| | Material | DC | LU | Vc | n | Vf | ap |
|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Austenitic stainless steel, Titanium alloy, Cobalt chromium alloy, Copper, Copper alloy | 0.4 | 1.2 | 40 | 30000 | 600 | 0.03 |
| | | 0.4 | 2 | 40 | 30000 | 420 | 0.02 |
| | | 0.4 | 3.2 | 40 | 30000 | 240 | 0.01 |
| | | 0.5 | 1.5 | 45 | 28000 | 670 | 0.04 |
| | | 0.5 | 2.5 | 45 | 28000 | 450 | 0.03 |
| | | 0.5 | 4 | 45 | 28000 | 280 | 0.015 |
| M | | 0.6 | 1.8 | 45 | 24000 | 670 | 0.05 |
| | | 0.6 | 3 | 45 | 24000 | 480 | 0.035 |
| | | 0.6 | 4.8 | 45 | 24000 | 290 | 0.02 |
| | | 0.7 | 2.1 | 45 | 20000 | 680 | 0.055 |
| | | 0.7 | 3.5 | 45 | 20000 | 480 | 0.035 |
| N | | 0.7 | 5.6 | 45 | 20000 | 280 | 0.02 |
| | | 0.8 | 2.4 | 45 | 18000 | 720 | 0.06 |
| | | 0.8 | 4 | 45 | 18000 | 500 | 0.04 |
| | | 0.8 | 6.4 | 45 | 18000 | 290 | 0.025 |
| S | | 1 | 3 | 45 | 15000 | 720 | 0.08 |
| | | 1 | 5 | 45 | 15000 | 600 | 0.05 |
| | | 1 | 8 | 45 | 15000 | 300 | 0.03 |
| S | Heat resistant steel, Pre-hardened steel, Hardened steel | 0.4 | 1.2 | 15 | 12000 | 240 | 0.03 |
| | | 0.4 | 2 | 15 | 12000 | 170 | 0.02 |
| | | 0.4 | 3.2 | 15 | 12000 | 96 | 0.01 |
| | | 0.5 | 1.5 | 15 | 9500 | 230 | 0.04 |
| | | 0.5 | 2.5 | 15 | 9500 | 150 | 0.03 |
| | | 0.5 | 4 | 15 | 9500 | 95 | 0.015 |
| | | 0.6 | 1.8 | 15 | 8000 | 220 | 0.05 |
| | | 0.6 | 3 | 15 | 8000 | 160 | 0.035 |
| | | 0.6 | 4.8 | 15 | 8000 | 96 | 0.02 |
| | | 0.7 | 2.1 | 15 | 6800 | 230 | 0.055 |
| | | 0.7 | 3.5 | 15 | 6800 | 160 | 0.035 |
| | | 0.7 | 5.6 | 15 | 6800 | 95 | 0.02 |
| | | 0.8 | 2.4 | 15 | 6000 | 240 | 0.06 |
| | | 0.8 | 4 | 15 | 6000 | 170 | 0.04 |
| | | 0.8 | 6.4 | 15 | 6000 | 96 | 0.025 |
| | | 1 | 3 | 15 | 4800 | 230 | 0.08 |
| | | 1 | 5 | 15 | 4800 | 190 | 0.05 |
| | | 1 | 8 | 15 | 4800 | 96 | 0.03 |

1/1

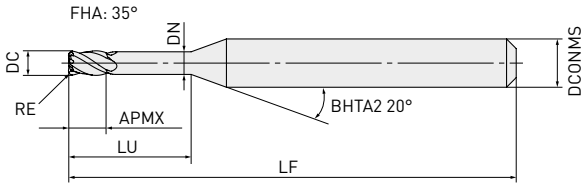


NEW

# VQ4XLRB

## CORNER RADIUS, SHORT CUT LENGTH, 4 FLUTE, LONG NECK

P M N S




| RE |
|---|
| +0.01 |

| DC |
|---|
| 0<br>-0.02 |

| DCONMS |
|---|
| 0<br>-0.005 |

- The use of SMART MIRACLE coating improves chip discharge dramatically.
- Small size, multi-flute end mills with a diameter of less than Ø 1.0 mm now available.

| Order number | Stock | DC | RE | APMX | LF | LU | DN | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|---|---|
| VQ4XLRBD0040R005N012 | ● | 0.4 | 0.05 | 0.6 | 40 | 1.2 | 0.36 | 4 | 4 |
| VQ4XLRBD0040R005N020 | ● | 0.4 | 0.05 | 0.6 | 40 | 2.0 | 0.36 | 4 | 4 |
| VQ4XLRBD0040R005N032 | ● | 0.4 | 0.05 | 0.6 | 40 | 3.2 | 0.36 | 4 | 4 |
| VQ4XLRBD0050R005N015 | ● | 0.5 | 0.05 | 0.75 | 40 | 1.5 | 0.46 | 4 | 4 |
| VQ4XLRBD0050R010N015 | ● | 0.5 | 0.1 | 0.75 | 40 | 1.5 | 0.46 | 4 | 4 |
| VQ4XLRBD0050R005N025 | ● | 0.5 | 0.05 | 0.75 | 40 | 2.5 | 0.46 | 4 | 4 |
| VQ4XLRBD0050R010N025 | ● | 0.5 | 0.1 | 0.75 | 40 | 2.5 | 0.46 | 4 | 4 |
| VQ4XLRBD0050R005N040 | ● | 0.5 | 0.05 | 0.75 | 45 | 4.0 | 0.46 | 4 | 4 |
| VQ4XLRBD0050R010N040 | ● | 0.5 | 0.1 | 0.75 | 45 | 4.0 | 0.46 | 4 | 4 |
| VQ4XLRBD0060R005N018 | ● | 0.6 | 0.05 | 0.9 | 40 | 1.8 | 0.56 | 4 | 4 |
| VQ4XLRBD0060R010N018 | ● | 0.6 | 0.1 | 0.9 | 40 | 1.8 | 0.56 | 4 | 4 |
| VQ4XLRBD0060R005N030 | ● | 0.6 | 0.05 | 0.9 | 40 | 3.0 | 0.56 | 4 | 4 |
| VQ4XLRBD0060R010N030 | ● | 0.6 | 0.1 | 0.9 | 40 | 3.0 | 0.56 | 4 | 4 |
| VQ4XLRBD0060R005N048 | ● | 0.6 | 0.05 | 0.9 | 45 | 4.8 | 0.56 | 4 | 4 |
| VQ4XLRBD0060R010N048 | ● | 0.6 | 0.1 | 0.9 | 45 | 4.8 | 0.56 | 4 | 4 |
| VQ4XLRBD0070R005N021 | ● | 0.7 | 0.05 | 1.05 | 40 | 2.1 | 0.66 | 4 | 4 |
| VQ4XLRBD0070R010N021 | ● | 0.7 | 0.1 | 1.05 | 40 | 2.1 | 0.66 | 4 | 4 |
| VQ4XLRBD0070R005N035 | ● | 0.7 | 0.05 | 1.05 | 40 | 3.5 | 0.66 | 4 | 4 |

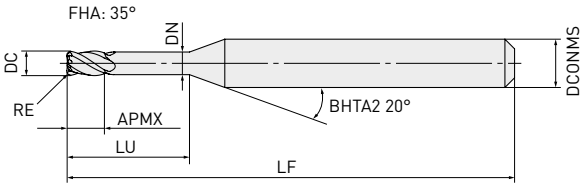
1/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

219 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

## VQ4XLRB – CORNER RADIUS, SHORT CUT LENGTH, 4 FLUTE, LONG NECK




| Order number | Stock | DC | RE | APMX | LF | LU | DN | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|---|---|
| VQ4XLRBD0070R010N035 | ● | 0.7 | 0.1 | 1.05 | 40 | 3.5 | 0.66 | 4 | 4 |
| VQ4XLRBD0070R005N056 | ● | 0.7 | 0.05 | 1.05 | 45 | 5.6 | 0.66 | 4 | 4 |
| VQ4XLRBD0070R010N056 | ● | 0.7 | 0.1 | 1.05 | 45 | 5.6 | 0.66 | 4 | 4 |
| VQ4XLRBD0080R005N024 | ● | 0.8 | 0.05 | 1.2 | 40 | 2.4 | 0.76 | 4 | 4 |
| VQ4XLRBD0080R010N024 | ● | 0.8 | 0.1 | 1.2 | 40 | 2.4 | 0.76 | 4 | 4 |
| VQ4XLRBD0080R005N040 | ● | 0.8 | 0.05 | 1.2 | 40 | 4.0 | 0.76 | 4 | 4 |
| VQ4XLRBD0080R010N040 | ● | 0.8 | 0.1 | 1.2 | 40 | 4.0 | 0.76 | 4 | 4 |
| VQ4XLRBD0080R005N064 | ● | 0.8 | 0.05 | 1.2 | 45 | 6.4 | 0.76 | 4 | 4 |
| VQ4XLRBD0080R010N064 | ● | 0.8 | 0.1 | 1.2 | 45 | 6.4 | 0.76 | 4 | 4 |
| VQ4XLRBD0100R010N030 | ● | 1.0 | 0.1 | 1.5 | 40 | 3.0 | 0.95 | 4 | 4 |
| VQ4XLRBD0100R020N030 | ● | 1.0 | 0.2 | 1.5 | 40 | 3.0 | 0.95 | 4 | 4 |
| VQ4XLRBD0100R010N050 | ● | 1.0 | 0.1 | 1.5 | 40 | 5.0 | 0.95 | 4 | 4 |
| VQ4XLRBD0100R020N050 | ● | 1.0 | 0.2 | 1.5 | 40 | 5.0 | 0.95 | 4 | 4 |
| VQ4XLRBD0100R010N080 | ● | 1.0 | 0.1 | 1.5 | 45 | 8.0 | 0.95 | 4 | 4 |
| VQ4XLRBD0100R020N080 | ● | 1.0 | 0.2 | 1.5 | 45 | 8.0 | 0.95 | 4 | 4 |



1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

219 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# VQ4XLRB

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| P<br>M<br>N<br>S | Carbon steel,<br>Alloy steel,<br>Austenitic stainless steel,<br>Titanium alloy,<br>Cobalt chromium alloy,<br>Copper,<br>Copper alloy | 0.4 | 1.2 | 50 | 40000 | 800 | 0.06 | 0.02 |
| | | 0.4 | 2.0 | 50 | 40000 | 560 | 0.06 | 0.02 |
| | | 0.4 | 3.2 | 50 | 40000 | 320 | 0.04 | 0.02 |
| | | 0.5 | 1.5 | 60 | 38000 | 910 | 0.075 | 0.025 |
| | | 0.5 | 2.5 | 60 | 38000 | 610 | 0.075 | 0.025 |
| | | 0.5 | 4.0 | 60 | 38000 | 380 | 0.05 | 0.025 |
| | | 0.6 | 1.8 | 60 | 32000 | 900 | 0.09 | 0.03 |
| | | 0.6 | 3.0 | 60 | 32000 | 640 | 0.09 | 0.03 |
| | | 0.6 | 4.8 | 60 | 32000 | 380 | 0.06 | 0.03 |
| | | 0.7 | 2.1 | 60 | 27000 | 920 | 0.105 | 0.035 |
| | | 0.7 | 3.5 | 60 | 27000 | 650 | 0.105 | 0.035 |
| | | 0.7 | 5.6 | 60 | 27000 | 380 | 0.07 | 0.035 |
| | | 0.8 | 2.4 | 60 | 24000 | 960 | 0.12 | 0.04 |
| | | 0.8 | 4.0 | 60 | 24000 | 670 | 0.12 | 0.04 |
| | | 0.8 | 6.4 | 60 | 24000 | 380 | 0.08 | 0.04 |
| | | 1.0 | 3.0 | 60 | 20000 | 960 | 0.15 | 0.05 |
| | | 1.0 | 5.0 | 60 | 20000 | 800 | 0.15 | 0.05 |
| | | 1.0 | 8.0 | 60 | 20000 | 400 | 0.1 | 0.05 |
| S | Heat resistant alloy,<br>Pre-hardened steel,<br>Hardened steel | 0.4 | 1.2 | 20 | 16000 | 320 | 0.06 | 0.02 |
| | | 0.4 | 2.0 | 20 | 16000 | 220 | 0.06 | 0.02 |
| | | 0.4 | 3.2 | 20 | 16000 | 130 | 0.04 | 0.02 |
| | | 0.5 | 1.5 | 20 | 13000 | 310 | 0.075 | 0.025 |
| | | 0.5 | 2.5 | 20 | 13000 | 210 | 0.075 | 0.025 |
| | | 0.5 | 4.0 | 20 | 13000 | 130 | 0.05 | 0.025 |
| | | 0.6 | 1.8 | 20 | 11000 | 310 | 0.09 | 0.03 |
| | | 0.6 | 3.0 | 20 | 11000 | 220 | 0.09 | 0.03 |
| | | 0.6 | 4.8 | 20 | 11000 | 130 | 0.06 | 0.03 |
| | | 0.7 | 2.1 | 20 | 9100 | 310 | 0.105 | 0.035 |
| | | 0.7 | 3.5 | 20 | 9100 | 220 | 0.105 | 0.035 |
| | | 0.7 | 5.6 | 20 | 9100 | 130 | 0.07 | 0.035 |
| | | 0.8 | 2.4 | 20 | 8000 | 320 | 0.12 | 0.04 |
| | | 0.8 | 4.0 | 20 | 8000 | 220 | 0.12 | 0.04 |
| | | 0.8 | 6.4 | 20 | 8000 | 130 | 0.08 | 0.04 |
| | | 1.0 | 3.0 | 20 | 6500 | 310 | 0.15 | 0.05 |
| | | 1.0 | 5.0 | 20 | 6500 | 260 | 0.15 | 0.05 |
| | | 1.0 | 8.0 | 20 | 6500 | 130 | 0.1 | 0.05 |

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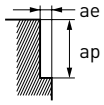


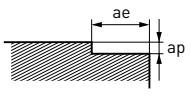
NEW

## VQ4XLRB

## BOTTOM FACE MILLING

| | Material | DC | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| P M N S | Carbon steel, Alloy steel, Austenitic stainless steel, Titanium alloy, Cobalt chromium alloy, Copper, Copper alloy | 0.4 | 1.2 | 50 | 40000 | 800 | 0.03 | ≤0.4 |
| | | 0.4 | 2.0 | 50 | 40000 | 560 | 0.02 | ≤0.4 |
| | | 0.4 | 3.2 | 50 | 40000 | 320 | 0.01 | ≤0.4 |
| | | 0.5 | 1.5 | 60 | 38000 | 910 | 0.04 | ≤0.5 |
| | | 0.5 | 2.5 | 60 | 38000 | 610 | 0.03 | ≤0.5 |
| | | 0.5 | 4.0 | 60 | 38000 | 380 | 0.015 | ≤0.5 |
| | | 0.6 | 1.8 | 60 | 32000 | 900 | 0.05 | ≤0.6 |
| | | 0.6 | 3.0 | 60 | 32000 | 640 | 0.035 | ≤0.6 |
| | | 0.6 | 4.8 | 60 | 32000 | 380 | 0.02 | ≤0.6 |
| | | 0.7 | 2.1 | 60 | 27000 | 920 | 0.055 | ≤0.7 |
| | | 0.7 | 3.5 | 60 | 27000 | 650 | 0.035 | ≤0.7 |
| | | 0.7 | 5.6 | 60 | 27000 | 380 | 0.02 | ≤0.7 |
| | | 0.8 | 2.4 | 60 | 24000 | 960 | 0.06 | ≤0.8 |
| | | 0.8 | 4.0 | 60 | 24000 | 670 | 0.04 | ≤0.8 |
| | | 0.8 | 6.4 | 60 | 24000 | 380 | 0.025 | ≤0.8 |
| | | 1.0 | 3.0 | 60 | 20000 | 960 | 0.08 | ≤1 |
| | | 1.0 | 5.0 | 60 | 20000 | 800 | 0.05 | ≤1 |
| | | 1.0 | 8.0 | 60 | 20000 | 400 | 0.03 | ≤1 |
| S | Heat resistant alloy, Pre-hardened steel, Hardened steel | 0.4 | 1.2 | 20 | 16000 | 320 | 0.03 | ≤0.2 |
| | | 0.4 | 2.0 | 20 | 16000 | 220 | 0.02 | ≤0.2 |
| | | 0.4 | 3.2 | 20 | 16000 | 130 | 0.01 | ≤0.2 |
| | | 0.5 | 1.5 | 20 | 13000 | 310 | 0.04 | ≤0.25 |
| | | 0.5 | 2.5 | 20 | 13000 | 210 | 0.03 | ≤0.25 |
| | | 0.5 | 4.0 | 20 | 13000 | 130 | 0.015 | ≤0.25 |
| | | 0.6 | 1.8 | 20 | 11000 | 310 | 0.05 | ≤0.3 |
| | | 0.6 | 3.0 | 20 | 11000 | 220 | 0.035 | ≤0.3 |
| | | 0.6 | 4.8 | 20 | 11000 | 130 | 0.02 | ≤0.3 |
| | | 0.7 | 2.1 | 20 | 9100 | 310 | 0.055 | ≤0.35 |
| | | 0.7 | 3.5 | 20 | 9100 | 220 | 0.035 | ≤0.35 |
| | | 0.7 | 5.6 | 20 | 9100 | 130 | 0.02 | ≤0.35 |
| | | 0.8 | 2.4 | 20 | 8000 | 320 | 0.06 | ≤0.4 |
| | | 0.8 | 4.0 | 20 | 8000 | 220 | 0.04 | ≤0.4 |
| | | 0.8 | 6.4 | 20 | 8000 | 130 | 0.025 | ≤0.4 |
| | | 1.0 | 3.0 | 20 | 6500 | 310 | 0.08 | ≤0.5 |
| | | 1.0 | 5.0 | 20 | 6500 | 260 | 0.05 | ≤0.5 |
| | | 1.0 | 8.0 | 20 | 6500 | 130 | 0.03 | ≤0.5 |

1/1



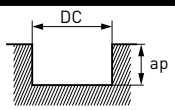
NEW

## VQ4XLRB

## SLOTTING

| | Material | DC | LU | Vc | n | Vf | ap |
|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Austenitic stainless steel, Titanium alloy, Cobalt chromium alloy, Copper, Copper alloy | 0.4 | 1.2 | 40 | 30000 | 600 | 0.030 |
| | | 0.4 | 2.0 | 40 | 30000 | 420 | 0.020 |
| | | 0.4 | 3.2 | 40 | 30000 | 240 | 0.010 |
| | | 0.5 | 1.5 | 45 | 28000 | 670 | 0.040 |
| | | 0.5 | 2.5 | 45 | 28000 | 450 | 0.030 |
| | | 0.5 | 4.0 | 45 | 28000 | 280 | 0.015 |
| M | | 0.6 | 1.8 | 45 | 24000 | 670 | 0.050 |
| | | 0.6 | 3.0 | 45 | 24000 | 480 | 0.035 |
| | | 0.6 | 4.8 | 45 | 24000 | 290 | 0.020 |
| | | 0.7 | 2.1 | 45 | 20000 | 680 | 0.055 |
| N | | 0.7 | 3.5 | 45 | 20000 | 480 | 0.035 |
| | | 0.7 | 5.6 | 45 | 20000 | 280 | 0.020 |
| | | 0.8 | 2.4 | 45 | 18000 | 720 | 0.060 |
| | | 0.8 | 4.0 | 45 | 18000 | 500 | 0.040 |
| | | 0.8 | 6.4 | 45 | 18000 | 290 | 0.025 |
| S | | 1.0 | 3.0 | 45 | 15000 | 720 | 0.080 |
| | | 1.0 | 5.0 | 45 | 15000 | 600 | 0.050 |
| | | 1.0 | 8.0 | 45 | 15000 | 300 | 0.030 |
| S | Heat resistant alloy, Pre-hardened steel, Hardened steel | 0.4 | 1.2 | 15 | 12000 | 240 | 0.030 |
| | | 0.4 | 2.0 | 15 | 12000 | 170 | 0.020 |
| | | 0.4 | 3.2 | 15 | 12000 | 96 | 0.010 |
| | | 0.5 | 1.5 | 15 | 9500 | 230 | 0.040 |
| | | 0.5 | 2.5 | 15 | 9500 | 150 | 0.030 |
| | | 0.5 | 4.0 | 15 | 9500 | 95 | 0.015 |
| | | 0.6 | 1.8 | 15 | 8000 | 220 | 0.050 |
| | | 0.6 | 3.0 | 15 | 8000 | 160 | 0.035 |
| | | 0.6 | 4.8 | 15 | 8000 | 96 | 0.020 |
| | | 0.7 | 2.1 | 15 | 6800 | 230 | 0.055 |
| | | 0.7 | 3.5 | 15 | 6800 | 160 | 0.035 |
| | | 0.7 | 5.6 | 15 | 6800 | 95 | 0.020 |
| | | 0.8 | 2.4 | 15 | 6000 | 240 | 0.060 |
| | | 0.8 | 4.0 | 15 | 6000 | 170 | 0.040 |
| | | 0.8 | 6.4 | 15 | 6000 | 96 | 0.025 |
| | | 1.0 | 3.0 | 15 | 4800 | 230 | 0.080 |
| | | 1.0 | 5.0 | 15 | 4800 | 190 | 0.050 |
| | | 1.0 | 8.0 | 15 | 4800 | 96 | 0.030 |

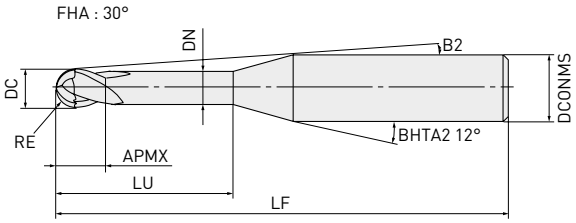




# VQ2XLB

## BALL NOSE, SHORT CUT LENGTH, 2 FLUTE, LONG NECK

S




| RE |
|---|
| ±0.005 |

| DCONMS |
|---|
| 0<br>-0.005 |

- Fracture resistance is improved by adopting a new S-shape, reinforced cutting edge geometry.
- SMART MIRACLE coating provides better wear resistance when machining difficult-to-cut materials.

| | Order number | Stock | DC | RE | APMX | LF | LU | DN | B2 | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NEW | VQ2XLBR0020N012 | ● | 0.4 | 0.2 | 0.3 | 40 | 1.2 | 0.36 | 13.1° | 4 | 2 |
| NEW | VQ2XLBR0020N020 | ● | 0.4 | 0.2 | 0.3 | 40 | 2 | 0.36 | 11.9° | 4 | 2 |
| NEW | VQ2XLBR0020N032 | ● | 0.4 | 0.2 | 0.3 | 45 | 3.2 | 0.36 | 10.5° | 4 | 2 |
| NEW | VQ2XLBR0025N015 | ● | 0.5 | 0.25 | 0.375 | 40 | 1.5 | 0.46 | 12.6° | 4 | 2 |
| NEW | VQ2XLBR0025N025 | ● | 0.5 | 0.25 | 0.375 | 40 | 2.5 | 0.46 | 11.2° | 4 | 2 |
| NEW | VQ2XLBR0025N040 | ● | 0.5 | 0.25 | 0.375 | 45 | 4 | 0.46 | 9.6° | 4 | 2 |
| NEW | VQ2XLBR0030N018 | ● | 0.6 | 0.3 | 0.45 | 40 | 1.8 | 0.56 | 12.0° | 4 | 2 |
| NEW | VQ2XLBR0030N030 | ● | 0.6 | 0.3 | 0.45 | 40 | 3 | 0.56 | 10.5° | 4 | 2 |
| NEW | VQ2XLBR0030N048 | ● | 0.6 | 0.3 | 0.45 | 45 | 4.8 | 0.56 | 8.8° | 4 | 2 |
| NEW | VQ2XLBR0035N021 | ● | 0.7 | 0.35 | 0.525 | 40 | 2.1 | 0.66 | 11.6° | 4 | 2 |
| NEW | VQ2XLBR0035N035 | ● | 0.7 | 0.35 | 0.525 | 40 | 3.5 | 0.66 | 9.9° | 4 | 2 |
| NEW | VQ2XLBR0035N056 | ● | 0.7 | 0.35 | 0.525 | 45 | 5.6 | 0.66 | 8.2° | 4 | 2 |
| NEW | VQ2XLBR0040N024 | ● | 0.8 | 0.4 | 0.6 | 40 | 2.4 | 0.76 | 11.2° | 4 | 2 |
| NEW | VQ2XLBR0040N040 | ● | 0.8 | 0.4 | 0.6 | 40 | 4 | 0.76 | 9.4° | 4 | 2 |
| NEW | VQ2XLBR0040N064 | ● | 0.8 | 0.4 | 0.6 | 50 | 6.4 | 0.76 | 7.6° | 4 | 2 |
| NEW | VQ2XLBR0050N030 | ● | 1 | 0.5 | 0.75 | 40 | 3 | 0.94 | 10.1° | 4 | 2 |
| NEW | VQ2XLBR0050N050 | ● | 1 | 0.5 | 0.75 | 40 | 5 | 0.94 | 8.2° | 4 | 2 |
| | VQ2XLBR0050N080 | ● | 1 | 0.5 | 0.75 | 50 | 8 | 0.94 | 6.4° | 4 | 2 |
| | VQ2XLBR0050N080S06 | ● | 1 | 0.5 | 0.75 | 50 | 8 | 0.94 | 8.3° | 6 | 2 |
| | VQ2XLBR0050N100 | ● | 1 | 0.5 | 0.75 | 50 | 10 | 0.94 | 5.6° | 4 | 2 |
| | VQ2XLBR0050N100S06 | ● | 1 | 0.5 | 0.75 | 55 | 10 | 0.94 | 7.5° | 6 | 2 |

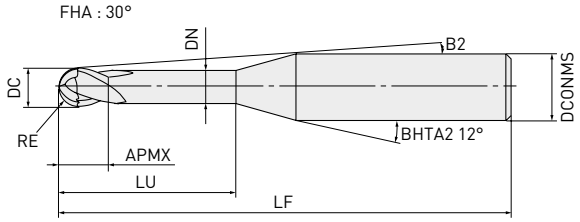
1/2





● : Inventory maintained. ★ : Inventory maintained in Japan.

## VQ2XLB – BALL NOSE, SHORT CUT LENGTH, 2 FLUTE, LONG NECK



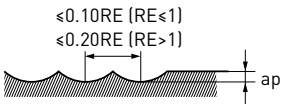

| Order number | Stock | DC | RE | APMX | LF | LU | DN | B2 | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|---|---|---|
| VQ2XLBR0050N120S06 | ● | 1 | 0.5 | 0.75 | 55 | 12 | 0.94 | 6.8° | 6 | 2 |
| VQ2XLBR0075N100S06 | ● | 1.5 | 0.75 | 1.1 | 55 | 10 | 1.44 | 7.2° | 6 | 2 |
| VQ2XLBR0075N120S06 | ● | 1.5 | 0.75 | 1.1 | 55 | 12 | 1.44 | 6.5° | 6 | 2 |
| VQ2XLBR0100N100 | ● | 2 | 1.0 | 1.5 | 50 | 10 | 1.9 | 4.5° | 4 | 2 |
| VQ2XLBR0100N100S06 | ● | 2 | 1.0 | 1.5 | 55 | 10 | 1.9 | 6.9° | 6 | 2 |
| VQ2XLBR0100N120 | ● | 2 | 1.0 | 1.5 | 50 | 12 | 1.9 | 3.9° | 4 | 2 |
| VQ2XLBR0100N120S06 | ● | 2 | 1.0 | 1.5 | 55 | 12 | 1.9 | 6.1° | 6 | 2 |
| VQ2XLBR0150N120 | ● | 3 | 1.5 | 2.3 | 55 | 12 | 2.9 | 5.3° | 4 | 2 |
| VQ2XLBR0150N140 | ● | 3 | 1.5 | 2.3 | 60 | 14 | 2.9 | 4.7° | 4 | 2 |
| VQ2XLBR0150N160 | ● | 3 | 1.5 | 2.3 | 60 | 16 | 2.9 | 4.3° | 4 | 2 |

# VQ2XLB

## RECOMMENDED CUTTING CONDITIONS

| | Material | RE | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| S | Titanium alloy | 0.20 | 1.2 | 50 | 40000 | 1200 | 0.02 | 0.04 |
| | | 0.20 | 2.0 | 50 | 40000 | 960 | 0.02 | 0.04 |
| | | 0.20 | 3.2 | 50 | 40000 | 660 | 0.02 | 0.04 |
| | | 0.25 | 1.5 | 63 | 40000 | 2000 | 0.03 | 0.05 |
| | | 0.25 | 2.5 | 63 | 40000 | 1500 | 0.03 | 0.05 |
| | | 0.25 | 4.0 | 63 | 40000 | 1000 | 0.03 | 0.05 |
| | | 0.30 | 1.8 | 75 | 40000 | 2600 | 0.03 | 0.06 |
| | | 0.30 | 3.0 | 75 | 40000 | 2000 | 0.03 | 0.06 |
| | | 0.30 | 4.8 | 75 | 40000 | 1400 | 0.03 | 0.06 |
| | | 0.35 | 2.1 | 87 | 40000 | 3200 | 0.04 | 0.07 |
| | | 0.35 | 3.5 | 87 | 40000 | 2500 | 0.04 | 0.07 |
| | | 0.35 | 5.6 | 87 | 40000 | 1700 | 0.04 | 0.07 |
| | | 0.40 | 2.4 | 100 | 40000 | 3500 | 0.04 | 0.08 |
| | | 0.40 | 4.0 | 100 | 40000 | 3000 | 0.04 | 0.08 |
| | | 0.40 | 6.4 | 100 | 40000 | 2100 | 0.04 | 0.08 |
| | | 0.50 | 3.0 | 100 | 32000 | 3500 | 0.05 | 0.1 |
| | | 0.50 | 5.0 | 100 | 32000 | 3000 | 0.05 | 0.1 |
| | | 0.50 | 8.0 | 100 | 32000 | 2500 | 0.05 | 0.1 |
| | | 0.50 | 10.0 | 75 | 24000 | 1500 | 0.05 | 0.1 |
| | | 0.50 | 12.0 | 75 | 24000 | 1500 | 0.03 | 0.1 |
| | | 0.75 | 10.0 | 100 | 21000 | 2100 | 0.13 | 0.3 |
| | | 0.75 | 12.0 | 75 | 16000 | 1500 | 0.13 | 0.3 |
| | | 1.00 | 10.0 | 100 | 16000 | 1800 | 0.2 | 0.5 |
| | | 1.00 | 12.0 | 100 | 16000 | 1800 | 0.2 | 0.5 |
| | | 1.50 | 12.0 | 100 | 10000 | 1600 | 0.3 | 0.8 |
| | | 1.50 | 14.0 | 100 | 10000 | 1600 | 0.3 | 0.8 |
| | | 1.50 | 16.0 | 100 | 10000 | 1600 | 0.3 | 0.8 |



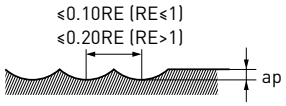



1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. When machining titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is smaller, the revolution and the feed rate can be increased.

## VQ2XLB

| | Material | RE | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| S | Cobalt chromium alloy | 0.20 | 1.2 | 50 | 40000 | 1200 | 0.02 | 0.04 |
| | | 0.20 | 2.0 | 50 | 40000 | 960 | 0.02 | 0.04 |
| | | 0.20 | 3.2 | 50 | 40000 | 660 | 0.02 | 0.04 |
| | | 0.25 | 1.5 | 63 | 40000 | 2000 | 0.03 | 0.05 |
| | | 0.25 | 2.5 | 63 | 40000 | 1500 | 0.03 | 0.05 |
| | | 0.25 | 4.0 | 63 | 40000 | 1000 | 0.03 | 0.05 |
| | | 0.30 | 1.8 | 75 | 40000 | 2600 | 0.03 | 0.06 |
| | | 0.30 | 3.0 | 75 | 40000 | 2000 | 0.03 | 0.06 |
| | | 0.30 | 4.8 | 75 | 40000 | 1400 | 0.03 | 0.06 |
| | | 0.35 | 2.1 | 80 | 36000 | 2800 | 0.04 | 0.07 |
| | | 0.35 | 3.5 | 80 | 36000 | 2200 | 0.04 | 0.07 |
| | | 0.35 | 5.6 | 80 | 36000 | 1500 | 0.04 | 0.07 |
| | | 0.40 | 2.4 | 80 | 32000 | 2800 | 0.04 | 0.08 |
| | | 0.40 | 4.0 | 80 | 32000 | 2500 | 0.04 | 0.08 |
| | | 0.40 | 6.4 | 80 | 32000 | 1700 | 0.04 | 0.08 |
| | | 0.50 | 3.0 | 80 | 25000 | 2800 | 0.05 | 0.1 |
| | | 0.50 | 5.0 | 80 | 25000 | 2400 | 0.05 | 0.1 |
| | | 0.50 | 8.0 | 80 | 25000 | 2000 | 0.05 | 0.1 |
| | | 0.50 | 10.0 | 60 | 19000 | 1500 | 0.05 | 0.1 |
| | | 0.50 | 12.0 | 60 | 19000 | 1500 | 0.03 | 0.1 |
| | | 0.75 | 10.0 | 80 | 17000 | 1700 | 0.08 | 0.1 |
| | | 0.75 | 12.0 | 60 | 13000 | 1200 | 0.08 | 0.1 |
| | | 1.00 | 10.0 | 80 | 13000 | 1500 | 0.2 | 0.5 |
| | | 1.00 | 12.0 | 80 | 13000 | 1500 | 0.2 | 0.5 |
| | | 1.50 | 12.0 | 80 | 8500 | 1300 | 0.3 | 0.8 |
| | | 1.50 | 14.0 | 80 | 8500 | 1300 | 0.3 | 0.8 |
| | | 1.50 | 16.0 | 80 | 8500 | 1300 | 0.3 | 0.8 |



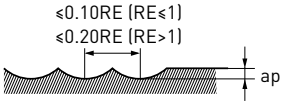



1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. When machining titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is smaller, the revolution and the feed rate can be increased.

## VQ2XLB

| | Material | RE | LU | Vc | n | Vf | ap | ae |
|---|---|---|---|---|---|---|---|---|
| S | Pure titanium | 0.20 | 1.2 | 50 | 40000 | 960 | 0.03 | 0.04 |
| | | 0.20 | 2.0 | 50 | 40000 | 760 | 0.03 | 0.04 |
| | | 0.20 | 3.2 | 50 | 40000 | 530 | 0.03 | 0.04 |
| | | 0.25 | 1.5 | 63 | 40000 | 1600 | 0.05 | 0.05 |
| | | 0.25 | 2.5 | 63 | 40000 | 1200 | 0.05 | 0.05 |
| | | 0.25 | 4.0 | 63 | 40000 | 800 | 0.05 | 0.05 |
| | | 0.30 | 1.8 | 75 | 40000 | 2000 | 0.05 | 0.06 |
| | | 0.30 | 3.0 | 75 | 40000 | 1600 | 0.05 | 0.06 |
| | | 0.30 | 4.8 | 75 | 40000 | 1100 | 0.05 | 0.06 |
| | | 0.35 | 2.1 | 80 | 36000 | 2200 | 0.06 | 0.07 |
| | | 0.35 | 3.5 | 80 | 36000 | 1800 | 0.06 | 0.07 |
| | | 0.35 | 5.6 | 80 | 36000 | 1200 | 0.06 | 0.07 |
| | | 0.40 | 2.4 | 80 | 32000 | 2600 | 0.06 | 0.08 |
| | | 0.40 | 4.0 | 80 | 32000 | 2000 | 0.06 | 0.08 |
| | | 0.40 | 6.4 | 80 | 32000 | 1400 | 0.06 | 0.08 |
| | | 0.50 | 3.0 | 80 | 27000 | 2500 | 0.08 | 0.1 |
| | | 0.50 | 5.0 | 80 | 27000 | 2000 | 0.08 | 0.1 |
| | | 0.50 | 8.0 | 80 | 27000 | 1600 | 0.08 | 0.1 |
| | | 0.50 | 10.0 | 60 | 19000 | 1200 | 0.08 | 0.1 |
| | | 0.50 | 12.0 | 60 | 19000 | 1200 | 0.04 | 0.1 |
| | | 0.75 | 10.0 | 120 | 25000 | 2000 | 0.13 | 0.2 |
| | | 0.75 | 12.0 | 100 | 21000 | 1600 | 0.13 | 0.2 |
| | | 1.00 | 10.0 | 200 | 32000 | 2500 | 0.32 | 0.8 |
| | | 1.00 | 12.0 | 180 | 29000 | 1700 | 0.32 | 0.8 |
| | | 1.50 | 12.0 | 200 | 21000 | 1600 | 0.48 | 1.2 |
| | | 1.50 | 14.0 | 200 | 21000 | 1600 | 0.48 | 1.2 |
| | | 1.50 | 16.0 | 200 | 21000 | 1600 | 0.48 | 1.2 |





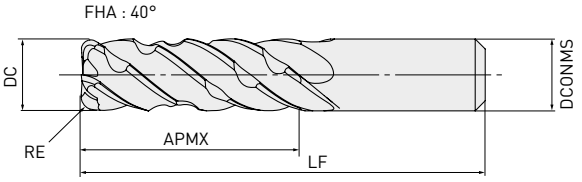

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. When machining titanium alloys, the use of water-soluble cutting fluid is effective.
3. If the depth of cut is smaller, the revolution and the feed rate can be increased.

NEW

# VQJCSRB

## CORNER RADIUS, SEMI LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S




| RE ≤ 0.3 | RE ≥ 0.5 |
|---|---|
| ±0.015 | ±0.020 |

| DC≤12 | DC>12 |
|---|---|
| 0<br>- 0.030 | 0<br>- 0.040 |

| DCONMS = 6 | DCONMS = 8, 10 | DCONMS = 12 | DCONMS = 16 | DCONMS = 20 |
|---|---|---|---|---|
| 0<br>-0.005 | 0<br>- 0.006 | 0<br>- 0.008 | 0<br>- 0.011 | 0<br>- 0.013 |

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

| Order number | Stock | DC | RE | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| VQJCSRBD0600R010 | ★ | 6 | 0.1 | 18 | 70 | 6 | 5 |
| VQJCSRBD0600R020 | ★ | 6 | 0.2 | 18 | 70 | 6 | 5 |
| VQJCSRBD0600R030 | ● | 6 | 0.3 | 18 | 70 | 6 | 5 |
| VQJCSRBD0600R050 | ● | 6 | 0.5 | 18 | 70 | 6 | 5 |
| VQJCSRBD0600R100 | ● | 6 | 1.0 | 18 | 70 | 6 | 5 |
| VQJCSRBD0800R020 | ★ | 8 | 0.2 | 24 | 80 | 8 | 5 |
| VQJCSRBD0800R030 | ● | 8 | 0.3 | 24 | 80 | 8 | 5 |
| VQJCSRBD0800R050 | ● | 8 | 0.5 | 24 | 80 | 8 | 5 |
| VQJCSRBD0800R100 | ● | 8 | 1.0 | 24 | 80 | 8 | 5 |
| VQJCSRBD0800R150 | ● | 8 | 1.5 | 24 | 80 | 8 | 5 |
| VQJCSRBD0800R200 | ★ | 8 | 2.0 | 24 | 80 | 8 | 5 |
| VQJCSRBD1000R020 | ★ | 10 | 0.2 | 30 | 90 | 10 | 5 |
| VQJCSRBD1000R030 | ★ | 10 | 0.3 | 30 | 90 | 10 | 5 |
| VQJCSRBD1000R050 | ● | 10 | 0.5 | 30 | 90 | 10 | 5 |
| VQJCSRBD1000R100 | ● | 10 | 1.0 | 30 | 90 | 10 | 5 |
| VQJCSRBD1000R150 | ● | 10 | 1.5 | 30 | 90 | 10 | 5 |
| VQJCSRBD1000R200 | ● | 10 | 2.0 | 30 | 90 | 10 | 5 |

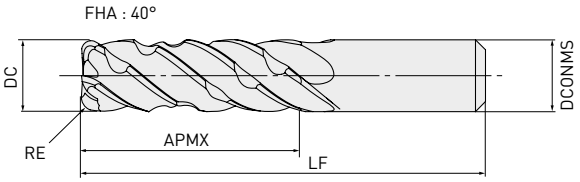
1/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

229 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

## VQJCSRB – CORNER RADIUS, SEMI LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER




| Order number | Stock | DC | RE | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| VQJCSRBD1000R250 | ★ | 10 | 2.5 | 30 | 90 | 10 | 5 |
| VQJCSRBD1200R050 | ● | 12 | 0.5 | 36 | 100 | 12 | 5 |
| VQJCSRBD1200R100 | ● | 12 | 1.0 | 36 | 100 | 12 | 5 |
| VQJCSRBD1200R150 | ● | 12 | 1.5 | 36 | 100 | 12 | 5 |
| VQJCSRBD1200R200 | ● | 12 | 2.0 | 36 | 100 | 12 | 5 |
| VQJCSRBD1200R250 | ★ | 12 | 2.5 | 36 | 100 | 12 | 5 |
| VQJCSRBD1200R300 | ● | 12 | 3.0 | 36 | 100 | 12 | 5 |
| VQJCSRBD1600R050 | ★ | 16 | 0.5 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R100 | ● | 16 | 1.0 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R200 | ● | 16 | 2.0 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R250 | ★ | 16 | 2.5 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R300 | ● | 16 | 3.0 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R400 | ★ | 16 | 4.0 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R500 | ● | 16 | 5.0 | 48 | 110 | 16 | 5 |
| VQJCSRBD1600R600 | ★ | 16 | 6.0 | 48 | 110 | 16 | 5 |
| VQJCSRBD2000R050 | ★ | 20 | 0.5 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R100 | ● | 20 | 1.0 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R200 | ● | 20 | 2.0 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R250 | ★ | 20 | 2.5 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R300 | ● | 20 | 3.0 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R400 | ★ | 20 | 4.0 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R500 | ● | 20 | 5.0 | 60 | 125 | 20 | 5 |
| VQJCSRBD2000R600 | ★ | 20 | 6.0 | 60 | 125 | 20 | 5 |

2/2

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229 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

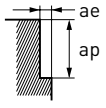
# VQJCSRB

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | Vc | n | Vf | ap | ae | hm | h max |
|---|---|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Mild steel | 6 | 200 | 10600 | 1800 | 18 | 0.9 | 0.010 | 0.019 |
| | | 8 | 200 | 8000 | 1800 | 24 | 1.2 | 0.013 | 0.025 |
| | | 10 | 200 | 6400 | 1700 | 30 | 1.5 | 0.016 | 0.029 |
| | | 12 | 200 | 5300 | 1700 | 36 | 1.8 | 0.019 | 0.035 |
| | | 16 | 200 | 4000 | 1400 | 48 | 2.4 | 0.020 | 0.039 |
| | | 20 | 200 | 3200 | 1200 | 60 | 3.0 | 0.023 | 0.043 |
| | Pre-hardened steel, Alloy tool steel | 6 | 180 | 9500 | 1500 | 18 | 0.9 | 0.009 | 0.017 |
| | | 8 | 180 | 7200 | 1500 | 24 | 1.2 | 0.012 | 0.023 |
| | | 10 | 180 | 5700 | 1400 | 30 | 1.5 | 0.015 | 0.028 |
| | | 12 | 180 | 4800 | 1400 | 36 | 1.8 | 0.017 | 0.032 |
| | | 16 | 180 | 3600 | 1200 | 48 | 2.4 | 0.018 | 0.035 |
| | | 20 | 180 | 2900 | 1000 | 60 | 3.0 | 0.021 | 0.039 |
| M / S | Austenitic, Ferritic and martensitic stainless steel, Titanium alloy | 6 | 120 | 6400 | 1000 | 18 | 0.5 | 0.006 | 0.012 |
| | | 8 | 120 | 4800 | 1000 | 24 | 0.6 | 0.008 | 0.016 |
| | | 10 | 120 | 3800 | 900 | 30 | 0.8 | 0.010 | 0.019 |
| | | 12 | 120 | 3200 | 800 | 36 | 0.9 | 0.011 | 0.021 |
| | | 16 | 120 | 2400 | 700 | 48 | 1.2 | 0.012 | 0.023 |
| | | 20 | 120 | 1900 | 600 | 60 | 1.5 | 0.013 | 0.026 |
| M | Hardened stainless steel, Cobalt chromium alloy | 6 | 100 | 5300 | 800 | 18 | 0.5 | 0.006 | 0.012 |
| | | 8 | 100 | 4000 | 800 | 24 | 0.6 | 0.008 | 0.016 |
| | | 10 | 100 | 3200 | 800 | 30 | 0.8 | 0.010 | 0.019 |
| | | 12 | 100 | 2700 | 700 | 36 | 0.9 | 0.011 | 0.021 |
| | | 16 | 100 | 2000 | 600 | 48 | 1.2 | 0.012 | 0.023 |
| | | 20 | 100 | 1600 | 500 | 60 | 1.5 | 0.013 | 0.026 |
| N | Copper, Copper alloy | 6 | 220 | 11700 | 2100 | 18 | 0.9 | 0.010 | 0.019 |
| | | 8 | 220 | 8800 | 2100 | 24 | 1.2 | 0.014 | 0.026 |
| | | 10 | 220 | 7000 | 1800 | 30 | 1.5 | 0.015 | 0.028 |
| | | 12 | 220 | 5800 | 1800 | 36 | 1.8 | 0.018 | 0.034 |
| | | 16 | 220 | 4400 | 1500 | 48 | 2.4 | 0.020 | 0.038 |
| | | 20 | 220 | 3500 | 1400 | 60 | 3.0 | 0.022 | 0.042 |
| S | Heat resistant alloy | 6 | 40 | 2100 | 200 | 18 | 0.18 | 0.002 | 0.004 |
| | | 8 | 40 | 1600 | 200 | 24 | 0.24 | 0.003 | 0.006 |
| | | 10 | 40 | 1300 | 200 | 30 | 0.30 | 0.003 | 0.007 |
| | | 12 | 40 | 1100 | 100 | 36 | 0.36 | 0.003 | 0.007 |
| | | 16 | 40 | 800 | 100 | 48 | 0.48 | 0.004 | 0.007 |
| | | 20 | 40 | 600 | 100 | 60 | 0.60 | 0.004 | 0.007 |

1/1



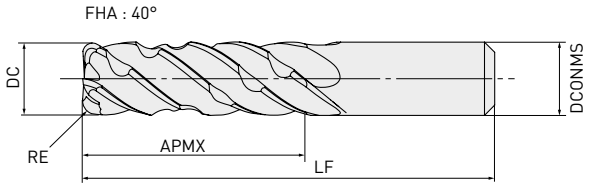

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur. In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

NEW

# VQLCSRB

## CORNER RADIUS, LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S




| RE ≤ 0.3 | RE ≥ 0.5 |
|---|---|
| ±0.015 | ±0.020 |

| DC ≤ 12 | DC > 12 |
|---|---|
| 0<br>- 0.030 | 0<br>- 0.040 |

| DCONMS = 6 | DCONMS = 8, 10 | DCONMS = 12 | DCONMS = 16 | DCONMS = 20 |
|---|---|---|---|---|
| 0<br>-0.005 | 0<br>- 0.006 | 0<br>- 0.008 | 0<br>- 0.011 | 0<br>- 0.013 |

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

| Order number | Stock | DC | RE | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| VQLCSRBD0600R010 | ★ | 6 | 0.1 | 24 | 70 | 6 | 5 |
| VQLCSRBD0600R020 | ★ | 6 | 0.2 | 24 | 70 | 6 | 5 |
| VQLCSRBD0600R030 | ● | 6 | 0.3 | 24 | 70 | 6 | 5 |
| VQLCSRBD0600R050 | ● | 6 | 0.5 | 24 | 70 | 6 | 5 |
| VQLCSRBD0600R100 | ● | 6 | 1.0 | 24 | 70 | 6 | 5 |
| VQLCSRBD0800R020 | ★ | 8 | 0.2 | 32 | 90 | 8 | 5 |
| VQLCSRBD0800R030 | ● | 8 | 0.3 | 32 | 90 | 8 | 5 |
| VQLCSRBD0800R050 | ● | 8 | 0.5 | 32 | 90 | 8 | 5 |
| VQLCSRBD0800R100 | ● | 8 | 1.0 | 32 | 90 | 8 | 5 |
| VQLCSRBD0800R150 | ● | 8 | 1.5 | 32 | 90 | 8 | 5 |
| VQLCSRBD0800R200 | ★ | 8 | 2.0 | 32 | 90 | 8 | 5 |
| VQLCSRBD1000R020 | ★ | 10 | 0.2 | 40 | 100 | 10 | 5 |
| VQLCSRBD1000R030 | ★ | 10 | 0.3 | 40 | 100 | 10 | 5 |
| VQLCSRBD1000R050 | ● | 10 | 0.5 | 40 | 100 | 10 | 5 |
| VQLCSRBD1000R100 | ● | 10 | 1.0 | 40 | 100 | 10 | 5 |
| VQLCSRBD1000R150 | ● | 10 | 1.5 | 40 | 100 | 10 | 5 |
| VQLCSRBD1000R200 | ● | 10 | 2.0 | 40 | 100 | 10 | 5 |

1/2

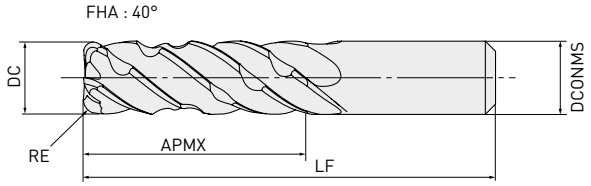
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

232



● : Inventory maintained. ★ : Inventory maintained in Japan.

## VQLCSRB – CORNER RADIUS, LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER




| Order number | Stock | DC | RE | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| VQLCSRBD1000R250 | ★ | 10 | 2.5 | 40 | 100 | 10 | 5 |
| VQLCSRBD1200R050 | ● | 12 | 0.5 | 48 | 110 | 12 | 5 |
| VQLCSRBD1200R100 | ● | 12 | 1.0 | 48 | 110 | 12 | 5 |
| VQLCSRBD1200R150 | ● | 12 | 1.5 | 48 | 110 | 12 | 5 |
| VQLCSRBD1200R200 | ● | 12 | 2.0 | 48 | 110 | 12 | 5 |
| VQLCSRBD1200R250 | ★ | 12 | 2.5 | 48 | 110 | 12 | 5 |
| VQLCSRBD1200R300 | ● | 12 | 3.0 | 48 | 110 | 12 | 5 |
| VQLCSRBD1600R050 | ★ | 16 | 0.5 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R100 | ● | 16 | 1.0 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R200 | ● | 16 | 2.0 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R250 | ● | 16 | 2.5 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R300 | ● | 16 | 3.0 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R400 | ★ | 16 | 4.0 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R500 | ● | 16 | 5.0 | 64 | 130 | 16 | 5 |
| VQLCSRBD1600R600 | ★ | 16 | 6.0 | 64 | 130 | 16 | 5 |
| VQLCSRBD2000R050 | ★ | 20 | 0.5 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R100 | ● | 20 | 1.0 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R200 | ● | 20 | 2.0 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R250 | ★ | 20 | 2.5 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R300 | ● | 20 | 3.0 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R400 | ★ | 20 | 4.0 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R500 | ● | 20 | 5.0 | 80 | 150 | 20 | 5 |
| VQLCSRBD2000R600 | ★ | 20 | 6.0 | 80 | 150 | 20 | 5 |



1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

232 Vc

NEW

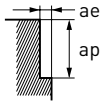
# VQLCSRB

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | Vc | n | Vf | ap | ae | hm | h max |
|---|---|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Mild steel | 6 | 180 | 9500 | 1600 | 24 | 0.6 | 0.008 | 0.015 |
| | | 8 | 180 | 7200 | 1600 | 32 | 0.8 | 0.010 | 0.020 |
| | | 10 | 180 | 5700 | 1500 | 40 | 1.0 | 0.012 | 0.023 |
| | | 12 | 180 | 4800 | 1500 | 48 | 1.2 | 0.015 | 0.028 |
| | | 16 | 180 | 3600 | 1300 | 64 | 1.6 | 0.017 | 0.033 |
| | | 20 | 180 | 2900 | 1100 | 80 | 2.0 | 0.018 | 0.035 |
| | Pre-hardened steel, Alloy tool steel | 6 | 160 | 8500 | 1200 | 24 | 0.6 | 0.007 | 0.013 |
| | | 8 | 160 | 6400 | 1300 | 32 | 0.8 | 0.009 | 0.018 |
| | | 10 | 160 | 5100 | 1200 | 40 | 1.0 | 0.011 | 0.022 |
| | | 12 | 160 | 4200 | 1200 | 48 | 1.2 | 0.013 | 0.025 |
| | | 16 | 160 | 3200 | 1000 | 64 | 1.6 | 0.015 | 0.028 |
| | | 20 | 160 | 2500 | 800 | 80 | 2.0 | 0.015 | 0.029 |
| M S | Austenitic, Ferritic and martensitic stainless steel, Titanium alloy | 6 | 100 | 5300 | 800 | 24 | 0.3 | 0.005 | 0.010 |
| | | 8 | 100 | 4000 | 800 | 32 | 0.4 | 0.006 | 0.013 |
| | | 10 | 100 | 3200 | 700 | 40 | 0.5 | 0.008 | 0.015 |
| | | 12 | 100 | 2700 | 700 | 48 | 0.6 | 0.008 | 0.017 |
| | | 16 | 100 | 2100 | 600 | 64 | 0.8 | 0.010 | 0.019 |
| | | 20 | 100 | 1600 | 500 | 80 | 1.0 | 0.011 | 0.021 |
| M | Hardened stainless steel, Cobalt chromium alloy | 6 | 90 | 4800 | 700 | 24 | 0.3 | 0.005 | 0.010 |
| | | 8 | 90 | 3600 | 700 | 32 | 0.4 | 0.006 | 0.013 |
| | | 10 | 90 | 2900 | 700 | 40 | 0.5 | 0.008 | 0.015 |
| | | 12 | 90 | 2400 | 600 | 48 | 0.6 | 0.008 | 0.016 |
| | | 16 | 90 | 1800 | 500 | 64 | 0.8 | 0.009 | 0.019 |
| | | 20 | 90 | 1400 | 400 | 80 | 1.0 | 0.010 | 0.019 |
| N | Copper, Copper alloy | 6 | 200 | 10600 | 1800 | 24 | 0.6 | 0.008 | 0.015 |
| | | 8 | 200 | 8000 | 1800 | 32 | 0.8 | 0.011 | 0.020 |
| | | 10 | 200 | 6400 | 1600 | 40 | 1.0 | 0.012 | 0.022 |
| | | 12 | 200 | 5300 | 1600 | 48 | 1.2 | 0.014 | 0.027 |
| | | 16 | 200 | 4000 | 1400 | 64 | 1.6 | 0.017 | 0.032 |
| | | 20 | 200 | 3200 | 1300 | 80 | 2.0 | 0.019 | 0.037 |
| S | Heat resistant alloy | 6 | 30 | 1600 | 100 | 24 | 0.12 | 0.002 | 0.003 |
| | | 8 | 30 | 1200 | 100 | 32 | 0.16 | 0.002 | 0.004 |
| | | 10 | 30 | 1000 | 100 | 40 | 0.20 | 0.003 | 0.005 |
| | | 12 | 30 | 800 | 100 | 48 | 0.24 | 0.003 | 0.005 |
| | | 16 | 30 | 600 | 80 | 64 | 0.32 | 0.003 | 0.006 |
| | | 20 | 30 | 500 | 80 | 80 | 0.40 | 0.003 | 0.007 |

1/1




1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur. In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

NEW

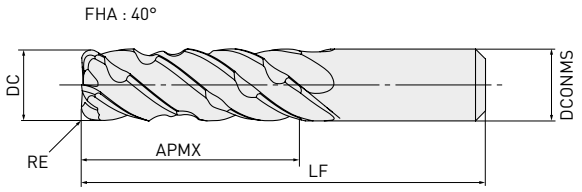
# VQELCSRB

40°

RE≤0.3 RE>0.3

## CORNER RADIUS, EXTRA LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S




| RE ≤ 0.3 | RE ≥ 0.5 |
|---|---|
| ±0.015 | ±0.020 |

| DC ≤ 12 | DC > 12 |
|---|---|
| 0<br>- 0.030 | 0<br>- 0.040 |

| DCONMS = 6 | DCONMS = 8, 10 | DCONMS = 12 | DCONMS = 16 | DCONMS = 20 |
|---|---|---|---|---|
| 0<br>-0.005 | 0<br>- 0.006 | 0<br>- 0.008 | 0<br>- 0.011 | 0<br>- 0.013 |

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

| Order number | Stock | DC | RE | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| VQELCSRBD0600R010 | ★ | 6 | 0.1 | 30 | 80 | 6 | 5 |
| VQELCSRBD0600R020 | ★ | 6 | 0.2 | 30 | 80 | 6 | 5 |
| VQELCSRBD0600R030 | ● | 6 | 0.3 | 30 | 80 | 6 | 5 |
| VQELCSRBD0600R050 | ● | 6 | 0.5 | 30 | 80 | 6 | 5 |
| VQELCSRBD0600R100 | ● | 6 | 1.0 | 30 | 80 | 6 | 5 |
| VQELCSRBD0800R020 | ★ | 8 | 0.2 | 40 | 100 | 8 | 5 |
| VQELCSRBD0800R030 | ● | 8 | 0.3 | 40 | 100 | 8 | 5 |
| VQELCSRBD0800R050 | ● | 8 | 0.5 | 40 | 100 | 8 | 5 |
| VQELCSRBD0800R100 | ● | 8 | 1.0 | 40 | 100 | 8 | 5 |
| VQELCSRBD0800R150 | ● | 8 | 1.5 | 40 | 100 | 8 | 5 |
| VQELCSRBD0800R200 | ★ | 8 | 2.0 | 40 | 100 | 8 | 5 |
| VQELCSRBD1000R020 | ★ | 10 | 0.2 | 50 | 110 | 10 | 5 |
| VQELCSRBD1000R030 | ★ | 10 | 0.3 | 50 | 110 | 10 | 5 |
| VQELCSRBD1000R050 | ● | 10 | 0.5 | 50 | 110 | 10 | 5 |
| VQELCSRBD1000R100 | ● | 10 | 1.0 | 50 | 110 | 10 | 5 |
| VQELCSRBD1000R150 | ● | 10 | 1.5 | 50 | 110 | 10 | 5 |
| VQELCSRBD1000R200 | ● | 10 | 2.0 | 50 | 110 | 10 | 5 |

1/2

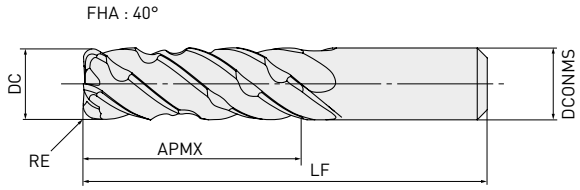
1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

235 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

## VQELCSRB – CORNER RADIUS, EXTRA LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER




| Order number | Stock | DC | RE | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| VQELCSRBD1000R250 | ★ | 10 | 2.5 | 50 | 110 | 10 | 5 |
| VQELCSRBD1200R050 | ● | 12 | 0.5 | 60 | 125 | 12 | 5 |
| VQELCSRBD1200R100 | ● | 12 | 1.0 | 60 | 125 | 12 | 5 |
| VQELCSRBD1200R150 | ● | 12 | 1.5 | 60 | 125 | 12 | 5 |
| VQELCSRBD1200R200 | ● | 12 | 2.0 | 60 | 125 | 12 | 5 |
| VQELCSRBD1200R250 | ★ | 12 | 2.5 | 60 | 125 | 12 | 5 |
| VQELCSRBD1200R300 | ● | 12 | 3.0 | 60 | 125 | 12 | 5 |
| VQELCSRBD1600R050 | ★ | 16 | 0.5 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R100 | ● | 16 | 1.0 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R200 | ● | 16 | 2.0 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R250 | ★ | 16 | 2.5 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R300 | ● | 16 | 3.0 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R400 | ★ | 16 | 4.0 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R500 | ● | 16 | 5.0 | 80 | 150 | 16 | 5 |
| VQELCSRBD1600R600 | ★ | 16 | 6.0 | 80 | 150 | 16 | 5 |
| VQELCSRBD2000R050 | ★ | 20 | 0.5 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R100 | ● | 20 | 1.0 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R200 | ● | 20 | 2.0 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R250 | ★ | 20 | 2.5 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R300 | ● | 20 | 3.0 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R400 | ★ | 20 | 4.0 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R500 | ● | 20 | 5.0 | 100 | 170 | 20 | 5 |
| VQELCSRBD2000R600 | ★ | 20 | 6.0 | 100 | 170 | 20 | 5 |

2/2

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

235 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

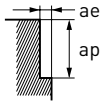
# VQELCSRB

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | Vc | n | Vf | ap | ae | hm | h max |
|---|---|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Mild steel | 6 | 160 | 8500 | 1400 | 30 | 0.5 | 0.007 | 0.013 |
| | | 8 | 160 | 6400 | 1400 | 40 | 0.6 | 0.009 | 0.018 |
| | | 10 | 160 | 5100 | 1300 | 50 | 0.8 | 0.011 | 0.021 |
| | | 12 | 160 | 4200 | 1300 | 60 | 0.9 | 0.013 | 0.025 |
| | | 16 | 160 | 3200 | 1100 | 80 | 1.2 | 0.014 | 0.028 |
| | | 20 | 160 | 2500 | 950 | 100 | 1.5 | 0.016 | 0.031 |
| P | Pre-hardened steel, Alloy tool steel | 6 | 150 | 8000 | 1100 | 30 | 0.5 | 0.006 | 0.011 |
| | | 8 | 150 | 6000 | 1200 | 40 | 0.6 | 0.008 | 0.016 |
| | | 10 | 150 | 4800 | 1100 | 50 | 0.8 | 0.009 | 0.018 |
| | | 12 | 150 | 4000 | 1100 | 60 | 0.9 | 0.011 | 0.022 |
| | | 16 | 150 | 3000 | 950 | 80 | 1.2 | 0.013 | 0.026 |
| | | 20 | 150 | 2400 | 700 | 100 | 1.5 | 0.012 | 0.024 |
| M | Austenitic, Ferritic and martensitic stainless steel, Titanium alloy | 6 | 90 | 4800 | 700 | 30 | 0.2 | 0.004 | 0.009 |
| | | 8 | 90 | 3600 | 700 | 40 | 0.3 | 0.006 | 0.012 |
| | | 10 | 90 | 2900 | 600 | 50 | 0.4 | 0.006 | 0.012 |
| S | | 12 | 90 | 2400 | 600 | 60 | 0.5 | 0.008 | 0.015 |
| | | 16 | 90 | 1800 | 500 | 80 | 0.6 | 0.008 | 0.017 |
| | | 20 | 90 | 1400 | 400 | 100 | 0.8 | 0.009 | 0.017 |
| M | Hardened stainless steel, Cobalt chromium alloy | 6 | 80 | 4200 | 600 | 30 | 0.2 | 0.004 | 0.009 |
| | | 8 | 80 | 3200 | 600 | 40 | 0.3 | 0.006 | 0.011 |
| | | 10 | 80 | 2500 | 600 | 50 | 0.4 | 0.007 | 0.014 |
| | | 12 | 80 | 2100 | 500 | 60 | 0.5 | 0.007 | 0.014 |
| | | 16 | 80 | 1600 | 400 | 80 | 0.6 | 0.008 | 0.015 |
| | | 20 | 80 | 1300 | 350 | 100 | 0.8 | 0.008 | 0.016 |
| N | Copper, Copper alloy | 6 | 180 | 9500 | 1600 | 30 | 0.5 | 0.007 | 0.014 |
| | | 8 | 180 | 7200 | 1600 | 40 | 0.6 | 0.009 | 0.018 |
| | | 10 | 180 | 5700 | 1500 | 50 | 0.8 | 0.011 | 0.021 |
| | | 12 | 180 | 4800 | 1500 | 60 | 0.9 | 0.013 | 0.025 |
| | | 16 | 180 | 3600 | 1300 | 80 | 1.2 | 0.015 | 0.029 |
| | | 20 | 180 | 2900 | 1200 | 100 | 1.5 | 0.017 | 0.033 |
| S | Heat resistant alloy | 6 | 25 | 1300 | 90 | 30 | 0.10 | 0.001 | 0.003 |
| | | 8 | 25 | 1000 | 90 | 40 | 0.12 | 0.002 | 0.003 |
| | | 10 | 25 | 800 | 90 | 50 | 0.16 | 0.002 | 0.004 |
| | | 12 | 25 | 700 | 80 | 60 | 0.18 | 0.002 | 0.004 |
| | | 16 | 25 | 500 | 70 | 80 | 0.24 | 0.003 | 0.005 |
| | | 20 | 25 | 400 | 70 | 100 | 0.30 | 0.003 | 0.007 |

1/1

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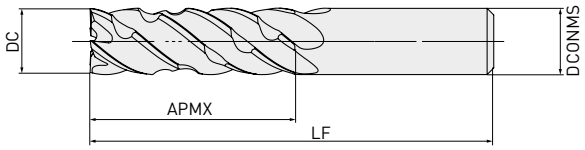
2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur. In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

# VQLCS

## END MILL, LONG CUT LENGTH (4 x DC), 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S




| DC≤12 | DC>12 |
|---|---|
| 0<br>-0.030 | 0<br>-0.040 |

| DCONMS=6 | DCONMS=8, 10 | DCONMS=12 | DCONMS=16 | DCONMS=20 |
|---|---|---|---|---|
| 0<br>-0.005 | 0<br>-0.006 | 0<br>-0.008 | 0<br>-0.011 | 0<br>-0.013 |

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

| | Order number | Stock | DC | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|---|
| | VQLCSD0600 | ● | 6 | 24 | 70 | 6 | 5 |
| | VQLCSD0800 | ● | 8 | 32 | 90 | 8 | |
| | VQLCSD1000 | ● | 10 | 40 | 100 | 10 | |
| | VQLCSD1200 | ● | 12 | 48 | 110 | 12 | |
| NEW | VQLCSD1600 | ● | 16 | 64 | 130 | 16 | |
| NEW | VQLCSD2000 | ● | 20 | 80 | 150 | 20 | |

1/1

1. If a flat is required on the tool for side clamping, please contact our technical department.

237 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

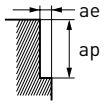
# VQLCS

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | Vc | n | Vf | ap | ae | hm | h max |
|---|---|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Mild steel | 6 | 180 | 9500 | 1600 | 24 | 0.6 | 0.008 | 0.015 |
| | | 8 | 180 | 7200 | 1600 | 32 | 0.8 | 0.010 | 0.020 |
| | | 10 | 180 | 5700 | 1500 | 40 | 1.0 | 0.012 | 0.023 |
| | | 12 | 180 | 4800 | 1500 | 48 | 1.2 | 0.015 | 0.028 |
| | | 16 | 180 | 3600 | 1300 | 64 | 1.6 | 0.017 | 0.033 |
| | | 20 | 180 | 2900 | 1100 | 80 | 2.0 | 0.018 | 0.035 |
| P | Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel | 6 | 160 | 8500 | 1200 | 24 | 0.6 | 0.007 | 0.013 |
| | | 8 | 160 | 6400 | 1300 | 32 | 0.8 | 0.009 | 0.018 |
| | | 10 | 160 | 5100 | 1200 | 40 | 1.0 | 0.011 | 0.022 |
| | | 12 | 160 | 4200 | 1200 | 48 | 1.2 | 0.013 | 0.025 |
| | | 16 | 160 | 3200 | 1000 | 64 | 1.6 | 0.015 | 0.028 |
| | | 20 | 160 | 2500 | 800 | 80 | 2.0 | 0.015 | 0.029 |
| M | Austenitic, Ferritic and martensitic stainless steel, Titanium alloy | 6 | 100 | 5300 | 800 | 24 | 0.3 | 0.005 | 0.010 |
| | | 8 | 100 | 4000 | 800 | 32 | 0.4 | 0.006 | 0.013 |
| | | 10 | 100 | 3200 | 700 | 40 | 0.5 | 0.008 | 0.015 |
| S | | 12 | 100 | 2700 | 700 | 48 | 0.6 | 0.008 | 0.017 |
| | | 16 | 100 | 2100 | 600 | 64 | 0.8 | 0.010 | 0.019 |
| | | 20 | 100 | 1600 | 500 | 80 | 1.0 | 0.011 | 0.021 |
| M | Hardened stainless steel, Cobaly chromium alloy | 6 | 90 | 4800 | 700 | 24 | 0.3 | 0.005 | 0.010 |
| | | 8 | 90 | 3600 | 700 | 32 | 0.4 | 0.006 | 0.013 |
| | | 10 | 90 | 2900 | 700 | 40 | 0.5 | 0.008 | 0.015 |
| | | 12 | 90 | 2400 | 600 | 48 | 0.6 | 0.008 | 0.016 |
| | | 16 | 90 | 1800 | 500 | 64 | 0.8 | 0.009 | 0.019 |
| | | 20 | 90 | 1400 | 400 | 80 | 1.0 | 0.010 | 0.019 |
| N | Copper, Copper alloy | 6 | 200 | 10600 | 1800 | 24 | 0.6 | 0.008 | 0.015 |
| | | 8 | 200 | 8000 | 1800 | 32 | 0.8 | 0.011 | 0.020 |
| | | 10 | 200 | 6400 | 1600 | 40 | 1.0 | 0.012 | 0.022 |
| | | 12 | 200 | 5300 | 1600 | 48 | 1.2 | 0.014 | 0.027 |
| | | 16 | 200 | 4000 | 1400 | 64 | 1.6 | 0.017 | 0.032 |
| | | 20 | 200 | 3200 | 1300 | 80 | 2.0 | 0.019 | 0.037 |
| S | Heat resistant alloy | 6 | 30 | 1600 | 100 | 24 | 0.12 | 0.002 | 0.003 |
| | | 8 | 30 | 1200 | 100 | 32 | 0.16 | 0.002 | 0.004 |
| | | 10 | 30 | 1000 | 100 | 40 | 0.20 | 0.003 | 0.005 |
| | | 12 | 30 | 800 | 100 | 48 | 0.24 | 0.003 | 0.005 |
| | | 16 | 30 | 600 | 80 | 64 | 0.32 | 0.003 | 0.006 |
| | | 20 | 30 | 500 | 80 | 80 | 0.40 | 0.003 | 0.007 |

1/1



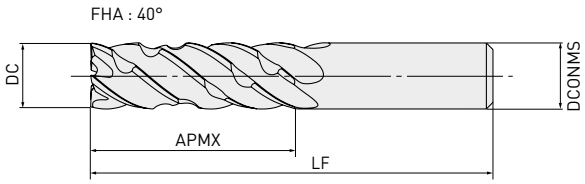

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.
2. The irregular pitch flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece material installation is poor, vibration or abnormal sounds can occur. In that case, please adjust the revolution, feed rate and depth of cut.
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

NEW

# VQELCS

## END MILL, EXTRA LONG CUT LENGTH, 5 FLUTE, IRREGULAR PITCH FLUTES, CHIPBREAKER

P M N S




| DC≤12 | DC>12 | | | |
|---|---|---|---|---|
| 0<br>-0.030 | 0<br>-0.040 | | | |
| DCONMS=6 | DCONMS=8, 10 | DCONMS=12 | DCONMS=16 | DCONMS=20 |
| 0<br>-0.005 | 0<br>-0.006 | 0<br>-0.008 | 0<br>-0.011 | 0<br>-0.013 |

- Chipbreaker type end mill for efficient chip breaking capabilities that also provides good surface finishes.
- A high rigidity SMART MIRACLE vibration damping end mill for high efficiency trochoidal milling.

| Order number | Stock | DC | APMX | LF | DCONMS | ZEFP |
|---|---|---|---|---|---|---|
| VQELCSD0600 | ● | 6 | 30 | 80 | 6 | 5 |
| VQELCSD0800 | ● | 8 | 40 | 100 | 8 | |
| VQELCSD1000 | ● | 10 | 50 | 110 | 10 | |
| VQELCSD1200 | ● | 12 | 60 | 125 | 12 | |
| VQELCSD1600 | ● | 16 | 80 | 150 | 16 | |
| VQELCSD2000 | ● | 20 | 100 | 170 | 20 | |

1/1

1. SMART MIRACLE coating has very low electrical conductivity; therefore, an electrical contact type of tool setter may not work. When measuring the tool length, please use a mechanical contact type or a laser tool setter.

239 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

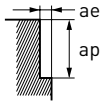
# VQELCS

## RECOMMENDED CUTTING CONDITIONS

### SIDE MILLING

| | Material | DC | Vc | n | Vf | ap | ae | hm | h max |
|---|---|---|---|---|---|---|---|---|---|
| P | Carbon steel, Alloy steel, Mild steel | 6 | 160 | 8500 | 1400 | 30 | 0.5 | 0.007 | 0.013 |
| | | 8 | 160 | 6400 | 1400 | 40 | 0.6 | 0.009 | 0.018 |
| | | 10 | 160 | 5100 | 1300 | 50 | 0.8 | 0.011 | 0.021 |
| | | 12 | 160 | 4200 | 1300 | 60 | 0.9 | 0.013 | 0.025 |
| | | 16 | 160 | 3200 | 1100 | 80 | 1.2 | 0.014 | 0.028 |
| | | 20 | 160 | 2500 | 950 | 100 | 1.5 | 0.016 | 0.031 |
| | Pre-hardened steel, Alloy tool steel | 6 | 150 | 8000 | 1100 | 30 | 0.5 | 0.006 | 0.011 |
| | | 8 | 150 | 6000 | 1200 | 40 | 0.6 | 0.008 | 0.016 |
| | | 10 | 150 | 4800 | 1100 | 50 | 0.8 | 0.009 | 0.018 |
| | | 12 | 150 | 4000 | 1100 | 60 | 0.9 | 0.011 | 0.022 |
| | | 16 | 150 | 3000 | 950 | 80 | 1.2 | 0.013 | 0.026 |
| | | 20 | 150 | 2400 | 700 | 100 | 1.5 | 0.012 | 0.024 |
| M S | Austenitic, Ferritic and martensitic stainless steel, Titanium alloy | 6 | 90 | 4800 | 700 | 30 | 0.2 | 0.004 | 0.009 |
| | | 8 | 90 | 3600 | 700 | 40 | 0.3 | 0.006 | 0.012 |
| | | 10 | 90 | 2900 | 600 | 50 | 0.4 | 0.006 | 0.012 |
| | | 12 | 90 | 2400 | 600 | 60 | 0.5 | 0.008 | 0.015 |
| | | 16 | 90 | 1800 | 500 | 80 | 0.6 | 0.008 | 0.017 |
| | | 20 | 90 | 1400 | 400 | 100 | 0.8 | 0.009 | 0.017 |
| M | Hardened stainless steel, Cobaly chromium alloy | 6 | 80 | 4200 | 600 | 30 | 0.2 | 0.004 | 0.009 |
| | | 8 | 80 | 3200 | 600 | 40 | 0.3 | 0.006 | 0.011 |
| | | 10 | 80 | 2500 | 600 | 50 | 0.4 | 0.007 | 0.014 |
| | | 12 | 80 | 2100 | 500 | 60 | 0.5 | 0.007 | 0.014 |
| | | 16 | 80 | 1600 | 400 | 80 | 0.6 | 0.008 | 0.015 |
| | | 20 | 80 | 1300 | 350 | 100 | 0.8 | 0.008 | 0.016 |
| N | Copper, Copper alloy | 6 | 180 | 9500 | 1600 | 30 | 0.5 | 0.007 | 0.014 |
| | | 8 | 180 | 7200 | 1600 | 40 | 0.6 | 0.009 | 0.018 |
| | | 10 | 180 | 5700 | 1500 | 50 | 0.8 | 0.011 | 0.021 |
| | | 12 | 180 | 4800 | 1500 | 60 | 0.9 | 0.013 | 0.025 |
| | | 16 | 180 | 3600 | 1300 | 80 | 1.2 | 0.015 | 0.029 |
| | | 20 | 180 | 2900 | 1200 | 100 | 1.5 | 0.017 | 0.033 |
| S | Heat resistant alloy | 6 | 25 | 1300 | 90 | 30 | 0.10 | 0.001 | 0.003 |
| | | 8 | 25 | 1000 | 90 | 40 | 0.12 | 0.002 | 0.003 |
| | | 10 | 25 | 800 | 90 | 50 | 0.16 | 0.002 | 0.004 |
| | | 12 | 25 | 700 | 80 | 60 | 0.18 | 0.002 | 0.004 |
| | | 16 | 25 | 500 | 70 | 80 | 0.24 | 0.003 | 0.005 |
| | | 20 | 25 | 400 | 70 | 100 | 0.30 | 0.003 | 0.007 |

1/1

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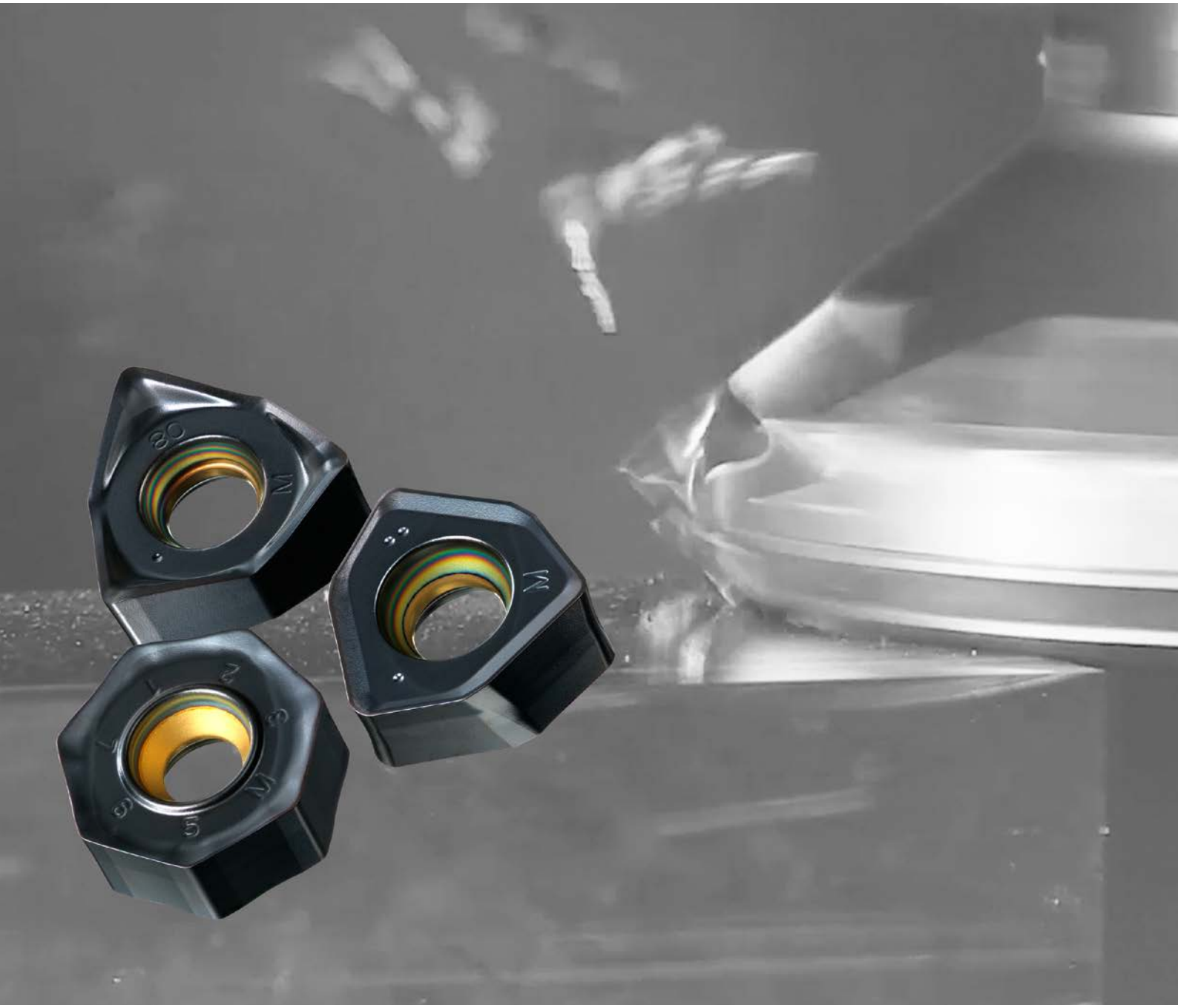
3. The revolution and feed rate can be increased with a smaller depth of cut.
4. For machining stainless steel, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

# MV1000 SERIES

## SETTING A NEW STANDARD FOR TOOL LIFE



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# MV1000 SERIES

## COATED CARBIDE GRADE FOR MILLING

### ADVANCED WEAR RESISTANCE

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays very high hardness. This greatly improves oxidation and wear resistance.

### ADVANCED THERMAL SHOCK RESISTANCE

The extreme heat resistance of this new series achieves amazing stability, not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking.

Graphical representation

**EXCELLENT WELDING RESISTANCE**

Smooth surface.

**OUTSTANDING WEAR RESISTANCE**

Newly developed Al-Rich coating.

**EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING**

Newly developed bonding layer.

**FRACTURE RESISTANCE FOR THE ULTIMATE STABILITY**

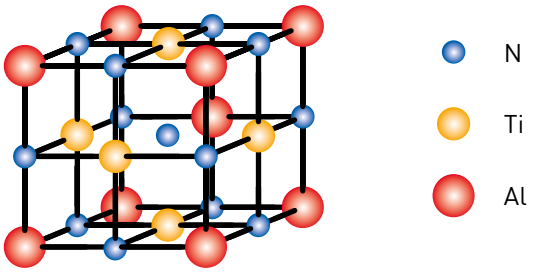
Exclusive cemented carbide substrate.

# MV1000 SERIES

## COMPLETE COATING TECHNOLOGY THAT REWRITES CURRENT TOOL LIFE STANDARDS

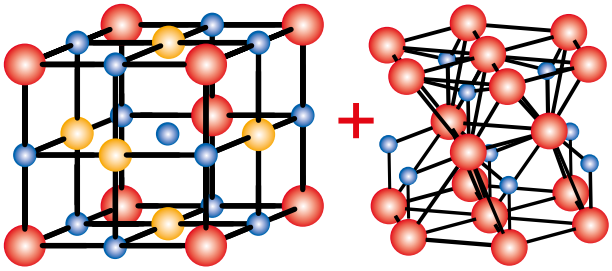
### DUE TO THE NEWLY DEVELOPED Al-RICH COATING

Aluminium titanium nitride (Al,Ti)N is a compound of aluminium and titanium that is widely used as a coating for cutting tools due to its extremely hard and heat-resistant properties.



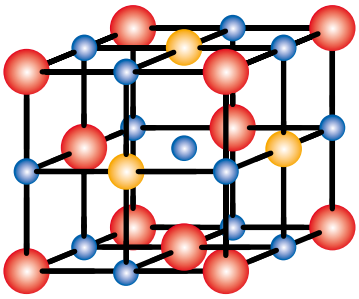

The combination of atoms with different sizes creates an exceptionally hard crystal structure.

The hardness of (Al,Ti)N increases as the Al content ratio increases, but with conventional technology, when the Al content ratio exceeds 60 %, the crystal structure changes and the hardness of (Al,Ti)N decreases.

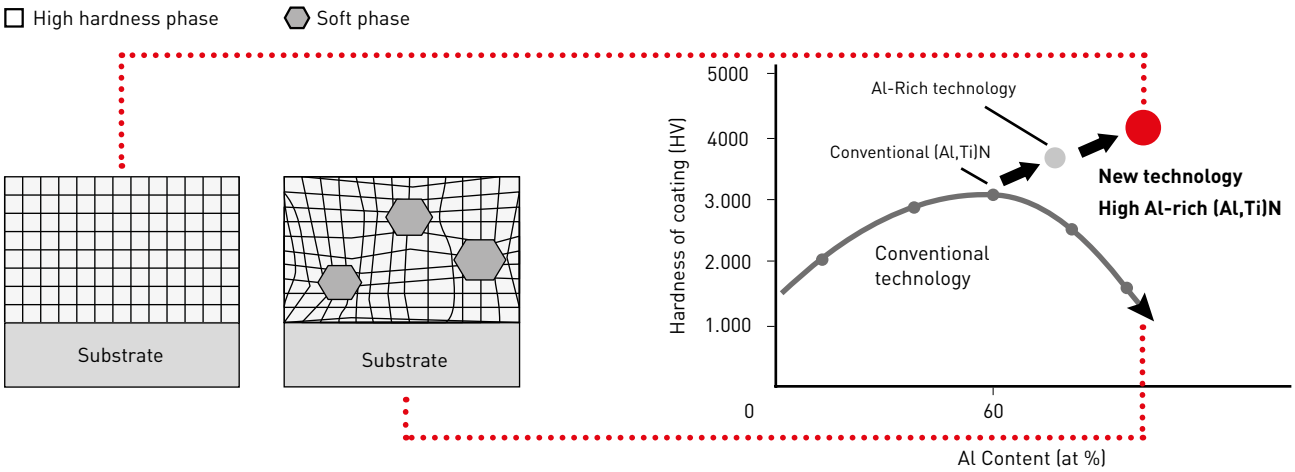


When the Al ratio is over 60 %, a softer crystal phase is formed.

Using a new coating process based on Mitsubishi Materials' own original technology. This a way in which the Al-Rich coating does not change its crystal structure even when the Al content is increased.
This enables a higher Al content and a provides a higher hardness (Al,Ti)N.



Crystal image of **MV1000** series



# MV1020 / MV1030

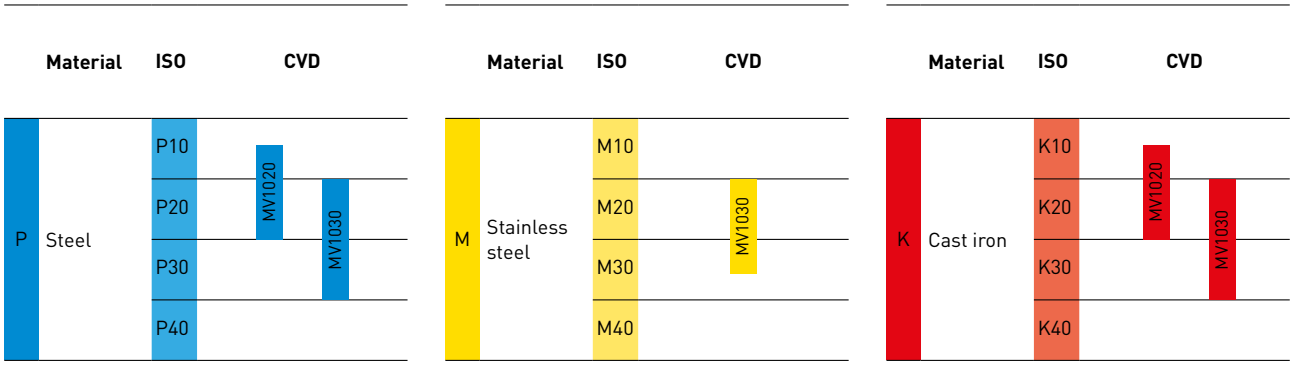
## COATED CARBIDE GRADE FOR MILLING

### MV1020

This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds, especially when machining steel and ductile cast iron, thus greatly reducing work time.

### MV1030

The new Al-Rich coating also provides excellent wear resistance. An unprecedented performance against sudden breakage was also realised especially during problematic wet cutting and when machining stainless steels.




1. Dry cutting is recommended for machining stainless steel with MV1030.

# MV1000 SERIES

## INSERTS

| | | | |
|---|---|---|---|
| P | Steel | ◆ | ◆ |
| M | Stainless steel | | ◆ |
| K | Cast iron | ◆ | ◆ |

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

**Honing:**
E: Round S: Chamfer + round

| | Order number | Application | Class | Honing | MV1020 | MV1030 | IC | S | S1 | BS | RE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NNMU130508ZER-L | Low cutting resistance | M | E | ● | ● | 13.4 | 5.09 | — | 1.0 | 0.8 | **AHX440/475** |
| | NNMU130508ZEN-M | General purpose cutting | M | E | ● | ● | 13.4 | 5.09 | — | 1.0 | 0.8 | |
| | NNMU130532ZEN-M | General purpose cutting | M | E | ● | ● | 13.4 | 5.09 | — | — | 3.2 | |
| | NNMU130532ZEN-R | Cutting edge strength | M | E | ● | ● | 13.4 | 5.09 | — | — | 3.2 | |
| NEW | NNMU200708ZEN-M | General purpose cutting | M | E | ● | ● | 20.0 | 7.28 | — | 1.0 | 0.8 | **AHX640** |
| NEW | NNMU200712ZER-L | Low cutting resistance | M | E | ● | ● | 20.0 | 7.24 | — | 1.0 | 0.8 | |
| NEW | NNMU200608ZEN-MK | General purpose cutting | M | E | ● | ● | 20.0 | 6.1 | — | 1.0 | 0.8 | |
| NEW | NNMU200608ZEN-HK | Strong purpose cutting | M | E | ● | ● | 20.0 | 6.1 | — | 1.0 | 0.8 | |
| | SEET13T3AGEN-JL | Finish-light cutting | E | E | ● | ● | 13.4 | 3.97 | — | 1.9 | 1.5 | **ASX445** |
| | SEMT13T3AGSN-JM | Light-rough cutting | M | S | ● | ● | 13.4 | 3.97 | — | 1.9 | 1.5 | |
| | SEMT13T3AGSN-JH | Medium-heavy cutting | M | S | ● | ● | 13.4 | 3.97 | — | 1.9 | 1.5 | |
| | SEMT13T3AGSN-FT | Cast iron milling | M | S | ● | ● | 13.4 | 3.97 | — | 1.9 | 1.5 | |
| | SOET12T308PEER-JL | Finish-light cutting | E | E | ● | ● | 12.7 | 3.97 | — | 1.4 | 0.8 | **ASX400** |
| | SOMT12T308PEER-JM | Light-rough cutting | M | E | ● | ● | 12.7 | 3.97 | — | 1.4 | 0.8 | |
| | SOMT12T308PEER-JH | Medium-heavy cutting | M | E | ● | ● | 12.7 | 3.97 | — | 1.4 | 0.8 | |
| | SOMT12T320PEER-FT | Heavy interrupted cutting | M | E | ● | ● | 12.7 | 3.97 | — | 0.5 | 2.0 | |



(10 inserts in one case)

247–249 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

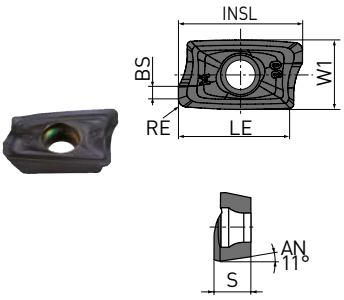
## MV1000 SERIES – INSERTS

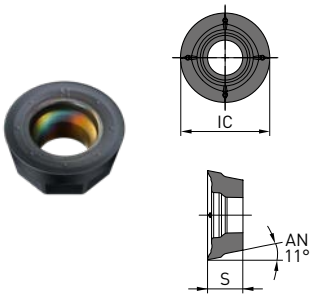
| | | | |
|---|---|---|---|
| P | Steel | ◆ | ◆ |
| M | Stainless steel | | ◆ |
| K | Cast iron | ◆ | ◆ |

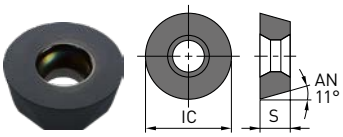
Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

**Honing:**
E: Round S: Chamfer + round

| Order number | Application | Class | MV1020 | MV1030 | IC | S | BS | W1 | RE | INSL | LE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AOMT123602PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 1.8 | 6.6 | 0.2 | 12 | 10 | **APX3000/4000** |
| AOMT123604PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 1.6 | 6.6 | 0.4 | 12 | 10 | |
| AOMT123608PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 1.2 | 6.6 | 0.6 | 12 | 10 | |
| AOMT123610PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 1.0 | 6.6 | 1 | 12 | 10 | |
| AOMT123612PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 0.8 | 6.6 | 1.2 | 12 | 10 | |
| AOMT123616PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 0.4 | 6.6 | 1.6 | 12 | 10 | |
| AOMT123620PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 0.4 | 6.6 | 2 | 12 | 10 | |
| AOMT123624PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 0.4 | 6.6 | 2.4 | 12 | 10 | |
| AOMT123630PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 0.4 | 6.6 | 3 | 12 | 10 | |
| AOMT123632PEER-M | General purpose cutting | M | ● | ● | | 3.6 | 0.4 | 6.6 | 3.2 | 12 | 10 | |
| AOMT123604PEER-H | Strong purpose cutting | M | ● | ● | | 3.6 | 1.6 | 6.6 | 0.4 | 12 | 10 | |
| AOMT123608PEER-H | Strong purpose cutting | M | ● | ● | | 3.6 | 1.6 | 6.6 | 0.8 | 12 | 10 | |
| AOMT123616PEER-H | Strong purpose cutting | M | ● | ● | | 3.6 | 0.4 | 6.6 | 1.6 | 12 | 10 | |
| AOMT184804PEER-M | General purpose cutting | M | ● | ● | | 4.8 | 1.8 | 9.0 | 0.4 | 18 | 15 | |
| AOMT184808PEER-M | General purpose cutting | M | ● | ● | | 4.8 | 1.4 | 9.0 | 0.8 | 18 | 15 | |
| AOMT184810PEER-M | General purpose cutting | M | ● | ● | | 4.8 | 1.0 | 9.0 | 1 | 18 | 15 | |
| AOMT184812PEER-M | General purpose cutting | M | ● | ● | | 4.8 | 0.8 | 9.0 | 1.2 | 18 | 15 | |
| AOMT184816PEER-M | General purpose cutting | M | ● | ● | | 4.8 | 0.4 | 9.0 | 1.6 | 18 | 15 | |
| AOMT184820PEER-M | General purpose cutting | M | ● | ● | | 4.8 | 0.4 | 9.0 | 2 | 18 | 15 | |
| AOMT184804PEER-H | Strong purpose cutting | M | ● | ● | | 4.8 | 1.8 | 9.0 | 0.4 | 18 | 15 | |
| AOMT184808PEER-H | Strong purpose cutting | M | ● | ● | | 4.8 | 1.4 | 9.0 | 0.8 | 18 | 15 | |
| AOMT184816PEER-H | Strong purpose cutting | M | ● | ● | | 4.8 | 0.4 | 9.0 | 1.6 | 18 | 15 | |
| RPMT1040M0E8-L1 | Low cutting resistance | M | ● | ● | 10 | 3.97 | | | | | | **ARP** |
| RPMT1040M0E4-L2 | Low cutting resistance | M | ● | ● | 10 | 3.97 | | | | | | |
| RPMT1040M0E8-M1 | General purpose cutting | M | ● | ● | 10 | 3.97 | | | | | | |
| RPMT1040M0E4-M2 | General purpose cutting | M | ● | ● | 10 | 3.97 | | | | | | |
| RPMT1040M0E8-R1 | Strong purpose cutting | M | ● | ● | 10 | 3.97 | | | | | | |
| RPMT1040M0E4-R2 | Strong purpose cutting | M | ● | ● | 10 | 3.97 | | | | | | |
| RPMT1248M0E8-L1 | Low cutting resistance | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMT1248M0E4-L2 | Low cutting resistance | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMT1248M0E8-M1 | General purpose cutting | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMT1248M0E4-M2 | General purpose cutting | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMT1248M0E8-R1 | Strong purpose cutting | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMT1248M0E4-R2 | Strong purpose cutting | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMW10T3M0E | General purpose cutting | M | ● | ● | 10 | 3.97 | | | | | | **BRP** |
| RPMW1204M0E | General purpose cutting | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMW1606M0E | General purpose cutting | M | ● | ● | 16 | 6.35 | | | | | | |
| RPMT08T2M0E-JS | Low cutting resistance | M | ● | ● | 8 | 2.78 | | | | | | |
| RPMT10T3M0E-JS | Low cutting resistance | M | ● | ● | 10 | 3.97 | | | | | | |
| RPMT1204M0E-JS | Low cutting resistance | M | ● | ● | 12 | 4.76 | | | | | | |
| RPMT1606M0E-JS | Low cutting resistance | M | ● | ● | 16 | 6.35 | | | | | | |






(10 inserts in one case)

250 – 252 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

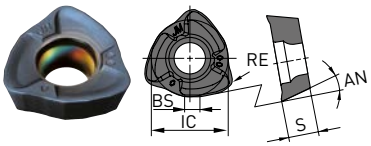
## MV1000 SERIES – INSERTS

| | | | |
|---|---|---|---|
| P | Steel | ◆ | ◆ |
| M | Stainless steel | | ◆ |
| K | Cast iron | ◆ | ◆ |

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

**Honing:**
E: Round S: Chamfer + round

| Order number | Application | Class | MV1020 | MV1030 | AN | IC | S | BS | RE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|
| JOMW06T215ZZSR-FT | Strong purpose cutting | M | ● | ● | 13° | 6.35 | 2.78 | 1.2 | 1.5 | AJX |
| JOMW080320ZZSR-FT | Strong purpose cutting | M | ● | ● | 13° | 8 | 3.18 | 1.4 | 2 | |
| JDMW09T320ZDSR-FT | Strong purpose cutting | M | ● | ● | 15° | 9.525 | 3.97 | 1.8 | 2 | |
| JDMW120420ZDSR-FT | Strong purpose cutting | M | ● | ● | 15° | 12 | 4.76 | 2.5 | 2 | |
| JDMW140520ZDSR-FT | Strong purpose cutting | M | ● | ● | 15° | 14 | 5.56 | 2.8 | 2 | |
| JDMT120420ZDSR-ST | Strong purpose cutting | M | ● | ● | 15° | 12 | 4.76 | 2.5 | 2 | |
| JDMT140520ZDSR-ST | Strong purpose cutting | M | ● | ● | 15° | 14 | 5.56 | 2.8 | 2 | |
| JOMT06T216ZZER-JL | Low cutting resistance | M | ● | ● | 13° | 6.35 | 2.78 | 1.2 | 1.6 | |
| JOMT080322ZZER-JL | Low cutting resistance | M | ● | ● | 13° | 8 | 3.18 | 1.4 | 2.2 | |
| JDMT09T323ZDER-JL | Low cutting resistance | M | ● | ● | 15° | 9.525 | 3.97 | 1.2 | 1.5 | |
| JDMT120423ZDER-JL | Low cutting resistance | M | ● | ● | 15° | 12 | 4.76 | 1.4 | 2 | |
| JDMT140523ZDER-JL | Low cutting resistance | M | ● | ● | 15° | 14 | 5.56 | 1.8 | 2 | |
| JOMT06T215ZZSR-JM | General purpose cutting | M | ● | ● | 13° | 6.35 | 2.78 | 1.2 | 1.5 | |
| JOMT080320ZZSR-JM | General purpose cutting | M | ● | ● | 13° | 8 | 3.18 | 1.4 | 2 | |
| JDMT09T320ZDSR-JM | General purpose cutting | M | ● | ● | 15° | 9.525 | 3.97 | 1.8 | 2 | |
| JDMT120420ZDSR-JM | General purpose cutting | M | ● | ● | 15° | 12 | 4.76 | 2.5 | 2 | |
| JDMT140520ZDSR-JM | General purpose cutting | M | ● | ● | 15° | 14 | 5.56 | 2.8 | 2 | |




3/3

(10 inserts in one case)

253 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

NEW

# AHX440S

## RECOMMENDED CUTTING CONDITIONS

### DRY CUTTING

| | Material | Properties | Vc | | fz | ap | ae |
|---|---|---|---|---|---|---|---|
| | | | MV1020 | MV1030 | | | |
| P | Mild steel | ≤180HB | 300 (200 – 400) | 245 (190 – 300) | 0.3 (0.2 – 0.4) | ≤3 | ≤0.8 DC |
| P | Carbon steel<br>Alloy steel | 180 – 280HB | 260 (170 – 350) | 210 (150 – 270) | 0.3 (0.2 – 0.4) | ≤3 | ≤0.8 DC |
| P | Carbon steel<br>Alloy steel | 280 – 350HB | 180 (100 – 250) | 135 ( 90 – 180) | 0.3 (0.2 – 0.4) | ≤3 | ≤0.8 DC |
| M | Stainless steel | ≤200HB | — | 185 (120 – 250) | 0.2 (0.1 – 0.3) | ≤3 | ≤0.8 DC |
| M | Stainless steel | >200HB | — | 140 ( 80 – 200) | 0.2 (0.1 – 0.3) | ≤3 | ≤0.8 DC |
| K | Ductile cast iron | Tensile strength ≤450MPa | 240 (130 – 350) | 185 (120 – 250) | 0.2 (0.1 – 0.3) | ≤3 | ≤0.8 DC |
| K | Ductile cast iron | Tensile strength ≤800MPa | 220 ( 80 – 350) | 150 (100 – 200) | 0.2 (0.1 – 0.3) | ≤3 | ≤0.8 DC |

1/1

1. Refer to the above table and set up cutting conditions according to cutting applications.
2. When placing emphasis on surface finish quality, wet cutting is recommended. (tool life is lowered as compared to dry cutting)
3. The recommended depth of cut differs according to insert geometry.
4. When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30 %.
5. Recommended wet cutting for good surface finishing of stainless steel. (Tool life is short compared to wet cutting.)

# AHX475S

## RECOMMENDED CUTTING CONDITIONS

### DRY CUTTING

| | Material | Properties | | Vc | | fz | ap | ae |
|---|---|---|---|---|---|---|---|---|
| | | | | MV1020 | MV1030 | | | |
| P | Mild steel | ≤180HB | R | 220 (170 – 270) | 140 (80 – 200) | 0.6 | ≤1.6 | ≤0.5 DC |
| P | Mild steel | ≤180HB | R | 220 (170 – 270) | 140 (80 – 200) | 0.8 | ≤1.6 | 0.5 DC < ae ≤ 0.8 DC |
| P | Mild steel | ≤180HB | M | 220 (170 – 270) | 140 (80 – 200) | 1.0 | ≤1.6 | 0.8 DC < ae ≤ DC |
| P | Carbon steel<br>Alloy steel | 180 – 280HB | R | 200 (150 – 250) | 120 (60 – 180) | 0.6 | ≤1.6 | ≤0.5 DC |
| P | Carbon steel<br>Alloy steel | 180 – 280HB | R | 200 (150 – 250) | 120 (60 – 180) | 0.8 | ≤1.6 | 0.5 DC < ae ≤ 0.8 DC |
| P | Carbon steel<br>Alloy steel | 180 – 280HB | M | 200 (150 – 250) | 120 (60 – 180) | 1.0 | ≤1.6 | 0.8 DC < ae ≤ DC |
| P | Carbon steel<br>Alloy steel | 280 – 350HB | R | 150 (100 – 200) | 90 (30 – 150) | 0.5 | ≤1.6 | ≤0.5 DC |
| P | Carbon steel<br>Alloy steel | 280 – 350HB | R | 150 (100 – 200) | 90 (30 – 150) | 0.6 | ≤1.6 | 0.5 DC < ae ≤ 0.8 DC |
| P | Carbon steel<br>Alloy steel | 280 – 350HB | R | 150 (100 – 200) | 90 (30 – 150) | 0.7 | ≤1.6 | 0.8 DC < ae ≤ DC |
| K | Ductile cast iron | Tensile strength ≤450MPa | R | 200 (150 – 250) | 140 (80 – 200) | 0.6 | ≤1.6 | ≤0.5 DC |
| K | Ductile cast iron | Tensile strength ≤450MPa | R | 200 (150 – 250) | 140 (80 – 200) | 0.8 | ≤1.6 | 0.5 DC < ae ≤ 0.8 DC |
| K | Ductile cast iron | Tensile strength ≤450MPa | M | 200 (150 – 250) | 140 (80 – 200) | 1.0 | ≤1.6 | 0.8 DC < ae ≤ DC |
| K | Ductile cast iron | Tensile strength ≤800MPa | R | 180 (130 – 230) | 140 (80 – 200) | 0.5 | ≤1.6 | ≤0.5 DC |
| K | Ductile cast iron | Tensile strength ≤800MPa | R | 180 (130 – 230) | 140 (80 – 200) | 0.6 | ≤1.6 | 0.5 DC < ae ≤ 0.8 DC |
| K | Ductile cast iron | Tensile strength ≤800MPa | R | 180 (130 – 230) | 140 (80 – 200) | 0.7 | ≤1.6 | 0.8 DC < ae ≤ DC |

1/1

1. When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30 %.

NEW

# AHX640S

## RECOMMENDED CUTTING CONDITIONS

### DRY CUTTING

| | Material | Properties | | Vc | | fz | ap | ae |
|---|---|---|---|---|---|---|---|---|
| | | | | MV1020 | MV1030 | | | |
| P | Mild steel | ≤180HB | M, L | 300 (200 – 400) | 245 (190 – 300) | 0.3 (0.2 – 0.4) | ≤5 | ≤0.8 DC |
| P | Carbon steel<br>Alloy steel | 180 – 280HB | M, L | 260 (170 – 350) | 210 (150 – 270) | 0.3 (0.2 – 0.4) | ≤5 | ≤0.8 DC |
| P | Carbon steel<br>Alloy steel | 280 – 350HB | M, L | 180 (100 – 250) | 135 ( 90 – 180) | 0.3 (0.2 – 0.4) | ≤5 | ≤0.8 DC |
| M | Stainless steel | ≤200HB | L | — | 185 (120 – 250) | 0.2 (0.1 – 0.3) | ≤5 | ≤0.8 DC |
| M | Stainless steel | >200HB | L | — | 140 ( 80 – 200) | 0.2 (0.1 – 0.3) | ≤5 | ≤0.8 DC |
| M | PH stainless steel | <450HB | L | — | 130 (100 – 160) | 0.2 (0.1 – 0.3) | ≤5 | ≤0.8 DC |
| K | Gray cast iron | Tensile strength ≤450MPa | M, MK, HK | 240 (130 – 350) | 185 (120 – 250) | 0.2 (0.1 – 0.3) | ≤5 | ≤0.8 DC |
| K | Gray cast iron | Tensile strength ≤800MPa | M, MK, HK | 220 ( 80 – 350) | 150 (100 – 200) | 0.2 (0.1 – 0.3) | ≤5 | ≤0.8 DC |

NEW

# ASX445

## RECOMMENDED CUTTING CONDITIONS

### DRY AND WET CUTTING

| | Material | Properties | Vc | | L | | M | | R | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MV1020 | MV1030 | fz | | fz | | fz | |
| P | Mild steel | ≤180HB | 300 (200 – 400) | 275 (200 – 350) | 0.15 (0.1 – 0.2) | JL | 0.2 (0.1 – 0.3) | JM | 0.3 (0.2 – 0.4) | JH |
| P | Carbon steel<br>Alloy steel | 180 – 350HB | 260 (170 – 350) | 235 (170 – 300) | 0.15 (0.1 – 0.2) | JL | 0.2 (0.1 – 0.3) | JM | 0.3 (0.2 – 0.4) | JH |
| P | | 280 – 350HB | 180 (100 – 250) | 165 (100 – 230) | 0.15 (0.1 – 0.2) | JL | 0.2 (0.1 – 0.3) | JM | 0.3 (0.2 – 0.4) | JH |
| M | Stainless steel | — | — | 220 (170 – 270) | 0.15 (0.1 – 0.2) | JL | 0.2 (0.1 – 0.3) | JM | 0.3 (0.2 – 0.4) | JH |
| K | Ductile cast iron | Tensile strength ≤450MPa | 240 (130 – 350) | 190 (130 – 250) | 0.15 (0.1 – 0.2) | JL | 0.2 (0.1 – 0.3) | JM | 0.3 (0.2 – 0.4) | JH, FT |
| K | | Tensile strength >450MPa | 220 ( 80 – 350) | 110 ( 80 – 150) | 0.15 (0.1 – 0.2) | JL | 0.2 (0.1 – 0.3) | JM | 0.3 (0.2 – 0.4) | JH, FT |

1/1

# ASX400

## RECOMMENDED CUTTING CONDITIONS

### DRY AND WET CUTTING

| | Material | Properties | Vc | | L | | M | | R | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MV1020 | MV1030 | fz | | fz | | fz | |
| P | Mild steel | ≤180HB | 300 (200 – 400) | 275 (200 – 350) | 0.18 (0.08 – 0.28) | JL | 0.20 (0.10 – 0.30) | JM | 0.25 (0.10 – 0.35) | JH |
| P | Carbon steel<br>Alloy steel | 180 – 350HB | 260 (170 – 350) | 235 (170 – 300) | 0.15 (0.07 – 0.23) | JL | 0.18 (0.10 – 0.28) | JM | 0.20 (0.10 – 0.30) | JH |
| P | | 280 – 350HB | 180 (100 – 250) | 165 (100 – 230) | 0.13 (0.06 – 0.20) | JL | 0.15 (0.10 – 0.25) | JM | 0.18 (0.10 – 0.28) | JH |
| M | Stainless steel | — | — | 220 (170 – 270) | 0.15 (0.07 – 0.23) | JL | 0.18 (0.10 – 0.28) | JM | 0.20 (0.10 – 0.30) | JH |
| K | Ductile cast iron | Tensile strength ≤450MPa | 240 (130 – 350) | 190 (130 – 250) | 0.18 (0.10 – 0.28) | JL | 0.20 (0.10 – 0.30) | JM | 0.25 (0.10 – 0.35) | JH, FT |
| K | | Tensile strength >450MPa | 220 ( 80 – 350) | 110 ( 80 – 150) | 0.18 (0.10 – 0.28) | JL | 0.20 (0.10 – 0.30) | JM | 0.25 (0.10 – 0.35) | JH, FT |

1/1

NEW

# APX3000 / 4000

## RECOMMENDED CUTTING CONDITIONS

### CUTTING SPEED (DRY CUTTING)

| | Material | Properties | Conditions | Recommendation 1st | Recommendation 2nd | ae ≤0.25 DC MV1020 | ae ≤0.25 DC MV1030 | ae 0.25 – 0.5 DC MV1020 | ae 0.25 – 0.5 DC MV1030 | ae 0.5 – 0.75 DC MV1020 | ae 0.5 – 0.75 DC MV1030 | ae DC (Slot) MV1020 | ae DC (Slot) MV1030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Mild steel | ≤180HB | ●● | L | M | 280 (220 – 330) | 230 (180 – 270) | 270 (210 – 320) | 220 (170 – 260) | 220 (170 – 260) | 180 (140 – 210) | 220 (170 – 260) | 180 (140 – 210) |
| P | Carbon steel Alloy steel | 180 – 280HB | ●● | L | M | 220 (170 – 260) | 180 (140 – 210) | 210 (160 – 240) | 170 (130 – 200) | 170 (130 – 200) | 140 (110 – 160) | 170 (130 – 200) | 170 (130 – 200) |
| P | Carbon steel Alloy steel | 280 – 350HB | ●● | L | M | 180 (140 – 210) | 180 (140 – 210) | 170 (130 – 200) | 170 (130 – 200) | 140 (110 – 160) | 140 (110 – 160) | 140 (110 – 160) | 140 (110 – 160) |
| M | Austenitic stainless steel | ≤200HB | ●● | L | M | — | 180 (140 – 210) | — | 170 (130 – 200) | — | 140 (110 – 160) | — | 140 (110 – 160) |
| M | Austenitic stainless steel | >200HB | ●● | L | M | — | 150 (110 – 180) | — | 140 (100 – 160) | — | 110 (80 – 130) | — | 110 (80 – 130) |
| M | PH stainless steel | <450HB | ●● | L | M | — | 140 (110 – 170) | — | 140 (110 – 170) | — | 140 (110 – 170) | — | 140 (110 – 170) |
| K | Gray cast iron | ≤450HB | ●● | M | L | 200 (150 – 280) | 150 (100 – 200) | 190 (140 – 270) | 140 (90 – 190) | 170 (130 – 240) | 125 (80 – 170) | 170 (130 – 240) | 100 (80 – 120) |
| K | Ductile cast iron | ≤800MPa | ●● | M | L | 180 (140 – 250) | 150 (100 – 200) | 170 (130 – 240) | 140 (90 – 190) | 150 (120 – 210) | 125 (80 – 170) | 150 (120 – 210) | 150 (120 – 210) |

1/1



Cutting conditions: ●: Stable cutting ●: General cutting ✱: Unstable cutting

NEW

# ARP5/6

## RECOMMENDED CUTTING CONDITIONS

### DRY CUTTING

| | Material | Properties | MV1020 | MV1030 |
|---|---|---|---|---|
| | | | Vc | Vc |
| M | Austenitic stainless steel | ≤200HB | 250 (200 – 300) | 220 (170 – 270) |
| | | >200HB | 220 (170 – 270) | 190 (140 – 240) |
| | Duplex steel | ≤280HB | 250 (200 – 300) | 220 (170 – 270) |
| | Ferritic and martensitic stainless steel | ≤200HB | 270 (220 – 320) | 240 (190 – 290) |
| | | >200HB | 270 (220 – 320) | 240 (190 – 290) |
| | PH stainless steel | <450HB | 190 (140 – 240) | 170 (120 – 220) |

1/1

### WET CUTTING

| | Material | Properties | MV1020 | MV1030 |
|---|---|---|---|---|
| | | | Vc | Vc |
| M | Austenitic stainless steel | ≤200HB | 180 (130 – 230) | 150 (100 – 200) |
| | | >200HB | 150 (100 – 200) | 130 (80 – 180) |
| | Duplex steel | ≤280HB | 180 (130 – 230) | 150 (100 – 200) |
| | Ferritic and martensitic stainless steel | ≤200HB | 190 (140 – 240) | 170 (120 – 220) |
| | | >200HB | 190 (140 – 240) | 170 (120 – 220) |
| | PH stainless steel | <450HB | 130 (80 – 180) | 120 (70 – 170) |

1/1

# BRP

## RECOMMENDED CUTTING CONDITIONS

### DRY CUTTING

| | Material | Properties | MV1020 | MV1030 |
|---|---|---|---|---|
| | | | Vc | Vc |
| P | Mild steel | ≤180HB | 300 (200 – 400) | 250 (200 – 300) |
| P | Carbon steel<br>Alloy steel | 180 – 280HB | 260 (170 – 350) | 220 (170 – 270) |
| P | | 280 – 350HB | 180 (100 – 250) | 135 ( 90 – 180) |
| M | Austenitic stainless steel | ≤200HB | 250 (200 – 300) | 220 (170 – 270) |
| M | | >200HB | 220 (170 – 270) | 190 (140 – 240) |
| M | PH stainless steel | <450HB | 190 (140 – 240) | 170 (120 – 220) |
| K | Gray cast iron | ≤450MPa | 240 (130 – 350) | 190 (130 – 250) |
| K | Ductile cast iron | ≤800MPa | 220 ( 80 – 350) | 110 ( 80 – 150) |

1/1

### FEED PER TOOTH (mm/t.)

| Type | Depth of cut (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| BRP4 | 0.40 | 0.30 | 0.20 | 0.10 | — | — | — | — |
| BRP5 | 0.40 | 0.35 | 0.30 | 0.20 | 0.10 | — | — | — |
| BRP6 | 0.50 | 0.40 | 0.30 | 0.25 | 0.23 | 0.20 | — | — |
| BRP8 | 0.60 | 0.50 | 0.45 | 0.40 | 0.33 | 0.30 | 0.25 | 0.20 |

NEW

# AJX

## RECOMMENDED CUTTING CONDITIONS

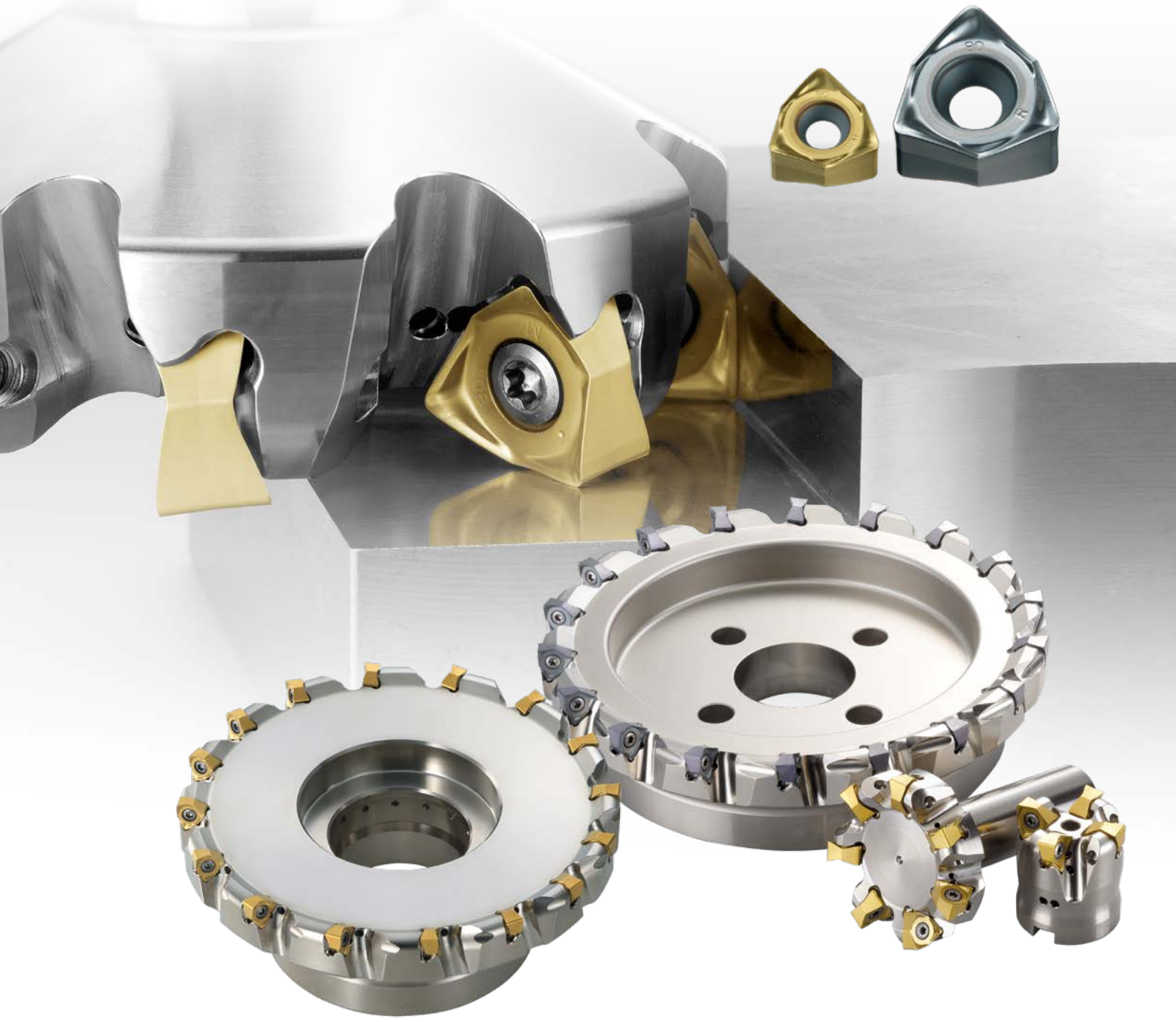
### CUTTING SPEED (DRY CUTTING)

| | Material | Properties | MV1020 | MV1030 |
|---|---|---|---|---|
| | | | Vc | Vc |
| P | Mild steel | ≤180HB | 230 (180 – 280) | 160 (100 – 220) |
| P | Carbon steel<br>Alloy steel | 180 – 350HB | 220 (170 – 270) | 150 ( 80 – 220) |
| P | | 280 – 350HBB | 180 (100 – 250) | 140 ( 70 – 210) |
| P | Alloy tool steel | ≤350HB | 180 (100 – 250) | 140 ( 70 – 210) |
| M | Austenitic stainless steel | ≤200HB | — | 160 (130 – 200) |
| M | | >200HB | — | 140 ( 80 – 200) |
| M | PH stainless steel | <450HB | — | 140 ( 80 – 200) |
| K | Gray cast iron | ≤450MPa | 210 (160 – 260) | 160 (120 – 210) |
| K | Ductile cast iron | ≤800MPa | 190 (140 – 240) | 130 ( 90 – 170) |

1/1

# WWX SERIES

## A NEW LEVEL OF VERSATILITY



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# WWX SERIES

## STABLE AND RELIABLE

High performance 90° face milling cutter with double-sided trigon inserts for shoulder, face and copy milling.

The indexable inserts with 6 usable cutting edges offer lower cost per cutting edge and excellent process reliability thanks to a special negative geometry but with a positive, sharp cutting action.

Precise locating of the inserts ensures a true 90° corner milling operation, eliminating the need for secondary operations, thereby saving valuable production time and costs.

**PRODUCT RANGE WWX200**

| | | |
|---|---|---|
| • Arbor type: | DC Ø | 40 – 160 mm |
| • Shank type: | DC Ø | 25 – 50 mm |
| • Inserts with radii: | | 0.4 – 0.8 |
| • Depth of cut: | APMX | 5 mm |

**PRODUCT RANGE WWX400**

| | | |
|---|---|---|
| • Arbor type: | DC Ø | 50 – 250 mm |
| • Shank type: | DC Ø | 50 – 80 mm |
| • Inserts with radii: | | 0.4 / 0.8 / 1.6 / 2.0 |
| • Depth of cut: | APMX | 8 mm |

**APPLICATION**

- General machining
- Face milling
- Shoulder milling

P M K N H S

**FEATURES**

- Low cutting force
- Good chip evacuation
- Large variety of grades and breakers available
- Double-sided trigon inserts with 6 cutting edges
- Superior surface finishing

# WWX SERIES

## UNIQUE PROPERTIES

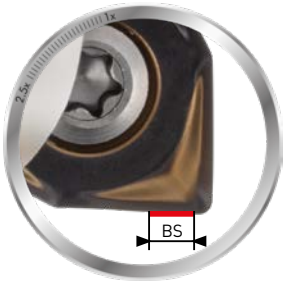
**CHOICE AND AVAILABILITY**
Diameters 25 – 160 mm (WWX200) / 50 – 250 mm (WWX400) are all available in coarse, fine and extra-fine pitch geometries. Providing a wide choice of sizes means the ideal milling body can be selected for a huge range of applications.

Additionally, each cutter body has an internal through coolant supply directed at each insert.

**PERFECT 90° WALL MACHINING AND INSERTS WITH MAXIMUM DEPTH OF CUT UP TO 5 MM (WWX200) / 8 MM (WWX400)**
Clever positioning of the insert generates extremely low cutting resistance and helps to generate accurate 90° walls under all machining conditions.

**LOW CUTTING FORCE**
Innovative geometry generates low cutting forces. The increased insert thickness provides excellent resistance to breakage.

**LARGE RADIUS OF MINOR CUTTING EDGE**
To meet the modern expectations regarding surface finish quality, a specially defined radius (R = 100 mm) with a cutting width BS of 0.5 – 1.7 mm, is used as a wiper geometry across all L, M and R chipbreakers.

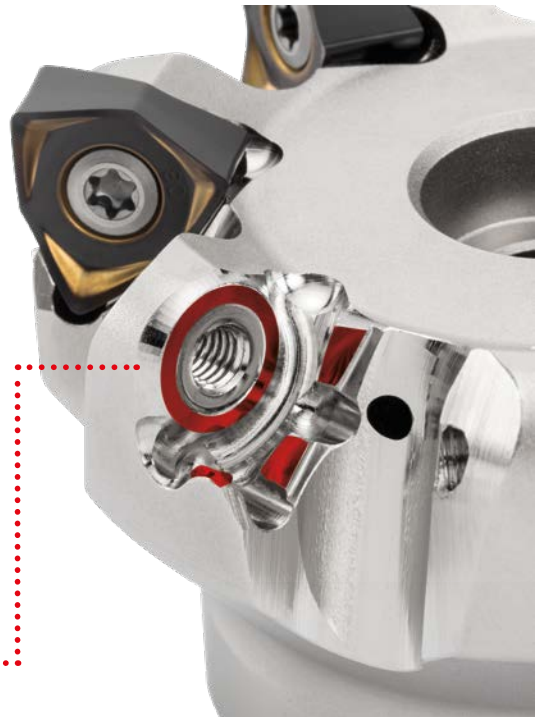


# WWX SERIES

## INSERTS

**PRECISE INSERT POSITIONING**
**IN COMBINATION WITH STRONG INSERT CLAMPING**
Four contact surfaces inside the insert pocket, plus use of a large clamping screw provides precise, but stable and secure clamping of the inserts.
Therefore, WWX200 / WWX400 can be recommended for both semi-roughing and finish machining.

Strong **X** geometry



**SHOULDER AND WALL MACHINING**
**WITHOUT CHIP INTERFERENCE**
Use of a convex main cutting edge allows for precise 90° shoulder machining and reduces contact between ejected chips and the workpiece.

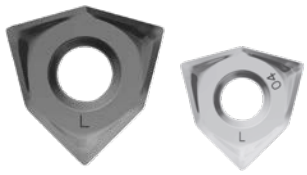
**WWX200 / WWX400**

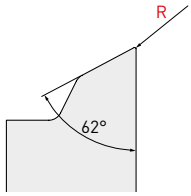
Conventional

# WWX SERIES

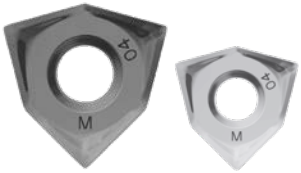
## GRADES AND CHIPBREAKERS

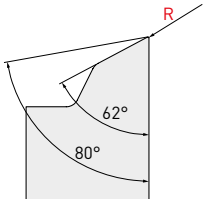
An extensive choice of grades and chipbreakers ensures the optimal choice is available for stable and efficient machining over a wide range of applications.



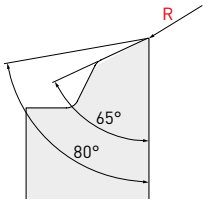




**L-BREAKER**
Recommended for machining that requires reduced cutting loads, or for machining HRSA materials.



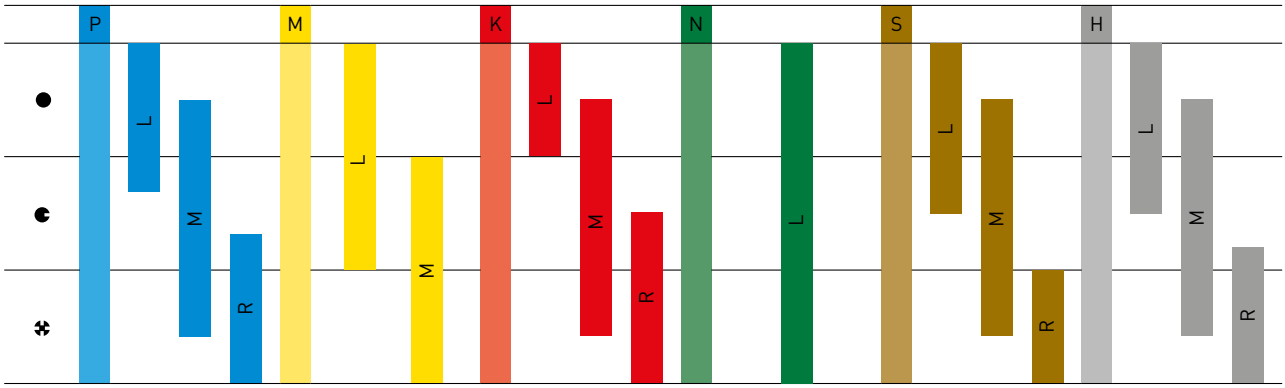

**M-BREAKER**
Outstanding balance of cutting edge sharpness and stability. First choice all-rounder, suitable for a variety of materials and applications.




**R-BREAKER**
First recommendation for interrupted cutting conditions.

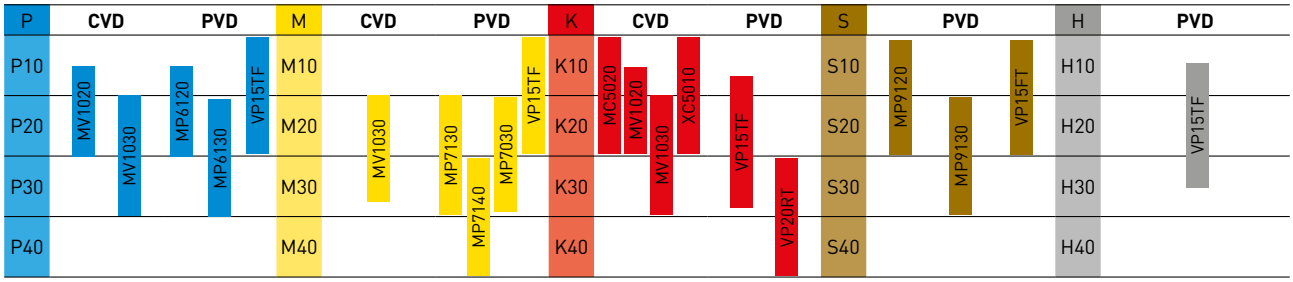
## APPLICATION OF CHIPBREAKERS

**Cutting conditions:** ●: Stable cutting ◐: General cutting ✥: Unstable cutting



# WWX SERIES

## GRADES FOR MACHINING A WIDE RANGE OF MATERIALS




**MV1020**
This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds, especially when machining steel and ductile cast iron, thus greatly reducing work time.

**MV1030**
The new Al-Rich coating also provides excellent wear resistance. An unprecedented performance against sudden breakage was also realised especially during problematic wet cutting and when machining stainless steels.

**MP6120**
For general milling of steel.

**MP6130**
For interrupted milling of steel.

**MP7130**
For general milling of stainless steel.

**MC5020**
For general milling of cast iron.

**MP9120**
For general milling of HRSA and titanium alloy.

**MP9130**
For interrupted and general milling of HRSA and Titanium alloy.

**TF15**
For general milling of aluminium.

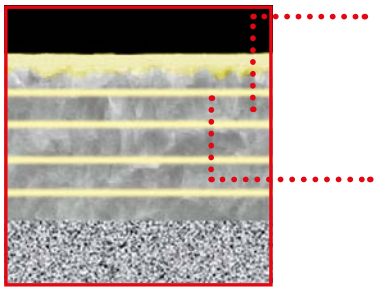
**VP15TF**
For stable machining when the coating is combined with a high wear and fracture resistant carbide substrate.

## MP6100/MP7100/MP9100 SERIES

### TOUGH-∑ TECHNOLOGY

A fusion of the separate coating technologies; PVD and multi-layering provides extra toughness.

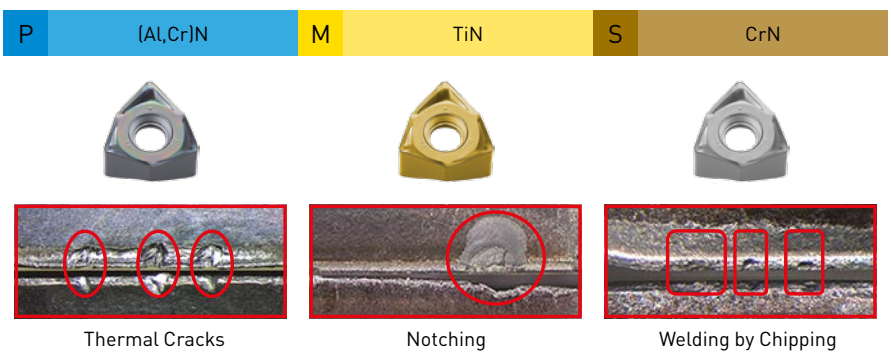
**Al-Ti-Cr-N BASED PVD COATING**



Graphical representation

**BASE LAYER HIGH Al-(Al, Ti)N**
The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

**BEST LAYER FOR EACH MATERIAL**




Thermal Cracks | Notching | Welding by Chipping

# MV1000 SERIES

## COATED CARBIDE GRADE FOR MILLING

### ADVANCED WEAR RESISTANCE

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays very high hardness. This greatly improves oxidation and wear resistance.

### ADVANCED THERMAL SHOCK RESISTANCE

The extreme heat resistance of this new series achieves amazing stability, not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking.

Graphical representation

**EXCELLENT WELDING RESISTANCE**

Smooth surface.

**OUTSTANDING WEAR RESISTANCE**

Newly developed Al-Rich coating.

**EXCELLENT CHIPPING RESISTANCE FOR STABLE MACHINING**

Newly developed bonding layer.

**FRACTURE RESISTANCE FOR THE ULTIMATE STABILITY**

Exclusive cemented carbide substrate.

# NEW LEVEL OF VERSATILITY

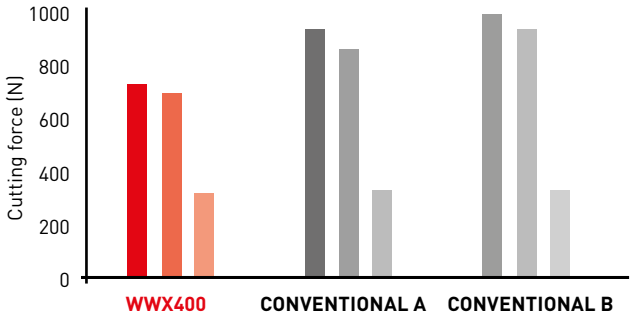
**BENEFITS**

- Inserts with the capability to machine up to APMX = 5 mm (WWX200)/8 mm (WWX400)
- Unique negative insert design with six cutting edges for high productivity machining enables lower costs per component
- Multi-edge, self-locating inserts enable robust and reliable machining
- Use over several different machining processes without changing tools provides flexibility

# WWX400

## CUTTING FORCE

| | |
|---|---|
| Material | 1.7225 / 42CrM04 |
| Tool | WWX400 Ø 80 |
| Vc (m/min) | 160 |
| fz (mm/t.) | 0.2 |
| ap (mm) | 2.0 |
| ae (mm) | 64 |
| Cutting mode | Single insert |

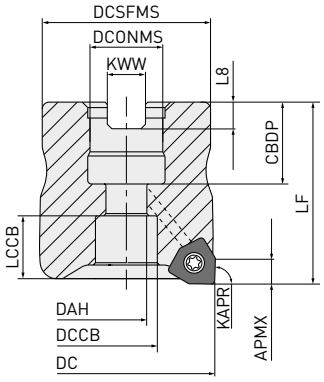


# WWX200

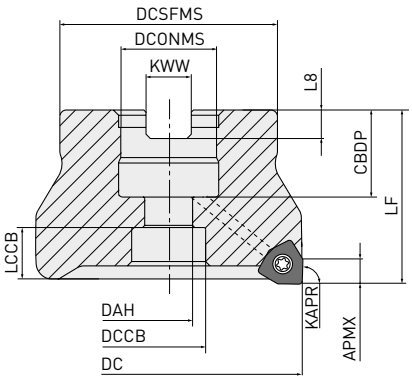
## 90° FACE MILLING CUTTER

P M K N S H

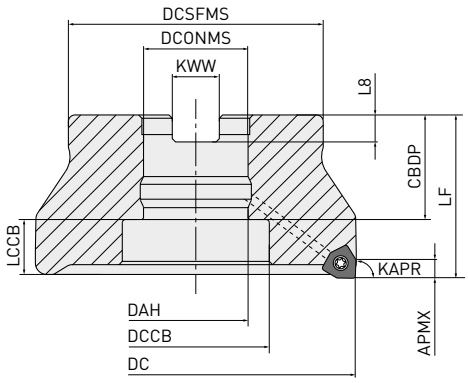
**1**
Ø40
Ø50



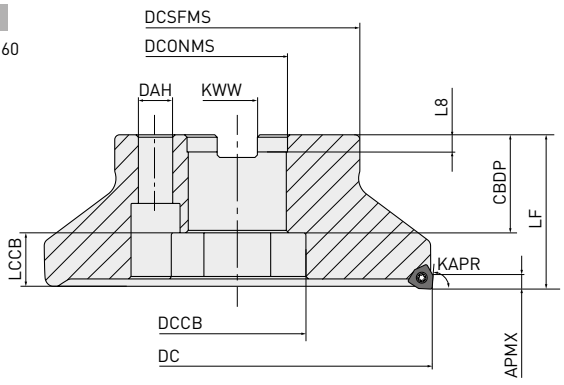

**2**
Ø63
Ø80




**3**
Ø100
Ø125
Ø160




**4**
Ø160




*Right hand tool holder only.*

### ARBOR TYPE

| Order number | Stock | APMX | DC | DCONMS | LF | RPMX | WT | ZEFP | | Type |
|---|---|---|---|---|---|---|---|---|---|---|
| WWX200-040A03AR | ● | 5 | 40 | 16 | 40 | 21600 | 0.2 | 3 | ○ | 1 |
| WWX200-040A04AR | ● | 5 | 40 | 16 | 40 | 21600 | 0.2 | 4 | ○ | 1 |
| WWX200-050A04AR | ● | 5 | 50 | 22 | 40 | 18600 | 0.4 | 4 | ○ | 1 |
| WWX200-050A05AR | ● | 5 | 50 | 22 | 40 | 18600 | 0.4 | 5 | ○ | 1 |
| WWX200-050A06AR | ● | 5 | 50 | 22 | 40 | 18600 | 0.3 | 6 | ○ | 1 |
| WWX200-063A05AR | ● | 5 | 63 | 22 | 40 | 16000 | 0.5 | 5 | ○ | 2 |
| WWX200-063A06AR | ● | 5 | 63 | 22 | 40 | 16000 | 0.5 | 6 | ○ | 2 |
| WWX200-063A07AR | ● | 5 | 63 | 22 | 40 | 16000 | 0.5 | 7 | ○ | 2 |
| WWX200-080A05AR | ● | 5 | 80 | 27 | 50 | 13600 | 1.1 | 5 | ○ | 2 |
| WWX200-080A07AR | ● | 5 | 80 | 27 | 50 | 13600 | 1.0 | 7 | ○ | 2 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

## WWX200 – 90° FACE MILLING CUTTER – ARBOR TYPE

| Order number | Stock | APMX | DC | DCONMS | LF | RPMX | WT | ZEFP | | Type |
|---|---|---|---|---|---|---|---|---|---|---|
| WWX200-080A09AR | ● | 5 | 80 | 27 | 50 | 13600 | 1.0 | 9 | ○ | 2 |
| WWX200-100B06AR | ● | 5 | 100 | 32 | 50 | 11700 | 1.7 | 6 | ○ | 3 |
| WWX200-100B08AR | ● | 5 | 100 | 32 | 50 | 11700 | 1.7 | 8 | ○ | 3 |
| WWX200-100B11AR | ● | 5 | 100 | 32 | 50 | 11700 | 1.7 | 11 | ○ | 3 |
| WWX200-125B07AR | ● | 5 | 125 | 40 | 63 | 10100 | 3.1 | 7 | ○ | 3 |
| WWX200-125B11AR | ● | 5 | 125 | 40 | 63 | 10100 | 3.0 | 11 | ○ | 3 |
| WWX200-125B14AR | ● | 5 | 125 | 40 | 63 | 10100 | 3.0 | 14 | ○ | 3 |
| WWX200-160C09NR | ● | 5 | 160 | 40 | 63 | 8600 | 4.6 | 9 | — | 4 |
| WWX200-160C12NR | ● | 5 | 160 | 40 | 63 | 8600 | 4.6 | 12 | — | 4 |
| WWX200-160C16NR | ● | 5 | 160 | 40 | 63 | 8600 | 4.6 | 16 | — | 4 |



1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes
4. A set bolt to the arbor is not supplied with the body. Please refer to page 266, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter (DC).
6. Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter (DC).

271 Vc

## MOUNTING DIMENSIONS

| Order number | CBDP | DAH | DCCB | DCONMS | DCSFMS | KWW | LCCB | L8 | Type |
|---|---|---|---|---|---|---|---|---|---|
| WWX200-040A03AR | 18 | 9 | 13.6 | 16 | 37 | 8.4 | 13.8 | 5.6 | 1 |
| WWX200-040A04AR | 18 | 9 | 13.6 | 16 | 37 | 8.4 | 13.8 | 5.6 | 1 |
| WWX200-050A04AR | 20 | 11 | 17 | 22 | 47 | 10.4 | 11.8 | 6.3 | 1 |
| WWX200-050A05AR | 20 | 11 | 17 | 22 | 47 | 10.4 | 11.8 | 6.3 | 1 |
| WWX200-050A06AR | 20 | 11 | 17 | 22 | 47 | 10.4 | 11.8 | 6.3 | 1 |
| WWX200-063A05AR | 20 | 11 | 17 | 22 | 50 | 10.4 | 11.8 | 6.3 | 2 |
| WWX200-063A06AR | 20 | 11 | 17 | 22 | 50 | 10.4 | 11.8 | 6.3 | 2 |
| WWX200-063A07AR | 20 | 11 | 17 | 22 | 50 | 10.4 | 11.8 | 6.3 | 2 |
| WWX200-080A05AR | 23 | 13 | 20 | 27 | 56 | 12.4 | 11.8 | 7 | 2 |
| WWX200-080A07AR | 23 | 13 | 20 | 27 | 56 | 12.4 | 11.8 | 7 | 2 |
| WWX200-080A09AR | 23 | 13 | 20 | 27 | 56 | 12.4 | 11.8 | 7 | 2 |
| WWX200-100B06AR | 26 | 32 | 45 | 32 | 78 | 14.4 | 16.8 | 8 | 3 |
| WWX200-100B08AR | 26 | 32 | 45 | 32 | 78 | 14.4 | 16.8 | 8 | 3 |
| WWX200-100B11AR | 26 | 32 | 45 | 32 | 78 | 14.4 | 16.8 | 8 | 3 |
| WWX200-125B07AR | 35 | 42 | 56 | 40 | 89 | 16.4 | 21.8 | 9 | 3 |
| WWX200-125B11AR | 35 | 42 | 56 | 40 | 89 | 16.4 | 21.8 | 9 | 3 |
| WWX200-125B14AR | 35 | 42 | 56 | 40 | 89 | 16.4 | 21.8 | 9 | 3 |
| WWX200-160C09NR | 40 | — | 56 | 40 | 100 | 16.4 | 21.8 | 9 | 4 |
| WWX200-160C12NR | 40 | — | 56 | 40 | 100 | 16.4 | 21.8 | 9 | 4 |
| WWX200-160C16NR | 40 | — | 56 | 40 | 100 | 16.4 | 21.8 | 9 | 4 |





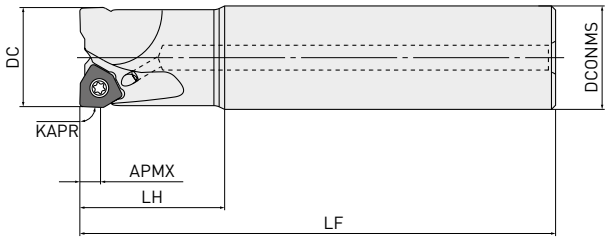
● : Inventory maintained. ★ : Inventory maintained in Japan.

# WWX200

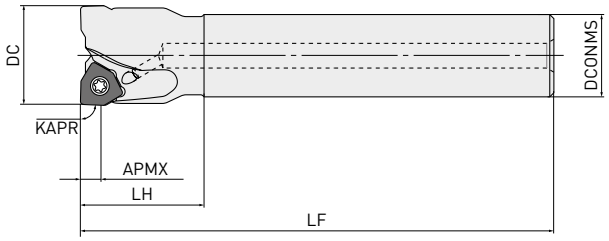
## 90° FACE MILLING CUTTER

P M K N S H

1




2




*Right hand tool holder only.*

### SHANK TYPE

| Order number | Stock | APMX | DC | DCONMS | LF | RPMX | WT | LH | ZEFP | | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WWX200R2502SA20S | ● | 5 | 25 | 20 | 115 | 29600 | 0.3 | 30 | 2 | ○ | 2 |
| WWX200R2502SA25S | ● | 5 | 25 | 25 | 115 | 29600 | 0.4 | 35 | 2 | ○ | 1 |
| WWX200R2502SA25L | ● | 5 | 25 | 25 | 170 | 29600 | 0.6 | 70 | 2 | ○ | 1 |
| WWX200R2502WA25S | ● | 5 | 25 | 25 | 91 | 29600 | 0.3 | 35 | 2 | ○ | 1 |
| WWX200R2802SA25S | ● | 5 | 28 | 25 | 115 | 27400 | 0.4 | 35 | 2 | ○ | 2 |
| WWX200R2802SA25L | ● | 5 | 28 | 25 | 170 | 27400 | 0.6 | 35 | 2 | ○ | 2 |
| WWX200R3002SA25S | ● | 5 | 30 | 25 | 125 | 26200 | 0.5 | 35 | 2 | ○ | 2 |
| WWX200R3202SA32S | ● | 5 | 32 | 32 | 125 | 26200 | 0.7 | 45 | 2 | ○ | 1 |
| WWX200R3202WA32S | ● | 5 | 32 | 32 | 105 | 26200 | 0.6 | 45 | 2 | ○ | 1 |
| WWX200R3203SA32S | ● | 5 | 32 | 32 | 125 | 26200 | 0.7 | 45 | 3 | ○ | 1 |
| WWX200R3203SA32L | ● | 5 | 32 | 32 | 190 | 26200 | 1.0 | 90 | 3 | ○ | 1 |
| WWX200R3203WA32S | ● | 5 | 32 | 32 | 105 | 26200 | 0.6 | 45 | 3 | ○ | 1 |
| WWX200R3503SA32L | ● | 5 | 35 | 32 | 190 | 25100 | 1.1 | 45 | 3 | ○ | 2 |
| WWX200R4003SA32S | ★ | 5 | 40 | 32 | 125 | 21600 | 0.8 | 45 | 3 | ○ | 2 |
| WWX200R4004SA32S | ★ | 5 | 40 | 32 | 125 | 21600 | 0.8 | 45 | 4 | ○ | 2 |
| WWX200R5004SA32S | ★ | 5 | 50 | 32 | 125 | 18600 | 0.9 | 45 | 4 | ○ | 2 |
| WWX200R5005SA32S | ★ | 5 | 50 | 32 | 125 | 18600 | 0.9 | 45 | 5 | ○ | 2 |
| WWX200R5006SA32S | ★ | 5 | 50 | 32 | 125 | 18600 | 0.9 | 45 | 6 | ○ | 2 |

1/1

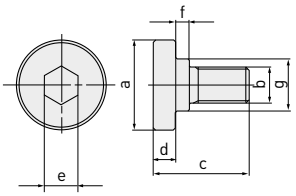
1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes

271 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

# WWX200

## PARTS SOLD SEPARATELY – SET BOLT

| Tool holder type | Set bolt | | Type | Reference dimensions | | | | | | | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | With coolant hole | Without coolant hole | | a | b | c | d | e | f | g | |
| | Order number | | | | | | | | | | |
| WWX200-040A○○AR | HSC08025H | — | 1 | 13 | M8x1.25 | 33 | 8 | 5 | — | — |  |
| WWX200-050A○○AR | HSC10030H | HSC10035 | 1 | 16 | M10x1.5 | 40 (45) | 10 | 6 | — | — | |
| WWX200-063A○○AR | HSC10030H | HSC10035 | 1 | 16 | M10x1.5 | 40 (45) | 10 | 6 | — | — | |
| WWX200-080A○○AR | HSC12035H | HSC12035 | 1 | 18 | M12x1.75 | 47 | 12 | 10 | — | — | |
| WWX200-100B○○AR | MBA16033H | — | 2 | 40 | M16x2 | 43 | 10 | 14 | 6 | 23 | |
| WWX200-125B○○AR | MBA20040H | — | 2 | 50 | M20x2.5 | 54 | 14 | 17 | 6 | 27 | |
| WWX200-160C○○NR | — | — | 2 | 50 | M20x2.5 | 54 | 14 | 17 | 6 | 27 | |

1. Internal coolant is necessary with the set bolt.

## SPARE PARTS

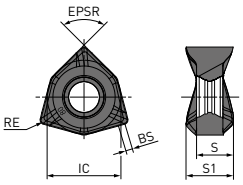
| Tool holder type | * Clamp screw | Wrench (Insert) | Anti-seize lubricant |
|---|---|---|---|
| WWX200 Arbor type | TPS3R | TIP10D | MK1KS |
| WWX200 Shank type | | | |

* Clamp torque (N • m): TPS3R = 2.0

## INSERTS

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Steel | ● | ◐ | | | | ✱ | | | ◐ | ◐ | |
| M | Stainless steel | | | ● | | | ◐ | | | | ◐ | |
| K | Cast iron | | | | | | ✱ | | ◐ | ◐ | ◐ | |
| N | Non-ferrous material | | | | | | | | ◐ | | | |
| S | Heat resistant alloy, Titanium alloy | | | | ● | ◐ | | | | | | |
| H | Hardened steel | ◐ | | | | | ● | | | | | |

**Cutting conditions :**
●: Stable cutting ◐: General cutting
✱: Unstable cutting
**Honing:**
E: Round F: Sharp edge S: Chamfer + round
T: Chamfer Z: Stable

| | Order number | Class | Honing | MP6120 | MP6130 | MP7130 | MP9120 | MP9130 | VP15TF | TF15 | MC5020 | MV1020 | NEW MV1030 | IC | S | S1 | BS | RE | Geometry *Right hand insert only.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NEW | 6NGU0906040PNER-L | G | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 9.0 | 5.3 | 6.1 | 1.6 | 0.4 |  |
| NEW | 6NGU0906080PNER-L | G | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 9.0 | 5.3 | 6.1 | 1.2 | 0.8 | |
| | 6NGU0906040PNFR-L | G | F | | | | | | | ● | | | | 9.0 | 5.3 | 6.1 | 1.3 | 0.4 | |
| | 6NGU0906080PNFR-L | G | F | | | | | | | ● | | | | 9.0 | 5.3 | 6.1 | 1.3 | 0.8 | |
| | 6NMU0906040PNER-M | M | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 9.0 | 5.3 | 6.1 | 1.6 | 0.4 | |
| | 6NMU0906080PNER-M | M | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 9.0 | 5.3 | 6.1 | 1.2 | 0.8 | |
| | 6NMU0906080PNER-R | M | E | ● | ● | | ● | ● | ● | | ● | ● | ● | 9.0 | 5.3 | 6.1 | 1.2 | 0.8 | |

1/1

(10 inserts in one case)



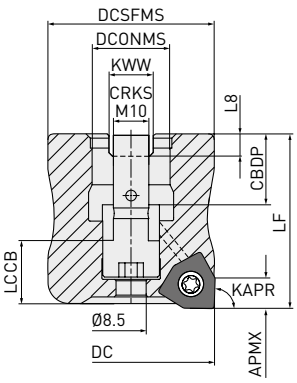
● : Inventory maintained. ★ : Inventory maintained in Japan.

# WWX400

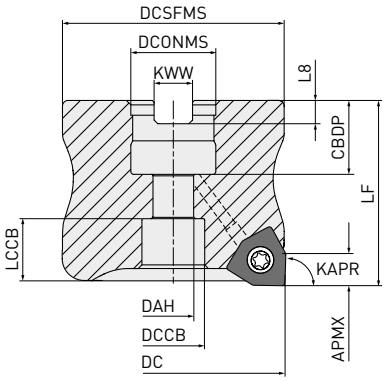
## 90° FACE MILLING CUTTER

P M K N S H

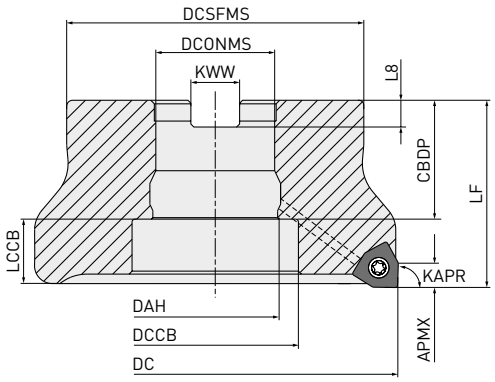
**1**
Ø50



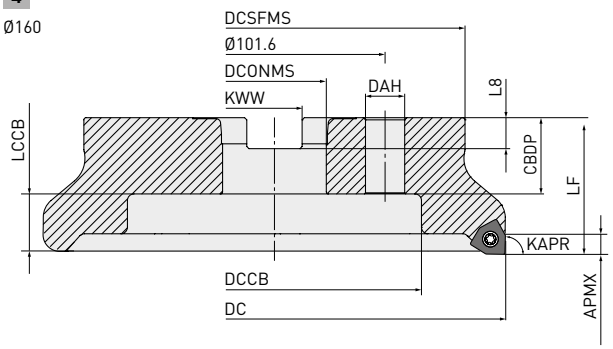

**2**
Ø63
Ø80



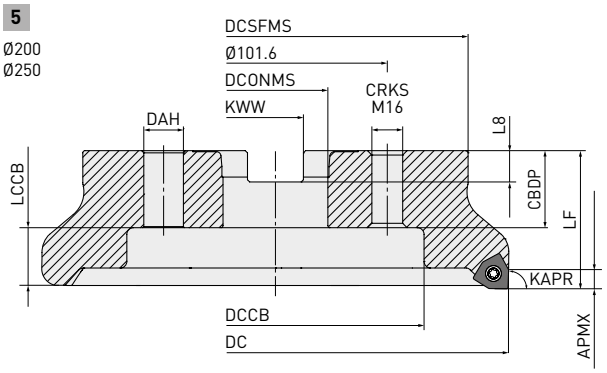

**3**
Ø100
Ø125



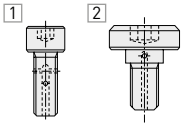

**4**
Ø160




**5**
Ø200
Ø250




*Right hand tool holder only.*

| DC | Set bolt | Geometry | |
|---|---|---|---|
| Ø 50, Ø 63 | HSC10030H | 1 |  |
| Ø 80 | HSC12035H | | |
| Ø 100 | MBA16033H | 2 | |
| Ø 125 | MBA20040H | | |
| Ø 160, Ø200, Ø250 | — | | |

## WWX400 – 90° FACE MILLING CUTTER – ARBOR TYPE

| Order number | Stock | APMX | DC | DCONMS | GAMF | LF | RMPX | RPMX | WT | ZEFP | | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WWX400-050A03AR | ★ | 8 | 50 | 22 | -12.8° | 55 | 0.4° | 5000 | 0.5 | 3 | ○ | 1 |
| WWX400-050A04AR | ● | 8 | 50 | 22 | -12.8° | 55 | 0.4° | 5000 | 0.5 | 4 | ○ | 1 |
| WWX400-063A03AR | ★ | 8 | 63 | 22 | -11° | 40 | 0.26° | 14100 | 0.5 | 3 | ○ | 2 |
| WWX400-063A04AR | ● | 8 | 63 | 22 | -11° | 40 | 0.26° | 14100 | 0.5 | 4 | ○ | 2 |
| WWX400-063A05AR | ● | 8 | 63 | 22 | -11° | 40 | 0.26° | 14100 | 0.5 | 5 | ○ | 2 |
| WWX400-080A04AR | ★ | 8 | 80 | 27 | -9.2° | 50 | 0.16° | 12200 | 1 | 4 | ○ | 2 |
| WWX400-080A05AR | ● | 8 | 80 | 27 | -9.2° | 50 | 0.16° | 12200 | 1 | 5 | ○ | 2 |
| WWX400-080A07AR | ● | 8 | 80 | 27 | -9.2° | 50 | 0.16° | 12200 | 0.9 | 7 | ○ | 2 |
| WWX400-100B05AR | ★ | 8 | 100 | 32 | -8.5° | 50 | — | 10700 | 1.6 | 5 | ○ | 3 |
| WWX400-100B07AR | ● | 8 | 100 | 32 | -8.5° | 50 | — | 10700 | 1.5 | 7 | ○ | 3 |
| WWX400-100B09AR | ● | 8 | 100 | 32 | -8.5° | 50 | — | 10700 | 1.5 | 9 | ○ | 3 |
| WWX400-125B06AR | ★ | 8 | 125 | 40 | -7.8° | 63 | — | 9500 | 3 | 6 | ○ | 3 |
| WWX400-125B08AR | ● | 8 | 125 | 40 | -7.8° | 63 | — | 9500 | 3 | 8 | ○ | 3 |
| WWX400-125B12AR | ★ | 8 | 125 | 40 | -7.8° | 63 | — | 9500 | 2.9 | 12 | ○ | 3 |
| WWX400-160C08NR | ★ | 8 | 160 | 40 | -7.3° | 63 | — | 8300 | 4.5 | 8 | — | 4 |
| WWX400-160C10NR | ★ | 8 | 160 | 40 | -7.3° | 63 | — | 8300 | 4.4 | 10 | — | 4 |
| WWX400-160C14NR | ★ | 8 | 160 | 40 | -10° | 63 | — | 8300 | 4.4 | 14 | — | 4 |
| WWX400-200C10NR | ★ | 8 | 200 | 60 | -7.2° | 63 | — | 7300 | 6.7 | 10 | — | 5 |
| WWX400-200C12NR | ★ | 8 | 200 | 60 | -7.2° | 63 | — | 7300 | 6.7 | 12 | — | 5 |
| WWX400-200C16NR | ★ | 8 | 200 | 60 | -8.5° | 63 | — | 7300 | 6.6 | 16 | — | 5 |
| WWX400-250C12NR | ★ | 8 | 250 | 60 | -7.2° | 63 | — | 6400 | 11.5 | 12 | — | 5 |
| WWX400-250C14NR | ★ | 8 | 250 | 60 | -7.2° | 63 | — | 6400 | 11.5 | 14 | — | 5 |
| WWX400-250C18NR | ★ | 8 | 250 | 60 | -7.2° | 63 | — | 6400 | 11.4 | 18 | — | 5 |

1/1

1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes
4. A set bolt to the arbor is not supplied with the body. Please refer to page 269, when ordering.
5. Please use a set bolt of the FMC type on the cutter body from 63 to 100 in diameter (DC).
6. Please use a set bolt of the FMA type on the cutter body from 125 to 250 in diameter (DC).

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## MOUNTING DIMENSIONS

| Order number | CBDP | DAH | DCCB | DCONMS | DCSFMS | KWW | LCCB | L8 | Type |
|---|---|---|---|---|---|---|---|---|---|
| WWX400-050A03AR | 20 | — | — | 22 | 47 | 10.4 | 12.2 | 6.3 | 1 |
| WWX400-050A04AR | 20 | — | — | 22 | 47 | 10.4 | 12.2 | 6.3 | 1 |
| WWX400-063A03AR | 20 | 11 | 17 | 22 | 50 | 10.4 | 11.2 | 6.3 | 2 |
| WWX400-063A04AR | 20 | 11 | 17 | 22 | 50 | 10.4 | 11.2 | 6.3 | 2 |
| WWX400-063A05AR | 20 | 11 | 17 | 22 | 50 | 10.4 | 11.2 | 6.3 | 2 |
| WWX400-080A04AR | 23 | 13 | 20 | 27 | 56 | 12.4 | 14.2 | 7.0 | 2 |
| WWX400-080A05AR | 23 | 13 | 20 | 27 | 56 | 12.4 | 14.2 | 7.0 | 2 |
| WWX400-080A07AR | 23 | 13 | 20 | 27 | 56 | 12.4 | 14.2 | 7.0 | 2 |
| WWX400-100B05AR | 32 | 32 | 45 | 32 | 78 | 14.4 | 16.2 | 8.0 | 3 |
| WWX400-100B07AR | 32 | 32 | 45 | 32 | 78 | 14.4 | 16.2 | 8.0 | 3 |
| WWX400-100B09AR | 32 | 32 | 45 | 32 | 78 | 14.4 | 16.2 | 8.0 | 3 |
| WWX400-125B06AR | 40 | 40 | 56 | 40 | 89 | 16.4 | 21.2 | 9.0 | 3 |
| WWX400-125B08AR | 40 | 40 | 56 | 40 | 89 | 16.4 | 21.2 | 9.0 | 3 |
| WWX400-125B12AR | 40 | 40 | 56 | 40 | 89 | 16.4 | 21.2 | 9.0 | 3 |
| WWX400-160C08NR | 40 | 14 | 56 | 40 | 100 | 16.4 | 21.2 | 9.0 | 4 |
| WWX400-160C10NR | 40 | 14 | 56 | 40 | 100 | 16.4 | 21.2 | 9.0 | 4 |
| WWX400-160C14NR | 40 | 14 | 56 | 40 | 100 | 16.4 | 21.2 | 9.0 | 4 |
| WWX400-200C10NR | 32 | 18 | 135 | 60 | 160 | 25.7 | 29.2 | 14.22 | 5 |
| WWX400-200C12NR | 32 | 18 | 135 | 60 | 160 | 25.7 | 29.2 | 14.22 | 5 |
| WWX400-200C16NR | 32 | 18 | 135 | 60 | 160 | 25.7 | 29.2 | 14.22 | 5 |
| WWX400-250C12NR | 32 | 18 | 180 | 60 | 210 | 25.7 | 29.2 | 14.22 | 5 |
| WWX400-250C14NR | 32 | 18 | 180 | 60 | 210 | 25.7 | 29.2 | 14.22 | 5 |
| WWX400-250C18NR | 32 | 18 | 180 | 60 | 210 | 25.7 | 29.2 | 14.22 | 5 |

1/1

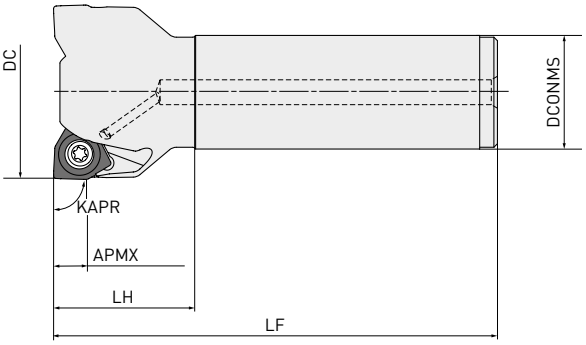


● : Inventory maintained. ★ : Inventory maintained in Japan.

# WWX400

## 90° FACE MILLING CUTTER

P M K N S H




*Right hand tool holder only.*

### SHANK TYPE

| Order number | Stock | APMX | DC | DCONMS | GAMF | LF | RMPX | RPMX | WT | LH | ZEFP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WWX400R5003SA32M | ★ | 8 | 50 | 32 | -12.8° | 125 | 0.45° | 16000 | 0.83 | 40 | 3 | ○ |
| WWX400R5004SA32M | ★ | 8 | 50 | 32 | -12.8° | 125 | 0.45° | 16000 | 0.81 | 40 | 4 | ○ |
| WWX400R6303SA32M | ★ | 8 | 63 | 32 | -11.0° | 125 | 0.31° | 14100 | 1.00 | 40 | 3 | ○ |
| WWX400R6304SA32M | ★ | 8 | 63 | 32 | -11.0° | 125 | 0.31° | 14100 | 0.97 | 40 | 4 | ○ |
| WWX400R6305SA32M | ★ | 8 | 63 | 32 | -11.0° | 125 | 0.31° | 14100 | 0.95 | 40 | 5 | ○ |
| WWX400R8004SA32M | ★ | 8 | 80 | 32 | -9.2° | 125 | 0.21° | 12200 | 1.27 | 40 | 4 | ○ |
| WWX400R8005SA32M | ★ | 8 | 80 | 32 | -9.2° | 125 | 0.21° | 12200 | 1.24 | 40 | 5 | ○ |
| WWX400R8007SA32M | ★ | 8 | 80 | 32 | -9.2° | 125 | 0.21° | 12200 | 1.19 | 40 | 7 | ○ |

1/1

1. The maximum spindle speeds RPMX are set to ensure tool and insert stability.
2. When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
3. ○ = With through coolant holes

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# SPARE PARTS

| Tool holder type | Clamp screw | Wrench (Insert) | Anti-seize lubricant |
|---|---|---|---|
| WWX400 Arbor type | TS5R | TKY20T | MK1KS |
| WWX400 Shank type | | | |

* Clamp torque (N • m): TS5R = 5.0

● : Inventory maintained. ★ : Inventory maintained in Japan.

# WWX400

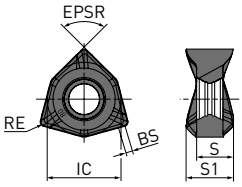
## INSERTS

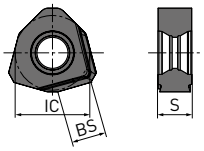
| | | MP6120 | MP6130 | MP7130 | MP9120 | MP9130 | VP15TF | TF15 | MC5020 | MV1020 | NEW MV1030 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Steel | ● | ◐ | | | | ✱ | | | ◐ | ◐ |
| M | Stainless steel | | | ● | | | ◐ | | | | ◐ |
| K | Cast iron | | | | | | ✱ | | ◐ | ◐ | ◐ |
| N | Non-ferrous material | | | | | | | ◐ | | | |
| S | Heat resistant alloy, Titanium alloy | | | | ● | ◐ | | | | | |
| H | Hardened steel | ◐ | | | | | ● | | | | |

**Cutting conditions :**
●: Stable cutting ◐: General cutting
✱: Unstable cutting
**Honing:**
E: Round F: Sharp edge S: Chamfer + round
T: Chamfer Z: Stable

| Order number | Class | Honing | MP6120 | MP6130 | MP7130 | MP9120 | MP9130 | VP15TF | TF15 | MC5020 | MV1020 | NEW MV1030 | IC | S | S1 | BS | RE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6NGU1409040PNER-L | G | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.7 | 0.4 |
| 6NGU1409080PNER-L | G | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.3 | 0.8 |
| 6NGU1409040PNFR-L | G | F | | | | | | | ● | | | | 14 | 7 | 9 | 1.7 | 0.4 |
| 6NGU1409080PNFR-L | G | F | | | | | | | ● | | | | 14 | 7 | 9 | 1.3 | 0.8 |
| 6NGU1409040PNER-M | G | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.7 | 0.4 |
| 6NGU1409080PNER-M | G | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.3 | 0.8 |
| 6NMU1409040PNER-M | M | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.7 | 0.4 |
| 6NMU1409080PNER-M | M | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.3 | 0.8 |
| 6NMU1409160PNER-M | M | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 0.5 | 1.6 |
| 6NMU1409200PNER-M | M | E | ● | ● | ● | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 0.5 | 2.0 |
| 6NMU1409080PNER-R | M | E | ● | ● | | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 1.3 | 0.8 |
| 6NMU1409160PNER-R | M | E | ● | ● | | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 0.5 | 1.6 |
| 6NMU1409200PNER-R | M | E | ● | ● | | ● | ● | ● | | ● | ● | ● | 14 | 7 | 9 | 0.5 | 2.0 |
| 2NGU1406ZNER6C-M | G | E | ● | | | | | ● | | ● | | | 14 | 6.3 | — | 6.5 | — |

**Geometry**
*Right hand insert only.*




1/1

(10 inserts in one case)

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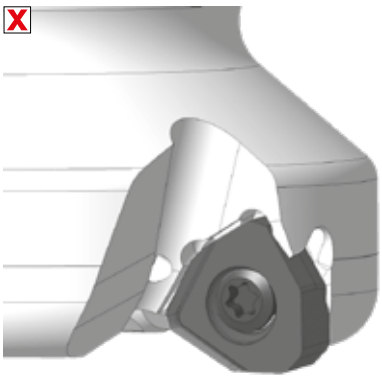
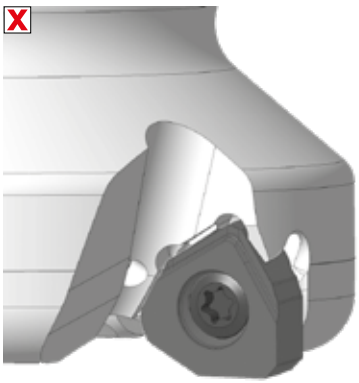
## INSTRUCTIONS FOR USE OF WIPER INSERTS

1



2



3

Wiper inserts for WWX400 are two-cornered. Please set as shown in picture 1.
Excellent surface finishes can be achieved with one wiper.
Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than 6.5 mm/rev.
When choosing a wiper insert select a general grade that is similar to the ideal cutting conditions.



● : Inventory maintained. ★ : Inventory maintained in Japan.

# WWX200 /400

## RECOMMENDED CUTTING CONDITIONS

### CUTTING SPEED / DRY CUTTING

| | Material | Properties | Cutting conditions | Grade | Vc | | |
|---|---|---|---|---|---|---|---|
| | | | | | ae ≤ 0.5 DC | ae ≤ 0.8 DC | ae = DC |
| P | Mild steel | ≤180HB | ● | MV1020 | 300 (250 – 350) | 280 (230 – 330) | 250 (200 – 300) |
| | | | ● | MP6120 | 240 (200 – 280) | 220 (180 – 260) | 200 (160 – 240) |
| | | | ● | MV1030 | 230 (190 – 270) | 210 (170 – 250) | 190 (150 – 230) |
| | | | ◐ | MV1020 | 290 (240 – 340) | 260 (210 – 320) | 240 (190 – 290) |
| | | | ◐ | MV1030 | 230 (190 – 270) | 210 (170 – 250) | 190 (150 – 230) |
| | | | ◐ | MP6130 | 230 (190 – 270) | 210 (170 – 250) | 190 (150 – 230) |
| | | | ✣ | MP6130 | 210 (170 – 250) | 190 (150 – 230) | 170 (130 – 210) |
| | | | ✣ | VP15TF | 210 (170 – 250) | 190 (150 – 230) | 170 (130 – 210) |
| | Carbon steel<br>Alloy steel | 180 – 280HB | ● | MV1020 | 260 (210 – 310) | 240 (190 – 280) | 210 (160 – 260) |
| | | | ● | MP6120 | 210 (170 – 250) | 190 (150 – 230) | 170 (130 – 210) |
| | | | ● | MV1030 | 200 (160 – 240) | 180 (140 – 220) | 160 (120 – 200) |
| | | | ◐ | MV1020 | 250 (200 – 300) | 230 (180 – 270) | 200 (150 – 250) |
| | | | ◐ | MV1030 | 200 (160 – 240) | 180 (140 – 220) | 160 (120 – 200) |
| | | | ◐ | MP6130 | 200 (160 – 240) | 180 (140 – 220) | 160 (120 – 200) |
| | | | ✣ | MP6130 | 180 (140 – 220) | 160 (120 – 200) | 140 (100 – 180) |
| | | | ✣ | VP15TF | 180 (140 – 220) | 160 (120 – 200) | 140 (100 – 180) |
| | Carbon steel<br>Alloy steel<br>Alloy tool steel | 280 – 350HB<br>≤350HB | ● | MV1020 | 260 (210 – 310) | 240 (190 – 280) | 210 (160 – 260) |
| | | | ● | MP6120 | 200 (160 – 240) | 180 (140 – 220) | 160 (120 – 200) |
| | | | ● | MV1030 | 200(160 – 240) | 180(140 – 220) | 200(150 – 250) |
| | | | ◐ | MV1020 | 250(200 – 300) | 230(180 – 270) | 200(150 – 250) |
| | | | ◐ | MV1030 | 190 (150 – 230) | 170 (130 – 210) | 150 (110 – 190) |
| | | | ◐ | MP6130 | 190 (150 – 230) | 170 (130 – 210) | 150 (110 – 190) |
| | | | ✣ | MP6130 | 170 (130 – 210) | 150 (110 – 190) | 130 ( 90 – 170) |
| | | | ✣ | VP15TF | 170 (130 – 210) | 150 (110 – 190) | 130 ( 90 – 170) |
| | Pre-hardened steel | 35 – 45HRC | ● | MP6120 | 140 (120 – 160) | — | — |
| | | | ◐ | MP6130 | 120 (100 – 140) | — | — |
| | | | ✣ | MP6130 | 110 ( 90 – 130) | — | — |
| | | | ✣ | VP15TF | 110 ( 90 – 130) | — | — |
| M | Austenitic stainless steel | ≤200HB | ● | MV1030 | 180 (160 – 200) | 160 (140 – 180) | — |
| | | | ● | MP7130 | 180 (160 – 200) | 160 (140 – 180) | — |
| | | | ◐ | MV1030 | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ◐ | MP7130 | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ◐ | VP15TF | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ✣ | MP7130 | 150 (130 – 170) | 130 (110 – 150) | — |
| | | | ✣ | VP15TF | 150 (130 – 170) | 130 (110 – 150) | — |
| | | >200HB | ● | MV1030 | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ● | MP7130 | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ◐ | MV1030 | 160 (140 – 180) | 140 (120 – 160) | — |
| | | | ◐ | MP7130 | 160 (140 – 180) | 140 (120 – 160) | — |
| | | | ◐ | VP15TF | 160 (140 – 180) | 140 (120 – 160) | — |
| | | | ✣ | MP7130 | 140 (120 – 160) | 120 (100 – 140) | — |
| | | | ✣ | VP15TF | 140 (120 – 160) | 120 (100 – 140) | — |

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Cutting conditions: ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## WWX200/400 – CUTTING SPEED / DRY CUTTING

| | Material | Properties | Cutting conditions | Grade | Vc | | |
|---|---|---|---|---|---|---|---|
| | | | | | ae ≤ 0.5 DC | ae ≤ 0.8 DC | ae = DC |
| M | Ferritic and martensitic Stainless steel | ≤200HB | ● | MV1030 | 180 (160 – 200) | 160 (140 – 180) | — |
| | | | ● | MP7130 | 180 (160 – 200) | 160 (140 – 180) | — |
| | | | ◕ | MV1030 | 170 (150 – 190) | 150 (130 – 170) | |
| | | | ◕ | MP7130 | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ◕ | VP15TF | 170 (150 – 190) | 150 (130 – 170) | — |
| | | | ✤ | MP7130 | 150 (130 – 170) | 130 (110 – 150) | — |
| | | | ✤ | VP15TF | 150 (130 – 170) | 130 (110 – 150) | — |
| | Duplex stainless steel | ≤280HB | ● | MP7130 | 160 (140 – 180) | 140 (120 – 160) | — |
| | | | ◕ | MP7130 | 150 (130 – 170) | 130 (110 – 150) | — |
| | | | ◕ | VP15TF | 150 (130 – 170) | 130 (110 – 150) | — |
| | | | ✤ | MP7130 | 130 (110 – 150) | 110 ( 90 – 130) | — |
| | | | ✤ | VP15TF | 130 (110 – 150) | 110 ( 90 – 130) | — |
| | Precipitation hardening Stainless steel | <450HB | ● | MP7130 | 140 (120 – 160) | — | — |
| | | | ◕ | MP7130 | 130 (110 – 150) | — | — |
| | | | ◕ | VP15TF | 130 (110 – 150) | — | — |
| | | | ✤ | MP7130 | 110 ( 90 – 130) | — | — |
| | | | ✤ | VP15TF | 110 ( 90 – 130) | — | — |
| K | Gray cast iron | ≤350MPa | ● | MC5020 | 250 (210 – 290) | 230 (190 – 270) | 210 (170 – 250) |
| | | | ◕ | MC5020 | 240 (200 – 280) | 220 (180 – 260) | 200 (160 – 240) |
| | | | ◕ | VP15TF | 240 (200 – 280) | 220 (180 – 260) | — |
| | | | ✤ | MC5020 | 220 (180 – 260) | 200 (160 – 240) | 180 (140 – 220) |
| | | | ✤ | VP15TF | 220 (180 – 260) | 200 (160 – 240) | 180 (140 – 220) |
| | Ductile cast iron | ≤450MPa | ● | MV1020 | 240 (200 – 310) | 220 (170 – 280) | 200 (150 – 260) |
| | | | ● | MV1030 | 210 (170 – 250) | 190 (150 – 230) | 170 (130 – 210) |
| | | | ● | MC5020 | 220 (180 – 260) | 200 (160 – 240) | 180 (140 – 220) |
| | | | ◕ | MV1020 | 230 (190 – 300) | 210 (160 – 270) | 190 (140 – 250) |
| | | | ◕ | MV1030 | 210 (170 – 250) | 190 (150 – 230) | 170 (130 – 210) |
| | | | ◕ | MC5020 | 210 (170 – 250) | 190 (150 – 230) | 170 (130 – 210) |
| | | | ◕ | VP15TF | 210 (170 – 250) | 190 (150 – 230) | — |
| | | | ✤ | MC5020 | 190 (150 – 230) | 170 (130 – 210) | 150 (110 – 190) |
| | | | ✤ | VP15TF | 190 (150 – 230) | 170 (130 – 210) | 150 (110 – 190) |
| | Ductile cast iron | ≤800MPa | ● | MV1020 | 210 (160 – 280) | 190 (140 – 250) | 160 (120 – 210) |
| | | | ● | MC5020 | 180 (140 – 220) | 160 (120 – 200) | 140 (100 – 180) |
| | | | ● | MV1030 | 170 (130 – 210) | 150 (110 – 190) | 130 ( 90 – 170) |
| | | | ◕ | MV1020 | 200 (150 – 270) | 180 (130 – 240) | 150 (110 – 200) |
| | | | ◕ | MV1030 | 170 (130 – 210) | 150 (110 – 190) | 130 ( 90 – 170) |
| | | | ◕ | MC5020 | 170 (130 – 210) | 150 (110 – 190) | 130 ( 90 – 170) |
| | | | ◕ | VP15TF | 170 (130 – 210) | 150 (110 – 190) | — |
| | | | ✤ | MC5020 | 150 (110 – 190) | 130 ( 90 – 170) | 110 ( 70 – 150) |
| | | | ✤ | VP15TF | 150 (110 – 190) | 130 ( 90 – 170) | 110 ( 70 – 150) |
| H | Hardened steel | 40 – 55HRC | ●◕ | VP15TF | 50 ( 30 – 70) | — | — |
| | | | ◕ | MP6120 | 40 ( 30 – 70) | — | — |





Cutting conditions: ● : Stable cutting ◕ : General cutting ✤ : Unstable cutting

# WWX200 /400

## RECOMMENDED CUTTING CONDITIONS

### CUTTING SPEED / WET CUTTING

| | Material | Properties | Cutting conditions | Grade | Vc | | |
|---|---|---|---|---|---|---|---|
| | | | | | ae ≤ 0.5 DC | ae ≤ 0.8 DC | ae = DC |
| P | Mild steel | ≤180HB | ● | MV1020 | 220 (210 – 230) | 190 (180 – 210) | 180 (160 – 190) |
| | | | ● | MP6120 | 150 (140 – 160) | 130 (120 – 140) | 120 (110 – 130) |
| | | | ● | MV1030 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ◕ | MV1020 | 210 (200 – 220) | 180 (170 – 200) | 170 (150 – 180) |
| | | | ◕ | MV1030 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ◕ | MP6130 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ✣ | MP6130 | 120 (110 – 130) | 100 ( 90 – 110) | 90 ( 80 – 100) |
| | | | ✣ | VP15TF | 120 (110 – 130) | 100 ( 90 – 110) | 90 ( 80 – 100) |
| | Carbon steel<br>Alloy steel | 180 –<br>280HB | ● | MV1020 | 200 (190 – 210) | 170 (160 – 190) | 160 (150 – 170) |
| | | | ● | MP6120 | 150 (140 – 160) | 130 (120 – 140) | 120 (110 – 130) |
| | | | ● | MV1030 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ◕ | MV1020 | 190 (180 – 200) | 160 (150 – 180) | 150 (140 – 160) |
| | | | ◕ | MV1030 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ◕ | MP6130 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ✣ | MP6130 | 120 (110 – 130) | 100 ( 90 – 110) | 90 ( 80 – 100) |
| | | | ✣ | VP15TF | 120 (110 – 130) | 100 ( 90 – 110) | 90 ( 80 – 100) |
| | Carbon steel<br>Alloy steel<br>Alloy tool steel | 280 –<br>350HB<br>≤350HB | ● | MV1020 | 200 (190 – 210) | 170 (160 – 190) | 160 (150 – 170) |
| | | | ● | MP6120 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ● | MV1030 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ◕ | MV1020 | 190 (180 – 200) | 160 (150 – 180) | 150 (140 – 160) |
| | | | ◕ | MV1030 | 140 (130 – 150) | 120 (110 – 130) | 110 (100 – 120) |
| | | | ◕ | MP6130 | 130 (120 – 140) | 110 (100 – 120) | 100 ( 90 – 110) |
| | | | ✣ | MP6130 | 110 (100 – 120) | 90 ( 80 – 100) | 80 ( 70 – 90) |
| | | | ✣ | VP15TF | 110 (100 – 120) | 90 ( 80 – 100) | 80 ( 70 – 90) |
| | Pre-hardened steel | 35 – 45HRC | ● | MP6120 | 110 (100 – 120) | — | — |
| | | | ◕ | MP6130 | 100 ( 90 – 110) | — | — |
| | | | ✣ | MP6130 | 80 ( 70 – 90) | — | — |
| | | | ✣ | VP15TF | 80 ( 70 – 90) | — | — |
| M | Austenitic stainless steel | ≤200HB | ● | MP7130 | 130 (120 – 140) | 110 (100 – 120) | — |
| | | | ◕ | MP7130 | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ◕ | VP15TF | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ✣ | MP7130 | 100 ( 90 – 110) | 80 ( 70 – 90) | — |
| | | | ✣ | VP15TF | 100 ( 90 – 110) | 80 ( 70 – 90) | — |
| | | >200HB | ● | MP7130 | 130 (120 – 140) | 110 (100 – 120) | — |
| | | | ◕ | MP7130 | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ◕ | VP15TF | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ✣ | MP7130 | 100 ( 90 – 110) | 80 ( 70 – 90) | — |
| | | | ✣ | VP15TF | 100 ( 90 – 110) | 80 ( 70 – 90) | — |
| | Ferritic and martensitic Stainless steel | ≤200HB | ● | MP7130 | 130 (120 – 140) | 110 (100 – 120) | — |
| | | | ◕ | MP7130 | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ◕ | VP15TF | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ✣ | MP7130 | 100 ( 90 – 110) | 80 ( 70 – 90) | — |
| | | | ✣ | VP15TF | 100 ( 90 – 110) | 80 ( 70 – 90) | — |

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Cutting conditions: ● : Stable cutting ◕ : General cutting ✣ : Unstable cutting

## WWX200/400 – CUTTING SPEED / WET CUTTING

| | Material | Properties | Cutting conditions | Grade | Vc | | |
|---|---|---|---|---|---|---|---|
| | | | | | ae ≤ 0.5 DC | ae ≤ 0.8 DC | ae = DC |
| P | Duplex stainless steel | ≤280HB | ● | MP7130 | 120 (110 – 130) | 100 ( 90 – 110) | — |
| | | | ◔ | MP7130 | 110 (100 – 120) | 90 ( 80 – 100) | — |
| | | | ◔ | VP15TF | 110 (100 – 120) | 90 ( 80 – 100) | — |
| | | | ✣ | MP7130 | 90 ( 80 – 100) | 70 ( 60 – 80) | — |
| | | | ✣ | VP15TF | 90 ( 80 – 100) | 70 ( 60 – 80) | — |
| | Precipitation hardening Stainless steel | <450HB | ● | MP7130 | 120 (110 – 130) | — | — |
| | | | ◔ | MP7130 | 110 (100 – 120) | — | — |
| | | | ◔ | VP15TF | 110 (100 – 120) | — | — |
| | | | ✣ | MP7130 | 90 ( 80 – 100) | — | — |
| | | | ✣ | VP15TF | 90 ( 80 – 100) | — | — |
| K | Gray cast iron | | ● | MC5020 | 170 (150 – 190) | 150 (130 – 170) | 130 (110 – 150) |
| | | | ◔ | MC5020 | 160 (140 – 180) | 140 (120 – 160) | 120 (100 – 140) |
| | | | ◔ | VP15TF | 160 (140 – 180) | 140 (120 – 160) | — |
| | | | ✣ | MC5020 | 140 (120 – 160) | 120 (100 – 140) | 100 ( 80 – 120) |
| | | | ✣ | VP15TF | 140 (120 – 160) | 120 (100 – 140) | 100 ( 80 – 120) |
| | Ductile cast iron | ≤450MPa | ● | MV1020 | 200 (180 – 240) | 180 (150 – 220) | 150 (130 – 200) |
| | | | ● | MC5020 | 170 (150 – 190) | 150 (130 – 170) | 130 (110 – 150) |
| | | | ● | MV1030 | 160 (140 – 180) | 140 (120 – 160) | 120 (100 – 140) |
| | | | ◔ | MV1020 | 190 (170 – 230) | 170 (140 – 210) | 140 (120 – 190) |
| | | | ◔ | MV1030 | 160 (140 – 180) | 140 (120 – 160) | 120 (100 – 140) |
| | | | ◔ | MC5020 | 160 (140 – 180) | 140 (120 – 160) | 120 (100 – 140) |
| | | | ◔ | VP15TF | 160 (140 – 180) | 140 (120 – 160) | — |
| | | | ✣ | MC5020 | 140 (120 – 160) | 120 (100 – 140) | 100 ( 80 – 120) |
| | | | ✣ | VP15TF | 140 (120 – 160) | 120 (100 – 140) | 100 ( 80 – 120) |
| | Ductile cast iron | ≤800MPa | ● | MV1020 | 180 (170 – 210) | 160 (150 – 190) | 140 (120 – 160) |
| | | | ● | MC5020 | 160 (150 – 170) | 140(130 – 150) | 120 (110 – 130) |
| | | | ● | MV1030 | 150 (140 – 160) | 130 (120 – 140) | 110 (100 – 120) |
| | | | ◔ | MV1020 | 170 (160 – 200) | 150 (140 – 180) | 120 (110 – 150) |
| | | | ◔ | MV1030 | 150 (140 – 160) | 130 (120 – 140) | 110 (100 – 120) |
| | | | ◔ | MC5020 | 150 (140 – 160) | 130 (120 – 140) | 110 (100 – 120) |
| | | | ◔ | VP15TF | 150 (140 – 160) | 130 (120 – 140) | — |
| | | | ✣ | MC5020 | 130 (120 – 140) | 110 (100 – 120) | 90 ( 80 – 100) |
| | | | ✣ | VP15TF | 130 (120 – 140) | 110 (100 – 120) | 90 ( 80 – 100) |
| N | Aluminium alloy | Si<5% | ● | TF15 | 500 (300 – 900) | 500 (300 – 900) | 500 (300 – 900) |
| | | | ◔ | TF15 | 500 (300 – 900) | 500 (300 – 900) | 500 (300 – 900) |
| | | | ✣ | TF15 | 400 (200 – 800) | 400 (200 – 800) | 400 (200 – 800) |
| S | Titanium alloy | — | ● | MP9120 | 80 ( 60 – 100) | — | — |
| | | | ◔ | MP9120 | 70 ( 50 – 90) | — | — |
| | | | ✣ | MP9130 | 60 ( 40 – 80) | — | — |
| | Heat resistant alloy | — | ● | MP9120 | 60 ( 50 – 70) | — | — |
| | | | ◔ | MP9120 | 50 ( 30 – 60) | — | — |
| | | | ✣ | MP9130 | 40 ( 20 – 40) | — | — |
| H | Hardened steel | 40 – 55HRC | ●◔ | VP15TF | 50 ( 30 – 70) | — | — |
| | | | ◔ | MP6120 | 40 ( 30 – 70) | — | — |

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1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.



Cutting conditions: ● : Stable cutting ◔ : General cutting ✣ : Unstable cutting

# WWX200

## RECOMMENDED CUTTING CONDITIONS

### DEPTH OF CUT / FEED PER TOOTH

| | Material | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.8 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| P | Mild steel | ≤180HB | ● | | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | | MP6120 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MP6130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1020 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | | MV1030 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | | MP6130 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✣ | | MP6130 | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✣ | | VP15TF | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Carbon steel<br>Alloy steel<br>Alloy tool steel | 180 – 280HB | ● | | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | | MP6120 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MP6130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1020 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | | MV1030 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | | MP6130 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✣ | | MP6130 | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✣ | | VP15TF | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Carbon steel<br>Alloy steel<br>Alloy tool steel | 280 – 350HB<br>≤350HB | ● | | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | | MP6120 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MP6130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | | MV1020 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | | MV1030 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | | MP6130 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✣ | | MP6130 | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✣ | | VP15TF | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Pre-hardened steel | 35 – 45HRC | ● | | MP6120 | M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◐ | | MP6130 | M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◐ | | MP6130 | R | ≤ 2.0 | 0.16 (0.10–0.20) | — | — | — | — | — | — |
| | | | ✣ | | MP6130 | R | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ✣ | | VP15TF | R | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |

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Cutting conditions: ● : Stable cutting ◐ : General cutting ✣ : Unstable cutting

## WWX200 – DEPTH OF CUT / FEED PER TOOTH

| | Material | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.8 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| M | Austenitic stainless steel | ≤200HB | ● ◕ | ✕ 💧 | MP7130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◕ | ✕ 💧 | MV1030 | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◕ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | >200HB | ● ◕ | ✕ | MP7130 | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◕ | 💧 | MP7130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◕ | ✕ | MV1030 | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◕ | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ | MP7130 | M | ≤ 2.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | 💧 | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ | VP15TF | M | ≤ 2.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | 💧 | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | Ferritic and martensitic Stainless steel | ≤200HB | ● ◕ | ✕ 💧 | MP7130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◕ | ✕ | MV1030 | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◕ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | Duplex stainless steel | ≤280HB | ● ◕ | ✕ | MP7130 | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◕ | 💧 | MP7130 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◕ | ✕ | VP15TF | M | ≤ 2.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◕ | 💧 | VP15TF | M | ≤ 3.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ | MP7130 | M | ≤ 2.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | 💧 | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ | VP15TF | M | ≤ 2.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | 💧 | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | Precipitation Hardening stainless steel | <450HB | ● ◕ | ✕ 💧 | MP7130 | L, M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◕ | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.16 (0.10–0.20) | — | — | — | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| K | Gray cast iron | ≤350MPa | ● ◕ | ✕ 💧 | MC5020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◕ | ✕ 💧 | VP15TF | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MC5020 | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✤ | ✕ 💧 | VP15TF | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Ductile cast iron | ≤800MPa | ● ◕ | ✕ 💧 | MV1020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● ◕ | ✕ 💧 | MV1030 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● ◕ | ✕ 💧 | MC5020 | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 3.0 | 0.13 (0.10–0.15) | L, M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◕ | ✕ 💧 | MV1020 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◕ | ✕ 💧 | MV1030 | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◕ | ✕ 💧 | VP15TF | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | M, R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MC5020 | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✤ | ✕ 💧 | VP15TF | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 3.0 | 0.13 (0.10–0.15) | M, R | ≤ 2.0 | 0.13 (0.10–0.15) |
| N | Aluminium alloy | | ●◕✤ | 💧 | TF15 | L | ≤ 3.0 | 0.13 (0.10–0.15) | L | ≤ 3.0 | 0.13 (0.10–0.15) | L | ≤ 2.0 | 0.13 (0.10–0.15) |
| S | Titanium alloy | — | ● ◕ | 💧 | MP9120 | L, M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| | | | ✤ | 💧 | MP9130 | L, M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| | Heat resistant alloy | — | ● ◕ | 💧 | MP9120 | L, M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| | | | ✤ | 💧 | MP9130 | L, M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| H | Hardened steel | 40 – 55HRC | ● | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.05 (0.05–0.10) | — | — | — | — | — | — |
| | | | ◕ | ✕ 💧 | VP15TF | M, R | ≤ 2.0 | 0.05 (0.05–0.10) | — | — | — | — | — | — |
| | | | ◕ | ✕ 💧 | MP6120 | M, R | ≤ 2.0 | 0.05 (0.05–0.10) | — | — | — | — | — | — |





Cutting conditions: ● : Stable cutting ◕ : General cutting ✤ : Unstable cutting

# WWX400

## RECOMMENDED CUTTING CONDITIONS

### DEPTH OF CUT / FEED PER TOOTH

| | Material | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.8 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| P | Mild steel | ≤180HB | ● | Dry | MV1020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | Dry | MV1030 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | Dry | MP6120 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1030 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MP6130 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1020 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◔ | Dry | MV1030 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◔ | Dry | MP6130 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✣ | Dry | MP6130 | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✣ | Dry | VP15TF | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Carbon steel<br>Alloy steel<br>Alloy tool steel | 180 – 280HB | ● | Dry | MV1020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | Dry | MV1030 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● | Dry | MP6120 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1030 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MP6130 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1020 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◔ | Dry | MV1030 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◔ | Dry | MP6130 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✣ | Dry | MP6130 | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✣ | Dry | VP15TF | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Carbon steel<br>Alloy steel<br>Alloy tool steel | 280 – 350HB<br>≤350HB | ● | Dry | MV1020 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) |
| | | | ● | Dry | MV1030 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) |
| | | | ● | Dry | MP6120 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1020 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1030 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MP6130 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◔ | Dry | MV1020 | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◔ | Dry | MV1030 | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◔ | Dry | MP6130 | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✣ | Dry | MP6130 | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✣ | Dry | VP15TF | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Pre-hardened steel | 35 – 45HRC | ● | Dry | MP6120 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◔ | Dry | MP6130 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◔ | Dry | MP6130 | M,R | ≤ 2.0 | 0.16 (0.10–0.20) | — | — | — | — | — | — |
| | | | ✣ | Dry | MP6130 | M,R | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ✣ | Dry | VP15TF | M,R | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |

1/2

1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.

Cutting conditions: ● : Stable cutting ◔ : General cutting ✣ : Unstable cutting

## WWX400 – DEPTH OF CUT / FEED PER TOOTH

| | Material | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.8 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| M | Austenitic stainless steel | ≤200HB | ● ◐ | ✕ | MV1030 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◐ | ✕ 💧 | MP7130 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◐ | ✕ 💧 | VP15TF | M | ≤ 4.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 4.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 4.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | >200HB | ● | ✕ | MV1030 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● | ✕ 💧 | MP7130 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◐ | ✕ | MV1030 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◐ | ✕ 💧 | MP7130 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◐ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | Ferritic and martensitic Stainless steel | ≤200HB | ● ◐ | ✕ | MV1030 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◐ | ✕ 💧 | MP7130 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◐ | ✕ 💧 | VP15TF | M | ≤ 4.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | Duplex stainless steel | ≤280HB | ● ◐ | ✕ | MP7130 | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ● ◐ | 💧 | MP7130 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ◐ | ✕ | VP15TF | M | ≤ 3.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | 💧 | VP15TF | M | ≤ 4.0 | 0.16 (0.10–0.20) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ | MP7130 | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | 💧 | MP7130 | M | ≤ 4.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ | VP15TF | M | ≤ 3.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | | | ✤ | 💧 | VP15TF | M | ≤ 4.0 | 0.13 (0.10–0.15) | M | ≤ 3.0 | 0.13 (0.10–0.15) | — | — | — |
| | Precipitation Hardening stainless steel | <450HB | ● | ✕ 💧 | MP7130 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◐ | ✕ 💧 | MP7130 | L,M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ◐ | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.16 (0.10–0.20) | — | — | — | — | — | — |
| | | | ✤ | ✕ 💧 | MP7130 | M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| | | | ✤ | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.13 (0.10–0.15) | — | — | — | — | — | — |
| K | Gray cast iron | ≤350MPa | ● ◐ | ✕ 💧 | MC5020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | ✕ 💧 | VP15TF | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MC5020 | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M,R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✤ | ✕ 💧 | VP15TF | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M,R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | Ductile cast iron | ≤800MPa | ● ◐ | ✕ 💧 | MV1020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● ◐ | ✕ 💧 | MV1030 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ● ◐ | ✕ 💧 | MC5020 | L,M | ≤ 4.0 | 0.13 (0.10–0.15) | L,M | ≤ 3.0 | 0.13 (0.10–0.15) | L,M | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ◐ | ✕ 💧 | MV1020 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | ✕ 💧 | MV1030 | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ◐ | ✕ 💧 | VP15TF | M,R | ≤ 4.0 | 0.16 (0.10–0.20) | M,R | ≤ 3.0 | 0.16 (0.10–0.20) | — | — | — |
| | | | ✤ | ✕ 💧 | MC5020 | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M,R | ≤ 2.0 | 0.13 (0.10–0.15) |
| | | | ✤ | ✕ 💧 | VP15TF | M,R | ≤ 4.0 | 0.13 (0.10–0.15) | M,R | ≤ 3.0 | 0.13 (0.10–0.15) | M,R | ≤ 2.0 | 0.13 (0.10–0.15) |
| N | Aluminium alloy | Si<5% | ● ◐ ✤ | 💧 | TF15 | L | ≤ 4.0 | 0.13 (0.10–0.15) | L | ≤ 3.0 | 0.13 (0.10–0.15) | L | ≤ 2.0 | 0.13 (0.10–0.15) |
| S | Titanium alloy | — | ● ◐ | 💧 | MP9120 | L,M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| | | | ✤ | 💧 | MP9130 | L,M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| | Heat resistant alloy | — | ● ◐ | 💧 | MP9120 | L,M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| | | | ✤ | 💧 | MP9130 | L,M | ≤ 2.0 | 0.10 (0.05–0.13) | — | — | — | — | — | — |
| H | Hardened steel | 40 – 55HRC | ● | ✕ 💧 | VP15TF | M | ≤ 2.0 | 0.05 (0.05–0.10) | — | — | — | — | — | — |
| | | | ◐ | ✕ 💧 | VP15TF | M,R | ≤ 2.0 | 0.05 (0.05–0.10) | — | — | — | — | — | — |



1. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.
2. When large vibration occurs, reduce the cutting conditions.
3. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.



Cutting conditions: ● : Stable cutting ◐ : General cutting ✤ : Unstable cutting

# MX3030

## NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

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MITSUBISHI MATERIALS

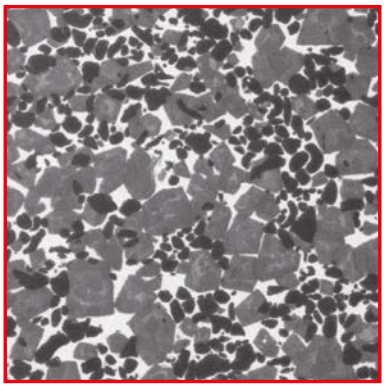
# MX3030

## NEW CERMET GRADE FOR A WIDER RANGE OF APPLICATIONS

Enables excellent surface finishes even at high efficiency machining conditions.

### IMPROVED MACHINING EFFICIENCY BY MAINTAINING EXCELLENT SURFACE FINISHES EVEN AT LARGE DEPTHS OF CUT

Cermet has a low affinity with iron, excellent thermal stability and oxidation resistance, and is therefore a suitable grade for finishing. However, it does not have the same bonding strength as cemented carbide thereby creating the challenge to compensate for fracture resistance.
MX3030 solves the challenge with higher thermal conductivity than conventional products and has excellent thermal cracking resistance. Therefore, it is possible to suppress wear and maintain high quality surface finishes. Also, since MX3030 has excellent toughness, improved machining efficiency even at large depths of cut can be realised.



MX3030

A special alloy is used for the binder material → Fracture resistance properties increased

High hardness Ti compound particles are used in the substrate → High wear resistance properties

## MILD STEEL DIN ST37-2 SURFACE FINISH COMPARISON

| Material | DIN ST37-2 |
|---|---|
| DC (mm) | 125 |
| Vc (m/min) | 200 |
| fz (mm/t) | 0.1 |
| ap (mm) | 2.0 |
| ae (mm) | 100 |
| Cutting mode | Dry cutting,<br>8 Inserts,<br>Centre cut,<br>After 8 m cutting work |

MX3030

Conventional

# MX3030

## INSERTS

| | | |
|---|---|---|
| P | Steel | ◆ |
| M | Stainless steel | ◆ |
| K | Cast iron | ◆ |

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

**Edge preparation: E**: Round **S**: Chamfer + Round **T**: Chamfer

| | Order number | Hand | Class | Edge preparation | MX3030 | IC | L | LE | W1 | S | BS | RE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SNGU140812ANER-L | R | G | E | ● | 14.0 | — | — | — | 8.4 | 1.5 | 1.2 | **WSX445** |
| | SNGU140812ANER-M | R | G | E | ● | | | | | | | | |
| | SNMU140812ANER-M | R | M | E | ● | | | | | | | | |
| | SNGU140812ANEL-L | L | G | E | ★ | | | | | | | | |
| | SNGU140812ANEL-M | L | G | E | ★ | | | | | | | | |
| | SNMU140812ANEL-M | L | M | E | ★ | | | | | | | | |
| NEW | AOMT123604PEER-M | R | M | E | ● | — | 12.0 | 10 | 6.6 | 3.6 | 1.6 | 0.4 | **APX3000** |
| NEW | AOMT123608PEER-M | R | M | E | ● | — | 12.0 | 10 | 6.6 | 3.6 | 1.2 | 0.8 | |
| | SEET13T3AGEN-JL | — | E | E | ● | 13.4 | — | — | — | 3.97 | 1.9 | 1.5 | **ASX445** |
| | SEMT13T3AGSN-JM | — | M | S | ● | 13.4 | — | — | — | 3.97 | 1.9 | 1.5 | |
| | SOET12T308PEER-JL | R | E | E | ● | 12.7 | — | — | — | 3.97 | 1.4 | 0.8 | **ASX400** |
| | SOMT12T308PEER-JM | R | M | E | ● | 12.7 | — | — | — | 3.97 | 1.4 | 0.8 | |
| | OEMX12T3ETR1 | R | M | T | ★ | 12.7 | — | — | — | 3.97 | 1.0 | — | **OCTACUT** |
| | OEMX1705ETR1 | R | M | T | ★ | 17.0 | — | — | — | 5.0 | 1.4 | — | |
| | RPMW10T3M0E | — | M | E | ★ | 10.0 | — | — | — | 3.97 | — | — | **BRP** |
| | RPMW1204M0E | — | M | E | ★ | 12.0 | — | — | — | 4.76 | — | — | |

1/2

(10 inserts in one case)

283 Vc

● : Inventory maintained. ★ : Inventory maintained in Japan.

## MX3030 – INSERTS

| | | |
|---|---|---|
| P | Steel | ◆ |
| M | Stainless steel | ◆ |
| K | Cast iron | ◆ |

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the recommended cutting conditions.

**Edge preparation: E**: Round **S**: Chamfer + Round **T**: Chamfer

| Order number | Hand | Class | Edge preparation | MX3030 | IC | L | LE | W1 | S | BS | RE | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPMW090304 | — | M | T | ★ | 9.525 | — | — | — | 3.18 | — | 0.4 | **CESP, SFSP, CGSP** |
| SPMW090308 | — | M | T | ★ | 9.525 | — | — | — | 3.18 | — | 0.8 | |
| SPMW120304 | — | M | T | ★ | 12.7 | — | — | — | 3.18 | — | 0.4 | |
| SPMW120308 | — | M | T | ● | 12.7 | — | — | — | 3.18 | — | 0.8 | |
| APMT1135PDER-H1 | R | M | E | ★ | — | 11.25 | 9 | 6.35 | 3.5 | 1.5 | 0.4 | **BAP300** |
| APMT1135PDER-H2 | R | M | E | ★ | — | 11.25 | 9 | 6.35 | 3.5 | 1.2 | 0.8 | |
| APMT1135PDER-M2 | R | M | E | ★ | — | 11.18 | 9 | 6.35 | 3.5 | 1.2 | 0.8 | |
| APMT1604PDER-H2 | R | M | E | ★ | — | 17.11 | 14 | 9.525 | 4.76 | 1.4 | 0.8 | **BAP400, SRM2** |
| APMT1604PDER-M2 | R | M | E | ★ | — | 17.10 | 14 | 9.525 | 4.76 | 1.4 | 0.8 | |

2/2

(10 inserts in one case)

283 Vc

# CUTTING PERFORMANCE

## SURFACE FINISH COMPARISON WHEN MACHINING DIN 42CrMo4 ALLOY STEEL

The MX3030 grades produced an excellent finished surface with uniform machining marks with only a slight cloudiness.

| | |
|---|---|
| Material | DIN 42CrMo4 |
| Tool | ASX400-JL |
| Vc (m/min) | 250 |
| fz (mm/t) | 0.05 |
| ap (mm) | 0.5 |
| ae (mm) | 100 |
| Cutting mode | Dry cutting |

Ra 0.5105 µm Rz 3.1582 µm

MX3030

Ra 0.5320 µm Rz 3.8950 µm

Conventional



● : Inventory maintained. ★ : Inventory maintained in Japan.

# MX3030

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | Cutter type | Inserts | Vc | ft | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| P | Mild steel | ≤180 HB | WSX445 | L, M | 180 (130 – 230) | 0.15 | |
| | | | APX3000 | M | 160 (120 – 200) | 0.15 | |
| | | | ASX445 | JL | 180 (130 – 250) | 0.15 | |
| | | | ASX445 | JM | 180 (130 – 250) | 0.2 | |
| | | | ASX400 | JL | 180 (130 – 250) | 0.15 | |
| | | | ASX400 | JM | 180 (130 – 250) | 0.18 | |
| | | | OCTACUT | — | 180 (100 – 250) | 0.2 | |
| | | | BAP | H | 160 (120 – 200) | 0.1 | |
| | | | BRP | — | 180 (130 – 250) | 0.30* | |
| | Carbon steel<br>Alloy steel | 180 – 280 HB | WSX445 | L, M | 150 (120 – 180) | 0.15 | |
| | | | APX3000 | M | 140 (100 – 180) | 0.15 | |
| | | | ASX445 | JL | 150 (120 – 180) | 0.15 | |
| | | | ASX445 | JM | 150 (120 – 180) | 0.2 | |
| | | | ASX400 | JL | 150 (120 – 180) | 0.13 | |
| | | | ASX400 | JM | 150 (120 – 180) | 0.15 | |
| | | | OCTACUT | — | 120 ( 80 – 160) | 0.2 | |
| | | | BAP | H | 120 (100 – 160) | 0.08 | |
| | | | BRP | — | 150 (120 – 180) | 0.30* | |
| | | | CESP, CFSP, CGSP | — | 130 (100 – 160) | 0.2 | 0.4 |
| | | 280 – 350 HB | WSX445 | L, M | 150 (120 – 180) | 0.15 | |
| | | | APX3000 | M | 100 ( 80 – 160) | 0.15 | |
| | | | ASX445 | JL | 100 ( 80 – 160) | 0.15 | |
| | | | ASX445 | JM | 100 ( 80 – 160) | 0.2 | |
| | | | ASX400 | JL | 100 ( 80 – 160) | 0.1 | |
| | | | ASX400 | JM | 100 ( 80 – 160) | 0.13 | |
| | | | OCTACUT | — | 100 ( 80 – 160) | 0.2 | |
| | | | BAP | — | 100 ( 80 – 160) | 0.08 | |
| | | | BRP | — | 100 ( 80 – 160) | 0.30* | |
| M | Stainless steel | ≤270 HB | WSX445 | L, M | 130 (100 – 180) | 0.15 | |
| | | | APX3000 | M | 120 ( 80 – 140) | 0.15 | |
| | | | ASX445 | JL | 150 (120 – 180) | 0.15 | |
| | | | ASX445 | JM | 150 (120 – 180) | 0.2 | |
| | | | ASX400 | JL | 150 (120 – 180) | 0.15 | |
| | | | ASX400 | JM | 150 (120 – 180) | 0.18 | |
| | | | OCTACUT | — | 150 (100 – 200) | 0.15 | |
| | | | BAP | M | 120 ( 80 – 140) | 0.1 | |
| | | | BRP | — | 150 (120 – 180) | 0.30* | |
| K | Cast iron<br>Ductile cast iron | ≤500 MPa | WSX445 | L, M | 150 (120 – 180) | 0.15 | |
| | | | APX3000 | M | 120 ( 80 – 140) | 0.15 | |
| | | | ASX445 | JL | 130 (100 – 160) | 0.15 | |
| | | | ASX445 | JM | 130 (100 – 160) | 0.2 | |
| | | | ASX400 | JL | 150 (120 – 180) | 0.15 | |
| | | | ASX400 | JM | 150 (120 – 180) | 0.18 | |
| | | | BAP | H | 100 ( 80 – 120) | 0.1 | |
| | | | BRP | — | 150 (120 – 180) | 0.30* | |

1/1

* BRP is the feed amount at a depth of cut of 3 mm.

1. For APX3000, the feed rate is for cutter diameter DC of 12 – 16 mm, cutting depth ae ≤DC x 0.25, and ap ≤ 4 mm.

NEW

# DXAS

## TRISTAR DRILL SERIES
## EXCHANGEABLE HEAD CARBIDE DRILL

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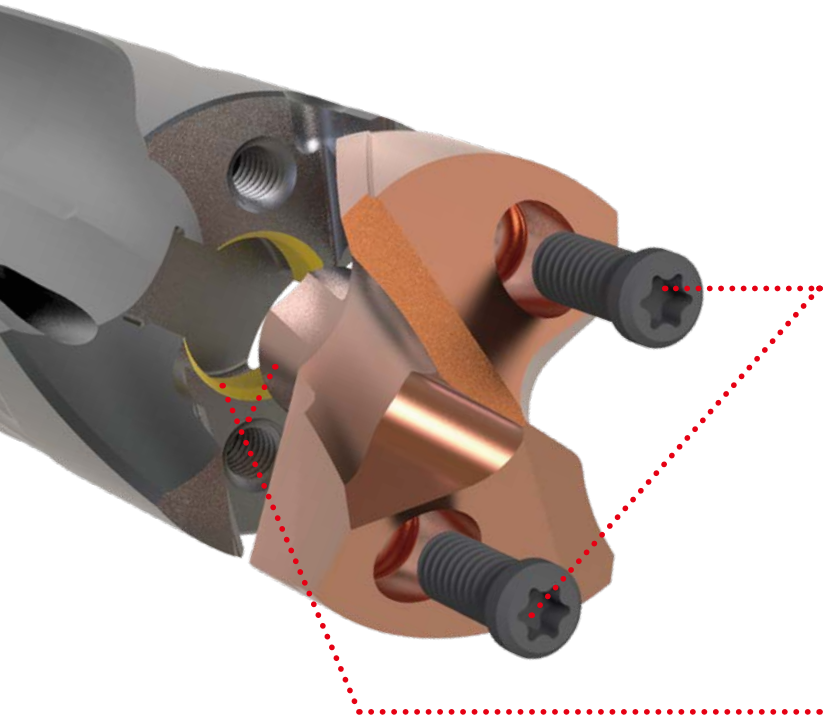
# DXAS

## EXCHANGEABLE HEAD CARBIDE DRILL

### REVOLUTIONISING THE HEAD REPLACEMENT SYSTEM

Dramatically reduces running costs and achieves machining accuracy and efficiency comparable to solid drills.

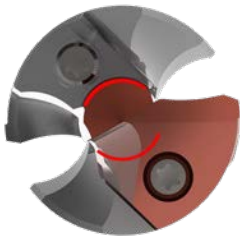


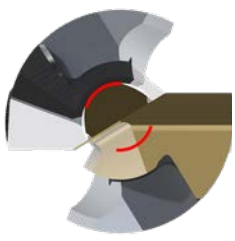
### STRONG AND INTUITIVE TWO-SCREW SYSTEM

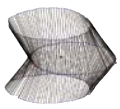
The two-screw fastening suppresses deformation of the holder and enables high-strength fastening, so it is less likely to loosen and securely fixes the head, even in high-stress machining environments.

### PERFECT CENTERING

"Perfect Centering" minimises the misalignment of the central axes of the head and holder that occurs when fastened, achieving hole precision comparable to that of a solid drill.

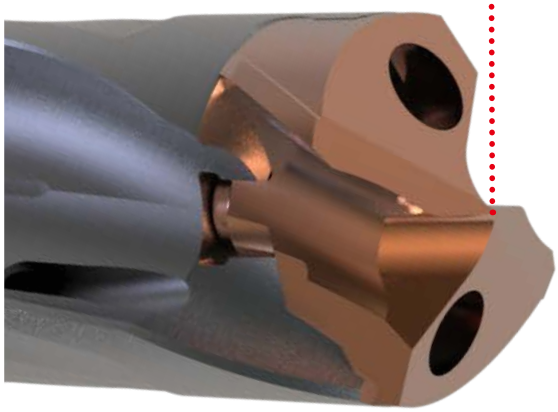



| | DXAS | Conventional | Conventional |
|---|---|---|---|
| | Head exchangeable type | | Solid drills |
| Cylindricity (mm) | 0.05 | 0.22 | 0.06 |
| | |  | |

# DXAS

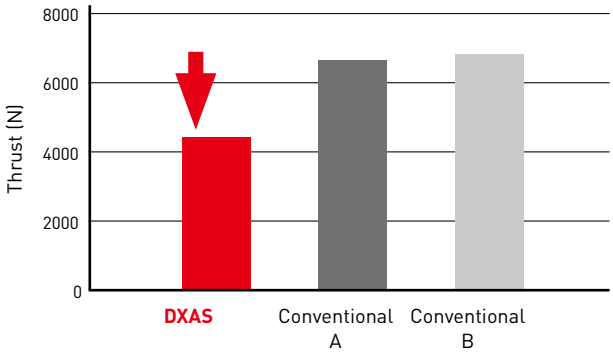
## STABLE MACHINING EVEN FOR LOW RIGIDITY WORKPIECES

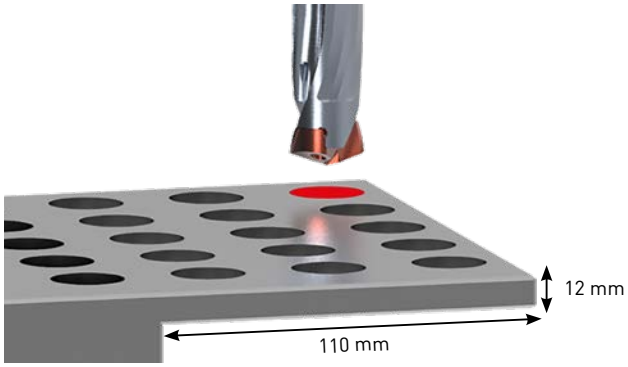


### XR POINT THINNING

By smoothly curling the chips, low resistance and excellent chip separation are achieved.
The low resistance design achieves highly efficient machining and reduces power consumption during machining.

**REDUCED TO 60 %**




### DIN CK50: COMPARISON WITH ONE-SIDED HOLDING WHEN DRILLING THIN PLATE

The high-strength fastening mechanism and low-resistance blade geometry have dramatically improved the processing stability of low-rigidity workpieces. High-precision drilling can be achieved even in thin plates, improving quality.

| | |
|---|---|
| Material | Carbon steel (DIN CK50) |
| Tool | Ø 30.0 mm, L/D = 5l |
| Vc (m/min) | 70 |
| fr (mm/rev) | 0.35 |
| Hole depth | 12 mm (Through hole) |
| Cutting mode | Wet cutting Internal coolant<br>Water-soluble coolant, 1MPa |

### BURR CONDITION ON THE EXIT SIDE

DXAS

Conventional

| | DXAS | Conventional |
|---|---|---|
| Hole oversize (mm) | 0.076 | 0.125 |
| Machine Load value (%) | 88 | 124 |



■: DXAS ■ A ■ B : Conventional tool

# DXAS

## STABLE MACHINING EVEN FOR DEEP HOLES

### NEW COOLANT SYSTEM

The new design ejects coolant from the flute directly onto the cutting edge, achieving excellent cooling.

DXAS

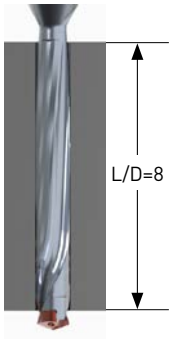
Conventional

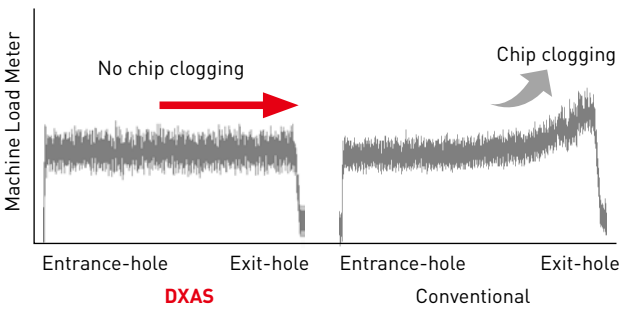
### FLUTE DESIGN WITH EXCELLENT CHIP EVACUATION

The strong point geometry at the tip directs chips into the wide end section of the flute, and the variable flute design achieves high chip removal performance.

### DIN CK50: COMPARISON OF CHIP REMOVAL WHEN DRILLING LARGE DIAMETER DEEP HOLES

| | |
|---|---|
| Material | Carbon steel (DIN CK50) |
| Tool | Ø 30.0 mm, L/D = 8 |
| Vc (m/min) | 70 |
| fr (mm/rev) | 0.25 |
| Hole depth | 240 mm (Through hole) |
| Cutting mode | Wet cutting Internal coolant<br>Water-soluble coolant, 1MPa |



# DXAS

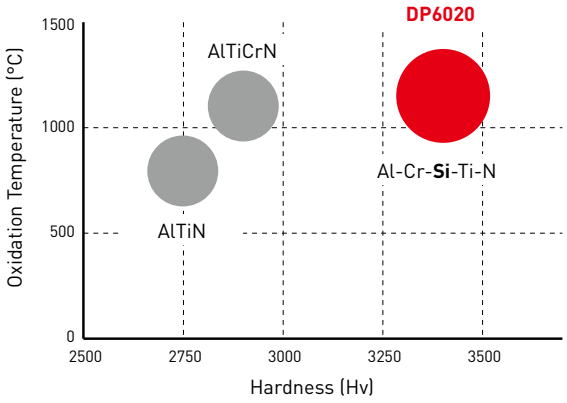
## P CLASS DRILLING HEAD

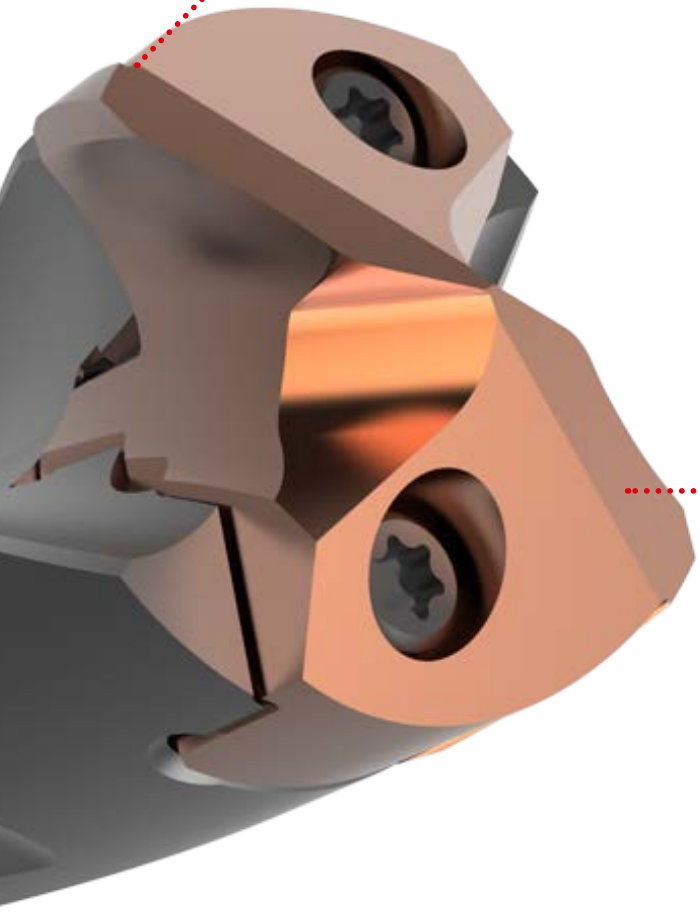
Al-Cr-**Si**-Ti-N
Multilayer Coating

*By Image

### DP6020 WITH EXCELLENT HEAT RESISTANCE AND HARDNESS

By adding Si, the coating hardness and the temperature at which oxidation started to occur were significantly raised. This multi-layer structure also improves wear and crack resistance during cutting and provided excellent wear resistance even during high-speed, high feed machining.



### HIGH STRENGTH NEGATIVE CUTTING EDGE

The negative rake blade improves wear resistance. It also breaks up chips when penetrating the workpiece, preventing them from wrapping around the holder.

**CUTTING EDGE WEAR PHOTO**

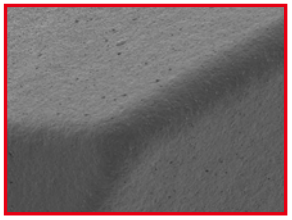
**DXAS**
*Can continue after 115 m*

Conventional
*Breakage at 45 m*

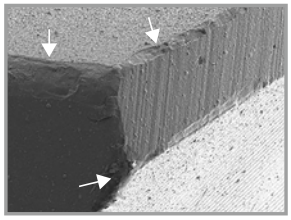
### HIGH-QUALITY CUTTING EDGE

The cutting edge is less susceptible to stress concentration and has excellent adhesion to the coating, providing both wear resistance and prevention of sudden breakage.

**ENLARGED PHOTO OF CUTTING EDGE**



**DXAS**



Conventional

# TRISTAR DRILL SERIES

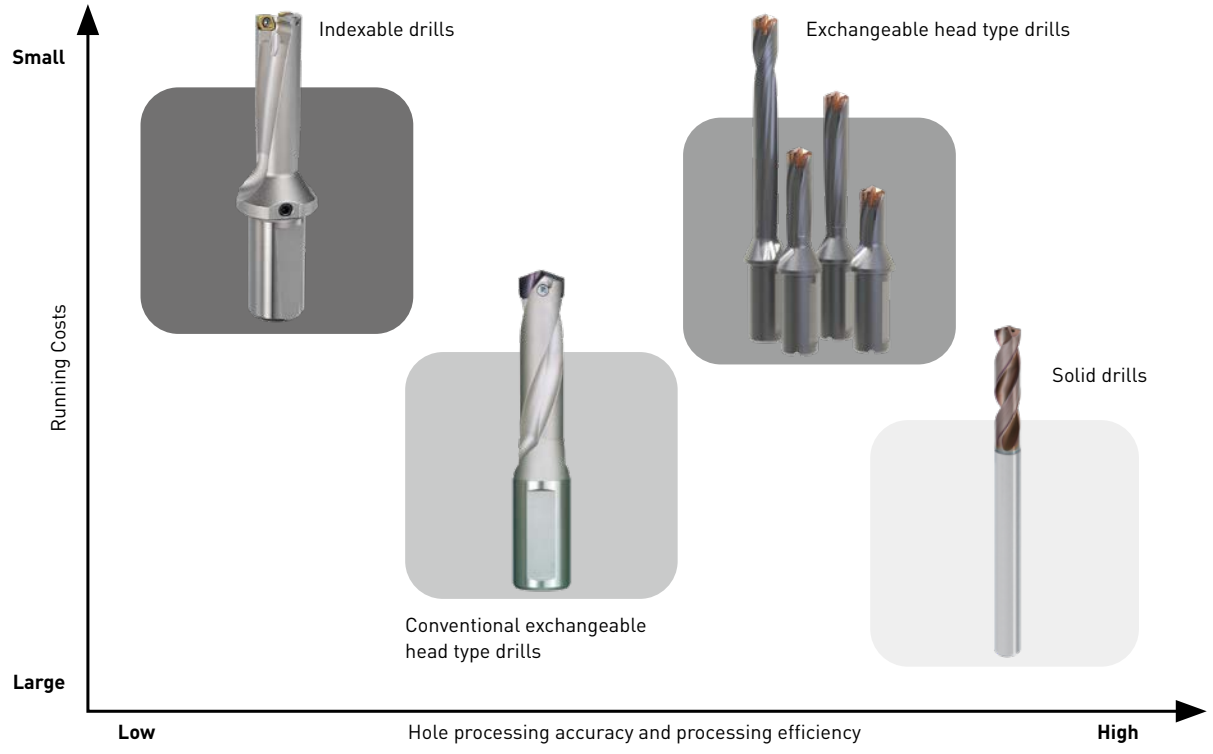
## REDUCED RUNNING COSTS – HIGH PRECISION – HIGH EFFICIENCY

**TRISTAR, A NEW GENERATION DRILL SERIES FROM MITSUBISHI MATERIALS PROVIDES 3 STRONG ADVANTAGES**

- Reduced running costs
- High precision
- High efficiency

Exceptionally long life and reduces running costs compared to conventional replaceable head drills.
In addition, it achieves machining accuracy and efficiency comparable to that of solid drills.

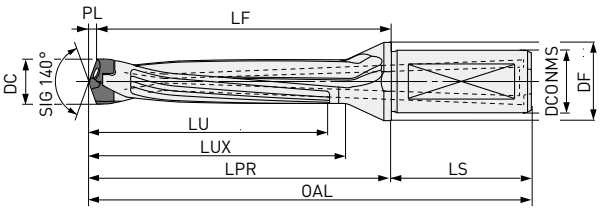
### SOLID CARBIDE TRISTAR DRILL SERIES



# DXAS

## TRISTAR DRILL SERIES

P K




| | DC < 18 | 18 < DC < 30 | 30 < DC |
|---|---|---|---|
| | 0.019<br>0.001 | 0.023<br>0.002 | 0.027<br>0.002 |
| | DCONMS = 25 | DCONMS = 32 | |
| h6 | 0<br>−0.013 | 0<br>−0.016 | |

| Order number | Stock | Hole depth (L/D) | No. of teeth | DC | LU | LUX | LPR | LS | OAL | LF | PL | DCONMS | DF | Applicable Heads |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DXAS1800X1F25 | ● | 1.5 | 2 | 18 | 32.0 | 40.0 | 58 | 56 | 114 | 55.0 | 3.0 | 25 | 31.3 | DXAS18○○P |
| DXAS1800X3F25 | ● | 3 | 2 | 18 | 59.0 | 67.0 | 85 | 56 | 141 | 82.0 | 3.0 | 25 | 31.3 | |
| DXAS1800X5F25 | ● | 5 | 2 | 18 | 95.0 | 103.0 | 121 | 56 | 177 | 118.0 | 3.0 | 25 | 31.3 | |
| DXAS1800X8F25 | ● | 8 | 2 | 18 | 149.0 | 157.0 | 175 | 56 | 231 | 172.0 | 3.0 | 25 | 31.3 | |
| DXAS1900X1F25 | ● | 1.5 | 2 | 19 | 33.5 | 41.5 | 59.5 | 56 | 115.5 | 56.3 | 3.2 | 25 | 31.3 | DXAS19○○P |
| DXAS1900X3F25 | ● | 3 | 2 | 19 | 62.0 | 70.0 | 88 | 56 | 144 | 84.8 | 3.2 | 25 | 31.3 | |
| DXAS1900X5F25 | ● | 5 | 2 | 19 | 100.0 | 108.0 | 126 | 56 | 182 | 122.8 | 3.2 | 25 | 31.3 | |
| DXAS1900X8F25 | ● | 8 | 2 | 19 | 157.0 | 165.0 | 183 | 56 | 239 | 179.8 | 3.2 | 25 | 31.3 | |
| DXAS2000X1F25 | ● | 1.5 | 2 | 20 | 35.0 | 43.0 | 61 | 56 | 117 | 57.6 | 3.4 | 25 | 31.3 | DXAS20○○P |
| DXAS2000X3F25 | ● | 3 | 2 | 20 | 65.0 | 73.0 | 91 | 56 | 147 | 87.6 | 3.4 | 25 | 31.3 | |
| DXAS2000X5F25 | ● | 5 | 2 | 20 | 105.0 | 113.0 | 131 | 56 | 187 | 127.6 | 3.4 | 25 | 31.3 | |
| DXAS2000X8F25 | ● | 8 | 2 | 20 | 165.0 | 173.0 | 191 | 56 | 247 | 187.6 | 3.4 | 25 | 31.3 | |
| DXAS2100X1F25 | ● | 1.5 | 2 | 21 | 36.5 | 44.5 | 62.5 | 56 | 118.5 | 58.9 | 3.6 | 25 | 31.3 | DXAS21○○P |
| DXAS2100X3F25 | ● | 3 | 2 | 21 | 68.0 | 76.0 | 94 | 56 | 150 | 90.4 | 3.6 | 25 | 31.3 | |
| DXAS2100X5F25 | ● | 5 | 2 | 21 | 110.0 | 118.0 | 136 | 56 | 192 | 132.4 | 3.6 | 25 | 31.3 | |
| DXAS2100X8F25 | ● | 8 | 2 | 21 | 173.0 | 181.0 | 199 | 56 | 255 | 195.4 | 3.6 | 25 | 31.3 | |
| DXAS2200X1F25 | ● | 1.5 | 2 | 22 | 38.0 | 46.0 | 64 | 56 | 120 | 60.3 | 3.7 | 25 | 31.3 | DXAS22○○P |
| DXAS2200X3F25 | ● | 3 | 2 | 22 | 71.0 | 79.0 | 97 | 56 | 153 | 93.3 | 3.7 | 25 | 31.3 | |
| DXAS2200X5F25 | ● | 5 | 2 | 22 | 115.0 | 123.0 | 141 | 56 | 197 | 137.3 | 3.7 | 25 | 31.3 | |
| DXAS2200X8F25 | ● | 8 | 2 | 22 | 181.0 | 189.0 | 207 | 56 | 263 | 203.3 | 3.7 | 25 | 31.3 | |
| DXAS2300X1F25 | ● | 1.5 | 2 | 23 | 39.5 | 47.5 | 65.5 | 56 | 121.5 | 61.6 | 3.9 | 25 | 31.3 | DXAS23○○P |
| DXAS2300X3F25 | ● | 3 | 2 | 23 | 74.0 | 82.0 | 100 | 56 | 156 | 96.1 | 3.9 | 25 | 31.3 | |
| DXAS2300X5F25 | ● | 5 | 2 | 23 | 120.0 | 128.0 | 146 | 56 | 202 | 142.1 | 3.9 | 25 | 31.3 | |
| DXAS2300X8F25 | ● | 8 | 2 | 23 | 189.0 | 197.0 | 215 | 56 | 271 | 211.1 | 3.9 | 25 | 31.3 | |
| DXAS2400X1F25 | ● | 1.5 | 2 | 24 | 41.0 | 49.0 | 67 | 56 | 123 | 62.9 | 4.1 | 25 | 31.3 | DXAS24○○P |
| DXAS2400X3F25 | ● | 3 | 2 | 24 | 77.0 | 85.0 | 103 | 56 | 159 | 98.9 | 4.1 | 25 | 31.3 | |
| DXAS2400X5F25 | ● | 5 | 2 | 24 | 125.0 | 133.0 | 151 | 56 | 207 | 146.9 | 4.1 | 25 | 31.3 | |
| DXAS2400X8F25 | ● | 8 | 2 | 24 | 197.0 | 205.0 | 223 | 56 | 279 | 218.9 | 4.1 | 25 | 31.3 | |

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● : Inventory maintained. ★ : Inventory maintained in Japan.

## DXAS – TRISTAR DRILL SERIES

| Order number | Stock | Hole depth (L/D) | No. of teeth | DC | LU | LUX | LPR | LS | OAL | LF | PL | DCONMS | DF | Applicable Heads |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DXAS2500X1F25 | ● | 1.5 | 2 | 25 | 42.5 | 50.5 | 68.5 | 56 | 124.5 | 64.3 | 4.2 | 25 | 31.3 | |
| DXAS2500X3F25 | ● | 3 | 2 | 25 | 80.0 | 88.0 | 106 | 56 | 162 | 101.8 | 4.2 | 25 | 31.3 | DXAS2500P* DXAS2550P |
| DXAS2500X5F25 | ● | 5 | 2 | 25 | 130.0 | 138.0 | 156 | 56 | 212 | 151.8 | 4.2 | 25 | 31.3 | |
| DXAS2500X8F25 | ● | 8 | 2 | 25 | 205.0 | 213.0 | 231 | 56 | 287 | 226.8 | 4.2 | 25 | 31.3 | |
| DXAS2600X1F32 | ● | 1.5 | 2 | 26 | 44.0 | 52.0 | 77 | 60 | 137 | 72.6 | 4.4 | 32 | 41.3 | |
| DXAS2600X3F32 | ● | 3 | 2 | 26 | 83.0 | 91.0 | 116 | 60 | 176 | 111.6 | 4.4 | 32 | 41.3 | DXAS2600P* DXAS2650P DXAS2670P |
| DXAS2600X5F32 | ● | 5 | 2 | 26 | 135.0 | 143.0 | 168 | 60 | 228 | 163.6 | 4.4 | 32 | 41.3 | |
| DXAS2600X8F32 | ● | 8 | 2 | 26 | 213.0 | 221.0 | 246 | 60 | 306 | 241.6 | 4.4 | 32 | 41.3 | |
| DXAS2700X1F32 | ● | 1.5 | 2 | 27 | 45.5 | 53.5 | 78.5 | 60 | 138.5 | 73.9 | 4.6 | 32 | 41.3 | |
| DXAS2700X3F32 | ● | 3 | 2 | 27 | 86.0 | 94.0 | 119 | 60 | 179 | 114.4 | 4.6 | 32 | 41.3 | DXAS2700P* DXAS2750P |
| DXAS2700X5F32 | ● | 5 | 2 | 27 | 140.0 | 148.0 | 173 | 60 | 233 | 168.4 | 4.6 | 32 | 41.3 | |
| DXAS2700X8F32 | ● | 8 | 2 | 27 | 221.0 | 229.0 | 254 | 60 | 314 | 249.4 | 4.6 | 32 | 41.3 | |
| DXAS2800X1F32 | ● | 1.5 | 2 | 28 | 47.0 | 55.0 | 80 | 60 | 140 | 75.3 | 4.7 | 32 | 41.3 | |
| DXAS2800X3F32 | ● | 3 | 2 | 28 | 89.0 | 97.0 | 122 | 60 | 182 | 117.3 | 4.7 | 32 | 41.3 | DXAS2800P* DXAS2850P |
| DXAS2800X5F32 | ● | 5 | 2 | 28 | 145.0 | 153.0 | 178 | 60 | 238 | 173.3 | 4.7 | 32 | 41.3 | |
| DXAS2800X8F32 | ● | 8 | 2 | 28 | 229.0 | 237.0 | 262 | 60 | 322 | 257.3 | 4.7 | 32 | 41.3 | |
| DXAS2900X1F32 | ● | 1.5 | 2 | 29 | 48.5 | 56.5 | 81.5 | 60 | 141.5 | 76.6 | 4.9 | 32 | 41.3 | |
| DXAS2900X3F32 | ● | 3 | 2 | 29 | 92.0 | 100.0 | 125 | 60 | 185 | 120.1 | 4.9 | 32 | 41.3 | DXAS2900P* DXAS2950P |
| DXAS2900X5F32 | ● | 5 | 2 | 29 | 150.0 | 158.0 | 183 | 60 | 243 | 178.1 | 4.9 | 32 | 41.3 | |
| DXAS2900X8F32 | ● | 8 | 2 | 29 | 237.0 | 245.0 | 270 | 60 | 330 | 265.1 | 4.9 | 32 | 41.3 | |
| DXAS3000X1F32 | ● | 1.5 | 2 | 30 | 50.0 | 58.0 | 83 | 60 | 143 | 77.9 | 5.1 | 32 | 41.3 | |
| DXAS3000X3F32 | ● | 3 | 2 | 30 | 95.0 | 103.0 | 128 | 60 | 188 | 122.9 | 5.1 | 32 | 41.3 | DXAS3000P* |
| DXAS3000X5F32 | ● | 5 | 2 | 30 | 155.0 | 163.0 | 188 | 60 | 248 | 182.9 | 5.1 | 32 | 41.3 | |
| DXAS3000X8F32 | ● | 8 | 2 | 30 | 245.0 | 253.0 | 278 | 60 | 338 | 272.9 | 5.1 | 32 | 41.3 | |



1. The above dimensions ( * ) are for when installing the inserts.

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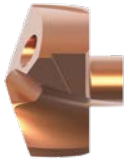
# SPARE PARTS

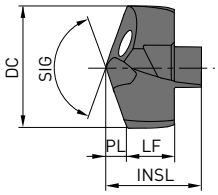
| Drill diameter (DC) | Clamp Screw | Clamp Torque (N x m) | Wrench | Drive Size |
|---|---|---|---|---|
| 18 – 19 | TPS25-1 | 1.0 | TIP07F | 7IP |
| 20 – 22 | TPS3-1 | 2.0 | TIP10F | 10IP |
| 23 – 25 | TPS351-1 | 2.5 | TIP10W | 10IP |
| 26 – 30 | TPS43 | 4.0 | TIP15W | 15IP |

● : Inventory maintained. ★ : Inventory maintained in Japan.

# DXAS

## INSERTS






| | DC < 18 | 18 < DC < 30 | 30 < DC |
|---|---|---|---|
| | 0.019 | 0.023 | 0.027 |
| | 0.001 | 0.002 | 0.002 |

| Order number | DP6020 | DC | LF | LPR | PL | SIG | Applicable holder |
|---|---|---|---|---|---|---|---|
| DXAS1800P | ● | 18.0 | 7.0 | 10.0 | 3.0 | 140° | DXAS1800 |
| DXAS1810P | ● | 18.1 | 6.9 | 10.0 | 3.1 | 140° | |
| DXAS1820P | ● | 18.2 | 6.9 | 10.0 | 3.1 | 140° | |
| DXAS1830P | ● | 18.3 | 6.9 | 10.0 | 3.1 | 140° | |
| DXAS1840P | ● | 18.4 | 6.9 | 10.0 | 3.1 | 140° | |
| DXAS1850P | ● | 18.5 | 6.9 | 10.0 | 3.1 | 140° | |
| DXAS1860P | ● | 18.6 | 6.9 | 10.0 | 3.1 | 140° | |
| DXAS1870P | ● | 18.7 | 6.8 | 10.0 | 3.2 | 140° | |
| DXAS1880P | ● | 18.8 | 6.8 | 10.0 | 3.2 | 140° | |
| DXAS1890P | ● | 18.9 | 6.8 | 10.0 | 3.2 | 140° | |
| DXAS1900P | ● | 19.0 | 6.8 | 10.0 | 3.2 | 140° | DXAS1900 |
| DXAS1910P | ● | 19.1 | 6.8 | 10.0 | 3.2 | 140° | |
| DXAS1920P | ● | 19.2 | 6.7 | 10.0 | 3.3 | 140° | |
| DXAS1930P | ● | 19.3 | 6.7 | 10.0 | 3.3 | 140° | |
| DXAS1940P | ● | 19.4 | 6.7 | 10.0 | 3.3 | 140° | |
| DXAS1950P | ● | 19.5 | 6.7 | 10.0 | 3.3 | 140° | |
| DXAS1960P | ● | 19.6 | 6.7 | 10.0 | 3.3 | 140° | |
| DXAS1970P | ● | 19.7 | 6.7 | 10.0 | 3.3 | 140° | |
| DXAS1980P | ● | 19.8 | 6.6 | 10.0 | 3.4 | 140° | |
| DXAS1990P | ● | 19.9 | 6.6 | 10.0 | 3.4 | 140° | |
| DXAS2000P | ● | 20.0 | 8.1 | 11.5 | 3.4 | 140° | DXAS2000 |
| DXAS2050P | ● | 20.5 | 8.0 | 11.5 | 3.5 | 140° | |
| DXAS2100P | ● | 21.0 | 7.9 | 11.5 | 3.6 | 140° | DXAS2100 |
| DXAS2150P | ● | 21.5 | 7.9 | 11.5 | 3.6 | 140° | |
| DXAS2200P | ● | 22.0 | 7.8 | 11.5 | 3.7 | 140° | DXAS2200 |
| DXAS2250P | ● | 22.5 | 7.7 | 11.5 | 3.8 | 140° | |
| DXAS2300P | ● | 23.0 | 9.1 | 13.0 | 3.9 | 140° | DXAS2300 |
| DXAS2350P | ● | 23.5 | 9.0 | 13.0 | 4.0 | 140° | |
| DXAS2400P | ● | 24.0 | 8.9 | 13.0 | 4.1 | 140° | DXAS2400 |
| DXAS2450P | ● | 24.5 | 8.9 | 13.0 | 4.1 | 140° | |
| DXAS2470P | ● | 24.7 | 8.8 | 13.0 | 4.2 | 140° | |
| DXAS2500P | ● | 25.0 | 8.8 | 13.0 | 4.2 | 140° | DXAS2500 |
| DXAS2550P | ● | 25.5 | 8.7 | 13.0 | 4.3 | 140° | |
| DXAS2600P | ● | 26.0 | 10.1 | 14.5 | 4.4 | 140° | DXAS2600 |
| DXAS2650P | ● | 26.5 | 10.0 | 14.5 | 4.5 | 140° | |
| DXAS2670P | ● | 26.7 | 10.0 | 14.5 | 4.5 | 140° | |
| DXAS2700P | ● | 27.0 | 9.9 | 14.5 | 4.6 | 140° | DXAS2700 |
| DXAS2750P | ● | 27.5 | 9.8 | 14.5 | 4.7 | 140° | |
| DXAS2800P | ● | 28.0 | 9.8 | 14.5 | 4.7 | 140° | DXAS2800 |
| DXAS2850P | ● | 28.5 | 9.7 | 14.5 | 4.8 | 140° | |
| DXAS2900P | ● | 29.0 | 10.6 | 15.5 | 4.9 | 140° | DXAS2900 |
| DXAS2950P | ● | 29.5 | 10.5 | 15.5 | 5.0 | 140° | |
| DXAS3000P | ● | 30.0 | 10.4 | 15.5 | 5.1 | 140° | DXAS3000 |

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● : Inventory maintained. ★ : Inventory maintained in Japan.

# DXAS – RECOMMENDED CUTTING CONDITIONS

| | Material | DC | Hole depth (L/D) | Vc | n | Vf |
|---|---|---|---|---|---|---|
| P | Mild steel<br>DIN St37-2 etc. | 18.0 | 1.5–8 | 110 ( 80 – 170 ) | 1900 | 0.30 ( 0.20 – 0.45 ) |
| | | 19.0 | 1.5–8 | 110 ( 80 – 170 ) | 1800 | 0.30 ( 0.20 – 0.45 ) |
| | | 20.0 | 1.5–8 | 110 ( 80 – 170 ) | 1800 | 0.30 ( 0.20 – 0.45 ) |
| | | 21.0 | 1.5–8 | 110 ( 80 – 170 ) | 1700 | 0.30 ( 0.20 – 0.45 ) |
| | | 22.0 | 1.5–8 | 110 ( 80 – 170 ) | 1600 | 0.30 ( 0.20 – 0.45 ) |
| | | 23.0 | 1.5–8 | 110 ( 80 – 170 ) | 1500 | 0.30 ( 0.20 – 0.45 ) |
| | | 24.0 | 1.5–8 | 110 ( 80 – 170 ) | 1500 | 0.30 ( 0.20 – 0.45 ) |
| | | 25.0 | 1.5–8 | 110 ( 80 – 170 ) | 1400 | 0.35 ( 0.25 – 0.45 ) |
| | | 26.0 | 1.5–8 | 110 ( 80 – 170 ) | 1300 | 0.35 ( 0.25 – 0.45 ) |
| | | 27.0 | 1.5–8 | 110 ( 80 – 170 ) | 1300 | 0.35 ( 0.25 – 0.45 ) |
| | | 28.0 | 1.5–8 | 110 ( 80 – 170 ) | 1300 | 0.35 ( 0.25 – 0.45 ) |
| | | 29.0 | 1.5–8 | 110 ( 80 – 170 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 30.0 | 1.5–8 | 110 ( 80 – 170 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | Carbon steel<br>DIN CK50 etc. | 18.0 | 1.5–8 | 100 ( 70 – 170 ) | 1800 | 0.30 ( 0.20 – 0.45 ) |
| | | 19.0 | 1.5–8 | 100 ( 70 – 170 ) | 1700 | 0.30 ( 0.20 – 0.45 ) |
| | | 20.0 | 1.5–8 | 100 ( 70 – 170 ) | 1600 | 0.30 ( 0.20 – 0.45 ) |
| | | 21.0 | 1.5–8 | 100 ( 70 – 170 ) | 1500 | 0.30 ( 0.20 – 0.45 ) |
| | | 22.0 | 1.5–8 | 100 ( 70 – 170 ) | 1400 | 0.30 ( 0.20 – 0.45 ) |
| | | 23.0 | 1.5–8 | 100 ( 70 – 170 ) | 1400 | 0.30 ( 0.20 – 0.45 ) |
| | | 24.0 | 1.5–8 | 100 ( 70 – 170 ) | 1300 | 0.30 ( 0.20 – 0.45 ) |
| | | 25.0 | 1.5–8 | 100 ( 70 – 170 ) | 1300 | 0.35 ( 0.25 – 0.45 ) |
| | | 26.0 | 1.5–8 | 100 ( 70 – 170 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 27.0 | 1.5–8 | 100 ( 70 – 170 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 28.0 | 1.5–8 | 100 ( 70 – 170 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | | 29.0 | 1.5–8 | 100 ( 70 – 170 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | | 30.0 | 1.5–8 | 100 ( 70 – 170 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | Alloy steel<br>DIN 41CrMo4, DIN 20Cr4 etc. | 18.0 | 1.5–8 | 100 ( 70 – 140 ) | 1800 | 0.30 ( 0.20 – 0.45 ) |
| | | 19.0 | 1.5–8 | 100 ( 70 – 140 ) | 1700 | 0.30 ( 0.20 – 0.45 ) |
| | | 20.0 | 1.5–8 | 100 ( 70 – 140 ) | 1600 | 0.30 ( 0.20 – 0.45 ) |
| | | 21.0 | 1.5–8 | 100 ( 70 – 140 ) | 1500 | 0.30 ( 0.20 – 0.45 ) |
| | | 22.0 | 1.5–8 | 100 ( 70 – 140 ) | 1400 | 0.30 ( 0.20 – 0.45 ) |
| | | 23.0 | 1.5–8 | 100 ( 70 – 140 ) | 1400 | 0.30 ( 0.20 – 0.45 ) |
| | | 24.0 | 1.5–8 | 100 ( 70 – 140 ) | 1300 | 0.30 ( 0.20 – 0.45 ) |
| | | 25.0 | 1.5–8 | 100 ( 70 – 140 ) | 1300 | 0.35 ( 0.25 – 0.45 ) |
| | | 26.0 | 1.5–8 | 100 ( 70 – 140 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 27.0 | 1.5–8 | 100 ( 70 – 140 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 28.0 | 1.5–8 | 100 ( 70 – 140 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | | 29.0 | 1.5–8 | 100 ( 70 – 140 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | | 30.0 | 1.5–8 | 100 ( 70 – 140 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| K | Cast iron<br>DIN GG30, DIN GGG45 etc. | 18.0 | 1.5–8 | 100 ( 70 – 170 ) | 1800 | 0.30 ( 0.20 – 0.45 ) |
| | | 19.0 | 1.5–8 | 100 ( 70 – 170 ) | 1700 | 0.30 ( 0.20 – 0.45 ) |
| | | 20.0 | 1.5–8 | 100 ( 70 – 170 ) | 1600 | 0.30 ( 0.20 – 0.45 ) |
| | | 21.0 | 1.5–8 | 100 ( 70 – 170 ) | 1500 | 0.30 ( 0.20 – 0.45 ) |
| | | 22.0 | 1.5–8 | 100 ( 70 – 170 ) | 1400 | 0.30 ( 0.20 – 0.45 ) |
| | | 23.0 | 1.5–8 | 100 ( 70 – 170 ) | 1400 | 0.30 ( 0.20 – 0.45 ) |
| | | 24.0 | 1.5–8 | 100 ( 70 – 170 ) | 1300 | 0.30 ( 0.20 – 0.45 ) |
| | | 25.0 | 1.5–8 | 100 ( 70 – 170 ) | 1300 | 0.35 ( 0.25 – 0.45 ) |
| | | 26.0 | 1.5–8 | 100 ( 70 – 170 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 27.0 | 1.5–8 | 100 ( 70 – 170 ) | 1200 | 0.35 ( 0.25 – 0.45 ) |
| | | 28.0 | 1.5–8 | 100 ( 70 – 170 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | | 29.0 | 1.5–8 | 100 ( 70 – 170 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |
| | | 30.0 | 1.5–8 | 100 ( 70 – 170 ) | 1100 | 0.35 ( 0.25 – 0.45 ) |



1. Refer to the table above for more details on how to set the cutting conditions according the usage.
2. When using non-water-soluble cutting fluid, reduce the cutting speed to 80 % to 90 %.
3. When using L/D=8, the maximum feed rate should be 0.4 mm/rev.

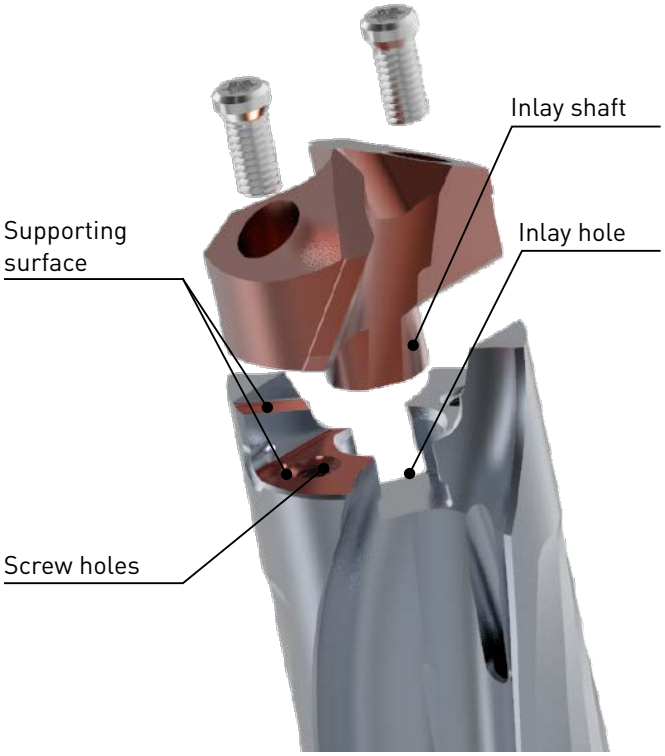
# HOW TO INSTALL THE HEAD

1. Thoroughly clean the head mounting area of the holder using an air blower, etc., and check that there are no foreign objects or dirt on the screw holes or the head support surface.

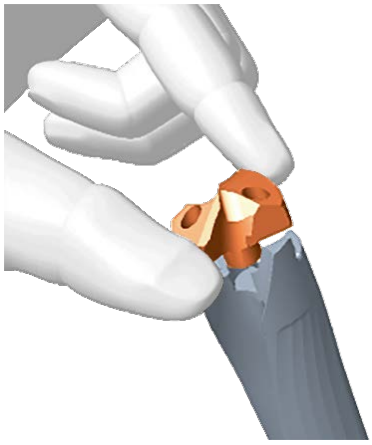
2. Insert the head's inlay shaft into the holder's inlay hole.

3. Insert the two clamp screws from the head and temporarily tighten each one.

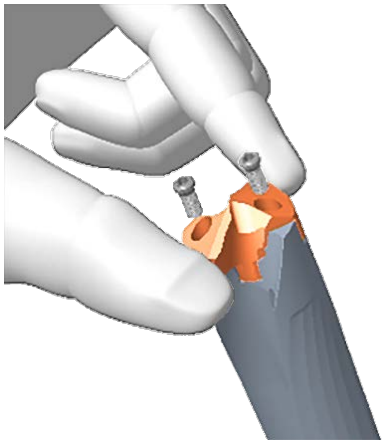
4. While lightly pressing the head against the support surface of the holder, tighten the two clamp screws to the recommended torque.



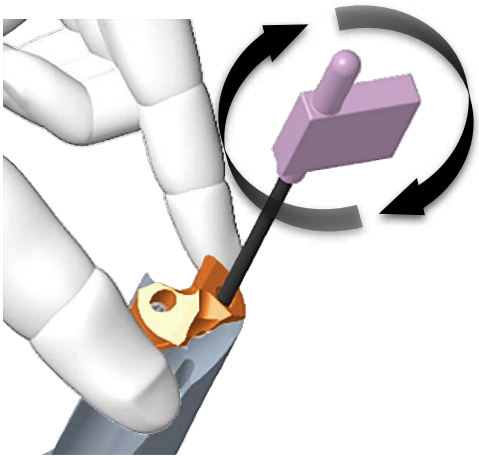

**2.**



**3.**



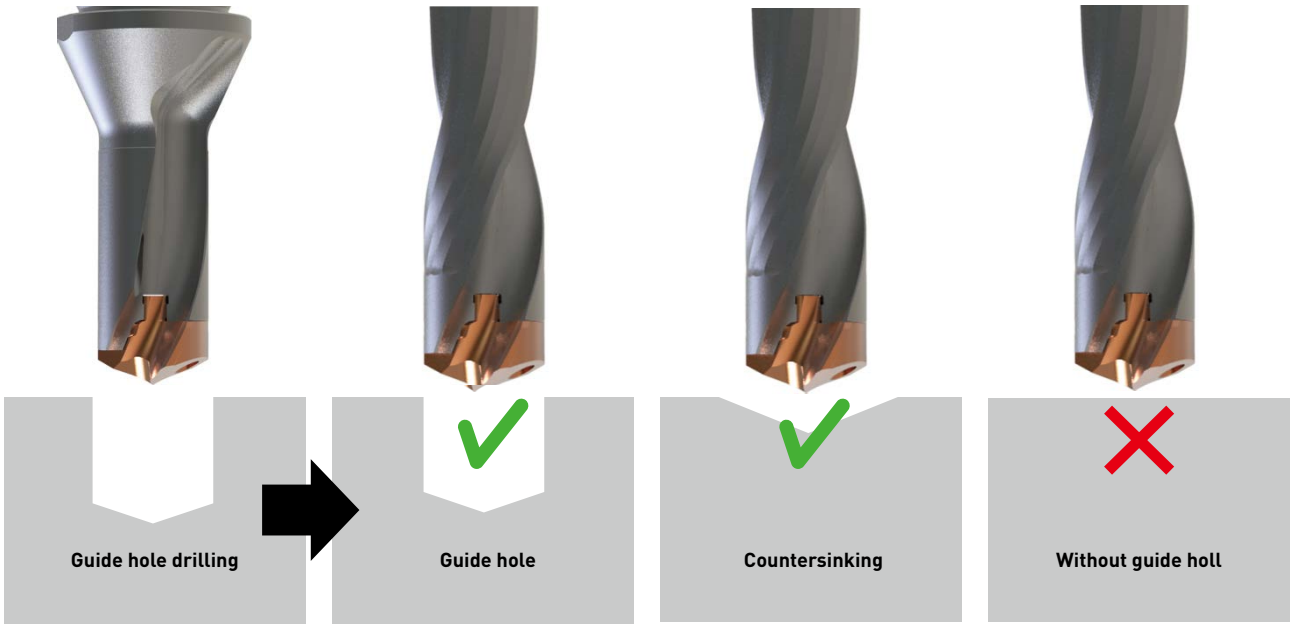
**4.**



# OPERATIONAL GUIDANCE

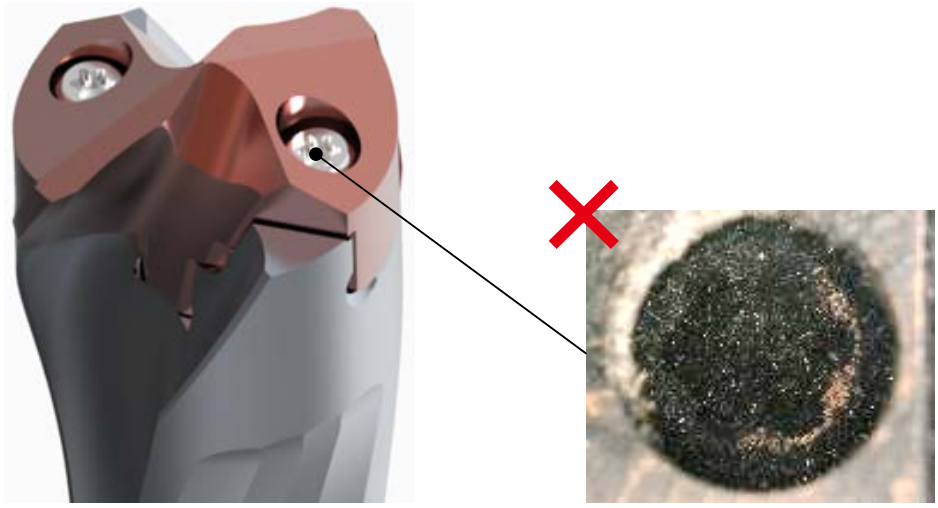
## 1. WHEN TO USE L/D = 8 AND HOW TO IMPROVE HOLE ACCURACY

Machining without guide holes increases the possibility of problems such as rifling occurring.




## 2. M.Q.L AND DRY MACHINING ARE NOT RECOMMENDED

M.Q.L. and dry machining are not recommended because sludge will accumulate on the clamping screws.



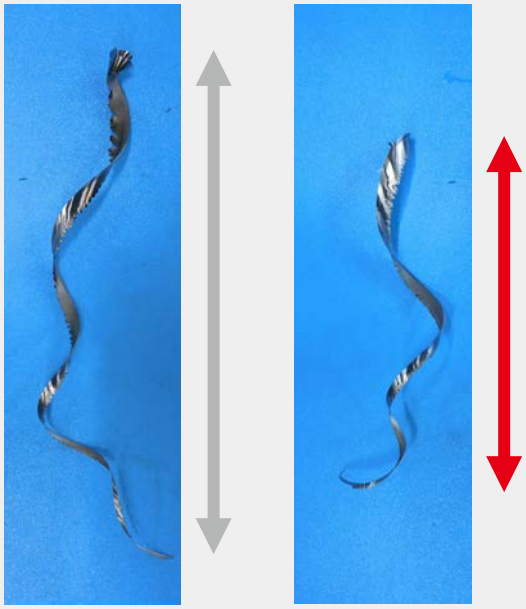
# OPERATIONAL GUIDANCE

### 3. HOW TO PREVENT CHIP WRAPPING

We do not recommend lowering the feed rate when penetrating the workpiece, as this can cause chips to wrap around the drill and workpiece.

**WHEN CUTTING CONDITIONS CAN BE INCREASED**

We recommend improving the cutting speed and feed rate.



Vc = 80 m/min
fr = 0.30 mm/rev

Vc = 100 m/min
fr = 0.35 mm/rev

**WHEN CUTTING CONDITIONS CANNOT BE INCREASED**

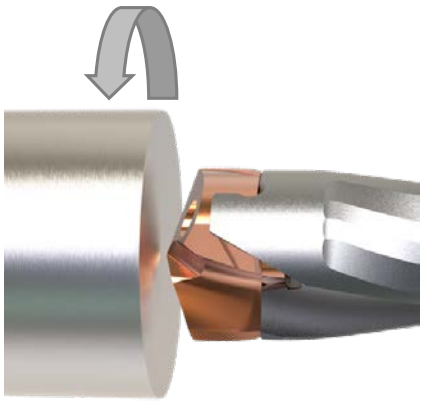
It is recommended to introduce a peck and stop the feed when half the drill point protrudes when drilling through holes.

Long chips produced when no peck feed is used.

Chips are successfully broken when a peck feed is used.

### 4. HOW TO SUPPRESS CHATTER AND VIBRATION IN MACHINING OPERATIONS WHERE THE WORKPIECE IS ROTATING

To reduce chatter and vibration when machining workpieces with rotating shafts, try machining at a lower peripheral speed and higher feed rate.



**When cutting speed is high**

Vc = 101 m/min
fr = 0.34 mm/rev
F = 391 mm/min

**Low cutting speed and high feed rate**

Vc = 70 m/min
fr = 0.45 mm/rev
F = 358 mm/min

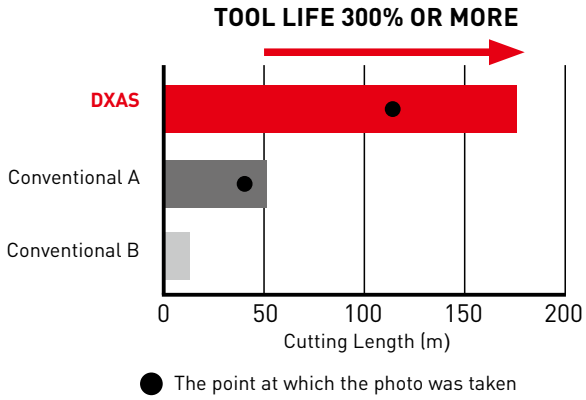
# DXAS

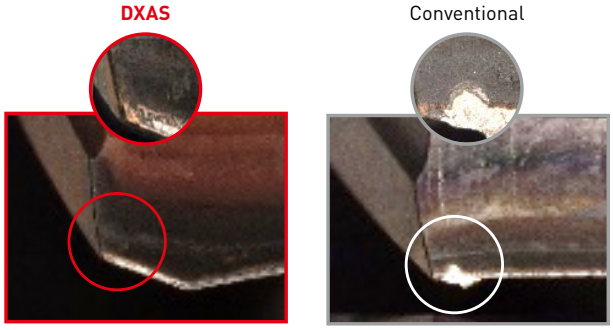
## APPLICATION EXAMPLES

### DIN CK50: TOOL LIFE COMPARISON UNDER GENERAL CUTTING CONDITIONS (F = 531 mm / min)

It has an overwhelming tool life that is more than three times longer than conventional products.
In addition to significantly reducing running costs, it also reduces the frequency of head replacement.

| | |
|---|---|
| Material | Carbon steel (DIN CK50) |
| Tool | Ø 18.0 mm, L/D = 5 |
| Vc (m / min) | 100 |
| fr (mm / rev) | 0.3 |
| Hole depth | 90 mm (Through hole) |
| Cutting mode | Wet cutting Internal coolant<br>Water-soluble coolant, 1MPa |



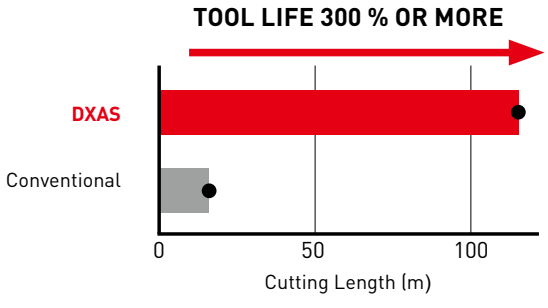

*Can continue after 115 m*

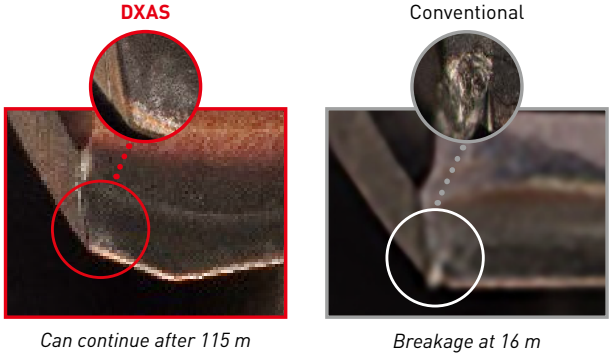
*Breakage at 45 m*

### DIN CK50: TOOL LIFE COMPARISON AT HIGHLY EFFICIENT CUTTING CONDITIONS (F = 955 mm / min)

DXAS has excellent wear resistance even under high-efficiency conditions, achieving more than three times the normal tool life.
The low resistance design enables stable machining.

| | |
|---|---|
| Material | Carbon steel (DIN CK50) |
| Tool | Ø 18.0 mm, L/D = 5 |
| Vc (m / min) | 120 |
| fr (mm / rev) | 0.45 |
| Hole depth | 90 mm (Through hole) |
| Cutting mode | Wet cutting Internal coolant<br>Water-soluble coolant, 1MPa |



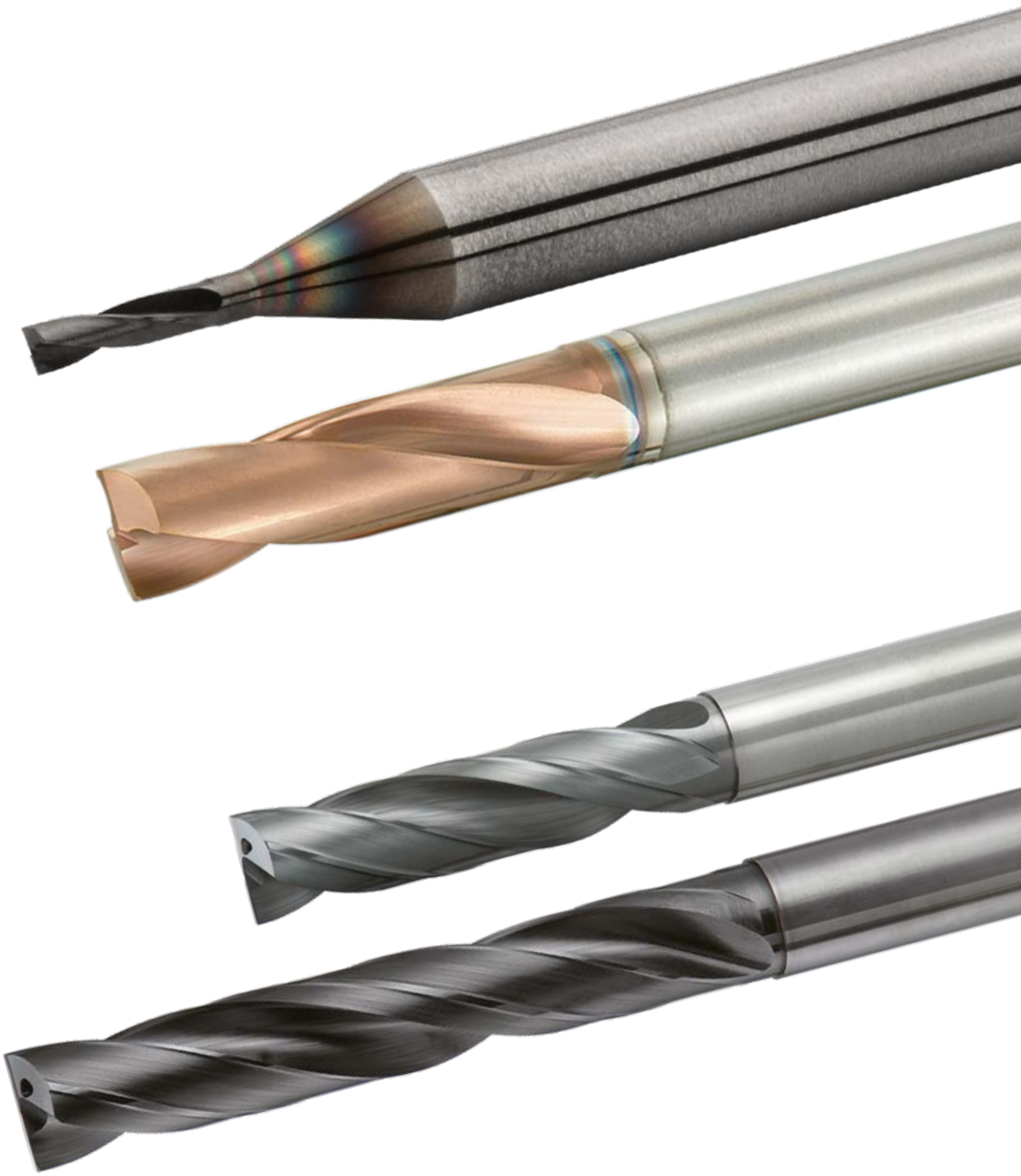

*Can continue after 115 m*

*Breakage at 16 m*

■ : DXAS ■ A ■ B : Conventional tool

# DFAS / MFE

## SOLID CARBIDE FLAT BOTTOM DRILLS FOR HIGH EFFICIENCY DRILLING OF VARIOUS APPLICATIONS



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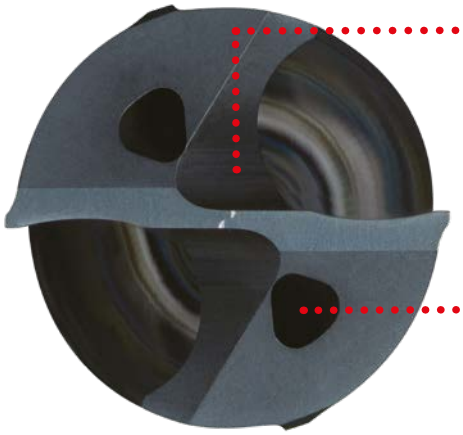
MITSUBISHI MATERIALS

NEW

# DFAS / DFAS-E

## SOLID CARBIDE FLAT BOTTOM DRILLS WITH INTERNAL COOLANT DC 3.0 – 14



### OPTIMISED CHIP CONTROL AND LOAD REDUCTION

The thinned centre cutting edge generates low cutting resistance and thereby creates an optimum chip geometry for a smoother chip flow.

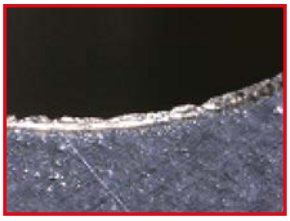
### TRI-COOLING TECHNOLOGY FOR ALL DIAMETERS

Coolant flow is increased without reducing the rigidity of the drill. The extra coolant flow dramatically improves chip evacuation and dissipates cutting heat. This enables stable machining of stainless steel and titanium alloys.

### ORIGINAL SHARP CUTTING EDGE SHAPE

Strength is ensured by providing a flat land (gash) at the corner and by adopting a sharp main cutting edge, burrs are suppressed.

**COMPARISON OF BURRS WHEN MACHINING TITANIUM ALLOY**



**DFAS**
0.08 mm

Conventional
0.12 mm

### COATED GRADE DP102A

DP102A coated grade provides excellent lubricity and long-term durability, achieving excellent wear resistance at low to medium cutting speeds.

# MINI-MFE

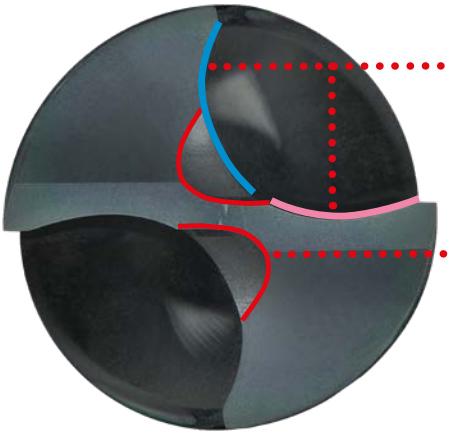
## SMALL DIAMETER SOLID CARBIDE FLAT BOTTOM DRILLS
## DC 0.75 – 2.95

### UNIQUE SHARP CUTTING EDGES

The flat lands on the corners provide greater strength and sharpness for substantial reduction of burrs.

### EXCELLENT CHIP CONTROL

End geometry that combines different radii forms a strong cutting edge and provides excellent chip control.



### POINT THINNING FOR LOWER THRUST FORCE

The mutli radius point geometry in combination with the thinned point forms ideal chip shapes, thereby dramatically reducing cutting resistance.

MFE

Conventional

## COATED GRADE DP102A

DP102A is a PVD coated cemented carbide grade specialised for drills. The coating has high adhesion and stability even on a sharp cutting edge. This greatly improves wear resistance and is ideal for drilling small diameter holes at low speed and feed conditions.

### SHARP CUTTING EDGES WITH LONG TOOL LIFE

| | |
|---|---|
| Material | X5CrNi189 |
| Tool / Drill | MFE0100X02S030 |
| L/D (mm) | 2 |
| Vc (m / min) | 25 |
| fr (mm / rev.) | 0.007 |
| Machine | Vertical MC (BT40) |

**100 HOLES**

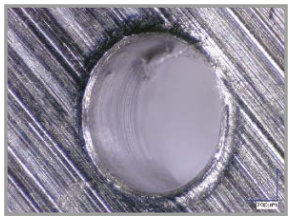
MFE

Conventional

Al-Cr-N Based PVD Coating

**500 HOLES**

MFE

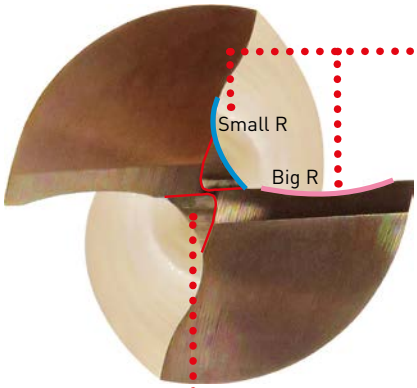


Conventional

NEW

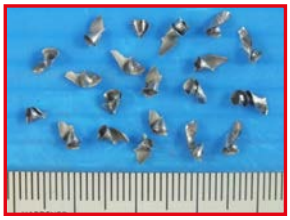
# MFE

## SOLID CARBIDE FLAT BOTTOM DRILLS
## DC 3.0 – 20.0




### EXCELLENT CHIP CONTROL

The combination of different radius geometries provides a strong cutting edge and excellent chip control.



| | |
|---|---|
| Material | DIN CK 50 |
| Vc (m/min) | 50 |
| fr (mm/rev.) | 0.07 |

### NEW "Z" POINT THINNING WITH LOWER THRUST FORCE

New point thinning provides excellent chip evacuation.

### GASH LAND FOR A STRONGER CORNER

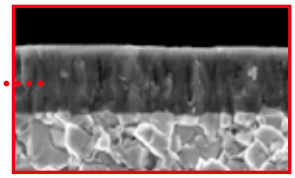
Gash land (0 degree rake) provides excellent chipping resistance.

### ZERO-μ SURFACE

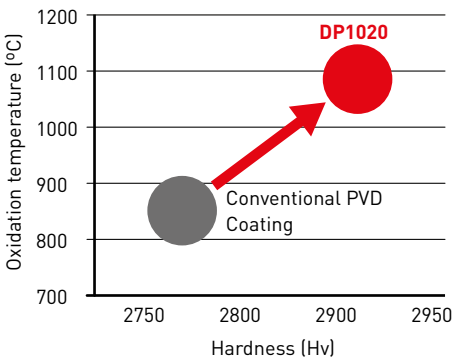
Smooth surface provides reduced deflection and excellent positional accuracy.

### COATED GRADE DP1020

DP1020 grade offers excellent wear resistance and reduced friction for longer tool life and covers a wide range of applications.



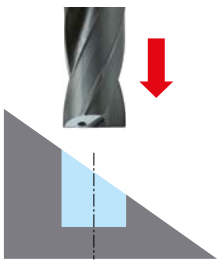
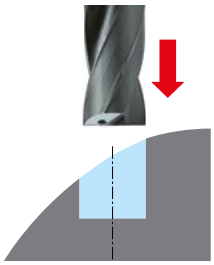
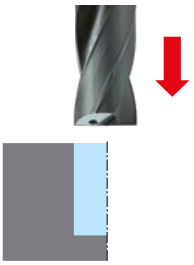
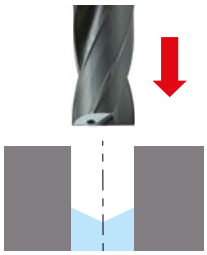
With accumulated AlTiCrN based PVD coating



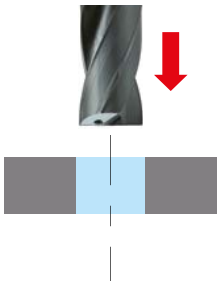
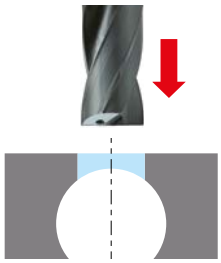
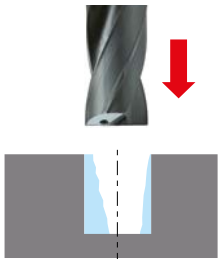
# DFAS / MFE

## HIGH EFFICIENCY OVER A WIDE APPLICATION RANGE

### HIGH EFFICIENCY COUNTER BORING IN VARIOUS TYPES OF MACHINING WITH EXCELLENT CHIPPING RESISTANCE

| | | Spot Facing and Pilot Drilling | | | |
|---|---|---|---|---|---|
| | | Angled surface | Offset circular surface | Shoulder | Deep hole |
| | |  |  |  |  |
| NEW | MFE | ◎ | ◎ | ◎ | |
| | DFAS 3D | ◎ | ◎ | ◎ | |
| NEW | DFAS 5D | | | | ◎ |

### LOW CUTTING FORCES REDUCES BURRS DUE TO ITS UNIQUE SHAPE, IT IS POSSIBLE TO CORRECT ECCENTRIC HOLES AND CAST HOLES WITH HIGH ACCURACY

| | | Drilling | | Reform | |
|---|---|---|---|---|---|
| | | Thin plate | Intersecting hole | Eccentric and cast holes | |
| | |  |  |  | |
| NEW | MFE | ◎ | ◎ | ◎ | |
| | DFAS 3D | ◎ | ◎ | ◎ | |
| NEW | DFAS 5D | | | | |

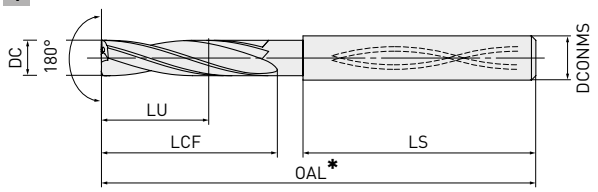
NEW

# DFAS-E

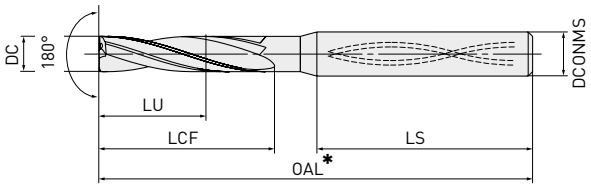
## SOLID CARBIDE FLAT BOTTOM DRILLS
## m7 TOLERANCE

P M K N S

1




2




| 3≤DC≤6 | 6<DC≤10 | 10<DC≤14 |
|---|---|---|
| + 0.016<br>+ 0.004 | + 0.021<br>+ 0.006 | + 0.025<br>+ 0.007 |
| 4≤DCONMS≤6 | 6<DCONMS≤10 | 10<DCONMS≤14 |
| 0<br>– 0.008 | 0<br>– 0.009 | 0<br>– 0.011 |

| Order number | DP102A | DC | L/D | LU | LCF | LS | OAL* | DCONMS | Type |
|---|---|---|---|---|---|---|---|---|---|
| DFAS0300X03S060E | ● | 3 | 3 | 9 | 14 | 40.4 | 62 | 6 | 2 |
| DFAS0310X03S060E | ● | 3.1 | 3 | 9.3 | 16 | 38.6 | 62 | 6 | 2 |
| DFAS0320X03S060E | ● | 3.2 | 3 | 9.6 | 16 | 38.8 | 62 | 6 | 2 |
| DFAS0330X03S060E | ● | 3.3 | 3 | 9.9 | 16 | 39.0 | 62 | 6 | 2 |
| DFAS0340X03S060E | ● | 3.4 | 3 | 10.2 | 16 | 39.1 | 62 | 6 | 2 |
| DFAS0350X03S060E | ● | 3.5 | 3 | 10.5 | 16 | 39.3 | 62 | 6 | 2 |
| DFAS0360X03S060E | ● | 3.6 | 3 | 10.8 | 17 | 38.5 | 62 | 6 | 2 |
| DFAS0370X03S060E | ● | 3.7 | 3 | 11.1 | 17 | 38.7 | 62 | 6 | 2 |
| DFAS0380X03S060E | ● | 3.8 | 3 | 11.4 | 18 | 41.9 | 66 | 6 | 2 |
| DFAS0390X03S060E | ● | 3.9 | 3 | 11.7 | 18 | 42.1 | 66 | 6 | 2 |
| DFAS0400X03S060E | ● | 4 | 3 | 12 | 18 | 42.3 | 66 | 6 | 2 |
| DFAS0410X03S060E | ● | 4.1 | 3 | 12.3 | 20 | 40.5 | 66 | 6 | 2 |
| DFAS0420X03S060E | ● | 4.2 | 3 | 12.6 | 20 | 40.6 | 66 | 6 | 2 |
| DFAS0430X03S060E | ● | 4.3 | 3 | 12.9 | 20 | 40.8 | 66 | 6 | 2 |
| DFAS0440X03S060E | ● | 4.4 | 3 | 13.2 | 20 | 41.0 | 66 | 6 | 2 |
| DFAS0450X03S060E | ● | 4.5 | 3 | 13.5 | 20 | 41.2 | 66 | 6 | 2 |
| DFAS0460X03S060E | ● | 4.6 | 3 | 13.8 | 21 | 42.3 | 66 | 6 | 2 |
| DFAS0470X03S060E | ● | 4.7 | 3 | 14.1 | 21 | 42.4 | 66 | 6 | 2 |
| DFAS0480X03S060E | ● | 4.8 | 3 | 14.4 | 22 | 41.4 | 66 | 6 | 2 |
| DFAS0490X03S060E | ● | 4.9 | 3 | 14.7 | 22 | 41.5 | 66 | 6 | 2 |
| DFAS0500X03S060E | ● | 5 | 3 | 15 | 23 | 40.5 | 66 | 6 | 2 |



* DIN6537-K



● : Inventory maintained. ★ : Inventory maintained in Japan.

## DFAS-E – SOLID CARBIDE FLAT BOTTOM DRILLS, m7 TOLERANCE

| Order number | DP102A | DC | L/D | LU | LCF | LS | OAL* | DCONMS | Type |
|---|---|---|---|---|---|---|---|---|---|
| DFAS0510X03S060E | ● | 5.1 | 3 | 15.3 | 25 | 38.6 | 66 | 6 | 2 |
| DFAS0520X03S060E | ● | 5.2 | 3 | 15.6 | 25 | 38.6 | 66 | 6 | 2 |
| DFAS0530X03S060E | ● | 5.3 | 3 | 15.9 | 25 | 38.7 | 66 | 6 | 2 |
| DFAS0540X03S060E | ● | 5.4 | 3 | 16.2 | 25 | 38.7 | 66 | 6 | 2 |
| DFAS0550X03S060E | ● | 5.5 | 3 | 16.5 | 25 | 38.8 | 66 | 6 | 2 |
| DFAS0560X03S060E | ● | 5.6 | 3 | 16.8 | 26 | 37.8 | 66 | 6 | 2 |
| DFAS0570X03S060E | ● | 5.7 | 3 | 17.1 | 26 | 37.9 | 66 | 6 | 2 |
| DFAS0580X03S060E | ● | 5.8 | 3 | 17.4 | 27 | 36.9 | 66 | 6 | 2 |
| DFAS0590X03S060E | ● | 5.9 | 3 | 17.7 | 27 | 37.0 | 66 | 6 | 2 |
| DFAS0600X03S060E | ● | 6 | 3 | 18 | 27 | 37.0 | 66 | 6 | 1 |
| DFAS0610X03S080E | ● | 6.1 | 3 | 18.3 | 29 | 47.1 | 79 | 8 | 2 |
| DFAS0620X03S080E | ● | 6.2 | 3 | 18.6 | 29 | 47.1 | 79 | 8 | 2 |
| DFAS0630X03S080E | ● | 6.3 | 3 | 18.9 | 29 | 47.2 | 79 | 8 | 2 |
| DFAS0640X03S080E | ● | 6.4 | 3 | 19.2 | 29 | 47.2 | 79 | 8 | 2 |
| DFAS0650X03S080E | ● | 6.5 | 3 | 19.5 | 29 | 47.3 | 79 | 8 | 2 |
| DFAS0660X03S080E | ● | 6.6 | 3 | 19.8 | 30 | 46.3 | 79 | 8 | 2 |
| DFAS0670X03S080E | ● | 6.7 | 3 | 20.1 | 30 | 46.4 | 79 | 8 | 2 |
| DFAS0680X03S080E | ● | 6.8 | 3 | 20.4 | 32 | 44.4 | 79 | 8 | 2 |
| DFAS0690X03S080E | ● | 6.9 | 3 | 20.7 | 32 | 44.5 | 79 | 8 | 2 |
| DFAS0700X03S080E | ● | 7 | 3 | 21 | 32 | 44.5 | 79 | 8 | 2 |
| DFAS0710X03S080E | ● | 7.1 | 3 | 21.3 | 34 | 42.6 | 79 | 8 | 2 |
| DFAS0720X03S080E | ● | 7.2 | 3 | 21.6 | 34 | 42.6 | 79 | 8 | 2 |
| DFAS0730X03S080E | ● | 7.3 | 3 | 21.9 | 34 | 42.7 | 79 | 8 | 2 |
| DFAS0740X03S080E | ● | 7.4 | 3 | 22.2 | 34 | 42.7 | 79 | 8 | 2 |
| DFAS0750X03S080E | ● | 7.5 | 3 | 22.5 | 34 | 42.8 | 79 | 8 | 2 |
| DFAS0760X03S080E | ● | 7.6 | 3 | 22.8 | 36 | 40.8 | 79 | 8 | 2 |
| DFAS0770X03S080E | ● | 7.7 | 3 | 23.1 | 36 | 40.9 | 79 | 8 | 2 |
| DFAS0780X03S080E | ● | 7.8 | 3 | 23.4 | 36 | 40.9 | 79 | 8 | 2 |
| DFAS0790X03S080E | ● | 7.9 | 3 | 23.7 | 36 | 41.0 | 79 | 8 | 2 |
| DFAS0800X03S080E | ● | 8 | 3 | 24 | 36 | 41.0 | 79 | 8 | 1 |
| DFAS0810X03S100E | ● | 8.1 | 3 | 24.3 | 39 | 47.1 | 89 | 10 | 2 |
| DFAS0820X03S100E | ● | 8.2 | 3 | 24.6 | 39 | 47.1 | 89 | 10 | 2 |
| DFAS0830X03S100E | ● | 8.3 | 3 | 24.9 | 39 | 47.2 | 89 | 10 | 2 |
| DFAS0840X03S100E | ● | 8.4 | 3 | 25.2 | 39 | 47.2 | 89 | 10 | 2 |
| DFAS0850X03S100E | ● | 8.5 | 3 | 25.5 | 39 | 47.3 | 89 | 10 | 2 |
| DFAS0860X03S100E | ● | 8.6 | 3 | 25.8 | 40 | 46.3 | 89 | 10 | 2 |
| DFAS0870X03S100E | ● | 8.7 | 3 | 26.1 | 40 | 46.4 | 89 | 10 | 2 |
| DFAS0880X03S100E | ● | 8.8 | 3 | 26.4 | 40 | 46.4 | 89 | 10 | 2 |
| DFAS0890X03S100E | ● | 8.9 | 3 | 26.7 | 40 | 46.5 | 89 | 10 | 2 |
| DFAS0900X03S100E | ● | 9 | 3 | 27 | 40 | 46.5 | 89 | 10 | 2 |
| DFAS0910X03S100E | ● | 9.1 | 3 | 27.3 | 43 | 43.6 | 89 | 10 | 2 |
| DFAS0920X03S100E | ● | 9.2 | 3 | 27.6 | 43 | 43.6 | 89 | 10 | 2 |
| DFAS0930X03S100E | ● | 9.3 | 3 | 27.9 | 43 | 43.7 | 89 | 10 | 2 |
| DFAS0940X03S100E | ● | 9.4 | 3 | 28.2 | 43 | 43.7 | 89 | 10 | 2 |
| DFAS0950X03S100E | ● | 9.5 | 3 | 28.5 | 43 | 43.8 | 89 | 10 | 2 |
| DFAS0960X03S100E | ● | 9.6 | 3 | 28.8 | 45 | 41.8 | 89 | 10 | 2 |
| DFAS0970X03S100E | ● | 9.7 | 3 | 29.1 | 45 | 41.9 | 89 | 10 | 2 |
| DFAS0980X03S100E | ● | 9.8 | 3 | 29.4 | 45 | 41.9 | 89 | 10 | 2 |



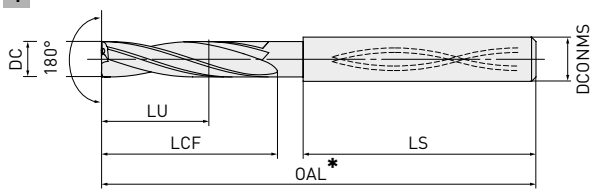
* DIN6537-K



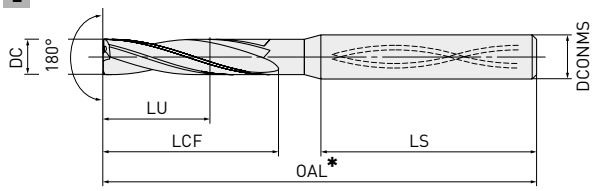
● : Inventory maintained. ★ : Inventory maintained in Japan.

## DFAS-E – SOLID CARBIDE FLAT BOTTOM DRILLS, m7 TOLERANCE

1




2




| Order number | DP102A | DC | L/D | LU | LCF | LS | OAL* | DCONMS | Type |
|---|---|---|---|---|---|---|---|---|---|
| DFAS0990X03S100E | ● | 9.9 | 3 | 29.7 | 45 | 42.0 | 89 | 10 | 2 |
| DFAS1000X03S100E | ● | 10 | 3 | 30 | 45 | 42.0 | 89 | 10 | 1 |
| DFAS1010X03S120E | ● | 10.1 | 3 | 30.3 | 47 | 53.0 | 102 | 12 | 1 |
| DFAS1020X03S120E | ● | 10.2 | 3 | 30.6 | 47 | 53.0 | 102 | 12 | 1 |
| DFAS1030X03S120E | ● | 10.3 | 3 | 30.9 | 47 | 53.0 | 102 | 12 | 1 |
| DFAS1040X03S120E | ● | 10.4 | 3 | 31.2 | 47 | 53.0 | 102 | 12 | 1 |
| DFAS1050X03S120E | ● | 10.5 | 3 | 31.5 | 47 | 53.0 | 102 | 12 | 1 |
| DFAS1060X03S120E | ● | 10.6 | 3 | 31.8 | 49 | 51.0 | 102 | 12 | 1 |
| DFAS1070X03S120E | ● | 10.7 | 3 | 32.1 | 49 | 51.0 | 102 | 12 | 1 |
| DFAS1080X03S120E | ● | 10.8 | 3 | 32.4 | 49 | 51.0 | 102 | 12 | 1 |
| DFAS1090X03S120E | ● | 10.9 | 3 | 32.7 | 49 | 51.0 | 102 | 12 | 1 |
| DFAS1100X03S120E | ● | 11 | 3 | 33 | 49 | 51.0 | 102 | 12 | 1 |
| DFAS1110X03S120E | ● | 11.1 | 3 | 33.3 | 52 | 48.0 | 102 | 12 | 1 |
| DFAS1120X03S120E | ● | 11.2 | 3 | 33.6 | 52 | 48.0 | 102 | 12 | 1 |
| DFAS1130X03S120E | ● | 11.3 | 3 | 33.9 | 52 | 48.0 | 102 | 12 | 1 |
| DFAS1140X03S120E | ● | 11.4 | 3 | 34.2 | 52 | 48.0 | 102 | 12 | 1 |
| DFAS1150X03S120E | ● | 11.5 | 3 | 34.5 | 52 | 48.0 | 102 | 12 | 1 |
| DFAS1160X03S120E | ● | 11.6 | 3 | 34.8 | 54 | 46.0 | 102 | 12 | 1 |
| DFAS1170X03S120E | ● | 11.7 | 3 | 35.1 | 54 | 46.0 | 102 | 12 | 1 |
| DFAS1180X03S120E | ● | 11.8 | 3 | 35.4 | 54 | 46.0 | 102 | 12 | 1 |
| DFAS1190X03S120E | ● | 11.9 | 3 | 35.7 | 54 | 46.0 | 102 | 12 | 1 |
| DFAS1200X03S120E | ● | 12 | 3 | 36 | 54 | 46.0 | 102 | 12 | 1 |
| DFAS1250X03S140E | ● | 12.5 | 3 | 37.5 | 56 | 49.0 | 107 | 14 | 1 |
| DFAS1300X03S140E | ● | 13 | 3 | 39 | 58 | 47.0 | 107 | 14 | 1 |
| DFAS1350X03S140E | ● | 13.5 | 3 | 40.5 | 60 | 45.0 | 107 | 14 | 1 |
| DFAS1400X03S140E | ● | 14 | 3 | 42 | 60 | 45.0 | 107 | 14 | 1 |



* DIN6537-K

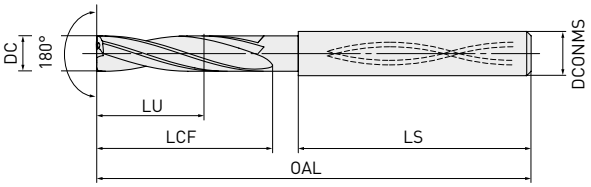


● : Inventory maintained. ★ : Inventory maintained in Japan.

# DFAS

## SOLID CARBIDE FLAT BOTTOM DRILLS
## h8 TOLERANCE

P M K N S




| DC=3 | 3<DC≤6 | 6<DC≤10 | 10<DC≤14 |
|---|---|---|---|
| 0<br>– 0.014 | 0<br>– 0.018 | 0<br>– 0.022 | 0<br>– 0.027 |

| 4≤DCONMS≤6 | 6<DCONMS≤10 | 10<DCONMS≤14 |
|---|---|---|
| 0<br>– 0.008 | 0<br>– 0.009 | 0<br>– 0.011 |

| | Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| | DFAS0300X03S040 | ● | 3.0 | 3 | 9.0 | 14 | 39.0 | 55 | 4 |
| NEW | DFAS0300X05S040 | ★ | 3.0 | 5 | 15.0 | 20 | 65.0 | 87 | 4 |
| | DFAS0310X03S040 | ★ | 3.1 | 3 | 9.3 | 16 | 37.0 | 55 | 4 |
| NEW | DFAS0310X05S040 | ★ | 3.1 | 5 | 15.5 | 23 | 62.0 | 87 | 4 |
| | DFAS0320X03S040 | ★ | 3.2 | 3 | 9.6 | 16 | 37.0 | 55 | 4 |
| NEW | DFAS0320X05S040 | ★ | 3.2 | 5 | 16.0 | 23 | 62.0 | 87 | 4 |
| | DFAS0330X03S040 | ● | 3.3 | 3 | 9.9 | 16 | 37.0 | 55 | 4 |
| NEW | DFAS0330X05S040 | ★ | 3.3 | 5 | 16.5 | 23 | 62.0 | 87 | 4 |
| | DFAS0340X03S040 | ★ | 3.4 | 3 | 10.2 | 16 | 37.0 | 55 | 4 |
| NEW | DFAS0340X05S040 | ★ | 3.4 | 5 | 17.0 | 23 | 62.0 | 87 | 4 |
| | DFAS0350X03S040 | ● | 3.5 | 3 | 10.5 | 16 | 37.0 | 55 | 4 |
| NEW | DFAS0350X05S040 | ★ | 3.5 | 5 | 17.5 | 23 | 62.0 | 87 | 4 |
| | DFAS0360X03S040 | ★ | 3.6 | 3 | 10.8 | 18 | 35.0 | 55 | 4 |
| NEW | DFAS0360X05S040 | ★ | 3.6 | 5 | 18.0 | 26 | 64.0 | 92 | 4 |
| | DFAS0370X03S040 | ★ | 3.7 | 3 | 11.1 | 18 | 35.0 | 55 | 4 |
| NEW | DFAS0370X05S040 | ★ | 3.7 | 5 | 18.5 | 26 | 64.0 | 92 | 4 |
| | DFAS0380X03S040 | ★ | 3.8 | 3 | 11.4 | 18 | 35.0 | 55 | 4 |
| NEW | DFAS0380X05S040 | ★ | 3.8 | 5 | 19.0 | 26 | 64.0 | 92 | 4 |
| | DFAS0390X03S040 | ★ | 3.9 | 3 | 11.7 | 18 | 35.0 | 55 | 4 |
| NEW | DFAS0390X05S040 | ★ | 3.9 | 5 | 19.5 | 26 | 64.0 | 92 | 4 |
| | DFAS0400X03S040 | ● | 4.0 | 3 | 12.0 | 18 | 35.0 | 55 | 4 |
| NEW | DFAS0400X05S040 | ★ | 4.0 | 5 | 20.0 | 26 | 64.0 | 92 | 4 |
| | DFAS0410X03S050 | ★ | 4.1 | 3 | 12.3 | 20 | 40.0 | 62 | 5 |
| NEW | DFAS0410X05S050 | ★ | 4.1 | 5 | 20.5 | 29 | 69.0 | 100 | 5 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

## DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

| | Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| | DFAS0420X03S050 | ● | 4.2 | 3 | 12.6 | 20 | 40.0 | 62 | 5 |
| NEW | DFAS0420X05S050 | ★ | 4.2 | 5 | 21.0 | 29 | 69.0 | 100 | 5 |
| | DFAS0430X03S050 | ★ | 4.3 | 3 | 12.9 | 20 | 40.0 | 62 | 5 |
| NEW | DFAS0430X05S050 | ★ | 4.3 | 5 | 21.5 | 29 | 69.0 | 100 | 5 |
| | DFAS0440X03S050 | ★ | 4.4 | 3 | 13.2 | 20 | 40.0 | 62 | 5 |
| NEW | DFAS0440X05S050 | ★ | 4.4 | 5 | 22.0 | 29 | 69.0 | 100 | 5 |
| | DFAS0450X03S050 | ● | 4.5 | 3 | 13.5 | 20 | 40.0 | 62 | 5 |
| NEW | DFAS0450X05S050 | ★ | 4.5 | 5 | 22.5 | 29 | 69.0 | 100 | 5 |
| | DFAS0460X03S050 | ★ | 4.6 | 3 | 13.8 | 23 | 37.0 | 62 | 5 |
| NEW | DFAS0460X05S050 | ★ | 4.6 | 5 | 23.0 | 33 | 70.0 | 105 | 5 |
| | DFAS0470X03S050 | ★ | 4.7 | 3 | 14.1 | 23 | 37.0 | 62 | 5 |
| NEW | DFAS0470X05S050 | ★ | 4.7 | 5 | 23.5 | 33 | 70.0 | 105 | 5 |
| | DFAS0480X03S050 | ★ | 4.8 | 3 | 14.4 | 23 | 37.0 | 62 | 5 |
| NEW | DFAS0480X05S050 | ★ | 4.8 | 5 | 24.0 | 33 | 70.0 | 105 | 5 |
| | DFAS0490X03S050 | ★ | 4.9 | 3 | 14.7 | 23 | 37.0 | 62 | 5 |
| NEW | DFAS0490X05S050 | ★ | 4.9 | 5 | 24.5 | 33 | 70.0 | 105 | 5 |
| | DFAS0500X03S050 | ● | 5.0 | 3 | 15.0 | 23 | 37.0 | 62 | 5 |
| NEW | DFAS0500X05S050 | ★ | 5.0 | 5 | 25.0 | 33 | 70.0 | 105 | 5 |
| | DFAS0510X03S060 | ★ | 5.1 | 3 | 15.3 | 25 | 39.0 | 66 | 6 |
| NEW | DFAS0510X05S060 | ★ | 5.1 | 5 | 25.5 | 36 | 62.0 | 100 | 6 |
| | DFAS0520X03S060 | ★ | 5.2 | 3 | 15.6 | 25 | 39.0 | 66 | 6 |
| NEW | DFAS0520X05S060 | ★ | 5.2 | 5 | 26.0 | 36 | 62.0 | 100 | 6 |
| | DFAS0530X03S060 | ● | 5.3 | 3 | 15.9 | 25 | 39.0 | 66 | 6 |
| NEW | DFAS0530X05S060 | ★ | 5.3 | 5 | 26.5 | 36 | 62.0 | 100 | 6 |
| | DFAS0540X03S060 | ★ | 5.4 | 3 | 16.2 | 25 | 39.0 | 66 | 6 |
| NEW | DFAS0540X05S060 | ★ | 5.4 | 5 | 27.0 | 36 | 62.0 | 100 | 6 |
| | DFAS0550X03S060 | ● | 5.5 | 3 | 16.5 | 25 | 39.0 | 66 | 6 |
| NEW | DFAS0550X05S060 | ★ | 5.5 | 5 | 27.5 | 36 | 62.0 | 100 | 6 |
| | DFAS0560X03S060 | ★ | 5.6 | 3 | 16.8 | 27 | 37.0 | 66 | 6 |
| NEW | DFAS0560X05S060 | ★ | 5.6 | 5 | 28.0 | 39 | 59.0 | 100 | 6 |
| | DFAS0570X03S060 | ★ | 5.7 | 3 | 17.1 | 27 | 37.0 | 66 | 6 |
| NEW | DFAS0570X05S060 | ★ | 5.7 | 5 | 28.5 | 39 | 59.0 | 100 | 6 |
| | DFAS0580X03S060 | ★ | 5.8 | 3 | 17.4 | 27 | 37.0 | 66 | 6 |
| NEW | DFAS0580X05S060 | ★ | 5.8 | 5 | 29.0 | 39 | 59.0 | 100 | 6 |
| | DFAS0590X03S060 | ★ | 5.9 | 3 | 17.7 | 27 | 37.0 | 66 | 6 |
| NEW | DFAS0590X05S060 | ★ | 5.9 | 5 | 29.5 | 39 | 59.0 | 100 | 6 |
| | DFAS0600X03S060 | ● | 6.0 | 3 | 18.0 | 27 | 37.0 | 66 | 6 |
| NEW | DFAS0600X05S060 | ★ | 6.0 | 5 | 30.0 | 39 | 59.0 | 100 | 6 |
| | DFAS0610X03S070 | ★ | 6.1 | 3 | 18.3 | 29 | 44.0 | 75 | 7 |
| NEW | DFAS0610X05S070 | ★ | 6.1 | 5 | 30.5 | 42 | 65.0 | 109 | 7 |
| | DFAS0620X03S070 | ★ | 6.2 | 3 | 18.6 | 29 | 44.0 | 75 | 7 |
| NEW | DFAS0620X05S070 | ★ | 6.2 | 5 | 31.0 | 42 | 65.0 | 109 | 7 |
| | DFAS0630X03S070 | ★ | 6.3 | 3 | 18.9 | 29 | 44.0 | 75 | 7 |
| NEW | DFAS0630X05S070 | ★ | 6.3 | 5 | 31.5 | 42 | 65.0 | 109 | 7 |
| | DFAS0640X03S070 | ★ | 6.4 | 3 | 19.2 | 29 | 44.0 | 75 | 7 |
| NEW | DFAS0640X05S070 | ★ | 6.4 | 5 | 32.0 | 42 | 65.0 | 109 | 7 |
| | DFAS0650X03S070 | ● | 6.5 | 3 | 19.5 | 29 | 44.0 | 75 | 7 |
| NEW | DFAS0650X05S070 | ★ | 6.5 | 5 | 32.5 | 42 | 65.0 | 109 | 7 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

## DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

| | Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| | DFAS0660X03S070 | ★ | 6.6 | 3 | 19.8 | 32 | 41.0 | 75 | 7 |
| NEW | DFAS0660X05S070 | ★ | 6.6 | 5 | 33.0 | 46 | 61.0 | 109 | 7 |
| | DFAS0670X03S070 | ★ | 6.7 | 3 | 20.1 | 32 | 41.0 | 75 | 7 |
| NEW | DFAS0670X05S070 | ★ | 6.7 | 5 | 33.5 | 46 | 61.0 | 109 | 7 |
| | DFAS0680X03S070 | ● | 6.8 | 3 | 20.4 | 32 | 41.0 | 75 | 7 |
| NEW | DFAS0680X05S070 | ★ | 6.8 | 5 | 34.0 | 46 | 61.0 | 109 | 7 |
| | DFAS0690X03S070 | ★ | 6.9 | 3 | 20.7 | 32 | 41.0 | 75 | 7 |
| NEW | DFAS0690X05S070 | ★ | 6.9 | 5 | 34.5 | 46 | 61.0 | 109 | 7 |
| | DFAS0700X03S070 | ● | 7.0 | 3 | 21.0 | 32 | 41.0 | 75 | 7 |
| NEW | DFAS0700X05S070 | ★ | 7.0 | 5 | 35.0 | 46 | 61.0 | 109 | 7 |
| | DFAS0710X03S080 | ★ | 7.1 | 3 | 21.3 | 34 | 44.0 | 80 | 8 |
| NEW | DFAS0710X05S080 | ★ | 7.1 | 5 | 35.5 | 49 | 67.0 | 118 | 8 |
| | DFAS0720X03S080 | ★ | 7.2 | 3 | 21.6 | 34 | 44.0 | 80 | 8 |
| NEW | DFAS0720X05S080 | ★ | 7.2 | 5 | 36.0 | 49 | 67.0 | 118 | 8 |
| | DFAS0730X03S080 | ★ | 7.3 | 3 | 21.9 | 34 | 44.0 | 80 | 8 |
| NEW | DFAS0730X05S080 | ★ | 7.3 | 5 | 36.5 | 49 | 67.0 | 118 | 8 |
| | DFAS0740X03S080 | ★ | 7.4 | 3 | 22.2 | 34 | 44.0 | 80 | 8 |
| NEW | DFAS0740X05S080 | ★ | 7.4 | 5 | 37.0 | 49 | 67.0 | 118 | 8 |
| | DFAS0750X03S080 | ● | 7.5 | 3 | 22.5 | 34 | 44.0 | 80 | 8 |
| NEW | DFAS0750X05S080 | ★ | 7.5 | 5 | 37.5 | 49 | 67.0 | 118 | 8 |
| | DFAS0760X03S080 | ★ | 7.6 | 3 | 22.8 | 36 | 42.0 | 80 | 8 |
| NEW | DFAS0760X05S080 | ★ | 7.6 | 5 | 38.0 | 52 | 64.0 | 118 | 8 |
| | DFAS0770X03S080 | ★ | 7.7 | 3 | 23.1 | 36 | 42.0 | 80 | 8 |
| NEW | DFAS0770X05S080 | ★ | 7.7 | 5 | 38.5 | 52 | 64.0 | 118 | 8 |
| | DFAS0780X03S080 | ★ | 7.8 | 3 | 23.4 | 36 | 42.0 | 80 | 8 |
| NEW | DFAS0780X05S080 | ★ | 7.8 | 5 | 39.0 | 52 | 64.0 | 118 | 8 |
| | DFAS0790X03S080 | ★ | 7.9 | 3 | 23.7 | 36 | 42.0 | 80 | 8 |
| NEW | DFAS0790X05S080 | ★ | 7.9 | 5 | 39.5 | 52 | 64.0 | 118 | 8 |
| | DFAS0800X03S080 | ● | 8.0 | 3 | 24.0 | 36 | 42.0 | 80 | 8 |
| NEW | DFAS0800X05S080 | ★ | 8.0 | 5 | 40.0 | 52 | 64.0 | 118 | 8 |
| | DFAS0810X03S090 | ★ | 8.1 | 3 | 24.3 | 38 | 45.0 | 85 | 9 |
| NEW | DFAS0810X05S090 | ★ | 8.1 | 5 | 40.5 | 55 | 70.0 | 127 | 9 |
| | DFAS0820X03S090 | ● | 8.2 | 3 | 24.6 | 38 | 45.0 | 85 | 9 |
| NEW | DFAS0820X05S090 | ★ | 8.2 | 5 | 41.0 | 55 | 70.0 | 127 | 9 |
| | DFAS0830X03S090 | ★ | 8.3 | 3 | 24.9 | 38 | 45.0 | 85 | 9 |
| NEW | DFAS0830X05S090 | ★ | 8.3 | 5 | 41.5 | 55 | 70.0 | 127 | 9 |
| | DFAS0840X03S090 | ★ | 8.4 | 3 | 25.2 | 38 | 45.0 | 85 | 9 |
| NEW | DFAS0840X05S090 | ★ | 8.4 | 5 | 42.0 | 55 | 70.0 | 127 | 9 |
| | DFAS0850X03S090 | ● | 8.5 | 3 | 25.5 | 38 | 45.0 | 85 | 9 |
| NEW | DFAS0850X05S090 | ★ | 8.5 | 5 | 42.5 | 55 | 70.0 | 127 | 9 |
| | DFAS0860X03S090 | ★ | 8.6 | 3 | 25.8 | 41 | 42.0 | 85 | 9 |
| NEW | DFAS0860X05S090 | ★ | 8.6 | 5 | 43.0 | 59 | 66.0 | 127 | 9 |
| | DFAS0870X03S090 | ★ | 8.7 | 3 | 26.1 | 41 | 42.0 | 85 | 9 |
| NEW | DFAS0870X05S090 | ★ | 8.7 | 5 | 43.5 | 59 | 66.0 | 127 | 9 |
| | DFAS0880X03S090 | ● | 8.8 | 3 | 26.4 | 41 | 42.0 | 85 | 9 |
| NEW | DFAS0880X05S090 | ★ | 8.8 | 5 | 44.0 | 59 | 66.0 | 127 | 9 |
| | DFAS0890X03S090 | ★ | 8.9 | 3 | 26.7 | 41 | 42.0 | 85 | 9 |
| NEW | DFAS0890X05S090 | ★ | 8.9 | 5 | 44.5 | 59 | 66.0 | 127 | 9 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

## DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

| | Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| | DFAS0900X03S090 | ● | 9.0 | 3 | 27.0 | 41 | 42.0 | 85 | 9 |
| NEW | DFAS0900X05S090 | ★ | 9.0 | 5 | 45.0 | 59 | 66.0 | 127 | 9 |
| | DFAS0910X03S100 | ★ | 9.1 | 3 | 27.3 | 43 | 45.0 | 90 | 10 |
| NEW | DFAS0910X05S100 | ★ | 9.1 | 5 | 45.5 | 62 | 72.0 | 136 | 10 |
| | DFAS0920X03S100 | ★ | 9.2 | 3 | 27.6 | 43 | 45.0 | 90 | 10 |
| NEW | DFAS0920X05S100 | ★ | 9.2 | 5 | 46.0 | 62 | 72.0 | 136 | 10 |
| | DFAS0930X03S100 | ★ | 9.3 | 3 | 27.9 | 43 | 45.0 | 90 | 10 |
| NEW | DFAS0930X05S100 | ★ | 9.3 | 5 | 46.5 | 62 | 72.0 | 136 | 10 |
| | DFAS0940X03S100 | ★ | 9.4 | 3 | 28.2 | 43 | 45.0 | 90 | 10 |
| NEW | DFAS0940X05S100 | ★ | 9.4 | 5 | 47.0 | 62 | 72.0 | 136 | 10 |
| | DFAS0950X03S100 | ● | 9.5 | 3 | 28.5 | 43 | 45.0 | 90 | 10 |
| NEW | DFAS0950X05S100 | ★ | 9.5 | 5 | 47.5 | 62 | 72.0 | 136 | 10 |
| | DFAS0960X03S100 | ★ | 9.6 | 3 | 28.8 | 45 | 43.0 | 90 | 10 |
| NEW | DFAS0960X05S100 | ★ | 9.6 | 5 | 48.0 | 65 | 69.0 | 136 | 10 |
| | DFAS0970X03S100 | ● | 9.7 | 3 | 29.1 | 45 | 43.0 | 90 | 10 |
| NEW | DFAS0970X05S100 | ★ | 9.7 | 5 | 48.5 | 65 | 69.0 | 136 | 10 |
| | DFAS0980X03S100 | ★ | 9.8 | 3 | 29.4 | 45 | 43.0 | 90 | 10 |
| NEW | DFAS0980X05S100 | ★ | 9.8 | 5 | 49.0 | 65 | 69.0 | 136 | 10 |
| | DFAS0990X03S100 | ★ | 9.9 | 3 | 29.7 | 45 | 43.0 | 90 | 10 |
| NEW | DFAS0990X05S100 | ★ | 9.9 | 5 | 49.5 | 65 | 69.0 | 136 | 10 |
| | DFAS1000X03S100 | ● | 10.0 | 3 | 30.0 | 45 | 43.0 | 90 | 10 |
| NEW | DFAS1000X05S100 | ★ | 10.0 | 5 | 50.0 | 65 | 69.0 | 136 | 10 |
| | DFAS1010X03S110 | ★ | 10.1 | 3 | 30.3 | 47 | 52.0 | 101 | 11 |
| NEW | DFAS1010X05S110 | ★ | 10.1 | 5 | 50.5 | 68 | 79.0 | 149 | 11 |
| | DFAS1020X03S110 | ● | 10.2 | 3 | 30.6 | 47 | 52.0 | 101 | 11 |
| NEW | DFAS1020X05S110 | ★ | 10.2 | 5 | 51.0 | 68 | 79.0 | 149 | 11 |
| | DFAS1030X03S110 | ★ | 10.3 | 3 | 30.9 | 47 | 52.0 | 101 | 11 |
| NEW | DFAS1030X05S110 | ★ | 10.3 | 5 | 51.5 | 68 | 79.0 | 149 | 11 |
| | DFAS1040X03S110 | ★ | 10.4 | 3 | 31.2 | 47 | 52.0 | 101 | 11 |
| NEW | DFAS1040X05S110 | ★ | 10.4 | 5 | 52.0 | 68 | 79.0 | 149 | 11 |
| | DFAS1050X03S110 | ● | 10.5 | 3 | 31.5 | 47 | 52.0 | 101 | 11 |
| NEW | DFAS1050X05S110 | ★ | 10.5 | 5 | 52.5 | 68 | 79.0 | 149 | 11 |
| | DFAS1060X03S110 | ★ | 10.6 | 3 | 31.8 | 50 | 49.0 | 101 | 11 |
| NEW | DFAS1060X05S110 | ★ | 10.6 | 5 | 53.0 | 72 | 75.0 | 149 | 11 |
| | DFAS1070X03S110 | ★ | 10.7 | 3 | 32.1 | 50 | 49.0 | 101 | 11 |
| NEW | DFAS1070X05S110 | ★ | 10.7 | 5 | 53.5 | 72 | 75.0 | 149 | 11 |
| | DFAS1080X03S110 | ★ | 10.8 | 3 | 32.4 | 50 | 49.0 | 101 | 11 |
| NEW | DFAS1080X05S110 | ★ | 10.8 | 5 | 54.0 | 72 | 75.0 | 149 | 11 |
| | DFAS1090X03S110 | ★ | 10.9 | 3 | 32.7 | 50 | 49.0 | 101 | 11 |
| NEW | DFAS1090X05S110 | ★ | 10.9 | 5 | 54.5 | 72 | 75.0 | 149 | 11 |
| | DFAS1100X03S110 | ● | 11.0 | 3 | 33.0 | 50 | 49.0 | 101 | 11 |
| NEW | DFAS1100X05S110 | ★ | 11.0 | 5 | 55.0 | 72 | 75.0 | 149 | 11 |
| | DFAS1110X03S120 | ★ | 11.1 | 3 | 33.3 | 52 | 51.0 | 105 | 12 |
| NEW | DFAS1110X05S120 | ★ | 11.1 | 5 | 55.5 | 75 | 81.0 | 158 | 12 |
| | DFAS1120X03S120 | ★ | 11.2 | 3 | 33.6 | 52 | 51.0 | 105 | 12 |
| NEW | DFAS1120X05S120 | ★ | 11.2 | 5 | 56.0 | 75 | 81.0 | 158 | 12 |
| | DFAS1130X03S120 | ★ | 11.3 | 3 | 33.9 | 52 | 51.0 | 105 | 12 |

## DFAS – SOLID CARBIDE FLAT BOTTOM DRILLS, h8 TOLERANCE

| | Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|---|
| NEW | DFAS1130X05S120 | ★ | 11.3 | 5 | 56.5 | 75 | 81.0 | 158 | 12 |
| | DFAS1140X03S120 | ★ | 11.4 | 3 | 34.2 | 52 | 51.0 | 105 | 12 |
| NEW | DFAS1140X05S120 | ★ | 11.4 | 5 | 57.0 | 75 | 81.0 | 158 | 12 |
| | DFAS1150X03S120 | ● | 11.5 | 3 | 34.5 | 52 | 51.0 | 105 | 12 |
| NEW | DFAS1150X05S120 | ★ | 11.5 | 5 | 57.5 | 75 | 81.0 | 158 | 12 |
| | DFAS1160X03S120 | ★ | 11.6 | 3 | 34.8 | 54 | 49.0 | 105 | 12 |
| NEW | DFAS1160X05S120 | ★ | 11.6 | 5 | 58.0 | 78 | 78.0 | 158 | 12 |
| | DFAS1170X03S120 | ★ | 11.7 | 3 | 35.1 | 54 | 49.0 | 105 | 12 |
| NEW | DFAS1170X05S120 | ★ | 11.7 | 5 | 58.5 | 78 | 78.0 | 158 | 12 |
| | DFAS1180X03S120 | ★ | 11.8 | 3 | 35.4 | 54 | 49.0 | 105 | 12 |
| NEW | DFAS1180X05S120 | ★ | 11.8 | 5 | 59.0 | 78 | 78.0 | 158 | 12 |
| | DFAS1190X03S120 | ★ | 11.9 | 3 | 35.7 | 54 | 49.0 | 105 | 12 |
| NEW | DFAS1190X05S120 | ★ | 11.9 | 5 | 59.5 | 78 | 78.0 | 158 | 12 |
| | DFAS1200X03S120 | ● | 12.0 | 3 | 36.0 | 54 | 49.0 | 105 | 12 |
| NEW | DFAS1200X05S120 | ★ | 12.0 | 5 | 60.0 | 78 | 78.0 | 158 | 12 |
| | DFAS1250X03S130 | ★ | 12.5 | 3 | 37.5 | 56 | 52.0 | 110 | 13 |
| NEW | DFAS1250X05S130 | ★ | 12.5 | 5 | 62.5 | 81 | 84.0 | 167 | 13 |
| | DFAS1300X03S130 | ● | 13.0 | 3 | 39.0 | 59 | 49.0 | 110 | 13 |
| NEW | DFAS1300X05S130 | ★ | 13.0 | 5 | 65.0 | 85 | 80.0 | 167 | 13 |
| | DFAS1350X03S140 | ★ | 13.5 | 3 | 40.5 | 61 | 51.0 | 114 | 14 |
| NEW | DFAS1350X05S140 | ★ | 13.5 | 5 | 67.5 | 88 | 86.0 | 176 | 14 |
| | DFAS1400X03S140 | ● | 14.0 | 3 | 42.0 | 63 | 49.0 | 114 | 14 |
| NEW | DFAS1400X05S140 | ★ | 14.0 | 5 | 70.0 | 91 | 83.0 | 176 | 14 |

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● : Inventory maintained. ★ : Inventory maintained in Japan.

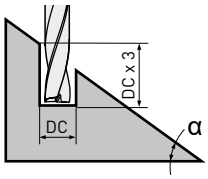
# DFAS / DFAS-E

## RECOMMENDED CUTTING CONDITIONS

| | Material | DC | L/D | n | α = 0° fr |
|---|---|---|---|---|---|
| P | Mild steel, Carbon steel, Alloy steel | 3.0 | ≤5 | 10610 | 0.07 (0.04 – 0.10) |
| | | 4.0 | ≤5 | 7960 | 0.08 (0.04 – 0.11) |
| | | 5.0 | ≤5 | 6370 | 0.10 (0.05 – 0.14) |
| | | 6.0 | ≤5 | 5310 | 0.12 (0.06 – 0.17) |
| | | 7.0 | ≤5 | 4550 | 0.13 (0.07 – 0.20) |
| | | 8.0 | ≤5 | 3980 | 0.16 (0.08 – 0.23) |
| | | 9.0 | ≤5 | 3540 | 0.17 (0.09 – 0.26) |
| | | 10.0 | ≤5 | 3180 | 0.20 (0.10 – 0.29) |
| | | 11.0 | ≤5 | 2890 | 0.22 (0.11 – 0.32) |
| | | 12.0 | ≤5 | 2650 | 0.24 (0.12 – 0.35) |
| | | 13.0 | ≤5 | 2450 | 0.26 (0.13 – 0.39) |
| | | 14.0 | ≤5 | 2270 | 0.28 (0.14 – 0.42) |
| M | Stainless Steel | 3.0 | ≤5 | 3180 | 0.04 (0.01 – 0.08) |
| | | 4.0 | ≤5 | 2390 | 0.06 (0.01 – 0.11) |
| | | 5.0 | ≤5 | 1910 | 0.08 (0.02 – 0.13) |
| | | 6.0 | ≤5 | 1590 | 0.08 (0.02 – 0.15) |
| | | 7.0 | ≤5 | 1360 | 0.09 (0.02 – 0.16) |
| | | 8.0 | ≤5 | 1190 | 0.10 (0.03 – 0.17) |
| | | 9.0 | ≤5 | 1060 | 0.11 (0.03 – 0.19) |
| | | 10.0 | ≤5 | 950 | 0.12 (0.03 – 0.20) |
| | | 11.0 | ≤5 | 870 | 0.13 (0.04 – 0.22) |
| | | 12.0 | ≤5 | 800 | 0.14 (0.04 – 0.24) |
| | | 13.0 | ≤5 | 730 | 0.15 (0.04 – 0.26) |
| | | 14.0 | ≤5 | 680 | 0.16 (0.05 – 0.28) |
| K | Gray cast iron, Ductile cast iron | 3.0 | ≤5 | 10610 | 0.04 (0.02 – 0.07) |
| | | 4.0 | ≤5 | 7960 | 0.05 (0.03 – 0.09) |
| | | 5.0 | ≤5 | 6370 | 0.07 (0.03 – 0.11) |
| | | 6.0 | ≤5 | 5310 | 0.08 (0.04 – 0.13) |
| | | 7.0 | ≤5 | 4550 | 0.09 (0.05 – 0.15) |
| | | 8.0 | ≤5 | 3980 | 0.11 (0.05 – 0.17) |
| | | 9.0 | ≤5 | 3540 | 0.12 (0.06 – 0.20) |
| | | 10.0 | ≤5 | 3180 | 0.13 (0.07 – 0.22) |
| | | 11.0 | ≤5 | 2890 | 0.15 (0.07 – 0.24) |
| | | 12.0 | ≤5 | 2650 | 0.16 (0.08 – 0.26) |
| | | 13.0 | ≤5 | 2450 | 0.17 (0.09 – 0.28) |
| | | 14.0 | ≤5 | 2270 | 0.19 (0.09 – 0.30) |

1/2

1. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
2. The cutting table above assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
   When the inclination angle α is 30° or less, reduce the feed rate by 30 % or more as a guideline.
   When the inclination angle α is greater than 30°, reduce the feed rate by 50 % or more as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.
4. If a drill with L/D = 5 is used, a pilot hole of the same diameter, or a centre drilled hole with a diameter larger than the finished drill is needed.

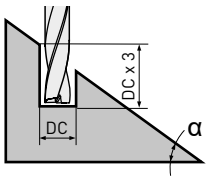


## DFAS / DFAS-E

| | Material | DC | L/D | n | α = 0° fr |
|---|---|---|---|---|---|
| N | Aluminium alloy | 3.0 | ≤5 | 13790 | 0.04 (0.02 – 0.07) |
| | | 4.0 | ≤5 | 10350 | 0.05 (0.03 – 0.09) |
| | | 5.0 | ≤5 | 8280 | 0.07 (0.03 – 0.11) |
| | | 6.0 | ≤5 | 6900 | 0.08 (0.04 – 0.13) |
| | | 7.0 | ≤5 | 5910 | 0.09 (0.05 – 0.15) |
| | | 8.0 | ≤5 | 5170 | 0.11 (0.05 – 0.17) |
| | | 9.0 | ≤5 | 4600 | 0.12 (0.06 – 0.20) |
| | | 10.0 | ≤5 | 4140 | 0.13 (0.07 – 0.22) |
| | | 11.0 | ≤5 | 3760 | 0.15 (0.07 – 0.24) |
| | | 12.0 | ≤5 | 3450 | 0.16 (0.08 – 0.26) |
| | | 13.0 | ≤5 | 3180 | 0.17 (0.09 – 0.28) |
| | | 14.0 | ≤5 | 2960 | 0.19 (0.09 – 0.30) |
| S | Titanium alloy | 3.0 | ≤5 | 3710 | 0.03 (0.01 – 0.05) |
| | | 4.0 | ≤5 | 2790 | 0.04 (0.01 – 0.07) |
| | | 5.0 | ≤5 | 2230 | 0.05 (0.02 – 0.08) |
| | | 6.0 | ≤5 | 1860 | 0.06 (0.02 – 0.10) |
| | | 7.0 | ≤5 | 1590 | 0.07 (0.02 – 0.12) |
| | | 8.0 | ≤5 | 1390 | 0.08 (0.03 – 0.13) |
| | | 9.0 | ≤5 | 1240 | 0.09 (0.03 – 0.15) |
| | | 10.0 | ≤5 | 1110 | 0.10 (0.03 – 0.17) |
| | | 11.0 | ≤5 | 1010 | 0.11 (0.04 – 0.18) |
| | | 12.0 | ≤5 | 930 | 0.12 (0.04 – 0.20) |
| | | 13.0 | ≤5 | 860 | 0.13 (0.04 – 0.22) |
| | | 14.0 | ≤5 | 800 | 0.14 (0.05 – 0.23) |



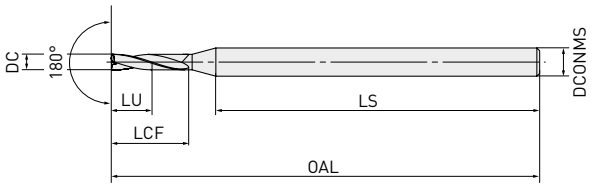
1. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
2. The cutting table above assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
   When the inclination angle α is 30° or less, reduce the feed rate by 30 % or more as a guideline.
   When the inclination angle α is greater than 30°, reduce the feed rate by 50 % or more as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.
4. If a drill with L/D = 5 is used, a pilot hole of the same diameter, or a centre drilled hole with a diameter larger than the finished drill is needed.



# MINI-MFE

## FOR SMALL DIAMETER HOLES
## DC 0.75 – 2.95

P M K N




| 0.75≤DC≤2.95 | |
|---|---|
| 0<br>– 0.014 | |
| DCONMS = 3 | DCONMS = 4 |
| 0<br>– 0.006 | 0<br>– 0.008 |

| Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|
| MFE0075X02S030 | ★ | 0.75 | 2 | 1.5 | 3.0 | 37.3 | 45 | 3 |
| MFE0080X02S030 | ★ | 0.80 | 2 | 1.6 | 3.2 | 37.2 | 45 | 3 |
| MFE0085X02S030 | ★ | 0.85 | 2 | 1.7 | 3.4 | 37.1 | 45 | 3 |
| MFE0090X02S030 | ★ | 0.90 | 2 | 1.8 | 3.6 | 37.0 | 45 | 3 |
| MFE0095X02S030 | ★ | 0.95 | 2 | 1.9 | 3.8 | 36.9 | 45 | 3 |
| MFE0100X02S030 | ★ | 1.00 | 2 | 2.0 | 4.0 | 36.8 | 45 | 3 |
| MFE0105X02S030 | ★ | 1.05 | 2 | 2.1 | 4.2 | 36.7 | 45 | 3 |
| MFE0110X02S030 | ★ | 1.10 | 2 | 2.2 | 4.4 | 36.6 | 45 | 3 |
| MFE0115X02S030 | ★ | 1.15 | 2 | 2.3 | 4.6 | 36.4 | 45 | 3 |
| MFE0120X02S030 | ★ | 1.20 | 2 | 2.4 | 4.8 | 36.3 | 45 | 3 |
| MFE0125X02S030 | ★ | 1.25 | 2 | 2.5 | 5.0 | 36.2 | 45 | 3 |
| MFE0130X02S030 | ★ | 1.30 | 2 | 2.6 | 5.2 | 36.1 | 45 | 3 |
| MFE0135X02S030 | ★ | 1.35 | 2 | 2.7 | 5.4 | 36.0 | 45 | 3 |
| MFE0140X02S030 | ★ | 1.40 | 2 | 2.8 | 5.6 | 35.9 | 45 | 3 |
| MFE0145X02S030 | ★ | 1.45 | 2 | 2.9 | 5.8 | 35.8 | 45 | 3 |
| MFE0150X02S030 | ★ | 1.50 | 2 | 3.0 | 6.0 | 35.7 | 45 | 3 |
| MFE0155X02S030 | ★ | 1.55 | 2 | 3.1 | 6.2 | 35.6 | 45 | 3 |
| MFE0160X02S030 | ★ | 1.60 | 2 | 3.2 | 6.4 | 35.5 | 45 | 3 |
| MFE0165X02S030 | ★ | 1.65 | 2 | 3.3 | 6.6 | 35.4 | 45 | 3 |
| MFE0170X02S030 | ★ | 1.70 | 2 | 3.4 | 6.8 | 35.3 | 45 | 3 |
| MFE0175X02S030 | ★ | 1.75 | 2 | 3.5 | 7.0 | 35.2 | 45 | 3 |



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## MINI-MFE – FOR SMALL DIAMETER HOLES, DC 0.75 – 2.95

| Order number | DP102A | DC | L/D | LU | LCF | LS | OAL | DCONMS |
|---|---|---|---|---|---|---|---|---|
| MFE0180X02S030 | ★ | 1.80 | 2 | 3.6 | 7.2 | 35.1 | 45 | 3 |
| MFE0185X02S030 | ★ | 1.85 | 2 | 3.7 | 7.4 | 35.0 | 45 | 3 |
| MFE0190X02S030 | ★ | 1.90 | 2 | 3.8 | 7.6 | 34.8 | 45 | 3 |
| MFE0195X02S030 | ★ | 1.95 | 2 | 3.9 | 7.8 | 34.7 | 45 | 3 |
| MFE0200X02S040 | ★ | 2.00 | 2 | 4.0 | 8.0 | 37.8 | 50 | 4 |
| MFE0205X02S040 | ★ | 2.05 | 2 | 4.1 | 8.2 | 37.7 | 50 | 4 |
| MFE0210X02S040 | ★ | 2.10 | 2 | 4.2 | 8.4 | 37.6 | 50 | 4 |
| MFE0215X02S040 | ★ | 2.15 | 2 | 4.3 | 8.6 | 37.4 | 50 | 4 |
| MFE0220X02S040 | ★ | 2.20 | 2 | 4.4 | 8.8 | 37.3 | 50 | 4 |
| MFE0225X02S040 | ★ | 2.25 | 2 | 4.5 | 9.0 | 37.2 | 50 | 4 |
| MFE0230X02S040 | ★ | 2.30 | 2 | 4.6 | 9.2 | 37.1 | 50 | 4 |
| MFE0235X02S040 | ★ | 2.35 | 2 | 4.7 | 9.4 | 37.0 | 50 | 4 |
| MFE0240X02S040 | ★ | 2.40 | 2 | 4.8 | 9.6 | 36.9 | 50 | 4 |
| MFE0245X02S040 | ★ | 2.45 | 2 | 4.9 | 9.8 | 36.8 | 50 | 4 |
| MFE0250X02S040 | ★ | 2.50 | 2 | 5.0 | 10.0 | 36.7 | 50 | 4 |
| MFE0255X02S040 | ★ | 2.55 | 2 | 5.1 | 10.2 | 36.6 | 50 | 4 |
| MFE0260X02S040 | ★ | 2.60 | 2 | 5.2 | 10.4 | 36.5 | 50 | 4 |
| MFE0265X02S040 | ★ | 2.65 | 2 | 5.3 | 10.6 | 36.4 | 50 | 4 |
| MFE0270X02S040 | ★ | 2.70 | 2 | 5.4 | 10.8 | 36.3 | 50 | 4 |
| MFE0275X02S040 | ★ | 2.75 | 2 | 5.5 | 11.0 | 36.2 | 50 | 4 |
| MFE0280X02S040 | ★ | 2.80 | 2 | 5.6 | 11.2 | 36.1 | 50 | 4 |
| MFE0285X02S040 | ★ | 2.85 | 2 | 5.7 | 11.4 | 36.0 | 50 | 4 |
| MFE0290X02S040 | ★ | 2.90 | 2 | 5.8 | 11.6 | 35.8 | 50 | 4 |
| MFE0295X02S040 | ★ | 2.95 | 2 | 5.9 | 11.8 | 35.7 | 50 | 4 |



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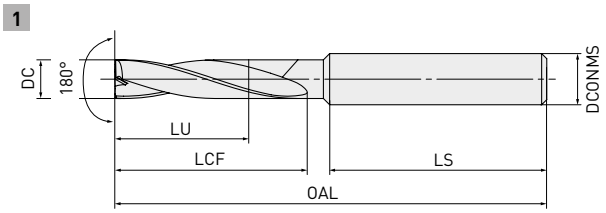
NEW

# MFE

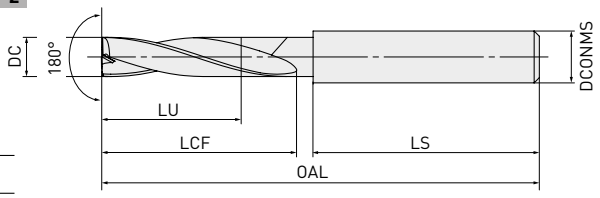
## SOLID CARBIDE FLAT BOTTOM DRILLS
## h7 TOLERANCE

P M K N

1




2




| 3≤DC≤6 | 6<DC≤10 | 10<DC≤18 | 18<DC≤20 |
|---|---|---|---|
| 0<br>– 0.012 | 0<br>– 0.015 | 0<br>– 0.018 | 0<br>– 0.021 |

| DCONMS = 6 | 6<DCONMS≤10 | 10<DCONMS≤18 | DCONMS = 20 |
|---|---|---|---|
| 0<br>– 0.008 | 0<br>– 0.009 | 0<br>– 0.011 | 0<br>– 0.013 |

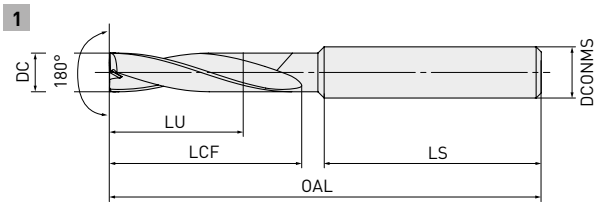
| Order number | DP1020 | DC | L/D | LU | LCF | LS | OAL | DCONMS | Type |
|---|---|---|---|---|---|---|---|---|---|
| MFE0300X02S060 | ★ | 3.0 | 2 | 6.0 | 12 | 35.4 | 55 | 6 | 1 |
| MFE0310X02S060 | ★ | 3.1 | 2 | 6.2 | 14 | 33.6 | 55 | 6 | 1 |
| MFE0320X02S060 | ★ | 3.2 | 2 | 6.4 | 14 | 33.8 | 55 | 6 | 1 |
| MFE0330X02S060 | ★ | 3.3 | 2 | 6.6 | 14 | 34.0 | 55 | 6 | 1 |
| MFE0340X02S060 | ★ | 3.4 | 2 | 6.8 | 14 | 34.1 | 55 | 6 | 1 |
| MFE0350X02S060 | ★ | 3.5 | 2 | 7.0 | 14 | 34.3 | 55 | 6 | 1 |
| MFE0360X02S060 | ★ | 3.6 | 2 | 7.2 | 16 | 32.5 | 55 | 6 | 1 |
| MFE0370X02S060 | ★ | 3.7 | 2 | 7.4 | 16 | 32.7 | 55 | 6 | 1 |
| MFE0380X02S060 | ★ | 3.8 | 2 | 7.6 | 16 | 32.9 | 55 | 6 | 1 |
| MFE0390X02S060 | ★ | 3.9 | 2 | 7.8 | 16 | 33.1 | 55 | 6 | 1 |
| MFE0400X02S060 | ★ | 4.0 | 2 | 8.0 | 16 | 33.3 | 55 | 6 | 1 |
| MFE0410X02S060 | ★ | 4.1 | 2 | 8.2 | 18 | 38.5 | 62 | 6 | 1 |
| MFE0420X02S060 | ★ | 4.2 | 2 | 8.4 | 18 | 38.6 | 62 | 6 | 1 |
| MFE0430X02S060 | ★ | 4.3 | 2 | 8.6 | 18 | 38.8 | 62 | 6 | 1 |
| MFE0440X02S060 | ★ | 4.4 | 2 | 8.8 | 18 | 39.0 | 62 | 6 | 1 |
| MFE0450X02S060 | ★ | 4.5 | 2 | 9.0 | 18 | 39.2 | 62 | 6 | 1 |
| MFE0460X02S060 | ★ | 4.6 | 2 | 9.2 | 20 | 38.3 | 62 | 6 | 1 |
| MFE0470X02S060 | ★ | 4.7 | 2 | 9.4 | 20 | 38.3 | 62 | 6 | 1 |
| MFE0480X02S060 | ★ | 4.8 | 2 | 9.6 | 20 | 38.4 | 62 | 6 | 1 |
| MFE0490X02S060 | ★ | 4.9 | 2 | 9.8 | 20 | 38.4 | 62 | 6 | 1 |
| MFE0500X02S060 | ★ | 5.0 | 2 | 10.0 | 20 | 38.5 | 62 | 6 | 1 |

## MFE – SOLID CARBIDE FLAT BOTTOM DRILLS, h7 TOLERANCE

| Order number | DP1020 | DC | L/D | LU | LCF | LS | OAL | DCONMS | Type |
|---|---|---|---|---|---|---|---|---|---|
| MFE0510X02S060 | ★ | 5.1 | 2 | 10.2 | 22 | 36.5 | 62 | 6 | 1 |
| MFE0520X02S060 | ★ | 5.2 | 2 | 10.4 | 22 | 36.6 | 62 | 6 | 1 |
| MFE0530X02S060 | ★ | 5.3 | 2 | 10.6 | 22 | 36.6 | 62 | 6 | 1 |
| MFE0540X02S060 | ★ | 5.4 | 2 | 10.8 | 22 | 36.7 | 62 | 6 | 1 |
| MFE0550X02S060 | ★ | 5.5 | 2 | 11.0 | 22 | 36.7 | 62 | 6 | 1 |
| MFE0560X02S060 | ★ | 5.6 | 2 | 11.2 | 24 | 34.8 | 62 | 6 | 1 |
| MFE0570X02S060 | ★ | 5.7 | 2 | 11.4 | 24 | 34.8 | 62 | 6 | 1 |
| MFE0580X02S060 | ★ | 5.8 | 2 | 11.6 | 24 | 34.9 | 62 | 6 | 1 |
| MFE0590X02S060 | ★ | 5.9 | 2 | 11.8 | 24 | 34.9 | 62 | 6 | 1 |
| MFE0600X02S060 | ★ | 6.0 | 2 | 12.0 | 24 | 35.0 | 62 | 6 | 1 |
| MFE0610X02S070 | ★ | 6.1 | 2 | 12.2 | 26 | 44.5 | 74 | 7 | 1 |
| MFE0610X02S080 | ★ | 6.1 | 2 | 12.2 | 26 | 44.0 | 74 | 8 | 1 |
| MFE0620X02S070 | ★ | 6.2 | 2 | 12.4 | 26 | 44.6 | 74 | 7 | 1 |
| MFE0620X02S080 | ★ | 6.2 | 2 | 12.4 | 26 | 44.1 | 74 | 8 | 1 |
| MFE0630X02S070 | ★ | 6.3 | 2 | 12.6 | 26 | 44.6 | 74 | 7 | 1 |
| MFE0630X02S080 | ★ | 6.3 | 2 | 12.6 | 26 | 44.1 | 74 | 8 | 1 |
| MFE0640X02S070 | ★ | 6.4 | 2 | 12.8 | 26 | 44.7 | 74 | 7 | 1 |
| MFE0640X02S080 | ★ | 6.4 | 2 | 12.8 | 26 | 44.2 | 74 | 8 | 1 |
| MFE0650X02S070 | ★ | 6.5 | 2 | 13.0 | 26 | 44.7 | 74 | 7 | 1 |
| MFE0650X02S080 | ★ | 6.5 | 2 | 13.0 | 26 | 44.2 | 74 | 8 | 1 |
| MFE0660X02S070 | ★ | 6.6 | 2 | 13.2 | 28 | 42.8 | 74 | 7 | 1 |
| MFE0660X02S080 | ★ | 6.6 | 2 | 13.2 | 28 | 42.3 | 74 | 8 | 1 |
| MFE0670X02S070 | ★ | 6.7 | 2 | 13.4 | 28 | 42.8 | 74 | 7 | 1 |
| MFE0670X02S080 | ★ | 6.7 | 2 | 13.4 | 28 | 42.3 | 74 | 8 | 1 |
| MFE0680X02S070 | ★ | 6.8 | 2 | 13.6 | 28 | 42.9 | 74 | 7 | 1 |
| MFE0680X02S080 | ★ | 6.8 | 2 | 13.6 | 28 | 42.4 | 74 | 8 | 1 |
| MFE0690X02S070 | ★ | 6.9 | 2 | 13.8 | 28 | 42.9 | 74 | 7 | 1 |
| MFE0690X02S080 | ★ | 6.9 | 2 | 13.8 | 28 | 42.4 | 74 | 8 | 1 |
| MFE0700X02S070 | ★ | 7.0 | 2 | 14.0 | 28 | 43.0 | 74 | 7 | 1 |
| MFE0700X02S080 | ★ | 7.0 | 2 | 14.0 | 28 | 42.5 | 74 | 8 | 1 |
| MFE0710X02S080 | ★ | 7.1 | 2 | 14.2 | 30 | 40.5 | 74 | 8 | 1 |
| MFE0720X02S080 | ★ | 7.2 | 2 | 14.4 | 30 | 40.6 | 74 | 8 | 1 |
| MFE0730X02S080 | ★ | 7.3 | 2 | 14.6 | 30 | 40.6 | 74 | 8 | 1 |
| MFE0740X02S080 | ★ | 7.4 | 2 | 14.8 | 30 | 40.7 | 74 | 8 | 1 |
| MFE0750X02S080 | ★ | 7.5 | 2 | 15.0 | 30 | 40.7 | 74 | 8 | 1 |
| MFE0760X02S080 | ★ | 7.6 | 2 | 15.2 | 32 | 38.8 | 74 | 8 | 1 |
| MFE0770X02S080 | ★ | 7.7 | 2 | 15.4 | 32 | 38.8 | 74 | 8 | 1 |
| MFE0780X02S080 | ★ | 7.8 | 2 | 15.6 | 32 | 38.9 | 74 | 8 | 1 |
| MFE0790X02S080 | ★ | 7.9 | 2 | 15.8 | 32 | 38.9 | 74 | 8 | 1 |
| MFE0800X02S080 | ★ | 8.0 | 2 | 16.0 | 32 | 39.0 | 74 | 8 | 1 |
| MFE0810X02S100 | ★ | 8.1 | 2 | 16.2 | 34 | 46.0 | 84 | 10 | 1 |
| MFE0820X02S100 | ★ | 8.2 | 2 | 16.4 | 34 | 46.1 | 84 | 10 | 1 |
| MFE0830X02S100 | ★ | 8.3 | 2 | 16.6 | 34 | 46.1 | 84 | 10 | 1 |
| MFE0840X02S100 | ★ | 8.4 | 2 | 16.8 | 34 | 46.2 | 84 | 10 | 1 |
| MFE0850X02S100 | ★ | 8.5 | 2 | 17.0 | 34 | 46.2 | 84 | 10 | 1 |
| MFE0860X02S100 | ★ | 8.6 | 2 | 17.2 | 36 | 44.3 | 84 | 10 | 1 |
| MFE0870X02S100 | ★ | 8.7 | 2 | 17.4 | 36 | 44.3 | 84 | 10 | 1 |
| MFE0880X02S100 | ★ | 8.8 | 2 | 17.6 | 36 | 44.4 | 84 | 10 | 1 |
| MFE0890X02S100 | ★ | 8.9 | 2 | 17.8 | 36 | 44.4 | 84 | 10 | 1 |
| MFE0900X02S100 | ★ | 9.0 | 2 | 18.0 | 36 | 44.5 | 84 | 10 | 1 |
| MFE0910X02S100 | ★ | 9.1 | 2 | 18.2 | 38 | 42.5 | 84 | 10 | 1 |
| MFE0920X02S100 | ★ | 9.2 | 2 | 18.4 | 38 | 42.6 | 84 | 10 | 1 |

## MFE – SOLID CARBIDE FLAT BOTTOM DRILLS, h7 TOLERANCE

1

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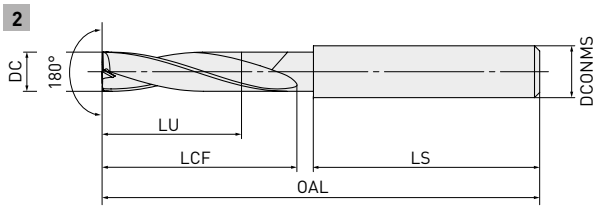



| Order number | DP1020 | DC | L/D | LU | LCF | LS | OAL | DCONMS | Type |
|---|---|---|---|---|---|---|---|---|---|
| MFE0930X02S100 | ★ | 9.3 | 2 | 18.6 | 38 | 42.6 | 84 | 10 | 1 |
| MFE0940X02S100 | ★ | 9.4 | 2 | 18.8 | 38 | 42.7 | 84 | 10 | 1 |
| MFE0950X02S100 | ★ | 9.5 | 2 | 19.0 | 38 | 42.7 | 84 | 10 | 1 |
| MFE0960X02S100 | ★ | 9.6 | 2 | 19.2 | 40 | 40.8 | 84 | 10 | 1 |
| MFE0970X02S100 | ★ | 9.7 | 2 | 19.4 | 40 | 40.8 | 84 | 10 | 1 |
| MFE0980X02S100 | ★ | 9.8 | 2 | 19.6 | 40 | 40.9 | 84 | 10 | 1 |
| MFE0990X02S100 | ★ | 9.9 | 2 | 19.8 | 40 | 40.9 | 84 | 10 | 1 |
| MFE1000X02S100 | ★ | 10.0 | 2 | 20.0 | 40 | 41.0 | 84 | 10 | 1 |
| MFE1010X02S120 | ★ | 10.1 | 2 | 20.2 | 42 | 49.0 | 95 | 12 | 1 |
| MFE1020X02S120 | ★ | 10.2 | 2 | 20.4 | 42 | 49.1 | 95 | 12 | 1 |
| MFE1030X02S120 | ★ | 10.3 | 2 | 20.6 | 42 | 49.1 | 95 | 12 | 1 |
| MFE1040X02S120 | ★ | 10.4 | 2 | 20.8 | 42 | 49.2 | 95 | 12 | 1 |
| MFE1050X02S120 | ★ | 10.5 | 2 | 21.0 | 42 | 49.2 | 95 | 12 | 1 |
| MFE1060X02S120 | ★ | 10.6 | 2 | 21.2 | 44 | 47.3 | 95 | 12 | 1 |
| MFE1070X02S120 | ★ | 10.7 | 2 | 21.4 | 44 | 47.3 | 95 | 12 | 1 |
| MFE1080X02S120 | ★ | 10.8 | 2 | 21.6 | 44 | 47.4 | 95 | 12 | 1 |
| MFE1090X02S120 | ★ | 10.9 | 2 | 21.8 | 44 | 47.4 | 95 | 12 | 1 |
| MFE1100X02S120 | ★ | 11.0 | 2 | 22.0 | 44 | 47.5 | 95 | 12 | 1 |
| MFE1110X02S120 | ★ | 11.1 | 2 | 22.2 | 46 | 45.5 | 95 | 12 | 1 |
| MFE1120X02S120 | ★ | 11.2 | 2 | 22.4 | 46 | 45.6 | 95 | 12 | 1 |
| MFE1130X02S120 | ★ | 11.3 | 2 | 22.6 | 46 | 45.6 | 95 | 12 | 1 |
| MFE1140X02S120 | ★ | 11.4 | 2 | 22.8 | 46 | 45.7 | 95 | 12 | 1 |
| MFE1150X02S120 | ★ | 11.5 | 2 | 23.0 | 46 | 45.7 | 95 | 12 | 1 |
| MFE1160X02S120 | ★ | 11.6 | 2 | 23.2 | 48 | 43.8 | 95 | 12 | 1 |
| MFE1170X02S120 | ★ | 11.7 | 2 | 23.4 | 48 | 43.8 | 95 | 12 | 1 |
| MFE1180X02S120 | ★ | 11.8 | 2 | 23.6 | 48 | 43.9 | 95 | 12 | 1 |
| MFE1190X02S120 | ★ | 11.9 | 2 | 23.8 | 48 | 43.9 | 95 | 12 | 1 |
| MFE1200X02S120 | ★ | 12.0 | 2 | 24.0 | 48 | 44.0 | 95 | 12 | 1 |
| MFE1250X02S140 | ★ | 12.5 | 2 | 25.0 | 50 | 49.0 | 102 | 14 | 2 |
| MFE1300X02S140 | ★ | 13.0 | 2 | 26.0 | 52 | 47.0 | 102 | 14 | 2 |
| MFE1350X02S140 | ★ | 13.5 | 2 | 27.0 | 54 | 45.0 | 102 | 14 | 2 |
| MFE1400X02S140 | ★ | 14.0 | 2 | 28.0 | 56 | 43.0 | 102 | 14 | 2 |
| MFE1450X02S160 | ★ | 14.5 | 2 | 29.0 | 58 | 50.0 | 111 | 16 | 2 |
| MFE1500X02S160 | ★ | 15.0 | 2 | 30.0 | 60 | 48.0 | 111 | 16 | 2 |
| MFE1550X02S160 | ★ | 15.5 | 2 | 31.0 | 62 | 46.0 | 111 | 16 | 2 |
| MFE1600X02S160 | ★ | 16.0 | 2 | 32.0 | 64 | 44.0 | 111 | 16 | 2 |
| MFE1650X02S180 | ★ | 16.5 | 2 | 33.0 | 66 | 50.0 | 119 | 18 | 2 |
| MFE1700X02S180 | ★ | 17.0 | 2 | 34.0 | 68 | 48.0 | 119 | 18 | 2 |
| MFE1750X02S180 | ★ | 17.5 | 2 | 35.0 | 70 | 46.0 | 119 | 18 | 2 |
| MFE1800X02S180 | ★ | 18.0 | 2 | 36.0 | 72 | 44.0 | 119 | 18 | 2 |
| MFE1850X02S200 | ★ | 18.5 | 2 | 37.0 | 74 | 50.0 | 127 | 20 | 2 |
| MFE1900X02S200 | ★ | 19.0 | 2 | 38.0 | 76 | 48.0 | 127 | 20 | 2 |
| MFE1950X02S200 | ★ | 19.5 | 2 | 39.0 | 78 | 46.0 | 127 | 20 | 2 |
| MFE2000X02S200 | ★ | 20.0 | 2 | 40.0 | 80 | 44.0 | 127 | 20 | 2 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

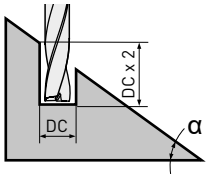
# MINI-MFE / MFE

## RECOMMENDED CUTTING CONDITIONS

| | Material | Properties | DC | L/D | n | α = 0° fr |
|---|---|---|---|---|---|---|
| P | Mild steel | ≤180HB | 0.75 | ≤2 | 23300 | 0.030 (0.010 – 0.050) |
| | | | 1.0 | ≤2 | 17500 | 0.030 (0.010 – 0.050) |
| | | | 1.5 | ≤2 | 12200 | 0.035 (0.015 – 0.055) |
| | | | 2.0 | ≤2 | 9500 | 0.040 (0.020 – 0.060) |
| | | | 2.5 | ≤2 | 7900 | 0.050 (0.030 – 0.070) |
| | | | 3.0 | ≤2 | 7900 | 0.060 (0.040 – 0.080) |
| | | | 4.0 | ≤2 | 5900 | 0.080 (0.060 – 0.100) |
| | | | 5.0 | ≤2 | 4700 | 0.100 (0.080 – 0.130) |
| | | | 6.0 | ≤2 | 3900 | 0.130 (0.100 – 0.150) |
| | | | 8.0 | ≤2 | 2900 | 0.150 (0.130 – 0.170) |
| | | | 10.0 | ≤2 | 2300 | 0.170 (0.150 – 0.200) |
| | | | 12.0 | ≤2 | 1900 | 0.200 (0.170 – 0.250) |
| | | | 16.0 | ≤2 | 1400 | 0.250 (0.200 – 0.300) |
| | | | 20.0 | ≤2 | 1100 | 0.300 (0.250 – 0.350) |
| | Carbon steel, Alloy steel | 180 – 280HB | 0.75 | ≤2 | 19000 | 0.030 (0.010 – 0.050) |
| | | | 1.0 | ≤2 | 14300 | 0.030 (0.010 – 0.050) |
| | | | 1.5 | ≤2 | 10000 | 0.035 (0.015 – 0.055) |
| | | | 2.0 | ≤2 | 7900 | 0.040 (0.020 – 0.060) |
| | | | 2.5 | ≤2 | 6600 | 0.050 (0.030 – 0.070) |
| | | | 3.0 | ≤2 | 7900 | 0.060 (0.040 – 0.080) |
| | | | 4.0 | ≤2 | 5900 | 0.080 (0.060 – 0.100) |
| | | | 5.0 | ≤2 | 4700 | 0.100 (0.080 – 0.130) |
| | | | 6.0 | ≤2 | 3900 | 0.130 (0.100 – 0.150) |
| | | | 8.0 | ≤2 | 2900 | 0.150 (0.130 – 0.170) |
| | | | 10.0 | ≤2 | 2300 | 0.170 (0.150 – 0.200) |
| | | | 12.0 | ≤2 | 1900 | 0.200 (0.170 – 0.250) |
| | | | 16.0 | ≤2 | 1400 | 0.250 (0.200 – 0.300) |
| | | | 20.0 | ≤2 | 1100 | 0.300 (0.250 – 0.350) |
| | Carbon steel, Alloy steel | 280 – 350HB | 0.75 | ≤2 | 16900 | 0.030 (0.010 – 0.050) |
| | | | 1.0 | ≤2 | 12700 | 0.030 (0.010 – 0.050) |
| | | | 1.5 | ≤2 | 8400 | 0.035 (0.015 – 0.050) |
| | | | 2.0 | ≤2 | 6700 | 0.040 (0.020 – 0.060) |
| | | | 2.5 | ≤2 | 5700 | 0.050 (0.030 – 0.070) |
| | | | 3.0 | ≤2 | 6800 | 0.060 (0.040 – 0.080) |
| | | | 4.0 | ≤2 | 5100 | 0.080 (0.060 – 0.100) |
| | | | 5.0 | ≤2 | 4100 | 0.100 (0.080 – 0.130) |
| | | | 6.0 | ≤2 | 3400 | 0.130 (0.100 – 0.150) |
| | | | 8.0 | ≤2 | 2500 | 0.150 (0.130 – 0.170) |
| | | | 10.0 | ≤2 | 2000 | 0.170 (0.150 – 0.200) |
| | | | 12.0 | ≤2 | 1700 | 0.200 (0.170 – 0.250) |
| | | | 16.0 | ≤2 | 1200 | 0.250 (0.200 – 0.300) |
| | | | 20.0 | ≤2 | 1000 | 0.300 (0.250 – 0.350) |

1/2

1. The recommended hole depth is DC x 2. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)
2. The above cutting table assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
   When the inclination angle α is 30° or less, adjust the feed rate to 70 % or lower as a guideline.
   When the inclination angle α is greater than 30°, adjust the feed rate to 50 % or lower as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.

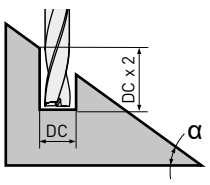


## MINI-MFE / MFE

| | Material | Properties | DC | L/D | n | α = 0° fr |
|---|---|---|---|---|---|---|
| M | Stainless steel | ≤200HB | 0.75 | ≤2 | 10600 | 0.007 (0.003 – 0.011) |
| | | | 1.0 | ≤2 | 7900 | 0.007 (0.003 – 0.011) |
| | | | 1.5 | ≤2 | 5300 | 0.010 (0.005 – 0.015) |
| | | | 2.0 | ≤2 | 4700 | 0.015 (0.010 – 0.020) |
| | | | 2.5 | ≤2 | 3800 | 0.015 (0.010 – 0.020) |
| | | | 3.0 | ≤2 | 3100 | 0.020 (0.010 – 0.030) |
| | | | 4.0 | ≤2 | 2300 | 0.030 (0.020 – 0.040) |
| | | | 5.0 | ≤2 | 1900 | 0.040 (0.030 – 0.050) |
| | | | 6.0 | ≤2 | 1500 | 0.050 (0.040 – 0.060) |
| | | | 8.0 | ≤2 | 1100 | 0.060 (0.050 – 0.080) |
| | | | 10.0 | ≤2 | 950 | 0.080 (0.060 – 0.100) |
| | | | 12.0 | ≤2 | 790 | 0.100 (0.080 – 0.120) |
| | | | 16.0 | ≤2 | 590 | 0.120 (0.100 – 0.150) |
| | | | 20.0 | ≤2 | 470 | 0.150 (0.120 – 0.200) |
| K | Gray cast iron | ≤350MPa | 0.75 | ≤2 | 23300 | 0.030 (0.010 – 0.050) |
| | | | 1.0 | ≤2 | 17500 | 0.030 (0.010 – 0.050) |
| | | | 1.5 | ≤2 | 12200 | 0.035 (0.015 – 0.055) |
| | | | 2.0 | ≤2 | 9500 | 0.040 (0.020 – 0.060) |
| | | | 2.5 | ≤2 | 7900 | 0.050 (0.030 – 0.070) |
| | | | 3.0 | ≤2 | 7900 | 0.060 (0.040 – 0.080) |
| | | | 4.0 | ≤2 | 5900 | 0.080 (0.060 – 0.100) |
| | | | 5.0 | ≤2 | 4700 | 0.100 (0.080 – 0.120) |
| | | | 6.0 | ≤2 | 3900 | 0.120 (0.100 – 0.140) |
| | | | 8.0 | ≤2 | 2900 | 0.140 (0.120 – 0.160) |
| | | | 10.0 | ≤2 | 2300 | 0.160 (0.140 – 0.180) |
| | | | 12.0 | ≤2 | 1900 | 0.180 (0.160 – 0.200) |
| | | | 16.0 | ≤2 | 1400 | 0.200 (0.180 – 0.240) |
| | | | 20.0 | ≤2 | 1100 | 0.240 (0.200 – 0.280) |
| | Ductile cast iron | ≤450MPa | 0.75 | ≤2 | 16900 | 0.010 (0.005 – 0.015) |
| | | | 1.0 | ≤2 | 12700 | 0.010 (0.005 – 0.015) |
| | | | 1.5 | ≤2 | 10000 | 0.020 (0.010 – 0.030) |
| | | | 2.0 | ≤2 | 8700 | 0.030 (0.015 – 0.045) |
| | | | 2.5 | ≤2 | 7300 | 0.045 (0.025 – 0.065) |
| | | | 3.0 | ≤2 | 6800 | 0.050 (0.040 – 0.060) |
| | | | 4.0 | ≤2 | 5500 | 0.060 (0.050 – 0.080) |
| | | | 5.0 | ≤2 | 4400 | 0.080 (0.060 – 0.100) |
| | | | 6.0 | ≤2 | 3700 | 0.100 (0.080 – 0.120) |
| | | | 8.0 | ≤2 | 2700 | 0.120 (0.100 – 0.150) |
| | | | 10.0 | ≤2 | 2200 | 0.150 (0.120 – 0.180) |
| | | | 12.0 | ≤2 | 1800 | 0.180 (0.150 – 0.200) |
| | | | 16.0 | ≤2 | 1300 | 0.200 (0.180 – 0.250) |
| | | | 20.0 | ≤2 | 1100 | 0.250 (0.200 – 0.300) |
| N | Aluminium alloys | Si<5 % | 0.75 | ≤2 | 42400 | 0.020 (0.010 – 0.030) |
| | | | 1.0 | ≤2 | 31800 | 0.020 (0.010 – 0.030) |
| | | | 1.5 | ≤2 | 21200 | 0.020 (0.010 – 0.030) |
| | | | 2.0 | ≤2 | 17500 | 0.050 (0.030 – 0.070) |
| | | | 2.5 | ≤2 | 14000 | 0.060 (0.040 – 0.090) |
| | | | 3.0 | ≤2 | 11600 | 0.060 (0.040 – 0.090) |
| | | | 4.0 | ≤2 | 8700 | 0.080 (0.060 – 0.100) |
| | | | 5.0 | ≤2 | 7000 | 0.100 (0.080 – 0.130) |
| | | | 6.0 | ≤2 | 5800 | 0.130 (0.100 – 0.160) |
| | | | 8.0 | ≤2 | 4300 | 0.160 (0.130 – 0.200) |
| | | | 10.0 | ≤2 | 3500 | 0.200 (0.160 – 0.240) |
| | | | 12.0 | ≤2 | 2900 | 0.240 (0.200 – 0.280) |
| | | | 16.0 | ≤2 | 2100 | 0.280 (0.240 – 0.320) |
| | | | 20.0 | ≤2 | 1700 | 0.320 (0.280 – 0.360) |

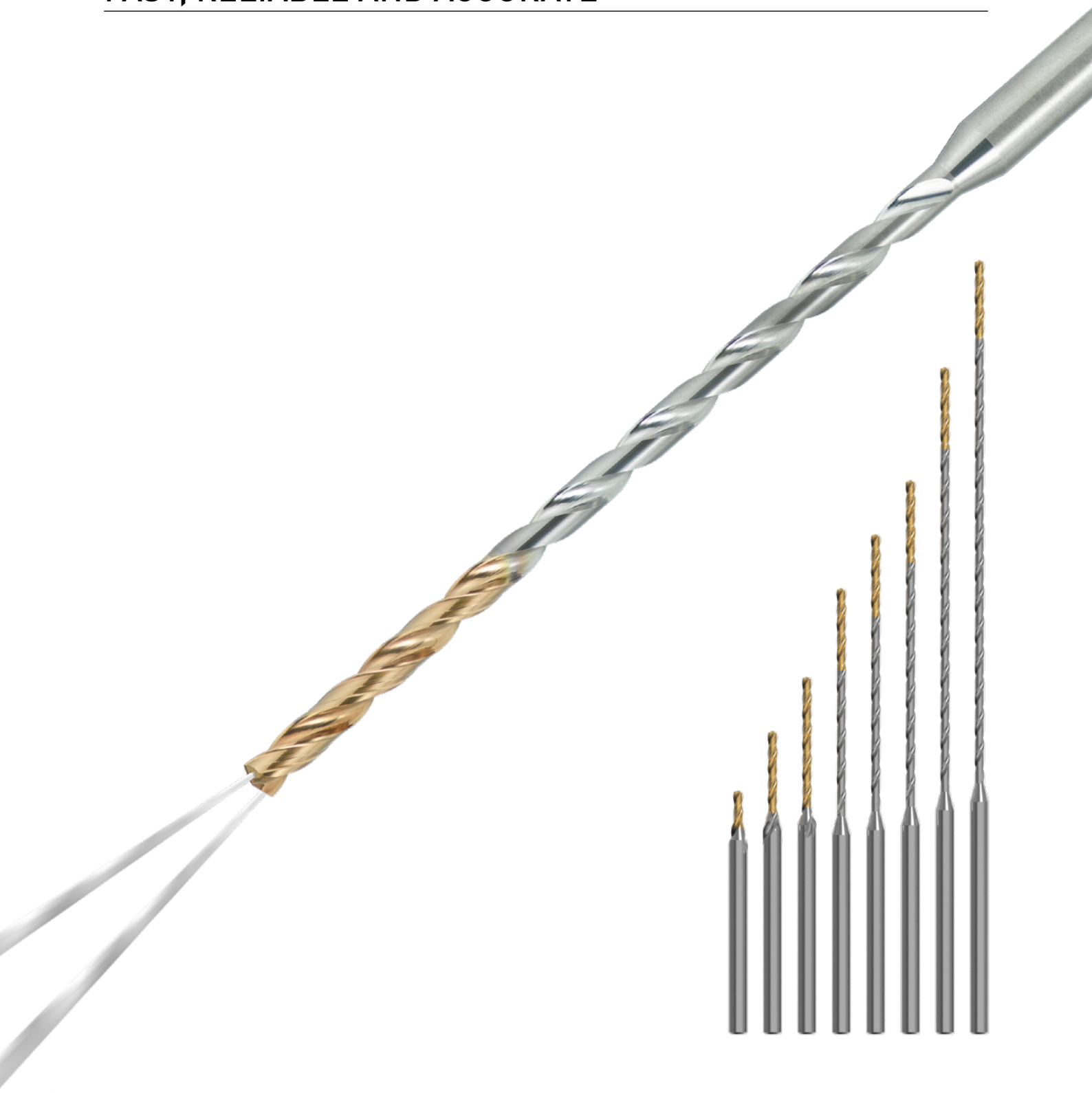


1. The recommended hole depth is DC x 2. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)
2. The above cutting table assumes drilling on a flat surface.
   For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
   When the inclination angle α is 30° or less, adjust the feed rate to 70 % or lower as a guideline.
   When the inclination angle α is greater than 30°, adjust the feed rate to 50 % or lower as a guideline.
3. This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.



# MINI DVAS

## SOLID CARBIDE TRISTAR DRILL SERIES
## FAST, RELIABLE AND ACCURATE



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# MINI DVAS

## HIGH EFFICIENCY, LONG TOOL LIFE, HIGH PRECISION

**TRISTAR, A NEW GENERATION DRILL SERIES PROVIDES 3 STRONG ADVANTAGES**

## TRISTAR: **FAST**

Conventional deep hole drilling is usually a slow process.

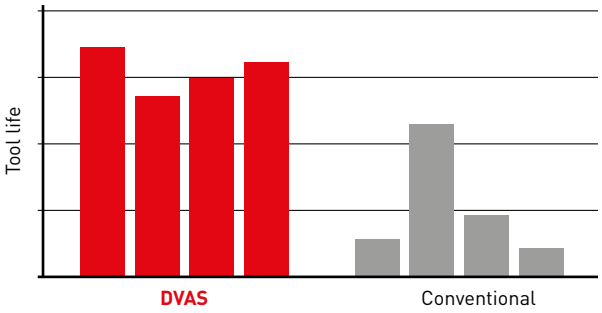
**DVAS drills can perform at higher feeds and speeds meaning faster drilling cycles.**

Cutting time 8 s/hole

## TRISTAR: **RELIABLE**

Breakages, short tool life and lack of coolant can be common with standard tools.

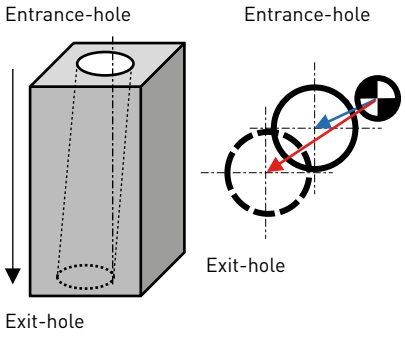
**DVAS – Tool life exceeds all normal expectations.**

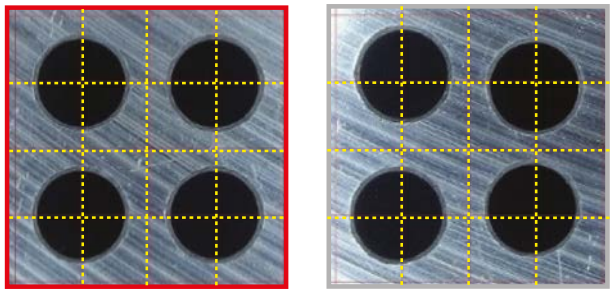



## TRISTAR: **ACCURATE**

Conventionally drilled holes can wander considerably and have poor positioning.

**Straighter holes and improved dimensional accuracy are enabled by using DVAS drills.**



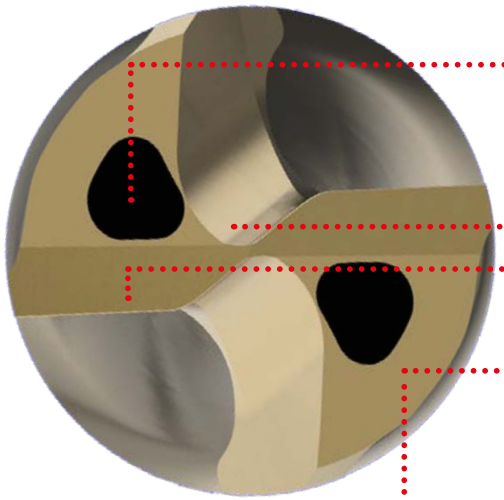
DVAS

Conventional

# MINI DVAS

## FAST, RELIABLE AND ACCURATE
## NEW STANDARDS ENABLED BY FIVE TECHNOLOGIES

The first of the TRISTAR series is a small diameter drill with 5 technological features for fast, reliable and accurate drilling.
Ø 1.0 mm – Ø 2.9 mm L/D = 2 – 50



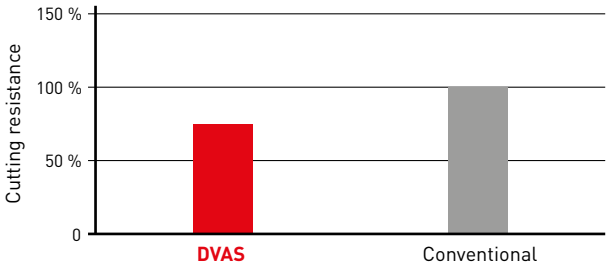
**ADVANCED COOLANT HOLE**

**NEW XR POINT THINNING**

**TOUGH AND SHARP CUTTING EDGE DESIGN**

**NEW COATED GRADE DP1120**

**UNIQUE RIGID FORM**




| | |
|---|---|
| Material | 42CrMo4 |
| Tool | DC = Ø 1.0 mm, L/D = 20 |
| Vc (m/min) | 70 |
| f (mm/rev) | 0.04 |

# DRILLS SELECTION

## DVAS – SOLID CARBIDE TRISTAR DRILL SERIES

| | Product code | DC | Size | Item | Hole depth | Material | | | | | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | P | M | K | N | S | |
| **Pilot drill** | DVAS○○○X02 | Ø1.0 – Ø2.9 | 0.1 | 20 | 2 | ◎ | ◎ | ○ | ○ | ◎ |  |
| | DVAS○○○X07 | Ø1.0 – Ø2.9 | 0.1 | 20 | 7 | ◎ | ◎ | ○ | ○ | ◎ |  |
| **Long drill** | DVAS○○○X12 | Ø1.0 – Ø2.9 | 0.1 | 20 | 12 | ◎ | ◎ | ○ | ○ | ◎ |  |
| | DVAS○○○X20 | Ø1.0 – Ø2.9 | 0.1 | 20 | 20 | ◎ | ◎ | ○ | ○ | ◎ |  |
| | DVAS○○○X25 | Ø1.0 – Ø2.9 | 0.1 | 20 | 25 | ◎ | ◎ | ○ | ○ | ◎ |  |
| | DVAS○○○X30 | Ø1.0 – Ø2.9 | 0.1 | 20 | 30 | ◎ | ◎ | ○ | ○ | ◎ |  |
| | DVAS○○○X40 | Ø1.0 – Ø2.9 | 0.1 | 20 | 40 | ◎ | ◎ | ○ | ○ | ◎ |  |
| | DVAS○○○X50 | Ø1.0 – Ø2.5 | 0.5 | 20 | 50 | ◎ | ◎ | ○ | ○ | ◎ |  |

# IDENTIFICATION

**Coolant**

S Internal coolant

**L/D**

X50 L/D = 50

X02 L/D = 2

**DVA** | **S** | **0100** | **X50** | **S040**

**Applications**

DVA General-purpose

**Diameter**

0100 | Ø 1.0 mm

0290 | Ø 2.9 mm

**Type of Shank**

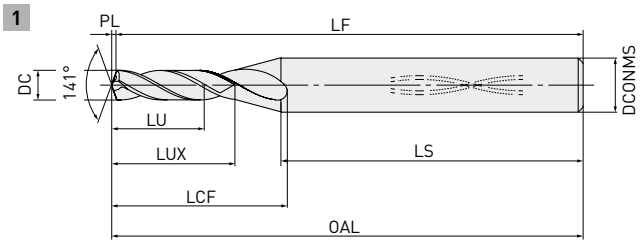
S040 Shank diameter 4 mm

# MINI DVAS

## SOLID CARBIDE PILOT DRILLS - TRISTAR DRILLS

P M K N S

1




| DC<3 |
|---|
| 0.006 |
| -0.004 |

| DCONMS = 4 |
|---|
| 0 |
| -0.008 |

| Order number | DP1120 | DC | DCONMS | L/D | LU | LUX | LCF | LS | OAL | LF | PL | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DVAS0100X02S040 | ● | 1.0 | 4 | 2 | 2.2 | 3.2 | 8.6 | 41.2 | 50.0 | 49.8 | 0.2 | 1 |
| DVAS0110X02S040 | ● | 1.1 | 4 | 2 | 2.4 | 3.5 | 9.0 | 41.1 | 50.0 | 49.8 | 0.2 | 1 |
| DVAS0120X02S040 | ● | 1.2 | 4 | 2 | 2.6 | 3.9 | 9.4 | 41.0 | 50.0 | 49.8 | 0.2 | 1 |
| DVAS0130X02S040 | ● | 1.3 | 4 | 2 | 2.8 | 4.2 | 9.9 | 40.8 | 50.0 | 49.8 | 0.2 | 1 |
| DVAS0140X02S040 | ● | 1.4 | 4 | 2 | 3.0 | 4.5 | 10.3 | 40.7 | 50.0 | 49.8 | 0.2 | 1 |
| DVAS0150X02S040 | ● | 1.5 | 4 | 2 | 3.3 | 4.8 | 10.7 | 40.6 | 50.0 | 49.7 | 0.3 | 1 |
| DVAS0160X02S040 | ● | 1.6 | 4 | 2 | 3.5 | 5.1 | 11.1 | 40.4 | 50.0 | 49.7 | 0.3 | 1 |
| DVAS0170X02S040 | ● | 1.7 | 4 | 2 | 3.7 | 5.5 | 11.6 | 40.3 | 50.0 | 49.7 | 0.3 | 1 |
| DVAS0180X02S040 | ● | 1.8 | 4 | 2 | 3.9 | 5.8 | 12.0 | 40.2 | 50.0 | 49.7 | 0.3 | 1 |
| DVAS0190X02S040 | ● | 1.9 | 4 | 2 | 4.1 | 6.1 | 12.4 | 40.0 | 50.0 | 49.7 | 0.3 | 1 |
| DVAS0200X02S040 | ● | 2.0 | 4 | 2 | 4.4 | 6.4 | 12.9 | 39.9 | 50.0 | 49.6 | 0.4 | 1 |
| DVAS0210X02S040 | ● | 2.1 | 4 | 2 | 4.6 | 6.7 | 13.3 | 39.8 | 50.0 | 49.6 | 0.4 | 1 |
| DVAS0220X02S040 | ● | 2.2 | 4 | 2 | 4.8 | 7.0 | 13.7 | 39.7 | 50.0 | 49.6 | 0.4 | 1 |
| DVAS0230X02S040 | ● | 2.3 | 4 | 2 | 5.0 | 7.4 | 14.1 | 44.5 | 55.0 | 54.6 | 0.4 | 1 |
| DVAS0240X02S040 | ● | 2.4 | 4 | 2 | 5.2 | 7.7 | 14.6 | 44.4 | 55.0 | 54.6 | 0.4 | 1 |
| DVAS0250X02S040 | ● | 2.5 | 4 | 2 | 5.5 | 8.0 | 15.0 | 44.3 | 55.0 | 54.6 | 0.4 | 1 |
| DVAS0260X02S040 | ● | 2.6 | 4 | 2 | 5.7 | 8.3 | 15.4 | 44.1 | 55.0 | 54.5 | 0.5 | 1 |
| DVAS0270X02S040 | ● | 2.7 | 4 | 2 | 5.9 | 8.6 | 15.8 | 44.0 | 55.0 | 54.5 | 0.5 | 1 |
| DVAS0280X02S040 | ● | 2.8 | 4 | 2 | 6.1 | 8.9 | 16.3 | 43.9 | 55.0 | 54.5 | 0.5 | 1 |
| DVAS0290X02S040 | ● | 2.9 | 4 | 2 | 6.3 | 9.3 | 16.7 | 43.7 | 55.0 | 54.5 | 0.5 | 1 |

1/1

329 Vc



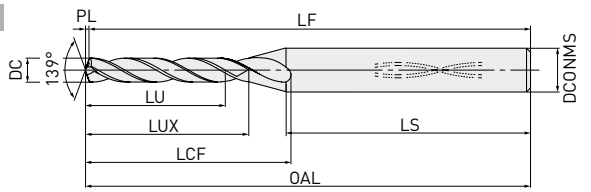
● : Inventory maintained. ★ : Inventory maintained in Japan.

# MINI DVAS

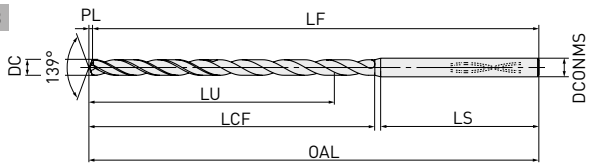
## SOLID CARBIDE TRISTAR DRILL

P M K S N

2




3




| | |
|---|---|
| DC<3 | |
| 0 | |
| -0.010 | |
| DCONMS = 4 | |
| 0 | |
| -0.008 | |

| | Order number | DP1120 | DC | DCONMS | L/D | LU | LUX | LCF | LS | OAL | LF | PL | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DVAS0100X07S040 | ● | 1.0 | 4 | 7 | 7.2 | 8.2 | 13.6 | 41.2 | 55.0 | 54.8 | 0.2 | 2 |
| | DVAS0100X12S040 | ● | 1.0 | 4 | 12 | 12.2 | 13.2 | 18.6 | 39.2 | 58.0 | 57.8 | 0.2 | 2 |
| | DVAS0100X20S040 | ● | 1.0 | 4 | 20 | 20.2 | — | 23.2 | 38.2 | 67.0 | 66.8 | 0.2 | 3 |
| | DVAS0100X25S040 | ● | 1.0 | 4 | 25 | 25.2 | — | 28.2 | 39.2 | 73.0 | 72.8 | 0.2 | 3 |
| | DVAS0100X30S040 | ● | 1.0 | 4 | 30 | 30.2 | — | 33.2 | 40.2 | 79.0 | 78.8 | 0.2 | 3 |
| | DVAS0100X40S040 | ● | 1.0 | 4 | 40 | 40.2 | — | 43.2 | 41.2 | 90.0 | 89.8 | 0.2 | 3 |
| | DVAS0100X50S040 | ● | 1.0 | 4 | 50 | 50.2 | — | 53.2 | 43.2 | 102.0 | 101.8 | 0.2 | 3 |
| | DVAS0110X07S040 | ● | 1.1 | 4 | 7 | 7.9 | 9.1 | 14.5 | 40.6 | 55.0 | 54.8 | 0.2 | 2 |
| | DVAS0110X12S040 | ● | 1.1 | 4 | 12 | 13.4 | 14.6 | 20.0 | 38.1 | 58.0 | 57.8 | 0.2 | 2 |
| | DVAS0110X20S040 | ● | 1.1 | 4 | 20 | 22.2 | — | 25.5 | 36.1 | 67.0 | 66.8 | 0.2 | 3 |
| | DVAS0110X25S040 | ● | 1.1 | 4 | 25 | 27.7 | — | 31.0 | 36.6 | 73.0 | 72.8 | 0.2 | 3 |
| | DVAS0110X30S040 | ● | 1.1 | 4 | 30 | 33.2 | — | 36.5 | 37.1 | 79.0 | 78.8 | 0.2 | 3 |
| | DVAS0110X40S040 | ● | 1.1 | 4 | 40 | 44.2 | — | 47.5 | 37.1 | 90.0 | 89.8 | 0.2 | 3 |
| NEW | DVAS0110X50S040 | ● | 1.1 | 4 | 50 | 55.2 | — | 58.5 | 38.1 | 102.0 | 101.8 | 0.2 | 3 |
| | DVAS0120X07S040 | ● | 1.2 | 4 | 7 | 8.6 | 9.9 | 15.4 | 40.0 | 55.0 | 54.8 | 0.2 | 2 |
| | DVAS0120X12S040 | ● | 1.2 | 4 | 12 | 14.6 | 15.9 | 21.4 | 39.0 | 60.0 | 59.8 | 0.2 | 2 |
| | DVAS0120X20S040 | ● | 1.2 | 4 | 20 | 24.2 | — | 27.8 | 38.0 | 71.0 | 70.8 | 0.2 | 3 |
| | DVAS0120X25S040 | ● | 1.2 | 4 | 25 | 30.2 | — | 33.8 | 38.0 | 77.0 | 76.8 | 0.2 | 3 |
| | DVAS0120X30S040 | ● | 1.2 | 4 | 30 | 36.2 | — | 39.8 | 39.0 | 84.0 | 83.8 | 0.2 | 3 |
| | DVAS0120X40S040 | ● | 1.2 | 4 | 40 | 48.2 | — | 51.8 | 40.0 | 97.0 | 96.8 | 0.2 | 3 |
| NEW | DVAS0120X50S040 | ● | 1.2 | 4 | 50 | 60.2 | — | 63.8 | 41.0 | 110.0 | 109.8 | 0.2 | 3 |
| | DVAS0130X07S040 | ● | 1.3 | 4 | 7 | 9.3 | 10.7 | 16.4 | 39.3 | 55.0 | 54.8 | 0.2 | 2 |
| | DVAS0130X12S040 | ● | 1.3 | 4 | 12 | 15.8 | 17.2 | 22.9 | 37.8 | 60.0 | 59.8 | 0.2 | 2 |
| | DVAS0130X20S040 | ● | 1.3 | 4 | 20 | 26.2 | — | 30.1 | 35.8 | 71.0 | 70.8 | 0.2 | 3 |
| | DVAS0130X25S040 | ● | 1.3 | 4 | 25 | 32.7 | — | 36.6 | 35.3 | 77.0 | 76.8 | 0.2 | 3 |
| | DVAS0130X30S040 | ● | 1.3 | 4 | 30 | 39.2 | — | 43.1 | 35.8 | 84.0 | 83.8 | 0.2 | 3 |
| | DVAS0130X40S040 | ● | 1.3 | 4 | 40 | 52.2 | — | 56.1 | 35.8 | 97.0 | 96.8 | 0.2 | 3 |
| NEW | DVAS0130X50S040 | ● | 1.3 | 4 | 50 | 65.2 | — | 69.1 | 35.8 | 110.0 | 109.8 | 0.2 | 3 |



● : Inventory maintained. ★ : Inventory maintained in Japan.

## MINI DVAS – SOLID CARBIDE TRISTAR DRILL

| | Order number | DP1120 | DC | DCONMS | L/D | LU | LUX | LCF | LS | OAL | LF | PL | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DVAS0140X07S040 | ● | 1.4 | 4 | 7 | 10.1 | 11.5 | 17.3 | 38.7 | 55.0 | 54.7 | 0.3 | 2 |
| | DVAS0140X12S040 | ● | 1.4 | 4 | 12 | 17.1 | 18.5 | 24.3 | 39.7 | 63.0 | 62.7 | 0.3 | 2 |
| | DVAS0140X20S040 | ● | 1.4 | 4 | 20 | 28.3 | — | 32.5 | 37.7 | 75.0 | 74.7 | 0.3 | 3 |
| | DVAS0140X25S040 | ● | 1.4 | 4 | 25 | 35.3 | — | 39.5 | 37.7 | 82.0 | 81.7 | 0.3 | 3 |
| | DVAS0140X30S040 | ● | 1.4 | 4 | 30 | 42.3 | — | 46.5 | 38.7 | 90.0 | 89.7 | 0.3 | 3 |
| | DVAS0140X40S040 | ● | 1.4 | 4 | 40 | 56.3 | — | 60.5 | 39.7 | 105.0 | 104.7 | 0.3 | 3 |
| NEW | DVAS0140X50S040 | ● | 1.4 | 4 | 50 | 70.3 | — | 74.5 | 40.7 | 120.0 | 119.7 | 0.3 | 3 |
| | DVAS0150X07S040 | ● | 1.5 | 4 | 7 | 10.8 | 12.3 | 18.2 | 38.1 | 55.0 | 54.7 | 0.3 | 2 |
| | DVAS0150X12S040 | ● | 1.5 | 4 | 12 | 18.3 | 19.8 | 25.7 | 38.6 | 63.0 | 62.7 | 0.3 | 2 |
| | DVAS0150X20S040 | ● | 1.5 | 4 | 20 | 30.3 | — | 34.8 | 35.6 | 75.0 | 74.7 | 0.3 | 3 |
| | DVAS0150X25S040 | ● | 1.5 | 4 | 25 | 37.8 | — | 42.3 | 35.1 | 82.0 | 81.7 | 0.3 | 3 |
| | DVAS0150X30S040 | ● | 1.5 | 4 | 30 | 45.3 | — | 49.8 | 35.6 | 90.0 | 89.7 | 0.3 | 3 |
| | DVAS0150X40S040 | ● | 1.5 | 4 | 40 | 60.3 | — | 64.8 | 35.6 | 105.0 | 104.7 | 0.3 | 3 |
| | DVAS0150X50S040 | ● | 1.5 | 4 | 50 | 75.3 | — | 79.8 | 35.6 | 120.0 | 119.7 | 0.3 | 3 |
| | DVAS0160X07S040 | ● | 1.6 | 4 | 7 | 11.5 | 13.1 | 19.2 | 39.4 | 57.0 | 56.7 | 0.3 | 2 |
| | DVAS0160X12S040 | ● | 1.6 | 4 | 12 | 19.5 | 21.1 | 27.2 | 40.4 | 66.0 | 65.7 | 0.3 | 2 |
| | DVAS0160X20S040 | ● | 1.6 | 4 | 20 | 32.3 | — | 37.1 | 37.4 | 79.0 | 78.7 | 0.3 | 3 |
| | DVAS0160X25S040 | ● | 1.6 | 4 | 25 | 40.3 | — | 45.1 | 38.4 | 88.0 | 87.7 | 0.3 | 3 |
| | DVAS0160X30S040 | ● | 1.6 | 4 | 30 | 48.3 | — | 53.1 | 41.4 | 99.0 | 98.7 | 0.3 | 3 |
| | DVAS0160X40S040 | ● | 1.6 | 4 | 40 | 64.3 | — | 69.1 | 39.4 | 113.0 | 112.7 | 0.3 | 3 |
| NEW | DVAS0160X50S040 | ● | 1.6 | 4 | 50 | 80.3 | — | 85.1 | 40.4 | 130.0 | 129.7 | 0.3 | 3 |
| | DVAS0170X07S040 | ● | 1.7 | 4 | 7 | 12.2 | 14.0 | 20.1 | 38.8 | 57.0 | 56.7 | 0.3 | 2 |
| | DVAS0170X12S040 | ● | 1.7 | 4 | 12 | 20.7 | 22.5 | 28.6 | 39.3 | 66.0 | 65.7 | 0.3 | 2 |
| | DVAS0170X20S040 | ● | 1.7 | 4 | 20 | 34.3 | — | 39.4 | 35.3 | 79.0 | 78.7 | 0.3 | 3 |
| | DVAS0170X25S040 | ● | 1.7 | 4 | 25 | 42.8 | — | 47.9 | 35.8 | 88.0 | 87.7 | 0.3 | 3 |
| | DVAS0170X30S040 | ● | 1.7 | 4 | 30 | 51.3 | — | 56.4 | 38.3 | 99.0 | 98.7 | 0.3 | 3 |
| | DVAS0170X40S040 | ● | 1.7 | 4 | 40 | 68.3 | — | 73.4 | 35.3 | 113.0 | 112.7 | 0.3 | 3 |
| NEW | DVAS0170X50S040 | ● | 1.7 | 4 | 50 | 85.3 | — | 90.4 | 35.3 | 130.0 | 129.7 | 0.3 | 3 |
| | DVAS0180X07S040 | ● | 1.8 | 4 | 7 | 12.9 | 14.8 | 21.0 | 40.2 | 59.0 | 58.7 | 0.3 | 2 |
| | DVAS0180X12S040 | ● | 1.8 | 4 | 12 | 21.9 | 23.8 | 30.0 | 41.2 | 69.0 | 68.7 | 0.3 | 2 |
| | DVAS0180X20S040 | ● | 1.8 | 4 | 20 | 36.3 | — | 41.7 | 38.2 | 84.0 | 83.7 | 0.3 | 3 |
| | DVAS0180X25S040 | ● | 1.8 | 4 | 25 | 45.3 | — | 50.7 | 39.2 | 94.0 | 93.7 | 0.3 | 3 |
| | DVAS0180X30S040 | ● | 1.8 | 4 | 30 | 54.3 | — | 59.7 | 40.2 | 104.0 | 103.7 | 0.3 | 3 |
| | DVAS0180X40S040 | ● | 1.8 | 4 | 40 | 72.3 | — | 77.7 | 41.2 | 123.0 | 122.7 | 0.3 | 3 |
| NEW | DVAS0180X50S040 | ● | 1.8 | 4 | 50 | 90.3 | — | 95.7 | 43.2 | 143.0 | 142.7 | 0.3 | 3 |
| | DVAS0190X07S040 | ● | 1.9 | 4 | 7 | 13.7 | 15.6 | 21.9 | 39.5 | 59.0 | 58.6 | 0.4 | 2 |
| | DVAS0190X12S040 | ● | 1.9 | 4 | 12 | 23.2 | 25.1 | 31.4 | 40.0 | 69.0 | 68.6 | 0.4 | 2 |
| | DVAS0190X20S040 | ● | 1.9 | 4 | 20 | 38.4 | — | 44.1 | 36.0 | 84.0 | 83.6 | 0.4 | 3 |
| | DVAS0190X25S040 | ● | 1.9 | 4 | 25 | 47.9 | — | 53.6 | 36.5 | 94.0 | 93.6 | 0.4 | 3 |
| | DVAS0190X30S040 | ● | 1.9 | 4 | 30 | 57.4 | — | 63.1 | 37.0 | 104.0 | 103.6 | 0.4 | 3 |
| | DVAS0190X40S040 | ● | 1.9 | 4 | 40 | 76.4 | — | 82.1 | 37.0 | 123.0 | 122.6 | 0.4 | 3 |
| NEW | DVAS0190X50S040 | ● | 1.9 | 4 | 50 | 95.4 | — | 101.1 | 38.0 | 143.0 | 142.6 | 0.4 | 3 |
| | DVAS0200X07S040 | ● | 2.0 | 4 | 7 | 14.4 | 16.4 | 22.9 | 41.9 | 62.0 | 61.6 | 0.4 | 2 |
| | DVAS0200X12S040 | ● | 2.0 | 4 | 12 | 24.4 | 26.4 | 32.9 | 42.9 | 73.0 | 72.6 | 0.4 | 2 |
| | DVAS0200X20S040 | ● | 2.0 | 4 | 20 | 40.4 | — | 46.4 | 40.9 | 91.0 | 90.6 | 0.4 | 3 |
| | DVAS0200X25S040 | ● | 2.0 | 4 | 25 | 50.4 | — | 56.4 | 41.9 | 102.0 | 101.6 | 0.4 | 3 |
| | DVAS0200X30S040 | ● | 2.0 | 4 | 30 | 60.4 | — | 66.4 | 42.9 | 113.0 | 112.6 | 0.4 | 3 |
| | DVAS0200X40S040 | ● | 2.0 | 4 | 40 | 80.4 | — | 86.4 | 45.9 | 136.0 | 135.6 | 0.4 | 3 |
| | DVAS0200X50S040 | ● | 2.0 | 4 | 50 | 100.4 | — | 106.4 | 47.9 | 158.0 | 157.6 | 0.4 | 3 |

## MINI DVAS – SOLID CARBIDE TRISTAR DRILL

| | Order number | DP1120 | DC | DCONMS | L/D | LU | LUX | LCF | LS | OAL | LF | PL | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DVAS0210X07S040 | ● | 2.1 | 4 | 7 | 15.1 | 17.2 | 23.8 | 41.3 | 62.0 | 61.6 | 0.4 | 2 |
| | DVAS0210X12S040 | ● | 2.1 | 4 | 12 | 25.6 | 27.7 | 34.3 | 41.8 | 73.0 | 72.6 | 0.4 | 2 |
| | DVAS0210X20S040 | ● | 2.1 | 4 | 20 | 42.4 | — | 48.7 | 38.8 | 91.0 | 90.6 | 0.4 | 3 |
| | DVAS0210X25S040 | ● | 2.1 | 4 | 25 | 52.9 | — | 59.2 | 39.3 | 102.0 | 101.6 | 0.4 | 3 |
| | DVAS0210X30S040 | ● | 2.1 | 4 | 30 | 63.4 | — | 69.7 | 39.8 | 113.0 | 112.6 | 0.4 | 3 |
| | DVAS0210X40S040 | ● | 2.1 | 4 | 40 | 84.4 | — | 90.7 | 41.8 | 136.0 | 135.6 | 0.4 | 3 |
| NEW | DVAS0210X50S040 | ● | 2.1 | 4 | 50 | 105.4 | — | 111.7 | 42.8 | 158.0 | 157.6 | 0.4 | 3 |
| | DVAS0220X07S040 | ● | 2.2 | 4 | 7 | 15.8 | 18.1 | 24.7 | 40.6 | 62.0 | 61.6 | 0.4 | 2 |
| | DVAS0220X12S040 | ● | 2.2 | 4 | 12 | 26.8 | 29.1 | 35.7 | 40.6 | 73.0 | 72.6 | 0.4 | 2 |
| | DVAS0220X20S040 | ● | 2.2 | 4 | 20 | 44.4 | — | 51.0 | 36.6 | 91.0 | 90.6 | 0.4 | 3 |
| | DVAS0220X25S040 | ● | 2.2 | 4 | 25 | 55.4 | — | 62.0 | 36.6 | 102.0 | 101.6 | 0.4 | 3 |
| | DVAS0220X30S040 | ● | 2.2 | 4 | 30 | 66.4 | — | 73.0 | 36.6 | 113.0 | 112.6 | 0.4 | 3 |
| | DVAS0220X40S040 | ● | 2.2 | 4 | 40 | 88.4 | — | 95.0 | 37.6 | 136.0 | 135.6 | 0.4 | 3 |
| NEW | DVAS0220X50S040 | ● | 2.2 | 4 | 50 | 110.4 | — | 117.0 | 37.6 | 158.0 | 157.6 | 0.4 | 3 |
| | DVAS0230X07S040 | ● | 2.3 | 4 | 7 | 16.5 | 18.9 | 25.7 | 43.0 | 65.0 | 64.6 | 0.4 | 2 |
| | DVAS0230X12S040 | ● | 2.3 | 4 | 12 | 28.0 | 30.4 | 37.2 | 44.5 | 78.0 | 77.6 | 0.4 | 2 |
| | DVAS0230X20S040 | ● | 2.3 | 4 | 20 | 46.4 | — | 53.3 | 41.5 | 98.0 | 97.6 | 0.4 | 3 |
| | DVAS0230X25S040 | ● | 2.3 | 4 | 25 | 57.9 | — | 64.8 | 43.0 | 111.0 | 110.6 | 0.4 | 3 |
| | DVAS0230X30S040 | ● | 2.3 | 4 | 30 | 69.4 | — | 76.3 | 44.5 | 124.0 | 123.6 | 0.4 | 3 |
| | DVAS0230X40S040 | ● | 2.3 | 4 | 40 | 92.4 | — | 99.3 | 47.5 | 150.0 | 149.6 | 0.4 | 3 |
| NEW | DVAS0230X50S040 | ● | 2.3 | 4 | 50 | 115.4 | — | 122.3 | 50.5 | 176.0 | 175.6 | 0.4 | 3 |
| | DVAS0240X07S040 | ● | 2.4 | 4 | 7 | 17.2 | 19.7 | 26.6 | 42.4 | 65.0 | 64.6 | 0.4 | 2 |
| | DVAS0240X12S040 | ● | 2.4 | 4 | 12 | 29.2 | 31.7 | 38.6 | 43.4 | 78.0 | 77.6 | 0.4 | 2 |
| | DVAS0240X20S040 | ● | 2.4 | 4 | 20 | 48.4 | — | 55.6 | 39.4 | 98.0 | 97.6 | 0.4 | 3 |
| | DVAS0240X25S040 | ● | 2.4 | 4 | 25 | 60.4 | — | 67.6 | 40.4 | 111.0 | 110.6 | 0.4 | 3 |
| | DVAS0240X30S040 | ● | 2.4 | 4 | 30 | 72.4 | — | 79.6 | 41.4 | 124.0 | 123.6 | 0.4 | 3 |
| | DVAS0240X40S040 | ● | 2.4 | 4 | 40 | 96.4 | — | 103.6 | 43.4 | 150.0 | 149.6 | 0.4 | 3 |
| NEW | DVAS0240X50S040 | ● | 2.4 | 4 | 50 | 120.4 | — | 127.6 | 45.4 | 176.0 | 175.6 | 0.4 | 3 |
| | DVAS0250X07S040 | ● | 2.5 | 4 | 7 | 18.0 | 20.5 | 27.5 | 41.7 | 65.0 | 64.5 | 0.5 | 2 |
| | DVAS0250X12S040 | ● | 2.5 | 4 | 12 | 30.5 | 33.0 | 40.0 | 42.2 | 78.0 | 77.5 | 0.5 | 2 |
| | DVAS0250X20S040 | ● | 2.5 | 4 | 20 | 50.5 | — | 58.0 | 37.2 | 98.0 | 97.5 | 0.5 | 3 |
| | DVAS0250X25S040 | ● | 2.5 | 4 | 25 | 63.0 | — | 70.5 | 37.7 | 111.0 | 110.5 | 0.5 | 3 |
| | DVAS0250X30S040 | ● | 2.5 | 4 | 30 | 75.5 | — | 83.0 | 38.2 | 124.0 | 123.5 | 0.5 | 3 |
| | DVAS0250X40S040 | ● | 2.5 | 4 | 40 | 100.5 | — | 108.0 | 39.2 | 150.0 | 149.5 | 0.5 | 3 |
| | DVAS0250X50S040 | ● | 2.5 | 4 | 50 | 125.5 | — | 133.0 | 40.2 | 176.0 | 175.5 | 0.5 | 3 |
| | DVAS0260X07S040 | ● | 2.6 | 4 | 7 | 18.7 | 21.3 | 28.4 | 41.1 | 65.0 | 64.5 | 0.5 | 2 |
| | DVAS0260X12S040 | ● | 2.6 | 4 | 12 | 31.7 | 34.3 | 41.4 | 41.1 | 78.0 | 77.5 | 0.5 | 2 |
| | DVAS0260X20S040 | ● | 2.6 | 4 | 20 | 52.5 | — | 60.3 | 35.1 | 98.0 | 97.5 | 0.5 | 3 |
| | DVAS0260X25S040 | ● | 2.6 | 4 | 25 | 65.5 | — | 73.3 | 35.1 | 111.0 | 110.5 | 0.5 | 3 |
| | DVAS0260X30S040 | ● | 2.6 | 4 | 30 | 78.5 | — | 86.3 | 35.1 | 124.0 | 123.5 | 0.5 | 3 |
| | DVAS0260X40S040 | ● | 2.6 | 4 | 40 | 104.5 | — | 112.3 | 35.1 | 150.0 | 149.5 | 0.5 | 3 |
| NEW | DVAS0260X50S040 | ● | 2.6 | 4 | 50 | 130.5 | — | 138.3 | 35.1 | 176.0 | 175.5 | 0.5 | 3 |
| | DVAS0270X07S040 | ● | 2.7 | 4 | 7 | 19.4 | 22.2 | 29.4 | 43.5 | 68.0 | 67.5 | 0.5 | 2 |
| | DVAS0270X12S040 | ● | 2.7 | 4 | 12 | 32.9 | 35.7 | 42.9 | 45.0 | 83.0 | 82.5 | 0.5 | 2 |
| | DVAS0270X20S040 | ● | 2.7 | 4 | 20 | 54.5 | — | 62.6 | 42.0 | 107.0 | 106.5 | 0.5 | 3 |
| | DVAS0270X25S040 | ● | 2.7 | 4 | 25 | 68.0 | — | 76.1 | 43.5 | 122.0 | 121.5 | 0.5 | 3 |
| | DVAS0270X30S040 | ● | 2.7 | 4 | 30 | 81.5 | — | 89.6 | 45.0 | 137.0 | 136.5 | 0.5 | 3 |
| | DVAS0270X40S040 | ● | 2.7 | 4 | 40 | 108.5 | — | 116.6 | 48.0 | 167.0 | 166.5 | 0.5 | 3 |
| NEW | DVAS0270X50S040 | ● | 2.7 | 4 | 50 | 135.5 | — | 143.6 | 51.0 | 197.0 | 196.5 | 0.5 | 3 |

## MINI DVAS – SOLID CARBIDE TRISTAR DRILL

| | Order number | DP1120 | DC | DCONMS | L/D | LU | LUX | LCF | LS | OAL | LF | PL | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DVAS0280X07S040 | ● | 2.8 | 4 | 7 | 20.1 | 23.0 | 30.3 | 42.8 | 68.0 | 67.5 | 0.5 | 2 |
| | DVAS0280X12S040 | ● | 2.8 | 4 | 12 | 34.1 | 37.0 | 44.3 | 43.8 | 83.0 | 82.5 | 0.5 | 2 |
| | DVAS0280X20S040 | ● | 2.8 | 4 | 20 | 56.5 | — | 64.9 | 39.8 | 107.0 | 106.5 | 0.5 | 3 |
| | DVAS0280X25S040 | ● | 2.8 | 4 | 25 | 70.5 | — | 78.9 | 40.8 | 122.0 | 121.5 | 0.5 | 3 |
| | DVAS0280X30S040 | ● | 2.8 | 4 | 30 | 84.5 | — | 92.9 | 41.8 | 137.0 | 136.5 | 0.5 | 3 |
| | DVAS0280X40S040 | ● | 2.8 | 4 | 40 | 112.5 | — | 120.9 | 43.8 | 167.0 | 166.5 | 0.5 | 3 |
| NEW | DVAS0280X50S040 | ● | 2.8 | 4 | 50 | 140.5 | — | 148.9 | 45.8 | 197.0 | 196.5 | 0.5 | 3 |
| | DVAS0290X07S040 | ● | 2.9 | 4 | 7 | 20.8 | 23.8 | 31.2 | 42.2 | 68.0 | 67.5 | 0.5 | 2 |
| | DVAS0290X12S040 | ● | 2.9 | 4 | 12 | 35.3 | 38.3 | 45.7 | 42.7 | 83.0 | 82.5 | 0.5 | 2 |
| | DVAS0290X20S040 | ● | 2.9 | 4 | 20 | 58.5 | — | 67.2 | 37.7 | 107.0 | 106.5 | 0.5 | 3 |
| | DVAS0290X25S040 | ● | 2.9 | 4 | 25 | 73.0 | — | 81.7 | 38.2 | 122.0 | 121.5 | 0.5 | 3 |
| | DVAS0290X30S040 | ● | 2.9 | 4 | 30 | 87.5 | — | 96.2 | 38.7 | 137.0 | 136.5 | 0.5 | 3 |
| | DVAS0290X40S040 | ● | 2.9 | 4 | 40 | 116.5 | — | 125.2 | 39.7 | 167.0 | 166.5 | 0.5 | 3 |
| NEW | DVAS0290X50S040 | ● | 2.9 | 4 | 50 | 145.5 | — | 154.2 | 40.7 | 197.0 | 196.5 | 0.5 | 3 |
| | | | | | | | | | | | | | 4/4 |

329 Vc



● : Inventory maintained. ★ : Inventory maintained in Japan.

# MINI DVAS

## RECOMMENDED CUTTING CONDITIONS

| | Material | DC | L/D | Vc | n | fr |
|---|---|---|---|---|---|---|
| P | Mild steel<br>Carbon steel,<br>Alloy steel | 1.0 | 2 – 30 | 65 (30 – 100) | 20700 | 0.035 (0.020 – 0.050) |
| | | 1.0 | 40, 50 | 65 (30 – 100) | 20700 | 0.030 (0.020 – 0.040) |
| | | 1.5 | 2 – 30 | 65 (30 – 100) | 13800 | 0.053 (0.030 – 0.075) |
| | | 1.5 | 40, 50 | 65 (30 – 100) | 13800 | 0.045 (0.030 – 0.060) |
| | | 2.0 | 2 – 30 | 70 (40 – 100) | 11100 | 0.070 (0.040 – 0.100) |
| | | 2.0 | 40, 50 | 70 (40 – 100) | 11100 | 0.060 (0.040 – 0.080) |
| | | 2.5 | 2 – 30 | 70 (40 – 100) | 8900 | 0.088 (0.050 – 0.125) |
| | | 2.5 | 40, 50 | 70 (40 – 100) | 8900 | 0.075 (0.050 – 0.100) |
| | | 2.9 | 2 – 30 | 70 (40 – 100) | 7700 | 0.102 (0.058 – 0.145) |
| | | 2.9 | 40, 50 | 70 (40 – 100) | 7700 | 0.087 (0.058 – 0.116) |
| M | Austenitic stainless steel,<br>Ferritic stainless steel<br>Ferritic and martensitic stainless steel<br>Precipitation hardening stainless steel | 1.0 | 2 – 30 | 60 (20 – 100) | 19100 | 0.025 (0.010 – 0.040) |
| | | 1.0 | 40, 50 | 60 (20 – 100) | 19100 | 0.020 (0.010 – 0.030) |
| | | 1.5 | 2 – 30 | 60 (20 – 100) | 12700 | 0.038 (0.015 – 0.060) |
| | | 1.5 | 40, 50 | 60 (20 – 100) | 12700 | 0.030 (0.015 – 0.045) |
| | | 2.0 | 2 – 30 | 60 (20 – 100) | 9500 | 0.050 (0.020 – 0.080) |
| | | 2.0 | 40, 50 | 60 (20 – 100) | 9500 | 0.040 (0.020 – 0.060) |
| | | 2.5 | 2 – 30 | 60 (20 – 100) | 7600 | 0.063 (0.025 – 0.100) |
| | | 2.5 | 40, 50 | 60 (20 – 100) | 7600 | 0.050 (0.025 – 0.075) |
| | | 2.9 | 2 – 30 | 60 (20 – 100) | 6600 | 0.073 (0.029 – 0.116) |
| | | 2.9 | 40, 50 | 60 (20 – 100) | 6600 | 0.058 (0.029 – 0.087) |
| K | Cast iron<br>Ductile cast iron | 1.0 | 2 – 30 | 70 (40 – 100) | 22300 | 0.035 (0.020 – 0.050) |
| | | 1.0 | 40, 50 | 70 (40 – 100) | 22300 | 0.030 (0.020 – 0.040) |
| | | 1.5 | 2 – 30 | 70 (40 – 100) | 14900 | 0.053 (0.030 – 0.075) |
| | | 1.5 | 40, 50 | 70 (40 – 100) | 14900 | 0.045 (0.030 – 0.060) |
| | | 2.0 | 2 – 30 | 70 (40 – 100) | 11100 | 0.070 (0.040 – 0.100) |
| | | 2.0 | 40, 50 | 70 (40 – 100) | 11100 | 0.060 (0.040 – 0.080) |
| | | 2.5 | 2 – 30 | 70 (40 – 100) | 8900 | 0.088 (0.050 – 0.125) |
| | | 2.5 | 40, 50 | 70 (40 – 100) | 8900 | 0.075 (0.050 – 0.100) |
| | | 2.9 | 2 – 30 | 70 (40 – 100) | 7700 | 0.102 (0.058 – 0.145) |
| | | 2.9 | 40, 50 | 70 (40 – 100) | 7700 | 0.087 (0.058 – 0.116) |
| N | Aluminium alloy | 1.0 | 2 – 30 | 140 (100 – 180) | 31800 | 0.040 (0.020 – 0.060) |
| | | 1.0 | 40, 50 | 140 (100 – 180) | 31800 | 0.035 (0.020 – 0.050) |
| | | 1.5 | 2 – 30 | 140 (100 – 180) | 21200 | 0.060 (0.030 – 0.090) |
| | | 1.5 | 40, 50 | 140 (100 – 180) | 21200 | 0.053 (0.030 – 0.075) |
| | | 2.0 | 2 – 30 | 140 (100 – 180) | 15900 | 0.080 (0.040 – 0.120) |
| | | 2.0 | 40, 50 | 140 (100 – 180) | 15900 | 0.070 (0.040 – 0.100) |
| | | 2.5 | 2 – 30 | 140 (100 – 180) | 12700 | 0.100 (0.050 – 0.150) |
| | | 2.5 | 40, 50 | 140 (100 – 180) | 12700 | 0.088 (0.050 – 0.125) |
| | | 2.9 | 2 – 30 | 140 (100 – 180) | 11000 | 0.116 (0.058 – 0.174) |
| | | 2.9 | 40, 50 | 140 (100 – 180) | 11000 | 0.102 (0.058 – 0.145) |

1/2

1. This recommended condition is only when using internal coolant.
2. Check the condition of chips and perform step machining if necessary.
   Reference of step length: 0.2 to 1.0 DC
3. Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
4. Machining depths exceeding flute length (LU) are not recommend.
5. Clamp the drill so that the drill runout is within 0.003 mm.
6. Do not clamp the flute part of the drill.

## MINI DVAS

| | Material | DC | L/D | Vc | n | fr |
|---|---|---|---|---|---|---|
| S | Heat resistant alloy | 1.0 | 2 – 30 | 30 (10 – 50) | 9500 | 0.015 (0.010 – 0.020) |
| | | 1.0 | 40, 50 | 30 (10 – 50) | 9500 | 0.015 (0.010 – 0.020) |
| | | 1.5 | 2 – 30 | 30 (10 – 50) | 6400 | 0.023 (0.015 – 0.030) |
| | | 1.5 | 40, 50 | 30 (10 – 50) | 6400 | 0.023 (0.015 – 0.030) |
| | | 2.0 | 2 – 30 | 30 (10 – 50) | 4800 | 0.030 (0.020 – 0.040) |
| | | 2.0 | 40, 50 | 30 (10 – 50) | 4800 | 0.030 (0.020 – 0.040) |
| | | 2.5 | 2 – 30 | 30 (10 – 50) | 3800 | 0.038 (0.025 – 0.050) |
| | | 2.5 | 40, 50 | 30 (10 – 50) | 3800 | 0.038 (0.025 – 0.050) |
| | | 2.9 | 2 – 30 | 30 (10 – 50) | 3300 | 0.044 (0.029 – 0.058) |
| | | 2.9 | 40, 50 | 30 (10 – 50) | 3300 | 0.044 (0.029 – 0.058) |
| | Titanium alloy | 1.0 | 2 – 30 | 30 (20 – 40) | 9500 | 0.020 (0.010 – 0.030) |
| | | 1.0 | 40, 50 | 30 (20 – 40) | 9500 | 0.020 (0.010 – 0.030) |
| | | 1.5 | 2 – 30 | 30 (20 – 40) | 6400 | 0.030 (0.015 – 0.045) |
| | | 1.5 | 40, 50 | 30 (20 – 40) | 6400 | 0.030 (0.015 – 0.045) |
| | | 2.0 | 2 – 30 | 30 (20 – 40) | 4800 | 0.040 (0.020 – 0.060) |
| | | 2.0 | 40, 50 | 30 (20 – 40) | 4800 | 0.040 (0.020 – 0.060) |
| | | 2.5 | 2 – 30 | 30 (20 – 40) | 3800 | 0.050 (0.025 – 0.075) |
| | | 2.5 | 40, 50 | 30 (20 – 40) | 3800 | 0.050 (0.025 – 0.075) |
| | | 2.9 | 2 – 30 | 30 (20 – 40) | 3300 | 0.058 (0.029 – 0.087) |
| | | 2.9 | 40, 50 | 30 (20 – 40) | 3300 | 0.058 (0.029 – 0.087) |
| | Cobalt chrome alloy | 1.0 | 2 – 30 | 60 (30 – 90) | 19100 | 0.020 (0.010 – 0.030) |
| | | 1.0 | 40, 50 | 60 (30 – 90) | 19100 | 0.020 (0.010 – 0.030) |
| | | 1.5 | 2 – 30 | 60 (30 – 90) | 12700 | 0.030 (0.015 – 0.045) |
| | | 1.5 | 40, 50 | 60 (30 – 90) | 12700 | 0.030 (0.015 – 0.045) |
| | | 2.0 | 2 – 30 | 60 (30 – 90) | 9500 | 0.040 (0.020 – 0.060) |
| | | 2.0 | 40, 50 | 60 (30 – 90) | 9500 | 0.040 (0.020 – 0.060) |
| | | 2.5 | 2 – 30 | 60 (30 – 90) | 7600 | 0.050 (0.025 – 0.075) |
| | | 2.5 | 40, 50 | 60 (30 – 90) | 7600 | 0.050 (0.025 – 0.075) |
| | | 2.9 | 2 – 30 | 60 (30 – 90) | 6600 | 0.058 (0.029 – 0.087) |
| | | 2.9 | 40, 50 | 60 (30 – 90) | 6600 | 0.058 (0.029 – 0.087) |

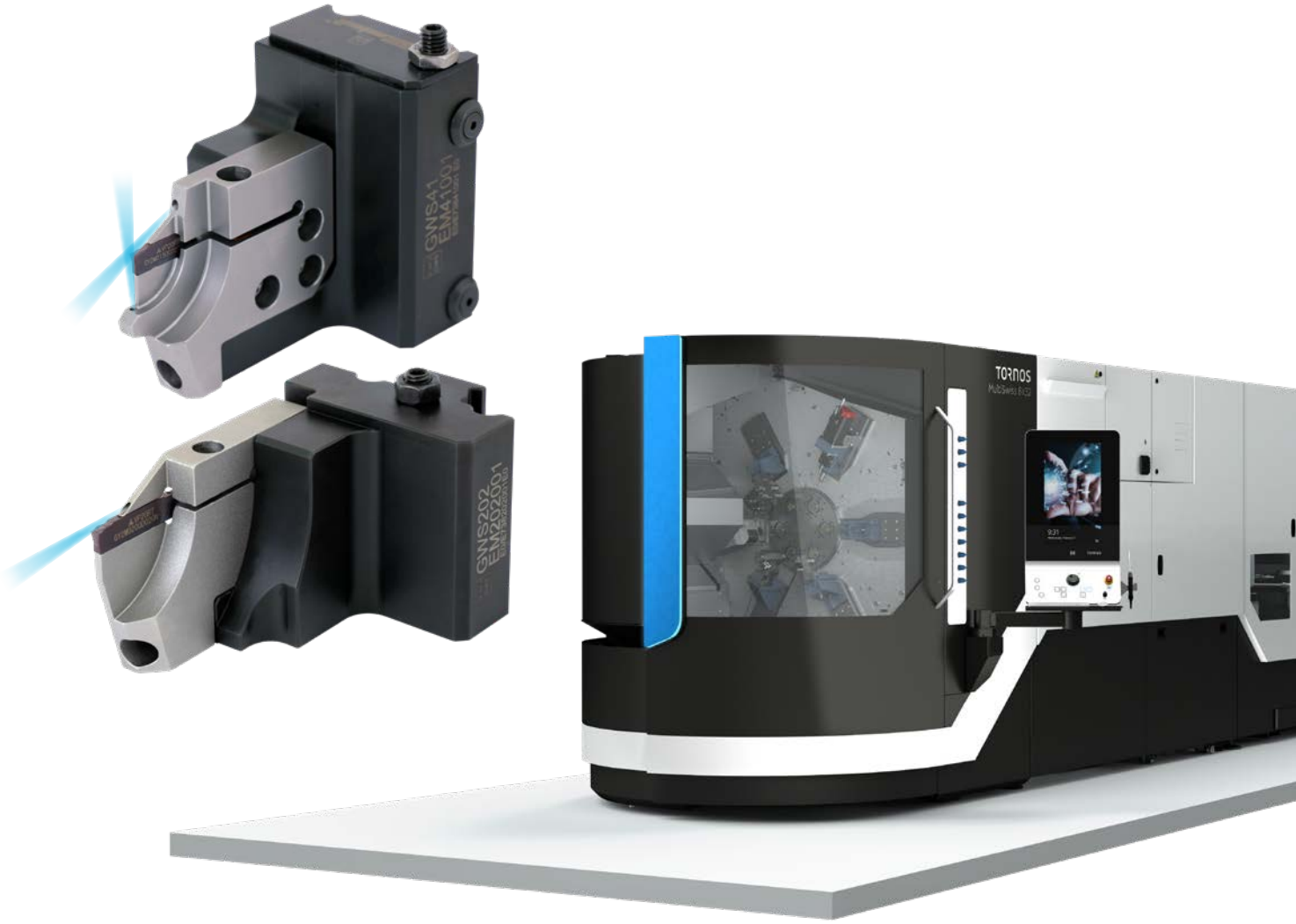


1. This recommended condition is only when using internal coolant.
2. Check the condition of chips and perform step machining if necessary.
   Reference of step length: 0.2 to 1.0 DC
3. Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
4. Machining depths exceeding flute length (LU) are not recommend.
5. Clamp the drill so that the drill runout is within 0.003 mm.
6. Do not clamp the flute part of the drill.

NEW

# G80A (MPLUS)

## PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

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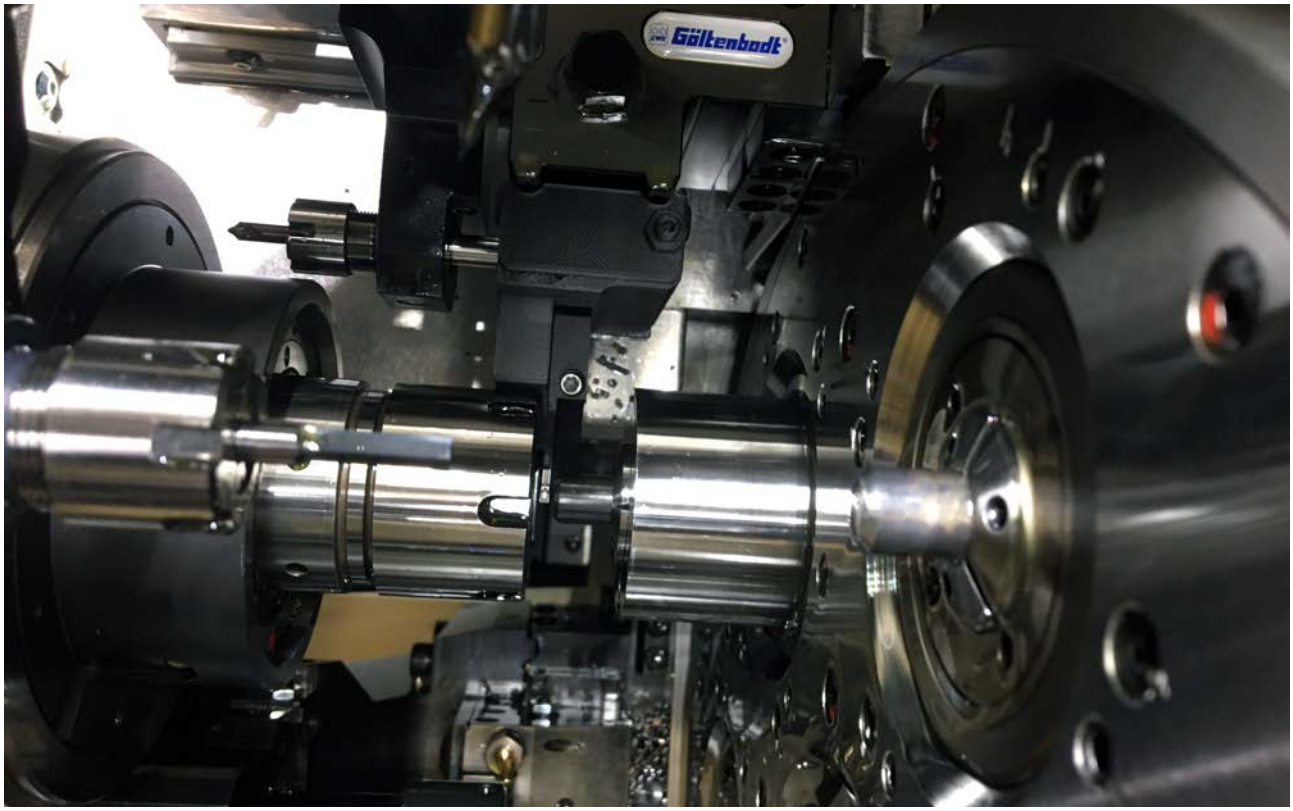
# PARTING OFF IN SERIES

## MODULAR – PERFORMANCE – UNCOMPROMISING

Regardless of the industry, it is the deep knowledge of the details that ultimately makes the difference and distinguishes the best from the rest. Whether it is in the medical or automotive industries, general mechanical engineering or the consumer goods industry, the components should be designed using the least space, weight or resources for the same function.

This means, small parts have to be produced in an efficient and precise way, as it has been done for many years on multi-spindle machines. Completely independent of any component details, one of the key elements in the whole machining process is reliable parting off.




The new G80A parting-off system, also includes the details that offer added performance, reliability and efficiency. The targeted internal coolant supply makes the process even more reliable and enables longer tool life.

Easy handling both when changing inserts and when setting the centre height are added features. The grooving modules are specially designed for the conditions on the machine, which significantly increases stability.

# PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

## FOR THE LIMITED SPACE IN MULTI-SPINDLE MACHINES

Reliable parting off with modular tools specially designed for Swiss multi-spindle machines in cooperation with Göltenbodt. Efficientand reliable processing is realised due to the optimized internal through coolant supply for parting off widths from 1.5 mm.

Product range

- Quick change adapter system GWS41
- Quick change adapter system GWS202
- Modules for GY indexable inserts
- GY indexable inserts

Characteristics

- Designed for the limited space between the main and counter spindle
- Secure and accurate clamping of the indexable insert
- Optimised through coolant supply

## SPECIALLY DESIGNED FEATURES FOR EFFICIENCY AND EASE OF USE

**BENEFITS**

- High process reliability
- Internal coolant supply optimised for long tool life
- Small grooving width for maximum material utilisation

# G80A

## PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

Internal coolant supply up to 8 Mpa
for optimal coolant on the cutting edge.

Stability based on the proven
Göltenbodt GWS column guide system.
Quick change, easy centre height
setting and precision in one system.

Accessible and strong clamping
of the indexable insert.

Optimal stability and function by
individual alignment of the components
and with regards to the limited space in
these type of machines.

# G80A

## PARTING OFF SYSTEM FOR TORNOS MULTI-SPINDLE MACHINES

Designed respectively for the current Tornos Multi-Swiss machines the following combinations are available.

Multi-Swiss 6 x 16 | Multi-Swiss 8 x 26 | Multi-Swiss 6 x 32

6 x 16

8 x 26
6 x 32

Göltenbodt Innovation and Precision.

Göltenbodt system GWS41 (page 336+337)

Modul G80A w = 1.5 – w = 2.0

Mplus...

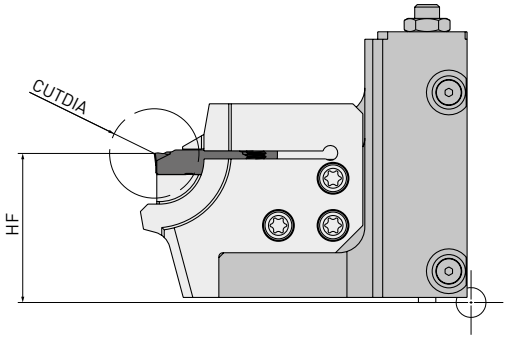
Göltenbodt system GWS202 (page 338+339)

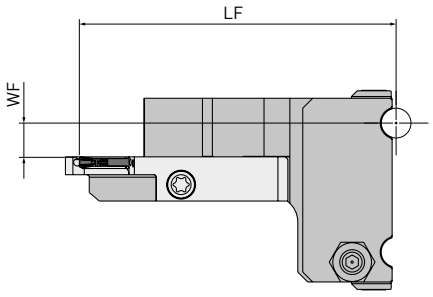
Modul G80A w = 2.0

Wide variety of GY-grooving inserts for applications in different materials

# G80A

## QUICK CHANGE TYPE ADAPTERS GWS41




| Order number | Stock | Hand | GWS system | Suitable for machine | CUTDIA | LF X-Axis | HF Y-Axis | WF Z-Axis |
|---|---|---|---|---|---|---|---|---|
| EM41001 | ● | R | 41 | MS 6 x 16 | 16 | 63.8* | 30 | 7.15 (cw = 1.5) / 6.9 (cw = 2.0) |

1/1

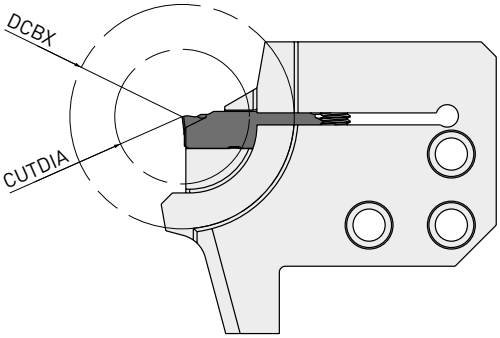
1. Module shown only for dimensional visualisation.
* Spindle nut diameter max. 30 mm.

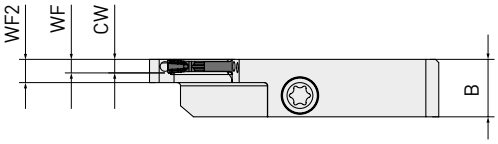


● : Inventory maintained.

# G80A

## MODULE FOR QUICK CHANGE ADAPTER GWS41




| Order number | Stock | Hand | GWS system | Suitable for machine | CUTDIA | DCBX | Seat size | CW | WF | WF2 | B | IK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G80A-EM410RL16GYC2-E | ● | R | 41 | MS 6x16 | 16 | 30 | C | 1.5 | 1.85 | 3.6 | 8.9 | FF1 / SF2 |
| G80A-EM410RL16GYD2-E | ● | R | 41 | MS 6x16 | 16 | 30 | D | 2.0 | 2.1 | 3.6 | 8.9 | FF1 / SF2 |

1/1

1. For modules with flank cooling (FF), tool presetting must be carried out using the incident light method.
2. Rake face coolant requires no specific presetting method.

## SPARE PARTS

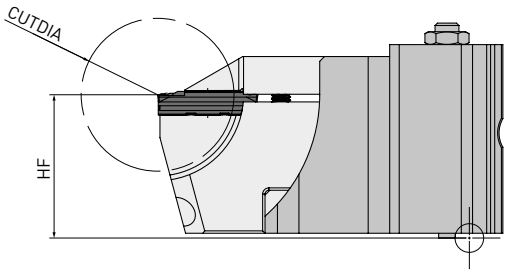
| Tool holder | Screw | Wrench |
|---|---|---|
| EM41001 | TS43 (3.5 Nm)* | TKY15W-E |
| G80A-EM410RL16GYC2-E | TS406 (3.5 Nm)* | |
| G80A-EM410RL16GYD2-E | | |

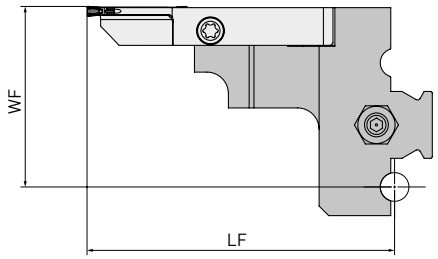
* Recommended to use a torque screwdriver with a Torx 15 bit.

● : Inventory maintained.

# G80A

## QUICK CHANGE ADAPTERS GWS202




| Order number | Stock | Hand | GWS system | Suitable for machine | CUTDIA | LF X-Axis | HF Y-Axis | WF Z-Axis |
|---|---|---|---|---|---|---|---|---|
| EM202001 | ● | L | 202 | MS 8x26 / MS 6x32 | 32* | 64.4 | 30 | 37.8 (cw = 2.0) |

1/1

1. Module shown only for dimensional visuilasation.
* Spindle nut diameter max. 66 mm.

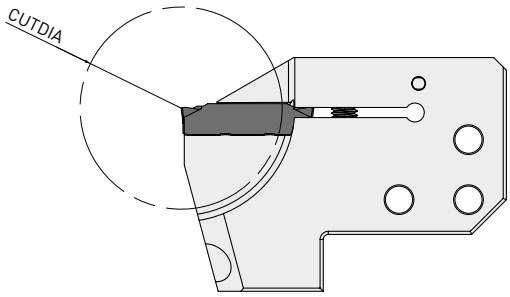
Gültenbodt Innovation and Precision.

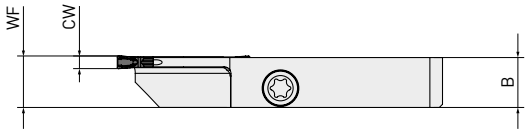


● : Inventory maintained.

# G80A

## MODULE FOR QUICK CHANGE ADAPTER GWS202




| Order number | Stock | Hand | GWS system | Suitable for machine | CUTDIA | Seat size | CW | WF | B | IK |
|---|---|---|---|---|---|---|---|---|---|---|
| G80A-EM202LL32GYD1-E | ● | L | 41 | MS 8x26 / MS 6x32 | 32 | D | 2.0 | 8.15 | 7.9 | SF1 |

1/1

1. Rake face coolant requires no specific presetting method.

## SPARE PARTS

| Tool holder | Screw | Wrench |
|---|---|---|
| EM202001 | TS43 (3.5 Nm)* | TKY15W-E |
| G80A-EM202LL32GYD1-E | TS406 (3.5 Nm)* | |

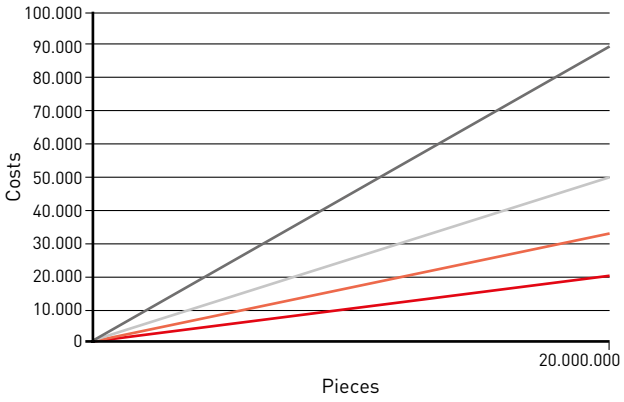
* Recommended to use a torque screwdriver with a Torx 15 bit.

● : Inventory maintained.

# G80A

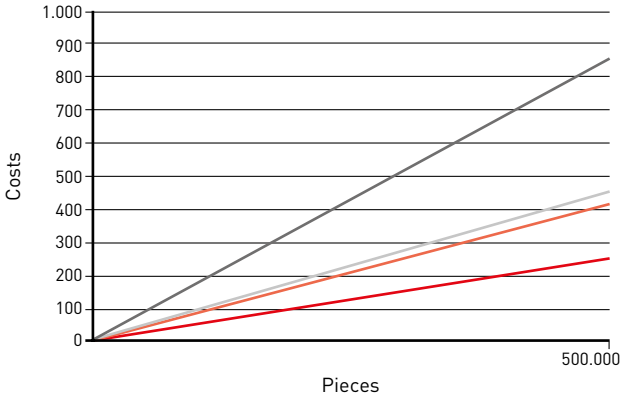
## PERFORMANCE COMPARISON 1

| | |
|---|---|
| Material | NiCr23Fe |
| Tool | GWS41 – G80A |
| Vc (m/min) | 47 |
| f (mm/rev) | 0.02 |
| Lot size | 20.000.000 |
| Efficiency increase | Approx. 55.000 €/batch tooling cost reduction |
| Results | 10.000 m less material consumption due to smaller grooving width. |




## PERFORMANCE COMPARISON 2

| | |
|---|---|
| Material | 100Cr6 |
| Tool | GWS41 – G80A |
| Vc (m/min) | 117 |
| f (mm/rev) | 0.03 |
| Lot size | 50.000 |
| Efficiency increase | Approx. 430 €/Lot |
| Results | Positive environmental influence enabled by producing less scrap material. |



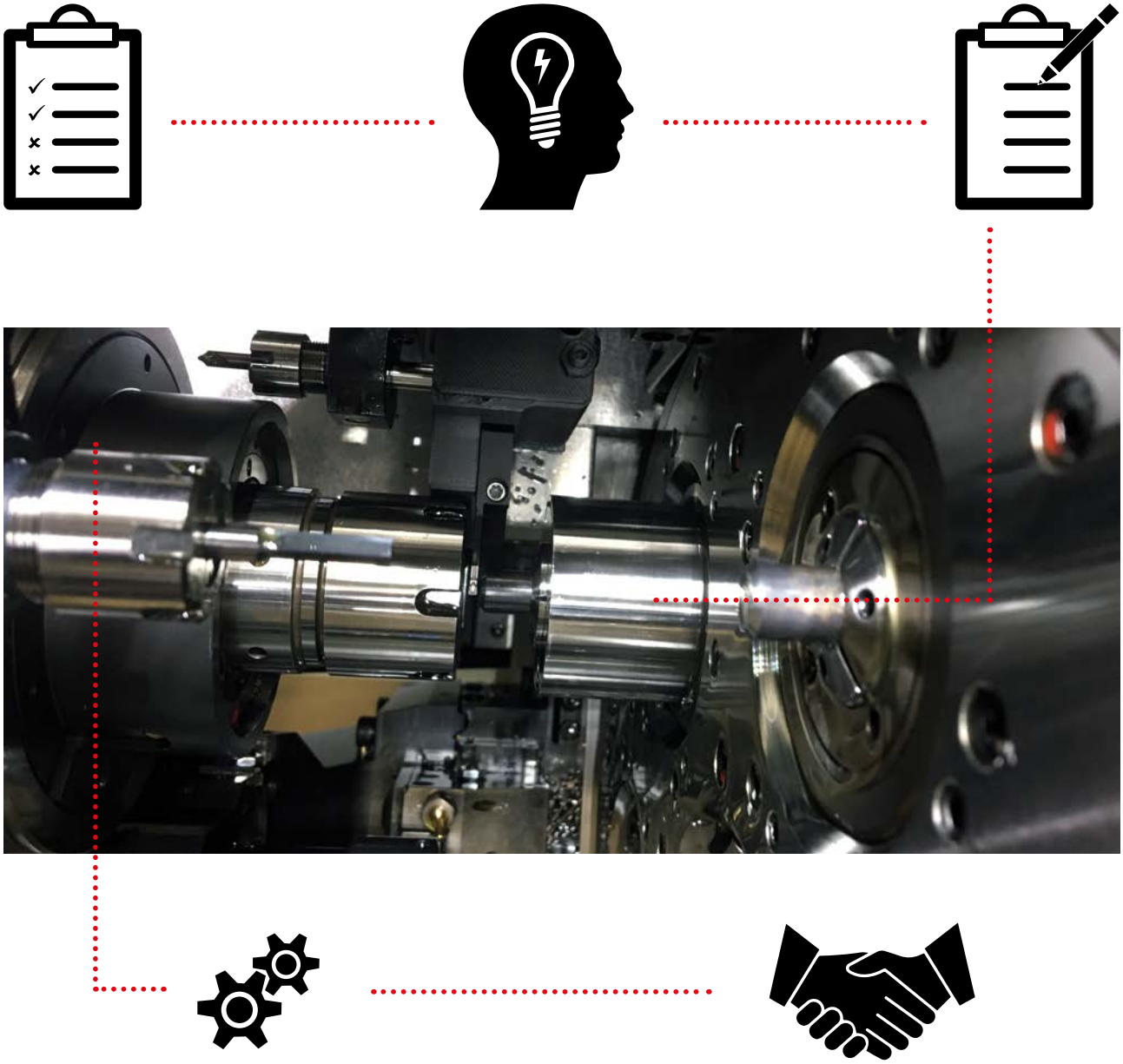



: Mplus tool
: Conventional tool
: Mplus tool including tool change
: Conventional tool including tool change

# G80A

## SPECIAL SOLUTIONS

Not all types of machines are mentioned in the overview on page 335. Technical support regarding fitment of the G80A type tool or a custom solution can be offered for other types of machines.



Please contact the local Mitsubishi Materials supplier for special analysis of the situation. If a tailored solution is required, collision tests are carried out both using CAD and on site using an additively manufactured tool model before the final tool is produced. After successful testing, a final solution will be offered.

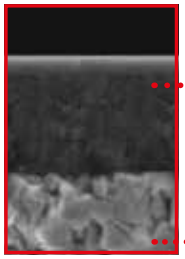
# G80A

## GY-GROOVING INSERTS

### INSERT GRADES

| P | M | K | S | N |
|---|---|---|---|---|
| NX2525 ● | | | | |
| MY5015 ◕ | | MY5015 ◕ | MP9015 ◕ | |
| VP10RT ◕ | VP10RT ◕ | VP10RT ◕ | MP9025 ◕ | RT9020 ● |
| VP20RT ✤ | VP20RT ✤ | VP20RT ✤ | MP9025 ✤ | RT9020 ◕ |

## MP9000 SERIES



The high Al-rich (Al, Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

High Al-rich (Al, Ti)N Single Layer Coating

Special Cemented Carbide Substrate

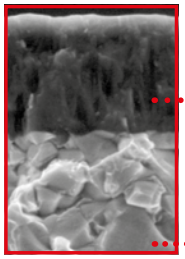
## VP20RT (1st Recommendation)

PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

MIRACLE coating

Carbide substrate (HRA90.5)

## VP10RT (2nd Recommendation)



PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult-to-cut materials and for extending tool life.

MIRACLE coating

Carbide substrate (HRA92.0)

## MY5015

CVD coated grade with excellent wear resistance even at high temperatures. Providing longer tool life when machining cast and ductile cast irons.
Also suitable for high speed continuous cutting of steels.

CVD coating

Carbide substrate

## RT9010

First recommended grade for titanium alloys.

## NX2525

NX2525, a cermet grade for finish machining of steels and for good surface finishes at lower cutting speeds.

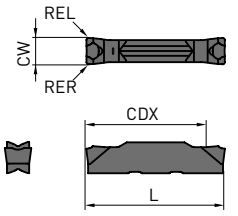
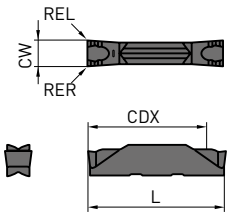
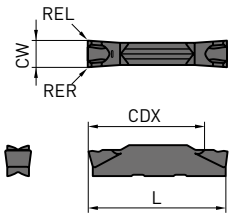
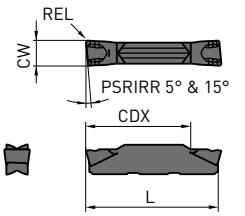
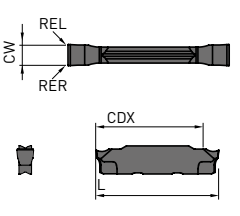


Cutting conditions: ●: Stable cutting ◕: General cutting ✤: Unstable cutting

# G80A

## A WIDE SELECTION OF INSERTS

### PARTING OFF

| GU Chipbreaker (For mild steel) | GS Chipbreaker (Low feeds) | GM Chipbreaker (Medium feeds) | R/L05-/R15-GS-GM Breaker (Medium feeds) | GL Breaker (For aluminium alloys) |
|---|---|---|---|---|
| | | | | |
|  |  |  |  |  |



*Right hand tool holder shown.*

### GROOVING / CUTTING OFF

| Order number | RT9010 | VP10RT | VP20RT | MY5015 | NX2525 | MP9015 | MP9025 | Seat size | CW | Tolerance | RE R/L | CDX | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GY2M0200D020N-GU | | ● | ● | | ● | | | D | 2.00 | ±0.03 | 0.2 | 19.7 | 20.70 |
| GY2M0150C010N-GS | | ● | ● | | | | | C | 1.50 | ±0.03 | 0.1 | 13.4 | 14.70 |
| GY2G0150C003R15-GS | | ● | ● | | | | | C | 1.50 | ±0.02 | 0.03 | 13.17 | 15.20 |
| GY2G0150C010R08-GS | | ● | ● | | | | | C | 1.50 | ±0.02 | 0.1 | 13.17 | 15.20 |
| GY2G0150C010R15-GS | | ● | ● | | | | | C | 1.50 | ±0.02 | 0.1 | 13.17 | 15.20 |
| GY2M0200D020N-GS | | ● | ● | | ● | | | D | 2.00 | ±0.03 | 0.2 | 18.7 | 20.70 |
| GY2G0200D003R15-GS | | ● | ● | | | | | D | 2.00 | ±0.03 | 0.03 | 18.85 | 21.30 |
| GY2G0200D010R15-GS | | ● | ● | | | | | D | 2.00 | ±0.03 | 0.1 | 18.85 | 21.30 |
| GY2G0200D020R08-GS | | ● | ● | | | | | D | 2.00 | ±0.03 | 0.2 | 18.85 | 21.30 |
| GY2M0150C020N-GM | | ● | ● | | ● | ● | ● | C | 1.50 | ±0.03 | 0.2 | 13.9 | 14.70 |
| GY2M0200D020N-GM | | ● | ● | ● | ● | ● | ● | D | 2.00 | ±0.03 | 0.2 | 19.4 | 20.70 |
| GY2M0200D020R05-GM | | ● | ● | | | | | D | 2.00 | ±0.03 | 0.2 | 19.5 | 20.80 |
| GY2M0200D020L05-GM | | ● | ● | | | | | D | 2.00 | ±0.03 | 0.2 | 19.5 | 20.80 |
| GY1M0200D020L05-GM | | ★ | ● | | | | | D | 2.00 | ±0.03 | 0.2 | — | 20.80 |
| GY1M0200D020N-GM | | ● | ● | ● | | ● | ● | D | 2.00 | ±0.03 | 0.2 | — | 20.70 |
| GY1M0200D020R05-GM | | ● | ● | | | | | D | 2.00 | ±0.03 | 0.2 | — | 20.80 |
| GY2G0200D005N-GL | ● | | | | | | | D | 2.00 | ±0.02 | 0.05 | 19.5 | 21.05 |

1/1

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● : Inventory maintained.

# G80A

## RECOMMENDED CUTTING CONDITIONS

| | Material | Hardness | Grade | Vc |
|---|---|---|---|---|
| P | Mild steel | <160HB | VP20RT | 160 (100 – 220) |
| | | | VP10RT | 170 (110 – 230) |
| | | | MY5015 | 220 (140 – 300) |
| | | | NX2525 | 150 ( 90 – 210) |
| | Carbon steel<br>Alloy steel | 160 – 280HB | VP20RT | 130 ( 80 – 180) |
| | | | VP10RT | 140 ( 90 – 190) |
| | | | MY5015 | 180 (110 – 250) |
| | | | NX2525 | 120 ( 70 – 170) |
| | | ≥280HB | VP20RT | 100 ( 60 – 140) |
| | | | VP10RT | 110 ( 70 – 150) |
| | | | MY5015 | 150 ( 90 – 210) |
| | | | NX2525 | 95 ( 55 – 135) |
| M | Stainless steel | ≤270HB | VP20RT | 100 ( 60 – 140) |
| | | | VP10RT | 110 ( 70 – 150) |
| K | Gray cast iron | Tensile strength ≤300MPa | VP20RT | 130 ( 80 – 180) |
| | | | VP10RT | 140 ( 90 – 190) |
| | | | MY5015 | 220 (140 – 300) |
| | Ductile cast iron | Tensile strength ≤800MPa | VP20RT | 100 ( 60 – 140) |
| | | | VP10RT | 110 ( 70 – 150) |
| | | | MY5015 | 150 ( 90 – 210) |
| S | Heat resistant alloy<br>Titanium alloy | — | MP9015 | 70 ( 40 – 100) |
| | | | MP9025 | 60 ( 30 – 90) |
| | | | VP20RT | 45 ( 30 – 60) |
| | | | VP10RT | 55 ( 40 – 70) |

1/1

1. **VP20RT** is the first recommended grade for materials other than hardened steel.
2. For VP10RT, VP20RT, MP9015, MP9025 and MY5015, wet cutting is recommended.

### RECOMMENDED FEED RATE (MM/REV)

| CW | Breaker | | | |
|---|---|---|---|---|
| | GU | GS | GM | GL |
| 1.5 | — | 0.025 – 0.130 | 0.05 – 0.15 | — |
| 2.0 | 0.03 – 0.08 | 0.025 – 0.130 | 0.05 – 0.15 | 0.02 – 0.08 |

# 415SD (MPLUS)

## FIRST CHOICE FOR HIGH-FEED MACHINING OF TITANIUM ALLOYS

Interested in more...

**MP111**

www.mhg-mediastore.net

# 415SD

## FOR HIGH-FEED EFFICIENT MACHINING

### HIGH-FEED MILLING CUTTER CONCEPT FOR STABILITY AND HIGH PERFORMANCE

- Unevenly spaced cutting edges reduce vibrations, especially in long overhang applications.
- Fine and extra fine pitch types enable a highly efficient cutting performance.
- Carefully selected steel for the tool body is capable of safely absorbing machining forces. In addition, the nickel coating increases wear and corrosion protection.
- The insert location in the holder combined with the ideal geometry and a precisely positioned coolant outlet achieves maximum stability and machining performance.

### CUTTING PERFORMANCE

The approach angle of 15° achieves an APMX of 2 mm, which enables a high removal rate but with low radial forces.

### TARGETED APPLICATIONS

The use of different diameters and the precise positioning of the coolant nozzles enables perfect chip removal as well as reducing and dissipating the high temperatures that occur at the cutting edge.

### SAFE, PRECISE AND RELIABLE

Exact positioning, secure insert clamping with large contact surfaces offers the possibility of high-performance and efficient high-feed machining of stainless steels and heat resistant materials.

# 415SD

## INSERTS FOR HIGH-FEED EFFICIENT MACHINING

**THE PVD-COATED, HIGH-PERFORMANCE GRADE MP9130 FOCUSES ON TITANIUM MACHINING**

- High-feed face milling including radial, plunge and ramping operations.
- Ideal for machining components that require a long overhang.
- Highly suitable for low power machines and low rigidity component clamping.

### L-BREAKER

Ideal for applications that require low cutting resistance.

### M-BREAKER

First recommendation - ideal combination of cutting edge stability and low cutting resistance.

### R-BREAKER

High cutting edge stability, for heavy interrupted machining or difficult cutting conditions.

Highest productivity even when applications require low cutting resistance.

- Low power consumption.
- Designed to achieve low radial cutting forces.
- Process reliability and long tool life, especially when machining difficult-to-cut materials.
- Stable and robust 4-edge insert for efficient, high-feed milling.

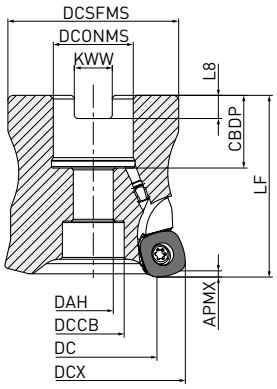
# 415SD

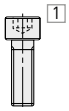
## HIGH-FEED CUTTER

P K S

**415SD**
GAMP: 9°
GAMF: 5° – 6°

1




| DCX | Set bolt | | Geometry |
|---|---|---|---|
| Ø 50, Ø 52 | HSC10035 | 1 |  |
| Ø 63, Ø 66 | HSC12035 | | |

*Right hand tool holder only.*

### ARBOR TYPE

| Order number | Stock | APMX | DC | DCONMS | DCX | LF | RMPX | WT | ZEFP | | Type | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 415SD-050A04AR-E | ● | 2 | 33.4 | 22 | 50 | 50 | 3° | 0.4 | 4 | ● | 1 | SDMT12 |
| 415SD-050A05AR-E | ● | 2 | 33.4 | 22 | 50 | 50 | 3° | 0.4 | 5 | ● | 1 | |
| 415SD-052A04AR-E | ● | 2 | 35.4 | 22 | 52 | 50 | 3° | 0.4 | 4 | ● | 1 | |
| 415SD-052A06AR-E | ● | 2 | 35.4 | 22 | 52 | 50 | 3° | 0.4 | 6 | ● | 1 | |
| 415SD-063X05AR-E | ● | 2 | 46.5 | 27 | 63 | 50 | 2° | 0.7 | 5 | ● | 1 | |
| 415SD-063X07AR-E | ● | 2 | 46.5 | 27 | 63 | 50 | 2° | 0.7 | 7 | ● | 1 | |
| 415SD-066X05AR-E | ● | 2 | 49.4 | 27 | 66 | 50 | 1.9° | 0.7 | 5 | ● | 1 | |
| 415SD-066X07AR-E | ● | 2 | 49.4 | 27 | 66 | 50 | 1.9° | 0.7 | 7 | ● | 1 | |

1/1

1. Please refer to page 351, for maximum depth of cut (APMX).

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● : Inventory maintained.

# 415SD

## HIGH-FEED CUTTER

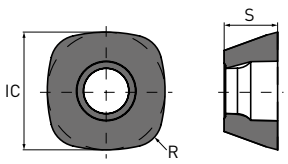
### MOUNTING DIMENSIONS

| Order number | CBDP | DAH | DCCB | DCONMS | DCSFMS | DCX | KWW | L8 | Type |
|---|---|---|---|---|---|---|---|---|---|
| 415SD-050A04AR-E | 20 | 11 | 17 | 22 | 47 | 50 | 10.4 | 6.3 | 1 |
| 415SD-050A05AR-E | 20 | 11 | 17 | 22 | 47 | 50 | 10.4 | 6.3 | 1 |
| 415SD-052A04AR-E | 20 | 11 | 17 | 22 | 47 | 52 | 10.4 | 6.3 | 1 |
| 415SD-052A06AR-E | 20 | 11 | 17 | 22 | 47 | 52 | 10.4 | 6.3 | 1 |
| 415SD-063X05AR-E | 22 | 13 | 19 | 27 | 60 | 63 | 12.4 | 7.0 | 1 |
| 415SD-063X07AR-E | 22 | 13 | 19 | 27 | 60 | 63 | 12.4 | 7.0 | 1 |
| 415SD-066X05AR-E | 22 | 13 | 19 | 27 | 60 | 66 | 12.4 | 7.0 | 1 |
| 415SD-066X07AR-E | 22 | 13 | 19 | 27 | 60 | 66 | 12.4 | 7.0 | 1 |

1/1

## INSERTS

| Order number | Class | MP9130 | NEW MV1020 | NEW MV1030 | IC | S | RE | Shape |
|---|---|---|---|---|---|---|---|---|
| SDMT125530ZEN-L | L | ● | ● | ● | 12.25 | 5.56 | 3.0 | |
| SDMT125530ZEN-M | M | ● | ● | ● | 12.25 | 5.56 | 3.0 | |
| SDMT125530ZSN-R | R | ● | ● | ● | 12.25 | 5.56 | 3.0 | |




1/1

● : Inventory maintained.

# 415SD

## HIGH-FEED CUTTER

### SPARE PARTS

| Tool holder | | | | | |
|---|---|---|---|---|---|
| | **Clamp screw** | **Flag wrench** | **Coolant nozzle** | **Standard L wrench** | **Anti-seize lubricant** |
| 415SD | TPS43 | TIP15W-E | HSD04004H12 | HKY20R | MK1KS |

1. Clamp torque (N • m): TPS43 = 3.5

### COOLANT NOZZLES ARE AVAILABLE WITH VARYING DIAMETERS FOR ADJUSTING COOLANT PRESSURE

| | | | ← Standard → | |
|---|---|---|---|---|
| | **≤ 1 Mpa (≤ 20 l/min.)** | **≥ 3 Mpa (≥ 25 l/min.)** | **≥ 5 Mpa (≥ 30 l/min.)** | **≥ 7 Mpa (≥ 50 l/min.)** |
| Nozzle Dia. | Ø 0.6 mm | Ø 0.8 mm | Ø 1.2 mm | Ø 1.6 mm |
| Order number | HSD04004H06 | HSD04004H08 | HSD04004H12 | HSD04004H16 |

# 415SD

## RECOMMENDED CUTTING CONDITIONS

### CORRECTION FACTOR BY OVERHANG LENGTH

| | DCX | Overhang length | Adjustment value | | |
|---|---|---|---|---|---|
| | | | Vc | ap | fz |
| Arbor type | 50 – 66 | <2.5xDCX | 100% | 100% | 100% |
| | | 3.0xDCX | 85% | 100% | 90% |
| | | 4.0xDCX | 80% | 80% | 80% |
| | | 5.0xDCX | 75% | 75% | 60% |
| | | 6.0xDCX | 70% | 70% | 40% |

### CUTTING SPEED / WET CUTTING

| | Material | Properties | Cutting conditions | Grade | APMX | Vc | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | ae ≤ 0.5 DC | ae ≤ 0.75 DC | ae = DC |
| S | Titanium alloy | — | ● ◐ ✲ | MP9130 | ≤ 1 | 55 (40 – 70) | 50 (35 – 65) | 45 (30 – 60) |
| | | | | MP9130 | ≤ 2 | 55 (40 – 70) | 50 (35 – 65) | 45 (30 – 60) |

1/1

NEW

### CUTTING SPEED / DRY CUTTING

| | Material | Properties | Cutting conditions | Grade | APMX | Vc | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | ae ≤ 0.5 DC | ae ≤ 0.75 DC | ae = DC |
| P | Mild steel | ≤ 180 HB | ● ◐ ✲ | MV1020 | ≤ 2 | 220 (170 – 270) | 220 (170 – 270) | 220 (170 – 270) |
| | | | | MV1030 | ≤ 2 | 140 ( 80 – 200) | 140 ( 80 – 200) | 140 ( 80 – 200) |
| | Carbon steel, Alloy steel | 180 – 280 HB | ● ◐ ✲ | MV1020 | ≤ 2 | 200 (150 – 250) | 200 (150 – 250) | 200 (150 – 250) |
| | | | | MV1030 | ≤ 2 | 120 ( 60 – 180) | 120 ( 60 – 180) | 120 ( 60 – 180) |
| | | 280 – 350 HB | | MV1020 | ≤ 2 | 150 (100 – 200) | 150 (100 – 200) | 150 (100 – 200) |
| | | | | MV1030 | ≤ 2 | 90 ( 30 – 150) | 90 ( 30 – 150) | 90 ( 30 – 150) |
| K | Ductile cast iron | Tensile strength ≤ 450 MPa | ● ◐ ✲ | MV1020 | ≤ 2 | 200 (150 – 250) | 200 (150 – 250) | 200 (150 – 250) |
| | | | | MV1030 | ≤ 2 | 140 (80 – 200) | 140 ( 80 – 200) | 140 ( 80 – 200) |
| | | Tensile strength ≤ 800 MPa | | MV1020 | ≤ 2 | 180 (130 – 230) | 180 (130 – 230) | 180 (130 – 230) |
| | | | | MV1030 | ≤ 2 | 140 (80 – 200) | 140 ( 80 – 200) | 140 ( 80 – 200) |

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Cutting conditions: ●: Stable cutting ◐: General cutting ✲: Unstable cutting

NEW

# 415SD

## RECOMMENDED CUTTING CONDITIONS

### DEPTH OF CUT / FEED PER TOOTH

| Material | | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.75 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| P | Mild steel | ≤ 180 HB | ● | | MV1020 | L | ≤ 1 | 0.9 (0.4 – 1.2) | L | ≤ 1 | 0.8 (0.4 – 1.1) | L | ≤ 1 | 0.8 (0.4 – 1.0) |
| | | | ● | | MV1030 | L | ≤ 1 | 0.9 (0.4 – 1.2) | L | ≤ 1 | 0.8 (0.4 – 1.1) | L | ≤ 1 | 0.8 (0.4 – 1.0) |
| | | | ● | | MV1020 | L | ≤ 2 | 0.8 (0.4 – 1.2) | L | ≤ 2 | 0.7 (0.4 – 1.1) | L | ≤ 2 | 0.7 (0.4 – 1.0) |
| | | | ● | | MV1030 | L | ≤ 2 | 0.8 (0.4 – 1.2) | L | ≤ 2 | 0.7 (0.4 – 1.1) | L | ≤ 2 | 0.7 (0.4 – 1.0) |
| | | | ◐ | | MV1020 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1030 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1020 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ◐ | | MV1030 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ● | | MV1020 | M | ≤ 1 | 1.2 (0.4 – 1.8) | M | ≤ 1 | 1.1 (0.4 – 1.6) | M | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ● | | MV1030 | M | ≤ 1 | 1.2 (0.4 – 1.8) | M | ≤ 1 | 1.1 (0.4 – 1.6) | M | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ● | | MV1020 | M | ≤ 2 | 1.1 (0.4 – 1.8) | M | ≤ 2 | 1.0 (0.4 – 1.6) | M | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ● | | MV1030 | M | ≤ 2 | 1.1 (0.4 – 1.8) | M | ≤ 2 | 1.0 (0.4 – 1.6) | M | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ◐ | | MV1020 | M | ≤ 1 | 1.0 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | ◐ | | MV1030 | M | ≤ 1 | 1.0 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | ◐ | | MV1020 | M | ≤ 2 | 0.9 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | ◐ | | MV1030 | M | ≤ 2 | 0.9 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | ✲ | | MV1020 | M | ≤ 1 | 1.0 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | ✲ | | MV1030 | M | ≤ 1 | 1.0 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | ✲ | | MV1020 | M | ≤ 2 | 0.9 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | ✲ | | MV1030 | M | ≤ 2 | 0.9 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | ● | | MV1020 | R | ≤ 1 | 1.5 (0.4 – 2.1) | R | ≤ 1 | 1.4 (0.4 – 1.9) | R | ≤ 1 | 1.4 (0.4 – 1.9) |
| | | | ● | | MV1030 | R | ≤ 1 | 1.5 (0.4 – 2.1) | R | ≤ 1 | 1.4 (0.4 – 1.9) | R | ≤ 1 | 1.4 (0.4 – 1.9) |
| | | | ● | | MV1020 | R | ≤ 2 | 1.4 (0.4 – 2.1) | R | ≤ 2 | 1.3 (0.4 – 1.9) | R | ≤ 2 | 1.3 (0.4 – 1.9) |
| | | | ● | | MV1030 | R | ≤ 2 | 1.4 (0.4 – 2.1) | R | ≤ 2 | 1.3 (0.4 – 1.9) | R | ≤ 2 | 1.3 (0.4 – 1.9) |
| | | | ◐ | | MV1020 | R | ≤ 1 | 1.4 (0.4 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 1 | 1.4 (0.4 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1020 | R | ≤ 2 | 1.3 (0.4 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 2 | 1.3 (0.4 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ✲ | | MV1020 | R | ≤ 1 | 1.4 (0.4 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ✲ | | MV1030 | R | ≤ 1 | 1.4 (0.4 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ✲ | | MV1020 | R | ≤ 2 | 1.3 (0.4 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ✲ | | MV1030 | R | ≤ 2 | 1.3 (0.4 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |





Cutting conditions: ●: Stable cutting ◐: General cutting ✲: Unstable cutting

## 415SD – DEPTH OF CUT / FEED PER TOOTH

| | Material | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.75 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| P | Carbon steel, Alloy steel | 180 – 280 HB | ● | | MV1020 | L | ≤ 1 | 0.7 (0.4 – 1.1) | L | ≤ 1 | 0.7 (0.4 – 1.0) | L | ≤ 1 | 0.7 (0.4 – 1.0) |
| | | | ● | | MV1030 | L | ≤ 1 | 0.7 (0.4 – 1.1) | L | ≤ 1 | 0.7 (0.4 – 1.0) | L | ≤ 1 | 0.7 (0.4 – 1.0) |
| | | | ● | | MV1020 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ● | | MV1030 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ◐ | | MV1020 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1030 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1020 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ◐ | | MV1030 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ● | | MV1020 | M | ≤ 1 | 1.0 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | ● | | MV1030 | M | ≤ 1 | 1.0 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | ● | | MV1020 | M | ≤ 2 | 0.9 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | ● | | MV1030 | M | ≤ 2 | 0.9 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | ◐ | | MV1020 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.8 (0.4 – 1.3) |
| | | | ◐ | | MV1030 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.8 (0.4 – 1.3) |
| | | | ◐ | | MV1020 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.7 (0.4 – 1.3) |
| | | | ◐ | | MV1030 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.7 (0.4 – 1.3) |
| | | | ✣ | | MV1020 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.8 (0.4 – 1.3) |
| | | | ✣ | | MV1030 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.8 (0.4 – 1.3) |
| | | | ✣ | | MV1020 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.7 (0.4 – 1.3) |
| | | | ✣ | | MV1030 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.7 (0.4 – 1.3) |
| | | | ● | | MV1020 | R | ≤ 1 | 1.4 (0.4 – 2.0) | R | ≤ 1 | 1.2 (1.0 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ● | | MV1030 | R | ≤ 1 | 1.4 (0.4 – 2.0) | R | ≤ 1 | 1.2 (1.0 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ● | | MV1020 | R | ≤ 2 | 1.3 (0.4 – 2.0) | R | ≤ 2 | 1.1 (1.0 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ● | | MV1030 | R | ≤ 2 | 1.3 (0.4 – 2.0) | R | ≤ 2 | 1.1 (1.0 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ◐ | | MV1020 | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.1 (0.8 – 1.6) | R | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ◐ | | MV1030 | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.1 (0.8 – 1.6) | R | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ◐ | | MV1020 | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.0 (0.8 – 1.6) | R | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ◐ | | MV1030 | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.0 (0.8 – 1.6) | R | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ✣ | | MV1020 | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.1 (0.8 – 1.6) | R | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ✣ | | MV1030 | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.1 (0.8 – 1.6) | R | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ✣ | | MV1020 | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.0 (0.8 – 1.6) | R | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ✣ | | MV1030 | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.0 (0.8 – 1.6) | R | ≤ 2 | 1.0 (0.4 – 1.6) |



Cutting conditions: ●: Stable cutting ◐: General cutting ✣: Unstable cutting

## 415SD – DEPTH OF CUT / FEED PER TOOTH

| Material | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.75 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ap | fz | | ap | fz | | ap | fz |
| P | Carbon steel, Alloy steel | 280 – 350 HB | | MV1020 | L | ≤ 1 | 0.6 (0.4 – 0.9) | L | ≤ 1 | 0.6 (0.4 – 0.8) | L | ≤ 1 | 0.6 (0.4 – 0.8) |
| | | | | MV1030 | L | ≤ 1 | 0.6 (0.4 – 0.9) | L | ≤ 1 | 0.6 (0.4 – 0.8) | L | ≤ 1 | 0.6 (0.4 – 0.8) |
| | | | | MV1020 | L | ≤ 2 | 0.5 (0.4 – 0.9) | L | ≤ 2 | 0.5 (0.4 – 0.8) | L | ≤ 2 | 0.5 (0.4 – 0.8) |
| | | | | MV1030 | L | ≤ 2 | 0.5 (0.4 – 0.9) | L | ≤ 2 | 0.5 (0.4 – 0.8) | L | ≤ 2 | 0.5 (0.4 – 0.8) |
| | | | | MV1020 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | | MV1030 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | | MV1020 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | | MV1030 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | | MV1020 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.8 (0.4 – 1.3) |
| | | | | MV1030 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.8 (0.4 – 1.3) |
| | | | | MV1020 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.7 (0.4 – 1.3) |
| | | | | MV1030 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.7 (0.4 – 1.3) |
| | | | | MV1020 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.7 (0.4 – 1.2) |
| | | | | MV1030 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.7 (0.4 – 1.2) |
| | | | | MV1020 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.6 (0.4 – 1.2) |
| | | | | MV1030 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.6 (0.4 – 1.2) |
| | | | | MV1020 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.7 (0.4 – 1.2) |
| | | | | MV1030 | M | ≤ 1 | 0.9 (0.4 – 1.5) | M | ≤ 1 | 0.8 (0.4 – 1.4) | M | ≤ 1 | 0.7 (0.4 – 1.2) |
| | | | | MV1020 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.6 (0.4 – 1.2) |
| | | | | MV1030 | M | ≤ 2 | 0.8 (0.4 – 1.5) | M | ≤ 2 | 0.7 (0.4 – 1.4) | M | ≤ 2 | 0.6 (0.4 – 1.2) |
| | | | | MV1020 | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.1 (0.4 – 1.6) | R | ≤ 1 | 1.1 (0.8 – 1.6) |
| | | | | MV1030 | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.1 (0.4 – 1.6) | R | ≤ 1 | 1.1 (0.8 – 1.6) |
| | | | | MV1020 | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.0 (0.4 – 1.6) | R | ≤ 2 | 1.0 (0.8 – 1.6) |
| | | | | MV1030 | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.0 (0.4 – 1.6) | R | ≤ 2 | 1.0 (0.8 – 1.6) |
| | | | | MV1020 | R | ≤ 1 | 1.1 (0.4 – 1.8) | R | ≤ 1 | 1.0 (0.4 – 1.6) | R | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | | MV1030 | R | ≤ 1 | 1.1 (0.4 – 1.8) | R | ≤ 1 | 1.0 (0.4 – 1.6) | R | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | | MV1020 | R | ≤ 2 | 1.0 (0.4 – 1.8) | R | ≤ 2 | 0.9 (0.4 – 1.6) | R | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | | MV1030 | R | ≤ 2 | 1.0 (0.4 – 1.8) | R | ≤ 2 | 0.9 (0.4 – 1.6) | R | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | | MV1020 | R | ≤ 1 | 1.1 (0.4 – 1.8) | R | ≤ 1 | 1.0 (0.4 – 1.6) | R | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | | MV1030 | R | ≤ 1 | 1.1 (0.4 – 1.8) | R | ≤ 1 | 1.0 (0.4 – 1.6) | R | ≤ 1 | 1.0 (0.4 – 1.5) |
| | | | | MV1020 | R | ≤ 2 | 1.0 (0.4 – 1.8) | R | ≤ 2 | 0.9 (0.4 – 1.6) | R | ≤ 2 | 0.9 (0.4 – 1.5) |
| | | | | MV1030 | R | ≤ 2 | 1.0 (0.4 – 1.8) | R | ≤ 2 | 0.9 (0.4 – 1.6) | R | ≤ 2 | 0.9 (0.4 – 1.5) |





Cutting conditions: ●: Stable cutting ◐: General cutting ✲: Unstable cutting

## 415SD – DEPTH OF CUT / FEED PER TOOTH

| Material | | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.75 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| K | Ductile cast iron | Tensile strength ≤ 350 MPa | ● | | MV1020 | L | ≤ 1 | 0.9 (0.4 – 1.2) | L | ≤ 1 | 0.8 (0.4 – 1.1) | L | ≤ 1 | 0.8 (0.4 – 1.1) |
| | | | ● | | MV1030 | L | ≤ 1 | 0.9 (0.4 – 1.2) | L | ≤ 1 | 0.8 (0.4 – 1.1) | L | ≤ 1 | 0.8 (0.4 – 1.1) |
| | | | ● | | MV1020 | L | ≤ 2 | 0.8 (0.4 – 1.2) | L | ≤ 2 | 0.7 (0.4 – 1.1) | L | ≤ 2 | 0.7 (0.4 – 1.1) |
| | | | ● | | MV1030 | L | ≤ 2 | 0.8 (0.4 – 1.2) | L | ≤ 2 | 0.7 (0.4 – 1.1) | L | ≤ 2 | 0.7 (0.4 – 1.1) |
| | | | ◐ | | MV1020 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1030 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1020 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ◐ | | MV1030 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ● | | MV1020 | M | ≤ 1 | 1.2 (0.4 – 1.8) | M | ≤ 1 | 1.1 (0.4 – 1.6) | M | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ● | | MV1030 | M | ≤ 1 | 1.2 (0.4 – 1.8) | M | ≤ 1 | 1.1 (0.4 – 1.6) | M | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ● | | MV1020 | M | ≤ 2 | 1.1 (0.4 – 1.8) | M | ≤ 2 | 1.0 (0.4 – 1.6) | M | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ● | | MV1030 | M | ≤ 2 | 1.1 (0.4 – 1.8) | M | ≤ 2 | 1.0 (0.4 – 1.6) | M | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ◐ | | MV1020 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ◐ | | MV1030 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ◐ | | MV1020 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ◐ | | MV1030 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ✲ | | MV1020 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ✲ | | MV1030 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ✲ | | MV1020 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ✲ | | MV1030 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ● | | MV1020 | R | ≤ 1 | 1.5 (0.4 – 2.1) | R | ≤ 1 | 1.4 (0.4 – 1.9) | R | ≤ 1 | 1.3 (1.1 – 1.9) |
| | | | ● | | MV1030 | R | ≤ 1 | 1.5 (0.4 – 2.1) | R | ≤ 1 | 1.4 (0.4 – 1.9) | R | ≤ 1 | 1.3 (1.1 – 1.9) |
| | | | ● | | MV1020 | R | ≤ 2 | 1.4 (0.4 – 2.1) | R | ≤ 2 | 1.3 (0.4 – 1.9) | R | ≤ 2 | 1.2 (1.1 – 1.9) |
| | | | ● | | MV1030 | R | ≤ 2 | 1.4 (0.4 – 2.1) | R | ≤ 2 | 1.3 (0.4 – 1.9) | R | ≤ 2 | 1.2 (1.1 – 1.9) |
| | | | ◐ | | MV1020 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1020 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ◐ | | MV1020 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1020 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |



Cutting conditions: ●: Stable cutting ◐: General cutting ✲: Unstable cutting

## 415SD – DEPTH OF CUT / FEED PER TOOTH

| Material | | Properties | Cutting conditions | Coolant | Grade | ae ≤ 0.5 DC | | | ae ≤ 0.75 DC | | | ae = DC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ap | fz | | ap | fz | | ap | fz |
| K | Ductile cast iron | Tensile strength ≤ 800 MPa | ● | | MV1020 | L | ≤ 1 | 0.9 (0.4 – 1.2) | L | ≤ 1 | 0.8 (0.4 – 1.1) | L | ≤ 1 | 0.8 (0.4 – 1.1) |
| | | | ● | | MV1030 | L | ≤ 1 | 0.9 (0.4 – 1.2) | L | ≤ 1 | 0.8 (0.4 – 1.1) | L | ≤ 1 | 0.8 (0.4 – 1.1) |
| | | | ● | | MV1020 | L | ≤ 2 | 0.8 (0.4 – 1.2) | L | ≤ 2 | 0.7 (0.4 – 1.1) | L | ≤ 2 | 0.7 (0.4 – 1.1) |
| | | | ● | | MV1030 | L | ≤ 2 | 0.8 (0.4 – 1.2) | L | ≤ 2 | 0.7 (0.4 – 1.1) | L | ≤ 2 | 0.7 (0.4 – 1.1) |
| | | | ◐ | | MV1020 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1030 | L | ≤ 1 | — | L | ≤ 1 | — | L | ≤ 1 | — |
| | | | ◐ | | MV1020 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ◐ | | MV1030 | L | ≤ 2 | — | L | ≤ 2 | — | L | ≤ 2 | — |
| | | | ● | | MV1020 | M | ≤ 1 | 1.2 (0.4 – 1.8) | M | ≤ 1 | 1.1 (0.4 – 1.6) | M | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ● | | MV1030 | M | ≤ 1 | 1.2 (0.4 – 1.8) | M | ≤ 1 | 1.1 (0.4 – 1.6) | M | ≤ 1 | 1.1 (0.4 – 1.6) |
| | | | ● | | MV1020 | M | ≤ 2 | 1.1 (0.4 – 1.8) | M | ≤ 2 | 1.0 (0.4 – 1.6) | M | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ● | | MV1030 | M | ≤ 2 | 1.1 (0.4 – 1.8) | M | ≤ 2 | 1.0 (0.4 – 1.6) | M | ≤ 2 | 1.0 (0.4 – 1.6) |
| | | | ◐ | | MV1020 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ◐ | | MV1030 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ◐ | | MV1020 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ◐ | | MV1030 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ✲ | | MV1020 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ✲ | | MV1030 | M | ≤ 1 | 1.1 (0.4 – 1.7) | M | ≤ 1 | 1.0 (0.4 – 1.5) | M | ≤ 1 | 0.9 (0.4 – 1.5) |
| | | | ✲ | | MV1020 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ✲ | | MV1030 | M | ≤ 2 | 1.0 (0.4 – 1.7) | M | ≤ 2 | 0.9 (0.4 – 1.5) | M | ≤ 2 | 0.8 (0.4 – 1.5) |
| | | | ● | | MV1020 | R | ≤ 1 | 1.5 (0.4 – 2.1) | R | ≤ 1 | 1.4 (0.4 – 1.9) | R | ≤ 1 | 1.3 (1.1 – 1.9) |
| | | | ● | | MV1030 | R | ≤ 1 | 1.5 (0.4 – 2.1) | R | ≤ 1 | 1.4 (0.4 – 1.9) | R | ≤ 1 | 1.3 (1.1 – 1.9) |
| | | | ● | | MV1020 | R | ≤ 2 | 1.4 (0.4 – 2.1) | R | ≤ 2 | 1.3 (0.4 – 1.9) | R | ≤ 2 | 1.2 (1.1 – 1.9) |
| | | | ● | | MV1030 | R | ≤ 2 | 1.4 (0.4 – 2.1) | R | ≤ 2 | 1.3 (0.4 – 1.9) | R | ≤ 2 | 1.2 (1.1 – 1.9) |
| | | | ◐ | | MV1020 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ◐ | | MV1020 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ◐ | | MV1030 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ✲ | | MV1020 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ✲ | | MV1030 | R | ≤ 1 | 1.4 (1.0 – 2.0) | R | ≤ 1 | 1.2 (0.4 – 1.8) | R | ≤ 1 | 1.2 (0.4 – 1.7) |
| | | | ✲ | | MV1020 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| | | | ✲ | | MV1030 | R | ≤ 2 | 1.3 (1.0 – 2.0) | R | ≤ 2 | 1.1 (0.4 – 1.8) | R | ≤ 2 | 1.1 (0.4 – 1.7) |
| S | Titanium alloy | — | ● | | MP9130 | L | ≤ 1 | 0.7 (0.5 – 0.9) | L | ≤ 1 | 0.6 (0.4 – 0.7) | L | ≤ 1 | 0.5 (0.3 – 0.6) |
| | | | ● | | MP9130 | L | ≤ 2 | 0.6 (0.4 – 0.8) | L | ≤ 2 | 0.5 (0.3 – 0.6) | L | ≤ 2 | 0.4 (0.2 – 0.5) |
| | | | ◐ | | MP9130 | M | ≤ 1 | 0.7 (0.5 – 0.9) | M | ≤ 1 | 0.6 (0.4 – 0.7) | M | ≤ 1 | 0.5 (0.3 – 0.6) |
| | | | ◐ | | MP9130 | M | ≤ 2 | 0.6 (0.4 – 0.8) | M | ≤ 2 | 0.5 (0.3 – 0.6) | M | ≤ 2 | 0.4 (0.2 – 0.5) |
| | | | ◐ | | MP9130 | R | ≤ 1 | 0.8 (0.6 – 1.0) | R | ≤ 1 | 0.7 (0.4 – 0.9) | R | ≤ 1 | 0.6 (0.4 – 0.8) |
| | | | ◐ | | MP9130 | R | ≤ 2 | 0.7 (0.5 – 0.9) | R | ≤ 2 | 0.6 (0.3 – 0.8) | R | ≤ 2 | 0.5 (0.3 – 0.7) |
| | | | ✲ | | MP9130 | R | ≤ 1 | 0.7 (0.5 – 0.9) | R | ≤ 1 | 0.6 (0.4 – 0.7) | R | ≤ 1 | 0.5 (0.3 – 0.6) |
| | | | ✲ | | MP9130 | R | ≤ 2 | 0.6 (0.4 – 0.8) | R | ≤ 2 | 0.5 (0.3 – 0.6) | R | ≤ 2 | 0.4 (0.2 – 0.5) |

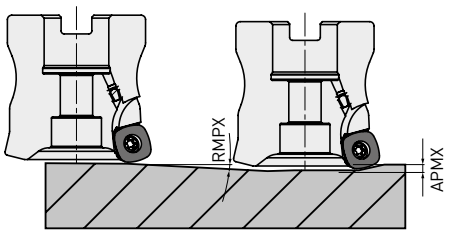


Cutting conditions: ●: Stable cutting ◐: General cutting ✲: Unstable cutting

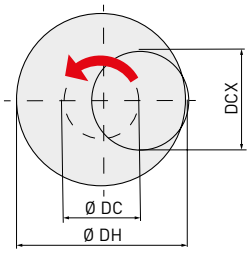
# 415SD

## MAXIMUM CAPACITIES BY MODE

**RAMPING**




**HELICAL DRILLING**




- How to derive a locus of the centre of the tool.

$$ØDC = ØDH - DCX$$

ØDC: Locus of the centre of the tool
ØDH: Desired hole diameter
DCX: Cutting Diameter Maximum

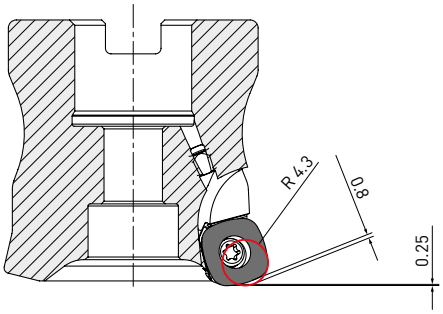
- For the depth of cut per pass, refer to the cutting conditions above for helical drilling.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

- When ramping and helical cutting, please apply a lower feed (60 % of the calculated feed rate or less).
- The long chips generated can disperse, ensure that adequate safety precautions are taken.

| Tool holder type | DCX | DC | APMX | Ramping | Helical drilling | |
|---|---|---|---|---|---|---|
| | | | | RMPX | DH | |
| | | | | | Min. | Max. |
| **ARBOR TYPE** | | | | | | |
| 41SD-050A04AR-E | 50 | 33.4 | 2 | 3 | 84 | 97 |
| 41SD-050A05AR-E | 50 | 33.4 | 2 | 3 | 84 | 97 |
| 41SD-052A04AR-E | 52 | 35.4 | 2 | 3 | 88 | 101 |
| 41SD-052A06AR-E | 52 | 35.4 | 2 | 3 | 88 | 101 |
| 41SD-063A05AR-E | 63 | 46.5 | 2 | 2 | 110 | 123 |
| 41SD-063A07AR-E | 63 | 46.5 | 2 | 2 | 110 | 123 |
| 41SD-066A05AR-E | 66 | 49.4 | 2 | 1.9 | 116 | 129 |
| 41SD-066A07AR-E | 66 | 49.4 | 2 | 1.9 | 116 | 129 |

## NOTE FOR PROGRAMMING

When using 415SD (Mplus), please programme as an RE = 4.3 radius cutter. The approximate uncut portions for the programme are as follows.



# SYMBOLS

**Recommended cutting conditions**

## APPLICATION

**Face milling**

**Chamfer milling**

**Shoulder milling with R**

**Face milling close to a wall**

**Shoulder milling**

**Side milling**

**Slot milling**

**Ramping**

**Pocket milling**

**Slot milling with R**

**Copy milling**

**T-Slot milling**

## MACHINING TYPE

**Roughing**

**Medium cutting**

**Light cutting**

**Pre-finishing**

**Finishing**

**Fine-finishing**

## TOOL MATERIAL

**Ultra micro grain carbide**
Ultra micro grain carbide substrate material.

**Cubic boron nitride**
Mitsubishi Materials' original CBN material.

**Ceramic**
For high speed efficient machining of super alloys due to the excellent high temperature strength property.

**High hardness powder metallurgy HSS**
High hardness powder metallurgy HSS substrate material.

**High grade high alloy HSS**
High grade high alloy HSS substrate material.

**Cobalt high speed steel**
Cobalt high speed steel substrate material.

**High speed steel**
High speed steel substrate material.

## COATING

**SMART MIRACLE coating**
New smooth and dense coating technology for high efficiency milling of difficult to cut materials.

**CRN coating**
Newly developed CrN coating for Copper Electrodes machining.

**Violet coating**
Increased tool life of 2-3 times more than TiN coated products.

**DP coating**
New generation coating suitable for a wide range of materials.

**MIRACLE coating**
The original Miracle (Al,Ti)N coating.
Also suitable for dry cutting.

**(Al, Ti)N coating**
(Al,Ti)N highly versatile application range.

**(Al,Ti,Cr)N multi-layer coating**
For carbon, alloy and hardened steels.

**IMPACT MIRACLE coating**
Single phase nano crystal coating technology has higher film hardness and heat resistance.

**MIRACLE coating**
The original MIRACLE (Al,Ti)N coating.
Also suitable for dry cutting.

**VFR coating**
The (AlCrSi)N/(AlTiSti)N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.

**DLC coating**
Hardness similar to CVD diamond coating achieved with high adhesion strength.

**Diamond coating**
Suitable for CFRP and CFRP-aluminium materials.

**Diamond coating**
Suitable for graphite machining.

**Diamond coating**
The original CVD diamond coating.

**CVD Diamond coating**
Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

## CUTTING EDGE PROPERTIES

**Sharp corner edge**
Indicates the end mill has a sharp corner edge.

**Gash land**
Indicates the end mill cutting edge has a protective chamfer.

**Rake angle**

**Helix angle**
Indicates the helix angle of the end mill.

**Point angle**
Indicates the drill point angle.

**Roughing flute geometry**

**Variable helix**

**Rounded gash**

**Corner angle**

## WEB THINNING

**X type point geometry**
X web thinning used at the drill point.

**XR type point geometry**
XR web thinning used at the drill point.

**S type point geometry**
Easy cutting geometry.

**N type point geometry**
Effective when the point web is thick.

**Chipbreaker**

# SYMBOLS

| TOLERANCES | |
|---|---|
| | **Tolerance of taper angle**<br>Indicates the tolerance of the taper angle. |
| | **R tolerance**<br>Indicates the radial tolerance of a ball nose end mill. |
| | **R tolerance**<br>Indicates the radial tolerance of the corner radius. |
| | **R tolerance**<br>Indicates the radial tolerance of a cutter with a corner radius. |
| | **Outside diameter tolerance**<br>Indicates the diameter tolerance of the end mill. |
| | **Peak tolerance**<br>Indicates the tolerance for the end diameter. |
| | **Shank diameter tolerance** |
| | **Shank diameter tolerance** |
| | **Drill tolerance / diameter** |
| **COOLANT HOLES** | |
| | **External coolant** |
| | **Internal coolant** |
| | **Internal coolant** |
| | **Centered, internal coolant hole** |
| | **Radial, internal coolant holes** |
| | **Internal coolant holes** |
| | **Internal coolant holes** |

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